

# Volume III: City Addendum City of Gearhart, Oregon

## Natural Hazard Mitigation Plan

The City of Gearhart developed this addendum to the Clatsop County Multi-Jurisdiction Natural Hazard Mitigation Plan in an effort to increase the community's resilience to natural hazards. The addendum focuses on the natural hazards that could affect the City of Gearhart, Oregon, including flood/heavy rain, windstorm, winter storm, El Nino/La Nina, earthquake, tsunami, forest fire/wildfire, landslide/subsidence, dust storm, volcanic hazard, and drought. It is impossible to predict exactly when disasters may occur, or the extent to which they will affect Gearhart. However, with 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 hazards.

The addendum provides a set of actions that aim to reduce the risks posed by natural hazards through education and outreach programs, the development of partnerships, and the implementation of preventative activities such as land use and watershed management programs. The actions described in the addendum are intended to be implemented through existing plans and programs within Gearhart.

The steps included in this natural hazard mitigation plan include:

- (1) adoption by the local governing body: by resolution after approval date
- (2) multi-jurisdiction plan adoption: by resolution after approval date
- (3) documentation of multi-jurisdiction plan participation
- (4) documentation of the local planning process
- (5) identifying hazards that can affect the jurisdiction
- (6) profiling hazards and events that can and have affected the jurisdiction
- (7) assessing vulnerability: identifying assets and community hazard impacts
- (8) assessing vulnerability: identifying potential losses (confidential data)
- (9) assessing vulnerability: analyzing development trends
- (10) multi-jurisdictional risk assessment: assessing local risks
- (11) local hazard mitigation goals
- (12) identification and analysis of mitigation measures: Gearhart action items
- (13) implementation of mitigation measures: prioritization, implementation, and administration of action items using a cost benefit analysis
- (14) multi-jurisdiction mitigation strategy: specific action items are included in section 12
- (15) monitoring, evaluating, and updating the plan: five-year cycle update schedule
- (16) implementation through existing programs: mitigation incorporated into plans
- (17) continued public involvement: how to ensure continued public participation

### **1. Adoption by the Local Governing Body:**

*Documentation that the plan has been formally adopted by the governing body*

\_\_\_\_\_ : The City of Gearhart will adopt the Gearhart Natural Hazard Mitigation Plan by resolution when FEMA determines that the plan is complete. Gearhart will submit this documentation of adoption to OEM and FEMA.

### **2. Multi-jurisdiction plan adoption:**

*Documentation that the plan has been formally adopted by the governing body*

\_\_\_\_\_ : Gearhart will adopt the Clatsop County Multi-Jurisdiction Natural Hazard Mitigation Plan by Resolution when FEMA determines that the Plan is complete. Gearhart will submit this documentation of adoption to OEM and FEMA.

## How the Gearhart Addendum was developed:

### 3. Documentation of Multi-jurisdiction Plan Participation

*Documentation of participation in the multi-jurisdiction plan development*

Fall 2006 Oregon Partnership for Disaster Resilience (OPDR) at the University of Oregon (UO) Community Service Center partners with Oregon Emergency Management (OEM) and Clatsop County to develop a pre-disaster mitigation planning grant to develop a natural hazard mitigation plan.

Clatsop County Commissioners sign a memorandum of understanding for this project.

Grant awarded by OEM

Fall 2007 The Clatsop County Sheriff Emergency Services Department hires Columbia River Estuary Study Taskforce (CREST) to facilitate the development of a multi-jurisdiction natural hazard mitigation plan for county and city.

The Clatsop County Multi-Jurisdiction Natural Hazard Mitigation Plan Steering Committee is established.

Steering committee role:

- coordinate local plan development with section for multi-jurisdiction plan
- organize internal meetings
- organize public involvement
- meet with steering committee
- plan and information published at website: [www.oregonshowcase.org](http://www.oregonshowcase.org)

April 16, 2008: Mission statement developed:  
"To create a disaster resilient Clatsop County"

### Public Events

January 11, 16, 17: Daily Astorian publishes media announcement of process

February 12, 2008 City of Seaside holds Open-for-Business Workshop: property protection and disaster planning

April 30, 2008: City of Seaside Civic and Convention Center: Emergency Preparedness Fair.

May 1, 2008: Public meeting at Clatsop Community College Performing Arts Center to answer questions about the process.

November 12, 2009: Town hall meeting – HMP noticed with minutes.

## City of Gearhart Natural Hazard Mitigation Plan

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April 13, 2010:	Tsunami awareness/emergency preparedness meeting
December 08, 2011	Planning Commission and staff prioritized hazards. Staff compiled data. Planning Commission volunteered for hazard mitigation emergency prep committee.
April 21, 2012	Gearhart community preparedness meeting at the Gearhart Volunteer Fire Station.
May 8, 2014	Planning Commission and staff identify hazards/profile hazards
June 12, 2014	Planning Commission and staff assess vulnerability/existing plans and policies/multi-jurisdiction risk assessment.
July 10, 2014	Review hazard mitigation goals and action items
August 14, 2014	Review with planning commission
September 11, 2014	Review with planning commission
October 9, 2014	Review with planning commission

### Steering Committee Meetings

- November 15, 2007: The steering committee met to discuss the purpose and outcomes of the process by answering questions about what is mitigation, why it is important, the role of the steering committee, the plan mission and goals, the public involvement strategy and to review the state community profiles, and approve a memorandum of understanding to participate in the process.
- February 14, 2008: The steering committee met at Bob Chisholm Community Center in Seaside to draft community profiles, hazard plans, and city addendums. The committee reviewed maps, developed stakeholder lists, and planned public forums.
- April 16, 2008: The steering committee met in the Warrenton City Hall City Commissioners' Room to finalize the mission statement and to plan goals. Committee members developed the initial list of mitigation items for the county plan and met with city representatives to discuss addendum plan progress.
- August 7, 2008 The steering committee met to present and prioritize mitigation action items and finalize the county plan and city addendums. The steering committee decided that biannual meetings will be held in May and November of each year. The next update to each local plan is due five years from the date the county plan is approved.
- November 10, 2011 Gearhart planner and staff met to discuss two committees for HMP planning.

### Steering Committee Schedule:

- Semi-Annual Meetings: In November and May of each year, steering committee members will meet to coordinate action item priorities. Stakeholder meeting dates and events will be planned at these meetings.
- Five Year Update: An update to the local plan is due five years from the date the county plan is approved.

