

Columbia County

Multi Jurisdiction

Natural Hazard Mitigation Plan

2020



Columbia County
Department of
Emergency Management

Contents

Introduction	1
Structure	1
The Basic plan	1
The Jurisdiction Annexes	1
Prerequisites	1
Community Description	1
Planning Process	2
Hazard Analysis	2
Vulnerability Analysis.....	2
Mitigation Strategy	2
Appendices.....	2
Hazard Mitigation Assistance	2
Hazard Mitigation Planning	2
Local Mitigation Planning Requirements.....	3
Grant Programs Requiring Hazard Mitigation Plans.....	3
Hazard Mitigation Grant Program	4
Pre-Disaster Mitigation Program	4
Flood Mitigation Assistance Grant Program.....	4
Planning Area Definition and Participating Jurisdictions.....	4
Columbia County Mitigation Planning Overview.....	5
Initial Planning Processes, 1998-2005	5
2009 Plan Update.....	5
2014 Hazard Mitigation Plan Update.....	6
2020 Hazard Mitigation Plan Update.....	6
Community Description	6
History and geography.....	6
Development.....	7
Demographics	7
Hazard Profile.....	8
Introduction	8
Narrative Hazard Profiles.....	10

Flood	10
Winter Storm	15
Landslide	19
Wildfires	22
Earthquake	27
Volcano	30
Wind	33
Erosion	36
El Niño/Southern Oscillation.....	39
Expansive Soils	41
Drought	43
Participating Jurisdictions	45
Columbia County.....	46
Cities.....	46
City of St. Helens	46
City of Scappoose.....	46
City of Columbia City.....	46
City of Clatskanie.....	46
City of Rainier	46
City of Vernonia	46
City of Prescott.....	46
Districts	46
Mist-Birkenfeld Rural Fire Protection District	46
Greater St. Helens Aquatic District	46
Scappoose Drainage Improvement District	46

Introduction

This Multi-Jurisdiction Hazard Mitigation Plan has been prepared for Columbia County Oregon, its incorporated jurisdictions, districts and special districts. The plan assesses the probability of hazard occurrence and local vulnerabilities then establishes goals, objectives, and strategies for natural hazard mitigation. It identifies resources for implementing the mitigation strategies and establishes processes, procedures, and responsibilities for periodically reviewing the plan, evaluating its effectiveness, and making adjustments throughout its five-year life.

Hazard mitigation is defined by 44 CFR 201.2 as any sustained action taken to reduce or eliminate the long-term risk to human life and property from hazards. Hazard mitigation is the responsibility of individuals, private businesses and industries, state and local governments, and the federal government. Engaging in mitigation actions provides the state, counties, cities, businesses, and citizens with several benefits: fewer injuries and deaths; less damage to buildings, critical facilities, and infrastructure; diminished interruption in essential services; reduced economic hardship; minimized environmental harm; and quicker, lower-cost recovery

Structure

This Multi-Jurisdiction Hazard Mitigation Plan consists of three components:

The Basic plan

This section defines the planning area and identifies the plan participants, describes the plan contents, federal regulations, grant programs that require an HMP and a review of the County's mitigation planning history. In addition, the Basic Plan offers a community description and documents the County wide Hazard profile that is used by each Jurisdiction Annex to inform their vulnerability analyses and mitigation strategies.

The Jurisdiction Annexes

The County and each of the cities and districts participating in this plan has its own annex. Each annex is essentially a standalone Hazard Mitigation Plan with a methodology and a detailed county Hazard Profile acting as shared elements from the basic plan. Each Annex will utilize the following layout:

Prerequisites - This section addresses the prerequisites of plan adoption, which include adoption by the governing body of each participating jurisdiction. Adoption resolutions for each jurisdiction are included in the Appendices.

Community Description - This section provides more detailed history and background of the communities and unincorporated areas of Columbia County,

Columbia County NHMP – Basic Plan

including historical trends for population and the demographic and economic conditions that have shaped the area.

Planning Process - This section describes the planning process and identifies the Steering Committee members, the meetings held as part of the planning process, and the key stakeholders within the county and surrounding region. In addition, this section documents public outreach activities, public meetings and the review and incorporation of relevant plans, reports, and other appropriate information.

Hazard Analysis - This section provides an opportunity for each jurisdiction to expand on the shared Hazard Profile documented in the Basic Plan, by providing specific recognition of certain hazards and historical events.

Vulnerability Analysis - This section identifies potentially vulnerable assets—people, residential and nonresidential buildings dwelling units, RL properties, critical facilities, and critical infrastructure—in the incorporated cities and unincorporated areas of the county. These data were compiled by assessing the potential impacts from each hazard using Geographic Information System (GIS) and community provided information. The resulting information identifies the full range of hazards that the incorporated cities and unincorporated areas of the county could face and potential impacts, damages, and (where data was available) economic losses.

Mitigation Strategy - The mitigation strategy provides a plan for reducing the potential losses identified in the vulnerability analysis. Each jurisdictions Steering Committee developed a list of mitigation goals and potential actions to address the risks facing Columbia County and the seven incorporated communities. All hazard mitigation actions and strategies include NFIP compliance, preventive actions, property protection techniques, natural resource protection strategies, structural projects, emergency services, and public information and awareness activities. The Steering Committees selected relevant mitigation actions and strategies to implement countywide.

Each section of the Jurisdiction Annexes is prefaced with the federal Planning Requirements and Planning Elements as documented in the FEMA Local Mitigation Plan Review Guide.

Appendices

This section is reserved for the addition of reference documentation, provision of annual review worksheets and a section aggregating the local resolutions adopting the plan.

Hazard Mitigation Assistance

Hazard Mitigation Planning

Hazard mitigation, as defined in Title 44 of the Code of Federal Regulations (CFR), Part 201.2, is “any action taken to reduce or eliminate the long-term risk to human life and property from natural hazards.” Many areas have expanded this definition to include human-caused hazards.

Columbia County NHMP – Basic Plan

As such, hazard mitigation is any work done to minimize the impacts of any type of hazard event before it occurs. It aims to reduce losses from future disasters. Hazard mitigation is a process in which hazards are identified and profiled, people and facilities at risk are analyzed, and mitigation actions are developed. The implementation of the mitigation actions, which include long-term strategies that may include planning, policy changes, programs, projects, and other activities, is the result of this process.

Local Mitigation Planning Requirements

Local hazard mitigation planning is driven by Federal law. On October 30, 2000, Congress passed the Disaster Mitigation Act of 2000 (DMA 2000) (P.L. 106-390) which amended the Robert T. Stafford Disaster Relief and Emergency Assistance Act (Stafford Act) (Title 42 of the United States Code [USC] 5121 et seq.) by repealing the act's previous mitigation planning section (409) and replacing it with a new mitigation planning section (322). This new section emphasized the need for State, Tribal, and local entities to closely coordinate mitigation planning and implementation efforts. In addition, it provided the legal basis for the Federal Emergency Management Agency's (FEMA) mitigation plan requirements for mitigation grant assistance.

To implement these planning requirements, FEMA published an Interim Final Rule in the *Federal Register* on February 26, 2002 (FEMA 2002a), 44 CFR Part 201 with subsequent updates. The planning requirements for local entities are described in detail in Section 2 and are identified in their appropriate sections throughout this MHMP.

FEMA's October 31, 2007 changes to 44 CFR Part 201 combined and expanded flood mitigation planning requirements with local mitigation plans (44 CFR §201.6). All hazard mitigation assistance program planning requirements for HMGP, PDM, FMA, SRL and potentially RFC programs were combined eliminating duplicated mitigation plan requirements. It also required participating NFIP communities' risk assessments and mitigation strategies to identify and address repetitively flood-damaged properties. Under 44 CFR §201.6. Local mitigation plans now qualified communities for federal Hazard Mitigation Assistance.

44 CFR §201.6 offers additional requirements for participation in the process: The risk assessment must assess each jurisdiction's risk where they may vary from the risks facing the entire planning area, there must be identifiable action items specific to the jurisdiction requesting FEMA approval or credit of the plan, and each jurisdiction requesting approval of the plan must document that it has been formally adopted.

Grant Programs Requiring Hazard Mitigation Plans

All FEMA grant programs provide funding to States, Tribes, and local entities that have a FEMA-approved State or Local Mitigation Plan.

Columbia County NHMP – Basic Plan

Hazard Mitigation Grant Program

This program is authorized by Section 404 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act, as amended (the Stafford Act), Title 42, United States Code (U.S.C.) 5170c. The purpose of HMGP is to help communities implement hazard mitigation measures following a Presidential Major Disaster Declaration in the areas of the state, tribe, or territory requested by the Governor or Tribal Executive. The key purpose of this grant program is to enact mitigation measures that reduce the risk of loss of life and property from future disasters. FEMA offers a variety of disaster assistance programs with different eligibility requirements. HMGP provides funds to states, tribes, and local communities after a disaster declaration to protect public or private property through various mitigation measures. Hazard mitigation includes long-term efforts to reduce the impact of future events. HMGP recipients (states, Federally-recognized tribes, or territories) have the primary responsibility for prioritizing, selecting, and administering state and local hazard mitigation projects.

Pre-Disaster Mitigation Program

This program is authorized by Section 203 of the Stafford Act, 42 U.S.C. 5133. The PDM program is designed to assist States, Territories, Indian Tribal governments, and local communities to implement a sustained pre-disaster natural hazard mitigation program to reduce overall risk to the population and structures from future hazard events, while also reducing reliance on Federal funding from future disasters. The program awards planning and project grants and provides opportunities for raising public awareness about reducing future losses before disaster strikes. Mitigation planning is a key process used to break the cycle of disaster damage, reconstruction, and repeated damage. PDM grants are funded annually by Congressional appropriations and are awarded on a nationally competitive basis.

Flood Mitigation Assistance Grant Program

The FMA program is authorized by Section 1366 of the National Flood Insurance Act of 1968, as amended with the goal of reducing or eliminating claims under the National Flood Insurance Program (NFIP). FMA provides funding to States, Territories, federally-recognized tribes and local communities for projects and planning that reduces or eliminates long-term risk of flood damage to structures insured under the NFIP. FMA funding is also available for management costs. Funding is appropriated by Congress annually. FEMA requires state, tribal, and local governments to develop and adopt hazard mitigation plans as a condition for receiving certain types of non-emergency disaster assistance, including funding for HMA mitigation projects.

Planning Area Definition and Participating Jurisdictions

This plan has been prepared by Columbia County, Oregon and covers the jurisdictions, governments, and districts located within its boundaries. The Columbia County MJHMP assesses risk in unincorporated Columbia County, the Cities of Scappoose, St. Helens, Columbia City, Rainier, Prescott, Clatskanie, and Vernonia.

Columbia County NHMP – Basic Plan

For the first time, several special purpose districts are also participating in this Hazard Mitigation Plan update. These districts have substantial administrative and fiscal independence, and their considerable risk to natural hazards allow a valid assessment relative to the other jurisdictions. The districts participating in this update are St. Helens School District, Mist Birkenfeld Rural Fire Protection District, and Scappoose Drainage Improvement District

Columbia County Mitigation Planning Overview

Initial Planning Processes, 1998-2005

In 1997 Columbia County was the first county in Oregon to begin the development of a complete (in 1998) a Hazard Mitigation plan – anticipating the requirement of the Disaster Mitigation Act of 2000 by two years.

In 2005, the Columbia County Director of Emergency Management, under direction from the County Commissioners, expanded the original Steering Committee to include, not only County agencies, but also city agencies, public safety agencies, private organizations, and businesses broadening countywide citizen involvement. The newly expanded Steering Committee collaboratively worked to evaluate and update the 1998 Natural Hazards Mitigation Plan to fulfill newly developed DMA 2000 requirements ultimately adopting it as the 2005 Natural Hazards Mitigation Plan (2005 HMP).

The 2005 HMP Steering Committee consisted of a county level commissioner, emergency management, road department, land development staff, city public works, police, fire and rescue, 911 communications staff, State forestry, fire district personnel and a consultant.

The 2005 HMP formed the basis for the County's All Hazard Mitigation Planning focus -- identifying five far-reaching planning goals with supporting objectives, and corresponding action items. This process refined goal achievement with a matrix to delineate coordinating and partner organizations, timelines, and lists the specific planning goals addressed by each action item.

The plan listed several mitigation actions to reduce or prevent damage and losses from natural hazards. However, limited resources prevented developing specific actions or assigning responsible entities to undertake project development and completion.

2009 Plan Update

The 2009 Columbia County Multi-Jurisdictional Hazard Mitigation Plan update was intended to: include newly identified hazards affecting individual jurisdictions; provide a comprehensive risk assessment and vulnerability analysis; provide community-based mitigation actions; identify funding sources; and include all incorporated jurisdictions within the county as part of the update.

FEMA provided technical assistance to facilitate developing this MHMP. This includes updating the portions of the existing plan for the unincorporated areas within the County as well as

Columbia County NHMP – Basic Plan

including the incorporated cities (the Cities of Clatskanie, Columbia City, Prescott, Rainier, Scappoose, and Vernonia). The City of Vernonia’s portion of this plan also addresses update requirements as part of bringing all of the cities under one Multi-Jurisdictional plan.

The 2009 planning effort was a comprehensive and technical substitution of the county’s previous HMP. The plan has served successfully to guide previous and ongoing mitigation efforts in the county and provided the basis for the subsequent hazard mitigation planning effort.

2014 Hazard Mitigation Plan Update

Unlike the 2009 effort this update did not rely on the services of an outside contractor – the entire effort was conducted ‘in house’. This decision was made based on the quality of the product that the county adopted in 2009. Resultantly, while that plan forms the template for the 2014 effort, significant changes were made throughout the basic plan and the county and jurisdictional appendices.

2020 Hazard Mitigation Plan Update

The 2020 planning effort demonstrated another evolution of the County’s Hazard Mitigation Plan as the former plan has been thoroughly reformatted in the interest of making the process as clear and as simple to attract as many cities and districts to the process as possible. The process that produced this plan was conducted with broad public input for each annex that makes up the plan. Again, this plan update process was conducted “in-house” and did not utilize consultation services to provide technical or staff support for the process.

Community Description

History and geography

Columbia County, named for the Columbia River, was created in 1854 from the northern half of Washington County. It encompasses 687 square miles and is bounded on the north and east by 62 miles of the Columbia River. It is bordered on the west by Clatsop County and on the south by Washington and Multnomah Counties. Columbia County is Oregon’s third smallest county and the sixteenth county to be formed.

Columbia County lies within the marine west coast climate zone. Summers are warm and dry with clear skies, with July averaging 68.4° Fahrenheit (F). Winters can be mild to chilly with January averaging 39°F, and very wet; the rainfall averages 44.6 inches per year. Columbia County averages 155 days of measurable precipitation a year. Snow occurs frequently in the coastal range and the County can experience major snow and ice storms as cold air patterns flow from the Columbia River Gorge. The county’s winter snowfall totals range from negligible to a high of 60.9 inches. The County’s lowest temperature was –3°F on February 2, 1950; the highest temperature reached 107°F on July 29, 1965, August 8, 1981, and August 10, 1981.

Columbia County NHMP – Basic Plan

The Lewis and Clark expedition traveled through Columbia County on its way to the Pacific Ocean. Early fur traders settled the County in 1810 and many settlers came to the heavily forested region as immigrants seeking adventure and lush farmland. Other inhabitants left Washington State because of ongoing Indian wars. These emigrants sought safer locations on the other side of the Columbia River arriving in what is now St. Helens and Columbia City.

The primary industries of private sector employment within Columbia County are manufacturing, retail trade, energy and health services. The county was once covered by old growth timber, which was completely logged over by the 1950s. Now second growth timber provides the raw material for regional lumber and paper mills.

Development

Since the 2008 nationwide financial crisis, development of residential areas of Columbia County and its incorporated cities has been slowly recovering. However, construction levels have not yet returned to their former pace. The result is that relatively little residential development has occurred in the county since the 2009 plan. In this regard, this updated plan has only made minor changes in its hazard and vulnerability assessments regarding new residential development.

The same is not true for industrial developments in the County. While new physical infrastructure construction (factories, refineries, etc.) has been flat, the commodity flow into these areas has increased. In addition, in March of 2014 the Columbia County Board of County Commissioners approved the rezoning of 737 acres adjacent to the Port Westward industrial park. This ordinance re-zoned the area as Rural Industrial Planned Development, though no new construction has been carried out on the area. Despite this the area remains a focus of mitigation planning for the county and the adjacent local jurisdiction.

Demographics

Understanding the population and certain of its characteristics help identify actions that can be taken to reduce the impacts of a disaster before it occurs. The population of Columbia County is located largely in low-lying areas along the Columbia River. The County's population is growing slowly except in the Southeastern corner, closest to the Portland Metropolitan area where significantly increased housing prices are driving working commuters to seek bargains in a rural setting.

Jurisdiction	2010 Census population*	2018 Estimate**	Percent Change
Columbia County	49,351	51,900	+5.1%
Clatskanie	1,737	1765	+1.6%
Columbia City	1,946	1,985	+2.0%
Rainier	1,895	1,925	+1.5%
St Helens	12,883	13,240	+2.8%

Columbia County NHMP – Basic Plan

Jurisdiction	2010 Census population*	2018 Estimate**	Percent Change
Scappoose	6,592	7,200	+9.2%
Vernonia	2,151	2,065	-4.0%

*US Census Bureau, 2011–2015 American Community Survey (<https://factfinder.census.gov/>)

**Portland State University, Population Research Center (<https://www.pdx.edu/prc/population-reports-estimates>)

Hazard Profile

Introduction

A description of Columbia County's Hazard profile has been accomplished by describing hazards in terms of their nature, history, magnitude, frequency, location, and probability. Hazards are identified through the collection of historical and anecdotal information, review of existing plans and studies, and preparation of hazard maps of the study area.

The Homeland Security and Emergency Management Commission (HSEMC), which acts as the steering committee for the County Hazard Mitigation Plan Annex (See Columbia County Annex), identified 16 hazards that could affect Columbia County and the participating jurisdictions. They evaluated and screened the comprehensive list of potential hazards based on a range of factors, including prior knowledge or perception of the relative risk presented by each hazard, the ability to mitigate the hazard, and the known or expected availability of information on the hazard. The table below indicates the HSEMC members determined that 2 hazards pose no risk as they have no historical precedent are unlikely to occur in the future.

Natural Hazards		
Hazard Type	Included	Explanation
Erosion (Riverine & Tributary)	Yes	Columbia County is located inland and is not subject to coastal erosion. Riverine and tributary erosion occurs throughout the county in localized areas.
Drought	Yes	Along with the entire State of Oregon, Columbia County is subject to impacts associated with drought.
Earthquake	Yes	Columbia County is located within the geographical area bordering the Cascadia Subduction Zone, and its geography contains crustal faults. The county is subject to impacts associated with earthquakes.
El Niño / La Niña	Yes	Historic El Niño / La Niña patterns have been observed affecting weather patterns throughout the state.
Expansive Soils	Yes	Expansive soils occur in Columbia County.
Tornado	Yes	Though there have only been a few incidents of unverified tornadic activity, tornadoes have been known to occur in neighboring jurisdictions.
Flood	Yes	Historic flooding has been identified as occurring throughout Columbia County.

Columbia County NHMP – Basic Plan

Natural Hazards		
Hazard Type	Included	Explanation
Landslide/Debris Flow	Yes	Columbia County is vulnerable to slope instability, especially after prolonged rainfalls.
Volcano	Yes	Columbia County is located in the vicinity of active volcanoes.
Wind	Yes	Columbia County's geography and vegetation, makes it vulnerable to high winds.
Winter Storm	Yes	Winter storms in Columbia County result in several natural hazards – including floods, ice formations, snow, and wind. This hazard is the most frequent cause of large disasters in the county.
Wildland/Urban Fire	Yes	The terrain, vegetation, and weather conditions in the region are favorable for the ignition and rapid spread of wildland fires in Columbia County. Historic downtowns, and dense development in many towns, along with dense forest growth right up to city boundaries, make many cities in the county vulnerable to Wildland/Urban Interface fires.
Dust Storm	No	There are no historical records of dust-storms in the county; there is little risk from this hazard to any portion of the jurisdiction.
Tsunami	No	Columbia county lies inland from the pacific coast of Oregon and thus is not vulnerable to Tsunami risk. It is possible that some localized flooding could occur as a result of seismic energy producing seiche in the Columbia River and Multnomah Channel, but the risk is considered too low or uncertain for mitigation planning.

In addition, the Columbia County Department of Emergency Management produced the following Hazard Analysis Matrix to inform its emergency operations plan.

Columbia County Hazard Analysis Matrix					
Hazard	Rating Criteria with Weight Factors				Total Score
	History ¹ (WF=2)	Vulnerability ² (WF=5)	Max Threat ³ (WF=10)	Probability ⁴ (WF=7)	
Rating Factor (High = 10 points; Moderate = 5 points; Low = 1 point) X Weight Factor (WF)					
Earthquake	10	100	100	7	217
Wildland/Urban Fire	10	50	10	35	105
Flood	20	100	100	70	290
Hazardous Materials	10	50	50	70	180
Transportation Accident	20	50	50	70	190
Severe Weather	20	100	100	35	255
Multiple Casualty Incident	20	10	10	70	110
Public	10	50	100	70	240

Columbia County NHMP – Basic Plan

Columbia County Hazard Analysis Matrix					
Hazard	Rating Criteria with Weight Factors				Total Score
	History ¹ (WF=2)	Vulnerability ² (WF=5)	Max Threat ³ (WF=10)	Probability ⁴ (WF=7)	
Rating Factor (High = 10 points; Moderate = 5 points; Low = 1 point) X Weight Factor (WF)					
Violence/Terrorism					
Volcanic Eruption	2	50	50	7	109
Drought	10	10	50	35	105
Notes:					
1. History addresses the record of previous major emergencies or disasters. Weight Factor is 2. Rating factors: high = 4 or more events in last 100 years; moderate = 3 events in last 100 years; low = 1 or 0 events in last 100 years. 2. Vulnerability addresses the percentage of population or property likely to be affected by a major emergency or disaster. Weight Factor is 5. Rating factors: high = more than 10% affected; moderate = 1%-10% affected; low = less than 1% affected. 3. Maximum Threat addresses the percentage of population or property that could be affected in a worst-case incident. Weight Factor is 10. Rating factors: high = more than 25% could be affected; moderate = 5%-25% could be affected; low = less than 5% could be affected. 4. Probability addresses the likelihood of a future major emergency or disaster within a specified period of time. Weight Factor is 7. Rating factors: high = one incident within a 10-year period; moderate = one incident within a 50-year period; low = one incident within a 100-year period.					
Source: Columbia County Emergency Operations Plan 2018					

Narrative Hazard Profiles

The narrative hazard profiles are intended to provide a comprehensive assessment on the hazards that can impact Columbia County. They include definitions of the hazards, their history extent and locations within the county, and the probability of future events. This section is meant to support each of the annexes that comprise the jurisdictional nature of this plan. However, additional information is provided in each annex to provide jurisdiction specific examples of the nature and local impact of these hazards.

Flood

A flood is the temporary inundation of water or mud on normally dry land. Heavy or prolonged rain, snowmelt, or dam collapse can cause inundation. In Columbia County floods usually are the result of major weather systems that cause flooding of smaller streams that flow into major rivers. This type of flood and inundation of the natural floodplains of the river system is a part of the natural process. Development in or near the floodplain puts lives and property at risk.

Areal, Urban, and Riverine flooding primarily affect Columbia County.

Areal Flooding - The National Weather Service defines an Areal Flood Warning as; flooding that develops more gradually, usually from prolonged and persistent moderate to heavy rainfall. This results in a gradual ponding or buildup of water in low-lying, flood prone areas, as well as small creeks and streams. The flooding normally occurs more than six hours after the rainfall begins and may cover a large area. However, even though this type of flooding develops more slowly than flash flooding, it can still be a threat to life and property. This type of flooding is very common in Columbia County.

Columbia County NHMP – Basic Plan

Urban Flooding - Urban flooding occurs in developed areas where the amount of water generated from rainfall and runoff exceeds the storm water systems' capacity. As land is converted from agricultural and forest to urban uses, it often loses its ability to adsorb rainfall. Rain flows over impervious surfaces such as concrete and asphalt and into nearby storm sewers and streams. This runoff can result in the rapid rise of floodwaters. During urban floods, streets can become inundated, and basements can fill with water. Storm drains often back up because of the volume of water and become blocked by vegetative debris like yard waste, which can cause additional flooding. Development in the floodplain can raise the base flood elevation and cause floodwaters to expand past their historic floodplains.

Riverine Flooding - Riverine or overbank flooding of rivers and streams is the most common type of flood hazard. Riverine flooding most frequently occurs in winter and late spring. Air rises and cools over the Coast Range and its foothills and heavy rainfall develops over high-elevation streams, as storms move from the Pacific across the Oregon Coast. In this region, as much as four to six inches of rain can fall over a 24-hour period. Severe and prolonged storms can raise rivers and streams to their flood stages for three to four days or longer. (State of Oregon 2015)

Flash Flooding - Flash floods were not identified as occurring in Columbia County as part of this planning process as typical incident events do not fulfill scientifically defined flashflood parameters.

These types of flood damage can include:

- Structure inundation
- Erosion of stream banks, road embankments, foundations, footings for bridge piers and other features
- Impact damage from high-velocity flow and from debris
- Additional debris damage from accumulation on or blockage of infrastructure
- Cropland destruction
- Sewage and hazardous or toxic materials releases from damaged pipelines, tanks, and facilities
- Economic loss (local facilities, utilities, communications, agriculture)

History

Several very destructive floods have been recorded in Columbia County, as well as much of western Oregon, throughout the years. Between 1955 and 1999, Oregon ranked eleventh nationally for flood losses, with more than \$197 million in annual damages. The county lies between the Coastal Range and the Cascade Range, in topography rich with rivers and tributaries. Because of this topography, melting snow and heavy winter rains can combine to produce devastating flood events. Floods along the Columbia River itself are in many places limited by the high, steep banks of the river, which contain most floodwaters to a narrow band. However, other waterways exceed their banks more easily. (Columbia County Department of Emergency Management, 2014)

Columbia County NHMP – Basic Plan

1948 A flood covered eight drainage districts, inundated the industrial port of St. Helens, and much of Clatskanie's central business district.

1964 Nearly every river in the state of Oregon exceeded its flood stages as weather stations set new records for precipitation. Known as the Christmas Flood, the event triggered debris flows, bridge failures and flooding that caused thousands to evacuate and closed airports, railways and hundreds of miles of roads across the state. Ultimately, the event caused more than \$157 million in damages and 20 people were killed.

1972, and 1974 the Nehalem River, Scappoose Creek, North Scappoose Creek, Clatskanie River, Conyers Creek, and McNulty Creek were all subject to winter flooding. (Columbia County Department of Emergency Management, 2014)

1987 a major flood of Scappoose Creek inundated many homes in Scappoose. (Columbia County Department of Emergency Management, 2014)

1996 Virtually every county in the state received a disaster declaration due to a combination of warm temperatures, heavy snow pack and four days of record-breaking rain. Many areas had already received above-average rainfall, meaning rivers were at or reaching their capacities and flood stages. Recent logging activities contributed to increased runoff, resulting in atypical sediment and debris, which made conditions ripe for flooding and landslides. Hundreds of homes were destroyed, power outages were widespread, thousands were evacuated to public shelters and five people died. Some estimates of flood-related damages exceeded \$1 billion. Later that year, in November, a tropical air mass swept across the state, once again bringing record-breaking precipitation. The stormy weather continued into December and early January as 26 major rivers reached flood stage. Snowmelt and intense rain caused extensive flooding that led to widespread landslides, erosion, power outages, damaged homes and businesses, closed roads and eventually resulted in a Presidential Disaster Declaration. (FEMA 2019a)

In Columbia County, there were widespread road closures due to high water and landslides, including the Scappoose-Vernonia Road and highways 30 and 47 in several places. At the peak of the flood, all major highways were closed and those secondary roads that were open were restricted to emergency vehicles. Road closures isolated Vernonia and Clatskanie. Much of these two communities as well as parts of Scappoose, St. Helens and Rainier had to be evacuated. A boil-water alert was in effect for most of the county, and telecommunications, including some emergency communications, were disrupted. FEMA disbursed repair and response totaling more than \$5,000,000 to public entities, and the Oregon Economic Development Department funded nearly \$1,000,000 in Disaster Recovery Grants. Damages to private property were estimated at more than \$5,000,000. Extensive as the 1996 flood was, much larger floods are possible in Columbia County.

2007 Severe storms, winds, mudslides, landslides, and flooding occurred between December 1 and 17, 2007 shutting down roads and highways including Interstate 5. Public infrastructure, homes, and personal property were damaged. In Oregon, 73,000 residents were without power, and wastewater treatment plants were overwhelmed. A major disaster was declared

Columbia County NHMP – Basic Plan

for the State of Oregon on December 8, 2007 with Columbia County included in the declaration. Coastal river flooding was estimated at or above the 25-year stage and compared to that of the 1964 and 1996 flood events.

The December storm flooded over 750 residences with 340 of those located in the City of Vernonia alone. 220 Vernonia homes were more than 50% damaged, and 34 greater than 70% damaged with an estimated \$16.5 million in losses. March 2008 FEMA disaster aid was estimated at approximately \$20 million including:

- \$6,051,729 in individual assistance approved
- \$10,957,500 in low-interest disaster loan assistance approved to homeowners, renters and businesses of all sizes
- \$3,157,918 in public assistance obligated
- 3,569 individuals registered for assistance
- 3,864 individuals visited Disaster Recovery Centers
- 2,014 home inspections completed

2015 In December a series of heavy rainfalls only previously saturated ground created flooding conditions in portions of the county. In Vernonia the Nehalem river crested above 13.5 feet as heavy rains continued to fall in the Nehalem drainage just south of Highway 26. Though a large portion of the city was inundated, and some damage was reported, mitigation efforts conducted after the 2007 flood event proved remarkably successful at minimizing impact. In Clatskanie high tide cycles produced flooding along the Clatskanie river as hydrologic damming forced water out of the banks, several properties and a large mobile home community were severely impacted. (Columbia County Department of Emergency Management, 2015)

Location

Columbia County is subject to flooding from river overflow (the Columbia River, Multnomah Channel, rivers such as the Nehalem and Clatskanie rivers) and lesser waterways (including Conyers, McNulty, Milton, Rock, and Scappoose creeks); as well as flooding from local storm water drainage. Between October and April, the county is susceptible to winter rain flooding, while between May and July, snowmelt and runoff can create floods. Typically, the most severe floods are winter rainfall floods in December, January and February.

Flood control storage reservoirs have substantially reduced flood potential along the Columbia River and other major waterways. Upstream of Columbia County, the Columbia River has 22 major reservoirs (representing 40 million acre-feet of flood storage), the Willamette River has 11 major reservoirs (1.7 million acre-feet), and the Cowlitz River, one (360,000 acre-feet). The Lewis River has three reservoirs (12,420 acre-feet). These reservoirs have reduced, but not eliminated flood potential. (American Rivers, 2017)

Extent

Floods are described in terms of their extent (including the horizontal area affected and the vertical depth of floodwaters) and the related probability of occurrence. Flood studies often use historical records, such as stream flow gauges, to determine the probability of occurrence for floods of different magnitudes.

FEMA has mapped most of the flood-prone streams in Oregon for 100- and 500-year flood events. A 100-year flood (one percent probability of occurring within any given year) is used as the standard for floodplain management in the United States and is referred to as a base flood. Flood Insurance Rate Maps (FIRMs) prepared by FEMA provide the most readily available source of information for 100-year floods. These maps are used to support the NFIP. FIRMs delineate 100- and 500-year (two percent probability of occurring in a given year) floodplain boundaries for identified flood hazards; these areas are Special Flood Hazard Areas (SFHAs) and provide the basis for flood insurance and floodplain management requirements.

Columbia County contains a total of 82.2 square miles within the 100-year floodplain, and 103.8 square miles within the 500-year floodplain. The 500-year event floodplain generally encompasses slightly more area than a 100-year event. Each watershed has its own water absorption characteristics. Buildings, roads, and parks replace grass and soil with asphalt or other non-absorbing materials, which limit or prevent water absorption. Therefore, 500-year events contain more water, which spreads further throughout the floodplain until the water can be managed by manmade and natural drainage systems. (Columbia County Department of Emergency Management, 2014)

The FEMA-mapped floodplains in Columbia County include, for the most part, only areas along the larger rivers and streams, which also have significant population and/or development. Other areas in the county have flood risk but are not included in the FIRM because of small stream size or low population. Flood hazard evaluation for Columbia County must also consider these localized areas of high flood risk or repetitive flooding which lie outside mapped floodplains.

For Columbia County, there are several dozen FIRMs for cities as well as for communities in the unincorporated portions of the county. These maps are available at the County Courthouse or online at: <https://msc.fema.gov/portal/home>

Probability of Future Events

Columbia County and the incorporated Cities of St. Helens, Columbia City, Scappoose, Clatskanie, Rainier, Prescott, and Vernonia, participate in the NFIP and are required to regulate floodplain development. Any structure built in the floodplain after 1974 must meet NFIP requirements for elevation and flood proofing. Columbia County and the incorporated jurisdictions use FEMA developed floodplain maps as the basis for implementing floodplain regulations. FIRMs delineate flood hazard areas where NFIP regulations apply. FIRMs and flood insurance studies assess the probability of flooding at given locations. These maps represent a snapshot in time, and do not account for changes in the floodplains. Development and other

Columbia County NHMP – Basic Plan

natural and artificial changes in floodplains have caused changes to the rivers and streams in Columbia County. For areas not mapped by FIRMS, flood-susceptible areas can be delineated, and flood levels estimated by using historic stream flow records to determine flood frequency and recurrence.

Flood studies use this information to determine the probability of occurrence for floods of different magnitudes. The probability of occurrence is expressed as a percentage indicating the probability of a specific flood event occurring in any given year.

Factors contributing to the frequency and severity of riverine flooding include:

- Rainfall intensity and duration
- Soil saturation
- Watershed conditions, including steepness of terrain, soil types, amount and type of vegetation, and density of development
- The existence of attenuating features in the watershed, including natural features such as swamps and lakes, and human-built features such as dams
- The existence of flood control features, such as levees and flood control channels
- Velocity of flow
- Tide heights
- Availability of sediment for transport, and the likelihood of erosion of the bed and banks of the watercourse

These factors are evaluated using a hydrologic analysis to determine the probability that discharge of a certain size will occur, and to determine the characteristics and depth of the flood resulting from that discharge.

Flooding in western Oregon generally occurs when storms from the Pacific Ocean bring intense or prolonged rainfall to the west coast. Columbia County typically experiences the most severe floods from winter rainfall in December, January, and February. These floods are occasionally exacerbated by frozen snow packs where rain and snow melt combine while the ground is frozen, preventing ground seepage capability. The County is subject to flooding from river overflows; as well as flooding from local storm water drainage. The county is susceptible to winter rain flooding from October through April; while the months between May and July bring snowmelt and runoff floods. Based on previous occurrences, the county is not susceptible to flash floods. However, the county is likely to experience major flood events occurring in and around the county every 2 to 6 years based on recent historic occurrences.

Winter Storm

Winter storms occurring in Columbia County result in several natural hazards – including floods, landslides/debris flows, and wind. Each on its own, or in combination, can completely immobilize emergency response activities, close transportation corridors, and disrupt

Columbia County NHMP – Basic Plan

transportation and utilities. Each of these natural hazards is individually discussed in detail in their respective sections.

Winter storms in Columbia County can bring snow as well as rain or can be followed by rising temperatures that melt newly fallen snow in higher elevations. Either scenario often causes flooding; most floods in western Oregon occur as a result of winter storms. The flood hazard is described in detail in the flood section of this document.

As is the case with flood, wind as a hazard in Columbia County most frequently occurs as part of a winter storm. The nature, history, location, extent, and probability of future events for wind, including winter storm wind, are explored in detail in the wind section of this document.

Nature

Ice and snowstorms, which include freezing rain, sleet, and hail, can be the most devastating of winter weather phenomena and are often the cause of automobile accidents, power outages and personal injury. Ice storms result in the accumulation of ice from freezing rain, which coats every surface it falls on with a glaze of ice. Freezing rain is most commonly found in a narrow band on the cold side of a warm front, where surface temperatures are at or just below freezing. Typically, ice crystals high in the atmosphere grow by collecting water vapor molecules, which are sometimes supplied by evaporating cloud droplets. As the ice crystals fall, the air warms and the particles melt and collapse into raindrops. As the raindrops approach the ground, they encounter a layer of cold air and cool to temperatures below freezing. However, since the cold layer is shallow, the drops themselves do not freeze, but rather are supercooled, that is cooled in a liquid state to below-freezing temperatures. These supercooled raindrops freeze on contact when they strike the ground or other cold surfaces.

Snowstorms happen when a mass of very cold air collides with a mass of warm air. The warm air rises quickly and the cold air cuts underneath it, cooling and condensing as it rises, forming a cloud bank in the process. As the moisture droplets in the cloud cool to a point below freezing, they become ice crystals, which then collide within the cloud and snow is formed. The resulting precipitation falls as snow only when the temperature of the air between the bottom of the cloud and the ground is below 40 degrees Fahrenheit. A higher temperature will cause the snowflakes to melt as they fall through the air, turning them into rain or sleet. Like those of ice storms, the effects of a snowstorm can disturb a community for weeks or even months. The combination of heavy snowfall, high winds and cold temperatures poses danger from prolonged power outages, automobile accidents and transportation delays, dangerous walkways, and through direct damage to buildings, pipes, crops, other vegetation, and livestock. Buildings and trees can also collapse under the weight of heavy snow.

History

The following table summarizes significant ice and snowstorms having occurred in Columbia County since 2000.

Columbia County NHMP – Basic Plan

Winter Storms Events, 2000 – 2020

Date	Snow Type (Ice, Snow, Sleet)	Details
12/3/2001	Heavy Snow	A powerful Pacific storm dumped very heavy snow in the Cascades again. In the Columbia River Gorge 3 to 4 inches of new snow was reported at Hood River, and both Bonneville Dam and Cascade.
12/17/2001	Heavy Snow	In the Columbia River Gorge, Hood River had 4 inches of snow.
12/27/2001	Winter Storm	In the Columbia River Gorge, Hood River reported 2 inches of snow.
12/30/2001	Winter Storm	In the Columbia River Gorge, Hood River reportedly received sleet, freezing rain, and one inch of snow.
11/17/2003	Winter Storm	Over a three-day period of strong Pacific storms, high winds were brought to the North and Central Oregon coast along with heavy rain and/or snow to the area. Locations in the Central and Southern Willamette Valley reported up to an inch.
1/7/2005	Heavy Snow	Snow fell in the NW Oregon Coast Range, with 8 inches in Buxton, 5 inches west of McMinnville, and 4 inches at Sunset Summit and Wilson River Summit. A cold Pacific storm brought heavy snow to the NW Oregon Coast Range, Northern Oregon Cascades, and Columbia River Gorge.
12/3/2005	Winter Storm	A strong moisture-laden Pacific system brought winter conditions to various regions of northwest Oregon.
3/8/2006	Winter Storm	A strong Pacific storm and associated cold front brought relatively late winter conditions to northwest Oregon. This snow event was one of the latest of the year seen in the Portland area, and forced many school closures around the area.
12/14/2006	Winter Storm and Flooding	A strong low-pressure system combined with existing very cold, shallow air over portions of northwest Oregon brought a wintry mix of precipitation resulting in flooding in eight counties including Columbia County.
12/08/07	Winter Storm	Severe storms resulted in flooding, landslides, and mudslides beginning on December 1, 2007 resulted in a major disaster declaration requiring over 20 million in aid. Five counties in Oregon were included in this disaster. Columbia county and participating jurisdictions were severely impacted by this storm.

Columbia County NHMP – Basic Plan

Winter Storms Events, 2000 – 2020

Date	Snow Type (Ice, Snow, Sleet)	Details
12/20-26/2008	Snow, Mudslide, Landslide	A severe storm, record and near-record snow, mudslides, and landslides occurred between December 20 and 26, 2008. Said to be the worst snow and ice event to occur in the Willamette Valley in 40 years -- significantly damaged agricultural buildings and equipment. Heavy snow and freezing rain caused ice buildup that resulted in downed trees, limbs and broken branches throughout northwestern Oregon. Roads, infrastructure, and private property were damaged as a result of the storm.
03/01/2012	Winter Storm	An unstable air mass following a Pacific cold front brought widespread snow showers to the North Oregon Cascades and foothills, and the North Oregon Coastal Range. Portions of Columbia County measured 20 inches of new snow.
2/6-10/2014	Snow, ice	Columbia County saw 8 inches to 12 inches of snow, followed by about 0.5 inches to 0.75 inches of ice. This storm resulted in considerable disruption of traffic in many portions of Columbia County.
1/3-23/2017	Snow, ice and freeze	Heavy snow accompanied by a deep freeze produced conditions that allowed following rain and warmer weather to produce flooding conditions as the soil could not absorb the melt and rainfall.

Data from NOAA, 2020 and Columbia County Department of Emergency Management, 2017

Location

All areas of Columbia County and the participating jurisdictions are susceptible to winter storms as cold arctic air breaches the Cascade Range and moves westward. Cold air rarely travels west of the Cascade Range, as the mountains provide a natural barrier separating the Willamette Valley from the cold air to the east. However, the Columbia River Gorge can provide a low-level passage funneling cold air westward. Rain, sleet, and/or snow will fall if moisture-saturated warm air from the Pacific moves into the area colliding with the colder air mass.

Extent

Columbia County is in Climate Zone 2, generally consisting of wet winters and dry summers. Winter storm characteristics are determined by the amount and extent of ice and snow, air temperature, wind speed and wind direction. Winter storms can cause power outages, transportation and economic disruptions, injuries and loss of life. Winter storms can also cause traffic-related accidents and death, hypothermia, and heart attacks from snow shoveling. Emergency response times can be slowed because of icy road conditions. The weight of the snow or ice can cause utility disruption and falling trees and limbs. Snowmelt can cause flooding and landslides.

Columbia County NHMP – Basic Plan

Probability of Future Events

Historical data shows that the probability for annual winter storm recurrence is high with a one-year recurrence interval. Winter storms combined with other weather events, like El Niño and La Niña cycle; often result in compounded hazards countywide. Winter storms have caused flooding, landslides, debris flows, utility and transportation systems disruptions.

Landslide

Nature

Landslide is a general term for the dislodgment and fall of a mass of soil or rocks along a sloped surface, or for the dislodged mass itself. The term is used for varying phenomena, including mudflows, mudslides, debris flows, rock falls, rockslides, debris avalanches, debris slides and slump-earth flows. The susceptibility of hillside and mountainous areas to landslides depends on variations in geology, topography, vegetation and weather.

Landslides can be triggered by natural events such as seismic tremors and earthquakes, volcanic eruptions, stream erosion, snowmelt, and prolonged or heavy rainfall. Development and other human activities can also provoke landslides. Increased runoff, excavation in hillsides, shocks and vibrations from construction, placement of non-engineered fill, and changes in vegetation from fire, timber harvesting, and land clearing have all led to landslide events. Weathering and decomposition of geologic material, and alterations in flow of surface or ground water can further increase the potential for landslides.

The United States Geological Survey (USGS) identifies six types of landslides, distinguished by the type of material and movement mechanism involved (USGS 2008a):

Slides - The more accurate and restrictive use of the term landslide refers to a mass movement of material, originating from a discrete area of weakness that slides from stable underlying material. A rotational slide occurs when there is movement along a concave surface; and a translational slide originates from movement along a flat surface.

Debris flows - Flows arise from saturated material that generally moves rapidly down a slope. A debris flow usually mobilizes from other types of landslides on steep slopes, then flows through confined channels, liquefying and gaining speed. Debris flows can travel at speeds of more than 35 miles per hour for several miles. Other types of flows include debris avalanches, mudflows, creeps, earthflows, debris flows, and lahars.

Lateral Spreads This type of landslide generally occurs on gentle slopes or flat terrain. Lateral spreads are characterized by liquefaction of fine-grained soils. The event is typically triggered by an earthquake or human-caused rapid ground motion.

Falls - Falls are the free-fall movement of rocks and boulders detached from steep slopes or cliffs.

Topples - Topples are rocks and boulders that rotate forward and may become falls.

Columbia County NHMP – Basic Plan

Complex - Any combination of landslide types.

The likelihood of a landslide in any given slide-prone location is largely dependent on the water content of the soil or rock fill. Landslides may happen at any time of the year, especially during rainy months when soils become saturated with water. Earthquakes can add to slope stress and disrupt ground stability, thereby triggering landslides, usually in already slide-prone locations. In addition, unconsolidated deposits of alluvial and glacial outwash materials are subject to accelerated stream bank erosion and landslides.

Landslides often occur in conjunction with other natural hazards, thereby exacerbating conditions, as described below:

- Shaking due to earthquakes can trigger events ranging from rock falls and topples to massive slides.
- Intense or prolonged precipitation that causes flooding can also saturate slopes and cause failures leading to landslides.
- Landslides into a reservoir can indirectly compromise dam safety, and a landslide can even affect the dam itself.
- Wildfires can remove vegetation from hillsides, significantly increasing runoff and landslide potential.

History

Landslides and debris flows are common in Columbia County. Much of the terrain is hilly and susceptible to slides; however, many slides take place in undeveloped areas and are unreported or even unnoticed. A statewide survey of winter storm landslides during 1996 and 1997, conducted by the Oregon Department of Geology and Mineral Industries (DOGAMI), reported 9,582 documented slides. The actual number was estimated to be many times the documented number. (Columbia County Department of Emergency Management, 2014)

Historically, long periods of winter rain and heavy snowfall in the mountains trigger landslides. These landslides affect county roads, Electric distribution and transmission and key emergency transportation routes.

A February 1996 winter storm triggered numerous slides in Columbia County. Slides interrupted transportation routes in dozens of locations, including two emergency transportation routes, the Scappoose-Vernonia Road (19 locations) and Apiary Road (four locations).

The December 2007 winter storm caused 77 landslides and 41 debris flows in Columbia, Clatsop, and Tillamook counties. In northwestern Columbia County, one or more small landslides occurred triggering a debris flow that traveled approximately 1 mile and blocked a drainage near Woodson on Highway 30. This blockage combined with additional rainfall resulted in a temporary lake (30-40 feet deep and 200 feet long). Woodson residents were evacuated, and Highway 30 was closed on December 11th, 2007. A catastrophic debris flow

Columbia County NHMP – Basic Plan

occurred when the embankment failed and engulfed Highway 30 and Woodson. No fatalities occurred.

During the 2015 flood event numerous landslides effected the county. A major slide near milepost 4 of the Scappoose Vernonia highway cut that road and did extensive damage to the electric distribution grid in that area. In fact, most major feeder roads in the County road system were blocked and badly damaged, in some cases multiple times, isolating the entire western portion of the county. State highway 47, 202 and the critical highway 30 were all closed multiple times at multiple locations for days after the worst of the rains had ended.

Since this latest event small incidents continue to require occasional clean up and indicate that landslides remain a constant hazard for county residents in the future.

Location

In general, the probability of slope failure increases with an increase in slope inclination. However, this is not always the case. Depending on various factors such as soil type and water content, a slope having a relatively low inclination could be at greater risk of failure than another slope having a relatively high inclination. Other factors that influence susceptibility include rock type; vegetative cover and type; slope aspect; permeability and rate of infiltration; proximity to seismic sources; and magnitude of seismic events. In addition, unconsolidated deposits of alluvial and glacial outwash materials are subject to accelerated stream bank erosion and landslides. The possibility of failure also increases in sloped areas in which human influences, such as cutbacks, have occurred.

Extent

The Oregon Department of Forestry (ODF) conducted a 3-year study of the impacts of landslides in Oregon. The ODF study included eight study areas, one of which was in Columbia County, but did not provide a detailed inventory of landslide prone areas in Columbia County, outside of the very small study area. This study concluded that the highest hazard for shallow rapid landslides in western Oregon occurs on slopes of over 70% to 80% steepness (depending on landform and geology). (ODF 2001)

The geographic extent of landslide events is essentially the same as slide location, while the effects depend on what infrastructure is in the way of a slide, as well as the magnitude and force of the slide itself. The extent of effects could be as limited as one building or property, to region-wide effects, as in the case of a major transportation disruption, slide-induced dam failure, or utility outage.

Rapidly moving landslides have the greatest potential to endanger human life or inflict serious injury, especially to those living in or traveling through rapidly moving slide prone areas. Slow moving slides are less likely to inflict serious human injuries but can cause property damage.

Columbia County NHMP – Basic Plan

Probability of Future Events

Landslides are an annual occurrence in Oregon during the rainy months, October through April. They generally result from intense or prolonged rainfall, particularly during a rain on snow event. Slope alteration and shape can also be a recurrence interval factor. Oregon's Enhanced Natural Hazard Mitigation Plan states that, "Landslide recurrence interval is highly variable" and is terrain dependent. (Oregon, 2015) Recurrence intervals for steep terrain can range from 50-5,000 years, with some debris flow recurrence intervals of less than 10 years.

Wildfires

Columbia County contains vast areas of second and third growth timber reproduction, and wildlands that take advantage of the temperate conditions and significant annual rainfall to produce considerable vegetation among multiple fuel types and sizes. Under certain conditions these areas are vulnerable to the ignition and rapid spread of large and damaging fires.

Nature

Wildfires can be classified as wildland fires, wildland/urban interface fires, urban fires, and prescribed fires. Due to the large amount of forested land in Columbia County, both wildland fires and wildland/urban interface fires are significant hazards.

Wildland fires spread through the consumption of vegetation. They often begin unnoticed, spread quickly, and are usually signaled by dense smoke that may be visible for miles around. Wildland fires can be caused by human activities such as arson or campfires, or by natural events like lightning. Wildland fires often occur in forests or other areas with ample vegetation. When a wildland fire spreads to developed areas such as suburbs, small communities, or isolated homes, it becomes a wildland/urban interface fire.

The following three factors contribute appreciably to wildland fire behavior and can be used to identify hazards.

Topography - As slope increases, the rate of wildfire spread increases. South-facing slopes are also subject to more solar radiation, making them drier and thereby intensifying wildfire behavior. However, ridge tops can mark the end of a wildfire's spread, since fire spreads more slowly or may even be unable to spread downhill.

Fuel - The type and condition of vegetation plays a significant role in the occurrence and spread of wildfires. Certain types of plants are more susceptible to burning or will burn with greater intensity. Dense or overgrown vegetation increases the amount of combustible material available to fuel the fire (referred to as the "fuel load"). The ratio of living to dead plant matter is also important. The moisture content of both living and dead plant matter decreases during periods of prolonged drought and greatly increases the risk of fire. The fuel's continuity, both horizontally and vertically, is also an important factor. Forests with strong ladder fuels (understory growth between ground fuels and tree crowns) are more likely to have major fires involving tree crowns. Forests with limited ground fuels and little or no ladder fuels are much more likely to experience minor ground fires than a fire involving tree crowns.

Columbia County NHMP – Basic Plan

Weather - The most variable factor affecting wildfire behavior is weather. Temperature, humidity, wind and lightning can affect chances for ignition and spread of fire. Extreme weather, such as high temperatures coupled with low humidity, can lead to devastating wildfires. Conversely, cool temperatures and higher humidity often signal reduced wildfire occurrence and easier containment of existing fires.

Columbia County contains the topography fuel and weather patterns necessary for the ignition and rapid spread of wildland fire. Wildland fires can be categorized as occurring in the following locations:

Agricultural - Agricultural fires burn in areas where the primary fuels are flammable cultivated crops, such as wheat. This type of fire tends to spread very rapidly but is relatively easy to suppress if adequate resources are available. Structures threatened, if any, are generally those belonging to ranch and farm owners. There can also be significant losses in agricultural products.

Forest - Forest fires are the classic wildland fire. These fires burn fuels composed primarily of timber and associated fuels, such as brush, grass, logging residue and thick stands of replanted trees. Due to variations in fuel and topography, this type of fire may be extremely difficult and costly to suppress.

Wildland-Urban Interface - Fires involving the wildland-urban interface occur in areas where urbanization and the presence of natural vegetation fuels allow a fire to spread rapidly from natural fuels to structures and vice versa. Especially in the early stage of such fires, structural fire suppression resources can be quickly overwhelmed, increasing the number of structures destroyed. Such fires are known for the large number of structures simultaneously exposed to fire. Nationally, wildland interface fires commonly produce widespread losses.

Although thought of as a summer occurrence, wildland fires can, and do, occur during any month of the year. Most wildland fires occur between July and October. Dry spells during the winter months, especially when combined with the factors of winds or dead fuels, result in fires that burn with alarming intensity and rate of spread. Common causes of wildland fire include lightning; equipment use; railroad activity; debris burning; arson; and improperly extinguished cigarettes and campfires.

Wildland fires are part of the natural ecology and natural life cycles of wildlands. Fires create open spaces with different habitats for both plants and animals than existed previously. Fires also reduce fuel loads in areas, which in turn decreases the potential for large catastrophic fires. However, a wildland fire may grow into an emergency or disaster if not promptly controlled. Even a small fire can threaten lives and resources and destroy property, especially in heavily developed interface areas. Wildland fires may also harm livestock and pets. In addition to threatening humans, animals, and infrastructure, wildfires in forested areas have a severe impact on natural resources. Wildland fires strip the land of vegetation and destroy forest resources. Soil exposed to intense heat may lose its capability to absorb moisture and support life. Exposed soils erode quickly and enhance siltation of rivers and streams, thus increasing

Columbia County NHMP – Basic Plan

flood potential, harming aquatic life and degrading water quality. Lands stripped of vegetation are also subject to increased debris flow hazards, as discussed in the landslides hazard profile.

History

ODF provided records for all wildland fires in ODF-responsibility lands in Columbia County for recent years. Since 1987 a total of 689 wildland fires occurred on ODF-responsibility lands in Columbia County, or an average of 20 fires per year. Most of these fires were less than one acre, 134 fires were between 1 and 9 acres, and 15 fires were 10 acres or more. The largest fire reported consumed 93 acres. It is important to keep in mind that these data are for ODF-responsibility areas, along with ODF joint responses to fires in areas where the primary responsibility is provided by local fire agencies. However, because ODF-responsibility lands include nearly 80% of the entire county, these data probably represent most of the wildland fires in Columbia County in the last 31 years. The following table shows recent fires in the vicinity of Columbia County.

Columbia County NHMP – Basic Plan

Recent Large Fires in Columbia County and Vicinity

Fire Name	Location	Size (Acres)	Fuel Type	w/i WUI	Year	Cause Category	Vicinity of Homes
Pebble Creek	South of Vernonia	165	Logging Slash/Timber	Yes	1987	Hunter/Smoking	Yes
Keasey Dam	West of Vernonia	117	Logging Slash Reproduction	No	1989	Recreationist/Campfire	No
Emerald Forest		37	Logging Slash	No	1994	Equipment/Logging	Yes
Kerry Road	West of Clatskanie	31	Fell/Buck, Slash, Reproduction			Equipment/Logging	No
Wolden Road		31	Reproduction	Yes	1999	Debris Burning	Yes
Lost Creek Road		20	Reproduction	Yes	1999	Debris Burning	Yes
Lost Creek Road	West of St. Helens	5	Logging Slash	Yes	1999	Burning	Yes
Scappoose Airport	Scappoose Airport	200	Logging Slash/Timber	Yes	2000	Burning	Yes
Pittsburg Road	South of Liberty Hill	5	Scrub Oak/Grass	Yes	2006	Recreationist/unknown	Yes
Hwy 30/Jones Rd	Hwy 30/Jones Rd	12	Grass/Brush	Yes	2008	Burning vehicle	Yes
North Fork Unit	Elk Creek	7	Slash	No	2008	Hold Over	No
Flora Road	Flora Road	23	Reproduction	No	2009	Vehicle Sparks	Yes
Pittsburg Road	Pittsburg Road	5	Grass	Yes	2012	Burning Building	Yes
Sunset Grade	N. Fork Wolf Creek	67	Logging Slash	No	2015	Recreationist/shooting	No
Hwy 47, MP 5	Hwy 47, MP 5	30	Logging Slash	No	2017	Vehicle Sparks	No
Chapman Grange Rd. # 1	Chapman Grange Rd.	42	Logging Slash	No	2018	Recreationist/unknown	No

Location

Columbia County is approximately 90% forested; therefore, there is high risk for wildland fires in the county. (Loy 2001) According to a United States Forest Service report identifying wildland/urban interface communities within the vicinity of Federal lands in Oregon that are at high risk from wildfire, every community in Columbia County is at risk for wildland/urban interface fires. (66 Fed. Reg. 43383-43435)

However, the actual fire hazard in these areas may be lower than expected because a high percentage of forest lands in Columbia County are actively managed for timber. Harvested

Columbia County NHMP – Basic Plan

areas typically have lower fire risk because they are relatively free of dead and downed material that would contribute to the fuel load. Lands under active management are typically served by a network of roads which provides access to fire fighting resources should a fire start. In addition, forests within Columbia County are relatively free of major insect and disease problems that often plague other forests in Oregon. Finally, typical rainfall amounts for Columbia County are “moderately high” to “high”, averaging 40 to 60 inches per year.

The fire protection service providers in the county identified areas of special concern for wildland/urban interface fires. These areas are identified in the following table.

Areas of Special Concern for Wildland/Urban Interface Fires

Community	Areas of Special Concern
Clatskanie	Conyers Creek drainage area, area NE of Clatskanie and populated areas in the interface adjoining natural cover and wildland fuels.
Mist-Birkenfeld	Fishhawk Lake area and other rural areas in the interface adjoining natural cover and wildland fuels.
Rainier	Populated areas of the interface adjoining natural cover and wildland areas.
Scappoose	Chapman, Alder Creek, JP West, Mt. View, Callahan, Bonneville, and Wilkinson Roads. Dutch Canyon, Pamarama Terrace and Raymond Creek subdivisions. Populated areas of the interface adjoining natural cover and wildland areas.
St. Helens	Gray Cliffs and surrounding greater St. Helens area. Areas involving oak, brush, and grass fuel types. Populated areas of the interface adjoining natural cover and wildland areas.
Vernonia	Populated areas of the interface adjoining natural cover and wildland areas.

Extent

ODF records of historical fires show that minor wildland fires occur regularly in Columbia County. Fire protection services have generally been able to contain these fires before they exceeded 10 acres. Due to successful fire control, the minor wildland fires that have occurred in Columbia County have damaged relatively few residential areas, scattered buildings, and natural resources in the affected forests. However, if a major wildland fire were to occur, it would have the potential to severely impact residential structures, roads, power lines, and other critical infrastructure in all jurisdictions in the county.

Probability of Future Events

In Oregon, wildland fire season normally begins in late June, peaks in August, and ends in October. However, a combination of above normal-temperatures and drought can increase the length of the traditional fire season. Wildland fire hazards throughout the county would be highest during prolonged periods of drought, especially after periods of below normal rainfall, which would result in a combination of high fuel loads and unusually dry conditions.

Due to historical fire patterns, the probability of a minor wildland fire occurring in any of the jurisdictions is very high. Although Columbia County has never experienced the major fires that

have affected other counties in Oregon, there is a possibility that a major wildland or wildland/urban interface fire could occur in Columbia County in the future.

Earthquake

Nature

An earthquake is a sudden motion or trembling of the earth produced by the rupture of rocks due to stresses beyond the rocks' elastic limits. The point inside the Earth where the rupture takes place is termed the hypocenter. The point on the planet's surface directly above the hypocenter is the epicenter. The effects of an earthquake can be felt far beyond the site of its occurrence. Earthquakes usually occur without warning and, after just a few seconds, can cause massive damage and extensive casualties. The most common effect of earthquakes is ground motion, usually felt as shaking and vibrations.

The severity of ground motion generally increases with the amount of energy released and decreases with distance from the fault or epicenter of the earthquake. Ground motion causes waves in the earth's interior, also known as seismic waves, and along the earth's surface, known as surface waves. There are two kinds of seismic waves. P (primary) waves are longitudinal or compression waves similar in character to sound waves, that cause back-and-forth oscillation along the direction of travel (vertical motion). S (secondary) waves, also known as shear waves, are slower than P waves and cause structures to vibrate from side to side (horizontal motion). When P and S waves hit the surface of the Earth, they generate surface waves, which are further categorized into Raleigh waves and Love waves. Slower than seismic waves, and therefore later to hit, surface waves are responsible for most of the damage during an earthquake.

Earthquakes are usually measured in terms of magnitude and intensity. Magnitude is related to the amount of energy released during an event, while intensity refers to the effects on people and structures at a specific place. Small to moderate earthquake magnitude is usually reported according to the standard Richter scale. Larger earthquakes are reported according to the moment-magnitude scale because the standard Richter scale does not adequately represent the energy released by these large events.

Intensity is usually reported using the Modified Mercalli Intensity Scale. This scale has 12 categories ranging from "not felt" to "total destruction." Different values can be recorded at different locations for the same event depending on local circumstances such as distance from the epicenter or building construction practices. Peak ground acceleration (PGA) is also used to measure earthquake intensity. It measures the earthquake's intensity by quantifying how hard the earth shakes in each location. PGA can be measured in g, which is acceleration due to gravity. The following table identifies corresponding intensity and magnitude ratings as well as effects associated with each rating.

Columbia County NHMP – Basic Plan

Effects of Intensity and Magnitude Ratings			
Magnitude	MM Intensity	PGA (% g)	Perceived Shaking
0 – 4.3	I	<0.17	Not Felt
	II-III	0.17 – 1.4	Weak
4.3 – 4.8	IV	1.4 – 3.9	Light
	V	3.9 – 9.2	Moderate
4.8 – 6.2	VI	9.2 – 18	Strong
	VII	18 – 34	Very Strong
6.2 – 7.3	VIII	34 – 65	Severe
	IX	65 – 124	Violent
	X	124 +	Extreme

In addition to ground motion, several secondary hazards can occur from earthquakes, such as surface faulting. Surface faulting is the differential movement of two sides of a fault at the earth's surface. Displacement along faults, both in terms of length and width, varies but can be significant (up to 20 feet), as can the length of the surface rupture (up to 200 miles). Surface faulting can cause severe damage to linear structures, such as railways, highways, pipelines, and tunnels.

Earthquake-related ground failure due to liquefaction is another secondary hazard. Liquefaction occurs when seismic waves pass through saturated granular soil, distorting its structure, and causing some of the empty spaces between granules to collapse. Pore-water pressure may also increase sufficiently to cause the soil to briefly become fluid. Liquefaction causes lateral spreads (horizontal movements commonly of 10 to 15 feet, but up to 100 feet), flow failures (massive flows of soil, typically hundreds of feet, but up to 12 miles) and loss of bearing strength (soil deformations causing structures to settle or tip). Liquefaction can cause severe damage to property.

The most common earthquakes that occur in Oregon are crustal, intraplate or great subduction earthquakes. These are described as follows:

Crustal earthquakes - These generally occur along shallow faults near the earth's surface. Crustal earthquakes make up most earthquakes in the Cascadia area (western Washington, Oregon and northwestern California) and are a result of fault movement in the Earth's surface. These shallow earthquakes are usually less than 7.5 magnitude and strong shaking generally lasts 20 to 60 seconds. Aftershocks, as well as tsunamis and landslides, are anticipated after a crustal event.

Intraplate earthquakes - These occur deeper, at 20 to 40 miles beneath the ground surface. These deep earthquakes are usually less than 7.5 magnitude, and damaging events occur every 10 to 30 years in this region. There are few aftershocks, and tsunamis are generally not anticipated, although landslides can trigger localized tsunamis. Due to the deep earth

Columbia County NHMP – Basic Plan

movement, an intraplate earthquake is felt over a larger area with less intensity. Damage from this type of event is generally less than with an equally sized crustal earthquake.

Great subduction earthquakes - occur offshore of the Oregon and Washington Coasts along the Cascadia Subduction Zone. This zone is the result of the Juan de Fuca plate being pushed under the North American plate. Earthquakes centered along this zone can be as great as 9.0 magnitude. Geologic evidence demonstrates approximately 500 years between events with the last significant event on January 26, 1700. Aftershocks up to 7.0 magnitude are anticipated to cause additional damage. Liquefaction, tsunamis and landslides are expected as a result of a great subduction earthquake.

History

Approximately 7,000 earthquakes in the Pacific Northwest have been documented over the past 200 years. This documentation has occurred sporadically, with only the most significant events being recorded until recent history. Currently, the University of Washington seismology laboratory records approximately 1,000 earthquakes of magnitude 1.0 or greater annually in Washington and Oregon. While most of these events are barely felt, anywhere from 12 to 24 earthquakes cause enough ground shaking to be recognized as an actual earthquake by area residents. The following table shows significant earthquakes potentially felt in Columbia County since 1949.

Significant Earthquakes, 1949 - 2006		
Date	Magnitude	Location
April 13, 1949	7.1	Olympia, WA
April 18, 1961	4.5	Albany, OR
November 5, 1962	5.5	Vancouver, WA
March 7, 1963	4.6	Salem, OR
March 25, 1993	5.6	Scotts Mills, OR
February 28, 2001	6.8	Anderson Island, WA
June 29, 2002	4.5	Mt. Hood, OR
June 30, 2004	4.4	Lakeview, OR
July 12, 2004	4.9	Newport, OR
July 22, 2004	4.3	Lakeview, OR
August 18, 2004	4.7	Newport, OR
July 14, 2008	4.2	Maupin, OR

Location

Columbia County is located within the geographical area bordering the Cascadia Subduction Zone. This zone is comprised of an 800-mile sloping fault and several smaller offshore faults located west of the Pacific Coast, from British Columbia to the north and Northern California to the south. The fault system separates the Juan de Fuca and North American plates. Inland,

Columbia County NHMP – Basic Plan

there are nine faults located within the USGS Quaternary Fault and Fold Database including the Portland Hills Fault, East Bank Fault, and Mount Angel Fault.

Extent

The extent of earthquake effects depends on the nature, magnitude, and location of the quake. An earthquake can range from a tiny tremor affecting only a small, localized area, to a major shake affecting an entire region. For hazard mitigation purposes, it should be considered that the extent of a major event would be greater than countywide.

While Columbia County contains crustal faults which can produce short high intensity earthquakes at a higher frequency than a Cascadia subduction zone earthquake, for planning purposes, the Department of Emergency Management follows the lead of the State of Oregon as identifying the CSZ event as the primary and most severe risk to the people and built environment of the county. A CSZ event, with a predicted magnitude of 9.0 or greater exceeds the MMI scale. Earthquakes with this energy release have occurred in Oregon and happened last in 1700. Columbia County's proximity to the coast means that such an event is anticipated to be the largest and most widespread natural hazard that the county faces.

Probability of Future Events

The evidence for past earthquakes of magnitude 9.0 suggests that they recur on average every 500 years, but the actual intervals between events are far from predictable—such earthquakes have been separated by as many as 1,000 years and as few as 200. The estimates of the sizes of pre-1700 earthquakes demonstrate that 9.0 magnitude earthquakes are possible but not certain. Cascadia has now been building up strain for over 300 years, so the next great earthquake could happen at any time. Reduced to simple odds, the chances that an earthquake as large as magnitude 9.0 will occur along the zone within the next 50 years are about one in ten, odds for an 8.0 or better rise to 4 in ten. (Cascadia Region Earthquake Workshop. 2013)

Volcano

Nature

A volcano is a vent or opening in the earth's crust from which molten lava (magma), pyroclastic materials, and volcanic gases are expelled onto the surface. Volcanoes and other volcanic phenomena can unleash cataclysmic destructive power and can pose serious hazards if they occur in populated and/or cultivated regions. Ashfall and tephra, an eruptive hazard, are of the greatest concern in Columbia County, though lahars (debris flows) can impact shipping in the navigation channel on the Columbia River.

There are four general types of volcanoes found within a short distance of Columbia County:

Lava domes - are domes that are formed when lava erupts and accumulates near the vent.

Columbia County NHMP – Basic Plan

Cinder cones - are cone-shaped and formed by accumulation of cinders, ash, and other fragmented materials originating from an eruption.

Shield volcanoes - are broad, gently sloping volcanic cones of flat domical shape, usually several tens or hundreds of square miles in extent, built chiefly of overlapping and interfingering basaltic lava flows.

Composite or stratovolcanoes - are typically steep-sided, symmetrical cones of large dimensions built of alternating layers of lava flows, volcanic ash, cinders, and blocks. Most composite volcanoes have a crater at the summit containing a central vent or clustered group of vents.

Along with the different kinds of volcanoes there are different types of eruptions. The type of eruption is a major determinant of what physical results an event will create, and what hazards it poses. Six main types of volcano hazards exist:

Volcanic gases - are made up of water vapor (steam), carbon dioxide, ammonia, as well as sulfur, chlorine, fluorine, boron, and several other compounds. Wind is the primary source of dispersion for volcanic gases. Life, health, and property can be endangered from volcanic gases within about six miles of a volcano. Acids, ammonia, and other compounds present in volcanic gases can damage eyes and respiratory systems, and heavier-than-air gases, such as carbon dioxide, can accumulate in closed depressions and suffocate humans or animals.

Lahars - are formed when loose masses of unconsolidated, wet debris become mobilized, and are usually created by shield volcanoes and stratovolcanoes. Eruptions may trigger one or more lahar directly by quickly melting snow and ice on a volcano or ejecting water from a crater lake. More often, lahars are formed by intense rainfall during or after an eruption. Rainwater can easily erode loose volcanic rock and soil on hillsides and in river valleys. As a lahar moves farther away from a volcano, it will eventually begin to lose its heavy load of sediment and decrease in size.

Landslides - are common on stratovolcanoes because their massive cones typically rise thousands of feet above the surrounding terrain and are often weakened by the very process that created the mountain – the rise and eruption of molten rock (magma). If the moving rock debris is large enough and contains a large content of water and soil material, the landslide may transform into a lahar and flow more than 50 miles from the volcano.

Lava flows - are streams of molten rock that erupt from a vent and move down slope. Lava flows destroy everything in their path. However, deaths caused directly by lava flows are uncommon because most move slowly and flows usually do not travel far from the source vent. Lava flows can bury homes and agricultural land under hardened rock, obscuring landmarks and property lines.

Pyroclastic flows - are dense mixtures of hot, dry rock fragments and gases that can reach 50 mph. Most pyroclastic flows include a ground flow composed of coarse fragments and an ash

Columbia County NHMP – Basic Plan

cloud that can travel by wind. Escape from a pyroclastic flow is unlikely because of the speed at which they move.

Tephra - is a term describing any size of volcanic rock or lava that is expelled from a volcano during an eruption. Large fragments generally fall back close to the erupting vent, while particles of ash can be carried hundreds to thousands of miles away from the source by wind. Ash clouds are common adaptations of tephra.

History

Mount St. Helens has been the most active volcano in the Cascade Range during the past 10,000 years. In Oregon, awareness of the potential for volcanic eruptions was greatly increased by the May 18, 1980 eruption which killed 57 people. The upper portion of the summit collapsed in a massive landslide triggered by volcanic tremors. That portion of the mountain is now a horseshoe-shaped crater partially filled by a lava dome. Early 19th Century settlers in the region witnessed eruptions occurring along the north flank area of the mountain.

As a result of the 1980 eruption and the far-reaching extent of the lateral blast, damage and reconstruction exceeded \$1 billion. The coverage area was 230 square miles and reached 17 miles northwest of the crater. Impacts from pyroclastic flows covered six square miles and reached 5 miles north of the crater, and landslides covered 23 square miles. Lahars affected the North and South Forks of the Toutle River, the Green River, and ultimately the Columbia River as far as 70 miles from the volcano.

Mount St Helens' most recent eruption began in October of 2004, with initial steam and ash eruptions giving away to slow-moving lava flows which ceased in January of 2008. Several other minor eruption periods occurred during the last 500 years with some lava flow near the summit. The eruptions created pyroclastic flows and lahars with little ash fall. The other volcanoes in the Pacific Northwest have undergone similar formation and eruption cycles.

Location

The extensive north-south oriented chain of volcanoes known as the Cascadia volcanic arc, or Cascade Range were formed by the Cascadia subduction zone. As the seafloor plate sinks beneath the North American Plate, it heats up and begins to melt, providing a vast reservoir of the heat and molten rock that create the magma chambers that become volcanoes.

Volcanoes near Columbia County include Mount St. Helens, Mt. Hood, Mt. Rainier, and Mt. Adams. The first three are active, and Mt. Adams is potentially active. Columbia County is approximately 40 miles from Mount St. Helens, and further away from the other volcanoes.

Extent

The volcanoes nearest to Columbia County are far enough away that none of the more devastating near source hazards are likely to be experienced. Heavier tephra particles will generally not reach Columbia County.

Columbia County NHMP – Basic Plan

The major hazard for Columbia County is ashfall – either minor ash falls from an eruption of Mount St. Helens or lesser ash falls from more distant volcanoes. Ashfall deposition is controlled by prevailing wind direction, which in the Cascades is predominately from the west. During previous eruptions, ashfall has drifted to the east of the volcanoes. Volcanic eruptions may impact water bodies, such as the Columbia River at Longview and further downstream. River valleys are susceptible to debris flows, landslides, and lahars; rivers may require dredging to maintain channel depths for navigation.

Mount St. Helens, a stratovolcano, in southwestern Washington is believed to be the volcano with the greatest potential to have a near-term impact on the region because of its activity since the cataclysmic event in 1980. A large eruption of Mount St. Helens is expected to eject tephra to altitudes of 12 to 20 miles, with a deposition area of 40,000 square miles or more. Wind direction and velocity, along with the vigor and duration of the eruption, will control the location, size, and shape of the area affected by tephra fall.

Probability of Future Events

By careful analysis of past activity, geologists can make general forecasts of long-term activity associated with individual volcanoes, but these are on the order of trends and likelihood, rather than specific events or timeline. Short-range forecasts are often possible with greater accuracy. Several signs of increasing activity can indicate that an eruption will follow within weeks or months. Magma moving upward into a volcano often causes a significant increase in small, localized earthquakes, and increased emissions of carbon dioxide and compounds of sulfur and chlorine that can be measured. Shifts in magma depth and location can cause changes in ground level elevation that can be detected through ground instrumentation or remote sensing.

The USGS has identified several other potentially active volcanoes in Washington, Oregon, and California. The effects of volcanic activity from these volcanoes could include landslide avalanches, lahars, tephra, lava, and pyroclastic flows or surges. Activity from one of these volcanoes is highly likely to reoccur.

Wind

Nature

Wind is air flow that travels horizontally with respect to the Earth's surface. High winds are defined as those that last longer than one hour at greater than 39 miles per hour (mph) or for any length of time at greater than 57 mph. Wind speeds vary with individual storms.

In general, the damaging effects of windstorms may extend for distances of 100 to 300 miles from the center of storm activity. Many buildings, utility and transportation systems in open areas, natural grasslands, agricultural, or timberlands are especially vulnerable to wind damage.

Columbia County's most devastating windstorms typically occur from the south.

Columbia County NHMP – Basic Plan

History

Columbia County has a two-year recurrence interval of sustained winds speed that ranges from 37 to 43 mph. Winds of this velocity may cause significant damage at sites where local wind speeds are higher than this average. Damage is more prevalent in clear-cut areas. The 50-year recurrence interval winds speed range from 56 to 62 mph, which can cause widespread wind damage.

Numerous damaging windstorms have occurred within Columbia County. The following table includes some of the most noteworthy windstorms that brought extensive damage to the region.

Windstorm Events, 1950 – 2008		
Date	Sustained Wind Speeds	Details
November 10–11, 1951	40 mph	Extensive timber, building, and utility losses and disruption. Damage experienced statewide. Statewide winds 40-80 mph
December 1951	42 mph	Serious damage to buildings and utility system disruption. Statewide winds 40-100 mph
December 21, 1955	60 mph	Extensive damage to buildings, power and telephone lines throughout the state. Statewide winds 55-70 mph
November 1958	51 mph	Extensive timber, building, and utility losses and disruption. At one point, all highways closed at one or more points from fallen trees. Statewide winds 50-75 mph
October 1962	62 mph (90 mph wind gusts)	Downed trees and power lines, utility disruption. The Columbus Day storm was the equivalent of a Category IV hurricane in terms of central pressures and wind speeds. The storm, which started east of the Philippines as Typhoon Freda, measured 1,000 miles long as it hit the West Coast. 38 fatalities, \$200M damages statewide. Statewide winds 29-138 mph. Portland wind-116 mph
March 1963	39-68 mph	Widespread destruction. Statewide wind 39-100 mph
October 1967	70 mph	Extensive agricultural, timber, power and telephone utilities, and home losses Statewide 70 - 115 mph, one fatality and 15 injuries
March 1971	58 mph	Extensive roof damage, trees toppled, power line breakage, extensive utility disruption. Statewide wind 40-71 mph
November 1981	57 mph	Strongest windstorm since the 1962 Columbus Day storm. 57 mph winds. 75-92 mph wind along coast, gusts, 11 fatalities, \$50M damages statewide
November 1997	52 mph	Trees uprooted

Columbia County NHMP – Basic Plan

Windstorm Events, 1950 – 2008		
Date	Sustained Wind Speeds	Details
December 2007	52 mph	Heavy snowfall, rains, rapid temperature warming created widespread flooding, tree blockages, landslides, transportation and utility disruptions, and 5 deaths in Oregon. Statewide wind 50-100 mph \$180M damages
November 2009	58 mph	Strong winds were estimated based reports of power outages in communities along the Columbia River in northwest Oregon
November 2011	81 mph	A strong Pacific cold front brought strong southerly winds to the north and central Oregon Coastal range. Strong winds were reported with a gust to 81 mph, and then the sensor stopped reporting.
November 2014	37-42 mph	Strong winds affected the River margin of Columbia County producing power outages and debris blocked roads.

Location

Several Pacific low-pressure centers make landfall on the Northwest each winter. Winds blowing along a north to south axis (parallel to the major mountain ranges) can prove extremely destructive. The windstorm pattern in this area is typically southwesterly, flowing directly into the Pacific Northwest. Severe windstorms have historically impacted all jurisdictions in Columbia County.

The National Weather Service’s extensive ENSO website delineates information explaining these weather patterns as they affect various US locations. They describe the Pacific Northwest’s late fall and early winter El Niño effects as warmer than normal temperatures with decreased precipitation, while La Niña patterns exhibit increased storminess, precipitation, and cold. These patterns and trends appear in Oregon’s historical weather events listing.

Extent

The low-pressure centers bring sustained winds (40-60 mph) strong enough to topple power lines and trees. These prolonged windstorms are likely to last an average of three to six hours before moving on. All areas of Columbia County are subject to strong and damaging wind events.

Probability of Future Events

Windstorms producing winds gusting up to 70 mph or greater occur 1- 2 times every 10 years, with high winds events being relatively common and usually occur during October through April. Destructive windstorms are less frequent. Tornadoes have been documented in Columbia County and nearby counties; two tornadoes have been documented in Columbia County (NOAA 2019); one in August of 1978 near Scappoose, and the other in November of

Columbia County NHMP – Basic Plan

1965 at Rainier. The nearby counties of Clatsop, Cowlitz, and Multnomah have experienced several tornado events. (Columbia County Department of Emergency Management, 2014). Despite these examples, climate and weather conditions in Columbia County make the occurrence of major tornadoes unlikely.

Erosion

Nature

Erosion is a process that involves the gradual wearing away, transport, and movement of land. However, not all erosion is gradual. It can occur quite quickly as the result of a flash flood, coastal storm, or other event. Most of the geomorphic change that occurs in a river system is in response to a peak flow event. It is a natural process, but its effects can be exacerbated by human activity.

Erosion is a problem in developed areas where the disappearing land threatens development and infrastructure. There are three main types of erosion that affect human activity in Oregon.

Coastal erosion is the wearing of land and loss of beach, shoreline, or dune material because of natural activity or man-made influences. It can occur gradually or suddenly. Usually erosion is a long-term process, but it can also happen quickly during storm events.

Wind erosion occurs when wind removes, moves, and redeposits soil. It can cause a loss of topsoil, hindering agricultural production. Blowing dust can also reduce visibility and have a negative effect on air quality.

Riverine erosion results from the force of flowing water in, and adjacent to, river, creek, and tributary channels. This erosion affects the bed and banks of the channel and can alter or preclude any channel navigation or embankment development. In less stable braided channel reaches, erosion and material deposition are a constant issue. In more stable meandering channels, episodes of erosion may only occur occasionally.

Riverine and wind erosion threaten various communities along the rivers, creeks, and tributaries in Columbia County. Erosion of any type rarely causes death or injury. However, erosion can cause significant destruction to property and infrastructure. The Columbia River is subject to tidal influences along the length of the county's coastline. Additionally, a major river reclamation project has taken away part of the natural floodplain north of Clatskanie. This combination of a high tide and reduced floodplain exacerbates flooding damages as these two conditions limit where excess Clatskanie River water can flow during a high-flow flood event. Flooding and erosion scour result from these two conditions.

Generally, erosion within the Columbia River occurs when the flow of the river changes and is directed towards the banks or mid-Channel Islands. These changes can be caused by surface wind stress and gravity waves during storm events (primarily severe winter storms),

transporting sediment by bottom currents. The reduction in peak river-flows due to the construction of dams and reservoirs have reduced the amount of sand reaching the lower river as well as reducing nearshore sediment movement in many areas of the Columbia River.

Rivers constantly alter their courses, changing shape and depth, trying to find a balance between the sediment transport capacity of the water and the sediment supply. This process is usually seen as the wearing away of the water course's banks and beds over a long time period.

Riverine erosion is often initiated by failure of an embankment causing high sediment loads, or by heavy rainfall. This generates high volume and velocity run-off, which will concentrate in the lower drainages within a river's catchment area. When the stress applied by these flows exceeds the resistance of the embankment material, erosion will occur. As the sediment load increases, fast-flowing waters will erode their banks downstream. Eventually, the river, creek, or tributary becomes overloaded or velocity is reduced, leading to the deposition of sediment further downstream or in dams and reservoirs. The deposition may eventually lead to the watercourse developing a new channel.

While all rivers change in the long-term, short-term rates of change vary significantly. All rivers can be categorized based on their ability to adjust their shape and gradient as either bedrock or alluvial channels. Within Columbia County, the Columbia River is an alluvial channel. (Tetra Tech 1992)

History

Erosion loss has historically occurred in Columbia County from landslides, stream bank failures, and agricultural activities. All rivers and creeks are subject to erosion. Columbia County has over 200 rivers and creeks.

A series of dams were constructed along the Columbia River and its major tributaries from 1912 through the 1970s; the US Army Corps of Engineers dredged the Clatskanie River to accommodate navigational concerns in 1924 and lowered the channel depth to -7.5 feet. Periodic dredging occurred until 1968 to maintain the channel depth, and again in 1998 by the City of Clatskanie. The combination of dam construction, dredging, flow training device construction, and bank stabilization projects has affected river velocities and sediment transport. Only limited major alterations have occurred since 1970 to the lower river system.

The following descriptions provide a brief overview of historic erosion events in Columbia County.

- Sand Island, located east of the City of St. Helens in the Columbia River, has experienced annual erosion loss.
- The shoreline at the Nehalem Street Bridge on the Clatskanie River lost 1.25 feet of depth between 1981 and 1996.
- A small side drainage coming into Conyer's Creek from the west caused road culvert damage.

Columbia County NHMP – Basic Plan

- In 2019 a strong winter rain event created high flow conditions on Fox creek in Rainier. This produced the undercutting of a parking lot near the confluence of the creek and the Columbia River.

Location

Columbia County has experienced erosion loss in several localized areas. Rivers, creeks, and tributaries within the county are subject to the effects of erosion include the Columbia, Clatskanie, and Nehalem Rivers, Beaver Creek, Conyer's Creek, Fox Creek, Nice Creek, Owl Creek, Rock Creek, and Bear Creek and several unidentified tributaries. The County experiences annual rain and wind events which assail river shorelines combined with landslides and debris flows within the watersheds, loss of plant cover in riparian areas, and river traffic induced erosion, particularly during severe storm events.

Historic Erosion Hazard Areas within Columbia County	
Community	Description of Location
City of Clatskanie	A number of locations within the Clatskanie River Basin (City of Clatskanie and upstream) occur where portions of the stream bank are unstable • Nehalem Street Bridge • Dirt road along Conyer's Creek • 25-75% of the Beaver Creek shoreline, which enters northeast of the City is subject to stream bank erosion.
Columbia City	North of Columbia City at McBride Creek and Columbia River.
City of Rainier	Nice Creek and Fox Creek as well as 25-75% of the Beaver Creek shoreline.
City of St. Helens	Sand Island and Columbia River shoreline along city boundary
City of Scappoose	Scappoose Creek (main and North and South areas as well as forks of Alder Creek and Coal Creek)
City of Vernonia	Nehalem River, Rock Creek, Knickerson Creek, Sheely Creek, and Bear Creek

Extent

A variety of natural and human-induced factors influence the erosion process. For example, embankment orientation and exposure to prevailing winds (which can be altered by human development) all influence erosion rates. Other factors that may influence riverine erosion include:

- Geomorphology (composition)
- Structure types along the river embankments

Columbia County NHMP – Basic Plan

- Development density
- Amount of encroachment in the high hazard zone
- Proximity of erosion-inducing structures
- Nature of the shoreline topography
- Embankment elevation
- Embankment wind exposure

The erosion rate depends on the sediment supply and amount of run-off reaching the watercourse. These variables are affected by many factors including earthquakes, floods, climatic changes, loss of bank vegetation, urbanization, and the construction of civil works in the waterway.

Erosion along the banks of the rivers and streams in Columbia County is generally caused by a combination of factors:

- The natural process of a watercourse to find the path of least resistance.
- Debris flows within the watershed.
- Loss of plant cover in of riparian areas.
- Logging.
- Increased boat traffic close to river embankments.
- Runoff from rainfall.

While erosion has been identified as occurring within the county, only one event was reported to result in damage (City of Clatskanie culvert at Conyer's Creek). Additionally, the Clatskanie River is reported to have lost 1.25 feet of depth over a 15-year period. Based on past events and the lack of development in proximity to erosion hazard areas, the magnitude and severity of erosion impacts in Columbia County are considered minor, though isolated areas are subject to higher risk.

Probability of Future Events

Based on historic events it is possible that structures located near the shoreline of the Columbia, Clatskanie, and Nehalem Rivers, and numerous creeks and tributaries are vulnerable to erosion. Erosion data is limited to localized geographic areas within the County.

El Niño/Southern Oscillation

ENSO comprise two weather phenomena known as El Niño and La Niña. While ENSO activities are not a hazard itself, it can lead to severe weather events and large-scale damage throughout the jurisdictions in Columbia County. Direct correlations have been found linking ENSO events to severe weather across the Pacific Northwest, particularly drought, flooding, and severe winter storms. (State of Oregon 2015) Therefore, increased awareness and understanding of the impacts of ENSO events on regional weather are important.

For more detailed discussions on drought, flood, and winter storms, please refer to their respective sections in this chapter.

Nature

ENSO weather patterns portray periodic warming and cooling of the central Pacific Ocean. This warming and cooling cycle has global implications as normal weather patterns are altered over vast areas of the world, causing changes in temperature and precipitation from Chile to Indonesia to the Pacific Northwest.

During El Niño periods, alterations in atmospheric pressure in equatorial regions yield an increase in the surface temperature off the west coast of South America. This gradual warming sets off a chain reaction affecting major air and water currents throughout the Pacific Ocean. In the North Pacific, the Jet Stream is pushed north, carrying moisture laden air up and away from its normal landfall along the Pacific Northwest coast. In Oregon, this shift results in reduced precipitation and warmer temperatures, normally experienced several months after the initial onset of the El Niño. These periods tend to last nine to twelve months, after which surface temperatures begin to trend back towards the long-term average.

La Niña periods ensue when surface temperatures increase past the long-term average. Typical weather patterns throughout the Pacific Ocean are strengthened, yielding stormier than normal weather throughout the Pacific Northwest. Above average precipitation and colder temperatures are experienced across Oregon during these periods, with the potential for severe snow storms increasing. These periods generally last longer than El Niño events, taking anywhere from one to three years to dissipate.

Both El Niño and La Niña periods tend to develop between March and June, and peak from December to April.

History

An examination of past ENSO patterns show El Niño and La Niña events are regularly observed in Oregon. Direct correlations have been found linking precipitation, temperature, and snowfall with ENSO across Oregon, including Columbia County (Taylor 2008). In general, El Niño periods result in warmer temperatures and lower precipitation, while La Niña periods are colder and wetter.

Strong El Niños of 1982 and 1997 were observed throughout the state, and the El Niño in 1994 resulted in widespread drought conditions. Alternatively, severe flooding caused by the heavy snow and intense rain in the winters of 1995-1996 and 1998-1999 were due to La Niñas.

Location

ENSO weather pattern effects are experienced on a global scale. Any local climate changes experienced in Columbia County will be reflective of a much broader trend impacting the entire Pacific Northwest. Hazards resulting from one of these periods will most likely be spread across large regions of the state, with adjoining counties experiencing similar conditions.

Columbia County NHMP – Basic Plan

Extent

Columbia County has a climate generally consisting of wet winters and dry summers. During El Niño years, decreased precipitation and increased temperatures throughout the winter can lead to drought. Alternatively, increased precipitation and decreased temperatures associated with La Niña periods can result in widespread flooding and severe winter storms.

Probability of Future Events

As climate scientists continue to unravel the oceanic and atmospheric relationships governing ENSO, predictive powers are growing. 1997 marked the first time an El Niño was accurately forecasted, and as more studies detail how ENSO impacts the Pacific Northwest, and Oregon in particular, hazard mitigation agencies will benefit from increased warning time. ENSO generally follows a two to seven-year cycle, with El Niño or La Niña periods occurring every three to five years. However, the cycle is highly irregular, and no set pattern exists. Furthermore, variations are likely to continue, and not all droughts and floods are related to El Niño or La Niña events.

Expansive Soils

Nature

The addition of moisture to any soil will cause a change in volume, which is referred to as a shrink-swell characteristic. Expansive soils are typically comprised of clay minerals that, under some conditions, can increase in volume when moisture is added. Clay soils consist of mineral particles that are less than 0.002 millimeters in diameter.

Linear extensibility is used to determine the shrink-swell potential of soils. Linear extensibility refers to the change in soil volume as the moisture content is decreased from a moist to a dry state. The amount and type of clay minerals in the soil influence volume change. The volume change is described as a percentage value change for the soil being tested. A low shrink-swell potential is considered less than a 3% change in soil volume; whereas a high shrink-swell potential is greater than 6% change in soil volume:

Expansive Soil Criteria Based on Shrink-Swell Potential	
Shrink-Swell Potential	Linear Extensibility (%)
Low	< 3
Moderate	3 - 6
High	6 - 9
Very High	> 9

Source: NRCS National Cooperative Soil Survey

Soil expansion may be caused by changes in soil moisture, variations in thickness and composition of the expansive foundation soil, non-uniform structural loads, and the geometry

Columbia County NHMP – Basic Plan

of the structure. Potential sources of moisture changes are variation in precipitation, poor gutter or water drainage, vegetation changes over time (such as root growth of nearby trees), and plumbing leaks. By affecting the relative moisture of soils underlying foundations, uneven movement such as localized heave can occur, causing shifting and non-uniform foundation movements, thus impacting the structures above.

However, many sources of soil moisture change can be avoided, minimized, or mitigated through planning and structure maintenance. Some signs of possible soil expansion include separation of joints and trim; cracks in walls, floors, or concrete; and bowed or non-vertical walls. Some possible mitigation measures are maintaining separation between structures and runoff, using compact fill to shed water, not absorb it, and planting trees a distance equal to their mature height away from buildings to reduce root interference.

Several different types of soil expansion related to structures and infrastructure exist, which can include but are not limited to:

- Doming heave - upward, long-term, dome-shaped foundation movement that develops over many years,
- Cyclic heave - shrink and swell associated with seasonal or water leak events,
- Edge heave - damaging edge or dish-shaped heaving, and
- Lateral movement – lateral thrust of expansive soils.

History

In 1982, expansive soils were documented as the costliest natural hazard in the US, causing more damage than all other natural hazards combined, including earthquakes, floods, tornadoes and hurricanes. Annual losses nationwide have been estimated between \$2 billion and \$9 billion. While expansive soils occur in Columbia County, there have been no historic damages reported.

Location

In Columbia County, approximately 18,925 acres contain soils with “moderate” to “high” rated shrink-swell potential, concentrated mainly in the northern portion of the county and along the Columbia River.

Potential damages to structures from expansive soils in Columbia County include cracks in grade beams, walls, and drilled shafts; distortion and cracking of pavements and on-grade floor slabs; failure of steel or concrete blocks supporting grade beams; jammed or misaligned doors and windows; and buckling of basement and retaining walls due to lateral forces. Extensive damage can potentially result in the condemnation of structures.

Extent

The geographic extent of expansive soil events is directly dependent on the extent of clay-based expansive soil types and the size and type of moisture event that triggers the soil

expansion. Another dependent factor for the extent is the amount and type of infrastructure that exists at the expansive soil location and near proximity, as well as the percentage volume change of the swelling or shrinking soil. The extent of expansive soil effects could be very local and limited to a single structure (i.e. resulting from a plumbing leak), or more landscape in nature due to a large area of soil moisture change (i.e. resulting from a large flood or storm event).

Probability of Future Events

Expansive soil events are difficult to predict because the location and time when water is available to the soil could happen at various periods in the life of a structure. Most soil expansion and associated structural damage has been shown to occur within five to eight years following construction. However, the effects of heave may also not be observed for many years until some change occurs in the foundation conditions to disrupt the moisture regime. The probability of damages increases for structures on expansive soils if the climate, effects of construction, and effects of occupancy promote moisture changes in the soil.

Drought

Nature

Drought is variously defined as a period of abnormally dry weather creating hydrologic imbalance, shortage of precipitation adversely affecting crops, or a period of below-average water in streams and lakes, reservoirs, aquifers, and soils. There is no universal measure of precipitation or dryness that signifies drought. Historically, droughts have been unpredictable and unavoidable events. Climate fluctuations occur everywhere, and periods of low precipitation are a normal, recurrent feature of climate.

Drought is commonly referenced in terms of its effects on agriculture, with crop damage or failure used to measure its effects. Other direct environmental effects of drought include livestock death or decreased production, wildland fire, impaired productivity of forest land, damage to fish habitat, loss of wetlands, and air quality effects. Indirect effects to society are measured by the economic and physical hardships brought on by drought and by the increased stress on residents of a drought-stricken area. The economic impact of drought is estimated between \$6 and \$8 billion annually in the United States. These costs primarily affect agricultural, forestry, fisheries, recreation and tourism, transportation and energy sectors. Drought is also associated with insect infestation, disease, and wind erosion.

Drought is usually thought of as a meteorological phenomenon, resulting from abnormally low precipitation. It can also be an institutional phenomenon, resulting from poor management of water supply and reserves – an imbalance in supply and demand – and is often due to a combination of these factors. Understanding drought as a recurring climate cycle is a first step toward creating management practices that effectively mitigate its effects.

Columbia County NHMP – Basic Plan

Drought is difficult to measure, due to its diverse geographical and temporal nature, and its operation on many scales. Despite that difficulty, various indices for measuring and characterizing drought can be useful. The Palmer Drought Indices and the Standardized Precipitation Index are most commonly used. Palmer's indices describe water balance—looking at water supply (precipitation), demand (transpiration), and loss (runoff)—on three scales; weekly during growing season, long-term cumulative measured by month, and another long-term scale that considers hydrological factors such as reservoir and groundwater levels. These are the Crop Moisture Index, the Palmer Drought Severity Index, and the Palmer Hydrological Drought Index, respectively. The Standardized Precipitation Index considers precipitation alone, comparing the probability of a region's receiving a given amount of precipitation (based on historical levels) in a given time period with precipitation recorded. (NOAA 2015)

There are four types of drought: meteorological, agricultural, hydrological and socioeconomic. Meteorological drought is based on the degree of dryness. Agricultural drought focuses the amount of soil moisture versus the needs of the crops. Hydrological drought is associated with shortfalls of surface and subsurface water supply. Socioeconomic drought refers to physical water shortages and its human effect and occurs when the need for water exceeds the supply resulting in a shortfall.

