

RESOLUTION NO. 2021-14

A RESOLUTION ACCEPTING THE UPDATED MULTI-JURISDICTIONAL COLUMBIA COUNTY HAZARD MITIGATION PLAN

WHEREAS, Vernonia, 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:

Section 1: The Vernonia City Council has reviewed the Columbia County Multi-Jurisdictional Hazard Mitigation Plan Update specific to the City of Vernonia.


Section 2: The Vernonia City Council accepts the updated Columbia County Multi-Jurisdictional Hazard Mitigation Plan.

Introduced and adopted the 6th day of July, 2021 by the following vote:

Ayes: 4 Nays: - Abstain: - Absent: -

Signed by me, Rick Hobart, Mayor, in authentication of its adoption this 6th day of July, 2021.


Rick Hobart, Mayor

Attest: 
Stephanie Borst, City Recorder

City of Vernonia
Hazard Mitigation Plan
Annex

2020 Update
Columbia County
Multi-Jurisdiction Hazard Mitigation Plan

City of Vernonia Annex

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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)	

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)*

Plan Development Methodology

The updating and authoring of this annex included six phases. These phases do not describe an exactly linear process and many of them were worked upon simultaneously and overlapped others. Each phase produced results that are evident in the final drafts of the Basic Plan and the County, Jurisdictional, and Agency Annexes.

Phase 1 – County Outreach: Under this phase, communication was received by Columbia County Jurisdictions and Districts from the County Emergency Management Department regarding the need for and the scope of the upcoming HMP plan update project. The County update coordinator provided planning information, documentation, an update plan, schedule, and template. Participation in producing this annex was encouraged, and the benefits of Hazard Mitigation Planning were explained.

Phase 2 – Assemble a team: This phase required the jurisdictions and districts to build a planning team, which long with input and direction from the HSEMC and the County Update Coordinator and seeking active involvement from the public would work to produce the required elements of the plan.

Phase 3 - Assess risk: Risk assessment is the process of measuring the potential loss of life, personal injury, economic injury, and property damage resulting from natural hazards. This process worked in coordination with the HSEMC and the County’s broader Hazard profile development, to provide information specific to this annex. During this process, the Update Team worked on the following tasks:

- Identify new hazards and update hazard profiles.
- Determine the impact of hazards on physical, social, and economic assets.
- Estimate the cost of damage or costs that can be avoided through mitigation.

Phase 4 – Determine public involvement and provide opportunities; under this phase, a public involvement strategy was developed that utilized public events outreach events, public questionnaires, media opportunities and public meetings seeking public input. The strategy focused on three primary objectives:

- Assess the public’s perception of Natural Hazard risk in the County.
- Assess the public’s perception of vulnerability to those risks.
- Identify mitigation strategies that will be supported by the public.

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Phase 5 - Identify goals, objectives, and action: Under this phase, the goals and objectives were reviewed and updated, as well as a range of potential mitigation actions for each identified natural hazard identified. A process was created under this phase for prioritizing, implementing, and administering action items based in part on a review of project benefits versus project costs.

Phase 6 - Implement and adopt the plan: Once pre-adoption approval has been granted by the County, the Oregon Office of Emergency Management and FEMA, the final adoption phase begins. In this phase the annex will be presented to our governing body for promulgation and adoption.

Plan Integration

Our jurisdiction will be responsible for ensuring that plan goals and objectives are considered and incorporated into applicable revisions of the adopted comprehensive plan and any new planning projects that we undertake. The plan may be adopted in its entirety, as part of our comprehensive development plan. This would enable the mitigation component of the comprehensive plan to be consistently revisited and reviewed. In addition, the MJHMP should also take into account any changes in the comprehensive plan and incorporate the information accordingly during its next update. This will require consistent communication to the HSEMC. This jurisdiction will seek ways to incorporate mitigation strategies into our comprehensive plans and capital facilities plans, emergency management plans, and budget documents. Lastly this participant will identify other planning documents or mechanisms to incorporate and focus on their hazard mitigation strategies (ex. emergency management plans, master plans).

Homeland Security and Emergency Management Commission (HSEMC) and Regional cooperation

The Homeland Security and Emergency Management Commission (HSEMC) is a body comprised of local Jurisdictions, Districts and Agencies, which have formed a partnership with Columbia County to produce a collaborative, mutually supportive emergency management effort. In the context of Hazard Mitigation planning the HSEMC acts as a permanent, whole community and public meeting space for Mitigation Plan reviews, additions and new ideas and considerations. In addition, the commission works extremely closely with the county Emergency Management Department (the only permanent EM program in the county), to offer and partake in regional planning efforts with agencies, jurisdictions and other similar commissions in the Greater Metropolitan urban area. Columbia County is identified as one of the five Metros counties for Urban Area Securities Initiative grant applications and is a member of the Regional Disaster Preparedness Organization. Either directly, or through the county EM Department or the HSEMC, Columbia County jurisdictions and districts have significant opportunity for involvement, and collaboration with a wide array of similar organizations on the topic of Hazard Mitigation.

