Natural Hazards Mitigation Plan

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Adopted by
Cottage Grove City Council

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Section 1: Introduction

The City of Cottage Grove, Oregon is subject to various hazards that pose threats to public safety and property. Developing a strategy over time best achieves the goal of reducing the impact of hazards that directly and indirectly affect all community members. This Hazard Mitigation plan is a locally specific guide for risk assessment and mitigation strategies and is a necessary component in assessing and mitigating the hazards to which the City of Cottage Grove and its residents are vulnerable.

The geographic boundaries represented by this plan are the areas within the City limits and Urban Growth Boundary of Cottage Grove, hereafter referred to as the 'planning area' or the City.

An approved NHMP is a basic requirement to be eligible for FEMA mitigation project funds per Section 322 of the Stafford Act, 42 U.S.C. 5165. Detailed requirements are outlined in the Code of Federal Regulations (CFR) Title 44, Part 201.6 and Part 206.434. The Disaster Mitigation Act (DMA) of 2000 also established a new requirement for local mitigation plans and authorized up to 7 % of HMGP funds available to a State for development of State, local, and Indian Tribal mitigation plans.

A Natural Hazard Mitigation Plan is distinguished from an emergency operation plan to the extent that it outlines the proactive implementation of mitigation projects and response activities prior to a hazard or disaster occurrence. Mitigation projects (or "Action Items") can be short or long term activities that reduce a community's vulnerability to hazard impact through various means including avoidance, protection, and preparedness.

What is Natural Hazard Mitigation?

Natural hazard mitigation is defined as permanent reduction or alleviation of loss of life, property and injuries resulting from natural hazards on the built environment through long and short-term strategies. Example strategies include: policy changes, such as updated ordinances; projects, such as seismic retrofits to critical facilities; and education and outreach to targeted audiences, such as Spanish speaking residents, or the elderly. Mitigation is the responsibility of individuals, private businesses and industries, state and local governments, and the federal government.

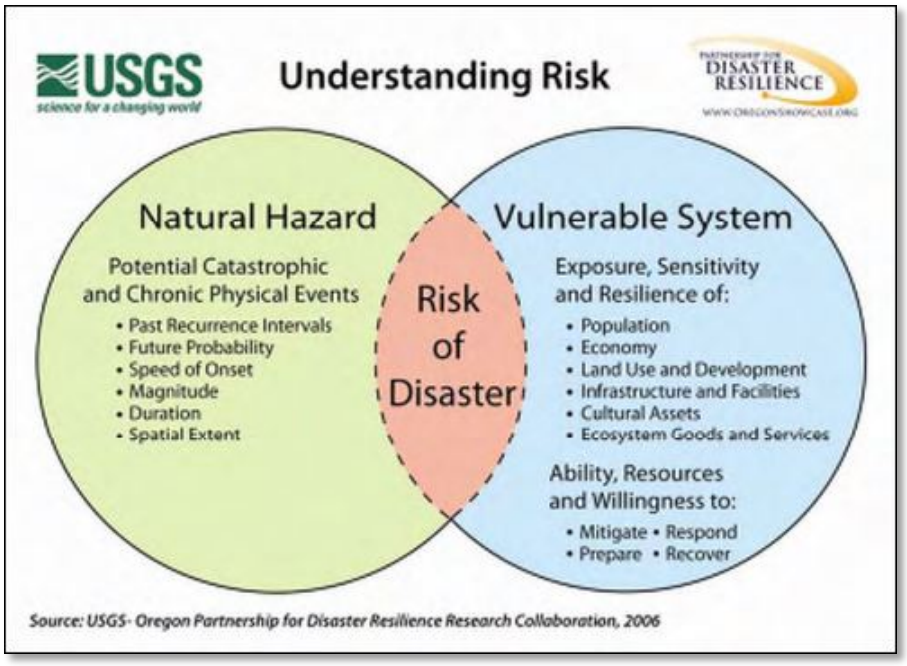
Identified as one of the four stages of Emergency Management (Planning and Preparation, Mitigation, Response and Recovery), engaging in mitigation activities provides jurisdictions with a number of benefits, including: reduced loss of life, property, essential services, critical facilities and economic hardship; reduced short-term and long-term recovery and reconstruction costs; increased cooperation and communication with the community through the planning process; and increased potential for state and federal funding for recovery and reconstruction projects.

Why Develop a Mitigation Plan?

Cottage Grove developed this Natural Hazard Mitigation Plan in an effort to reduce future loss of life and property resulting from natural disasters. It is impossible to predict exactly when these disasters will occur, or the extent to which they will affect the City. However, with deliberate awareness, careful planning and collaboration among public agencies, private sector organizations, and citizens within the community, it is possible to minimize the losses that can result from natural disasters.

A natural hazard mitigation plan can assist the community in understanding what puts the community at risk. When a community can identify and understand the relationship between the natural hazards it faces, its vulnerable systems, and its existing capabilities, it becomes better equipped to identify and implement actions aimed at reducing the community's overall risk of disasters.

Figure 1: Understanding Hazard Vulnerability and Risk



This plan focuses on the primary natural hazards that could affect Cottage Grove and the Southern Willamette Valley, which include earthquakes, floods, landslides, severe weather, volcanoes, drought, and wildland-urban interface fires. The dramatic increase in the costs associated with natural disasters over past decades has fostered interest in identifying and implementing effective means of reducing vulnerability. This Natural Hazard Mitigation Plan Update is intended to assist Cottage Grove in reducing its risks from natural hazards by identifying resources, information, and strategies for risk reduction.

The plan is strategic and non-regulatory in nature, meaning that it does not set forth any new policy. It does, however, provide: (1) a foundation for coordination and collaboration among agencies and the public in the city; (2) identification and prioritization of future mitigation activities; and (3) aid in meeting federal planning requirements and qualifying for assistance programs. The mitigation plan works in conjunction with other municipal plans and programs including the Comprehensive Land Use Plan, Emergency Operations Plan, and Capital Improvement Plan as well as the State of Oregon Natural Hazards Mitigation Plan and Lane County Natural Hazard Mitigation Plan.

Authorities:

Federal Authorities

The Cottage Grove Natural Hazard Mitigation Plan was developed in accordance with the Robert T. Stafford Disaster Relief and Emergency Assistance Act (Stafford Act) which is the primary authority for providing federal disaster recovery and hazard mitigation financial assistance to states and local governments. The Stafford Act was amended in 1996, 2000 (Disaster Mitigation Act), 2007, and 2013. The basic provisions of these acts are implemented as federal rules in CFR Title 44. The program requirements related to hazard mitigation are included in 44 CFR Parts 9, 10, 13, 14, 78, 201 and 206.

Federal administrative authority for hazard mitigation planning in the northwestern United States resides with FEMA's Region X (10) office in Bothell, Washington. This plan was reviewed by FEMA Region X, and found to meet or exceed all requirements outlined in the FEMA publication *Local Mitigation Plan Review Guide* October 2011.

State Authorities

This document was developed in accordance with ORS Chapter 401 — Emergency Management and Services and subordinate administrative rules. State administrative authority for hazard mitigation planning resides with the Oregon Office of Emergency Management, Mitigation, and Recovery Services based in Salem.

Local Authorities

The City of Cottage Grove Community Development Department is the primary overseer of plan development, implementation, and maintenance. The Community Development Department is responsible for monitoring implementation over time and tracking the status of identified hazard mitigation actions.

Policy Framework for Natural Hazard Mitigation in Oregon

Planning for natural hazards is an integral element of Oregon's statewide land use planning program, which began in 1973. All Oregon cities and counties have comprehensive plans and implementing ordinances that are required to comply with the statewide planning goals. The challenge faced by state and local governments is to keep this network of local plans coordinated in response to the changing conditions and needs of Oregon communities.

Statewide land use planning Goal 7: Areas Subject to Natural Hazards calls for local plans to include inventories, policies and ordinances to guide development in hazard areas. Goal 7, along with other land use planning goals, has helped to reduce losses from natural hazards. Through risk identification and the recommendation of risk-reduction actions, this plan aligns with the goals of the City of Cottage Grove Comprehensive Plan, and helps Cottage Grove meet the requirements of statewide planning Goal 7.

The primary responsibility for the development and implementation of risk reduction strategies and policies lies with local jurisdictions. However, resources exist at the state and federal levels. Some of the key agencies in this area include Office of Office of Emergency Management (OEM), Oregon Building Codes Division (BCD), Oregon Department of Forestry (ODF), Oregon Department of Geology and Mineral Industries (DOGAMI), Oregon Department of Transportation (ODOT), and the Department of Land Conservation and Development (DLCD).

The Disaster Mitigation Act of 2000 (DMA 2000) is a key piece of federal legislation addressing mitigation planning. DMA 2000 amended the Robert T. Stafford Disaster Relief and Emergency Assistance Act by repealing the previous mitigation planning provisions and replacing them with a new set of requirements that emphasize the need for State, local, and Indian Tribal entities to closely coordinate mitigation planning and implementation efforts. It reinforces the importance of mitigation planning and emphasizes planning for disasters before they occur. As such, this Act established the Pre-Disaster Mitigation (PDM) grant program and new requirements for the national post-disaster Hazard Mitigation Grant Program (HMGP). Section 322 of the Act specifically addresses mitigation planning at the state and local levels. State and local communities must have approved mitigation plans in place in order to qualify to receive post-disaster HMGP funds and Pre-Disaster Mitigation (PDM) grants for projects. Mitigation plans must demonstrate that their proposed mitigation measures are based on a sound planning process that accounts for the risk to the individual and their capabilities.

Local Adoption

> ***44 CFR requirement 201.6(c)(5):***
> *The local hazard mitigation plan shall include documentation that the plan has been formally adopted by the governing body of the jurisdiction requesting approval of the plan. For multi-jurisdictional plans, each jurisdiction requesting approval of the plan must document that it has been formally adopted.*

Upon provisional approval of this Plan by the State of Oregon Office of Emergency Management (OEM) and the Federal Emergency Management Agency, the Cottage Grove City Council will formally adopt the document in public session. Copies of local adoption instruments are included in this document as an appendix.

Planning Process

> ***44 CFR Requirement §201.6(b):*** *In order to develop a more comprehensive approach to reducing the effects of natural disasters, the planning process **shall** include:*
> *(1) An opportunity for the public to comment on the plan during the drafting stage and prior to plan approval;*
> *(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;*
> *(3) Review and incorporation, if appropriate, of existing plans, studies, reports, and technical information.*
> ***Requirement §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.*

Update of the Natural Hazard Mitigation Plan for the City of Cottage Grove marks the completion of the third full planning cycle undertaken by the city. During the first planning cycle 2005-2010, numerous mitigation projects were identified, many of which were either implemented, or identified for future action. The second adopted plan, in 2012, showed continued progress on identified goals. Several activities were accomplished during the previous planning cycles, which this update takes into account, and builds upon for future updates.

The process to update the Plan followed a four-step outline prescribed in FEMA publication, *Local Multi-Hazard Mitigation Planning Guidance*:

1) Organize resources
2) Assess risks
3) Develop the mitigation plan
4) Implement the plan and monitor progress

The first step (organize resources) was addressed by assembling the Natural Hazard Mitigation Advisory Committee as coordinated by the Cottage Grove Community Development Department. In keeping with the goal of including multiple stakeholders - neighboring communities, agencies, businesses, academia, non-profits, and other interested parties - were invited to review the plan document and

participate in the planning process. The 2016 Advisory Committee included the Community Development Director, Finance Director, City Planner, Urban Forestry Committee Chair, City Engineer, Planning Commission Chair, Chief of Police, South Lane County Fire and Rescue Fire Chief, and the Director of the Coast Fork Willamette Watershed Council.

The second step (assess risks), was conducted via review and consideration of the original version of the Risk Assessments done for the 2005 NHMP by the City Community Development Department, and again for the 2012 NHMP Update. Existing technical reports provided by Lane County Emergency Management, studies and planning documents and input from various data sources brought forth by members of City Staff, and members of the Advisory Committee were all utilized in the 2015-16 update. This included a review of Lane County's update to its Hazard Mitigation Action Plan (HMAP) (equivalent to a Natural Hazard Mitigation Plan or NHMP), and the City of Eugene's Natural Hazard Mitigation Plan Update. A detailed listing of data sources for current risk assessments is found in Section 2, Table 5, "City of Cottage Grove Hazard and Risk Assessment".

The third step (develop the mitigation plan) includes input from the HMAC and data sources referred to in Step 2. Mitigation project development and prioritization for the Plan emphasized a review of costs vs. benefits and the social, technical, administrative, political, legal, economic, and environmental considerations of mitigation related projects. Plan update involved preparing a public review draft and a public comment period to solicit input from the public and interested parties. Open houses were held at City Hall and the Library; the plan was made available on the city's website and comments solicited via social media and print media; and presentations were made at various community groups and local events including an Emergency Preparedness Fair. Comments and recommendations from these sources were incorporated into the final version of the Natural Hazard Mitigation Plan submitted to the State and FEMA and ultimately adopted by the City.

The fourth step (plan implementation and monitoring) will occur on an ongoing and annual basis prior to and following State and FEMA approval. Adoption of the approved plan is the first step toward implementing the plan. Feasibility study and scoping of mitigation projects are secondary steps, followed by grant writing coordinated through OEM to secure funding and ultimately the implement the projects. Other mitigation projects that do not require outside funding will be enacted on an ongoing basis. Monitoring will also occur on an ongoing basis as action items are implemented, following major disaster events, and during annual meetings of the Hazard Mitigation Advisory Committee.

Adjustments to implementation and review processes are made over time. Reviews are conducted on a project-by-project basis which proved to generate more enthusiasm, improved results, and ultimately engaged more people in the process. Additionally, it was recognized that unforeseen incidents and situations will inevitably emerge; therefore the NHMP is purposely designed to be flexible enough to address new projects and evolving priorities relevant to hazard mitigation.

Section 2: Community Profile

Overview

History

Cottage Grove, known as the *Covered Bridge Capital of Oregon*, is located approximately 20 miles south of Eugene. The city is bisected by Interstate 5 (I-5), with its downtown situated west of the interstate. Cottage Grove is a friendly, recreation-and-family-oriented town. The city's tree-covered hillsides, river greenways, water courses, natural vegetation, and colorful heritage add variety and give the urban area its distinctive form and livability.

In 1853, early Cottage Grove settlers built the first sawmill in the area that is now Dorena Lake. Four years later, Harvey Hazelton built the region's first commercial mill on Silk Creek. The post office, originally located near Creswell, kept moving south until it was established in what became known as Cottage Grove. The Cottage Grove Post Office was so named because it originally operated near Creswell out of a cottage in a grove of trees. The City of Cottage Grove, named after the post office, officially incorporated in 1887.

Early settlers farmed in and around the Cottage Grove area, raising sheep and cattle and growing fruits, vegetables, and grasses. The population of the area began to increase significantly after 1858 when gold was discovered 30 miles east of the present city. While the Civil War briefly put extraction activity on hold, this discovery lured thousands of prospectors to the area. In 1871, the Oregon and California Railroad reached Cottage Grove and expanded the city's access to markets. Originally, the town was on the west side of the river. When the railroad came, it spurred growth down Main Street toward the tracks and the stretch between the river and the railroad tracks became the downtown core. By the end of the nineteenth century, Cottage Grove had begun developing its timber-based economy and its population grew quickly.

Historically, the timber industry supported families in and around the city. Through the years, Cottage Grove diversified and expanded its lumber and wood product industries. Since the mid 1980's, this sector has been in decline. Agricultural activities currently play a minor role in the economy. Recreation and tourism have recently become more of a focus, partly due to the presence of six historic covered bridges in the area. Flood control reservoirs build in the late 1940's provide the superb recreational opportunities now available at Dorena and Cottage Grove Lakes. Cottage Grove and Dorena dams are part of a system that controls 28 % of the water flow in the larger Willamette Watershed.

Geography and Climate

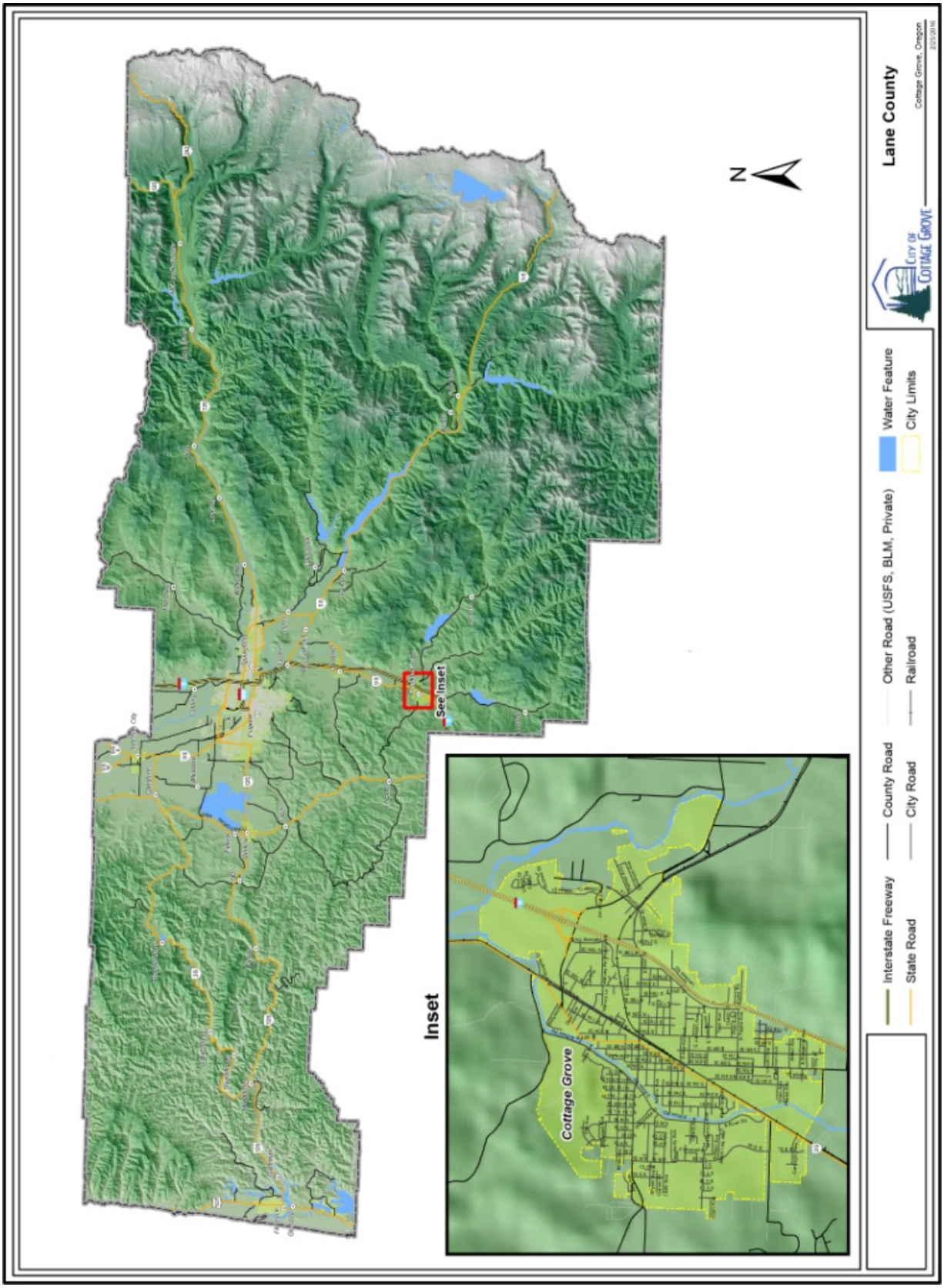
Cottage Grove is located in the south end of the Willamette Valley, at the confluence of the Coast Fork of the Willamette River and the Row River, between the Coast Range and the Cascade Mountains. In addition to the Coast Fork and Row Rivers, there are numerous creeks and streams in the area, including Bennett, Silk and Mosby Creek, and two large flood control reservoirs operated by the U.S. Army Corps of Engineers. The City lies wholly within the Coast Fork Willamette Watershed Basin.

The defining feature of the Willamette Valley is the remarkably broad and level floodplain of the Willamette River. The Willamette Valley begins just south of the City of Cottage Grove and runs northward approximately 110 miles to the urbanized areas and foothills south of Portland. Along its course the valley averages 15-30 miles in width. The city of Cottage Grove is located near the southern border of Lane County, which is located in the southern portion of the Willamette Valley with cool, wet winters and warm, dry summers. Average annual precipitation is less than 40 inches.

Extreme temperatures in Cottage Grove are rare. Days with a maximum temperature above 90°F degrees occur only 5-15 times per year on average, and days with below zero temperatures occur only about once every 25 years. Although snow falls every few years on the South Willamette Valley floor, typical depth is less than 6 inches, though it is more frequent and deeper at higher elevations in the foothills. Ice storms occasionally occur and high winds typically occur several times per year in association with major weather systems.

The climate of Cottage Grove is moderate. The average high temperature in January is 46 degrees while the average low is 34 degrees. In August the average high is about 82 degrees with an average low of 51 degrees. Each year the area receives about 38 inches of precipitation.

Figure 2: Lane County & City of Cottage Grove



Population and Demographics

Cottage Grove is home to approximately 9,840 persons as of 2015. The annual average growth rate for the period 2015–2035, developed by the Portland State University Population Research Center, is estimated to be 1.3%.

The most recent demographic United States Census data for the City of Cottage Grove is the 5-year American Community Survey 2009–2013 Census. This census data describes the population of Cottage Grove as being 47.7% male and 52.3% female. The racial makeup of Cottage Grove is predominately White, at 90% of the population. African American, Native American, Asian, Hawaiian or Pacific Islander, two or more races, and other race alone represent approximately 10% of the population.

Disaster impacts in terms of loss and the ability to recover quickly to pre-disaster levels can vary between population groups. Historically 80% of disaster burdens fall onto the shoulders of the public, and disproportionately affects certain populations more than others. The elderly, the very young, the disabled, minorities, non-English-speakers, and low income persons are often impacted to a greater degree than others. These vulnerable populations will need more assistance during and after a disaster. In Cottage Grove as of 2013:

- 23% are children under the age of 14.
- 18% are elders over the age of 65.
- 17% of families and 12% of the elderly population have incomes at or below the poverty level.
- 10% of the adult population, 18–64 years old, and 8% of elders over 65 are classified as disabled.

These groups are likely to have greater needs during and after a disaster, a factor which must be taken into account when planning for disaster response and recovery operations.

Per the 2010 Census, 16.5% of Cottage Grove's population is over 64 years old, as compared to 14.5% of Lane County's; 24.4% of Cottage Grove's population is under 18, as compared to 19.9% in the County as a whole. Hence the city has both larger numbers of children, and larger numbers of retirees than the county as a whole. The region also has a higher share of retirement workers (17.9%) than the state average of 16.6%.

Business Oregon lists Cottage Grove as a Distressed Community, with 21.3% of population living under the Poverty Line based on data from the U.S. Census Bureau, 2009-2013 American Community Survey Five-Year Estimates.

Economy

Due to the City's location at the outer end of a comfortable commute to the Eugene-Springfield metro area, Cottage Grove has the feeling of a relatively self-contained, independent community. Despite its size and relative independence, the City has

struggled in recent years to sustain its economy, and Cottage Grove residents depend heavily on the metro area for employment.

In 1998, Cottage Grove's 313 employers provided a total of 3,200 jobs. In 2006, the City had 4,423 jobs. In the 2009 Economic Opportunities Analysis, ECONorthwest projected that employment in Cottage Grove will increase at an average of 1.4% per year—to 6.075 employees in 2029. This means 1,652 new jobs—a 37% increase during this 20-year planning period. Cottage Grove currently has a jobs-to-population ratio of 1:2.1, or one job for every 2.1 people. This is low compared with Springfield (1:1.7) and the state as a whole (1:1.6).

Major economic generators within the City include Weyerhaeuser, Kimwood, Cottage Grove Community Medical Center, South Lane School District, and the City of Cottage Grove.

Land Use

Residential uses occupy the largest share of development land within the urban growth boundary (UGB), comprising 26 % of the total land area. Residential development, mostly single family and duplex development, has been occurring slowly on infill lots throughout the community and in several large subdivisions under development (River Walk and Sunrise Ridge). Industrial development has continued in the Cottage Grove Industrial Park. In the last five years, the City has seen its park land inventory expand to include the 14-acre Bohemia Park, the .62 acre Chambers Bridge Park, the All-America Square, and expanded acreage at Coiner Park and the Row River Trailhead Park. In 2011, the City's Urban Growth Boundary was expanded to include 240 acres of industrial and commercial property along Hwy 99 S and S. 6th Street. With this expansion, Weyerhaeuser was included within the City's UGB.

Housing

According to the Population Research Center (Portland State University) Coordinated Population Forecast (2015-2065) Housing Data, there are 4,353 housing units in Cottage Grove, less than 7% of which are unoccupied. The minimum lot size is 6,000 square feet in Low Density Residential districts, and 5,500 in Medium Density Residential districts. New housing is built on lots ranging from 5,500 to 9,000 square feet.

Transportation

In 2010, approximately 50 % of workers living in Cottage Grove commuted to Eugene-Springfield, along Highway 99 and I-5.

Over the years, the city's streets have developed primarily in a grid pattern. More recently, the City has begun to develop a beltway arterial along the outer edges of the city to facilitate ease of movement.

The Oregon Department of Transportation (ODOT) maintains bridges on I-5 and Highway 99, and the Cottage Grove Connector, all of which are within City limits. There are 23 bridges and overpasses in the City, three of which are maintained by

Lane County; the remaining 20 are maintained by the Oregon Department of Transportation (ODOT).

Bicycle and pedestrian travel in Cottage Grove has been emphasized in local transportation planning for many years. A bike path system provides links to two natural resource parks within the city and to regional multi-use trails. The 16.3-mile Row River Trail "*Rails-to-Trails"* project is a popular recreational amenity for residents and visitors alike. This trail, a former short line railroad right-of-way, runs from downtown Cottage Grove, along Dorena Lake, to Culp Creek. These improvements have helped make the City more welcoming to pedestrians and bicyclists.

Public transit bus service is provided to commuters by Lane Transit District, and South Lane Wheels provides local fixed route and on-demand service within Cottage Grove. A taxi service also provides local service in and around the city. The Central Oregon and Pacific Railroad provides daily freight service.

Cottage Grove State Airport is located at 78803 Airport Road, east of downtown along the Row River with a 3,188-foot runway. The airport does not have a control tower; however, it is attended Monday through Saturday 10am to 7pm. The State Aviation Division owns the airport.

The Central Oregon & Pacific Railroad has three to five scheduled freight trains running through the City during weekdays travelling on the Union Pacific Railroad rail line. The rail line parallels Highway 99, N. Douglas Ave., and N. Lane St. within the City limits.

Public Facilities and Services

Cottage Grove owns and operates its own water supply system. Since the late 1970's, the City has planned major improvements to its water production and storage facilities to ensure a continued water supply for the future. Construction was completed on a new water intake and treatment facility at the Row River Nature Park in 2007, and continued improvements include covering the reservoir to improve water quality and developing new drying ponds at the water treatment plant.

The City owns and operates its own wastewater treatment system, which was upgraded in 2005 to accommodate growth and increase effluence quality. Effluent discharge is treated through irrigation of the Middlefield Golf Course and other properties owned by the city. This system has numerous limitations and stormwater is contributing to inflow and infiltration problems.

Electricity is provided by Pacific Power and Emerald People's Utility District. Natural Gas is provided by Northwest Natural Gas. Qwest is the local telephone service provider. Cottage Grove is a member of the Fibersouth Consortium, a cooperative effort among local governments to provide modern fiber optic services to their communities. There are two fiber optic lines installed along the railroad tracks running through town: the main north-south West Coast fiber optic backbone and a new Fibersouth Consortium line. Both of these lines run just outside the Cottage Grove Industrial Park. Over 80% of the city is covered by WiFi, which is provided as

a public utility by the City of Cottage Grove. Cellular phone service is available from several national companies that provide regional coverage.

The South Lane School District provides education services to Cottage Grove students. The district operates three K -5, two pre K - 8, one middle school, one 9-12 alternative high school, one 9-12 comprehensive high school, and two Charter Schools. Elementary Schools range in population from 100 to 500 students. Lincoln Middle School serves grades 6-8 and has approximately population of 550. Cottage Grove High School (CGHS) serves grades 9-12 with a population of approximately 850 students.

Cottage Grove maintains its own police force, which operates out of City Hall. The South Lane County Fire & Rescue provides fire protection, emergency medical response, and other specific rescue services for the City of Cottage Grove and surrounding rural areas. Fire Station #1 is located within city limits at Hwy 99 S and Harrison Avenue.

Cottage Grove Community Medical Center is located at 1515 Village Drive, and maintains landing and support facilities for the LifeFlight Air-Ambulance service.

Natural Resources, Open Space, and the Environment

Cottage Grove includes part of the floodplain of the Coast Fork of the Willamette River that flows north to the Willamette River, and is situated just upstream of the confluence of the Coast Fork and Row Rivers. The surrounding hillsides and waterways contribute to the attractiveness of the area. Cottage Grove area residents and visitors can choose from a variety of water-oriented and urban parks, ranging from pocket parks to regional parks and the Willamette River Greenway. The hillside surrounding Cottage Grove provides an aesthetic environment for the community. The hillsides also present a specific set of development challenges and limitations. The complex system of slopes, soils, vegetation, and hydrology require sensitive, responsible development. In recognition of the importance of the hillsides to the city, Cottage Grove developed a major report on hillside development and included it as a specific focus of the C*ottage Grove Comprehensive Plan*.

Waterways are also significant features in Cottage Grove. Land in the city drains into the Coast Fork of the Willamette River, Row River, and Silk Creek. The section of the Coast Fork running through town is part of the Willamette River Greenway.

The most important wildlife habitat areas in and around Cottage Grove centers on the Coast Fork of the Willamette River, the Row River, and the backwater slough areas at the confluence of these two rivers. There is significant fish spawning area in the Coast Fork, about one mile upstream of the UGB. The fishing of native cutthroat trout, steelhead, Chinook, and Coho is a primary recreation activity.

Future Expectations

Land Use

The City of Cottage Grove Community Development Department enforces building and development codes to promote public safety and preserve the quality of life in Cottage Grove. The *Cottage Grove Comprehensive Plan's* development-related goals for future land use are:

- "To preserve our prime agricultural and forest lands considering their potential for both short and long term productivity.
- To encourage rural non-farm forest uses to locate on marginal lands where environmental and development constraints are limited.
- To protect our natural and cultural features from inappropriate and hazardous development
- To assure wise and efficient use of our urbanized lands."