History

Drought occurs in all parts of Oregon and has had profound effects in the past on the state's economy, particularly the agricultural and hydro-power sectors. Environmental consequences have included insect infestations in forests, insufficient stream flows to support endangered fish species, and increased susceptibility to fire.

The following past drought events were recorded for Columbia County:

- 1928-1941 – Statewide prolonged drought caused major agricultural problems
- 1976-1981 – Stream flows were low for western Oregon; 1976 and 1977 were the driest years of the century.
- 1985- 1994 – Ten consecutive years of drought cause problems statewide; fires were common, and insects attacked trees; a drought emergency was declared in 1992.
- 1999 – Drought reduced spring and summer agriculture yields and delayed planting of winter wheat.
- 2000-2001 – Severe drought conditions; October 2000 to February 2001 was the second driest period of record in Washington and Oregon.
- 2005 – February 2005 was the driest since 1977.
- 2015-2016 a severe and widespread drought affected all of Oregon with 1005 of the state experiencing D2 severe drought or higher.

Location

Droughts occur in every climate zone and can vary from region to region. Drought occurs in all parts of Oregon, and has had profound effects on the state's economy, particularly the

Columbia County NHMP – Basic Plan

agricultural and hydro-power sectors. All jurisdictions in Columbia County are susceptible to drought.

Extent

Drought is often associated with El Niño events affecting the polar and subtropical jet streams. The polar jet stream dips southward causing the northwest to be drier than average. The severity of drought depends on the degree of moisture deficiency, duration, and size of the affected area. The agricultural sector is usually the first to feel the impacts of drought because of its dependence on soil moisture. Those reliant on surface and groundwater sources are usually the last to feel the effects of drought.

Probability of Future Events

As part of a statewide HMP process, county emergency management program managers conducted risk analyses to determine probability of, and vulnerability to, severe drought occurrence in each county. Oregon’s Partnership for Disaster Resilience assesses Columbia County as having an “average risk” for drought; a future drought affecting the planning area is likely.

Drought appears to be a cyclic part of the climate of Oregon, occurring in both summer and winter, with an average recurrence interval between 8 and 12 years. Short-term, seasonal events are more frequent, while the less frequent, long-term events have ranged from 3 to 12 years in length.

Estimating drought probability and frequency is difficult but understanding cyclic climate variations and other variables that contribute to weather behavior is advancing. Understanding ENSO weather systems are helping scientists to better predict weather changes in the Pacific Northwest.

Participating Jurisdictions

This is a multi-jurisdiction Hazard Mitigation Plan. In this update to the county plan all the incorporated cities participated. In addition, for the first time, several districts participated in the planning process, contributing their own annexes to the plan. The list below includes each of the jurisdictions that contributed annexes to this plan:

Columbia County NHMP – Basic Plan

Columbia County

Cities

City of St. Helens

City of Scappoose

City of Columbia City

City of Clatskanie

City of Rainier

City of Vernonia

City of Prescott

Districts

Mist-Birkenfeld Rural Fire Protection District

Greater St. Helens Aquatic District

Scappoose Drainage Improvement District

Columbia County NHMP – Basic Plan

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Columbia County
Hazard Mitigation Plan
Annex

2020 Update
Columbia County
Multi-Jurisdiction Hazard Mitigation Plan

Contents

Introduction	2
Planning Process and Capability Assessment	2
DMA 2000 Requirements: Planning Process	2
Steering Committee Participants	3
Public Participation.....	4
Capability Assessment.....	7
Hazard Identification and Risk Assessment	14
DMA 2000 Requirements: Hazard Identification and Risk Assessment	14
Hazard Identification	14
Values at Risk.....	15
Population Analysis	15
Asset Inventory.....	15
Critical Facilities and Infrastructure.....	15
Vulnerability Analysis	22
Methodology	22
Data	22
National Flood Insurance Policy	26
Mitigation Strategy.....	27
DMA 2000 Requirements: Mitigation Strategy	27
Identify Mitigation Goals.....	28
Evaluate and Prioritize Mitigation Actions	28
Mitigation Action Plan.....	36
Plan Adoption and Maintenance.....	41
DMA 2000 Requirements: Plan Review, Evaluation, Implementation, and Adoption...	41
Resolution of Adoption.....	42
Standing Review Committee	43

Introduction

This Annex contains information specific to the Columbia County and its unincorporated areas to support the Columbia County 2020 Multi-Jurisdictional Natural Hazard Mitigation Plan. This section further supports the County's planning process by summarizing the review and incorporation of existing plans, studies, and reports used to develop this NHMP. This annex is an addition to Columbia County's Hazard Mitigation Plan and shares attributes of that plan.

Planning Process and Capability Assessment

The following section includes a detailed capability assessment that describes the resources available to support this plan. The goal of this assessment is not to identify all capabilities the organization may have, but only those that are currently used or could be used to support mitigation efforts. Capabilities are arranged in tables by type and fall under the explicit authority of the jurisdiction/district.

DMA 2000 Requirements: Planning Process	
Planning Requirements	
§201.6(b)	An open public involvement process is essential to the development of an effective plan. In order to develop a more comprehensive approach to reducing the effects of natural disasters, the planning process shall include:
§201.6(b)(1)	(1) An opportunity for the public to comment on the plan during the drafting stage and prior to plan approval;
§201.6(b)(2)	(2) An opportunity for neighboring communities, local and regional agencies involved in hazard mitigation activities, and agencies that have the authority to regulate development, as well as businesses, academia and other private and non-profit interests to be involved in the planning process; and
§201.6(b)(3)	(3) Review and incorporation, if appropriate, of existing plans, studies, reports, and technical information.
§201.6(c)(1)	[The plan shall document] the planning process used to develop the plan, including how it was prepared, who was involved in the process, and how the public was involved.
§201.6(c)(4)(i)	[The plan maintenance process shall include a] section describing the method and schedule of monitoring, evaluating, and updating the mitigation plan within a five-year cycle.
§201.6(c)(4)(iii)	[The plan maintenance process shall include a] discussion on how the community will continue public participation in the plan maintenance process.
Planning Elements	
A1. Does the Plan document the planning process, including how it was prepared and who was involved in the process for each jurisdiction? 44 CFR 201.6(c)(1)	

- A2. Does the Plan document an opportunity for neighboring communities, local and regional agencies involved in hazard mitigation activities, agencies that have the authority to regulate development as well as other interests to be involved in the planning process? 44 CFR 201.6(b)(2)**
- A3. Does the Plan document how the public was involved in the planning process during the drafting stage? 44 CFR 201.6(b)(1) and 201.6(c)(1)**
- A4. Does the Plan document the review and incorporation of existing plans, studies, reports, and technical information? 44 CFR 201.6(b)(3)**
- A5. Is there discussion on how the communities will continue public participation in the plan maintenance process? 44 CFR 201.6(c)(4)(iii)**
- A6. Is there a description of the method and schedule for keeping the plan current (monitoring, evaluating and updating the mitigation plan within a 5-year cycle)? 44 CFR 201.6(c)(4)(i)**

Steering Committee Participants

Columbia County is dedicated to mitigating potential natural hazards to its population and infrastructure. To fulfill that goal, Columbia County Emergency Management empaneled the Homeland Security Emergency Management Commission (HSEMC) as the steering committee for this NHMP. The HSEMC consists of representatives of agencies, cities, and county departments, and is otherwise ideally composed to identify hazards and develop actions to mitigate damage and life losses from those threats.

Table 1 records the HSEMC/Steering Committee's participant list.

Table 1. Columbia County Update Steering Committee	
Name	Agency/Department/Affiliation
Anne Parrott	Columbia County Public Health – PHEP Coordinator
Johnathan Baker	Columbia County Emergency Management
Dan Brown	Columbia County – Community Action Team
Michael Carter	Rainier School District - Superintendent
Sean Clark	Port of Columbia County
Dave Crawford	Mist Birkenfeld RFPD
Della Graham	Columbia County Emergency Management
Diane Dillard	Sacagawea Health Center
Mike Fletcher	Columbia 911 Communications District - Director
Mike Greisen	Columbia River Fire and Rescue - Chief
Doug Hayes	Port of Columbia County – Executive Director
Greg Hinkleman	Clatskanie – City Manager
Pat LaPointe	Citizen Member
Lonny Welter	Columbia County – Roads Department
Margaret Magruder	Columbia County – County Commissioner
Mike McGlothlin	Columbia City – Chief of Police
Michael Paul	Columbia County Public Health - Director
Mike Deroia	City of St. Helens – Building Official

Columbia County Annex

Norm Miller	Scappoose – Chief of Police
Kelly Niles	Chair - Oregon Department of Forestry
Ian O'Connor	Columbia River Fire and Rescue – Division Chief
Bob Perry	Western Oregon Electrical Coop - Director
Shaun Brown	Columbia County Emergency Management
Steve Pegram	Columbia County Emergency Management - Director
Scot Stockwell	St. Helens School District - Superintendent
Todd Meunier	Citizen Member
Jeff VanNatta	Vice – Chair Citizen Member
Casey Wheeler	Columbia County Food bank

Public Participation

As defined by FEMA, Whole Community Planning is; a means by which residents, emergency management practitioners, organizational and community leaders, and government officials can collectively understand and assess the needs of their respective communities and determine the best ways to organize and strengthen their assets, capacities, and interests. By doing so, a more effective path to societal security and resilience is built.

This Hazard Mitigation Plan was conducted with opportunities for the public to participate to try and meet the goals of whole community planning. Table 2 highlights these efforts.

Table 2. Public Involvement Mechanisms	
Date	Description
2014	
7/19/2014	Columbia Emergency Preparedness Association EXPO – Large emergency management event covering all topics (preparedness, fire, law, mitigation, response).
9/20/2014	Columbia City Preparedness Fair - Engaged locals and visitors on topics like preparedness, and mitigation planning.
10/4/2014	Vernonia Salmon Festival - Engaged locals and visitors on topics like preparedness, and mitigation planning.
11/11/2014	HSEMC – Columbia County's Homeland Security and Emergency Management Commission is recognized by the Board of County Commissioners as the cornerstones of a whole community approach to emergency management planning. All jurisdictions are members of the commission. Semi Annual NHMP meeting, plan review was conducted.
2015	
5/12/2015	HSEMC – Columbia County's Homeland Security and Emergency Management Commission is recognized by the Board of County Commissioners as the cornerstones of a whole community approach to emergency management

Columbia County Annex

Table 2. Public Involvement Mechanisms	
Date	Description
	planning. All jurisdictions are members of the commission. Semi Annual NHMP meeting, plan review was conducted.
9/19/2015	Columbia City Preparedness Fair – Engaged locals and visitors on topics like preparedness, and mitigation planning.
11/10/2015	HSEMC – Columbia County’s Homeland Security and Emergency Management Commission is recognized by the Board of County Commissioners as the cornerstones of a whole community approach to emergency management planning. All jurisdictions are members of the commission. Semi Annual NHMP meeting, plan review was conducted.
2016	
4/2/2016	KOHI Radio Preparedness Talk – Radio talk show for Columbia County, topics “specifically included preparing for the next flood event”.
4/3/2016	CERT Preparedness Meet-up – Locals interested in public volunteerism met with St. Helens CERT.
5/10/2016	HSEMC – Columbia County’s Homeland Security and Emergency Management Commission is recognized by the Board of County Commissioners as the cornerstones of a whole community approach to emergency management planning. All jurisdictions are members of the commission. Semi Annual NHMP meeting, plan review was conducted.
5/24/2016	Neighborhood Association Meeting Talk – Presentation to local HOA.
6/4/2016	Ford Family Foundation Preparedness Fair - County wide event to promote preparedness and mitigation in cooperation with the Ford Family Foundation. All cities participated.
6/9/2016	Geologic Hazards presentation – Presentation by local Geologic Hazards Coordinator in Clatskanie.
7/23/2016	Columbia Emergency Preparedness Association EXPO – Large emergency management event covering all topics (preparedness, fire, law, mitigation, response).
9/17/2016	Columbia City Preparedness Fair – Engaged locals and visitors on topics like preparedness, and mitigation planning.
9/22/2016	Columbia County Soil and Water Conservation District – Event hosted by SWCD on preparedness and flood mitigation efforts.
11/15/2016	HSEMC – Columbia County’s Homeland Security and Emergency Management Commission is recognized by the Board of County Commissioners as the cornerstones of a whole community approach to emergency management planning. All jurisdictions are members of the commission. Semi Annual NHMP meeting, plan review was conducted.
2017	
2/16/2017	Kiwanis Presentation – Preparedness Presentation on CSZ risk.

Table 2. Public Involvement Mechanisms	
Date	Description
4/4/2017	Paradise Moorage Presentation – topics included homeowner action to prepare for CSZ and mitigate against seiches in the Multnomah Channel.
5/9/2017	HSEMC – Columbia County’s Homeland Security and Emergency Management Commission is recognized by the Board of County Commissioners as the cornerstones of a whole community approach to emergency management planning. All jurisdictions are members of the commission. Semi Annual NHMP meeting, plan review was conducted.
9/16/2017	Columbia City Preparedness Fair - Engaged locals and visitors on topics like preparedness, and mitigation planning.
9/23/2017	Clatskanie Safety and Preparedness Fair - Engaged locals and visitors on topics like preparedness, and mitigation planning.
11/14/2017	HSEMC – Columbia County’s Homeland Security and Emergency Management Commission is recognized by the Board of County Commissioners as the cornerstones of a whole community approach to emergency management planning. All jurisdictions are members of the commission. Semi Annual NHMP meeting, plan review was conducted.
11/29/2017	Unprepared showing – St. Helens - presentation of OPB documentary regarding CSZ earthquake and tsunami.
12/8/2017	Fishhawk Lake - Presentation to local HOA
2018	
1/19/2018	Preparedness to Vets Group – Presentation to Veterans regarding personal preparedness and flood mitigation.
1/29/2018	Unprepared showing – Mist/Birkenfeld – presentation of OPB documentary regarding CSZ earthquake and tsunami.
5/8/2018	HSEMC – Columbia County’s Homeland Security and Emergency Management Commission is recognized by the Board of County Commissioners as the cornerstones of a whole community approach to emergency management planning. All jurisdictions are members of the commission. Semi Annual NHMP meeting, plan review was conducted and plans for plan update discussed.
9/13/18	Family Preparedness event – Family specific information for preparing for a disaster.
10/14/18	South County Chamber - Preparedness Presentation on CSZ risk.
10/15/18	Columbia City Preparedness Fair - Engaged locals and visitors on topics like preparedness, and mitigation planning.
11/13/2018	HSEMC – Columbia County’s Homeland Security and Emergency Management Commission is recognized by the Board of County Commissioners as the cornerstones of a whole community approach to emergency management planning. All jurisdictions are members of the commission. Semi Annual County-wide Hazard Mitigation meeting. Work Session on Hazard Mitigation Plan update conducted.

Table 2. Public Involvement Mechanisms	
Date	Description
11/27/2018	Pints and Preparedness – various topics including Hazard mitigation, and individual preparedness.
2019	
1/22/2019	Pints and Preparedness – various topics including Hazard mitigation, and individual preparedness.
2/20/2019	St. Helens Mitigation – Public meetings with presentations regarding mitigation planning.
3/26/2019	Drainage Districts Mitigation – Public meetings with presentations regarding mitigation planning.
3/26/2019	Pints and Preparedness – various topics including Hazard mitigation, and individual preparedness.
5/7/2019	HSEMC – Columbia County’s Homeland Security and Emergency Management Commission is recognized by the Board of County Commissioners as the cornerstones of a whole community approach to emergency management planning. All jurisdictions are members of the commission. Semi Annual County-wide Hazard Mitigation meeting. Work Session on Hazard Mitigation Plan update conducted.
4/16/2019	Drainage Districts Mitigation – Public meetings with presentations regarding mitigation planning.
4/23/2019	Pints and Preparedness – various topics including Hazard mitigation, and individual preparedness.
9/7/2019	Preparedness for Scouts – Presentation on preparedness for all hazards.
9/14/2019	Columbia City Preparedness Fair - Engaged locals and visitors on topics like preparedness, and mitigation planning.
9/28/2019	Clatskanie Safety Fair - Engaged locals and visitors on topics like preparedness, and mitigation planning.

Capability Assessment

Table 3, 4, and 5 contain the Columbia County resources used to support planning activities, including the reports and studies reviewed as part of the update process.

Table 3. Columbia County Legal and Regulatory Resources Available for Hazard Mitigation		
Regulatory Tool	Name	Effect on Hazard Mitigation
Plans	2009/2014 Columbia County Multi-Jurisdictional Hazard Mitigation Plan	The primary objectives of the Mitigation plan are to reduce the negative impacts of future disasters on the community: to save lives and reduce injuries, minimize damage to buildings and infrastructure (especially critical facilities), and minimize economic losses. The Mitigation Plan is a planning document, not a regulatory document.
	Transportation System Plan	The Comprehensive Plan contains public policy concerning the development and conservation of the County's resources, and provision of public facilities and services. The policies and objectives of the plan must be consistent with the Statewide Planning Goals and Guidelines and Administrative Rules. 1) The plan emphasizes natural resources including land, air, and water and how they are to be preserved, conserved, managed, or utilized. 2) Constraints on development, such as resource limitations as well as the physical limitations of the public and private sectors in providing necessary services. 3) The locations for various types of land and water uses and activities in an area, such as agricultural, forestry, residential, commercial, public, and industrial. 4) The utilities, services, and facilities needed to support current and contemplated uses and activities. 5) Considerations deriving from special values and needs of the area, such as housing, energy supplies, recreational facilities, and scenic areas. The plan is a document upon which public agencies, private firms, and individuals must be able to rely so that their decisions are consistent with land use policies as well as Statewide Goals and Guidelines. The plan is implemented by zoning and subdivision regulations, which must be consistent with the overall Policies and Objectives reflected in the plan.
	Emergency Operations Plan (EOP)	The Transportation System Plan (TSP) for Columbia County provides the framework to guide development of the transportation system into the twenty-first century. It addresses the needs, funding resources, and implementation requirements to respond to future growth in population and employment. All modes of transportation are considered, including vehicular and freight movement, public transit, walking and bicycling, service for the transportation disadvantaged, railroad, air, water, and pipeline transportation. This plan provides for transportation development in the rural areas of Columbia County. In a separate process, TSP documents

Table 3. Columbia County Legal and Regulatory Resources Available for Hazard Mitigation		
Regulatory Tool	Name	Effect on Hazard Mitigation
		have been previously completed for most incorporated cities within the County.
	Columbia County Debris Management Plan	This plan describes the roles and responsibilities of the departments and certain other agencies (including Special Districts) during major emergencies or disasters. The plan sets forth a strategy and operating guidelines using the National Incident Management System's (NIMS) Incident Support Model, adopted by the County for managing its response and recovery activities during emergencies and disasters. It is the intent of the County to integrate all emergency response systems into a program for comprehensive emergency management.
	Columbia County Community Wildfire Protection Plan (CWPP)	To facilitate and coordinate the removal, collection, and disposal of debris following a disaster, to mitigate against any potential threat to the health, safety, and welfare of the impacted citizens, and expedite recovery efforts in the impacted area, and address any threat of significant damage to improved public or private property.
	National Flood Insurance Program (NFIP)	Document serves as a resource for the wildland urban interface fire threat mitigation through community education and awareness, prioritized hazard and risk reduction, and community action partnerships. The Columbia County Community Wildfire Protection Plan (CWPP) is a strategic planning document that forms a foundation for a realistic assessment of wildfire risks in our county and develops plans or action statements of what we can do as a community to mitigate wildfire threats to life, property, and natural resources.
Programs	Community Rating System (CRS) Rating	Makes affordable flood insurance available to homeowners, business owners, and renters in participating communities. In exchange, those communities must adopt and enforce minimum floodplain management regulations to reduce the risk of damage from future floods.
	Zoning and Land Use Ordinances	This rating demonstrates the County's commitment to floodplain mitigation. The County has incorporated programs, which surpasses the basic NFIP requirements and have subsequently earned a rating, which reduces their NFIP policyholder's insurance premiums.
Policies	Columbia County Storm Water and Erosion Control Ordinance	Flood Overlay Zone Regulations – Flood Plain Ordinance regulates development within the floodplain.
	State of Oregon Uniform Building Codes	The purpose of this ordinance is to: •Prevent water quality degradation of the county's water resources;

Table 3. Columbia County Legal and Regulatory Resources Available for Hazard Mitigation		
Regulatory Tool	Name	Effect on Hazard Mitigation
		• Prevent damage to property from increased runoff rates and volumes; • Protect the quality of waters for drinking water supply, contact recreation, fisheries, irrigation, and other beneficial uses; • Establish sound development policies which protect and preserve the county's water and land resources; • Protect County roads and right-of-ways from damage due to inadequately controlled runoff and erosion; • Protect the health, safety, and welfare of the inhabitants of the County; • Maintain existing stream flows; and • Preserve and enhance the aesthetic quality of the County's water resources.
	Emergency Services and Communications Statute (ORS 401)	The Building Codes Division (BCD) provides code development, administration, inspection, plan review, licensing, and permit services to the construction industry. These are integral to the safe and effective construction of structures in Oregon and are administered by the County. The division was added to the newly formed Department of Consumer & Business Services in 1993.
	Emergency Services and Communications Statute (ORS 401)	(1) The general purpose of ORS 401.015 to 401.107, 401.257 to 401.325 and 401.355 to 401.584 is to reduce the vulnerability of the State of Oregon to loss of life, injury to persons or property, and human suffering and financial loss resulting from emergencies, and to provide for recovery and relief assistance for the victims of such occurrences. (2) It is the declared policy and intent of the Legislative Assembly that preparations for emergencies and governmental responsibility for responding to emergencies be placed at the local government level. The state shall prepare for emergencies but shall not assume authority or responsibility for responding to such an event unless the appropriate response is beyond the capability of the County and county in which it occurs, the County or county fails to act, or the emergency involves two or more counties.
	Subdivision and Partitioning Ordinance	The purpose of this ordinance is to establish standards and procedures for the partitioning of land in the County outside the incorporated cities' boundaries. These regulations are necessary in order to provide uniform procedures and standards for the subdivision of land, to assure adequate width of streets, to coordinate proposed development with plans for utilities and other public

Table 3. Columbia County Legal and Regulatory Resources Available for Hazard Mitigation		
Regulatory Tool	Name	Effect on Hazard Mitigation
		facilities, to avoid undue congestion of population, to assure adequate sanitation and water supply, to provide for the protection, conservation, and proper use of land and to protect in other ways the public's health, safety, and welfare. This ordinance is supplemental to the provisions of the Columbia County Zoning Ordinance of 1985. Where conflicts exist with the provisions of the Zoning Ordinance, this ordinance will take precedence.

Table 4. Columbia County Administrative and Technical Resources for Hazard Mitigation

Staff/Personnel Resources	Department/Division Position
Planner(s) or engineer(s) with knowledge of land development and land management practices	Land Development Services / Planning Division
Engineer(s) or professional(s) trained in construction practices related to buildings and/or infrastructure	Land Development Services / Building Division and County Road Department
Planner(s) or engineer(s) with an understanding of manmade or natural hazards	Emergency Management, Staff and Director
Floodplain manager	Land Development Services / Planning Division
Personnel skilled in GIS and/or HAZUS-MH	Assessment and Taxation / County Cartographer (GIS Only)
Emergency Services	Emergency Management, Director
Finance (grant writers, purchasing)	County Finance Department
Public Information Officers	Board of County Commissioners / Public Information Officer

Table 5. Columbia County Financial Resources for Hazard Mitigation

Financial Resources	Effect on Hazard Mitigation
General funds	Yes
Authority to levy taxes for specific purposes	yes, with voter approval
Incur debt through general obligation bonds	yes, with voter approval
Incur debt through special tax and revenue bonds	yes, with voter approval
Incur debt through private activity bonds	No
Hazard Mitigation Grant Program (HMGP)	FEMA funding which is available to local communities after a Presidentially-declared disaster. It can be used to fund both pre- and post-disaster mitigation plans and projects.
Pre-Disaster Mitigation (PDM) grant program	FEMA funding which is available on an annual basis. This grant can only be used to fund pre-disaster mitigation plans and projects only.
Flood Mitigation Assistance (FMA) grant program	FEMA funding which is available on an annual basis. This grant can be used to mitigate repetitively flooded structures and infrastructure to protect repetitive flood structures.

Table 5. Columbia County Financial Resources for Hazard Mitigation	
Financial Resources	Effect on Hazard Mitigation
United States Fire Administration (USFA) Grants	The purpose of these grants is to assist state, regional, national or local organizations to address fire prevention and safety. The primary goal is to reach high-risk target groups including children, seniors and firefighters.
Fire Mitigation Fees	Used to finance future fire protection facilities' construction and other fire capital expenditures to protect new development. The County Council or Fire District may charge fire mitigation fees to ensure new development pays their fair share of constructing these improvements.

Hazard Identification and Risk Assessment

DMA 2000 Requirements: Hazard Identification and Risk Assessment	
Planning Requirements	
§201.6(c)(2)(i)	The risk assessment shall include a] description of the type, location and extent of all-natural hazards that can affect the jurisdiction. The plan shall include information on previous occurrences of hazard events and on the probability of future hazard events.
§201.6(c)(2)(ii)	The risk assessment shall include a] description of the jurisdiction's vulnerability to the hazards described in paragraph (c)(2)(i) of this section. This description shall include an overall summary of each hazard and its impact on the community. All plans approved after October 1, 2008 must also address NFIP insured structures that have been repetitively damaged by floods. The plan should describe vulnerability in terms of:
§201.6(c)(2)(ii)(A)	(A) The types and numbers of existing and future buildings, infrastructure, and critical facilities located in the identified hazard areas;
§201.6(c)(2)(ii)(B)	(B) An estimate of the potential dollar losses to vulnerable structures identified in ... this section and a description of the methodology used to prepare the estimate.
§201.6(c)(2)(ii)(C)	(C) Providing a general description of land uses and development trends within the community so that mitigation options can be considered in future land use decisions.
§201.6(c)(2)(iii)	For multi-jurisdictional plans, the risk assessment section must assess each jurisdiction's risks where they vary from the risks facing the entire planning area.
Planning Elements	
B1. Does the Plan include a description of the type, location, and extent of all-natural hazards that can affect each jurisdiction? 44 CFR 201.6(c)(2)(i) and 44 CFR 201.6(c)(2)(iii)	
B2. Does the Plan include information on previous occurrences of hazard events and on the probability of future hazard events for each jurisdiction? 44 CFR 201.6(c)(2)(i)	
B3. Is there a description of each identified hazard's impact on the community as well as an overall summary of the community's vulnerability for each jurisdiction? 44 CFR 201.6(c)(2)(ii)	
B4. Does the Plan address NFIP insured structures within each jurisdiction that have been repetitively damaged by floods? 44 CFR 201.6(c)(2)(ii)	

Hazard Identification

In the Basic Plan of this Natural Hazard Mitigation Plan, a detailed hazard profile was developed for the entire county. This was done with the intent of providing a shared overview for the participating jurisdictions and districts in this plan, while allowing them to add location specific notes, experiences, and additional data in their annexes as desired. However, the shared hazard profile provides all the information necessary for hazard identification for the purposes of the County annex. Therefore, no additional information will be presented in this section. Please

refer to pages 8-44 in the Basic Plan for a detailed discussion of Columbia County's Hazard Profile

Values at Risk

Population Analysis

Population data listed in Table 6 were obtained from the 2010 U.S. Census and Portland State University. It comprises census block level data and estimates from university conducted community research.

Table 6. Population		
2010 Census*	2018 Estimate*	Percent Change
49,351	51,900	+5.1%

*US Census Bureau, 2011–2015 American Community Survey (<https://factfinder.census.gov/>)

**Portland State University, Population Research Center (<https://www.pdx.edu/prc/population-reports-estimates>)

Asset Inventory

The Asset Inventory describes the physical values; the public facilities, and infrastructure within Columbia County that may be affected by hazard events. These values are described in Tables 7 and 8.

Columbia County seeks to protect its population by supporting Columbia County and Oregon State initiatives, ordinances, building codes, and development regulations. One of the most important initiatives is to prohibit or not allow future development of buildings, infrastructure and critical facilities in identified high hazard areas. Any essential infrastructure component will undergo stringent review to ensure potential hazard risk will be mitigated.

Table 7. Residential Buildings	
Total Building Count	Total Value of Buildings (\$)
17,572	2,648,100,400

Critical Facilities and Infrastructure

A critical facility is defined as a local (non-State or Federal) facility in either the public or private sector that provides essential products and services to the general public, such as preserving life in Columbia County and fulfilling essential public safety, emergency response, and disaster recovery functions. The critical facilities profiled in this plan are provided in Table 8.

Columbia County Annex

Table 8. Critical Facilities and Infrastructure

Facility Type	Name / Number	Address	Value ¹
Government	County Courthouse and Administrative Offices	230 Strand Street., St. Helens, OR 97051	\$32,960.00
	Old County Courthouse	230 Strand Street., St. Helens, OR 97051	\$9,350,433.32
	Jail – Men’s Transitional House	280 Strand Street, St. Helens, OR 97051	\$5,042,656.25
	Jail - Women’s Transitional House	901 Port Avenue., St. Helens OR 97051	\$265,842.00
	County Road Department	901 Port Avenue, St. Helens, OR 97051	\$213,330.00
	Road Department Building	1004 Oregon Street, St. Helens, OR 97051	\$1,411,391.28
	Animal Control	1054 Oregon Street, St. Helens, OR 97051	\$790,760.70
	Columbia County Fair Grounds	2084 Oregon Street, St. Helens, OR 97051	\$735,396.65
	Clatskanie Shop Bldg (Road Dept)	58892 Saulser Road, St. Helens, OR 97051	\$3,916,329.64
	Rainier Shop Equipment Shed (Road Dept)	5th Street, Clatskanie, OR 97016	\$339,532.75
	Vernonia Shop Bldg (Road Dept)	30526 Brownlee Road, Rainier, OR 97048	\$464,930.31
Emergency Response	Sheriff’s Office / Jail Community Corrections	901 Port Avenue, St. Helens, OR 97051	\$16,183,948.97
	Emergency Operations Center	58595 McNulty Way, St. Helens, OR 97051	\$639,246.08
	Columbia 911 Communications District	58688 McNulty Way, St. Helens, OR 97051	\$830,346.88 office building \$2,351,200.00 Contents and tower
	Microwave Relay Stations	Various locations	\$2,065,544.20
	Clatskanie Rural Fire (CRF)– Main	230 SE 3Rd Clatskanie, OR	\$1,278,886.00
	CRF – Substation 1	76015 Atkins Road, Rainier, OR	\$260,372.00

Columbia County Annex

Table 8. Critical Facilities and Infrastructure

Facility Type	Name / Number	Address	Value ¹
	Columbia River Fire and Rescue (CRF&R) Administrative Office	270 Columbia Blvd, St. Helens, OR	\$616,665.92
	CRF&R Columbia County Station	400 G Street, Columbia County, OR	\$28,444.00
	CRF&R Fairgrounds Station	58798 Sausler Road, St. Helens, OR	\$380,580.72
	CRF&R Rainier Station	211 W 2 nd Street, Rainier, OR	\$1,872,175.33
	CRF&R St. Helens Station	105 S 12 th Street, St. Helens, OR	\$3,041,144.96
	CRF&R Maintenance Shop	58555 McNulty Way, St. Helens, OR	\$476,984.00
	CRF&R Garage – Goble	69321 Nicolai Road, Goble, OR	\$82,487.60
	CRF&R Garage – Rainier	73667 Neer County Road, Rainier, OR	\$16,410.00
	CRF&R Fire Station – Deer Island	33701 Canaan Road, Deer Island, OR	\$380,580.72
	CRF&R Fire Station – Fernhill	73153 Doan Road, Rainier, OR	\$375,460.80
	CRF&R Fire Station – Goble	69321 Nicolai Road, Goble, OR	\$375,460.80
	Mist-Birkenfeld Rural Fire Protection District – Main Station	12525 Highway 202, Mist, OR	\$1,349,996.00 Building \$170,664.00 Contents
	Mist-Birkenfeld Rural Fire Protection District – Sager Sub Station # 2	75125 Highway 202, Clatskanie, OR	\$80,956.00
	Mist-Birkenfeld Rural Fire Protection District – Station # 3	71921 N Shore Drive, Clatskanie, OR	\$99,554.00
	Mist-Birkenfeld Rural Fire Protection District – Sub Station # 4	65551 Nehalem Highway, Vernonia, OR	\$84,238.00
	Mist-Birkenfeld Rural Fire Protection District – Storage	67131 Burris Road, Vernonia, OR	\$49,230.00
	Mist-Birkenfeld Rural Fire Protection District – Storage	11131 Highway 202, Birkenfeld, OR	\$73,298.00
	Scappoose Rural Fire Protection District (RFPD) Main	52751 Columbia River Highway, Scappoose, OR	\$2,526,046.00
	Scappoose RFPD – Boathouse Lighthouse Moorage	34323 Johnson Landing Road, Scappoose, OR	\$29,538.00
	Scappoose RFPD – Chapman	27713 Chapman Road, Scappoose, OR	\$271,312.00

Columbia County Annex

Table 8. Critical Facilities and Infrastructure

Facility Type	Name / Number	Address	Value ¹
	Scappoose RFPD – Holbrook	19260 NW Cleetwood Dr, Portland, OR	\$80,956.00
	County Sheriff's Sub Station Delena Fire Station	76015 Atkins Rd. Clatskanie, OR 97016	\$5,432.80
	Mist-Birkenfeld County Sheriff's Substation	12525 Hwy 202, Mist, OR	\$2,635.45
Care Facility	Legacy Clinic	500 Columbia River Hwy, St. Helens, OR 97051	\$1,183,161.00
	Providence Medical Center	510 Bridge Street, Vernonia, OR 97064	Unknown
	OHSU Clinic	53177 Old Portland Road, Scappoose, OR	\$294,986.16
	Clatskanie Family Health Center	401 SW Bel Air Drive, Clatskanie, OR	Unknown
	Avamere at St. Helens	2400 Gable Road, St. Helens	\$191,450.00
	Clatskanie Care Center	203 SW Bel Air Drive, Clatskanie, OR	Unknown
	Columbia Care	33910 Columbia Avenue, Scappoose, OR	Unknown
County Roads	There are 553 miles of county-maintained roads in Columbia County	County wide	553 x \$415,720 = \$229,893,160.00
Railroads	Portland and Western Railroad	51 miles	
Bridges	There are 97 county maintained non state or federally owned bridges in Columbia County		Total value of all bridges estimated at: \$80,349,752.24
Transportation Facilities	Dixieline Lumber Co (deep water dock)	62420 Columbia River Hwy, Columbia County, OR	Unknown
	Knife River Dock	63180 Columbia River Hwy, Deer Island, OR	Unknown
	Port of St Helens Facility, Port Westward	(deep water port, 1,250 ft dock) Clatskanie, OR 97016	Unknown
	Port of St Helens Facility, Rainier – Teevins Bros	(deep water access) Rainier, OR 97048	Unknown

Columbia County Annex

Table 8. Critical Facilities and Infrastructure

Facility Type	Name / Number	Address	Value ¹
	Columbia County Rider	1155 Deer Island Road St Helens, OR 97051	Unknown
Utilities	Meissner Radio Repeater		\$20,639.40
	Fishhawk Lake Recreation Club Inc, Water Treatment Plant		\$39,723.14
	KOHI Radio Station		\$1,312,800.00
	Rainier Waste Water Treatment Plant		Unknown
	Transfer Station		\$757,321.50
	Clatskanie PUD, Main Office		Unknown
	Clatskanie PUD, Conservation Bldg		\$202,556.29 Building \$46,420.61 Contents
	Clatskanie PUD, Warehouse		\$2,328.00 Building \$11,605.15 Contents
	Clatskanie PUD, Pole Yard		\$2,133,399.55 Building \$1,740,772.80 Contents
	Clatskanie PUD, Bradbury Substation		\$58,196.42
	Clatskanie PUD, Clatskanie Substation		\$5,716,150.00
	Clatskanie PUD, Delena Substation		\$1,790,265.36
	Clatskanie PUD, Rainier Substation		\$1,783,438.80
	Clatskanie PUD, Rainier Switching Station		\$1,790,265.36
	Clatskanie PUD, Wauna Substation		\$178,343.88
	Clatskanie PUD, Gas Turbine		\$9,145,840.00
	Columbia River PUD		\$6,885,636.00
	Western Oregon Electric Coop, Inc (WOEC), Headquarters		\$24,138,203.07
	WOEC Warehouse		\$898,721.00
	WOEC Overhead Transmission Lines		\$459,480.00
	WOEC Underground Transmission Lines		\$7,548,600.00
	WOEC Storage Buildings		\$153,160.00
	WOEC Substation 1		\$2,188,000.00
	WOEC Substation 2		\$2,188,000.00

Columbia County Annex

Table 8. Critical Facilities and Infrastructure

Facility Type	Name / Number	Address	Value ¹
	WOEC Substation 3		\$2,188,000.00
	WOEC Substation 4		\$2,188,000.00
	Deer Island Water Works		Unknown
	Fishhawk Lake Recreation Club Inc, Sewage Treatment Plant		Unknown
	McNulty Water PUD Association		Unknown
	Quincy Water Association		\$23,061.52
	Woodson Water Association		\$202,411.88
	Scappoose Water Treatment Plant – Primary		Unknown
	Scappoose Water Treatment Plant – Secondary		Unknown
	Scappoose Waste Water Treatment Plant		Unknown
	St. Helens Waste Water / Sewage Treatment Plant		\$29,829,624.30
	Vernonia Water Treatment Plant		\$3,428,596.00
	Vernonia Waste Water Treatment Plant		Unknown
	Northwest Natural - Natural Gas and Pipelines		Unknown
	BPA and PGE transmission		Unknown
Dams	Vernonia Log Pond		Unknown
	James O. Fisher Reservoir		Unknown
	Petes Slough		Unknown
	Deep Lake Reservoir		Unknown
	Ruby Lake Reservoir		Unknown
	Millionaire Lake Reservoir		Unknown
	Salmonberry Reservoir		Unknown
	Sherman Stock Reservoir # 1		Unknown
	Sherman Stock Reservoir # 2		Unknown
	Bauder Reservoir		Unknown
	Beaver Drainage District	P.O. Box 201, Clatskanie, OR 97016	Unknown
	Clatskanie Drainage Improvement Company	P.O. Box 201, Clatskanie, OR 97016	Unknown
	Columbia Drainage #1	33491 NW Reeder Road, Portland, OR 97231	Unknown

Table 8. Critical Facilities and Infrastructure

Facility Type	Name / Number	Address	Value ¹
	Deer Island Drainage	St. Helens, OR 97051	Unknown
	Fishhawk Lake	9997 Beach Drive, Clatskanie, OR (Birkenfeld, OR)	Unknown
	John Drainage Improvement Company	79338 Stewart Creek Road, Clatskanie, OR 97016	Unknown
	Marshland Drainage Improvement	12589 Hwy 30, Clatskanie, OR 97016	\$1,094.00
	Magruder Drainage Improvement Company	15914 Colvin Road, Clatskanie, OR 97016	Unknown
	Midland Drainage Improvement	15694 Luxford Road, Clatskanie, OR 97016	\$744,707.68
	Rainier Drainage Improvement	75442 Fern Hill Road, Rainier, OR 97048	Unknown
	Sauvie Island Drainage Improvement	34856 E. Columbia Avenue, Scappoose,	Unknown
	Scappoose Drainage Improvement	53466 E. Honeyman Road, Scappoose, OR 97056	Unknown
	Westland Drainage Improvement Company	P.O. Box 201, Clatskanie, OR 97016	Unknown
	Clatsop Diking Improvement Company	P.O. Box 201, Clatskanie, OR	Unknown
	Woodson Drainage District	77521 Woodson Road, Clatskanie, OR 97016	Unknown

¹ The valuations of these properties were calculated as the 2014 insured values of the buildings multiplied by 8.6% in order to account for inflation between 2014-2019 as referenced by the Bureau of Labor Statistics

Vulnerability Analysis

A vulnerability analysis predicts the extent of exposure, and the impacts that may result from a hazard event of a given intensity in each area. The analysis provides quantitative data that may be used to identify and prioritize potential mitigation measures by allowing communities to focus attention on areas with the greatest risk of damage.

The Tables 9, 10, 11 are derived from the best available data for facility locations and values. In many cases, values were unavailable, and therefore the totals listed below should be considered incomplete and likely less than the actual costs associated with the respective hazards

Methodology

A conservative exposure-level analysis was conducted to assess the risks of the identified hazards. This analysis is a simplified assessment of the potential effects of the hazards on values at risk without consideration of probability or level of damage.

Using census block level information, a spatial proportion was used to determine the percentage of the population and residential and nonresidential structures located where hazards are likely to occur. Census blocks that are completely within the boundary of a hazard area were determined to be vulnerable and were totaled. A spatial proportion was also used to determine the amount of linear assets, such as highways, within a hazard area. The exposure analysis for linear assets was measured in miles.

Replacement values or insurance coverage were developed for physical assets. For facilities that didn't have specific values per building in a multi-building scenario (e.g., schools), the buildings were grouped together and assigned one value where available. Value information is not available for all critical facilities at this time and will be collected as it becomes available. For each physical asset located within a hazard area, exposure was calculated by assuming the worst-case scenario (that is, the asset would be destroyed and would have to be replaced). Finally, the aggregate exposure, in terms of replacement value or insurance coverage, for each category of structure or facility was calculated.

Data

The vulnerability estimates provided herein use the best data currently available, and the methodologies applied result in an approximation of risk. These estimates may be used to understand relative risk from hazards and potential losses. However, uncertainties are inherent in any loss estimation methodology, arising in part from incomplete scientific knowledge concerning hazards and their effects on the built environment as well as the use of approximations and simplifications that are necessary for a comprehensive analysis.

Columbia County Annex

Table 9. Columbia County Potential Hazard Exposure Analysis Overview – Population and Buildings

			Population	Buildings			
				Residential		Non-Residential	
Hazard Type	Hazard Area	Methodology	Number	Number	Value (\$) ¹	Number	Value (\$) ¹
Flood	Moderate	500-year floodplain	31,889	9,337	1,407,085,900	49	unknown
	High	100-year floodplain	22,145	8,686	1,308,980	48	unknown
Winter Storm		descriptive	49,163	17,572	2,648,100,400	91	unknown
Landslide	Moderate	>14-32 degrees	34,155	13,075	1,970,402,500	63	unknown
	High	>32-56 degrees	21,896	8,437	1,271,455,900	34	unknown
Wildland Fire	Moderate	Moderate fuel rank	44,470	16,784	2,529,348,800	91	unknown
	High	High fuel rank	38,825	14,793	2,229,305,100	75	unknown
	Very High	Very high fuel rank	25,791	9,856	1,485,299,200	38	unknown
	Extreme	Extreme fuel rank	11,856	4,559	687,041,300	20	unknown
Earthquake	Strong	9-20% (g)	44,113	16,552	2,494,386,400	91	unknown
	Very strong	20-40% (g)	726	404	60,882,800	0	unknown
	Severe	>40-60% (g)	0	0	0	0	0
Volcano		descriptive	49,163	17,572	2,648,100,400	91	unknown
Wind		descriptive	49,163	17,572	2,648,100,400	91	unknown
Erosion		within 300’ of potential areas of erosion	--	925	139,397,500	11	unknown
ENSO (El Niño and La Niña)		descriptive	49,163	--	--	--	--
Expansive Soils	Low	<3% percent	--	14,482	2,182,437,400	71	unknown
	Moderate	3-6 percent	15,320	6,038	909,926,600	26	unknown
	High	6-9%	623	250	37,675,000	0	unknown
	Very High	>9%	0	0	0	0	0
Drought		descriptive	--	--	--	--	--

¹ Average insured structural value of all residential buildings (including single-family dwellings, mobile homes, etc., is \$150,700 per structure).

Columbia County Annex

Table 10. Columbia County Potential Hazard Exposure Analysis Overview – Critical Facilities

Hazard Type	Hazard Area	Methodology	Government		Emergency		Educational		Care		Community	
			No.	Value (\$) ¹	No.	Value (\$) ¹	No.	Value (\$) ¹	No.	Value (\$) ¹	No.	Value (\$) ¹
Flood	Moderate	500-year floodplain	6	13.5M	7	7M	7	21M	--	--	--	--
	High	100-year floodplain	8	13.3M	14	10.5M	--	--	3	341K	9	21.3M
Winter Storm			25	24.3M	36	32.6M	55	201.2M	16	792K	122	15M
Landslide	Moderate	>14-32 degrees	15	19.2M	20	9.6M	32	82.8M	7	720K	73	7.9M
	High	>32-56 degrees	8	14.4M	6	1.1M	7	42M	4	175K	27	3.2M
Wildland Fire	Moderate	Moderate fuel rank	25	24.3M	32	31.8M	54	200M	16	792K	116	14.7M
	High	High fuel rank	19	21.6M	27	3.2M	39	129.9M	9	450K	94	12.5M
	Very High	Very high fuel rank	5	1M	14	26.3M	17	48.7M	3	175K	37	4.8M
	Extreme	Extreme fuel rank	1	150K	2	425K	--	--	--	--	2	unknown
Earthquake	Strong	9-20% (g)	25	24.4M	35	32.5M	55	201.2M	16	792K	118	15.1M
	Very strong	20-40% (g)	--	--	1	67K	--	--	--	--	4	unknown
	Severe	>40-60% (g)	--	--	--	--	--	--	--	--	--	--
Volcano			25	24.3M	36	32.6M	55	201.2M	16	792K	122	15M
Wind			25	24.3M	36	32.6M	55	201.2M	16	792K	122	15M
Erosion		within 300' of potential areas of erosion	8	13.5M	3	3M	6	20.4M	4	341K	10	1.6M
ENSO (El Niño and La Niña)		descriptive	25	26M	36	33M	57	162M	16	792K	117	15M
Expansive Soils	Low	<3% percent	--	--	--	--	--	--	--	--	--	--
	Moderate	3-6 percent	--	--	1	8.8K	--	--	--	--	1	840K
	High	6-9%	--	--	--	--	--	--	--	--	--	--
	Very High	>9%	--	--	--	--	--	--	--	--	--	--
Drought		descriptive	25	26M	36	33M	57	162M	16	792K	117	15M

Columbia County Annex

Table 11. Columbia County Potential Hazard Exposure Analysis Overview – Critical Infrastructure

			Highways		Railroads		Bridges		Transportation		Utilities		Dams	
Hazard Type	Hazard Area	Methodology	Miles	Value	Miles	Value	No.	Value	No.	Value	No.	Value	No.	Value
Flood	Moderate	500-year floodplain	--	--	--	--	21	21.9M	2	unk	9	6.5M	4	unk
	High	100-year floodplain	--	--	--	--	88	64M	2	unk	9	6.5M	8	680K
Winter Storm			--	--	unk	unk	100	73M	9	720K	29	84.2K	20	686K
Landslide	Moderate	>14-32 degrees	unk	unk	--	--	75	49.4M	4	719K	19	39.7M	13	unk
	High	>32-56 degrees	--	--	--	--	43	29.4M	3	719K	4	32.2M	8	unk
Wildland Fire	Moderate	Moderate fuel rank	--	--	--	--	98	69.3M	8	720K	26	68.1M	15	681K
	High	High fuel rank	--	--	--	--	91	66M	5	719K	20	37.1M	14	unk
	Very High	Very high fuel rank	--	--	--	--	55	35.6M	--	--	10	33.5M	9	unk
	Extreme	Extreme fuel rank	--	--	--	--	4	2.3M	--	--	1	1.6M	2	unk
Earthquake	Strong	9-20% (g)	--	--	--	--	95	67.8M	9	719K	22	67.7M	16	680K
	Very strong	20-40% (g)	--	--	--	--	6	8M	--	--	7	16.5M	4	5K
	Severe	>40-60% (g)	--	--	--	--	--	--	--	--	--	--	--	--
Volcano			--	--	unk	unk	100	73M	9	720K	29	84.2K	20	686K
Wind			--	--	unk	unk	100	73M	9	720K	29	84.2K	20	686K
Erosion		within 300' of potential areas of erosion	--	--	--	--	10	7M	2	720K	4	1.1M	2	unk
ENSO		descriptive	4	206M	51	unk	--	--	9	720K	38	123M	29	686K
Expansive Soils	Low	<3% percent	--	--	--	--	--	--	--	--	--	--	--	--
	Moderate	3-6 percent	--	--	--	--	--	--	--	--	--	--	--	--
	High	6-9%	--	--	--	--	--	--	--	--	--	--	1	unk
	Very High	>9%	--	--	--	--	--	--	--	--	--	--	--	--
Drought		descriptive	4	206M	51	unk	--	--	9	720K	38	123M	29	686K

Columbia County Annex

National Flood Insurance Policy

National Flood Insurance Program data were obtained from the State Department of Land Conservation and Development. This data is significant for the vulnerability assessment as it identifies the impact of flooding, one of the most often repeated natural hazards for the county. This data is displayed in Table 12 and 12a.

Table 12. Columbia County NFIP Insurance Report

Jurisdiction	Effective FIRM and FIS	Initial FIRM	Total Policies	Pre—FIRM Policies	Policies by Building Type				Minus Rated A Zone	Minus Rated V Zone
					Single Family	2 to 4 Family	Other Residential	Non-Residential		
Columbia County	11/26/2000	8/16/1988	315	196	292	1	0	20	13	0

Source: FEMA Community Information System 02/21/2019

Table 12a. Columbia County NFIP Insurance Report

Jurisdiction	Insurance in Force	Total Paid Claims	Pre-Firm Claims Paid	Substantial Damage Claims	Total Paid Amount	Repetitive Loss Structures	Severe Repetitive Loss Structures	CRS Class Rating	Last Community Assistance Visit
Columbia County	\$76,844,600	112	74	33	\$3,149,235	5	0	10	4/28/2000

Source: FEMA Community Information System 02/21/2019

Mitigation Strategy

The following section defines mitigation action identification and analysis as stipulated in DMA 2000 and its implementing regulations.

DMA 2000 Requirements: Mitigation Strategy	
Planning Requirements	
§201.6(c)(3)	The plan shall include the following: A mitigation strategy that provides the jurisdiction's blueprint for reducing the potential losses identified in the risk assessment, based on existing authorities, policies, programs, and resources, and its ability to expand on and improve these existing tools.
§201.6(c)(3)(i)	The hazard mitigation strategy shall include a description of mitigation goals to reduce or avoid long-term vulnerabilities to the identified hazards.
§201.6(c)(3)(ii)	The hazard mitigation strategy shall include a section that identifies and analyzes a comprehensive range of specific mitigation actions and projects being considered to reduce the effects of each hazard, with particular emphasis on new and existing buildings and infrastructure. All plans approved by FEMA after October 1, 2008, must also address the jurisdiction's participation in the NFIP, and continued compliance with NFIP requirements, as appropriate.
§201.6(c)(3)(iii)	The hazard mitigation strategy shall include an] action plan, describing how the action identified in paragraph (c)(3)(ii) of this section will be prioritized, implemented, and administered by the local jurisdiction. Prioritization shall include a special emphasis on the extent to which benefits are maximized according to a cost benefit review of the proposed projects and their associated costs.
§201.6(c)(3)(iv)	For multi-jurisdictional plans, there must be identifiable action items specific to the jurisdiction requesting FEMA approval or credit of the plan.
§201.6(c)(4)(ii)	The plan shall include a] process by which local governments incorporate the requirements of the mitigation plan into other planning mechanisms such as comprehensive or capital improvements, when appropriate.
Planning Elements	
C1. Does the plan document each jurisdiction's existing authorities, policies, programs and resources, and its ability to expand on and improve these existing policies and programs? 44 CFR 201.6(c)(3)	
C2. Does the Plan address each jurisdiction's participation in the NFIP and continued compliance with NFIP requirements, as appropriate? 44 CFR 201.6(c)(3)(ii)	
C3. Does the Plan include goals to reduce/avoid long-term vulnerabilities to the identified hazards? 44 CFR 201.6(c)(3)(i)	
C4. Does the Plan identify and analyze a comprehensive range of specific mitigation actions and projects for each jurisdiction being considered to reduce the effects of hazards, with emphasis on new and existing buildings and infrastructure? 44 CFR 201.6(c)(3)(ii) and 44 CFR 201.6(c)(3)(iv)	
C5. Does the Plan contain an action plan that describes how the actions identified will be prioritized (including cost benefit review), implemented, and administered by each jurisdiction? 44 CFR 201.6(c)(3)(iii) and 44 CFR (c)(3)(iv)	
C6. Does the Plan describe a process by which local governments will integrate the requirements of the mitigation plan into other planning mechanisms, such as comprehensive or capital improvement plans, when appropriate? 44 CFR 201.6(c)(4)(ii)	

Identify Mitigation Goals

Columbia County Steering committee adopted the Goals in Table 13 for the current planning period.

Table 13. Columbia County Mitigation Goals	
Goal Number	Goal Description
1	Reduce the Threat to Life Safety Enhance life safety by minimizing the potential for deaths and injuries in future disaster events.
2	Protect Critical Facilities and Enhance Emergency and Essential Services • Implement activities or projects to protect critical facilities and infrastructure. • Seek opportunities to enhance, protect, and integrate emergency and essential services. • Strengthen emergency operations plans and procedures by increasing collaboration and coordination among public agencies, non-profit organizations, businesses, and industry.
3	Reduce the Threat to Property • Seek opportunities to protect, enhance and integrate emergency and essential services. • Strengthen emergency operations plans and procedures by increasing collaboration and coordination among public agencies, non-profit organizations, businesses, industries and the citizens of Columbia County.
4	Create a Disaster Resistant and Disaster-Resilient Economy • Develop and implement activities to protect economic well-being and vitality while reducing economic hardship in post disaster situations. • Reduce insurance losses and repetitive claims for chronic hazard events. • Work with State and Federal Partners to reduce short-term and long-term recovery and reconstruction costs. • Work with local and County organizations, such as Columbia Emergency Planning Association (CEPA). • Expedite pre-disaster and post-disaster grants and program funding.
5	Increase Public Awareness, Education, Outreach, and Partnerships • Coordinate and collaborate, where possible, risk reduction outreach efforts with the Oregon Partners for Disaster Resistance & Resilience and other public and private organizations. • Develop and implement risk reduction education programs to increase awareness among citizens, local, county, and regional agencies, non-profit organizations, businesses, and industry. • Promote insurance coverage for catastrophic hazards • Strengthen communication and coordinate participation in and between public agencies, citizens, nonprofit organizations, businesses, and industry.

Evaluate and Prioritize Mitigation Actions

Mitigation actions are activities, measures, or projects that help achieve the goals of a mitigation plan. Table 14 lists the mitigation actions developed during this mitigation planning process or offered during whole community planning activities. It is not intended that this plan will attempt to act on all of these action items, but the list will be maintained in order to provide documentation for future planning efforts.

Table 14. Columbia County Mitigation Actions – Existing and Newly Considered			
Hazard	Status Complete, Deferred, Deleted, Ongoing, or New	Comment	Description
Multi-Hazard			
Multi-Hazard	Ongoing		Inventory and protect critical facility glass breakage associated with wind, seismic, fire, terrorism, and other hazards to ensure occupant safety.
Multi-Hazard	Ongoing		Review ordinances and develop outreach programs to assure propane tanks are properly anchored and hazardous materials are properly stored and protected from known natural hazards such as seismic or flooding events.
Multi-Hazard	Ongoing		Cross-reference and incorporate mitigation planning provisions into all community planning processes such as comprehensive, capital improvement, land use, transportation plans, etc. to demonstrate multi-benefit considerations and facilitate using multiple funding source consideration.
Multi-Hazard	Ongoing		Develop and incorporate mitigation provisions and recommendations into zoning ordinances and community development processes to maintain the floodway and protect critical infrastructure and private residences from other hazard areas.
Multi-Hazard	Ongoing		Purchase and install generators with main power distribution disconnect switches for identified and prioritized critical facilities susceptible to short-term power disruption. (i.e. first responder and medical facilities, schools, correctional facilities, and water and sewage pump stations, etc.)
Multi-Hazard	Ongoing		Install lightning rods and lightening grade surge protection devices on critical electronic components such as warning systems, communications equipment, and computers for critical facilities.
Multi-Hazard	Ongoing		Develop, produce, and distribute information materials concerning

Table 14. Columbia County Mitigation Actions – Existing and Newly Considered			
Hazard	Status Complete, Deferred, Deleted, Ongoing, or New	Comment	Description
			mitigation, preparedness, and safety procedures for all natural hazards.
Multi-Hazard	Ongoing		Explore the need for, develop, and implement hazard-zoning ordinances for high-risk hazard area land-use.
Multi-Hazard	Ongoing, Partially Complete		Identify and list repetitively flooded structures and infrastructures, analyze the threat to these facilities, and prioritize mitigation actions to acquire, relocate, elevate, and/or flood proof to protect the threatened population.
Multi-Hazard	Ongoing, and Partially Complete		Install storm shutters, hurricane clips, bracing systems, etc. as part of retrofit to meet applicable building codes while reducing disaster damages.
Multi-Hazard	Ongoing, and Partially Complete		Retrofit structures to protect them from seismic, flood, high wind, earthquake, or other natural hazard events.
Multi-Hazard	Ongoing& Partially Complete		Acquire, demolish, or relocate structures from hazard prone areas. Property deeds shall be restricted for open space uses in perpetuity to keep people from rebuilding in hazard areas.
Multi-Hazard	Ongoing, and Partially Complete		Harden utility infrastructure located along transportation corridors and river embankments to mitigate potential flood, debris, and erosion damages.
Multi-Hazard	Ongoing		Regularly Maintain a plan to develop a sustainable process to implement, monitor, and evaluate countywide mitigation actions.
Multi-Hazard	Ongoing		Pursue funding opportunities to implement mitigation actions.
Multi-Hazard	Ongoing		Develop public and private sector partnerships to foster hazard mitigation activities.
Flood			

Table 14. Columbia County Mitigation Actions – Existing and Newly Considered			
Hazard	Status Complete, Deferred, Deleted, Ongoing, or New	Comment	Description
Flood	Ongoing		Complete inventory of critical facilities within 100-year and 500-year floodplains, with GIS mapping if possible.
Flood	Ongoing		Complete inventory of residential and commercial buildings within 100-year and 500-year floodplains, with GIS mapping if possible.
Flood	Ongoing		Consult with property owners and explore mitigation actions for any Columbia County properties on FEMA's national repetitive loss list
Flood	new		Explore mitigation options with critical facilities property owners and implement mitigation measures within the 100-year floodplain and for other structures deep within the 100-year floodplain.
Flood	Ongoing		Determine and implement mitigation measures such as upsizing culverts or storm water drainage ditches for locations with repetitive flooding and significant damages or road closures,
Flood	Ongoing		Support FIRM Update.
Flood	Ongoing		Develop an outreach program to educate public concerning NFIP participation benefits, floodplain development, land use regulation, and NFIP flood insurance availability to facilitate continued compliance with the NFIP.
Flood	Ongoing		Develop, implement, and enforce floodplain management ordinances.
Flood	Ongoing		Install new stream flow and rainfall measuring gauges.
Flood	Completed		Develop or revise, adopt, and enforce storm water ordinances and regulations to manage run-off from new development, including buffers and retention basins.
Flood	Ongoing		Increase culvert size to increase its drainage efficiency.
Winter Storms			

Table 14. Columbia County Mitigation Actions – Existing and Newly Considered			
Hazard	Status Complete, Deferred, Deleted, Ongoing, or New	Comment	Description
Winter Storms	Ongoing		Enhance tree-trimming efforts especially for transmission lines and trunk distribution lines.
Winter Storms	Ongoing		Encourage prudent tree planting (avoid service lines) and safe, professional tree trimming where necessary.
Winter Storms	Ongoing	Partially complete	Ensure that all critical facilities in Columbia County have backup power and emergency operations plans to deal with power outages.
Winter Storms	Ongoing		Determine and implement mitigation measures such as upsizing culverts or storm water drainage ditches for locations with repetitive flooding and significant damages or road closures.
Winter Storms	Ongoing		Consider upgrading lines and poles to improve wind/ice loading, undergrounding critical lines, and adding interconnect switches to allow alternative feed paths and disconnect switches to minimize outage areas.
Winter Storms	Ongoing		Encourage new developments to include underground power lines
Winter Storms	Ongoing		Install new stream flow and precipitation measuring gauges and develop monitoring and early warning program.
Winter Storms	Ongoing		Develop outreach program with school districts.
Winter Storms	Completed	Enforcement continuing	Implement and enforce the most current Uniform International, and State, Building Codes to ensure structures can withstand winter storm hazards such as high winds, rain, water and snow.
Winter Storms	Ongoing		Increase power line wire size and incorporate quick disconnects (breakaway devices) to reduce load on power lines to prevent severe wind or winter ice storm event failure.
Landslide			

Table 14. Columbia County Mitigation Actions – Existing and Newly Considered			
Hazard	Status Complete, Deferred, Deleted, Ongoing, or New	Comment	Description
Landslide	Ongoing		Complete the inventory of locations where critical facilities, other buildings and infrastructure are subject to landslides.
Landslide	Ongoing		Consider landslide mitigation actions for slides seriously threatening critical facilities, other buildings or infrastructure.
Landslide	Complete		Limit future development in known landslide potential areas.
Landslide	Ongoing		Develop comprehensive geological landslide and rockslide prone area maps. (LIDAR)
Wildland Fire			
Wildland Fire	Ongoing		Identify specific parts of Columbia County at high risk for urban/wildland urban interface fires because of fuel loading, topography and prevailing construction practices.
Wildland Fire	Ongoing		Identify evacuation routes and procedures for high-risk areas and educate the public.
Wildland Fire	Complete		Develop Community Wildland Fire Protection Plans for all at-risk communities.
Wildland Fire	Ongoing		Encourage fire-safe construction practices for existing and new construction in high-risk areas.
Wildland Fire	Ongoing		Continue to encourage home landscape cleanup (defensible space) and debris disposal..
Wildland Fire	Ongoing		Identify potential fuel breaks and fuel reduction zones and implement mitigation actions.
Wildland Fire	Complete		Implement SB360 Wildland Urban Interface Act of 1997 in Columbia County.
Wildland Fire	Deferred	Considered 2008 Lack of funding and staff	Identify critical facilities and vulnerable populations based on mapped high hazard areas.
Earthquake			

Table 14. Columbia County Mitigation Actions – Existing and Newly Considered			
Hazard	Status Complete, Deferred, Deleted, Ongoing, or New	Comment	Description
Earthquake	<i>Deferred</i>	Considered 2008 Lack funding and staff	Complete inventory of public and commercial buildings that may be particularly vulnerable to earthquake damage.
Earthquake	<i>Ongoing</i>		Disseminate FEMA pamphlets to educate homeowners about structural and non-structural retrofitting of vulnerable homes and encourage retrofit.
Earthquake	<i>Ongoing</i>		Complete seismic vulnerability analysis of important public facilities with significant seismic vulnerabilities.
Earthquake	<i>Ongoing</i>		Obtain funding and retrofit important public facilities with significant seismic vulnerabilities.
Earthquake	<i>Ongoing</i>		Retrofit bridges that are not seismically adequate for lifeline transportation routes.
Earthquake	<i>Deferred</i>	Considered 2008 Lack of staff and funding	Identify high seismic hazard areas; develop a wood-frame residential building inventory and an outreach program to educate population concerning facilities particularly vulnerable to earthquake damage, such as pre-1940s homes and homes with cripple wall foundations.
Earthquake	<i>Ongoing</i>		Retrofit critical public facilities with significant seismic vulnerabilities, such as unreinforced masonry construction.
Earthquake	<i>Ongoing</i>		Complete seismic vulnerability analysis of important public facilities with significant seismic vulnerabilities.
Volcano			
Volcano	<i>Ongoing</i>		Update public emergency notification procedures and develop an outreach program for ash fall events.
Volcano	<i>Ongoing</i>		Update emergency response planning for ash fall events.
Volcano	<i>Ongoing</i>		Update emergency response planning and develop client focused outreach

Columbia County Annex

Table 14. Columbia County Mitigation Actions – Existing and Newly Considered			
Hazard	Status Complete, Deferred, Deleted, Ongoing, or New	Comment	Description
			program for ash fall events affecting river, air, and highway transportation, and industrial facilities and operations.
<i>Wind</i>			
Wind	Ongoing		Review ordinances and develop outreach programs to assure mobile homes and manufactured buildings are protected from severe wind hazards. (Anchoring, elevation, siting, and other methods as applicable) (Based on wind exposure areas)
Wind	Ongoing		Identify and prioritize critical facilities' overhead utilities that could be placed underground to reduce power disruption from windstorm / tree blow down damage.
Wind	Ongoing		Corridor tree removal to protect utilities.
Wind	Ongoing		Increase power line wire size and incorporate quick disconnects (breakaway devices) to reduce ice load power line failure during severe wind or winter ice storm events.
<i>Erosion</i>			
Erosion	Ongoing		Maintain and update erosion hazard locations, identify critical facilities potentially impacted and develop mitigation initiatives such as bank stabilization or facility relocation to prevent or reduce the threat.
Erosion	Ongoing		Enforce through existing ordinance new construction standards regarding development in erosion hazard areas.
Erosion	Ongoing		Apply for grants/funds to implement riverbank protection methods.
Erosion	Ongoing		Hold series of community meetings and other outreach efforts to provide erosion hazard specific information to residents dependent upon erosion hazard location data.

Table 14. Columbia County Mitigation Actions – Existing and Newly Considered			
Hazard	Status Complete, Deferred, Deleted, Ongoing, or New	Comment	Description
Erosion	Ongoing		Install bank protection where needed.
Erosion	Ongoing		Develop outreach program to educate the public concerning planting processes and materials used to stabilize hill slopes or stream banks. This is known as bioengineering; which uses logs, root wads, or wood debris or other vegetation to reduce scour and erosion.
Erosion	Ongoing		Install erosion control during new construction.
ENSO (El Niño / La Niña)			
ENSO	Ongoing		Educate public regarding weather patterns associated with El Niño / La Niña.
Expansive Soils			
Expansive Soils	Completed	Must determine how to access data/maps	Develop and maintain inventory of expansive soils throughout Columbia County.
Drought			
Drought	Ongoing		Encourage the USACOE to prioritize dams according to hazard risks such as seismic vulnerability and make seismic improvements as necessary.
Drought	Ongoing		Evaluate the adequacy of dams and dike systems for both floods and earthquakes and implement mitigation measures as necessary.

Mitigation Action Plan

The Steering Committee has evaluated and prioritized considered mitigation actions to determine which would be included in the Mitigation Action Plan. The Committee then determined the responsible agency and potential funding sources. The Mitigation Action Plan represents mitigation projects and programs to be implemented through the cooperation of multiple entities.

Upon review, the Steering Committee assigned a high priority ranking to actions that best fulfill the goals of the NHMP and are appropriate and feasible for the County and responsible entities to implement during the 5-year lifespan of this version of the NHMP. As such, the Steering

Columbia County Annex

Committee determined that only the mitigation actions that received a high priority ranking would be included in the County's Mitigation Action Plan. Table 15 depicts the County's mitigation actions grouped by hazard and in descending priority order within each hazard.

Table 15. Columbia County Mitigation Action Plan Matrix					
Hazard	Description	Managing Department / Agency	Timeframe	Potential Funding Source(s)	Benefit-Costs / Technical Feasibility
Multi-Hazard (MH)					
MH	Purchase and install generators with main power distribution disconnect switches for identified and prioritized critical facilities susceptible to short term power disruption. The Priority will be the County Fairgrounds which has been identified as the primary mass care and COOP location for the county.	Public Works	3-5 years	General Fund, HS, HMGP	BC: TBD TF: Yes
MH	Electronic surge protection devices on critical electronic components such as warning systems, communications equipment, and computers for critical facilities.	Public Works	1 yr	General Fund	BC: TBD TF: Yes
MH	Update or develop, implement, and maintain jurisdictional debris management plans.	County Admin/ Public Works	1-3 yrs	General Fund	BC: TBD TF: Yes
MH	Develop and implement strategies and educational outreach programs for debris management.	County Admin/ Public Works	1-3 yrs (Plan) 3-5 (outreach)	General Fund	BC: TBD TF: Yes
MH	Cross reference and incorporate mitigation planning provisions into all community planning processes such as comprehensive, capital improvement, land use, transportation plans, etc. to demonstrate multi-benefit considerations and facilitate using multiple funding source consideration.	County Admin/ Planning	1-5 yrs	General Fund	BC: TBD TF: Yes
MH	Develop outreach program for educating private facility owners/operators concerning alternative or emergency power source acquisition to enable them to deliver services during disaster emergency response and recovery efforts.	County Admin Public Works	2-5 yrs	General Fund	BC: TBD TF: Yes
MH	Develop critical facility list needing emergency back-up power systems, prioritize, seek funding and implement mitigation actions.	Public Works	1-2 yrs	General Fund	BC: TBD TF: Yes

Columbia County Annex

Table 15. Columbia County Mitigation Action Plan Matrix

Hazard	Description	Managing Department / Agency	Timeframe	Potential Funding Source(s)	Benefit-Costs / Technical Feasibility
MH	Update public emergency notification procedures and develop an outreach program for all emergencies	County Admin	3-5 years	General Fund, NOAA/NW S, HMPG	BC:TBD TF: Yes
Flood					
Flood	Develop and implement a plan with local stakeholders to address Fox Creek repeated flooding issues	County Admin	1-2 yrs	General Fund	BC: TBD TF: Yes
Flood	Develop system of flood gauges at rivers in the county that frequently flood and make provisions to provide that telemetry to locations including the EOC and NWS	County Admin Public Works	2-5 yrs	General Fund	BC: TBD TF: Yes
Flood	Develop, implement, and enforce floodplain management ordinances.	County Admin	1-3 yrs	General Fund	BC: TBD TF: Yes
Flood	Develop, or revise, adopt, and enforce storm water ordinances and regulations to manage run-off from new development, including buffers and retention basins.	County Admin/Planning/ Public Works	Ongoing	General Fund	BC: TBD TF: Yes
Flood	Create detention storage basins, ponds, reservoirs etc. to allow water to temporarily accumulate. Water ultimately returning to its watercourse at a reduced flow rate.	Public Works/ Engineers	0-5 yrs	Street Fund, FMA, HMGP, PDM	BC: TBD TF: Yes
Flood	Implement flood protection to mitigate damage and contamination of wastewater systems.	Public Works	5-10 yrs	Sewer Fund, FMA, HMGP, PDM	BC: TBD TF: Yes
Winter Storm					
Winter Storm	Develop and implement programs to coordinate maintenance and mitigation activities to reduce public infrastructure from severe winter storms.	Public Works	Ongoing	General Fund	BC: TBD TF: Yes
Winter Storm	Review critical facilities and government building energy efficiency, winter readiness, and electrical protection capability. Identify, prioritize, and implement infrastructure upgrade or rehabilitation project prioritization and development.	Public Works	Ongoing	General Fund, HMGP	BC: TBD TF: Yes
Landslide					

Columbia County Annex

Table 15. Columbia County Mitigation Action Plan Matrix

Hazard	Description	Managing Department / Agency	Timeframe	Potential Funding Source(s)	Benefit-Costs / Technical Feasibility
Landslide	Inventory high risk landslides that repetitively impact county roads and state highways in the county. Develop and implement solutions to stabilize high risk areas and minimize disruption to travel corridors.	Public Works	Ongoing	General Fund, HMGP	BC: TBD TF: Yes
Landslide	Develop process to limit future development in steep slope areas (permitting, geotechnical review, soil stabilization techniques, etc).	Planning/ Engineering	Completed	General Fund	BC: TBD TF: Yes
Wildland Fire					
Wildland Fire	Update Community Wildland Fire Protection Plan	Fire District	Ongoing	General Fund, FMAP	BC: TBD TF: Yes
Wildland Fire	Provide wildland fire information in an easily distributed format for all residents.	County Admin Fire District	Ongoing	General Fund, FMAP	BC: TBD TF: Yes
Wildland Fire	Develop, adopt, and enforce burn ordinances that require burn permits, restricts campfires, and controls outdoor burning.	County Admin/ Fire District	Ongoing	General Fund	BC: TBD TF: Yes
Earthquake					
EQ	Identify, evaluate, and prioritize critical public facilities' seismic performance.	County Admin/ Public Works/ Engineering	3-5 yrs	General Fund	BC: TBD TF: Yes
Volcano					
Volcano	Evaluate ash impact on storm water drainage system and develop mitigation actions.	Public Works/ Engineering	3-5 yrs	General Fund	BC: TBD TF: Yes
Wind					
Wind	Identify and prioritize critical facilities' overhead utilities that could be placed underground to reduce power disruption from wind storm / tree blow down damage.	Public Works	1-5 yrs	General Fund, Utility Co., HMGP, PDM	BC: TBD TF: Yes
Erosion					

Table 15. Columbia County Mitigation Action Plan Matrix

Hazard	Description	Managing Department / Agency	Timeframe	Potential Funding Source(s)	Benefit-Costs / Technical Feasibility
Erosion	Maintain and update erosion hazard locations, identify critical facilities potentially impacted and develop and implement mitigation initiatives	Public Works	3-5 yrs	General Fund, HMGP, PDM	BC: TBD TF: Yes
Erosion	Periodically provide available information to residents on riverbank erosion and methods to prevent it in an easily distributed format.	Public Works	3-5 yrs	General Fund	BC: TBD TF: Yes
Erosion	Install riprap, or pilings to harden or "armor" a stream bank where severe erosion occurs.	Public Works	3-5 yrs	General Fund, FMA, HMGP, PDM	BC: TBD TF: Yes

Plan Adoption and Maintenance

The following section provides documentation of the formal adoption of this annex by the governing board of the district or the County council/county commission of the jurisdiction. It also identifies the standing committee that will be responsible for future reviews between update periods.

DMA 2000 Requirements: Plan Review, Evaluation, Implementation, and Adoption	
Planning Requirements	
§201.6(d)(3)	A local jurisdiction must review and revise its plan to reflect changes in development, progress in local mitigation efforts, and changes in priorities, and resubmit if for approval within 5 years in order to continue to be eligible for mitigation project grant funding.
§201.6(c)(5)	The plan shall include...] Documentation that the plan has been formally adopted by the governing body of the jurisdiction requesting approval of the plan (e.g., County Council, County commissioner, Tribal Council). For multi-jurisdictional plans, each jurisdiction requesting approval of the plan must document that it has been formally adopted.
Planning Elements	
D1. Was the plan revised to reflect changes in development? 44 CFR 201.6(d)(3)	
D2. Was the plan revised to reflect progress in local mitigation efforts? 44 CFR 201.6(d)(3)	
D3. Was the plan revised to reflect changes in priorities? 44 CFR 201.6(d)(3)	
E1. Does the Plan include documentation that the plan has been formally adopted by the governing body of the jurisdiction requesting approval? 44 CFR 201.6(c)(5)	
E2. For multi-jurisdictional plans, has each jurisdiction requesting approval of the plan documented formal plan adoption? 44 CFR 201.6(c)(5)	

Resolution of Adoption

(Example) BEFORE THE BOARD OF COUNTY COMMISSIONERS FOR COLUMBIA COUNTY, OREGON

In the Matter of Adopting the 2014) Columbia County Multi-Jurisdictional) RESOLUTION NO. 40-2014 Hazard
Mitigation Plan Update)

WHEREAS, Columbia County, Oregon has experienced repetitive disasters that have
damaged commercial, residential and public properties, displaced citizens and businesses, and
presented general public health and safety concerns; and

WHEREAS, Columbia County has prepared a Multi-Jurisdictional Hazard Mitigation Plan that outlines the options to
reduce overall damage and impact from natural hazards; and

WHEREAS, the Multi-Jurisdictional Hazard Mitigation Plan has been reviewed by community residents, business
owners, and federal, state and local agencies, and has been revised to reflect their concerns;

NOW, THEREFORE, BE IT RESOLVED that:

1. 1. The Multi-Jurisdictional Hazard Mitigation Plan is hereby adopted as an official plan of Columbia County.
2. 2. A Hazard Mitigation Planning Group is hereby established as a permanent advisory body. The Hazard Mitigation
Planning Coordinator shall designate its members, subject to the approval of the County and the
participating jurisdictions. They shall serve one-year terms. The group's duties shall be as
designated in the Hazard Mitigation Plan.
3. 3. The Hazard Mitigation Planning Coordinator is charged with supervising the
implementation of the Plan's recommendations within the funding limitations as provided by Columbia
County or other sources.
4. 4. The Hazard Mitigation Planning Coordinator shall give priority attention to the goals identified in Table A-13 of the
Columbia County Appendix, and the actions listed in Table A-14 of the Columbia County Appendix
to the Hazard Mitigation Plan and;
5. 5. The Hazard Mitigation Planning Coordinator shall convene the hazard mitigation planning group annually. The
planning group shall monitor implementation of the plan and shall submit an annual review
worksheet to the Board of County Commissioners in accordance with the following format:
 - a. A review of the original plan.
 - b. A review of any disasters or emergencies that occurred during the previous calendar year.
 - c. A review of the actions taken, including what was accomplished during the previous year.
 - d. A discussion of any implementation problems.
 - e. Recommendations for new projects or revised action items. Such recommendations shall be subject to approval
by the Columbia County.

Dated this 27th day of August, 2014.

BOARD OF COUNTY COMMISSIONERS FOR COLUMBIA COUNTY, OREGON

By: _____ Anthony Hyde, Chair

By: _____ Henry Heimuller, Commissioner

By: _____ Earl Fisher, Commissioner

Standing Review Committee

The following table identifies the members of the Standing committee that will meet quarterly to review the NHMP annex and provide a running update.

Table 16. Columbia County Standing Hazard Mitigation Committee	
Name	Agency/Department/Affiliation
Anne Parrott	Columbia County Public Health – PHEP Coordinator
Johnathan Baker	Columbia County Emergency Management
Dan Brown	Columbia County – Community Action Team
Michael Carter	Rainier School District - Superintendent
Sean Clark	Port of Columbia County
Dave Crawford	Mist Birkenfeld RFPD
Della Graham	Columbia County Emergency Management
Diane Dillard	Sacagawea Health Center
Mike Fletcher	Columbia 911 Communications District - Director
Mike Greisen	Columbia River Fire and Rescue - Chief
Doug Hayes	Port of Columbia County – Executive Director
Greg Hinkleman	Clatskanie – City Manager
Pat LaPointe	Citizen Member
Lonny Welter	Columbia County – Roads Department
Margaret Magruder	Columbia County – County Commissioner
Mike McGlothlin	Columbia City – Chief of Police
Michael Paul	Columbia County Public Health - Director
Mike Deroia	City of St. Helens – Building Official
Norm Miller	Scappoose – Chief of Police
Kelly Niles	Chair - Oregon Department of Forestry
Ian O'Connor	Columbia River Fire and Rescue – Division Chief
Bob Perry	Western Oregon Electrical Coop - Director
Shaun Brown	Columbia County Emergency Management
Steve Pegram	Columbia County Emergency Management - Director
Scot Stockwell	St. Helens School District - Superintendent
Todd Meunier	Citizen Member
Jeff VanNatta	Vice – Chair Citizen Member
Casey Wheeler	Columbia County Food bank

City of Clatskanie

Hazard Mitigation Plan Annex

2020 Update
Columbia County
Multi-Jurisdiction Hazard Mitigation Plan

Contents

Introduction	3
Planning Process and Capability Assessment	3
DMA 2000 Requirements: Planning Process	3
Steering Committee Participants	4
Public Participation.....	4
Capability Assessment	6
Hazard Identification and Vulnerability Assessment	10
DMA 2000 Requirements: Hazard Identification and Risk Assessment	10
Hazard Identification	10
Specific Impacts of Identified Hazards	11
Flood.....	11
Winter Storm.....	11
Landslide	12
Wildland Fires.....	12
Earthquake	13
Volcano.....	13
Wind	14
Erosion.....	14
Values at Risk.....	15
Population Analysis	15
Asset Inventory.....	15
National Flood Insurance Policy	18
Vulnerability Analysis	19
Mitigation Strategy.....	23
DMA 2000 Requirements: Mitigation Strategy	23
Identify Mitigation Goals.....	24
Evaluate and Prioritize Mitigation Actions	24
Mitigation Action Plan	36
Plan Adoption and Maintenance.....	41
DMA 2000 Requirements: Plan Review, Evaluation, Implementation, and Adoption...	41

Resolution of Adoption..... 42

Standing Review Committee 43

Introduction

This Annex contains specific City of Clatskanie information to support the Columbia County 2020 Multi-Jurisdictional Hazard Mitigation Plan. This section further supports the County’s planning process by summarizing the review and incorporation of existing plans, studies, and reports used to develop this MHMP. This annex is an addition to Columbia County’s Hazard Mitigation Plan and shares attributes of that plan.

Planning Process and Capability Assessment

The following section includes a detailed capability assessment that describes the resources available to support this plan. The goal of this assessment is not to identify all capabilities the organization may have, but only those that are currently used or could be used to support mitigation efforts. Capabilities are arranged in tables by type and fall under the explicit authority of the jurisdiction/district.

DMA 2000 Requirements: Planning Process	
Planning Requirements	
§201.6(b)	An open public involvement process is essential to the development of an effective plan. In order to develop a more comprehensive approach to reducing the effects of natural disasters, the planning process shall include:
§201.6(b)(1)	(1) An opportunity for the public to comment on the plan during the drafting stage and prior to plan approval;
§201.6(b)(2)	(2) An opportunity for neighboring communities, local and regional agencies involved in hazard mitigation activities, and agencies that have the authority to regulate development, as well as businesses, academia and other private and non-profit interests to be involved in the planning process; and
§201.6(b)(3)	(3) Review and incorporation, if appropriate, of existing plans, studies, reports, and technical information.
§201.6(c)(1)	[The plan shall document] the planning process used to develop the plan, including how it was prepared, who was involved in the process, and how the public was involved.
§201.6(c)(4)(i)	[The plan maintenance process shall include a] section describing the method and schedule of monitoring, evaluating, and updating the mitigation plan within a five-year cycle.
§201.6(c)(4)(iii)	[The plan maintenance process shall include a] discussion on how the community will continue public participation in the plan maintenance process.
Planning Elements	
A1. Does the Plan document the planning process, including how it was prepared and who was involved in the process for each jurisdiction? 44 CFR 201.6(c)(1)	
A2. Does the Plan document an opportunity for neighboring communities, local and regional agencies involved in hazard mitigation activities, agencies that have the authority to regulate development as well as other interests to be involved in the planning process? 44 CFR 201.6(b)(2)	

A3. Does the Plan document how the public was involved in the planning process during the drafting stage? 44 CFR 201.6(b)(1) and 201.6(c)(1)

A4. Does the Plan document the review and incorporation of existing plans, studies, reports, and technical information? 44 CFR 201.6(b)(3)

A5. Is there discussion on how the communities will continue public participation in the plan maintenance process? 44 CFR 201.6(c)(4)(iii)

A6. Is there a description of the method and schedule for keeping the plan current (monitoring, evaluating and updating the mitigation plan within a 5-year cycle)? 44 CFR 201.6(c)(4)(i)

Steering Committee Participants

The City of Clatskanie is dedicated to mitigating potential natural hazards to its population and infrastructure. To fulfill that goal, a Hazard Mitigation Plan Development Steering Committee was seated; dedicated to identifying hazard threats and developing actions to mitigate damage and life losses from those threats.

Table 1 records the Steering Committee's participant list.

Table 1. City of Clatskanie Steering Committee	
Name	Agency/Department/Affiliation
Greg Hinkelman	City Manager - Clatskanie
Robert Brajcich	Mayor, Clatskanie
Dave True	Public Works Director - Clatskanie
Shaun Brown	Columbia County Emergency Management

Public Participation

As defined by FEMA, Whole Community Planning is; a means by which residents, emergency management practitioners, organizational and community leaders, and government officials can collectively understand and assess the needs of their respective communities and determine the best ways to organize and strengthen their assets, capacities, and interests. By doing so, a more effective path to societal security and resilience is built.

This Hazard Mitigation Plan was conducted with opportunities for the public to participate to try and meet the goals of whole community planning. Table 2 highlights these efforts.

Table 2. Clatskanie Public Involvement Mechanisms	
Date	Description
2014	
7/19/2014	Columbia Emergency Preparedness Association EXPO – Large emergency management event covering all topics (preparedness, fire, law, mitigation, response).
11/11/2014	HSEMC – Columbia County’s Homeland Security and Emergency Management Commission is recognized by the Board of County Commissioners as the cornerstones of a whole community approach to emergency management planning. All jurisdictions are members of the commission. Semi Annual NHMP meeting, plan review was conducted.
2015	
5/12/2015	HSEMC – Semi Annual NHMP meeting, plan review was conducted.
11/10/2015	HSEMC – Columbia County’s Homeland Security and Emergency Management Commission is recognized by the Board of County Commissioners as the cornerstones of a whole community approach to emergency management planning. All jurisdictions are members of the commission. Semi Annual NHMP meeting, plan review was conducted.
2016	
4/2/2016	KOHI Radio Preparedness Talk – Radio talk show for Columbia County, topics “specifically included preparing for the next flood event”.
5/10/2016	HSEMC – Columbia County’s Homeland Security and Emergency Management Commission is recognized by the Board of County Commissioners as the cornerstones of a whole community approach to emergency management planning. All jurisdictions are members of the commission. Semi Annual NHMP meeting, plan review was conducted.
6/4/2016	Ford Family Foundation Preparedness Fair - County wide event to promote preparedness and mitigation in cooperation with the Ford Family Foundation. All cities participated.
6/9/2016	Geologic Hazards presentation – Presentation by local Geologic Hazards Coordinator in Clatskanie.
7/23/2016	Columbia Emergency Preparedness Association EXPO – Large emergency management event covering all topics (preparedness, fire, law, mitigation, response).
9/22/2016	Columbia County Soil and Water Conservation District – Event hosted by SWCD on preparedness and flood mitigation efforts.
11/15/2016	HSEMC – Columbia County’s Homeland Security and Emergency Management Commission is recognized by the Board of County Commissioners as the cornerstones of a whole community approach to emergency management planning. All jurisdictions are members of the commission. Semi Annual NHMP meeting, plan review was conducted.
2017	
5/9/2017	HSEMC – Columbia County’s Homeland Security and Emergency Management Commission is recognized by the Board of County Commissioners as the cornerstones of a whole community approach to emergency management planning. All jurisdictions are members of the commission. Semi Annual NHMP meeting, plan review was conducted.
11/14/2017	HSEMC – Columbia County’s Homeland Security and Emergency Management Commission is recognized by the Board of County Commissioners as the

Table 2. Clatskanie Public Involvement Mechanisms	
Date	Description
	cornerstones of a whole community approach to emergency management planning. All jurisdictions are members of the commission. Semi Annual NHMP meeting, plan review was conducted.
11/29/2017	Unprepared showing – St. Helens - presentation of OPB documentary regarding CSZ earthquake and tsunami.
2018	
1/19/2018	Preparedness to Vets Group – Presentation to Veterans regarding personal preparedness and flood mitigation.
1/29/2018	Unprepared showing – Mist/Birkenfeld – presentation of OPB documentary regarding CSZ earthquake and tsunami.
5/8/2018	HSEMC – Columbia County’s Homeland Security and Emergency Management Commission is recognized by the Board of County Commissioners as the cornerstones of a whole community approach to emergency management planning. All jurisdictions are members of the commission. Semi Annual NHMP meeting, plan review was conducted and plans for plan update discussed.
11/13/2018	HSEMC – Columbia County’s Homeland Security and Emergency Management Commission is recognized by the Board of County Commissioners as the cornerstones of a whole community approach to emergency management planning. All jurisdictions are members of the commission. Semi Annual County-wide Hazard Mitigation meeting. Work Session on Hazard Mitigation Plan update conducted.
11/27/2018	Pints and Preparedness – various topics including Hazard mitigation, and individual preparedness.
2019	
1/22/2019	Pints and Preparedness – various topics including Hazard mitigation, and individual preparedness.
3/26/2019	Pints and Preparedness – various topics including Hazard mitigation, and individual preparedness.
5/7/2019	HSEMC – Columbia County’s Homeland Security and Emergency Management Commission is recognized by the Board of County Commissioners as the cornerstones of a whole community approach to emergency management planning. All jurisdictions are members of the commission. Semi Annual County-wide Hazard Mitigation meeting. Work Session on Hazard Mitigation Plan update conducted.

Capability Assessment

Table 3, 4, and 5 contain the City of Clatskanie resources used to support planning activities, including the reports and studies reviewed as part of the update process.

Table 3. City of Clatskanie Legal and Regulatory Resources Available for Hazard Mitigation		
Regulatory Tool	Name	Effect on Hazard Mitigation
Plans	Clatskanie Transportation System Plan (1997)	Presents suggested improvements for each of the transportation system elements; preliminary planning level cost estimates, an implementation scheme recommends which improvements should be made during the first decade and which should be scheduled for the second decade along with suggested land use ordinance modifications. Modified in June 2008 and November 2009
	Clatskanie Transportation Refinement Plan (2005)	Presents Clatskanie requested improvements to The Oregon Department of Transportation (ODOT) preservation and enhancement project on US Highway 30 (US 30) through the City of Clatskanie in 2007.
	Flood Hazard Mitigation Plan (1999)	Presents Flood Hazard Mitigation Plan for areas within the City limits and Urban Growth Boundary for inclusion into other City and County Hazard Mitigation Plans for a comprehensive county-wide mitigation planning effort.
	Potential Flood Level Mitigation by Downstream Channel Deepening, Lower Clatskanie River, OR, (1997)	An evaluation to determine potential for reducing flood levels with the City by dredging the downstream navigation channel to improve flow conveyance in the lower Clatskanie River
	City of Clatskanie Comprehensive Plan	Identifies the long-range land use policy for the city providing a framework for decision-making processes and a means of directing community efforts towards sound future growth, better understanding between the public and private efforts for a beautiful and livable community.
	City of Clatskanie Emergency Operations Plan (2014)	Identifies emergency planning, policies, procedures, and response to extraordinary emergency situations associated with natural disasters, technological incidents, and national security emergencies.
Programs	National Flood Insurance Program (NFIP)	Makes affordable flood insurance available to homeowners, business owners, and renters in participating communities. In exchange, those communities must adopt and enforce minimum floodplain management regulations to reduce the risk of damage from future floods.
Policies (Municipal Codes)	Clatskanie Development Code	Guides development and land-use within the City
	Clatskanie Municipal Code	Chapter 9 Land-Use and Development Code

Table 4. City of Clatskanie Administrative and Technical Resources for Hazard Mitigation	
Staff/Personnel Resources	Department/Division Position
Planner(s) or engineer(s) with knowledge of land development and land management practices	City Engineer: Dave True City Planner: Mark Barnes Planning Commissioner Chair: Rich Larsen
Engineer(s) or professional(s) trained in construction practices related to buildings and/or infrastructure	Public Works City Engineer: Dave True Contract Building Official; NW Code Professionals
Planner(s) or engineer(s) with an understanding of manmade or natural hazards	Contract Planner: Mark Barnes City Engineer: Dave True Contract Building Official: NW Code Professionals
Floodplain manager	City Manager: Greg Hinkelman
Personnel skilled in GIS and/or HAZUS-MH	none
Director of Emergency Services	City Manager: Greg Hinkelman
Finance (grant writers, purchasing)	Finance Manager: Marci Moore
Public Information Officers	City Manager or Mayor

Table 5. City of Clatskanie Financial Resources for Hazard Mitigation	
Financial Resources	Effect on Hazard Mitigation
General funds	Yes
Authority to levy taxes for specific purposes	Yes, with voter approval
Incur debt through general obligation bonds	Yes, with voter approval
Incur debt through special tax and revenue bonds	Yes, with voter approval
Incur debt through private activity bonds	Yes
Hazard Mitigation Grant Program (HMGP)	FEMA funding which is available to local communities after a Presidentially-declared disaster. It can be used to fund both pre- and post-disaster mitigation plans and projects.
Pre-Disaster Mitigation (PDM) grant program	FEMA funding which is available on an annual basis. This grant can only be used to fund pre-disaster mitigation plans and projects only.
Flood Mitigation Assistance (FMA) grant program	FEMA funding which is available on an annual basis. This grant can be used to mitigate repetitively flooded structures and infrastructure to protect repetitive flood structures.
United States Fire Administration (USFA) Grants	The purpose of these grants is to assist state, regional, national or local organizations to address fire prevention and safety. The primary goal is to reach high-risk target groups including children, seniors and firefighters.
Fire Mitigation Fees	Used to finance future fire protection facilities' construction and other fire capital expenditures to protect new development. The City Council or Fire District may charge fire mitigation fees to ensure new development pays their fair share of constructing these improvements.

Hazard Identification and Vulnerability Assessment

DMA 2000 Requirements: Hazard Identification and Risk Assessment	
Planning Requirements	
§201.6(c)(2)(i)	The risk assessment shall include a] description of the type, location and extent of all-natural hazards that can affect the jurisdiction. The plan shall include information on previous occurrences of hazard events and on the probability of future hazard events.
§201.6(c)(2)(ii)	The risk assessment shall include a] description of the jurisdiction's vulnerability to the hazards described in paragraph (c)(2)(i) of this section. This description shall include an overall summary of each hazard and its impact on the community. All plans approved after October 1, 2008 must also address NFIP insured structures that have been repetitively damaged by floods. The plan should describe vulnerability in terms of:
§201.6(c)(2)(ii)(A)	(A) The types and numbers of existing and future buildings, infrastructure, and critical facilities located in the identified hazard areas;
§201.6(c)(2)(ii)(B)	(B) An estimate of the potential dollar losses to vulnerable structures identified in ... this section and a description of the methodology used to prepare the estimate.
§201.6(c)(2)(ii)(C)	(C) Providing a general description of land uses and development trends within the community so that mitigation options can be considered in future land use decisions.
§201.6(c)(2)(iii)	For multi-jurisdictional plans, the risk assessment section must assess each jurisdiction's risks where they vary from the risks facing the entire planning area.
Planning Elements	
B1. Does the Plan include a description of the type, location, and extent of all-natural hazards that can affect each jurisdiction? 44 CFR 201.6(c)(2)(i) and 44 CFR 201.6(c)(2)(iii)	
B2. Does the Plan include information on previous occurrences of hazard events and on the probability of future hazard events for each jurisdiction? 44 CFR 201.6(c)(2)(i)	
B3. Is there a description of each identified hazard's impact on the community as well as an overall summary of the community's vulnerability for each jurisdiction? 44 CFR 201.6(c)(2)(ii)	
B4. Does the Plan address NFIP insured structures within each jurisdiction that have been repetitively damaged by floods? 44 CFR 201.6(c)(2)(ii)	

Hazard Identification

The Steering Committee determined that the following hazards could potentially threaten the community. Table 6 establishes the hazard profile against which this plan is designed.

Table 6. Hazard Profile	
Natural Hazards	
Flood	X
Winter Storm	X
Landslide	X
Fire (Wildland/Urban)	X
Earthquake	X
Volcano	X
Wind	X
Erosion	X
ENSO (El Niño / La Niña)	
Expansive Soils	X
Drought	

Specific Impacts of Identified Hazards

The following section provides specific details of the vulnerabilities and impacts from natural hazards for the City of Clatskanie.

The Basic Plan of this Multi-Jurisdiction Hazard Mitigation Plan contains the full narrative Hazard Profile for the entire county, including full details for this annex. This section is designed to provide additional notes and concerns regarding hazards that can impact this jurisdiction.

Flood

FEMA FIRMs were used to outline the 100-year and 500-year floodplains for the City of Clatskanie. The 100-year floodplain delineates an area of high risk, while the 500-year floodplain delineates an area of moderate risk.

There are 381 residential structures (worth \$ 43.2M), six non-residential structures (value unknown), six government facilities (worth \$1M), 3 emergency response facilities (worth \$753K), four community facilities (worth \$538K), Four bridges (worth \$25M), and 13 utilities (worth \$8.8M) within the 500-year floodplain. A major mitigation project was completed in 2018 with the demolition of the Northwoods Inn property which was deemed a severe repetitive loss property.