## Clatsop County Multi-Jurisdiction Hazard Mitigation Plan

### Steering Committee Members

#	Organization	Name	Phone Number	Email
1	Clatsop County EMD	Tom Manning (Emergency Mgr) Tiffany Brown (Emergency Mgr)	(503) 325-8645 (503)338-3774	<a href="mailto:tmanning@co.clatsop.or.us">tmanning@co.clatsop.or.us</a> <a href="mailto:tbrown@co.clatsop.or.us">tbrown@co.clatsop.or.us</a>
2	Clatsop County Development Director	Jennifer Bunch (GIS & Lead Planner)	(503) 325-8611	<a href="mailto:jbunch@co.clatsop.or.us">jbunch@co.clatsop.or.us</a>
3	CC Elected / Appointed Official	(County Planning Chair)	(503) 325-8611	
4	County Public Health	Michael McNickle (Environmental Health)	(503) 325-1000 (extension 1927)	<a href="mailto:mmcnickle@co.clatsop.or.us">mmcnickle@co.clatsop.or.us</a>
5	City of Astoria	(Planner)	(503) 338-5183	<a href="mailto:rjohnson@astoriaor.us">rjohnson@astoriaor.us</a>
6	City of Warrenton	(Planning Director)	(503) 861-0920	<a href="mailto:Planningdirector@ci.warrenton.or.us">Planningdirector@ci.warrenton.or.us</a>
7	City of Seaside	(Planning Director)	(503) 738-7100	<a href="mailto:kcupples@cityofseaside.us">kcupples@cityofseaside.us</a>
8	City of Cannon Beach	(Planning Consultant)	(503) 436-1581 x 118	<a href="mailto:mays@ci.cannon-beach.or.us">mays@ci.cannon-beach.or.us</a>
9	City of Gearhart	Chad Sweet (City Administrator)	(503) 738-5501 / (503) 355-8282	<a href="mailto:cityadmin@freedomnw.com">cityadmin@freedomnw.com</a>
10	OSU Sea Grant	Patrick Corcoran (Coastal Hazards)	(503) 325-8573	<a href="mailto:Patrick.corcoran@oregonstate.edu">Patrick.corcoran@oregonstate.edu</a>
11	Columbia Memorial Hospital	Tara Dyrset (Emergency Prep. Coordinator)	(503) 338-7505	<a href="mailto:tara_dyrset@columbiamemorial.org">tara_dyrset@columbiamemorial.org</a>
12	Port of Astoria	Lora Eddy	(503) 325-0435	<a href="mailto:leddy@columbiaestuary.org">leddy@columbiaestuary.org</a>
13	Seaside School District	Doug Dougherty	(503) 738-5591	<a href="mailto:ddougherty@seaside.k12.or.us">ddougherty@seaside.k12.or.us</a>
14	Fire Defense Board Chief	Ron Tyson	(503)298-8524	<a href="mailto:rtyson@pacifier.com">rtyson@pacifier.com</a>
15	Clatsop Community College	Joann Zahn (Vice President – Finance & Operations)	(503) 338-2421	<a href="mailto:jzahn@clatsopcc.edu">jzahn@clatsopcc.edu</a>
16	CREST	(Coastal Planner)	(503)325-0435	<a href="mailto:jflint@columbiaestuary.org">jflint@columbiaestuary.org</a>

### **Gearhart Planning Process:**

#### **4. Documentation of the Local Planning Process**

*A narrative description that explains the plan's development process, including who led the development at the staff level, any external contributors such as contractors, who was involved, who provided information, who reviewed drafts, and how the public was involved.*

In November 2007, with authorization from the Gearhart City Council, Gearhart City Administrator Dennis McNally began the process of developing the Gearhart Hazard Mitigation Plan. McNally participated in the multi-jurisdiction planning process and began a draft plan with the assistance of the multi-jurisdiction steering committee and the plan facilitator hired by CREST. McNally reviewed the draft with the Gearhart fire chief, building official, police chief, and planner.

In April of 2008, Gearhart Planner Sabrina Pearson began reviewing the draft with the Gearhart Planning Commission. The commission reviewed the draft updates at each subsequent public planning commission meeting held April 10, May 8, June 12, July 10, August 14, and October 9. The draft is written in Microsoft Word (.doc) format and converted to an Adobe Acrobat (.pdf) file. This will enable the city to make necessary edits and updates and to upload the document onto the Gearhart city website.

On October 14, 2008, Gearhart submitted a printed copy and an electronic DVD copy of the Gearhart Natural Hazard Mitigation Plan to Oregon Emergency Management (OEM), FEMA Federal Emergency Management Agency, and Clatsop County.

In November 2013, Gearhart participated in the Clatsop County multi-jurisdiction meeting with the Clatsop County OEM.

### 5. Identifying Hazards

*The risk assessment includes a description describing the characteristics of each hazard for each type of probable natural hazard that can affect the jurisdiction.*

The following hazards are considered to be of risk to the City of Gearhart in Clatsop County:

#### 1. FLOOD / HEAVY RAIN

Flooding generally occurs quickly due to heavy concentrated rainfall. Tidal changes in conjunction with high winds and/or snow accumulation at higher elevations have influence on the severity as well. Flood season is in effect from November 1 through March 31. Principal riverine flood sources in Gearhart are Neacoxie Creek, Neawanna Creek, and Necanicum River.

#### 2. WINDSTORM

Wind storm hazards are common in Gearhart and usually result in localized power outages or large scale power outages, which can affect all of Clatsop County. Windstorms can reach hurricane strength in the exposed areas and damage to homes and property is not unusual during the winter months. Structures the most vulnerable to high winds include insufficiently anchored manufactured homes and older buildings in need of roof repair. It is essential that tie down standards are enforced. Fallen trees can affect emergency operations by blocking roads and can down power and utility lines. Strategic pruning and establishing a tree removal and maintenance program is prudent.

#### 3. WINTER STORM

In most cases this hazard is limited to the mountain passes in Clatsop County with limited impact to the populated area. The hazard results in travel hazards throughout the county and both localized and large-scale power outages, which are more serious with low temperatures.

#### 4. EL NINO/LA NINA

Water temperatures in the Pacific Ocean play an important factor in determining the event of localized weather patterns. Some of our worst flood events coincide with La Nina where water temperatures are below average along the equator. El Nino sets up most of the weather pattern south of Gearhart, which can lead to dry or drought conditions. With La Nina we are at a higher risk for flood and severe weather patterns, and with El Nino we have a higher wildland fire hazard or drought.

#### 5. EARTHQUAKE

This hazard is created by tectonic movement within the earth's crust. This movement is manifested as localized ground shaking and may include soil liquefaction and ground subsidence. After the initial seismic event, tremors or aftershocks can occur for an extended period of time resulting in additional structural damage to buildings and public facilities. Additionally there are earthquake fault lines throughout the Willamette Valley and the Cascadia Subduction Zone approximately 65 miles off the Oregon coastline. The movement of the Pacific Plate and Juan de Fuca Plate with the North American Plate may create a more serious situation not only to the magnitude of the earthquake itself, but also the likely tsunami which would immediately be generated.



### 6. TSUNAMI

This is a series of traveling ocean waves of extremely long length and period, generated by disturbances associated with earthquakes. As it enters the shoaling water of coastlines in its path, the velocity of its waves diminishes and wave height increases. In shallow waters they can crest to heights up to 40-60 feet and become a threat to life and property. The Gearhart coastline is particularly vulnerable with all residents in need of early warning.

### 7. FOREST FIRE/WILDFIRE

A major threat in Clatsop County is forest fire in the large areas of public and private forest lands. Needles from the trees are highly flammable. There is a high forest fire hazard particularly during the dry months of August, September, and October. The City of Gearhart is also surrounded by grasslands particularly on the ocean dunes that have potential for fire danger.

### 8. LANDSLIDE/SUBSIDENCE

This hazard is the downslope movement of rock, soil, or other debris or the opening of sink holes. These hazards are often associated with other incidents such as heavy rainfall, snow melt run-off, and floods or earthquakes. Our past history has been that we have frequent landslides during the rainy months on our mountain roads, highways, and city streets. The landslide hazard within Gearhart includes the erosion of ocean beaches. Beach landslides in addition to regular landslides increase this hazard in its severity level for the county.

### 9. DUST STORM/SAND STORM

Dust storms are rare in Clatsop County; however, Gearhart does suffer from blowing sand and sand storms that are mitigated by the maintenance of vegetated dunes. The Oregon Department of State Parks and the City of Gearhart work together with property owners in addressing this problem. City ordinances require the maintenance of vegetation on exposed sand areas. Sand storms could bury oceanfront homes without the stabilizing effect of vegetation.

### 9. VOLCANIC HAZARD

Another hazard experienced in some areas of Clatsop County in 1980 included volcanic ash. The eruption of the Mount St. Helen's Volcano in the Cascade Range created 4-6 inches of ash fallout. An epidemiological emergency could occur particularly within the rural agricultural community including salmon habitat and wildlife habitat. The volcanic ash was very difficult to remove and damaged some road maintenance equipment.