The UGB contains a total of 3,294 acres. The comprehensive plan designates 63 % of Cottage Grove's UGB for residential use, and about 19 % for commercial uses.

Economic Goals

Cottage Grove faces some challenges over the next 50 years to stimulate its economy. The city's pleasant, attractive neighborhoods and well-established infrastructure give it a good foundation upon which to build. The Downtown Historic District has long been recognized as an economic center in the city, and is a key resource in the continued economic success of the community.

Concerted efforts are underway to diversify and strengthen the economy in order to provide more opportunities for employment and to continue improving city services. The City recognized a need for additional industrial land in order to diversify its industrial and manufacturing sector, a key to rebuilding and sustaining the local economy, and expanded its UGB in 2011 to incorporate 240 additional acres. Planned improvements in the water, stormwater, and wastewater systems are integral to continued development and renewal of Cottage Grove's commercial and industrial sectors.

Cottage Grove has the potential to draw visitors from I-5, directing them to the downtown core, to the lakes, and around the community. The Economic Development Committee, Economic/Business Improvement District, the Cottage Grove Area Chamber of Commerce, the City of Cottage Grove, and other groups of citizens have worked to make Cottage Grove more attractive to tourists, to draw more dollars to the community while keeping intact the City's small town charm.

As the economy rejuvenates, Cottage Grove's vision is to emerge as a vibrant, independent, leading community in the Southern Willamette Valley region.

Section 3: Mission, Goals, and Action Items

What are the Plan's Missions and Goals

Plan Mission

The mission of the City of Cottage Grove Natural Hazards Mitigation Plan is to promote sound public policy designed to protect citizens, critical facilities, infrastructure, and property from natural hazards. This can be achieved by increasing public awareness, documenting resources for risk reduction and loss-prevention, and identifying activities to guide the City towards a safer, more sustainable community.

Plan Goals

The plan goals provide guidance in developing specific action items from the general mission statement. The goals describe the overall direction the City of Cottage Grove desires to work towards in mitigating the effects of natural hazards. Our goals and priorities remain largely unchanged from the 2012 NHMP, as Cottage Grove has grown only slightly in the interim period and has not seen any political, economic, social or environmental changes since the last plan was written. Raising understanding of hazards exacerbated by climate change, such as winter storms and drought, has increased awareness of these issues, which is reflected in the 2016 plan's hazard section.

Protect Life and Property

- Implement activities that assist in protecting life and property from losses due to natural hazards.
- Reduce losses and repetitive damage from chronic hazard events.
- Improve hazard assessment information to make recommendations for discouraging new development in areas vulnerable to natural hazards.
- Encourage preventative measures in existing vulnerable areas.
- Ensure ability to recover from disaster.

Public Awareness

- Develop and implement educational outreach programs to increase public awareness of the hazards associated with natural disasters.
- Provide information on tools, partnerships, and funding resources to assist in implementing hazard mitigation actions.

Emergency Services

- Establish policy to ensure mitigation for critical facilities, services, and infrastructure.
- Coordinate and integrate natural hazard mitigation activities with emergency operations plans and procedures.

Partnerships and Implementation

- Strengthen communication and coordinate participation among and within public agencies, citizens, non-profit organizations, businesses, and industry.
- Encourage leadership within the public and private sectors to prioritize and implement local, county, and regional hazard mitigation activities.

State/National Guidelines

- Meet the Federal Emergency Management Associations (FEMA) mitigation planning requirements so Cottage Grove remains eligible for pre- and post-disaster mitigation funding from FEMA.
- Continue to comply with National Flood Insurance Program requirements.
- Meet Oregon's Goal 7 natural hazard planning guidelines.

These goals were originally developed as part of the 2005 Cottage Grove Natural Hazards Mitigation Plan and are still relevant for the 2015-16 update. Advisory committee members agreed at the December 18, 2015 meeting that these goals still adequately guide the direction of the City of Cottage Grove as they relate to natural hazards mitigation.

Mitigation Action Items

Short and long-term action items identified through the planning process are an important part of the mitigation plan. Action items are detailed recommendations for activities that local developments, citizens and others could engage in to reduce risk. They address both All-Hazard and hazard-specific issues.

The Cottage Grove Community Development Department staff and Natural Hazards Advisory Committee [aka Plan Team] developed the action items presented in this plan. These action items are a combination of revised action items from the 2005 and 2010 mitigation plans and new action items that address hazards and opportunities identified during the 2015-16 update process, including increased awareness of increased risk from climate change-related hazards, such as drought, and opportunities presented by recent planning projects focused on stormwater management, floodplain management and drinking water protection The mitigation strategies were not impacted by changes in land use, however, as Cottage Grove has seen little growth or change in land use since the last Natural Hazard Mitigation Plan was adopted.

During the update process, city staff identified which actions from previous Natural Hazard Mitigationplans had been completed or not, and whether or not these actions should be completed. Previous action items can be found in the appendix sections.

Current 2016 action items are located in Chapter 3: Natural Hazards. Within each individual Hazard description is a narrative describing the hazard and its potential impacts and consequences for the City. Located in individual tables, the Action Items are specific, and detail the *Estimated Cost*, expected *Timeline*, *Responsible Agency(s)*, and *Priority* level. These action items can assist the community in pre-packaging potential projects for grant funding.

Action items include both short-term (1-3 years, or 3-5 years) and on-going activities. Each action item includes an estimate of timeline for implementation. Short-term action items are activities that may be implementing with existing resources and authorities within one to five years. On-going action items may require new or additional resources and/or authorities, may be part of the city's annual work program, or may take over five years to implement.

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Section 4: Implementation, Maintenance and Public Participation

The plan maintenance section of this document details the formal process that ensures that the City of Cottage Grove Natural Hazards Mitigation Plan remains an active and relevant document. The plan maintenance process includes a schedule for monitoring and evaluating the plan annually and producing an updated plan every five years. This section also describes how the City will integrate public participation throughout the plan maintenance and implementation process. Finally, this section includes an explanation of how the City intends to incorporate the mitigation strategies outlined in this Plan into existing planning mechanisms and programs such as the City of Cottage Grove comprehensive land use planning process, capital improvement planning process, and building codes enforcement and implementation.

The plan's format allows the City to review and update sections when new data becomes available. New data can be easily incorporated, resulting in a natural hazards mitigation plan that remains current and relevant to Cottage Grove.

Plan Implementation

The Community Development Director or their designee will be responsible for submitting the final draft of this plan to the State Hazard Mitigation Officer at Oregon Office of Emergency Management. OEM will then submit the plan to the Federal Emergency Management Agency (FEMA–Region X) for review. This review will address the federal criteria outlined in 44 CFR Part 201. Upon approval by FEMA, the plan is adopted via ordinance by the Cottage Grove City Council. The City will then gain eligibility for the Pre-Disaster Mitigation Grant Program, Hazard Mitigation Grant Program funds, and Flood Mitigation Assistance program funds.

The Natural Hazards Mitigation Advisory Committee will remain intact after the plan is adopted and focus its efforts on plan implementation and maintenance. The Advisory Committee serves as the coordinating body for implementation and plan updates. The City of Cottage Grove Community Development Department will serve as the convener of the Advisory Committee.

The effectiveness of the City's non-regulatory Natural Hazard Mitigation Plan will be contingent on the implementation of the plan and incorporation of the outlined action items into existing City plans, policies, and programs. The Natural Hazard Mitigation Plan includes a range of action items that, if implemented, would reduce loss from hazard events in the City of Cottage Grove. Together, the action items in the City of Cottage Grove Natural Hazard Mitigation Plan provide the framework for activities that city departments can choose to implement over the next five years. The Advisory Committee prioritizes the plan's goals and action items, which will be implemented, as resources permit, through existing plans, policies, and programs.

Implementation through Existing Programs

The Natural Hazard Mitigation Plan includes a range of action items that, when implemented, will reduce loss from hazard events in Cottage Grove. Within the framework of the plan, FEMA requires the identification of existing programs that might be used to implement these action items. The City of Cottage Grove addresses statewide planning goals and legislative requirements through its Comprehensive Plan, Development Code, Emergency Operations Plan, utility Master Plans, and Building Codes. The Natural Hazards Mitigation Plan provides recommendations that are tied to the goals of existing plans and programs. The City of Cottage Grove will be able to implement action items through existing programs and procedures, as well as apply for additional assistance for projects requiring funding currently outside existing programs.

Multi-Jurisdictional Planning Efforts

The City of Cottage Grove is committed to regional hazard planning as an integral part of the Natural Hazards Mitigation planning process. The City has a representative on the Lane County Countywide Preparedness Group and takes part in regional meetings and exercises. This involvement ensures that the City is represented in broader scale natural hazard planning activities. The City of Cottage Grove partnered with the Lane County Geo-Spatial Information Services (GIS) to create natural hazard maps for the 2015 City of Cottage Grove Natural Hazards Mitigation Plan. These maps were updated and/or verified as part of the 2015-16 update process for the City's Emergency Operation Plan (EOP). The City will continue to partner with other agencies on the local, county, state, and federal level in order to effectively mitigate loss to life and property from natural hazards.

Plan Maintenance

Plan maintenance is a critical component of the Natural Hazard Mitigation Plan. Proper maintenance of the plan will ensure that this plan will benefit Cottage Grove's efforts to reduce the risks posed by natural hazards. This section was developed by the University of Oregon's Oregon Natural Hazards Workgroup as an aspect of the 2012 NHMP, and presents a process to ensure that a regular review and update of the plan occurs. The Advisory Committee and local staff will be responsible for implementing this process in addition to maintaining and updating the plan through a series of meetings outlined in the maintenance schedule below.

Table 1: Plan Maintenance Meeting Schedule

Semi-Annual Meeting	Annual Meeting	Five-Year Review
Review Current Actions	Update Risk Assessment Data and Findings	Review plan update questions
Identify New Issues and Needs	Discussion of Methods of Continued Public Involvement	Update plan sections as necessary
Prioritize Potential Projects	Document Successes and Lessons Learned	Review entire plan and update as needed

Project Prioritization Process

The requirements of Disaster Mitigation Act of 2000 through the Pre-Disaster Mitigation Program state that the plan must identify a process for prioritizing potential actions. Potential mitigation activities will often come from a variety of sources; therefore the project prioritization process needs to be flexible. Examples of the methods in which projects may be identified include: Committee members, local government staff, other planning documents, or the Risk Assessment. Depending on the potential project's intent and implementation methods, several funding sources may be appropriate. Examples of mitigation funding sources include, but are not limited to: FEMA's Pre-Disaster Mitigation competitive grant program (PDM), Flood Mitigation Assistance (FMA) program, National Fire Plan (NFP), Title II funds, Title III funds, Community Development Block Grants (CDBG), local general funds, and private foundations, among others. Some of these examples are used in the figure below to illustrate the project prioritization process. The prioritization process utilizes a four step process to prioritize activities to help ensure that mitigation dollars are used in a cost–effective manner.

Step 1: Examine Funding Requirements

The committee will examine the selected funding stream's requirements to ensure that the mitigation activity would be eligible through the funding source. The committee may consult with the funding entity, Oregon Office of Emergency Management, or other appropriate state or regional organization about the project's eligibility.

Step 2: Complete Risk Assessment Evaluation

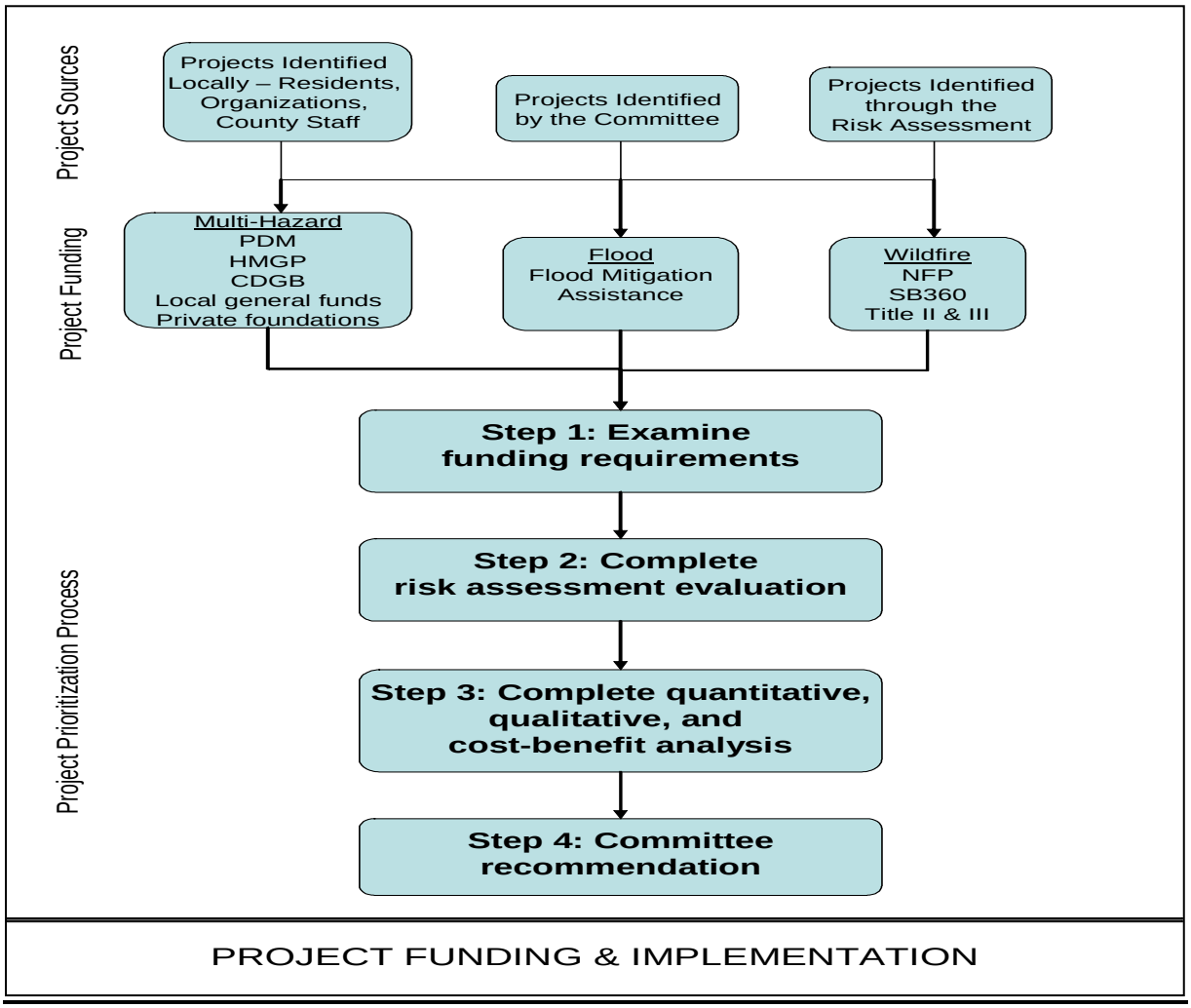
The second step in prioritizing the plan's action items is to examine which hazards they are associated with and where these hazards rank in terms of community risk. The committee will determine whether or not the plan's Risk Assessment supports the implementation of the mitigation activity. This determination will be based on the location of the potential activity and the proximity to known hazard areas, historic hazard occurrence, and the probability of future occurrence documented in the plan.

To rank the hazards, the community's natural hazard risk assessment was utilized. This risk assessment identified various hazards that may threaten community facilities in a range from:

- None/Low
- Limited
- Moderate
- High
- Severe

Table 5, "City of Cottage Grove Hazard and Risk Assessment", presents the relative probability of occurrence, and the city's vulnerability to a given event.

Figure 3 Project Prioritization Process Overview



The City of Cottage Grove is subject to the following natural hazards in order of likelihood of occurrence:

1) Flood
2) Winter/Severe Storm
3) Earthquake
4) Wildfire
5) Landside
6) Volcano
7) Drought

Each of the action items in the plan addresses risk from one or more of these hazards.

Step 3: Complete Quantitative, Qualitative Assessment, and Economic Analysis

Depending on the type of project and the funding source, either a quantitative or qualitative assessment of cost effectiveness will be completed to assist in prioritizing potential actions. Conducting benefit/cost analysis for a mitigation activity can assist communities in determining whether a project is worth undertaking now, in order to avoid disaster-related damages later. Cost-effectiveness analysis evaluates how best to spend a given amount of money to achieve a specific goal. Determining the economic feasibility of mitigating natural hazards provides decision-makers with an understanding of the potential benefits and costs of an activity, as well as a basis upon which to compare alternative projects.

If the activity is seeking federal funding for a structural project the committee will use a FEMA-approved cost-benefit analysis tool to evaluate the appropriateness of the activity. A project must have a benefit cost ratio of greater than 1 in order to be eligible for FEMA funding.

For FEMA-funded non-structural projects or projects funded through entities other than FEMA, a qualitative assessment will be completed to determine the project's cost effectiveness. The committee will use a multi-variable assessment technique called STAPLE/E to prioritizing these actions. STAPLE/E stands for Social, Technical, Administrative, Political, Legal, Economic, and Environmental. Assessing projects based upon these seven variables can help define a project's qualitative cost effectiveness. The STAPLE/E technique has been tailored for natural hazard action item prioritization by the University of Oregon's Oregon Natural Hazards Workgroup.

Step 4: Committee Recommendation

Based on the steps above, the committee will recommend whether or not the mitigation activity should be moved forward. If the committee decides to move forward with the action, the coordinating organization designated for the activity will be responsible for taking further action and documenting success upon project completion. The Hazard Mitigation Advisory Committee will convene a meeting to review the issues surrounding grant applications and shared knowledge and/or resources. This process will afford greater coordination and less competition for limited funds.

The Hazard Mitigation Advisory Committee and the community's leadership have the option to implement any of the action items at any time (regardless of the prioritized order). This allows the committee to consider mitigation strategies as new opportunities arise, such as funding for action items that may not be of highest priority. This methodology was used by the Hazard Mitigation Steering Committee to initially prioritize the plan's action items in addition to maintaining the action list during annual review and update.

Annual Meeting

The Committee will meet annually to review updates of the Risk Assessment data and findings, discuss methods of continued public involvement, and document successes and lessons learned based on actions that were accomplished during the past year. The convener will be responsible for documenting the outcomes of the annual meeting.

Five Year Review of Plan

This plan will be updated every five years in accordance with the update schedule outlined in the Disaster Mitigation Act of 2000. During this plan update, the following questions should be asked to determine what actions are necessary to update the plan. The convener will be responsible for convening the Committee to address the questions outlined below.

- Are the plan goals still applicable?
- Do the plan's priorities align with State priorities?
- Are there new partners that should be brought to the table?
- Are there new local, regional, state, or federal policies influencing natural hazards that should be addressed?
- Has the community successfully implemented any mitigation activities since the plan was last updated?
- Have new issues or problems related to hazards been identified in the community?
- Do existing actions need to be reprioritized for implementation?
- Are the actions still appropriate given current resources?
- Have there been any changes in development patterns that could influence the effects of hazards?
- Have there been any significant changes in the community's demographics that could influence the effects of hazards?
- Are there new studies or data available that would enhance the risk assessment?
- Has the community been affected by any disasters? Did the plan accurately address the impacts of this event?

The questions above will help the committee determine what components of the mitigation plan need updating. The Committee will be responsible for updating any deficiencies found in the plan based on the questions above.

Continued Public Involvement and Participation

44 CFR Requirement 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: (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. (3) Review and incorporation, if appropriate, of existing plans, studies, reports, and technical information.

The City of Cottage Grove is dedicated to involving the public directly in the continual reshaping and updating of the Natural Hazard Mitigation Plan. The public will have the opportunity to submit comments on the plan to the Community Development Department at any time. Copies of the plan will be kept in the Community Development Department, the Cottage Grove Public Library, and online at http://www.cottagegrove.org. The City recognizes that involvement by and with the public is an effective means of engaging the public's active involvement and participation in increasing the whole community's resilience to natural hazards and disasters in general, a city priority.

Public input was obtained through several concurrent means including:

- Contact with committee members and their organizations
- Notifications to stakeholders
- As part of Public Education and Outreach events in which committee members participated and Plan elements were discussed
- An internet web page located at www.CottageGrove.org

The final draft document was available on line for public comment for the month of September, 2016.

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Chapter 2: Hazard Assessment

Section 1: Hazard Assessment Overview

Definition of a Hazard Assessment

> ***44 CFR Requirement §201.6(c) (2) (i):***
> *[The risk assessment shall include a] description of the … 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.*

Conducting a hazard assessment can provide information on the location of hazards, the value of existing land and property in hazard locations, and an analysis of risk to life, property, and the environment that may result from natural hazard events. Hazard assessments are subject to the availability of hazard-specific data. The three levels of a hazard assessment are as follows:

1. Hazard Identification - Identifies the geographic extent and intensity of the hazard, and the probability of its occurrence. Maps are frequently used to display the hazard identification data. The City of Cottage Grove identified six major hazards that threaten the area. These hazards are floods, landslides, wildfires, earthquakes, winter storms, volcano, and drought.
2. Vulnerability Assessment - Inventorying assets combines hazard identification with an inventory of the existing (or planned) property and population exposed to a hazard. A complete listing of the community assets exposed to each hazard is located in Table 5, *"City of Cottage Grove Infrastructure & Facility Hazard Vulnerability"*. Additionally, a more detailed description of the vulnerability of these assets is located in the specific hazard sections.
3. Risk Analysis - Estimating potential losses involves estimating the damage, injuries, and financial losses likely to be sustained in a geographic area over a given period of time. This level of analysis involves using mathematical models. The two major components of risk analysis are the magnitude of the harm that may result and the likelihood of the harm occurring. Describing vulnerability in terms of dollar losses provides the community and the state with a common framework in which to measure the effects of hazards on assets. An Overall Hazard Analysis Scoring (Quantification) has been provided for identified hazards in Lane County in the multi-agency Lane County Natural Hazards Mitigation Plan, of which Cottage Grove's plan is an appendix. This scoring method is used to assist with prioritizing hazards and understanding risk. The

same methodology was used by the Advisory Committee to determine Cottage Grove's hazard and risk quantitatively (See Table 3 below.) These scores have been used to develop risk assessment scores for the various hazards facing Cottage Grove (Table 4) and assess the vulnerability of critical facilities during each type of event (Table 5).

Federal Requirements for a Hazard Assessment

Federal regulations for hazard mitigation plans outlined in 44 CFR Part 201.6 (c) (2) include a requirement for hazard assessment. This hazard assessment requirement is intended to provide information that will help communities to identify and prioritize mitigation activities that will reduce losses from the identified hazards. Table 3, below, shows the federal criteria for hazard assessment and how the City of Cottage Grove Natural Hazard Mitigation Plan meets those criteria.

Table 2: Federal Criteria for Hazard Assessment

Section 322 requirement	How is this addressed?
Identifying Hazards	The City of Cottage has mapped the hazard areas for wildfire, flood, landslide, and earthquake. (See individual hazard sections for more information.)
Profiling Hazard Events	The hazard sections of the Cottage Grove Natural Hazard Mitigation Plan provide documentation for all of the historic large-scale hazard events affecting the city.
Assessing Vulnerability: Identifying Assets	Table 5 "Infrastructure & Facility Hazard Vulnerability" documents key community assets and critical infrastructure that are vulnerable to natural hazards.
Assessing Vulnerability: Estimating Potential Losses	Using the best available data, an estimate of potential losses from natural hazards in located in the hazard specific sections.
Assessing Vulnerability: Analyzing Development Trends	The Community Profile section of this plan provides a description of the development trends in the City of Cottage Grove.

Hazard Quantification Categories

For the purpose of hazard quantification the following four categories were developed:

1) History (previous occurrences, primarily within last century)
2) Vulnerability (number, degree or extent of people or assets at risk per hazard)
3) Maximum threat (credible worst-case scenario),
4) Probability (calculated likelihood of future occurrence)

Weight Factors, Scoring Guidelines

Weighting factors were developed for each of the four hazard quantification categories. This is done to emphasize certain categories over others in terms of risk assessment. Scoring guidelines are also developed as a method of standardizing assessment and to minimize subjectivity.

History (weight factor for category = 2).

History is the record of previous occurrences. Events to include in assessing history of a hazard event for which the following types of activities were required:

- The EOC or alternate EOC was activated;
- Three or more EOP functions were implemented, e.g., alert & warning, evacuation, shelter, etc.
- An extraordinary multi-jurisdictional response was required; and/or
- A "Local Emergency" was declared.

LOW – score at 1 to 3 points based on… 0 - 1 event past 100 years

MEDIUM – score at 4 to 7 points based on… 2 - 3 events past100 years

HIGH – score at 8 to 10 points based on… 4 + events past100 years

Vulnerability (weight factor for category = 5)

Vulnerability is the %age of population and property likely to be affected under an “average” occurrence of the hazard.

LOW – score at 1 to 3 points based on… < 1% affected

MEDIUM – score at 4 to 7 points based on… 1 - 10% affected

HIGH – score at 8 to 10 points based on… > 10% affected

Maximum Threat (weight factor for category = 10)

Maximum threat is the highest %age of population and property that could be impacted under a worst-case scenario.

LOW – score at 1 to 3 points based on… < 5% affected

MEDIUM – score at 4 to 7 points based on… 5 - 25% affected

HIGH – score at 8 to 10 points based on… > 25% affected

Probability (weight factor for category = 7)

Probability is the likelihood of future occurrence within a specified period of time.

LOW – score at 1 to 3 points based on… one incident likely within 75 to 100 years

MEDIUM – score at 4 to 7 points based on… one incident likely within 35 to 75 years

HIGH – score at 8 to 10 points based on… one incident likely within 10 to 35 years

Scores for each category are multiplied by the associated weight factors for each category to create a 'sub-score'. Adding the sub-scores for history, vulnerability, maximum threat, and probability for each hazard produces a 'total score' for each hazard. It should be noted that a total score, in itself, is not as important as how it compares with the total scores for other hazards in Cottage Grove. By comparing scores, we can determine priorities: Which hazards should the jurisdiction be most concerned about? Which ones less so?

The following table summarizes the quantified Hazard Analysis Score for the City of Cottage Grove for the key hazards that have been identified by the Advisory Committee:

Table 3: Cottage Grove Hazard & Risk Assessment (Quantitative)

City of Cottage Grove	OEM Hazard Analysis Methodology												
HAZARD RISK ASSESSMENT MODEL Created June 2015	History			Vulnerability			Maximum Threat			Probability			
Threat Event / Hazard	Severity	Weight Factor	Subtotal	Severity	Weight Factor	Subtotal	Severity	Weight Factor	Subtotal	Severity	Weight Factor	Subtotal	Total Threat Score
Earthquake	3	2	6	8	5	40	10	10	100	3	7	21	167
Terrorism / Cyber Attack	1	2	2	2	5	10	3	10	30	2	7	14	56
Flood - Riverine	8	2	16	7	5	35	6	10	60	9	7	63	174
Flood - Dam Failure	1	2	2	1	5	5	10	10	100	1	7	7	114
Landslide/Debris Flow	2	2	4	2	5	10	4	10	40	3	7	21	75
Volcano	1	2	2	4	5	20	2	10	20	1	7	7	49
Wildfire (WUI)	3	2	6	4	5	20	3	10	30	5	7	35	91
Severe Weather	8	2	16	8	5	40	5	10	50	9	7	63	169
HAZMAT Incident	2	2	4	4	5	20	9	10	90	3	7	21	135

Hazard Assessment Mapping Methodology

The City of Cottage Grove has contracted with Lane County Information Services for map products that illustrate the hazards in and near Cottage Grove. These maps were developed using local knowledge as well as information developed by Lane County and other government agencies in order to produce the most accurate maps using best available data. Maps are located in the sections in which they are discussed, and in Appendix A.

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Section 2: Local Hazard Assessment

Relative Risk Assessment

Table 4: *"City of Cottage Grove Hazard and Risk Assessment",* provides an easy to read assessment on the relative risk to the city from a given, specific, hazard. Each is listed with the relative probability of occurrence, and the city's vulnerability to that particular event.

Table 4: City of Cottage Grove Hazard and Risk Assessment

HAZARD RISK ASSESSMENT		NHMP Risk Assessment Scores	
Threat Event / Hazard		**Probability**	**Vulnerability**
	Earthquake	Low	High
	Terrorism / Cyber Attack	Low	Low
	Flood - Riverine	High	High
	Flood - Dam Failure	Low	Low
	Landslide/Debris Flow	Low	Low
	Volcano	Low	Medium
	Wildfire (WUI)	Medium	Medium
	Severe Weather	High	High
	HAZMAT Incident	Low	Medium
	Drought	Low	Low

Vulnerability Assessment

This section outlines the resources, facilities, and infrastructure that, if damaged, could significantly impact public safety, economic conditions, and environmental integrity of the City of Cottage Grove. The list below outlines the types of critical facilities and infrastructure within the City of Cottage Grove. The exposure of community assets to natural hazards is provided in Table 5: "City of Cottage Grove Infrastructure & Facility Hazard Vulnerability".

Table 5: City of Cottage Grove Infrastructure & Facility Hazard Vulnerability

NHMP Critical Infrastructure and Key Facilities	Flood (Land Area Impacted 5%)	Landslide (<1%)	Earthquake (100%)	Winter Storm (100%)	Wildfire (20%)	Volcano (<1%)	Drought (100%)
Critical Facilities							
Cottage Grove City Hall	X		X	X			
Cottage Grove Police Department (911 Call Center and Dispatch), City Jail	X		X	X			
Cottage Grove Community Hospital	X		X	X			
City of Cottage Grove Public Works Shops (EOC #2)	X		X	X			
Water Treatment Facility (Row River)	X		X	X			X
Waste Water Treatment Plant	X		X	X	X		
South Lane County Fire and Rescue Fire Station #1	X		X	X			
Cottage Grove Schools	X		X	X			
Cottage Grove High School			X	X			
Our Lady of Perpetual Help Catholic Church (Red Cross Shelter)	X		X	X			
Knox Butte Reservoir		X	X	X	X		
Downtown Historical District			X				
Cottage Grove Lake Dam	X	X	X		X		X
Dorena Reservoir Dam	X	X	X		X		X

Table 5: City of Cottage Grove Infrastructure & Facility Hazard Vulnerability (cont.)