Winter Storm

The natural hazards resulting from winter storms, such as ice, cold, wind and floods, are often widespread. A single event is capable of impacting all people, critical facilities and infrastructure within the City of Clatskanie, and therefore the entire population (1,765 people), including 802 residential structures (worth \$89.7M), 43 Commercial structures (value unknown), 12 government facilities (worth \$1.6M), five emergency response facilities (worth \$1.2M), three

educational facilities (worth \$2.2M), three care facilities (worth \$800K), 14 community facilities (worth \$2.7M), two highways (values unknown), one railroad (value unknown), four bridges bridge (worth \$25M), 15 utilities (worth \$12.7M), and two dams (worth \$10M) are at risk.

Landslide

The potential impacts from landslides can be widespread. Potential debris flows and landslides can impact transportation and rail routes, utility systems, and water and waste treatment infrastructure along with public, private, and business structures located adjacent to steep slopes, along riverine embankments, or within alluvial fans or natural drainages. Response and recovery efforts will likely vary from minor cleanup to more extensive utility system rebuilding. Utility disruptions are usually local and terrain dependent. Damages may require reestablishing electrical, communication, and gas pipeline connections occurring from specific breakage points. Initial debris clearing from emergency routes and high traffic areas may be required. Water and waste water utilities may need treatment to quickly improve water quality by reducing excessive water turbidity and reestablishing waste disposal capability.

USGS elevation datasets were used to determine the landslide hazard areas within the City of Clatskanie. Risk was assigned based on slope angle. A slope angle less than 14 degrees was assigned a low risk, a slope angle between 14 and 32 degrees was assigned a medium risk, and a slope angle greater than 32 degrees was assigned a high risk.

There are 732 residential structures (worth \$60.1M), 4 Commercial structures (value unknown), 7 government facilities (worth \$580k), four emergency response facilities (worth \$1.2M), two educational facilities (worth \$1.9M), three care facilities (worth \$800K), 14 community facilities (worth \$2.7M), four bridges (worth \$25M), two dams (worth \$10M) and 15 utilities (worth \$12.7M) are in the moderate landslide risk area.

There are 70 residential structures (worth \$20.6M), one non-residential structures (value unknown), five government facilities (worth \$463K), one educational facility (worth \$1.5M), one care facility (worth \$180K), three community facilities (worth \$1.2M) and nine utilities (worth \$4.6M) are in the high landslide risk area.

Wildland Fires

Wildland fire hazard areas were identified using a model incorporating slope, aspect, and fuel load. South-facing, steep, and heavily vegetated areas were assigned the highest fuel values while areas with little slope and natural vegetation were assigned the lowest fuel values. Risk levels of moderate, high, very high, and extreme were assigned to the entire region based on the results of this modeling.

There are 780 residential structures (worth \$80.5M), four government facilities (worth \$1.2M), five emergency response facilities (worth \$1.2M), two educational facilities (worth \$1.9M), two

care facilities (worth \$650K), 14 community facilities (worth \$2.7M), four bridges (worth \$25M), 15 utilities (worth \$12.7M), and two dams (worth \$10M) are located in moderate fire risk areas.

There are 735 residential structures (worth \$60.9M), nine government facilities (worth \$1M), four emergency response facilities (worth \$1.2M), two educational facilities (worth \$1.9M), one care facility (worth \$180K), 11 community facilities (worth \$2M), one bridge (worth \$15M), 12 utilities (worth \$12M), and two dams (worth \$10M) are located in the high fire risk areas.

There are 511 residential structures (worth \$36.2M), one non-residential structures (value unknown), five government facilities (worth \$468K), one emergency response facility (worth \$238K), two educational facilities (value \$1.9M), one care facility (worth \$180K), three community facilities (worth \$1.1M), two dams (worth \$10M) and two utilities (worth \$4M) are located in very high fire risk areas.

There are 184 residential structures (worth \$22M), one non-residential structures (value unknown), and no critical facilities located in the extreme fire risk area.

Earthquake

Based on PGA shake maps produced by the USGS, the western portion of Columbia County is likely to experience higher levels of shaking than the eastern portion, as a result of its proximity to the Cascadia Subduction Zone. Ground movement in both areas, however, is likely to cause damage to weak, unreinforced masonry buildings, and to induce small landslides along unstable slopes. As well as landslide, earthquakes can trigger other hazards such as dam failure and disruption of transportation and utility systems.

The eastern portion of Columbia County is likely to experience strong shaking should a subduction zone earthquake occur (9-20 percent of the acceleration of gravity). In contrast, the far western portion of the county is likely to experience very strong shaking (20-25 percent). This rating represents the peak acceleration of the ground caused by the earthquake.

All people, critical facilities and infrastructure within the City of Clatskanie, and therefore the entire population (1,765 people), including 802 residential structures (worth \$89.7M), 43 commercial structures (value unknown), 12 government facilities (worth \$1.6M), five emergency response facilities (worth \$1.2M), three educational facilities (worth \$2.2M), three care facilities (worth \$800K), 14 community facilities (worth \$2.7M), two highways (values unknown), one railroad (value unknown), four bridges (worth \$25M), 15 utilities (worth \$12.7M), and two dams (worth \$10M) are located in the strong shaking (9-20 percent) area.

Volcano

A volcanic eruption would have a minor impact on the City of Clatskanie due to the proximity to volcanoes within the Cascade region. The major resources of concern include air quality and waterway sedimentation. During previous eruptions, ashfall has drifted to the east of the volcanoes. (State Interagency Hazard Mitigation Team 2006)

The City of Clatskanie will likely only experience damage from volcanic eruption columns and clouds which contain volcanic gases, minerals, and rock. The columns and clouds form rapidly and extend several miles above an eruption. Solid particles within the clouds present a serious aviation threat, can distribute acid rain (sulfur dioxide gas and water), can create risk of suffocation (carbon dioxide is heavier than air and collects in valleys and depressions threatening human and animals), and pose a toxic threat from fluorine which clings to ash particles potentially poisoning grazing livestock and contaminating domestic water supplies.

Buildings, streets, and roads throughout the city may require minor cleanup with negligible impacts. Temporary utility interruptions are likely, and minor cleanup may be required for electrical and other utility services. Water treatment facilities may require additional attention to address high turbidity water. Injuries associated with respiratory problems may result. (Goettel 2005)

Due to the nature of the hazard, it is impossible to predict the location or extent of future events with any probability, although it can be assumed that all critical facilities and infrastructure within the City of Clatskanie are at risk including the entire population (1,765 people), 802 residential structures (worth \$89.7M), 43 commercial structures (value unknown), 12 government facilities (worth \$1.6M), five emergency response facilities (worth \$1.2M), three educational facilities (worth \$2.2M), three care facilities (worth \$800K), 14 community facilities (worth \$2.7M), two highways (values unknown), one railroad (value unknown), four bridges (worth \$25M), 15 utilities (worth \$12.7M), and two dams (worth \$10M)).

Wind

Many buildings, utilities and transportation systems in open areas, natural grasslands, or agricultural lands are especially vulnerable to wind damage. Impacts associated with wind can include damage to power lines, trees, and structures, and can also cause temporary disruptions of power. Additionally, high winds can cause significant damage to forestlands.

All areas within the City of Clatskanie are equally at risk of a windstorm event including all people, critical facilities and infrastructure, and therefore the entire population (1,765 people), 802 residential structures (worth \$89.7M), 43 commercial structures (value unknown), 12 government facilities (worth \$1.6M), five emergency response facilities (worth \$1.2M), three educational facilities (worth \$2.2M), three care facilities (worth \$800K), 14 community facilities (worth \$2.7M), two highways (values unknown), one railroad (value unknown), four sbridge (worth \$25M), 15 utilities (worth \$12.7M), and two dams (worth \$10M).

Erosion

Riverine erosion rarely causes death or injury. However, erosion causes significant destruction of property, development, and infrastructure. Erosion hazard data is not readily available, however, descriptions of several localized areas were identified during the development of this

document and are identified only by location on a map referencing the river or stream reach described. Critical facilities that may be at risk of erosion were identified using a 300 foot-buffer in the areas identified as having historic erosion impacts to conservatively account for building footprints.

There are 178 residential structures (worth \$20.1M), four government facilities (worth \$800K), one emergency response facility (worth \$481K), four community facilities (worth \$116K), four bridges (worth \$25M), and nine utilities (worth \$7.9M) identified in the City of Clatskanie to be at risk from erosion impacts.

Erosion

Riverine erosion rarely causes death or injury. However, erosion causes significant destruction of property, development, and infrastructure. Erosion hazard data is not readily available, however, descriptions of several localized areas were identified during the development of this document and are identified only by location on a map referencing the river or stream reach described. Critical facilities that may be at risk of erosion were identified using a 300 foot-buffer in the areas identified as having historic erosion impacts to conservatively account for building footprints.

There are 178 residential structures (worth \$20.1M), two non-residential structures (value unknown), four government facilities (worth \$800K), one emergency response facility (worth \$481K), four community facilities (worth \$116K), four bridges (worth \$25M), and nine utilities (worth \$7.9M) identified in the City of Clatskanie to be at risk from erosion impacts.

Values at Risk

Population Analysis

Population data listed in Table 7 were obtained from the 2010 U.S. Census and Portland State University. It comprises census block level data and estimates from university conducted community research.

Table 7. Population			
2000 Census	2010 Census	% Change	2018 PSU Estimate
1528	1660	8.5	1765

Asset Inventory

The Asset Inventory describes the physical values; the residential building stock, public facilities, and infrastructure within each community that may be affected by hazard events and includes population, residential and nonresidential buildings, critical facilities, and infrastructure. These values are described in Tables 8 and 9 and portray the City's critical infrastructure numbers and values, and their potential vulnerability by hazard type.

City of Clatskanie Annex

City of Clatskanie seeks to protect its population by supporting Columbia County and Oregon State initiatives, ordinances, building codes, and development regulations. One of the most important initiatives is to prohibit or not allow future development of buildings, infrastructure and critical facilities in identified high hazard areas. Any essential infrastructure component will undergo stringent review to ensure potential hazard risk will be mitigated.

Table 8. Residential Buildings	
Total Building Count	Total Value of Buildings
672	\$74,460,000

Table 9. Critical Facilities and Infrastructure			
Facility Type	Name / Number	Address	Value ¹
Government	City Public Works Shop	520 SW Bryant	\$257,500
	Clatskanie Cultural Center (City Hall) (not City owned)	75 S. Nehalem	\$1,600,000
	Public Works Hwy 47 shop	Corner of SW Norman and Hwy 47	\$260,000
	City owned Timber land	Highway 47 access	\$25,000,000
Emergency Response	Police Station	195 SE 2nd	\$255,000
	Clatskanie Rural Fire Protection District Main Station	280 SE 3rd St	\$510,000
	Clatskanie Rural Fire Protection District Substation 1	76015 Atkins Rd	\$240,000
	Clatskanie Rural Fire Protection District Substation 2	80694 Mayger Fill Rd	\$65,000
	Clatskanie Rural Fire Protection District Substation 3	79704 Quincy Mayger Rd.	\$220,000
Educational	Clatskanie Head Start Program	365 SE High School Dr.	\$757,000
	Clatskanie Elementary School	815 S. Nehalem	\$310,000
	Clatskanie Middle/High School	471 SW Bel Air Dr.	\$875,000
	Piercing Arrow	175 N. Nehalem	N/A
Care Facility	Amber Assisted Living	365 SW Bel Air Dr.	\$850,000
	Arcadian	950 SW Janis Ct	250,000

Table 9. Critical Facilities and Infrastructure

Facility Type	Name / Number	Address	Value ¹
Community	City Park-Pool, Basketball Court, Tennis Court, Playground, Skate Park, Ball Field, Restrooms, Ball Fields	City Park	\$718,000
	Turning Point Community Service Center	220 W Columbia River Hwy	\$76,000
	The Chief Newspaper	148 N Nehalem Street	
	Clatskanie Parks and Recreation	300 NE Park Street	\$30,480
	Clatskanie Public Library	11 Lillich St	\$1,600,000
	Apostolic Lutheran Church	18558 Beaver Falls Road	\$640,000
	Clatskanie Baptist Church	415 S Nehalem Street	\$275,000
	Clatskanie Presbyterian Church	215 S Nehalem Street	\$310,000
	Faith Lutheran Church Elca	1010 NE 5th Street	\$160,000
	Gateway Worship Center	610 NW 5th Street	\$150,000
	Great Vow Zen Monastery	79640 Quincy Mayger Road	\$375,000
	Mayger-Downing Community Church	80072 Life Lane	\$323,220
	St John the Baptist Catholic Church	125 SW High St.	\$340,000
	The Church at Beaver Creek	Beaver Falls Rd	\$280,000
	The Meeting Place	290 S Nehalem Street	\$72,000
State and Federal Highways	US Highway 30		1.25 miles
	State Hwy 47		5 miles
Railroads	Portland and Western Railroad		2 miles
Bridges	Highway 30 Clatskanie River Bridge	Located at Milepost 61.3	\$15,000,000
	Nehalem St. Bridge	North Nehalem Street	\$8,000,000
Transportation Facilities	Fire Dept Heliport	280 SE 3rd St.	\$10,000
Utilities	Mist Natural Gas Facility	South of City	\$7,800,000
	City of Clatskanie-City Sewer Treatment Plant	7-4-8-AC 3100 End of NW 4th Street	\$7,500,000
	City of Clatskanie-1A Sewer Pump Station	7-4-8-DB 601 50 NW 4th Street	\$350,000
	City of Clatskanie-City Reservoir, Water Plant	7-4-8-CC 300 520 SW Bryant Street	\$4,000,000

Table 9. Critical Facilities and Infrastructure			
Facility Type	Name / Number	Address	Value ¹
	City of Clatskanie-Main Sewer Lift Station-Grannis Square	350 W Columbia River Hwy	\$300,000
	City of Clatskanie-Poplar St. Water Pump Station	NE 8th & NE Poplar	\$50,000
	City Water Reservoir (1 M gallon capacity)	855 "K" Street	\$1,700,000
	Clatskanie PUD Office	469 N Nehalem St	\$12,500,000
	Marshland Drainage Improvement Company	12588 Highway 30	\$4,500
	Marshland Drainage Improvement Company	12589 Highway 30	\$1,000
	Midland Drainage Improvement Company	15694 Luxford Road	\$680,720
	Quincy Water Association	77285 Woodson Road	\$21,080
	Woodson Water Association	77285 Woodson Road	\$185,020
	City Water Distribution System	City-wide	15 miles
	City Sewer System	City-wide	10.2 miles
	Fiber Optics	City-wide	10 miles
	City Storm Water System	City-wide	
	City Storm Water System	City-wide	
Dams	West Creek Dam-1 (1910)		\$5,000,000
	Roaring Creek Dam-1		\$5,000,000
	Roaring Creek Dam-2		\$5,000,000

National Flood Insurance Policy

National Flood Insurance Program data were obtained from the State Department of Land Conservation and Development. This data is significant for the vulnerability assessment as it identifies the impact of flooding, one of the most often repeated natural hazards for the county. This data is displayed in Table 10.

Table 10. Clatskanie NFIP Insurance Report										
Jurisdiction	Effective FIRM and FIS	Initial FIRM	Total Policies	Pre FIRM Policies	Policies by Building Type				Minus Rated A Zone	Minus Rated V Zone
					Single Family	2 to 4 Family	Other Residential	Non-Residential		
Clatskanie	11/26/2010	9/29/1986	16	8	2	1	0	13	1	0

Source: FEMA Community Information System 02/21/2019

Table 10a. Clatskanie NFIP Insurance Report									
Jurisdiction	Insurance in Force	Total Paid Claims	Pre-Firm Claims Paid	Substantial Damage Claims	Total Paid Amount	Repetitive Loss Structures	Severe Repetitive Loss Structures	CRS Class Rating	Last Community Assistance Visit
Clatskanie	\$7,524,200	11	10	2	\$1,012,649	1	0	10	5/12/2017

Source: FEMA Community Information System 02/21/2019

Vulnerability Analysis

A vulnerability analysis predicts the extent of exposure, and the impacts that may result from a hazard event of a given intensity in each area. The analysis provides quantitative data that may be used to identify and prioritize potential mitigation measures by allowing communities to focus attention on areas with the greatest risk of damage. A vulnerability analysis is divided into five steps including asset inventory, methodology, data limitations, exposure analysis for current assets, and areas of future development.

The following is derived from the best available data for facility locations and values. In many cases, values were unavailable, and therefore the totals listed below should be considered incomplete and likely less than the actual costs associated with the respective hazards

The vulnerability analysis development process is thoroughly discussed in the Columbia County Basic Plan, Section 6, which generated the following Hazard Exposure Analysis Overviews in Tables 11, 12, and 13.

Table 11. City of Clatskanie Potential Hazard Exposure Analysis Overview
Population and Buildings

			Population	Buildings			
				Residential		Non-Residential	
Hazard Type	Hazard Area	Methodology	Number	Number	Value (\$)	Number	Value (\$)
Flood	Moderate	500-year floodplain	--	381	41,910,000	6	unknown
	High	100-year floodplain	--	353	38,830,000	6	unknown
Winter Storm		descriptive	1,660	802	89,700,000	unknown	unknown
Landslide	Moderate	>14-32 degrees	--	725	79,750,000	5	unknown
	High	>32-56 degrees	--	455	50,050,000	1	unknown
Wildland Fire	Moderate	Moderate fuel rank	--	764	84,040,000	6	unknown
	High	High fuel rank	--	735	80,850,000	5	unknown
	Very High	Very high fuel rank	--	511	56,210,000	1	unknown
	Extreme	Extreme fuel rank	--	184	20,240,000	1	unknown
Earthquake	Strong	9-20% (g)	--	802	89,700,000	6	unknown
	Very strong	20-40% (g)	--	0		0	unknown
	Severe	>40-60% (g)	--	0		0	unknown
Volcano		descriptive	1,660	802	89,700,000	unknown	unknown
Wind		descriptive	1,660	802	89,700,000	unknown	unknown
Erosion		within 300' of potential areas of erosion	--	178	19,580,000	2	unknown
Expansive Soils	Low	<3% percent	--	790	86,900,000	6	unknown
Drought		descriptive	--	--	--	--	--

¹ Average insured structural value of all residential buildings (including single-family dwellings, mobile homes, etc., is \$172,500 per structure).

Table 12. City of Clatskanie Potential Hazard Exposure Analysis Overview
Critical Facilities

			Government		Emergency Response		Educational		Care		Community	
Hazard Type	Hazard Area	Methodology	No.	\$	No.	\$	No.	\$	No.	\$	No.	\$
Flood	Moderate	500-year floodplain	6	1M	3	731K	--	--	--	--	4	523K
	High	100-year floodplain	7	1.2M	4	978K	--	--	--	--	7	839K
Winter Storm		Descriptive	28	27M	5	1.3M	5	4.3M	3	575K	17	5.4M
Landslide	Moderate	>14-32 degrees	7	569K	4	1.2M	5	1.8M	2	450K	12	2.6M
	High	>32-56 degrees	5	463K			3	1.5M	1	175K	3	1.2M
Wildland Fire	Moderate	Moderate fuel rank	12	1.6M	5	1.2M	5	1.9M	2	450K	14	2.6M
	High	High fuel rank	9	1.2M	4	1.2M	4	1.8M	1	175K	11	2M
	Very High	Very high fuel rank	10	463M	1	238K	3	1.6M	1	175K	3	1.1M
	Extreme	Extreme fuel rank	--	--	--	--	--	--	--	--	--	--
Earthquake	Strong	9-20% (g)	12	1.6M	5	1.2M	5	1.9M	2	450K	14	2.6M
	Very strong	20-40% (g)	--	--	--	--	--	--	--	--	--	--
	Severe	>40-60% (g)	--	--	--	--	--	--	--	--	--	--
Volcano	Moderate		12	1.6M	5	1.2M	5	1.9M	2	450K	14	2.6M
Wind	Moderate		12	1.6M	5	1.2M	5	1.9M	2	450K	14	2.6M
Erosion		within 300' of potential areas of erosion	4	800K	1	481K	--	--	--	--	4	116K
El Nino and La Nina		Descriptive	28	27M	5	1.3M	5	4.3M	3	575K	17	5.4M
Expansive Soils	Low	<3% percent	--	--	--	--	--	--	--	--	--	--
Drought		Descriptive	28	27M	5	1.3M	5	4.3M	3	575K	17	5.4M

Table 13. City of Clatskanie Potential Hazard Exposure Analysis Overview
Critical Infrastructure

			Highways		Railroads		Bridges		Transportation Facilities		Utilities		Dams	
Hazard Type	Hazard Area	Methodology	Miles	Value	Miles	Value	No.	Value	No.	Value	No.	Value	No.	Value
Flood	Moderate	500-year floodplain	--	--	--	--	1	14M			13	8.6M		
	High	100-year floodplain	--	--	--	--	1	14M			12	8.6M	2	10M
Winter Storm		descriptive	1.75	unknown	2	unknown	1	14M			18	21M	4	20M
Landslide	Moderate	>14-32 degrees	--	--	--	--	1	14M			10	5M	2	10M
	High	>32-56 degrees	--	--	--	--	--	--			9	4.6M	--	--
Wildland Fire	Moderate	Moderate fuel rank	--	--	--	--	1	14M			15	12.7M	2	10M
	High	High fuel rank	--	--	--	--	1	14M			12	12M	2	10M
	Very High	Very high fuel rank	--	--	--	--	--	--			2	4M	2	10M
	Extreme	Extreme fuel rank	--	--	--	--	--	--			--	--	--	--
Earthquake	Strong	9-20% (g)	2	unknown	1	unknown	1	14M			15	12.7M	2	10M
	Very strong	20-40% (g)	--	--	--	--	--	--			--	--	--	--
	Severe	>40-60% (g)	--	--	--	--	--	--			--	--	--	--
Volcano	Moderate		2	unknown	1	unknown	1	14M			15	12.7	2	10M
Wind	Moderate		2	unknown	1	unknown	1	14M			15	12.7	2	10M
Erosion		within 300' of potential areas of erosion	--	--	--	--	1	14M			9	7.9M	--	--
El Nino and La Nina		descriptive	1.75	unknown	2	unknown	1	14M			18	21M	4	20M
Expansive Soils	Low	<3% percent	--	--	--	--	--	--			--	--	--	--
Drought		descriptive	1.75	unknown	2	unknown	1	14M			18	21M	4	20M

Mitigation Strategy

The following section defines mitigation action identification and analysis as stipulated in DMA 2000 and its implementing regulations.

DMA 2000 Requirements: Mitigation Strategy	
Planning Requirements	
§201.6(c)(3)	The plan shall include the following:] A mitigation strategy that provides the jurisdiction’s blueprint for reducing the potential losses identified in the risk assessment, based on existing authorities, policies, programs, and resources, and its ability to expand on and improve these existing tools.
§201.6(c)(3)(i)	The hazard mitigation strategy shall include a] description of mitigation goals to reduce or avoid long-term vulnerabilities to the identified hazards.
§201.6(c)(3)(ii)	The hazard mitigation strategy shall include a] section that identifies and analyzes a comprehensive range of specific mitigation actions and projects being considered to reduce the effects of each hazard, with particular emphasis on new and existing buildings and infrastructure. All plans approved by FEMA after October 1, 2008, must also address the jurisdiction’s participation in the NFIP, and continued compliance with NFIP requirements, as appropriate.
§201.6(c)(3)(iii)	The hazard mitigation strategy shall include an] action plan, describing how the action identified in paragraph (c)(3)(ii) of this section will be prioritized, implemented, and administered by the local jurisdiction. Prioritization shall include a special emphasis on the extent to which benefits are maximized according to a cost benefit review of the proposed projects and their associated costs.
§201.6(c)(3)(iv)	For multi-jurisdictional plans, there must be identifiable action items specific to the jurisdiction requesting FEMA approval or credit of the plan.
§201.6(c)(4)(ii)	The plan shall include a] process by which local governments incorporate the requirements of the mitigation plan into other planning mechanisms such as comprehensive or capital improvements, when appropriate.
Planning Elements	
C1. Does the plan document each jurisdiction’s existing authorities, policies, programs and resources, and its ability to expand on and improve these existing policies and programs? 44 CFR 201.6(c)(3)	
C2. Does the Plan address each jurisdiction’s participation in the NFIP and continued compliance with NFIP requirements, as appropriate? 44 CFR 201.6(c)(3)(ii)	
C3. Does the Plan include goals to reduce/avoid long-term vulnerabilities to the identified hazards? 44 CFR 201.6(c)(3)(i)	
C4. Does the Plan identify and analyze a comprehensive range of specific mitigation actions and projects for each jurisdiction being considered to reduce the effects of hazards, with emphasis on new and existing buildings and infrastructure? 44 CFR 201.6(c)(3)(ii) and 44 CFR 201.6(c)(3)(iv)	

C5. Does the Plan contain an action plan that describes how the actions identified will be prioritized (including cost benefit review), implemented, and administered by each jurisdiction? 44 CFR 201.6(c)(3)(iii) and 44 CFR (c)(3)(iv)

C6. Does the Plan describe a process by which local governments will integrate the requirements of the mitigation plan into other planning mechanisms, such as comprehensive or capital improvement plans, when appropriate? 44 CFR 201.6(c)(4)(ii)

Identify Mitigation Goals

Columbia City reviewed the Columbia County goals and determined they meet the City's needs and subsequently adopted the Goals in Table 14 for the current planning period.

Table 14. City of Clatskanie Mitigation Goals	
Goal Number	Goal Description
1	Reduce the Threat to Life Safety Enhance life safety by minimizing the potential for deaths and injuries in future disaster events.
2	Protect Critical Facilities and Enhance Emergency and Essential Services • Implement activities or projects to protect critical facilities and infrastructure. • Seek opportunities to enhance, protect, and integrate emergency and essential services. • Strengthen emergency operations plans and procedures by increasing collaboration and coordination among public agencies, Special Districts, non-profit organizations, businesses, and industry.
3	Reduce the Threat to Property • Seek opportunities to protect, enhance and integrate emergency and essential services. • Strengthen emergency operations plans and procedures by increasing collaboration and coordination among public agencies, Special Districts, non-profit organizations, businesses, industries and the citizens of Clatskanie.
4	Create a Disaster Resistant and Disaster-Resilient Economy • Develop and implement activities to protect economic well-being and vitality while reducing economic hardship in post disaster situations. • Reduce insurance losses and repetitive claims for chronic hazard events. • Work with State and Federal Partners to reduce short-term and long-term recovery and reconstruction costs. • Work with local and County organizations, such as the Local Emergency Planning Association (LEPC). • Expedite pre-disaster and post-disaster grants and program funding.
5	Increase Public Awareness, Education, Outreach, and Partnerships • Coordinate and collaborate, where possible, risk reduction outreach efforts with the Oregon Partners for Disaster Resistance & Resilience and other public and private organizations. • Develop and implement risk reduction education programs to increase awareness among citizens, local, county, and regional agencies, non-profit organizations, businesses, and industry. • Promote insurance coverage for catastrophic hazards • Strengthen communication and coordinate participation in and between public agencies, citizens, nonprofit organizations, businesses, and industry.

Evaluate and Prioritize Mitigation Actions

Mitigation actions are activities, measures, or projects that help achieve the goals of a mitigation plan. Table 15 lists the mitigation actions developed during this mitigation planning process or offered during whole community planning activities. It is not intended that this plan will attempt

to act on all of these action items, but the list will be maintained in order to provide documentation for future planning efforts.

Table 15. City of Clatskanie Mitigation Actions Considered			
Hazard	Status	Comment	Description
Natural Hazards			
<i>Multi-Hazard (MH)</i>			
Multi-Hazard	Ongoing		Develop and incorporate building ordinances commensurate with building codes to reflect survivability from wind, seismic, fire, and other hazards to ensure occupant safety.
Multi-Hazard	Consider		Review ordinances and develop outreach programs to assure mobile homes and manufactured buildings are protected from severe wind and flood hazards. (Anchoring, elevation, and other methods as applicable)
Multi-Hazard	Consider		Review and develop outreach programs to assure fuel oil and propane tanks are properly anchored and hazardous materials are properly stored and protected from known natural hazards such as seismic or flooding events.
Multi-Hazard	Ongoing		Cross reference and incorporate mitigation planning provisions into all community planning processes such as comprehensive, capital improvement, land use, transportation plans, etc to demonstrate multi-benefit considerations and facilitate using multiple funding source consideration.
Multi-Hazard	Ongoing		Develop and incorporate mitigation provisions and recommendations into zoning ordinances and community development processes to maintain the floodway and protect critical infrastructure and private residences from other hazard areas.
Multi-Hazard	Consider		Increase power line wire size and incorporate quick disconnects (break away devices) to reduce ice load and wind storm power line failure during severe wind or winter ice storm events.
Multi-Hazard	Ongoing	Generator for High School Purchased	Purchase and install generators with main power distribution disconnect switches for identified and prioritized critical facilities susceptible to short term power disruption. (i.e. first responder and medical facilities, schools, correctional facilities, and water and sewage pump stations, etc.)

Table 15. City of Clatskanie Mitigation Actions Considered			
Hazard	Status	Comment	Description
Multi-Hazard	Ongoing		Develop, produce, and distribute information materials concerning mitigation, preparedness, and safety procedures for all natural hazards.
Multi-Hazard	Ongoing		Explore the need for, develop, and implement hazard zoning ordinances for high-risk hazard area land-use.
Multi-Hazard	Ongoing		Based on known high-risk hazard areas, identify hazard-specific signage needs and purchase and install hazard warning signs near these areas to notify and educate the public of potential hazards.
Multi-Hazard	Ongoing		Identify and list repetitively flooded structures and infrastructures, analyze the threat to these facilities, and prioritize mitigation actions to acquire, relocate, elevate, and/or flood proof to protect the threatened population.
Multi-Hazard	Ongoing		Perform hydrologic and hydraulic engineering, and drainage studies and analyses. Use information obtained for feasibility determination and project design. This information should be a key component, directly related to a proposed project.
Multi-Hazard	Consider		Develop vegetation projects to restore clear cut and riverine erosion damage and to increase landslide susceptible slope stability.
Multi-Hazard	Consider		Retrofit structures to protect them from seismic, floods, high winds, earthquakes, or other natural hazards.
Multi-Hazard	Consider	Northwoods Inn removed	Acquire, demolish, or relocate structures from hazard prone area. Property deeds shall be restricted for open space uses in perpetuity to keep people from rebuilding in hazard areas.
Multi-Hazard	Consider		Harden utility headers located along river embankments to mitigate potential flood, debris, and erosion damages.
Multi-Hazard	Consider		Establish a formal role for the jurisdictional Hazard Mitigation Planning Committees to develop a sustainable process to implement, monitor, and evaluate citywide mitigation actions.
Multi-Hazard	Consider		Identify and pursue funding opportunities to implement mitigation actions.

Table 15. City of Clatskanie Mitigation Actions Considered			
Hazard	Status	Comment	Description
Multi-Hazard	Consider		Develop public and private sector partnerships to foster hazard mitigation activities.
Multi-Hazard	Consider		Integrate the Mitigation Plan findings into planning and regulatory documents and programs and into enhanced emergency planning.
Flood			
Flood	Consider		Develop and maintain GIS mapped critical facility inventory for all structures located within 100-year and 500-year floodplains.
Flood	Consider		Develop and maintain GIS mapped inventory, and develop prioritized list of residential and commercial buildings within 100-year and 500-year floodplains.
Flood	Consider		Develop and maintain GIS mapped inventory of repetitive loss properties to include the types and numbers of properties.
Flood	On-going		Develop and implement mitigation actions for repetitive loss properties.
Flood	On-going		Establish flood mitigation priorities for critical facilities and residential and commercial buildings located within the 100- year floodplain using survey elevation data.
Flood	On-going		Implement mitigation measures identified by critical facilities' owners, and other facility owners, to protect facilities located within the 100-year floodplain.
Flood	Consider		Develop and maintain an inventory of locations subject to frequent storm water flooding based on most current USACOE flood data.
Flood	Consider		Request DOGAMI debris flow and lidar data be included in FIRM updates. Use the updated FIRMS for land use and mitigation planning.
Flood	On-going		Determine and implement most cost beneficial and feasible mitigation actions for locations with repetitive flooding and significant damages or road closures.
Flood	Consider		Develop an outreach program to educate public concerning NFIP participation benefits, floodplain development, land use regulation, and NFIP flood insurance availability to facilitate continued compliance with the NFIP.

Table 15. City of Clatskanie Mitigation Actions Considered

Hazard	Status	Comment	Description
Flood	On-going		Develop, implement, and enforce floodplain management ordinances.
Flood	Consider		Acquire, relocate, elevate, or otherwise flood-proof identified properties.
Flood	Consider		Acquire, relocate, elevate, or otherwise flood-proof critical facilities.
Flood	On-going	Possible project with LCWSC	Install new streamflow and precipitation measuring gauges.
Flood	On-going		Develop, or revise, adopt, and enforce storm water ordinances and regulations to manage run-off from new development, including buffers and retention basins.
Flood	On-going		Construct earthen berms to divert flood flows into bridge or culvert openings. The earth fill should be erosion-resistant and the berms should be covered with erosion-resistant fabric, armoring materials, or vegetation.
Flood	On-going		Increase culvert size to increase its drainage efficiency.
Flood	Consider		Construct debris basins to retain debris in order to prevent downstream drainage structure clogging.
Flood	Consider		Create detention storage basins, ponds, reservoirs etc. to allow water to temporarily accumulate to reduce pressure on culverts and low water crossings. Water ultimately returning to its watercourse at a reduced flow rate.
Flood	Consider		Install triangular or circular flow deflectors on or immediately upstream from bridge footings to deflect water flow and reduce flow velocities preventing footing scour.
Flood	On-going		Construct low water crossings in a road prism to carry flood flows from an intermittent drainage
Flood	Consider		Construct a high water overflow crossing to carry flood flows from over bank areas.
Flood	Consider		Realign bridge piers & abutments to be parallel with the stream's centerline. This prevents pier and abutment undermining and reduces debris catchment.
Flood	On-going		Create relief drainage ditch opening using a culvert, bridge, or multiple culverts; to relieve rapid water accumulation during high water flow events. .

Table 15. City of Clatskanie Mitigation Actions Considered			
Hazard	Status	Comment	Description
Flood	On-going		Raise bridge height or convert bridge from a multi-span to single span to increase water flow and reduce debris catchment.
Flood	Consider		Construct spur dikes along the embankments to direct flood flows into a bridge opening or On-going away from a continuous impact site.
Flood	On-going		Construct concrete wing walls at culvert or bridge entrances and outlets to direct water flow into their openings
Flood	Consider		Provide flood protection to mitigate damage and contamination of wastewater treatment systems.
Flood	On-going		Develop and implement flood risk reduction program and outreach efforts considering upstream storage, channel improvements, including dredging.
Flood	Consider		Evaluate the adequacy of dike systems for both floods and earthquakes and implement mitigation measures as necessary.
Flood	Consider	Completed	Construct permanent berm along same section of the Clatskanie River along Conyers Street top prevent area flooding during high-water/flood events.
Winter Storm			
Winter Storms	Consider		Develop and implement strategies and educational outreach programs for debris management from severe winter storms.
Winter Storms	On-going		Develop and implement programs to coordinate maintenance and mitigation activities to reduce risk to public infrastructure from severe winter storms.
Winter Storms	On-going		Update or develop, implement, and maintain jurisdictional debris management plans.
Winter Storms	On-going		Develop critical facility list needing emergency back-up power systems, prioritize, seek funding and implement mitigation actions.
Winter Storms	On-going		Develop and maintain severe winter storm public outreach program defining mitigation activity benefits through educational outreach aimed at households and businesses while targeting of special needs populations.
Winter Storms	Consider		Develop and implement tree clearing mitigation programs to keep trees from threatening lives,

Table 15. City of Clatskanie Mitigation Actions Considered			
Hazard	Status	Comment	Description
			property, and public infrastructure from severe weather events.
Winter Storms	On-going		Develop, implement, and maintain partnership program with electrical utilities to use underground utility placement methods where possible to reduce or On-going eliminate power outages from severe winter storms. Consider developing incentive programs.
Winter Storms	On-going		Develop personal use and educational outreach training for a “safe tree harvesting” program. Implement along utility and road corridors, preventing potential winter storm damage.
Winter Storms	On-going		Purchase NOAA Weather radios and develop a web portal linking residents to various weather information sites. (NWS, FEMA, The Weather Channel).
Winter Storms	On-going	Possible Project with LCWSC	Install new streamflow and precipitation measuring gauges and develop monitoring and early warning program.
Winter Storms	Consider		Develop outreach program with school district contests having students develop, display, and explain mitigation projects or initiatives.
Winter Storms	On-going		Develop early warning test program partnering with NOAA, City Police, Fire Departments, and Volunteer Fire Department to coordinate tests.
Winter Storms	On-going		Implement and enforce the most current Uniform International, and State, Building Codes to ensure structures can withstand winter storm hazards such as high winds, rain, water and snow.
Winter Storms	On-going		Increase power line wire size and incorporate quick disconnects (break away devices) to reduce ice load power line severe wind or winter ice storm event failure.
Winter Storms	Consider		Review critical facilities and government building energy efficiency, winter readiness, and electrical protection capability. Identify, prioritize, and implement infrastructure upgrade or rehabilitation project prioritization and development.
Landslide			

Table 15. City of Clatskanie Mitigation Actions Considered			
Hazard	Status	Comment	Description
Landslide	Consider		Complete a landslide location inventory, identify threatened critical facilities and other buildings and infrastructure.
Landslide	On-going		Develop process to limit future development in high landslide potential areas (permitting, geotechnical review, soil stabilization techniques, etc).
Landslide	Consider		Update the storm water management plan to include regulations to control runoff, both for flood reduction and to minimize saturated soils on steep slopes that can cause landslides.
Landslide	On-going		Develop comprehensive geological landslide and rockslide prone area maps.
Landslide	On-going		Develop a vegetation management plan addressing slope-stabilizing root strength while facilitating precipitation containment.
Landslide	On-going		Identify and seasonally restrict recreational and construction activities in high landslide areas.
Landslide	Consider		Develop, implement and enforce property development landslide risk assessment procedures to identify potential facility vulnerability.
Landslide	On-going		Develop process to limit future development in high landslide potential areas (permitting, geotechnical review, soil stabilization techniques, etc).
Wildland Fire			
Wildland Fire	Consider		Identify critical facilities and vulnerable populations based on mapped high hazard areas.
Wildland Fire	On-going		Identify evacuation routes away from high hazard areas and develop outreach program to educate the public concerning warnings and evacuation procedures.
Wildland Fire	On-going		Develop Community Wildland Fire Protection Plans for all at-risk communities.
Wildland Fire	Consider		Provide real-time internet access and interagency cooperation to decrease wildland fire warning times.
Wildland Fire	Consider		Hold FireWise workshop to educate residents and contractors concerning fire resistant landscaping.

Table 15. City of Clatskanie Mitigation Actions Considered			
Hazard	Status	Comment	Description
Wildland Fire	Consider		Promote FireWise building siting, design, and construction materials.
Wildland Fire	Consider		Retrofit structures with FireWise building design materials.
Wildland Fire	Consider		Develop FireWise Public Service Announcements (PSA).
Wildland Fire	Consider		Provide wildland fire information in an easily distributed format for all residents.
Wildland Fire	On-going		Schedule and perform government facility "fire drills" at least twice per year.
Wildland Fire	Consider		Conduct residential audits for wildland and building fire hazard identification then develop an outreach program to convey the findings.
Wildland Fire	On-going		Develop, adopt, and enforce burn ordinances that require burn permits, restrict campfires, and controls outdoor burning.
Wildland Fire	Consider		Develop outreach program to educate and encourage home landscape cleanup (defensible space) and define debris disposal programs.
Earthquake			
Earthquake	Consider		Supplement State Seismic Needs Analysis data (schools, fire, law enforcement). Complete inventory of public and commercial buildings that may be particularly vulnerable to earthquake damage.
Earthquake	On-going		Disseminate FEMA pamphlets to educate and encourage homeowners concerning seismic structural and non-structural retrofit benefits.
Earthquake	On-going		Retrofit important public facilities with significant seismic vulnerabilities, such as unreinforced masonry construction.
Earthquake	On-going		Retrofit bridges that are not seismically adequate for lifeline transportation routes.
Earthquake	On-going		Update existing (or adopt the most current) Uniform Building Code
Earthquake	On-going		Implement and enforce the Uniform, International, and State Building Codes.
Earthquake	On-going		Inspect and/or certify all new construction.
Earthquake	Consider		Develop public outreach program to train earthquake safety; perform drop-cover-hold drills at schools and public facilities.
Earthquake	Consider		Develop outreach program to educate population concerning household, business, and

Table 15. City of Clatskanie Mitigation Actions Considered			
Hazard	Status	Comment	Description
			public facility mitigation measures. For example, staff public information tables at fairs, safety events, and festivals.
Earthquake	Consider		Develop outreach program to educate residents concerning benefits of increased seismic resistance and modern building code compliance during rehabilitation or major repairs for residences or businesses.
Earthquake	Consider		Inspect, prioritize, and retrofit any critical facility or public infrastructure that does not meet current Building Codes.
Earthquake	Consider		Identify and prioritize a list of critical facilities with unreinforced masonry problems including non-structural projects such as brick chimney bracing or replacement, water heater bracing, and anchoring, etc.
Earthquake	Consider		Evaluate critical public facility seismic performance for fire stations, public works buildings, potable water systems, wastewater systems, electric power systems, and bridges within the jurisdiction.
Earthquake	Consider		Develop outreach program for educating private facilities concerning alternative or emergency power source acquisition to enable them to deliver food, fuel, and medical services during disaster emergency response and recovery efforts.
Earthquake	On-going		Encourage utility companies to evaluate and harden vulnerable infrastructure elements for sustainability.
Earthquake	On-going		Develop partnerships to mitigate hazards that result in jurisdictional facility lifeline or emergency transportation route closures.
Volcano			
Volcano	On-going	CAN System	Update public emergency notification procedures and develop an outreach program for ash fall events.
Volcano	Consider		Update emergency response planning and develop client focused outreach program for ash fall events affecting river, air, and highway transportation, and industrial facilities and operations.

Table 15. City of Clatskanie Mitigation Actions Considered			
Hazard	Status	Comment	Description
Volcano	Consider		Evaluate capability of water treatment plants to deal with high turbidity from ash falls, update emergency response plans, and upgrade treatment facilities' physical plant to deal with ash falls. Prioritize and initiate actions to fill capability gaps.
Volcano	Consider		Evaluate ash impact on storm water drainage system and develop mitigation actions.
Wind			
Wind	On-going		Review ordinances and develop outreach programs to assure manufactured buildings are protected from severe wind and flood hazards. (Anchoring, elevation, siting, and other methods as applicable)
Wind	On-going		Identify and prioritize critical facilities' overhead utilities that could be placed underground to reduce power disruption from wind storm / tree blow down damage.
Wind	On-going		Revise requirements to place utilities underground to reduce power disruption from wind storm / tree blow down damage when upgrading or during new development.
Wind	On-going		Increase power line wire size and incorporate quick disconnects (break away devices) to reduce ice load power line failure during severe wind or winter ice storm events.
Erosion			
Erosion	On-going		Maintain and update erosion hazard locations, identify critical facilities potentially impacted and develop mitigation initiatives such as bank stabilization or facility relocation to prevent or reduce the threat.
Erosion	Consider		Relocate buildings that are at risk of being affected by erosion.
Erosion	On-going	Project with LCWSC	Apply for grants/funds to implement riverbank protection methods.
Erosion	On-going		Hold series of community meetings and other outreach efforts to provide erosion hazard specific information to residents.
Erosion	Consider		Develop and provide information to all residents on riverbank erosion and methods to prevent it in an easily distributed format

Table 15. City of Clatskanie Mitigation Actions Considered			
Hazard	Status	Comment	Description
Erosion	On-going		Install riprap, or pilings to harden or "armor" a stream bank where severe erosion occurs.
Erosion	On-going		Install bank protection such as rock, concrete, asphalt, vegetation, or other armoring or protective materials to provide river bank protection.
Erosion	On-going		Develop outreach program to educate the public concerning planting processes and materials used to stabilize hill slopes or stream banks. This is known as bio-engineering; which uses logs, root wads, or wood debris or other vegetation to reduce scour and erosion.
Erosion	On-going		Install embankment protection such as vegetation, riprap, gabion baskets, sheet piling, and walls to reduce or eliminate erosion.
Erosion	On-going		Install walls at the end of a drainage structure to prevent embankment erosion at its entrance or outlet (end walls).
Erosion	On-going		Install flared outlets or end sections at culvert entrances and outlets to match the embankment slope to reduce erosion and scour at the entrance and exit points during high flow.
Erosion	Consider		Install flow diverters a short distance into a water body, tied into the bank, to protect from erosion at their end. Designed to redirect water flow away from embankments.
Erosion	Consider		Install channel lining using pipe, rock, concrete, or asphalt to reduce scouring embankments and ditch bottom erosion.
Erosion	Consider		Install bank revetment protection to prevent erosion.
Erosion	Consider	Concrete blocks in place	Shore up or install pilings along Clatskanie River bank that runs parallel to Conyers Street in downtown section to prevent erosion of river bank leading to erosion of material under the street itself.
Expansive Soils			
Expansive Soils	Consider		Review construction codes to require non-absorbent fill soils that slope away from foundations for a minimum of five feet to prevent ponding and water retention.
Expansive Soils	On-going		Require building design, engineering, and construction processes that address expansive

Table 15. City of Clatskanie Mitigation Actions Considered			
Hazard	Status	Comment	Description
			soil conditions at potentially affected building sites.
Expansive Soils	Consider		Plant trees a distance equal to their mature height away from a structure built on expansive soils. Minimum distance from foundation is 15 feet.
Expansive Soils	On-going		Require road design, engineering, and construction processes that address expansive soil conditions. Water absorption prevention, impermeable membrane, soil compaction, and drainage methods need to be considered once geologic studies determine soil composition.

Mitigation Action Plan

The Steering Committee has evaluated and prioritized each of the considered mitigation actions to determine which would be included in the Mitigation Action Plan. The Committee then determined the responsible agency and potential funding sources. The Mitigation Action Plan represents mitigation projects and programs to be implemented through the cooperation of multiple entities.

Upon review, the Steering Committee assigned a high priority ranking to actions that best fulfill the goals of the HMP and are appropriate and feasible for the City and responsible entities to implement during the 5-year lifespan of this version of the HMP. As such, the Steering Committee determined that only the mitigation actions that received a high priority ranking would be included in the City's Mitigation Action Plan. Table 16 depicts the City's mitigation actions grouped by hazard and in descending priority order within each hazard.

Table 16. City of Clatskanie Mitigation Action Plan Matrix

Hazard	Description	Managing Department / Agency	Timeframe	Potential Funding Source(s)	Benefit-Costs / Technical Feasibility
Multi-Hazard (MH)					
MH	Review ordinances and develop outreach programs to assure mobile homes and manufactured buildings are protected from severe wind and flood hazards. (Anchoring, elevation, and other methods are applicable)	Greg Hinkelman/City Manager	0-2 years	General Fund	BC: TBD TF: Yes
MH	Cross reference and incorporate mitigation planning provisions into all community planning processes such as comprehensive, capital improvement, land use transportation plans, etc. to demonstrate multi-benefit considerations and facilitate using multiple funding source consideration.	Greg Hinkelman/City Manager Mark Barnes/Land Use Planning Consultant	0-2 years	General Fund	BC: TBD TF: Yes
MH	Purchase and install generators with main power distribution disconnect switches for identified and prioritized critical facilities susceptible to short term power disruption. (i.e. first responder and medical facilities, schools, correctional facilities, and water and sewage pump stations, etc.)	Dave True/Public Works	0-4 years	Grant Tim. Fund	BC: TBD TF: Yes
MH	Develop, produce, and distribute information materials concerning mitigation, preparedness, and safety procedures for all natural hazards.	Greg Hinkelman/City Manager	0-2 years	Grant	BC: TBD TF: Yes
MH	Integrate the Mitigation Plan findings into planning and regulatory documents and programs and into enhanced emergency planning.	Greg Hinkelman/City Manager	0-3 years	Grant	BC: TBD TF: Yes
Flood					
Flood	Establish flood mitigation priorities for critical facilities and residential and commercial buildings located within the 100-year and 500-year floodplains.	Dave True/Public Works	0-3 years	General Fund	BC: TBD TF: Yes

Table 16. City of Clatskanie Mitigation Action Plan Matrix

Hazard	Description	Managing Department / Agency	Timeframe	Potential Funding Source(s)	Benefit-Costs / Technical Feasibility
Flood	Request DOGAMI debris flow and lidar data be included in FIRM updates. Use the updated FIRMS for land use and mitigation planning.	Greg Hinkelman/City Manager	0-4 years	General Fund	BC: TBD TF: Yes
Flood	Develop, implement and enforce floodplain management ordinances.	Greg Hinkelman/City Manager	0-2 years	General Fund	BC: TBD TF: Yes
Flood	Develop or revise, adopt, and enforce storm water ordinances and regulations to manage runoff from new development, including buffers and retention basins.	Greg Hinkelman/City Manager Dave True/Public Works	0-3 years	General Fund	BC: TBD TF: Yes
Flood	Provide Flood protection to mitigate damage and contamination of wastewater treatment systems.	Dave True/Public Works	0-3 years	Capital Improvements	BC: TBD TF: Yes
Flood	Construct permanent berm along same section of the Clatskanie River along Conyers Street to prevent area flooding during high-water flood events.	City of Clatskanie, Public Works	Complete	FEMA 404 Grant	BC: TBD TF: Yes
Winter Storm					
Winter Storms	Develop and implement programs to coordinate maintenance and mitigation activities to reduce risk to public infrastructure from severe winter storms.	Dave True/Public Works	0-4 years	Grant	BC: TBD TF: Yes
Winter Storms	Update or develop, implement, and maintain jurisdictional debris management plans.	Dave True/Public Works	0-4 years	Grant	BC: TBD TF: Yes
Winter Storms	Develop critical facility list needing emergency back-up power systems, prioritize, seek funding, and implement mitigation actions.	Greg Hinkelman/City Manager	0-3 years	Grant	BC: TBD TF: Yes
Winter Storms	Develop and maintain severe winter storm public outreach program defining mitigation activity benefits through educational outreach aimed at	Greg Hinkelman/City Manager	0-5 years	Grant	BC: TBD TF: Yes

Table 16. City of Clatskanie Mitigation Action Plan Matrix

Hazard	Description	Managing Department / Agency	Timeframe	Potential Funding Source(s)	Benefit-Costs / Technical Feasibility
	households and businesses while targeting special needs populations.				
Winter Storms	Purchase NOAA weather radios and develop a web portal linking residents to various weather information sites. (NWS, FEMA, The Weather channel).	Greg Hinkelman/City Manager	0-5 years	Grant	BC: TBD TF: Yes
Winter Storms	Develop early warning test program partnering with NOAA, City Police, Fire Departments, and Volunteer Fire Department to coordinate tests.	Greg Hinkelman/City Manager	0-4 years	General Fund	BC: TBD TF: Yes
Landslide					
Landslide	Develop process to limit future development in high landslide potential areas (permitting, geotechnical review, soil stabilization techniques, etc.).	Greg Hinkelman/City Manager	0-5 years	General Fund	BC: TBD TF: Yes
Wildland Fire					
Wildland Fire	Identify evacuation routes away from hazard areas and develop outreach program to educate the public concerning warnings and evaluation procedures.	Greg Hinkelman Dave True/Public Works	0-3 years	General Fund	BC: TBD TF: Yes
Earthquake					
Earthquake	Disseminate FEMA pamphlets to educate and encourage homeowners concerning seismic structural and non-structural retrofit projects.	Greg Hinkelman/City Manager	0-2 years	General Fund	BC: TBD TF: Yes
Earthquake	Inspect and/or certify all new construction.	Greg Hinkelman/City Manager	0-1 year	General Fund	BC: TBD TF: Yes
Earthquake	Encourage utility companies to evaluate and harden vulnerable infrastructure elements for sustainability.	Dave True/Public Works	0-4 years	General Fund	BC: TBD TF: Yes
Volcano					
Volcano	Update public emergency notification procedures and develop and outreach program for ash fall events.	Police Department	0-2 years	General Fund	BC: TBD TF: Yes

Table 16. City of Clatskanie Mitigation Action Plan Matrix					
Hazard	Description	Managing Department / Agency	Timeframe	Potential Funding Source(s)	Benefit-Costs / Technical Feasibility
Wind					
Wind	Identify and prioritize critical facilities' overhead utilities that could be placed underground to reduce power disruption from wind storm/tree blow down damage.	Dave True/Public Works	0-4 years	Capital Improvements	BC: TBD TF: Yes
Erosion					
Erosion	Apply for grants/funds to implement riverbank protection methods.	Greg Hinkelman/City Manager Dave True/Public Works	0-5 years	Grant	BC: TBD TF: Yes
Erosion	Shore up or install pilings along Clatskanie River bank that runs parallel to Conyers Street in downtown section to prevent erosion of river bank leading to erosion of material under the street itself	City of Clatskanie/Public Works	Complete	FEMA 404 Grant	BC: TBD TF: Yes
Expansive Soils					
Expansive Soils	Review construction codes to require non-absorbent fill soils that slope away from foundations for a minimum of five feet to prevent ponding and water retention.	Greg Hinkelman/City Manager Dave True/Public Works	0-2 years	Grant	BC: TBD TF: Yes
Expansive Soils	Require building design, engineering, and construction processes that address expansive soil conditions at potentially affected building sites.	Greg Hinkelman/City Manager Dave True/Public Works	0-3 years	General Fund	BC: TBD TF: Yes

Plan Adoption and Maintenance

The following section provides documentation of the formal adoption of this annex by the governing board of the district or the city council/county commission of the jurisdiction. It also identifies the standing committee that will be responsible for future reviews between update periods.

DMA 2000 Requirements: Plan Review, Evaluation, Implementation, and Adoption	
Planning Requirements	
§201.6(d)(3)	A local jurisdiction must review and revise its plan to reflect changes in development, progress in local mitigation efforts, and changes in priorities, and resubmit if for approval within 5 years in order to continue to be eligible for mitigation project grant funding.
§201.6(c)(5)	The plan shall include...] Documentation that the plan has been formally adopted by the governing body of the jurisdiction requesting approval of the plan (e.g., City Council, County commissioner, Tribal Council). For multi-jurisdictional plans, each jurisdiction requesting approval of the plan must document that it has been formally adopted.
Planning Elements	
D1. Was the plan revised to reflect changes in development? 44 CFR 201.6(d)(3)	
D2. Was the plan revised to reflect progress in local mitigation efforts? 44 CFR 201.6(d)(3)	
D3. Was the plan revised to reflect changes in priorities? 44 CFR 201.6(d)(3)	
E1. Does the Plan include documentation that the plan has been formally adopted by the governing body of the jurisdiction requesting approval? 44 CFR 201.6(c)(5)	
E2. For multi-jurisdictional plans, has each jurisdiction requesting approval of the plan documented formal plan adoption? 44 CFR 201.6(c)(5)	

Resolution of Adoption

(Example) BEFORE THE BOARD OF COUNTY COMMISSIONERS FOR COLUMBIA COUNTY, OREGON

In the Matter of Adopting the 2014) Columbia County Multi-Jurisdictional) RESOLUTION NO. 40-2014 Hazard
Mitigation Plan Update)

WHEREAS, Columbia County, Oregon has experienced repetitive disasters that have
damaged commercial, residential and public properties, displaced citizens and businesses, and
presented general public health and safety concerns; and

WHEREAS, Columbia County has prepared a Multi-Jurisdictional Hazard Mitigation Plan that outlines the options to
reduce overall damage and impact from natural hazards; and

WHEREAS, the Multi-Jurisdictional Hazard Mitigation Plan has been reviewed by community residents, business
owners, and federal, state and local agencies, and has been revised to reflect their concerns;

NOW, THEREFORE, BE IT RESOLVED that:

1. 1. The Multi-Jurisdictional Hazard Mitigation Plan is hereby adopted as an official plan of Columbia County.
2. 2. A Hazard Mitigation Planning Group is hereby established as a permanent advisory body. The Hazard Mitigation
Planning Coordinator shall designate its members, subject to the approval of the County and the
participating jurisdictions. They shall serve one-year terms. The group's duties shall be as
designated in the Hazard Mitigation Plan.
3. 3. The Hazard Mitigation Planning Coordinator is charged with supervising the
implementation of the Plan's recommendations within the funding limitations as provided by Columbia
County or other sources.
4. 4. The Hazard Mitigation Planning Coordinator shall give priority attention to the goals identified in Table A-13 of the
Columbia County Appendix, and the actions listed in Table A-14 of the Columbia
County Appendix to the Hazard Mitigation Plan and;
5. 5. The Hazard Mitigation Planning Coordinator shall convene the hazard mitigation planning group annually. The
planning group shall monitor implementation of the plan and shall submit an annual review
worksheet to the Board of County Commissioners in accordance with the following format:
 - a. A review of the original plan.
 - b. A review of any disasters or emergencies that occurred during the previous calendar year.
 - c. A review of the actions taken, including what was accomplished during the previous year.
 - d. A discussion of any implementation problems.
 - e. Recommendations for new projects or revised action items. Such recommendations shall be subject to approval
by the Columbia County.

Dated this 27th day of August, 2014.

BOARD OF COUNTY COMMISSIONERS FOR COLUMBIA COUNTY, OREGON

By: _____ Anthony Hyde, Chair

By: _____ Henry Heimuller, Commissioner

By: _____ Earl Fisher, Commissioner

Standing Review Committee

The following table identifies the members of the Standing committee that will meet quarterly to review the HMP annex and provide a running update.

Table 17. City of Clatskanie Standing Hazard Mitigation Committee	
Name	Agency/Department/Affiliation
Robert Brajcich	Mayor, City of Clatskanie
Greg Hinkelman	City Manager, City of Clatskanie
Dave True	Public Works Director, City of Clatskanie
Steve Sharek	Fire Chef, CRFD

City of Columbia City
Hazard Mitigation Plan
Annex

2020 Update
Columbia County
Multi-Jurisdiction Hazard Mitigation Plan

Contents

Introduction	3
Planning Process and Capability Assessment	3
DMA 2000 Requirements: Planning Process	3
Steering Committee Participants	4
Public Participation.....	4
Capability Assessment	8
Hazard Identification and Vulnerability Assessment	12
DMA 2000 Requirements: Hazard Identification and Risk Assessment	12
Hazard Identification	12
Values at Risk.....	13
Population Analysis	18
Asset Inventory.....	19
National Flood Insurance Policy	21
Vulnerability Analysis	22
Impacts of Identified Hazards.....	13
Flood.....	13
Winter Storm.....	13
Landslide	14
Wildland Fires.....	14
Earthquake	15
Volcano.....	15
Wind	16
Erosion.....	16
Dam Failure	17
Disruption of Utility and Transportation Systems	17
Hazardous Material Event	17
Terrorism	18
Infectious Disease Epidemic.....	18
Mitigation Strategy.....	26
DMA 2000 Requirements: Mitigation Strategy	26

Identify Mitigation Goals 27

Evaluate and Prioritize Mitigation Actions 27

Mitigation Action Plan 35

Plan Adoption and Maintenance 38

 DMA 2000 Requirements: Plan Review, Evaluation, Implementation, and Adoption... 39

 Resolution of Adoption..... 40

 Standing Review Committee 41

Introduction

This Annex contains specific Columbia City information to support the Columbia County 2020 Multi-Jurisdictional Hazard Mitigation Plan. This section further supports the County's planning process by summarizing the review and incorporation of existing plans, studies, and reports used to develop this MHMP. This annex is an addition to Columbia County's Hazard Mitigation Plan and shares attributes of that plan.

Planning Process and Capability Assessment

The following section includes a detailed capability assessment that describes the resources available to support this plan. The goal of this assessment is not to identify all capabilities the organization may have, but only those that are currently used or could be used to support mitigation efforts. Capabilities are arranged in tables by type and fall under the explicit authority of the jurisdiction/district.

DMA 2000 Requirements: Planning Process	
Planning Requirements	
§201.6(b)	An open public involvement process is essential to the development of an effective plan. In order to develop a more comprehensive approach to reducing the effects of natural disasters, the planning process shall include:
§201.6(b)(1)	(1) An opportunity for the public to comment on the plan during the drafting stage and prior to plan approval;
§201.6(b)(2)	(2) An opportunity for neighboring communities, local and regional agencies involved in hazard mitigation activities, and agencies that have the authority to regulate development, as well as businesses, academia and other private and non-profit interests to be involved in the planning process; and
§201.6(b)(3)	(3) Review and incorporation, if appropriate, of existing plans, studies, reports, and technical information.
§201.6(c)(1)	[The plan shall document] the planning process used to develop the plan, including how it was prepared, who was involved in the process, and how the public was involved.
§201.6(c)(4)(i)	[The plan maintenance process shall include a] section describing the method and schedule of monitoring, evaluating, and updating the mitigation plan within a five-year cycle.
§201.6(c)(4)(iii)	[The plan maintenance process shall include a] discussion on how the community will continue public participation in the plan maintenance process.
Planning Elements	
A1. Does the Plan document the planning process, including how it was prepared and who was involved in the process for each jurisdiction? 44 CFR 201.6(c)(1)	
A2. Does the Plan document an opportunity for neighboring communities, local and regional agencies involved in hazard mitigation activities, agencies that have the authority to regulate development as well as other interests to be involved in the planning process? 44 CFR 201.6(b)(2)	

A3. Does the Plan document how the public was involved in the planning process during the drafting stage? 44 CFR 201.6(b)(1) and 201.6(c)(1)

A4. Does the Plan document the review and incorporation of existing plans, studies, reports, and technical information? 44 CFR 201.6(b)(3)

A5. Is there discussion on how the communities will continue public participation in the plan maintenance process? 44 CFR 201.6(c)(4)(iii)

A6. Is there a description of the method and schedule for keeping the plan current (monitoring, evaluating and updating the mitigation plan within a 5-year cycle)? 44 CFR 201.6(c)(4)(i)

Steering Committee Participants

Columbia City is dedicated to mitigating potential natural hazards to its population and infrastructure. To fulfill that goal, a Hazard Mitigation Plan Development Steering Committee was seated; dedicated to identifying hazard threats and developing actions to mitigate damage and life losses from those threats.

Table 1 records the Steering Committee's participant list.

Table 1. Columbia City Steering Committee	
Name	Agency/Department/Affiliation
Kelly Niles	Oregon Department of Forestry – Planning Group Leader
Karli Ebert	City Council of Columbia City – Council Representative
Gary Hudson	Columbia City – Citizen Member
Frank Hupp	Columbia City – Citizen Member
Dan McGraw	Columbia City – Citizen Member
Mike McGlothlin	Columbia City – Chief of Police
Anne Parrott	Columbia County Public Health
Steve Pegram	Columbia County Emergency Management

Public Participation

As defined by FEMA, Whole Community Planning is; a means by which residents, emergency management practitioners, organizational and community leaders, and government officials can collectively understand and assess the needs of their respective communities and determine the best ways to organize and strengthen their assets, capacities, and interests. By doing so, a more effective path to societal security and resilience is built.

City of Columbia City Annex

This Hazard Mitigation Plan was conducted with opportunities for the public to participate to try and meet the goals of whole community planning. Table 2 highlights these efforts.

Table 2. Public Involvement Mechanisms	
Date	Description
2014	
7/19/2014	Columbia Emergency Preparedness Association EXPO – Large emergency management event covering all topics (preparedness, fire, law, mitigation, response).
9/20/2014	Columbia City Preparedness Fair - Engaged locals and visitors on topics like preparedness, and mitigation planning.
11/11/2014	HSEMC – Columbia County’s Homeland Security and Emergency Management Commission is recognized by the Board of County Commissioners as the cornerstones of a whole community approach to emergency management planning. All jurisdictions are members of the commission. Semi Annual NHMP meeting, plan review was conducted.
2015	
5/12/2015	HSEMC – Columbia County’s Homeland Security and Emergency Management Commission is recognized by the Board of County Commissioners as the cornerstones of a whole community approach to emergency management planning. All jurisdictions are members of the commission. Semi Annual NHMP meeting, plan review was conducted.
9/19/2015	Columbia City Preparedness Fair – Engaged locals and visitors on topics like preparedness, and mitigation planning.
11/10/2015	HSEMC – Columbia County’s Homeland Security and Emergency Management Commission is recognized by the Board of County Commissioners as the cornerstones of a whole community approach to emergency management planning. All jurisdictions are members of the commission. Semi Annual NHMP meeting, plan review was conducted.
2016	
4/2/2016	KOHI Radio Preparedness Talk – Radio talk show for Columbia County, topics “specifically included preparing for the next flood event”.
5/10/2016	HSEMC – Columbia County’s Homeland Security and Emergency Management Commission is recognized by the Board of County Commissioners as the cornerstones of a whole community approach to emergency management planning. All jurisdictions are members of the commission. Semi Annual NHMP meeting, plan review was conducted.
6/4/2016	Ford Family Foundation Preparedness Fair - County wide event to promote preparedness and mitigation in cooperation with the Ford Family Foundation. All cities participated.
7/23/2016	Columbia Emergency Preparedness Association EXPO – Large emergency management event covering all topics (preparedness, fire, law, mitigation, response).
9/17/2016	Columbia City Preparedness Fair – Engaged locals and visitors on topics like preparedness, and mitigation planning.
9/22/2016	Columbia County Soil and Water Conservation District – Event hosted by SWCD on preparedness and flood mitigation efforts.

Table 2. Public Involvement Mechanisms	
Date	Description
11/15/2016	HSEMC – Columbia County’s Homeland Security and Emergency Management Commission is recognized by the Board of County Commissioners as the cornerstones of a whole community approach to emergency management planning. All jurisdictions are members of the commission. Semi Annual NHMP meeting, plan review was conducted.
2017	
5/9/2017	HSEMC – Columbia County’s Homeland Security and Emergency Management Commission is recognized by the Board of County Commissioners as the cornerstones of a whole community approach to emergency management planning. All jurisdictions are members of the commission. Semi Annual NHMP meeting, plan review was conducted.
9/16/2017	Columbia City Preparedness Fair - Engaged locals and visitors on topics like preparedness, and mitigation planning.
11/14/2017	HSEMC – Columbia County’s Homeland Security and Emergency Management Commission is recognized by the Board of County Commissioners as the cornerstones of a whole community approach to emergency management planning. All jurisdictions are members of the commission. Semi Annual NHMP meeting, plan review was conducted.
11/29/2017	Unprepared showing – St. Helens - presentation of OPB documentary regarding CSZ earthquake and tsunami.
2018	
1/19/2018	Preparedness to Vets Group – Presentation to Veterans regarding personal preparedness and flood mitigation.
5/8/2018	HSEMC – Columbia County’s Homeland Security and Emergency Management Commission is recognized by the Board of County Commissioners as the cornerstones of a whole community approach to emergency management planning. All jurisdictions are members of the commission. Semi Annual NHMP meeting, plan review was conducted and plans for plan update discussed.
10/14/18	South County Chamber - Preparedness Presentation on CSZ risk.
10/15/18	Columbia City Preparedness Fair - Engaged locals and visitors on topics like preparedness, and mitigation planning.
11/13/2018	HSEMC – Columbia County’s Homeland Security and Emergency Management Commission is recognized by the Board of County Commissioners as the cornerstones of a whole community approach to emergency management planning. All jurisdictions are members of the commission. Semi Annual County-wide Hazard Mitigation meeting. Work Session on Hazard Mitigation Plan update conducted.
11/27/2018	Pints and Preparedness – various topics including Hazard mitigation, and individual preparedness.
2019	
1/22/2019	Pints and Preparedness – various topics including Hazard mitigation, and individual preparedness.
3/26/2019	Pints and Preparedness – various topics including Hazard mitigation, and individual preparedness.
5/7/2019	HSEMC – Columbia County’s Homeland Security and Emergency Management Commission is recognized by the Board of County Commissioners as the cornerstones of a whole community approach to emergency management

Table 2. Public Involvement Mechanisms	
Date	Description
	planning. All jurisdictions are members of the commission. Semi Annual County-wide Hazard Mitigation meeting. Work Session on Hazard Mitigation Plan update conducted.
4/23/2019	Pints and Preparedness – various topics including Hazard mitigation, and individual preparedness.
9/7/2019	Preparedness for Scouts – Presentation on preparedness for all hazards.
9/14/2019	Columbia City Preparedness Fair - Engaged locals and visitors on topics like preparedness, and mitigation planning.

Capability Assessment

Table 3, 4, and 5 contain the Columbia City resources used to support planning activities, including the reports and studies reviewed as part of the update process.

Table 3. Columbia City Legal and Regulatory Resources Available for Hazard Mitigation		
Regulatory Tool	Name	Effect on Hazard Mitigation
Plans	City of Columbia Comprehensive Plan, 2003	Provides overall guidance for a community's land use, economic development, and resource management.
	Columbia City Municipal Waterworks Emergency Response Plan 10/28/05	Provides overall guidance for Public Works water emergency responsibilities and authority.
	Transportation System Plan (2001)	Provides overall guidance for the community's transportation system development and resource management.
	Columbia City Water Curtailment Plan 10/5/00	Provides overall guidance to meet minimum supply needs encountered during water shortages.
	Columbia County Comprehensive Emergency Management Plan 9/11/02	Provides overall guidance for a community's land use, economic development, resource management, and disaster emergency management.
	Columbia City Emergency Operations Plan 6/19/08	Provides overall guidance for emergency management responsibilities and authority.
	Columbia City Municipal Waterworks Emergency Response Plan 10/28/05	Provides overall guidance for Public Works water emergency responsibilities and authority.
	Transportation System Plan (2001)	Provides overall guidance for the community's transportation system development and resource management.
	Parks Master Plan	Provides overall guidance for the community's park system, a 20 year planning/growth process. Park needs of future population.
	Water Master Plan	Provides overall guidance for the community's water use and future development requirements. 20 year planning horizon.
	Wastewater Master Plan	Provides overall guidance for the community's wastewater use and future development requirements 20 year planning horizon.
	Water Management and Conservation Plan	Provides overall guidance for the community's water use and conservation efforts.
Programs	National Flood Insurance Program (NFIP)	Makes affordable flood insurance available to homeowners, business owners, and renters in participating communities. In exchange, those communities must adopt and enforce minimum floodplain management regulations to reduce the risk of damage from future floods.
Policies (Municipal Codes)	City Charter	To provide for the government of Columbia City, Columbia County, Oregon; and to repeal all charter provisions of the city enacted prior to the time that this charter takes effect except as hereinafter specifically retained.

Table 3. Columbia City Legal and Regulatory Resources Available for Hazard Mitigation		
Regulatory Tool	Name	Effect on Hazard Mitigation
	Columbia City Development Code	Provides the principal means for the implementation of the Columbia City Comprehensive Plan. The provisions of this Ordinance shall be deemed the minimum requirements for the preservation of the public safety, health, convenience, comfort, prosperity, and general welfare of the people of Columbia City, Oregon. This Ordinance is designed to: Regulate the division of land and to classify, designate and regulate the location of building, structures and land; Divide the City into zones to carry out these regulations and provide for their enforcement; Promote public health, safety, convenience and general welfare; Promote coordinated development with consideration for the City's natural environment, amenities, views, and the appearance of its buildings and open spaces; Achieve a balanced and efficient land use pattern to protect and enhance real property values; Promote safe, efficient traffic movement; Avoid uses and development that might be detrimental to the stability and livability of the City; and Insure adequate provisions for community utilities and facilities.
	2013 Columbia City Water Quality Report	An annual report of the outcome of our many water quality tests. This report explains water supply capability.
	City Ordinances	Provide guidance for land-use and development and requirements to follow building and fire codes.
	Flood Hazard Overlay section of the Columbia City Development Code 6/03/10 as amended	Provides the City's Flood Management Program

Table 4. Columbia City Administrative and Technical Resources for Hazard Mitigation

Staff/Personnel Resources	Department/Division Position
Planner(s) or engineer(s) with knowledge of land development and land management practices	Contract Planner Contract Engineer
Engineer(s) or professional(s) trained in construction practices related to buildings and/or infrastructure	Public Works Contract Engineer Contract Building Official
Planner(s) or engineer(s) with an understanding of manmade or natural hazards	Contract Planner Contract Engineer Contract Building Official
Floodplain manager	City Administrator, Building Secretary, Contract Planner and Contract Building Official
Personnel skilled in GIS and/or HAZUS-MH	no
Director of Emergency Services	City Administrator (will defer to Columbia County in the event of major disaster)
Finance (grant writers, purchasing)	City Administrator
Public Information Officers	City Administrator or Mayor

Table 5. Columbia City Financial Resources for Hazard Mitigation

Financial Resources	Effect on Hazard Mitigation
General funds	yes
Authority to levy taxes for specific purposes	yes, with voter approval
Incur debt through general obligation bonds	yes, with voter approval
Incur debt through special tax and revenue bonds	yes, with voter approval
Incur debt through private activity bonds	no
Hazard Mitigation Grant Program (HMGP)	FEMA funding which is available to local communities after a Presidentially-declared disaster. It can be used to fund both pre- and post-disaster mitigation plans and projects.
Pre-Disaster Mitigation (PDM) grant program	FEMA funding which is available on an annual basis. This grant can only be used to fund pre-disaster mitigation plans and projects only.
Flood Mitigation Assistance (FMA) grant program	FEMA funding which is available on an annual basis. This grant can be used to mitigate repetitively flooded structures and infrastructure to protect repetitive flood structures.
United States Fire Administration (USFA) Grants	The purpose of these grants is to assist state, regional, national or local organizations to address fire prevention and safety. The primary goal is to reach high-risk target groups including children, seniors and firefighters.

Table 5. Columbia City Financial Resources for Hazard Mitigation	
Financial Resources	Effect on Hazard Mitigation
Fire Mitigation Fees	Used to finance future fire protection facilities' construction and other fire capital expenditures to protect new development. The City Council or Fire District may charge fire mitigation fees to ensure new development pays their fair share of constructing these improvements.

Hazard Identification and Vulnerability Assessment

DMA 2000 Requirements: Hazard Identification and Risk Assessment	
Planning Requirements	
§201.6(c)(2)(i)	The risk assessment shall include a] description of the type, location and extent of all-natural hazards that can affect the jurisdiction. The plan shall include information on previous occurrences of hazard events and on the probability of future hazard events.
§201.6(c)(2)(ii)	The risk assessment shall include a] description of the jurisdiction's vulnerability to the hazards described in paragraph (c)(2)(i) of this section. This description shall include an overall summary of each hazard and its impact on the community. All plans approved after October 1, 2008 must also address NFIP insured structures that have been repetitively damaged by floods. The plan should describe vulnerability in terms of:
§201.6(c)(2)(ii)(A)	(A) The types and numbers of existing and future buildings, infrastructure, and critical facilities located in the identified hazard areas;
§201.6(c)(2)(ii)(B)	(B) An estimate of the potential dollar losses to vulnerable structures identified in ... this section and a description of the methodology used to prepare the estimate.
§201.6(c)(2)(ii)(C)	(C) Providing a general description of land uses and development trends within the community so that mitigation options can be considered in future land use decisions.
§201.6(c)(2)(iii)	For multi-jurisdictional plans, the risk assessment section must assess each jurisdiction's risks where they vary from the risks facing the entire planning area.
Planning Elements	
B1. Does the Plan include a description of the type, location, and extent of all-natural hazards that can affect each jurisdiction? 44 CFR 201.6(c)(2)(i) and 44 CFR 201.6(c)(2)(iii)	
B2. Does the Plan include information on previous occurrences of hazard events and on the probability of future hazard events for each jurisdiction? 44 CFR 201.6(c)(2)(i)	
B3. Is there a description of each identified hazard's impact on the community as well as an overall summary of the community's vulnerability for each jurisdiction? 44 CFR 201.6(c)(2)(ii)	
B4. Does the Plan address NFIP insured structures within each jurisdiction that have been repetitively damaged by floods? 44 CFR 201.6(c)(2)(ii)	

Hazard Identification

The Steering Committee determined that the following hazards could potentially threaten the community. Table 6 establishes the hazard profile against which this plan is designed.

Table 6. Hazard Profile	
Natural Hazards	
Flood	X
Winter Storm	X
Landslide	X
Fire (Wildland/Urban)	X
Earthquake	X
Volcano	X
Wind	X
Erosion	X
ENSO (El Niño / La Niña)	
Expansive Soils	
Drought	

Specific Impacts of Identified Hazards

The following section provides specific details of the vulnerabilities and impacts from natural hazards for the Columbia City.

The Basic Plan of this Multi-Jurisdiction Hazard Mitigation Plan contains the full narrative Hazard Profile for the entire county, including full details for this annex. This section is designed to provide additional notes and concerns regarding hazards that can impact this jurisdiction.

Flood

FEMA FIRMs were used to outline the 100-year and 500-year floodplains for Columbia City. The 100-year floodplain delineates an area of high risk, while the 500-year floodplain delineates an area of moderate risk.

There are 301 residential structures (worth \$51.9M), one care facility (worth \$131K), two community facilities (worth \$500K) and three utilities (worth \$260K) within the boundaries of the 100-year floodplain. There are 301 residential structures (worth \$51.9M) and no critical facilities within the 500-year floodplain.

Winter Storm

The natural hazards resulting from winter storms, such as ice, cold, wind and floods, are often widespread. A single event is capable of impacting all people, critical facilities and infrastructure within Columbia City, and therefore the entire population (1,955 people), including 824 residential structures (worth \$142.1 M), four government facilities (worth \$718K), three emergency response facilities (worth \$276K), one education facility (worth \$4.4M), two care facilities (worth \$233K), 12 community facilities (worth \$4.7M), 17 utilities (worth \$3.4M), one

state and federal highway (worth \$150K), one transportation facility (worth \$2.9M), one railroad facility (value unknown) and one bridge (worth \$1.5M) are at risk.

Landslide

The potential impacts from landslides can be widespread. Potential debris flows, and landslides can impact transportation and rail routes, utility systems, and water and waste treatment infrastructure along with public, private, and business structures located adjacent to steep slopes, along riverine embankments, or within alluvial fans or natural drainages. Response and recovery efforts will likely vary from minor cleanup to more extensive utility system rebuilding. Utility disruptions are usually local and terrain dependent. Damages may require reestablishing electrical, communication, and gas pipeline connections occurring from specific breakage points. Initial debris clearing from emergency routes and high traffic areas may be required. Water and waste-water utilities may need treatment to quickly improve water quality by reducing excessive water turbidity and reestablishing waste disposal capability.

USGS elevation datasets were used to determine the landslide hazard areas within Columbia City. Risk was assigned based on slope angle. A slope angle less than 14 degrees was assigned a low risk, a slope angle between 14 and 32 degrees was assigned a medium risk, and a slope angle greater than 32 degrees was assigned a high risk.

There are 647 residential structures (worth \$111.6M), four non-residential structures (value unknown), three government facilities (worth \$264K), two emergency response facilities (worth \$276K), two care facilities (worth \$233K), three community facilities (worth \$483K), 13 utilities (worth \$3.3M), one state and federal highway (worth \$150K), and one bridge (worth \$1.5M) in the moderate landslide risk area.

There are 368 residential structures (worth \$64.5M), five government facilities (worth \$464K), one care facility (worth \$175K), three educational facilities (worth \$1.5M), three community facilities (worth \$1.2M), and nine utilities (worth \$4.6M) located in the high landslide risk area.

Wildland Fires

Wildland fire hazard areas were identified using a model incorporating slope, aspect, and fuel load. South-facing, steep, and heavily vegetated areas were assigned the highest fuel values while areas with little slope and natural vegetation were assigned the lowest fuel values. Risk levels of moderate, high, very high, and extreme were assigned to the entire region based on the results of this modeling.

There are 824 residential structures (worth \$142.1M), four non-residential structures (value unknown), four government facilities (worth \$718K), three emergency response facilities (worth \$276K), one education facility (worth \$4.4M), two care facilities (worth \$233K), eight community facilities (worth \$3.2M), 15 utilities (worth \$3.3M), one transportation facility (worth \$2.9M), and one bridge (worth \$1.5M) located in moderate fire risk areas.

There are 552 residential structures (worth \$95.2M), four government facilities (worth \$718K), three emergency response facilities (worth \$276K), two care facilities (worth \$233K), five community facilities (worth \$1.6M), 13 utilities (worth \$3.3M), and one transportation facility (worth \$2.9M) located in the high fire risk areas.

There are 249 residential structures (worth \$43M), one community facility (value \$50K), and six utilities (value \$2.3M) located in very high fire risk areas with no critical facilities identified in the extreme fire risk area.

Earthquake

Based on PGA shake maps produced by the USGS, the western portion of Columbia County is likely to experience higher levels of shaking than the eastern portion, as a result of its proximity to the Cascadia Subduction Zone. Ground movement in both areas, however, is likely to cause damage to weak, unreinforced masonry buildings, and to induce small landslides along unstable slopes. As well as landslide, earthquakes can trigger other hazards such as dam failure and disruption of transportation and utility systems.

The eastern portion of Columbia County is likely to experience strong shaking should a subduction zone earthquake occur (9-20 percent of the acceleration of gravity). In contrast, the far western portion of the county is likely to experience very strong shaking (20-25 percent). This rating represents the peak acceleration of the ground caused by the earthquake.

Due to Columbia City's proximity to the eastern portion of the county, all people, critical facilities and infrastructure within Columbia City, and therefore the entire population (1,955 people), including 824 residential structures (worth \$142.1M), four non-residential structures (value unknown), four government facilities (worth \$718K), three emergency response facilities (worth \$276K), one education facility (worth \$4.4M), two care facilities (worth \$233K), 12 community facilities (worth \$4.7M), 17 utilities (worth \$3.4M), one state and federal highway (worth \$150K), one transportation facility (worth \$2.9M), one railroad facility (value unknown) and one bridge (worth \$1.5M) are located in the strong shaking (9-20 percent) area.

Volcano

A volcanic eruption would have a minor impact on Columbia City due to the proximity to volcanoes within the Cascade region. The major resources of concern include air quality and waterway sedimentation. During previous eruptions, ashfall has drifted to the east of the volcanoes. (State Interagency Hazard Mitigation Team 2006)

Columbia City will likely only experience damage from volcanic eruption columns and clouds which contain volcanic gases, minerals, and rock. The columns and clouds form rapidly and extend several miles above an eruption. Solid particles within the clouds present a serious aviation threat, can distribute acid rain (sulfur dioxide gas and water), can create risk of suffocation (carbon dioxide is heavier than air and collects in valleys and depressions threatening

human and animals), and pose a toxic threat from fluorine which clings to ash particles potentially poisoning grazing livestock and contaminating domestic water supplies.

Buildings streets and roads throughout the city may require minor cleanup with negligible impacts. Temporary utility interruptions are likely, and minor cleanup may be required for electrical and other utility services. Water treatment facilities may require additional attention to address high turbidity water. River traffic along the Columbia River could be disrupted due to sedimentation from a large eruption from Mt. St. Helens or Hood and dredging to restore channel depths may be necessary. Injuries associated with respiratory problems may result. (Goettel 2005)

Due to the nature of the hazard, it is impossible to predict the location or extent of future events with any probability, although it can be assumed that all critical facilities and infrastructure within Columbia City are at risk including the entire population (1,955 people), 824 residential structures (worth \$142.1 M), four government facilities (worth \$718K), three emergency response facilities (worth \$276K), one education facility (worth \$4.4M), two care facilities (worth \$233K), 12 community facilities (worth \$4.7M), 17 utilities (worth \$3.4M), one state and federal highway (worth \$150K), one transportation facility (worth \$2.9M), one railroad facility (value unknown), and one bridge (worth \$1.5M).

Wind

Many buildings, utilities and transportation systems in open areas, natural grasslands, or agricultural lands are especially vulnerable to wind damage. Impacts associated with wind can include damage to power lines, trees, and structures, and can also cause temporary disruptions of power. Additionally, high winds can cause significant damage to forestlands.

All areas within Columbia City are equally at risk of a windstorm event including all people, critical facilities and infrastructure, and therefore the entire population (1,955 people), including 824 residential structures (worth \$142.1 M), four government facilities (worth \$718K), three emergency response facilities (worth \$276K), one education facility (worth \$4.4M), two care facilities (worth \$233K), 12 community facilities (worth \$4.7M), 17 utilities (worth \$3.4M), one state and federal highway (worth \$150K), one transportation facility (worth \$2.9M), one railroad facility (value unknown) and one bridge (worth \$1.5M).

Erosion

Riverine erosion rarely causes death or injury. However, erosion causes significant destruction of property, development, and infrastructure. Erosion hazard data is not readily available, however, descriptions of several localized areas were identified during the development of this document and are identified only by location on a map referencing the river or stream reach described. Critical facilities that may be at risk of erosion were identified using a 300 foot-buffer

in the areas identified as having historic erosion impacts to conservatively account for building footprints.

The City of St. Helens owned Water Treatment Plant is located in the vicinity of the Columbia River and McBride Creek confluence, north of Columbia City. Columbia City relies on this facility for their water treatment needs. This facility does experience periodic erosion events and is prone to potential debris damage.

Dam Failure

US Army Corps of Engineers inundation data for the Columbia River and the PacifiCorp inundation data for the Lewis River in the State of Washington were used to determine the impacts from dam failure upriver from Columbia County. Any facilities located within the inundation area are considered to be at high risk of inundation. Facilities located within the inundation area include 331 residential structures (worth \$57.1M), one care facility (value \$131K), four community facilities (\$1.6M) and four utilities (value \$352K).

Disruption of Utility and Transportation Systems

Transportation system disruption impacts range from effects on life, health, and safety (emergency vehicle mobility, access to hospitals, access to evacuation routes, access to vital supplies if transport is seriously disrupted for a long time) to the economic effects of delays, lost commerce, and lost time. Similarly, disruption of utility systems can affect the county at the level of commerce and recreation as well as at the level of fundamental health and safety. County-wide as well as localized areas of disruption are likely to impact all residents equally. Structural damage from disruption to these systems is not expected; rather the risks are present to residents and those traveling in the area.

Hazardous Material Event

The National Response Center and the EPA's Environmental Facts Multisystem Query were used to locate hazardous waste handling facilities and businesses that generate hazardous waste from their activities. Transportation routes likely to carry hazardous waste were examined, and all facilities within a 0.25 mile radius of those are considered at risk.

There are 748 residential structures (worth \$129M), four non-residential structures (value unknown), four government facilities (worth \$720K), three emergency response facilities (worth \$276K) one education facility (worth \$4.4M), two care facilities (worth \$233K), 12 community facilities (worth \$4.7M), one transportation facility (worth \$2.9M), one bridge (worth \$1.5M) and 17 utilities (worth \$3.4M) located with a 0.25 mile radius of a transportation route and may be at risk from a hazardous material event.

Facilities considered at risk near buffered EHS Sites include four government facilities (worth \$720K), three emergency response facilities (worth \$276K) one education facility (worth \$4.4M),

two care facilities (worth \$233K), 11 community facilities (worth \$4.6M), one transportation facility (worth \$2.9M), one bridge (worth \$1.5M) and 12 utilities (worth \$1.1M).

Terrorism

It is difficult to determine the scope of any terrorist threat to Columbia City. Although there seem to be few high-profile targets present, it is impossible to predict future terrorist events. Depending on the extent of the action, the community may suffer economic loss, disruption of utilities, and cleanup relating to explosions and other facility damages. Structural damage, injuries or casualties may occur; however, it is beyond the scope of this analysis to estimate losses.

Infectious Disease Epidemic

The consequences of a pandemic as described in Chapter 5 could be devastating. In the event of a poor-fit vaccine or very limited vaccine supply, the public health measures that would work best include: isolation and quarantine; restricting movement between and within communities; prohibiting public gatherings and group activities; and closing schools.

The county and state have isolation and quarantine laws; cities can also apply quarantines and restrict public movement in a public health emergency. The recently passed public health emergency law in Oregon provides a process for such mechanisms to be implemented. (L. Rivers, personal communication; K. Ladd, personal communication)

Impacts associated with infectious disease epidemics in general have the potential to include loss of life and shutdown of critical facilities. Furthermore, an epidemic level of infectious disease in the community could overwhelm local resources, although there are no structural risks or losses associated with this hazard. The entire population of 1,955 is at risk from the effects of an infectious disease epidemic.

Values at Risk

Population Analysis

Population data listed in Table 7 were obtained from the 2010 U.S. Census and Portland State University. It comprises census block level data and estimates from university conducted community research.

Table 7. Population			
2000 Census	2010 Census	% Change	2018 PSU Estimate
1571	1946	+24%	1,985

Asset Inventory

The Asset Inventory describes the physical values; the residential building stock, public facilities, and infrastructure within each community that may be affected by hazard events and includes population, residential and nonresidential buildings, critical facilities, and infrastructure. These values are described in Tables 8 and 9 and portray the City's critical infrastructure numbers and values, and their potential vulnerability by hazard type.

Columbia City seeks to protect its population by supporting Columbia County and Oregon State initiatives, ordinances, building codes, and development regulations. One of the most important initiatives is to prohibit or not allow future development of buildings, infrastructure and critical facilities in identified high hazard areas. Any essential infrastructure component will undergo stringent review to ensure potential hazard risk will be mitigated.

Table 8. Residential Buildings	
Total Building Count	Total Value of Buildings (\$)
824	142,140,000

Table 9. Critical Facilities and Infrastructure			
Facility Type	Name / Number	Address	Value ¹
Government	Shop Garage	1755 2nd Place	\$32,960
	Shop	1755 2nd Place	\$200,000
	Shop Office	1755 2nd Place	\$30,900
	City Hall	1840 Second Street	\$454,230
Emergency Response	Oregon State Forestry	405 E Street	\$250,000
	City of Columbia City Police Department	1840 Second Street	See City Hall
	Columbia Rural Fire and Rescue Fire Station - Columbia City	400 G Street	\$26,000
Educational	Columbia City Elementary School	2000 Second Street	\$4,400,000
Care Facility	Riverside Home	1730 6th Street	\$102,000
	Life House Home	1455 2nd Street	\$131,120
Community	Columbia City Community Hall	1850 2nd Street	\$618,000
	Columbia City Sports & Recreation	320 A Street	\$752,500
	International Church Foursquare Gospel	1955 Second Street	\$509,800

Table 9. Critical Facilities and Infrastructure

Facility Type	Name / Number	Address	Value ¹
	Columbia City Community Library	205 I Street	\$83,100
	Caples House Museum and Knapp Social Center	1925 1st Street	\$750,000
	Harvard Park	3025 Sixth Street	\$160,000
	Jim Bundy Memorial Park	390 "E" Street	\$350,000
	Davis Park	1990 The Strand	\$200,000
	Carolyn King Park	855 "K" Street	\$50,000
	Pixie Park	1910 The Strand	\$300,000
	Ruth Rose Richardson Memorial Park	1900 First Street	\$300,00
	Columbia City Mini-Mart (gas and groceries)	300 A Street	\$603,600
State and Federal Highways	US Highway 30		2 miles
	City Streets		13.3 miles
	City Retaining Wall	1750 Third Street	\$150,000
Railroads	Portland and Western Railroad		2 miles
Bridges	L St Rail Bridge		\$1,500,000
Transportation Facilities	Port of St Helens - Columbia City Industrial Park & Admin Office	2305 Second Street	\$2,937,200
Utilities	Sewer Lift Station 1	505 "K" Street	\$93,730
	Sewer Lift Station 2	3660 Tahoma Street	\$93,730
	Sewer Lift Station 3	1910 The Strand	\$93,730
	Sewer Lift Station 4	1228 Spinnaker Way	\$166,860
	Pump House	855 "K" Street	\$74,160
	Sewer Compressor Vault	505 "K" Street	\$14,736
	Well Pump House	1755 2nd Place	\$237,500
	SH Ranney (PW) Well #1	62400 Columbia River Hwy	Individual values unknown Well development is tied into distribution piping and RR crossing. They're bundled. \$300,000
	SH Ranney (PW) Well #2	2260 The Strand	
	SH Ranney (PW) Well #3	1680 Second Street	
	Water Tank (200K gallon capacity)	855 "K" Street	\$251,320
	City Water Reservoir (1 M gallon capacity)	855 "K" Street	\$1,664,480
	City Fencing	855 "K" Street	\$10,005
	City Water Tank (200K gallon capacity)	36401 Miloris Way	\$251,320

Table 9. Critical Facilities and Infrastructure			
Facility Type	Name / Number	Address	Value ¹
	City Fencing	Miloris Way	\$10,005
	City Water Pump Station	Hwy 30 & L Street.	\$56,650
	City Sewer Flow Monitoring Station	Hwy 30 & Oregon Street.	\$22,101
Utilities	City Sewer Collection System	City-wide	13 miles
	City Water Distribution System	City-wide	15.4 miles
	Fiber Optics	Hwy 30 & RR corridor	Same length of city & railroad- 2 miles (x 2 sets =4 miles)
	City Groundwater Well #1 (47 gpm capacity)	1755 2nd Place	\$400,000
	City Groundwater Well #2 (250 gpm capacity)	1755 2nd Place	
	City Storm Water System	City-wide	

Sources: FEMA HAZUS-MH, local jurisdictions.

¹Estimated and/or insured structural value for critical facilities and estimated values for critical infrastructure.

NA = Not Available.

National Flood Insurance Policy

National Flood Insurance Program data were obtained from the State Department of Land Conservation and Development. This data is significant for the vulnerability assessment as it identifies the impact of flooding, one of the most often repeated natural hazards for the county. This data is displayed in Table 10.

Table 10. Columbia City NFIP Insurance Report										
Jurisdiction	Effective FIRM and FIS	Initial FIRM	Total Policies	Pre FIRM Policies	Policies by Building Type				Minus Rated A Zone	Minus Rated V Zone
					Single Family	2 to 4 Family	Other Residential	Non-Residential		
Columbia City	11/26/2010	6/5/1985	12	3	12	0	0	0	1	0

Source: FEMA Community Information System 02/21/2019

Table 10a. Columbia City NFIP Insurance Report

Jurisdiction	Insurance in Force	Total Paid Claims	Pre-Firm Claims Paid	Substantial Damage Claims	Total Paid Amount	Repetitive Loss Structures	Severe Repetitive Loss Structures	CRS Class Rating	Last Community Assistance Visit
Columbia City	\$3,590,000	0	0	0	\$0	0	0	10	7/1/1985

Source: FEMA Community Information System 02/21/2019

Vulnerability Analysis

A vulnerability analysis predicts the extent of exposure, and the impacts that may result from a hazard event of a given intensity in each area. The analysis provides quantitative data that may be used to identify and prioritize potential mitigation measures by allowing communities to focus attention on areas with the greatest risk of damage. A vulnerability analysis is divided into five steps including asset inventory, methodology, data limitations, exposure analysis for current assets, and areas of future development.

The following is derived from the best available data for facility locations and values. In many cases, values were unavailable, and therefore the totals listed below should be considered incomplete and likely less than the actual costs associated with the respective hazards

The vulnerability analysis development process is thoroughly discussed in the Columbia County Basic Plan, Section 6, which generated the following Hazard Exposure Analysis Overviews in Tables 11, 12, and 13.