### 10. DROUGHT

Historically, Clatsop County has very few drought years. However, when drought conditions prevail, area creeks and fish can suffer. In addition, the surrounding forest is more susceptible to disease and the Clatsop plains and forests are susceptible to wildland fire.

### 6. Profiling Hazard Events

*The risk assessment identifies the location and extent of all natural hazards that can affect the jurisdiction. The Plan includes information on previous occurrences of hazard events and on the probability of future hazard events.*

Gearhart obtained a regional risk assessment from the Oregon Natural Hazard Mitigation Plan Oregon Coast Regional Profile for Region 1 (2012) included in the Gearhart Natural Hazard Mitigation Plan as an appendix to this document. The regional plan is important as it accurately identifies the location of each hazard addressed in the plan, the extent of each hazard identified in the plan, previous occurrences of each natural hazard, and the probability of future hazard events. Probability and vulnerability scores are upgraded or downgraded depending on the locality characteristics using existing plans, maps, and historical documentation.

The regional profile determination of probability and vulnerability is summarized below. Details of local occurrences are included in the Oregon Coast Regional Profile.

#### Probability

H: High = One incident likely within a 1 to 35 year period

M: Moderate = One incident likely within a 35 to 75 year period

L: Low = One incident likely within a 75 to 100 year period

#### Vulnerability

H: High = More than 10% affected

M: Moderate = 1% to 10% affected

L: Low = Less than 1% affected

	<b>Hazard</b>	<b>Probability</b>	<b>Vulnerability</b>	<b>Local Occurrences?</b>
1	Flood/Heavy Rain	H	H	Yes
2	Windstorm	H	H	Yes
3	Winter Storm	H	H	Yes
4	El Nino/La Nina	H	H	Yes
5	Earthquake	M	H	Yes
6	Tsunami	M	H	Yes
7	Forest fire/Wildfire	H	M	Yes
8	Landslide/Subsidence	H	M	Yes
9	Dust Storm	H	L	Yes
10	Volcanic	L	M	Yes
11	Drought	L	L	Yes

## Gearhart Community Profile

### 7. Assessing Vulnerability: Identifying Assets

*The plan provides an overall summary description of the community vulnerability to each hazard and the potential hazard impact on the community.*

#### **Hazards**

The natural hazards that could affect the City of Gearhart, Oregon, include flood/heavy rain, windstorm, winter storm, El Nino/La Nina, earthquake, tsunami, forest fire/wildfire, landslide/subsidence, dust storm, volcanic hazard, and drought. The State of Oregon provides a detailed description of the community vulnerability to each hazard documenting probability for the Oregon Coast Region; this State of Oregon documentation is included in the multi-jurisdiction plan.

#### **Using Existing Plans and Maps to document vulnerability and impact**

The plan uses existing public facility master plans and capital improvement plans, city county insurance services documentation, and tax assessor records to document the types and numbers of buildings, infrastructure, and critical facilities within the hazard area. Existing maps document where these lie within identified hazard areas.

#### **Critical facilities, Communications and Power**

During disaster events, communications and power transmission lines can easily be lost due to their location above ground. Critical facilities need power and communication equipment to function. The community relies upon imported public facilities and services and goods to meet community needs and requires a local sustainability program to ensure that those needs are met in the event of a disaster.

#### **Water**

The City of Gearhart has its own water treatment facility and reservoirs. The jurisdiction also currently obtains water service from the City of Warrenton plant located less than 2 miles east of Gearhart. Water service could easily be lost in the event of a disaster that requires sustainability. Plans to strengthen and make the water system safe-to-fail in the event of a system wide shut down are a priority

#### **Transportation**

Transportation in and out of the city relies upon US Highway 101. This highway is two lanes each direction at each end of the city, one north and one south, and four or five lanes in central Gearhart. During disaster events, evacuation may make the highway unusable within the necessary evacuation timeline as all surrounding jurisdictions also rely upon it for transportation. Lewis and Clark Road, a two lane roadway that travels east across the forest lands towards Astoria with access to the county interior, may provide secondary access if it is not impacted in a disaster event.

### **8. Assessing Vulnerability: Estimating Potential Losses**

*Vulnerability in terms of an estimate of the potential dollar loss to vulnerable structures and a description of the methodology used to prepare the estimate.*

The types and numbers of future and existing buildings located in the identified hazards areas, the potential dollar losses, and a general description of land uses and development trends are reflected in existing plans, policies, and maps. The Clatsop County Tax Assessor's Record calculates the current assessed value and market value of each structure. Clatsop County Insurance Services records calculate the current value of each city owned facility based on official appraisal records.

### **9. Assessing Vulnerability: Analyzing Development Trends**

*Vulnerability in terms of providing a general description of land uses and development trends within the community so that mitigation options can be considered in future land use decisions.*

The Gearhart Zoning Ordinance, the Gearhart Comprehensive Plan, FEMA flood maps, and the Gearhart Wetland Delineation Study Guide influence land use, land development, and population growth. Existing plans and policies already in existence with documented support from local residents, businesses and policy makers, are updated regularly and can adapt easily to changing conditions and needs.

### **Land Use & Development**

A detailed description of the Gearhart Land Use and Development requires review of the Gearhart Comprehensive Plan, the Gearhart Zoning Ordinance, the census data, the Gearhart Zoning Map, the Clatsop County Tax Assessor Plat Maps, FEMA flood maps, wetland delineations, and the existing plans, policies, and maps sited above.

Land use is governed by the Gearhart Land Use Zoning Map and the Gearhart Zoning Ordinance which define the permitted uses for each zone. Specific land use patterns and ownership distribution are shown on the tax assessor plat maps. Development in Gearhart is divided by US Highway 101. The majority of the residential housing is located west of US Highway 101 between the highway and the Pacific Ocean. Housing density east of US 101 increased rapidly between 2000 and 2014. High density condominium units and a higher density of single family dwellings are located near or on oceanfront. Commercial land use is dense east of US 101 and limited to neighborhood use in a small area west of US 101. Two golf courses are located west of US Highway 101.

### **Transportation & Commuting Patterns**

A detailed description of the Gearhart Transportation and Commuting Patterns requires review of the Gearhart Comprehensive Plan, the Gearhart Zoning Ordinance, census data, the coordinated population forecast, and the existing plans, policies, and maps referenced above.

In summary, transportation facilities are described on the City of Gearhart ODOT Transportation Map and the Clatsop County ODOT Transportation Map. Currently, Gearhart is served by the Sunset Empire Transportation District. The bus connects Cannon Beach, Seaside, Gearhart, Warrenton and Astoria.

Transportation is an important consideration when planning for emergency service provisions. Growth within the city will put pressure on both major and minor roads, especially if the main

mode of travel is by automobiles. How people travel to work is indicative of the prevalence of low occupancy vehicle travel and can help predict the amount of traffic congestion and the potential for accidents. Census data for 2008-2012 indicates 77.36% of those employed Gearhart residents 16 and older drive to work alone, 8% work at home, 11.99% carpool, 1.9% walk, and less than .5% uses public transportation.

### **Geography & Climate**

Gearhart is located on the Pacific Ocean front on the central coast of western Clatsop County. The climate in Gearhart is moderate. The monthly average temperatures range from highs around 68 degrees and lows around 51 degrees in July and August, to highs around 51 degrees and lows around 36 degrees in December and January. The city receives approximately 42 inches of rain annually. Monthly precipitation averages range from 10 inches during the wetter months of November through January, to less than 1 inch during the drier summer months of June through August. Knowledge of geographic factors like soil types can help identify areas vulnerable to natural hazards, specifically landslides and earthquake related hazards such as liquefaction, and can assist in mitigation planning. The types of soil found in Gearhart can be characterized as sandy loam and sand with small sections of silt and peat. The majority of soil types in the city have a slight to moderate hazard of erosion ( $K = 0.02-0.32$ ).