NHMP Critical Infrastructure and Key Facilities	Flood (Land Area Impacted 5%)	Landslide (<1%)	Earthquake (100%)	Winter Storm (100%)	Wildfire (20%)	Volcano (<1%)	Drought (100%)
Key Infrastructure							
Telephone Lines	X	X	X	X	X		
Wastewater Collection System	X		X	X			
Stormwater Collection System	X		X	X			
Cell Phone Towers	X		X	X			
Roads	X	X	X	X			
Cottage Grove State Airport	X		X	X	X		
NW Natural Gas Lines	X		X				
Overhead Power Lines	X	X	X	X	X		
Transportation Networks	X	X	X	X	X		
Bridges	X		X	X	X		
Central Oregon & Pacific Railroad Lines	X		X	X	X		
Water Treatment, Storage, and Distribution Lines	X		X	X			

Critical Facilities and Infrastructure

Figure 4 below maps the location of the following Critical Facilities in Cottage Grove.

Critical Facilities: Those facilities and infrastructure necessary for emergency response efforts.

- City Hall (Emergency Operations Center (EOC) #1
- Police Station, 911 Call Center, Jail
- Cottage Grove Community Hospital
- City of Cottage Grove Public Works Shop (EOC #2)
- Water Treatment Facilities (Row River)
- Water Intake Facility (Row River)
- Water Treatment, Storage, and Distribution Lines
- Wastewater Treatment Plant (WWTP)
- South Lane County Fire and Rescue Station #1
- Cottage Grove State Airport
- Cottage Grove Schools
- Cottage Grove High School
- Our Lady of Perpetual Help Catholic Church (Red Cross Shelter)
- Knox Butte Reservoir
- Downtown Historical District
- Cottage Grove Reservoir Dam
- Dorena Reservoir Dam

Critical Infrastructure: Infrastructure that provides services for the City of Cottage Grove.

- Telephone Lines
- Wastewater Collection System
- Stormwater Collection System
- Cell Phone Towers
- Roads
- NW Natural Gas Lines
- Overhead Power lines
- Transportation Networks
- Bridges
- Central Oregon and Pacific Railroad Lines

Vulnerable Populations: Locations serving populations that have special needs or require special consideration.

- Cottage Grove Community Hospital
- Coast Fork Nursing Home
- Middlefield Oaks Assisted Living/Memory Care Facility
- Magnolia Gardens Assisted Living/Memory Care Facility
- Riverview Terrace Apartments
- South Lane School District Schools
- Coast Fork Learning Center
- Family Relief Nursery

Economic Assets/Population Centers: Economic Centers, are those businesses that employ large numbers of people, and provide an economic resource to the City of Cottage Grove. *Population Centers* usually are aligned with economic centers, and will be of particular concern for evacuation/notification during a hazard event.

- South Lane School District office and schools
- Cottage Grove Community Hospital
- Lane Community College
- Cottage Grove Industrial Park
- Safeway
- Wal-Mart
- Starfire Lumber
- Weyerhaeuser
- Downtown Cottage Grove Historic District

Environmental Assets: Environmental assets are those parks, green spaces, wetlands, and rivers that provide an aesthetic and functional service for the community.

- North Regional Park
- Row River Nature Park
- Coiner Park
- Bohemia Park
- Willamette River Greenway
- Coast Fork of the Willamette River
- Row River
- Silk Creek
- Wetlands – Speedway, Row River Nature Park, High School, Industrial Park,
- Mt. David
- Row River Trail
- Cottage Grove & Dorena Reservoirs
- Willamette National Forest and Umpqua National Forest

Hazardous Materials: Those sites that store, manufacture, or use potentially hazardous materials.

- Welt & Welt
- Kimwood Corp
- City of Cottage Grove

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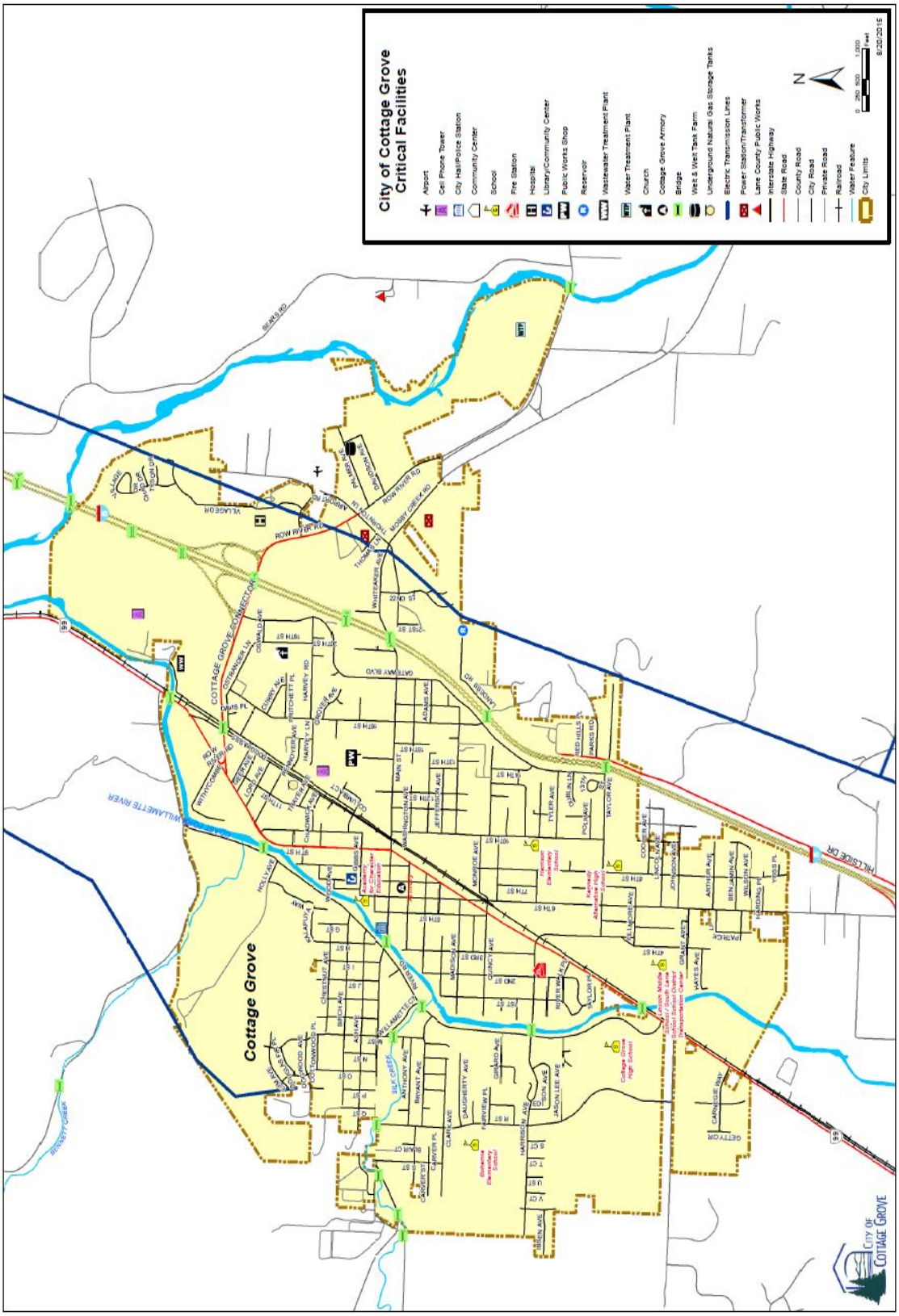
Figure 4: Cottage Grove Critical Facilities



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Section 3: Climate Change

The City of Cottage Grove is committed to understanding and planning for how climate change could impact citizens and natural resources. Climate change is a constantly occurring process that can affect different natural hazards such as drought and wildfire in different ways, exaggerating some while minimizing others. Planning for climate change is a responsible means of mitigating natural variations in climate with the understanding that change is a constant process that is capable of impacting the built and natural environments.

Climate science is rapidly evolving, and it is impossible to predict where the state of the science will be in the next 5 to 10 years. Regional climate impacts and the extent to which human activities contributed to a specific change is one of the hottest topics in climate change science in 2016. We will understand more about regional climate impacts as the science evolves into the future.

The City of Cottage Grove commits to addressing climate change in each climate-related hazard to the extent that the science can support inclusion into each section. We address the uncertainty of the state of the science, and maintain that we will only draw from peer-reviewed literature to support the plan. The U.S. National Climate Assessment is now undergoing a sustained assessment, or continued examination of climate change impacts as they affect the United States. Oregon Climate Change Research Institute (OCCRI) at Oregon State University is involved in the sustained assessment, and we will draw from this work with the 2021 plan as appropriate. With some confidence, we feel that we will be able to improve information about climate change impacts to drought, flood, and wildfire hazards in the next NHMP update.

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Chapter 3: Natural Hazards

Overview of Local Hazard Mitigation Mission and Goals

Short and long-term action items identified through the planning process are an important part of the mitigation plan. Action items are more detailed recommendations for activities that local government, developers, citizens and others could engage in to reduce risk. They address both All-Hazard and hazard-specific issues.

The sector summaries describe sensitivities to Flood, Landslide, Wildfire, Winter and Severe Storms, Earthquake, Drought, and an All-Hazards section to address actions which may encompass several different hazard threat sources. Because of limited meeting time with system experts, the assessment does *not* reflect all hazards for all sectors. The flood scenario used does *not* include dam failure and associated inundation. It reflects riverine flooding due to precipitation and snow melt as well as some impacts of urban street flooding.

The Cottage Grove Natural Hazards Mitigation Steering Committee developed the action items presented in this plan. The action items can be found within each individual Hazard Section, in Chapter 3. These can also be found in Appendix D are a combination of revised action items from the 2005, 2010 and 2015-16 updates. Mitigation plans and new action items that address hazards and opportunities are identified during the update process. During the update process, the steering committee has identified which actions from previous plans have been completed or not completed, and whether or not these actions would be completed.

2016 action items are detailed in an action item worksheet detailing the activity, identifying the rationale for the project, identifying potential ideas for implementation, and assigning coordinating and partner organizations. The action items located in the appendices can assist the community in pre-packaging potential projects for grant funding.

Action items include short and long-term activities, and include an estimate on time for implementation. Short-term action items are activities that may be implementing with existing resources and authorities within one to five years. On-going action items may require new or additional resources or authorities, may be part of the annual work program, and/or may take over five years to implement.

In a continuing effort to coordinate plan contents and planning activities, the City of Cottage Grove has taken into account efforts being made at the County level in order to seamlessly integrate with Lane County's Natural Hazards Mitigation Plan Goals. This ensures alignment with Lane County goals, and those for the State of Oregon. In furtherance of this effort, the Goals in the City of Cottage Grove NHMP match those of Lane County and can be seen in Table 6 "Goals of the Cottage Grove Natural Hazard Mitigation Plan"; and "Goals from the State of Oregon Natural Hazard Mitigation Plan (2015)", which follow in Table 7.

Table 6: Goals of the Cottage Grove Natural Hazard Mitigation Plan

Goal 1: Prevent loss of life and reduce injuries and illness.

Goal 2: Minimize and prevent damage to buildings and infrastructure.

Goal 3: Reduce recovery period and minimize economic losses for the community.

Goal 4: Maintain and improve ability of Lane County, municipal governments, and critical service providers to quickly resume operations.

Goal 5: Protect natural, historic, and cultural resources.

Goal 6: Increase awareness of hazards and understanding of mitigation methods.

Goal 7: Improve attractiveness to individuals and businesses by demonstrating effectiveness in dealing with a disaster.

Table 7: Goals from the State of Oregon Natural Hazard Mitigation Plan (2015)

Goal 1: Protect life and reduce injuries resulting from natural hazards.

Goal 2: Minimize public and private property damages and the disruption of essential infrastructure and services from natural hazards.

Goal 3: Increase the resilience of local, regional, and statewide economies.

Goal 4: Minimize the impact of natural hazards while protecting and restoring the environment.

Goal 5: Enhance and maintain state capability to implement a comprehensive statewide hazard loss reduction strategy.

Goal 6: Document and evaluate Oregon's progress in achieving hazard mitigation.

Goal 7: Motivate the public, private sector, and government agencies to mitigate against the effects of natural hazards through information and education.

Goal 8: Eliminate development within mapped hazardous areas where the risks to people and property cannot be mitigated.

Action Item Identification and Prioritization

There were several factors considered in determining the action items for the next five years. This Plan update is being written during a time of shrinking budgets and thinning resources. Therefore, to keep this plan meaningful, potential action items are prioritized and only those meeting the following criteria were included in the Plan:

- Does the purpose of the Action Item (AI) align with the core mission of Cottage Grove City government?
- Is there motivation to carry out the AI?
- Do we know what to do to carry out the AI?
- Does the AI address some of our most pressing challenges?
- Is implementing the AI feasible in terms of cost and resources?
- Are there tangible benefits?

These criteria are evaluated on a continuing basis, with the intent of accomplishing as many of the listed action items as are feasible given limited budget and limited availability of staff time and resources. Project prioritization may change over the next five years as availability of funding opportunities become available.

Action Items are located at the end of each Hazard Section.

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Section 1: Flooding

The City of Cottage Grove has provided online access to mapping tools that include floodplain maps (www.cottagegrove.org). Additionally, the State Department of Geology and Mineral Industries (DOGAMI) provides the online tool HAZVU, which is available to the general public: http://www.oregongeology.org/hazvu/.

Detailed mapping resources can be found at Lane County GIS, located at: http://www.lanecounty.org/Departments/IS/GIS/Pages/default.aspx.

Flooding Profile

The City of Cottage Grove is located south of the confluence of the Row River and the Coast Fork of the Willamette River. These two rivers as well as Silk, Mosby, and Bennett Creeks contribute to the flooding hazard in Cottage Grove. The city itself is located wholly within the Coast Fork Willamette Watershed Basin.

The Coast Fork of the Willamette River runs north then northeast through the center of the city along a fairly narrow, channelized corridor that has seen development since the founding of the community in the 1860's. The original channel has been heavily modified. Some slight movement of the Coast Fork Willamette channel has been seen in its more northern reaches within City limits.

The Row River forms the City's eastern boundary. Its channel remains fairly natural, with multiple meanders and a wide, vegetated floodplain. Much of the Row River floodplain in the City is under City of Cottage Grove ownership as a measure of floodwater control. The Row River joins the Coast Fork of the Willamette River immediately to the north of the city's urban growth boundary. Silk Creek enters the city from the west from the foothills of the Coast Range. This creek flows through the back yards of several residential neighborhoods before crossing under River Road via a culvert to join the Coast Fork. Mosby Creek joins the Row River east of the City, west of Dorena Lake.

The U.S. Army Corps of Engineers operates 13 multi-purpose flood control projects (dams) in the Willamette Valley Project, nine of which are located in Lane County, and were constructed between 1941 and 1968.

The Dorena Dam was built on the Row River upstream of Cottage Grove in 1942. This federally owned dam is operated and maintained by the U.S. Army Corps of Engineers, as a part of the Willamette Valley Project. The structure is 154 high, and has 131,000 acre feet of storage in this earthen type dam.

The Cottage Grove Dam was built on the Coast Fork Willamette River upstream of Cottage Grove in 1943. Like Dorena, the dam is owned federally, operated and maintained by the U.S. Army Corps of Engineers as a part of the Willamette Valley Project. The structure is 103 feet high, and has 50,000 acre feet of storage in an earthen type dam.

A primary purpose of the Willamette Valley Project is flood control, although the reservoirs only control flooding on 50% of the tributaries in the Willamette Basin. Reservoirs are maintained at full pool from May to September for recreation, and drained in the fall for the wet season to provide storage capacity for winter storms. Most riverine flooding in Cottage Grove occurs along tributaries and rivers with no flood control devices, such as Silk Creek and Mosby Creek.

Flooding occurs when climate, geology, and hydrology combine to create conditions where river and stream waters flow outside of their usual course and “overspill” beyond their banks. In Lane County, the combination of these factors, augmented by ongoing development, create chronic seasonal flooding conditions. Lane County spans a wide range of climatic and geologic regions from the Pacific coast to the high Cascades. This diversity results in considerable variation in precipitation. The average annual precipitation ranges from less than 40 inches in the Willamette Valley to over 100 inches in the Coast Range and along the west slope of the Cascades. Snowmelt from the Central Cascades provides a continuous water source throughout the year, and can contribute significantly to flooding.

Flooding is most common from October through April, when storms from the Pacific Ocean bring intense rainfall to the area. Larger floods result from heavy rains that continue over the course of several days, augmented by snowmelt at time when the soil is near saturation from previous rains.

Previous Occurrences

Cottage Grove has a long history of flood events. The most heavily flooded areas are the low lands along the Row and Willamette Rivers, and the properties adjacent to Silk Creek. The following historical recount of flooding was developed from the Cottage Grove Development Timeline created by community members using data from local historical resources, such as the Cottage Grove Museum. The complete timeline is attached as Appendix H.

- 1861 Floods hit the area
- 1881 Floods in the town
- 1926 People rode rowboats into the Bartell Hotel
- 1933 Flood in the town
- 1946 January heavy rains…4.32 inches-Floods
- 1961 February Floods-4.74 inches in 24 hours
- 1963 High water at Christmas
- 1964 High water again
- 1985 Flooding in the area with heavy rains
- 1996 100 inches of rain, flooding along Silk Creek, Mosby Creek

Since the construction of Cottage Grove and Dorena Dams in the 1940s, flooding has been less severe along the Row River and Coast Fork of the Willamette. These dams have reduced the expected 100-year stream discharges (volume of water flowing in the rivers). Hence expected flood elevations and overall flood potential for

major flood events along these rivers have been substantially reduced. The flood hazard areas shown on the current Flood Insurance Rate Maps (FIRM) for Cottage Grove assume that the dams are operating properly. Dam failure hazards are not addressed by the FIRM.

Despite the reduction in flood potential from construction of the dams, the Cottage Grove area continues to face flood risks from the Coast Fork Willamette and Row Rivers as well as smaller creeks like Silk Creek and Bennett Creek. Flood risk on these smaller streams has not been reduced by the dams.

The most recent major flood event occurred in February 1997. Unusually heavy rains over the four-day period from February 5th to February 8th resulted in significant flooding on numerous rivers and streams throughout western Oregon. The 1997 flood may have been about a 250-year event. During this flood event, Silk Creek flooded adjacent properties, and the Row River raised high enough to damage the city's current water treatment intake facility. Damage to Lane County businesses, residences and infrastructure was estimated to be roughly $19 million dollars for this February 1997 storm.

In January 2011, several days of heavy rain caused isolated flooding throughout the County, although little or no flooding occurred within Cottage Grove. Saturated soils caused the loss of the Coast Fork Willamette River bank in a few locations, and overloaded storm drains caused isolated street flooding in the community. These locations were documented by city maintenance staff for future maintenance. At the end of the event, the U.S. Army Corps of Engineers opened the floodgates on the Cottage Grove and Dorena Dams, rapidly raising the levels of the Coast Fork and Row Rivers. The prolonged high waters weakened many riparian trees along the Coast Fork. Although Lane County activated its EOC during this event, Cottage Grove had no need to do so.

It should be noted that stormwater is not treated in the City wastewater system. There exist remnants within the city of older piping that combines stormwater into the sewer system, increasing unnecessary costs in waste water treatment. These remnants are addressed and removed on a case by case basis when found and as funding is available.

The City of Cottage Grove takes a three pronged approach to addressing flood hazards in the city:

- Administration of regulations applying to private property.
- Maintenance / enhancement of City-owned facilities and utilities.
- Education and awareness of flood risks.

In addition to this three pronged approach, the city is mindful of meeting all minimum federal requirements with regard to federal flood legislation, laws, regulations, and local code. These include compliance with Presidential Executive Order 11988 (1977) "Floodplain Management" as amended in 2015, and incorporation of changes into current city code. The City also prepares needed documentation for the National Flood Insurance Program (NIFP).

The City has established a Floodplain Manager in the person of the Community Development Director. The City is actively participating in the Community Assistance Visit (CAV) program, which is a major component of the NFIP's Community Assistance Program (CAP). The most recent CAV occurred on February 11, 2016 with positive reviews, and no administrative or potential violations identified. The City intends to proactively continue its efforts to reduce flood risk.

Flooding Hazard Assessment

Hazard Identification

FEMA last produced Flood Insurance Rate Maps (FIRM) for Cottage Grove that detail the flood hazard areas in 1999. These 100-year floodplain and floodway maps have been digitized and reproduced for the City of Cottage Grove by Lane County, and can be seen in Figure 5: “Flood Zones City of Cottage Grove”, below.

As of March, 2016, 206 parcels have been identified as either being wholly or partially within the Special Flood Hazard Area.150 properties have natural or artificial wetlands on part or all of the property.

Based on historical occurrence Lane County and by extension, Cottage Grove, can expect a significant flood event every 15 – 20 years; however, much of this risk is mitigated through dams and efforts undertaken by the Corps of Engineers. A failure of either the Cottage Grove Dam or Dorena Dam would cause significant flooding in the area, far beyond the scale of a naturally occurring flood event.

This is considered to be an unlikely possibility, requiring a “perfect storm” of factors such as the reservoirs being at full pool (normally occurring only during the summer recreation season), combined with saturated soils (a winter wet season phenomenon). These conditions rarely occur at the same time.

Flooding potential is most common from October through April when storms from the Pacific Ocean bring steady and occasionally intense rainfall, and soil saturation remains high. Flooding can be aggravated when streams are altered by human activity, such as through channelization of streams or loss of wetlands. Many types of flood hazards exist in Oregon, including riverine floods, flash floods (resulting from locally intense thunderstorms, ice jams, and dam failures), coastal floods, shallow area and urban flooding, and playa flooding.

Riverine flooding is affected by the intensity and distribution of rainfall, soil moisture, seasonal variation in vegetation, and water-resistance of the surface areas caused by urbanization. Flash flooding is a localized flood that results from a short duration of intense rainfall across a limited geographic area. During extended periods of intense rainfall, stormwater conveyance systems can be overwhelmed and flooding of surrounding neighborhoods can result.

Table 8: Flood Warning Types

Riverine Flooding
Flood Potential Outlook (FPO): Announcement to alert the public of potentially heavy rainfall that could send rivers and streams into flood or aggravate an existing flood.
Flood Watch: Announcement to inform the public that current or developing conditions indicate a threat of flooding, but occurrence is neither certain nor imminent.
Flood Warning: An announcement by the NWS to inform the public of flooding along larger streams in which there is a serious threat to life or property. A flood warning will usually contain river stage forecasts.
Flood Statement: A statement issued by the NWS to inform the public of flooding along major streams in which there is not a serious threat to life or property. It may also follow a flood warning to give later information.

Flash Floods
Flash Flood Watch: Announcement that current or developing conditions indicate potential flash flooding in the watch area
Flash Flood Warning: Issued to inform the public that flash flooding is in progress, imminent, or highly likely.
Flash Flood Statement: A statement by the NWS which provides follow-up information on flash flood watches

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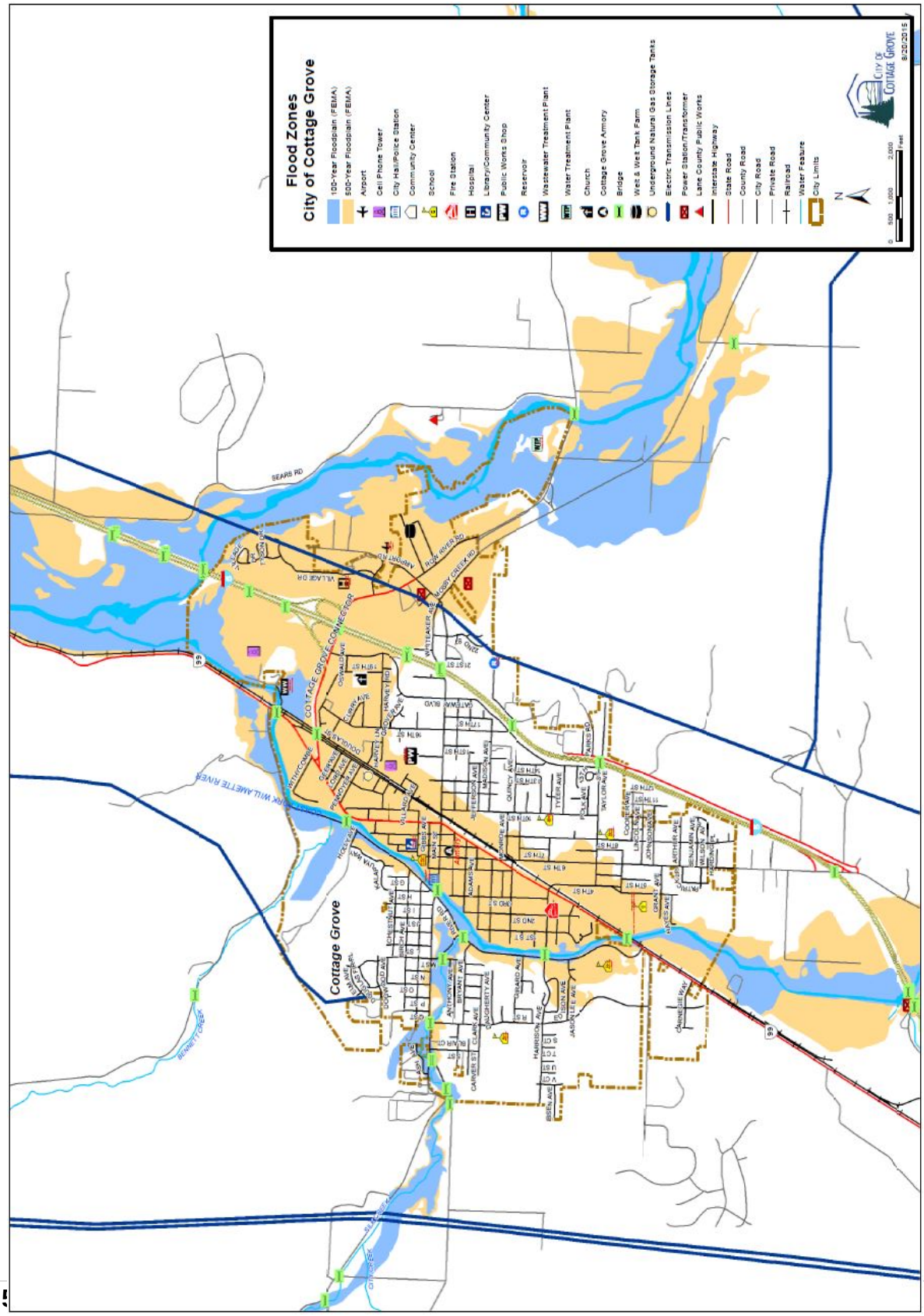
Figure 5: Flood Zones City of Cottage Grove



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Vulnerability Assessment and Risk Analysis

Community assets located in the 100-year floodplain include the Row River Water Treatment Facility, the Wastewater Treatment Facility, the Middlefield Golf Course, North Regional Park, Row River Nature Park, Willamette River Greenway Trail, and the Row River Trail. Bridges may also be impacted, and can be found in Figure 5: "Flood Zones City of Cottage Grove".

The critical facilities that face flood hazards in the 100-year floodplain are major facilities that if incapacitated would cause tremendous problems for the City as well as citizens. Bridges are vulnerable to flooding because debris can choke bridges and cause them to collapse under the increased pressure. The City of Cottage Grove relies on bridges for transportation, as the Coast Fork of the Willamette River divides the city with all critical facilities located on the east portion of the city. A collapse of all bridges would leave the west portion of the city isolated from emergency services.

Potential 100-year flood events affect less than 5 % of the property within the City of Cottage Grove. A 500-year flood event would impact approximately one third of the land located within city limits. Dorena Dam failure could impact the eastern third of the city, particularly the Cottage Grove Airport, the Cottage Grove Community Hospital, Welt & Welt, and Wal-Mart. Failure of the Cottage Grove dam would inundate over one half of the city, including all of the historic core and Hwy 99.

Based on potential impacts, high long term probability, and presence of development and infrastructure in riparian areas, a **High Vulnerability** classification is assigned for flood. Our Hazard Risk Assessment model ranks riverine flooding as the highest threat in Cottage Grove (score of 174).

Repetitive Flood Loss

The City of Cottage Grove works to mitigate problems regarding flood issues when they arise. Throughout history, some areas in the city have proven more susceptible to flooding issues and may have incurred repetitive losses, meaning they have more than two National Flood Insurance Program (NFIP) claims in a ten-year period. There have been 10 claims to NFIP in Cottage Grove since its inception in 1978. Of those claims only 3 were closed for a total of $5,068.63 in payouts. According to the most current data from Oregon Department of Land Conservation and Development (DLCD), there are no properties in Cottage Grove that meet the criteria for repetitive loss at this time.

Existing Flood Mitigation Activities

Flood mitigation activities listed here include current mitigation programs and activities that are being implemented by the City of Cottage Grove or other agencies or organizations.

Flood Mitigation Projects

Cottage Grove has actively pursued several flood hazard mitigation activities in an effort to reduce vulnerability to damage and disruption from flooding events. Efforts include:

- Cottage Grove participates in the National Flood Insurance Program, which enables property and business owners to qualify for federally underwritten flood insurance.
- In 2008, the City replaced the Row River Water Treatment Facility intake structure with a flood-proof intake structure.
- The City has been working with the Coast Fork Willamette Watershed Council to pursue funding to re-connect the Row River Nature Park wetlands to the Row River to encourage riparian meandering and lessen flood hazard.
- The City has begun replacing and hardening stormwater outfalls into the Coast Fork to ensure that flood waters continue to drain into the river during high-water events.
- The City has adopted a Stormwater Management Plan. The goal of this plan is to protect citizens and property from urban flooding through planning for and building adequate green and gray stormwater systems.
- The City has participated in dam failure scenarios with the Lane County Emergency Preparedness Coalition, South Lane County Fire & Rescue, USACE and the Cottage Grove Community Hospital.

Flood Mitigation Objectives and Action Items

The flood mitigation Objectives and their associated Action Items below and in the appendices provide direction on specific activities that the City of Cottage Grove, organizations, and residents may undertake to reduce risk and prevent loss from flood events. Each Objective is followed by Action Items that are intended to achieve in part or in whole the Objective they are attached to. These Objectives and Actions may be used by local decision makers in pursuing strategies for implementation.