Table 11. Columbia City Potential Hazard Exposure Analysis Overview
Population and Buildings

			Population	Buildings			
				Residential		Non-Residential	
Hazard Type	Hazard Area	Methodology	Number	Number	Value (\$) ¹	Number	Value (\$)
Flood	Moderate	500-year floodplain	--	301	51,922,500	0	unknown
	High	100-year floodplain	--	301	51,922,500	0	unknown
Winter Storm		descriptive	1,955	824	142,140,000	4	unknown
Landslide	Moderate	>14-32 degrees	--	647	111,607,500	4	unknown
	High	>32-56 degrees	--	368	64,480,000	0	unknown
Wildland Fire	Moderate	Moderate fuel rank	--	813	140,242,500	4	unknown
	High	High fuel rank	--	552	95,220,000	0	unknown
	Very High	Very high fuel rank	--	249	42,952,500	0	unknown
	Extreme	Extreme fuel rank	--	0	--	0	unknown
Earthquake	Strong	9-20% (g)	--	824	142,140,000	4	unknown
	Very strong	20-40% (g)	--	0	--	0	unknown
	Severe	>40-60% (g)	--	0	--	0	unknown
Volcano		descriptive	1,955	824	142,140,000	4	unknown
Wind		descriptive	1,955	824	142,140,000	4	unknown
Erosion		within 300' of potential areas of erosion	--	--	--	unknown	unknown

Table 12. Columbia City Potential Hazard Exposure Analysis Overview
Critical Facilities

			Government		Emergency Response		Educational		Care		Community	
Hazard Type	Hazard Area	Methodology	No.	\$	No.	\$	No.	\$	No.	\$	No.	\$
Flood	Moderate	500-year floodplain	--	--	--	--	--	--	--	--	--	--
	High	100-year floodplain	--	--	--	--	--	--	1	131K	2	500K
Winter Storm	Moderate		4	718K	3	276K	1	4.4M	2	233K	12	4.7M
Landslide	Moderate	>14-32 degrees	3	264K	2	276K	--	--	2	233K	3	483K
	High	>32-56 degrees	5	150K	--	--	3	1.5M	1	175K	3	1.2M
Wildland Fire	Moderate	Moderate fuel rank	4	718K	3	276K	1	4.4M	2	233K	8	3.2M
	High	High fuel rank	4	7.18K	3	276K	--	--	2	233K	5	1.6M
	Very High	Very high fuel rank	--	--	--	--	--	--	--	--	1	50K
	Extreme	Extreme fuel rank	--	--	--	--	--	--	--	--	--	--
Earthquake	Strong	9-20% (g)	4	718K	3	276K	1	4.4M	2	233K	12	4.7M
	Very strong	20-40% (g)	--	--	--	--	--	--	--	--	--	--
	Severe	>40-60% (g)	--	--	--	--	--	--	--	--	--	--
Volcano	Moderate		4	718K	3	276K	1	4.4M	2	233K	12	4.7M
Wind	Moderate		4	718K	3	276K	1	4.4M	2	233K	12	4.7M
Erosion		within 300' of potential areas of erosion	--	--	--	--	--	--	--	--	--	--

Table 13. Columbia City Potential Hazard Exposure Analysis Overview

Critical Infrastructure

			Highways		Railroads		Bridges		Transportation Facilities		Utilities		Dams	
Hazard Type	Hazard Area	Methodology	Miles	Value\$	Miles	Value\$	No.	Value\$	No.	Value\$	No.	Value\$	No.	Value\$
Flood	Moderate	500-year floodplain	--	--	--	--	--	--	--	--	--	--	--	--
	High	100-year floodplain	--	--	--	--	--	--	--	--	3	260K	--	--
Winter Storm	Moderate		1 unknown	150K	1 unknown	unknown	1	unknown	1	2.9M	17	3.4M	--	--
Landslide	Moderate	>14-32 degrees	1 unknown	150K	--	--	1	1.5M	--	--	13	3.3M	--	--
	High	>32-56 degrees	--	--	--	--	--	--	--	--	9	4.6M	--	--
Wildland Fire	Moderate	Moderate fuel rank	--	--	--	--	1	1.5M	1	2.9M	15	3.3M	--	--
	High	High fuel rank	--	--	--	--	--	--	1	2.9M	13	3.3M	--	--
	Very High	Very high fuel rank	--	--	--	--	--	--	--	--	6	2.3M	--	--
	Extreme	Extreme fuel rank	--	--	--	--	--	--	--	--	--	--	--	--
Earthquake	Strong	9-20% (g)	1 unknown	150K	1 unknown	unknown	1	1.5M	1	2.9M	17	3.4M	--	--
	Very strong	20-40% (g)	--	--	--	--	--	--	--	--	--	--	--	--
	Severe	>40-60% (g)	--	--	--	--	--	--	--	--	--	--	--	--
Volcano	Moderate		1 unknown	150K	1 unknown	unknown	1	1.5M	1	2.9M	17	3.4M	--	--
Wind	Moderate		1 unknown	150K	1 unknown	unknown	1	1.5M	1	2.9M	17	3.4M	--	--
Erosion		within 300' of potential areas of erosion	--	--	--	--	--	--	--	--	--	--	--	--

Mitigation Strategy

The following section defines mitigation action identification and analysis as stipulated in DMA 2000 and its implementing regulations.

DMA 2000 Requirements: Mitigation Strategy	
Planning Requirements	
§201.6(c)(3)	The plan shall include the following:] A mitigation strategy that provides the jurisdiction’s blueprint for reducing the potential losses identified in the risk assessment, based on existing authorities, policies, programs, and resources, and its ability to expand on and improve these existing tools.
§201.6(c)(3)(i)	The hazard mitigation strategy shall include a] description of mitigation goals to reduce or avoid long-term vulnerabilities to the identified hazards.
§201.6(c)(3)(ii)	The hazard mitigation strategy shall include a] section that identifies and analyzes a comprehensive range of specific mitigation actions and projects being considered to reduce the effects of each hazard, with particular emphasis on new and existing buildings and infrastructure. All plans approved by FEMA after October 1, 2008, must also address the jurisdiction’s participation in the NFIP, and continued compliance with NFIP requirements, as appropriate.
§201.6(c)(3)(iii)	The hazard mitigation strategy shall include an] action plan, describing how the action identified in paragraph (c)(3)(ii) of this section will be prioritized, implemented, and administered by the local jurisdiction. Prioritization shall include a special emphasis on the extent to which benefits are maximized according to a cost benefit review of the proposed projects and their associated costs.
§201.6(c)(3)(iv)	For multi-jurisdictional plans, there must be identifiable action items specific to the jurisdiction requesting FEMA approval or credit of the plan.
§201.6(c)(4)(ii)	The plan shall include a] process by which local governments incorporate the requirements of the mitigation plan into other planning mechanisms such as comprehensive or capital improvements, when appropriate.
Planning Elements	
C1. Does the plan document each jurisdiction’s existing authorities, policies, programs and resources, and its ability to expand on and improve these existing policies and programs? 44 CFR 201.6(c)(3)	
C2. Does the Plan address each jurisdiction’s participation in the NFIP and continued compliance with NFIP requirements, as appropriate? 44 CFR 201.6(c)(3)(ii)	
C3. Does the Plan include goals to reduce/avoid long-term vulnerabilities to the identified hazards? 44 CFR 201.6(c)(3)(i)	
C4. Does the Plan identify and analyze a comprehensive range of specific mitigation actions and projects for each jurisdiction being considered to reduce the effects of hazards, with emphasis on new and existing buildings and infrastructure? 44 CFR 201.6(c)(3)(ii) and 44 CFR 201.6(c)(3)(iv)	

C5. Does the Plan contain an action plan that describes how the actions identified will be prioritized (including cost benefit review), implemented, and administered by each jurisdiction? 44 CFR 201.6(c)(3)(iii) and 44 CFR (c)(3)(iv)

C6. Does the Plan describe a process by which local governments will integrate the requirements of the mitigation plan into other planning mechanisms, such as comprehensive or capital improvement plans, when appropriate? 44 CFR 201.6(c)(4)(ii)

Identify Mitigation Goals

Columbia City reviewed the Columbia County goals and determined they meet the City's needs and subsequently adopted the Goals in Table 14 for the current planning period.

Table 14. Columbia City Mitigation Goals	
Goal Number	Goal Description
1	Reduce the Threat to Life Safety Enhance life safety by minimizing the potential for deaths and injuries in future disaster events.
2	Protect Critical Facilities and Enhance Emergency and Essential Services • Implement activities or projects to protect critical facilities and infrastructure. • Seek opportunities to enhance, protect, and integrate emergency and essential services. • Strengthen emergency operations plans and procedures by increasing collaboration and coordination among public agencies, non-profit organizations, businesses, and industry.
3	Reduce the Threat to Property • Seek opportunities to protect, enhance and integrate emergency and essential services. • Strengthen emergency operations plans and procedures by increasing collaboration and coordination among public agencies, non-profit organizations, businesses, industries and the citizens of Columbia City.
4	Create a Disaster Resistant and Disaster-Resilient Economy • Develop and implement activities to protect economic well-being and vitality while reducing economic hardship in post disaster situations. • Reduce insurance losses and repetitive claims for chronic hazard events. • Work with State and Federal Partners to reduce short-term and long-term recovery and reconstruction costs. • Work with local and County organizations, such as Columbia Emergency Planning Association (CEPA). • Expedite pre-disaster and post-disaster grants and program funding.
5	Increase Public Awareness, Education, Outreach, and Partnerships • Coordinate and collaborate, where possible, risk reduction outreach efforts with the Oregon Partners for Disaster Resistance & Resilience and other public and private organizations. • Develop and implement risk reduction education programs to increase awareness among citizens, local, county, and regional agencies, non-profit organizations, businesses, and industry. • Promote insurance coverage for catastrophic hazards • Strengthen communication and coordinate participation in and between public agencies, citizens, nonprofit organizations, businesses, and industry.

Evaluate and Prioritize Mitigation Actions

Mitigation actions are activities, measures, or projects that help achieve the goals of a mitigation plan. Table 15 lists the mitigation actions developed during this mitigation planning process or offered during whole community planning activities. It is not intended that this plan will attempt

to act on these action items, but the list will be maintained in order to provide documentation for future planning efforts.

Table 15. Columbia City Mitigation Actions Considered			
Hazard	Status	Comment	Description
<i>Multi-Hazard (MH)</i>			
MH	Consider		Develop, implement, and maintain jurisdictional debris management plans.
MH	Ongoing		Develop and incorporate ordinances commensurate with development and building codes to reflect survivability from wind, seismic, fire, and other hazards to ensure occupant safety.
MH	Ongoing		Review ordinances and develop outreach programs to assure manufactured homes and buildings are protected from severe wind and flood hazards. (Anchoring, elevation, and other methods as applicable)
MH	Ongoing		Cross reference and incorporate mitigation planning provisions into all community planning processes such as comprehensive, capital improvement, land use, transportation plans, etc to demonstrate multi-benefit considerations and facilitate using multiple funding source consideration.
MH	Ongoing		Purchase and install generators with main power distribution disconnect switches for identified and prioritized critical facilities susceptible to short term power disruption. (i.e. first responder and schools, and water and sewage pump stations, etc.)
MH	Ongoing		Electronic surge protection devices on critical electronic components such as warning systems, communications equipment, and computers for critical facilities.
MH	Ongoing		Distribute information materials concerning mitigation, preparedness, and safety procedures for all natural hazards.
MH	Ongoing		Explore the need for, develop, and implement hazard zoning ordinances for high-risk hazard area land-use.
MH	Consider	Police Department, EOC, City Hall	Retrofit structures to protect them from seismic, floods, high winds, earthquakes, or other natural hazards.

Table 15. Columbia City Mitigation Actions Considered			
Hazard	Status	Comment	Description
MH	Consider		Acquire, demolish, or relocate structures from hazard prone area. Property deeds shall be restricted for open space uses in perpetuity to keep people from rebuilding in hazard areas.
MH	Consider		Harden utility headers located along river embankments to mitigate potential flood, debris, and erosion damages.
MH	Ongoing		Establish a formal role for the jurisdictional Hazard Mitigation Planning Committees to develop a sustainable process to implement, monitor, and evaluate citywide mitigation actions.
MH	Ongoing		Identify and pursue funding opportunities to implement mitigation actions.
MH	Ongoing		Develop public and private sector partnerships to foster hazard mitigation activities.
MH	Ongoing		Integrate the Mitigation Plan findings into planning and regulatory documents and programs and into enhanced emergency planning.
Flood			
Flood	Consider		Develop and maintain GIS mapped critical facility inventory for all structures located within 100-year and 500-year floodplains.
Flood	Consider		Develop and maintain GIS mapped inventory, and develop prioritized list of residential and commercial buildings within 100-year and 500-year floodplains.
Flood	Consider		Develop and maintain GIS mapped inventory of repetitive loss properties to include the types and numbers of properties.
Flood	Ongoing		Develop and implement mitigation actions for repetitive loss properties.
Flood	Ongoing		Establish flood mitigation priorities for critical facilities and residential and commercial buildings located within the 100- year floodplain using survey elevation data.
Flood	Ongoing		Implement mitigation measures identified by critical facilities' owners, and other facility owners, to protect facilities located within the 100-year floodplain.

Table 15. Columbia City Mitigation Actions Considered			
Hazard	Status	Comment	Description
Flood	Ongoing		Develop an outreach program to educate public concerning NFIP participation benefits, floodplain development, land use regulation, and NFIP flood insurance availability to facilitate continued compliance with the NFIP.
Flood	Ongoing		Develop, implement, and enforce floodplain management ordinances.
Flood	Consider		Acquire, relocate, elevate, or otherwise flood-proof critical facilities.
Flood	Ongoing		Develop, or revise, adopt, and enforce storm water ordinances and regulations to manage run-off from new development, including buffers and retention basins.
Flood	Ongoing		Create detention storage basins, ponds, reservoirs etc. to allow water to temporarily accumulate. Water ultimately returning to its watercourse at a reduced flow rate.
Flood	Ongoing		Provide flood protection to mitigate damage and contamination of wastewater systems.
Flood	Ongoing		Develop and incorporate mitigation provisions and recommendations into zoning ordinances and community development processes to maintain the floodway and protect critical infrastructure and private residences from other hazard areas.
Flood	Ongoing		Identify and list repetitively flooded structures and infrastructures, analyze the threat to these facilities, and prioritize mitigation actions to acquire, relocate, elevate, and/or flood proof to protect the threatened population.
Flood	Ongoing		Perform hydrologic and hydraulic engineering, and drainage studies and analyses. Use information obtained for feasibility determination and project design. This information should be a key component, directly related to a proposed project.
Winter Storm			
Winter Storms	Ongoing		Develop and implement programs to coordinate maintenance and mitigation activities to reduce risk to public infrastructure from severe winter storms.

Table 15. Columbia City Mitigation Actions Considered			
Hazard	Status	Comment	Description
Winter Storms	Ongoing		Develop critical facility list needing emergency back-up power systems, prioritize, seek funding and implement mitigation actions.
Winter Storms	Ongoing		Develop and maintain severe winter storm public outreach program defining mitigation activity benefits through educational outreach aimed at households and businesses while targeting of special needs populations.
Winter Storms	Ongoing		Develop and implement tree clearing mitigation programs to keep trees from threatening lives, property, and public infrastructure from severe weather events.
Winter Storms	Ongoing		Develop, implement, and maintain partnership program with electrical utilities to use underground utility placement methods where possible to reduce or eliminate power outages from severe winter storms. Consider developing incentive programs.
Winter Storms	Ongoing		Develop early warning test program partnering with NOAA, City Police, Fire Departments, and Volunteer Fire Department to coordinate tests.
Winter Storms	Ongoing		Review critical facilities and government building energy efficiency, winter readiness, and electrical protection capability. Identify, prioritize, and implement infrastructure upgrade or rehabilitation project prioritization and development.
Landslide			
Landslide	Ongoing		Complete a landslide location inventory, identify threatened critical facilities and other buildings and infrastructure.
Landslide	Consider		Develop prioritized list of mitigation actions for threatened critical facilities and other buildings or infrastructure.
Landslide	Ongoing		Develop process to limit future development in steep slope areas (permitting, geotechnical review, soil stabilization techniques, etc).
Landslide	Ongoing		Update the storm water management plan to include regulations to control runoff, both for flood reduction and to minimize saturated soils on steep slopes that can cause landslides.
Landslide	Ongoing		Develop comprehensive geological landslide and rockslide prone area maps.

Table 15. Columbia City Mitigation Actions Considered			
Hazard	Status	Comment	Description
Landslide	Ongoing		Identify and seasonally restrict construction activities in steep slope areas.
Wildland Fire			
Wildland Fire	Ongoing		Identify critical facilities and vulnerable populations based on mapped high hazard areas.
Wildland Fire	Consider		Identify evacuation routes away from high hazard areas and develop outreach program to educate the public concerning warnings and evacuation procedures.
Wildland Fire	Ongoing		Develop Community Wildland Fire Protection Plans for all at-risk communities.
Wildland Fire	Ongoing		Hold FireWise workshop to educate residents and contractors concerning fire resistant landscaping.
Wildland Fire	Consider		Promote FireWise building siting, design, and construction materials.
Wildland Fire	Consider		Develop FireWise Public Service Announcements (PSA).
Wildland Fire	Ongoing		Provide wildland fire information in an easily distributed format for all residents.
Wildland Fire	Consider		Schedule and perform government facility "fire drills" at least twice per year.
Wildland Fire	Ongoing		Develop, adopt, and enforce burn ordinances that require burn permits, restricts campfires, and controls outdoor burning.
Wildland Fire	Consider		Develop outreach program to educate and encourage fire-safe construction practices for existing and new construction in high risk areas.
Wildland Fire	Ongoing		Identify, develop, and implement, and enforce mitigation actions such as fuel breaks and reduction zones for potential wildland fire hazard areas.
Earthquake			
Earthquake	Consider		Supplement State Seismic Needs Analysis data (schools, fire, law enforcement). Complete inventory of public and commercial buildings that may be particularly vulnerable to earthquake damage.
Earthquake	Consider		Identify high seismic hazard areas; develop a wood-frame residential building inventory and an outreach program to educate population concerning facilities particularly vulnerable to

Table 15. Columbia City Mitigation Actions Considered			
Hazard	Status	Comment	Description
			earthquake damage, such as pre-1940s homes and homes with cripple wall foundations.
Earthquake	Consider		Disseminate FEMA pamphlets to educate and encourage homeowners concerning seismic structural and non-structural retrofit benefits.
Earthquake	Ongoing		Retrofit important public facilities with significant seismic vulnerabilities, such as unreinforced masonry construction.
Earthquake	Completed		Retrofit bridges that are not seismically adequate for lifeline transportation routes.
Earthquake	Ongoing		Update existing (or adopt the most current) Uniform Building Code
Earthquake	Ongoing		Implement and enforce the Uniform, International, and State Building Codes.
Earthquake	Ongoing		Inspect and/or certify all new construction.
Earthquake	Ongoing		Develop outreach program to educate residents concerning benefits of increased seismic resistance and modern building code compliance during rehabilitation or major repairs for residences or businesses.
Earthquake	Ongoing		Inspect, prioritize, and retrofit any critical facility or public infrastructure that does not meet current Building Codes.
Earthquake	Ongoing		Evaluate critical public facility seismic performance for fire stations, public works buildings, potable water systems, wastewater systems, electric power systems, and bridges within the jurisdiction.
Earthquake	Consider		Develop outreach program for educating private facility owners/operators concerning alternative or emergency power source acquisition to enable them to deliver food, fuel, and medical services during disaster emergency response and recovery efforts.
Earthquake	Ongoing		Encourage utility companies to evaluate and harden vulnerable infrastructure elements for sustainability.
Earthquake	Ongoing		Develop partnerships to mitigate hazards that result in jurisdictional facility lifeline or emergency transportation route closures.
Volcano			

Table 15. Columbia City Mitigation Actions Considered			
Hazard	Status	Comment	Description
Volcano	Consider		Update public emergency notification procedures and develop an outreach program for ash fall events.
Volcano	Consider		Update emergency response planning and develop client focused outreach program for ash fall events affecting river, air, and highway transportation, and industrial facilities and operations.
Volcano	Consider		Evaluate ash impact on storm water drainage system and develop mitigation actions.
Wind			
Wind	Ongoing		Review ordinances and develop outreach programs to assure manufactured buildings are protected from severe wind and flood hazards. (Anchoring, elevation, siting, and other methods as applicable)
Wind	Consider		Identify and prioritize critical facilities' overhead utilities that could be placed underground to reduce power disruption from wind storm / tree blow down damage.
Wind	Ongoing		Revise requirements to place utilities underground to reduce power disruption from wind storm / tree blow down damage when upgrading or during new development.
Wind	Ongoing		Increase power line wire size and incorporate quick disconnects (break away devices) to reduce ice load power line failure during severe wind or winter ice storm events.
Erosion			
Erosion	Consider		Maintain and update erosion hazard locations, identify critical facilities potentially impacted and develop and implement mitigation initiatives such as bank stabilization or facility relocation to prevent or reduce the threat.
Erosion	Consider		Apply for grants/funds to implement riverbank protection methods.
Erosion	Consider		Periodically provide available information to residents on riverbank erosion and methods to prevent it in an easily distributed format.
Erosion	Consider		Install riprap, or pilings to harden or "armor" a stream bank where severe erosion occurs.

Table 15. Columbia City Mitigation Actions Considered			
Hazard	Status	Comment	Description
Erosion	Consider		Install bank protection such as rock, concrete, asphalt, vegetation, or other armoring or protective materials to provide river bank protection.
Erosion	Ongoing		Harden culvert entrance with asphalt, concrete, rock, to reduce erosion or scour.
Erosion	Ongoing		Construct a structure to dissipate energy or reduce flow velocity to prevent erosion of the streambed and banks.

Mitigation Action Plan

The Steering Committee has evaluated and prioritized each of the considered mitigation actions to determine which would be included in the Mitigation Action Plan. The Committee then determined the responsible agency and potential funding sources. The Mitigation Action Plan represents mitigation projects and programs to be implemented through the cooperation of multiple entities.

Upon review, the Steering Committee assigned a high priority ranking to actions that best fulfill the goals of the HMP and are appropriate and feasible for the City and responsible entities to implement during the 5-year lifespan of this version of the HMP. As such, the Steering Committee determined that only the mitigation actions that received a high priority ranking would be included in the City's Mitigation Action Plan. Table C-14 depicts the City's mitigation actions grouped by hazard and in descending priority order within each hazard.

Table 16. Columbia City Mitigation Action Plan Matrix					
Hazard	Description	Managing Department / Agency	Timeframe	Potential Funding Source(s)	Benefit-Costs / Technical Feasibility
Multi-Hazard (MH)					
MH	Purchase and install generators with main power distribution disconnect switches for identified and prioritized critical facilities susceptible to short term power disruption. (i.e. first responder and schools, and water and sewage pump stations, etc.)	Public Works	Completed	General Fund, HS, HMGP	BC: TBD TF: Yes

Table 16. Columbia City Mitigation Action Plan Matrix

Hazard	Description	Managing Department / Agency	Timeframe	Potential Funding Source(s)	Benefit-Costs / Technical Feasibility
MH	Electronic surge protection devices on critical electronic components such as warning systems, communications equipment, and computers for critical facilities.	Public Works	1 yr	General Fund	BC: TBD TF: Yes
MH	Update or develop, implement, and maintain jurisdictional debris management plans.	City Admin/ Public Works	1-3 yrs	General Fund	BC: TBD TF: Yes
MH	Develop and implement strategies and educational outreach programs for debris management.	City Admin/ Public Works	1-3 yrs (Plan) 3-5 (outreach)	General Fund	BC: TBD TF: Yes
MH	Cross reference and incorporate mitigation planning provisions into all community planning processes such as comprehensive, capital improvement, land use, transportation plans, etc. to demonstrate multi-benefit considerations and facilitate using multiple funding source consideration.	City Admin/ Planning	1-5 yrs	General Fund	BC: TBD TF: Yes
MH	Develop outreach program for educating private facility owners/operators concerning alternative or emergency power source acquisition to enable them to deliver services during disaster emergency response and recovery efforts.	City Admin Public Works	2-5 yrs	General Fund	BC: TBD TF: Yes
MH	Develop critical facility list needing emergency back-up power systems, prioritize, seek funding and implement mitigation actions.	Public Works	1-2 yrs	General Fund	BC: TBD TF: Yes
MH	Update public emergency notification procedures and develop an outreach program for all emergencies	City Admin	3-5 years	General Fund, NOAA/NW S, HMPG	BC:TBD TF: Yes
Flood					
Flood	Develop, implement, and enforce floodplain management ordinances.	City Admin	1-3 yrs	General Fund	BC: TBD TF: Yes
Flood	Develop, or revise, adopt, and enforce storm water ordinances and regulations	City Admin/Plann	Ongoing	General Fund	BC: TBD TF: Yes

Table 16. Columbia City Mitigation Action Plan Matrix					
Hazard	Description	Managing Department / Agency	Timeframe	Potential Funding Source(s)	Benefit-Costs / Technical Feasibility
	to manage run-off from new development, including buffers and retention basins.	ing/ Public Works			
Flood	Create detention storage basins, ponds, reservoirs etc. to allow water to temporarily accumulate. Water ultimately returning to its watercourse at a reduced flow rate.	Public Works/ Engineers	0-5 yrs	Street Fund, FMA, HMGP, PDM	BC: TBD TF: Yes
Flood	Implement flood protection to mitigate damage and contamination of wastewater systems.	Public Works	5-10 yrs	Sewer Fund, FMA, HMGP, PDM	BC: TBD TF: Yes
Winter Storm					
Winter Storm	Develop and implement programs to coordinate maintenance and mitigation activities to reduce public infrastructure from severe winter storms.	Public Works	Ongoing	General Fund	BC: TBD TF: Yes
Winter Storm	Review critical facilities and government building energy efficiency, winter readiness, and electrical protection capability. Identify, prioritize, and implement infrastructure upgrade or rehabilitation project prioritization and development.	Public Works	Ongoing	General Fund, HMGP	BC: TBD TF: Yes
Landslide					
Landslide	Develop process to limit future development in steep slope areas (permitting, geotechnical review, soil stabilization techniques, etc).	Planning/ Engineering	Completed	General Fund	BC: TBD TF: Yes
Wildland Fire					
Wildland Fire	Develop Community Wildland Fire Protection Plan	Fire District	Ongoing	General Fund, FMAP	BC: TBD TF: Yes
Wildland Fire	Provide wildland fire information in an easily distributed format for all residents.	City Admin Fire District	Ongoing	General Fund, FMAP	BC: TBD TF: Yes
Wildland Fire	Develop, adopt, and enforce burn ordinances that require burn permits,	City Admin/ Fire District	Ongoing	General Fund	BC: TBD TF: Yes

Table 16. Columbia City Mitigation Action Plan Matrix					
Hazard	Description	Managing Department / Agency	Timeframe	Potential Funding Source(s)	Benefit-Costs / Technical Feasibility
	restricts campfires, and controls outdoor burning.				
Earthquake					
EQ	Identify, evaluate, and prioritize critical public facilities' seismic performance.	City Admin/ Public Works/ Engineering	3-5 yrs	General Fund	BC: TBD TF: Yes
Volcano					
Volcano	Evaluate ash impact on storm water drainage system and develop mitigation actions.	Public Works/ Engineering	3-5 yrs	General Fund	BC: TBD TF: Yes
Wind					
Wind	Identify and prioritize critical facilities' overhead utilities that could be placed underground to reduce power disruption from wind storm / tree blow down damage.	Public Works	1-5 yrs	General Fund, Utility Co., HMGP, PDM	BC: TBD TF: Yes
Erosion					
Erosion	Maintain and update erosion hazard locations, identify critical facilities potentially impacted and develop and implement mitigation initiatives	Public Works	3-5 yrs	General Fund, HMGP, PDM	BC: TBD TF: Yes
Erosion	Periodically provide available information to residents on riverbank erosion and methods to prevent it in an easily distributed format.	Public Works	3-5 yrs	General Fund	BC: TBD TF: Yes
Erosion	Install riprap, or pilings to harden or "armor" a stream bank where severe erosion occurs.	Public Works	3-5 yrs	General Fund, FMA, HMGP, PDM	BC: TBD TF: Yes

Plan Adoption and Maintenance

The following section provides documentation of the formal adoption of this annex by the governing board of the district or the city council/county commission of the jurisdiction. It also identifies the standing committee that will be responsible for future reviews between update periods.

DMA 2000 Requirements: Plan Review, Evaluation, Implementation, and Adoption	
Planning Requirements	
§201.6(d)(3)	A local jurisdiction must review and revise its plan to reflect changes in development, progress in local mitigation efforts, and changes in priorities, and resubmit if for approval within 5 years in order to continue to be eligible for mitigation project grant funding.
§201.6(c)(5)	The plan shall include...] Documentation that the plan has been formally adopted by the governing body of the jurisdiction requesting approval of the plan (e.g., City Council, County commissioner, Tribal Council). For multi-jurisdictional plans, each jurisdiction requesting approval of the plan must document that it has been formally adopted.
Planning Elements	
D1. Was the plan revised to reflect changes in development? 44 CFR 201.6(d)(3) D2. Was the plan revised to reflect progress in local mitigation efforts? 44 CFR 201.6(d)(3) D3. Was the plan revised to reflect changes in priorities? 44 CFR 201.6(d)(3) E1. Does the Plan include documentation that the plan has been formally adopted by the governing body of the jurisdiction requesting approval? 44 CFR 201.6(c)(5) E2. For multi-jurisdictional plans, has each jurisdiction requesting approval of the plan documented formal plan adoption? 44 CFR 201.6(c)(5)	

Resolution of Adoption

(Example) BEFORE THE BOARD OF COUNTY COMMISSIONERS FOR COLUMBIA COUNTY, OREGON

In the Matter of Adopting the 2014) Columbia County Multi-Jurisdictional) RESOLUTION NO. 40-2014 Hazard
Mitigation Plan Update)

WHEREAS, Columbia County, Oregon has experienced repetitive disasters that have
damaged commercial, residential and public properties, displaced citizens and businesses, and
presented general public health and safety concerns; and

WHEREAS, Columbia County has prepared a Multi-Jurisdictional Hazard Mitigation Plan that outlines the options to
reduce overall damage and impact from natural hazards; and

WHEREAS, the Multi-Jurisdictional Hazard Mitigation Plan has been reviewed by community residents, business
owners, and federal, state and local agencies, and has been revised to reflect their concerns;

NOW, THEREFORE, BE IT RESOLVED that:

1. 1. The Multi-Jurisdictional Hazard Mitigation Plan is hereby adopted as an official plan of Columbia County.
2. 2. A Hazard Mitigation Planning Group is hereby established as a permanent advisory body. The Hazard Mitigation
Planning Coordinator shall designate its members, subject to the approval of the County and the
participating jurisdictions. They shall serve one-year terms. The group's duties shall be as
designated in the Hazard Mitigation Plan.
3. 3. The Hazard Mitigation Planning Coordinator is charged with supervising the
implementation of the Plan's recommendations within the funding limitations as provided by Columbia
County or other sources.
4. 4. The Hazard Mitigation Planning Coordinator shall give priority attention to the goals identified in Table A-13 of the
Columbia County Appendix, and the actions listed in Table A-14 of the Columbia
County Appendix to the Hazard Mitigation Plan and;
5. 5. The Hazard Mitigation Planning Coordinator shall convene the hazard mitigation planning group annually. The
planning group shall monitor implementation of the plan and shall submit an annual review
worksheet to the Board of County Commissioners in accordance with the following format:
 - a. A review of the original plan.
 - b. A review of any disasters or emergencies that occurred during the previous calendar year.
 - c. A review of the actions taken, including what was accomplished during the previous year.
 - d. A discussion of any implementation problems.
 - e. Recommendations for new projects or revised action items. Such recommendations shall be subject to approval
by the Columbia County.

Dated this 27th day of August, 2014.

BOARD OF COUNTY COMMISSIONERS FOR COLUMBIA COUNTY, OREGON

By: _____ Anthony Hyde, Chair

By: _____ Henry Heimuller, Commissioner

By: _____ Earl Fisher, Commissioner

Standing Review Committee

The following table identifies the members of the Standing committee that will meet quarterly to review the HMP annex and provide a running update.

Table 17. Columbia City Standing Hazard Mitigation Committee	
Name	Agency/Department/Affiliation
Kelly Niles	Oregon Department of Forestry – Planning Group Leader
Karli Ebert	City Council of Columbia City – Council Representative
Gary Hudson	Columbia City – Citizen Member
Frank Hupp	Columbia City – Citizen Member
Dan McGraw	Columbia City – Citizen Member
Mike McGlothlin	Columbia City – Chief of Police
Anne Parrott	Columbia County Public Health
Steve Pegram	Columbia County Emergency Management

Columbia River People's Utility District Hazard Mitigation Plan Annex

2020 Update
Columbia County
Multi-Jurisdiction Hazard Mitigation Plan

Contents

Introduction	2
Planning Process and Capability Assessment	2
DMA 2000 Requirements: Planning Process	2
Steering Committee Participants	3
Public Participation.....	3
Capability Assessment	6
Hazard Identification and Vulnerability Assessment	7
DMA 2000 Requirements: Hazard Identification and Risk Assessment	7
Hazard Identification	8
Specific Impacts of Identified Hazards	9
Flood.....	9
Winter Storm.....	9
Landslide	10
Wildland Fires.....	10
Earthquake	10
Volcano.....	10
Wind	10
Values at Risk.....	11
Population Analysis	11
Asset Inventory.....	11
Mitigation Strategy.....	12
DMA 2000 Requirements: Mitigation Strategy	12
Identify Mitigation Goals	13
Mitigation Action Plan	13
Plan Adoption and Maintenance.....	15
DMA 2000 Requirements: Plan Review, Evaluation, Implementation, and Adoption...	15
Standing Review Committee	15

Introduction

This Annex contains specific **Columbia River People’s Utility District (PUD)** information to support the Columbia County 2020 Multi-Jurisdictional Hazard Mitigation Plan. This plan contains information that was available during the time of creating the report. It is not based on technical evaluation or actual professional recommendations. This section further supports the County’s planning process by summarizing the review and incorporation of existing plans, studies, and reports used to develop this MHMP. This annex is an addition to Columbia County’s Hazard Mitigation Plan and shares attributes of that plan.

Planning Process and Capability Assessment

The following section includes a detailed capability assessment that describes the resources available to support this plan. The goal of this assessment is not to identify all capabilities the organization may have, but only those that are currently used or could be used to support mitigation efforts. Capabilities are arranged in tables by type and fall under the explicit authority of the jurisdiction/district.

DMA 2000 Requirements: Planning Process	
Planning Requirements	
§201.6(b)	An open public involvement process is essential to the development of an effective plan. In order to develop a more comprehensive approach to reducing the effects of natural disasters, the planning process shall include:
§201.6(b)(1)	(1) An opportunity for the public to comment on the plan during the drafting stage and prior to plan approval;
§201.6(b)(2)	(2) An opportunity for neighboring communities, local and regional agencies involved in hazard mitigation activities, and agencies that have the authority to regulate development, as well as businesses, academia and other private and non-profit interests to be involved in the planning process; and
§201.6(b)(3)	(3) Review and incorporation, if appropriate, of existing plans, studies, reports, and technical information.
§201.6(c)(1)	[The plan shall document] the planning process used to develop the plan, including how it was prepared, who was involved in the process, and how the public was involved.
§201.6(c)(4)(i)	[The plan maintenance process shall include a] section describing the method and schedule of monitoring, evaluating, and updating the mitigation plan within a five-year cycle.
§201.6(c)(4)(iii)	[The plan maintenance process shall include a] discussion on how the community will continue public participation in the plan maintenance process.

Planning Elements
A1. Does the Plan document the planning process, including how it was prepared and who was involved in the process for each jurisdiction? 44 CFR 201.6(c)(1)
A2. Does the Plan document an opportunity for neighboring communities, local and regional agencies involved in hazard mitigation activities, agencies that have the authority to regulate development as well as other interests to be involved in the planning process? 44 CFR 201.6(b)(2)
A3. Does the Plan document how the public was involved in the planning process during the drafting stage? 44 CFR 201.6(b)(1) and 201.6(c)(1)
A4. Does the Plan document the review and incorporation of existing plans, studies, reports, and technical information? 44 CFR 201.6(b)(3)
A5. Is there discussion on how the communities will continue public participation in the plan maintenance process? 44 CFR 201.6(c)(4)(iii)
A6. Is there a description of the method and schedule for keeping the plan current (monitoring, evaluating and updating the mitigation plan within a 5-year cycle)? 44 CFR 201.6(c)(4)(i)

Steering Committee Participants

Columbia River PUD is dedicated to mitigating potential natural hazards to its population and infrastructure. To fulfill that goal, a Hazard Mitigation Plan Development Steering Committee was seated; dedicated to identifying hazard threats and developing actions to mitigate damage and life losses from those threats.

Table 1 records the Steering Committee's participant list.

Table 1. Columbia River PUD Steering Committee	
Name	Agency/Department/Affiliation
John Nguyen	General Manager
Branden Staehely	Engineering Manager
Kurt Nasshahn	Operations Manager
Kyle Boggs	Community & Public Relations Specialist

Public Participation

As defined by FEMA, Whole Community Planning is; a means by which residents, emergency management practitioners, organizational and community leaders, and government officials can collectively understand and assess the needs of their respective communities and determine the best ways to organize and strengthen their assets, capacities, and interests. By doing so, a more effective path to societal security and resilience is built.

This Hazard Mitigation Plan was conducted with opportunities for the public to participate to try and meet the goals of whole community planning. Table 2 highlights these efforts.

Table 2. Public Involvement Mechanisms	
Date	Description
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Table 2. Public Involvement Mechanisms	
Date	Description
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9/7/2019	Preparedness for Scouts – Presentation on preparedness for all hazards.

Capability Assessment

Table 3 & 4 contain the Columbia River PUD resources used to support planning activities.

Table 3. Columbia River PUD Legal and Regulatory Resources Available for Hazard Mitigation		
Regulatory Tool	Name	Effect on Hazard Mitigation
Plan	Emergency Action Plan	Provide overall guidance for emergency management responsibilities and authority.
Plan	Substation Emergency Switching Plan	Provides guidance for processes of rerouting power.
Plan	Electrical Substation Oil Spill Prevention and Response Plan	Provides overall guidance for prevention of and/or response to the discharge of oil.
Plan	Outage Procedures	Provide overall guidance for duties and responsibilities in the event of a power outage.
Policy	Mutual Aid Agreement	Develops an agreement between utilities to assist one another in the event widespread emergency assistance is necessary.
Program	Safety Trainings	Monthly safety trainings ensure employees are well equipped to handle a variety of situations.

Table 4. Columbia River PUD Administrative and Technical Resources for Hazard Mitigation	
Staff/Personnel Resources	Department/Division Position
John Nguyen	General Manager
Branden Staehely	Engineering Manager
Kurt Nasshahn	Operations Manager

Table 5. Columbia River PUD Financial Resources for Hazard Mitigation	
Financial Resources	Effect on Hazard Mitigation
General funds	Yes

Hazard Identification and Vulnerability Assessment

DMA 2000 Requirements: Hazard Identification and Risk Assessment	
Planning Requirements	
§201.6(c)(2)(i)	The risk assessment shall include a] description of the type, location and extent of all-natural hazards that can affect the jurisdiction. The plan shall include information on previous occurrences of hazard events and on the probability of future hazard events.
§201.6(c)(2)(ii)	The risk assessment shall include a] description of the jurisdiction's vulnerability to the hazards described in paragraph (c)(2)(i) of this section. This description shall include an overall summary of each hazard and its impact on the community. All plans approved after October 1, 2008 must also address NFIP insured structures that have been repetitively damaged by floods. The plan should describe vulnerability in terms of:
§201.6(c)(2)(ii)(A)	(A) The types and numbers of existing and future buildings, infrastructure, and critical facilities located in the identified hazard areas;
§201.6(c)(2)(ii)(B)	(B) An estimate of the potential dollar losses to vulnerable structures identified in ... this section and a description of the methodology used to prepare the estimate.
§201.6(c)(2)(ii)(C)	(C) Providing a general description of land uses and development trends within the community so that mitigation options can be considered in future land use decisions.
§201.6(c)(2)(iii)	For multi-jurisdictional plans, the risk assessment section must assess each jurisdiction's risks where they vary from the risks facing the entire planning area.
Planning Elements	
B1. Does the Plan include a description of the type, location, and extent of all-natural hazards that can affect each jurisdiction? 44 CFR 201.6(c)(2)(i) and 44 CFR 201.6(c)(2)(iii)	
B2. Does the Plan include information on previous occurrences of hazard events and on the probability of future hazard events for each jurisdiction? 44 CFR 201.6(c)(2)(i)	
B3. Is there a description of each identified hazard's impact on the community as well as an overall summary of the community's vulnerability for each jurisdiction? 44 CFR 201.6(c)(2)(ii)	
B4. Does the Plan address NFIP insured structures within each jurisdiction that have been repetitively damaged by floods? 44 CFR 201.6(c)(2)(ii)	

Hazard Identification

The Steering Committee determined that the following hazards could potentially threaten the community. Table 6 establishes the hazard profile against which this plan is designed.

Table 6. Hazard Profile	
Natural Hazards	
Flood	X
Winter Storm	X
Landslide	X
Fire (Wildland/Urban)	X
Earthquake	X
Volcano	X
Wind	X
Erosion	
ENSO (El Niño / La Niña)	
Expansive Soils	
Drought	

Specific Impacts of Identified Hazards

The following section provides specific details of the vulnerabilities and impacts from natural hazards for the **Columbia River PUD**.

The Basic Plan of this Multi-Jurisdiction Hazard Mitigation Plan contains the full narrative Hazard Profile for the entire county, including full details for this annex. This section is designed to provide additional notes and concerns regarding hazards that can impact this jurisdiction.

Flood

According to the FEMA Flood map service, areas within Columbia River PUD's service territory are considered special flood hazard areas. The land adjacent to Columbia River PUD's headquarters is one of these areas. Extensive flooding can adversely impact Columbia River PUD's electric distribution system.

Winter Storm

The natural hazards resulting from winter storms, such as ice, cold, wind and floods, are often widespread. A single event is capable of causing tremendous damage to power poles and overhead power lines.

This damage can result in long-lasting power outages throughout the county. Columbia River PUD has 609 miles of overhead power lines that can be vulnerable to winter storms. Moving these power lines underground can reduce the impact of future winter storms.

Landslide

The potential impacts from landslides can be widespread. Potential debris flows and landslides can adversely impact Columbia River PUD's electric distribution system.

Wildland Fires

Wildland fires have potential to severely damage electric distribution systems. They have the potential to cause widespread outages.

Earthquake

Based on PGA shake maps produced by the USGS, the western portion of Columbia County is likely to experience higher levels of shaking than the eastern portion, as a result of its proximity to the Cascadia Subduction Zone. Ground movement in both areas, however, is likely to cause damage to weak, unreinforced masonry buildings, and to induce small landslides along unstable slopes. As well as landslide, earthquakes can trigger other hazards that disrupt the electric system.

The eastern portion of Columbia County is likely to experience strong shaking should a subduction zone earthquake occur (9-20 percent of the acceleration of gravity). In contrast, the far western portion of the county is likely to experience very strong shaking (20-25 percent). This rating represents the peak acceleration of the ground caused by the earthquake.

Columbia River PUD's electric distribution system is susceptible to catastrophic damages in the event of a major earthquake.

Volcano

A volcanic eruption would have a minor impact on Columbia County due to the proximity to volcanoes within the Cascade region. The major resources of concern include air quality and waterway sedimentation. During previous eruptions, ashfall has drifted to the east of the volcanoes. (State Interagency Hazard Mitigation Team 2006)

Due to the nature of the hazard, it is impossible to predict the location or extent of future events with any probability, although it can be assumed that Columbia River PUD would be affected.

Wind

Many buildings, utilities and transportation systems in open areas, natural grasslands, or agricultural lands are especially vulnerable to wind damage. Impacts associated with wind can include damage to power lines, trees, and structures, and can also cause temporary disruptions of power. Additionally, high winds can cause significant damage to forestlands.

Columbia River PUD has 609 miles of overhead power lines that can be vulnerable to high winds. Moving these power lines underground can reduce the impact of future windstorms.

Values at Risk

Population Analysis

Population data for Columbia County listed in Table 7 were obtained from the 2010 U.S. Census and Portland State University. It comprises census block level data and estimates from university conducted community research.

Table 7. Population		
2010 Census*	2018 Estimate**	Percent Change
49,351	51,900	+5.1%

*US Census Bureau, 2011–2015 American Community Survey (<https://factfinder.census.gov/>)

**Portland State University, Population Research Center (<https://www.pdx.edu/prc/population-reports-estimates>)

Asset Inventory

Columbia River PUD seeks to protect its population by supporting Columbia County and Oregon State initiatives, ordinances, building codes, and development regulations.

Table 8. Residential Buildings	
Total Building Count	Total Value of Buildings (\$)
1	\$2,050,733

Table 9. Critical Facilities and Infrastructure			
Facility Type	Name / Number	Address	Value ¹
Substations	9	Columbia County	\$7,217,748.21
Infrastructure	Electric Distribution System	Columbia County	\$21,813,408.91

Mitigation Strategy

The following section defines mitigation action identification and analysis as stipulated in DMA 2000 and its implementing regulations.

DMA 2000 Requirements: Mitigation Strategy	
Planning Requirements	
§201.6(c)(3)	The plan shall include the following:] A mitigation strategy that provides the jurisdiction’s blueprint for reducing the potential losses identified in the risk assessment, based on existing authorities, policies, programs, and resources, and its ability to expand on and improve these existing tools.
§201.6(c)(3)(i)	The hazard mitigation strategy shall include a] description of mitigation goals to reduce or avoid long-term vulnerabilities to the identified hazards.
§201.6(c)(3)(ii)	The hazard mitigation strategy shall include a] section that identifies and analyzes a comprehensive range of specific mitigation actions and projects being considered to reduce the effects of each hazard, with particular emphasis on new and existing buildings and infrastructure. All plans approved by FEMA after October 1, 2008, must also address the jurisdiction’s participation in the NFIP, and continued compliance with NFIP requirements, as appropriate.
§201.6(c)(3)(iii)	The hazard mitigation strategy shall include an] action plan, describing how the action identified in paragraph (c)(3)(ii) of this section will be prioritized, implemented, and administered by the local jurisdiction. Prioritization shall include a special emphasis on the extent to which benefits are maximized according to a cost benefit review of the proposed projects and their associated costs.
§201.6(c)(3)(iv)	For multi-jurisdictional plans, there must be identifiable action items specific to the jurisdiction requesting FEMA approval or credit of the plan.
§201.6(c)(4)(ii)	The plan shall include a] process by which local governments incorporate the requirements of the mitigation plan into other planning mechanisms such as comprehensive or capital improvements, when appropriate.
Planning Elements	
C1. Does the plan document each jurisdiction’s existing authorities, policies, programs and resources, and its ability to expand on and improve these existing policies and programs? 44 CFR 201.6(c)(3)	
C2. Does the Plan address each jurisdiction’s participation in the NFIP and continued compliance with NFIP requirements, as appropriate? 44 CFR 201.6(c)(3)(ii)	
C3. Does the Plan include goals to reduce/avoid long-term vulnerabilities to the identified hazards? 44 CFR 201.6(c)(3)(i)	
C4. Does the Plan identify and analyze a comprehensive range of specific mitigation actions and projects for each jurisdiction being considered to reduce the effects of hazards, with emphasis on new and existing buildings and infrastructure? 44 CFR 201.6(c)(3)(ii) and 44 CFR 201.6(c)(3)(iv)	

C5. Does the Plan contain an action plan that describes how the actions identified will be prioritized (including cost benefit review), implemented, and administered by each jurisdiction? 44 CFR 201.6(c)(3)(iii) and 44 CFR (c)(3)(iv)

C6. Does the Plan describe a process by which local governments will integrate the requirements of the mitigation plan into other planning mechanisms, such as comprehensive or capital improvement plans, when appropriate? 44 CFR 201.6(c)(4)(ii)

Identify Mitigation Goals

Columbia River PUD reviewed the Columbia County goals and determined they meet the PUD's needs and subsequently adopted the Goals in Table 10 for the current planning period.

Table 10. Columbia River PUD Mitigation Goals	
Goal Number	Goal Description
1	Reduce the Threat to Life Safety Enhance life safety by minimizing the potential for deaths and injuries in future disaster events.
2	Protect Critical Facilities and Enhance Emergency and Essential Services • Implement activities or projects to protect critical facilities and infrastructure. • Seek opportunities to enhance, protect, and integrate emergency and essential services. • Strengthen emergency operations plans and procedures by increasing collaboration and coordination among public agencies, non-profit organizations, businesses, and industry.
3	Reduce the Threat to Property • Seek opportunities to protect, enhance and integrate emergency and essential services. • Strengthen emergency operations plans and procedures by increasing collaboration and coordination among public agencies, non-profit organizations, businesses, industries and the citizens of Columbia County.

Mitigation Action Plan

The Steering Committee has evaluated and prioritized considered mitigation actions to determine which would be included in the Mitigation Action Plan. The Committee then determined a timeframe and potential funding sources. The Mitigation Action Plan represents mitigation projects and programs to be implemented through cooperation with the County.

Upon review, the Steering Committee assigned a high priority ranking to actions that best fulfill the goals of the NHMP and are appropriate and feasible for the District to implement during the 5-year lifespan of this version of the NHMP. As such, the Steering Committee determined that only the six mitigation actions that received the highest priority ranking would be included in the Mitigation Action Plan. Table 11 depicts the District's mitigation actions grouped by hazard and in descending priority order within each hazard.

Table 11. Columbia River PUD Mitigation Action Plan Matrix

Hazard	Description	Managing Department / Agency	Timeframe	Potential Funding Source(s)	Benefit-Costs / Technical Feasibility
MH	Continue converting overhead power lines underground.	CRPUD	Ongoing	General Fund, FEMA	BC: No TF: No
MH	Continue to trim trees and other vegetation growing near power lines.	CRPUD	Ongoing	General Fund, FEMA	BC: No TF: No
MH	Educate customers about how to be prepared for disasters and long-lasting power outages.	CRPUD	Ongoing	General Fund	BC: No TF: No
MH	Encourage customers to plant trees safely so they do not interfere with overhead power lines.	CRPUD	Ongoing	General Fund	BC: No TF: No
MH	Continue to install interconnect switches in the electric distribution system to allow alternative paths and disconnect switches to isolate outage areas.	CRPUD	Ongoing	General Fund	BC: No TF: No
MH	Encourage all critical facilities in Columbia County to have a backup power source and an emergency operation plan in place to deal with power outages.	CRPUD	Ongoing	General Fund	BC: No TF: No
Wind, Winter Storms	Increase conductor size on power lines to reduce stress on power lines and prevent failures during severe wind or ice storms.	CRPUD	Ongoing	General Fund, FEMA	BC: No TF: No

Plan Adoption and Maintenance

The following section provides documentation of the formal adoption of this annex by the governing board of the district or the city council/county commission of the jurisdiction. It also identifies the standing committee that will be responsible for future reviews between update periods.

DMA 2000 Requirements: Plan Review, Evaluation, Implementation, and Adoption	
Planning Requirements	
§201.6(d)(3)	A local jurisdiction must review and revise its plan to reflect changes in development, progress in local mitigation efforts, and changes in priorities, and resubmit if for approval within 5 years in order to continue to be eligible for mitigation project grant funding.
§201.6(c)(5)	The plan shall include...] Documentation that the plan has been formally adopted by the governing body of the jurisdiction requesting approval of the plan (e.g., City Council, County commissioner, Tribal Council). For multi-jurisdictional plans, each jurisdiction requesting approval of the plan must document that it has been formally adopted.
Planning Elements	
D1. Was the plan revised to reflect changes in development? 44 CFR 201.6(d)(3)	
D2. Was the plan revised to reflect progress in local mitigation efforts? 44 CFR 201.6(d)(3)	
D3. Was the plan revised to reflect changes in priorities? 44 CFR 201.6(d)(3)	
E1. Does the Plan include documentation that the plan has been formally adopted by the governing body of the jurisdiction requesting approval? 44 CFR 201.6(c)(5)	
E2. For multi-jurisdictional plans, has each jurisdiction requesting approval of the plan documented formal plan adoption? 44 CFR 201.6(c)(5)	

Standing Review Committee

The following table identifies the members of the Standing committee that will meet quarterly to review the HMP annex and provide a running update.

Table 12. Columbia River PUD Standing Hazard Mitigation Committee	
Name	Agency/Department/Affiliation
John Nguyen	General Manager
Branden Staehely	Engineering Manager
Kurt Nasshahn	Operations Manager

Greater St. Helens Aquatic District

aka: Eisenschmidt Pool

Hazard Mitigation Plan

2020 Update

Columbia County

Multi-Jurisdiction Hazard Mitigation Plan

Contents

Introduction	2
Planning Process and Capability Assessment	2
DMA 2000 Requirements: Planning Process	2
Steering Committee Participants	3
Public Participation.....	3
Capability Assessment	6
Hazard Identification and Vulnerability Assessment	7
DMA 2000 Requirements: Hazard Identification and Risk Assessment	7
Hazard Identification	7
Specific Impacts of Identified Hazards	8
Flood.....	8
Winter Storm.....	8
Landslide	8
Wildland Fires.....	8
Earthquake	9
Volcano.....	9
Wind	9
Values at Risk.....	9
Population Analysis	9
Asset Inventory.....	10
Mitigation Strategy.....	11
DMA 2000 Requirements: Mitigation Strategy	11
Identify Mitigation Goals	12
Mitigation Action Plan	12
Plan Adoption and Maintenance.....	14
DMA 2000 Requirements: Plan Review, Evaluation, Implementation, and Adoption...	14
Standing Review Committee	14

Introduction

This Annex contains specific **Greater St. Helens Aquatic District** (*also known as Eisenschmidt Pool*), information to support the Columbia County 2020 Multi-Jurisdictional Hazard Mitigation Plan. This plan contains information that was available during the time of creating the report. It is not based on technical evaluation or actual professional recommendations. This section further supports the County's planning process by summarizing the review and incorporation of existing plans, studies, and reports used to develop this MHMP. This annex is an addition to Columbia County's Hazard Mitigation Plan and shares attributes of that plan.

Planning Process and Capability Assessment

The following section includes a detailed capability assessment that describes the resources available to support this plan. The goal of this assessment is not to identify all capabilities the organization may have, but only those that are currently used or could be used to support mitigation efforts. Capabilities are arranged in tables by type and fall under the explicit authority of the jurisdiction/district.

DMA 2000 Requirements: Planning Process	
Planning Requirements	
§201.6(b)	An open public involvement process is essential to the development of an effective plan. In order to develop a more comprehensive approach to reducing the effects of natural disasters, the planning process shall include:
§201.6(b)(1)	(1) An opportunity for the public to comment on the plan during the drafting stage and prior to plan approval;
§201.6(b)(2)	(2) An opportunity for neighboring communities, local and regional agencies involved in hazard mitigation activities, and agencies that have the authority to regulate development, as well as businesses, academia and other private and non-profit interests to be involved in the planning process; and
§201.6(b)(3)	(3) Review and incorporation, if appropriate, of existing plans, studies, reports, and technical information.
§201.6(c)(1)	[The plan shall document] the planning process used to develop the plan, including how it was prepared, who was involved in the process, and how the public was involved.
§201.6(c)(4)(i)	[The plan maintenance process shall include a] section describing the method and schedule of monitoring, evaluating, and updating the mitigation plan within a five-year cycle.
§201.6(c)(4)(iii)	[The plan maintenance process shall include a] discussion on how the community will continue public participation in the plan maintenance process.

Greater St. Helens Aquatic District

Planning Elements
A1. Does the Plan document the planning process, including how it was prepared and who was involved in the process for each jurisdiction? 44 CFR 201.6(c)(1)
A2. Does the Plan document an opportunity for neighboring communities, local and regional agencies involved in hazard mitigation activities, agencies that have the authority to regulate development as well as other interests to be involved in the planning process? 44 CFR 201.6(b)(2)
A3. Does the Plan document how the public was involved in the planning process during the drafting stage? 44 CFR 201.6(b)(1) and 201.6(c)(1)
A4. Does the Plan document the review and incorporation of existing plans, studies, reports, and technical information? 44 CFR 201.6(b)(3)
A5. Is there discussion on how the communities will continue public participation in the plan maintenance process? 44 CFR 201.6(c)(4)(iii)
A6. Is there a description of the method and schedule for keeping the plan current (monitoring, evaluating and updating the mitigation plan within a 5-year cycle)? 44 CFR 201.6(c)(4)(i)

Steering Committee Participants

Greater St. Helens Aquatic District is dedicated to mitigating potential natural hazards to its population and infrastructure. To fulfill that goal, a Hazard Mitigation Plan Development Steering Committee was seated; dedicated to identifying hazard threats and developing actions to mitigate damage and life losses from those threats.

Table 1 records the Steering Committee's participant list.

Table 1. Greater St. Helens Aquatic District Steering Committee	
Name	Agency/Department/Affiliation
Anne Scholz	General Manager
Anne Collson	Finance Manager
Keith Forsythe, President	Position 2 Board Member
Grant Gillis, Vice President	Position 1 Board Member
Patty Tracy	Position 5 Board Member
Andrew Niemi	Position 3 Board Member
Lisa Widmer	Position 4 Board Member

Public Participation

As defined by FEMA, Whole Community Planning is; a means by which residents, emergency management practitioners, organizational and community leaders, and government officials can collectively understand and assess the needs of their respective

Greater St. Helens Aquatic District

communities and determine the best ways to organize and strengthen their assets, capacities, and interests. By doing so, a more effective path to societal security and resilience is built.

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Greater St. Helens Aquatic District

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Greater St. Helens Aquatic District

Table 2. Public Involvement Mechanisms	
Date	Description
2019	
1/22/2019	Pints and Preparedness – various topics including Hazard mitigation, and individual preparedness.
3/26/2019	Pints and Preparedness – various topics including Hazard mitigation, and individual preparedness.
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9/7/2019	Preparedness for Scouts – Presentation on preparedness for all hazards.

Capability Assessment

Table 3 & 4 contain the Greater St. Helens Aquatic District resources used to support planning activities.

Table 3. Greater St. Helens Aquatic District Legal and Regulatory Resources Available for Hazard Mitigation		
Regulatory Tool	Name	Effect on Hazard Mitigation
Plans	4/15/19 Public Board Meeting	Provide overall guidance and implementation of the hazard plan for Eisenschmidt Pool

Table 4. Greater St. Helens Aquatic District Administrative and Technical Resources for Hazard Mitigation	
Staff/Personnel Resources	Department/Division Position
General Manager of Eisenschmidt Swimming pool	General Manager
Finance Manager of Eisenschmidt Swimming pool	Finance Manager

Table 5. Greater St. Helens Aquatic District Financial Resources for Hazard Mitigation	
Financial Resources	Effect on Hazard Mitigation
General funds	yes

Hazard Identification and Vulnerability Assessment

DMA 2000 Requirements: Hazard Identification and Risk Assessment	
Planning Requirements	
§201.6(c)(2)(i)	The risk assessment shall include a] description of the type, location and extent of all-natural hazards that can affect the jurisdiction. The plan shall include information on previous occurrences of hazard events and on the probability of future hazard events.
§201.6(c)(2)(ii)	The risk assessment shall include a] description of the jurisdiction's vulnerability to the hazards described in paragraph (c)(2)(i) of this section. This description shall include an overall summary of each hazard and its impact on the community. All plans approved after October 1, 2008 must also address NFIP insured structures that have been repetitively damaged by floods. The plan should describe vulnerability in terms of:
§201.6(c)(2)(ii)(A)	(A) The types and numbers of existing and future buildings, infrastructure, and critical facilities located in the identified hazard areas;
§201.6(c)(2)(ii)(B)	(B) An estimate of the potential dollar losses to vulnerable structures identified in ... this section and a description of the methodology used to prepare the estimate.
§201.6(c)(2)(ii)(C)	(C) Providing a general description of land uses and development trends within the community so that mitigation options can be considered in future land use decisions.
§201.6(c)(2)(iii)	For multi-jurisdictional plans, the risk assessment section must assess each jurisdiction's risks where they vary from the risks facing the entire planning area.
Planning Elements	
B1. Does the Plan include a description of the type, location, and extent of all-natural hazards that can affect each jurisdiction? 44 CFR 201.6(c)(2)(i) and 44 CFR 201.6(c)(2)(iii)	
B2. Does the Plan include information on previous occurrences of hazard events and on the probability of future hazard events for each jurisdiction? 44 CFR 201.6(c)(2)(i)	
B3. Is there a description of each identified hazard's impact on the community as well as an overall summary of the community's vulnerability for each jurisdiction? 44 CFR 201.6(c)(2)(ii)	
B4. Does the Plan address NFIP insured structures within each jurisdiction that have been repetitively damaged by floods? 44 CFR 201.6(c)(2)(ii)	

Hazard Identification

The Steering Committee determined that the following hazards could potentially threaten the community. Table 6 establishes the hazard profile against which this plan is designed.

Table 6. Hazard Profile	
Natural Hazards	
Flood	X
Winter Storm	X
Landslide	X
Fire (Wildland/Urban)	X
Earthquake	X
Volcano	X
Wind	X
Erosion	
ENSO (El Niño / La Niña)	
Expansive Soils	
Drought	

Specific Impacts of Identified Hazards

The following section provides specific details of the vulnerabilities and impacts from natural hazards for the **Greater St. Helens Aquatic District**.

The Basic Plan of this Multi-Jurisdiction Hazard Mitigation Plan contains the full narrative Hazard Profile for the entire county, including full details for this annex. This section is designed to provide additional notes and concerns regarding hazards that can impact this jurisdiction.

Flood

According to the FEMA Flood map service, Eisenschmidt Pool is in a minimal flood hazard area.

Winter Storm

The natural hazards resulting from winter storms, such as ice, cold, wind and floods, are often widespread. A single event is capable of impacting all people, the facility and infrastructure of Eisenschmidt Pool.

Landslide

The potential impacts from landslides can be widespread. Potential debris flows, and landslides can impact the function of Eisenschmidt Pool.

Wildland Fires

Eisenschmidt Pool is in a wildland fire area with little slope or natural vegetation.

Earthquake

Based on PGA shake maps produced by the USGS, the western portion of Columbia County is likely to experience higher levels of shaking than the eastern portion, as a result of its proximity to the Cascadia Subduction Zone. Ground movement in both areas, however, is likely to cause damage to weak, unreinforced masonry buildings, and to induce small landslides along unstable slopes. As well as landslide, earthquakes can trigger other hazards such as dam failure and disruption of transportation and utility systems.

The eastern portion of Columbia County is likely to experience strong shaking should a subduction zone earthquake occur (9-20 percent of the acceleration of gravity). In contrast, the far western portion of the county is likely to experience very strong shaking (20-25 percent). This rating represents the peak acceleration of the ground caused by the earthquake.

Eisenschmidt Pool is likely to suffer catastrophic damages in the event of an earthquake.

Volcano

A volcanic eruption would have a minor impact on Columbia County due to the proximity to volcanoes within the Cascade region. The major resources of concern include air quality and waterway sedimentation. During previous eruptions, ashfall has drifted to the east of the volcanoes. (State Interagency Hazard Mitigation Team 2006)

Eisenschmidt Pool will likely only experience damage from volcanic eruption columns and clouds which contain volcanic gases, minerals, and rock. The columns and clouds form rapidly and extend several miles above an eruption.

Due to the nature of the hazard, it is impossible to predict the location or extent of future events with any probability, although it can be assumed that Eisenschmidt Pool would be affected.

Wind

Many buildings, utilities and transportation systems in open areas, natural grasslands, or agricultural lands are especially vulnerable to wind damage. Impacts associated with wind can include damage to power lines, trees, and structures, and can also cause temporary disruptions of power. Additionally, high winds can cause significant damage to forestlands.

The Eisenschmidt Pool facility could severely be affected by wind.

Values at Risk

Population Analysis

Population data for Columbia County listed in Table 7 were obtained from the 2010 U.S. Census and Portland State University. It comprises census block level data and estimates from university conducted community research.

Greater St. Helens Aquatic District *(aka: Eisenschmidt Pool)*

Table 7. Population		
2010 Census*	2018 Estimate**	Percent Change
49,351	51,900	+5.1%

*US Census Bureau, 2011–2015 American Community Survey (<https://factfinder.census.gov/>)

**Portland State University, Population Research Center (<https://www.pdx.edu/prc/population-reports-estimates>)

Asset Inventory

Greater St. Helens Aquatic District seeks to protect its population by supporting Columbia County and Oregon State initiatives, ordinances, building codes, and development regulations.

Table 8. Residential Buildings	
Total Building Count	Total Value of Buildings (\$)
1	\$3,642,834

Table 9. Critical Facilities and Infrastructure			
Facility Type	Name / Number	Address	Value ¹
Public Swimming Pool	Main Pool Facility	1070 Eisenschmidt Lane	\$3,642,834

Mitigation Strategy

The following section defines mitigation action identification and analysis as stipulated in DMA 2000 and its implementing regulations.

DMA 2000 Requirements: Mitigation Strategy	
Planning Requirements	
§201.6(c)(3)	The plan shall include the following:] A mitigation strategy that provides the jurisdiction's blueprint for reducing the potential losses identified in the risk assessment, based on existing authorities, policies, programs, and resources, and its ability to expand on and improve these existing tools.
§201.6(c)(3)(i)	The hazard mitigation strategy shall include a] description of mitigation goals to reduce or avoid long-term vulnerabilities to the identified hazards.
§201.6(c)(3)(ii)	The hazard mitigation strategy shall include a] section that identifies and analyzes a comprehensive range of specific mitigation actions and projects being considered to reduce the effects of each hazard, with particular emphasis on new and existing buildings and infrastructure. All plans approved by FEMA after October 1, 2008, must also address the jurisdiction's participation in the NFIP, and continued compliance with NFIP requirements, as appropriate.
§201.6(c)(3)(iii)	The hazard mitigation strategy shall include an] action plan, describing how the action identified in paragraph (c)(3)(ii) of this section will be prioritized, implemented, and administered by the local jurisdiction. Prioritization shall include a special emphasis on the extent to which benefits are maximized according to a cost benefit review of the proposed projects and their associated costs.
§201.6(c)(3)(iv)	For multi-jurisdictional plans, there must be identifiable action items specific to the jurisdiction requesting FEMA approval or credit of the plan.
§201.6(c)(4)(ii)	The plan shall include a] process by which local governments incorporate the requirements of the mitigation plan into other planning mechanisms such as comprehensive or capital improvements, when appropriate.
Planning Elements	
C1. Does the plan document each jurisdiction's existing authorities, policies, programs and resources, and its ability to expand on and improve these existing policies and programs? 44 CFR 201.6(c)(3)	
C2. Does the Plan address each jurisdiction's participation in the NFIP and continued compliance with NFIP requirements, as appropriate? 44 CFR 201.6(c)(3)(ii)	
C3. Does the Plan include goals to reduce/avoid long-term vulnerabilities to the identified hazards? 44 CFR 201.6(c)(3)(i)	
C4. Does the Plan identify and analyze a comprehensive range of specific mitigation actions and projects for each jurisdiction being considered to reduce the effects of hazards, with emphasis on new and existing buildings and infrastructure? 44 CFR 201.6(c)(3)(ii) and 44 CFR 201.6(c)(3)(iv)	

C5. Does the Plan contain an action plan that describes how the actions identified will be prioritized (including cost benefit review), implemented, and administered by each jurisdiction? 44 CFR 201.6(c)(3)(iii) and 44 CFR (c)(3)(iv)

C6. Does the Plan describe a process by which local governments will integrate the requirements of the mitigation plan into other planning mechanisms, such as comprehensive or capital improvement plans, when appropriate? 44 CFR 201.6(c)(4)(ii)

Identify Mitigation Goals

Greater St. Helens Aquatic District reviewed the Columbia County goals and determined they meet the District's needs and subsequently adopted the Goals in Table 10 for the current planning period.

Table 10. Greater St. Helens Aquatic Districts Mitigation Goals	
Goal Number	Goal Description
1	Reduce the Threat to Life Safety Enhance life safety by minimizing the potential for deaths and injuries in future disaster events.
2	Protect Critical Facilities and Enhance Emergency and Essential Services • Implement activities or projects to protect critical facilities and infrastructure. • Seek opportunities to enhance, protect, and integrate emergency and essential services. • Strengthen emergency operations plans and procedures by increasing collaboration and coordination among public agencies, non-profit organizations, businesses, and industry.
3	Reduce the Threat to Property • Seek opportunities to protect, enhance and integrate emergency and essential services. • Strengthen emergency operations plans and procedures by increasing collaboration and coordination among public agencies, non-profit organizations, businesses, industries and the citizens of Columbia County.

Mitigation Action Plan

The Steering Committee has evaluated and prioritized considered mitigation actions to determine which would be included in the Mitigation Action Plan. The Committee then determined a timeframe and potential funding sources. The Mitigation Action Plan represents mitigation projects and programs to be implemented through cooperation with the County.

Upon review, the Steering Committee assigned a high priority ranking to actions that best fulfill the goals of the NHMP and are appropriate and feasible for the District to implement during the 5-year lifespan of this version of the NHMP. As such, the Steering Committee determined that only the six mitigation actions that received the highest priority ranking would be included in the Mitigation Action Plan. Table 11 depicts the District's mitigation actions grouped by hazard and in descending priority order within each hazard.

Greater St. Helens Aquatic District *(aka: Eisenschmidt Pool)*

Table 11. Greater St. Helens Aquatic District Mitigation Action Plan Matrix

Hazard	Description	Managing Department / Agency	Timeframe	Potential Funding Source(s)	Benefit-Costs / Technical Feasibility
MH	At this time, generators are needed for critical facilities susceptible to short term power disruption. Any new electrical construction will consider if a generator is needed.	GSHAD	3-5 years	General Fund, HMGP	BC: TBD TF: Yes
MH	Electronic surge protection devices on critical electronic components such as warning systems, communications equipment, and computers for critical facilities.	GSHAD	1 yr	General Fund, HMGP	BC: TBD TF: Yes
MH	Any new construction, repairs, or replacements will take into consideration protection from seismic, floods, high winds, earthquakes, or other natural hazards.	GSHAD	1-3 yrs	General Fund, HMGP	BC: TBD TF: Yes
Flood	We will implement measures to protect our facility from flood and water damage due to weather.	GSHAD	?	General Fund, HMGP	BC: TBD TF: Yes
Winter Storms	Develop and implement programs to coordinate maintenance and mitigation activities to reduce risk to infrastructure from severe winter storms.	GSHAD	?	General Fund, HMGP	BC: TBD TF: Yes
Urban Fire	Schedule and perform facility “fire drills” at least twice per year. Make sure all vegetation and surrounding areas are maintained to reduce the spread of fire.	GSHAD	continuous	General Fund, HMGP	BC: TBD TF: Yes

Plan Adoption and Maintenance

The following section provides documentation of the formal adoption of this annex by the governing board of the district or the city council/county commission of the jurisdiction. It also identifies the standing committee that will be responsible for future reviews between update periods.

DMA 2000 Requirements: Plan Review, Evaluation, Implementation, and Adoption	
Planning Requirements	
§201.6(d)(3)	A local jurisdiction must review and revise its plan to reflect changes in development, progress in local mitigation efforts, and changes in priorities, and resubmit if for approval within 5 years in order to continue to be eligible for mitigation project grant funding.
§201.6(c)(5)	The plan shall include...] Documentation that the plan has been formally adopted by the governing body of the jurisdiction requesting approval of the plan (e.g., City Council, County commissioner, Tribal Council). For multi-jurisdictional plans, each jurisdiction requesting approval of the plan must document that it has been formally adopted.
Planning Elements	
D1. Was the plan revised to reflect changes in development? 44 CFR 201.6(d)(3)	
D2. Was the plan revised to reflect progress in local mitigation efforts? 44 CFR 201.6(d)(3)	
D3. Was the plan revised to reflect changes in priorities? 44 CFR 201.6(d)(3)	
E1. Does the Plan include documentation that the plan has been formally adopted by the governing body of the jurisdiction requesting approval? 44 CFR 201.6(c)(5)	
E2. For multi-jurisdictional plans, has each jurisdiction requesting approval of the plan documented formal plan adoption? 44 CFR 201.6(c)(5)	

Standing Review Committee

The following table identifies the members of the Standing committee that will meet quarterly to review the HMP annex and provide a running update.

Table 12. Greater St. Helens Aquatic District Standing Hazard Mitigation Committee	
Name	Agency/Department/Affiliation
Anne Scholz	General Manager
Anne Collson	Finance Manager

Greater St. Helens Aquatic District *(aka: Eisenschmidt Pool)*

Keith Forsythe, President	Position 2 Board Member
Grant Gillis, Vice President	Position 1 Board Member
Patty Tracy	Position 5 Board Member
Andrew Niemi	Position 3 Board Member
Lisa Widmer	Position 4 Board Member

Mist-Birkenfeld RFPD
Hazard Mitigation Plan
Annex

2020 Update
Columbia County
Multi-Jurisdiction Hazard Mitigation Plan

Contents

Introduction	3
Planning Process and Capability Assessment	3
DMA 2000 Requirements: Planning Process	3
Steering Committee Participants	4
Public Participation.....	4
Capability Assessment	7
Hazard Identification and Vulnerability Assessment	9
DMA 2000 Requirements: Hazard Identification and Risk Assessment	9
Hazard Identification	9
Specific Impacts of Identified Hazards	10
Flood.....	10
Winter Storm.....	10
Landslide	11
Wildland Fires.....	11
Earthquake	11
Volcano.....	12
Wind	12
Erosion.....	13
Values at Risk.....	13
Population Analysis	13
Asset Inventory.....	13
National Flood Insurance Policy	14
Vulnerability Analysis	15
Mitigation Strategy.....	19
DMA 2000 Requirements: Mitigation Strategy	19
Identify Mitigation Goals.....	20
Evaluate and Prioritize Mitigation Actions	20
Mitigation Action Plan	28
Plan Adoption and Maintenance.....	30
DMA 2000 Requirements: Plan Review, Evaluation, Implementation, and Adoption...	31
Resolution of Adoption.....	32

Standing Review Committee 33

Introduction

This Annex contains specific **Mist-Birkenfeld RFPD** information to support the Columbia County 2020 Multi-Jurisdictional Hazard Mitigation Plan. This section further supports the County's planning process by summarizing the review and incorporation of existing plans, studies, and reports used to develop this MHMP. This annex is an addition to Columbia County's Hazard Mitigation Plan and shares attributes of that plan.

Planning Process and Capability Assessment

The following section includes a detailed capability assessment that describes the resources available to support this plan. The goal of this assessment is not to identify all capabilities the organization may have, but only those that are currently used or could be used to support mitigation efforts. Capabilities are arranged in tables by type and fall under the explicit authority of the jurisdiction/district.

DMA 2000 Requirements: Planning Process	
Planning Requirements	
§201.6(b)	An open public involvement process is essential to the development of an effective plan. In order to develop a more comprehensive approach to reducing the effects of natural disasters, the planning process shall include:
§201.6(b)(1)	(1) An opportunity for the public to comment on the plan during the drafting stage and prior to plan approval;
§201.6(b)(2)	(2) An opportunity for neighboring communities, local and regional agencies involved in hazard mitigation activities, and agencies that have the authority to regulate development, as well as businesses, academia and other private and non-profit interests to be involved in the planning process; and
§201.6(b)(3)	(3) Review and incorporation, if appropriate, of existing plans, studies, reports, and technical information.
§201.6(c)(1)	[The plan shall document] the planning process used to develop the plan, including how it was prepared, who was involved in the process, and how the public was involved.
§201.6(c)(4)(i)	[The plan maintenance process shall include a] section describing the method and schedule of monitoring, evaluating, and updating the mitigation plan within a five-year cycle.
§201.6(c)(4)(iii)	[The plan maintenance process shall include a] discussion on how the community will continue public participation in the plan maintenance process.
Planning Elements	
A1. Does the Plan document the planning process, including how it was prepared and who was involved in the process for each jurisdiction? 44 CFR 201.6(c)(1)	
A2. Does the Plan document an opportunity for neighboring communities, local and regional agencies involved in hazard mitigation activities, agencies that have the authority to regulate development as well as other interests to be involved in the planning process? 44 CFR 201.6(b)(2)	

A3. Does the Plan document how the public was involved in the planning process during the drafting stage? 44 CFR 201.6(b)(1) and 201.6(c)(1)

A4. Does the Plan document the review and incorporation of existing plans, studies, reports, and technical information? 44 CFR 201.6(b)(3)

A5. Is there discussion on how the communities will continue public participation in the plan maintenance process? 44 CFR 201.6(c)(4)(iii)

A6. Is there a description of the method and schedule for keeping the plan current (monitoring, evaluating and updating the mitigation plan within a 5-year cycle)? 44 CFR 201.6(c)(4)(i)

Steering Committee Participants

Mist-Birkenfeld RFPD is dedicated to mitigating potential natural hazards to its population and infrastructure. To fulfill that goal, a Hazard Mitigation Plan Development Steering Committee was seated; dedicated to identifying hazard threats and developing actions to mitigate damage and life losses from those threats.

Table 1 records the Steering Committee's participant list.

Table 1. Mist-Birkenfeld RFPD Steering Committee	
Name	Agency/Department/Affiliation
Joe Kaczinski	Fire Chief
Don Beck	Deputy Chief
Mary Lou Busch	Vol. Asst. Chief
Ann Berg	Division Chief, EMS
Larry Boxman	Paramedic

Public Participation

As defined by FEMA, Whole Community Planning is; a means by which residents, emergency management practitioners, organizational and community leaders, and government officials can collectively understand and assess the needs of their respective communities and determine the best ways to organize and strengthen their assets, capacities, and interests. By doing so, a more effective path to societal security and resilience is built.

This Hazard Mitigation Plan was conducted with opportunities for the public to participate to try and meet the goals of whole community planning. Table 2 highlights these efforts.

Table 2. Public Involvement Mechanisms	
Date	Description
2014	
7/19/2014	Columbia Emergency Preparedness Association EXPO – Large emergency management event covering all topics (preparedness, fire, law, mitigation, response).
11/11/2014	HSEMC – Columbia County’s Homeland Security and Emergency Management Commission is recognized by the Board of County Commissioners as the cornerstones of a whole community approach to emergency management planning. All jurisdictions are members of the commission. Semi Annual NHMP meeting, plan review was conducted.
2015	
5/12/2015	HSEMC – Columbia County’s Homeland Security and Emergency Management Commission is recognized by the Board of County Commissioners as the cornerstones of a whole community approach to emergency management planning. All jurisdictions are members of the commission. Semi Annual NHMP meeting, plan review was conducted.
11/10/2015	HSEMC – Columbia County’s Homeland Security and Emergency Management Commission is recognized by the Board of County Commissioners as the cornerstones of a whole community approach to emergency management planning. All jurisdictions are members of the commission. Semi Annual NHMP meeting, plan review was conducted.
2016	
4/2/2016	KOHI Radio Preparedness Talk – Radio talk show for Columbia County, topics “specifically included preparing for the next flood event”.
5/10/2016	HSEMC – Columbia County’s Homeland Security and Emergency Management Commission is recognized by the Board of County Commissioners as the cornerstones of a whole community approach to emergency management planning. All jurisdictions are members of the commission. Semi Annual NHMP meeting, plan review was conducted.
6/4/2016	Ford Family Foundation Preparedness Fair - County wide event to promote preparedness and mitigation in cooperation with the Ford Family Foundation. All cities participated.
7/23/2016	Columbia Emergency Preparedness Association EXPO – Large emergency management event covering all topics (preparedness, fire, law, mitigation, response).
9/22/2016	Columbia County Soil and Water Conservation District – Event hosted by SWCD on preparedness and flood mitigation efforts.
11/15/2016	HSEMC – Columbia County’s Homeland Security and Emergency Management Commission is recognized by the Board of County Commissioners as the cornerstones of a whole community approach to emergency management

Table 2. Public Involvement Mechanisms	
Date	Description
	planning. All jurisdictions are members of the commission. Semi Annual NHMP meeting, plan review was conducted.
2017	
5/9/2017	HSEMC – Columbia County’s Homeland Security and Emergency Management Commission is recognized by the Board of County Commissioners as the cornerstones of a whole community approach to emergency management planning. All jurisdictions are members of the commission. Semi Annual NHMP meeting, plan review was conducted.
11/14/2017	HSEMC – Columbia County’s Homeland Security and Emergency Management Commission is recognized by the Board of County Commissioners as the cornerstones of a whole community approach to emergency management planning. All jurisdictions are members of the commission. Semi Annual NHMP meeting, plan review was conducted.
11/29/2017	Unprepared showing – St. Helens - presentation of OPB documentary regarding CSZ earthquake and tsunami.
2018	
1/19/2018	Preparedness to Vets Group – Presentation to Veterans regarding personal preparedness and flood mitigation.
5/8/2018	HSEMC – Columbia County’s Homeland Security and Emergency Management Commission is recognized by the Board of County Commissioners as the cornerstones of a whole community approach to emergency management planning. All jurisdictions are members of the commission. Semi Annual NHMP meeting, plan review was conducted and plans for plan update discussed.
11/13/2018	HSEMC – Columbia County’s Homeland Security and Emergency Management Commission is recognized by the Board of County Commissioners as the cornerstones of a whole community approach to emergency management planning. All jurisdictions are members of the commission. Semi Annual County-wide Hazard Mitigation meeting. Work Session on Hazard Mitigation Plan update conducted.
11/27/2018	Pints and Preparedness – various topics including Hazard mitigation, and individual preparedness.
2019	
1/22/2019	Pints and Preparedness – various topics including Hazard mitigation, and individual preparedness.
3/26/2019	Pints and Preparedness – various topics including Hazard mitigation, and individual preparedness.
5/7/2019	HSEMC – Columbia County’s Homeland Security and Emergency Management Commission is recognized by the Board of County Commissioners as the cornerstones of a whole community approach to emergency management planning. All jurisdictions are members of the commission. Semi Annual

Table 2. Public Involvement Mechanisms	
Date	Description
	County-wide Hazard Mitigation meeting. Work Session on Hazard Mitigation Plan update conducted.
4/23/2019	Pints and Preparedness – various topics including Hazard mitigation, and individual preparedness.
9/7/2019	Preparedness for Scouts – Presentation on preparedness for all hazards.

Capability Assessment

Table 3, 4, and 5 contain the Mist-Birkenfeld RFPD resources used to support planning activities, including the reports and studies reviewed as part of the update process.

Table 3 Mist-Birkenfeld RFPD Legal and Regulatory Resources Available for Hazard Mitigation		
Regulatory Tool	Name	Effect on Hazard Mitigation
Plans	Columbia County Comprehensive Emergency Management Plan 11/2018	Provides overall guidance for a community's land use, economic development, resource management and disaster emergency management.
	Oregon Department of Geology	Provides risk assessment for land movement
	Oregon Department of Forestry	Provides risk assessment for wildland fire
Programs	National Flood Insurance Program (NFIP)	Makes affordable flood insurance available to homeowners, business owners, and renters in participating communities. In exchange, those communities must adopt and enforce minimum floodplain management regulations to reduce the risk of damage from future floods.
Policies	Board Policies	To provide for the operation and management of Mist-Birkenfeld RFPD, Mist, Columbia County, Oregon and to enable by resolution to meet financial and operation requirements during Hazard events.

Table 4. Mist-Birkenfeld RFPD Administrative and Technical Resources for Hazard Mitigation

Staff/Personnel Resources	Department/Division Position
Fire Chief	Administrator and Operations Manager
Deputy Fire Chief/other fire officers	Operations
Administrative staff	Financial planning
Personnel skilled in GIS and/or HAZUS-MH	no

Table 5. Mist-Birkenfeld RFPD Financial Resources for Hazard Mitigation

Financial Resources	Effect on Hazard Mitigation
General funds	yes
Authority to levy taxes for specific purposes	yes, with voter approval
Incur debt through general obligation bonds	yes, with voter approval
Incur debt through special tax and revenue bonds	yes, with voter approval
Incur debt through private activity bonds	no
Hazard Mitigation Grant Program (HMGP)	FEMA funding which is available to local communities after a Presidentially-declared disaster. It can be used to fund both pre- and post-disaster mitigation plans and projects.
Pre-Disaster Mitigation (PDM) grant program	FEMA funding which is available on an annual basis. This grant can only be used to fund pre-disaster mitigation plans and projects only.
Flood Mitigation Assistance (FMA) grant program	FEMA funding which is available on an annual basis. This grant can be used to mitigate repetitively flooded structures and infrastructure to protect repetitive flood structures.
United States Fire Administration (USFA) Grants	The purpose of these grants is to assist state, regional, national or local organizations to address fire prevention and safety. The primary goal is to reach high-risk target groups including children, seniors and firefighters.

Hazard Identification and Vulnerability Assessment

DMA 2000 Requirements: Hazard Identification and Risk Assessment	
Planning Requirements	
§201.6(c)(2)(i)	The risk assessment shall include a] description of the type, location and extent of all-natural hazards that can affect the jurisdiction. The plan shall include information on previous occurrences of hazard events and on the probability of future hazard events.
§201.6(c)(2)(ii)	The risk assessment shall include a] description of the jurisdiction's vulnerability to the hazards described in paragraph (c)(2)(i) of this section. This description shall include an overall summary of each hazard and its impact on the community. All plans approved after October 1, 2008 must also address NFIP insured structures that have been repetitively damaged by floods. The plan should describe vulnerability in terms of:
§201.6(c)(2)(ii)(A)	(A) The types and numbers of existing and future buildings, infrastructure, and critical facilities located in the identified hazard areas;
§201.6(c)(2)(ii)(B)	(B) An estimate of the potential dollar losses to vulnerable structures identified in ... this section and a description of the methodology used to prepare the estimate.
§201.6(c)(2)(ii)(C)	(C) Providing a general description of land uses and development trends within the community so that mitigation options can be considered in future land use decisions.
§201.6(c)(2)(iii)	For multi-jurisdictional plans, the risk assessment section must assess each jurisdiction's risks where they vary from the risks facing the entire planning area.
Planning Elements	
B1. Does the Plan include a description of the type, location, and extent of all-natural hazards that can affect each jurisdiction? 44 CFR 201.6(c)(2)(i) and 44 CFR 201.6(c)(2)(iii)	
B2. Does the Plan include information on previous occurrences of hazard events and on the probability of future hazard events for each jurisdiction? 44 CFR 201.6(c)(2)(i)	
B3. Is there a description of each identified hazard's impact on the community as well as an overall summary of the community's vulnerability for each jurisdiction? 44 CFR 201.6(c)(2)(ii)	
B4. Does the Plan address NFIP insured structures within each jurisdiction that have been repetitively damaged by floods? 44 CFR 201.6(c)(2)(ii)	

Hazard Identification

The Steering Committee determined that the following hazards could potentially threaten the community. Table 6 establishes the hazard profile against which this plan is designed.

Table 6. Hazard Profile	
Natural Hazards	
Flood	X
Winter Storm	X
Landslide	X
Fire (Wildland/Urban)	X
Earthquake	X
Volcano	X
Wind	X
Erosion	X
ENSO (El Niño / La Niña)	
Expansive Soils	
Drought	

Specific Impacts of Identified Hazards

The following section provides specific details of the vulnerabilities and impacts from natural hazards for the **Mist-Birkenfeld RFPD** identified in Table 6.

The Basic Plan of this Multi-Jurisdiction Hazard Mitigation Plan contains the full narrative Hazard Profile for the entire county, including full details for this annex. This section is designed to provide additional notes and concerns regarding hazards that can impact this jurisdiction

Flood

FEMA FIRMs were used to outline the 100-year and 500-year floodplains for the Nehalem River and assorted watersheds within the district. The 100-year floodplain delineates an area of high risk, while the 500-year floodplain delineates an area of moderate risk.

There are 148 residential structures (worth \$10.7M), and one sawmill (worth \$5.5M) within both the 100-year and the 500-year floodplain. There are 2 critical facilities within the high floodplain.

Winter Storm

The natural hazards resulting from winter storms, such as ice, cold, wind and floods, are often widespread. A single event is capable of impacting all people, critical facilities and infrastructure within Mist-Birkenfeld fire district, and therefore the entire population (1,388 people), including 433 residential structures (worth \$455,525,000 M), one government facility (worth \$75K), 5 emergency response facilities (worth \$1.5M), one education facility (worth \$500K), facilities 2 community facilities (worth \$300K), 1 utility (worth \$4.5M), one state and federal highway, 2 paved county highways (including bridges)(worth TBD).

Landslide

The potential impacts from landslides can be widespread. Potential debris flows, and landslides can impact transportation and utility systems, and water and waste treatment infrastructure along with public, private, and business structures located adjacent to steep slopes, along riverine embankments, or within alluvial fans or natural drainages. Response and recovery efforts will likely vary from minor cleanup to more extensive utility system rebuilding. Utility disruptions are usually local and terrain dependent. Damages may require reestablishing electrical, communication, and gas pipeline connections occurring from specific breakage points. Initial debris clearing from emergency routes and high traffic areas may be required. Water and waste-water utilities may need treatment to quickly improve water quality by reducing excessive water turbidity and reestablishing waste disposal capability.

SLIDO from the Department of Geology and Mining was used to determine past and forecast landslide potential for the Mist-Birkenfeld Fire District. Most of the district is characterized as High or Very High with very little Moderate.

There are 325 residential structures (worth \$34.2M) and 1 emergency response structure (\$75K) located in the very high landslide risk area. There are 1 emergency response structure (\$93K) and 109 residential structures (worth \$11.4M) located in the high-risk area.

Wildland Fires

Wildland fire hazard areas were identified using Oregon Wildfire Risk Explorer. All are located within 0.3km of designated hazard zones.

There are 40 residential structures (worth \$4.2M) and multiple outbuildings (worth unknown) such as barns located in moderate fire risk areas. There are 4 emergency response facilities (worth \$300K) and one mill (worth \$5.5M) in the moderate risk areas.

There are 153 residential structures (worth \$16.1M), multiple outbuildings and one county park (worth reflected in county plan) located in the high-risk areas.

There are 24 residential structures (worth \$2.5M) with multiple outbuildings and, one utility (Miller Station and adjuncts) (worth \$98.4M) in the very high fire risk areas.

Earthquake

Based on Oregon HazVu, the western portion of Columbia County is likely to experience higher levels of shaking than the eastern portion, as a result of its proximity to the Cascadia Subduction Zone. Ground movement in both areas, however, is likely to cause damage to weak, unreinforced masonry buildings, and to induce small landslides along unstable slopes. As well as landslide, earthquakes can trigger other hazards such as dam failure and disruption of transportation and utility systems.

The eastern portion of Columbia County is likely to experience strong shaking should a subduction zone earthquake occur (9-20 percent of the acceleration of gravity). In contrast, the far western portion of the county is likely to experience very strong shaking (20-25 percent). This rating represents the peak acceleration of the ground caused by the earthquake.

Due to Mist-Birkenfeld's location in the western portion of the county, all people, critical facilities and infrastructure within the district, and therefore the entire population (1,388 people), including 433 residential structures (worth \$45.5M), multiple non-residential structures (value unknown), 1 government facility (worth \$75K), 4 emergency response facilities (worth \$300K), one education facility (worth \$500K), 2 community facilities (worth \$300K), 2 utilities (worth \$147M), one state and federal highway with 5 bridges (worth reflected in county plan), and county roads with bridges are located in the very strong shaking area.

Volcano

A volcanic eruption would have a minor impact on Mist-Birkenfeld due to the proximity to volcanoes within the Cascade region. The major resources of concern include air quality and waterway sedimentation. During previous eruptions, ashfall has drifted to the east of the volcanoes. (State Interagency Hazard Mitigation Team 2006)

Mist-Birkenfeld will likely only experience damage from volcanic eruption columns and clouds which would deposit ash. Solid particles within the clouds, can distribute acid rain (sulfur dioxide gas and water), can create risk of suffocation (carbon dioxide is heavier than air and collects in valleys and depressions threatening human and animals), and pose a toxic threat from fluorine which clings to ash particles potentially poisoning grazing livestock and contaminating domestic water supplies.

Buildings and roads throughout the area may require minor cleanup with negligible impacts. Temporary utility interruptions are likely, and minor cleanup may be required for electrical and other utility services. Injuries associated with respiratory problems may result. (Goettel 2005)

Due to the nature of the hazard, it is impossible to predict the location or extent of future events with any probability, although it can be assumed that all critical facilities and infrastructure within Mist-Birkenfeld are at risk including the entire population (1,388), 433 residential structures (worth \$45.5 M), 1 government facility (worth \$75K), 7 emergency response facilities (worth \$1.75M), one education facility (worth \$500K), 2 community facilities (worth \$300K), 2 utilities (worth \$147M), one state and federal highway with 5 bridges (worth reflected in county plan).

Wind

Many buildings, utilities and transportation systems in open areas, natural grasslands, or agricultural lands are especially vulnerable to wind damage. Impacts associated with wind can

include damage to power lines, trees, and structures, and can also cause temporary disruptions of power. Additionally, high winds can cause significant damage to forestlands.

All areas within Mist-Birkenfeld are equally at risk of a windstorm event including all people, critical facilities and infrastructure, and therefore the entire population (1,388), including 433 residential structures (worth \$45.5 M), 1 government facility (worth \$75K), 7 emergency response facilities (worth \$1.75M), one education facility (worth \$500K), 2 community facilities (worth \$300K), 2 utilities (worth \$147M), one state and federal highway with 5 bridges (worth reflected in county plan).

Erosion

Riverine erosion rarely causes death or injury. However, erosion causes significant destruction of property, development, and infrastructure. Erosion hazard data is not readily available, however, descriptions of several localized areas were identified during the development of this document and are identified only by location on a map referencing the river or stream reach described. Critical facilities that may be at risk of erosion were identified using a 300 foot-buffer in the areas identified as having historic erosion impacts to conservatively account for building footprints. 7 residences (worth \$2.7M) were identified as being at risk for erosion loss.

Values at Risk

Population Analysis

Population data listed in Table 7 is the same data as listed for the county. The Fire District responds to a geographic area that includes properties and residents that are in both Columbia and Clatsop counties.

Table 7. Population		
2010 Census*	2018 Estimate*	Percent Change
49,351	51,900	+5.1%

Asset Inventory

The Asset Inventory describes the physical values; the residential building stock, public facilities, and infrastructure within each community that may be affected by hazard events and includes population, residential and nonresidential buildings, critical facilities, and infrastructure. The Mist Birkenfeld RFD special district does not have jurisdiction over residential structures for the purposes of this Hazard mitigation Plan. Those residential structures which exist within our borders are included in the County's annex.

MBRFD does contain several critical facilities that we will list. These values are described in Tables 8 and portray the District's critical infrastructure numbers and values, and their potential vulnerability by hazard type.

Mist-Birkenfeld RFPD Annex

Table 8. Critical Facilities and Infrastructure			
Facility Type	Name / Number	Address	Value ¹
Government and Emergency Response	Main Station	12525 Hwy 202	\$1,294,466
	Sager Station	75125 Hwy 202	\$75,702
	Birkenfeld Station	11131 Highway 202	\$68,541
	Fishhawk Station	71288 North Shore	\$93,093
	Peterson Station	65551 Nehalem Hwy N	\$78,771
	Burris Station	67131 Burris Rd	\$46,035
	Fleming Pond pump system	12525 Hwy 202	\$89,000
Educational	Mist Elementary & Gym	69163 Hwy 47	500K
	Big Eddy Park	64555 Nehalem Hwy N	County plan
	Natal Grange	67542 Nehalem Hwy N	150K
	Birkenfeld Community Church	11247 Hwy 202	150K
State and Federal Highways	Highway 47	6 miles	County plan
	Nehalem Hwy N	10 miles	County plan
	Hwy 202	10 miles	County plan
State Bridges	Lindgren Creek		County plan
	Flora Rd.		County plan
	Birkenfeld Bridge		County plan
County Bridges and Major Culverts	Vesper Bridge		County plan
	Northrup Hwy Bridge		County plan
	Oak Ranch Culvert	Apiary Road	
	Oak Ranch Bridge	Apiary Road	County plan
	Burris Road Bridge	Jct Burris/Nehalem Hwy N	County plan
	Fishhawk Bridge 1	Fishhawk Rd near 202	County plan
	Fishhawk Bridge 2	MP 4.5 Fishhawk RD	County plan
	Northrup Creek Bridge	MP 2 Northrup Ck	County plan
	Sjoli Rd Bridge	MP 2 Fishhawk Rd.	County plan
	West Oregon Electric	12521 Hwy 202	4.5M

National Flood Insurance Policy

National Flood Insurance Program data were obtained from the State Department of Land Conservation and Development for the County Annex. While there may be some NFIP properties inside the district the MBRFD does not claim jurisdiction over those properties. Data for NFIP in unincorporated Columbia County can be found in the Columbia County Annex.