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

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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.

Public participation during the drafting of this update was encouraged in several ways. The first is through the HSEMC described earlier. Each Bi-Monthly meeting of the commission is open to the public, and during each meeting, public commentary is encouraged. Appeals to the public to present information, and feedback to the HSEMC for consideration in the Hazard Mitigation Plan was ongoing throughout the two years of the planning process and continues as HSEMC prepares to enter plan maintenance mode after this update cycle.

In addition, the community was encouraged to provide feedback during the drafting office by filling out surveys intended to identify risks and specific hazards of greatest interest. These surveys were made available at every outreach event, public meeting, and preparedness effort in each jurisdiction and district in the county for the last several years. Upon completion the surveys were gathered, and result incorporated into the planning process of each jurisdiction. Like the opportunity for public testimony the survey program is an ongoing effort intended to maintain a public awareness of Hazard Mitigation with the public.

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.

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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

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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-

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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.

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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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	<p>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:</p> <ul style="list-style-type: none"> 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. <p>http://www.vernonia-or.gov/Forms/Ordinances.asp</p>
	Vernonia Water Quality Report	An annual report of the outcome of our many water quality tests. This report explains water supply capability.

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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

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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

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

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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.

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

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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

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(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

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

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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.

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

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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

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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.

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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.

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

Hazard Type	Hazard Area	Methodology	Population Number	Buildings			
				Residential		Non-Residential	
				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).

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

Hazard Type	Hazard Area	Methodology	Government		Emergency Response		Educational		Care		Community	
			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	Descriptor	3	2.5M	2	1.5M	1	14M	1	unknown	15	2.2M
	Moderate	Descriptor	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

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

Hazard Type	Hazard Area	Methodology	Highways		Railroads		Bridges		Transportation Facilities		Utilities		Dams	
			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	unknown					1	unknown	10	8.3M	--	--
Landslide	Moderate	>14-32 degrees	unknown	unknown			1	unknown	1	unknown	5	6M	--	--
	High	>32-56 degrees							--	--	1	3.1M	--	--
Wildland Fire	Moderate	Moderate fuel rank	unknown	unknown			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	unknown			2	unknown	1	unknown	10	8.3M	--	--
	Very strong	20-40% (g)							--	--	--	--	--	--
	Severe	>40-60% (g)							--	--	--	--	--	--
Volcano	Moderate		unknown			2	unknown	1	unknown	10	8.3M	--	--	
Wind	Moderate		unknown	unknown		2	unknown	1	unknown	10	8.3M	--	--	
Erosion		within 300' of potential areas of erosion					2	unknown	--	--	--	3	2.1M	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)	

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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.

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 <ul style="list-style-type: none"> • 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 <ul style="list-style-type: none"> • 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 <ul style="list-style-type: none"> • 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 <ul style="list-style-type: none"> • 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.

Mitigation strategies were evaluated using FEMA's recommended STAPLEE process. This process addresses all major factors when weighing the costs and benefits of implementing one action over another. Important factors to be considered when ranking the strategies include the prohibitive costs, the community's resource capabilities, the community's desires and concerns, and the overall feasibility of the action. STAPLEE criteria were used to evaluate the potential benefits of each participant's listing of mitigation alternatives or actions. The STAPLEE evaluation includes consideration of the social, technical, administrative, political, legal, economic, and environmental benefits of the mitigation actions, which are summarized below.

- S – Social: Mitigation actions are acceptable to the community if they do not adversely affect a particular segment of the population, do not cause relocation of lower income people, and if they are compatible with the communities social and cultural values.
- T – Technical: Mitigation actions are technically most effective if they provide long-term reduction of losses and have minimal secondary adverse impacts.
- A – Administrative: Mitigation actions are easier to implement if the jurisdiction has the necessary staffing and funding.
- P – Political: Mitigation actions can truly be successful if all stakeholders have been offered an opportunity to participate in the planning process and if there is public support of the action. L – Legal: It is critical that the jurisdiction or implementing agency have the legal authority to implement and enforce a mitigation action.
- E – Economical: Budget constraints can significantly deter the implementation of mitigation actions. Hence, it is important to evaluate whether an action is cost-effective, as determined by a cost benefit review, and possible to fund.
- E – Environmental: Sustainable mitigation actions that do not have an adverse effect on the environment, comply with Federal, State, and local environmental regulations, and are consistent with the community's environmental goals provide mitigation benefits while being environmentally sound.