Agency Coordination

1) **Seek training and exercise opportunities with other agencies and jurisdictions.**

Estimated Cost:	Low
Timeline:	Ongoing
Responsible Agency:	Cottage Grove Community Development Department (CGCDD); Oregon Dept. of Transportation (ODOT); NW Natural Gas; Pacific Power; Eugene Public Utilities District (EPUD)
Priority:	High

2) **Work with United States Corps of Engineers (USACE) and the Federal Emergency Management Agency (FEMA) on Upper Willamette Valley Flood Insurance Map Update project.**

Estimated Cost:	None / Staff time
Timeline:	Ongoing
Responsible Agency:	CGCDD; USACE; FEMA
Priority:	Low

3) **Coordinate with Coast Fork Willamette Watershed Council, USACE, and Oregon Department of Fish and Wildlife on Row River Nature Park flood storage improvements.**

Estimated Cost:	High
Timeline:	3-5 years
Responsible Agency:	Coast Fork Willamette Watershed Council, State and Federal Agencies
Priority:	Medium/High

4) **Participate in state-wide water management group led by USACE for flood controlled streams (join conference call held on a weekly, bi-weekly, or as needed basis). Participate in Northwest Regional Floodplain Management Association (NORFMA) and Association of State Floodplain Managers (ASFM).**

Estimated Cost:	Low / Staff time
Timeline:	Ongoing
Responsible Agency:	Public Works; CGCDD; NORFMA
Priority:	High

Critical Facilities Protection

1) **Evaluate and flood-proof City-owned Critical Facilities within the 500 year floodplain.**

Estimated Cost:	High
Timeline:	Ongoing
Responsible Agency:	CGCDD
Priority:	Low

Flood Loss Mitigation

1) **Increase awareness of localized flood risk and safety: Use outreach programs to advise home and property owners of risks to life, property, health, and safety. Increase outreach to residential and commercial residents of the city on additional measures property owners can take to reduce their risk to flooding, and facilitate funding for mitigation measures.**

Estimated Cost:	Low
Timeline:	Ongoing
Responsible Agency:	CGCDD; Public Works
Priority:	High

2) **Extend the freeboard requirement.**

Estimated Cost:	Low
Timeline:	1-3 Years
Responsible Agency:	CGCDD
Priority:	High

3) **Mitigate flooding by limiting or restricting how development occurs in flood prone areas through actions such as: Prohibit or limit floodway development through regulatory and/or incentive-based measures; Limit the density of developments in the floodplain; Require that floodways be kept as open space; Manage and enforce a riparian buffer ordinance to protect water resources and limit flood impacts; Limit fill in floodplain areas.**

Estimated Cost:	Low
Timeline:	1-3 Years
Responsible Agency:	CGCDD
Priority:	High

4) **Develop a long term plan for Open Space land acquisitions (purchases by the City) for floodway protection (in 4 specific lots within the Floodplain).**

Estimated Cost:	High
Timeline:	3-5 Years
Responsible Agency:	CGCDD
Priority:	Low

Floodplain Management

1) **Designate a local floodplain manager and/or CRS coordinator who achieves Certified Floodplain Manager (CFM) certification.**

Estimated Cost:	Low
Timeline:	Completed / Ongoing
Responsible Agency:	CGCDD
Priority:	Medium

2) **Conduct NIFP community workshops to provide information and incentives for property owners to acquire flood insurance.**

Estimated Cost:	Low
Timeline:	1-3 Years
Responsible Agency:	CGCDD
Priority:	Low

3) **Require and maintain FEMA elevation certificates for all new and improved buildings located in floodplains. (Records are maintained in the Cottage Grove Community Development Office.)**

Estimated Cost:	Low
Timeline:	Ongoing
Responsible Agency:	CGCDD
Priority:	High

4) **Include requirements in the local floodplain ordinance for homeowners to sign non-conversion agreements for areas below base flood elevation.**

Estimated Cost:	None / Staff Time
Timeline:	1-3 Years
Responsible Agency:	CGCDD
Priority:	Low

5) **Maintain and provide access to Flood Insurance Rate Maps.**

Estimated Cost:	None/staff time
Timeline:	Ongoing
Responsible Agency:	CGCDD
Priority:	High

6) **Implement damage reduction measures for existing, publically owned, buildings such as acquisition, relocation, retrofitting, and maintenance of drainage ways and retention basins.**

Estimated Cost:	High
Timeline:	3-5 Years
Responsible Agency:	CGCDD
Priority:	Low

7) **Improve flood warning, emergency response, and evacuation planning. (Alert Sense)**

Estimated Cost:	Medium
Timeline:	Ongoing
Responsible Agency:	CGCDD
Priority:	High

Stormwater Management and Improvement

1) **Integrate Natural Hazard Mitigation plan goals and policies with Total Maximum Daily Loads (TMDL) plan goals and policies.**

Estimated Cost:	Low
Timeline:	Ongoing
Responsible Agency:	Public Works; CGCDD
Priority:	Medium

2) **Rehabilitate and manage riparian areas under city ownership to improve function; utilize stream restoration to ensure adequate drainage and diversion of stormwater; and protect and enhance landforms that serve as natural mitigation features (i.e., riverbanks, wetlands, buffers etc.).**

Estimated Cost:	High TBD
Timeline:	Ongoing → 3-5 Years
Responsible Agency:	Public Works; CGCDD
Priority:	Low

3) **Obtain and install a River Flow Gauge at the mouth of Mosby Creek at confluence of Row River.**

Estimated Cost:	Medium
Timeline:	3-5 Years
Responsible Agency:	CGCDD
Priority:	High

4) Pursue funding for culvert resizing.

Estimated Cost:	High
Timeline:	2-5 years
Responsible Agency:	Public Works; CGCDD
Priority:	Medium

5) Develop stormwater management standards in Development Code.

Estimated Cost:	Medium
Timeline:	1-3 Years
Responsible Agency:	Public Works; CGCDD
Priority:	High

6) Enforce Riparian Development standards.

Estimated Cost:	Low
Timeline:	Ongoing
Responsible Agency:	Public Works; CGCDD, Coast Fork Willamette Watershed Council
Priority:	Medium

7) Coordinate with Coast Fork Watershed Council on riparian area restoration and education programs.

Estimated Cost:	Low
Timeline:	Ongoing
Responsible Agency:	Public Works; CGCDD; Coast Fork Willamette Watershed Council
Priority:	Low

8) Join or schedule yearly (or bi-annual) river/stream cleanup projects with the public at-large, and facilitate debris removal activities with Coast Fork Watershed Council and United States Forest Service (USFS) to use debris removed from the Coast Fork and Row Rivers for wildlife habitat in the Row River Nature Park.

Estimated Cost:	Low
Timeline:	Annual / Biannual basis
Responsible Agency:	Public Works; CGCDD; Coast Fork Willamette Watershed Council
Priority:	Medium

9) Develop an open space acquisition, reuse, and preservation plan targeting hazard areas.

Estimated Cost:	Low / Staff Time
Timeline:	3-5 Years
Responsible Agency:	Public Works; CGCDD; Coast Fork Willamette Watershed Council
Priority:	Medium

10) Compensate an owner for partial rights, such as easement or development rights, to prevent a property from being developed.

Estimated Cost:	High
Timeline:	Long Term
Responsible Agency:	Public Works; CGCDD
Priority:	Low

Section 2: Landslide

Landslide Profile

The probability of landslide events in the City of Cottage Grove was determined using scientific data, historical occurrences, and local knowledge and has been mapped by Lane County for the City of Cottage Grove. Figure 6, *"Landslide Hazard Region, City of Cottage Grove"*, illustrates these areas below. The Lane County All-Hazard Mitigation Plan addresses the risk of landslide in Lane County, in section 8, and the same assessment applies to Cottage Grove and will not be repeated here.

The historical timeline for the city suggests that no major landslide events have occurred within the City of Cottage Grove in recent history. Evidence along on the escarpment of Mt. David revel prior landslides occurred in this area approximately 500 years ago. Small slope movements have occurred along the northern side of Mt. David along the edge of Holly Avenue since 2003, when the hillside was logged.

Landslide Hazard Assessment

Hazard Identification

Landslide hazards within the City of Cottage Grove are concentrated in the Mt. David area, especially portions of the north, south, and east sides of Mt. David along Holly Avenue and Kalapuya Way. Construction has already occurred on the lower potions of Holly Avenue and portions of Kalapuya Way. Other debris-flow hazards located within the City of Cottage Grove are above and east of the 22nd Street neighborhood.

Vulnerability and Risk Assessment

Though less than one % of the land area is subject to landslide hazards there are some areas in which landslides do pose a hazard to built property. Using analysis of aerial photographs and comparing them with the debris flow hazard maps to identify structures located in debris-flow hazard areas, there were 31 properties identified in the debris-flow hazard areas. These properties do not include any commercial or industrial developments. No critical facilities are located within a landslide hazard area. Due to the small percentage of land potentially impacted by landslides in Cottage Grove and the small amount of development in these areas, the Risk Assessment scores for landslides/debris flows are 75, with a rating of **low vulnerability** and **low probability**.

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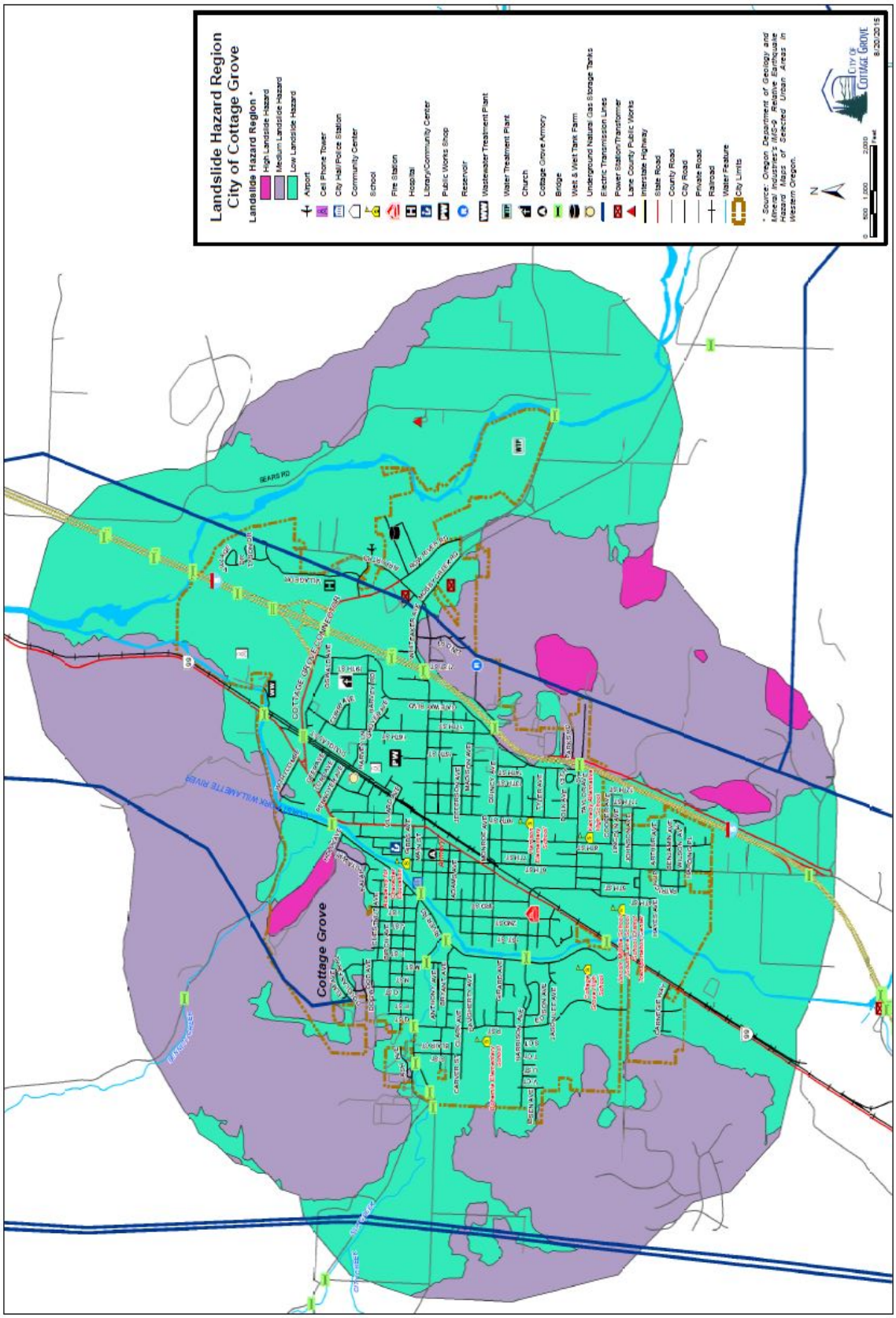
Figure 6: Landslide Hazard Region, City of Cottage Grove



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Existing Landslide Mitigation Activities

Landslide mitigation activities listed here include current mitigation programs and activities that are being implemented by the City of Cottage Grove or other agencies or organizations.

Incorporated Municipality Codes Pertaining to Landslides

The City of Cottage Grove Comprehensive Plan addresses hillside development. In 1977 a report was completed entitled, *The City and Its Hillsides: A Report Concerning Future Hillside Development*. This report and *The Comprehensive Plan* address the need for a hillside development ordinance. In 2008, Chapter 14.3.7.100 Hillside Development was adopted as part of the Cottage Grove Development Code. The intent and purpose of this code includes:

1) To implement the landslide hazard prevention goals in the City of Cottage Grove Natural Hazard Mitigation Plan;
2) To implement the "Hillside Development" element of the City of Cottage Grove Comprehensive Plan;
3) To provide for the review of hillside development applications and evaluate properties for potential slope related hazards;
4) To assess the risk that a proposed use or activity may adversely affect the stability and slide susceptibility of an area; and thus promote the public health, safety, and welfare;
5) To establish standards and requirements for the development of lands in a hillside area; and
6) To mitigate risk within a hillside area, not to act as a guarantee that the hazard risk will be eliminated, nor as a guarantee that there is a higher risk of hazard at any location.

The standards in 14.3.7.100 are applicable to any development subject to Land Use or Site Design Review on hillsides, in designated floodplains, along river corridors, or within the state-designated Willamette River Greenway. Development is regulated in hillside areas of 15% or greater.

Landslide Mitigation Projects

The City of Cottage Grove has identified steep slopes that may be susceptible to landslide hazards, but no mitigation projects have been completed at this time.

Landslide Mitigation Objectives and Action Items

The landslide mitigation action items below and in the Appendices provide direction on specific activities that organizations and residents in Cottage Grove can undertake to reduce risk and prevent loss from landslide events. Each action item can be used by local decision makers in pursuing strategies for implementation.

Landslide Mitigation

1) **Utilize Geospatial Information Systems (GIS) to map, identify, and study landslide hazard areas; develop and maintain a database to track community vulnerability to landslides.**

Estimated Cost:	Low
Timeline:	Ongoing/ 1-3 Years
Responsible Agency:	Public Works; CGCDD
Priority:	Low

2) **Develop and maintain a database to track community vulnerability to landslides.**

Estimated Cost:	Low/Staff time
Timeline:	1-3 years
Responsible Agency:	Public Works; CGCDD
Priority:	Medium

3) **Locate utilities outside of landslide areas to decrease the risk of service disruption.**

Estimated Cost:	TBD – Project Specific
Timeline:	Ongoing
Responsible Agency:	CGCDD; Public Works; EPUD; Pacific Power, NW Natural gas
Priority:	High

Evaluate Landslide Hazard on Mt. David

1) **Begin the mitigation process on north slope of Mt. David through use of Geological Assessment in compliance with Cottage Grove City Development Code 3.7.100 Hillside Development.**

Estimated Cost:	Medium
Timeline:	1-3
Responsible Agency:	CGCDD
Priority:	Medium

2) **Engage in long term program to purchase land at high risk of landslide (i.e., Mt. David)**

Estimated Cost:	High
Timeline:	3-5 Years
Responsible Agency:	CGCDD
Priority:	Low

3) **Consider Conservation Easements in lieu of land purchase in areas of moderate to high landslide risk.**

Estimated Cost:	Medium
Timeline:	3-5 Years
Responsible Agency:	Public Works; CGCDD
Priority:	Low

Regulatory tools and enforcement

1) Create and adopt regulations regarding erosion control.

Estimated Cost:	Low / Staff time
Timeline:	3 Years
Responsible Agency:	CGCDD
Priority:	Medium

2) Provide education to city staff on erosion control.

Estimated Cost:	Low / Medium
Timeline:	Ongoing
Responsible Agency:	Public Works; CGCDD
Priority:	High

Section 3: Wildfire

Wildfire Profile

The probability of wildfire events in Cottage Grove was determined using scientific data, historical occurrences, and local knowledge has been mapped previously by LCOG. The map, *Wildland-Urban Interface in Cottage Grove*, can be seen below, and is attached to this plan in appendices. The Lane County All-Hazard Mitigation Plan addresses the risk of wildfire in Lane County, in section 9, and the same assessment applies to Cottage Grove and will not be repeated here.

This historical account of wildfire was developed from the Cottage Grove Development Timeline created by community members using data from local historical resources, such as the Cottage Grove Museum. The only major wildfires to occur within the city limits of Cottage Grove within the last 200 years were on Mt. David, in 1986 and most recently in 2016, along the edge of Mt. David at the end of K Street. These fires were started by arson and no structures were lost. Wildfires have occurred in the nearby Umpqua National Forest periodically, but have not approached developed areas.

Wildfire Hazard Assessment

Hazard Identification

Wildfire hazards within the City of Cottage Grove occur mostly in the outlying areas of the city: in the north section of the city, in North Regional Park and Mt. David; to the west along the UGB edge including the Grove of Pines development as well as areas behind Bohemia Elementary School and Cottage Grove High School; and to the south on properties along the Willamette River Greenway. Fortunately these are sparsely populated areas. To the east along Knox Butte there is also substantial wildland-urban interface potential. Much of this area is comprised of commercial timber lands under Lane County's jurisdiction that are zoned F-1 or F-2.

Vulnerability and Risk Assessment

Community assets located in the wildland-urban interface hazard area include the Wastewater Treatment Facility, Bohemia School, Cottage Grove High School, South Lane County Fire & Rescue, and Knox Butte Reservoir.

The critical facilities that face wildland-urban interface hazard potential are major facilities that if incapacitated would cause tremendous problems for the City and citizens. Only one densely populated area within the UGB, the Grove of Pines subdivision, is in the wildland-urban interface hazard area.

Although only 10 % of the land in Cottage Grove is located in the wildland-urban interface and there is no history of large wildland fire in the Cottage Grove area, the potential damage caused by such a fire is great. The NHMP Risk Assessment scores for wildfire rank this hazard as **medium probability and medium vulnerability** (total threat score of 91).

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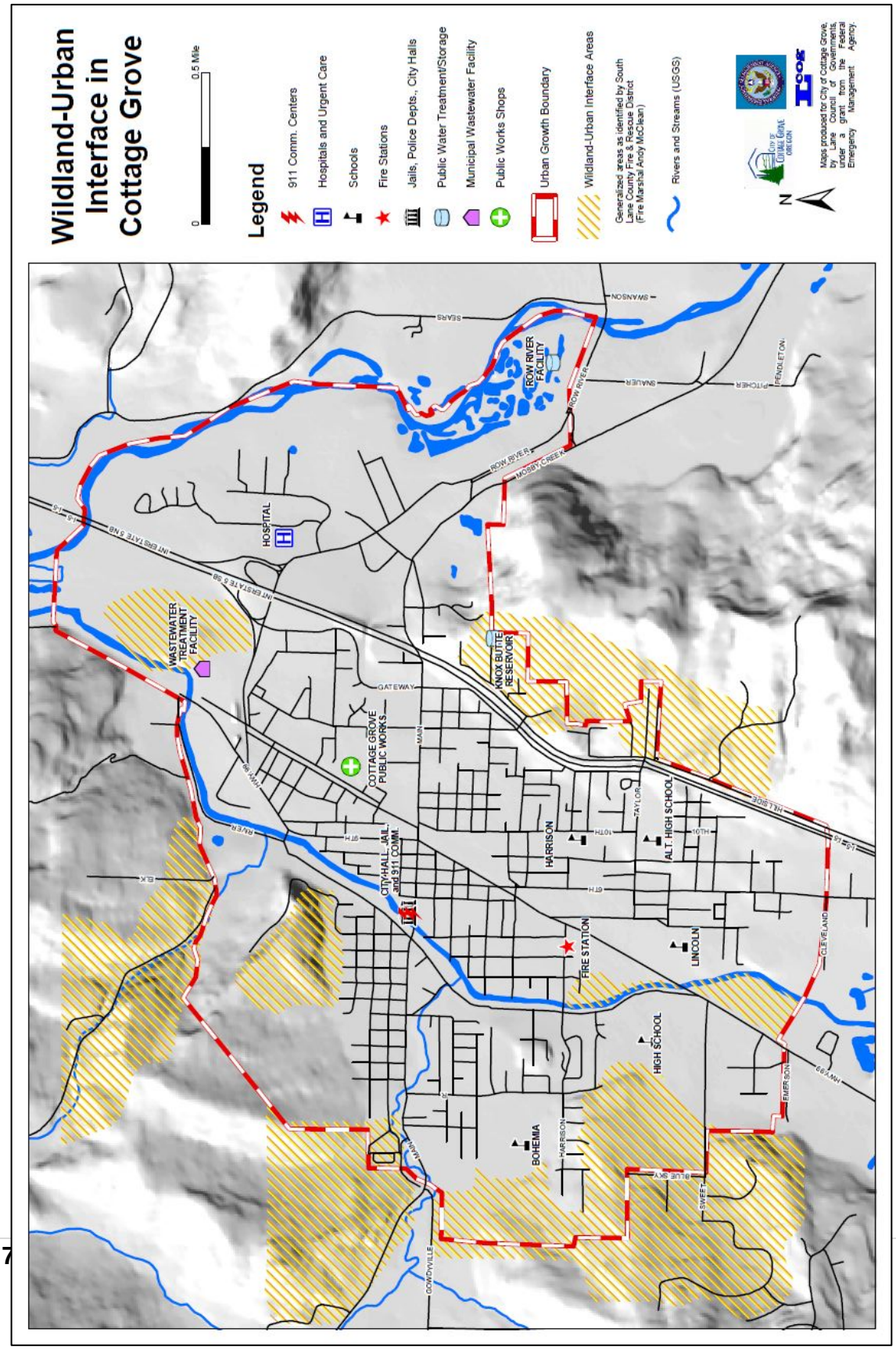
Figure 7: Wildland-Urban Interface



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Existing Wildfire Mitigation Activities

The South Lane County Fire & Rescue District covers 150 square miles with a population of 25,000. The district is comprised of an urban and rural mix of residential properties, light industry, commercial, and forestland. The fire district provides information and public outreach during the year to promote fire safety awareness.

Incorporated Municipality Codes Pertaining to Wildfires

Grove Municipal Code 8.12.040, Noxious Vegetation, states:

"No person shall allow, cause, permit or suffer noxious vegetation on property or in the right of way of a street, alley or sidewalk abutting the property. Noxious vegetation must be cut down or destroyed as often as needed to prevent the creation of a health, fire or traffic hazard, or in the case of weeds or other noxious vegetation, from maturing or from going to seed. Noxious vegetation includes:

A. *Vegetation that is or is likely to become:*
    a. *A health hazard;*
    b. *A fire hazard;*
    c. *A traffic hazard, because it impairs the view of a public right of way or otherwise makes the use of the thoroughfare hazardous; or*
    d. *Grass or weeds exceeding 12 inches. Properties used for crop cultivation and livestock grazing are exempt from the tall grass and weeds provision if a five foot wide cut or cleared fire break surrounds the perimeter of the property.*
B. *Poison Oak.*
C. *Poison Ivy.*
D. *Blackberry bushes that extend into a public way or a pathway frequently by children, or cross a property line."*

This code is aggressively enforced between June 15 and October 15 of each year by the Community Development Department with the help of the South Lane County Fire & Rescue District. Enforcement ensures that fire hazard within the city limits is low during the dry summer months.

Local Fire Prevention/Education Programs

South Lane County Fire & Rescue Department offers the following fire prevention/education services for its residents.

- Smokey The Bear
- 1st Grade Fire Awareness
- Business Fire Inspections
- Educational Classes upon Request
- Fire Prevention Week
- Community Emergency Response Team (CERT) training

Wildfire Mitigation Objectives and Action Items

The wildfire mitigation action items below and in appendices provides direction on specific activities that organizations and residents in Cottage Grove can undertake to reduce risk and prevent loss from wildfire events. The action items may be used by local decision makers in pursuing strategies for implementation.

Incorporate wildfire mitigation in the comprehensive plan.

1) **Include considerations of wildfire hazards in land use, public safety, and other elements of the comprehensive plan.**

Estimated Cost:	Low/Staff time
Timeline:	Comp. Plan Update Item
Responsible Agency:	CGCDD
Priority:	High

2) **Recognize the existence of wildfire hazards and identify areas of risk based on a wildfire vulnerability assessment.**

Estimated Cost:	Low/Staff time
Timeline:	1-3 years
Responsible Agency:	South Lane County Fire and Rescue District, CGCDD
Priority:	Medium

3) **Describe policies and recommendations for addressing wildfire risk and discouraging expansion in the wildland-urban interface.**

Estimated Cost:	Low/Staff Time
Timeline:	Ongoing
Responsible Agency:	CGCDD
Priority:	Low

Reduce risk to wildfire through land use planning

1) **Use GIS mapping of wildfire hazard areas to facilitate analysis and planning decisions through comparison with zoning, development, infrastructure, etc.**

Estimated Cost:	Low
Timeline:	Land County GIS – LIDAR Mapping Ongoing
Responsible Agency:	South Lane County Fire and Rescue District, CGCDD
Priority:	Medium

2) **Promote conservation of open space or wildland-urban boundary zones to separate developed areas from high-hazard areas.**

Estimated Cost:	Low/Staff Time
Timeline:	Ongoing
Responsible Agency:	CGCDD
Priority:	Low

Participate in FireWise system

1) **Join the "FireWise Communities/USA" recognition program sponsored by the National Wildlife Coordinating Group (firewise.org).**

Estimated Cost:	Low/Staff Time
Timeline:	Ongoing
Responsible Agency:	CGCDD
Priority:	High

2) **Sponsor FireWise workshops for local officials, developers, civic groups, and neighborhood/homeowners' associations.**

Estimated Cost:	Low
Timeline:	Ongoing
Responsible Agency:	CGCDD
Priority:	Low

Decrease vulnerability and risk from wildfire to new and existing construction, and increase public awareness to wildfire risks and mitigations.

1. **Offer GIS hazard mapping Information online (i.e., DOGAMI HAZVU) for residents, developers, and design professionals.**

Estimated Cost:	Low
Timeline:	Paused until LIDAR Data available from Lane County GIS
Responsible Agency:	CGCDD
Priority:	Low

2. **Organize a local fire department tour to show local elected officials and planners the most vulnerable areas of the city's wildland-urban interface and increase their understanding of risks.**

Estimated Cost:	Low
Timeline:	Ongoing
Responsible Agency:	CGCDD
Priority:	Low

3. **Partner with local fire departments to conduct education programs in schools.**

Estimated Cost:	Low/Staff time
Timeline:	Ongoing
Responsible Agency:	CGCDD
Priority:	Low

4. **Inform the public about proper evacuation procedures (Workshop/Open House).**

Estimated Cost:	Low/Staff Time
Timeline:	Ongoing
Responsible Agency:	CGCDD
Priority:	Low

5. **Empower and educate property owners about wildfire mitigation techniques which reduce the risk to property and life.**

Estimated Cost:	Low
Timeline:	Ongoing
Responsible Agency:	CGCDD
Priority:	Low

Encourage Fire-safe construction practices for existing and new construction in high-risk areas.

1. **Provide developers, homeowners, and businesses with fire-safe construction practice information, and other mitigation options to reduce fire risk.**

Estimated Cost:	Low
Timeline:	Ongoing
Responsible Agency:	South Lane County Fire and Rescue District, CGCDD
Priority:	Low

2. **Explore FireWise construction and development practices for new development.**

Estimated Cost:	Low
Timeline:	Ongoing
Responsible Agency:	CGCDD
Priority:	Low

3. **Explore mitigation funding for existing houses on perimeter of city at risk to wildfire.**

Estimated Cost:	Low
Timeline:	Ongoing
Responsible Agency:	CGCDD
Priority:	Low

Section 4: Winter Storm

Winter Storm Profile

The probability of winter storm events in Cottage Gove was determined by using scientific data, historical occurrences, and local knowledge. The Lane County All-Hazard Mitigation Plan addresses the risk of winter storms in Lane County, in section 7, and the same assessment applies to Cottage Grove and will not be repeated here.

This historical account of winter storms was developed from the Cottage Grove Development Timeline created by community members using data from local historical resources, such as the Cottage Grove Museum. 1884 Year of the BIG snow, three feet in December

- 1887 Cyclone hits Cottage Grove
- 1919 The deep snows
- 1931 Huge windstorm in May-55 trees topple on Brice Creek Road
- 1949 Cottage Grove Lake freezes over
- 1962 Hurricane Frieda (Columbus Day Storm) in October. 100 mph winds.
- 1984 Heavy snows and lots of freezing
- 1988 Snow heavy
- 2002 Wind storm knocks trees down
- 2003/2004 freezing rain, ice, and snow
- 2013 Ice Storm

The impact of these events was felt city-wide. Those areas with the oldest residential development (and hence most overhead power lines) or oldest trees experienced the most negative impacts due to loss of power and property damage. The City parks within historic neighborhoods were heavily damaged in the 2013 Ice Storm in particular.

Winter Storm Hazard Assessment

Hazard Identification

Severe winter storm hazards are located where trees and vegetation align with utility and power lines as well as near roads and houses. Winter storm hazards are located throughout the city. The majority of winter storms result in power outages, blocked streets, and property damage from fallen trees.

Vulnerability and Risk Assessment

Severe storms can be life threatening, cause major infrastructure damage, and can be difficult to manage in terms of response and recovery. Winter storms can cover the road networks with snow and ice, impeding transportation to schools and

medical facilities. Winter storms and windstorms can topple trees, down power lines, and cause widespread power outages. Local utilities and Public Works could be strained during a severe storm event as they work to clear roads and repair or replace power distribution and/or transmission lines, and maintain telephone lines for communication. Older residential areas such as the Northwest Neighborhood, 1-3rd Street neighborhood, and N. 10th Street neighborhoods, are more susceptible to winter storm hazards due to overhead power lines and large trees.