Vulnerability Analysis

A vulnerability analysis predicts the extent of exposure, and the impacts that may result from a hazard event of a given intensity in each area. The analysis provides quantitative data that may be used to identify and prioritize potential mitigation measures by allowing communities to focus attention on areas with the greatest risk of damage. A vulnerability analysis is divided into five steps including asset inventory, methodology, data limitations, exposure analysis for current assets, and areas of future development.

The following is derived from the best available data for facility locations and values. In many cases, values were unavailable, and therefore the totals listed below should be considered incomplete and likely less than the actual costs associated with the respective hazards

The vulnerability analysis development process is thoroughly discussed in the Columbia County Basic Plan, Section 6, which generated the following Hazard Exposure Analysis Overviews in Tables 9, 10, and 11.

Table 9. Mist-Birkenfeld Potential Hazard Exposure Analysis Overview
Population and Buildings

			Population	Buildings			
				Residential		Non-Residential	
Hazard Type	Hazard Area	Methodology	Number	Number	Value (\$) ¹	Number	Value (\$)
Flood	High	500-year floodplain	---	148	10,730,000	125	unknown
	High	100-year floodplain	--	148	10,730,000	125	unknown
Winter Storm		descriptive	1,388	433	45,552,500	4	unknown
Landslide	Moderate	SLIDO	--	325	34,164,600	0	unknown
	High	SLIDO	--	109	113,882,200	0	unknown
Wildland Fire	Moderate	OR Risk Explorer	--	40	4,208,082	--	unknown
	High	OR Risk Explorer	--	153	16,095,916	--	unknown
	Very High	OR Risk Explorer	--	192	20,152,000	3	unknown
	Extreme	Extreme fuel rank	--	24	2,524,848	0	unknown
Earthquake	Strong	OR HazVu	1,388	433	45,552,858	14	unknown
	Very strong	OR HazVu	--	0	--	0	unknown
	Severe	OR HazVu	--	0	--	0	unknown
Volcano		descriptive	1388	433	45,552,858	14	unknown
Wind		descriptive	1,388	433	45,552,858	14	unknown
Erosion		within 300' of potential areas of erosion	--	7	736,414	unknown	unknown

¹ Average insured structural value of all residential buildings (including single-family dwellings, mobile homes, etc., is \$172,500 per structure).

Mist-Birkenfeld RFPD Annex

Table 10. Mist-Birkenfeld Potential Hazard Exposure Analysis Overview
Critical Facilities

			Government		Emergency Response		Educational		Care		Community	
Hazard Type	Hazard Area	Methodology	No.	\$	No.	\$	No.	\$	No.	\$	No.	\$
Flood	Moderate	500-year floodplain	--	--	--	--	1	500K	--	--	--	--
	High	100-year floodplain	--	--	2	167K	--	--	--	--	1	167K
Winter Storm	Moderate		1	75K	5	1.5M	1	500K	--	--	2	300K
Landslide	Moderate	SLIDO	--	--	1	93K	--	--	--	--	--	--
	High	SLIDO	--	--	1	93K	--	--	--	--	--	--
Wildland Fire	Moderate	Moderate fuel rank	--	--	--	--	1	500K	--	--	1	150K
	High	High fuel rank	--	--	1	93K	--	--	--	--	--	--
	Very High	Very high fuel rank	--	--	--	--	--	--	--	--	--	--
	Extreme	Extreme fuel rank	--	--	--	--	--	--	--	--	--	--
Earthquake	Strong	OR HazVu	--	--	1	78.1K	1	500K	--	--	2	300K
	Very strong	OR HazVu	--	--	2	169K	--	--	--	--	--	--
	Severe	OR HazVu	--	--	2	1.3M	--	--	--	--	--	--
Volcano	Moderate		--	--	2	1.3M	1	500K	--	--	2	300K
Wind	Moderate		1	75K	2	1.3M	1	500K			2	300K
Erosion		within 300' of potential areas of erosion	--	--	1	75K	--	--	--	--	--	--

Table 11. Mist-Birkenfeld RFPD Potential Hazard Exposure Analysis Overview
Critical Infrastructure

			Highways		Railroads		Bridges		Transportation Facilities		Utilities		Dams	
Hazard Type	Hazard Area	Methodology	Miles	Value (\$) ¹	Miles	Value (\$) ¹	No.	Value (\$) ¹	No.	Value (\$) ¹	No.	Value (\$) ¹	No.	Value (\$) ¹
Flood	Moderate	500-year floodplain	13	--	--	--	9	State	--	--	--	--	--	--
	High	100-year floodplain	13	--	--	--	9	State	--	--	--	--	--	--
Winter Storm	Moderate		28	--	--	--	9	State	--	--	1	4.5M	--	--
Landslide	Moderate	SLIDO	28	--	--	--	9	State	--	--	--	--	--	--
	High	SLIDO	28	--	--	--	9	State	--	--	--	--	--	--
Wildland Fire	Moderate	OR Risk Explorer	--	--	--	--	--	--	--	--	--	--	--	--
	High	OR Risk Explorer	--	--	--	--	--	--	--	--	--	--	--	--
	Very High	OR Risk Explorer	--	--	--	--	--	--	--	--	--	--	--	--
	Extreme	OR Risk Explorer	--	--	--	--	--	--	--	--	--	--	--	--
Earthquake	Strong	OR HazVu	28	--	--	--	9	State	--	--	1	4.5M	--	--
	Very strong	OR HazVu	28	--	--	--	9	State	--	--	1	4.5M	--	--
	Severe	OR HazVu	28	--	--	--	9	State	--	--	1	4.5M	--	--
Volcano	Moderate	descriptive	--	--	--	--	--	--	--	--	1	4.5M	--	--
Wind	Moderate	descriptive	--	--	--	--	--	--	--	--	--	--	--	--
Erosion		within 300' of potential areas of erosion	--	--	--	--	--	--	--	--	--	--	--	--

Mitigation Strategy

The following section defines mitigation action identification and analysis as stipulated in DMA 2000 and its implementing regulations.

DMA 2000 Requirements: Mitigation Strategy	
Planning Requirements	
§201.6(c)(3)	The plan shall include the following:] A mitigation strategy that provides the jurisdiction’s blueprint for reducing the potential losses identified in the risk assessment, based on existing authorities, policies, programs, and resources, and its ability to expand on and improve these existing tools.
§201.6(c)(3)(i)	The hazard mitigation strategy shall include a] description of mitigation goals to reduce or avoid long-term vulnerabilities to the identified hazards.
§201.6(c)(3)(ii)	The hazard mitigation strategy shall include a] section that identifies and analyzes a comprehensive range of specific mitigation actions and projects being considered to reduce the effects of each hazard, with particular emphasis on new and existing buildings and infrastructure. All plans approved by FEMA after October 1, 2008, must also address the jurisdiction’s participation in the NFIP, and continued compliance with NFIP requirements, as appropriate.
§201.6(c)(3)(iii)	The hazard mitigation strategy shall include an] action plan, describing how the action identified in paragraph (c)(3)(ii) of this section will be prioritized, implemented, and administered by the local jurisdiction. Prioritization shall include a special emphasis on the extent to which benefits are maximized according to a cost benefit review of the proposed projects and their associated costs.
§201.6(c)(3)(iv)	For multi-jurisdictional plans, there must be identifiable action items specific to the jurisdiction requesting FEMA approval or credit of the plan.
§201.6(c)(4)(ii)	The plan shall include a] process by which local governments incorporate the requirements of the mitigation plan into other planning mechanisms such as comprehensive or capital improvements, when appropriate.
Planning Elements	
C1. Does the plan document each jurisdiction’s existing authorities, policies, programs and resources, and its ability to expand on and improve these existing policies and programs? 44 CFR 201.6(c)(3)	
C2. Does the Plan address each jurisdiction’s participation in the NFIP and continued compliance with NFIP requirements, as appropriate? 44 CFR 201.6(c)(3)(ii)	
C3. Does the Plan include goals to reduce/avoid long-term vulnerabilities to the identified hazards? 44 CFR 201.6(c)(3)(i)	
C4. Does the Plan identify and analyze a comprehensive range of specific mitigation actions and projects for each jurisdiction being considered to reduce the effects of hazards, with emphasis on new and existing buildings and infrastructure? 44 CFR 201.6(c)(3)(ii) and 44 CFR 201.6(c)(3)(iv)	

C5. Does the Plan contain an action plan that describes how the actions identified will be prioritized (including cost benefit review), implemented, and administered by each jurisdiction? 44 CFR 201.6(c)(3)(iii) and 44 CFR (c)(3)(iv)

C6. Does the Plan describe a process by which local governments will integrate the requirements of the mitigation plan into other planning mechanisms, such as comprehensive or capital improvement plans, when appropriate? 44 CFR 201.6(c)(4)(ii)

Identify Mitigation Goals

Mist-Birkenfeld reviewed the Columbia County goals and determined they meet the City's needs and subsequently adopted the Goals in Table 12 for the current planning period.

Table 12. Mist-Birkenfeld RFPD Mitigation Goals	
Goal Number	Goal Description
1	Reduce the Threat to Life Safety Enhance life safety by minimizing the potential for deaths and injuries in future disaster events.
2	Protect Critical Facilities and Enhance Emergency and Essential Services • Implement activities or projects to protect critical facilities and infrastructure. • Seek opportunities to enhance, protect, and integrate emergency and essential services. • Strengthen emergency operations plans and procedures by increasing collaboration and coordination among public agencies, non-profit organizations, businesses, and industry.
3	Reduce the Threat to Property • Seek opportunities to protect, enhance and integrate emergency and essential services. • Strengthen emergency operations plans and procedures by increasing collaboration and coordination among public agencies, non-profit organizations, businesses, industries and the citizens of Mist-Birkenfeld RFPD.
4	Create a Disaster Resistant and Disaster-Resilient Economy • Develop and implement activities to protect economic well-being and vitality while reducing economic hardship in post disaster situations. • Reduce insurance losses and repetitive claims for chronic hazard events. • Work with State and Federal Partners to reduce short-term and long-term recovery and reconstruction costs. • Work with local and County organizations, such as Columbia Emergency Planning Association (CEPA). • Expedite pre-disaster and post-disaster grants and program funding.
5	Increase Public Awareness, Education, Outreach, and Partnerships • Coordinate and collaborate, where possible, risk reduction outreach efforts with the Oregon Partners for Disaster Resistance & Resilience and other public and private organizations. • Develop and implement risk reduction education programs to increase awareness among citizens, local, county, and regional agencies, non-profit organizations, businesses, and industry. • Promote insurance coverage for catastrophic hazards • Strengthen communication and coordinate participation in and between public agencies, citizens, nonprofit organizations, businesses, and industry.

Evaluate and Prioritize Mitigation Actions

Mitigation actions are activities, measures, or projects that help achieve the goals of a mitigation plan. Table 13 lists the mitigation actions developed during this mitigation planning process or offered during whole community planning activities. It is not intended that this plan will attempt

Mist-Birkenfeld RFPD Annex

to act on all of these action items, but the list will be maintained in order to provide documentation for future planning efforts.

Table 13 Mist-Birkenfeld RFPD Mitigation Actions Considered			
Hazard	Status	Comment	Description
<i>Multi-Hazard (MH)</i>			
MH	Consider		Develop, implement, and maintain jurisdictional debris management plans.
MH	Ongoing	Support County efforts	Develop and incorporate ordinances commensurate with development and building codes to reflect survivability from wind, seismic, fire, and other hazards to ensure occupant safety.
MH	Ongoing	Support County efforts	Review ordinances and develop outreach programs to assure manufactured homes and buildings are protected from severe wind and flood hazards. (Anchoring, elevation, and other methods as applicable)
MH	Ongoing	Support County efforts	Cross reference and incorporate mitigation planning provisions into all community planning processes such as comprehensive, capital improvement, land use, transportation plans, etc. to demonstrate multi-benefit considerations and facilitate using multiple funding source consideration.
MH	Ongoing		Purchase and install generators with main power distribution disconnect switches for identified and prioritized critical facilities susceptible to short term power disruption.
MH	Ongoing		Electronic surge protection devices on critical electronic components such as warning systems, communications equipment, and computers for critical facilities.
MH	Ongoing		Distribute information materials concerning mitigation, preparedness, and safety procedures for all natural hazards.
MH	Ongoing	Support County efforts	Explore the need for, develop, and implement hazard zoning ordinances for high-risk hazard area land-use.
MH	Consider		Retrofit structures to protect them from seismic, floods, high winds, earthquakes, or other natural hazards.
MH	Consider	Support County efforts	Acquire, demolish, or relocate structures from hazard prone area. Property deeds shall be

Table 13 Mist-Birkenfeld RFPD Mitigation Actions Considered			
Hazard	Status	Comment	Description
			restricted for open space uses in perpetuity to keep people from rebuilding in hazard areas.
MH	Consider		Harden utility headers located along river embankments to mitigate potential flood, debris, and erosion damages.
MH	Ongoing		Establish a formal role for the jurisdictional Hazard Mitigation Planning Committees to develop a sustainable process to implement, monitor, and evaluate citywide mitigation actions.
MH	Ongoing		Identify and pursue funding opportunities to implement mitigation actions.
MH	Ongoing		Develop public and private sector partnerships to foster hazard mitigation activities.
MH	Ongoing		Integrate the Mitigation Plan findings into planning and regulatory documents and programs and into enhanced emergency planning.
Flood			
Flood	Consider		Develop and maintain GIS mapped critical facility inventory for all structures located within 100-year and 500-year floodplains.
Flood	Consider		Develop and maintain GIS mapped inventory, and develop prioritized list of residential and commercial buildings within 100-year and 500-year floodplains.
Flood	Consider		Develop and maintain GIS mapped inventory of repetitive loss properties to include the types and numbers of properties.
Flood	Ongoing		Develop and implement mitigation actions for repetitive loss properties.
Flood	Ongoing		Establish flood mitigation priorities for critical facilities and residential and commercial buildings located within the 100- year floodplain using survey elevation data.
Flood	Ongoing		Implement mitigation measures identified by critical facilities' owners, and other facility owners, to protect facilities located within the 100-year floodplain.
Flood	Ongoing		Develop an outreach program to educate public concerning NFIP participation benefits, floodplain development, land use regulation,

Table 13 Mist-Birkenfeld RFPD Mitigation Actions Considered			
Hazard	Status	Comment	Description
			and NFIP flood insurance availability to facilitate continued compliance with the NFIP.
Flood	Ongoing		Develop, implement, and enforce floodplain management ordinances.
Flood	Consider		Acquire, relocate, elevate, or otherwise flood-proof critical facilities.
Flood	Ongoing		Develop, or revise, adopt, and enforce storm water ordinances and regulations to manage run-off from new development, including buffers and retention basins.
Flood	Ongoing		Create detention storage basins, ponds, reservoirs etc. to allow water to temporarily accumulate. Water ultimately returning to its watercourse at a reduced flow rate.
Flood	Ongoing		Provide flood protection to mitigate damage and contamination of wastewater systems.
Flood	Ongoing	Support County efforts	Develop and incorporate mitigation provisions and recommendations into zoning ordinances and community development processes to maintain the floodway and protect critical infrastructure and private residences from other hazard areas.
Flood	Ongoing		Identify and list repetitively flooded structures and infrastructures, analyze the threat to these facilities, and prioritize mitigation actions to acquire, relocate, elevate, and/or flood proof to protect the threatened population.
Flood	Ongoing	Support County efforts	Perform hydrologic and hydraulic engineering, and drainage studies and analyses. Use information obtained for feasibility determination and project design. This information should be a key component, directly related to a proposed project.
Winter Storm			
Winter Storms	Ongoing		Develop and implement programs to coordinate maintenance and mitigation activities to reduce risk to public infrastructure from severe winter storms.
Winter Storms	Ongoing		Develop critical facility list needing emergency back-up power systems, prioritize, seek funding and implement mitigation actions.
Winter Storms	Ongoing		Develop and maintain severe winter storm public outreach program defining mitigation

Table 13 Mist-Birkenfeld RFPD Mitigation Actions Considered			
Hazard	Status	Comment	Description
			activity benefits through educational outreach aimed at households and businesses while targeting of special needs populations.
Winter Storms	Ongoing	Support WOEC	Develop and implement tree clearing mitigation programs to keep trees from threatening lives, property, and public infrastructure from severe weather events.
Winter Storms	Ongoing		Develop, implement, and maintain partnership program with electrical utilities to use underground utility placement methods where possible to reduce or eliminate power outages from severe winter storms. Consider developing incentive programs.
Winter Storms	Ongoing		Develop early warning test program partnering with NOAA, City Police, Fire Departments, and Volunteer Fire Department to coordinate tests.
Winter Storms	Ongoing		Review critical facilities and government building energy efficiency, winter readiness, and electrical protection capability. Identify, prioritize, and implement infrastructure upgrade or rehabilitation project prioritization and development.
Landslide			
Landslide	Ongoing		Complete a landslide location inventory, identify threatened critical facilities and other buildings and infrastructure.
Landslide	Consider		Develop prioritized list of mitigation actions for threatened critical facilities and other buildings or infrastructure.
Landslide	Ongoing	Support County efforts	Develop process to limit future development in steep slope areas (permitting, geotechnical review, soil stabilization techniques, etc.).
Landslide	Ongoing		Update the storm water management plan to include regulations to control runoff, both for flood reduction and to minimize saturated soils on steep slopes that can cause landslides.
Landslide	Ongoing		Develop comprehensive geological landslide and rockslide prone area maps.
Landslide	Ongoing		Identify and seasonally restrict construction activities in steep slope areas.
Wildland Fire			

Table 13 Mist-Birkenfeld RFPD Mitigation Actions Considered			
Hazard	Status	Comment	Description
Wildland Fire	Ongoing		Identify critical facilities and vulnerable populations based on mapped high hazard areas.
Wildland Fire	Consider		Identify evacuation routes away from high hazard areas and develop outreach program to educate the public concerning warnings and evacuation procedures.
Wildland Fire	Ongoing		Develop Community Wildland Fire Protection Plans for all at-risk communities.
Wildland Fire	Ongoing		Hold FireWise workshop to educate residents and contractors concerning fire resistant landscaping.
Wildland Fire	Consider		Promote FireWise building siting, design, and construction materials.
Wildland Fire	Consider		Develop FireWise Public Service Announcements (PSA).
Wildland Fire	Ongoing		Provide wildland fire information in an easily distributed format for all residents.
Wildland Fire	Consider		Schedule and perform government facility "fire drills" at least twice per year.
Wildland Fire	Ongoing		Develop, adopt, and enforce burn ordinances that require burn permits, restricts campfires, and controls outdoor burning.
Wildland Fire	Consider	Support County efforts	Develop outreach program to educate and encourage fire-safe construction practices for existing and new construction in high risk areas.
Wildland Fire	Ongoing		Identify, develop, and implement, and enforce mitigation actions such as fuel breaks and reduction zones for potential wildland fire hazard areas.
Earthquake			
Earthquake	Consider		Supplement State Seismic Needs Analysis data (schools, fire, law enforcement). Complete inventory of public and commercial buildings that may be particularly vulnerable to earthquake damage.
Earthquake	Consider		Identify high seismic hazard areas; develop a wood-frame residential building inventory and an outreach program to educate population concerning facilities particularly vulnerable to earthquake damage, such as pre-1940s homes and homes with cripple wall foundations.

Table 13 Mist-Birkenfeld RFPD Mitigation Actions Considered			
Hazard	Status	Comment	Description
Earthquake	Consider		Disseminate FEMA pamphlets to educate and encourage homeowners concerning seismic structural and non-structural retrofit benefits.
Earthquake	Ongoing		Retrofit important public facilities with significant seismic vulnerabilities, such as unreinforced masonry construction.
Earthquake	Request		Retrofit bridges that are not seismically adequate for lifeline transportation routes.
Earthquake	Ongoing		Update existing (or adopt the most current) Uniform Building Code
Earthquake	Ongoing		Implement and enforce the Uniform, International, and State Building Codes.
Earthquake	Ongoing		Inspect and/or certify all new construction.
Earthquake	Ongoing		Develop outreach program to educate residents concerning benefits of increased seismic resistance and modern building code compliance during rehabilitation or major repairs for residences or businesses.
Earthquake	Ongoing		Inspect, prioritize, and retrofit any critical facility or public infrastructure that does not meet current Building Codes.
Earthquake	Ongoing		Evaluate critical public facility seismic performance for fire stations, public works buildings, potable water systems, wastewater systems, electric power systems, and bridges within the jurisdiction.
Earthquake	Consider		Develop outreach program for educating private facility owners/operators concerning alternative or emergency power source acquisition to enable them to deliver food, fuel, and medical services during disaster emergency response and recovery efforts.
Earthquake	Ongoing		Encourage utility companies to evaluate and harden vulnerable infrastructure elements for sustainability.
Earthquake	Ongoing		Develop partnerships to mitigate hazards that result in jurisdictional facility lifeline or emergency transportation route closures.
Volcano			
Volcano	Consider		Update public emergency notification procedures and develop an outreach program for ash fall events.

Table 13 Mist-Birkenfeld RFPD Mitigation Actions Considered			
Hazard	Status	Comment	Description
Volcano	Consider		Update emergency response planning and develop client focused outreach program for ash fall events affecting river, air, and highway transportation, and industrial facilities and operations.
Volcano	Consider		Evaluate ash impact on storm water drainage system and develop mitigation actions.
Wind			
Wind	Ongoing		Review ordinances and develop outreach programs to assure manufactured buildings are protected from severe wind and flood hazards. (Anchoring, elevation, siting, and other methods as applicable)
Wind	Consider		Identify and prioritize critical facilities' overhead utilities that could be placed underground to reduce power disruption from wind storm / tree blow down damage.
Wind	Ongoing		Revise requirements to place utilities underground to reduce power disruption from wind storm / tree blow down damage when upgrading or during new development.
Wind	Ongoing		Increase power line wire size and incorporate quick disconnects (break away devices) to reduce ice load power line failure during severe wind or winter ice storm events.
Erosion			
Erosion	Consider		Maintain and update erosion hazard locations, identify critical facilities potentially impacted and develop and implement mitigation initiatives such as bank stabilization or facility relocation to prevent or reduce the threat.
Erosion	Consider		Apply for grants/funds to implement riverbank protection methods.
Erosion	Consider		Periodically provide available information to residents on riverbank erosion and methods to prevent it in an easily distributed format.
Erosion	Consider		Install riprap, or pilings to harden or "armor" a stream bank where severe erosion occurs.
Erosion	Consider		Install bank protection such as rock, concrete, asphalt, vegetation, or other armoring or protective materials to provide river bank protection.

Table 13 Mist-Birkenfeld RFPD Mitigation Actions Considered			
Hazard	Status	Comment	Description
Erosion	Ongoing		Harden culvert entrance with asphalt, concrete, rock, to reduce erosion or scour.
Erosion	Ongoing		Construct a structure to dissipate energy or reduce flow velocity to prevent erosion of the streambed and banks.

Mitigation Action Plan

The Steering Committee has evaluated and prioritized each of the considered mitigation actions to determine which would be included in the Mitigation Action Plan. The Committee then determined the responsible agency and potential funding sources. The Mitigation Action Plan represents mitigation projects and programs to be implemented through the cooperation of multiple entities.

Upon review, the Steering Committee assigned a high priority ranking to actions that best fulfill the goals of the HMP which are appropriate and feasible for Mist-Birkenfeld RFPD and responsible entities to implement during the 5-year lifespan of this version of the HMP. As such, the Steering Committee determined that only the mitigation actions that received a high priority ranking would be included in the Mitigation Action Plan.

Table 14. Mist-Birkenfeld RFPD Mitigation Action Plan Matrix					
Hazard	Description	Managing Department / Agency	Timeframe	Potential Funding Source(s)	Benefit-Costs / Technical Feasibility
Multi-Hazard (MH)					
MH	Maintain previously installed generator system. Purchase portables for deployment as needed.	Fire District	Completed	General fund	BC: TBD TF: Yes
MH	Electronic surge protection devices on critical electronic components such as warning systems, communications equipment, and computers for critical facilities.	Fire District	Completed	General Fund	BC: TBD TF: Yes
MH	Interface with EOC to develop and implement incident specific temporary debris management plans.	Fire District	1-3 yrs	General Fund	BC: TBD TF: Yes

Mist-Birkenfeld RFPD Annex

Table 14. Mist-Birkenfeld RFPD Mitigation Action Plan Matrix					
Hazard	Description	Managing Department / Agency	Timeframe	Potential Funding Source(s)	Benefit-Costs / Technical Feasibility
MH	Develop and implement strategies and educational outreach programs for debris management.		1-3 yrs (Plan) 3-5 (outreach)	General Fund	BC: TBD TF: Yes
MH	Cross reference and incorporate mitigation planning provisions into district planning processes such as capital improvement, to demonstrate multi-benefit considerations and facilitate using multiple funding source consideration.	Fire District	1-5 yrs	General Fund	BC: TBD TF: Yes
MH	Update public emergency notification procedures and develop an outreach program for all emergencies	Fire District	3-5 years	General Fund	BC: TBD TF: Yes
Flood					
Flood	Update public emergency notification procedures and develop an outreach program for flood emergencies	Fire District	3-5 years	General Fund	BC: TBD TF: Yes
Winter Storm					
Winter Storm	Develop and implement programs to coordinate maintenance and mitigation activities to reduce public infrastructure from severe winter storms.	Fire District	Ongoing	General Fund	BC: TBD TF: Yes
Winter Storm	Review critical facilities and government building energy efficiency, winter readiness, and electrical protection capability. Identify, prioritize, and implement infrastructure upgrade or rehabilitation project prioritization and development.	Fire District	Ongoing	General Fund, HMGP	BC: TBD TF: Yes
Landslide					
Landslide	Support County Planning's efforts to avoid construction in slide prone areas	Fire District	Completed	General Fund	BC: TBD TF: Yes
Wildland Fire					
Wildland Fire	Develop Community Wildland Fire Protection Plan	Fire District	Ongoing	General Fund, FMAP	BC: TBD TF: Yes

Table 14. Mist-Birkenfeld RFPD Mitigation Action Plan Matrix					
Hazard	Description	Managing Department / Agency	Timeframe	Potential Funding Source(s)	Benefit-Costs / Technical Feasibility
Wildland Fire	Provide wildland fire information in an easily distributed format for all residents.	Fire District	Ongoing	General Fund, FMAP	BC: TBD TF: Yes
Wildland Fire	Develop, adopt, and enforce burn ordinances that require burn permits, restricts campfires, and controls outdoor burning.	Fire District	Ongoing	General Fund	BC: TBD TF: Yes
Earthquake					
EQ	Identify, evaluate, and prioritize critical public facilities' seismic performance.	Fire District	3-5 yrs	General Fund	BC: TBD TF: Yes
Volcano					
Volcano	Evaluate ash impact on Emergency response facilities and plan for mitigation.	Fire District	3-5 yrs	General Fund	BC: TBD TF: Yes
Wind					
Wind	Identify and prioritize critical facilities' overhead utilities that could be placed underground to reduce power disruption from wind storm / tree blow down damage.	Fire District	Completed	General Fund, Utility Co., HMGP, PDM	BC: TBD TF: Yes
Erosion					
Erosion	Maintain and update erosion hazard locations, identify critical facilities potentially impacted and develop and implement mitigation initiatives	Fire District	3-5 yrs	General Fund, HMGP, PDM	BC: TBD TF: Yes
Erosion	Periodically provide available information to residents on riverbank erosion and methods to prevent it in an easily distributed format.	Fire District	3-5 yrs	General Fund	BC: TBD TF: Yes

Plan Adoption and Maintenance

The following section provides documentation of the formal adoption of this annex by the governing board of the district or the city council/county commission of the jurisdiction. It also identifies the standing committee that will be responsible for future reviews between update periods.

DMA 2000 Requirements: Plan Review, Evaluation, Implementation, and Adoption	
Planning Requirements	
§201.6(d)(3)	A local jurisdiction must review and revise its plan to reflect changes in development, progress in local mitigation efforts, and changes in priorities, and resubmit if for approval within 5 years in order to continue to be eligible for mitigation project grant funding.
§201.6(c)(5)	The plan shall include...] Documentation that the plan has been formally adopted by the governing body of the jurisdiction requesting approval of the plan (e.g., City Council, County commissioner, Tribal Council). For multi-jurisdictional plans, each jurisdiction requesting approval of the plan must document that it has been formally adopted.
Planning Elements	
D1. Was the plan revised to reflect changes in development? 44 CFR 201.6(d)(3) D2. Was the plan revised to reflect progress in local mitigation efforts? 44 CFR 201.6(d)(3) D3. Was the plan revised to reflect changes in priorities? 44 CFR 201.6(d)(3) E1. Does the Plan include documentation that the plan has been formally adopted by the governing body of the jurisdiction requesting approval? 44 CFR 201.6(c)(5) E2. For multi-jurisdictional plans, has each jurisdiction requesting approval of the plan documented formal plan adoption? 44 CFR 201.6(c)(5)	

Resolution of Adoption

(Example) BEFORE THE BOARD OF COUNTY COMMISSIONERS FOR COLUMBIA COUNTY, OREGON

In the Matter of Adopting the 2014) Columbia County Multi-Jurisdictional) RESOLUTION NO. 40-2014 Hazard
Mitigation Plan Update)

WHEREAS, Columbia County, Oregon has experienced repetitive disasters that have
damaged commercial, residential and public properties, displaced citizens and businesses, and
presented general public health and safety concerns; and

WHEREAS, Columbia County has prepared a Multi-Jurisdictional Hazard Mitigation Plan that outlines the options to
reduce overall damage and impact from natural hazards; and

WHEREAS, the Multi-Jurisdictional Hazard Mitigation Plan has been reviewed by community residents, business
owners, and federal, state and local agencies, and has been revised to reflect their concerns;

NOW, THEREFORE, BE IT RESOLVED that:

1. 1. The Multi-Jurisdictional Hazard Mitigation Plan is hereby adopted as an official plan of Columbia County.
2. 2. A Hazard Mitigation Planning Group is hereby established as a permanent advisory body. The Hazard Mitigation
Planning Coordinator shall designate its members, subject to the approval of the County and the
participating jurisdictions. They shall serve one-year terms. The group's duties shall be as
designated in the Hazard Mitigation Plan.
3. 3. The Hazard Mitigation Planning Coordinator is charged with supervising the
implementation of the Plan's recommendations within the funding limitations as provided by Columbia
County or other sources.
4. 4. The Hazard Mitigation Planning Coordinator shall give priority attention to the goals identified in Table A-13 of the
Columbia County Appendix, and the actions listed in Table A-14 of the Columbia County Appendix
to the Hazard Mitigation Plan and;
5. 5. The Hazard Mitigation Planning Coordinator shall convene the hazard mitigation planning group annually. The
planning group shall monitor implementation of the plan and shall submit an annual review
worksheet to the Board of County Commissioners in accordance with the following format:
 - a. A review of the original plan.
 - b. A review of any disasters or emergencies that occurred during the previous calendar year.
 - c. A review of the actions taken, including what was accomplished during the previous year.
 - d. A discussion of any implementation problems.
 - e. Recommendations for new projects or revised action items. Such recommendations shall be subject to approval
by the Columbia County.

Dated this 27th day of August, 2014.

BOARD OF COUNTY COMMISSIONERS FOR COLUMBIA COUNTY, OREGON

By: _____ Anthony Hyde, Chair

By: _____ Henry Heimuller, Commissioner

By: _____ Earl Fisher, Commissioner

Standing Review Committee

The following table identifies the members of the Standing committee that will meet quarterly to review the HMP annex and provide a running update.

Table 15. Mist-Birkenfeld RFPD Standing Hazard Mitigation Committee	
Name	Agency/Department/Affiliation
Joe Kaczinski	Fire Chief
Don Beck	Deputy Chief
Mary Lou Busch	Vol. Asst. Chief
Ann Berg	Division Chief, EMS
Larry Boxman	Paramedic

City of Prescott
Hazard Mitigation Plan
Annex

2020 Update
Columbia County
Multi-Jurisdiction Hazard Mitigation Plan

Contents

Introduction	3
Planning Process and Capability Assessment	3
DMA 2000 Requirements: Planning Process	3
Steering Committee Participants	4
Public Participation.....	4
Capability Assessment	7
Hazard Identification and Vulnerability Assessment	10
DMA 2000 Requirements: Hazard Identification and Risk Assessment	10
Hazard Identification	10
Values at Risk.....	11
Population Analysis	13
Asset Inventory.....	14
National Flood Insurance Policy	15
Vulnerability Analysis	15
Impacts of Identified Hazards.....	11
Flood.....	11
Winter Storm.....	11
Landslide	11
Wildland Fires.....	12
Earthquake	12
Volcano.....	12
Wind	13
Erosion.....	13
Dam Failure	Error! Bookmark not defined.
Disruption of Utility and Transportation Systems	Error! Bookmark not defined.
Hazardous Material Event	Error! Bookmark not defined.
Terrorism	Error! Bookmark not defined.
Infectious Disease Epidemic.....	Error! Bookmark not defined.
Mitigation Strategy.....	20
DMA 2000 Requirements: Mitigation Strategy	20

Identify Mitigation Goals	21
Evaluate and Prioritize Mitigation Actions	21
Mitigation Action Plan	29
Plan Adoption and Maintenance	33
DMA 2000 Requirements: Plan Review, Evaluation, Implementation, and Adoption...	33
Resolution of Adoption.....	34
Standing Review Committee	35

Introduction

This Annex contains specific City of Prescott information to support the Columbia County 2020 Multi-Jurisdictional Hazard Mitigation Plan. This section further supports the County's planning process by summarizing the review and incorporation of existing plans, studies, and reports used to develop this MHMP. This annex is an addition to Columbia County's Hazard Mitigation Plan and shares attributes of that plan.

Planning Process and Capability Assessment

The following section includes a detailed capability assessment that describes the resources available to support this plan. The goal of this assessment is not to identify all capabilities the organization may have, but only those that are currently used or could be used to support mitigation efforts. Capabilities are arranged in tables by type and fall under the explicit authority of the jurisdiction/district.

DMA 2000 Requirements: Planning Process	
Planning Requirements	
§201.6(b)	An open public involvement process is essential to the development of an effective plan. In order to develop a more comprehensive approach to reducing the effects of natural disasters, the planning process shall include:
§201.6(b)(1)	(1) An opportunity for the public to comment on the plan during the drafting stage and prior to plan approval;
§201.6(b)(2)	(2) An opportunity for neighboring communities, local and regional agencies involved in hazard mitigation activities, and agencies that have the authority to regulate development, as well as businesses, academia and other private and non-profit interests to be involved in the planning process; and
§201.6(b)(3)	(3) Review and incorporation, if appropriate, of existing plans, studies, reports, and technical information.
§201.6(c)(1)	[The plan shall document] the planning process used to develop the plan, including how it was prepared, who was involved in the process, and how the public was involved.
§201.6(c)(4)(i)	[The plan maintenance process shall include a] section describing the method and schedule of monitoring, evaluating, and updating the mitigation plan within a five-year cycle.
§201.6(c)(4)(iii)	[The plan maintenance process shall include a] discussion on how the community will continue public participation in the plan maintenance process.
Planning Elements	
A1. Does the Plan document the planning process, including how it was prepared and who was involved in the process for each jurisdiction? 44 CFR 201.6(c)(1)	

A2. Does the Plan document an opportunity for neighboring communities, local and regional agencies involved in hazard mitigation activities, agencies that have the authority to regulate development as well as other interests to be involved in the planning process? 44 CFR 201.6(b)(2)

A3. Does the Plan document how the public was involved in the planning process during the drafting stage? 44 CFR 201.6(b)(1) and 201.6(c)(1)

A4. Does the Plan document the review and incorporation of existing plans, studies, reports, and technical information? 44 CFR 201.6(b)(3)

A5. Is there discussion on how the communities will continue public participation in the plan maintenance process? 44 CFR 201.6(c)(4)(iii)

A6. Is there a description of the method and schedule for keeping the plan current (monitoring, evaluating and updating the mitigation plan within a 5-year cycle)? 44 CFR 201.6(c)(4)(i)

Steering Committee Participants

City of Prescott is dedicated to mitigating potential natural hazards to its population and infrastructure. To fulfill that goal, a Hazard Mitigation Plan Development Steering Committee was seated; dedicated to identifying hazard threats and developing actions to mitigate damage and life losses from those threats.

Table 1 records the Steering Committee's participant list.

Table 1. City of Prescott Steering Committee	
Name	Agency/Department/Affiliation
Joyce Rivas	Mayor
Karlyn Gedrose	Prescott City Recorder
Frank Oliver	Prescott City Council
James Larson	Prescott City Council
Michael Blair	Prescott City Council
Keli Von Pinnon	Prescott City Treasurer

Public Participation

As defined by FEMA, Whole Community Planning is; a means by which residents, emergency management practitioners, organizational and community leaders, and government officials can collectively understand and assess the needs of their respective communities and determine the best ways to organize and strengthen their assets, capacities, and interests. By doing so, a more effective path to societal security and resilience is built.

This Hazard Mitigation Plan was conducted with opportunities for the public to participate to try and meet the goals of whole community planning. Table 2 highlights these efforts.

Table 2. Public Involvement Mechanisms	
Date	Description
2014	
7/19/2014	Columbia Emergency Preparedness Association EXPO – Large emergency management event covering all topics (preparedness, fire, law, mitigation, response).
11/11/2014	HSEMC – Columbia County’s Homeland Security and Emergency Management Commission is recognized by the Board of County Commissioners as the cornerstones of a whole community approach to emergency management planning. All jurisdictions are members of the commission. Semi Annual NHMP meeting, plan review was conducted.
2015	
5/12/2015	HSEMC – Columbia County’s Homeland Security and Emergency Management Commission is recognized by the Board of County Commissioners as the cornerstones of a whole community approach to emergency management planning. All jurisdictions are members of the commission. Semi Annual NHMP meeting, plan review was conducted.
11/10/2015	HSEMC – Columbia County’s Homeland Security and Emergency Management Commission is recognized by the Board of County Commissioners as the cornerstones of a whole community approach to emergency management planning. All jurisdictions are members of the commission. Semi Annual NHMP meeting, plan review was conducted.
2016	
4/2/2016	KOHI Radio Preparedness Talk – Radio talk show for Columbia County, topics “specifically included preparing for the next flood event”.
5/10/2016	HSEMC – Columbia County’s Homeland Security and Emergency Management Commission is recognized by the Board of County Commissioners as the cornerstones of a whole community approach to emergency management planning. All jurisdictions are members of the commission. Semi Annual NHMP meeting, plan review was conducted.
6/4/2016	Ford Family Foundation Preparedness Fair - County wide event to promote preparedness and mitigation in cooperation with the Ford Family Foundation. All cities participated.
7/23/2016	Columbia Emergency Preparedness Association EXPO – Large emergency management event covering all topics (preparedness, fire, law, mitigation, response).

Table 2. Public Involvement Mechanisms	
Date	Description
9/22/2016	Columbia County Soil and Water Conservation District – Event hosted by SWCD on preparedness and flood mitigation efforts.
11/15/2016	HSEMC – Columbia County’s Homeland Security and Emergency Management Commission is recognized by the Board of County Commissioners as the cornerstones of a whole community approach to emergency management planning. All jurisdictions are members of the commission. Semi Annual NHMP meeting, plan review was conducted.
2017	
5/9/2017	HSEMC – Columbia County’s Homeland Security and Emergency Management Commission is recognized by the Board of County Commissioners as the cornerstones of a whole community approach to emergency management planning. All jurisdictions are members of the commission. Semi Annual NHMP meeting, plan review was conducted.
11/14/2017	HSEMC – Columbia County’s Homeland Security and Emergency Management Commission is recognized by the Board of County Commissioners as the cornerstones of a whole community approach to emergency management planning. All jurisdictions are members of the commission. Semi Annual NHMP meeting, plan review was conducted.
11/29/2017	Unprepared showing – St. Helens - presentation of OPB documentary regarding CSZ earthquake and tsunami.
2018	
1/19/2018	Preparedness to Vets Group – Presentation to Veterans regarding personal preparedness and flood mitigation.
5/8/2018	HSEMC – Columbia County’s Homeland Security and Emergency Management Commission is recognized by the Board of County Commissioners as the cornerstones of a whole community approach to emergency management planning. All jurisdictions are members of the commission. Semi Annual NHMP meeting, plan review was conducted and plans for plan update discussed.
11/13/2018	HSEMC – Columbia County’s Homeland Security and Emergency Management Commission is recognized by the Board of County Commissioners as the cornerstones of a whole community approach to emergency management planning. All jurisdictions are members of the commission. Semi Annual County-wide Hazard Mitigation meeting. Work Session on Hazard Mitigation Plan update conducted.
11/27/2018	Pints and Preparedness – various topics including Hazard mitigation, and individual preparedness.
2019	

Table 2. Public Involvement Mechanisms	
Date	Description
1/22/2019	Pints and Preparedness – various topics including Hazard mitigation, and individual preparedness.
3/26/2019	Pints and Preparedness – various topics including Hazard mitigation, and individual preparedness.
5/7/2019	HSEMC – Columbia County’s Homeland Security and Emergency Management Commission is recognized by the Board of County Commissioners as the cornerstones of a whole community approach to emergency management planning. All jurisdictions are members of the commission. Semi Annual County-wide Hazard Mitigation meeting. Work Session on Hazard Mitigation Plan update conducted.
4/23/2019	Pints and Preparedness – various topics including Hazard mitigation, and individual preparedness.
9/7/2019	Preparedness for Scouts – Presentation on preparedness for all hazards.

Capability Assessment

Table 3, 4, and 5 contain the City of Prescott resources used to support planning activities, including the reports and studies reviewed as part of the update process.

Table 3. City of Prescott Legal and Regulatory Resources Available for Hazard Mitigation		
Regulatory Tool	Name	Effect on Hazard Mitigation
Plans	Development / Land Use Plan	City of Prescott has had an active Land Use Plan since the mid 1970’s
Programs	National Flood Insurance Program (NFIP)	Makes affordable flood insurance available to homeowners, business owners, and renters in participating communities. In exchange, those communities must adopt and enforce minimum floodplain management regulations to reduce the risk of damage from future floods.
Policies (Municipal Codes)	Land Use Ordinance	The City of Prescott has land use ordinances and incorporates the County ordinances into the City’s land use planning
	Zoning and Planning	The City of Prescott has zoning and planning ordinances
	Building Codes	The City of Prescott has adopted and enforces the Columbia County and State of Oregon Building codes.

Table 4. City of Prescott Administrative and Technical Resources for Hazard Mitigation

Staff/Personnel Resources	Department/Division Position
Planner(s) or engineer(s) with knowledge of land development and land management practices	Contract Planner Contract Engineer
Engineer(s) or professional(s) trained in construction practices related to buildings and/or infrastructure	Contract Engineer
Planner(s) or engineer(s) with an understanding of manmade or natural hazards	Contract Planner Contract Engineer
Floodplain manager	City of Prescott mayor in conjunction with the Columbia County floodplain manager
Personnel skilled in GIS and/or HAZUS-MH	no
Director of Emergency Services	City of Prescott mayor (will defer to Columbia County in the event of major disaster)
Finance (grant writers, purchasing)	City of Prescott Treasurer
Public Information Officers	City of Prescott Mayor

Table 5. City of Prescott Financial Resources for Hazard Mitigation

Financial Resources	Effect on Hazard Mitigation
General funds	yes
Authority to levy taxes for specific purposes	yes, with voter approval (W/Measure 5 cap)
Incur debt through general obligation bonds	no
Incur debt through special tax and revenue bonds	yes, with voter approval
Incur debt through private activity bonds	yes
Hazard Mitigation Grant Program (HMGP)	FEMA funding which is available to local communities after a Presidentially-declared disaster. It can be used to fund both pre- and post-disaster mitigation plans and projects.
Pre-Disaster Mitigation (PDM) grant program	FEMA funding which is available on an annual basis. This grant can only be used to fund pre-disaster mitigation plans and projects only.
Flood Mitigation Assistance (FMA) grant program	FEMA funding which is available on an annual basis. This grant can be used to mitigate repetitively flooded structures and infrastructure to protect repetitive flood structures.
United States Fire Administration (USFA) Grants	The purpose of these grants is to assist state, regional, national or local organizations to address fire prevention and safety. The primary goal is to reach high-risk target groups including children, seniors and firefighters.
Fire Mitigation Fees	Used to finance future fire protection facilities' construction and other fire capital expenditures to protect new development. The City Council or Fire District may charge fire mitigation fees to ensure new

Table 5. City of Prescott Financial Resources for Hazard Mitigation	
Financial Resources	Effect on Hazard Mitigation
	development pays their fair share of constructing these improvements.

Hazard Identification and Vulnerability Assessment

DMA 2000 Requirements: Hazard Identification and Risk Assessment	
Planning Requirements	
§201.6(c)(2)(i)	The risk assessment shall include a] description of the type, location and extent of all-natural hazards that can affect the jurisdiction. The plan shall include information on previous occurrences of hazard events and on the probability of future hazard events.
§201.6(c)(2)(ii)	The risk assessment shall include a] description of the jurisdiction's vulnerability to the hazards described in paragraph (c)(2)(i) of this section. This description shall include an overall summary of each hazard and its impact on the community. All plans approved after October 1, 2008 must also address NFIP insured structures that have been repetitively damaged by floods. The plan should describe vulnerability in terms of:
§201.6(c)(2)(ii)(A)	(A) The types and numbers of existing and future buildings, infrastructure, and critical facilities located in the identified hazard areas;
§201.6(c)(2)(ii)(B)	(B) An estimate of the potential dollar losses to vulnerable structures identified in ... this section and a description of the methodology used to prepare the estimate.
§201.6(c)(2)(ii)(C)	(C) Providing a general description of land uses and development trends within the community so that mitigation options can be considered in future land use decisions.
§201.6(c)(2)(iii)	For multi-jurisdictional plans, the risk assessment section must assess each jurisdiction's risks where they vary from the risks facing the entire planning area.
Planning Elements	
B1. Does the Plan include a description of the type, location, and extent of all-natural hazards that can affect each jurisdiction? 44 CFR 201.6(c)(2)(i) and 44 CFR 201.6(c)(2)(iii)	
B2. Does the Plan include information on previous occurrences of hazard events and on the probability of future hazard events for each jurisdiction? 44 CFR 201.6(c)(2)(i)	
B3. Is there a description of each identified hazard's impact on the community as well as an overall summary of the community's vulnerability for each jurisdiction? 44 CFR 201.6(c)(2)(ii)	
B4. Does the Plan address NFIP insured structures within each jurisdiction that have been repetitively damaged by floods? 44 CFR 201.6(c)(2)(ii)	

Hazard Identification

The Steering Committee determined that the following hazards could potentially threaten the community. Table 6 establishes the hazard profile against which this plan is designed.

Table 6. Hazard Profile	
Natural Hazards	
Flood	X
Winter Storm	X
Landslide	X
Fire (Wildland/Urban)	X
Earthquake	X
Volcano	X
Wind	X
Erosion	
ENSO (El Niño / La Niña)	
Expansive Soils	
Drought	

Specific Impacts of Identified Hazards

The following section provides specific details of the vulnerabilities and impacts from natural hazards for the City of Prescott in addition to technological and manmade hazards identified in Table 6.

The Basic Plan of this Multi-Jurisdiction Hazard Mitigation Plan contains the full narrative Hazard Profile for the entire county, including full details for this annex. This section is designed to provide additional notes and concerns regarding hazards that can impact this jurisdiction.

Flood

FEMA FIRMs were used to outline the 100-year and 500-year floodplains for City of Prescott. The 100-year floodplain delineates an area of high risk, while the 500-year floodplain delineates an area of moderate risk.

Winter Storm

The natural hazards resulting from winter storms, such as ice, cold, wind and floods, are often widespread. A single event is capable of impacting all people, critical facilities and infrastructure within City of Prescott, and therefore the entire population is at risk.

Landslide

The potential impacts from landslides can be widespread. Potential debris flows, and landslides can impact transportation and rail routes, utility systems, and water and waste treatment infrastructure along with public, private, and business structures located adjacent to steep slopes, along riverine embankments, or within alluvial fans or natural drainages. Response and

recovery efforts will likely vary from minor cleanup to more extensive utility system rebuilding. Utility disruptions are usually local and terrain dependent. Damages may require reestablishing electrical, communication, and gas pipeline connections occurring from specific breakage points. Initial debris clearing from emergency routes and high traffic areas may be required. Water and waste-water utilities may need treatment to quickly improve water quality by reducing excessive water turbidity and reestablishing waste disposal capability.

USGS elevation datasets were used to determine the landslide hazard areas within the City of Prescott. Risk was assigned based on slope angle. A slope angle less than 14 degrees was assigned a low risk, a slope angle between 14 and 32 degrees was assigned a medium risk, and a slope angle greater than 32 degrees was assigned a high risk.

Wildland Fires

Wildland fire hazard areas were identified using a model incorporating slope, aspect, and fuel load. South-facing, steep, and heavily vegetated areas were assigned the highest fuel values while areas with little slope and natural vegetation were assigned the lowest fuel values. Risk levels of moderate, high, very high, and extreme were assigned to the entire region based on the results of this modeling.

Earthquake

Based on PGA shake maps produced by the USGS, the western portion of Columbia County is likely to experience higher levels of shaking than the eastern portion, as a result of its proximity to the Cascadia Subduction Zone. Ground movement in both areas, however, is likely to cause damage to weak, unreinforced masonry buildings, and to induce small landslides along unstable slopes. As well as landslide, earthquakes can trigger other hazards such as dam failure and disruption of transportation and utility systems.

The eastern portion of Columbia County is likely to experience strong shaking should a subduction zone earthquake occur (9-20 percent of the acceleration of gravity). In contrast, the far western portion of the county is likely to experience very strong shaking (20-25 percent). This rating represents the peak acceleration of the ground caused by the earthquake.

Volcano

A volcanic eruption would have a minor impact on the City of Prescott due to the proximity to volcanoes within the Cascade region. The major resources of concern include air quality and waterway sedimentation. During previous eruptions, ashfall has drifted to the east of the volcanoes. (State Interagency Hazard Mitigation Team 2006)

The City of Prescott will likely only experience damage from volcanic eruption columns and clouds which contain volcanic gases, minerals, and rock. The columns and clouds form rapidly and extend several miles above an eruption. Solid particles within the clouds present a serious aviation threat, can distribute acid rain (sulfur dioxide gas and water), can create risk of

suffocation (carbon dioxide is heavier than air and collects in valleys and depressions threatening human and animals), and pose a toxic threat from fluorine which clings to ash particles potentially poisoning grazing livestock and contaminating domestic water supplies.

Buildings streets and roads throughout the city may require minor cleanup with negligible impacts. Temporary utility interruptions are likely, and minor cleanup may be required for electrical and other utility services. Water treatment facilities may require additional attention to address high turbidity water. River traffic along the Columbia River could be disrupted due to sedimentation from a large eruption from Mt. St. Helens or Hood and dredging to restore channel depths may be necessary. Injuries associated with respiratory problems may result.

Due to the nature of the hazard, it is impossible to predict the location or extent of future events with any probability, although it can be assumed that all critical facilities and infrastructure within the City of Prescott are at risk including the entire population.

Wind

Many buildings, utilities and transportation systems in open areas, natural grasslands, or agricultural lands are especially vulnerable to wind damage. Impacts associated with wind can include damage to power lines, trees, and structures, and can also cause temporary disruptions of power. Additionally, high winds can cause significant damage to forestlands.

All areas within the City of Prescott are equally at risk of a windstorm event including all people, critical facilities and infrastructure, and therefore the entire population.

Erosion

Riverine erosion rarely causes death or injury. However, erosion causes significant destruction of property, development, and infrastructure. Erosion hazard data is not readily available; however, descriptions of several localized areas were identified during the development of this document and are identified only by location on a map referencing the river or stream reach described.

Values at Risk

Population Analysis

Population data listed in Table 7 were obtained from the 2010 U.S. Census and Portland State University. It comprises census block level data and estimates from university conducted community research.

Table 7. Population			
2000 Census	2010 Census	% Change	PSU Estimate 2018
72	55	-24%	55

Asset Inventory

The Asset Inventory describes the physical values; the residential building stock, public facilities, and infrastructure within each community that may be affected by hazard events and includes population, residential and nonresidential buildings, critical facilities, and infrastructure. These values are described in Tables 8 and 9 and portray the City's critical infrastructure numbers and values, and their potential vulnerability by hazard type.

City of Prescott seeks to protect its population by supporting Columbia County and Oregon State initiatives, ordinances, building codes, and development regulations. One of the most important initiatives is to prohibit or not allow future development of buildings, infrastructure and critical facilities in identified high hazard areas. Any essential infrastructure component will undergo stringent review to ensure potential hazard risk will be mitigated.

Table 8. Residential Buildings	
Total Building Count	Total Value of Buildings (\$)
55	5,846,500

Table 9. Critical Facilities and Infrastructure			
Facility Type	Name / Number	Address	Value ¹
Government	Maintenance/ Water Treatment	72742 Blakely Street	\$50,000
	City Hall	72742 Blakely Street	\$100,000
Emergency Response			
	None		
Educational	None		
Care Facility	None		
Community	Park (County)	Prescott Beach County Park	Outside of city limits
State and Federal Highways	US Highway 30		.5 miles away
			0 miles within city
Railroads	Portland and Western Railroad (Industrial Only)		Railroad skirts western edge of Prescott for approximately .5 mile
Bridges	None		
Transportation Facilities	None		

Table 9. Critical Facilities and Infrastructure

Facility Type	Name / Number	Address	Value ¹
Utilities	Well		\$35,000
	Well House		\$15,000

National Flood Insurance Policy

National Flood Insurance Program data were obtained from the State Department of Land Conservation and Development. This data is significant for the vulnerability assessment as it identifies the impact of flooding, one of the most often repeated natural hazards for the county. This data is displayed in Table 10.

Table 10. Prescott NFIP Insurance Report

Jurisdiction	Effective FIRM and FIS	Initial FIRM	Total Policies	Pre FIRM Policies	Policies by Building Type				Minus Rated A Zone	Minus Rated V Zone
					Single Family	2 to 4 Family	Other Residential	Non-Residential		
11/26/2010	8/16/1988	1	1	1	0	0	0	0	0	11/26/2010

Source: FEMA Community Information System 02/21/2019

Table 10a. Prescott NFIP Insurance Report

Jurisdiction	Insurance in Force	Total Paid Claims	Pre-Firm Claims Paid	Substantial Damage Claims	Total Paid Amount	Repetitive Loss Structures	Severe Repetitive Loss Structures	CRS Class Rating	Last Community Assistance Visit
Prescott	\$250,000	0	0	0	\$0	0	0	10	n/a

Source: FEMA Community Information System 02/21/2019

Vulnerability Analysis

A vulnerability analysis predicts the extent of exposure, and the impacts that may result from a hazard event of a given intensity in each area. The analysis provides quantitative data that may be used to identify and prioritize potential mitigation measures by allowing communities to

focus attention on areas with the greatest risk of damage. A vulnerability analysis is divided into five steps including asset inventory, methodology, data limitations, exposure analysis for current assets, and areas of future development.

The following is derived from the best available data for facility locations and values. In many cases, values were unavailable, and therefore the totals listed below should be considered incomplete and likely less than the actual costs associated with the respective hazards

The vulnerability analysis development process is thoroughly discussed in the Columbia County Basic Plan, Section 6, which generated the following Hazard Exposure Analysis Overviews in Tables 11, 12, and 13.

Table 11. City of Prescott Potential Hazard Exposure Analysis Overview
Population and Buildings

			Population	Buildings			
				Residential		Non-Residential	
Hazard Type	Hazard Area	Methodology	Number	Number	Value (\$) ¹	Number	Value (\$)
Flood	Moderate	500-year floodplain	--	18	2,381,400	unknown	unknown
	High	100-year floodplain	--	18	2,381,400	unknown	unknown
Winter Storm		descriptive	60	55	5,846,500	unknown	unknown
Landslide	Moderate	>14-32 degrees	--	28	3,704,400	unknown	unknown
	High	>32-56 degrees	--	27	3,572,100	unknown	unknown
Wildland Fire	Moderate	Moderate fuel rank	--	32	4,233,600	unknown	unknown
	High	High fuel rank	--	29	3,836,700	unknown	unknown
	Very High	Very high fuel rank	--	25	3,307,500	unknown	unknown
	Extreme	Extreme fuel rank	--	0	--	unknown	unknown
Earthquake	Strong	9-20% (g)	--	55	5,846,500	unknown	unknown
	Very strong	20-40% (g)	--	0	--	unknown	unknown
	Severe	>40-60% (g)	--	0	--	unknown	unknown
Volcano		descriptive	60	55	5,846,500	unknown	unknown
Wind		descriptive	60	55	5,846,500	unknown	unknown
Erosion		within 300' of potential erosion	--	--	--	unknown	unknown

Table 12. City of Prescott Potential Hazard Exposure Analysis Overview
Critical Facilities

			Government		Emergency Response		Educational		Care		Community	
Hazard Type	Hazard Area	Methodology	No.	\$	No.	\$	No.	\$	No.	\$	No.	\$
Flood	Moderate	500-year floodplain	--	--	--	--	--	--	--	--	--	--
	High	100-year floodplain	--	--	--	--	--	--	--	--	--	--
Winter Storm	Moderate		--	--	--	--	--	--	--	--	--	--
Landslide	Moderate	>14-32 degrees	--	--	--	--	--	--	--	--	--	--
	High	>32-56 degrees	--	--	--	--	--	--	--	--	--	--
Wildland Fire	Moderate	Moderate fuel rank	--	--	--	--	--	--	--	--	--	--
	High	High fuel rank	--	--	--	--	--	--	--	--	--	--
	Very High	Very high fuel rank	--	--	--	--	--	--	--	--	--	--
	Extreme	Extreme fuel rank	--	--	--	--	--	--	--	--	--	--
Earthquake	Strong	9-20% (g)	--	--	--	--	--	--	--	--	--	--
	Very strong	20-40% (g)	--	--	--	--	--	--	--	--	--	--
	Severe	>40-60% (g)	--	--	--	--	--	--	--	--	--	--
Volcano	Moderate		--	--	--	--	--	--	--	--	--	--
Wind	Moderate		--	--	--	--	--	--	--	--	--	--
Erosion		within 300' of potential areas of erosion	--	--	--	--	--	--	--	--	--	--

Table 13. City of Prescott Potential Hazard Exposure Analysis Overview
Critical Infrastructure

Hazard Type	Hazard Area	Methodology	Highways		Railroads		Bridges		Transportation Facilities		Utilities		Dams	
			Miles	No.	Value	No.	No.	Value	No.	Value	No.	Value	No.	Value
Flood	Moderate	500-year floodplain	--	--	--	--	--	--	--					
	High	100-year floodplain	--	--	--	--	--	--	--					
Winter Storm	Moderate		--	--	--	--	--	--	--					
Landslide	Moderate	>14-32 degrees	--	--	--	--	--	--	--					
	High	>32-56 degrees	--	--	--	--	--	--	--					
Wildland Fire	Moderate	Moderate fuel rank	--	--	--	--	--	--	--					
	High	High fuel rank	--	--	--	--	--	--	--					
	Very High	Very high fuel rank	--	--	--	--	--	--	--					
	Extreme	Extreme fuel rank	--	--	--	--	--	--	--					
Earthquake	Strong	9-20% (g)	--	--	--	--	--	--	--					
	Very strong	20-40% (g)	--	--	--	--	--	--	--					
	Severe	>40-60% (g)	--	--	--	--	--	--	--					
Volcano	Moderate		--	--	--	--	--	--	--					
Wind	Moderate		--	--	--	--	--	--	--					
Erosion		within 300' of potential areas of erosion	--	--	--	--	--	--	--					

Mitigation Strategy

The following section defines mitigation action identification and analysis as stipulated in DMA 2000 and its implementing regulations.

DMA 2000 Requirements: Mitigation Strategy	
Planning Requirements	
§201.6(c)(3)	The plan shall include the following:] A mitigation strategy that provides the jurisdiction’s blueprint for reducing the potential losses identified in the risk assessment, based on existing authorities, policies, programs, and resources, and its ability to expand on and improve these existing tools.
§201.6(c)(3)(i)	The hazard mitigation strategy shall include a] description of mitigation goals to reduce or avoid long-term vulnerabilities to the identified hazards.
§201.6(c)(3)(ii)	The hazard mitigation strategy shall include a] section that identifies and analyzes a comprehensive range of specific mitigation actions and projects being considered to reduce the effects of each hazard, with particular emphasis on new and existing buildings and infrastructure. All plans approved by FEMA after October 1, 2008, must also address the jurisdiction’s participation in the NFIP, and continued compliance with NFIP requirements, as appropriate.
§201.6(c)(3)(iii)	The hazard mitigation strategy shall include an] action plan, describing how the action identified in paragraph (c)(3)(ii) of this section will be prioritized, implemented, and administered by the local jurisdiction. Prioritization shall include a special emphasis on the extent to which benefits are maximized according to a cost benefit review of the proposed projects and their associated costs.
§201.6(c)(3)(iv)	For multi-jurisdictional plans, there must be identifiable action items specific to the jurisdiction requesting FEMA approval or credit of the plan.
§201.6(c)(4)(ii)	The plan shall include a] process by which local governments incorporate the requirements of the mitigation plan into other planning mechanisms such as comprehensive or capital improvements, when appropriate.
Planning Elements	
C1. Does the plan document each jurisdiction’s existing authorities, policies, programs and resources, and its ability to expand on and improve these existing policies and programs? 44 CFR 201.6(c)(3)	
C2. Does the Plan address each jurisdiction’s participation in the NFIP and continued compliance with NFIP requirements, as appropriate? 44 CFR 201.6(c)(3)(ii)	
C3. Does the Plan include goals to reduce/avoid long-term vulnerabilities to the identified hazards? 44 CFR 201.6(c)(3)(i)	
C4. Does the Plan identify and analyze a comprehensive range of specific mitigation actions and projects for each jurisdiction being considered to reduce the effects of hazards, with emphasis on new and existing buildings and infrastructure? 44 CFR 201.6(c)(3)(ii) and 44 CFR 201.6(c)(3)(iv)	

C5. Does the Plan contain an action plan that describes how the actions identified will be prioritized (including cost benefit review), implemented, and administered by each jurisdiction? 44 CFR 201.6(c)(3)(iii) and 44 CFR (c)(3)(iv)

C6. Does the Plan describe a process by which local governments will integrate the requirements of the mitigation plan into other planning mechanisms, such as comprehensive or capital improvement plans, when appropriate? 44 CFR 201.6(c)(4)(ii)

Identify Mitigation Goals

Columbia City reviewed the Columbia County goals and determined they meet the City's needs and subsequently adopted the Goals in Table 14 for the current planning period.

Table 14. City of Prescott Mitigation Goals	
Goal Number	Goal Description
1	Reduce the Threat to Life Safety Enhance life safety by minimizing the potential for deaths and injuries in future disaster events.
2	Protect Critical Facilities and Enhance Emergency and Essential Services • Implement activities or projects to protect critical facilities and infrastructure. • Seek opportunities to enhance, protect, and integrate emergency and essential services. • Strengthen emergency operations plans and procedures by increasing collaboration and coordination among public agencies, non-profit organizations, businesses, and industry.
3	Reduce the Threat to Property • Seek opportunities to protect, enhance and integrate emergency and essential services. • Strengthen emergency operations plans and procedures by increasing collaboration and coordination among public agencies, non-profit organizations, businesses, industries and the citizens of Columbia City.
4	Create a Disaster Resistant and Disaster-Resilient Economy • Develop and implement activities to protect economic well-being and vitality while reducing economic hardship in post disaster situations. • Reduce insurance losses and repetitive claims for chronic hazard events. • Work with State and Federal Partners to reduce short-term and long-term recovery and reconstruction costs. • Work with local and County organizations, such as Columbia Emergency Planning Association (CEPA). • Expedite pre-disaster and post-disaster grants and program funding.
5	Increase Public Awareness, Education, Outreach, and Partnerships • Coordinate and collaborate, where possible, risk reduction outreach efforts with the Oregon Partners for Disaster Resistance & Resilience and other public and private organizations. • Develop and implement risk reduction education programs to increase awareness among citizens, local, county, and regional agencies, non-profit organizations, businesses, and industry. • Promote insurance coverage for catastrophic hazards • Strengthen communication and coordinate participation in and between public agencies, citizens, nonprofit organizations, businesses, and industry.

Evaluate and Prioritize Mitigation Actions

Mitigation actions are activities, measures, or projects that help achieve the goals of a mitigation plan. Table 15 lists the mitigation actions developed during this mitigation planning process or offered during whole community planning activities. It is not intended that this plan will attempt

to act on all of these action items, but the list will be maintained in order to provide documentation for future planning efforts.

Table 15. City of Prescott Mitigation Actions Considered			
Hazard	Status	Comment	Description
Natural Hazards			
Multi-Hazard (MH)			
MH	Consider		Develop, implement, and maintain jurisdictional debris management plans.
MH	Consider		Develop and incorporate ordinances commensurate with development and building codes to reflect survivability from wind, seismic, fire, and other hazards to ensure occupant safety.
MH	Consider		Review ordinances and develop outreach programs to assure manufactured homes and buildings are protected from severe wind and flood hazards. (Anchoring, elevation, and other methods as applicable)
MH	Consider		Cross reference and incorporate mitigation planning provisions into all community planning processes such as comprehensive, capital improvement, land use, transportation plans, etc to demonstrate multi-benefit considerations and facilitate using multiple funding source consideration.
MH	Consider		Purchase and install generators with main power distribution disconnect switches for identified and prioritized critical facilities susceptible to short term power disruption. (i.e. first responder and schools, and water and sewage pump stations, etc.)
MH	Consider		Electronic surge protection devices on critical electronic components such as warning systems, communications equipment, and computers for critical facilities.
MH	Consider		Distribute information materials concerning mitigation, preparedness, and safety procedures for all natural hazards.
MH	Consider		Explore the need for, develop, and implement hazard zoning ordinances for high-risk hazard area land-use.
MH	Consider		Retrofit structures to protect them from seismic, floods, high winds, earthquakes, or other natural hazards.

Table 15. City of Prescott Mitigation Actions Considered			
Hazard	Status	Comment	Description
MH	Consider		Acquire, demolish, or relocate structures from hazard prone area. Property deeds shall be restricted for open space uses in perpetuity to keep people from rebuilding in hazard areas.
MH	Consider		Harden utility headers located along river embankments to mitigate potential flood, debris, and erosion damages.
MH	<i>Consider</i>		Establish a formal role for the jurisdictional Hazard Mitigation Planning Committees to develop a sustainable process to implement, monitor, and evaluate citywide mitigation actions.
MH	<i>Consider</i>		Identify and pursue funding opportunities to implement mitigation actions.
MH	<i>Consider</i>		Develop public and private sector partnerships to foster hazard mitigation activities.
MH	<i>Consider</i>		Integrate the Mitigation Plan findings into planning and regulatory documents and programs and into enhanced emergency planning.
Flood			
Flood	Consider		Develop and maintain GIS mapped critical facility inventory for all structures located within 100-year and 500-year floodplains.
Flood	Consider		Develop and maintain GIS mapped inventory, and develop prioritized list of residential and commercial buildings within 100-year and 500-year floodplains.
Flood	Consider		Develop and maintain GIS mapped inventory of repetitive loss properties to include the types and numbers of properties.
Flood	<i>Consider</i>		Develop and implement mitigation actions for repetitive loss properties.
Flood	<i>Consider</i>		Establish flood mitigation priorities for critical facilities and residential and commercial buildings located within the 100- year floodplain using survey elevation data.
Flood	<i>Consider</i>		Implement mitigation measures identified by critical facilities' owners, and other facility owners, to protect facilities located within the 100-year floodplain.

Table 15. City of Prescott Mitigation Actions Considered			
Hazard	Status	Comment	Description
Flood	<i>Consider</i>		Develop an outreach program to educate public concerning NFIP participation benefits, floodplain development, land use regulation, and NFIP flood insurance availability to facilitate continued compliance with the NFIP.
Flood	<i>Consider</i>		Develop, implement, and enforce floodplain management ordinances.
Flood	<i>Consider</i>		Acquire, relocate, elevate, or otherwise flood-proof critical facilities.
Flood	<i>Consider</i>		Develop, or revise, adopt, and enforce storm water ordinances and regulations to manage run-off from new development, including buffers and retention basins.
Flood	<i>Consider</i>		Create detention storage basins, ponds, reservoirs etc. to allow water to temporarily accumulate. Water ultimately returning to its watercourse at a reduced flow rate.
Flood	<i>Consider</i>		Provide flood protection to mitigate damage and contamination of wastewater systems.
Flood	<i>Consider</i>		Develop and incorporate mitigation provisions and recommendations into zoning ordinances and community development processes to maintain the floodway and protect critical infrastructure and private residences from other hazard areas.
Flood	<i>Consider</i>		Identify and list repetitively flooded structures and infrastructures, analyze the threat to these facilities, and prioritize mitigation actions to acquire, relocate, elevate, and/or flood proof to protect the threatened population.
Flood	<i>Consider</i>		Perform hydrologic and hydraulic engineering, and drainage studies and analyses. Use information obtained for feasibility determination and project design. This information should be a key component, directly related to a proposed project.
Winter Storm			
Winter Storms	<i>Consider</i>		Develop and implement programs to coordinate maintenance and mitigation activities to reduce risk to public infrastructure from severe winter storms.

Table 15. City of Prescott Mitigation Actions Considered			
Hazard	Status	Comment	Description
Winter Storms	<i>Consider</i>		Develop critical facility list needing emergency back-up power systems, prioritize, seek funding and implement mitigation actions.
Winter Storms	<i>Consider</i>		Develop and maintain severe winter storm public outreach program defining mitigation activity benefits through educational outreach aimed at households and businesses while targeting of special needs populations.
Winter Storms	<i>Consider</i>		Develop and implement tree clearing mitigation programs to keep trees from threatening lives, property, and public infrastructure from severe weather events.
Winter Storms	<i>Consider</i>		Develop, implement, and maintain partnership program with electrical utilities to use underground utility placement methods where possible to reduce or eliminate power outages from severe winter storms. Consider developing incentive programs.
Winter Storms	<i>Consider</i>		Develop early warning test program partnering with NOAA, City Police, Fire Departments, and Volunteer Fire Department to coordinate tests.
Winter Storms	<i>Consider</i>		Review critical facilities and government building energy efficiency, winter readiness, and electrical protection capability. Identify, prioritize, and implement infrastructure upgrade or rehabilitation project prioritization and development.
Landslide			
Landslide	<i>Consider</i>		Complete a landslide location inventory, identify threatened critical facilities and other buildings and infrastructure.
Landslide	<i>Consider</i>		Develop prioritized list of mitigation actions for threatened critical facilities and other buildings or infrastructure.
Landslide	<i>Consider</i>		Develop process to limit future development in steep slope areas (permitting, geotechnical review, soil stabilization techniques, etc).
Landslide	<i>Consider</i>		Update the storm water management plan to include regulations to control runoff, both for flood reduction and to minimize saturated soils on steep slopes that can cause landslides.
Landslide	<i>Consider</i>		Develop comprehensive geological landslide and rockslide prone area maps.

Table 15. City of Prescott Mitigation Actions Considered			
Hazard	Status	Comment	Description
Landslide	<i>Consider</i>		Identify and seasonally restrict construction activities in steep slope areas.
Wildland Fire			
Wildland Fire	<i>Consider</i>		Identify critical facilities and vulnerable populations based on mapped high hazard areas.
Wildland Fire	<i>Consider</i>		Identify evacuation routes away from high hazard areas and develop outreach program to educate the public concerning warnings and evacuation procedures.
Wildland Fire	<i>Consider</i>		Develop Community Wildland Fire Protection Plans for all at-risk communities.
Wildland Fire	<i>Consider</i>		Hold FireWise workshop to educate residents and contractors concerning fire resistant landscaping.
Wildland Fire	<i>Consider</i>		Promote FireWise building siting, design, and construction materials.
Wildland Fire	<i>Consider</i>		Develop FireWise Public Service Announcements (PSA).
Wildland Fire	<i>Consider</i>		Provide wildland fire information in an easily distributed format for all residents.
Wildland Fire	<i>Consider</i>		Schedule and perform government facility "fire drills" at least twice per year.
Wildland Fire	<i>Consider</i>		Develop, adopt, and enforce burn ordinances that require burn permits, restricts campfires, and controls outdoor burning.
Wildland Fire	<i>Consider</i>		Develop outreach program to educate and encourage fire-safe construction practices for existing and new construction in high risk areas.
Wildland Fire	<i>Consider</i>		Identify, develop, and implement, and enforce mitigation actions such as fuel breaks and reduction zones for potential wildland fire hazard areas.
Earthquake			
Earthquake	<i>Consider</i>		Supplement State Seismic Needs Analysis data (schools, fire, law enforcement). Complete inventory of public and commercial buildings that may be particularly vulnerable to earthquake damage.
Earthquake	<i>Consider</i>		Identify high seismic hazard areas; develop a wood-frame residential building inventory and an outreach program to educate population concerning facilities particularly vulnerable to

Table 15. City of Prescott Mitigation Actions Considered			
Hazard	Status	Comment	Description
			earthquake damage, such as pre-1940s homes and homes with cripple wall foundations.
Earthquake	Consider		Disseminate FEMA pamphlets to educate and encourage homeowners concerning seismic structural and non-structural retrofit benefits.
Earthquake	Ongoing		Retrofit important public facilities with significant seismic vulnerabilities, such as unreinforced masonry construction.
Earthquake	Completed		Retrofit bridges that are not seismically adequate for lifeline transportation routes.
Earthquake	Ongoing		Update existing (or adopt the most current) Uniform Building Code
Earthquake	Ongoing		Implement and enforce the Uniform, International, and State Building Codes.
Earthquake	Ongoing		Inspect and/or certify all new construction.
Earthquake	Ongoing		Develop outreach program to educate residents concerning benefits of increased seismic resistance and modern building code compliance during rehabilitation or major repairs for residences or businesses.
Earthquake	Ongoing		Inspect, prioritize, and retrofit any critical facility or public infrastructure that does not meet current Building Codes.
Earthquake	Ongoing		Evaluate critical public facility seismic performance for fire stations, public works buildings, potable water systems, wastewater systems, electric power systems, and bridges within the jurisdiction.
Earthquake	Consider		Develop outreach program for educating private facility owners/operators concerning alternative or emergency power source acquisition to enable them to deliver food, fuel, and medical services during disaster emergency response and recovery efforts.
Earthquake	Ongoing		Encourage utility companies to evaluate and harden vulnerable infrastructure elements for sustainability.
Earthquake	Ongoing		Develop partnerships to mitigate hazards that result in jurisdictional facility lifeline or emergency transportation route closures.
Volcano			

Table 15. City of Prescott Mitigation Actions Considered			
Hazard	Status	Comment	Description
Volcano	Consider		Update public emergency notification procedures and develop an outreach program for ash fall events.
Volcano	Consider		Update emergency response planning and develop client focused outreach program for ash fall events affecting river, air, and highway transportation, and industrial facilities and operations.
Volcano	Consider		Evaluate ash impact on storm water drainage system and develop mitigation actions.
Wind			
Wind	<i>Consider</i>		Review ordinances and develop outreach programs to assure manufactured buildings are protected from severe wind and flood hazards. (Anchoring, elevation, siting, and other methods as applicable)
Wind	Consider		Identify and prioritize critical facilities' overhead utilities that could be placed underground to reduce power disruption from wind storm / tree blow down damage.
Wind	<i>Consider</i>		Revise requirements to place utilities underground to reduce power disruption from wind storm / tree blow down damage when upgrading or during new development.
Wind	<i>Consider</i>		Increase power line wire size and incorporate quick disconnects (break away devices) to reduce ice load power line failure during severe wind or winter ice storm events.
Erosion			
Erosion	Consider		Maintain and update erosion hazard locations, identify critical facilities potentially impacted and develop and implement mitigation initiatives such as bank stabilization or facility relocation to prevent or reduce the threat.
Erosion	Consider		Apply for grants/funds to implement riverbank protection methods.
Erosion	Consider		Periodically provide available information to residents on riverbank erosion and methods to prevent it in an easily distributed format.
Erosion	Consider		Install riprap, or pilings to harden or "armor" a stream bank where severe erosion occurs.

Table 15. City of Prescott Mitigation Actions Considered			
Hazard	Status	Comment	Description
Erosion	Consider		Install bank protection such as rock, concrete, asphalt, vegetation, or other armoring or protective materials to provide river bank protection.
Erosion	Consider		Harden culvert entrance with asphalt, concrete, rock, to reduce erosion or scour.
Erosion	Consider		Construct a structure to dissipate energy or reduce flow velocity to prevent erosion of the streambed and banks.

Mitigation Action Plan

The Steering Committee has evaluated and prioritized each of the considered mitigation actions to determine which would be included in the Mitigation Action Plan. The Committee then determined the responsible agency and potential funding sources. The Mitigation Action Plan represents mitigation projects and programs to be implemented through the cooperation of multiple entities.

Upon review, the Steering Committee assigned a high priority ranking to actions that best fulfill the goals of the HMP and are appropriate and feasible for the City and responsible entities to implement during the 5-year lifespan of this version of the HMP. As such, the Steering Committee determined that only the mitigation actions that received a high priority ranking would be included in the City's Mitigation Action Plan. Table C-14 depicts the City's mitigation actions grouped by hazard and in descending priority order within each hazard.

Table 16. Columbia City Mitigation Action Plan Matrix					
Hazard	Description	Managing Department / Agency	Timeframe	Potential Funding Source(s)	Benefit-Costs / Technical Feasibility
Multi-Hazard (MH)					
MH	Purchase and install generators with main power distribution disconnect switches for identified and prioritized critical facilities susceptible to short term power disruption. (i.e. first responder and				

	schools, and water and sewage pump stations, etc.)				
MH	Electronic surge protection devices on critical electronic components such as warning systems, communications equipment, and computers for critical facilities.				
MH	Update or develop, implement, and maintain jurisdictional debris management plans.				
MH	Develop and implement strategies and educational outreach programs for debris management.				
MH	Cross reference and incorporate mitigation planning provisions into all community planning processes such as comprehensive, capital improvement, land use, transportation plans, etc. to demonstrate multi-benefit considerations and facilitate using multiple funding source consideration.				
MH	Develop outreach program for educating private facility owners/operators concerning alternative or emergency power source acquisition to enable them to deliver services during disaster emergency response and recovery efforts.				
MH	Develop critical facility list needing emergency back-up power systems, prioritize, seek funding and implement mitigation actions.				
MH	Update public emergency notification procedures and develop an outreach program for all emergencies				
Flood					
Flood	Develop, implement, and enforce floodplain management ordinances.				
Flood	Develop, or revise, adopt, and enforce storm water ordinances and regulations to manage run-off from new				

	development, including buffers and retention basins.				
Flood	Create detention storage basins, ponds, reservoirs etc. to allow water to temporarily accumulate. Water ultimately returning to its watercourse at a reduced flow rate.				
Flood	Implement flood protection to mitigate damage and contamination of wastewater systems.				
Winter Storm					
Winter Storm	Develop and implement programs to coordinate maintenance and mitigation activities to reduce public infrastructure from severe winter storms.				
Winter Storm	Review critical facilities and government building energy efficiency, winter readiness, and electrical protection capability. Identify, prioritize, and implement infrastructure upgrade or rehabilitation project prioritization and development.				
Landslide					
Landslide	Develop process to limit future development in steep slope areas (permitting, geotechnical review, soil stabilization techniques, etc).				
Wildland Fire					
Wildland Fire	Develop Community Wildland Fire Protection Plan				
Wildland Fire	Provide wildland fire information in an easily distributed format for all residents.				
Wildland Fire	Develop, adopt, and enforce burn ordinances that require burn permits, restricts campfires, and controls outdoor burning.				
Earthquake					
EQ	Identify, evaluate, and prioritize critical public facilities' seismic performance.				

<i>Volcano</i>					
Volcano	Evaluate ash impact on storm water drainage system and develop mitigation actions.				
<i>Wind</i>					
Wind	Identify and prioritize critical facilities' overhead utilities that could be placed underground to reduce power disruption from wind storm / tree blow down damage.				
<i>Erosion</i>					
Erosion	Maintain and update erosion hazard locations, identify critical facilities potentially impacted and develop and implement mitigation initiatives				
Erosion	Periodically provide available information to residents on riverbank erosion and methods to prevent it in an easily distributed format.				
Erosion	Install riprap, or pilings to harden or "armor" a stream bank where severe erosion occurs.				

Plan Adoption and Maintenance

The following section provides documentation of the formal adoption of this annex by the governing board of the district or the city council/county commission of the jurisdiction. It also identifies the standing committee that will be responsible for future reviews between update periods.

DMA 2000 Requirements: Plan Review, Evaluation, Implementation, and Adoption	
Planning Requirements	
§201.6(d)(3)	A local jurisdiction must review and revise its plan to reflect changes in development, progress in local mitigation efforts, and changes in priorities, and resubmit if for approval within 5 years in order to continue to be eligible for mitigation project grant funding.
§201.6(c)(5)	The plan shall include...] Documentation that the plan has been formally adopted by the governing body of the jurisdiction requesting approval of the plan (e.g., City Council, County commissioner, Tribal Council). For multi-jurisdictional plans, each jurisdiction requesting approval of the plan must document that it has been formally adopted.
Planning Elements	
D1. Was the plan revised to reflect changes in development? 44 CFR 201.6(d)(3)	
D2. Was the plan revised to reflect progress in local mitigation efforts? 44 CFR 201.6(d)(3)	
D3. Was the plan revised to reflect changes in priorities? 44 CFR 201.6(d)(3)	
E1. Does the Plan include documentation that the plan has been formally adopted by the governing body of the jurisdiction requesting approval? 44 CFR 201.6(c)(5)	
E2. For multi-jurisdictional plans, has each jurisdiction requesting approval of the plan documented formal plan adoption? 44 CFR 201.6(c)(5)	

Resolution of Adoption

(Example) BEFORE THE BOARD OF COUNTY COMMISSIONERS FOR COLUMBIA COUNTY, OREGON

In the Matter of Adopting the 2014) Columbia County Multi-Jurisdictional) RESOLUTION NO. 40-2014 Hazard
Mitigation Plan Update)

WHEREAS, Columbia County, Oregon has experienced repetitive disasters that have
damaged commercial, residential and public properties, displaced citizens and businesses, and
presented general public health and safety concerns; and

WHEREAS, Columbia County has prepared a Multi-Jurisdictional Hazard Mitigation Plan that outlines the options to
reduce overall damage and impact from natural hazards; and

WHEREAS, the Multi-Jurisdictional Hazard Mitigation Plan has been reviewed by community residents, business
owners, and federal, state and local agencies, and has been revised to reflect their concerns;

NOW, THEREFORE, BE IT RESOLVED that:

1. 1. The Multi-Jurisdictional Hazard Mitigation Plan is hereby adopted as an official plan of Columbia County.
2. 2. A Hazard Mitigation Planning Group is hereby established as a permanent advisory body. The Hazard Mitigation
Planning Coordinator shall designate its members, subject to the approval of the County and the
participating jurisdictions. They shall serve one-year terms. The group's duties shall be as
designated in the Hazard Mitigation Plan.
3. 3. The Hazard Mitigation Planning Coordinator is charged with supervising the
implementation of the Plan's recommendations within the funding limitations as provided by Columbia
County or other sources.
4. 4. The Hazard Mitigation Planning Coordinator shall give priority attention to the goals identified in Table A-13 of the
Columbia County Appendix, and the actions listed in Table A-14 of the Columbia
County Appendix to the Hazard Mitigation Plan and;
5. 5. The Hazard Mitigation Planning Coordinator shall convene the hazard mitigation planning group annually. The
planning group shall monitor implementation of the plan and shall submit an annual review
worksheet to the Board of County Commissioners in accordance with the following format:
 - a. A review of the original plan.
 - b. A review of any disasters or emergencies that occurred during the previous calendar year.
 - c. A review of the actions taken, including what was accomplished during the previous year.
 - d. A discussion of any implementation problems.
 - e. Recommendations for new projects or revised action items. Such recommendations shall be subject to approval
by the Columbia County.

Dated this 27th day of August, 2014.

BOARD OF COUNTY COMMISSIONERS FOR COLUMBIA COUNTY, OREGON

By: _____ Anthony Hyde, Chair

By: _____ Henry Heimuller, Commissioner

By: _____ Earl Fisher, Commissioner

Standing Review Committee

The following table identifies the members of the Standing committee that will meet quarterly to review the HMP annex and provide a running update.

Table 17. City of Prescott Standing Hazard Mitigation Committee	
Name	Agency/Department/Affiliation
Joyce Rivas	Mayor
Karlyn Gedrose	Prescott City Recorder
Frank Oliver	Prescott City Council
James Larson	Prescott City Council
Michael Blair	Prescott City Council
Keli Von Pinnon	Prescott City Treasurer

City of Prescott
Hazard Mitigation Plan
Annex

2020 Update
Columbia County
Multi-Jurisdiction Hazard Mitigation Plan

Contents

Introduction	3
Planning Process and Capability Assessment	3
DMA 2000 Requirements: Planning Process	3
Steering Committee Participants	4
Public Participation.....	4
Capability Assessment	7
Hazard Identification and Vulnerability Assessment	10
DMA 2000 Requirements: Hazard Identification and Risk Assessment	10
Hazard Identification	10
Values at Risk.....	11
Population Analysis	13
Asset Inventory.....	14
National Flood Insurance Policy	15
Vulnerability Analysis	15
Impacts of Identified Hazards.....	11
Flood.....	11
Winter Storm.....	11
Landslide	11
Wildland Fires.....	12
Earthquake	12
Volcano.....	12
Wind	13
Erosion.....	13
Dam Failure	Error! Bookmark not defined.
Disruption of Utility and Transportation Systems	Error! Bookmark not defined.
Hazardous Material Event	Error! Bookmark not defined.
Terrorism	Error! Bookmark not defined.
Infectious Disease Epidemic.....	Error! Bookmark not defined.
Mitigation Strategy.....	20
DMA 2000 Requirements: Mitigation Strategy	20

Identify Mitigation Goals	21
Evaluate and Prioritize Mitigation Actions	21
Mitigation Action Plan	29
Plan Adoption and Maintenance	33
DMA 2000 Requirements: Plan Review, Evaluation, Implementation, and Adoption...	33
Resolution of Adoption.....	34
Standing Review Committee	35

Introduction

This Annex contains specific City of Prescott information to support the Columbia County 2020 Multi-Jurisdictional Hazard Mitigation Plan. This section further supports the County's planning process by summarizing the review and incorporation of existing plans, studies, and reports used to develop this MHMP. This annex is an addition to Columbia County's Hazard Mitigation Plan and shares attributes of that plan.

Planning Process and Capability Assessment

The following section includes a detailed capability assessment that describes the resources available to support this plan. The goal of this assessment is not to identify all capabilities the organization may have, but only those that are currently used or could be used to support mitigation efforts. Capabilities are arranged in tables by type and fall under the explicit authority of the jurisdiction/district.

DMA 2000 Requirements: Planning Process	
Planning Requirements	
§201.6(b)	An open public involvement process is essential to the development of an effective plan. In order to develop a more comprehensive approach to reducing the effects of natural disasters, the planning process shall include:
§201.6(b)(1)	(1) An opportunity for the public to comment on the plan during the drafting stage and prior to plan approval;
§201.6(b)(2)	(2) An opportunity for neighboring communities, local and regional agencies involved in hazard mitigation activities, and agencies that have the authority to regulate development, as well as businesses, academia and other private and non-profit interests to be involved in the planning process; and
§201.6(b)(3)	(3) Review and incorporation, if appropriate, of existing plans, studies, reports, and technical information.
§201.6(c)(1)	[The plan shall document] the planning process used to develop the plan, including how it was prepared, who was involved in the process, and how the public was involved.
§201.6(c)(4)(i)	[The plan maintenance process shall include a] section describing the method and schedule of monitoring, evaluating, and updating the mitigation plan within a five-year cycle.
§201.6(c)(4)(iii)	[The plan maintenance process shall include a] discussion on how the community will continue public participation in the plan maintenance process.
Planning Elements	
A1. Does the Plan document the planning process, including how it was prepared and who was involved in the process for each jurisdiction? 44 CFR 201.6(c)(1)	

A2. Does the Plan document an opportunity for neighboring communities, local and regional agencies involved in hazard mitigation activities, agencies that have the authority to regulate development as well as other interests to be involved in the planning process? 44 CFR 201.6(b)(2)

A3. Does the Plan document how the public was involved in the planning process during the drafting stage? 44 CFR 201.6(b)(1) and 201.6(c)(1)

A4. Does the Plan document the review and incorporation of existing plans, studies, reports, and technical information? 44 CFR 201.6(b)(3)

A5. Is there discussion on how the communities will continue public participation in the plan maintenance process? 44 CFR 201.6(c)(4)(iii)

A6. Is there a description of the method and schedule for keeping the plan current (monitoring, evaluating and updating the mitigation plan within a 5-year cycle)? 44 CFR 201.6(c)(4)(i)

Steering Committee Participants

City of Prescott is dedicated to mitigating potential natural hazards to its population and infrastructure. To fulfill that goal, a Hazard Mitigation Plan Development Steering Committee was seated; dedicated to identifying hazard threats and developing actions to mitigate damage and life losses from those threats.

Table 1 records the Steering Committee's participant list.

Table 1. City of Prescott Steering Committee	
Name	Agency/Department/Affiliation
Joyce Rivas	Mayor
Karlyn Gedrose	Prescott City Recorder
Frank Oliver	Prescott City Council
James Larson	Prescott City Council
Michael Blair	Prescott City Council
Keli Von Pinnon	Prescott City Treasurer

Public Participation

As defined by FEMA, Whole Community Planning is; a means by which residents, emergency management practitioners, organizational and community leaders, and government officials can collectively understand and assess the needs of their respective communities and determine the best ways to organize and strengthen their assets, capacities, and interests. By doing so, a more effective path to societal security and resilience is built.

This Hazard Mitigation Plan was conducted with opportunities for the public to participate to try and meet the goals of whole community planning. Table 2 highlights these efforts.

Table 2. Public Involvement Mechanisms	
Date	Description
2014	
7/19/2014	Columbia Emergency Preparedness Association EXPO – Large emergency management event covering all topics (preparedness, fire, law, mitigation, response).
11/11/2014	HSEMC – Columbia County’s Homeland Security and Emergency Management Commission is recognized by the Board of County Commissioners as the cornerstones of a whole community approach to emergency management planning. All jurisdictions are members of the commission. Semi Annual NHMP meeting, plan review was conducted.
2015	
5/12/2015	HSEMC – Columbia County’s Homeland Security and Emergency Management Commission is recognized by the Board of County Commissioners as the cornerstones of a whole community approach to emergency management planning. All jurisdictions are members of the commission. Semi Annual NHMP meeting, plan review was conducted.
11/10/2015	HSEMC – Columbia County’s Homeland Security and Emergency Management Commission is recognized by the Board of County Commissioners as the cornerstones of a whole community approach to emergency management planning. All jurisdictions are members of the commission. Semi Annual NHMP meeting, plan review was conducted.
2016	
4/2/2016	KOHI Radio Preparedness Talk – Radio talk show for Columbia County, topics “specifically included preparing for the next flood event”.
5/10/2016	HSEMC – Columbia County’s Homeland Security and Emergency Management Commission is recognized by the Board of County Commissioners as the cornerstones of a whole community approach to emergency management planning. All jurisdictions are members of the commission. Semi Annual NHMP meeting, plan review was conducted.
6/4/2016	Ford Family Foundation Preparedness Fair - County wide event to promote preparedness and mitigation in cooperation with the Ford Family Foundation. All cities participated.
7/23/2016	Columbia Emergency Preparedness Association EXPO – Large emergency management event covering all topics (preparedness, fire, law, mitigation, response).

Table 2. Public Involvement Mechanisms	
Date	Description
9/22/2016	Columbia County Soil and Water Conservation District – Event hosted by SWCD on preparedness and flood mitigation efforts.
11/15/2016	HSEMC – Columbia County’s Homeland Security and Emergency Management Commission is recognized by the Board of County Commissioners as the cornerstones of a whole community approach to emergency management planning. All jurisdictions are members of the commission. Semi Annual NHMP meeting, plan review was conducted.
2017	
5/9/2017	HSEMC – Columbia County’s Homeland Security and Emergency Management Commission is recognized by the Board of County Commissioners as the cornerstones of a whole community approach to emergency management planning. All jurisdictions are members of the commission. Semi Annual NHMP meeting, plan review was conducted.
11/14/2017	HSEMC – Columbia County’s Homeland Security and Emergency Management Commission is recognized by the Board of County Commissioners as the cornerstones of a whole community approach to emergency management planning. All jurisdictions are members of the commission. Semi Annual NHMP meeting, plan review was conducted.
11/29/2017	Unprepared showing – St. Helens - presentation of OPB documentary regarding CSZ earthquake and tsunami.
2018	
1/19/2018	Preparedness to Vets Group – Presentation to Veterans regarding personal preparedness and flood mitigation.
5/8/2018	HSEMC – Columbia County’s Homeland Security and Emergency Management Commission is recognized by the Board of County Commissioners as the cornerstones of a whole community approach to emergency management planning. All jurisdictions are members of the commission. Semi Annual NHMP meeting, plan review was conducted and plans for plan update discussed.
11/13/2018	HSEMC – Columbia County’s Homeland Security and Emergency Management Commission is recognized by the Board of County Commissioners as the cornerstones of a whole community approach to emergency management planning. All jurisdictions are members of the commission. Semi Annual County-wide Hazard Mitigation meeting. Work Session on Hazard Mitigation Plan update conducted.
11/27/2018	Pints and Preparedness – various topics including Hazard mitigation, and individual preparedness.
2019	

Table 2. Public Involvement Mechanisms	
Date	Description
1/22/2019	Pints and Preparedness – various topics including Hazard mitigation, and individual preparedness.
3/26/2019	Pints and Preparedness – various topics including Hazard mitigation, and individual preparedness.
5/7/2019	HSEMC – Columbia County’s Homeland Security and Emergency Management Commission is recognized by the Board of County Commissioners as the cornerstones of a whole community approach to emergency management planning. All jurisdictions are members of the commission. Semi Annual County-wide Hazard Mitigation meeting. Work Session on Hazard Mitigation Plan update conducted.
4/23/2019	Pints and Preparedness – various topics including Hazard mitigation, and individual preparedness.
9/7/2019	Preparedness for Scouts – Presentation on preparedness for all hazards.

Capability Assessment

Table 3, 4, and 5 contain the City of Prescott resources used to support planning activities, including the reports and studies reviewed as part of the update process.

Table 3. City of Prescott Legal and Regulatory Resources Available for Hazard Mitigation		
Regulatory Tool	Name	Effect on Hazard Mitigation
Plans	Development / Land Use Plan	City of Prescott has had an active Land Use Plan since the mid 1970’s
Programs	National Flood Insurance Program (NFIP)	Makes affordable flood insurance available to homeowners, business owners, and renters in participating communities. In exchange, those communities must adopt and enforce minimum floodplain management regulations to reduce the risk of damage from future floods.
Policies (Municipal Codes)	Land Use Ordinance	The City of Prescott has land use ordinances and incorporates the County ordinances into the City’s land use planning
	Zoning and Planning	The City of Prescott has zoning and planning ordinances
	Building Codes	The City of Prescott has adopted and enforces the Columbia County and State of Oregon Building codes.