### **Population & Demographics**

Gearhart began to draw attention as a result of the railroad between Astoria and Seaside built in 1889. Gearhart attracted many vacationers from Portland and Astoria as a pleasant and quiet landscape for relaxation. Eventually, people began moving to Gearhart, some making permanent residences and many others setting up vacation and second homes. In 2010 the city was home to 1462 permanent residents, which made up approximately 3.9% of Clatsop County's total population. Census data describes the city population and demographics. Population growth forecasts are developed from the trend of population growth. Population in Gearhart increased from 967 in 1980 to 1,027 in 1990, decreased to 995 in 2000, and increased to 1462 in 2010. The impact in terms of loss and the ability to recover vary among population groups following a disaster. Historically, 80% of the disaster burden falls on the public and may be placed upon special needs groups such as children, the elderly, the disabled, minorities, and low income persons. The 2010 census data provides the following statistics for these groups: children under 19 years of age are 19.2% of the population and those over 60 years of age are 28.5% of the population. Residents who speak English as a second language constitute 2.7% of the city's population.

### **Employment & Economics**

A review of the official US Census 2008-2012 data reveals the employment distribution and median income in Gearhart. In the 2008-2012 survey, the median household income in Gearhart was \$49,063. This is almost \$4,000 below the 2008-2012 national median household income of \$53,046 and almost \$5,000 above the \$44,330 median household income for Clatsop County. Although it can be used to compare areas as a whole, this number does not reflect how income is divided among area residents.

### **Housing**

Housing type and year-built dates are important factors in mitigation planning. Certain housing types tend to be less disaster resistant and warrant special attention: mobile homes, for example, are generally more prone to wind and water damage than standard stick-built homes. Generally the older the home is, the greater the risk of damage from natural disasters. This is because more strict building codes have been developed following improved scientific understanding of plate tectonics and earthquake risk. For example, structures built after the late 1980s in the Northwest and California use earthquake resistant designs and construction techniques. In addition, FEMA began assisting communities with floodplain mapping during the 1970s, and communities developed ordinances that required homes in the floodplain to be elevated to one foot above base flood elevation.

In the 2010 Census, Gearhart had 1,450 housing units. Per the 2008-2012 American Community Survey the majority of the housing units, 74.76% is single family dwellings, 24.46% of the housing is multifamily, and less than 1% of the housing is mobile homes. For all housing units, 33.52% (486) are owner occupied, 11.24% (163) are renter occupied, and 55.24% (801) are vacant seasonal, recreational, or occasional use homes. Of the Gearhart housing stock, 90% was built prior to 1980 before stronger seismic building codes were put into place. This aging housing stock is susceptible to damage during disaster events.

### **Historic & Cultural Resources**

Historic and cultural resources such as historic structures and landmarks can help to define a community and may also be sources of tourism dollars. Because of their role in defining and supporting the community, protecting these resources from the impact of disasters is important. The National Register of Historic Places lists two historic sites within the City of Gearhart – the Charles David Latourette House and Sea Lyft.

### **Critical Facilities**

Critical facilities are those that support government and first responders' ability to take action in an emergency. They are a top priority in any comprehensive hazard mitigation plan. Critical facilities in Gearhart include the fire station, city hall, police station, and water treatment facility and reservoirs. Gearhart Elementary School located in Gearhart is part of the Seaside School District. These facilities can serve as temporary shelters until locally designated shelters are developed. The nearest hospitals are North Coast Providence Hospital in Seaside and Columbia Memorial hospital in Astoria.

### Public Facilities and Services

Water Service is provided by the City of Gearhart Water Treatment Facility and water transmission lines from the City of Warrenton and City of Seaside. In the event of a disaster, Gearhart's first priority will be to restore local services, then aid Seaside and Warrenton using established connections.

Sewer Service is provided to each lot by on-site septic systems that must be approved by the Oregon Department of Environmental Quality. The regional office is located in the Clatsop County building in Astoria.

Power Supply is provided by Pacific Corp who is responsible for system maintenance and repair in the event of a disaster.

Telephone and Cable Charter and Century Link communications provide cable TV, computer, and local telephone service. Multiple mobile phone services such as Verizon, Sprint, and AT&T are available. During a disaster event each respective service provider will be responsible for system maintenance and repair.

Gas Service is provided by transmission lines by Northwest Natural Gas. LP gas is provided by multiple delivery companies such as Suburban Propane. Each respective service provider will be responsible for system maintenance and repair.



### Existing Plans & Policies

Data included in this plan and all other data available upon request

<u>Gearhart Comprehensive Plan</u>	goals and policies and description of the jurisdiction in terms of the Oregon Statewide Planning Goals
<u>Gearhart Zoning Ordinance</u>	Governs land use, implements comprehensive plan.
<u>Gearhart General Ordinances</u>	Govern city administration.
<u>Water Facilities Plans</u>	Ensures adequate water supply.
<u>Oregon Fire Code</u>	Ensures adequate access and water supply are available prior to approval of any land use application.
<u>Oregon Building Code/IBC</u>	Building code compliance regulates construction.
<u>Gearhart Local Wetland Inventory</u>	Depicts riparian areas identified by the Oregon Department of State Lands.
<u>Gearhart Flood Hazard Rate Study</u>	Describes the potential flood risks
<u>Census Data</u>	Describes population, income, housing, and employment data to document potential loss.
<u>Coordinated County Population Forecast</u>	Predicts population growth.
<u>City County Insurance Services Assessment</u>	documentation of the current value of Gearhart assets and critical facilities including the fire station the police station, city hall, and city vehicles
<u>Tax Assessors Tax Account Records</u>	information about the current value of structures to document potential loss



## City of Gearhart Natural Hazard Mitigation Plan

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### Maps

Maps depict geographic characteristics of the jurisdiction and assist the jurisdiction in planning for natural hazards when making land use decisions.

\* = Map included in this plan; all other maps available upon request

Gearhart Zoning Map

\*ODOT Transportation System  
Map for Gearhart

\*ODOT Transportation System  
Map for Clatsop County

\*Gearhart FEMA NFIP FIRM,  
June 16, 1999;  
City Map: CPN# 4100300001D  
Product Kit: 410030P  
Flood Insurance Study: 410030S