Based upon the small size of Cottage Grove and the widespread nature of these events, the NHMP Risk Assessment Score for winter storms and severe weather shows a **high probability** and **high vulnerability**, with a total threat score of 169.

Existing Winter Storm Mitigation Activities

Local utilities work to identify areas for tree trimming that can cause power line outages, and put life and property at risk.

Incorporated Municipality Codes Pertaining to Winter Storms

Section 14.3.4.500 Utilities in the Cottage Grove Development Code states that "all new utility lines including, but not limited to, those required for electric, communication, lighting, and cable television services and related facilities shall be placed underground…" Enforcement of this code ensures that new utilities will not be subject to winter storm hazards.

City Maintenance

The City maintains snow removal equipment for use during winter storms. Maintenance staff trim trees on public lands and right-of-ways as necessary. Additionally, the City makes every attempt to underground existing utilities as part of ongoing maintenance projects.

Limb Removal

The City of Cottage Grove performs city-wide limb pick-up at least annually. This service allows homeowners to trim trees without the burden of disposal, encouraging the maintenance of the tree canopy.

Winter and Severe Storm Mitigation Objectives and Action Items

The winter storm or severe storm mitigation action items below and in Appendix D. which provide direction on specific activities that organizations and residents in Cottage Grove may undertake to reduce risk and prevent loss from these severe storm events. The action item is may be used by local decision makers in pursuing strategies for implementation.

Protect power lines from winter and severe storms effects.

1. **Continue to require all new construction including remodels, to include underground power lines.**

Estimated Cost:	Low
Timeline:	Ongoing
Responsible Agency:	CGCDD
Priority:	High

Create a Debris Management Plan.

1. **Determine major stakeholders, and begin planning process for a Debris Management Plan.**

Estimated Cost:	Low/Staff Time
Timeline:	3-5 Years
Responsible Agency:	CGCDD; Public Works
Priority:	Low

2. **Create a formal Memorandum of Understanding (MOU) with property owners for temporary storage of storm debris.**

Estimated Cost:	Low/Staff Time
Timeline:	3-5 years
Responsible Agency:	CGCDD; Public Works
Priority:	Low

Reduce hazards associated with un-trimmed trees on city property.

1. **Survey City owned trees on a seasonal (spring and fall) basis.**

Estimated Cost:	Staff Time
Timeline:	Ongoing
Responsible Agency:	Public Works; CGCDD
Priority:	Medium

2. **Trim trees identified as being in need, and schedule removal of diseased or dead trees.**

Estimated Cost:	Staff Time
Timeline:	Ongoing
Responsible Agency:	Public Works; CGCDD
Priority:	Medium

Ensure that critical facilities have backup power and emergency operations plans to deal with power outages.

1. **Maintain backup power availability at Critical Facilities including the City EOC, backup EOC.**

Estimated Cost:	Low
Timeline:	Ongoing Maintenance
Responsible Agency:	Public Works; CGCDD
Priority:	Low

Section 5: Earthquake

Earthquake Profile

The probability of earthquake events in Cottage Grove was determined using scientific data, historical occurrences, and local knowledge and has been mapped by Lane County. The map, *Relative Earthquake Hazard Zones in Cottage Grove*, is attached to this plan in the appendices. The Lane County All-Hazard Mitigation Plan addresses the risk of earthquakes in Lane County, in section 10, and the same assessment applies to Cottage Grove and will not be repeated here.

This historical recount of earthquakes was developed from the Cottage Grove Development Timeline created by community members using data from local historical resources, such as the Cottage Grove Museum.

Small earthquakes occur throughout the region on a semi-frequent basis. The latest earthquakes in Oregon over 4.0 in magnitude were in Newport on August 18, 2004, and Walterville, Oregon on July 4, 2015 measuring 4.2 in magnitude.

In general the Pacific Northwest and Cottage Grove, is subject to earthquakes of three differing types:

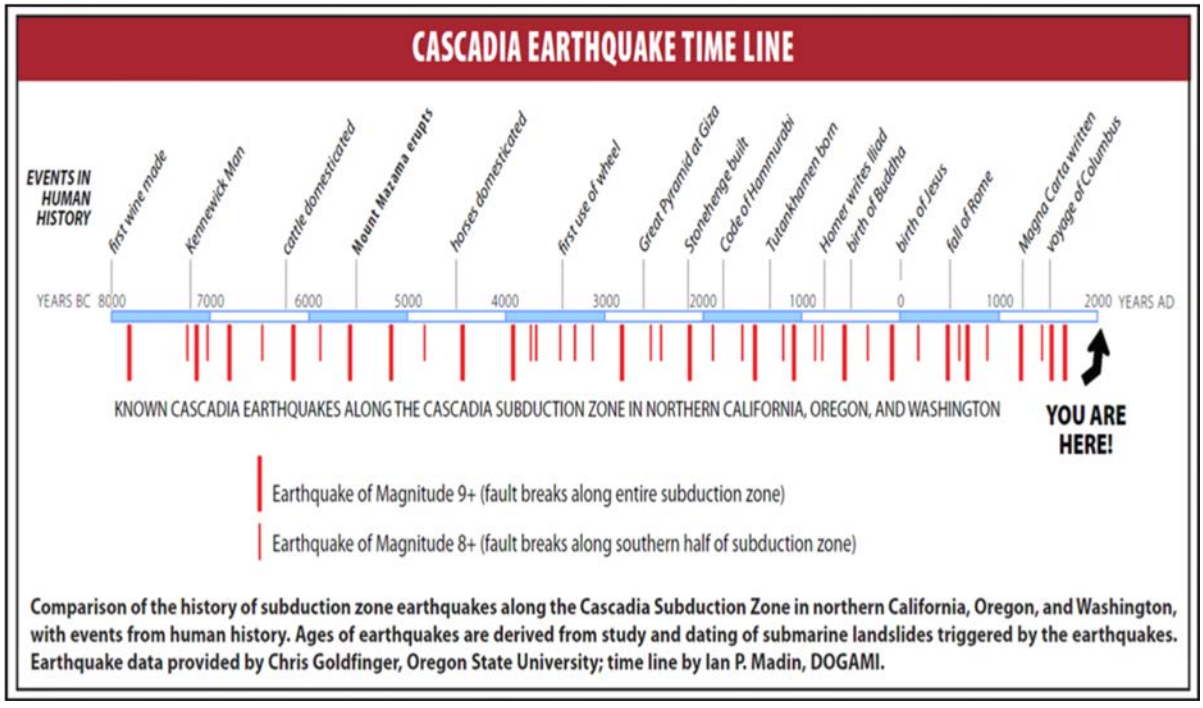
- **Crustal Earthquakes** which tend to be relatively shallow in depth, short in duration, and relatively low on the modified Richter scale - in the range of 1 to 4 in magnitude. These earthquakes represent stresses built up by the presence of the Cascadia Tectonic Subduction Zone, but are not directly linked or connected to it. Shaking tends to be localized, and damages relatively low.
- **Cascadia Deep Subduction Zone** earthquakes are directly caused by Cascadia but occur deep in the earth where the Juan De Fuca plate is singing into the Earth's mantle. These can cause moderate earthquakes but again tend to cause less damage as they are shorter in duration and lower in magnitude.
- **Cascadia Subduction Zone Shallow** earthquakes are major events capable of temblors in the range of **8.6** to **9.2** on the modified Richter scale. These can occur in three types:
    - Southern Ruptures – the most common form of shallow Cascadia events, and is capable of causing tsunami on the coast. Shaking can last 1 to 3 minutes, but tend to be of lower magnitude and duration than full ruptures of the 600 mile long fault. The City of Cottage Grove may see shaking, liquefaction, and other forms of damage from these events.
    - Southern to Mid-State Ruptures - these are not as common as the exclusively southern ruptures, but occur closer to Cottage Grove presenting a greater risk to the community. While not directly threatened by the tsunami generated by these types of Cascadia events, it will greatly impact the coast, which may impact Cottage

Grove in the form of evacuees moving east. The City may also experience shaking, liquefaction, and other related damages from these events.

- Cascadia Full Rupture – These are events referred to as “The Big One”, and are devastating large scale earthquakes. Widespread damage on the Oregon Coast will occur from both the shaking and the tsunami generated. Inland, shaking will last from three to five minutes, with significant damage to state wide infrastructure from the Cascade mountain range west to the Pacific Ocean. Cottage Grove will experience significant direct and indirect effects from a Cascadia Full Rupture event.

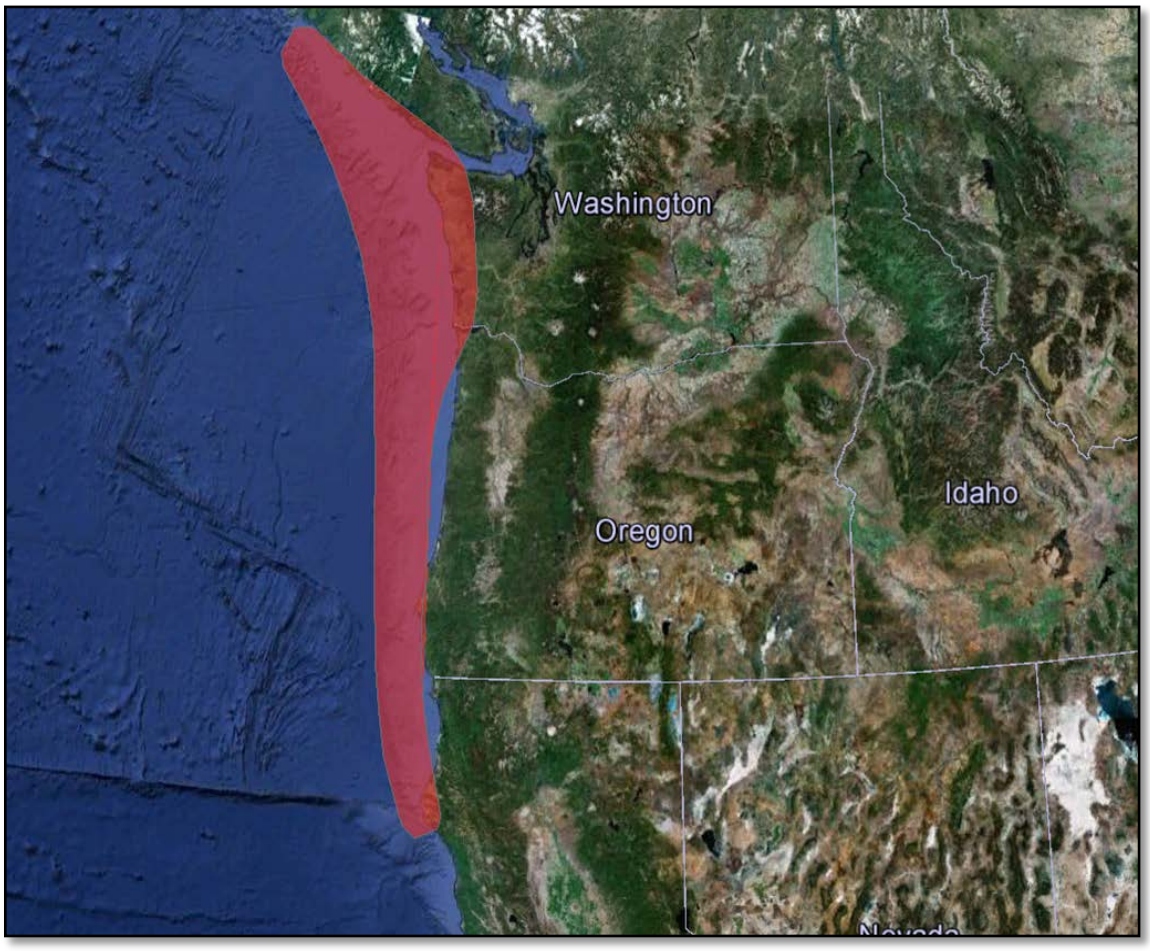
The most recent full rupture occurred on January 26, 1700 creating an “orphan” tsunami on Japan’s eastern coast. This event is known in significant detail due to records kept in Japan at the time, and when combined with drilling cores done off the coast of Oregon, Washington and California by Oregon State University Geologists, we have a strong timeline of past events occurring on the Cascadia Fault:

Figure 8: Cascadia Subduction Fault Timeline



The Cascadia Tectonic Subduction Zone is one of the largest natural hazards in the United States. Cottage Grove, like the rest of Western Oregon, will suffer from the loss of state infrastructure, and lack of basic services will significantly impact residents for a considerable period of time after the shaking has subsided.

Figure 9: Cascadia Subduction Zone



Earthquake Hazard Assessment

Hazard Identification

Lane County has created relative earthquake hazard maps for Cottage Grove using information from the Department of Geology and Mineral Industries. There are two distinct lines of low to intermediate hazard running through the city. These lines diverge near the I-5 Row River Road intersection. The west branch of the hazard area runs through the North 10th Street area and continues down Highway 99. The east branch follows closely along Row River. The only intermediate to high hazard area is located along Holly Avenue where the Hidden Valley development exists on the border of Hidden Valley Golf Course.

There are several areas within the City that are assessed at a higher risk, largely due to the threat of landslides on steeper slopes. One of these is located in NW Cottage Grove, four more can be found in the SE of the city and are illustrated in Figure 10 *"Relative Earthquake Hazard"*.

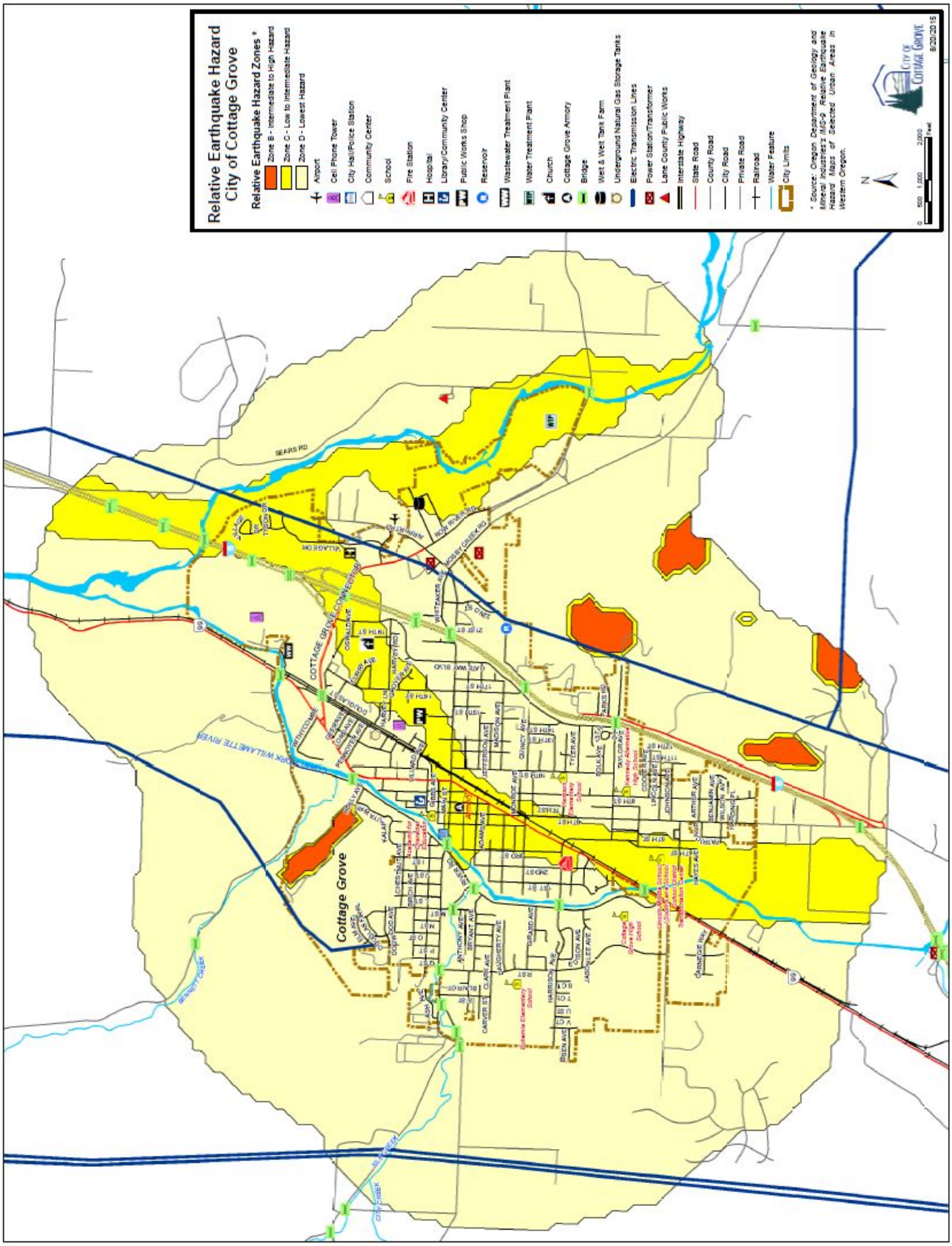
Vulnerability and Risk Assessment

Community assets located in the low to intermediate earthquake hazard area include the Row River Water Treatment Facility, Lincoln Middle School, Fire Station 1, City Hall, and Public Works Shops. Many other buildings due to lack of seismic retrofitting are at risk during an earthquake event. All of downtown is susceptible during an earthquake. Many of the buildings downtown are at specific risk due to the type of construction. Liquefaction in the downtown core is a possibility but the probability is relatively small. There are no critical facilities located in the intermediate to high hazard areas.

An earthquake event could cause substantial damage to area bridges and infrastructure. In the case of bridge failure the west side of the city could potentially be cut off from all emergency services. The water transmission line to the Knox Hill Reservoir is at risk during an earthquake event. This line supplies much of the city's drinking water and a break in the line would cause a significant problem for Public Works to deal with.

Research published by Oregon State University and the USGS is 2012 calculates a 40 percent chance for a major Cascadia Zone earthquake during the next 50 years. This equates to slightly less than a 1% probability of occurrence in a given year, and a **low probability** of occurrence. The magnitude and severity of the event, however, would be catastrophic, with the entire city showing **high vulnerability**. The total threat score for this type of earthquake is 167.

Figure 10: Cottage Grove Relative Earthquake Hazard



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Existing Earthquake Mitigation Activities

The City of Cottage Grove has adopted the International Building Code, which sets the minimum design and construction standards for new buildings.

The South Lane School District has developed seismic preparation procedures and routinely conducts drills. These drills include familiarization with routes and methods of exiting the building and methods of duck, cover and hold during an earthquake.

Earthquake Mitigation Action Items

The earthquake mitigation action items below and in the appendices provide direction on specific activities that organizations and residents in Cottage Grove can undertake to reduce risk and prevent loss from earthquake events. The action items are followed by ideas for implementation, which can be used by local decision makers in pursuing strategies for implementation.

Address Community vulnerability to seismic threats.

1. **Develop an inventory of public, commercial, and historically significant buildings that may be particularly vulnerable to earthquake damage.**

Estimated Cost:	Low/Staff Time
Timeline:	Ongoing
Responsible Agency:	CGCDD
Priority:	High

2. **Inventory of buildings within Downtown Historic District vulnerable to earthquake damage, and investigate potential funding sources for building retrofits.**

Estimated Cost:	Low/Staff Time
Timeline:	Ongoing
Responsible Agency:	CGCDD
Priority:	High

3. **Develop mitigation strategies for seismic retrofitting of critical city structures and conduct seismic retrofitting for critical public facilities and historic structures within the Downtown Historical District most at risk to earthquakes.**

Estimated Cost:	Medium
Timeline:	1-5 years / Ongoing
Responsible Agency:	GCCDD
Priority:	High

4. **Create an earthquake scenario to estimate potential loss of life and injuries, the types of potential damage, and existing vulnerabilities within community to develop earthquake mitigation priorities (EOP Exercises).**

Estimated Cost:	Staff Time
Timeline:	1-3 years
Responsible Agency:	CGCDD
Priority:	High

5. **Establish a school survey procedure and guidance document to inventory structural and non-structural hazards in and around school buildings.**

Estimated Cost:	Staff Time
Timeline:	1-3 years
Responsible Agency:	CGCDD, South Lane County School District
Priority:	High

6. **Assist with and/or develop program to fund seismic retrofit designs for historic buildings and encourage seismic retrofits as part of any alterations or remodels.**

Estimated Cost:	Staff Time
Timeline:	3-5 years
Responsible Agency:	CGCDD
Priority:	Medium

Evaluate and protect critical facilities and infrastructure.

1. **Identify and harden critical lifeline systems (i.e., critical public services such as utilities and roads) to meet "Seismic Design Guidelines and Standards for Lifelines" or equivalent standards such as American Lifelines Alliance (ALA) guidance.**

Estimated Cost:	High
Timeline:	ongoing
Responsible Agency:	CGCDD
Priority:	Medium

2. **Evaluate bridges for resilience to earthquake, and establish priority listing from post event evaluation and repair.**

Estimated Cost:	Staff Time
Timeline:	Ongoing
Responsible Agency:	CGCDD; ODOT Public Works
Priority:	High

3. Develop a process by which critical public buildings are prioritized for retrofitting based upon their role in recovery after an earthquake.

Estimated Cost:	Low / Staff time
Timeline:	1-3 Years
Responsible Agency:	CGCDD
Priority:	Medium

Section 6: Drought

Drought has long been considered a slow moving type of event, and though it may not lead to visible, rapid changes, or catastrophic destruction in the short term, the long term effects can be significant.

Western Oregon is blessed with a mild climate and generally plentiful rainfall. While Lane County is located in a temperate region where precipitation is generally adequate, it is not immune from the occurrence or effects of drought. Regional droughts do occur, and can affect local water table heights, the recharge rate of aquifers, local stream and tributary flow rates, and water quality, as well as other regional ecological effects on fish and wildlife habitat and riparian areas. Locally, reduced flow rates on the Row River could impact the city water supply both through a reduced volume, and increases in turbidity, which Public Works would need to mitigate. Drought would also impact adjacent forestry and agricultural industries, and increase the risk of wildfire.

Although Cottage Grove has not yet experienced drought that lasted more than a few months, it can be assumed that the impact of extreme drought will be felt city-wide.

Vulnerability and Risk Assessment

Drought by itself is unlikely to present life-threatening conditions or cause physical damage to City infrastructure or critical facilities. Environmental impacts and economic losses, particularly to nearby agriculture, recreation and forestry, and impacts to the City's water supply are the most prevalent concerns. Based upon this evaluation, the NHMP Risk Assessment score for drought shows a **low probability** and **low vulnerability**.

Drought Action Items

Drought action items found in appendices are those activities that pertain to the slow onset hazard of Drought. These strategies are new to this NHMP update, as drought risk was not considered in previous planning efforts.

Assess vulnerability to drought risk.

1. **Gather and analyze water and climate data to gain a better understanding of local climate and drought history.**

Estimated Cost:	Low
Timeline:	Ongoing
Responsible Agency:	CGCDD; Public Works
Priority:	Low

2. **Identify factors that affect the severity of a drought.**

Estimated Cost:	Low
Timeline:	Ongoing
Responsible Agency:	CGCDD
Priority:	Low

3. **Identify alternative available water sources.**

Estimated Cost:	Low
Timeline:	Very Long Term
Responsible Agency:	CGCDD
Priority:	Low

Monitor drought conditions.

1. **Identify local drought indicators, such as precipitation, temperature, surface water levels, soil moisture, etc.**

Estimated Cost:	Low
Timeline:	Ongoing
Responsible Agency:	CGCDD; Public Works
Priority:	Low

2. **Establish a regular schedule to monitor and record conditions on at least a monthly basis when drought conditions exist.**

Estimated Cost:	Low
Timeline:	Ongoing
Responsible Agency:	CGCDD
Priority:	Low

Monitor water supply

1. **Regularly check for leaks to minimize water supply losses.**

Estimated Cost:	Low
Timeline:	Ongoing
Responsible Agency:	Public Works
Priority:	Medium

2. **Improve water supply monitoring through the installation of a USGS Monitoring system on Mosby Creek**

Estimated Cost:	High
Timeline:	Future Project - grant funding needed.
Responsible Agency:	Public Works
Priority:	High

3. **Develop a long range water conservation plan**

Estimated Cost:	Low
Timeline:	Long term
Responsible Agency:	CGCDD; Public Works
Priority:	Medium

Section 7: All-Hazards

This section summarizes actions that increase community resilience and reduce risks associated with all hazards. These actions are largely focused on public outreach and developing means of involving the public in community resilience building efforts.

Develop Community Involvement

1. **Work with insurance companies, utility providers, and others to include wildfire safety information in materials provided to area residents.**

Estimated Cost:	Low
Timeline:	Long term
Responsible Agency:	CGCDD
Priority:	Low

2. **Develop partnerships with neighborhood groups, homeowners' associations, and others to conduct outreach activities. (E.g., Community Emergency Response Teams, Map My Neighborhood etc.).**

Estimated Cost:	Low
Timeline:	Long term
Responsible Agency:	CGCDD
Priority:	Medium

3. **Create a severe weather scenario to estimate potential damage and existing vulnerabilities within community to develop severe wind/weather mitigation priorities.**

Estimated Cost:	Low
Timeline:	1-2 years
Responsible Agency:	CGCDD
Priority:	Low

4. **Develop tabletop or other exercises for the purposes of training city employees on how to respond to an emergency.**

Estimated Cost:	Medium/Staff Time
Timeline:	1-2 years
Responsible Agency:	CGCDD
Priority:	High

5. **Develop exercises or events to strengthen community resilience through public participation and educational events.**

Estimated Cost:	Low
Timeline:	1 year
Responsible Agency:	CGCDD
Priority:	High

Section 8: Volcanic Eruption

Volcano Profile

The probability of volcanic eruptions in Cottage Grove was determined using scientific data, historical occurrences, and local knowledge. The Lane County Multi-Hazard Mitigation Plan addresses the risk of volcanic eruption in Lane County, in section 11, and the same assessment applies to Cottage Grove.

The only volcanic activity of note in the Pacific Northwest in recent times occurred in the spring of 1980, with the violent eruption and landslide at Mt. St. Helens in Southern Washington State. This event caused little in the way of disruption in Cottage Grove.

Lane County has several volcanos on its eastern edge. According to information from the State of Oregon Hazard Mitigation Plan, the Three Sisters region has a clear history of eruptions but none noted in at least the last 15,000 years. North Sister has probably been inactive for at least 100,000 years. Middle Sister last erupted between 25,000 and 15,000 years ago. From 1996 to 2003 South Sister had minor but broad uplift of about one inch a year, indicating subsurface magma activity. There is no current indication that the previously active uplift will result in a volcanic eruption, but monitoring continues in order to quickly identify changes in condition.

Volcanic Eruption Hazard & Risk Assessment

There is very little risk for the City of Cottage Grove concerning volcanic eruption. The closest active volcanoes, the Three Sisters Range, pose little threat of ash fall to Cottage Grove due to the direction of the prevailing wind moving ash away from Cottage Grove. If ash fall were to become significant in the Cottage Grove area it could pose a risk to all critical facilities as well as transportation routes and water sources. Ash fall would impact the entire region, making resources scarce. Consequently, the NHMP Risk Assessment scores volcanos as **low probability**, but recognizes that the City has a **medium vulnerability** to impacts from volcano eruption due to the widespread nature of this type of hazard. The total threat score is very low, at 49, due to the low probability.

Existing Volcanic Eruption Mitigation Activities

There are currently no existing volcanic eruption mitigation activities occurring within Cottage Grove.

Volcanic Eruption Mitigation Action Items

The City of Cottage Grove will not be undertaking any local volcanic eruption mitigation activities at this time.