Table 4. City of Prescott Administrative and Technical Resources for Hazard Mitigation

Staff/Personnel Resources	Department/Division Position
Planner(s) or engineer(s) with knowledge of land development and land management practices	Contract Planner Contract Engineer
Engineer(s) or professional(s) trained in construction practices related to buildings and/or infrastructure	Contract Engineer
Planner(s) or engineer(s) with an understanding of manmade or natural hazards	Contract Planner Contract Engineer
Floodplain manager	City of Prescott mayor in conjunction with the Columbia County floodplain manager
Personnel skilled in GIS and/or HAZUS-MH	no
Director of Emergency Services	City of Prescott mayor (will defer to Columbia County in the event of major disaster)
Finance (grant writers, purchasing)	City of Prescott Treasurer
Public Information Officers	City of Prescott Mayor

Table 5. City of Prescott Financial Resources for Hazard Mitigation

Financial Resources	Effect on Hazard Mitigation
General funds	yes
Authority to levy taxes for specific purposes	yes, with voter approval (W/Measure 5 cap)
Incur debt through general obligation bonds	no
Incur debt through special tax and revenue bonds	yes, with voter approval
Incur debt through private activity bonds	yes
Hazard Mitigation Grant Program (HMGP)	FEMA funding which is available to local communities after a Presidentially-declared disaster. It can be used to fund both pre- and post-disaster mitigation plans and projects.
Pre-Disaster Mitigation (PDM) grant program	FEMA funding which is available on an annual basis. This grant can only be used to fund pre-disaster mitigation plans and projects only.
Flood Mitigation Assistance (FMA) grant program	FEMA funding which is available on an annual basis. This grant can be used to mitigate repetitively flooded structures and infrastructure to protect repetitive flood structures.
United States Fire Administration (USFA) Grants	The purpose of these grants is to assist state, regional, national or local organizations to address fire prevention and safety. The primary goal is to reach high-risk target groups including children, seniors and firefighters.
Fire Mitigation Fees	Used to finance future fire protection facilities' construction and other fire capital expenditures to protect new development. The City Council or Fire District may charge fire mitigation fees to ensure new

Table 5. City of Prescott Financial Resources for Hazard Mitigation	
Financial Resources	Effect on Hazard Mitigation
	development pays their fair share of constructing these improvements.

Hazard Identification and Vulnerability Assessment

DMA 2000 Requirements: Hazard Identification and Risk Assessment	
Planning Requirements	
§201.6(c)(2)(i)	The risk assessment shall include a] description of the type, location and extent of all-natural hazards that can affect the jurisdiction. The plan shall include information on previous occurrences of hazard events and on the probability of future hazard events.
§201.6(c)(2)(ii)	The risk assessment shall include a] description of the jurisdiction's vulnerability to the hazards described in paragraph (c)(2)(i) of this section. This description shall include an overall summary of each hazard and its impact on the community. All plans approved after October 1, 2008 must also address NFIP insured structures that have been repetitively damaged by floods. The plan should describe vulnerability in terms of:
§201.6(c)(2)(ii)(A)	(A) The types and numbers of existing and future buildings, infrastructure, and critical facilities located in the identified hazard areas;
§201.6(c)(2)(ii)(B)	(B) An estimate of the potential dollar losses to vulnerable structures identified in ... this section and a description of the methodology used to prepare the estimate.
§201.6(c)(2)(ii)(C)	(C) Providing a general description of land uses and development trends within the community so that mitigation options can be considered in future land use decisions.
§201.6(c)(2)(iii)	For multi-jurisdictional plans, the risk assessment section must assess each jurisdiction's risks where they vary from the risks facing the entire planning area.
Planning Elements	
B1. Does the Plan include a description of the type, location, and extent of all-natural hazards that can affect each jurisdiction? 44 CFR 201.6(c)(2)(i) and 44 CFR 201.6(c)(2)(iii)	
B2. Does the Plan include information on previous occurrences of hazard events and on the probability of future hazard events for each jurisdiction? 44 CFR 201.6(c)(2)(i)	
B3. Is there a description of each identified hazard's impact on the community as well as an overall summary of the community's vulnerability for each jurisdiction? 44 CFR 201.6(c)(2)(ii)	
B4. Does the Plan address NFIP insured structures within each jurisdiction that have been repetitively damaged by floods? 44 CFR 201.6(c)(2)(ii)	

Hazard Identification

The Steering Committee determined that the following hazards could potentially threaten the community. Table 6 establishes the hazard profile against which this plan is designed.

Table 6. Hazard Profile	
Natural Hazards	
Flood	X
Winter Storm	X
Landslide	X
Fire (Wildland/Urban)	X
Earthquake	X
Volcano	X
Wind	X
Erosion	
ENSO (El Niño / La Niña)	
Expansive Soils	
Drought	

Specific Impacts of Identified Hazards

The following section provides specific details of the vulnerabilities and impacts from natural hazards for the City of Prescott in addition to technological and manmade hazards identified in Table 6.

The Basic Plan of this Multi-Jurisdiction Hazard Mitigation Plan contains the full narrative Hazard Profile for the entire county, including full details for this annex. This section is designed to provide additional notes and concerns regarding hazards that can impact this jurisdiction.

Flood

FEMA FIRMs were used to outline the 100-year and 500-year floodplains for City of Prescott. The 100-year floodplain delineates an area of high risk, while the 500-year floodplain delineates an area of moderate risk.

Winter Storm

The natural hazards resulting from winter storms, such as ice, cold, wind and floods, are often widespread. A single event is capable of impacting all people, critical facilities and infrastructure within City of Prescott, and therefore the entire population is at risk.

Landslide

The potential impacts from landslides can be widespread. Potential debris flows, and landslides can impact transportation and rail routes, utility systems, and water and waste treatment infrastructure along with public, private, and business structures located adjacent to steep slopes, along riverine embankments, or within alluvial fans or natural drainages. Response and

recovery efforts will likely vary from minor cleanup to more extensive utility system rebuilding. Utility disruptions are usually local and terrain dependent. Damages may require reestablishing electrical, communication, and gas pipeline connections occurring from specific breakage points. Initial debris clearing from emergency routes and high traffic areas may be required. Water and waste-water utilities may need treatment to quickly improve water quality by reducing excessive water turbidity and reestablishing waste disposal capability.

USGS elevation datasets were used to determine the landslide hazard areas within the City of Prescott. Risk was assigned based on slope angle. A slope angle less than 14 degrees was assigned a low risk, a slope angle between 14 and 32 degrees was assigned a medium risk, and a slope angle greater than 32 degrees was assigned a high risk.

Wildland Fires

Wildland fire hazard areas were identified using a model incorporating slope, aspect, and fuel load. South-facing, steep, and heavily vegetated areas were assigned the highest fuel values while areas with little slope and natural vegetation were assigned the lowest fuel values. Risk levels of moderate, high, very high, and extreme were assigned to the entire region based on the results of this modeling.

Earthquake

Based on PGA shake maps produced by the USGS, the western portion of Columbia County is likely to experience higher levels of shaking than the eastern portion, as a result of its proximity to the Cascadia Subduction Zone. Ground movement in both areas, however, is likely to cause damage to weak, unreinforced masonry buildings, and to induce small landslides along unstable slopes. As well as landslide, earthquakes can trigger other hazards such as dam failure and disruption of transportation and utility systems.

The eastern portion of Columbia County is likely to experience strong shaking should a subduction zone earthquake occur (9-20 percent of the acceleration of gravity). In contrast, the far western portion of the county is likely to experience very strong shaking (20-25 percent). This rating represents the peak acceleration of the ground caused by the earthquake.

Volcano

A volcanic eruption would have a minor impact on the City of Prescott due to the proximity to volcanoes within the Cascade region. The major resources of concern include air quality and waterway sedimentation. During previous eruptions, ashfall has drifted to the east of the volcanoes. (State Interagency Hazard Mitigation Team 2006)

The City of Prescott will likely only experience damage from volcanic eruption columns and clouds which contain volcanic gases, minerals, and rock. The columns and clouds form rapidly and extend several miles above an eruption. Solid particles within the clouds present a serious aviation threat, can distribute acid rain (sulfur dioxide gas and water), can create risk of

suffocation (carbon dioxide is heavier than air and collects in valleys and depressions threatening human and animals), and pose a toxic threat from fluorine which clings to ash particles potentially poisoning grazing livestock and contaminating domestic water supplies.

Buildings streets and roads throughout the city may require minor cleanup with negligible impacts. Temporary utility interruptions are likely, and minor cleanup may be required for electrical and other utility services. Water treatment facilities may require additional attention to address high turbidity water. River traffic along the Columbia River could be disrupted due to sedimentation from a large eruption from Mt. St. Helens or Hood and dredging to restore channel depths may be necessary. Injuries associated with respiratory problems may result.

Due to the nature of the hazard, it is impossible to predict the location or extent of future events with any probability, although it can be assumed that all critical facilities and infrastructure within the City of Prescott are at risk including the entire population.

Wind

Many buildings, utilities and transportation systems in open areas, natural grasslands, or agricultural lands are especially vulnerable to wind damage. Impacts associated with wind can include damage to power lines, trees, and structures, and can also cause temporary disruptions of power. Additionally, high winds can cause significant damage to forestlands.

All areas within the City of Prescott are equally at risk of a windstorm event including all people, critical facilities and infrastructure, and therefore the entire population.

Erosion

Riverine erosion rarely causes death or injury. However, erosion causes significant destruction of property, development, and infrastructure. Erosion hazard data is not readily available; however, descriptions of several localized areas were identified during the development of this document and are identified only by location on a map referencing the river or stream reach described.

Values at Risk

Population Analysis

Population data listed in Table 7 were obtained from the 2010 U.S. Census and Portland State University. It comprises census block level data and estimates from university conducted community research.

Table 7. Population			
2000 Census	2010 Census	% Change	PSU Estimate 2018
72	55	-24%	55

Asset Inventory

The Asset Inventory describes the physical values; the residential building stock, public facilities, and infrastructure within each community that may be affected by hazard events and includes population, residential and nonresidential buildings, critical facilities, and infrastructure. These values are described in Tables 8 and 9 and portray the City's critical infrastructure numbers and values, and their potential vulnerability by hazard type.

City of Prescott seeks to protect its population by supporting Columbia County and Oregon State initiatives, ordinances, building codes, and development regulations. One of the most important initiatives is to prohibit or not allow future development of buildings, infrastructure and critical facilities in identified high hazard areas. Any essential infrastructure component will undergo stringent review to ensure potential hazard risk will be mitigated.

Table 8. Residential Buildings	
Total Building Count	Total Value of Buildings (\$)
55	5,846,500

Table 9. Critical Facilities and Infrastructure			
Facility Type	Name / Number	Address	Value ¹
Government	Maintenance/ Water Treatment	72742 Blakely Street	\$50,000
	City Hall	72742 Blakely Street	\$100,000
Emergency Response			
	None		
Educational	None		
Care Facility	None		
Community	Park (County)	Prescott Beach County Park	Outside of city limits
State and Federal Highways	US Highway 30		.5 miles away
			0 miles within city
Railroads	Portland and Western Railroad (Industrial Only)		Railroad skirts western edge of Prescott for approximately .5 mile
Bridges	None		
Transportation Facilities	None		

Table 9. Critical Facilities and Infrastructure

Facility Type	Name / Number	Address	Value ¹
Utilities	Well		\$35,000
	Well House		\$15,000

National Flood Insurance Policy

National Flood Insurance Program data were obtained from the State Department of Land Conservation and Development. This data is significant for the vulnerability assessment as it identifies the impact of flooding, one of the most often repeated natural hazards for the county. This data is displayed in Table 10.

Table 10. Prescott NFIP Insurance Report

Jurisdiction	Effective FIRM and FIS	Initial FIRM	Total Policies	Pre FIRM Policies	Policies by Building Type				Minus Rated A Zone	Minus Rated V Zone
					Single Family	2 to 4 Family	Other Residential	Non-Residential		
11/26/2010	8/16/1988	1	1	1	0	0	0	0	0	11/26/2010

Source: FEMA Community Information System 02/21/2019

Table 10a. Prescott NFIP Insurance Report

Jurisdiction	Insurance in Force	Total Paid Claims	Pre-Firm Claims Paid	Substantial Damage Claims	Total Paid Amount	Repetitive Loss Structures	Severe Repetitive Loss Structures	CRS Class Rating	Last Community Assistance Visit
Prescott	\$250,000	0	0	0	\$0	0	0	10	n/a

Source: FEMA Community Information System 02/21/2019

Vulnerability Analysis

A vulnerability analysis predicts the extent of exposure, and the impacts that may result from a hazard event of a given intensity in each area. The analysis provides quantitative data that may be used to identify and prioritize potential mitigation measures by allowing communities to

focus attention on areas with the greatest risk of damage. A vulnerability analysis is divided into five steps including asset inventory, methodology, data limitations, exposure analysis for current assets, and areas of future development.

The following is derived from the best available data for facility locations and values. In many cases, values were unavailable, and therefore the totals listed below should be considered incomplete and likely less than the actual costs associated with the respective hazards

The vulnerability analysis development process is thoroughly discussed in the Columbia County Basic Plan, Section 6, which generated the following Hazard Exposure Analysis Overviews in Tables 11, 12, and 13.

Table 11. City of Prescott Potential Hazard Exposure Analysis Overview
Population and Buildings

			Population	Buildings			
				Residential		Non-Residential	
Hazard Type	Hazard Area	Methodology	Number	Number	Value (\$) ¹	Number	Value (\$)
Flood	Moderate	500-year floodplain	--	18	2,381,400	unknown	unknown
	High	100-year floodplain	--	18	2,381,400	unknown	unknown
Winter Storm		descriptive	60	55	5,846,500	unknown	unknown
Landslide	Moderate	>14-32 degrees	--	28	3,704,400	unknown	unknown
	High	>32-56 degrees	--	27	3,572,100	unknown	unknown
Wildland Fire	Moderate	Moderate fuel rank	--	32	4,233,600	unknown	unknown
	High	High fuel rank	--	29	3,836,700	unknown	unknown
	Very High	Very high fuel rank	--	25	3,307,500	unknown	unknown
	Extreme	Extreme fuel rank	--	0	--	unknown	unknown
Earthquake	Strong	9-20% (g)	--	55	5,846,500	unknown	unknown
	Very strong	20-40% (g)	--	0	--	unknown	unknown
	Severe	>40-60% (g)	--	0	--	unknown	unknown
Volcano		descriptive	60	55	5,846,500	unknown	unknown
Wind		descriptive	60	55	5,846,500	unknown	unknown
Erosion		within 300' of potential erosion	--	--	--	unknown	unknown

Table 12. City of Prescott Potential Hazard Exposure Analysis Overview
Critical Facilities

			Government		Emergency Response		Educational		Care		Community	
Hazard Type	Hazard Area	Methodology	No.	\$	No.	\$	No.	\$	No.	\$	No.	\$
Flood	Moderate	500-year floodplain	--	--	--	--	--	--	--	--	--	--
	High	100-year floodplain	--	--	--	--	--	--	--	--	--	--
Winter Storm	Moderate		--	--	--	--	--	--	--	--	--	--
Landslide	Moderate	>14-32 degrees	--	--	--	--	--	--	--	--	--	--
	High	>32-56 degrees	--	--	--	--	--	--	--	--	--	--
Wildland Fire	Moderate	Moderate fuel rank	--	--	--	--	--	--	--	--	--	--
	High	High fuel rank	--	--	--	--	--	--	--	--	--	--
	Very High	Very high fuel rank	--	--	--	--	--	--	--	--	--	--
	Extreme	Extreme fuel rank	--	--	--	--	--	--	--	--	--	--
Earthquake	Strong	9-20% (g)	--	--	--	--	--	--	--	--	--	--
	Very strong	20-40% (g)	--	--	--	--	--	--	--	--	--	--
	Severe	>40-60% (g)	--	--	--	--	--	--	--	--	--	--
Volcano	Moderate		--	--	--	--	--	--	--	--	--	--
Wind	Moderate		--	--	--	--	--	--	--	--	--	--
Erosion		within 300' of potential areas of erosion	--	--	--	--	--	--	--	--	--	--

Table 13. City of Prescott Potential Hazard Exposure Analysis Overview
Critical Infrastructure

Hazard Type	Hazard Area	Methodology	Highways		Railroads		Bridges		Transportation Facilities		Utilities		Dams	
			Miles	No.	Value	No.	No.	Value	No.	Value	No.	Value	No.	Value
Flood	Moderate	500-year floodplain	--	--	--	--	--	--	--					
	High	100-year floodplain	--	--	--	--	--	--	--					
Winter Storm	Moderate		--	--	--	--	--	--	--					
Landslide	Moderate	>14-32 degrees	--	--	--	--	--	--	--					
	High	>32-56 degrees	--	--	--	--	--	--	--					
Wildland Fire	Moderate	Moderate fuel rank	--	--	--	--	--	--	--					
	High	High fuel rank	--	--	--	--	--	--	--					
	Very High	Very high fuel rank	--	--	--	--	--	--	--					
	Extreme	Extreme fuel rank	--	--	--	--	--	--	--					
Earthquake	Strong	9-20% (g)	--	--	--	--	--	--	--					
	Very strong	20-40% (g)	--	--	--	--	--	--	--					
	Severe	>40-60% (g)	--	--	--	--	--	--	--					
Volcano	Moderate		--	--	--	--	--	--	--					
Wind	Moderate		--	--	--	--	--	--	--					
Erosion		within 300' of potential areas of erosion	--	--	--	--	--	--	--					

Mitigation Strategy

The following section defines mitigation action identification and analysis as stipulated in DMA 2000 and its implementing regulations.

DMA 2000 Requirements: Mitigation Strategy	
Planning Requirements	
§201.6(c)(3)	The plan shall include the following:] A mitigation strategy that provides the jurisdiction’s blueprint for reducing the potential losses identified in the risk assessment, based on existing authorities, policies, programs, and resources, and its ability to expand on and improve these existing tools.
§201.6(c)(3)(i)	The hazard mitigation strategy shall include a] description of mitigation goals to reduce or avoid long-term vulnerabilities to the identified hazards.
§201.6(c)(3)(ii)	The hazard mitigation strategy shall include a] section that identifies and analyzes a comprehensive range of specific mitigation actions and projects being considered to reduce the effects of each hazard, with particular emphasis on new and existing buildings and infrastructure. All plans approved by FEMA after October 1, 2008, must also address the jurisdiction’s participation in the NFIP, and continued compliance with NFIP requirements, as appropriate.
§201.6(c)(3)(iii)	The hazard mitigation strategy shall include an] action plan, describing how the action identified in paragraph (c)(3)(ii) of this section will be prioritized, implemented, and administered by the local jurisdiction. Prioritization shall include a special emphasis on the extent to which benefits are maximized according to a cost benefit review of the proposed projects and their associated costs.
§201.6(c)(3)(iv)	For multi-jurisdictional plans, there must be identifiable action items specific to the jurisdiction requesting FEMA approval or credit of the plan.
§201.6(c)(4)(ii)	The plan shall include a] process by which local governments incorporate the requirements of the mitigation plan into other planning mechanisms such as comprehensive or capital improvements, when appropriate.
Planning Elements	
C1. Does the plan document each jurisdiction’s existing authorities, policies, programs and resources, and its ability to expand on and improve these existing policies and programs? 44 CFR 201.6(c)(3)	
C2. Does the Plan address each jurisdiction’s participation in the NFIP and continued compliance with NFIP requirements, as appropriate? 44 CFR 201.6(c)(3)(ii)	
C3. Does the Plan include goals to reduce/avoid long-term vulnerabilities to the identified hazards? 44 CFR 201.6(c)(3)(i)	
C4. Does the Plan identify and analyze a comprehensive range of specific mitigation actions and projects for each jurisdiction being considered to reduce the effects of hazards, with emphasis on new and existing buildings and infrastructure? 44 CFR 201.6(c)(3)(ii) and 44 CFR 201.6(c)(3)(iv)	

C5. Does the Plan contain an action plan that describes how the actions identified will be prioritized (including cost benefit review), implemented, and administered by each jurisdiction? 44 CFR 201.6(c)(3)(iii) and 44 CFR (c)(3)(iv)

C6. Does the Plan describe a process by which local governments will integrate the requirements of the mitigation plan into other planning mechanisms, such as comprehensive or capital improvement plans, when appropriate? 44 CFR 201.6(c)(4)(ii)

Identify Mitigation Goals

Columbia City reviewed the Columbia County goals and determined they meet the City's needs and subsequently adopted the Goals in Table 14 for the current planning period.

Table 14. City of Prescott Mitigation Goals	
Goal Number	Goal Description
1	Reduce the Threat to Life Safety Enhance life safety by minimizing the potential for deaths and injuries in future disaster events.
2	Protect Critical Facilities and Enhance Emergency and Essential Services • Implement activities or projects to protect critical facilities and infrastructure. • Seek opportunities to enhance, protect, and integrate emergency and essential services. • Strengthen emergency operations plans and procedures by increasing collaboration and coordination among public agencies, non-profit organizations, businesses, and industry.
3	Reduce the Threat to Property • Seek opportunities to protect, enhance and integrate emergency and essential services. • Strengthen emergency operations plans and procedures by increasing collaboration and coordination among public agencies, non-profit organizations, businesses, industries and the citizens of Columbia City.
4	Create a Disaster Resistant and Disaster-Resilient Economy • Develop and implement activities to protect economic well-being and vitality while reducing economic hardship in post disaster situations. • Reduce insurance losses and repetitive claims for chronic hazard events. • Work with State and Federal Partners to reduce short-term and long-term recovery and reconstruction costs. • Work with local and County organizations, such as Columbia Emergency Planning Association (CEPA). • Expedite pre-disaster and post-disaster grants and program funding.
5	Increase Public Awareness, Education, Outreach, and Partnerships • Coordinate and collaborate, where possible, risk reduction outreach efforts with the Oregon Partners for Disaster Resistance & Resilience and other public and private organizations. • Develop and implement risk reduction education programs to increase awareness among citizens, local, county, and regional agencies, non-profit organizations, businesses, and industry. • Promote insurance coverage for catastrophic hazards • Strengthen communication and coordinate participation in and between public agencies, citizens, nonprofit organizations, businesses, and industry.

Evaluate and Prioritize Mitigation Actions

Mitigation actions are activities, measures, or projects that help achieve the goals of a mitigation plan. Table 15 lists the mitigation actions developed during this mitigation planning process or offered during whole community planning activities. It is not intended that this plan will attempt

to act on all of these action items, but the list will be maintained in order to provide documentation for future planning efforts.

Table 15. City of Prescott Mitigation Actions Considered			
Hazard	Status	Comment	Description
Natural Hazards			
Multi-Hazard (MH)			
MH	Consider		Develop, implement, and maintain jurisdictional debris management plans.
MH	Consider		Develop and incorporate ordinances commensurate with development and building codes to reflect survivability from wind, seismic, fire, and other hazards to ensure occupant safety.
MH	Consider		Review ordinances and develop outreach programs to assure manufactured homes and buildings are protected from severe wind and flood hazards. (Anchoring, elevation, and other methods as applicable)
MH	Consider		Cross reference and incorporate mitigation planning provisions into all community planning processes such as comprehensive, capital improvement, land use, transportation plans, etc to demonstrate multi-benefit considerations and facilitate using multiple funding source consideration.
MH	Consider		Purchase and install generators with main power distribution disconnect switches for identified and prioritized critical facilities susceptible to short term power disruption. (i.e. first responder and schools, and water and sewage pump stations, etc.)
MH	Consider		Electronic surge protection devices on critical electronic components such as warning systems, communications equipment, and computers for critical facilities.
MH	Consider		Distribute information materials concerning mitigation, preparedness, and safety procedures for all natural hazards.
MH	Consider		Explore the need for, develop, and implement hazard zoning ordinances for high-risk hazard area land-use.
MH	Consider		Retrofit structures to protect them from seismic, floods, high winds, earthquakes, or other natural hazards.

Table 15. City of Prescott Mitigation Actions Considered			
Hazard	Status	Comment	Description
MH	Consider		Acquire, demolish, or relocate structures from hazard prone area. Property deeds shall be restricted for open space uses in perpetuity to keep people from rebuilding in hazard areas.
MH	Consider		Harden utility headers located along river embankments to mitigate potential flood, debris, and erosion damages.
MH	<i>Consider</i>		Establish a formal role for the jurisdictional Hazard Mitigation Planning Committees to develop a sustainable process to implement, monitor, and evaluate citywide mitigation actions.
MH	<i>Consider</i>		Identify and pursue funding opportunities to implement mitigation actions.
MH	<i>Consider</i>		Develop public and private sector partnerships to foster hazard mitigation activities.
MH	<i>Consider</i>		Integrate the Mitigation Plan findings into planning and regulatory documents and programs and into enhanced emergency planning.
Flood			
Flood	Consider		Develop and maintain GIS mapped critical facility inventory for all structures located within 100-year and 500-year floodplains.
Flood	Consider		Develop and maintain GIS mapped inventory, and develop prioritized list of residential and commercial buildings within 100-year and 500-year floodplains.
Flood	Consider		Develop and maintain GIS mapped inventory of repetitive loss properties to include the types and numbers of properties.
Flood	<i>Consider</i>		Develop and implement mitigation actions for repetitive loss properties.
Flood	<i>Consider</i>		Establish flood mitigation priorities for critical facilities and residential and commercial buildings located within the 100- year floodplain using survey elevation data.
Flood	<i>Consider</i>		Implement mitigation measures identified by critical facilities' owners, and other facility owners, to protect facilities located within the 100-year floodplain.

Table 15. City of Prescott Mitigation Actions Considered			
Hazard	Status	Comment	Description
Flood	<i>Consider</i>		Develop an outreach program to educate public concerning NFIP participation benefits, floodplain development, land use regulation, and NFIP flood insurance availability to facilitate continued compliance with the NFIP.
Flood	<i>Consider</i>		Develop, implement, and enforce floodplain management ordinances.
Flood	<i>Consider</i>		Acquire, relocate, elevate, or otherwise flood-proof critical facilities.
Flood	<i>Consider</i>		Develop, or revise, adopt, and enforce storm water ordinances and regulations to manage run-off from new development, including buffers and retention basins.
Flood	<i>Consider</i>		Create detention storage basins, ponds, reservoirs etc. to allow water to temporarily accumulate. Water ultimately returning to its watercourse at a reduced flow rate.
Flood	<i>Consider</i>		Provide flood protection to mitigate damage and contamination of wastewater systems.
Flood	<i>Consider</i>		Develop and incorporate mitigation provisions and recommendations into zoning ordinances and community development processes to maintain the floodway and protect critical infrastructure and private residences from other hazard areas.
Flood	<i>Consider</i>		Identify and list repetitively flooded structures and infrastructures, analyze the threat to these facilities, and prioritize mitigation actions to acquire, relocate, elevate, and/or flood proof to protect the threatened population.
Flood	<i>Consider</i>		Perform hydrologic and hydraulic engineering, and drainage studies and analyses. Use information obtained for feasibility determination and project design. This information should be a key component, directly related to a proposed project.
Winter Storm			
Winter Storms	<i>Consider</i>		Develop and implement programs to coordinate maintenance and mitigation activities to reduce risk to public infrastructure from severe winter storms.

Table 15. City of Prescott Mitigation Actions Considered			
Hazard	Status	Comment	Description
Winter Storms	<i>Consider</i>		Develop critical facility list needing emergency back-up power systems, prioritize, seek funding and implement mitigation actions.
Winter Storms	<i>Consider</i>		Develop and maintain severe winter storm public outreach program defining mitigation activity benefits through educational outreach aimed at households and businesses while targeting of special needs populations.
Winter Storms	<i>Consider</i>		Develop and implement tree clearing mitigation programs to keep trees from threatening lives, property, and public infrastructure from severe weather events.
Winter Storms	<i>Consider</i>		Develop, implement, and maintain partnership program with electrical utilities to use underground utility placement methods where possible to reduce or eliminate power outages from severe winter storms. Consider developing incentive programs.
Winter Storms	<i>Consider</i>		Develop early warning test program partnering with NOAA, City Police, Fire Departments, and Volunteer Fire Department to coordinate tests.
Winter Storms	<i>Consider</i>		Review critical facilities and government building energy efficiency, winter readiness, and electrical protection capability. Identify, prioritize, and implement infrastructure upgrade or rehabilitation project prioritization and development.
Landslide			
Landslide	<i>Consider</i>		Complete a landslide location inventory, identify threatened critical facilities and other buildings and infrastructure.
Landslide	<i>Consider</i>		Develop prioritized list of mitigation actions for threatened critical facilities and other buildings or infrastructure.
Landslide	<i>Consider</i>		Develop process to limit future development in steep slope areas (permitting, geotechnical review, soil stabilization techniques, etc).
Landslide	<i>Consider</i>		Update the storm water management plan to include regulations to control runoff, both for flood reduction and to minimize saturated soils on steep slopes that can cause landslides.
Landslide	<i>Consider</i>		Develop comprehensive geological landslide and rockslide prone area maps.

Table 15. City of Prescott Mitigation Actions Considered			
Hazard	Status	Comment	Description
Landslide	<i>Consider</i>		Identify and seasonally restrict construction activities in steep slope areas.
Wildland Fire			
Wildland Fire	<i>Consider</i>		Identify critical facilities and vulnerable populations based on mapped high hazard areas.
Wildland Fire	<i>Consider</i>		Identify evacuation routes away from high hazard areas and develop outreach program to educate the public concerning warnings and evacuation procedures.
Wildland Fire	<i>Consider</i>		Develop Community Wildland Fire Protection Plans for all at-risk communities.
Wildland Fire	<i>Consider</i>		Hold FireWise workshop to educate residents and contractors concerning fire resistant landscaping.
Wildland Fire	<i>Consider</i>		Promote FireWise building siting, design, and construction materials.
Wildland Fire	<i>Consider</i>		Develop FireWise Public Service Announcements (PSA).
Wildland Fire	<i>Consider</i>		Provide wildland fire information in an easily distributed format for all residents.
Wildland Fire	<i>Consider</i>		Schedule and perform government facility "fire drills" at least twice per year.
Wildland Fire	<i>Consider</i>		Develop, adopt, and enforce burn ordinances that require burn permits, restricts campfires, and controls outdoor burning.
Wildland Fire	<i>Consider</i>		Develop outreach program to educate and encourage fire-safe construction practices for existing and new construction in high risk areas.
Wildland Fire	<i>Consider</i>		Identify, develop, and implement, and enforce mitigation actions such as fuel breaks and reduction zones for potential wildland fire hazard areas.
Earthquake			
Earthquake	<i>Consider</i>		Supplement State Seismic Needs Analysis data (schools, fire, law enforcement). Complete inventory of public and commercial buildings that may be particularly vulnerable to earthquake damage.
Earthquake	<i>Consider</i>		Identify high seismic hazard areas; develop a wood-frame residential building inventory and an outreach program to educate population concerning facilities particularly vulnerable to

Table 15. City of Prescott Mitigation Actions Considered			
Hazard	Status	Comment	Description
			earthquake damage, such as pre-1940s homes and homes with cripple wall foundations.
Earthquake	Consider		Disseminate FEMA pamphlets to educate and encourage homeowners concerning seismic structural and non-structural retrofit benefits.
Earthquake	Ongoing		Retrofit important public facilities with significant seismic vulnerabilities, such as unreinforced masonry construction.
Earthquake	Completed		Retrofit bridges that are not seismically adequate for lifeline transportation routes.
Earthquake	Ongoing		Update existing (or adopt the most current) Uniform Building Code
Earthquake	Ongoing		Implement and enforce the Uniform, International, and State Building Codes.
Earthquake	Ongoing		Inspect and/or certify all new construction.
Earthquake	Ongoing		Develop outreach program to educate residents concerning benefits of increased seismic resistance and modern building code compliance during rehabilitation or major repairs for residences or businesses.
Earthquake	Ongoing		Inspect, prioritize, and retrofit any critical facility or public infrastructure that does not meet current Building Codes.
Earthquake	Ongoing		Evaluate critical public facility seismic performance for fire stations, public works buildings, potable water systems, wastewater systems, electric power systems, and bridges within the jurisdiction.
Earthquake	Consider		Develop outreach program for educating private facility owners/operators concerning alternative or emergency power source acquisition to enable them to deliver food, fuel, and medical services during disaster emergency response and recovery efforts.
Earthquake	Ongoing		Encourage utility companies to evaluate and harden vulnerable infrastructure elements for sustainability.
Earthquake	Ongoing		Develop partnerships to mitigate hazards that result in jurisdictional facility lifeline or emergency transportation route closures.
Volcano			

Table 15. City of Prescott Mitigation Actions Considered			
Hazard	Status	Comment	Description
Volcano	Consider		Update public emergency notification procedures and develop an outreach program for ash fall events.
Volcano	Consider		Update emergency response planning and develop client focused outreach program for ash fall events affecting river, air, and highway transportation, and industrial facilities and operations.
Volcano	Consider		Evaluate ash impact on storm water drainage system and develop mitigation actions.
Wind			
Wind	<i>Consider</i>		Review ordinances and develop outreach programs to assure manufactured buildings are protected from severe wind and flood hazards. (Anchoring, elevation, siting, and other methods as applicable)
Wind	Consider		Identify and prioritize critical facilities' overhead utilities that could be placed underground to reduce power disruption from wind storm / tree blow down damage.
Wind	<i>Consider</i>		Revise requirements to place utilities underground to reduce power disruption from wind storm / tree blow down damage when upgrading or during new development.
Wind	<i>Consider</i>		Increase power line wire size and incorporate quick disconnects (break away devices) to reduce ice load power line failure during severe wind or winter ice storm events.
Erosion			
Erosion	Consider		Maintain and update erosion hazard locations, identify critical facilities potentially impacted and develop and implement mitigation initiatives such as bank stabilization or facility relocation to prevent or reduce the threat.
Erosion	Consider		Apply for grants/funds to implement riverbank protection methods.
Erosion	Consider		Periodically provide available information to residents on riverbank erosion and methods to prevent it in an easily distributed format.
Erosion	Consider		Install riprap, or pilings to harden or "armor" a stream bank where severe erosion occurs.

Table 15. City of Prescott Mitigation Actions Considered			
Hazard	Status	Comment	Description
Erosion	Consider		Install bank protection such as rock, concrete, asphalt, vegetation, or other armoring or protective materials to provide river bank protection.
Erosion	Consider		Harden culvert entrance with asphalt, concrete, rock, to reduce erosion or scour.
Erosion	Consider		Construct a structure to dissipate energy or reduce flow velocity to prevent erosion of the streambed and banks.

Mitigation Action Plan

The Steering Committee has evaluated and prioritized each of the considered mitigation actions to determine which would be included in the Mitigation Action Plan. The Committee then determined the responsible agency and potential funding sources. The Mitigation Action Plan represents mitigation projects and programs to be implemented through the cooperation of multiple entities.

Upon review, the Steering Committee assigned a high priority ranking to actions that best fulfill the goals of the HMP and are appropriate and feasible for the City and responsible entities to implement during the 5-year lifespan of this version of the HMP. As such, the Steering Committee determined that only the mitigation actions that received a high priority ranking would be included in the City's Mitigation Action Plan. Table C-14 depicts the City's mitigation actions grouped by hazard and in descending priority order within each hazard.

Table 16. Columbia City Mitigation Action Plan Matrix					
Hazard	Description	Managing Department / Agency	Timeframe	Potential Funding Source(s)	Benefit-Costs / Technical Feasibility
Multi-Hazard (MH)					
MH	Purchase and install generators with main power distribution disconnect switches for identified and prioritized critical facilities susceptible to short term power disruption. (i.e. first responder and				

	schools, and water and sewage pump stations, etc.)				
MH	Electronic surge protection devices on critical electronic components such as warning systems, communications equipment, and computers for critical facilities.				
MH	Update or develop, implement, and maintain jurisdictional debris management plans.				
MH	Develop and implement strategies and educational outreach programs for debris management.				
MH	Cross reference and incorporate mitigation planning provisions into all community planning processes such as comprehensive, capital improvement, land use, transportation plans, etc. to demonstrate multi-benefit considerations and facilitate using multiple funding source consideration.				
MH	Develop outreach program for educating private facility owners/operators concerning alternative or emergency power source acquisition to enable them to deliver services during disaster emergency response and recovery efforts.				
MH	Develop critical facility list needing emergency back-up power systems, prioritize, seek funding and implement mitigation actions.				
MH	Update public emergency notification procedures and develop an outreach program for all emergencies				
Flood					
Flood	Develop, implement, and enforce floodplain management ordinances.				
Flood	Develop, or revise, adopt, and enforce storm water ordinances and regulations to manage run-off from new				

	development, including buffers and retention basins.				
Flood	Create detention storage basins, ponds, reservoirs etc. to allow water to temporarily accumulate. Water ultimately returning to its watercourse at a reduced flow rate.				
Flood	Implement flood protection to mitigate damage and contamination of wastewater systems.				
Winter Storm					
Winter Storm	Develop and implement programs to coordinate maintenance and mitigation activities to reduce public infrastructure from severe winter storms.				
Winter Storm	Review critical facilities and government building energy efficiency, winter readiness, and electrical protection capability. Identify, prioritize, and implement infrastructure upgrade or rehabilitation project prioritization and development.				
Landslide					
Landslide	Develop process to limit future development in steep slope areas (permitting, geotechnical review, soil stabilization techniques, etc).				
Wildland Fire					
Wildland Fire	Develop Community Wildland Fire Protection Plan				
Wildland Fire	Provide wildland fire information in an easily distributed format for all residents.				
Wildland Fire	Develop, adopt, and enforce burn ordinances that require burn permits, restricts campfires, and controls outdoor burning.				
Earthquake					
EQ	Identify, evaluate, and prioritize critical public facilities' seismic performance.				

<i>Volcano</i>					
Volcano	Evaluate ash impact on storm water drainage system and develop mitigation actions.				
<i>Wind</i>					
Wind	Identify and prioritize critical facilities' overhead utilities that could be placed underground to reduce power disruption from wind storm / tree blow down damage.				
<i>Erosion</i>					
Erosion	Maintain and update erosion hazard locations, identify critical facilities potentially impacted and develop and implement mitigation initiatives				
Erosion	Periodically provide available information to residents on riverbank erosion and methods to prevent it in an easily distributed format.				
Erosion	Install riprap, or pilings to harden or "armor" a stream bank where severe erosion occurs.				

Plan Adoption and Maintenance

The following section provides documentation of the formal adoption of this annex by the governing board of the district or the city council/county commission of the jurisdiction. It also identifies the standing committee that will be responsible for future reviews between update periods.

DMA 2000 Requirements: Plan Review, Evaluation, Implementation, and Adoption	
Planning Requirements	
§201.6(d)(3)	A local jurisdiction must review and revise its plan to reflect changes in development, progress in local mitigation efforts, and changes in priorities, and resubmit if for approval within 5 years in order to continue to be eligible for mitigation project grant funding.
§201.6(c)(5)	The plan shall include...] Documentation that the plan has been formally adopted by the governing body of the jurisdiction requesting approval of the plan (e.g., City Council, County commissioner, Tribal Council). For multi-jurisdictional plans, each jurisdiction requesting approval of the plan must document that it has been formally adopted.
Planning Elements	
D1. Was the plan revised to reflect changes in development? 44 CFR 201.6(d)(3)	
D2. Was the plan revised to reflect progress in local mitigation efforts? 44 CFR 201.6(d)(3)	
D3. Was the plan revised to reflect changes in priorities? 44 CFR 201.6(d)(3)	
E1. Does the Plan include documentation that the plan has been formally adopted by the governing body of the jurisdiction requesting approval? 44 CFR 201.6(c)(5)	
E2. For multi-jurisdictional plans, has each jurisdiction requesting approval of the plan documented formal plan adoption? 44 CFR 201.6(c)(5)	

Resolution of Adoption

(Example) BEFORE THE BOARD OF COUNTY COMMISSIONERS FOR COLUMBIA COUNTY, OREGON

In the Matter of Adopting the 2014) Columbia County Multi-Jurisdictional) RESOLUTION NO. 40-2014 Hazard
Mitigation Plan Update)

WHEREAS, Columbia County, Oregon has experienced repetitive disasters that have
damaged commercial, residential and public properties, displaced citizens and businesses, and
presented general public health and safety concerns; and

WHEREAS, Columbia County has prepared a Multi-Jurisdictional Hazard Mitigation Plan that outlines the options to
reduce overall damage and impact from natural hazards; and

WHEREAS, the Multi-Jurisdictional Hazard Mitigation Plan has been reviewed by community residents, business
owners, and federal, state and local agencies, and has been revised to reflect their concerns;

NOW, THEREFORE, BE IT RESOLVED that:

1. 1. The Multi-Jurisdictional Hazard Mitigation Plan is hereby adopted as an official plan of Columbia County.
2. 2. A Hazard Mitigation Planning Group is hereby established as a permanent advisory body. The Hazard Mitigation
Planning Coordinator shall designate its members, subject to the approval of the County and the
participating jurisdictions. They shall serve one-year terms. The group's duties shall be as
designated in the Hazard Mitigation Plan.
3. 3. The Hazard Mitigation Planning Coordinator is charged with supervising the
implementation of the Plan's recommendations within the funding limitations as provided by Columbia
County or other sources.
4. 4. The Hazard Mitigation Planning Coordinator shall give priority attention to the goals identified in Table A-13 of the
Columbia County Appendix, and the actions listed in Table A-14 of the Columbia
County Appendix to the Hazard Mitigation Plan and;
5. 5. The Hazard Mitigation Planning Coordinator shall convene the hazard mitigation planning group annually. The
planning group shall monitor implementation of the plan and shall submit an annual review
worksheet to the Board of County Commissioners in accordance with the following format:
 - a. A review of the original plan.
 - b. A review of any disasters or emergencies that occurred during the previous calendar year.
 - c. A review of the actions taken, including what was accomplished during the previous year.
 - d. A discussion of any implementation problems.
 - e. Recommendations for new projects or revised action items. Such recommendations shall be subject to approval
by the Columbia County.

Dated this 27th day of August, 2014.

BOARD OF COUNTY COMMISSIONERS FOR COLUMBIA COUNTY, OREGON

By: _____ Anthony Hyde, Chair

By: _____ Henry Heimuller, Commissioner

By: _____ Earl Fisher, Commissioner

Standing Review Committee

The following table identifies the members of the Standing committee that will meet quarterly to review the HMP annex and provide a running update.

Table 17. City of Prescott Standing Hazard Mitigation Committee	
Name	Agency/Department/Affiliation
Joyce Rivas	Mayor
Karlyn Gedrose	Prescott City Recorder
Frank Oliver	Prescott City Council
James Larson	Prescott City Council
Michael Blair	Prescott City Council
Keli Von Pinnon	Prescott City Treasurer

City of Scappoose
Hazard Mitigation Plan
Annex

2020 Update
Columbia County
Multi-Jurisdiction Hazard Mitigation Plan

Contents

Introduction	2
Planning Process and Capability Assessment	2
DMA 2000 Requirements: Planning Process	2
Steering Committee Participants	3
Public Participation.....	3
Capability Assessment	6
Hazard Identification and Vulnerability Assessment	10
DMA 2000 Requirements: Hazard Identification and Risk Assessment	10
Hazard Identification	10
Specific Impacts of Identified Hazards	11
Values at Risk.....	15
Population Analysis	15
Asset Inventory.....	16
National Flood Insurance Policy	18
Vulnerability Analysis	19
Mitigation Strategy.....	23
DMA 2000 Requirements: Mitigation Strategy	23
Identify Mitigation Goals	24
Evaluate and Prioritize Mitigation Actions	24
Mitigation Action Plan	31
Plan Adoption and Maintenance.....	35
DMA 2000 Requirements: Plan Review, Evaluation, Implementation, and Adoption...	35
Resolution of Adoption.....	36
Standing Review Committee	37

Introduction

This Annex contains specific City of Scappoose information to support the Columbia County 2020 Multi-Jurisdictional Hazard Mitigation Plan. This section further supports the County's planning process by summarizing the review and incorporation of existing plans, studies, and reports used to develop this MHMP. This annex is an addition to Columbia County's Hazard Mitigation Plan and shares attributes of that plan.

Planning Process and Capability Assessment

The following section includes a detailed capability assessment that describes the resources available to support this plan. The goal of this assessment is not to identify all capabilities the organization may have, but only those that are currently used or could be used to support mitigation efforts. Capabilities are arranged in tables by type and fall under the explicit authority of the jurisdiction/district.

DMA 2000 Requirements: Planning Process	
Planning Requirements	
§201.6(b)	An open public involvement process is essential to the development of an effective plan. In order to develop a more comprehensive approach to reducing the effects of natural disasters, the planning process shall include:
§201.6(b)(1)	(1) An opportunity for the public to comment on the plan during the drafting stage and prior to plan approval;
§201.6(b)(2)	(2) An opportunity for neighboring communities, local and regional agencies involved in hazard mitigation activities, and agencies that have the authority to regulate development, as well as businesses, academia and other private and non-profit interests to be involved in the planning process; and
§201.6(b)(3)	(3) Review and incorporation, if appropriate, of existing plans, studies, reports, and technical information.
§201.6(c)(1)	[The plan shall document] the planning process used to develop the plan, including how it was prepared, who was involved in the process, and how the public was involved.
§201.6(c)(4)(i)	[The plan maintenance process shall include a] section describing the method and schedule of monitoring, evaluating, and updating the mitigation plan within a five-year cycle.
§201.6(c)(4)(iii)	[The plan maintenance process shall include a] discussion on how the community will continue public participation in the plan maintenance process.
Planning Elements	
A1. Does the Plan document the planning process, including how it was prepared and who was involved in the process for each jurisdiction? 44 CFR 201.6(c)(1)	
A2. Does the Plan document an opportunity for neighboring communities, local and regional agencies involved in hazard mitigation activities, agencies that have the authority to regulate development as well as other interests to be involved in the planning process? 44 CFR 201.6(b)(2)	

A3. Does the Plan document how the public was involved in the planning process during the drafting stage? 44 CFR 201.6(b)(1) and 201.6(c)(1)

A4. Does the Plan document the review and incorporation of existing plans, studies, reports, and technical information? 44 CFR 201.6(b)(3)

A5. Is there discussion on how the communities will continue public participation in the plan maintenance process? 44 CFR 201.6(c)(4)(iii)

A6. Is there a description of the method and schedule for keeping the plan current (monitoring, evaluating and updating the mitigation plan within a 5-year cycle)? 44 CFR 201.6(c)(4)(i)

Steering Committee Participants

The City of Scappoose is dedicated to mitigating potential natural hazards to its population and infrastructure. To fulfill that goal, a Hazard Mitigation Plan Development Steering Committee was seated; dedicated to identifying hazard threats and developing actions to mitigate damage and life losses from those threats.

Table 1 records the Steering Committee's participant list.

Table 1. City of Scappoose Steering Committee	
Name	Agency/Department/Affiliation
Susan Reeves	City Administrator/Recorder - Scappoose
Kelly Niles	Oregon Department of Forestry
Michael Greisen	Scappoose Fire and Rescue
Laurie Oliver	City Planner - Scappoose
Dave Sukau	Public Works Director - Scappoose
Norman Miller	Chief of Police - Scappoose

Public Participation

As defined by FEMA, Whole Community Planning is; a means by which residents, emergency management practitioners, organizational and community leaders, and government officials can collectively understand and assess the needs of their respective communities and determine the best ways to organize and strengthen their assets, capacities, and interests. By doing so, a more effective path to societal security and resilience is built.

This Hazard Mitigation Plan was conducted with opportunities for the public to participate to try and meet the goals of whole community planning. Table 2 highlights these efforts.

Table 2. Scappoose Public Involvement Mechanisms	
Date	Description
2014	
7/19/2014	Columbia Emergency Preparedness Association EXPO – Large emergency management event covering all topics (preparedness, fire, law, mitigation, response).
11/11/2014	HSEMC – Columbia County’s Homeland Security and Emergency Management Commission is recognized by the Board of County Commissioners as the cornerstones of a whole community approach to emergency management planning. All jurisdictions are members of the commission. Semi Annual NHMP meeting, plan review was conducted.
2015	
5/12/2015	HSEMC – Columbia County’s Homeland Security and Emergency Management Commission is recognized by the Board of County Commissioners as the cornerstones of a whole community approach to emergency management planning. All jurisdictions are members of the commission. Semi Annual NHMP meeting, plan review was conducted.
11/10/2015	HSEMC – Columbia County’s Homeland Security and Emergency Management Commission is recognized by the Board of County Commissioners as the cornerstones of a whole community approach to emergency management planning. All jurisdictions are members of the commission. Semi Annual NHMP meeting, plan review was conducted.
2016	
4/2/2016	KOHI Radio Preparedness Talk – Radio talk show for Columbia County, topics “specifically included preparing for the next flood event”.
5/10/2016	HSEMC – Columbia County’s Homeland Security and Emergency Management Commission is recognized by the Board of County Commissioners as the cornerstones of a whole community approach to emergency management planning. All jurisdictions are members of the commission. Semi Annual NHMP meeting, plan review was conducted.
5/24/2016	Neighborhood Association Meeting Talk – Presentation to local HOA.
6/4/2016	Ford Family Foundation Preparedness Fair - County wide event to promote preparedness and mitigation in cooperation with the Ford Family Foundation. All cities participated.
7/23/2016	Columbia Emergency Preparedness Association EXPO – Large emergency management event covering all topics (preparedness, fire, law, mitigation, response).
9/22/2016	Columbia County Soil and Water Conservation District – Event hosted by SWCD on preparedness and flood mitigation efforts.
11/15/2016	HSEMC – Columbia County’s Homeland Security and Emergency Management Commission is recognized by the Board of County Commissioners as the cornerstones of a whole community approach to emergency management planning. All jurisdictions are members of the commission. Semi Annual NHMP meeting, plan review was conducted.
2017	
2/16/2017	Kiwanis Presentation – Preparedness Presentation on CSZ risk.
5/9/2017	HSEMC – Columbia County’s Homeland Security and Emergency Management

Table 2. Scappoose Public Involvement Mechanisms	
Date	Description
	Commission is recognized by the Board of County Commissioners as the cornerstones of a whole community approach to emergency management planning. All jurisdictions are members of the commission. Semi Annual NHMP meeting, plan review was conducted.
11/14/2017	HSEMC – Columbia County’s Homeland Security and Emergency Management Commission is recognized by the Board of County Commissioners as the cornerstones of a whole community approach to emergency management planning. All jurisdictions are members of the commission. Semi Annual NHMP meeting, plan review was conducted.
11/29/2017	Unprepared showing – St. Helens - presentation of OPB documentary regarding CSZ earthquake and tsunami.
2018	
1/19/2018	Preparedness to Vets Group – Presentation to Veterans regarding personal preparedness and flood mitigation.
5/8/2018	HSEMC – Columbia County’s Homeland Security and Emergency Management Commission is recognized by the Board of County Commissioners as the cornerstones of a whole community approach to emergency management planning. All jurisdictions are members of the commission. Semi Annual NHMP meeting, plan review was conducted and plans for plan update discussed.
10/14/18	South County Chamber - Preparedness Presentation on CSZ risk.
11/13/2018	HSEMC – Columbia County’s Homeland Security and Emergency Management Commission is recognized by the Board of County Commissioners as the cornerstones of a whole community approach to emergency management planning. All jurisdictions are members of the commission. Semi Annual County-wide Hazard Mitigation meeting. Work Session on Hazard Mitigation Plan update conducted.
11/27/2018	Pints and Preparedness – various topics including Hazard mitigation, and individual preparedness.
2019	
1/22/2019	Pints and Preparedness – various topics including Hazard mitigation, and individual preparedness.
3/26/2019	Drainage Districts Mitigation – Public meetings with presentations regarding mitigation planning.
3/26/2019	Pints and Preparedness – various topics including Hazard mitigation, and individual preparedness.
5/7/2019	HSEMC – Columbia County’s Homeland Security and Emergency Management Commission is recognized by the Board of County Commissioners as the cornerstones of a whole community approach to emergency management planning. All jurisdictions are members of the commission. Semi Annual County-wide Hazard Mitigation meeting. Work Session on Hazard Mitigation Plan update conducted.
4/16/2019	Drainage Districts Mitigation – Public meetings with presentations regarding mitigation planning.
4/23/2019	Pints and Preparedness – various topics including Hazard mitigation, and individual preparedness.
9/7/2019	Preparedness for Scouts – Presentation on preparedness for all hazards.

Capability Assessment

Table 3, 4, and 5 contain the **City of Scappoose** resources used to support planning activities, including the reports and studies reviewed as part of the update process.

Regulatory Tool	Name	Effect on Hazard Mitigation
Plans	City of Scappoose Comprehensive Plan, updated 2018	Provides overall guidance for a community's land use, economic development, and resource management.
	Transportation System Plan 2016	Provides overall guidance for the community's transportation system development and resource management. 20 year planning horizon.
	City of Scappoose Water Curtailment Plan	Provides overall guidance to meet minimum supply needs encountered during water shortages.
	Columbia County Comprehensive Emergency Management Plan	Provides overall guidance for a community's disaster emergency management.
	City of Scappoose Emergency Operations Plan	Identifies emergency planning, policies, procedures, and response to extraordinary emergency situations associated with natural disasters, technological incidents, and national security emergencies.
	Parks Master Plan 2017	Provides overall guidance for the community's park system, a 20-year planning/growth process.
	Water and Wastewater Master Plans	Provides overall guidance for the community's water and wastewater use and management and future development requirements. 20 year planning horizon.
	Stormwater Master Plan	Provides overall guidance for the community's stormwater management and future development requirements. 20-year planning horizon.
Programs	National Flood Insurance Program (NFIP)	Makes affordable flood insurance available to homeowners, business owners, and renters in participating communities. In exchange, those communities must adopt and enforce minimum floodplain management regulations to reduce the risk of damage from future floods.
Policies (Municipal Codes)	City Charter	To provide for the government of Scappoose, Columbia County, Oregon; and to repeal all charter provisions of the city enacted prior to the time that this charter takes effect except as hereinafter specifically retained.
	Current State Building code	Seismic standards-updates regularly

Table 3. City of Scappoose Legal and Regulatory Resources Available for Hazard Mitigation		
Regulatory Tool	Name	Effect on Hazard Mitigation
	City of Scappoose Municipal Code	Provides the principal means for the implementation of the Scappoose Comprehensive Plan. The provisions of this Ordinance shall be deemed the minimum requirements for the preservation of the public safety, health, convenience, comfort, prosperity, and general welfare of the people of Scappoose, Oregon. Contains Floodplain, steep slope, cut and fill regulations. All development regulated by the code.
	2019 City of Scappoose Water Quality Report	An annual report of the outcome of our many water quality tests. This report explains water supply capability.
	Flood Hazard Overlay section of the City of Scappoose Development Code 01/16/18, as amended	Provides the City's Floodplain Management Program

Table 4. City of Scappoose Administrative and Technical Resources for Hazard Mitigation

Staff/Personnel Resources	Department/Division Position
Planner(s) or engineer(s) with knowledge of land development and land management practices	Planner - Laurie Oliver, CFM Engineer - Chris Negelspach, P.E.
Engineer(s) or professional(s) trained in construction practices related to buildings and/or infrastructure	Public Works Director - Dave Sukau Engineer - Chris Negelspach, P.E. Building Official - Don VanDomelen
Planner(s) or engineer(s) with an understanding of manmade or natural hazards	Planner - Laurie Oliver, CFM Engineer - Chris Negelspach, P.E. Building Official - Don VanDomelen
Floodplain manager(s)	Laurie Oliver and Chris Negelspach
Personnel skilled in GIS and/or HAZUS-MH	Geo-Comm – City’s GIS consultant
Director of Emergency Services	City Administrator (will defer to Columbia County in the event of major disaster)
Finance (grant writers, purchasing)	City Manager – Michael Sykes, Jill Herr - Finance Administrator
Public Information Officers	City Manager

Table 5. City of Scappoose Financial Resources for Hazard Mitigation

Financial Resources	Effect on Hazard Mitigation
General funds	Yes
Authority to levy taxes for specific purposes	Yes, with voter approval
Incur debt through general obligation bonds	Yes, with voter approval
Incur debt through special tax and revenue bonds	Yes, with voter approval
Incur debt through private activity bonds	No
Hazard Mitigation Grant Program (HMGP)	FEMA funding which is available to local communities after a Presidentially-declared disaster. It can be used to fund both pre- and post-disaster mitigation plans and projects.
Pre-Disaster Mitigation (PDM) grant program	FEMA funding which is available on an annual basis. This grant can only be used to fund pre-disaster mitigation plans and projects only.
Flood Mitigation Assistance (FMA) grant program	FEMA funding which is available on an annual basis. This grant can be used to mitigate repetitively flooded structures and infrastructure to protect repetitive flood structures.
United States Fire Administration (USFA) Grants	The purpose of these grants is to assist state, regional, national or local organizations to address fire prevention and safety. The primary goal is to reach high-risk target groups including children, seniors and firefighters.
Fire Mitigation Fees	Used to finance future fire protection facilities’

Table 5. City of Scappoose Financial Resources for Hazard Mitigation	
Financial Resources	Effect on Hazard Mitigation
	construction and other fire capital expenditures to protect new development. The City Council or Fire District may charge fire mitigation fees to ensure new development pays their fair share of constructing these improvements.

Hazard Identification and Vulnerability Assessment

DMA 2000 Requirements: Hazard Identification and Risk Assessment	
Planning Requirements	
§201.6(c)(2)(i)	The risk assessment shall include a] description of the type, location and extent of all-natural hazards that can affect the jurisdiction. The plan shall include information on previous occurrences of hazard events and on the probability of future hazard events.
§201.6(c)(2)(ii)	The risk assessment shall include a] description of the jurisdiction's vulnerability to the hazards described in paragraph (c)(2)(i) of this section. This description shall include an overall summary of each hazard and its impact on the community. All plans approved after October 1, 2008 must also address NFIP insured structures that have been repetitively damaged by floods. The plan should describe vulnerability in terms of:
§201.6(c)(2)(ii)(A)	(A) The types and numbers of existing and future buildings, infrastructure, and critical facilities located in the identified hazard areas;
§201.6(c)(2)(ii)(B)	(B) An estimate of the potential dollar losses to vulnerable structures identified in ... this section and a description of the methodology used to prepare the estimate.
§201.6(c)(2)(ii)(C)	(C) Providing a general description of land uses and development trends within the community so that mitigation options can be considered in future land use decisions.
§201.6(c)(2)(iii)	For multi-jurisdictional plans, the risk assessment section must assess each jurisdiction's risks where they vary from the risks facing the entire planning area.
Planning Elements	
B1. Does the Plan include a description of the type, location, and extent of all-natural hazards that can affect each jurisdiction? 44 CFR 201.6(c)(2)(i) and 44 CFR 201.6(c)(2)(iii)	
B2. Does the Plan include information on previous occurrences of hazard events and on the probability of future hazard events for each jurisdiction? 44 CFR 201.6(c)(2)(i)	
B3. Is there a description of each identified hazard's impact on the community as well as an overall summary of the community's vulnerability for each jurisdiction? 44 CFR 201.6(c)(2)(ii)	
B4. Does the Plan address NFIP insured structures within each jurisdiction that have been repetitively damaged by floods? 44 CFR 201.6(c)(2)(ii)	

Hazard Identification

The Steering Committee determined that the following hazards could potentially threaten the community. Table 6 establishes the hazard profile against which this plan is designed.

Table 6. Hazard Profile	
Natural Hazards	
Flood	X
Winter Storm	X
Landslide	X
Fire (Wildland/Urban)	X
Earthquake	X
Volcano	X
Wind	X
Erosion	X
ENSO (El Niño / La Niña)	
Expansive Soils	
Drought	X

Specific Impacts of Identified Hazards

The following section provides specific details of the vulnerabilities and impacts from natural hazards for the City of Scappoose in Table 6.

The Basic Plan of this Multi-Jurisdiction Hazard Mitigation Plan contains the full narrative Hazard Profile for the entire county, including full details for this annex. This section is designed to provide additional notes and concerns regarding hazards that can impact this jurisdiction.

Flood

FEMA FIRMs were used to outline the 100-year and 500-year floodplains for the City of Scappoose. The 100-year floodplain delineates an area of high risk, while the 500-year floodplain delineates an area of moderate risk.

There are 873 residential structures (worth \$196M), six non-residential structures (value unknown), one emergency response facility (worth \$2.4M), three community facilities (worth \$82.6K), six bridges (worth \$11.1M) and two utilities (worth \$16.1M) within the boundaries of the 100-year floodplain.

There are 1,328 residential structures (worth \$299M), seven non-residential structures (value unknown), one emergency response facility (worth \$2.4M) four community facilities (value unknown), five bridges (worth \$9M) and three utilities (worth \$20.6M) within the 500-year floodplain.

Winter Storm

The natural hazards resulting from winter storms, such as ice, cold, wind and floods, are often widespread. A single event is capable of impacting all people, critical facilities and infrastructure within the City of Scappoose, and therefore the entire population (7,200 people), including 2,512 residential structures (worth \$566.8M), 14 non-residential structures (value unknown), one government facility (worth \$1.2M), one emergency response facility (worth \$2.4M), seven educational facilities (worth \$63.3M), 16 community facilities (value \$2.6M), six bridges (worth \$11.3M), one highway (value unknown), one railroad (value unknown), two transportation facilities (value unknown), and five utilities (worth \$25.6M) are located in the winter storm area.

Landslide

The potential impacts from landslides can be widespread. Potential debris flows and landslides can impact transportation and rail routes, utility systems, and water and waste treatment infrastructure along with public, private, and business structures located adjacent to steep slopes, along riverine embankments, or within alluvial fans or natural drainages. Response and recovery efforts will likely vary from minor cleanup to more extensive utility system rebuilding. Utility disruptions are usually local and terrain dependent. Damages may require reestablishing electrical, communication, and gas pipeline connections occurring from specific breakage points. Initial debris clearing from emergency routes and high traffic areas may be required. Water and waste water utilities may need treatment to quickly improve water quality by reducing excessive water turbidity and reestablishing waste disposal capability.

USGS elevation datasets were used to determine the landslide hazard areas within the City of Scappoose. Risk was assigned based on slope angle. A slope angle less than 14 degrees was assigned a low risk, a slope angle between 14 and 32 degrees was assigned a medium risk, and a slope angle greater than 32 degrees was assigned a high risk.

There are 705 residential structures (worth \$158.6M), three non-residential structures (value unknown), two educational facilities (worth \$8.6M), three community facilities (worth \$226K), one bridge (worth \$1.5M) and two utilities (worth \$4.9M) in the medium landslide risk area. There are 344 residential structures (worth \$54.9M), three non-residential structures (value unknown), and one community facility (worth \$82K) in the high landslide risk area.

Wildland Fires

Wildland fire hazard areas were identified using a model incorporating slope, aspect, and fuel load. South-facing, steep, and heavily vegetated areas were assigned the highest fuel values while areas with little slope and natural vegetation were assigned the lowest fuel values. Risk levels of moderate, high, very high, and extreme were assigned to the entire region based on the results of this modeling.

There are 2,209 residential structures (worth \$351.6M), 14 non-residential structures (value unknown), one government facility (worth \$1.2M), one emergency response facility (worth \$2.4M), seven educational facilities (worth \$63.3M), 16 community facilities (value \$2.6M), six bridges (worth \$6M), one highway (value unknown), one railroad (value unknown), two transportation facilities (value unknown), and five utilities (worth \$25.6M) located in moderate fire risk areas.

There are 882 residential structures (worth \$140.8M), eight non-residential structures (value unknown), four community facilities (value \$288K), one transportation facility (value unknown), two bridges (worth \$2.9M), and three utilities (value \$4.9M) located in the high fire risk areas.

There are 433 residential structures (worth \$69.2M), three non-residential structures (value unknown), one community facility (worth \$82K), and two utilities (worth \$4.9M) located in very high fire risk areas. There were 116 residential structures (worth \$18.5M) and no critical facilities identified in the extreme fire risk area.

Earthquake

Based on PGA shake maps produced by the USGS, the western portion of Columbia County is likely to experience higher levels of shaking than the eastern portion, as a result of its proximity to the Cascadia Subduction Zone. Ground movement in both areas, however, is likely to cause damage to weak, unreinforced masonry buildings, and to induce small landslides along unstable slopes. As well as landslide, earthquakes can trigger other hazards such as dam failure and disruption of transportation and utility systems.

The eastern portion of Columbia County is likely to experience strong shaking should a subduction zone earthquake occur (9-20 percent of the acceleration of gravity). In contrast, the far western portion of the county is likely to experience very strong shaking (20-25 percent). This rating represents the peak acceleration of the ground caused by the earthquake.

Due to City of Scappoose's proximity to the eastern portion of the county, all people, critical facilities and infrastructure within the City of Scappoose, and therefore the entire population (7,200 people), including 2,512 residential structures (worth \$566.8M), 14 non-residential structures (value unknown), one government facility (worth \$1.2M), one emergency response facility (worth \$2.4M), seven educational facilities (worth \$63.3M), 16 community facilities (value \$2.6M), six bridges (worth \$11.1M), one highway (value unknown), one railroad (value unknown), two transportation facilities (value unknown), and five utilities (worth \$25.6M) are located in the strong shaking (9-20 percent) area.

Volcano

A volcanic eruption would have a minor impact on The City of Scappoose due to the proximity to volcanoes within the Cascade region. The major resources of concern include air quality and

waterway sedimentation. During previous eruptions, ashfall has drifted to the east of the volcanoes. (State Interagency Hazard Mitigation Team 2006)

The City of Scappoose will likely only experience damage from volcanic eruption columns and clouds which contain volcanic gases, minerals, and rock. The columns and clouds form rapidly and extend several miles above an eruption. Solid particles within the clouds present a serious aviation threat, can distribute acid rain (sulfur dioxide gas and water), can create risk of suffocation (carbon dioxide is heavier than air and collects in valleys and depressions threatening human and animals), and pose a toxic threat from fluorine which clings to ash particles potentially poisoning grazing livestock and contaminating domestic water supplies.

Buildings streets and roads throughout the city may require minor cleanup with negligible impacts. Temporary utility interruptions are likely, and minor cleanup may be required for electrical and other utility services. Water treatment facilities may require additional attention to address high turbidity water. River traffic along the Columbia River could be disrupted due to sedimentation from a large eruption from Mt. St. Helens or Hood and dredging to restore channel depths may be necessary. Injuries associated with respiratory problems may result. (Goettel 2005)

Due to the nature of the hazard, it is impossible to predict the location or extent of future events with any probability, although it can be assumed that all critical facilities and infrastructure within the City of Scappoose are at risk including the entire population (7,200 people), including 2,512 residential structures (worth \$566.8M), 14 non-residential structures (value unknown), one government facility (worth \$1.2M), one emergency response facility (worth \$2.4M), seven educational facilities (worth \$63.3M), 16 community facilities (value \$2.6M), six bridges (worth \$11.1M), one highway (value unknown), one railroad (value unknown), and five utilities (worth \$25.6M).

Wind

Many buildings, utilities and transportation systems in open areas, natural grasslands, or agricultural lands are especially vulnerable to wind damage. Impacts associated with wind can include damage to power lines, trees, and structures, and can also cause temporary disruptions of power. Additionally, high winds can cause significant damage to forestlands.

All areas within the City of Scappoose are equally at risk of a windstorm event including all people, critical facilities and infrastructure, and therefore the entire population (7,200 people), including 2,512 residential structures (worth \$566.8M), 14 non-residential structures (value unknown), one government facility (worth \$1.2M), one emergency response facility (worth \$2.4M), seven educational facilities (worth \$63.3M), 16 community facilities (value \$2.6M), six bridges (worth \$11.1M), one highway (value unknown), one railroad (value unknown), two transportation facilities (value unknown), and five utilities (worth \$25.6M).

Erosion

Riverine and stream erosion rarely causes death or injury. However, erosion causes significant destruction of property, development, and infrastructure. Erosion hazard data is not readily available; however, descriptions of several localized areas were identified during the development of this document and are identified only by location on a map referencing the river or stream reach described. Critical facilities that may be at risk of erosion were identified using a 300 foot-buffer in the areas identified as having historic erosion impacts to conservatively account for building footprints.

The City of Scappoose has 49 residential structures (worth \$7.8M), one educational facility (worth \$3.8M), and six bridges (worth \$11.1M) within potential erosion hazard areas. There is also one pump station (worth \$1.3M) and sewer and water lines (values unknown) in close proximity (within 30 feet) of Scappoose Creek which possess an erosion threat to the infrastructure.

Drought

State-wide droughts have historically occurred in Oregon, and as it is a region-wide phenomenon, all residents are equally at risk. Structural damage from drought is not expected; rather the risks are present to humans and resources. Agriculture, fishing, and timber have historically been impacted, as well as local and regional economies.

Dam Failure

US Army Corps of Engineers inundation data for the Columbia River and the PacifiCorp inundation data for the Lewis River in the State of Washington were used to determine the impacts from dam failure upriver from the City of Scappoose. There are 1,094 residential structures (worth \$246.8M), six non-residential structures (value unknown), one government facility (value \$1.2M), one emergency response facility (value \$2.4M), seven educational facilities (worth \$63.3M), seven community facilities (value \$1.8M), two bridges (worth \$3.8M), two transportation facilities (value unknown), and four utilities (value \$20.8M) located in the inundation area.

Values at Risk

Population Analysis

Population data listed in Table 7 were obtained from the 2010 U.S. Census and Portland State University. It comprises census block level data and estimates from university conducted community research.

Table 7. Population			
2000 Census	2010 Census	% Change	2018 Estimate
4,976	6,592	33%	7,200

Asset Inventory

The Asset Inventory describes the physical values; the residential building stock, public facilities, and infrastructure within each community that may be affected by hazard events and includes population, residential and nonresidential buildings, critical facilities, and infrastructure. These values are described in Tables 8 and 9 and portray the City's critical infrastructure numbers and values, and their potential vulnerability by hazard type.

City of Scappoose seeks to protect its population by supporting Columbia County and Oregon State initiatives, ordinances, building codes, and development regulations. One of the most important initiatives is to prohibit or not allow future development of buildings, infrastructure and critical facilities in identified high hazard areas. Any essential infrastructure component will undergo stringent review to ensure potential hazard risk will be mitigated.

Table 8. Residential Buildings	
Total Building Count	Total Value of Buildings (\$)
2,512	\$566,850,384

Table 9. Critical Facilities and Infrastructure			
Facility Type	Name / Number	Address	Value ¹
Government	Scappoose City Hall (includes Police Department and Municipal Court)	33568 E Columbia Ave	\$1,571,038
	Public Works Shop	34485 E Columbia Ave	\$450,000
Emergency Response	City of Scappoose Police Department	See City Hall	See City Hall
	Scappoose Fire Station - Scappoose	52751 Columbia River Hwy	\$2,660,600
Educational	Peterson Elementary	52050 SE 3 rd Street	\$16,109,880
	Grant Watts Elementary	52000 SE 3 rd Place	\$5,833,229
	Scappoose Middle School	52265 Columbia River Hwy	\$8,518,634
	Scappoose High School	33700 SE High School Way	\$28,083,935
Community	OHSU Family Medicine Clinic	51377 SW Old Portland Road	Unknown

Table 9. Critical Facilities and Infrastructure

Facility Type	Name / Number	Address	Value ¹
	Scappoose Public Library	52469 SE 2nd St	\$1,635,580
	Watts House Museum	52432 SE 1st St	Unknown
	Heritage Park	SE 2 nd Street	\$1,200,000
	Veterans Park	52590 Captain Roger Kucera Way	\$1,700,000
	Miller Park	52451 Miller Road	\$700,000
	Creek View Park	51925 SW Creek View Place	\$350,000
	Chief Comcomly Park	Seely Lane	\$1,300,000
	Scappoose Four Square Church	33404 SW JP West Rd	Unknown
	Church of Jesus Christ	53987 Columbia River Highway	Unknown
	Grace Lutheran Church	51737 South Columbia River Hwy	Unknown
	St Wenceslaus Catholic Church	51555 Old Portland Rd	Unknown
	Scappoose Senior Center	33342 SW Meadow Dr	Unknown
	Creekside Baptist Church	51681 SW Old Portland Rd	Unknown
State and Federal Highways	US 30	1.5 miles	Unknown
Railroads	Portland Western (short line with switching facility and staging line)	1.5 miles	Unknown
Transportation Facilities	Scappoose Airport (non-towered) with Heliport	Airport Road	Unknown
Bridges	Bridge #1	Hwy 30	\$2,756,000
	Bridge #2 (County #7)	EJ Smith Rd	\$1,484,000
	Bridge #3 (County #1)	EM Watts Street	\$1,696,000
	Bridge #4 (County #6)	JP West Road	\$1,696,000
	Bridge #5 (County #10)	Scappoose Vernonia Hwy	\$2,014,000
	Bridge #6 (County #121)	Dutch Canyon Road	\$1,484,000
Utilities	Wireless company/tower at high school	High School Way	Unknown
	Qwest Telephone		Unknown
	Pump House		\$93,730
	Keys Road Water Treatment Plant		\$6,360,000
	Miller Road Water Treatment Plant		\$4,770,000

Table 9. Critical Facilities and Infrastructure			
Facility Type	Name / Number	Address	Value ¹
	Wastewater Treatment Plant		\$16,000,000
	Dutch Canyon Well		\$300,000
	Miller Road Well		\$300,000
	Reservoirs (3-storage tanks; 2M, 1M and 350K gallons)		\$4,770,000
	Reservoirs (2 storage tanks; 350K and 300K gallon capacity)		\$1,600,000
	EJ Smith Waste lift station		\$1,272,000
	Hwy 30, Keys Landing, Seven Oaks and Spring Lake Lift Stations		\$1,700,000
	Columbia River PUD Power Plant/Sub Stations		Unknown
Dams	Gourley Creek Dam		\$1,596,000
	South Fork Dam		\$1,596,000
	Lacey Creek Dam		\$850,000

1 Estimated and/or insured structural value for critical facilities and estimated values for critical infrastructure.

National Flood Insurance Policy

National Flood Insurance Program data were obtained from the State Department of Land Conservation and Development. This data is significant for the vulnerability assessment as it identifies the impact of flooding, one of the most often repeated natural hazards for the county. This data is displayed in Table 10 and 10a.

Table 10. Scappoose NFIP Insurance Report										
Jurisdiction	Effective FIRM and FIS	Initial FIRM	Total Policies	Pre FIRM Policies	Policies by Building Type				Minus Rated A Zone	Minus Rated V Zone
					Single Family	2 to 4 Family	Other Residential	Non-Residential		
Scappoose	10/1/18	8/16/88	117	46	110	2	5	0	1	0

Source: FEMA Community Information System 02/21/2019

Table 10a. Scappoose NFIP Insurance Report

Jurisdiction	Insurance in Force	Total Paid Claims	Pre-Firm Claims Paid	Substantial Damage Claims	Total Paid Amount	Repetitive Loss Structures	Severe Repetitive Loss Structures	CRS Class Rating	Last Community Assistance Visit
Scappoose	\$29,773,400	17	16	0	\$113,635	1	0	8	2/19/2015

Source: FEMA Community Information System 02/21/2019

Vulnerability Analysis

A vulnerability analysis predicts the extent of exposure, and the impacts that may result from a hazard event of a given intensity in each area. The analysis provides quantitative data that may be used to identify and prioritize potential mitigation measures by allowing communities to focus attention on areas with the greatest risk of damage. A vulnerability analysis is divided into five steps including asset inventory, methodology, data limitations, exposure analysis for current assets, and areas of future development.

The following is derived from the best available data for facility locations and values. In many cases, values were unavailable, and therefore the totals listed below should be considered incomplete and likely less than the actual costs associated with the respective hazards.

The vulnerability analysis development process is thoroughly discussed in the Columbia County Basic Plan, Section 6, which generated the following Hazard Exposure Analysis Overviews in Tables 11, 12, and 13.

Table 11. City of Scappoose Potential Hazard Exposure Analysis Overview							
Population and Buildings							
			Population	Buildings			
				Residential		Non-Residential	
Hazard Type	Hazard Area	Methodology	Number	Number	Value (\$) ⁱ	Number	Value (\$)
Flood	Moderate	500-year floodplain	--	1,328	299,000,000	7	unknown
	High	100-year floodplain	--	873	196,000,000	6	unknown
Winter Storm		descriptive	7,200	2,512	566,800,000	14	unknown
Landslide	Moderate	>14-32 degrees	--	705	158,600,000	3	unknown
	High	>32-56 degrees	--	344	54,900,000	3	unknown
Wildland Fire	Moderate	Moderate fuel rank	--	2,209	351,600,000	14	unknown
	High	High fuel rank	--	882	140,800,000	8	unknown
	Very High	Very high fuel rank	--	433	69,200,000	3	unknown
	Extreme	Extreme fuel rank	--	116	18,500,000	0	unknown
Earthquake	Strong	9-20% (g)	--	2,512	566,800,000	14	unknown
	Very strong	20-40% (g)	--	0	--	0	unknown
	Severe	>40-60% (g)	--	0	--	0	unknown
Volcano		descriptive	7,200	2,512	566,800,000	14	unknown
Wind		descriptive	7,200	2,512	566,800,000	14	unknown
Erosion		within 300' of potential areas of erosion	--	49	7,800,000	unknown	unknown
Drought		Descriptive	--	--	--	--	unknown

Table 12. Scappoose Potential Hazard Exposure Analysis Overview

Critical Facilities

			Government		Emergency Response		Educational		Care		Community	
Hazard Type	Hazard Area	Methodology	No.	\$	No.	\$	No.	\$	No.	\$	No.	\$
Flood	Moderate	500-year floodplain	--	--	1	2.4M	2	13.3M	--	--	4	N/A
	High	100-year floodplain	--	--	1	2.4M	1	3.6M			3	82K
Winter Storm		Descriptive	1	1.2M	1	2.4M	7	63.3M			16	2.6M
Landslide	Moderate	>14-32 degrees	--	--	--	--	2	8.6M			3	226K
	High	>32-56 degrees	--	--	--	--					1	82K
Wildland Fire	Moderate	Moderate fuel rank	1	1.2M	1	2.4M	7	63.3M	--	--	16	2.6M
	High	High fuel rank	--	--	--	--	--	--	--	--	4	288K
	Very High	Very high fuel rank	--	--	--	--	--	--	--	--	1	82K
	Extreme	Extreme fuel rank	--	--	--	--	--	--	--	--	--	--
Earthquake	Strong	9-20% (g)	1	1.2M	1	2.4M	7	63.3M	--	--	16	2.6M
	Very strong	20-40% (g)	--	--	--	--	--	--	--	--	--	--
	Severe	>40-60% (g)	--	--	--	--	--	--	--	--	--	--
Volcano		Descriptive	1	1.2M	1	2.4M	7	63.3M	--	--	16	2.6M
Wind		Descriptive	1	1.2M	3	2.4M	7	63.3M	--	--	16	2.6M
Erosion		within 300' of potential areas of erosion	1	1.3M	--	--	1	3.8M	--	--	--	--

Table 13. Scappoose Potential Hazard Exposure Analysis Overview

Critical Infrastructure

			Highways		Railroads		Bridges		Transportation Facilities		Utilities		Dams	
Hazard Type	Hazard Area	Methodology	Miles	Value (\$)	Miles	Value (\$)	No.	Value (\$)	No.	Value (\$)	No.	Value (\$)	No.	Value (\$)
Flood	Moderate	500-year floodplain	--	--	--	--	5	9M	--	--	3	20.6M	--	--
	High	100-year floodplain	--	--	--	--	6	11.1M	--	--	2	16.1M	--	--
Winter Storm	Moderate		1.5	unknown	1.5	unknown	6	11.1M	2	unknown	5	25.6M	--	--
Landslide	Moderate	>14-32 degrees	1.5	unknown	1.5	unknown	1	1.5M	--	--	2	4.9M	--	--
	High	>32-56 degrees	--	--	--	--	--	--	--	--	--	--	--	--
Wildland Fire	Moderate	Moderate fuel rank	1	unknown	1	Unknown	6	11.1M	2	unknown	5	25.6M	--	--
	High	High fuel rank	--	--	--	--	--	--	--	--	3	4.9M	--	--
	Very High	Very high fuel rank	--	--	--	--	--	--	--	--	--	--	--	--
	Extreme	Extreme fuel rank	--	--	--	--	--	--	--	--	--	--	--	--
Earthquake	Strong	9-20% (g)	1	unknown	1	Unknown	6	11.1M	2	unknown	5	25.6M	--	--
	Very strong	20-40% (g)	--	--	--	--	--	--	--	--	--	--	--	--
	Severe	>40-60% (g)	--	--	--	--	--	--	--	--	--	--	--	--
Volcano		Descriptive	1	unknown	1	unknown	6	11.1M	2	unknown	5	25.6M	--	--
Wind		Descriptive	1	unknown	1	unknown	6	11.1M	2	unknown	5	25.6M	--	--
Erosion		within 300' of potential areas of erosion	--	--	--	--	6	10.7M	--	--	--	--	--	--

Mitigation Strategy

The following section defines mitigation action identification and analysis as stipulated in DMA 2000 and its implementing regulations.

DMA 2000 Requirements: Mitigation Strategy	
Planning Requirements	
§201.6(c)(3)	The plan shall include the following:] A mitigation strategy that provides the jurisdiction’s blueprint for reducing the potential losses identified in the risk assessment, based on existing authorities, policies, programs, and resources, and its ability to expand on and improve these existing tools.
§201.6(c)(3)(i)	The hazard mitigation strategy shall include a] description of mitigation goals to reduce or avoid long-term vulnerabilities to the identified hazards.
§201.6(c)(3)(ii)	The hazard mitigation strategy shall include a] section that identifies and analyzes a comprehensive range of specific mitigation actions and projects being considered to reduce the effects of each hazard, with particular emphasis on new and existing buildings and infrastructure. All plans approved by FEMA after October 1, 2008, must also address the jurisdiction’s participation in the NFIP, and continued compliance with NFIP requirements, as appropriate.
§201.6(c)(3)(iii)	The hazard mitigation strategy shall include an] action plan, describing how the action identified in paragraph (c)(3)(ii) of this section will be prioritized, implemented, and administered by the local jurisdiction. Prioritization shall include a special emphasis on the extent to which benefits are maximized according to a cost benefit review of the proposed projects and their associated costs.
§201.6(c)(3)(iv)	For multi-jurisdictional plans, there must be identifiable action items specific to the jurisdiction requesting FEMA approval or credit of the plan.
§201.6(c)(4)(ii)	The plan shall include a] process by which local governments incorporate the requirements of the mitigation plan into other planning mechanisms such as comprehensive or capital improvements, when appropriate.
Planning Elements	
C1. Does the plan document each jurisdiction’s existing authorities, policies, programs and resources, and its ability to expand on and improve these existing policies and programs? 44 CFR 201.6(c)(3)	
C2. Does the Plan address each jurisdiction’s participation in the NFIP and continued compliance with NFIP requirements, as appropriate? 44 CFR 201.6(c)(3)(ii)	
C3. Does the Plan include goals to reduce/avoid long-term vulnerabilities to the identified hazards? 44 CFR 201.6(c)(3)(i)	
C4. Does the Plan identify and analyze a comprehensive range of specific mitigation actions and projects for each jurisdiction being considered to reduce the effects of hazards, with emphasis on new and existing buildings and infrastructure? 44 CFR 201.6(c)(3)(ii) and 44 CFR 201.6(c)(3)(iv)	
C5. Does the Plan contain an action plan that describes how the actions identified will be prioritized	

(including cost benefit review), implemented, and administered by each jurisdiction? 44 CFR 201.6(c)(3)(iii) and 44 CFR (c)(3)(iv)

C6. Does the Plan describe a process by which local governments will integrate the requirements of the mitigation plan into other planning mechanisms, such as comprehensive or capital improvement plans, when appropriate? 44 CFR 201.6(c)(4)(ii)

Identify Mitigation Goals

Scappoose reviewed the Columbia County goals and determined they meet the City's needs and subsequently adopted the Goals in Table 14 for the current planning period.

Table 14. Scappoose Mitigation Goals	
Goal Number	Goal Description
1	Reduce the Threat to Life Safety Enhance life safety by minimizing the potential for deaths and injuries in future disaster events.
2	Protect Critical Facilities and Enhance Emergency and Essential Services • Implement activities or projects to protect critical facilities and infrastructure. • Seek opportunities to enhance, protect, and integrate emergency and essential services. • Strengthen emergency operations plans and procedures by increasing collaboration and coordination among public agencies, non-profit organizations, businesses, and industry.
3	Reduce the Threat to Property • Seek opportunities to protect, enhance and integrate emergency and essential services. • Strengthen emergency operations plans and procedures by increasing collaboration and coordination among public agencies, non-profit organizations, businesses, industries and the citizens of Columbia City.
4	Create a Disaster Resistant and Disaster-Resilient Economy • Develop and implement activities to protect economic well-being and vitality while reducing economic hardship in post disaster situations. • Reduce insurance losses and repetitive claims for chronic hazard events. • Work with State and Federal Partners to reduce short-term and long-term recovery and reconstruction costs. • Work with local and County organizations, such as Columbia Emergency Planning Association (CEPA). • Expedite pre-disaster and post-disaster grants and program funding.
5	Increase Public Awareness, Education, Outreach, and Partnerships • Coordinate and collaborate, where possible, risk reduction outreach efforts with the Oregon Partners for Disaster Resistance & Resilience and other public and private organizations. • Develop and implement risk reduction education programs to increase awareness among citizens, local, county, and regional agencies, non-profit organizations, businesses, and industry. • Promote insurance coverage for catastrophic hazards • Strengthen communication and coordinate participation in and between public agencies, citizens, nonprofit organizations, businesses, and industry.

Evaluate and Prioritize Mitigation Actions

Mitigation actions are activities, measures, or projects that help achieve the goals of a mitigation plan. Table 15 lists the mitigation actions developed during this mitigation planning process or offered during whole community planning activities. It is not intended that this plan will attempt

to act on all of these action items, but the list will be maintained in order to provide documentation for future planning efforts.

Table 15. Scappoose Mitigation Actions Considered			
Hazard	Status	Comment	Description
Natural Hazards			
<i>Multi-Hazard (MH)</i>			
MH	Consider		Develop, implement, and maintain jurisdictional debris management plans.
MH	Ongoing		Develop and incorporate ordinances commensurate with development and building codes to reflect survivability from wind, seismic, fire, and other hazards to ensure occupant safety.
MH	Ongoing		Review ordinances and develop outreach programs to assure manufactured homes and buildings are protected from severe wind and flood hazards. (Anchoring, elevation, and other methods as applicable)
MH	Ongoing		Cross reference and incorporate mitigation planning provisions into all community planning processes such as comprehensive, capital improvement, land use, transportation plans, etc to demonstrate multi-benefit considerations and facilitate using multiple funding source consideration.
MH	Ongoing		Purchase and install generators with main power distribution disconnect switches for identified and prioritized critical facilities susceptible to short term power disruption. (i.e. first responder and schools, and water and sewage pump stations, etc.)
MH	Ongoing		Electronic surge protection devices on critical electronic components such as warning systems, communications equipment, and computers for critical facilities.
MH	Ongoing		Distribute information materials concerning mitigation, preparedness, and safety procedures for all natural hazards.
MH	Ongoing		Explore the need for, develop, and implement hazard zoning ordinances for high-risk hazard area land-use.
MH	Consider		Retrofit structures to protect them from seismic, floods, high winds, earthquakes, or other natural hazards.

Table 15. Scappoose Mitigation Actions Considered			
Hazard	Status	Comment	Description
MH	Consider		Acquire, demolish, or relocate structures from hazard prone area. Property deeds shall be restricted for open space uses in perpetuity to keep people from rebuilding in hazard areas.
MH	Consider		Harden utility headers located along river embankments to mitigate potential flood, debris, and erosion damages.
MH	Ongoing		Establish a formal role for the jurisdictional Hazard Mitigation Planning Committees to develop a sustainable process to implement, monitor, and evaluate citywide mitigation actions.
MH	Ongoing		Identify and pursue funding opportunities to implement mitigation actions.
MH	Ongoing		Develop public and private sector partnerships to foster hazard mitigation activities.
MH	Ongoing		Integrate the Mitigation Plan findings into planning and regulatory documents and programs and into enhanced emergency planning.
Flood			
Flood	Consider		Develop and maintain GIS mapped critical facility inventory for all structures located within 100-year and 500-year floodplains.
Flood	Consider		Develop and maintain GIS mapped inventory, and develop prioritized list of residential and commercial buildings within 100-year and 500-year floodplains.
Flood	Consider		Develop and maintain GIS mapped inventory of repetitive loss properties to include the types and numbers of properties.
Flood	Ongoing		Develop and implement mitigation actions for repetitive loss properties.
Flood	Ongoing		Establish flood mitigation priorities for critical facilities and residential and commercial buildings located within the 100- year floodplain using survey elevation data.
Flood	Ongoing		Implement mitigation measures identified by critical facilities' owners, and other facility owners, to protect facilities located within the 100-year floodplain.
Flood	Ongoing		Develop an outreach program to educate public

Table 15. Scappoose Mitigation Actions Considered			
Hazard	Status	Comment	Description
			concerning NFIP participation benefits, floodplain development, land use regulation, and NFIP flood insurance availability to facilitate continued compliance with the NFIP.
Flood	Ongoing		Develop, implement, and enforce floodplain management ordinances.
Flood	Consider		Acquire, relocate, elevate, or otherwise flood-proof critical facilities.
Flood	Ongoing		Develop, or revise, adopt, and enforce storm water ordinances and regulations to manage run-off from new development, including buffers and retention basins.
Flood	Ongoing		Create detention storage basins, ponds, reservoirs etc. to allow water to temporarily accumulate. Water ultimately returning to its watercourse at a reduced flow rate.
Flood	Ongoing		Provide flood protection to mitigate damage and contamination of wastewater systems.
Flood	Ongoing		Develop and incorporate mitigation provisions and recommendations into zoning ordinances and community development processes to maintain the floodway and protect critical infrastructure and private residences from other hazard areas.
Flood	Ongoing		Identify and list repetitively flooded structures and infrastructures, analyze the threat to these facilities, and prioritize mitigation actions to acquire, relocate, elevate, and/or flood proof to protect the threatened population.
Flood	Ongoing		Perform hydrologic and hydraulic engineering, and drainage studies and analyses. Use information obtained for feasibility determination and project design. This information should be a key component, directly related to a proposed project.
Winter Storm			
Winter Storms	Ongoing		Develop and implement programs to coordinate maintenance and mitigation activities to reduce risk to public infrastructure from severe winter storms.
Winter Storms	Ongoing		Develop critical facility list needing emergency back-up power systems, prioritize, seek funding and implement mitigation actions.

Table 15. Scappoose Mitigation Actions Considered			
Hazard	Status	Comment	Description
Winter Storms	Ongoing		Develop and maintain severe winter storm public outreach program defining mitigation activity benefits through educational outreach aimed at households and businesses while targeting of special needs populations.
Winter Storms	Ongoing		Develop and implement tree clearing mitigation programs to keep trees from threatening lives, property, and public infrastructure from severe weather events.
Winter Storms	Ongoing		Develop, implement, and maintain partnership program with electrical utilities to use underground utility placement methods where possible to reduce or eliminate power outages from severe winter storms. Consider developing incentive programs.
Winter Storms	Ongoing		Develop early warning test program partnering with NOAA, City Police, Fire Departments, and Volunteer Fire Department to coordinate tests.
Winter Storms	Ongoing		Review critical facilities and government building energy efficiency, winter readiness, and electrical protection capability. Identify, prioritize, and implement infrastructure upgrade or rehabilitation project prioritization and development.
Landslide			
Landslide	Ongoing		Complete a landslide location inventory, identify threatened critical facilities and other buildings and infrastructure.
Landslide	Consider		Develop prioritized list of mitigation actions for threatened critical facilities and other buildings or infrastructure.
Landslide	Ongoing		Develop process to limit future development in steep slope areas (permitting, geotechnical review, soil stabilization techniques, etc).
Landslide	Ongoing		Update the storm water management plan to include regulations to control runoff, both for flood reduction and to minimize saturated soils on steep slopes that can cause landslides.
Landslide	Ongoing		Develop comprehensive geological landslide and rockslide prone area maps.
Landslide	Ongoing		Identify and seasonally restrict construction activities in steep slope areas.
Wildland Fire			

Table 15. Scappoose Mitigation Actions Considered			
Hazard	Status	Comment	Description
Wildland Fire	Ongoing		Identify critical facilities and vulnerable populations based on mapped high hazard areas.
Wildland Fire	Consider		Identify evacuation routes away from high hazard areas and develop outreach program to educate the public concerning warnings and evacuation procedures.
Wildland Fire	Ongoing		Develop Community Wildland Fire Protection Plans for all at-risk communities.
Wildland Fire	Ongoing		Hold FireWise workshop to educate residents and contractors concerning fire resistant landscaping.
Wildland Fire	Consider		Promote FireWise building siting, design, and construction materials.
Wildland Fire	Consider		Develop FireWise Public Service Announcements (PSA).
Wildland Fire	Ongoing		Provide wildland fire information in an easily distributed format for all residents.
Wildland Fire	Consider		Schedule and perform government facility "fire drills" at least twice per year.
Wildland Fire	Ongoing		Develop, adopt, and enforce burn ordinances that require burn permits, restricts campfires, and controls outdoor burning.
Wildland Fire	Consider		Develop outreach program to educate and encourage fire-safe construction practices for existing and new construction in high risk areas.
Wildland Fire	Ongoing		Identify, develop, and implement, and enforce mitigation actions such as fuel breaks and reduction zones for potential wildland fire hazard areas.
Earthquake			
Earthquake	Consider		Supplement State Seismic Needs Analysis data (schools, fire, law enforcement). Complete inventory of public and commercial buildings that may be particularly vulnerable to earthquake damage.
Earthquake	Consider		Identify high seismic hazard areas; develop a wood-frame residential building inventory and an outreach program to educate population concerning facilities particularly vulnerable to earthquake damage, such as pre-1940s homes and homes with cripple wall foundations.
Earthquake	Consider		Disseminate FEMA pamphlets to educate and

Table 15. Scappoose Mitigation Actions Considered			
Hazard	Status	Comment	Description
			encourage homeowners concerning seismic structural and non-structural retrofit benefits.
Earthquake	Ongoing		Retrofit important public facilities with significant seismic vulnerabilities, such as unreinforced masonry construction.
Earthquake	Completed		Retrofit bridges that are not seismically adequate for lifeline transportation routes.
Earthquake	Ongoing		Update existing (or adopt the most current) Uniform Building Code
Earthquake	Ongoing		Implement and enforce the Uniform, International, and State Building Codes.
Earthquake	Ongoing		Inspect and/or certify all new construction.
Earthquake	Ongoing		Develop outreach program to educate residents concerning benefits of increased seismic resistance and modern building code compliance during rehabilitation or major repairs for residences or businesses.
Earthquake	Ongoing		Inspect, prioritize, and retrofit any critical facility or public infrastructure that does not meet current Building Codes.
Earthquake	Ongoing		Evaluate critical public facility seismic performance for fire stations, public works buildings, potable water systems, wastewater systems, electric power systems, and bridges within the jurisdiction.
Earthquake	Consider		Develop outreach program for educating private facility owners/operators concerning alternative or emergency power source acquisition to enable them to deliver food, fuel, and medical services during disaster emergency response and recovery efforts.
Earthquake	Ongoing		Encourage utility companies to evaluate and harden vulnerable infrastructure elements for sustainability.
Earthquake	Ongoing		Develop partnerships to mitigate hazards that result in jurisdictional facility lifeline or emergency transportation route closures.
Volcano			
Volcano	Consider		Update public emergency notification procedures and develop an outreach program for ash fall events.
Volcano	Consider		Update emergency response planning and

Table 15. Scappoose Mitigation Actions Considered			
Hazard	Status	Comment	Description
			develop client focused outreach program for ash fall events affecting river, air, and highway transportation, and industrial facilities and operations.
Volcano	Consider		Evaluate ash impact on storm water drainage system and develop mitigation actions.
Wind			
Wind	Ongoing		Review ordinances and develop outreach programs to assure manufactured buildings are protected from severe wind and flood hazards. (Anchoring, elevation, siting, and other methods as applicable)
Wind	Consider		Identify and prioritize critical facilities' overhead utilities that could be placed underground to reduce power disruption from wind storm / tree blow down damage.
Wind	Ongoing		Revise requirements to place utilities underground to reduce power disruption from wind storm / tree blow down damage when upgrading or during new development.
Wind	Ongoing		Increase power line wire size and incorporate quick disconnects (break away devices) to reduce ice load power line failure during severe wind or winter ice storm events.
Erosion			
Erosion	Consider		Maintain and update erosion hazard locations, identify critical facilities potentially impacted and develop and implement mitigation initiatives such as bank stabilization or facility relocation to prevent or reduce the threat.
Erosion	Ongoing		Harden culvert entrance with asphalt, concrete, rock, to reduce erosion or scour.
Erosion	Ongoing		Construct a structure to dissipate energy or reduce flow velocity to prevent erosion of the streambed and banks.