\*Gearhart Local Wetland Map  
Oregon Department of State Lands

\*DOGAMI and USGS File #0A-95-13  
Tsunami Hazard Map of the Gearhart Quadrangle

USGS File #O846123A8 Geo  
Topographic Survey

DOGAMI  
Coastal Erosion Rate Maps

Clatsop County  
Tax Assessor Plat Maps

\*Cascadia Subduction Zone Map

DOGAMI IMS-10 Map

Gearhart Comprehensive Plan  
Geology Map

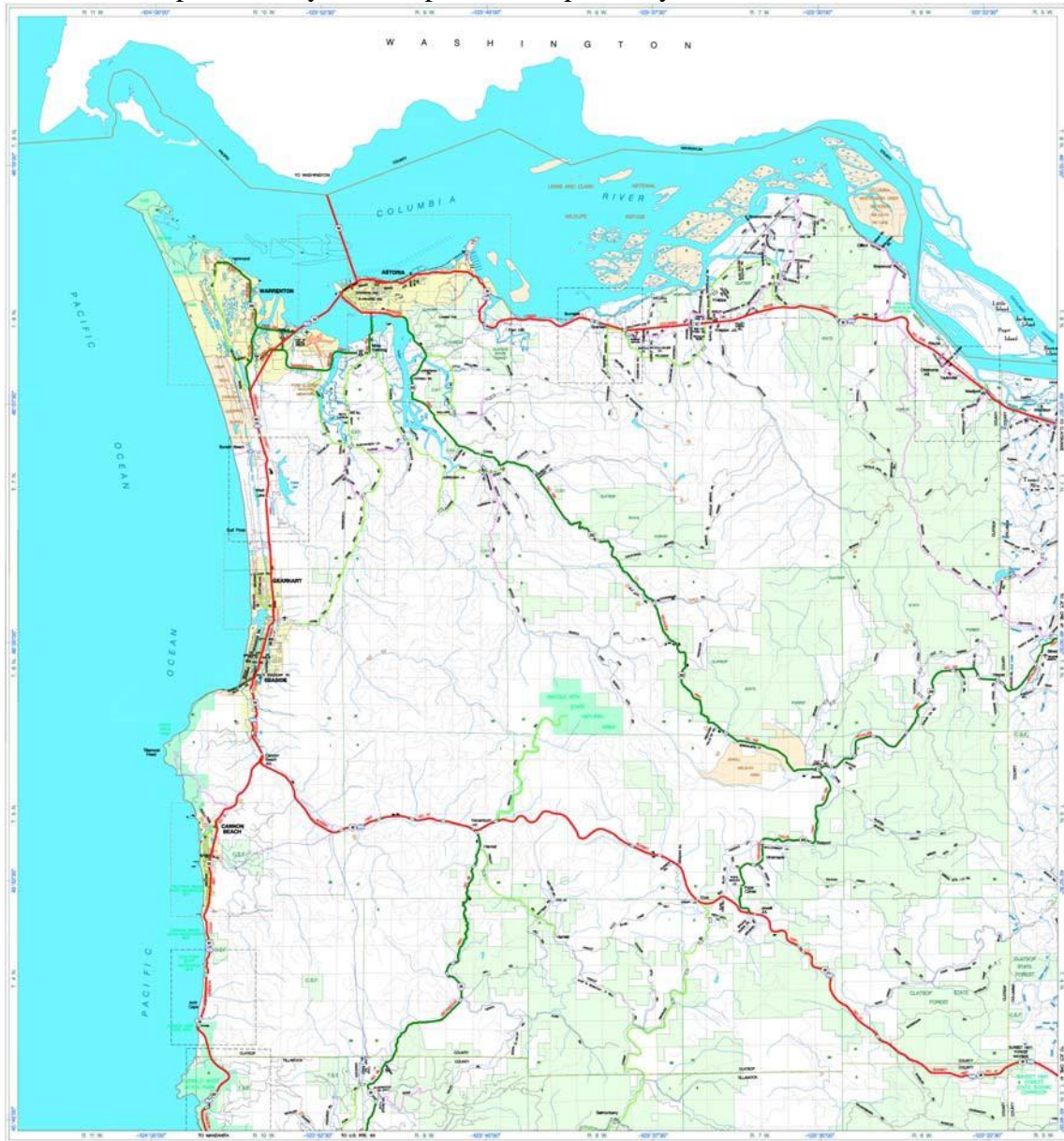
# City of Gearhart Natural Hazard Mitigation Plan

## \*ODOT Transportation System Map for Gearhart



# City of Gearhart Natural Hazard Mitigation Plan

## \*ODOT Transportation System Map for Clatsop County



**LEGEND**

State Routes - 100, 30, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454, 455, 456, 457, 458, 459, 460, 461, 462, 463, 464, 465, 466, 467, 468, 469, 470, 471, 472, 473, 474, 475, 476, 477, 478, 479, 480, 481, 482, 483, 484, 485, 486, 487, 488, 489, 490, 491, 492, 493, 494, 495, 496, 497, 498, 499, 500, 501, 502, 503, 504, 505, 506, 507, 508, 509, 510, 511, 512, 513, 514, 515, 516, 517, 518, 519, 520, 521, 522, 523, 524, 525, 526, 527, 528, 529, 530, 531, 532, 533, 534, 535, 536, 537, 538, 539, 540, 541, 542, 543, 544, 545, 546, 547, 548, 549, 550, 551, 552, 553, 554, 555, 556, 557, 558, 559, 560, 561, 562, 563, 564, 565, 566, 567, 568, 569, 570, 571, 572, 573, 574, 575, 576, 577, 578, 579, 580, 581, 582, 583, 584, 585, 586, 587, 588, 589, 590, 591, 592, 593, 594, 595, 596, 597, 598, 599, 600, 601, 602, 603, 604, 605, 606, 607, 608, 609, 610, 611, 612, 613, 614, 615, 616, 617, 618, 619, 620, 621, 622, 623, 624, 625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647, 648, 649, 650, 651, 652, 653, 654, 655, 656, 657, 658, 659, 660, 661, 662, 663, 664, 665, 666, 667, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695, 696, 697, 698, 699, 700, 701, 702, 703, 704, 705, 706, 707, 708, 709, 710, 711, 712, 713, 714, 715, 716, 717, 718, 719, 720, 721, 722, 723, 724, 725, 726, 727, 728, 729, 730, 731, 732, 733, 734, 735, 736, 737, 738, 739, 740, 741, 742, 743, 744, 745, 746, 747, 748, 749, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759, 760, 761, 762, 763, 764, 765, 766, 767, 768, 769, 770, 771, 772, 773, 774, 775, 776, 777, 778, 779, 780, 781, 782, 783, 784, 785, 786, 787, 788, 789, 790, 791, 792, 793, 794, 795, 796, 797, 798, 799, 800, 801, 802, 803, 804, 805, 806, 807, 808, 809, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819, 820, 821, 822, 823, 824, 825, 826, 827, 828, 829, 830, 831, 832, 833, 834, 835, 836, 837, 838, 839, 840, 841, 842, 843, 844, 845, 846, 847, 848, 849, 850, 851, 852, 853, 854, 855, 856, 857, 858, 859, 860, 861, 862, 863, 864, 865, 866, 867, 868, 869, 870, 871, 872, 873, 874, 875, 876, 877, 878, 879, 880, 881, 882, 883, 884, 885, 886, 887, 888, 889, 890, 891, 892, 893, 894, 895, 896, 897, 898, 899, 900, 901, 902, 903, 904, 905, 906, 907, 908, 909, 910, 911, 912, 913, 914, 915, 916, 917, 918, 919, 920, 921, 922, 923, 924, 925, 926, 927, 928, 929, 930, 931, 932, 933, 934, 935, 936, 937, 938, 939, 940, 941, 942, 943, 944, 945, 946, 947, 948, 949, 950, 951, 952, 953, 954, 955, 956, 957, 958, 959, 960, 961, 962, 963, 964, 965, 966, 967, 968, 969, 970, 971, 972, 973, 974, 975, 976, 977, 978, 979, 980, 981, 982, 983, 984, 985, 986, 987, 988, 989, 990, 991, 992, 993, 994, 995, 996, 997, 998, 999, 1000

**ARRANGEMENT OF SHEETS**

ENLARGEMENT AREA  
CITY MAP AVAILABLE

SCALE

KEY TO COUNTIES

PRELIMINARY COPY  
SUBJECT TO CORRECTION

**OREGON TRANSPORTATION MAP**  
Showing Functional Classification of Roads

**CLATSOP COUNTY**

PUBLISHED BY: SHEET 1 OF 1  
Population 37,440 \*  
2007

PREPARED ORIGINALLY BY THE OREGON DEPARTMENT OF TRANSPORTATION IN COOPERATION WITH THE U.S. DEPARTMENT OF TRANSPORTATION FEDERAL HIGHWAY ADMINISTRATION