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APPENDICES:

Appendix A: Hazard Maps

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Figure 11: Lane County and Cottage Grove

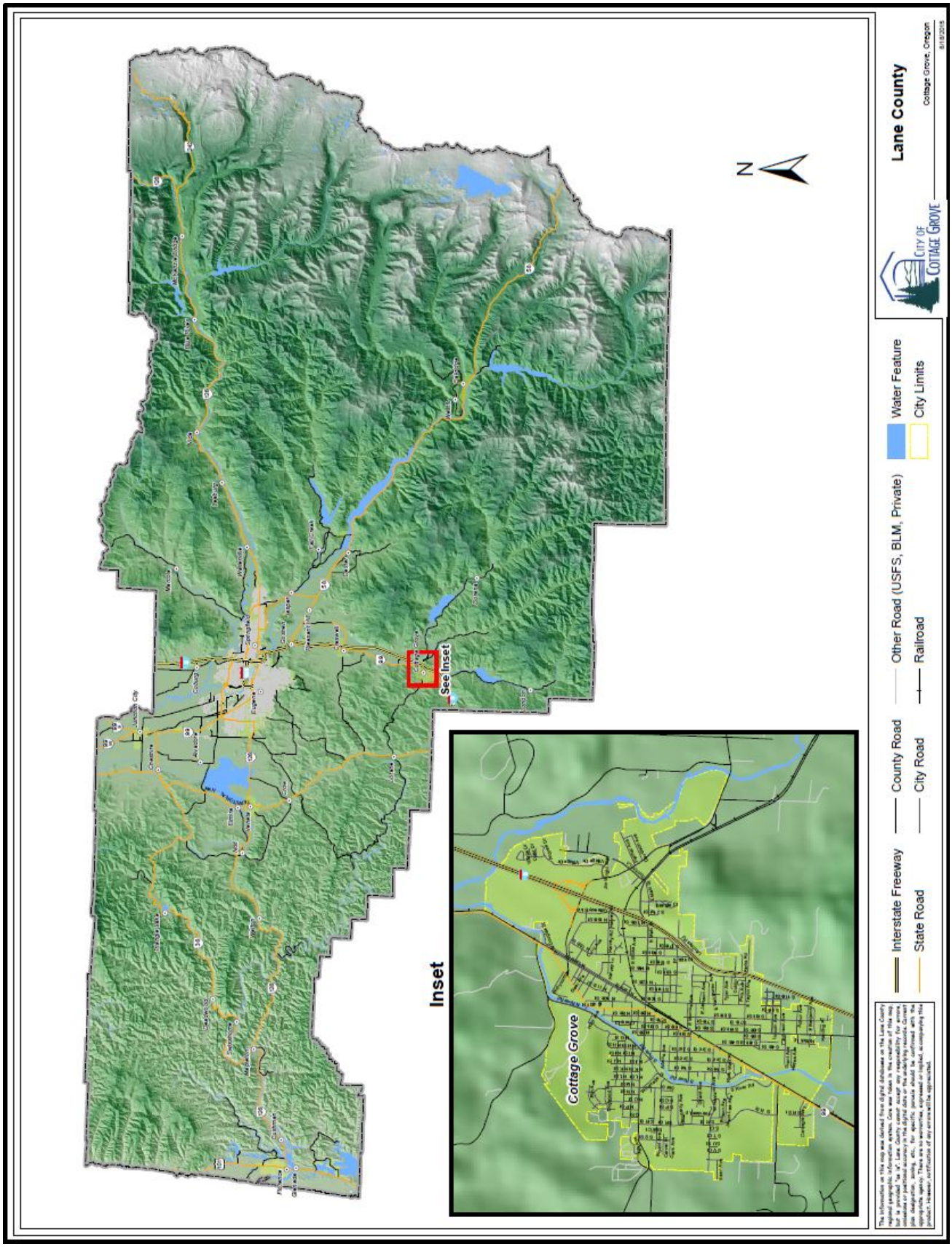

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Figure 12: City of Cottage Grove

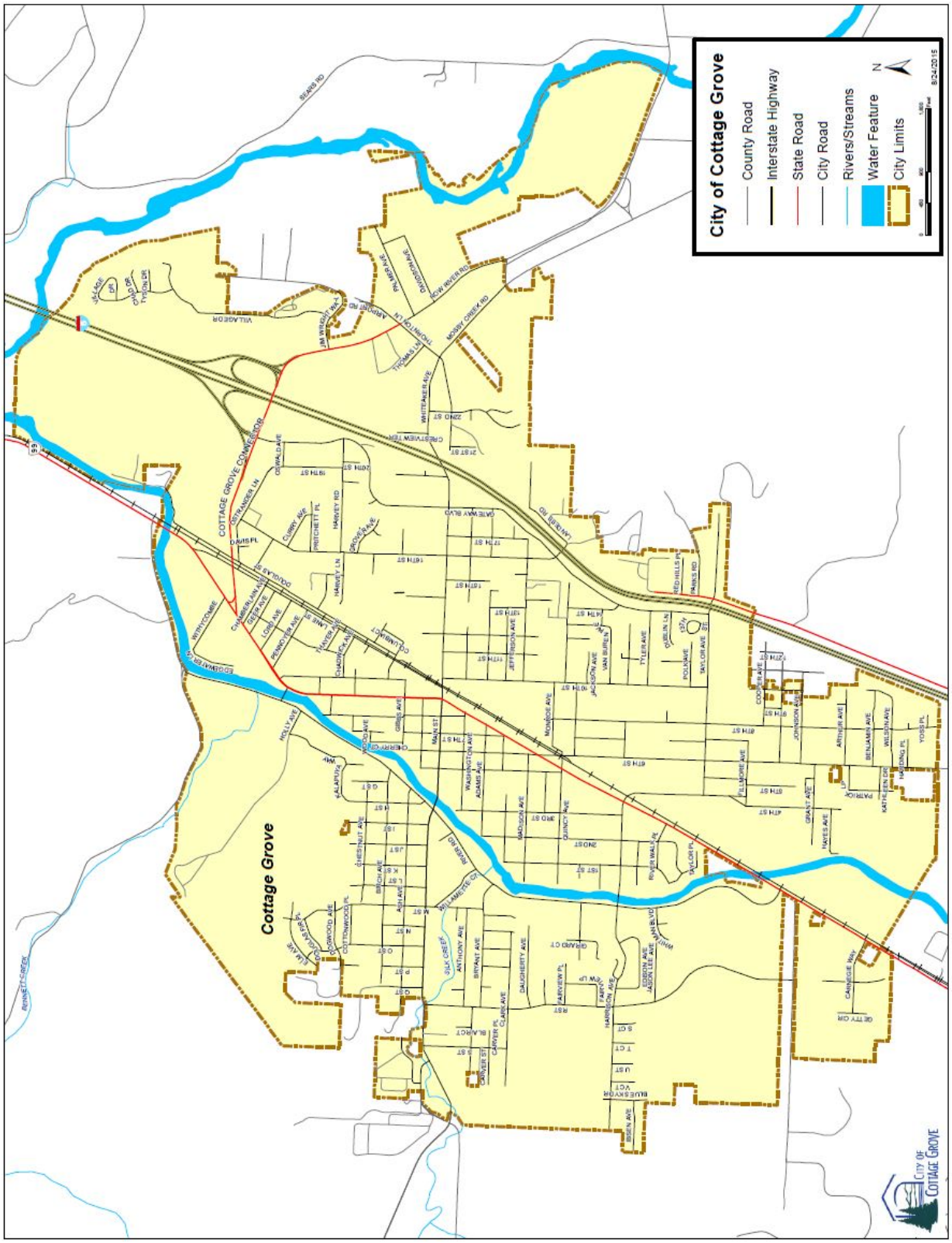

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Figure 13: 100 and 500 Year Flood Zones

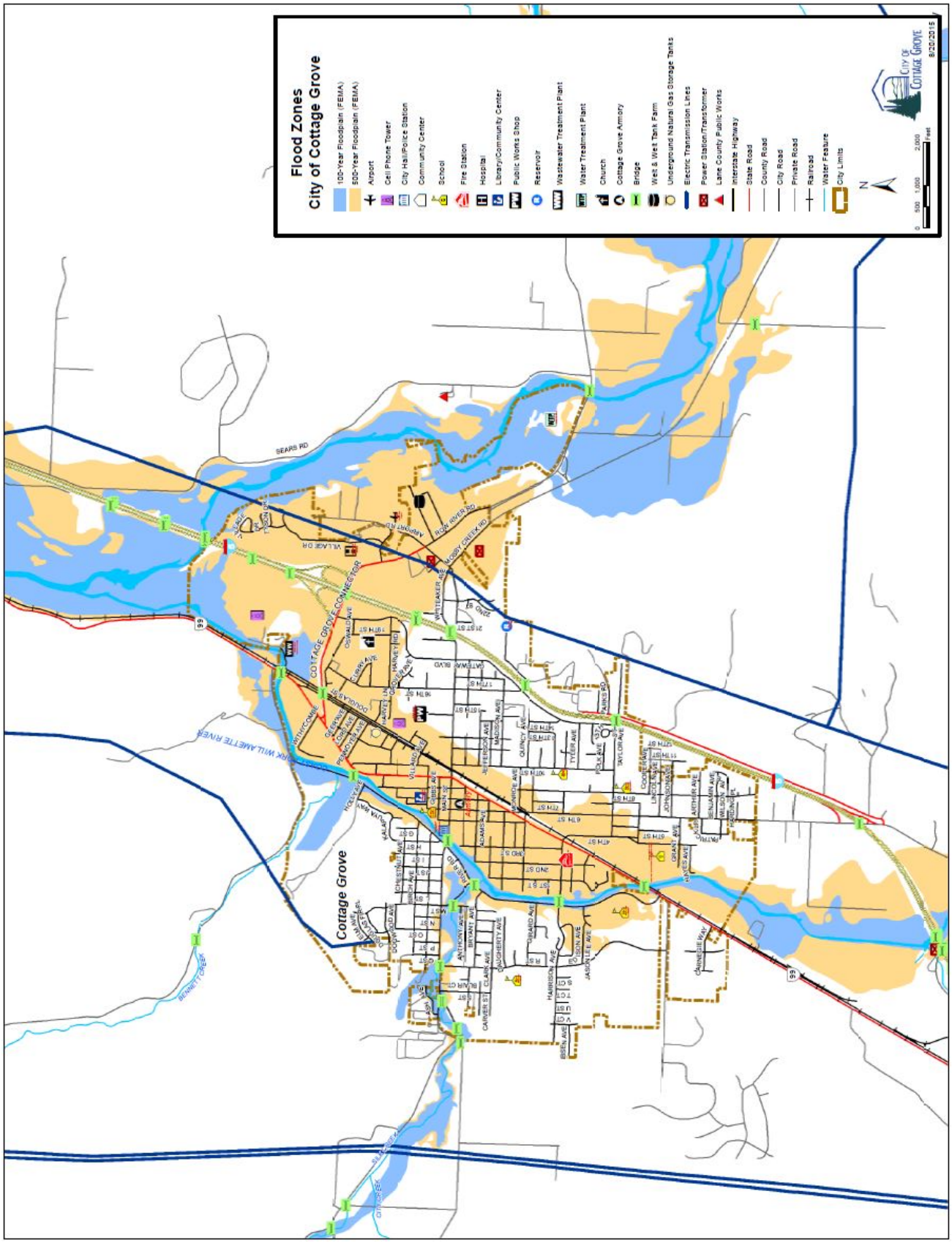

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Figure 14: Wildland Urban Interface

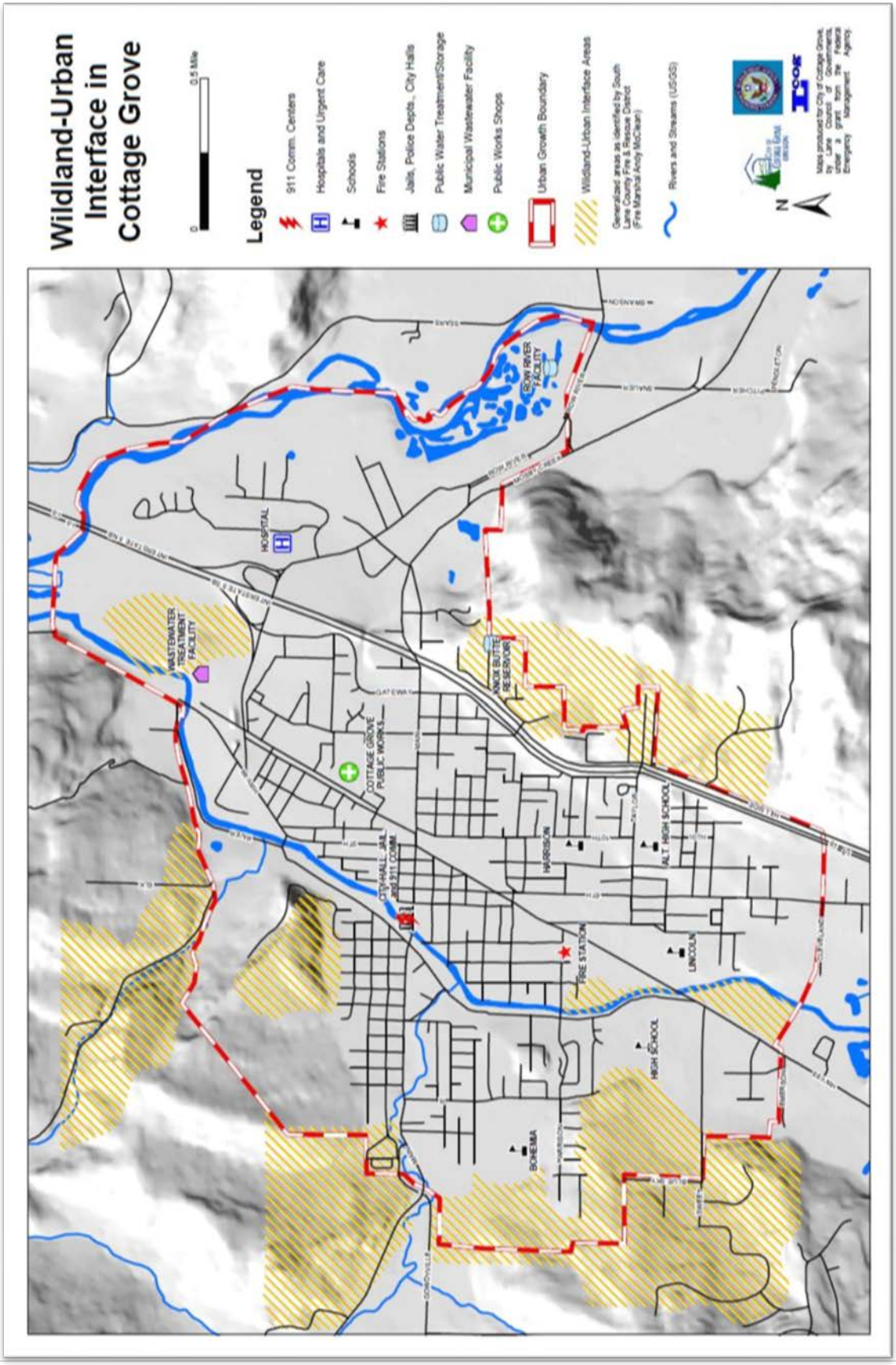

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Figure 15: Landslide Hazard Regions

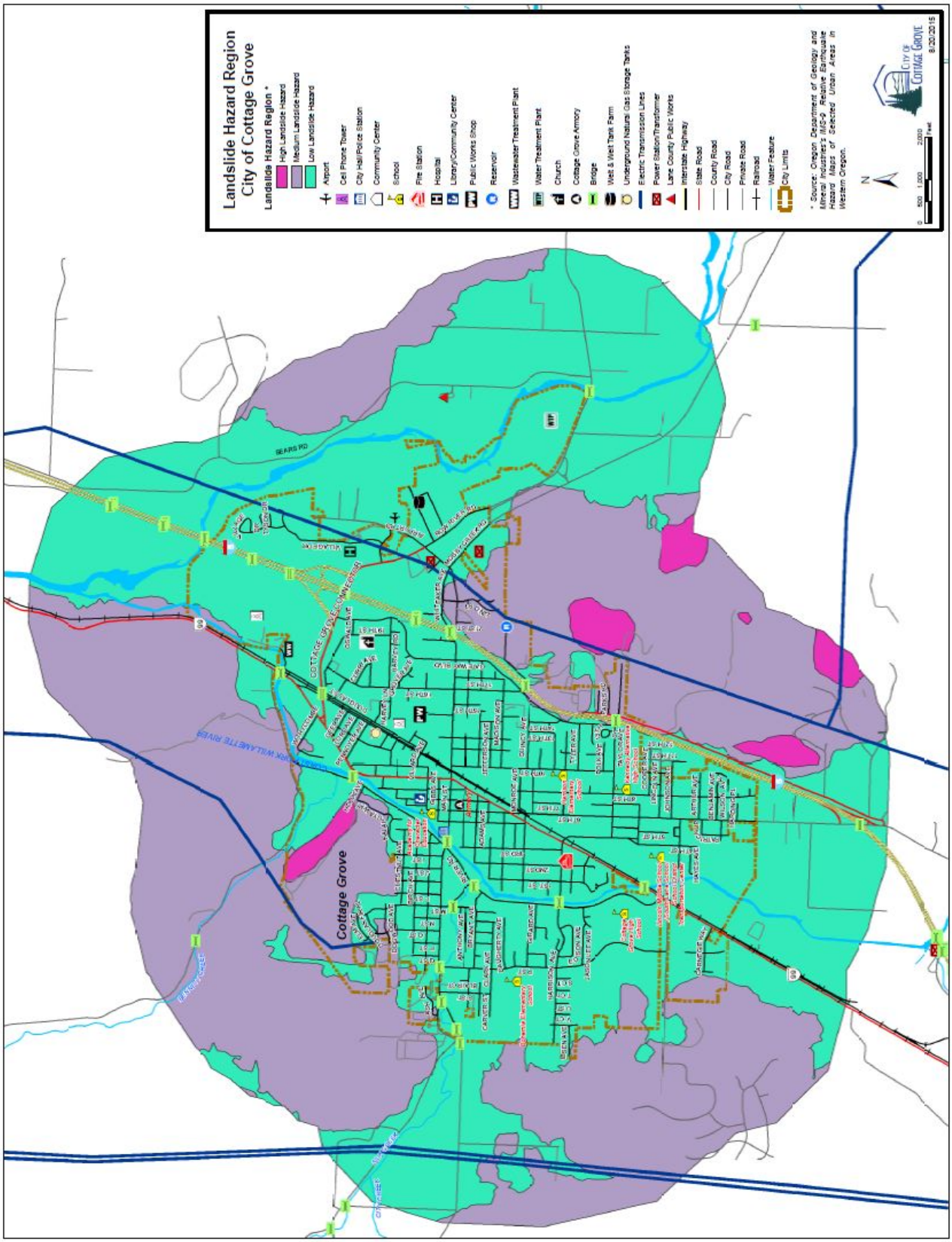

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Figure 16: Relative Earthquake Hazard

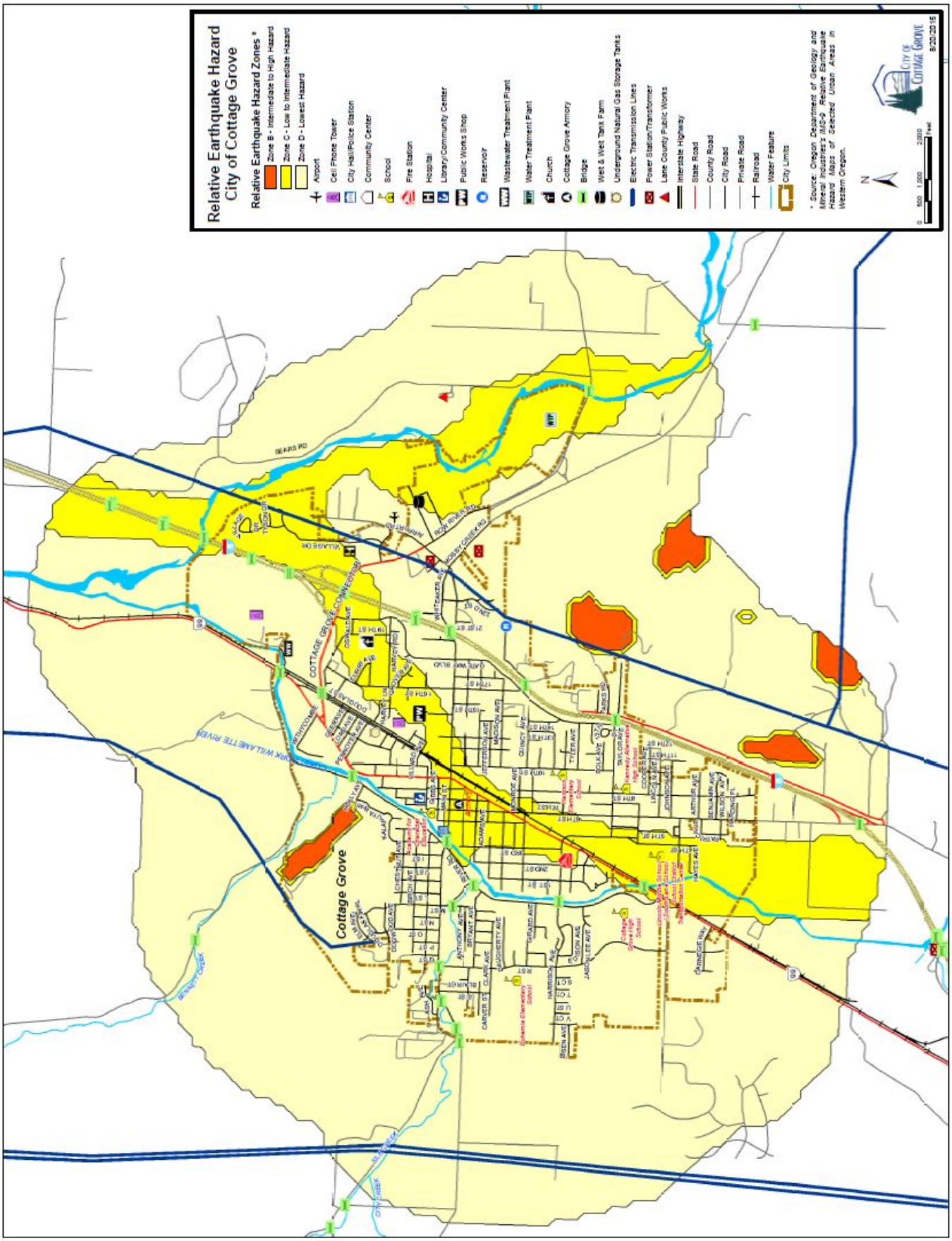

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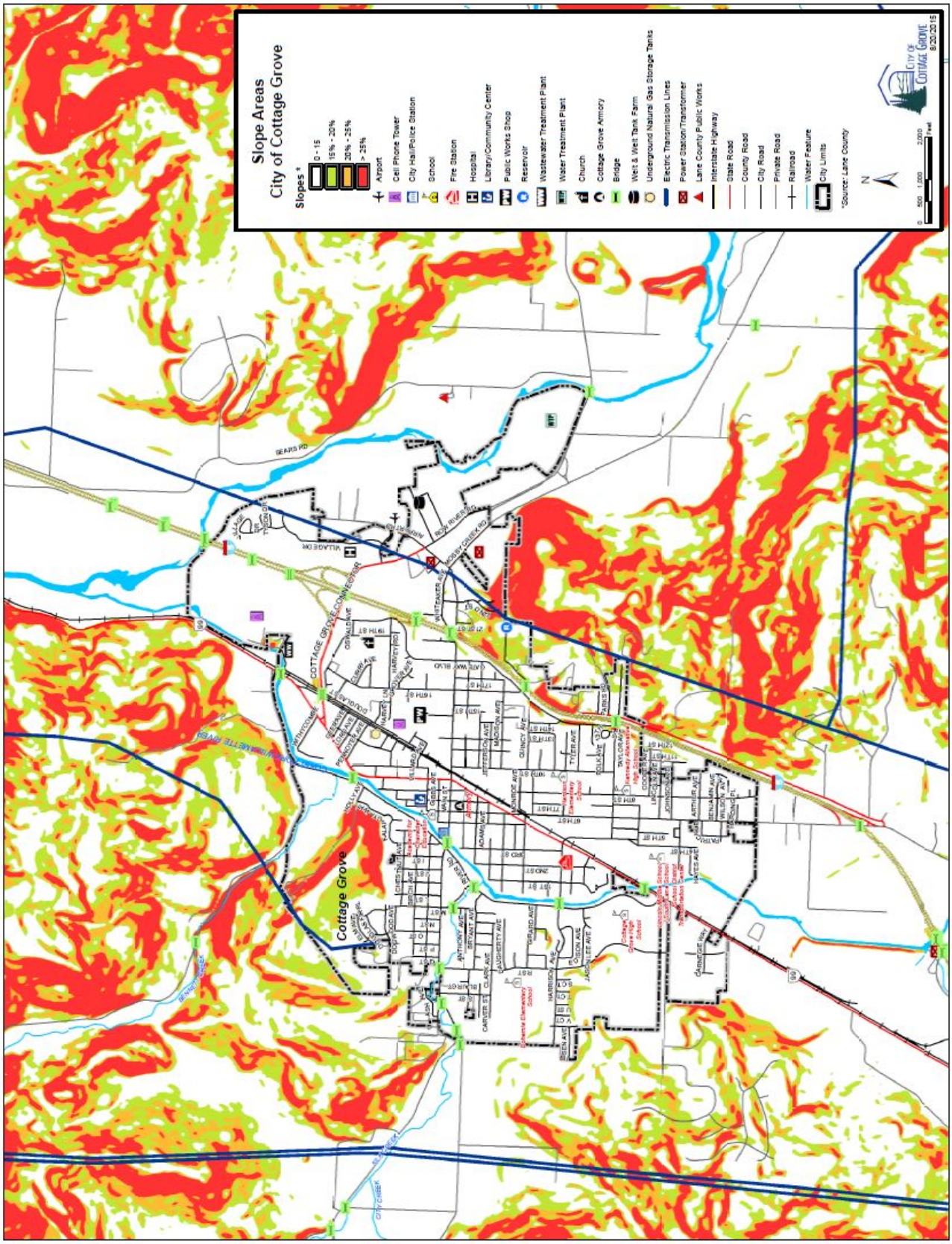
Figure 17: Slope Areas



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Appendix B: Critical Facilities

NHMP Critical Infrastructure and Key Facilities (% Land Area Impacted)	Flood (5%)	Landslide (<1%)	Earthquake (100%)	Winter Storm (100%)	Wildfire (20%)	Volcano (<1%)	Drought (100%)
Critical Facilities							
Cottage Grove City Hall	X		X	X			
Cottage Grove Police Department (911 Call Center and Dispatch), City Jail	X		X	X			
Cottage Grove Community Hospital	X		X	X			
City of Cottage Grove Public Works Shops (EOC #2)	X		X	X			
Water Treatment Facility (Row River)	X		X	X			X
Waste Water Treatment Plant	X		X	X	X		
South Lane County Fire and Rescue Fire Station #1	X		X	X			
Cottage Grove Schools	X		X	X			
Cottage Grove High School			X	X			
Our Lady of Perpetual Help Catholic Church (Red Cross Shelter)	X		X	X			
Knox Butte Reservoir		X	X	X	X		
Downtown Historical District			X				
Cottage Grove Lake Dam	X	X	X		X		X
Dorena Reservoir Dam	X	X	X		X		X

Table 5: City of Cottage Grove Infrastructure & Facility Hazard Vulnerability (cont.)

NHMP Critical Infrastructure and Key Facilities (% Land Area Impacted)	Flood (5%)	Landslide (<1%)	Earthquake (100%)	Winter Storm (100%)	Wildfire (20%)	Volcano (<1%)	Drought (100%)
Key Infrastructure							
Telephone Lines	X	X	X	X	X		
Wastewater Collection System	X		X	X			
Stormwater Collection System	X		X	X			
Cell Phone Towers	X		X	X			
Roads	X	X	X	X			
Cottage Grove State Airport	X		X	X	X		
NW Natural Gas Lines	X		X				
Overhead Power Lines	X	X	X	X	X		
Transportation Networks	X	X	X	X	X		
Bridges	X		X	X	X		
Central Oregon & Pacific Railroad Lines	X		X	X	X		
Water Treatment, Storage, and Distribution Lines	X		X	X			

Figure 18: Cottage Grove Critical Facilities

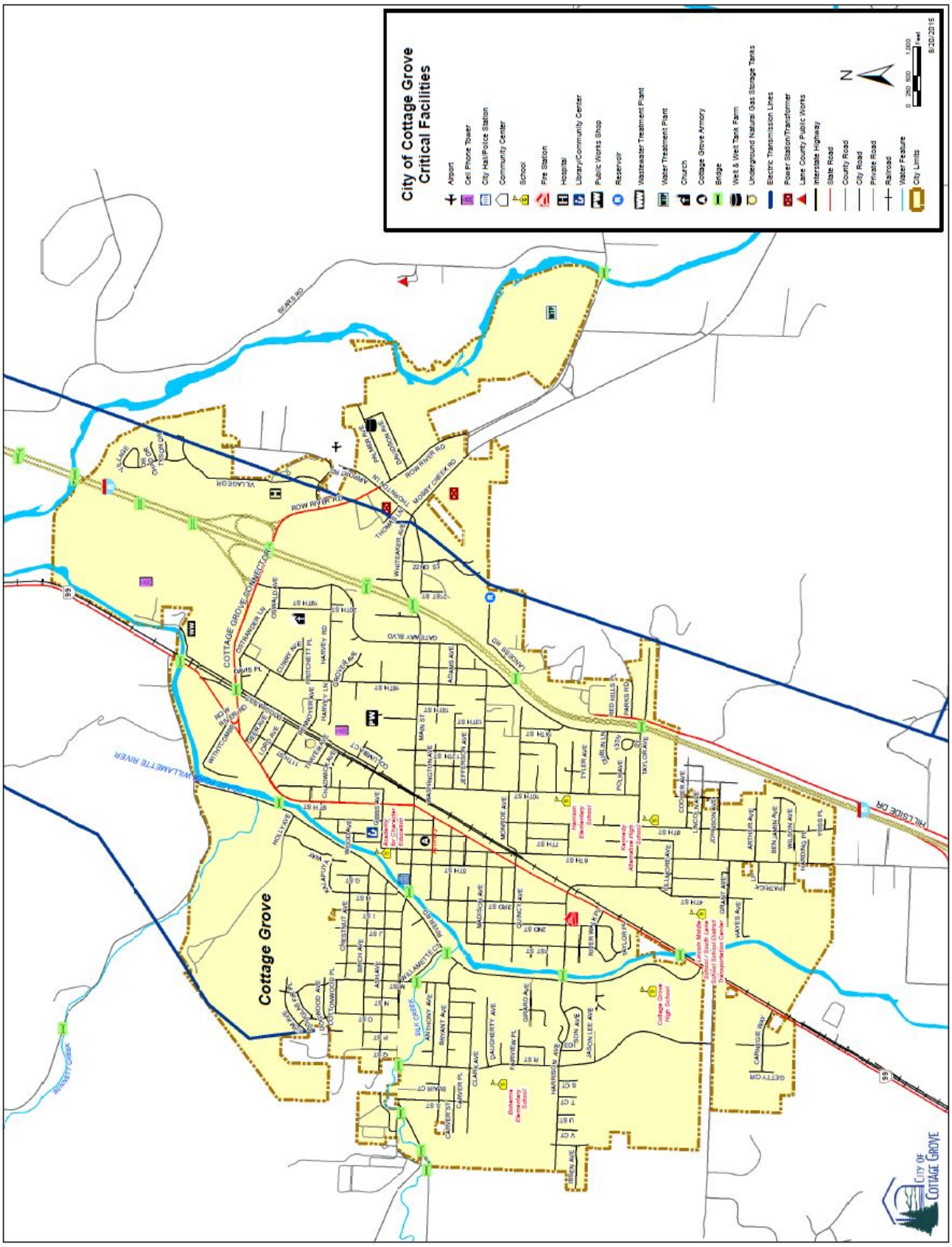

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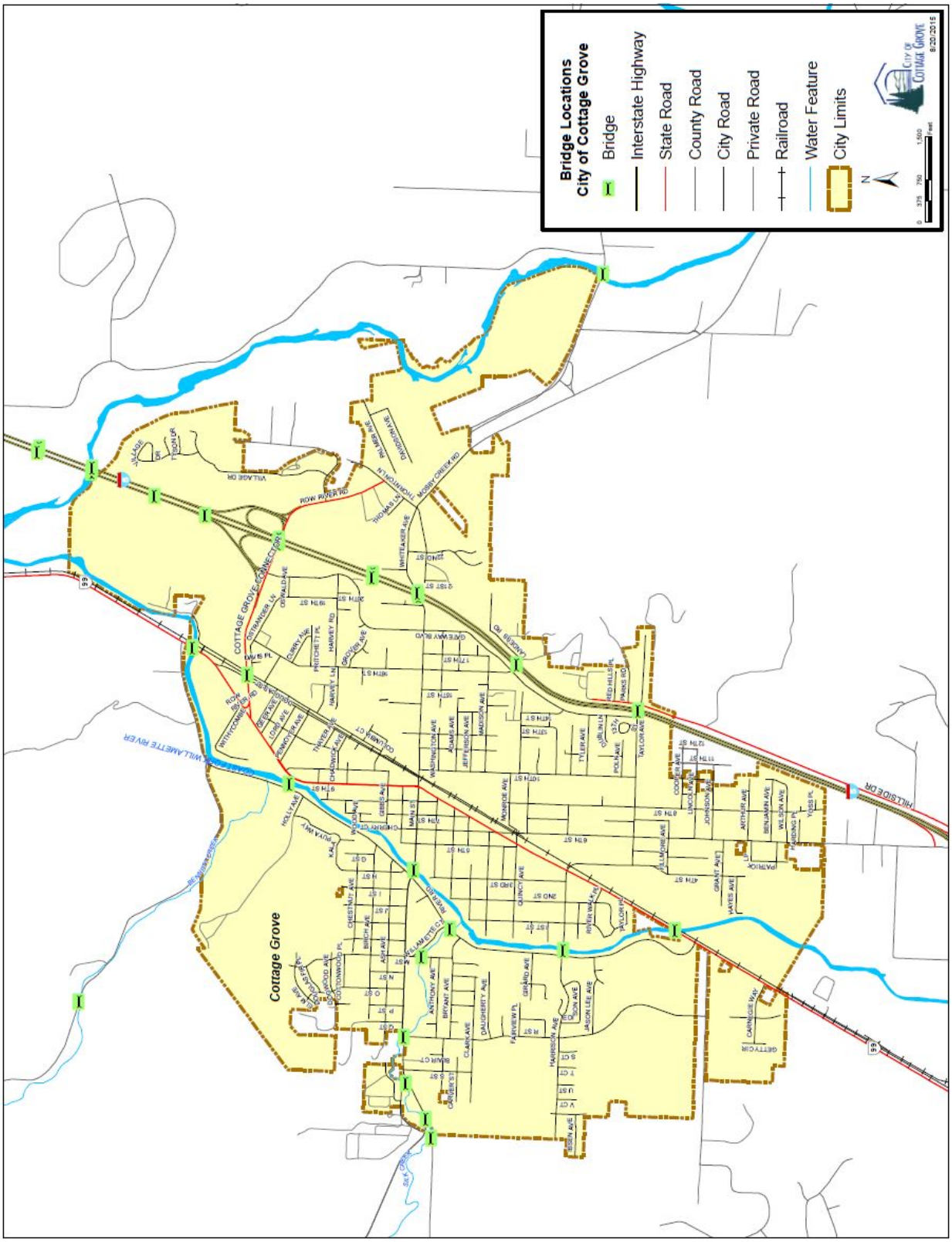
Figure 19: Cottage Grove Bridge Locations