Mitigation Action Plan

The Steering Committee has evaluated and prioritized each of the considered mitigation actions to determine which would be included in the Mitigation Action Plan. The Committee then determined the responsible agency and potential funding sources. The Mitigation Action Plan

represents mitigation projects and programs to be implemented through the cooperation of multiple entities.

Upon review, the Steering Committee assigned a high priority ranking to actions that best fulfill the goals of the HMP and are appropriate and feasible for the City and responsible entities to implement during the 5-year lifespan of this version of the HMP. As such, the Steering Committee determined that only the mitigation actions that received a high priority ranking would be included in the City's Mitigation Action Plan. Table 16 depicts the City's mitigation actions grouped by hazard and in descending priority order within each hazard.

Table 16. Scappoose Mitigation Action Plan Matrix					
Hazard	Description	Managing Department / Agency	Timeframe	Potential Funding Source(s)	Benefit-Costs / Technical Feasibility
Natural Hazards					
Multi-Hazard (MH)					
MH	Purchase and install generators with main power distribution disconnect switches for identified and prioritized critical facilities susceptible to short term power disruption. (i.e. first responder and schools, and water and sewage pump stations, etc.)	Public Works	Completed	General Fund, HMGP	BC: TBD TF: Yes
MH	Electronic surge protection devices on critical electronic components such as warning systems, communications equipment, and computers for critical facilities.	Public Works	1 yr	General Fund	BC: TBD TF: Yes
MH	Update or develop, implement, and maintain jurisdictional debris management plans.	City Admin/ Public Works	1-3 yrs	General Fund	BC: TBD TF: Yes
MH	Develop and implement strategies and educational outreach programs for debris management.	City Admin/ Public Works	1-3 yrs (Plan) 3-5 (outreach)	General Fund	BC: TBD TF: Yes
MH	Cross reference and incorporate mitigation planning provisions into all community planning processes such as comprehensive, capital improvement, land use, transportation plans, etc. to	City Admin/ Planning	1-5 yrs	General Fund	BC: TBD TF: Yes

	demonstrate multi-benefit considerations and facilitate using multiple funding source consideration.				
MH	Develop outreach program for educating private facility owners/operators concerning alternative or emergency power source acquisition to enable them to deliver services during disaster emergency response and recovery efforts.	City Admin Public Works	2-5 yrs	General Fund	BC: TBD TF: Yes
MH	Develop critical facility list needing emergency back-up power systems, prioritize, seek funding and implement mitigation actions.	Public Works	1-2 yrs	General Fund	BC: TBD TF: Yes
MH	Update public emergency notification procedures and develop an outreach program for all emergencies	City Admin	3-5 years	General Fund, HMPG	BC:TBD TF: Yes
Flood					
Flood	Develop, implement, and enforce floodplain management ordinances.	Planning Dept.	Ongoing	General Fund	BC: TBD TF: Yes
Flood	Develop, or revise, adopt, and enforce storm water ordinances and regulations to manage run-off from new development, including buffers and retention basins.	Planning/ Public Works	Ongoing	General Fund	BC: TBD TF: Yes
Flood	Create detention storage basins, ponds, reservoirs etc. to allow water to temporarily accumulate. Water ultimately returning to its watercourse at a reduced flow rate.	Public Works/ Engineers	0-5 yrs	Street Fund, FMA, HMGP, PDM	BC: TBD TF: Yes
Flood	Implement flood protection to mitigate damage and contamination of wastewater systems.	Public Works	5-10 yrs	Sewer Fund, FMA, HMGP, PDM	BC: TBD TF: Yes
Winter Storm					
Winter Storm	Develop and implement programs to coordinate maintenance and mitigation activities to reduce public infrastructure from severe winter storms.	Public Works	Ongoing	General Fund	BC: TBD TF: Yes
Winter Storm	Review critical facilities and government building energy efficiency, winter	Public Works	Ongoing	General Fund,	BC: TBD

City of Scappoose Annex

	readiness, and electrical protection capability. Identify, prioritize, and implement infrastructure upgrade or rehabilitation project prioritization and development.			HMGP	TF: Yes
Landslide					
Landslide	Develop process to limit future development in steep slope areas (permitting, geotechnical review, soil stabilization techniques, etc).	Planning/ Engineering	Completed	General Fund	BC: TBD TF: Yes
Wildland Fire					
	Develop Community Wildland Fire Protection Plan	Fire District	Ongoing	General Fund, FMAP	BC: TBD TF: Yes
Wildland Fire	Provide wildland fire information in an easily distributed format for all residents.	City Admin Fire District	Ongoing	General Fund, FMAP	BC: TBD TF: Yes
Wildland Fire	Develop, adopt, and enforce burn ordinances that require burn permits, restricts campfires, and controls outdoor burning.	City Admin/ Fire District	Ongoing	General Fund	BC: TBD TF: Yes
Earthquake					
EQ	Identify, evaluate, and prioritize critical public facilities' seismic performance.	City Admin/ Public Works/ Engineering	3-5 yrs	General Fund	BC: TBD TF: Yes
Volcano					
Volcano	Evaluate ash impact on storm water drainage system and develop mitigation actions.	Public Works/ Engineering	3-5 yrs	General Fund	BC: TBD TF: Yes
Wind					
Wind	Identify and prioritize critical facilities' overhead utilities that could be placed underground to reduce power disruption from wind storm / tree blow down damage.	Public Works	1-5 yrs	General Fund, Utility Co., HMGP, PDM	BC: TBD TF: Yes
Erosion					
Erosion	Maintain and update erosion hazard locations, identify critical facilities potentially impacted and develop and	Public Works	3-5 yrs	General Fund, HMGP, PDM	BC: TBD TF: Yes

	implement mitigation initiatives				

Plan Adoption and Maintenance

The following section provides documentation of the formal adoption of this annex by the governing board of the district or the city council/county commission of the jurisdiction. It also identifies the standing committee that will be responsible for future reviews between update periods.

DMA 2000 Requirements: Plan Review, Evaluation, Implementation, and Adoption	
Planning Requirements	
§201.6(d)(3)	A local jurisdiction must review and revise its plan to reflect changes in development, progress in local mitigation efforts, and changes in priorities, and resubmit if for approval within 5 years in order to continue to be eligible for mitigation project grant funding.
§201.6(c)(5)	The plan shall include...] Documentation that the plan has been formally adopted by the governing body of the jurisdiction requesting approval of the plan (e.g., City Council, County commissioner, Tribal Council). For multi-jurisdictional plans, each jurisdiction requesting approval of the plan must document that it has been formally adopted.
Planning Elements	
D1. Was the plan revised to reflect changes in development? 44 CFR 201.6(d)(3) D2. Was the plan revised to reflect progress in local mitigation efforts? 44 CFR 201.6(d)(3) D3. Was the plan revised to reflect changes in priorities? 44 CFR 201.6(d)(3) E1. Does the Plan include documentation that the plan has been formally adopted by the governing body of the jurisdiction requesting approval? 44 CFR 201.6(c)(5) E2. For multi-jurisdictional plans, has each jurisdiction requesting approval of the plan documented formal plan adoption? 44 CFR 201.6(c)(5)	

Resolution of Adoption

RESOLUTION NO. 14-15

**A RESOLUTION OF THE SCAPPOOSE CITY COUNCIL ADOPTING THE UPDATED
COLUMBIA COUNTY MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN
FOR THE CITY OF SCAPPOOSE**

WHEREAS, the Federal Emergency Management Agency (FEMA) requires municipalities to adopt Hazard Mitigation Plans in order to be eligible for FEMA funding in the event of future disasters; and

WHEREAS, the City of Scappoose adopted a Hazard Mitigation Plan through Resolution No. 09-13; and

WHEREAS, the City of Scappoose, Columbia County, and other county municipalities have since updated the Hazard Mitigation Plan; and

WHEREAS, the Columbia County Multi-Jurisdictional Hazard Mitigation Plan for the City of Scappoose, attached hereto as Exhibit A, has been reviewed by residents, business owners, and federal, state, and local agencies and has been revised to reflect their concerns.

**NOW, THEREFORE, THE CITY OF SCAPPOOSE COUNCIL RESOLVES AS
FOLLOWS:**

Section 1: The Columbia County Multi-Jurisdictional Hazard Mitigation Plan for the City of Scappoose, attached hereto as Exhibit A, is hereby adopted as an official plan of the City of Scappoose.

Section 2: Resolution No. 09-13 is hereby rescinded and replaced.

PASSED AND ADOPTED by the City Council of Scappoose and signed by me, and the City Recorder in authentication of its passage this 7th day of July 2014.

CITY OF SCAPPOOSE, OREGON

Attest:

Scott Burge, Mayor

Susan M. Reeves, MMC, City Recorder

Standing Review Committee

The following table identifies the members of the Standing committee that will meet quarterly to review the HMP annex and provide a running update.

Table 17. (Name of Jurisdiction/District here) Standing Hazard Mitigation Committee	
Name	Agency/Department/Affiliation
Susan Reeves	City Administrator/Recorder - Scappoose
Kelly Niles	Oregon Department of Forestry
Michael Greisen	Scappoose Fire and Rescue
Laurie Oliver	City Planner - Scappoose
Dave Sukau	Public Works Director - Scappoose
Norman Miller	Chief of Police - Scappoose

Scappoose Drainage Improvement
Company
Hazard Mitigation Plan
Annex

2020 Update
Columbia County
Multi-Jurisdiction Hazard Mitigation Plan

Scappoose Drainage Improvement Company Annex

Contents

Introduction	3
Planning Process and Capability Assessment	3
DMA 2000 Requirements: Planning Process	3
Steering Committee Participants	4
Public Participation.....	4
Capability Assessment	6
Hazard Identification and Vulnerability Assessment	9
DMA 2000 Requirements: Hazard Identification and Risk Assessment	9
Hazard Identification	10
Specific Impacts of Identified Hazards	10
Flood.....	10
Winter Storm.....	11
Landslides	11
Wildland Fires.....	11
Earthquake	11
Volcano.....	11
Wind	11
Erosion.....	11
Values at Risk.....	12
Population Analysis	12
Asset Inventory.....	12
National Flood Insurance Policy	13
Vulnerability Analysis	13
Mitigation Strategy.....	17
DMA 2000 Requirements: Mitigation Strategy	17
Identify Mitigation Goals.....	18
Evaluate and Prioritize Mitigation Actions	19
Mitigation Action Plan	22
Plan Adoption and Maintenance.....	23
DMA 2000 Requirements: Plan Review, Evaluation, Implementation, and Adoption...	23

Scappoose Drainage Improvement Company Annex

Resolution of Adoption..... 24

Standing Review Committee 25

Scappoose Drainage Improvement Company Annex

Introduction

This Annex contains specific Scappoose Drainage Improvement Company information to support the Columbia County 2020 Multi-Jurisdictional Hazard Mitigation Plan. This section further supports the County's planning process by summarizing the review and incorporation of existing plans, studies, and reports used to develop this MHMP. This annex is an addition to Columbia County's Hazard Mitigation Plan and shares attributes of that plan.

Planning Process and Capability Assessment

The following section includes a detailed capability assessment that describes the resources available to support this plan. The goal of this assessment is not to identify all capabilities the organization may have, but only those that are currently used or could be used to support mitigation efforts. Capabilities are arranged in tables by type and fall under the explicit authority of the jurisdiction/district.

DMA 2000 Requirements: Planning Process	
Planning Requirements	
§201.6(b)	An open public involvement process is essential to the development of an effective plan. In order to develop a more comprehensive approach to reducing the effects of natural disasters, the planning process shall include:
§201.6(b)(1)	(1) An opportunity for the public to comment on the plan during the drafting stage and prior to plan approval;
§201.6(b)(2)	(2) An opportunity for neighboring communities, local and regional agencies involved in hazard mitigation activities, and agencies that have the authority to regulate development, as well as businesses, academia and other private and non-profit interests to be involved in the planning process; and
§201.6(b)(3)	(3) Review and incorporation, if appropriate, of existing plans, studies, reports, and technical information.
§201.6(c)(1)	[The plan shall document] the planning process used to develop the plan, including how it was prepared, who was involved in the process, and how the public was involved.
§201.6(c)(4)(i)	[The plan maintenance process shall include a] section describing the method and schedule of monitoring, evaluating, and updating the mitigation plan within a five-year cycle.
§201.6(c)(4)(iii)	[The plan maintenance process shall include a] discussion on how the community will continue public participation in the plan maintenance process.
Planning Elements	
A1. Does the Plan document the planning process, including how it was prepared and who was involved in the process for each jurisdiction? 44 CFR 201.6(c)(1)	
A2. Does the Plan document an opportunity for neighboring communities, local and regional agencies involved in hazard mitigation activities, agencies that have the authority to regulate development as	

Scappoose Drainage Improvement Company Annex

well as other interests to be involved in the planning process? *44 CFR 201.6(b)(2)*

A3. Does the Plan document how the public was involved in the planning process during the drafting stage? *44 CFR 201.6(b)(1) and 201.6(c)(1)*

A4. Does the Plan document the review and incorporation of existing plans, studies, reports, and technical information? *44 CFR 201.6(b)(3)*

A5. Is there discussion on how the communities will continue public participation in the plan maintenance process? *44 CFR 201.6(c)(4)(iii)*

A6. Is there a description of the method and schedule for keeping the plan current (monitoring, evaluating and updating the mitigation plan within a 5-year cycle)? *44 CFR 201.6(c)(4)(i)*

Steering Committee Participants

Scappoose Drainage Improvement Company is dedicated to mitigating potential natural hazards to its population and infrastructure. To fulfill that goal, a Hazard Mitigation Plan Development Steering Committee was seated; dedicated to identifying hazard threats and developing actions to mitigate damage and life losses from those threats.

Table 1 records the Steering Committee's participant list.

Table 1. (Name of Jurisdiction/District here) Steering Committee	
Name	Agency/Department/Affiliation
Jack Richards	SDIC Operations Manager
Karen Vaughan	SDIC Office Manager
Marie Gadotti	SDIC Landowner/Volunteer

Public Participation

As defined by FEMA, Whole Community Planning is; a means by which residents, emergency management practitioners, organizational and community leaders, and government officials can collectively understand and assess the needs of their respective communities and determine the best ways to organize and strengthen their assets, capacities, and interests. By doing so, a more effective path to societal security and resilience is built.

This Hazard Mitigation Plan was conducted with opportunities for the public to participate to try and meet the goals of whole community planning. Table 2 highlights these efforts.

Scappoose Drainage Improvement Company Annex

Table 2. Public Involvement Mechanisms	
Date	Description
2014	
7/19/2014	Columbia Emergency Preparedness Association EXPO – Large emergency management event covering all topics (preparedness, fire, law, mitigation, response).
11/11/2014	HSEMC – Columbia County’s Homeland Security and Emergency Management Commission is recognized by the Board of County Commissioners as the cornerstones of a whole community approach to emergency management planning. All jurisdictions are members of the commission. Semi Annual NHMP meeting, plan review was conducted.
2015	
5/12/2015	HSEMC – Columbia County’s Homeland Security and Emergency Management Commission is recognized by the Board of County Commissioners as the cornerstones of a whole community approach to emergency management planning. All jurisdictions are members of the commission. Semi Annual NHMP meeting, plan review was conducted.
11/10/2015	HSEMC – Columbia County’s Homeland Security and Emergency Management Commission is recognized by the Board of County Commissioners as the cornerstones of a whole community approach to emergency management planning. All jurisdictions are members of the commission. Semi Annual NHMP meeting, plan review was conducted.
2016	
4/2/2016	KOHI Radio Preparedness Talk – Radio talk show for Columbia County, topics “specifically included preparing for the next flood event”.
5/10/2016	HSEMC – Columbia County’s Homeland Security and Emergency Management Commission is recognized by the Board of County Commissioners as the cornerstones of a whole community approach to emergency management planning. All jurisdictions are members of the commission. Semi Annual NHMP meeting, plan review was conducted.
6/4/2016	Ford Family Foundation Preparedness Fair - County wide event to promote preparedness and mitigation in cooperation with the Ford Family Foundation. All cities participated.
7/23/2016	Columbia Emergency Preparedness Association EXPO – Large emergency management event covering all topics (preparedness, fire, law, mitigation, response).
9/22/2016	Columbia County Soil and Water Conservation District – Event hosted by SWCD on preparedness and flood mitigation efforts.
11/15/2016	HSEMC – Columbia County’s Homeland Security and Emergency Management Commission is recognized by the Board of County Commissioners as the cornerstones of a whole community approach to emergency management planning. All jurisdictions are members of the commission. Semi Annual NHMP meeting, plan review was conducted.
2017	
5/9/2017	HSEMC – Columbia County’s Homeland Security and Emergency Management Commission is recognized by the Board of County Commissioners as the cornerstones of a whole community approach to emergency management planning. All jurisdictions are members of the commission. Semi Annual NHMP meeting, plan review was conducted.

Scappoose Drainage Improvement Company Annex

Table 2. Public Involvement Mechanisms	
Date	Description
11/14/2017	HSEMC – Columbia County’s Homeland Security and Emergency Management Commission is recognized by the Board of County Commissioners as the cornerstones of a whole community approach to emergency management planning. All jurisdictions are members of the commission. Semi Annual NHMP meeting, plan review was conducted.
11/29/2017	Unprepared showing – St. Helens - presentation of OPB documentary regarding CSZ earthquake and tsunami.
2018	
1/19/2018	Preparedness to Vets Group – Presentation to Veterans regarding personal preparedness and flood mitigation.
5/8/2018	HSEMC – Columbia County’s Homeland Security and Emergency Management Commission is recognized by the Board of County Commissioners as the cornerstones of a whole community approach to emergency management planning. All jurisdictions are members of the commission. Semi Annual NHMP meeting, plan review was conducted and plans for plan update discussed.
11/13/2018	HSEMC – Columbia County’s Homeland Security and Emergency Management Commission is recognized by the Board of County Commissioners as the cornerstones of a whole community approach to emergency management planning. All jurisdictions are members of the commission. Semi Annual County-wide Hazard Mitigation meeting. Work Session on Hazard Mitigation Plan update conducted.
11/27/2018	Pints and Preparedness – various topics including Hazard mitigation, and individual preparedness.
2019	
1/22/2019	Pints and Preparedness – various topics including Hazard mitigation, and individual preparedness.
3/26/2019	Pints and Preparedness – various topics including Hazard mitigation, and individual preparedness.
5/7/2019	HSEMC – Columbia County’s Homeland Security and Emergency Management Commission is recognized by the Board of County Commissioners as the cornerstones of a whole community approach to emergency management planning. All jurisdictions are members of the commission. Semi Annual County-wide Hazard Mitigation meeting. Work Session on Hazard Mitigation Plan update conducted.
4/23/2019	Pints and Preparedness – various topics including Hazard mitigation, and individual preparedness.
9/7/2019	Preparedness for Scouts – Presentation on preparedness for all hazards.

Capability Assessment

Table 3, 4, and 5 contain Scappoose Drainage Improvement Company resources used to support planning activities, including the reports and studies reviewed as part of the update process.

Scappoose Drainage Improvement Company Annex

Table 3. Scappoose Drainage Improvement Company Legal and Regulatory Resources Available for Hazard Mitigation		
Regulatory Tool	Name	Effect on Hazard Mitigation
Plans	SDIC Emergency Response Plan	Provides procedure to follow in case of Emergency within the district as well as listing Emergency Contacts and locations where Sandbags and Rock are available.
	SDIC Hazard Communication Plan	Details procedure for dealing with Hazardous Chemicals and SDS for Hazardous Chemicals
	Columbia County Comprehensive Emergency Management Plan 9/11/02	Provides overall guidance for a community's land use, economic development, resource management, and disaster emergency management.
Programs	National Flood Insurance Program (NFIP)	Makes affordable flood insurance available to homeowners, business owners, and renters in participating communities. In exchange, those communities must adopt and enforce minimum floodplain management regulations to reduce the risk of damage from future floods.
	911 Reverse Call Program	Columbia County dispatch alert system with emergency messages using SDIC database.
	Levee Accreditation Program	Allows those who live within the boundaries of the district to buy affordable flood insurance once the levee is accredited.
	USACE Rehabilitation And Inspection Program (RIP)	Specifically defines the types of projects that can be eligible for assistance after a flood, and specifies the ongoing for operation and maintenance requirements for the FCW's that qualify.
Policies	SDIC Bylaws	Bylaws contain provisions relating to the ways SDIC conducts its affairs, the duties of its directors and the responsibilities of its officers and employees.
	Vegetation Management Policy	Determines areas where vegetation is controlled by either mechanical, or chemical means using sprays, grazing animals, or mowing.
	Grazing Policy	Allows grazing of livestock on the levee between April 15, and October 15 for the purpose of keeping down unwanted vegetation while keeping levee damage to a minimum during the wet season.

Scappoose Drainage Improvement Company Annex

Table 4. Scappoose Drainage Improvement Company Administrative and Technical Resources for Hazard Mitigation

Staff/Personnel Resources	Department/Division Position
Planner(s) or engineer(s) with knowledge of land development and land management practices	NA
Engineer(s) or professional(s) trained in construction practices related to buildings and/or infrastructure	NA
Planner(s) or engineer(s) with an understanding of manmade or natural hazards	NA
Floodplain manager	NA
Personnel skilled in GIS and/or HAZUS-MH	NA
Director of Emergency Services	NA
Finance (grant writers, purchasing)	NA
Public Information Officers	NA

Table 5. Scappoose Drainage Improvement Company Financial Resources for Hazard Mitigation

Financial Resources	Effect on Hazard Mitigation
General funds	Yes
Authority to levy taxes for specific purposes	Yes
Incur debt through general obligation bonds	yes, with voter approval
Incur debt through special tax and revenue bonds	yes, with voter approval
Incur debt through private activity bonds	No
Hazard Mitigation Grant Program (HMGP)	FEMA funding which is available to local communities after a Presidentially-declared disaster. It can be used to fund both pre- and post-disaster mitigation plans and projects.
Pre-Disaster Mitigation (PDM) grant program	FEMA funding which is available on an annual basis. This grant can only be used to fund pre-disaster mitigation plans and projects only.
Flood Mitigation Assistance (FMA) grant program	FEMA funding which is available on an annual basis. This grant can be used to mitigate repetitively flooded structures and infrastructure to protect repetitive flood structures.

Hazard Identification and Vulnerability Assessment

DMA 2000 Requirements: Hazard Identification and Risk Assessment	
Planning Requirements	
§201.6(c)(2)(i)	The risk assessment shall include a] description of the type, location and extent of all-natural hazards that can affect the jurisdiction. The plan shall include information on previous occurrences of hazard events and on the probability of future hazard events.
§201.6(c)(2)(ii)	The risk assessment shall include a] description of the jurisdiction's vulnerability to the hazards described in paragraph (c)(2)(i) of this section. This description shall include an overall summary of each hazard and its impact on the community. All plans approved after October 1, 2008 must also address NFIP insured structures that have been repetitively damaged by floods. The plan should describe vulnerability in terms of:
§201.6(c)(2)(ii)(A)	(A) The types and numbers of existing and future buildings, infrastructure, and critical facilities located in the identified hazard areas;
§201.6(c)(2)(ii)(B)	(B) An estimate of the potential dollar losses to vulnerable structures identified in ... this section and a description of the methodology used to prepare the estimate.
§201.6(c)(2)(ii)(C)	(C) Providing a general description of land uses and development trends within the community so that mitigation options can be considered in future land use decisions.
§201.6(c)(2)(iii)	For multi-jurisdictional plans, the risk assessment section must assess each jurisdiction's risks where they vary from the risks facing the entire planning area.
Planning Elements	
B1. Does the Plan include a description of the type, location, and extent of all-natural hazards that can affect each jurisdiction? 44 CFR 201.6(c)(2)(i) and 44 CFR 201.6(c)(2)(iii)	
B2. Does the Plan include information on previous occurrences of hazard events and on the probability of future hazard events for each jurisdiction? 44 CFR 201.6(c)(2)(i)	
B3. Is there a description of each identified hazard's impact on the community as well as an overall summary of the community's vulnerability for each jurisdiction? 44 CFR 201.6(c)(2)(ii)	
B4. Does the Plan address NFIP insured structures within each jurisdiction that have been repetitively damaged by floods? 44 CFR 201.6(c)(2)(ii)	

Hazard Identification

The Steering Committee determined that the following hazards could potentially threaten the community. Table 6 establishes the hazard profile against which this plan is designed.

Table 6. Hazard Profile	
Natural Hazards	
Flood	X
Winter Storm	X
Landslide	
Fire (Wildland/Urban)	X
Earthquake	X
Volcano	X
Wind	X
Erosion	X
ENSO (El Niño / La Niña)	
Expansive Soils	
Drought	

Specific Impacts of Identified Hazards

The following section provides specific details of the vulnerabilities and impacts from natural hazards for the Scappoose Drainage Improvement Company in addition to technological and manmade hazards identified in Table 6.

The Basic Plan of this Multi-Jurisdiction Hazard Mitigation Plan contains the full narrative Hazard Profile for the entire county, including full details for this annex. This section is designed to provide additional notes and concerns regarding hazards that can impact this jurisdiction.

Flood

FEMA FIRMs were used to outline the 100-year and 500-year floodplains for SDIC. The 100-year floodplain delineates an area of high risk, while the 500-year floodplain delineates an area of moderate risk.

The entirety of the SDIC is contained within the 100-year floodplain.

Scappoose Drainage Improvement Company Annex

Winter Storm

The natural hazards resulting from winter storms, such as ice, cold, wind and floods, are often widespread. A single event is capable of impacting all people, critical facilities and infrastructure within SDIC

Landslides

Wildland Fires

Wildland Fire Hazard areas within the district are limited mostly to the levee slope itself.

Earthquake

Earthquakes pose a significant flood risk to SDIC levees. Ground motion represents seismic risk due to liquefaction of the levees. In the wake of an earthquake structural damage could cause severe flooding.

Volcano

A volcanic eruption would have a minor impact on SDIC due to the proximity to volcanoes within the Cascade region. The major resources of concern include air quality and waterway sedimentation. During previous eruptions, ashfall has drifted to the east of the volcanoes. (State Interagency Hazard Mitigation Team 2006)

Columbia City will likely only experience damage from volcanic eruption columns and clouds which contain volcanic gases, minerals, and rock. The columns and clouds form rapidly and extend several miles above an eruption. Solid particles within the clouds present a serious aviation threat, can distribute acid rain (sulfur dioxide gas and water), can create risk of suffocation (carbon dioxide is heavier than air and collects in valleys and depressions threatening human and animals), and pose a toxic threat from fluorine which clings to ash particles potentially poisoning grazing livestock and contaminating domestic water supplies. Injuries associated with respiratory problems may result. Due to the nature of the hazard, it is impossible to predict the location or extent of future events with any probability, although it can be assumed that all critical facilities and infrastructure within SDIC are at risk.

Wind

Many buildings, utilities and transportation systems in open areas, natural grasslands, or agricultural lands are especially vulnerable to wind damage. Impacts associated with wind can include damage to power lines, trees, and structures, and can also cause temporary disruptions of power. Additionally, high winds can cause significant damage to forestlands.

Erosion

Riverine Erosion can cause major harm to the levee protection the Eastern border of the district but is mitigated through implementation of the USACE RIP program.

Scappoose Drainage Improvement Company Annex

Values at Risk

Population Analysis

Population data listed in Table 7 were obtained from the 2010 U.S. Census and Portland State University. It comprises census block level data and estimates from university conducted community research.

Table 7. Population		
2010 Census	2018 Estimate*	Percent Change
49,351	51,900	+5.1%

Asset Inventory

The Asset Inventory describes the physical values; the residential building stock, public facilities, and infrastructure within each community that may be affected by hazard events and includes population, residential and nonresidential buildings, critical facilities, and infrastructure. These values are described in Tables 8 and 9 and portray the City's critical infrastructure numbers and values, and their potential vulnerability by hazard type.

Scappoose Drainage Improvement Company seeks to protect its population by supporting Columbia County and Oregon State initiatives, ordinances, building codes, and development regulations. One of the most important initiatives is to prohibit or not allow future development of buildings, infrastructure and critical facilities in identified high hazard areas. Any essential infrastructure component will undergo stringent review to ensure potential hazard risk will be mitigated.

Table 8. Residential Buildings	
Total Building Count	Total Value of Buildings (\$)
1	\$295,549.00

Table 9. Critical Facilities and Infrastructure			
Facility Type	Name / Number	Address	Value ¹
SDIC Owned infrastructure	Evans Pump House	53466 E. Honeyman Road Scappoose, Oregon 97056	\$492,098.00
	Cherry Orchard Pump House	37037 Ellis Farm Rd Scappoose, Oregon 97056	\$110,762.00
	Hovan Pump House	53951 E Honeyman Rd Scappoose, Oregon 97056	

Scappoose Drainage Improvement Company Annex

Table 9. Critical Facilities and Infrastructure

Facility Type	Name / Number	Address	Value ¹
	Smith Pump House	53341 E Honeyman Rd Scappoose, Oregon 97056	\$131,346.00
	Honeyman Pump House	52201 E Honeyman Rd Scappoose, Oregon 97056	\$65,751.00
	Johnson Pump House	25601 E Columbia Ave Scappoose, Oregon 97056	\$184,110.00
	Sternberg Pump House	35892 E Honeyman Rd Scappoose, Oregon 97056	\$61,199.00
	North Pump House	37037 Ellis Farm Rd Scappoose, Oregon 97056	\$100,762.00
	Kessi Pump House	34616 E Columbia Ave Scappoose, Oregon 97056	\$136,441.00
	Jackson Creek Diversion	33650 Johnson Landing Rd Scappoose, OR 97056	\$71,059.00
	Evans Pump Transformers	53466 E. Honeyman Road Scappoose, Oregon 97056	\$35,148.00
	Garage Pole Building	53466 E. Honeyman Road Scappoose, Oregon 97056	\$125,672.00
	North Tide Gate		\$100,000
	South Tide Gate		\$60,000
	Sub-levee Sluice Gates		\$100,000
	SDIC Levee		\$50,500,000 (estimated at \$5mil/mile)
	SDIC Sub-levee		\$3,560,000 (estimated at \$2mil/mile)

National Flood Insurance Policy

National Flood Insurance Program data were obtained from the State Department of Land Conservation and Development for the County Annex. While there may be some NFIP properties inside the district the SDIC does not claim jurisdiction over those properties. Data for NFIP in unincorporated Columbia County can be found in the Columbia County Annex.

Vulnerability Analysis

A vulnerability analysis predicts the extent of exposure, and the impacts that may result from a hazard event of a given intensity in each area. The analysis provides quantitative data that may be used to identify and prioritize potential mitigation measures by allowing communities to focus attention on areas with the greatest risk of damage. A vulnerability analysis is divided into

Scappoose Drainage Improvement Company Annex

five steps including asset inventory, methodology, data limitations, exposure analysis for current assets, and areas of future development.

The following is derived from the best available data for facility locations and values. In many cases, values were unavailable, and therefore the totals listed below should be considered incomplete and likely less than the actual costs associated with the respective hazards

The vulnerability analysis development process is thoroughly discussed in the Columbia County Basic Plan, Section 6, which generated the following Hazard Exposure Analysis Overviews in Tables 11, 12, and 13.

Table 11. Scappoose Drainage Improvement Company Potential Hazard Exposure Analysis Overview							
Population and Buildings							
			Population	Buildings			
				Residential		Non-Residential	
Hazard Type	Hazard Area	Methodology	Number	Number	Value (\$)	Number	Value (\$)
Flood	Moderate	500-year floodplain					
	High	100-year floodplain					
Winter Storm		descriptive					
Landslide	Moderate	>14-32 degrees					
	High	>32-56 degrees					
Wildland Fire	Moderate	Moderate fuel rank					
	High	High fuel rank					
	Very High	Very high fuel rank					
	Extreme	Extreme fuel rank					
Earthquake	Strong	9-20% (g)					
	Very strong	20-40% (g)					
	Severe	>40-60% (g)					
Volcano		descriptive					
Wind		descriptive					
Erosion		within 300’ of potential areas of erosion					

¹ Average insured structural value of all residential buildings (including single-family dwellings, mobile homes, etc., is \$172,500 per structure).

Scappoose Drainage Improvement Company Annex

Table 12. Scappoose Drainage Improvement Company Potential Hazard Exposure Analysis Overview

Critical Facilities

			Government		Emergency Response		Educational		Care		Community	
Hazard Type	Hazard Area	Methodology	No.	\$	No.	\$	No.	\$	No.	\$	No.	\$
Flood	Moderate	500-year floodplain										
	High	100-year floodplain										
Winter Storm	Moderate											
Landslide	Moderate	>14-32 degrees										
	High	>32-56 degrees										
Wildland Fire	Moderate	Moderate fuel rank										
	High	High fuel rank										
	Very High	Very high fuel rank										
	Extreme	Extreme fuel rank										
Earthquake	Strong	9-20% (g)										
	Very strong	20-40% (g)										
	Severe	>40-60% (g)										
Volcano	Moderate											
Wind	Moderate											
Erosion		within 300' of potential areas of erosion										

Scappoose Drainage Improvement Company Annex

Table 13. Scappoose Drainage Improvement Company Potential Hazard Exposure Analysis Overview

Critical Infrastructure

Hazard Type	Hazard Area	Methodology	Highways		Railroads		Bridges	
			Miles	Value (\$) ¹	Miles	Value (\$) ¹	No.	Value (\$) ¹
Flood	Moderate	500-year floodplain						
	High	100-year floodplain						
Winter Storm	Moderate							
Landslide	Moderate	>14-32 degrees						
	High	>32-56 degrees						
Wildland Fire	Moderate	Moderate fuel rank						
	High	High fuel rank						
	Very High	Very high fuel rank						
	Extreme	Extreme fuel rank						
Earthquake	Strong	9-20% (g)						
	Very strong	20-40% (g)						
	Severe	>40-60% (g)						
Volcano	Moderate							
Wind	Moderate							
Erosion		within 300' of potential areas of erosion						

Table 13. Scappoose Drainage Improvement Company Potential Hazard Exposure Analysis Overview

Critical Infrastructure - Continued

Hazard Type	Hazard Area	Methodology	Transportation Facilities		Utilities		Dams	
			No.	Value (\$) ¹	No.	Value (\$) ¹	No.	Value (\$) ¹
Flood	Moderate	500-year floodplain						
	High	100-year floodplain						
Winter Storm	Moderate							
Landslide	Moderate	>14-32 degrees						
	High	>32-56 degrees						
Wildland Fire	Moderate	Moderate fuel rank						
	High	High fuel rank						
	Very High	Very high fuel rank						
	Extreme	Extreme fuel rank						

Scappoose Drainage Improvement Company Annex

Earthquake	Strong	9-20% (g)						
	Very strong	20-40% (g)						
	Severe	>40-60% (g)						
Volcano	Moderate							
Wind	Moderate							
Erosion		within 300' of potential areas of erosion						

Mitigation Strategy

The following section defines mitigation action identification and analysis as stipulated in DMA 2000 and its implementing regulations.

DMA 2000 Requirements: Mitigation Strategy	
Planning Requirements	
§201.6(c)(3)	The plan shall include the following:] A mitigation strategy that provides the jurisdiction's blueprint for reducing the potential losses identified in the risk assessment, based on existing authorities, policies, programs, and resources, and its ability to expand on and improve these existing tools.
§201.6(c)(3)(i)	The hazard mitigation strategy shall include a] description of mitigation goals to reduce or avoid long-term vulnerabilities to the identified hazards.
§201.6(c)(3)(ii)	The hazard mitigation strategy shall include a] section that identifies and analyzes a comprehensive range of specific mitigation actions and projects being considered to reduce the effects of each hazard, with particular emphasis on new and existing buildings and infrastructure. All plans approved by FEMA after October 1, 2008, must also address the jurisdiction's participation in the NFIP, and continued compliance with NFIP requirements, as appropriate.
§201.6(c)(3)(iii)	The hazard mitigation strategy shall include an] action plan, describing how the action identified in paragraph (c)(3)(ii) of this section will be prioritized, implemented, and administered by the local jurisdiction. Prioritization shall include a special emphasis on the extent to which benefits are maximized according to a cost benefit review of the proposed projects and their associated costs.
§201.6(c)(3)(iv)	For multi-jurisdictional plans, there must be identifiable action items specific to the jurisdiction requesting FEMA approval or credit of the plan.
§201.6(c)(4)(ii)	The plan shall include a] process by which local governments incorporate the requirements of the mitigation plan into other planning mechanisms such as comprehensive or capital improvements, when appropriate.
Planning Elements	

Scappoose Drainage Improvement Company Annex

- C1. Does the plan document each jurisdiction’s existing authorities, policies, programs and resources, and its ability to expand on and improve these existing policies and programs? 44 CFR 201.6(c)(3)**
- C2. Does the Plan address each jurisdiction’s participation in the NFIP and continued compliance with NFIP requirements, as appropriate? 44 CFR 201.6(c)(3)(ii)**
- C3. Does the Plan include goals to reduce/avoid long-term vulnerabilities to the identified hazards? 44 CFR 201.6(c)(3)(i)**
- C4. Does the Plan identify and analyze a comprehensive range of specific mitigation actions and projects for each jurisdiction being considered to reduce the effects of hazards, with emphasis on new and existing buildings and infrastructure? 44 CFR 201.6(c)(3)(ii) and 44 CFR 201.6(c)(3)(iv)**
- C5. Does the Plan contain an action plan that describes how the actions identified will be prioritized (including cost benefit review), implemented, and administered by each jurisdiction? 44 CFR 201.6(c)(3)(iii) and 44 CFR (c)(3)(iv)**
- C6. Does the Plan describe a process by which local governments will integrate the requirements of the mitigation plan into other planning mechanisms, such as comprehensive or capital improvement plans, when appropriate? 44 CFR 201.6(c)(4)(ii)**

Identify Mitigation Goals

Scappoose Drainage Improvement Company reviewed the Columbia County goals and determined they meet the City’s needs and subsequently adopted the Goals in Table 14 for the current planning period.

Table 14. Scappoose Drainage Improvement Company Mitigation Goals	
Goal Number	Goal Description
1	Reduce the Threat to Life Safety Enhance life safety by minimizing the potential for deaths and injuries in future disaster events.
2	Protect Critical Facilities and Enhance Emergency and Essential Services • Implement activities or projects to protect critical facilities and infrastructure. • Seek opportunities to enhance, protect, and integrate emergency and essential services. • Strengthen emergency operations plans and procedures by increasing collaboration and coordination among public agencies, non-profit organizations, businesses, and industry.
3	Reduce the Threat to Property • Seek opportunities to protect, enhance and integrate emergency and essential services. • Strengthen emergency operations plans and procedures by increasing collaboration and coordination among public agencies, non-profit organizations, businesses, industries and the citizens of Scappoose Drainage Improvement Company
4	Create a Disaster Resistant and Disaster-Resilient Economy • Develop and implement activities to protect economic well-being and vitality while reducing economic hardship in post disaster situations. • Reduce insurance losses and repetitive claims for chronic hazard events. • Work with State and Federal Partners to reduce short-term and long-term recovery and reconstruction costs. • Work with local and County organizations, such as Columbia Emergency Planning Association (CEPA). • Expedite pre-disaster and post-disaster grants and program funding.

Scappoose Drainage Improvement Company Annex

5	Increase Public Awareness, Education, Outreach, and Partnerships • Coordinate and collaborate, where possible, risk reduction outreach efforts with the Oregon Partners for Disaster Resistance & Resilience and other public and private organizations. • Develop and implement risk reduction education programs to increase awareness among citizens, local, county, and regional agencies, non-profit organizations, businesses, and industry. • Promote insurance coverage for catastrophic hazards • Strengthen communication and coordinate participation in and between public agencies, citizens, nonprofit organizations, businesses, and industry.

Evaluate and Prioritize Mitigation Actions

Mitigation actions are activities, measures, or projects that help achieve the goals of a mitigation plan. Table 15 lists the mitigation actions developed during this mitigation planning process or offered during whole community planning activities. It is not intended that this plan will attempt to act on all these action items, but the list will be maintained in order to provide documentation for future planning efforts.

Table 15. Scappoose Drainage Improvement Company Mitigation Actions Considered			
Hazard	Status	Comment	Description
<i>Multi-Hazard (MH)</i>			
MH	Consider		Develop, implement, and maintain jurisdictional debris management plans.
MH	<i>Ongoing</i>		Purchase and install generators with main power distribution disconnect switches for identified and prioritized critical facilities susceptible to short term power disruption. (i.e. first responder and schools, and water and sewage pump stations, etc.)
MH	<i>Ongoing</i>		Electronic surge protection devices on critical electronic components such as warning systems, communications equipment, and computers for critical facilities.
MH	<i>Ongoing</i>		Distribute information materials concerning mitigation, preparedness, and safety procedures for all natural hazards.
MH	Consider		Harden utility headers located along river embankments to mitigate potential flood, debris, and erosion damages.
MH	<i>Ongoing</i>		Identify and pursue funding opportunities to implement mitigation actions.
MH	<i>Ongoing</i>		Integrate the Mitigation Plan findings into planning and regulatory documents and programs and into enhanced emergency

Scappoose Drainage Improvement Company Annex

Table 15. Scappoose Drainage Improvement Company Mitigation Actions Considered			
Hazard	Status	Comment	Description
			planning.
MH	Ongoing		Obtain high resolution dam failure inundation area maps from USACOE & Pacific Corp; use to update emergency response plans, evacuation route identification, public notification, and evacuation procedures.
MH	Ongoing		Encourage the USACOE and Pacific Corp to conduct assessments for dams upstream of populated areas.
Flood			
Flood	Consider		Develop and maintain GIS mapped critical facility inventory for all structures located within 100-year and 500-year floodplains.
Flood	Consider		Develop and maintain GIS mapped inventory, and develop prioritized list of residential and commercial buildings within 100-year and 500-year floodplains.
Flood	Consider		Develop and maintain GIS mapped inventory of repetitive loss properties to include the types and numbers of properties.
Flood	Ongoing		Develop and implement mitigation actions for repetitive loss properties.
Flood	Ongoing		Establish flood mitigation priorities for critical facilities and residential and commercial buildings located within the 100- year floodplain using survey elevation data.
Flood	Ongoing		Develop an outreach program to educate public concerning NFIP participation benefits, floodplain development, land use regulation, and NFIP flood insurance availability to facilitate continued compliance with the NFIP.
Flood	Consider		Acquire, relocate, elevate, or otherwise flood-proof critical facilities.
Flood	Ongoing		Identify and list repetitively flooded structures and infrastructures, analyze the threat to these facilities, and prioritize mitigation actions to acquire, relocate, elevate, and/or flood proof to protect the threatened population.
Flood	Ongoing		Perform hydrologic and hydraulic engineering, and drainage studies and analyses. Use information obtained for feasibility determination and project design. This

Scappoose Drainage Improvement Company Annex

Table 15. Scappoose Drainage Improvement Company Mitigation Actions Considered			
Hazard	Status	Comment	Description
			information should be a key component, directly related to a proposed project.
Winter Storm			
Winter Storms	Ongoing		Develop critical facility list needing emergency back-up power systems, prioritize, seek funding and implement mitigation actions.
Winter Storms	Ongoing		Develop and implement tree clearing mitigation programs to keep trees from threatening lives, property, and public infrastructure from severe weather events.
Winter Storms	Ongoing		Develop early warning test program partnering with NOAA, City Police, Fire Departments, and Volunteer Fire Department to coordinate tests.
Landslide - None			
Wildland Fire			
Wildland Fire	Ongoing		Identify critical facilities and vulnerable populations based on mapped high hazard areas.
Wildland Fire	Consider		Schedule and perform government facility "fire drills" at least twice per year.
Wildland Fire	Ongoing		Identify, develop, and implement, and enforce mitigation actions such as fuel breaks and reduction zones for potential wildland fire hazard areas.
Earthquake			
Earthquake	Consider		Supplement State Seismic Needs Analysis data (schools, fire, law enforcement). Complete inventory of public and commercial buildings that may be particularly vulnerable to earthquake damage.
Earthquake	Ongoing		Inspect, prioritize, and retrofit any critical facility or public infrastructure that does not meet current Building Codes.
Earthquake	Ongoing		Encourage utility companies to evaluate and harden vulnerable infrastructure elements for sustainability.
Volcano			
Volcano	Consider		Evaluate ash impact on storm water drainage system and develop mitigation actions.
Wind			

Scappoose Drainage Improvement Company Annex

Table 15. Scappoose Drainage Improvement Company Mitigation Actions Considered			
Hazard	Status	Comment	Description
Wind	Consider		Identify and prioritize critical facilities' overhead utilities that could be placed underground to reduce power disruption from wind storm / tree blow down damage.
Wind	Ongoing		Increase power line wire size and incorporate quick disconnects (break away devices) to reduce ice load power line failure during severe wind or winter ice storm events.
Erosion			
Erosion	Consider		Maintain and update erosion hazard locations, identify critical facilities potentially impacted and develop and implement mitigation initiatives such as bank stabilization or facility relocation to prevent or reduce the threat.
Erosion	Consider		Apply for grants/funds to implement riverbank protection methods.
Erosion	Consider		Install riprap, or pilings to harden or "armor" a stream bank where severe erosion occurs.
Erosion	Consider		Install bank protection such as rock, concrete, asphalt, vegetation, or other armoring or protective materials to provide river bank protection.
Erosion	Ongoing		Harden culvert entrance with asphalt, concrete, rock, to reduce erosion or scour.
Erosion	Ongoing		Construct a structure to dissipate energy or reduce flow velocity to prevent erosion of the streambed and banks.

Mitigation Action Plan

The Steering Committee has evaluated and prioritized each of the considered mitigation actions and determined all would be included in the Mitigation Action Plan. Because this is the Districts first Hazard Mitigation plan, the District intends to act on each of the considered actions in Table 15 and will begin, during the review process, to build an action plan matrix as progress on considered actions is advanced.

Plan Adoption and Maintenance

The following section provides documentation of the formal adoption of this annex by the governing board of the district or the city council/county commission of the jurisdiction. It also identifies the standing committee that will be responsible for future reviews between update periods.

DMA 2000 Requirements: Plan Review, Evaluation, Implementation, and Adoption	
Planning Requirements	
§201.6(d)(3)	A local jurisdiction must review and revise its plan to reflect changes in development, progress in local mitigation efforts, and changes in priorities, and resubmit if for approval within 5 years in order to continue to be eligible for mitigation project grant funding.
§201.6(c)(5)	The plan shall include...] Documentation that the plan has been formally adopted by the governing body of the jurisdiction requesting approval of the plan (e.g., City Council, County commissioner, Tribal Council). For multi-jurisdictional plans, each jurisdiction requesting approval of the plan must document that it has been formally adopted.
Planning Elements	
D1. Was the plan revised to reflect changes in development? 44 CFR 201.6(d)(3)	
D2. Was the plan revised to reflect progress in local mitigation efforts? 44 CFR 201.6(d)(3)	
D3. Was the plan revised to reflect changes in priorities? 44 CFR 201.6(d)(3)	
E1. Does the Plan include documentation that the plan has been formally adopted by the governing body of the jurisdiction requesting approval? 44 CFR 201.6(c)(5)	
E2. For multi-jurisdictional plans, has each jurisdiction requesting approval of the plan documented formal plan adoption? 44 CFR 201.6(c)(5)	

Scappoose Drainage Improvement Company Annex

Resolution of Adoption

(Example) BEFORE THE BOARD OF COUNTY COMMISSIONERS FOR COLUMBIA COUNTY, OREGON

In the Matter of Adopting the 2014) Columbia County Multi-Jurisdictional) RESOLUTION NO. 40-2014 Hazard
Mitigation Plan Update)

WHEREAS, Columbia County, Oregon has experienced repetitive disasters that have
damaged commercial, residential and public properties, displaced citizens and businesses, and
presented general public health and safety concerns; and

WHEREAS, Columbia County has prepared a Multi-Jurisdictional Hazard Mitigation Plan that outlines the options to
reduce overall damage and impact from natural hazards; and

WHEREAS, the Multi-Jurisdictional Hazard Mitigation Plan has been reviewed by community residents, business
owners, and federal, state and local agencies, and has been revised to reflect their concerns;

NOW, THEREFORE, BE IT RESOLVED that:

1. 1. The Multi-Jurisdictional Hazard Mitigation Plan is hereby adopted as an official plan of Columbia County.
2. 2. A Hazard Mitigation Planning Group is hereby established as a permanent advisory body. The Hazard Mitigation
Planning Coordinator shall designate its members, subject to the approval of the County and the
participating jurisdictions. They shall serve one-year terms. The group's duties shall be as
designated in the Hazard Mitigation Plan.
3. 3. The Hazard Mitigation Planning Coordinator is charged with supervising the
implementation of the Plan's recommendations within the funding limitations as provided by Columbia
County or other sources.
4. 4. The Hazard Mitigation Planning Coordinator shall give priority attention to the goals identified in Table A-13 of the
Columbia County Appendix, and the actions listed in Table A-14 of the Columbia County Appendix
to the Hazard Mitigation Plan and;
5. 5. The Hazard Mitigation Planning Coordinator shall convene the hazard mitigation planning group annually. The
planning group shall monitor implementation of the plan and shall submit an annual review
worksheet to the Board of County Commissioners in accordance with the following format:
 - a. A review of the original plan.
 - b. A review of any disasters or emergencies that occurred during the previous calendar year.
 - c. A review of the actions taken, including what was accomplished during the previous year.
 - d. A discussion of any implementation problems.
 - e. Recommendations for new projects or revised action items. Such recommendations shall be subject to approval
by the Columbia County.

Dated this 27th day of August, 2014.

BOARD OF COUNTY COMMISSIONERS FOR COLUMBIA COUNTY, OREGON

By: _____ Anthony Hyde, Chair

By: _____ Henry Heimuller, Commissioner

By: _____ Earl Fisher, Commissioner

Standing Review Committee

The following table identifies the members of the Standing committee that will meet quarterly to review the HMP annex and provide a running update.

Table 17. Scappoose Drainage Improvement Company Standing Hazard Mitigation Committee	
Name	Agency/Department/Affiliation
Jack Richards	SDIC Manager
Karen Vaughan	SDIC Office Manager
Marie Gadotti	SDIC Landowner/Volunteer

City of St. Helens
Hazard Mitigation Plan
Annex

2020 Update
Columbia County
Multi-Jurisdiction Hazard Mitigation Plan

City of St. Helens Hazard Mitigation Plan- Annex

Contents

Introduction	2
Planning Process and Capability Assessment.....	2
Steering Committee Participants	3
Public Participation	3
Capability Assessment	6
Hazard Identification and Vulnerability Assessment	10
Hazard Identification.....	11
Specific Impacts of Identified Hazards	11
Values at Risk	15
Vulnerability Analysis	21
Mitigation Strategy	25
Identify Mitigation Goals.....	26
Evaluate and Prioritize Mitigation Actions.....	26
Mitigation Action Plan.....	36
Plan Adoption and Maintenance	40
Resolution of Adoption	41
Standing Review Committee	43

City of St. Helens Hazard Mitigation Plan- Annex

Introduction

This Annex contains specific City of St. Helens information to support the Columbia County 2020 Multi-Jurisdictional Hazard Mitigation Plan. This section further supports the County's planning process by summarizing the review and incorporation of existing plans, studies, and reports used to develop this MHMP. This annex is an addition to Columbia County's Hazard Mitigation Plan and shares attributes of that plan.

Planning Process and Capability Assessment

The following section includes a detailed capability assessment that describes the resources available to support this plan. The goal of this assessment is not to identify all capabilities the organization may have, but only those that are currently used or could be used to support mitigation efforts. Capabilities are arranged in tables by type and fall under the explicit authority of the jurisdiction/district.

DMA 2000 Requirements: Planning Process	
Planning Requirements	
§201.6(b)	An open public involvement process is essential to the development of an effective plan. In order to develop a more comprehensive approach to reducing the effects of natural disasters, the planning process shall include:
§201.6(b)(1)	(1) An opportunity for the public to comment on the plan during the drafting stage and prior to plan approval;
§201.6(b)(2)	(2) An opportunity for neighboring communities, local and regional agencies involved in hazard mitigation activities, and agencies that have the authority to regulate development, as well as businesses, academia and other private and non-profit interests to be involved in the planning process; and
§201.6(b)(3)	(3) Review and incorporation, if appropriate, of existing plans, studies, reports, and technical information.
§201.6(c)(1)	[The plan shall document] the planning process used to develop the plan, including how it was prepared, who was involved in the process, and how the public was involved.
§201.6(c)(4)(i)	[The plan maintenance process shall include a] section describing the method and schedule of monitoring, evaluating, and updating the mitigation plan within a five-year cycle.
§201.6(c)(4)(iii)	[The plan maintenance process shall include a] discussion on how the community will continue public participation in the plan maintenance process.
Planning Elements	

City of St. Helens Hazard Mitigation Plan- Annex

A1. Does the Plan document the planning process, including how it was prepared and who was involved in the process for each jurisdiction? 44 CFR 201.6(c)(1)

A2. Does the Plan document an opportunity for neighboring communities, local and regional agencies involved in hazard mitigation activities, agencies that have the authority to regulate development as well as other interests to be involved in the planning process? 44 CFR 201.6(b)(2)

A3. Does the Plan document how the public was involved in the planning process during the drafting stage? 44 CFR 201.6(b)(1) and 201.6(c)(1)

A4. Does the Plan document the review and incorporation of existing plans, studies, reports, and technical information? 44 CFR 201.6(b)(3)

A5. Is there discussion on how the communities will continue public participation in the plan maintenance process? 44 CFR 201.6(c)(4)(iii)

A6. Is there a description of the method and schedule for keeping the plan current (monitoring, evaluating and updating the mitigation plan within a 5-year cycle)? 44 CFR 201.6(c)(4)(i)

Steering Committee Participants

City of St. Helens is dedicated to mitigating potential natural hazards to its population and infrastructure. To fulfill that goal, a Hazard Mitigation Plan Development Steering Committee was seated; dedicated to identifying hazard threats and developing actions to mitigate damage and life losses from those threats.

Table 1 records the Steering Committee's participant list.

Table 1. City of St. Helens Steering Committee	
Name	Agency/Department/Affiliation
John Walsh	City Administrator
Michael De Roia	Building Official
Sue Nelson	Engineering Director
Dave Elder	Public Works Supervisor
Shaun Brown	County Emergency Management

Public Participation

As defined by FEMA, Whole Community Planning is; a means by which residents, emergency management practitioners, organizational and community leaders, and government officials can collectively understand and assess the needs of their respective communities and determine the best ways to organize and strengthen their assets, capacities, and interests. By doing so, a more effective path to societal security and resilience is built.

City of St. Helens Hazard Mitigation Plan- Annex

This Hazard Mitigation Plan was conducted with opportunities for the public to participate to try and meet the goals of whole community planning. Table 2 highlights these efforts.

Table 2. St. Helens Public Involvement Mechanisms	
Date	Description
2014	
7/19/2014	Columbia Emergency Preparedness Association EXPO – Large emergency management event covering all topics (preparedness, fire, law, mitigation, response).
11/11/2014	HSEMC – Columbia County’s Homeland Security and Emergency Management Commission is recognized by the Board of County Commissioners as the cornerstones of a whole community approach to emergency management planning. All jurisdictions are members of the commission. Semi Annual NHMP meeting, plan review was conducted.
2015	
5/12/2015	HSEMC – Columbia County’s Homeland Security and Emergency Management Commission is recognized by the Board of County Commissioners as the cornerstones of a whole community approach to emergency management planning. All jurisdictions are members of the commission. Semi Annual NHMP meeting, plan review was conducted.
11/10/2015	HSEMC – Columbia County’s Homeland Security and Emergency Management Commission is recognized by the Board of County Commissioners as the cornerstones of a whole community approach to emergency management planning. All jurisdictions are members of the commission. Semi Annual NHMP meeting, plan review was conducted.
2016	
4/2/2016	KOHI Radio Preparedness Talk – Radio talk show for Columbia County, topics “specifically included preparing for the next flood event”.
4/3/2016	CERT Preparedness Meet-up – Locals interested in public volunteerism met with St. Helens CERT.
5/10/2016	HSEMC – Columbia County’s Homeland Security and Emergency Management Commission is recognized by the Board of County Commissioners as the cornerstones of a whole community approach to emergency management planning. All jurisdictions are members of the commission. Semi Annual NHMP meeting, plan review was conducted.
6/4/2016	Ford Family Foundation Preparedness Fair - County wide event to promote preparedness and mitigation in cooperation with the Ford Family Foundation. All cities participated.
7/23/2016	Columbia Emergency Preparedness Association EXPO – Large emergency management event covering all topics (preparedness, fire, law, mitigation, response).

City of St. Helens Hazard Mitigation Plan- Annex

Table 2. St. Helens Public Involvement Mechanisms	
Date	Description
9/22/2016	Columbia County Soil and Water Conservation District – Event hosted by SWCD on preparedness and flood mitigation efforts.
11/15/2016	HSEMC – Columbia County’s Homeland Security and Emergency Management Commission is recognized by the Board of County Commissioners as the cornerstones of a whole community approach to emergency management planning. All jurisdictions are members of the commission. Semi Annual NHMP meeting, plan review was conducted.
2017	
2/16/2017	Kiwanis Presentation – Preparedness Presentation on CSZ risk.
5/9/2017	HSEMC – Columbia County’s Homeland Security and Emergency Management Commission is recognized by the Board of County Commissioners as the cornerstones of a whole community approach to emergency management planning. All jurisdictions are members of the commission. Semi Annual NHMP meeting, plan review was conducted.
11/14/2017	HSEMC – Columbia County’s Homeland Security and Emergency Management Commission is recognized by the Board of County Commissioners as the cornerstones of a whole community approach to emergency management planning. All jurisdictions are members of the commission. Semi Annual NHMP meeting, plan review was conducted.
11/29/2017	Unprepared showing – St. Helens - presentation of OPB documentary regarding CSZ earthquake and tsunami.
2018	
1/19/2018	Preparedness to Vets Group – Presentation to Veterans regarding personal preparedness and flood mitigation.
5/8/2018	HSEMC – Columbia County’s Homeland Security and Emergency Management Commission is recognized by the Board of County Commissioners as the cornerstones of a whole community approach to emergency management planning. All jurisdictions are members of the commission. Semi Annual NHMP meeting, plan review was conducted and plans for plan update discussed.
10/14/18	South County Chamber - Preparedness Presentation on CSZ risk.
11/13/2018	HSEMC – Columbia County’s Homeland Security and Emergency Management Commission is recognized by the Board of County Commissioners as the cornerstones of a whole community approach to emergency management planning. All jurisdictions are members of the commission. Semi Annual County-wide Hazard Mitigation meeting. Work Session on Hazard Mitigation Plan update conducted.
11/27/2018	Pints and Preparedness – various topics including Hazard mitigation, and individual preparedness.
2019	
1/22/2019	Pints and Preparedness – various topics including Hazard mitigation, and individual preparedness.

City of St. Helens Hazard Mitigation Plan- Annex

Table 2. St. Helens Public Involvement Mechanisms	
Date	Description
2/20/2019	St. Helens Mitigation – Public meetings with presentations regarding mitigation planning.
3/26/2019	Drainage Districts Mitigation – Public meetings with presentations regarding mitigation planning.
3/26/2019	Pints and Preparedness – various topics including Hazard mitigation, and individual preparedness.
5/7/2019	HSEMC – Columbia County’s Homeland Security and Emergency Management Commission is recognized by the Board of County Commissioners as the cornerstones of a whole community approach to emergency management planning. All jurisdictions are members of the commission. Semi Annual County-wide Hazard Mitigation meeting. Work Session on Hazard Mitigation Plan update conducted.
4/16/2019	Drainage Districts Mitigation – Public meetings with presentations regarding mitigation planning.
4/23/2019	Pints and Preparedness – various topics including Hazard mitigation, and individual preparedness.
9/7/2019	Preparedness for Scouts – Presentation on preparedness for all hazards.

Capability Assessment

Table 3, 4, and 5 contain the City of St. Helens resources used to support planning activities, including the reports and studies reviewed as part of the update process.

Table 3. City of St. Helens Legal and Regulatory Resources Available for Hazard Mitigation		
Regulatory Tool	Name	Effect on Hazard Mitigation
Plans	City of St. Helens Comprehensive Plan	Provides overall guidance for a community's land use, economic development, and resource management.
	Transportation System Plan	Provides overall guidance for the community's transportation system development and resource management.
	City of St. Helens Emergency Operations Plan 6/19/08	Provides overall guidance for emergency management responsibilities and authority.
	Storm Water Master plan	Provides overall guidance for the community’s storm water system and future developments
	Parks and Trails Master Plan	Provides overall guidance for the community's parks and trails system.
	Water Master Plan	Provides overall guidance for the community's water use and future development requirements.

City of St. Helens Hazard Mitigation Plan- Annex

Table 3. City of St. Helens Legal and Regulatory Resources Available for Hazard Mitigation

Regulatory Tool	Name	Effect on Hazard Mitigation
	Wastewater Master Plan	Provides overall guidance for the community's wastewater use and future development requirements.
	Water Management and Conservation Plan	Provides overall guidance for the community's water use and conservation efforts.
Programs	National Flood Insurance Program (NFIP)	Makes affordable flood insurance available to homeowners, business owners, and renters in participating communities. In exchange, those communities must adopt and enforce minimum floodplain management regulations to reduce the risk of damage from future floods.

City of St. Helens Hazard Mitigation Plan- Annex

Policies (Municipal Codes)	City Charter	To provide for the government of the City of St. Helens and to repeal all charter provisions of the city enacted prior to the time that this charter takes effect except as hereinafter specifically retained.
	Title 17 Community Development Regulations	As a means of promoting the general health, safety, and welfare of the public, this code is designed to set forth the standards and procedures governing the development and use of land in the city of St. Helens and to implement the St. Helens comprehensive plan.
	St. Helens Municipal Code	The St. Helens Municipal Code is hereby adopted as the official city code of the city of St. Helens. The code shall be cited as the "St. Helens Municipal Code." It consists of the ordinances of the city that have ongoing effect and which have not expired according to their terms.
	Engineering Standards Manual	The purpose of this title is to set standards for the construction of public improvements to serve new and future developments and for the reconstruction of existing facilities to upgrade existing infrastructure.

Table 4. City of St. Helens Administrative and Technical Resources for Hazard Mitigation	
Staff/Personnel Resources	Department/Division Position
Planner(s) or engineer(s) with knowledge of land development and land management practices	City Engineer: Sue Nelson City Planner: Jacob Graichen
Engineer(s) or professional(s) trained in construction practices related to buildings and/or infrastructure	Building Official: Michael De Roia
Planner(s) or engineer(s) with an understanding of manmade or natural hazards	City Engineer: Sue Nelson
Floodplain manager	City Planner: Jacob Graichen
Personnel skilled in GIS and/or HAZUS-MH	City Planner: Jacob Graichen
Director of Emergency Services	Police Chief: Brian Greenway
Finance (grant writers, purchasing)	Finance Director: Matt Brown Grant Writer: Jenny Dimsho
Public Information Officers	Police Department: Melinda Duran Communication Officer: Crystal Farnsworth

City of St. Helens Hazard Mitigation Plan- Annex

Table 5. City of St. Helens Financial Resources for Hazard Mitigation	
Financial Resources	Effect on Hazard Mitigation
General funds	yes
Authority to levy taxes for specific purposes	yes, with voter approval
Incur debt through general obligation bonds	yes
Incur debt through special tax and revenue bonds	yes
Incur debt through private activity bonds	Unknown
Hazard Mitigation Grant Program (HMGP)	FEMA funding which is available to local communities after a Presidentially-declared disaster. It can be used to fund both pre- and post-disaster mitigation plans and projects.
Pre-Disaster Mitigation (PDM) grant program	FEMA funding which is available on an annual basis. This grant can only be used to fund pre-disaster mitigation plans and projects only.
Flood Mitigation Assistance (FMA) grant program	FEMA funding which is available on an annual basis. This grant can be used to mitigate repetitively flooded structures and infrastructure to protect repetitive flood structures.
United States Fire Administration (USFA) Grants	The purpose of these grants is to assist state, regional, national or local organizations to address fire prevention and safety. The primary goal is to reach high-risk target groups including children, seniors and firefighters.
Fire Mitigation Fees	Used to finance future fire protection facilities' construction and other fire capital expenditures to protect new development. The City Council or Fire District may charge fire mitigation fees to ensure new development pays their fair share of constructing these improvements.

Hazard Identification and Vulnerability Assessment

DMA 2000 Requirements: Hazard Identification and Risk Assessment	
Planning Requirements	
§201.6(c)(2)(i)	The risk assessment shall include a] description of the type, location and extent of all-natural hazards that can affect the jurisdiction. The plan shall include information on previous occurrences of hazard events and on the probability of future hazard events.
§201.6(c)(2)(ii)	The risk assessment shall include a] description of the jurisdiction's vulnerability to the hazards described in paragraph (c)(2)(i) of this section. This description shall include an overall summary of each hazard and its impact on the community. All plans approved after October 1, 2008 must also address NFIP insured structures that have been repetitively damaged by floods. The plan should describe vulnerability in terms of:
§201.6(c)(2)(ii)(A)	(A) The types and numbers of existing and future buildings, infrastructure, and critical facilities located in the identified hazard areas;
§201.6(c)(2)(ii)(B)	(B) An estimate of the potential dollar losses to vulnerable structures identified in ... this section and a description of the methodology used to prepare the estimate.
§201.6(c)(2)(ii)(C)	(C) Providing a general description of land uses and development trends within the community so that mitigation options can be considered in future land use decisions.
§201.6(c)(2)(iii)	For multi-jurisdictional plans, the risk assessment section must assess each jurisdiction's risks where they vary from the risks facing the entire planning area.
Planning Elements	
B1. Does the Plan include a description of the type, location, and extent of all-natural hazards that can affect each jurisdiction? 44 CFR 201.6(c)(2)(i) and 44 CFR 201.6(c)(2)(iii)	
B2. Does the Plan include information on previous occurrences of hazard events and on the probability of future hazard events for each jurisdiction? 44 CFR 201.6(c)(2)(i)	
B3. Is there a description of each identified hazard's impact on the community as well as an overall summary of the community's vulnerability for each jurisdiction? 44 CFR 201.6(c)(2)(ii)	
B4. Does the Plan address NFIP insured structures within each jurisdiction that have been repetitively damaged by floods? 44 CFR 201.6(c)(2)(ii)	

City of St. Helens Hazard Mitigation Plan- Annex

Hazard Identification

The Steering Committee determined that the following hazards could potentially threaten the community. Table 6 establishes the hazard profile against which this plan is designed

Table 6. Hazard Profile	
Natural Hazards	
Flood	X
Winter Storm	X
Landslide	X
Fire (Wildland/Urban)	X
Earthquake	X
Volcano	X
Wind	X
Erosion	X
ENSO (El Niño / La Niña)	
Expansive Soils	
Drought	

Specific Impacts of Identified Hazards

The following section describes Community specific vulnerabilities and impacts from the natural hazards identified in the 2009 Columbia County MHMP.

The following is derived from the best available data for facility locations and values. In many cases, values were unavailable, and therefore the totals listed below should be considered incomplete and likely less than the actual costs associated with the respective hazards.

Flood

FEMA FIRMs were used to outline the 100-year and 500-year floodplains for Columbia County. The 100-year floodplain delineates an area of high risk, while the 500-year floodplain delineates an area of moderate risk.

There are 903 residential structures (worth \$112.6M), 11 non-residential structures (value unknown), three government facilities (worth \$6.4M), one emergency response facility (worth \$4.5M), one care facility (worth \$323K), four community facilities (worth \$3.8M), five bridges (worth \$6.1M), and four utilities (worth \$392K) within the boundaries of the 100-year floodplain.

There are 886 residential structures (worth \$110.5M), 11 non-residential structures (value unknown), three government facilities (worth \$6.4M), one emergency response facility (worth \$4.5M), three community facilities (worth \$3.7M), three bridges (worth \$3.8M), and one utility (worth \$80K) located within the 500-year floodplain.

Winter Storm

City of St. Helens Hazard Mitigation Plan- Annex

The natural hazards resulting from winter storms, such as ice, cold, wind and floods, are often widespread. A single event is capable of impacting all people, critical facilities and infrastructure within the City of St. Helens, and therefore the entire population (12,895), including 4,109 residential structures (worth \$512M), 31 non-residential structures (value unknown), four government facilities (worth \$6.8M), three emergency response facilities (worth \$6.7M), nine educational facilities (worth \$2.7M) seven care facilities (worth \$9.9M), 29 community facilities (worth \$9M), five miles of highway and rail (value unknown), one transportation facility (worth \$175K), 22 utilities (worth \$77M), five bridges (worth \$6M), one transportation facility (worth \$178K), and one dam (value unknown) is at risk.

Landslide

The potential impacts from landslides can be widespread. Potential debris flows and landslides can impact transportation and rail routes, utility systems, and water and waste treatment infrastructure along with public, private, and business structures located adjacent to steep slopes, along riverine embankments, or within alluvial fans or natural drainages. Response and recovery efforts will likely vary from minor cleanup to more extensive utility system rebuilding. Utility disruptions are usually local and terrain dependent. Damages may require reestablishing electrical, communication, and gas pipeline connections occurring from specific breakage points. Initial debris clearing from emergency routes and high traffic areas may be required. Water and wastewater utilities may need treatment to quickly improve water quality by reducing excessive water turbidity and reestablishing waste disposal capability.

USGS elevation datasets were used to determine the landslide hazard areas within the City of St. Helens. Risk was assigned based on slope angle. A slope angle less than 14 degrees was assigned a low risk, a slope angle between 14 and 32 degrees was assigned a medium risk, and a slope angle greater than 32 degrees was assigned a high risk.

There are 2,402 residential structures (worth \$299.5M), 17 non-residential structures (value unknown), two government facilities (worth \$4.5M), two emergency response facilities (worth \$5M), three educational facilities (worth \$694K), one care facility (worth \$226K), 11 community facilities (worth \$668K), three bridges (worth \$3.8M) and eight utilities (worth \$46.6M) in the moderate landslide risk area.

There are 1,062 residential structures (worth \$132.4M), 11 non-residential structures (value unknown), one government facility (worth \$2.7M), one emergency response facility (worth \$4.5M), one educational facility (value unknown), one care facility (worth \$226K), four community facilities (worth \$230K), and three utilities (worth \$27.7M) in the high landslide risk area.

Wildland Fires

Wildland fire hazard areas were identified using a model incorporating slope, aspect, and fuel load. South-facing, steep, and heavily vegetated areas were assigned the highest fuel values while areas with little slope and natural vegetation were assigned the lowest fuel values. Risk levels of moderate, high, very high, and extreme were assigned to the entire region based on the results of this modeling.

City of St. Helens Hazard Mitigation Plan- Annex

There are 3,706 residential structures (worth \$468.9M), 31 non-residential structures (value unknown), four government facilities (worth \$6.8M), three emergency response facilities (worth \$6.7M), nine educational facilities (worth \$2.7M) seven care facilities (worth \$9.9M), 28 community facilities (worth \$7M), five bridges (worth \$6M), one transportation facility (worth \$178K), and 13 utilities (worth \$48.7M) located in the moderate fire risk areas.

There are 3,395 residential structures (worth \$423.4M), 25 non-residential structures (value unknown), four government facilities (worth \$6.8M), three emergency response facilities (worth \$6.7M), six educational facilities (worth \$2.6M) three care facilities (worth \$653K), 23 community facilities (worth \$6.5M), five bridges (worth \$6M), one transportation facility (worth \$178K), and 13 utilities (worth \$48.7M) located in the high fire risk areas.

There are 1,420 residential structures (worth \$177.1M), 15 non-residential structures (value unknown), one educational facility (worth \$500K), one care facility (worth \$226K), one community facility (worth \$45K), three bridges (worth \$3.8M) and one utility (worth \$27.3M) located in very high fire risk areas. There were ten residential structures (worth \$1.3M) and no critical facilities identified in the extreme fire risk area.

Earthquake

Based on PGA shake maps produced by the USGS, the western portion of Columbia County is likely to experience higher levels of shaking than the eastern portion, as a result of its proximity to the Cascadia Subduction Zone. Ground movement in both areas, however, is likely to cause damage to weak, unreinforced masonry buildings, and to induce small landslides along unstable slopes. As well as landslide, earthquakes can trigger other hazards such as dam failure and disruption of transportation and utility systems.

The eastern portion of Columbia County is likely to experience strong shaking should a subduction zone earthquake occur (9-20 percent of the acceleration of gravity). In contrast, the far western portion of the county is likely to experience very strong shaking (20-25 percent). This rating represents the peak acceleration of the ground caused by the earthquake.

Due to the City of Helens proximity to the eastern portion of the county, all people, critical facilities and infrastructure within the City of St. Helens, and therefore the entire population (12,895), including 4,109 residential structures (worth \$512M), 31 non-residential structures (value unknown), four government facilities (worth \$6.8M), three emergency response facilities (worth \$6.7M), nine educational facilities (worth \$2.7M) seven care facilities (worth \$9.9M), 29 community facilities (worth \$9M), five miles of highway and rail (value unknown), one transportation facility (worth \$175K), 22 utilities (worth \$77M), five bridges (worth \$6M), one transportation facility (worth \$178K), and one dam (value unknown) are located in the strong shaking (9-20 percent) area.

Volcano

A volcanic eruption would have a minor impact on City of St. Helens due to the proximity to volcanoes within the Cascade region. The major resources of concern include air quality and waterway sedimentation. During previous eruptions, ash fall has drifted to the east of the volcanoes. (State Interagency Hazard Mitigation Team 2006)

The City of St. Helens will likely only experience damage from volcanic eruption columns and clouds which contain volcanic gases, minerals, and rock. The columns and clouds form rapidly and extend several miles above an eruption. Solid particles within the clouds present a serious aviation threat, can distribute acid rain (sulfur dioxide gas and water), can create risk of suffocation (carbon dioxide is heavier than air and collects in valleys and depressions threatening human and animals), and pose a toxic threat from fluorine which clings to ash particles potentially poisoning grazing livestock and contaminating domestic water supplies.

Buildings streets and roads throughout the city may require minor cleanup with negligible impacts. Temporary utility interruptions are likely, and minor cleanup may be required for electrical and other utility services. Water treatment facilities may require additional attention to address high turbidity water. River traffic along the Columbia River could be disrupted due to sedimentation from a large eruption from Mt. St. Helens or Hood and dredging to restore channel depths may be necessary. Injuries associated with respiratory problems may result.

Due to the nature of the hazard, it is impossible to predict the location or extent of future events with any probability, although it can be assumed that all critical facilities and infrastructure within the City of St. Helens are at risk including the entire population (12,895), including 4,109 residential structures (worth \$512M), 31 non-residential structures (value unknown), four government facilities (worth \$6.8M), three emergency response facilities (worth \$6.7M), nine educational facilities (worth \$2.7M) seven care facilities (worth \$9.9M), 29 community facilities (worth \$9M), five miles of highway and rail (value unknown), one transportation facility (worth \$175K), 22 utilities (worth \$77M), five bridges (worth \$6M), one transportation facility (worth \$178K), and one dam (value unknown).

Wind

Many buildings, utilities and transportation systems in open areas, natural grasslands, or agricultural lands are especially vulnerable to wind damage. Impacts associated with wind can include damage to power lines, trees, and structures, and can also cause temporary disruptions of power. Additionally, high winds can cause significant damage to forestlands.

All areas within the City of St. Helens are equally at risk of a windstorm event including the entire population (12,895), including 4,109 residential structures (worth \$512M), 31 non-residential structures (value unknown), four government facilities (worth \$6.8M), three emergency response facilities (worth \$6.7M), nine educational facilities (worth \$2.7M) seven care facilities (worth \$9.9M), 29 community facilities (worth \$9M), five miles of highway and rail (value unknown), one transportation facility (worth \$175K), 22 utilities (worth \$77M), five bridges (worth \$6M), one transportation facility (worth \$178K), and one dam (value unknown) is at risk.

Erosion

Riverine erosion rarely causes death or injury. However, erosion causes significant destruction of property, development, and infrastructure. Erosion hazard data is not readily available, however, descriptions of several localized areas were identified during the development of this document and are identified only by location on a map referencing the river or stream reach described. Critical facilities that may be at risk of erosion were identified using a 300 foot-buffer in the areas identified as having historic erosion impacts to conservatively account for building footprints.

The City of St. Helens has 540 residential structures (worth \$67.3M), eight non-residential structures (value unknown), two government facilities (worth \$4.5M), one emergency response facility (worth \$4.5M), three community facilities (worth \$2.1M) and one utility (worth \$263K) that may be at risk from erosion impacts.

Values at Risk

Population Analysis

Population data listed in Table 7 were obtained from the 2010 U.S. Census and Portland State University. It comprises census block level data and estimates from university conducted community research.

Table 7. Population			
2000 Census	2010 Census	% Change	2020 PSU Estimate
10,019	12,883	22%	15,591

Asset Inventory

The Asset Inventory describes the physical values; the residential building stock, public facilities, and infrastructure within each community that may be affected by hazard events and includes population, residential and nonresidential buildings, critical facilities, and infrastructure. These values are described in Tables 8 and 9 and portray the City's critical infrastructure numbers and values, and their potential vulnerability by hazard type.

(Name of Jurisdiction/District here) seeks to protect its population by supporting Columbia County and Oregon State initiatives, ordinances, building codes, and development regulations. One of the most important initiatives is to prohibit or not allow future development of buildings, infrastructure and critical facilities in identified high hazard areas. Any essential infrastructure component will undergo stringent review to ensure potential hazard risk will be mitigated.

City of St. Helens Hazard Mitigation Plan- Annex

Table 8. Residential Buildings	
Total Building Count	Total Value of Buildings (\$)
4,109	512,392,300

Table 9. City of St. Helens Critical Facilities and Infrastructure			
Facility Type	Name / Number	Address	Value ¹
Government	St. Helens City Hall	265 Strand St	\$2,750,000
	St. Helens Parks Dept.	477 18 th St S	\$1,860,160
	City Shops (Public Works)	984 Oregon Street	\$461,229
	VAGT Building	257-277 Strand Street	1,750,000
Emergency Response	Columbia River Fire & Rescue	270 Columbia Blvd	\$563,680
	St. Helens Police Department	150 S 13th St	\$1,648,847
	Emergency Operations Center	230 The Strand	\$4,468,000
Educational	McBride Elementary School	2774 Columbia Blvd	\$32,300
	Lewis & Clark Intermediate School	111 S 9th St	Unknown
	St. Helens Middle School	354 N 15th St	Unknown

City of St. Helens Hazard Mitigation Plan- Annex

	St. Helens High School	2375 Gable Rd	Unknown
	Columbia County Education Campus	474 16th N 16th Street	Unknown
	St. Helens Arthur Academy (Mastery Learning Institute)	33035 Pittsburgh Road	\$500,000
	St. Helens School District Office	475 16th N 16th Street	\$146,300
	Columbia Learning Center	375 S 18th Street	\$1,860,160
	Portland Community College, St. Helens Center	1510 St. Helens St.	\$194,000
Care Facilities	Legacy Imaging & Radiology Services	475 S Columbia River Hwy	\$7,185,890
	Legacy Urgent Care Clinic	475 S Columbia River Hwy	Unknown
	Columbia Community Mental Health	58646 McNulty Way	Unknown
	Legacy Labs St. Helens	500 N Columbia River Hwy	Unknown
	Public Health Foundation of Columbia County	2370 Gable Rd	\$104,000
	Columbia Veterinary Clinic	35645 Firlok Park Blvd	Unknown
	St. Helens Senior Center	375 S 15th St	\$2,103,070
Community	St. Helens City Library	375 S 18th St	\$3,139,384
	McCormick Park	475 S 18th St & Portland Road	\$1,537,187
	Campbell Park	Vernonia & Allendale Dr	\$427,303
	Columbia View Park	Strand St & Columbia River	\$287,813
	Civic Pride Park	111 S 9th St	\$11,883
	Godfrey Park	N 4th St	\$33,802
	Heinie Heumann Park	S 15th St & Tualatin St	\$11,667
	6 th Street Park	6th St & West St	\$66,730
	Columbia Botanical Garden	N 6th St	Unknown
	Sand Island Marine Park	.75 mi from 265 Strand St	\$1,866,393
	Nob Hill Nature Park	6 th St & Plymouth St.	Unknown
	Walnut Tree Park		

City of St. Helens Hazard Mitigation Plan- Annex

Table 9. City of St. Helens Critical Facilities and Infrastructure			
Facility Type	Name / Number	Address	Value ¹
	Grey Cliffs Park	Wyeth St. & Columbia River	Unknown
	Ascension Lutheran Church	1911 Columbia Blvd	Unknown
	Buccini Hall	165 S 145h St	Unknown
	Bethel Fellowship	104 N Vernonia Rd	\$127,600
	Calvary Chapel	213 S 1st St	Unknown
	Calvary Lutheran	58251 S Division Rd	\$191,340
	Christ Episcopal Church	35350 E Division Rd	\$292,700
	Church of Christ	295 S 18th St	Unknown
	Church of the Nazarene	2360 Gable Rd	Unknown
	First Christian Church	185 S 12th St	Unknown
	First Evangelical Church of St. Helens	225 3 rd St N	\$135,840
	First Evangelical Lutheran Church	360 Wyeth St	Unknown
	First Missionary Baptist Church	2625 Gable Rd	Unknown
	First United Methodist Church	560 Columbia Blvd	\$192,080
	Plymouth Presbyterian Church	2615 Sykes Rd	Unknown
	St Frederic Catholic Church	175 13th St S	\$390,800
	St. Helens Community Bible Church	35031 Millard Rd	\$79,700
	Sunset Park Community Church	174 Sunset Blvd	\$86,200
	The Church of Jesus Christ of Latter-Day Saints	2755 Sykes Rd	Unknown
	Yankton Baptist Church	33579 Pittsburgh Rd	\$45,400
State and Federal Highways	US Hwy 30		Approx 5 miles long
Railroads	Portland & Western Railroad		Approx. 5 miles long
Bridges	Milton Creek Bike and Pedestrian Bridge	GPD Coordinates 45deg51min1.47 secN 122deg48min52.41secW	\$546,000

City of St. Helens Hazard Mitigation Plan- Annex

Table 9. City of St. Helens Critical Facilities and Infrastructure			
Facility Type	Name / Number	Address	Value ¹
	Old Portland Road Bridge	18th St and Old Portland Rd	\$1,500,000
	McNulty Way Bridge	58645 McNulty Way	\$1,754,691
	Tree Farm North Bridge	Salmonberry - 1 mile from 309C	\$82,507
	Milton Way Bridge	Milton Way	\$982,230
	Columbia Blvd Bridge	155 S Columbia River Hwy/Columbia Blvd	\$1,300,000
Transportation Facilities	Port of Columbia County	530 Milton Way	\$178,700
	CC Rider Transit Center	1155 Deer Island Road	Unknown
	St. Helens Public Docks	275 The Strand	Unknown
Utilities	Columbia River PUD	64001 Columbia River Hwy, Deer Island	\$166,400
	Waste Water Treatment Plant	451 Plymouth St	\$27,266,567
	Columbia County Talk Radio KOHI AM 1600	36200 Pittsburgh Rd	Unknown
	Water Reservoir - Old and New	Pittsburgh Rd & Battle Mountain Rd	\$4,112,483
	Water Reservoir - West Hill	West Hill & Pittsburgh Rd	\$2,000,000
	Boise Cascade Landfill	1300 Kaster Rd. 45.8476 N / -122.803 W	Unknown
	Department of Public Works	984 Oregon St	\$1,878,104
	Pump Station #12	N 1st St & Lemont St	\$198,265
	Pump Station #11	Parkwood Dr	\$132,768
	Pump Station #9 (Yachts Landing)	River St & marina	\$77,342
	Pump Station #8 (Clark St)	Clark St & Milton Wy	\$47,486
	Pump Station #7 (McNulty Creek)	Old Portland Rd & Reed Dr	\$225,607
	Pump Station #6	S 10th St	\$62,430
	Pump Station #5 (Elks)	Belton Rd	\$177,590
	Pump Station #4 (True Value)	Hwy 30 & Firlock	\$80,140
	Pump Station #3 (Kozy)	4th & Columbia Blvd	\$106,170
	Pump Station #2 (River)	River & St. Helens St	\$264,748
	Pump Station #1(Klondike)	S 1st St & Cowlitz	\$163,899
	Pump Station	Oregon St	258605

City of St. Helens Hazard Mitigation Plan- Annex

Table 9. City of St. Helens Critical Facilities and Infrastructure			
Facility Type	Name / Number	Address	Value ¹
	Fuel Tanks	984 Oregon St	32,295
	Waste Water Treatment Plant	451 Plymouth St	\$27,266,567
	Water Filtration Facility	1215 4th St - Columbia City	\$12,526,345
Dams	Salmonberry	Salmonberry Lake	No Value
	Dalton Lake Recreation Area	Dalton Lake Dam	No Value

National Flood Insurance Policy

National Flood Insurance Program data were obtained from the State Department of Land Conservation and Development. This data is significant for the vulnerability assessment as it identifies the impact of flooding, one of the most often repeated natural hazards for the county. This data is displayed in Table 10 and 10a.

Table 10. Scappoose NFIP Insurance Report										
Jurisdiction	Effective FIRM and FIS	Initial FIRM	Total Policies	Pre FIRM Policies	Policies by Building Type				Minus Rated A Zone	Minus Rated V Zone
					Single Family	2 to 4 Family	Other Residential	Non-Residential		
St. Helens	11/26/2010	9/29/1986	82	56	71	6	0	5	2	0

Source: FEMA Community Information System 02/21/2019

Table 10a. Scappoose NFIP Insurance Report									
Jurisdiction	Insurance in Force	Total Paid Claims	Pre-Firm Claims Paid	Substantial Damage Claims	Total Paid Amount	Repetitive Loss Structures	Severe Repetitive Loss Structures	CRS Class Rating	Last Community Assistance Visit
St. Helens	\$23,204,700	12	9	1	\$62,420	1	0	10	9/27/2006

Source: FEMA Community Information System 02/21/2019

Vulnerability Analysis

A vulnerability analysis predicts the extent of exposure, and the impacts that may result from a hazard event of a given intensity in each area. The analysis provides quantitative data that may be used to identify and prioritize potential mitigation measures by allowing communities to focus attention on areas with the greatest risk of damage. A vulnerability analysis is divided into five steps including asset inventory, methodology, data limitations, exposure analysis for current assets, and areas of future development.

The following is derived from the best available data for facility locations and values. In many cases, values were unavailable, and therefore the totals listed below should be considered incomplete and likely less than the actual costs associated with the respective hazards

The vulnerability analysis development process is thoroughly discussed in the Columbia County Basic Plan, Section 6, which generated the following Hazard Exposure Analysis Overviews in Tables 11, 12, and 13

City of St. Helens Hazard Mitigation Plan- Annex

Table 11. City of St. Helens Potential Hazard Exposure Analysis Overview-Population and Buildings

Table 11. City of St. Helens Potential Hazard Exposure Analysis Overview-Population and Buildings							
			Population	Buildings			
				Residential		Non-Residential	
Hazard Type	Hazard Area	Methodology	Number	Number	Value (\$) ¹	Number	Value (\$) ¹
Flood	Moderate	500-year floodplain	--	886	110,484,200	11	unknown
	High	100-year floodplain	--	903	112,604,100	11	unknown
Winter Storm		descriptive	12,895	4,109	512,392,300	31	unknown
Landslide	Moderate	>14-32 degrees	--	2,402	299,529,400	17	unknown
	High	>32-56 degrees	--	1,062	132,431,400	11	unknown
Wildland Fire	Moderate	Moderate fuel rank	--	3,760	468,872,000	31	unknown
	High	High fuel rank	--	3,395	423,356,500	25	unknown
	Very High	Very high fuel rank	--	1,420	177,074,000	15	unknown
	Extreme	Extreme fuel rank	--	10	1,247,000	0	unknown
Earthquake	Strong	9-20% (g)	--	3,772	470,368,400	31	unknown
	Very strong	20-40% (g)	--	0	--	0	unknown
	Severe	>40-60% (g)	--	0	--	0	unknown
Volcano		descriptive	12,895	4,109	512,392,300	31	unknown
Wind		descriptive	12,895	4,109	512,392,300	31	unknown
Erosion		within 300' of potential areas of erosion	--	540	67,338,000	8	unknown

City of St. Helens Hazard Mitigation Plan- Annex

Table 12. City of St. Helens Potential Hazard Exposure Analysis Overview
Critical Facilities

			Government		Emergency Response		Educational		Care		Community	
Hazard Type	Hazard Area	Methodology	No.	Value (\$) ¹	No.	Value (\$) ¹	No.	Value (\$) ¹	No.	Value (\$) ¹	No.	Value (\$) ¹
Flood	Moderate	500-year floodplain	3	6.4M	1	4.5M	--	--	--	--	3	3.7M
	High	100-year floodplain	3	6.4M	1	4.5M	--	--	1	323K	4	3.8M
Winter Storm		descriptive	4	6.8M	3	6.7M	9	2.7M	7	9.9M	29	9M
Landslide	Moderate	>14-32 degrees	2	4.5M	2	5M	3	694K	1	226K	11	668K
	High	>32-56 degrees	1	2.7M	1	4.5M	1	unknown	1	226K	4	230K
Wildland Fire	Moderate	Moderate fuel rank	4	6.8M	3	6.7M	9	2.7M	7	9.9M	28	7M
	High	High fuel rank	4	6.8M	3	6.7M	6	2.6M	3	653K	23	6.5M
	Very High	Very high fuel rank	--	--	--	--	1	500K	1	226K	1	45K
	Extreme	Extreme fuel rank	--	--	--	--	--	--	--	--	--	--
Earthquake	Strong	9-20% (g)	4	6.8M	3	6.7M	9	2.7M	7	9.9M	29	9M
	Very strong	20-40% (g)	--	--	--	--	--	--	--	--	--	--
	Severe	>40-60% (g)	--	--	--	--	--	--	--	--	--	--
Volcano		descriptive	4	6.8M	3	6.7M	9	2.7M	7	9.9M	29	9M
Wind		descriptive	4	6.8M	3	6.7M	9	2.7M	7	9.9M	29	9M
Erosion		within 300' of potential areas of erosion	2	4.5M	1	4.5M	--	--	--	--	3	2.1M

City of St. Helens Hazard Mitigation Plan- Annex

Table 13. City of St. Helens Potential Hazard Exposure Analysis Overview
Critical Facilities

[illegible]

Mitigation Strategy

The following section defines mitigation action identification and analysis as stipulated in DMA 2000 and its implementing regulations.

DMA 2000 Requirements: Mitigation Strategy	
Planning Requirements	
§201.6(c)(3)	The plan shall include the following:] A mitigation strategy that provides the jurisdiction's blueprint for reducing the potential losses identified in the risk assessment, based on existing authorities, policies, programs, and resources, and its ability to expand on and improve these existing tools.
§201.6(c)(3)(i)	The hazard mitigation strategy shall include a] description of mitigation goals to reduce or avoid long-term vulnerabilities to the identified hazards.
§201.6(c)(3)(ii)	The hazard mitigation strategy shall include a] section that identifies and analyzes a comprehensive range of specific mitigation actions and projects being considered to reduce the effects of each hazard, with particular emphasis on new and existing buildings and infrastructure. All plans approved by FEMA after October 1, 2008, must also address the jurisdiction's participation in the NFIP, and continued compliance with NFIP requirements, as appropriate.
§201.6(c)(3)(iii)	The hazard mitigation strategy shall include an] action plan, describing how the action identified in paragraph (c)(3)(ii) of this section will be prioritized, implemented, and administered by the local jurisdiction. Prioritization shall include a special emphasis on the extent to which benefits are maximized according to a cost benefit review of the proposed projects and their associated costs.
§201.6(c)(3)(iv)	For multi-jurisdictional plans, there must be identifiable action items specific to the jurisdiction requesting FEMA approval or credit of the plan.
§201.6(c)(4)(ii)	The plan shall include a] process by which local governments incorporate the requirements of the mitigation plan into other planning mechanisms such as comprehensive or capital improvements, when appropriate.
Planning Elements	
C1. Does the plan document each jurisdiction's existing authorities, policies, programs and resources, and its ability to expand on and improve these existing policies and programs? 44 CFR 201.6(c)(3)	
C2. Does the Plan address each jurisdiction's participation in the NFIP and continued compliance with NFIP requirements, as appropriate? 44 CFR 201.6(c)(3)(ii)	
C3. Does the Plan include goals to reduce/avoid long-term vulnerabilities to the identified hazards? 44 CFR 201.6(c)(3)(i)	
C4. Does the Plan identify and analyze a comprehensive range of specific mitigation actions and projects for each jurisdiction being considered to reduce the effects of hazards, with emphasis on new and existing buildings and infrastructure? 44 CFR 201.6(c)(3)(ii) and 44 CFR 201.6(c)(3)(iv)	

C5. Does the Plan contain an action plan that describes how the actions identified will be prioritized (including cost benefit review), implemented, and administered by each jurisdiction? 44 CFR 201.6(c)(3)(iii) and 44 CFR (c)(3)(iv)

C6. Does the Plan describe a process by which local governments will integrate the requirements of the mitigation plan into other planning mechanisms, such as comprehensive or capital improvement plans, when appropriate? 44 CFR 201.6(c)(4)(ii)

Identify Mitigation Goals

City of St. Helens reviewed the Columbia County goals and determined they meet the City's needs and subsequently adopted the Goals in Table 14 for the current planning period.

Table 14. City of St. Helens Mitigation Goals	
Goal Number	Goal Description
1	Reduce the Threat to Life Safety Enhance life safety by minimizing the potential for deaths and injuries in future disaster events.
2	Protect Critical Facilities and Enhance Emergency and Essential Services • Implement activities or projects to protect critical facilities and infrastructure. • Seek opportunities to enhance, protect, and integrate emergency and essential services. • Strengthen emergency operations plans and procedures by increasing collaboration and coordination among public agencies, non-profit organizations, businesses, and industry.
3	Reduce the Threat to Property • Seek opportunities to protect, enhance and integrate emergency and essential services. • Strengthen emergency operations plans and procedures by increasing collaboration and coordination among public agencies, non-profit organizations, businesses, industries and the citizens of City of St. Helens.
4	Create a Disaster Resistant and Disaster-Resilient Economy • Develop and implement activities to protect economic well-being and vitality while reducing economic hardship in post disaster situations. • Reduce insurance losses and repetitive claims for chronic hazard events. • Work with State and Federal Partners to reduce short-term and long-term recovery and reconstruction costs. • Work with local and County organizations, such as Columbia Emergency Planning Association (CEPA) and Local Emergency Planning Commission (LEPC). • Expedite pre-disaster and post-disaster grants and program funding.
5	Increase Public Awareness, Education, Outreach, and Partnerships • Coordinate and collaborate, where possible, risk reduction outreach efforts with the Oregon Partners for Disaster Resistance & Resilience and other public and private organizations. • Develop and implement risk reduction education programs to increase awareness among citizens, local, county, and regional agencies, non-profit organizations, businesses, and industry. • Promote insurance coverage for catastrophic hazards • Strengthen communication and coordinate participation in and between public agencies, citizens, nonprofit organizations, businesses, and industry.

Evaluate and Prioritize Mitigation Actions

Mitigation actions are activities, measures, or projects that help achieve the goals of a mitigation plan. Table 15 lists the mitigation actions developed during this mitigation planning process or offered during whole community planning activities. It is not intended that this plan will attempt

City of St. Helens Hazard Mitigation Plan- Annex

to act on all of these action items, but the list will be maintained in order to provide documentation for future planning efforts.