NORTH

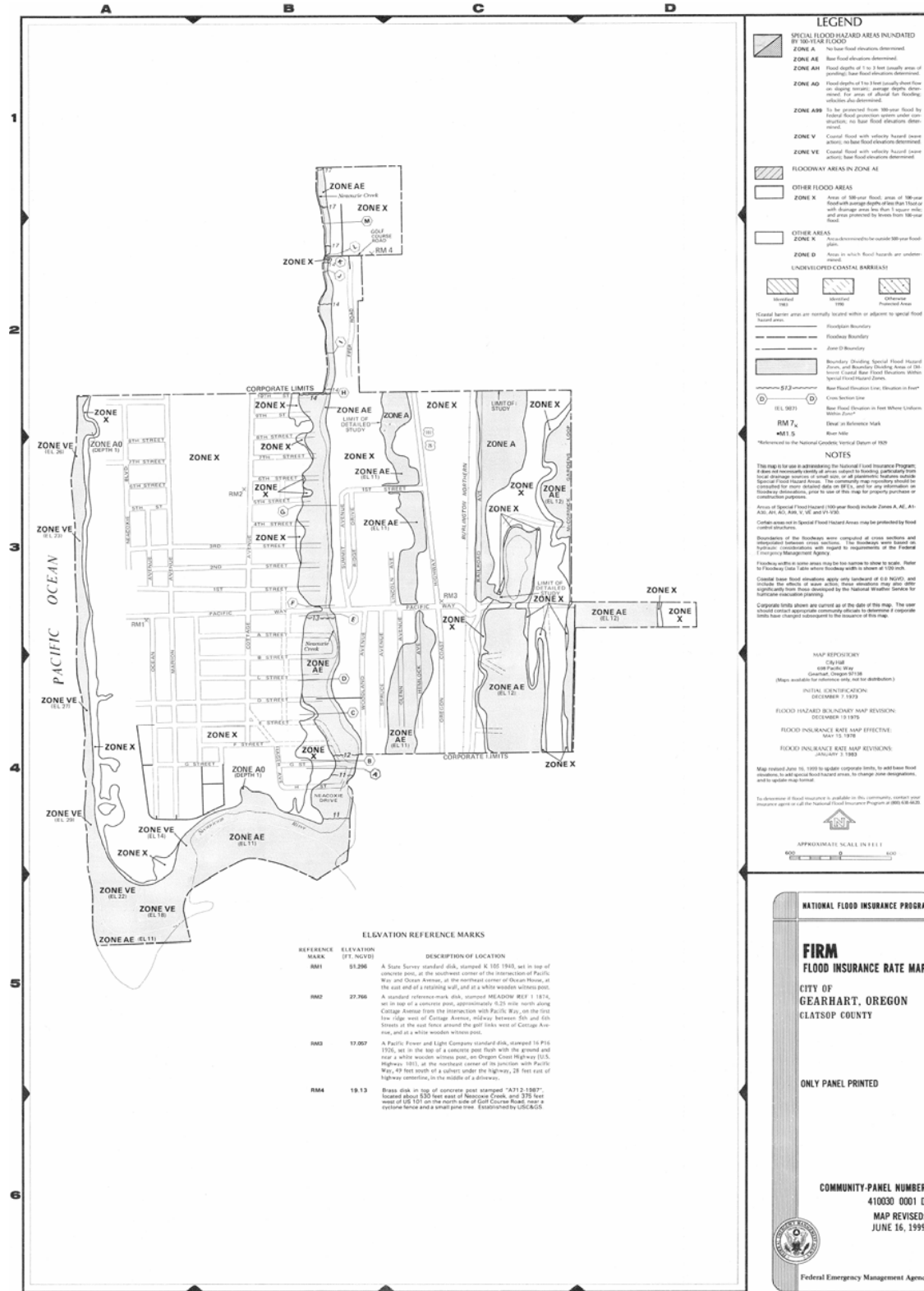
Copies available from the Oregon Department of Transportation, Map Distribution Unit, 383 Cook Office Building, 555 13th St. NE, Salem, Oregon 97301, Telephone (503) 986-0154, <http://www.oregon.gov/odot/transportation>

\* Based on latest Oregon Population Report, College of Urban and Public Affairs, Portland State University, <http://www.pdx.edu/cupr>

**CLATSOP COUNTY ATLAS PAGE 4 - 1**

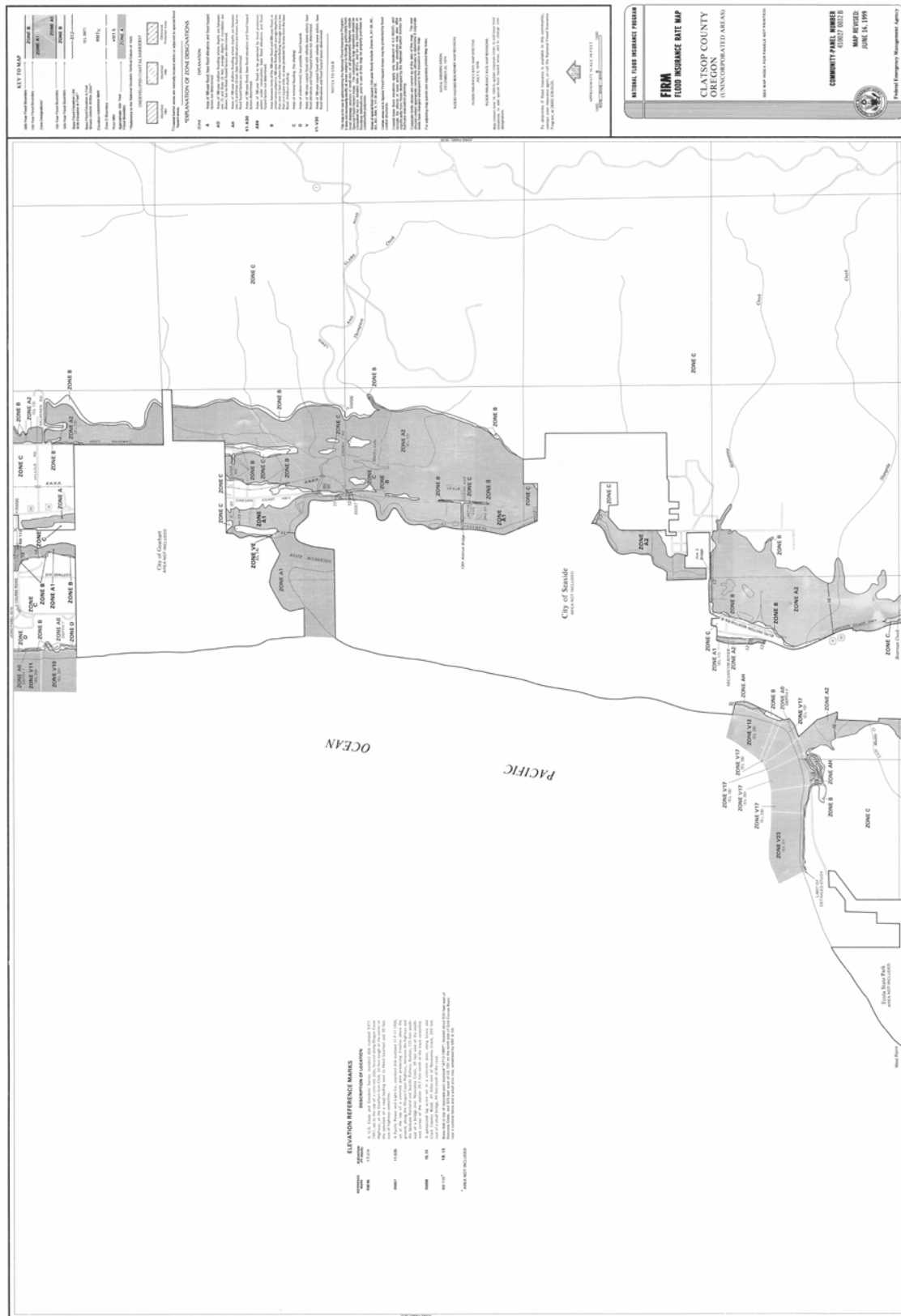
# City of Gearhart Natural Hazard Mitigation Plan