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Appendix C: Action Item Table

NHMP Critical Facilities Land Area Impacted	Flood (5%)	Landslide (<1%)	Earthquake (100%)	Winter Storm (100%)	Wildfire (20%)	Volcano (<1%)	Drought (100%)
Critical Facilities							
Cottage Grove City Hall	X		X	X			
Cottage Grove Police Department (911 Call Center and Dispatch), City Jail	X		X	X			
Water Treatment Facility (Row River)	X		X	X			X
Waste Water Treatment Plant	X		X	X	X		
South Lane County Fire and Rescue Fire Station #1	X		X	X			
City of Cottage Grove Public Works Shops (EOC #2)	X		X	X			
Cottage Grove City Hall	X		X	X			
Cottage Grove Police Department (911 Call Center and Dispatch), City Jail	X		X	X			
Water Treatment Facility (Row River)	X		X	X			X
Waste Water Treatment Plant	X		X	X	X		

NHMP Critical Facilities Land Area Impacted	Flood (5%)	Landslide (<1%)	Earthquake (100%)	Winter Storm (100%)	Wildfire (20%)	Volcano (<1%)	Drought (100%)
South Lane County Fire and Rescue Fire Station #1	X		X	X			
City of Cottage Grove Public Works Shops (EOC #2)	X		X	X			
Cottage Grove Community Medical Center (Hosp.)	X		X	X			
Cottage Grove Schools	X		X	X			
Cottage Grove High School			X	X			
Downtown Historical District			X				
Cottage Grove Lake Dam	X	X	X		X		X
Dorena Reservoir Dam	X	X	X		X		X

Appendix D: Hazard Action Item Tables

Hazard	Action Name		Mitigation Action	Estimated Cost	Timeline	Responsible Agency/Department	Priority
Flood	Agency Coordination	1	Seek training and exercise opportunities with other agencies and jurisdictions.	Low	Ongoing	Community Development Dept. (CGCDD); ODOT; NW Natural Gas; Pacific Power; EPUD	High
		2	Work with USACE and FEMA on Upper Willamette Valley Flood Insurance Map Update project.	None / Staff Time	Ongoing	CGCDD; USACE; FEMA	Low
		3	Coordinate with Coast Fork Watershed Council, USACE, and Oregon Department of Fish and Wildlife on Row River Nature Park flood storage improvements.	High	3-5 Years	CGCDD; USACE; ODFFW; Coast Fork Willamette Watershed Council	Medium / High
		4	Participate in state-wide water management group led by USACE for flood controlled streams (join conference call held on a weekly, bi-weekly, or as needed basis). Participate in Northwest Regional Floodplain Management Association (NORFMA) and Association of State Floodplain Managers (ASFM).	Low / Staff Time	Ongoing	Public Works; CGCDD; NORFMA; ASFM	High
	Critical Facilities Protection	1	Evaluate and flood-proof City-owned Critical Facilities within the 500 year floodplain..	To be determined	Ongoing	CGCDD	Low
	Flood Loss Mitigation	1	Increase awareness of localized flood risk and safety: Use outreach programs to advise home and property owners of risks to life, property, health, and safety. Increase outreach to residential and commercial residents of the city on additional measures property owners can take to reduce their risk to flooding, and facilitate funding for mitigation measures.	Low	Ongoing	CGCDD; Public Works	High
		2	Extend the freeboard requirement.	Low	In Process	CGCDD	High
		3	Mitigate flooding by limiting or restricting how development occurs in flood prone areas through actions such as: Prohibit or limit floodway development through regulatory and/or incentive-based measures; Limit the density of developments in the floodplain; Require that floodways be kept as open space; Manage and enforce a riparian buffer ordinance to protect water resources and limit flood impacts; Limit fill in floodplain areas.	Low	In Process	CGCDD	High
		4	Develop a long term plan for Open Space land acquisitions (purchases by the City) for floodway protection (in 4 specific lots within the Floodplain).	High	Future	CGCDD	Low
	Floodplain Management	1	Designate a local floodplain manager and/or CRS coordinator who achieves Certified Floodplain Manager (CFM) certification.	Low	Completed / Ongoing	CGCDD	Medium
		2	Conduct NFIP community workshops to provide information and incentives for property owners to acquire flood insurance.	Low	1-3 Years	CGCDD	Low
		3	Require and maintain FEMA elevation certificates for all new and improved buildings located in floodplains. (Records are maintained in the Cottage Grove Community Development Office.)	Low	Ongoing	CGCDD	High
		4	Include requirements in the local floodplain ordinance for homeowners to sign non-conversion agreements for areas below BFE.	None / Staff Time	1-3 Years	CGCDD	High
		5	Maintain and provide access to Flood Insurance Rate Maps.	None / Staff Time	Ongoing	CGCDD	High
		6	Implement damage reduction measures for existing, publically owned, buildings such as acquisition, relocation, retrofitting, and maintenance of drainage ways and retention basins.	High	3-5 Years	CGCDD	Low
		7	Improve flood warning, emergency response, and evacuation planning. (Alert Sense)	Medium	Ongoing	CGCDD	High
	Stormwater Management and Improvement	1	Integrate Natural Hazard Mitigation plan goals and policies with Total Maximum Daily Loads (TMDL) plan goals and policies.	Low	Ongoing	Public Works; CGCDD	Medium
		2	Rehabilitate and manage riparian areas under city ownership to improve function; utilize stream restoration to ensure adequate drainage and diversion of storm water; and protect and enhance landforms that serve as natural mitigation features (i.e., riverbanks, wetlands, buffers etc.).	High TBD	Ongoing -> 3-5 Years	Public Works; CGCDD	Low
		3	Obtain and install a River Flow Gauge at the mouth of Mosby Creek at confluence of Row River.	Medium	3-5 Years	Public Works; CGCDD	Low
		4	Pursue funding for culvert resizing.	High	2-5 Years	Public Works; CGCDD	Medium
		5	Develop storm water management standards in Development Code.	Medium	1-3 Years	Public Works; CGCDD	High
		6	Enforce Riparian Development standards.	Low	Ongoing	Public Works; CGCDD; Coast Fork Willamette Watershed Council	Medium
		7	Coordinate with Coast Fork Watershed Council on riparian area restoration and education programs.	Low	Ongoing	Public Works; CGCDD; Coast Fork Willamette Watershed Council	Low
		8	Join or schedule yearly (or bi-annual) river/stream cleanup projects with the public at-large, and facilitate debris removal activities with Coast Fork Watershed Council and United States Forest Service (USFS) to use debris removed from the Coast Fork and Row Rivers for wildlife habitat in the Row River Nature Park.	Low	Annual / Biannual Basis	Public Works; CGCDD; Coast Fork Willamette Watershed Council	Medium
		9	Develop an open space acquisition, reuse, and preservation plan targeting hazard areas.	Low / Staff Time	3-5 Years	Public Works; CGCDD; Coast Fork Willamette Watershed Council	Medium
		10	Compensate an owner for partial rights, such as easement or development rights, to prevent a property from being developed.	High	Long term	Public Works; CGCDD; Coast Fork Willamette Watershed Council	Low

Hazard	Action Name		Mitigation Action	Estimated Cost	Timeline	Responsible Agency/Department	Priority
Landslide	Landslide Mitigation	1	Utilize Geospatial Information Systems (GIS) to map, identify, and study landslide hazard areas; develop and maintain a database to track community vulnerability to landslides.	Low	Ongoing / 1-3 Years	CGCDD	Low
		2	Develop and maintain a database to track community vulnerability to landslides.	Low / Staff Time	1-3 Years	CGCDD	Medium
		3	Locate utilities outside of landslide areas to decrease the risk of service disruption.	TBD - Project Specific	Ongoing	CGCDD; Public Works; EPUD; Pacific Power, NW Natural gas	High
	Evaluate Landslide Hazard on Mt. David	1	Begin the mitigation process on north slope of Mt. David through use of Geological Assessment in compliance with Cottage Grove City Development Code 3.7.100 Hillside Development.	Medium	1-3 Years	CGCDD	Medium
		2	Engage in long term program to purchase land at high risk of landslide (i.e., Mt. David)	High	3-5 Years	CGCDD	Low
		3	Create or increase setback limits on parcels near high-risk areas.	Medium	3-5 Years	CGCDD	Low
	Regulatory tools and enforcement	1	Create and adopt regulations regarding erosion control.	Low / Staff Time	3 Years	CGCDD	Medium
		2	Provide education to city staff on erosion control.	Low / Staff Time	Ongoing	Public Works; CGCDD	High
Wildfire	Incorporate wildfire mitigation in the comprehensive plan.	1	Include considerations of wildfire hazards in land use, public safety, and other elements of the comprehensive plan.	Low / Staff Time	Comp. Plan Update Item	CGCDD	High
		2	Recognize the existence of wildfire hazards and identify areas of risk based on a wildfire vulnerability assessment.	Low / Staff Time	1-3 Years	South Lane County Fire and Rescue District, CGCDD	Medium
		3	Describe policies and recommendations for addressing wildfire risk and discouraging expansion in the wildland-urban interface.	Low / Staff Time	Ongoing	CGCDD	Low
	Reduce risk to wildfire through land use planning	1	Use GIS mapping of wildfire hazard areas to facilitate analysis and planning decisions through comparison with zoning, development, infrastructure, etc.	Low	Lane County GIS LIDAR Mapping	South Lane County Fire and Rescue District, CGCDD	Medium
		2	Promote conservation of open space or wildland-urban boundary zones to separate developed areas from high-hazard areas.	Low / Staff Time	Ongoing	CGCDD	Low
	Participate in FireWise system	1	Join the "FireWise Communities/USA" recognition program sponsored by the National Wildlife Coordinating Group (firewise.org).	Low / Staff Time	Ongoing	CGCDD	High
		2	Sponsor FireWise workshops for local officials, developers, civic groups, and neighborhood/homeowners' associations.	Low	Ongoing	CGCDD	Low
	Decrease vulnerability and risk from wildfire to new and existing construction, and increase public awareness to wildfire risks and mitigations.	1	Offer GIS hazard mapping online (i.e., DOGAMI HAZVU) for residents, developers, and design professionals.	Low	Paused for LIDAR Map Data	CGCDD	Low
		2	Organize a local fire department tour to show local elected officials and planners the most vulnerable areas of the city's wildland-urban interface and increase their understanding of risks.	Low	Ongoing	CGCDD	Low
		3	Utilize local fire departments to conduct education programs in schools.	Low / Staff Time	Ongoing	CGCDD	Low
		4	Inform the public about proper evacuation procedures.	Low / Staff Time	Ongoing	CGCDD	Medium
		5	Empower and educate property owners about wildfire mitigation techniques which reduce the risk to property and life.	Low	Ongoing	CGCDD	Low
	Encourage Fire-safe construction practices for existing and new construction in high-risk areas.	1	Provide developers, homeowners, and businesses with fire-safe construction practices, and other mitigation options to reduce fire risk.	Low	Ongoing	South Lane County Fire and Rescue District, CGCDD	Low
		2	Explore FireWise construction and development practices for new development.	Low	Ongoing	CGCDD	Low
		3	Explore mitigation funding for existing houses on perimeter of city at risk to wildfire.	Low	Ongoing	CGCDD	Low

Hazard	Action Name		Mitigation Action	Estimated Cost	Timeline	Responsible Agency/Department	Priority
Winter-Severe Storm	Protect powerlines from winter and severe storms effects.	1	Continue to require all new construction including remodels, to include underground power lines.	Low	Ongoing	CGCDD	High
	Create A Debris Management Plan.	1	Determine major stakeholders, and begin planning process for a Debris Management Plan.	Low / Staff Time	3-5 Years	CGCDD; Public Works	Low
		2	Create a formal Memorandum of Understanding (MOU) with property owners for temporary storage of storm debris.	Low / Staff Time	3-5 Years	CGCDD; Public Works	Low
	Reduce hazards associated with un-trimmed trees on city property.	1	Survey City owned trees on a seasonal (spring and fall) basis.	Low / Staff Time	Ongoing	Public Works	Medium
		2	Trim tress identified as being in need, and schedule removal of diseased or dead trees.	Low / Staff Time	Ongoing	Public Works	Medium
	Ensure that critical facilites have backup power and emergency operations plans to deal with power outages.	1	Maintain backup power availability at Critical Facilities including the City EOC, backup EOC.	Low	Ongoing	Public Works	Low
Earthquake	Address Community vulnerability to seismic threats.	1	1. Develop an inventory of public and commercial and Historically significant buildings that may be particularly vulnerable to earthquake damage.	Low / Staff Time	Ongoing	CGCDD	High
		2	2. Inventory of buildings within Downtown Historic District vulnerable to earthquake damage, and investigate potential funding sources for building retrofits.	Low / Staff Time	Ongoing	CGCDD	High
		3	3. Develop mitigation strategies for seismic retrofitting of critical city structures and conduct seismic retrofitting for critical public facilities and historic structures within the Downtown Historical District most at risk to earthquakes.	Medium	1-5 Years / Ongoing	CGCDD	High
		4	4. Create an earthquake scenario to estimate potential loss of life and injuries, the types of potential damage, and existing vulnerabilities within a community to develop earthquake mitigation priorities.	Staff Time	1-3 Years	CGCDD	High
		5	5. Establish a school survey procedure and guidance document to inventory structural and non-structural hazards in and around school buildings.	Staff Time	1-3 Years	CGCDD South Lane County School District	High
		6	6. Assist with and/or develop program to fund seismic retrofit designs for historic buildings and encourage seismic retrofits as part of any alterations or remodels.	Staff Time	1-3 Years	CGCDD	High
	Evaluate and protect critical facilities and infrastructure.	1	Identify and harden critical lifeline systems (i.e., critical public services such as utilities and roads) to meet "Seismic Design Guidelines and Standards for Lifelines" or equivalent standards such as American Lifelines Alliance (ALA) guidance.	High	Ongoing	City Engineer; CGCDD	Medium
		2	Evaluate bridges for resilience to earthquake, and establish priority listing fro post event evaluation and repair.	Staff Time	Ongoing	City Engineer; Public Works; CGCDD	High
		3	Develop a process by which critical public buildings are prioritized for retrofitting based upon their role in recovery after an earthquake.	Low / Staff Time	1-3 Years	City Engineer; Public Works; CGCDD	Medium
Drought	Assess vulnerability to drought risk.	1	Gather and analyze water and climate data to gain a better understanding of local climate and drought history.	Low	Ongoing	CGCDD; Public Works	Low
		2	Identify factors that affect the severity of a drought.	Low	Ongoing	CGCDD	Low
		3	Identify available water sources.	Low	Very long term	CGCDD	Low
	Monitor drought conditions.	1	Identify local drought indicators, such as precipitation, temperature, surface water levels, soil moisture, etc.	Low	Ongoing	CGCDD; Public Works	Low
		2	Establish a regular schedule to monitor and record conditions on at least a monthly basis when drought conditions exist.	Low	Ongoing	CGCDD; Public Works	Low
	Monitor water supply	1	Regularly check for leaks to minimize water supply losses.	Low	Ongoing	Public Works	Medium
		2	Improve water supply monitoring through the installation of a USGS Monitoring system on Mosby Creek	Moderate	Future Project - grant funding	Public Works	High
		3	Develop a long range water conservation plan	Low		CGCDD; Public Works	Medium
All Hazards	Develop Community Involvement	1	Work with insurance companies, utility providers, and others to include wildfire safety information in materials provided to area residents.	Low	Long Term	CGCDD	Low
		2	Develop partnerships with neighborhood groups, homeowners' associations, and others to conduct outreach activities. (E.g., Community Emergency Response Teams, Map My Neighborhood etc.).	Low	Long Term	CGCDD	Medium
		3	Create a severe weather scenario to estimate potential damage and existing vulnerabilities within community to develop severe wind/weather mitigation priorities.	Low	1-2 Years	CGCDD	Low
		4	Develop tabletop or other exercises for the purposes of training city employees on how to respond to an emergency.	Medium/Staff Time	1-2 Years	CGCDD	High
		5	Develop exercises or events to strengthen community resilience through public participation and educational events.	Low	1 year	CGCDD	High

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Appendix E: Evaluation of Mitigation Strategies

Economic Analysis of Natural Hazard Mitigation Projects

This appendix was developed by the University of Oregon's Oregon Natural Hazards Workgroup and it outlines three approaches for conducting economic analysis of natural hazard mitigation projects. It describes the importance of implementing mitigation activities, different approaches to economic analysis of mitigation strategies, and methods to calculate costs and benefits associated with mitigation strategies. Information in this section is derived in part from: The Interagency Hazards Mitigation Team, *State Hazard Mitigation Plan,* (Oregon State Police – Office of Emergency Management, 2000), and Federal Emergency Management Agency Publication 331, *Report on Costs and Benefits of Natural Hazard Mitigatio*n. This section is not intended to provide a comprehensive description of benefit/cost analysis, nor is it intended to provide the details of economic analysis methods that can be used to evaluate local projects. It is intended to (1) raise benefit/cost analysis as an important issue, and (2) provide some background on how economic analysis can be used to evaluate mitigation projects.

Why Evaluate Mitigation Strategies?

Mitigation activities reduce the cost of disasters by minimizing property damage, injuries, and the potential for loss of life, and by reducing emergency response costs, which would otherwise be incurred. Evaluating possible natural hazard mitigation activities provides decision-makers with an understanding of the potential benefits and costs of an activity, as well as a basis upon which to compare alternative projects.

Evaluating mitigation projects is a complex and difficult undertaking, which is influenced by many variables. First, natural disasters affect all segments of the communities they strike, including individuals, businesses, and public services such as fire, police, utilities, and schools. Second, while some of the direct and indirect costs of disaster damages are measurable, some of the costs are non-financial and difficult to quantify in dollars. Third, many of the impacts of such events produce "ripple-effects" throughout the community, greatly increasing the disaster's social and economic consequences.

While not easily accomplished, there is value, from a public policy perspective, in assessing the positive and negative impacts from mitigation activities, and obtaining an instructive benefit/cost comparison. Otherwise, the decision to pursue or not pursue various mitigation options would not be based on an objective understanding of the net benefit or loss associated with these actions.

What are Some Economic Analysis Approaches for Evaluating Mitigation Strategies?

The approaches used to identify the costs and benefits associated with natural hazard mitigation strategies, measures, or projects fall into three general categories: benefit/cost analysis, cost-effectiveness analysis and the STAPLE/E approach. The distinction between the methods is outlined below:

Benefit/cost Analysis

Benefit/cost analysis is a key mechanism used by the state Office of Emergency Management (OEM), the Federal Emergency Management Agency, and other state and federal agencies in evaluating hazard mitigation projects..

Benefit/cost analysis is used in natural hazards mitigation to show if the benefits to life and property protected through mitigation efforts exceed the cost of the mitigation activity. Conducting benefit/cost analysis for a mitigation activity can assist communities in determining whether a project is worth undertaking now, in order to avoid disaster-related damages later. Benefit/cost analysis is based on calculating the frequency and severity of a hazard, avoided future damages, and risk. In benefit/cost analysis, all costs and benefits are evaluated in terms of dollars, and a net benefit/cost ratio is computed to determine whether a project should be implemented. A project worth pursuing will have a benefit/cost ratio greater than 1 (i.e., the net benefits will the exceed net costs).

Cost-Effectiveness Analysis

Cost-effectiveness analysis evaluates how best to spend a given amount of money to achieve a specific goal. This type of analysis, however, does not necessarily measure costs and benefits in terms of dollars. Determining the economic feasibility of mitigating natural hazards can also be organized according to the perspective of those with an economic interest in the outcome. Hence, economic analysis approaches are covered for both public and private sectors as follows.

Investing in public sector mitigation activities

Evaluating mitigation strategies in the public sector is complicated because it involves estimating all of the economic benefits and costs regardless of who realizes them, and potentially to a large number of people and economic entities. Some benefits cannot be evaluated monetarily, but still affect the public in profound ways. Economists have developed methods to evaluate the economic feasibility of public decisions which involve a diverse set of beneficiaries and non-market benefits.

Investing in private sector mitigation activities

Private sector mitigation projects may occur on the basis of one of two approaches: it may be mandated by a regulation or standard, or it may be economically justified on its own merits.

A building or landowner, whether a private entity or a public agency, required to conform to a mandated standard may consider the following options:

- Request cost sharing from public agencies;
- Dispose of the building or land either by sale or demolition;
- Change the designated use of the building or land and change the hazard mitigation compliance requirement; or
- Evaluate the most feasible alternatives and initiate the most cost effective hazard mitigation alternative.

The sale of a building or land triggers another set of concerns. For example, real estate disclosure laws can be developed which require sellers of real property to disclose known defects and deficiencies in the property, including earthquake weaknesses and hazards to prospective purchasers. Correcting deficiencies can be expensive and time consuming, but their existence can prevent the sale of the building. Conditions of a sale regarding the deficiencies and the price of the building can be negotiated between a buyer and seller.

STAPLE/E Approach

Conducting detailed benefit/cost or cost-effectiveness analysis for every possible mitigation activity could be very time consuming and may not be practical. There are some alternate approaches for conducting a quick evaluation of the proposed mitigation activities which could be used to identify those mitigation activities that merit more detailed assessment. One of these methods is the STAPLE/E Approach.

Using STAPLE/E criteria, mitigation activities can be evaluated quickly by steering committees in a systematic fashion. This criteria requires the committee to assess the mitigation activities based on the Social, Technical, Administrative, Political, Legal, Economic, and Environmental (STAPLE/E) constraints and opportunities of implementing the particular mitigation item in your community. The second chapter in FEMA's April How-To Guide "Developing the Mitigation Plan – Identifying Mitigation Actions and Implementation Strategies" as well as the "State of Oregon's Local Natural Hazard Mitigation Plan: An Evaluation Process" outline some specific considerations in analyzing each aspect. The following are suggestions for how to examine each aspect of the STAPLE/E Approach from the "State of Oregon's Local Natural Hazard Mitigation Plan: An Evaluation Process".

Social: Community development staff, local non-profit organizations, or a local planning board can help answer these questions:

- Is the proposed action socially acceptable to the community?
- Are there equity issues involved that would mean that one segment of the community is treated unfairly?
- Will the action cause social disruption?

Technical: The city or county public works staff, and building department staff can help answer these questions.

- Will the proposed action work?
- Will it create more problems than it solves?
- Does it solve a problem or only a symptom?
- Is it the most useful action in light of other community goals?

Administrative: Elected officials or the city or county administrator, can help answer these questions.

- Can the community implement the action?
- Is there someone to coordinate and lead the effort?
- Is there sufficient funding, staff, and technical support available?
- Are there ongoing administrative requirements that need to be met?

Political: Consult the mayor, city council or county planning commission, city or county administrator, and local planning commissions to help answer these questions.

- Is the action politically acceptable?
- Is there public support both to implement and to maintain the project?

Legal: Include legal counsel, land use planners, risk managers, and city council or county planning commission members, among others, in this discussion.

- Is the community authorized to implement the proposed action? Is there a clear legal basis or precedent for this activity?
- Are there legal side effects? Could the activity be construed as a taking?
- Is the proposed action allowed by the comprehensive plan, or must the comprehensive plan be amended to allow the proposed action?
- Will the community be liable for action or lack of action?
- Will the activity be challenged?

Economic: Community economic development staff, civil engineers, building department staff, and the assessor's office can help answer these questions.

- What are the costs and benefits of this action?
- Do the benefits exceed the costs?
- Are initial, maintenance, and administrative costs taken into account?
- Has funding been secured for the proposed action? If not, what are the potential funding sources (public, non-profit, and private)?
- How will this action affect the fiscal capability of the community?
- What burden will this action place on the tax base or local economy?
- What are the budget and revenue effects of this activity?
- Does the action contribute to other community goals, such as capital improvements or economic development?
- What benefits will the action provide? (This can include dollar amount of damages prevented, number of homes protected, credit under the CRS, potential for funding under the HMGP or the FMA program, etc.)

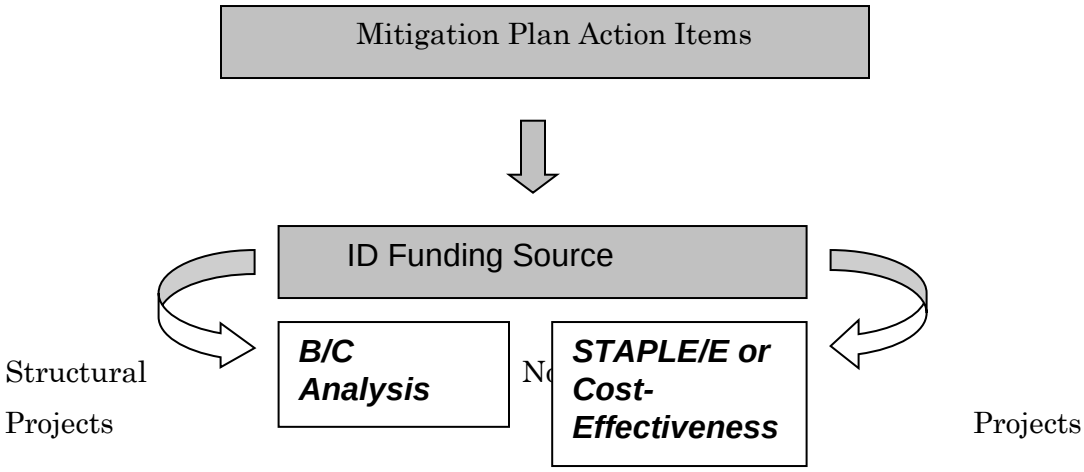
Environmental: Watershed councils, environmental groups, land use planners and natural resource managers can help answer these questions.

- How will the action impact the environment?
- Will the action need environmental regulatory approvals?
- Will it meet local and state regulatory requirements?
- Are endangered or threatened species likely to be affected?

The STAPLE/E approach is helpful for doing a quick analysis of mitigation projects. Most projects that seek federal funding and others often require more detailed Benefit/Cost Analyses.

When to use the Various Approaches

It is important to realize that various funding sources require different types of economic analyses. The following figure is to serve as a guideline for when to use the various approaches.



Implementing the Approaches

Benefit/cost analysis, cost-effectiveness analysis, and the STAPLE/E are important tools in evaluating whether or not to implement a mitigation activity. A framework for evaluating mitigation activities is outlined below. This framework should be used in further analyzing the feasibility of prioritized mitigation activities.

1. Identify the Activities

Activities for reducing risk from natural hazards can include structural projects to enhance disaster resistance, education and outreach, and acquisition or demolition of exposed properties, among others. Different mitigation project can assist in minimizing risk to natural hazards, but do so at varying economic costs.

2. Calculate the Costs and Benefits

Choosing economic criteria is essential to systematically calculating costs and benefits of mitigation projects and selecting the most appropriate activities. Potential economic criteria to evaluate alternatives include:

Determine the project cost. This may include initial project development costs, and repair and operating costs of maintaining projects over time.

***Estimate the benefit*s.** Projecting the benefits, or cash flow resulting from a project can be difficult. Expected future returns from the mitigation effort depend on the correct specification of the risk and the effectiveness of the project, which may not be well known. Expected future costs depend on the physical durability and potential economic obsolescence of the investment. This is difficult to project. These considerations will also provide guidance in selecting an appropriate salvage value. Future tax structures and rates must be projected. Financing alternatives must be researched, and they may include retained earnings, bond and stock issues, and commercial loans.

Consider costs and benefits to society and the environment. These are not easily measured, but can be assessed through a variety of economic tools including existence value or contingent value theories. These theories provide quantitative data on the value people attribute to physical or social environments. Even without hard data, however, impacts of structural projects to the physical environment or to society should be considered when implementing mitigation projects.