Table 15. City of St. Helens Mitigation Actions Considered			
Hazard	Status	Comment	Description
Natural Hazards			
<i>Multi-Hazard (MH)</i>			
MH	Complete		Develop and incorporate building ordinances commensurate with building codes to reflect survivability from wind, seismic, fire, and other hazards to ensure occupant safety.
MH	Complete		Review ordinances and develop outreach programs to assure mobile homes and manufactured buildings are protected from severe wind and flood hazards. (Anchoring, elevation, and other methods as applicable)
MH	Complete		Review ordinances and develop outreach programs to assure fuel oil and propane tanks are properly anchored and hazardous materials are properly stored and protected from known natural hazards such as seismic or flooding events.
MH	Ongoing	Ordinances already exist	Cross reference and incorporate mitigation planning provisions into all community planning processes such as comprehensive, capital improvement, land use, transportation plans, etc to demonstrate multi-benefit considerations and facilitate using multiple funding source consideration.
MH	Complete		Develop and incorporate mitigation provisions and recommendations into zoning ordinances and community development processes to maintain the floodway and protect critical infrastructure and private residences from other hazard areas.
MH	Ongoing	Some units purchased for some locations.	Purchase and install generators with main power distribution disconnect switches for identified and prioritized critical facilities susceptible to short term power disruption. (i.e. first responder and medical facilities, schools, correctional facilities, and water and sewage pump stations, etc.)
MH	Consider	A few rods in place We get very few strikes	Install lightning rods and lightening grade surge protection devices on critical electronic components such as warning systems, communications equipment, and computers for critical facilities.
MH	Ongoing	Continual updating of EAP	Develop, produce, and distribute information materials concerning mitigation, preparedness, and safety procedures for all natural hazards.
MH	Consider	We will review issues and address with	Explore the need for, develop, and implement hazard zoning ordinances for high-risk hazard area land-use.

City of St. Helens Hazard Mitigation Plan- Annex

Table 15. City of St. Helens Mitigation Actions Considered			
Hazard	Status	Comment	Description
		ordinances where applicable	
MH	Consider	Where signs will help or protect the public	Based on known high-risk hazard areas, identify hazard-specific signage needs and purchase and install hazard warning signs near these areas to notify and educate the public of potential hazards.
MH	Ongoing	We are working on identified repeat flooding areas to correct	Identify and list repetitively flooded structures and infrastructures, analyze the threat to these facilities, and prioritize mitigation actions to acquire, relocate, elevate, and/or flood proof to protect the threatened population.
MH	Complete	Ordinances exist	Install storm shutters, hurricane clips, bracing systems etc. to meet or exceed applicable building codes while reducing disaster damages.
MH	Ongoing	Ordinances Exist	Perform hydrologic and hydraulic engineering, and drainage studies and analyses. Use information obtained for feasibility determination and project design. This information should be a key component, directly related to a proposed project.
MH	Consider	We will review for applicability	Develop vegetation projects to restore clear cut and riverine erosion damage and to increase landslide susceptible slope stability.
MH	Consider	We will do this as money and opportunity allows	Retrofit structures to protect them from seismic, floods, high winds, earthquakes, or other natural hazards.
MH	Complete	We have rules to control this and presently do not have public buildings in harm's way	Acquire, demolish, or relocate structures from hazard prone area. Property deeds shall be restricted for open space uses in perpetuity to keep people from rebuilding in hazard areas.
MH	Consider	As bridges are replaced this will normally be accomplished	Harden utility headers located along river embankments to mitigate potential flood, debris, and erosion damages.
MH	Complete	Public Works and City	Establish a formal role for the jurisdictional Hazard Mitigation Planning Committees to develop a sustainable process to implement, monitor, and evaluate citywide mitigation actions.

City of St. Helens Hazard Mitigation Plan- Annex

Table 15. City of St. Helens Mitigation Actions Considered			
Hazard	Status	Comment	Description
		Council will do this	
MH	Ongoing	Ongoing process	Identify and pursue funding opportunities to implement mitigation actions.
MH	Ongoing	We have such a mechanism in HSEMC & LEPC	Develop public and private sector partnerships to foster hazard mitigation activities.
MH	Ongoing	Partly exists already	Integrate the Mitigation Plan findings into planning and regulatory documents and programs and into enhanced emergency planning.
<i>Flood</i>			
Flood	Ongoing	GIS already has flood maps and buildings. Partially complete	Develop and maintain GIS mapped critical facility inventory for all structures located within 100-year and 500-year floodplains.
Flood	Complete	Most buildings mapped	Develop and maintain GIS mapped inventory, and develop prioritized list of residential and commercial buildings within 100-year and 500-year floodplains.
Flood	Consider	Can be done as funds allow	Develop and maintain GIS mapped inventory of repetitive loss properties to include the types and numbers of properties.
Flood	Ongoing	Engineering is working on this.	Develop and implement mitigation actions for repetitive loss properties.
Flood	Complete	Locations already identified	Develop and maintain an inventory of locations subject to frequent storm water flooding based on most current USACOE flood data.
Flood	Ongoing	Awaiting state input	Request DOGAMI debris flow and lahar data be included in FIRM updates. Use the updated FIRMS for land use and mitigation planning.
Flood	Ongoing	Work is being done to mitigate or consider such	Determine and implement most cost beneficial and feasible mitigation actions for locations with repetitive flooding and significant damages or road closures.
Flood	Consider	We will work on this as time and funds allow	Develop an outreach program to educate public concerning NFIP participation benefits, floodplain development, land use regulation, and NFIP flood insurance availability to facilitate continued compliance with the NFIP.
Flood	Complete	Done	Develop, implement, and enforce floodplain management ordinances.

City of St. Helens Hazard Mitigation Plan- Annex

Table 15. City of St. Helens Mitigation Actions Considered			
Hazard	Status	Comment	Description
Flood	Ongoing	I & I Project	Develop outreach program to educate residents concerning flood proofed well and sewer/septic installation.
Flood	Ongoing	Have installed in two locations within city	Install new streamflow and rainfall measuring gauges.
Flood	Ongoing	Rules exist as do programs to accomplish	Develop, or revise, adopt, and enforce storm water ordinances and regulations to manage run-off from new development, including buffers and retention basins.
Flood	Consider	We will accomplish where applicable	Construct earthen berms to divert flood flows into bridge or culvert openings. The earth fill should be erosion-resistant and the berms should be covered with erosion-resistant fabric, armoring materials, or vegetation.
Flood	Ongoing	We will accomplish where applicable and as funds are available	Increase culvert size to increase its drainage efficiency.
Flood	Ongoing	Where applicable	Construct debris basins to retain debris in order to prevent downstream drainage structure clogging.
Flood	Complete	Done where applicable	Install debris cribs over culvert inlets to prevent inflow of coarse bed-load and light floating debris.
Flood	Consider	Where applicable and when funds available	Construct debris deflectors to deflect the major portion of debris away from culvert entrances and bridge piers. They are normally "V" shaped.
Flood	Consider	Where applicable and when funds available	Install debris fins upstream of a culvert to align debris so that the debris will pass through a drainage opening without clogging the inlet. They are sometimes used on bridge piers to deflect drifting materials.
Flood	Ongoing	Done on new development and will review for older areas	Create detention storage basins, ponds, reservoirs etc. to allow water to temporarily accumulate to reduce pressure on culverts and low water crossings. Water ultimately returning to its watercourse at a reduced flow rate.
Flood	Consider	Where applicable and when funds available	Install triangular or circular flow deflectors on or immediately upstream from bridge footings to deflect water flow and reduce flow velocities preventing footing scour.
Flood	Consider	Where applicable and	Construct a high water overflow crossing to carry flood flows from over bank areas.

City of St. Helens Hazard Mitigation Plan- Annex

Table 15. City of St. Helens Mitigation Actions Considered			
Hazard	Status	Comment	Description
		when funds available	
Flood	Consider	Where applicable and when funds available	Create relief drainage ditch opening using a culvert, bridge, or multiple culverts; to relieve rapid water accumulation during high water flow events. .
Flood	Consider	Where applicable and when funds available	Modify existing culverts by developing a ring compression, by flattening, or beveling the end of a circular culvert to match the angle of the embankment. May need to install flanges to stiffen the beveled section of the culvert.
Flood	Consider	Where applicable and when funds available	Construct spur dikes along the embankments to direct flood flows into a bridge opening or away from a continuous impact site.
Flood	Ongoing	Where applicable and when funds available	Construct concrete wing walls at culvert or bridge entrances and outlets to direct water flow into their openings
Flood	Complete	Done	Provide flood protection to mitigate damage and contamination of wastewater treatment systems.
Flood	Consider	Where applicable and when funds available	Develop and implement flood risk reduction program and outreach efforts considering upstream storage, channel improvements, and flood walls or levee construction.
<i>Winter Storms</i>			
Winter Storms	Ongoing	Need to develop a program	Develop and implement programs to coordinate maintenance and mitigation activities to reduce risk to public infrastructure from severe winter storms.
Winter Storms	Complete	We will add back up power as funding allows.	Develop critical facility list needing emergency back-up power systems, prioritize, seek funding and implement mitigation actions.
Winter Storms	Ongoing	We will review as to applicability	Develop and implement tree clearing mitigation programs to keep trees from threatening lives, property, and public infrastructure from severe weather events.
Winter Storms	Complete	Rules exists for this	Develop, implement, and maintain partnership program with electrical utilities to use underground utility placement methods where possible to reduce or eliminate power outages from severe winter storms. Consider developing incentive programs.
Winter Storms	Ongoing	Partly done with power provider	Develop personal use and educational outreach training for a “safe tree harvesting” program. Implement along utility and road corridors, preventing potential winter storm damage.

City of St. Helens Hazard Mitigation Plan- Annex

Table 15. City of St. Helens Mitigation Actions Considered			
Hazard	Status	Comment	Description
Winter Storms	Complete	City has linkage and contacts	Purchase NOAA Weather radios and develop a web portal linking residents to various weather information sites. (NWS, FEMA, The Weather Channel).
Winter Storms	Ongoing	Partially Complete City has some equip for measuring	Install new streamflow and precipitation measuring gauges and develop monitoring and early warning program.
Winter Storms	Consider	We will review with School District	Develop outreach program with school district contests having students develop, display, and explain mitigation projects or initiatives.
Winter Storms	Consider	We will review with applicable agencies	Develop early warning test program partnering with NOAA, City Police, Fire Departments, and Volunteer Fire Department to coordinate tests.
Winter Storms	Complete	Rules exist	Implement and enforce the most current Uniform International, and State, Building Codes to ensure structures can withstand winter storm hazards such as high winds, rain, water and snow.
Winter Storms	Consider	Power company issue (Community Partner)	Increase power line wire size and incorporate quick disconnects (break away devices) to reduce ice load power line severe wind or winter ice storm event failure.
Winter Storms	Consider	Where applicable and when funds available	Review critical facilities and government building energy efficiency, winter readiness, and electrical protection capability. Identify, prioritize, and implement infrastructure upgrade or rehabilitation project prioritization and development.
<i>Landslide</i>			
Landslide	Complete	Done by State	Develop comprehensive geological landslide and rockslide prone area maps.
Landslide	Complete	Rules exist	Develop, implement and enforce property development landslide risk assessment procedures to identify potential facility vulnerability.
<i>Wildland Fire</i>			
Wildland Fire	Ongoing	Partially Complete In process and should be done by Dec 2009	Identify critical facilities and vulnerable populations based on mapped high hazard areas.
Wildland Fire	Consider	Where applicable and	Identify evacuation routes away from high hazard areas and develop outreach program to educate the public concerning warnings and evacuation procedures.

City of St. Helens Hazard Mitigation Plan- Annex

Table 15. City of St. Helens Mitigation Actions Considered			
Hazard	Status	Comment	Description
		when funds available	
Wildland Fire	Complete	Fire District has done	Develop Community Wildland Fire Protection Plans for all at-risk communities.
Wildland Fire	Ongoing	By Fire District	Provide real-time internet access and interagency cooperation to decrease wildland fire warning times.
Wildland Fire	Complete	By fire district	Hold "Ready, Set, Go" workshop to educate residents and contractors concerning fire resistant landscaping.
Wildland Fire	Consider	Need property rules	Promote "Ready, Set, Go" building siting, design, and construction materials.
Wildland Fire	Complete	Done	Develop "Ready, Set, Go" Public Service Announcements (PSA).
Wildland Fire	Consider	Provided by Fire District	Provide wildland fire information in an easily distributed format for all residents.
Wildland Fire	Ongoing	Scheduled per Fire Code	Schedule and perform government facility "fire drills" per Fire Code
Wildland Fire	Complete	Fire district is leading this	Conduct residential audits for wildland and building fire hazard identification then develop an outreach program to convey the findings.
Wildland Fire	Complete	Rules exist	Develop, adopt, and enforce burn ordinances that require burn permits, restricts campfires, and controls outdoor burning.
Wildland Fire	Consider	Where applicable and when funds available	Develop outreach program to educate and encourage fire-safe construction practices for existing and new construction in high risk areas.
Wildland Fire	Consider	Fire District is conduct this	Develop outreach program to educate and encourage home landscape cleanup (defensible space) and define debris disposal programs.
Wildland Fire	Consider	Where applicable and when funds available	Identify, develop, and implement, and enforce mitigation actions such as fuel breaks and reduction zones for potential wildland fire hazard areas.
<i>Earthquake</i>			
Earthquake	Consider	Where applicable and when funds available	Supplement State Seismic Needs Analysis data (schools, fire, law enforcement). Complete inventory of public and commercial buildings that may be particularly vulnerable to earthquake damage.
Earthquake	Consider	Where applicable and when funds available	Identify high seismic hazard areas; develop a wood-frame residential building inventory and an outreach program to educate population concerning facilities particularly vulnerable to earthquake damage, such as pre-1940s homes and homes with cripple wall foundations.

City of St. Helens Hazard Mitigation Plan- Annex

Table 15. City of St. Helens Mitigation Actions Considered			
Hazard	Status	Comment	Description
Earthquake	Ongoing	Available at City Hall	Disseminate FEMA pamphlets to educate and encourage homeowners concerning seismic structural and non-structural retrofit benefits.
Earthquake	Consider	As funds allow	Retrofit important public facilities with significant seismic vulnerabilities, such as unreinforced masonry construction.
Earthquake	Complete	Done by State	Retrofit bridges that are not seismically adequate for lifeline transportation routes.
Earthquake	Complete	Done	Update existing (or adopt the most current) Uniform Building Code
Earthquake	Complete	Done	Implement and enforce the Uniform, International, and State Building Codes.
Earthquake	Complete	Done	Inspect and/or certify all new construction.
Earthquake	Consider	We will consider as advised and as funded	Develop public outreach program to train earthquake safety; perform drop-cover-hold drills at schools and public facilities.
Earthquake	Ongoing	As personnel and funding allows	Develop outreach program to educate population concerning household, business, and public facility mitigation measures. For example, staff public information tables at fairs, safety events, and festivals.
Earthquake	Ongoing	As personnel and funding allows	Develop outreach program to educate residents concerning benefits of increased seismic resistance and modern building code compliance during rehabilitation or major repairs for residences or businesses.
Earthquake	Consider	Some are earthquake and others not and will have to wait for funding	Inspect, prioritize, and retrofit any critical facility or public infrastructure that does not meet current Building Codes.
Earthquake	Complete	Inventory made but priorities not set	Identify and prioritize a list of critical facilities with unreinforced masonry problems including non-structural projects such as brick chimney bracing or replacement, water heater bracing, and anchoring, etc.
Earthquake	Ongoing	We will review and fund as allowed	Evaluate critical public facility seismic performance for fire stations, public works buildings, potable water systems, wastewater systems, electric power systems, and bridges within the jurisdiction.
Earthquake	Consider	Possibly done with other outreaches	Develop outreach program for educating private facilities concerning alternative or emergency power source acquisition to enable them to deliver food, fuel, and medical services during disaster emergency response and recovery efforts.

City of St. Helens Hazard Mitigation Plan- Annex

Table 15. City of St. Helens Mitigation Actions Considered			
Hazard	Status	Comment	Description
Earthquake	Completed	LEPC	Encourage utility companies to evaluate and harden vulnerable infrastructure elements for sustainability.
Earthquake	Completed	LEPC	Develop partnerships to mitigate hazards that result in jurisdictional facility lifeline or emergency transportation route closures.
<i>Volcano</i>			
Volcano	Ongoing	Tree developed already	Update public emergency notification procedures and develop an outreach program for ash fall events.
Volcano	Completed	We have such rules	Update emergency response planning and develop client focused outreach program for ash fall events affecting river, air, and highway transportation, and industrial facilities and operations.
Volcano	Consider	Where applicable and when funds available	Evaluate ash impact on storm water drainage system and develop mitigation actions.
<i>Wind</i>			
Wind	Complete	Existing rules	Review ordinances and develop outreach programs to assure mobile homes and manufactured buildings are protected from severe wind and flood hazards. (Anchoring, elevation, siting, and other methods as applicable)
Wind	Ongoing	New development is to underground	Identify and prioritize critical facilities' overhead utilities that could be placed underground to reduce power disruption from wind storm / tree blow down damage.
Wind	Complete	Done	Revise requirements to place utilities underground to reduce power disruption from wind storm / tree blow down damage when upgrading or during new development.
Wind	Consider	Power company will review	Increase power line wire size and incorporate quick disconnects (break away devices) to reduce ice load power line failure during severe wind or winter ice storm events.
Wind	Consider	Where applicable and when funds available	Develop prioritized location list to construct safe rooms to provide tornado and severe wind shelters for public and private use. Projects must meet requirements in FEMA 320 and FEMA 361.
<i>Erosion</i>			
Erosion	Ongoing	Being done for at least one project	Apply for grants/funds to implement riverbank protection methods.
Erosion	Consider	We will look to see if it applies	Develop and provide information to all residents on riverbank erosion and methods to prevent it in an easily distributed format

City of St. Helens Hazard Mitigation Plan- Annex

Table 15. City of St. Helens Mitigation Actions Considered			
Hazard	Status	Comment	Description
Erosion	Ongoing	Resolved as needed	Install riprap, or pilings to harden or "armor" a stream bank where severe erosion occurs.
Erosion	Ongoing	Resolved as needed	Install bank protection such as rock, concrete, asphalt, vegetation, or other armoring or protective materials to provide river bank protection.
Erosion	Ongoing	We will review where applicable	Harden culvert entrance bottoms with asphalt, concrete, rock, to reduce erosion or scour.
Erosion	Ongoing	Where applicable and when funds available	Install walls at the end of a drainage structure to prevent embankment erosion at its entrance or outlet. (end walls).
Erosion	Ongoing	We will review for applicability	Install flared outlets or end sections at culvert entrances and outlets to match the embankment slope to reduce erosion and scour at the entrance and exit points during high flow.
Erosion	Consider	We will review for applicability	Install flow diverters a short distance into a water body, tied into the bank, to protect from erosion at their end. Designed to redirect water flow away from embankments.
Erosion	Ongoing	We will review for applicability	Install channel lining using pipe, rock, concrete, or asphalt to reduce scouring embankments and ditch bottom erosion.
Erosion	Ongoing	Rules in place	Install bank revetment protection to prevent erosion.
<i>ENSO (El Niño/La Niña)</i>			
ENSO (El Niño/La Niña)	Consider	Will use public forums and news articles	Educate public regarding weather patterns associated with El Niño / La Niña.
<i>Expansive Soils</i>			
Expansive Soils	Complete	Rules exist	Require building design, engineering, and construction processes that address expansive soil conditions at potentially affected building sites.
Expansive Soils	Consider	We will review for applicability	Plant trees a distance equal to their mature height away from a structure built on expansive soils. Minimum distance from foundation is 15 feet.
Expansive Soils	Complete	Rules exist	Require road design, engineering, and construction processes that address expansive soil conditions. Water absorption prevention, impermeable membrane, soil compaction, and drainage methods need to be considered once geologic studies determine soil composition.

Mitigation Action Plan

The Steering Committee has evaluated and prioritized each of the considered mitigation actions to determine which would be included in the Mitigation Action Plan. The Committee then

City of St. Helens Hazard Mitigation Plan- Annex

determined the responsible agency and potential funding sources. The Mitigation Action Plan represents mitigation projects and programs to be implemented through the cooperation of multiple entities.

Upon review, the Steering Committee assigned a high priority ranking to actions that best fulfill the goals of the HMP and are appropriate and feasible for the City and responsible entities to implement during the 5-year lifespan of this version of the HMP. As such, the Steering Committee determined that only the mitigation actions that received a high priority ranking would be included in the City's Mitigation Action Plan. Table 16 depicts the City's mitigation actions grouped by hazard and in descending priority order within each hazard.

Table 16 City of St. Helens Mitigation Action Plan Matrix					
Hazard	Description	Managing Department / Agency	Timeframe	Potential Funding Source(s)	Benefit-Costs / Technical Feasibility
Natural Hazards					
<i>Multi-Hazard (MH)</i>					
MH	Educate staff and public about possible hazard events	HZMP committee	2 yrs.	General	BC: TBD TF: Yes
MH	Install lighting rods to protect City's communications and electronic gear	HZMP committee	2-5 yrs.	General /enterprise	BC: TBD TF: Yes

City of St. Helens Hazard Mitigation Plan- Annex

Table 16 City of St. Helens Mitigation Action Plan Matrix					
Hazard	Description	Managing Department / Agency	Timeframe	Potential Funding Source(s)	Benefit-Costs / Technical Feasibility
MH	Install hazard warning signs where applicable	HZMP committee	2-5 yrs.	General /enterprise	BC: TBD TF: Yes
MH	Purchase and install generators	PW	2-5 yrs.	Enterprise/ General	BC: TBD TF: Yes
MH	Cross reference and incorporate resiliency planning provisions into all community planning processes and master planning efforts	Eng/Plan	1-5yrs.	General	BC: TBD TF:Yes
MH	Educate all on safety issues of hazards/mitigation procedures	HZMP	1-2 yrs.	General	BC: TBD TF: Yes
MH	Create or improve ordinances	HZMP/Admin	2-3 yrs.	General	BC: TBD TF: Yes
MH	Formalize HZMP comm. roles	Admin/PW	1-2 yrs.	Gen/Other	BC: TBD TF: Yes
MH	Integrate the Mitigation Plan into Emer Plans	Emer Mgmt Comm	1-2 yrs.	General	BC: TBD TF: Yes
<i>Flood</i>					
Flood	GIS updates on flood areas and hazards	Plan/GIS	2-3 yrs.	General/ Enterprise	BC: TBD TF: Yes
Flood	Develop GIS maps on repeat hazard damages	Plan/GIs	2-3 yrs.	Enterprise	BC: TBD TF: Yes
Flood	Develop plan to mitigate repeat flooding issues	Eng/PW	1-2 yrs.	Enterprise	BC: TBD TF: Yes
Flood	Request DOGAMI debris flow data	Eng/Plan	1 yr.	General	BC: TBD TF: Yes
Flood`	Develop program to educate public on floods	Eng/Plan	1 yr.	General	BC: TBD TF: Yes
Flood	Develop mitigation programs for flooding	Eng/PW	1-10 yrs.	Enterprise	BC: TBD TF: Yes
<i>Winter Storms</i>					
WS	Improve plans and exercise	Admin/safety	1-2 yrs.	General	BC: TBD TF: Yes
WS	Develop early warning system/program	Eng/PW	1-2 yrs.	Enterprise	BC: TBD TF: Yes
<i>Wildfires</i>					

City of St. Helens Hazard Mitigation Plan- Annex

Table 16 City of St. Helens Mitigation Action Plan Matrix					
Hazard	Description	Managing Department / Agency	Timeframe	Potential Funding Source(s)	Benefit-Costs / Technical Feasibility
WF	Develop an education program on wildfire issues	Eng/PW/Fire Dept.	1 yr.	General	BC: TBD TF: Yes
<i>Earthquake</i>					
Earthquake	Survey and retrofit buildings as required	HZMP/Building	2-10 yrs.	General	BC: TBD TF: Yes
Earthquake	Develop public ed program	Admin	1-3 yrs.	General	BC: TBD TF: Yes
Earthquake	Develop plans to handle when it happens	Emer Mgmt Comm	1 yr.	General	BC: TBD TF: Yes
<i>Volcano</i>					
Volcano	Include in emergency management plan	Emer/HZMP	1-3 yrs.	General	BC: TBD TF: Yes
Volcano	Evaluate impact on infrastructure	Eng/PW	2-4 yrs.	Enterprise	BC: TBD TF: Yes
<i>ENSO (El Niño/La Niña)</i>					
ENSO	Educate public on this subject	PW/Admin	1-3 yrs.	General	BC: TBD TF: Yes

Plan Adoption and Maintenance

The following section provides documentation of the formal adoption of this annex by the governing board of the district or the city council/county commission of the jurisdiction. It also identifies the standing committee that will be responsible for future reviews between update periods.

DMA 2000 Requirements: Plan Review, Evaluation, Implementation, and Adoption	
Planning Requirements	
§201.6(d)(3)	A local jurisdiction must review and revise its plan to reflect changes in development, progress in local mitigation efforts, and changes in priorities, and resubmit if for approval within 5 years in order to continue to be eligible for mitigation project grant funding.
§201.6(c)(5)	The plan shall include...] Documentation that the plan has been formally adopted by the governing body of the jurisdiction requesting approval of the plan (e.g., City Council, County commissioner, Tribal Council). For multi-jurisdictional plans, each jurisdiction requesting approval of the plan must document that it has been formally adopted.
Planning Elements	
D1. Was the plan revised to reflect changes in development? 44 CFR 201.6(d)(3)	
D2. Was the plan revised to reflect progress in local mitigation efforts? 44 CFR 201.6(d)(3)	
D3. Was the plan revised to reflect changes in priorities? 44 CFR 201.6(d)(3)	
E1. Does the Plan include documentation that the plan has been formally adopted by the governing body of the jurisdiction requesting approval? 44 CFR 201.6(c)(5)	
E2. For multi-jurisdictional plans, has each jurisdiction requesting approval of the plan documented formal plan adoption? 44 CFR 201.6(c)(5)	

Resolution of Adoption

City of St.
Helens

RESOLUTION NO. xxxx

A RESOLUTION ADOPTING A HAZARD MITIGATION PLAN UPDATE FOR THE CITY OF ST. HELENS AND SUPERSEDING RESOLUTION NO. 1677

Whereas, City of St. Helens, Oregon has experienced repetitive disasters that have damaged commercial, residential and public properties, displaced citizens and businesses, and presented general public health and safety concerns; and

Whereas, the City of St. Helens, Oregon has prepared a Multi-Jurisdictional Hazard Mitigation Plan that outlines the City of St. Helens, Oregon options to reduce overall damage and impact from natural hazards; and

Whereas, the Multi-Jurisdictional Hazard Mitigation Plan has been reviewed by community residents, business owners, and federal, state and local agencies, and has been revised to reflect their concerns;

NOW, THEREFORE, BE IT RESOLVED that:

1. The Multi-Jurisdictional Hazard Mitigation Plan is hereby adopted as an official plan of City of St. Helens, Oregon.
2. A hazard mitigation planning group is hereby established as a permanent advisory body. The Hazard Mitigation Planning Team Leader shall designate its members, subject to the approval of the County and the participating jurisdictions. They shall serve one-year terms. The group's duties shall be as designated in the Multi-Jurisdictional Hazard Mitigation Plan.
3. The Hazard Mitigation Planning Coordinator is charged with supervising the implementation of the Plan's recommendations within the funding limitations as provided by City of St. Helens, Oregon or other sources.
4. The Hazard Mitigation Planning Coordinator shall give priority attention to the goals identified in Table 14 of the City of St. Helens, Oregon Appendix, and the

City of St. Helens Hazard Mitigation Plan- Annex

actions listed in Table 15 of the City of St. Helens, Oregon Appendix to the Multi-Jurisdictional Hazard Mitigation Plan and:

5. The Hazard Mitigation Planning Coordinator shall convene the hazard mitigation planning group annually. The planning group shall monitor implementation of the plan and shall submit a written progress report to the City Council of City of St. Helens, Oregon in accordance with the following format:
 - a. A review of the original plan.
 - b. A review of any disasters or emergencies that occurred during the previous calendar year.
 - c. A review of the actions taken, including what was accomplished during the previous year.
 - d. A discussion of any implementation problems.
 - e. Recommendations for new projects or revised action items. Such recommendations shall be subject to approval by the City Council of City of St. Helens, Oregon.

APPROVED AND ADOPTED this 1st day of May, 2019.

Ayes: Locke, Carlson, Topaz, Morten, Scholl

Nays: None

/s/_____

Rick Scholl, Mayor

ATTEST:

/s/_____

Kathy Payne, City Recorder

Standing Review Committee

The following table identifies the members of the Standing committee that will meet quarterly to review the HMP annex and provide a running update.

Table 17. City of St. Helens Standing Hazard Mitigation Committee	
Name	Agency/Department/Affiliation
John Walsh	City Administrator
Sue Nelson	Public Works Engineering Director
Dave Elder	Public Works Supervisor
Jacob Graichen	City Planner/Flood Plain Administrator
Michael De Roia	Building Official
Shaun Brown	Columbia County Emergency Management

City of Vernonia
Hazard Mitigation Plan
Annex

2020 Update
Columbia County
Multi-Jurisdiction Hazard Mitigation Plan

City of Vernonia Annex

Contents

Introduction	3
Planning Process and Capability Assessment	3
DMA 2000 Requirements: Planning Process	3
Steering Committee Participants	4
Public Participation.....	4
Capability Assessment.....	7
Hazard Identification and Vulnerability Assessment	12
DMA 2000 Requirements: Hazard Identification and Risk Assessment	12
Hazard Identification	12
Specific Impacts of Identified Hazards	13
Flood.....	13
Winter Storm.....	13
Landslide	14
Wildland Fires.....	14
Earthquake	15
Volcano.....	15
Wind	16
Erosion.....	16
Expansive Soils.....	17
Values at Risk.....	17
Population Analysis	17
Asset Inventory.....	17
National Flood Insurance Policy	19
Vulnerability Analysis	20
Mitigation Strategy.....	24
DMA 2000 Requirements: Mitigation Strategy	24
Identify Mitigation Goals.....	25
Evaluate and Prioritize Mitigation Actions	25
Mitigation Action Plan	33
Plan Adoption and Maintenance	37

City of Vernonia Annex

DMA 2000 Requirements: Plan Review, Evaluation, Implementation, and Adoption..... 37

Resolution of Adoption..... 38

Standing Review Committee 39

City of Vernonia Annex

Introduction

This Annex contains specific City of Vernonia information to support the Columbia County 2020 Multi-Jurisdictional Hazard Mitigation Plan. This section further supports the County's planning process by summarizing the review and incorporation of existing plans, studies, and reports used to develop this MHMP. This annex is an addition to Columbia County's Hazard Mitigation Plan and shares attributes of that plan.

Planning Process and Capability Assessment

The following section includes a detailed capability assessment that describes the resources available to support this plan. The goal of this assessment is not to identify all capabilities the organization may have, but only those that are currently used or could be used to support mitigation efforts. Capabilities are arranged in tables by type and fall under the explicit authority of the jurisdiction/district.

DMA 2000 Requirements: Planning Process	
Planning Requirements	
§201.6(b)	An open public involvement process is essential to the development of an effective plan. In order to develop a more comprehensive approach to reducing the effects of natural disasters, the planning process shall include:
§201.6(b)(1)	(1) An opportunity for the public to comment on the plan during the drafting stage and prior to plan approval;
§201.6(b)(2)	(2) An opportunity for neighboring communities, local and regional agencies involved in hazard mitigation activities, and agencies that have the authority to regulate development, as well as businesses, academia and other private and non-profit interests to be involved in the planning process; and
§201.6(b)(3)	(3) Review and incorporation, if appropriate, of existing plans, studies, reports, and technical information.
§201.6(c)(1)	[The plan shall document] the planning process used to develop the plan, including how it was prepared, who was involved in the process, and how the public was involved.
§201.6(c)(4)(i)	[The plan maintenance process shall include a] section describing the method and schedule of monitoring, evaluating, and updating the mitigation plan within a five-year cycle.
§201.6(c)(4)(iii)	[The plan maintenance process shall include a] discussion on how the community will continue public participation in the plan maintenance process.
Planning Elements	
A1. Does the Plan document the planning process, including how it was prepared and who was involved in the process for each jurisdiction? 44 CFR 201.6(c)(1)	
A2. Does the Plan document an opportunity for neighboring communities, local and regional agencies involved in hazard mitigation activities, agencies that have the authority to regulate development as well as other interests to be involved in the planning process? 44 CFR 201.6(b)(2)	

City of Vernonia Annex

A3. Does the Plan document how the public was involved in the planning process during the drafting stage? 44 CFR 201.6(b)(1) and 201.6(c)(1)

A4. Does the Plan document the review and incorporation of existing plans, studies, reports, and technical information? 44 CFR 201.6(b)(3)

A5. Is there discussion on how the communities will continue public participation in the plan maintenance process? 44 CFR 201.6(c)(4)(iii)

A6. Is there a description of the method and schedule for keeping the plan current (monitoring, evaluating and updating the mitigation plan within a 5-year cycle)? 44 CFR 201.6(c)(4)(i)

Steering Committee Participants

The City of Vernonia is dedicated to mitigating potential natural hazards to its population and infrastructure. To fulfill that goal, a Hazard Mitigation Plan Development Steering Committee was seated; dedicated to identifying hazard threats and developing actions to mitigate damage and life losses from those threats.

Table 1 records the Steering Committee's participant list.

Table 1. City of Vernonia Steering Committee	
Name	Agency/Department/Affiliation
Josette Mitchell	City Administrator
Matt Straite	Planning Commission, City of Vernonia
Maggy Peyton	Upper Nehalem Watershed Council
Michael Conner	Chief Vernonia Police Department
Dean Smith	Fire Chief Vernonia Rural Fire Protection District
Sandy Welch	Director of Vernonia Cares
Steve Pegram	Columbia County Emergency Management

Public Participation

As defined by FEMA, Whole Community Planning is; a means by which residents, emergency management practitioners, organizational and community leaders, and government officials can collectively understand and assess the needs of their respective communities and determine the best ways to organize and strengthen their assets, capacities, and interests. By doing so, a more effective path to societal security and resilience is built.

This Hazard Mitigation Plan was conducted with opportunities for the public to participate to try and meet the goals of whole community planning. Table 2 highlights these efforts.

City of Vernonia Annex

Table 2. Vernonia Public Involvement Mechanisms

Date	Description
2014	
7/19/2014	Columbia Emergency Preparedness Association EXPO – Large emergency management event covering all topics (preparedness, fire, law, mitigation, response).
10/4/2014	Vernonia Salmon Festival - Engaged locals and visitors on topics like preparedness, and mitigation planning.
11/11/2014	HSEMC – Columbia County’s Homeland Security and Emergency Management Commission is recognized by the Board of County Commissioners as the cornerstones of a whole community approach to emergency management planning. All jurisdictions are members of the commission. Semi Annual NHMP meeting, plan review was conducted.
2015	
5/12/2015	HSEMC – Columbia County’s Homeland Security and Emergency Management Commission is recognized by the Board of County Commissioners as the cornerstones of a whole community approach to emergency management planning. All jurisdictions are members of the commission. Semi Annual NHMP meeting, plan review was conducted.
11/10/2015	HSEMC – Columbia County’s Homeland Security and Emergency Management Commission is recognized by the Board of County Commissioners as the cornerstones of a whole community approach to emergency management planning. All jurisdictions are members of the commission. Semi Annual NHMP meeting, plan review was conducted.
2016	
4/2/2016	KOHI Radio Preparedness Talk – Radio talk show for Columbia County, topics “specifically included preparing for the next flood event”.
5/10/2016	HSEMC – Columbia County’s Homeland Security and Emergency Management Commission is recognized by the Board of County Commissioners as the cornerstones of a whole community approach to emergency management planning. All jurisdictions are members of the commission. Semi Annual NHMP meeting, plan review was conducted.
6/4/2016	Ford Family Foundation Preparedness Fair - County wide event to promote preparedness and mitigation in cooperation with the Ford Family Foundation. All cities participated.
7/23/2016	Columbia Emergency Preparedness Association EXPO – Large emergency management event covering all topics (preparedness, fire, law, mitigation, response).
9/22/2016	Columbia County Soil and Water Conservation District – Event hosted by SWCD on preparedness and flood mitigation efforts.
11/15/2016	HSEMC – Columbia County’s Homeland Security and Emergency Management Commission is recognized by the Board of County Commissioners as the cornerstones of a whole community approach to emergency management planning. All jurisdictions are members of the commission. Semi Annual NHMP meeting, plan review was conducted.
2017	
5/9/2017	HSEMC – Columbia County’s Homeland Security and Emergency Management Commission is recognized by the Board of County Commissioners as the cornerstones of a whole community approach to emergency management

City of Vernonia Annex

Table 2. Vernonia Public Involvement Mechanisms

Date	Description
	planning. All jurisdictions are members of the commission. Semi Annual NHMP meeting, plan review was conducted.
11/14/2017	HSEMC – Columbia County’s Homeland Security and Emergency Management Commission is recognized by the Board of County Commissioners as the cornerstones of a whole community approach to emergency management planning. All jurisdictions are members of the commission. Semi Annual NHMP meeting, plan review was conducted.
11/29/2017	Unprepared showing – St. Helens - presentation of OPB documentary regarding CSZ earthquake and tsunami.
2018	
1/19/2018	Preparedness to Vets Group – Presentation to Veterans regarding personal preparedness and flood mitigation.
5/8/2018	HSEMC – Columbia County’s Homeland Security and Emergency Management Commission is recognized by the Board of County Commissioners as the cornerstones of a whole community approach to emergency management planning. All jurisdictions are members of the commission. Semi Annual NHMP meeting, plan review was conducted and plans for plan update discussed.
11/13/2018	HSEMC – Columbia County’s Homeland Security and Emergency Management Commission is recognized by the Board of County Commissioners as the cornerstones of a whole community approach to emergency management planning. All jurisdictions are members of the commission. Semi Annual County-wide Hazard Mitigation meeting. Work Session on Hazard Mitigation Plan update conducted.
11/27/2018	Pints and Preparedness – various topics including Hazard mitigation, and individual preparedness.
2019	
1/22/2019	Pints and Preparedness – various topics including Hazard mitigation, and individual preparedness.
3/26/2019	Pints and Preparedness – various topics including Hazard mitigation, and individual preparedness.
5/7/2019	HSEMC – Columbia County’s Homeland Security and Emergency Management Commission is recognized by the Board of County Commissioners as the cornerstones of a whole community approach to emergency management planning. All jurisdictions are members of the commission. Semi Annual County-wide Hazard Mitigation meeting. Work Session on Hazard Mitigation Plan update conducted.
4/23/2019	Pints and Preparedness – various topics including Hazard mitigation, and individual preparedness.
9/7/2019	Preparedness for Scouts – Presentation on preparedness for all hazards.

Table 2a. Continuing Public Involvement Mechanisms

Date	Description
News Media-news papers	The City of Vernonia will provide reporters with information for writing articles about what Vernonia is doing in the following papers-

City of Vernonia Annex

Table 2a. Continuing Public Involvement Mechanisms

Date	Description
	Vernonia Voice. We will also provide press releases and dates of meetings and/or workshops
Flyer Dissemination-PSA's	Information pieces about the Hazard Mitigation Plan update process, including the dates of meetings, will be posted in conspicuous places around town
Email	The City municipal billing has a large email list that can be used to disseminate information
City of Vernonia Website	Information and meeting times will be posted to the City website
Columbia County Flood Relief Website	Information and meeting times will be posted on the CCFR's website

Capability Assessment

Table 3, 4, and 5 contain the **City of Vernonia** resources used to support planning activities, including the reports and studies reviewed as part of the update process.

Table 3. City of Vernonia Legal and Regulatory Resources Available for Hazard Mitigation

Regulatory Tool	Name	Effect on Hazard Mitigation
Plans	Emergency Operations Plan (Fire District) (2018)	Delineates emergency operation's responsibilities and authorities
	Hazard Mitigation	Defines risks vulnerability and proposed actions
	Transportation Plan	Provides overall guidance for the community's transportation system development and resource management.
	Utilities Emergency Operations Plan	Delineates emergency operation's responsibilities and authorities
	Water System Master Plan	Delineates the 500 year flood hazard area, riparian streams and water bodies, wetlands, natural drainage ways and steep slopes
	Natural Drainage Way Map	Depicts natural drainage ways to maximize topography for setback development and reduce drainage way filling. This will decrease erosion or need for elaborate storm drain construction
	Wastewater Master Plan	Provides overall guidance for the community's wastewater use and future development requirements 20 year planning horizon.
	Water Management and Conservation Plan	Provides overall guidance for the community's water use and conservation efforts.

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City of Vernonia Annex

Table 3. City of Vernonia Legal and Regulatory Resources Available for Hazard Mitigation

Regulatory Tool	Name	Effect on Hazard Mitigation
	National Flood Insurance Program (NFIP)	Makes affordable flood insurance available to homeowners, business owners, and renters in participating communities. In exchange, those communities must adopt and enforce minimum floodplain management regulations to reduce the risk of damage from future floods.
	City Charter	To provide for the government of the City of Vernonia, Columbia County, Oregon; and to repeal all charter provisions of the city enacted prior to the time that this charter takes effect except as hereinafter specifically retained.
	City of Vernonia Title 9	Provides the principal means for the implementation of the City of Vernonia Comprehensive Plan. The provisions of this Ordinance shall be deemed the minimum requirements for the preservation of the public safety, health, convenience, comfort, prosperity, and general welfare of the people of Vernonia, Oregon. This Ordinance is designed to: Regulate the division of land and to classify, designate and regulate the location of building, structures and land; Divide the City into zones to carry out these regulations and provide for their enforcement; Promote public health, safety, convenience and general welfare; Promote coordinated development with consideration for the City's natural environment, amenities, views, and the appearance of its buildings and open spaces; Achieve a balanced and efficient land use pattern to protect and enhance real property values; Promote safe, efficient traffic movement; Avoid uses and development that might be detrimental to the stability and livability of the City; and Insure adequate provisions for community utilities and facilities. http://www.vernonia-or.gov/Forms/Ordinances.asp
	Vernonia Water Quality Report	An annual report of the outcome of our many water quality tests. This report explains water supply capability.

City of Vernonia Annex

Table 3. City of Vernonia Legal and Regulatory Resources Available for Hazard Mitigation

Regulatory Tool	Name	Effect on Hazard Mitigation
Programs	City Ordinances	Provide guidance for land-use and development and requirements to follow building and fire codes. http://www.vernonia-or.gov/Forms/Ordinances.asp
Policies (Municipal Codes)	Title 9-05 Flood Hazard Reduction	Provides the City's Flood Management Program

City of Vernonia Annex

Table 4. City of Vernonia Administrative and Technical Resources for Hazard Mitigation

Staff/Personnel Resources	Department/Division Position
Planner(s) or engineer(s) with knowledge of land development and land management practices	Contract Planner Contract Engineer
Engineer(s) or professional(s) trained in construction practices related to buildings and/or infrastructure	Public Works Contract Building Official
Planner(s) or engineer(s) with an understanding of manmade or natural hazards	Contract Planner Contract Building Official
Floodplain manager	City Administrator, , Contract Planner and Contract Building Official
Personnel skilled in GIS and/or HAZUS-MH	Yes
Director of Emergency Services	City Administrator (will defer to Columbia County in the event of major disaster)
Finance (grant writers, purchasing)	City Finance Director
Public Information Officers	City Administrator or Mayor

Table 5. City of Vernonia Financial Resources for Hazard Mitigation

Financial Resources	Effect on Hazard Mitigation
General funds	yes
Authority to levy taxes for specific purposes	yes, with voter approval
Incur debt through general obligation bonds	yes, with voter approval
Incur debt through special tax and revenue bonds	yes, with voter approval
Incur debt through private activity bonds	yes, with voter approval
Hazard Mitigation Grant Program (HMGP)	FEMA funding which is available to local communities after a Presidentially-declared disaster. It can be used to fund both pre- and post-disaster mitigation plans and projects.
Pre-Disaster Mitigation (PDM) grant program	FEMA funding which is available on an annual basis. This grant can only be used to fund pre-disaster mitigation plans and projects only.
Flood Mitigation Assistance (FMA) grant program	FEMA funding which is available on an annual basis. This grant can be used to mitigate repetitively flooded

City of Vernonia Annex

Table 5. City of Vernonia Financial Resources for Hazard Mitigation	
Financial Resources	Effect on Hazard Mitigation
	structures and infrastructure to protect repetitive flood structures.
United States Fire Administration (USFA) Grants	The purpose of these grants is to assist state, regional, national or local organizations to address fire prevention and safety. The primary goal is to reach high-risk target groups including children, seniors and firefighters.
Fire Mitigation Fees	Used to finance future fire protection facilities' construction and other fire capital expenditures to protect new development. The City Council or Fire District may charge fire mitigation fees to ensure new development pays their fair share of constructing these improvements.

Hazard Identification and Vulnerability Assessment

DMA 2000 Requirements: Hazard Identification and Risk Assessment	
Planning Requirements	
§201.6(c)(2)(i)	The risk assessment shall include a] description of the type, location and extent of all-natural hazards that can affect the jurisdiction. The plan shall include information on previous occurrences of hazard events and on the probability of future hazard events.
§201.6(c)(2)(ii)	The risk assessment shall include a] description of the jurisdiction's vulnerability to the hazards described in paragraph (c)(2)(i) of this section. This description shall include an overall summary of each hazard and its impact on the community. All plans approved after October 1, 2008 must also address NFIP insured structures that have been repetitively damaged by floods. The plan should describe vulnerability in terms of:
§201.6(c)(2)(ii)(A)	(A) The types and numbers of existing and future buildings, infrastructure, and critical facilities located in the identified hazard areas;
§201.6(c)(2)(ii)(B)	(B) An estimate of the potential dollar losses to vulnerable structures identified in ... this section and a description of the methodology used to prepare the estimate.
§201.6(c)(2)(ii)(C)	(C) Providing a general description of land uses and development trends within the community so that mitigation options can be considered in future land use decisions.
§201.6(c)(2)(iii)	For multi-jurisdictional plans, the risk assessment section must assess each jurisdiction's risks where they vary from the risks facing the entire planning area.
Planning Elements	
B1. Does the Plan include a description of the type, location, and extent of all-natural hazards that can affect each jurisdiction? 44 CFR 201.6(c)(2)(i) and 44 CFR 201.6(c)(2)(iii)	
B2. Does the Plan include information on previous occurrences of hazard events and on the probability of future hazard events for each jurisdiction? 44 CFR 201.6(c)(2)(i)	
B3. Is there a description of each identified hazard's impact on the community as well as an overall summary of the community's vulnerability for each jurisdiction? 44 CFR 201.6(c)(2)(ii)	
B4. Does the Plan address NFIP insured structures within each jurisdiction that have been repetitively damaged by floods? 44 CFR 201.6(c)(2)(ii)	

Hazard Identification

The Steering Committee determined that the following hazards could potentially threaten the community. Table 6 establishes the hazard profile against which this plan is designed.

City of Vernonia Annex

Table 6. Hazard Profile	
Natural Hazards	
Flood	X
Winter Storm	X
Landslide	X
Fire (Wildland/Urban)	X
Earthquake	X
Volcano	X
Wind	X
Erosion	X
ENSO (El Niño / La Niña)	
Expansive Soils	X
Drought	X

Specific Impacts of Identified Hazards

The following section provides specific details of the vulnerabilities and impacts from natural hazards for the City of Vernonia in addition to technological and manmade hazards identified in Table 6.

The Basic Plan of this Multi-Jurisdiction Hazard Mitigation Plan contains the full narrative Hazard Profile for the entire county, including full details for this annex. This section is designed to provide additional notes and concerns regarding hazards that can impact this jurisdiction.

Flood

FEMA FIRMs were used to outline the 100-year and 500-year floodplains for the City of Vernonia. The 100-year floodplain delineates an area of high risk, while the 500-year floodplain delineates an area of moderate risk.

There are 683 residential structures (worth \$78M), three (3) government facility (worth\$2,019,416),one educational facility (worth\$ unknown), twelve (12)community facilities (worth \$5,698,870), two bridges (worth unknown),one transportation facility (worth \$500,000), and six utilities (worth \$ 16,236,471) within the boundaries of the 100 year flood plain.

Winter Storm

The natural hazards resulting from winter storms, such as ice, cold, wind and floods, are often widespread. A single event is capable of impacting all people, critical facilities and infrastructure within the City of Vernonia, and therefore the entire population (2,151 people), including 822 residential structures (worth \$101 M). three (3) government facility (worth\$2,019,416),two educational facilities (worth\$ unknown), twelve (12)community facilities (worth \$5,698,870, two

City of Vernonia Annex

bridges (worth unknown), one transportation facility (worth \$500,000), and six utilities (worth \$16,236,471) within the boundaries of the 100 year flood plain.

Landslide

The potential impacts from landslides can be widespread. Potential debris flows, and landslides can impact transportation and rail routes, utility systems, and water and waste treatment infrastructure along with public, private, and business structures located adjacent to steep slopes, along riverine embankments, or within alluvial fans or natural drainages. Response and recovery efforts will likely vary from minor cleanup to more extensive utility system rebuilding. Utility disruptions are usually local and terrain dependent. Damages may require reestablishing electrical, communication, and gas pipeline connections occurring from specific breakage points. Initial debris clearing from emergency routes and high traffic areas may be required. Water and waste-water utilities may need treatment to quickly improve water quality by reducing excessive water turbidity and reestablishing waste disposal capability.

USGS elevation datasets were used to determine the landslide hazard areas within the City of Vernonia. Risk was assigned based on slope angle. A slope angle less than 14 degrees was assigned a low risk, a slope angle between 14 and 32 degrees was assigned a medium risk, and a slope angle greater than 32 degrees was assigned a high risk.

There are The City of Vernonia has 793 residential structures (worth \$91.4M), three non-residential structures (worth \$ unknown), one educational facility (worth \$ unknown), one government facility (worth \$289K), one emergency response facility (worth \$107K), five community facilities (worth \$868K), one highway (worth unknown), one bridge (worth unknown), and five utility facilities (worth \$6M) located in moderate landslide risk areas. There are 321 residential structures (worth \$37M), three non-residential structures (worth unknown), one educational facility (worth unknown), one community facility (worth unknown), and one utility (worth \$3.1M) located in the high landslide risk area.

Wildland Fires

Wildland fire hazard areas were identified using a model incorporating slope, aspect, and fuel load. South-facing, steep, and heavily vegetated areas were assigned the highest fuel values while areas with little slope and natural vegetation were assigned the lowest fuel values. Risk levels of moderate, high, very high, and extreme were assigned to the entire region based on the results of this modeling.

The City of Vernonia has 994 residential structures (worth \$114.6M), four non-residential structures (worth unknown), three government facilities (worth \$2.5M), two emergency response facilities (worth \$1.5M), two educational facilities (worth unknown), one care facility (worth unknown), fifteen community facilities (worth \$2.2M), one highway (worth unknown), two bridges (worth unknown), one transportation facility (worth unknown), and ten utilities

City of Vernonia Annex

(worth \$8.3M) located in moderate fire risk areas. There are 852 residential structures (worth \$98.2M), four non-residential structures (worth unknown), one government facility (worth \$269K), one emergency response facility (worth \$107K), one educational facility (worth unknown), eight community facilities (worth \$934K), one bridge (worth unknown), one transportation facility (worth unknown), and eight utilities (worth \$5.1) located in the high fire risk areas. There are 544 residential structures (worth \$62.7M), three non-residential structures (worth unknown), one government facility (worth \$290K), one educational facility (worth unknown), one community facility (worth unknown), and three utilities (worth \$4M) are located in the very high risk area. Nine residential structures (worth \$1.03M), three non-residential structures (worth unknown), and two utilities (worth \$115K) are located in the extreme for hazard area. No facilities are located in the areas of extreme risk.

Earthquake

Based on PGA shake maps produced by the USGS, the western portion of Columbia County is likely to experience higher levels of shaking than the eastern portion, as a result of its proximity to the Cascadia Subduction Zone. Ground movement in both areas, however, is likely to cause damage to weak, unreinforced masonry buildings, and to induce small landslides along unstable slopes. As well as landslide, earthquakes can trigger other hazards such as dam failure and disruption of transportation and utility systems.

The eastern portion of Columbia County is likely to experience strong shaking should a subduction zone earthquake occur (9-20 percent of the acceleration of gravity). In contrast, the far western portion of the county is likely to experience very strong shaking (20-25 percent). This rating represents the peak acceleration of the ground caused by the earthquake.

The entire City of Vernonia is equally vulnerable to earthquake impacts, to include, all people, critical facilities and infrastructure within , and therefore the entire population (2,151 people), including 822 residential structures (worth \$142.1M), four non-residential structures value, three (3) government facility (worth\$2,019,416),two educational facilities (worth unknown), twelve (12)community facilities (worth \$5,698,870), two bridges (worth unknown),one transportation facility (worth \$500,000), and six utilities (worth \$ 16,236,471) within the boundaries of the 100 year flood plain.

Volcano

A volcanic eruption would have a minor impact on the City of Vernonia due to the proximity to volcanoes within the Cascade region. The major resources of concern include air quality and waterway sedimentation. During previous eruptions, ash fall has drifted to the east of the volcanoes. (State Interagency Hazard Mitigation Team 2006)

The City of Vernonia will likely only experience damage from volcanic eruption columns and clouds which contain volcanic gases, minerals, and rock. The columns and clouds form rapidly

City of Vernonia Annex

and extend several miles above an eruption. Solid particles within the clouds present a serious aviation threat, can distribute acid rain (sulfur dioxide gas and water), can create risk of suffocation (carbon dioxide is heavier than air and collects in valleys and depressions threatening human and animals), and pose a toxic threat from fluorine which clings to ash particles potentially poisoning grazing livestock and contaminating domestic water supplies.

Buildings streets and roads throughout the city may require minor cleanup with negligible impacts. Temporary utility interruptions are likely, and minor cleanup may be required for electrical and other utility services. Water treatment facilities may require additional attention to address high turbidity water. River traffic along the Columbia River could be disrupted due to sedimentation from a large eruption from Mt. St. Helens or Hood and dredging to restore channel depths may be necessary. Injuries associated with respiratory problems may result. (Goettel 2005)

Due to the nature of the hazard, it is impossible to predict the location or extent of future events with any probability, although it can be assumed that all critical facilities and infrastructure within the City of Vernonia are at risk including the entire population (2,151 people) , 880 residential structures (worth \$101.4M), four nonresidential structures (worth unknown), three government facilities (worth \$2.5M), two emergency response facilities (worth \$1.5M), two educational facilities (worth \$14M), one care facility (worth unknown), fifteen community facilities (worth \$2.2M), one highway (worth unknown), two bridges (worth unknown), one transportation facility (worth unknown), and ten utilities (worth \$8.3M).

Wind

Many buildings, utilities and transportation systems in open areas, natural grasslands, or agricultural lands are especially vulnerable to wind damage. Impacts associated with wind can include damage to power lines, trees, and structures, and can also cause temporary disruptions of power. Additionally, high winds can cause significant damage to forestlands.

All areas within the City of Vernonia are equally at risk of a windstorm event including all people, critical facilities and infrastructure, and therefore the entire population (2,151 people) , 880 residential structures (worth \$101.4M), four nonresidential structures (worth unknown), three government facilities (worth \$2.5M), two emergency response facilities (worth \$1.5M), two educational facilities (worth \$14M), one care facility (worth unknown), fifteen community facilities (worth \$2.2M), one highway (worth unknown), two bridges (worth unknown), one transportation facility (worth unknown), and ten utilities (worth \$8.3M).

Erosion

Riverine erosion rarely causes death or injury. However, erosion causes significant destruction of property, development, and infrastructure. Erosion hazard data is not readily available, however, descriptions of several localized areas were identified during the development of this

City of Vernonia Annex

document and are identified only by location on a map referencing the river or stream reach described. Critical facilities that may be at risk of erosion were identified using a 300 foot-buffer in the areas identified as having historic erosion impacts to conservatively account for building footprints.

The City of Vernonia owned Water Treatment Plant is located in the vicinity of Rock Creek and the Nehalem River confluence. The City relies on this facility for their water treatment needs. This facility does experience periodic erosion events and is prone to potential debris damage.

The City of Vernonia has three government facilities (worth \$2.5M), one emergency response facility (worth \$1.4M), one educational facility (worth unknown), one care facility (worth unknown), seven community facilities (worth unknown), two bridges (worth unknown), and three utilities (worth \$2.15M) at risk from erosion impacts.

Expansive Soils

Shrinking and swelling soils can lead to damaged foundations and structures. The most common damage includes cracking and loss of integrity of building foundations and walls of residential and light. (one-or-two-story), buildings, highways, canal, and reservoir linings, and retaining walls. (PCCDD2006, US ARMY 1983) Using NRCS soil data, risk for shrink-swell potential was calculated using linear extensibility of moderate (3-6 percent), high (6-9 percent), and very high (greater than 9 percent)

The City of Vernonia has 809 residential structures (worth \$93.3 M), nonresidential (worth unknown), and no critical facilities located in expansive soils low (<3%) risk areas. There are 202 residential structures (worth \$23.9M) located in the expansive soils moderate (3-6%) risk areas. There are no facilities located in high expansive soil areas.

Values at Risk

Population Analysis

Population data listed in Table 7 were obtained from the 2010 U.S. Census and Portland State University. It comprises census block level data and estimates from university conducted community research.

Table 7. Population			
2010 Census	2010 Census	% Change	2018 PSU Estimate
2,228	2,151	-3.5%	2,065

Asset Inventory

The Asset Inventory describes the physical values; the residential building stock, public facilities, and infrastructure within each community that may be affected by hazard events and includes population, residential and nonresidential buildings, critical facilities, and infrastructure. These

City of Vernonia Annex

values are described in Tables 8 and 9 and portray the City's critical infrastructure numbers and values, and their potential vulnerability by hazard type.

The City of Vernonia seeks to protect its population by supporting Columbia County and Oregon State initiatives, ordinances, building codes, and development regulations. One of the most important initiatives is to prohibit or not allow future development of buildings, infrastructure and critical facilities in identified high hazard areas. Any essential infrastructure component will undergo stringent review to ensure potential hazard risk will be mitigated.

Table 8. Residential Buildings

Total Building Count	Total Value of Buildings (\$)
824	142,140,000

Table 9. Critical Facilities and Infrastructure

Facility Type	Name / Number	Address	Value ¹
Government	Vernonia Learning Center	939 Bridge Street	512,760
	Vernonia City Library	701 Weed Avenue	618,976
	City Hall	1001 Bridge Street	1,164,747
	Vernonia Police Department	1001 Bridge Street	See City Hall
	Vernonia Rural fire Protection District	555 E Bridge Street	107,000
Educational	Vernonia Schools K-12	1000 Missouri Avenue	Est. 13,218,136
	District Office	1201 Texas Avenue	278,988
Care Facility	Vernonia Clinic	1005 Cougar Street	1,006,590
Community	Vernonia Pioneer Museum	511 E Bridge Street	Est. 500,000
	Nehalem River Park and Campground	next to Vernonia Municipal Airport	Est. 175,290
	Anderson Park	South end of Adams Avenue and Jefferson Avenue	395,000
	Hawkins Park	900 Park Drive	130,670
	Spencer Park	377 Bridge Street	894,390
	Vernonia Lake	E of downtown	710,320
	St. Mary's Catholic Church	960 Missouri Avenue	977,890
	Vernonia Christian Church	410 North Street	625,000

City of Vernonia Annex

Table 9. Critical Facilities and Infrastructure

Facility Type	Name / Number	Address	Value ¹
	Grace Family Fellowship	359 A Street	280,550
	Church of Jesus Christ Latter Day Saints	1350 Knott Street	\$300,000
	Seven Day Adventist Church	1294 Nehalem Street	\$28,670
State and Federal Highways	US Highway 47		3 miles
Railroads	None		
Bridges	Nehalem River Rock Creek		unknown
Transportation Facilities	Vernonia Municipal Airport	15915 Airport Way	Est. 500,000
Utilities	Pump Station #1	west of lagoons	113,934
	Pump Station #2	Ivy Street and Mist Drive	271,814
	Pump Station #3	Lakeview Drive	258,416
	Water Treatment Plant	Lincoln Street	2,849,970
	Sewage Lagoon #1		772,000
	Sewage Lagoon #2		561,000
	Sewage Lagoon #3		701,000
	Sewage Headworks		3,222,157
	Vernonia Transfer Station		Est. 100,000
	West Oregon Electric Power Substation		48,000
	West Oregon Electric Facility	652 Rose Avenue	993,000
	Verizon Telephone Exchange	Bridge Street across from Grant Avenue	1,000,000
	AT&T Wireless Tower		
	Columbia County 911 Microwave Tower		35,000
	Vernonia Water Reservoir	Bridge Street	660,938
	Vernonia Water Reservoir	60471 Stoney Point Road	1,425,735

National Flood Insurance Policy

National Flood Insurance Program data were obtained from the State Department of Land Conservation and Development. This data is significant for the vulnerability assessment as it identifies the impact of flooding, one of the most often repeated natural hazards for the county. This data is displayed in Table 10.

City of Vernonia Annex

Table 10. Scappoose NFIP Insurance Report

Jurisdiction	Effective FIRM and FIS	Initial FIRM	Total Policies	Pre FIRM Policies	Policies by Building Type				Minus Rated A Zone	Minus Rated V Zone
					Single Family	2 to 4 Family	Other Residential	Non-Residential		
Vernonia	11/26/2010	8/16/1988	165	91	144	6	1	14	11	0

Source: FEMA Community Information System 02/21/2019

Table 10a. Scappoose NFIP Insurance Report

Jurisdiction	Insurance in Force	Total Paid Claims	Pre-Firm Claims Paid	Substantial Damage Claims	Total Paid Amount	Repetitive Loss Structures	Severe Repetitive Loss Structures	CRS Class Rating	Last Community Assistance Visit
Vernonia	\$36,744,900	219	139	58	\$7,229,394	8	1	10	7/11/2014

Source: FEMA Community Information System 02/21/2019

Vulnerability Analysis

A vulnerability analysis predicts the extent of exposure, and the impacts that may result from a hazard event of a given intensity in each area. The analysis provides quantitative data that may be used to identify and prioritize potential mitigation measures by allowing communities to focus attention on areas with the greatest risk of damage. A vulnerability analysis is divided into five steps including asset inventory, methodology, data limitations, exposure analysis for current assets, and areas of future development.

The following is derived from the best available data for facility locations and values. In many cases, values were unavailable, and therefore the totals listed below should be considered incomplete and likely less than the actual costs associated with the respective hazards

The vulnerability analysis development process is thoroughly discussed in the Columbia County Basic Plan, Section 6, which generated the following Hazard Exposure Analysis Overviews in Tables 11, 12, and 13.

City of Vernonia Annex

Table 11. City of Vernonia Potential Hazard Exposure Analysis Overview
Population and Buildings

			Population	Buildings			
				Residential		Non-Residential	
Hazard Type	Hazard Area	Methodology	Number	Number	Value (\$) ¹	Number	Value (\$)
Flood	Moderate-500 year	year floodplain		636	73,330,0800	0	unknown
	High- 100 year	year floodplain		683			unknown
Winter Storm		descriptive	2,151	1,009	116,337,700		unknown
Landslide	Moderate	>14-32 degrees		793	91,432,900	3	unknown
	High	>32-56 degrees		321	37,011,300	3	unknown
Wildland Fire	Moderate	Moderate fuel rank		994	114,608,200		unknown
	High	High fuel rank		852	98,235,600	4	unknown
	Very High	Very high fuel rank		544	62,723,200	3	unknown
	Extreme	Extreme fuel rank		9	1,037,700	3	unknown
Earthquake	Strong	9-20% (g)		1,009	116,337,700		unknown
	Very strong	20-40% (g)					unknown
	Severe	>40-60% (g)					unknown
Volcano		descriptive	2,151	1,009	116,337,700		unknown
Wind		descriptive	2,151	1,009	116.337,700		unknown
Erosion		within 300' of potential areas of erosion	--	--	--	unknown	unknown
Expansive Soil				809	93,277,700	3	

¹ Average insured structural value of all residential buildings (including single-family dwellings, mobile homes, etc., is \$172,500 per structure).

City of Vernonia Annex

Table 12. City of Vernonia Potential Hazard Exposure Analysis Overview

Critical Facilities

			Government		Emergency Response		Educational		Care		Community	
Hazard Type	Hazard Area	Methodology	No.	\$	No.	\$	No.	\$	No.	\$	No.	\$
Flood	Moderate	500-year floodplain	--1	289K	--	--	--	--	--	--	--	--
	High	100-year floodplain	--1	289K	--	--	--	--	--	--	7	960K
Winter Storm		Descriptor	3	2.5M to 1.5M			1	14M			15	2.2M
Landslide	Moderate	>14-32 degrees	1	289K	1	107K	--	--	1	270K		868K
	High	>32-56 degrees			--	--	1	unknown			1	unknown
Wildland Fire	Moderate	Moderate fuel rank	3	2.5M to 1.5M			1	14M	2	342K	15	2.2M
	High	High fuel rank	1	269K	1	107K	--	--			8	943K
	Very High	Very high fuel rank	--1	290K	--	--	1	unknown	--	--	1	unknown
	Extreme	Extreme fuel rank	--	--	--	--	--	--	--	--	--	--
Earthquake	Strong	9-20% (g)	3	2.5M to 1.5M			1	14M	1	unknown	15	2.2M
	Very strong	20-40% (g)	--	--	--	--	--	--	--	--	--	--
	Severe	>40-60% (g)	--	--	--	--	--	--	--	--	--	--
Volcano	Moderate	Descriptive	3	2.5M	2	1.5M	1	14M	1	unknown	15	2.2M
Wind	Moderate	Descriptive	3	2.5M	2	1.5M	1	14M	1	unknown	15	2.2M
Erosion		within 300' of potential areas of erosion	3	2.5M	2	1.5M	1	14M	1	unknown	15	2.2M

City of Vernonia Annex

Table 13. City of Vernonia Potential Hazard Exposure Analysis Overview
Critical Infrastructure

			Highways		Railroads		Bridges		Transportation Facilities		Utilities		Dams	
Hazard Type	Hazard Area	Methodology	Miles	Value (\$)	Miles	Value (\$)	No.	Value (\$)	No.	Value (\$)	No.	Value (\$)	No.	Value (\$)
Flood	Moderate	500-year floodplain					2	unknown	--	--	-6-	4.2M	--	--
	High	100-year floodplain					2	unknown	1--	unknown	8	4.5M	--	--
Winter Storm	Moderate		unknown	unkno wn					1	unknown	10	8.3M	--	--
Landslide	Moderate	>14-32 degrees	unknown	unkno wn			1	unknown	1	unknown	5	6M	--	--
	High	>32-56 degrees							--	--	1	3.1M	--	--
Wildland Fire	Moderate	Moderate fuel rank	unknown	unkno wn			2	unknown	1	unknown	10	8.3M	--	--
	High	High fuel rank							1	unknown	8	5.1M	--	--
	Very High	Very high fuel rank							--	--	3	4M	--	--
	Extreme	Extreme fuel rank							--	--	2	115K	--	--
Earthquake	Strong	9-20% (g)	unknown	unkno wn			2	unknown	1	unknown	10	8.3M	--	--
	Very strong	20-40% (g)							--	--	--	--	--	--
	Severe	>40-60% (g)							--	--	--	--	--	--
Volcano	Moderate		unknown	unkno wn			2	unknown	1	unknown	10	8.3M	--	--
Wind	Moderate		unknown	unkno wn			2	unknown	1	unknow n	10	8.3M	--	--
Erosion		within 300' of potential areas of erosion					2	unknown	--	--	--	3	2.1 5M	--

Mitigation Strategy

The following section defines mitigation action identification and analysis as stipulated in DMA 2000 and its implementing regulations.

DMA 2000 Requirements: Mitigation Strategy	
Planning Requirements	
§201.6(c)(3)	The plan shall include the following:] A mitigation strategy that provides the jurisdiction's blueprint for reducing the potential losses identified in the risk assessment, based on existing authorities, policies, programs, and resources, and its ability to expand on and improve these existing tools.
§201.6(c)(3)(i)	The hazard mitigation strategy shall include a] description of mitigation goals to reduce or avoid long-term vulnerabilities to the identified hazards.
§201.6(c)(3)(ii)	The hazard mitigation strategy shall include a] section that identifies and analyzes a comprehensive range of specific mitigation actions and projects being considered to reduce the effects of each hazard, with particular emphasis on new and existing buildings and infrastructure. All plans approved by FEMA after October 1, 2008, must also address the jurisdiction's participation in the NFIP, and continued compliance with NFIP requirements, as appropriate.
§201.6(c)(3)(iii)	The hazard mitigation strategy shall include an] action plan, describing how the action identified in paragraph (c)(3)(ii) of this section will be prioritized, implemented, and administered by the local jurisdiction. Prioritization shall include a special emphasis on the extent to which benefits are maximized according to a cost benefit review of the proposed projects and their associated costs.
§201.6(c)(3)(iv)	For multi-jurisdictional plans, there must be identifiable action items specific to the jurisdiction requesting FEMA approval or credit of the plan.
§201.6(c)(4)(ii)	The plan shall include a] process by which local governments incorporate the requirements of the mitigation plan into other planning mechanisms such as comprehensive or capital improvements, when appropriate.
Planning Elements	
C1. Does the plan document each jurisdiction's existing authorities, policies, programs and resources, and its ability to expand on and improve these existing policies and programs? 44 CFR 201.6(c)(3)	
C2. Does the Plan address each jurisdiction's participation in the NFIP and continued compliance with NFIP requirements, as appropriate? 44 CFR 201.6(c)(3)(ii)	
C3. Does the Plan include goals to reduce/avoid long-term vulnerabilities to the identified hazards? 44 CFR 201.6(c)(3)(i)	
C4. Does the Plan identify and analyze a comprehensive range of specific mitigation actions and projects for each jurisdiction being considered to reduce the effects of hazards, with emphasis on new and existing buildings and infrastructure? 44 CFR 201.6(c)(3)(ii) and 44 CFR 201.6(c)(3)(iv)	

City of Vernonia Annex

C5. Does the Plan contain an action plan that describes how the actions identified will be prioritized (including cost benefit review), implemented, and administered by each jurisdiction? 44 CFR 201.6(c)(3)(iii) and 44 CFR (c)(3)(iv)

C6. Does the Plan describe a process by which local governments will integrate the requirements of the mitigation plan into other planning mechanisms, such as comprehensive or capital improvement plans, when appropriate? 44 CFR 201.6(c)(4)(ii)

Identify Mitigation Goals

The City of Vernonia reviewed the Columbia County goals and determined they meet the City's needs and subsequently adopted the Goals in Table 14 for the current planning period.

Table 14. City of Vernonia Mitigation Goals	
Goal Number	Goal Description
1	Reduce the Threat to Life Safety Enhance life safety by minimizing the potential for deaths and injuries in future disaster events.
2	Protect Critical Facilities and Enhance Emergency and Essential Services • Implement activities or projects to protect critical facilities and infrastructure. • Seek opportunities to enhance, protect, and integrate emergency and essential services. • Strengthen emergency operations plans and procedures by increasing collaboration and coordination among public agencies, non-profit organizations, businesses, and industry.
3	Reduce the Threat to Property • Seek opportunities to protect, enhance and integrate emergency and essential services. • Strengthen emergency operations plans and procedures by increasing collaboration and coordination among public agencies, non-profit organizations, businesses, industries and the citizens of Vernonia.
4	Create a Disaster Resistant and Disaster-Resilient Economy • Develop and implement activities to protect economic well-being and vitality while reducing economic hardship in post disaster situations. • Reduce insurance losses and repetitive claims for chronic hazard events. • Work with State and Federal Partners to reduce short-term and long-term recovery and reconstruction costs. • Work with local and County organizations, such as Columbia Emergency Planning Association (CEPA). • Expedite pre-disaster and post-disaster grants and program funding.
5	Increase Public Awareness, Education, Outreach, and Partnerships • Coordinate and collaborate, where possible, risk reduction outreach efforts with the Oregon Partners for Disaster Resistance & Resilience and other public and private organizations. • Develop and implement risk reduction education programs to increase awareness among citizens, local, county, and regional agencies, non-profit organizations, businesses, and industry. • Promote insurance coverage for catastrophic hazards • Strengthen communication and coordinate participation in and between public agencies, citizens, nonprofit organizations, businesses, and industry.

Evaluate and Prioritize Mitigation Actions

Mitigation actions are activities, measures, or projects that help achieve the goals of a mitigation plan. Table 15 lists the mitigation actions developed during this mitigation planning process or offered during whole community planning activities. It is not intended that this plan will attempt

City of Vernonia Annex

to act on all of these action items, but the list will be maintained in order to provide documentation for future planning efforts.

Table 15. City of Vernonia Mitigation Actions Considered			
Hazard	Status	Comment	Description
Natural Hazards			
Multi-Hazard (MH)			
MH	Consider		Develop, implement, and maintain jurisdictional debris management plans.
MH	Ongoing		Develop and incorporate ordinances commensurate with development and building codes to reflect survivability from wind, seismic, fire, and other hazards to ensure occupant safety.
MH	Ongoing		Review ordinances and develop outreach programs to assure manufactured homes and buildings are protected from severe wind and flood hazards. (Anchoring, elevation, and other methods as applicable)
MH	Ongoing		Cross reference and incorporate mitigation planning provisions into all community planning processes such as comprehensive, capital improvement, land use, transportation plans, etc to demonstrate multi-benefit considerations and facilitate using multiple funding source consideration.
MH	Ongoing		Purchase and install generators with main power distribution disconnect switches for identified and prioritized critical facilities susceptible to short term power disruption. (i.e. first responder and schools, and water and sewage pump stations, etc.)
MH	Ongoing		Electronic surge protection devices on critical electronic components such as warning systems, communications equipment, and computers for critical facilities.
MH	Ongoing		Distribute information materials concerning mitigation, preparedness, and safety procedures for all natural hazards.
MH	Ongoing		Explore the need for, develop, and implement hazard zoning ordinances for high-risk hazard area land-use.
MH	Consider	Police Department,	Retrofit structures to protect them from seismic, floods, high winds, earthquakes, or other natural hazards.

City of Vernonia Annex

Table 15. City of Vernonia Mitigation Actions Considered

Hazard	Status	Comment	Description
		EOC, City Hall complete	
MH	Consider		Acquire, demolish, or relocate structures from hazard prone area. Property deeds shall be restricted for open space uses in perpetuity to keep people from rebuilding in hazard areas.
MH	Consider		Harden utility headers located along river embankments to mitigate potential flood, debris, and erosion damages.
MH	<i>Ongoing</i>		Establish a formal role for the jurisdictional Hazard Mitigation Planning Committees to develop a sustainable process to implement, monitor, and evaluate citywide mitigation actions.
MH	<i>Ongoing</i>		Identify and pursue funding opportunities to implement mitigation actions.
MH	<i>Ongoing</i>		Develop public and private sector partnerships to foster hazard mitigation activities.
MH	<i>Ongoing</i>		Integrate the Mitigation Plan findings into planning and regulatory documents and programs and into enhanced emergency planning.
Flood			
Flood	<i>Ongoing</i>		Develop and maintain GIS mapped critical facility inventory for all structures located within 100-year and 500-year floodplains.
Flood	<i>Ongoing</i>		Develop and maintain GIS mapped inventory, and develop prioritized list of residential and commercial buildings within 100-year and 500-year floodplains.
Flood	<i>Ongoing</i>		Develop and maintain GIS mapped inventory of repetitive loss properties to include the types and numbers of properties.
Flood	<i>Ongoing</i>		Develop and implement mitigation actions for repetitive loss properties.
Flood	<i>Ongoing</i>		Establish flood mitigation priorities for critical facilities and residential and commercial buildings located within the 100- year floodplain using survey elevation data.
Flood	<i>Ongoing</i>		Implement mitigation measures identified by critical facilities' owners, and other facility

City of Vernonia Annex

Table 15. City of Vernonia Mitigation Actions Considered

Hazard	Status	Comment	Description
			owners, to protect facilities located within the 100-year floodplain.
Flood	<i>Ongoing</i>		Develop an outreach program to educate public concerning NFIP participation benefits, floodplain development, land use regulation, and NFIP flood insurance availability to facilitate continued compliance with the NFIP.
Flood	<i>Ongoing</i>		Develop, implement, and enforce floodplain management ordinances.
Flood	<i>Consider</i>		Acquire, relocate, elevate, or otherwise flood-proof critical facilities.
Flood	<i>Ongoing</i>		Develop, or revise, adopt, and enforce storm water ordinances and regulations to manage run-off from new development, including buffers and retention basins.
Flood	<i>Ongoing</i>		Create detention storage basins, ponds, reservoirs etc. to allow water to temporarily accumulate. Water ultimately returning to its watercourse at a reduced flow rate.
Flood	<i>Ongoing</i>		Provide flood protection to mitigate damage and contamination of wastewater systems.
Flood	<i>Ongoing</i>		Develop and incorporate mitigation provisions and recommendations into zoning ordinances and community development processes to maintain the floodway and protect critical infrastructure and private residences from other hazard areas.
Flood	<i>Ongoing</i>		Identify and list repetitively flooded structures and infrastructures, analyze the threat to these facilities, and prioritize mitigation actions to acquire, relocate, elevate, and/or flood proof to protect the threatened population.
Flood	<i>Ongoing</i>		Perform hydrologic and hydraulic engineering, and drainage studies and analyses. Use information obtained for feasibility determination and project design. This information should be a key component, directly related to a proposed project.
Winter Storm			
Winter Storms	<i>Ongoing</i>		Develop and implement programs to coordinate maintenance and mitigation activities to reduce risk to public infrastructure from severe winter storms.

City of Vernonia Annex

Table 15. City of Vernonia Mitigation Actions Considered

Hazard	Status	Comment	Description
Winter Storms	<i>Ongoing</i>		Develop critical facility list needing emergency back-up power systems, prioritize, seek funding and implement mitigation actions.
Winter Storms	<i>Ongoing</i>		Develop and maintain severe winter storm public outreach program defining mitigation activity benefits through educational outreach aimed at households and businesses while targeting of special needs populations.
Winter Storms	<i>Ongoing</i>		Develop and implement tree clearing mitigation programs to keep trees from threatening lives, property, and public infrastructure from severe weather events.
Winter Storms	<i>Ongoing</i>		Develop, implement, and maintain partnership program with electrical utilities to use underground utility placement methods where possible to reduce or eliminate power outages from severe winter storms. Consider developing incentive programs.
Winter Storms	<i>Ongoing</i>		Develop early warning test program partnering with NOAA, City Police, Fire Departments, and Volunteer Fire Department to coordinate tests.
Winter Storms	<i>Ongoing</i>		Review critical facilities and government building energy efficiency, winter readiness, and electrical protection capability. Identify, prioritize, and implement infrastructure upgrade or rehabilitation project prioritization and development.
Landslide			
Landslide	<i>Ongoing</i>		Complete a landslide location inventory, identify threatened critical facilities and other buildings and infrastructure.
Landslide	<i>Consider</i>		Develop prioritized list of mitigation actions for threatened critical facilities and other buildings or infrastructure.
Landslide	<i>Ongoing</i>		Develop process to limit future development in steep slope areas (permitting, geotechnical review, soil stabilization techniques, etc).
Landslide	<i>Ongoing</i>		Update the storm water management plan to include regulations to control runoff, both for flood reduction and to minimize saturated soils on steep slopes that can cause landslides.
Landslide	<i>Ongoing</i>		Develop comprehensive geological landslide and rockslide prone area maps.

City of Vernonia Annex

Table 15. City of Vernonia Mitigation Actions Considered

Hazard	Status	Comment	Description
Landslide	<i>Ongoing</i>		Identify and seasonally restrict construction activities in steep slope areas.
Wildland Fire			
Wildland Fire	<i>Ongoing</i>		Identify critical facilities and vulnerable populations based on mapped high hazard areas.
Wildland Fire	Consider		Identify evacuation routes away from high hazard areas and develop outreach program to educate the public concerning warnings and evacuation procedures.
Wildland Fire	<i>Ongoing</i>		Develop Community Wildland Fire Protection Plans for all at-risk communities.
Wildland Fire	<i>Ongoing</i>		Hold FireWise workshop to educate residents and contractors concerning fire resistant landscaping.
Wildland Fire	Consider		Promote FireWise building siting, design, and construction materials.
Wildland Fire	Consider		Develop FireWise Public Service Announcements (PSA).
Wildland Fire	<i>Ongoing</i>		Provide wildland fire information in an easily distributed format for all residents.
Wildland Fire	Consider		Schedule and perform government facility "fire drills" at least twice per year.
Wildland Fire	<i>Ongoing</i>		Develop, adopt, and enforce burn ordinances that require burn permits, restricts campfires, and controls outdoor burning.
Wildland Fire	Consider		Develop outreach program to educate and encourage fire-safe construction practices for existing and new construction in high risk areas.
Wildland Fire	<i>Ongoing</i>		Identify, develop, and implement, and enforce mitigation actions such as fuel breaks and reduction zones for potential wildland fire hazard areas.
Earthquake			
Earthquake	Consider		Supplement State Seismic Needs Analysis data (schools, fire, law enforcement). Complete inventory of public and commercial buildings that may be particularly vulnerable to earthquake damage.
Earthquake	Consider		Identify high seismic hazard areas; develop a wood-frame residential building inventory and an outreach program to educate population concerning facilities particularly vulnerable to

City of Vernonia Annex

Table 15. City of Vernonia Mitigation Actions Considered

Hazard	Status	Comment	Description
			earthquake damage, such as pre-1940s homes and homes with cripple wall foundations.
Earthquake	Consider		Disseminate FEMA pamphlets to educate and encourage homeowners concerning seismic structural and non-structural retrofit benefits.
Earthquake	Ongoing		Retrofit important public facilities with significant seismic vulnerabilities, such as unreinforced masonry construction.
Earthquake	Completed		Retrofit bridges that are not seismically adequate for lifeline transportation routes.
Earthquake	Ongoing		Update existing (or adopt the most current) Uniform Building Code
Earthquake	Ongoing		Implement and enforce the Uniform, International, and State Building Codes.
Earthquake	Ongoing		Inspect and/or certify all new construction.
Earthquake	Ongoing		Develop outreach program to educate residents concerning benefits of increased seismic resistance and modern building code compliance during rehabilitation or major repairs for residences or businesses.
Earthquake	Ongoing		Inspect, prioritize, and retrofit any critical facility or public infrastructure that does not meet current Building Codes.
Earthquake	Ongoing		Evaluate critical public facility seismic performance for fire stations, public works buildings, potable water systems, wastewater systems, electric power systems, and bridges within the jurisdiction.
Earthquake	Consider		Develop outreach program for educating private facility owners/operators concerning alternative or emergency power source acquisition to enable them to deliver food, fuel, and medical services during disaster emergency response and recovery efforts.
Earthquake	Ongoing		Encourage utility companies to evaluate and harden vulnerable infrastructure elements for sustainability.
Earthquake	Ongoing		Develop partnerships to mitigate hazards that result in jurisdictional facility lifeline or emergency transportation route closures.
Volcano			

City of Vernonia Annex

Table 15. City of Vernonia Mitigation Actions Considered

Hazard	Status	Comment	Description
Volcano	Consider		Update public emergency notification procedures and develop an outreach program for ash fall events.
Volcano	Consider		Update emergency response planning and develop client focused outreach program for ash fall events affecting river, air, and highway transportation, and industrial facilities and operations.
Volcano	Consider		Evaluate ash impact on storm water drainage system and develop mitigation actions.
Wind			
Wind	<i>Ongoing</i>		Review ordinances and develop outreach programs to assure manufactured buildings are protected from severe wind and flood hazards. (Anchoring, elevation, siting, and other methods as applicable)
Wind	Consider		Identify and prioritize critical facilities' overhead utilities that could be placed underground to reduce power disruption from wind storm / tree blow down damage.
Wind	<i>Ongoing</i>		Revise requirements to place utilities underground to reduce power disruption from wind storm / tree blow down damage when upgrading or during new development.
Wind	<i>Ongoing</i>		Increase power line wire size and incorporate quick disconnects (break away devices) to reduce ice load power line failure during severe wind or winter ice storm events.
Erosion			
Erosion	Consider		Maintain and update erosion hazard locations, identify critical facilities potentially impacted and develop and implement mitigation initiatives such as bank stabilization or facility relocation to prevent or reduce the threat.
Erosion	Consider		Apply for grants/funds to implement riverbank protection methods.
Erosion	Consider		Periodically provide available information to residents on riverbank erosion and methods to prevent it in an easily distributed format.
Erosion	Consider		Install riprap, or pilings to harden or "armor" a stream bank where severe erosion occurs.

City of Vernonia Annex

Table 15. City of Vernonia Mitigation Actions Considered

Hazard	Status	Comment	Description
Erosion	Consider		Install bank protection such as rock, concrete, asphalt, vegetation, or other armoring or protective materials to provide river bank protection.
Erosion	Ongoing		Harden culvert entrance with asphalt, concrete, rock, to reduce erosion or scour.
Erosion	Ongoing		Construct a structure to dissipate energy or reduce flow velocity to prevent erosion of the streambed and banks.

Mitigation Action Plan

The Steering Committee has evaluated and prioritized each of the considered mitigation actions to determine which would be included in the Mitigation Action Plan. The Committee then determined the responsible agency and potential funding sources. The Mitigation Action Plan represents mitigation projects and programs to be implemented through the cooperation of multiple entities.

Upon review, the Steering Committee assigned a high priority ranking to actions that best fulfill the goals of the HMP and are appropriate and feasible for the City and responsible entities to implement during the 5-year lifespan of this version of the HMP. As such, the Steering Committee determined that only the mitigation actions that received a high priority ranking would be included in the City's Mitigation Action Plan. Table C-14 depicts the City's mitigation actions grouped by hazard and in descending priority order within each hazard.

Table 16. City of Vernonia Mitigation Action Plan Matrix

Hazard	Description	Managing Department / Agency	Timeframe	Potential Funding Source(s)	Benefit-Costs / Technical Feasibility
Multi-Hazard (MH)					
MH	Purchase and install generators with main power distribution disconnect switches for identified and prioritized critical facilities susceptible to short term power disruption. (i.e. first responder and schools, and water and sewage pump stations, etc.)	Public Works	Completed	General Fund, HS, HMGP	BC: TBD TF: Yes

City of Vernonia Annex

Table 16. City of Vernonia Mitigation Action Plan Matrix

Hazard	Description	Managing Department / Agency	Timeframe	Potential Funding Source(s)	Benefit-Costs / Technical Feasibility
MH	Electronic surge protection devices on critical electronic components such as warning systems, communications equipment, and computers for critical facilities.	Public Works	1 yr	General Fund	BC: TBD TF: Yes
MH	Update or develop, implement, and maintain jurisdictional debris management plans.	City Admin/ Public Works	1-3 yrs	General Fund	BC: TBD TF: Yes
MH	Develop and implement strategies and educational outreach programs for debris management.	City Admin/ Public Works	1-3 yrs (Plan) 3-5 (outreach)	General Fund	BC: TBD TF: Yes
MH	Cross reference and incorporate mitigation planning provisions into all community planning processes such as comprehensive, capital improvement, land use, transportation plans, etc. to demonstrate multi-benefit considerations and facilitate using multiple funding source consideration.	City Admin/ Planning	1-5 yrs	General Fund	BC: TBD TF: Yes
MH	Develop outreach program for educating private facility owners/operators concerning alternative or emergency power source acquisition to enable them to deliver services during disaster emergency response and recovery efforts.	City Admin Public Works	2-5 yrs	General Fund	BC: TBD TF: Yes
MH	Develop critical facility list needing emergency back-up power systems, prioritize, seek funding and implement mitigation actions.	Public Works	1-2 yrs	General Fund	BC: TBD TF: Yes
MH	Update public emergency notification procedures and develop an outreach program for all emergencies	City Admin	3-5 years	General Fund, NOAA/NW S, HMPG	BC:TBD TF: Yes
Flood					

City of Vernonia Annex

Table 16. City of Vernonia Mitigation Action Plan Matrix

Hazard	Description	Managing Department / Agency	Timeframe	Potential Funding Source(s)	Benefit-Costs / Technical Feasibility
Flood	Develop, implement, and enforce floodplain management ordinances.	City Admin	1-3 yrs	General Fund	BC: TBD TF: Yes
Flood	Develop, or revise, adopt, and enforce storm water ordinances and regulations to manage run-off from new development, including buffers and retention basins.	City Admin/Planning/ Public Works	Ongoing	General Fund	BC: TBD TF: Yes
Flood	Create detention storage basins, ponds, reservoirs etc. to allow water to temporarily accumulate. Water ultimately returning to its watercourse at a reduced flow rate.	Public Works/ Engineers	0-5 yrs	Street Fund, FMA, HMGP, PDM	BC: TBD TF: Yes
Flood	Implement flood protection to mitigate damage and contamination of wastewater systems.	Public Works	5-10 yrs	Sewer Fund, FMA, HMGP, PDM	BC: TBD TF: Yes
Winter Storm					
Winter Storm	Develop and implement programs to coordinate maintenance and mitigation activities to reduce public infrastructure from severe winter storms.	Public Works	Ongoing	General Fund	BC: TBD TF: Yes
Winter Storm	Review critical facilities and government building energy efficiency, winter readiness, and electrical protection capability. Identify, prioritize, and implement infrastructure upgrade or rehabilitation project prioritization and development.	Public Works	Ongoing	General Fund, HMGP	BC: TBD TF: Yes
Landslide					
Landslide	Develop process to limit future development in steep slope areas (permitting, geotechnical review, soil stabilization techniques, etc).	Planning/ Engineering	Completed	General Fund	BC: TBD TF: Yes
Wildland Fire					

City of Vernonia Annex

Table 16. City of Vernonia Mitigation Action Plan Matrix

Hazard	Description	Managing Department / Agency	Timeframe	Potential Funding Source(s)	Benefit-Costs / Technical Feasibility
Wildland Fire	Develop Community Wildland Fire Protection Plan	Fire District	Ongoing	General Fund, FMAP	BC: TBD TF: Yes
Wildland Fire	Provide wildland fire information in an easily distributed format for all residents.	City Admin Fire District	Ongoing	General Fund, FMAP	BC: TBD TF: Yes
Wildland Fire	Develop, adopt, and enforce burn ordinances that require burn permits, restricts campfires, and controls outdoor burning.	City Admin/ Fire District	Ongoing	General Fund	BC: TBD TF: Yes
Earthquake					
EQ	Identify, evaluate, and prioritize critical public facilities' seismic performance.	City Admin/ Public Works/ Engineering	3-5 yrs	General Fund	BC: TBD TF: Yes
Volcano					
Volcano	Evaluate ash impact on storm water drainage system and develop mitigation actions.	Public Works/ Engineering	3-5 yrs	General Fund	BC: TBD TF: Yes
Wind					
Wind	Identify and prioritize critical facilities' overhead utilities that could be placed underground to reduce power disruption from wind storm / tree blow down damage.	Public Works	1-5 yrs	General Fund, Utility Co., HMGP, PDM	BC: TBD TF: Yes
Erosion					
Erosion	Maintain and update erosion hazard locations, identify critical facilities potentially impacted and develop and implement mitigation initiatives	Public Works	3-5 yrs	General Fund, HMGP, PDM	BC: TBD TF: Yes
Erosion	Periodically provide available information to residents on riverbank erosion and methods to prevent it in an easily distributed format.	Public Works	3-5 yrs	General Fund	BC: TBD TF: Yes

City of Vernonia Annex

Table 16. City of Vernonia Mitigation Action Plan Matrix

Hazard	Description	Managing Department / Agency	Timeframe	Potential Funding Source(s)	Benefit-Costs / Technical Feasibility
Erosion	Install riprap, or pilings to harden or "armor" a stream bank where severe erosion occurs.	Public Works	3-5 yrs	General Fund, FMA, HMGP, PDM	BC: TBD TF: Yes

Plan Adoption and Maintenance

The following section provides documentation of the formal adoption of this annex by the governing board of the district or the city council/county commission of the jurisdiction. It also identifies the standing committee that will be responsible for future reviews between update periods.

DMA 2000 Requirements: Plan Review, Evaluation, Implementation, and Adoption

Planning Requirements

- §201.6(d)(3) A local jurisdiction must review and revise its plan to reflect changes in development, progress in local mitigation efforts, and changes in priorities, and resubmit if for approval within 5 years in order to continue to be eligible for mitigation project grant funding.
- §201.6(c)(5) The plan shall include... Documentation that the plan has been formally adopted by the governing body of the jurisdiction requesting approval of the plan (e.g., City Council, County commissioner, Tribal Council). For multi-jurisdictional plans, each jurisdiction requesting approval of the plan must document that it has been formally adopted.

Planning Elements

- D1. Was the plan revised to reflect changes in development? 44 CFR 201.6(d)(3)**
- D2. Was the plan revised to reflect progress in local mitigation efforts? 44 CFR 201.6(d)(3)**
- D3. Was the plan revised to reflect changes in priorities? 44 CFR 201.6(d)(3)**
- E1. Does the Plan include documentation that the plan has been formally adopted by the governing body of the jurisdiction requesting approval? 44 CFR 201.6(c)(5)**
- E2. For multi-jurisdictional plans, has each jurisdiction requesting approval of the plan documented formal plan adoption? 44 CFR 201.6(c)(5)**

City of Vernonia Annex

Resolution of Adoption

BEFORE THE BOARD OF COUNTY COMMISSIONERS FOR COLUMBIA COUNTY, OREGON

In the Matter of Adopting the 2014) Columbia County Multi-Jurisdictional) RESOLUTION NO. 40-2014 Hazard Mitigation Plan Update)

WHEREAS, Columbia County, Oregon has experienced repetitive disasters that have damaged commercial, residential and public properties, displaced citizens and businesses, and presented general public health and safety concerns; and

WHEREAS, Columbia County has prepared a Multi-Jurisdictional Hazard Mitigation Plan that outlines the options to reduce overall damage and impact from natural hazards; and

WHEREAS, the Multi-Jurisdictional Hazard Mitigation Plan has been reviewed by community residents, business owners, and federal, state and local agencies, and has been revised to reflect their concerns;

NOW, THEREFORE, BE IT RESOLVED that:

1. 1. The Multi-Jurisdictional Hazard Mitigation Plan is hereby adopted as an official plan of Columbia County.
2. 2. A Hazard Mitigation Planning Group is hereby established as a permanent advisory body. The Hazard Mitigation Planning Coordinator shall designate its members, subject to the approval of the County and the participating jurisdictions. They shall serve one-year terms. The group's duties shall be as designated in the Hazard Mitigation Plan.
3. 3. The Hazard Mitigation Planning Coordinator is charged with supervising the implementation of the Plan's recommendations within the funding limitations as provided by Columbia County or other sources.
4. 4. The Hazard Mitigation Planning Coordinator shall give priority attention to the goals identified in Table A-13 of the Columbia County Appendix, and the actions listed in Table A-14 of the Columbia County Appendix to the Hazard Mitigation Plan and;
5. 5. The Hazard Mitigation Planning Coordinator shall convene the hazard mitigation planning group annually. The planning group shall monitor implementation of the plan and shall submit an annual review worksheet to the Board of County Commissioners in accordance with the following format:
 - a. A review of the original plan.
 - b. A review of any disasters or emergencies that occurred during the previous calendar year.
 - c. A review of the actions taken, including what was accomplished during the previous year.
 - d. A discussion of any implementation problems.
 - e. Recommendations for new projects or revised action items. Such recommendations shall be subject to approval by the Columbia County.

Dated this 27th day of August, 2014.

BOARD OF COUNTY COMMISSIONERS FOR COLUMBIA COUNTY, OREGON

By: _____ Alex Tardif, Commissioner

By: _____ Henry Heimuller, Commissioner

By: _____ Margaret Magruder, Commissioner

City of Vernonia Annex

Standing Review Committee

The following table identifies the members of the Standing committee that will meet quarterly to review the HMP annex and provide a running update.

Table 17. (Name of Jurisdiction/District here) Standing Hazard Mitigation Committee	
Name	Agency/Department/Affiliation
Josette Mitchell	City Administrator
Stephanie Borst	Vernonia City Recorder
Dean Smith	Vernonia Rural Fire Protection District
Matt Straite	City Planner - City of Vernonia
Jeff Birch	Public Works Superintendent - City of Vernonia
Michael Conner	Chief of Police - City of Vernonia
Steve Pegram	Columbia County Emergency Management