## FLOOD MAPS



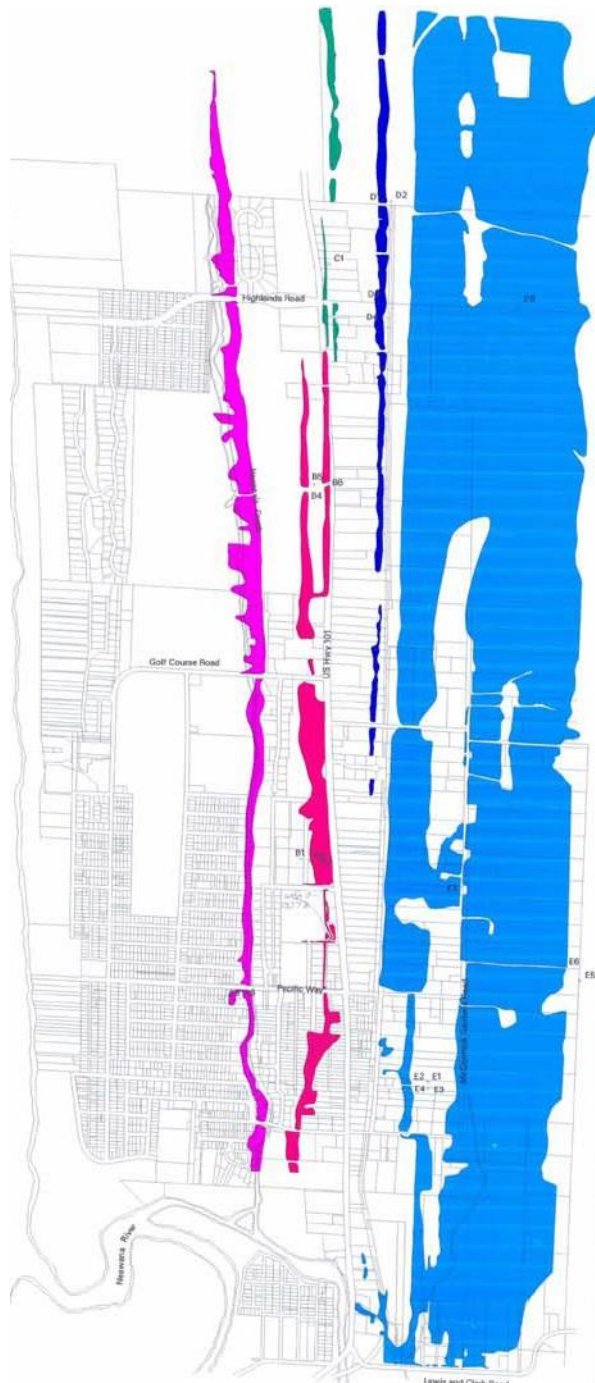


# City of Gearhart Natural Hazard Mitigation Plan



# City of Gearhart

## Local Wetlands Inventory



### Legend

May 9, 1995

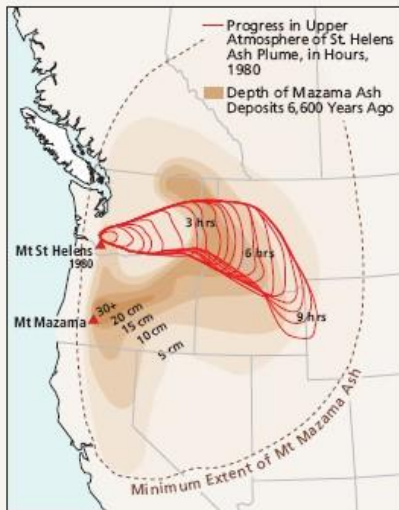
- Area A
- Area B
- Area C
- Area O
- Area E

This inventory map is primarily for planning purposes. Wetland boundaries are approximate. There may be some small wetlands that were not mapped. Wetlands that are not mapped will be regulated by the Division of State Lands.



Volcanoes

Mount Mazama and Mount St. Helens Ash Fall



Subduction and Volcanism



Ring of Fire: Volcanoes Around the Pacific



The Oregon Cascades are part of the archipelago of volcanoes that extends from northern California to British Columbia. These volcanoes typically experience episodes of growth punctuated by long periods of inactivity. They erupt very intermittently and almost always give advance warning of an impending eruption.

Loy, W.G., ed. 2001. *Atlas of Oregon, 2nd edition*. Eugene: University of Oregon Press. pp. 136-137

Maps from: *Atlas of Oregon, 2nd edition*  
 Copyright 2001 by the University of Oregon Press.

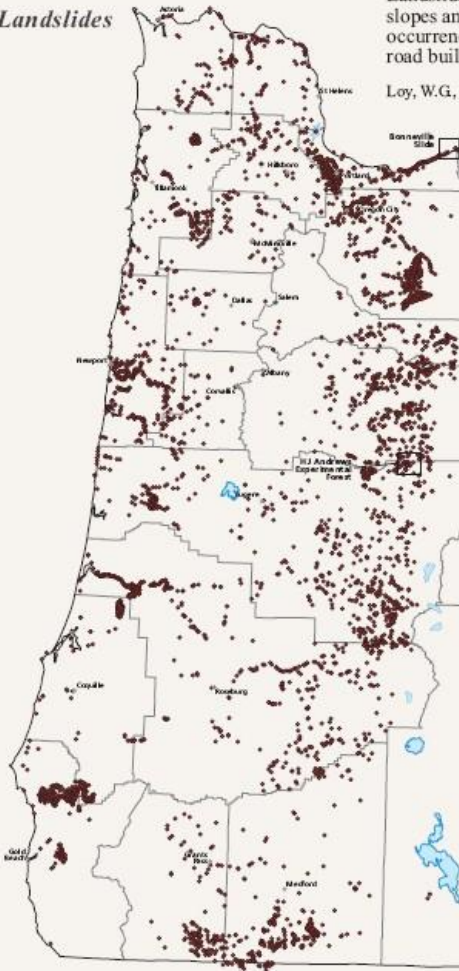


## Landslides and Earthquakes

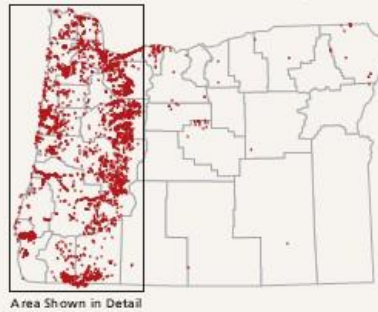
### Landslides

Landslides are common in Western Oregon as a result of favorable conditions - steep slopes and high rainfall. Rare during the dry summer and fall, landslides are frequent occurrences in the winter and spring. Causes include undercutting of steep slopes, road building, and earthquake activity.