Determine the correct discount rate. Determination of the discount rate can just be the risk-free cost of capital, but it may include the decision maker's time preference and also a risk premium. Including inflation should also be considered.

3. Analyze and Rank the Activities

Once costs and benefits have been quantified, economic analysis tools can rank the possible mitigation activities. Two methods for determining the best activities given varying costs and benefits include net present value and internal rate of return.

- ***Net present value***. Net present value is the value of the expected future returns of an investment minus the value of expected future cost expressed in today's dollars. If the net present value is greater than the project costs, the project may be determined feasible for implementation. Selecting the discount rate, and identifying the present and future costs and benefits of the project calculates the net present value of projects.
- ***Internal Rate of Return***. Using the *internal rate of return* method to evaluate mitigation projects provides the interest rate equivalent to the dollar returns expected from the project. Once the rate has been calculated, it can be compared to rates earned by investing in alternative projects. Projects may be feasible to implement when the internal rate of return is greater than the total costs of the project. Once the mitigation projects are ranked on the basis of economic criteria, decision-makers can consider other factors, such as risk, project effectiveness, and economic, environmental, and social returns in choosing the appropriate project for implementation.

Economic Returns of Natural Hazard Mitigation

The estimation of economic returns, which accrue to building or landowner as a result of natural hazard mitigation, is difficult. Owners evaluating the economic feasibility of mitigation should consider reductions in physical damages and financial losses. A partial list follows:

- Building damages avoided
- Content damages avoided
- Inventory damages avoided
- Rental income losses avoided
- Relocation and disruption expenses avoided
- Proprietor's income losses avoided

These parameters can be estimated using observed prices, costs, and engineering data. The difficult part is to correctly determine the effectiveness of the hazard mitigation project and the resulting reduction in damages and losses. Equally as difficult is assessing the probability that an event will occur. The damages and losses should only include those that will be borne by the owner. The salvage value of the investment can be important in determining economic feasibility. Salvage value becomes more important as the time horizon of the owner declines. This is important because most businesses depreciate assets over a period of time.

Additional Costs from Natural Hazards

Property owners should also assess changes in a broader set of factors that can change as a result of a large natural disaster. These are usually termed "indirect" effects, but they can have a very direct effect on the economic value of the owner's building or land. They can be positive or negative, and include changes in the following:

- Commodity and resource prices
- Availability of resource supplies
- Commodity and resource demand changes
- Building and land values
- Capital availability and interest rates
- Availability of labor
- Economic structure
- Infrastructure
- Regional exports and imports
- Local, state, and national regulations and policies
- Insurance availability and rates

Changes in the resources and industries listed above are more difficult to estimate and require models that are structured to estimate total economic impacts. Total economic impacts are the sum of direct and indirect economic impacts. Total economic impact models are usually not combined with economic feasibility models.

Many models exist to estimate total economic impacts of changes in an economy. Decision makers should understand the total economic impacts of natural disasters in order to calculate the benefits of a mitigation activity. This suggests that understanding the local economy is an important first step in being able to understand the potential impacts of a disaster, and the benefits of mitigation activities.

Additional Considerations

Conducting an economic analysis for potential mitigation activities can assist decision-makers in choosing the most appropriate strategy for their community to reduce risk and prevent loss from natural hazards. Economic analysis can also save time and resources from being spent on inappropriate or unfeasible projects. Several resources and models are listed on the following page that can assist in conducting an economic analysis for natural hazard mitigation activities.

Benefit/cost analysis is complicated, and the numbers may divert attention from other important issues. It is important to consider the qualitative factors of a project associated with mitigation that cannot be evaluated economically. There are alternative approaches to implementing mitigation projects. Many communities are looking towards developing multi-objective projects. With this in mind, opportunity rises to develop strategies that integrate natural hazard mitigation with projects related to watersheds, environmental planning, community economic development, and small business development, among others. Incorporating natural hazard mitigation with other community projects can increase the viability of project implementation.

Resources

CUREe Kajima Project, *Methodologies For Evaluating The Socio-Economic Consequences Of Large Earthquakes*, Task 7.2 Economic Impact Analysis, Prepared by University of California, Berkeley Team, Robert A. Olson, VSP Associates, Team Leader; John M. Eidinger, G&E Engineering Systems; Kenneth A. Goettel, Goettel and Associates Inc.; and Gerald L. Horner, Hazard Mitigation Economics Inc., 1997.

Federal Emergency Management Agency, *Benefit/Cost Analysis of Hazard Mitigation Projects*, Riverine Flood, Version 1.05, Hazard Mitigation Economics Inc., 1996.

Federal Emergency Management Agency *Report on Costs and Benefits of Natural Hazard Mitigation.* Publication 331, 1996.

Goettel & Horner Inc., *Earthquake Risk Analysis Volume III: The Economic Feasibility of Seismic Rehabilitation of Buildings in The City of Portland*, Submitted to the Bureau of Buildings, City of Portland, August 30, 1995.

Goettel & Horner Inc., *Benefit/Cost Analysis of Hazard Mitigation Projects* Volume V, Earthquakes, Prepared for FEMA's Hazard Mitigation Branch, October 25, 1995.

Horner, Gerald, *Benefit/Cost Methodologies for Use in Evaluating the Cost Effectiveness of Proposed Hazard Mitigation Measures*, Robert Olson Associates, Prepared for Oregon State Police, Office of Emergency Management, July 1999.

Interagency Hazards Mitigation Team, *State Hazard Mitigation Plan*, (Oregon State Police – Office of Emergency Management, 2000).

Risk Management Solutions, Inc., *Development of a Standardized Earthquake Loss Estimation Methodology*, National Institute of Building Sciences, Volume I and II, 1994.

VSP Associates, Inc., *A Benefit/Cost Model for the Seismic Rehabilitation of Buildings*, Volumes 1 & 2, Federal Emergency Management Agency, FEMA Publication Numbers 227 and 228, 1991.

VSP Associates, Inc., *Benefit/Cost Analysis of Hazard Mitigation Projects: Section 404 Hazard Mitigation Program and Section 406 Public Assistance Program, Volume 3: Seismic Hazard Mitigation Projects*, 1993.

VSP Associates, Inc., *Seismic Rehabilitation of Federal Buildings: A Benefit/Cost Model*, Volume 1, Federal Emergency Management Agency, FEMA Publication Number 255, 1994.

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Appendix F: Plan Development Timeline

2005

General: The City of Cottage Grove developed the 2005 Hazards Mitigation Plan as an addendum to the Lane County All-Hazard Mitigation Plan in an effort to take a more regional approach to planning for natural hazard scenarios. The Natural Hazards Mitigation Plan Team was formed in February of 2003, and served to provide guidance and direction in the Natural Hazards Mitigation Plan by the City Council in 2005.

Activities: Community Development Department engaged in several community-wide planning activities that implemented elements of the 2005 Natural Hazards Mitigation Plan, including a 2050 Visioning project, Total Maximum Daily Load (TMDL) Implementation Planning process and plan adoption, extended work with the Coast Fork Watershed Council on floodplain and riparian protections, work with the 2006-2007 Development Code Advisory Committee on the adoption of new sensitive lands standards in 2008, and ongoing work with the Lane County Countywide Preparedness Group.

The original Natural Hazards Mitigation Plan Advisory Committee was used as an Advisory Committee for the TMDL Implementation Plan; information from this on-going planning process was used to inform changes made in the Update done in 2010.

Table 9: 2005 NHMP Action Items

Flood #1: Investigate FEMA's Community Rating System requirements to potentially lower flood insurance rates.
Flood #2: Improve upon localized flood hazard knowledge.
Flood #3: Inventory structures and infrastructure in the FEMA mapped floodway and explore mitigation options.
Flood #4: Address concerns associated with development in areas with high water tables.
Flood #5: Increase channel maintenance and debris removal from rivers and streams.
Flood #6: Update Storm Drainage Master Plan, determine and implement appropriate mitigation measures.
Flood #7: Improve public notification system in case of a dam break.
Landslide #1: Evaluate risk level for buildings identified in the landslide hazard area.

Landslide #2: Limit future development in high landslide potential areas.
Landslide #3: Adopt erosion control regulations for all development, especially in high landslide hazard areas. Wildland Fire #1: Encourage fire-safe construction practices for existing and new construction in high-risk areas.
Winter Storm #1: Decrease risk of power and utility outages by moving lines underground.
Winter Storm #2: Periodically survey trees on city property and trim as necessary.
Winter Storm #3: Ensure that critical facilities have backup power and emergency operations plans to deal with power outages.
Earthquake #1: Complete inventory of residential, commercial, and public buildings in Cottage Grove that may be particularly vulnerable to earthquake damage, including (but not limited to) unreinforced masonry buildings and wood frame buildings with cripple wall foundations and with sill plates not bolted to the foundation.
Earthquake #2: Complete seismic vulnerability assessments and develop mitigation strategies of seismic retrofit of critical public buildings identified as being particularly vulnerable.
Earthquake #3: Study and make necessary improvements to the water transmission line from Layng Creek.
Multi-Hazard #1: Complete inventories of buildings and infrastructure at risk from each hazard and prioritize mitigation projects to reduce the level of risk.
Multi-Hazard #2: Identify and pursue funding opportunities to develop and implement specific mitigation projects in Cottage Grove.
Multi-Hazard #3: Strengthen emergency preparedness and response capabilities.
Multi-Hazard #4: Integrate the information, objectives, mitigation strategies and action items into existing regulatory documents and programs.
Multi-Hazard #5: Update the Comprehensive Plan to meet State Land Use Planning Goal 7.
Multi-Hazard #6: Enhance awareness of natural hazards.
Multi-Hazard #7: Increase the medical resources capable of handling large-scale medical needs.
Multi-Hazard #8: Ensure that there are adequate shelter facilities in hazard-free zones to serve Cottage Grove residents.

2010

General: The 2005 Plan was due for an update by April 2010. In December 2009, a steering committee was formed to update the 2005 Plan.

This committee reviewed and updated the mission, goals and objectives of the 2005 Plan. They also reviewed and updated the plan's risk assessment, the mitigation actions, and the plan implementation and maintenance process. The planning process was designed to: (1) result in an updated plan that is Disaster Mitigation Act 2000 compliant; (2) coordinate with the State's plan and Lane County's plan; (3) build a network of local organizations that can play an active role in plan implementation; and (4) reflect any changes or new information that occurred since the plan's initial adoption in 2005.

This planning process was influenced by the work done by the Oregon Partnership for Disaster Resilience on the 2009 Eugene/Springfield Multi-Jurisdictional Natural Hazards Mitigation Plan, funded through a FEMA awarded Pre-Disaster Mitigation grant.

Table 10: 2010 NHMP Action Items

Flood Hazard 1: Improve upon localized flood hazard knowledge.
Flood Hazard 2: Inventory structures and infrastructure in the FEMA mapped floodway and explore mitigation options.
Flood Hazard 3: Coordinate with other local, state and federal agencies on floodplain improvements
Flood Hazard 4: Increase channel maintenance and debris removal from rivers and streams.
Flood Hazard 5: Adopt Storm Drainage Master Plan, and determine and implement appropriate mitigation measures.
Flood Hazard 6: Improve public notification system in case of a dam break.
Flood Hazard 7: Improve Riparian area health.
Landslide Hazard 1: Evaluate risk level for buildings identified in the Landslide hazard area.
Landslide Hazard 2: Limit future development in high landslide potential areas.
Landslide Hazard 3: Adopt erosion control regulations for all development, especially in high landslide hazard areas.
Landslide Hazard 4: Evaluate landslide hazard risk for Knox Hill Reservoir and mitigate as necessary.
Landslide Hazard 5: Improve knowledge of landslide hazard through better mapping.
Wildfire 1: Encourage fire-safe construction practices for existing and new

construction in high-risk areas.
Winterstorm 1: Decrease risk of power and utility outages by moving lines underground.
Winterstorm 2: Periodically survey trees on city property and trim as necessary.
Winterstorm 3: Ensure that critical facilities have backup power and emergency operations plans to deal with power outages.
Winterstorm 4: Develop plans for snow emergency and roof clearance.
Earthquake 1: Complete and maintain inventory of critical infrastructure in Cottage Grove that may be particularly vulnerable to earthquake damage, including (but not limited to) unreinforced masonry buildings and infrastructure.
Earthquake 2: Complete seismic vulnerability assessments and develop mitigation strategies of seismic retrofit of critical public buildings and facilities identified as being particularly vulnerable.
Earthquake 3: Complete and maintain inventory of commercial and multi-family residential buildings in Cottage Grove that may be particularly vulnerable to earthquake damage, including (but not limited to) unreinforced masonry buildings and wood frame buildings with cripple wall foundations and with sill plates not bolted to the foundation.
Earthquake 4: Complete necessary improvements to the Row River Water Treatment Plant.
Earthquake 5: Participate in ODOT Bridge review program.
Multi Hazard 1: Complete inventory of buildings and infrastructure at risk from each hazard and prioritize mitigation projects to reduce the level of risk.
Multi Hazard 2: Identify and pursue funding opportunities to develop and implement specific mitigation projects in Cottage Grove.
Multi Hazard 3: Strengthen emergency preparedness and response capabilities.
Multi Hazard 4: Integrate the information. Objectives, mitigation strategies and action items into existing regulatory documents and programs.
Multi Hazard 5: Update the Comprehensive Plan and Development Code to meet State Land Use Planning Goal 7.
Multi Hazard 6: Enhance awareness of natural hazards.
Multi Hazard 7: Increase the medical resources capable of handling large-scale medical needs.
Multi Hazard 8: Ensure that there are adequate shelter facilities in hazard-free zones to serve Cottage Grove residents.

Activities:

Steering Committee Meeting (February, 2010)

The committee met to review and update as necessary plan goals and objectives; (2) develop a stakeholder list and approve a public involvement plan; and (3) develop a project timeline.

Steering Committee Meeting (March, 2010)

The committee met again in early March to (1) review and update the city's hazard profile and vulnerability estimates; (2) review and make recommendations on mitigation strategies; and (3) discuss stakeholder survey content.

Agendas from those meeting were included as part of the City's Appendix to the Lane County Natural Hazards Mitigation Plan Update. Once defined, the public involvement schedule and project goals were uploaded to the City's website and a notice of the upcoming planning process was sent to all City water service customers.

Stakeholder Identification

As part of the public involvement plan, the Steering Committee identified a group of stakeholders that may be impacted by or have some control over the impacts of natural hazards in Cottage Grove. Representatives from the following organizations were contacted via mail and email to inform them on the ongoing project and request comment on revised mitigation strategies:

- The Building Department
- Cottage Grove Historical Society
- Cottage Grove Area Chamber of Commerce
- Coast Fork Willamette Watershed Council
- City of Cottage Grove Public Works, Engineering
- City of Cottage Grove, Maintenance
- City of Cottage Grove, Sewer & Water
- South Lane County Fire and Rescue District
- Lane County Transportation Planning
- Oregon Department of Forestry
- U.S. Forest Service
- Department of State Lands
- Lane County Waste Management
- Lane County Land Management
- ODOT Region 5
- Pacific Power & Light
- NW Natural
- Emerald People's Utility District
- Peace Health
- South Lane School District
- Cottage Grove Economic & Business Improvement District

- Visioning Committee
- U.S. Army Corps of Engineers
- Department of Land Conservation & Development

Public Open House & Steering Committee meeting (June 2010)

The Steering Committee met to review final draft mitigation strategies as prepared by Community Development Department staff at a meeting in June at City Hall in an Open House format. The drafts were made available on-line for public comment two weeks before the open house.

All stakeholders had received email and written invitations to attend the Open House. Additionally, all water-bill customers within Cottage Grove received a public notice of the meeting. The public open house was also published in the Sentinel and advertised on-line and at various public locations throughout Cottage Grove. Comments taken at the meeting were incorporated into the final draft of the document. (See Appendix for copies of public notice, meeting materials and meeting attendance.)

Final Draft

Staff created a draft 2011 Natural Hazards Mitigation Plan Update integrating comments received during the open house. This draft was sent to the State Hazard Mitigation Office and to FEMA Region 5 for review and comment to verify that the City was on the right track. Comments were incorporated into the draft prior to release to the public.

State Hazard Mitigation Officer Review (November 2011)

The final approved draft of the 2011 Update was sent to the State Hazard Mitigation Officer and to FEMA for review. Upon receipt of approval pending adoption, City staff began the process for local adoption.

Final adoption (April 2012)

The Cottage Grove City Council is responsible for adopting the City of Cottage Grove Natural Hazards Mitigation Plan as well as the Lane County All-Hazard Mitigation Plan as an addendum to the Cottage Grove Plan.

The City Council adopted the final draft of the document through Resolution No. 1802 on April 23, 2012.

2015-16 Update

In June of 2015, the decision was made to update the City's current NHMP as Lane County was also in the process of updating its NHMP in order to incorporate changes made in state level planning guidelines. The Cottage Grove NHMP Update is being undertaken early in the 5 year planning cycle in order to make it adaptable

to new FEMA mitigation planning standards released in 2013, and in coordination with efforts undertaken by Lane County Emergency Management.

The process began with a review of the current plan as it was adopted in April of 2012. The changes to the 2016 plan update include a significant change in the format of the document, and a very thorough review of existing Mitigation Actions. Mitigation Actions are now listed in a concise table format, and separate tables outlining Critical Infrastructure and Key Resources (CIKR), and the Natural Hazards to which they are vulnerable. Below is the timeline of development:

2015-16 NHMP Update Timeline	
October	• Form Advisory Committee • Invitees: o South Lane County Fire and Rescue – Justin Baird o Cottage Grove Police Department – Dan White o Planning Commission – Alan Widener o City Council - Garland Burbank o Community Development Department - Howard Schesser o City Planner - Amanda Ferguson o Public Works – Jan Wellman o Water Treatment – Jan Wellman o Finance Department – Bert Olson • Contact Stakeholders with Initial Information
December	• Advisory Committee • Review Proposed Mitigation Actions
March 2016	• Public Forum on survey results, proposed mitigation measures
April	• Advisory Committee: Review Second Draft Plan • Public Meeting on Draft Plan
May	• Final Draft of plan to stakeholders (written notice, plan on-line) • Advisory Committee: final Draft Review • Planning Commission – Draft Review • Revise as necessary based on comments
June	• Final Draft of Plan made available to City Council for comment
September	• Final Draft of Plan open for public comment on website
October	• Final Draft of Plan to OEM

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Appendix G: Public Meeting Documentation

44 CFR Requirement 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: (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. (3) Review and incorporation, if appropriate, of existing plans, studies, reports, and technical information.

Outlined below are the highlights of Cottage Grove Natural Hazards Mitigation Plan Advisory Committee meetings and general mitigation activities undertaken during this planning cycle. These activities demonstrate the committed and diverse involvement of community members, local government, regional agencies, the public, and various stakeholders.

The 2016 Natural Hazards Mitigation Plan Advisory Committee began meeting in late December 2015. Committee members included staff from Public Works, Community Development, South Lane Fire & Rescue District, Cottage Grove City Council, Cottage Grove Planning Commission, Coast Fork Willamette Watershed Council, and representatives from recognized neighborhood groups. Lane County Emergency Management acted as an ex-officio member of the committee, receiving agenda packets prior to each meeting. The list of stakeholders from the 2010 planning process was used for notification purposes.

Meetings were held in the Sinclair Room at City Hall, 400 E. Main Street. Public meetings were held on December 18th, 2015 and April 25, 2016. Information was sent out to the community about the meetings through press releases and website updates at least 2 weeks before each meeting, and current drafts of the document were available to review as it was being developed on the City's website, www.cottagegrove.org. The final document was made available for review by City Council and stakeholders in June 2016. In September, the final draft was placed on the City's website for public comment for 30 days. No additional comments were received during this public comment period. The final draft was then forwarded to the Oregon Office of Emergency Management (OEM) for their review in October, 2016.

AGENDA

Natural Hazards Mitigation Update

Advisory Committee Meeting

December 18, 2015

11:00 AM

Sinclair Room, City Hall

Cottage Grove, Oregon. 97424

1. Review of previous plan – Why we are updating early
2. Review New Action Items
3. Update on Project timeline / Public Involvement Plan
4. Schedule future meeting

AGENDA

Natural Hazards Mitigation Update

Advisory Committee Meeting

April 25, 2016

1:30pm

Sinclair Room

1. Introductions
2. Review the Draft Natural Hazard Mitigation Plan Update.
3. Review the Hazard Actions and cost and time requirements
4. Next Steps

TIMELINE 2010:

February	• Form Advisory Committee • Goals and Objectives • Identify Stakeholders
March	• Contact Stakeholders with Initial Information • Website Page Developed • Advisory Committee: Identify Proposed Mitigation Measures • Develop Stakeholder Survey
April	• Stakeholder Survey on Mitigation Measures
May	• Public Forum on survey results, proposed mitigation measures • Advisory Committee: Review survey results and finalize mitigation measures
June	• Develop draft plan
July	• Advisory Committee: Review first Draft Plan • Public Meeting on Draft Plan
August	• Final Draft of plan to stakeholders (written notice, plan on-line) • Advisory Committee: final Draft Review • Revise as necessary based on comments
September	• Final Draft of plan to OEM • Final Draft of Plan to City Council

Community Involvement in Plan Update

February 2010-Fall 2010

1. Establish Advisory Committee (February 2010)
    - Emergency Management
    - Public Works
    - Community Development (planning department)
    - Community Services
    - Finance
    - Coast Fork Willamette Watershed Council
    - Planning Commission
2. Identify Stakeholders (February/March 2010)
    - City representatives
        - 2030 Vision group
        - City Council
        - Building Official
        - Cottage Grove Public Works, Engineering
        - Cottage Grove Maintenance
    - representatives of regional, state, and federal agencies
        - South Lane Fire & Rescue
        - US Forest Service
        - Department of State Lands
        - ODOT Region 5
        - Office of Emergency ManagementOffice of Emergency Management
        - Oregon Department of Fish & Wildlife
        - US Army Corps of Engineers
        - Lane County Transportation Planning
        - Lane County Waste Management
        - Lane County Land Management
    - Utilities
        - PP&L
        - EPUD
        - NW Natural
    - Critical Facilities
        - Peace Health
        - Assisted Living facilities
        - Lane Community College
        - South Lane School District
    - property owners, homeowners, renters
    - Friends of Mt. David
    - EBID & Chamber of Commerce
    - Service clubs (Rotary, Lions, Kiwanis, etc.)

- land developers, real estate agents, lenders (Realty Board, Homebuilders Association)
- neighboring jurisdictions (Lane County, Creswell, E/S, LCOG)

3. Contact Stakeholders:

1) at beginning of process (February/March 2010)

3) with survey on mitigation strategies (March/April 2010)

2) with draft plan (August 2010)

4. Identify outreach & education activities

1. Stakeholder contact (February/March 2010):

-- initial mailing with timeline for project, goals and objectives, contact information

2. Website update (Ongoing)

-- include timeline for project, updated goals, draft plan, contact information, survey link

3. Stakeholder survey (March/April 2010):

Monkey survey for stakeholders (including public link on website, and email to identified stakeholders) on proposed mitigation strategies

Survey report on line & incorporated in findings of draft plan

4. Public Open House (May 2010)

-- when draft mitigation strategies prepared, prior to final draft

5. Public meeting (July 2010)

-- review of final draft

6. Final Draft review & comment (August 2010)

-- notice to stakeholders of final draft completion

-- final draft available on line for comment

5. Adoption

1) Public Hearing at City Council (September 2010)

DATE: May 24, 2010

TO: Potential Stakeholders

FROM: City of Cottage Grove
Natural Hazard Mitigation Advisory Committee

RE: **Cottage Grove Natural Hazard Mitigation Plan Update**

Dear Potential Stakeholder:

The City of Cottage Grove has initiated a planning process to update our 2016 Natural Hazard Mitigation Plan. We would like to invite you to participate in the 5-year update of this important planning document.

We have formed an Advisory Committee to work with staff to update the plan. To date, the Advisory Committee, which is comprised of representatives from the Planning Commission, City Council, implicated city departments, and the Coast Fork Watershed Council, have met twice, to review the plan's goals and mission, develop a project timeline, and recommend amendments to existing mitigation priorities. I have attached the 2010 Natural Hazard Mitigation Plan's Mission & Goals for your review.

We will hold an **OPEN HOUSE** on June 16th, at City Hall, from 5:30-6:30pm to present revised/updated Mitigation Strategies. Proposed mitigation strategies will be available on-line at www.cottagegrove.org for your review by June 5. Please feel free to send any comments or questions regarding these strategies to planner@cottagegrove.org.

Our next step will to develop a draft mitigation plan, which will be taken to public comment during the Summer of 2010.

When the draft plan is available in August, we would like to send your agency a copy for review and comment. If you are not interested in receiving a draft of the plan, please let me know at the email above or by phone at (541) 942-3340.

We welcome your participation in the planning process. Thank you in advance for your time.

Sincerely,

Amanda Ferguson
City Planner
planner@cottagegrove.org

NATURAL HAZARD MITIGATION PLAN UPDATE 2010

The City of Cottage Grove is working on updating our 2005 Natural Hazards Mitigation Plan. Staff is working with an Advisory Committee to update our plan to reflect current federal, state and local regulations and needs. We hope to have a final draft ready for adoption by September, 2010. We welcome your participation and feedback in the planning process!

What are the Natural Hazard Mitigation Plan's Mission and Goals?

Plan Mission

The mission of the City of Cottage Grove Natural Hazards Mitigation Plan is to promote sound public policy designed to protect citizens, critical facilities, infrastructure, and property from natural hazards. This can be achieved by increasing public awareness, documenting resources for risk reduction and loss-prevention, and identifying activities to guide the City towards a safer, more sustainable community.

Plan Goals

The plan goals provide guidance in developing specific action items from the general mission statement. The goals describe the overall direction the City of Cottage Grove desires to work towards in mitigating the effects of natural hazards.

Protect Life and Property

- Implement activities that assist in protecting life and property from losses due to natural hazards.

- Reduce losses and repetitive damage from chronic hazard events.
- Improve hazard assessment information to make recommendations for discouraging new development in areas vulnerable to natural hazards.
- Encourage preventative measures in existing vulnerable areas.
- Recovery from disaster

Public Awareness

- Develop and implement educational outreach programs to increase public awareness of the hazards associated with natural disasters.
- Provide information on tools, partnerships, and funding resources to assist in implementing hazard mitigation actions.

Emergency Services

- Establish policy to ensure mitigation for critical facilities, services, and infrastructure.
- Coordinate and integrate natural hazard mitigation activities with emergency operations plans and procedures.

Partnerships and Implementation

- Strengthen communication and coordinate participation among and within public agencies, citizens, non-profit organizations, businesses, and industry.
- Encourage leadership within the public and private sectors to prioritize and implement local, county, and regional hazard mitigation activities.

State/National Guidelines

- Meet the Federal Emergency Management Associations (FEMA) mitigation planning requirements so Cottage Grove remains eligible for pre- and post-disaster mitigation funding from FEMA.
- Continue to comply with National Flood Insurance Program requirements.
- Office of Emergency ManagementMeet Oregon's Goal 7 natural hazard planning guidelines.

Advisory Committee Makeup:

- Howard Schesser, Emergency Program Director
- Jan Wellman, Public Works Director
- Bert McClintock, Finance Director
- Amanda Ferguson, City Planner
- Pam Reber, Coast Fork Watershed
- Lindsey Haskell, Cottage Grove Planning Commission

Upcoming Events:

Open House to present Mitigation Strategies – _____(Insert Date Here)_____

Draft Available for Comment to Public -- _____

Final Draft to Stakeholders -- _____

FORE MORE INFORMATION, CONTACT:

Amanda Ferguson
City Planner, Community Development Department
400 E. Main Street
Cottage Grove, OR 97424
(541) 942-3340
planner@cottagegrove.org
www.cottagegrove.org

RESOLUTION NO. 1802

A RESOLUTION ADOPTING
THE COTTAGE GROVE NATURAL HAZARDS MITIGATION PLAN

WHEREAS, a Natural Hazards Mitigation Plan has been prepared by the City in compliance with the criteria outlined in 44 CFR Part 201; and,

WHEREAS, the Natural Hazards Mitigation Plan includes resources and information to assist the city government, residents, public and private sector organizations, and others interested in participating in planning for natural hazards; and

WHEREAS, the Natural Hazards Mitigation Plan provides a list of activities that may assist the City of Cottage Grove in reducing risk and preventing loss from future hazard; and,

WHEREAS, the Natural Hazards Mitigation Plan is a collaborative effort between the City of Cottage Grove and local stakeholders. The Natural Hazards Mitigation Plan Team was formed in February 2003 and assisted in the preparation of this; and

WHEREAS, the plan was reviewed at a public meeting, and a public hearing before the Planning Commission; and

WHEREAS, City Council of Cottage Grove approved the Natural Hazards Mitigation Plan in 2005 by adopting Resolution No. 1586 on December 19, 2005 following approval by the Federal Emergency Management Agency (FEMA) on November 25, 2005; and

WHEREAS, the 2005 Natural Hazards Mitigation Plan had a requirement to be reviewed every five years; and

WHEREAS, a planning process was established that included the formation of a Natural Hazards Mitigation Plan Update Steering Committee, Work Sessions, Stakeholder Notification, Public Open House, Public Posting on City Website, and submissions to the State Hazard Mitigation Officer and FEMA Region X Risk Analysis Branch, Mitigation Division; and

WHEREAS, with approval of this plan by the City and FEMA the City will maintain eligibility for the Pre-Disaster Mitigation Grant Program, the Hazard Mitigation Grant Program, and the Flood Mitigation Assistance Program; and

WHEREAS, the Natural Hazards Mitigation Plan has been reviewed by the Oregon State Office of Emergency Management and Region X of FEMA; and

WHEREAS, Region X of FEMA approved the Natural Hazards Mitigation Plan on March 30, 2012 subject to the adoption of the plan by the City Council of the City of Cottage Grove; and

NOW, THEREFORE, BE IT RESOLVED that the ***2011 Natural Hazard Mitigation Plan***, set forth in Exhibit "A" is hereby adopted.

This resolution will take effect immediately.

PASSED BY THE COMMON COUNCIL AND APPROVED BY THE MAYOR THIS 23rd DAY OF April, 2012.

ATTEST:

Richard Meyers, City Manager
Date: April 23, 2012

APPROVED:

Gary Williams, Mayor
Date: April 23, 2012