STAPLEE criteria were reviewed and applied to proposed mitigation actions in order to provide a prioritized list in each jurisdiction. HSEMC and other key personnel and members attending the public meetings were asked to take into account all of the STAPLEE criteria and to come up with a cumulative priority ranking that maximizes the benefits of each alternative. The projects with the greatest benefits and lowest relative costs as determined by the STAPLEE criteria were assigned a higher priority, while alternatives with lower benefits and relatively higher costs were assigned a lower priority.

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In the future, a more detailed and formal formulation of the costs and benefits of each mitigation strategy could be established to better prioritize the participant action items. A final list of strategies, or actions, was established including information on the associated hazard mitigated and a description of the action, responsible party, cost estimate, potential funding sources and timeline.

Table 15. City of Vernonia 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	<i>Ongoing</i>		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	<i>Ongoing</i>		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	<i>Ongoing</i>		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	<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.

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Table 15. City of Vernonia Mitigation Actions Considered			
Hazard	Status	Comment	Description
MH	<i>Ongoing</i>		Explore the need for, develop, and implement hazard zoning ordinances for high-risk hazard area land-use.
MH	Consider	Police Department, EOC, City Hall complete	Retrofit structures to protect them from seismic, floods, high winds, earthquakes, or other natural hazards.
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	Ongoing		Develop and maintain GIS mapped critical facility inventory for all structures located within 100-year and 500-year floodplains.
Flood	Ongoing		Develop and maintain GIS mapped inventory, and develop prioritized list of residential and commercial buildings within 100-year and 500-year floodplains.
Flood	Ongoing		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

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Table 15. City of Vernonia Mitigation Actions Considered			
Hazard	Status	Comment	Description
			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 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	Consider		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.
<i>Winter Storm</i>			

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Table 15. City of Vernonia Mitigation Actions Considered			
Hazard	Status	Comment	Description
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.
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.
<i>Landslide</i>			
Landslide	<i>Ongoing</i>		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	<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

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Table 15. City of Vernonia Mitigation Actions Considered			
Hazard	Status	Comment	Description
			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.
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, and law enforcement). Complete inventory of public and commercial buildings that may be particularly vulnerable to earthquake damage.

Table 15. City of Vernonia Mitigation Actions Considered

Hazard	Status	Comment	Description
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 encourage homeowners concerning seismic structural and non-structural retrofit benefits.
Earthquake	<i>Ongoing</i>		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	<i>Ongoing</i>		Update existing (or adopt the most current) Uniform Building Code
Earthquake	<i>Ongoing</i>		Implement and enforce the Uniform, International, and State Building Codes.
Earthquake	<i>Ongoing</i>		Inspect and/or certify all new construction.
Earthquake	<i>Ongoing</i>		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	<i>Ongoing</i>		Inspect, prioritize, and retrofit any critical facility or public infrastructure that does not meet current Building Codes.
Earthquake	<i>Ongoing</i>		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	<i>Ongoing</i>		Encourage utility companies to evaluate and harden vulnerable infrastructure elements for sustainability.

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Table 15. City of Vernonia Mitigation Actions Considered			
Hazard	Status	Comment	Description
Earthquake	<i>Ongoing</i>		Develop partnerships to mitigate hazards that result in jurisdictional facility lifeline or emergency transportation route closures.
<i>Volcano</i>			
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.
<i>Wind</i>			
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.
<i>Erosion</i>			
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.

Table 15. City of Vernonia Mitigation Actions Considered

Hazard	Status	Comment	Description
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.
Erosion	<i>Ongoing</i>		Harden culvert entrance with asphalt, concrete, rock, to reduce erosion or scour.
Erosion	<i>Ongoing</i>		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.

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
<i>Multi-Hazard (MH)</i>					
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
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,	Public Works	1-2 yrs	General Fund	BC: TBD TF: Yes

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Table 16. City of Vernonia Mitigation Action Plan Matrix

Hazard	Description	Managing Department / Agency	Timeframe	Potential Funding Source(s)	Benefit-Costs / Technical Feasibility
	prioritize, seek funding and implement mitigation actions.				
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 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

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Table 16. City of Vernonia Mitigation Action Plan Matrix

Hazard	Description	Managing Department / Agency	Timeframe	Potential Funding Source(s)	Benefit-Costs / Technical Feasibility
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, 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	Public Works	3-5 yrs	General Fund,	BC: TBD TF: Yes

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Table 16. City of Vernonia Mitigation Action Plan Matrix

Hazard	Description	Managing Department / Agency	Timeframe	Potential Funding Source(s)	Benefit-Costs / Technical Feasibility
	potentially impacted and develop and implement mitigation initiatives			HMGP, PDM	
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)*

City of Vernonia 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. (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