Loy, W.G., ed. 2001. *Atlas of Oregon, 2nd edition*. Eugene: University of Oregon Press. pp. 140-141



1996-1997 Landslides in Oregon



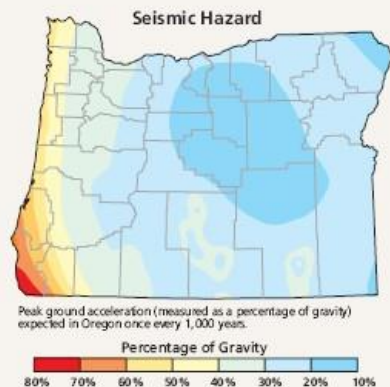
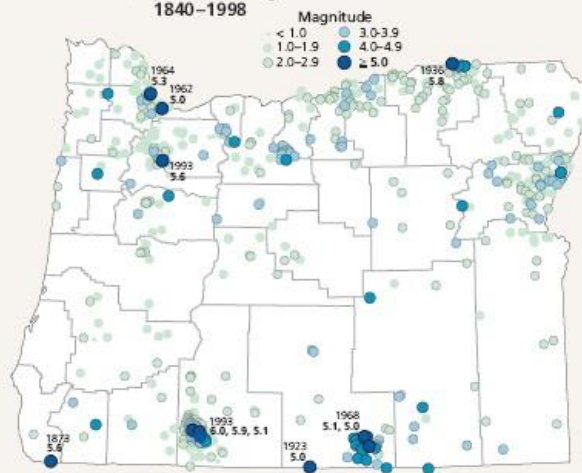
Earthquakes are caused by the bending and breaking of rocks along faults, which are most abundant in boundary zones between tectonic plates, as depicted in the Subduction and Volcanism map. Seismometers locate earthquakes and measure the resulting ground movement. The size and location of past earthquakes (map below) can be a powerful tool for predicting where future earthquakes will occur.

The Seismic Hazard map on the bottom left shows the maximum level of ground shaking likely to occur during a fixed interval of time (here, 1,000 years) from all possible earthquakes. Damage becomes significant at shaking levels of about 20% of the pull of gravity (Seismic Hazard map).

Loy, W.G., ed. 2001. *Atlas of Oregon, 2nd edition*. Eugene: University of Oregon Press. pp. 138-139

### Earthquakes

Earthquakes in Oregon 1840-1998



Maps from: *Atlas of Oregon, 2nd edition*  
Copyright 2001 by the University of Oregon Press.



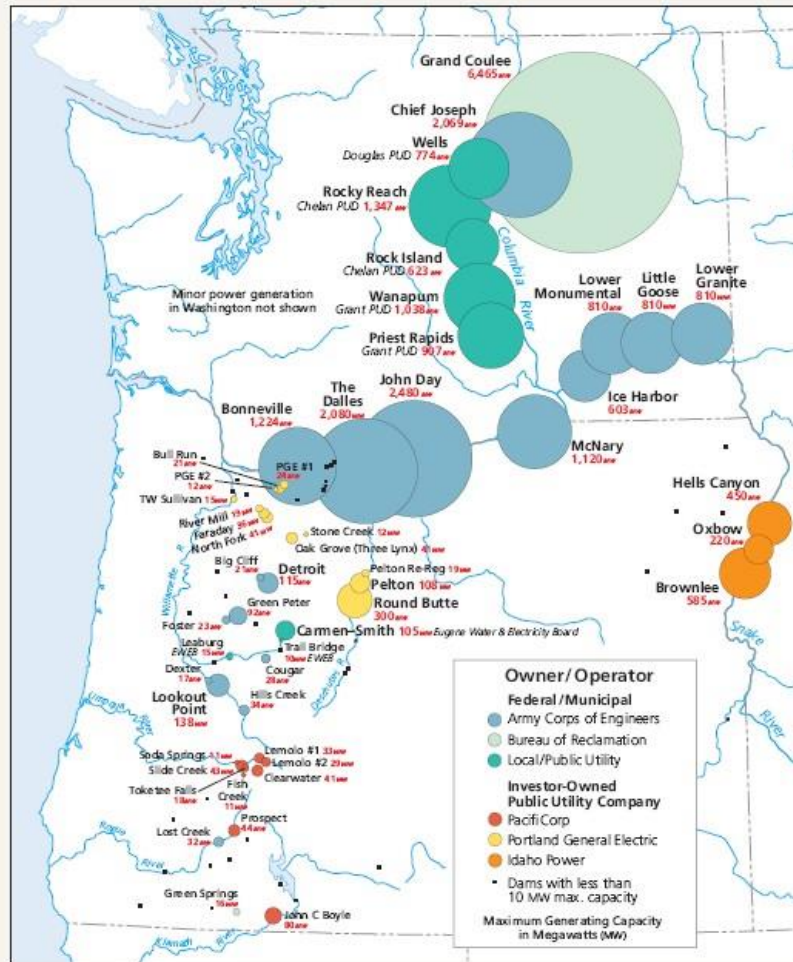
Power

Hydropower

Hydropower plants, the largest of which are on the Columbia River, account for most of Oregon's electricity generation. Coal and natural gas each account for 5% to 10% of Oregon's electricity generation. Electricity was first produced commercially in Oregon by a hydropower facility installed at the Willamette Falls in 1889. Large scale production of hydropower began in the 1930s when the federal government built dams and power plants on the Columbia, Umpqua, Rogue, and Klamath Rivers, and their tributaries.

Loy, W.G., ed. 2001. *Atlas of Oregon, 2nd edition*. Eugene: University of Oregon Press. pp. 100

Hydropower Facilities



Facilities with Greater Than 10 MW Capacity

Facility	Owner/Operator	Date in Service	Current Capacity (MW)
<b>Columbia</b>			
Bonneville Dam	USACE	1938	1,224
Chief Joseph Dam	USACE	1961	2,069
Grand Coulee Dam	BuRec	1942	6,465
John Day Dam	USACE	1968	2,480
McNary Dam	USACE	1953	1,120
Priest Rapids Dam	Grant PUD	1961	907
Rocky Reach	Chelan PUD	1961	1,347
The Dalles Dam	USACE	1957	2,080
Wanapum Dam	Grant PUD	1964	1,038
Wells Dam	Douglas PUD	1967	774
<b>Lower Snake</b>			
Brownlee Dam	ID Power	1959	585
Hells Canyon Dam	ID Power	1967	450
Ice Harbor Dam	USACE	1962	603
Little Goose Dam	USACE	1970	810
Lower Monumental Dam	USACE	1975	810
Lower Granite Dam	USACE	1969	810
Oxbow Dam	ID Power	1961	220

Facility	Owner/Operator	Date in Service	Current Capacity (MW)
<b>Willamette</b>			
Big Cliff Dam	USACE	1954	21
Carmen-Smith Project	EWEB	1963	105
Cougar Dam	USACE	1964	28
Detroit Dam	USACE	1953	115
Dexter Dam	USACE	1955	17
Faraday Dam	PGE	1965	36
Foster Dam	USACE	1968	23
Green Peter Dam	USACE	1967	92
Hills Creek Dam	USACE	1962	34
Leaburg Dam	EWEB	1930	15
Lookout Point Dam	USACE	1954	138
North Fork Dam	PGE	1958	41
Oak Grove (Three Lynx)	PGE	1923	41
River Mill Dam	PGE	1911	19
Stone Creek	PGE	1956	12
T.W. Sullivan	PGE	1923	15
Trail Bridge Dam	EWEB	1963	10

Facility	Owner/Operator	Date in Service	Current Capacity (MW)
<b>Sandy/Deschutes</b>			
Bull Run Dam	PGE	1894	21
PGE (Bull Run) No. 1	PGE	1929	24
PGE (Bull Run) No. 2	PGE	1962	12
Pelton Dam	PGE	1957	108
Pelton Re-Regulating Dam	PGE	1958	19
Round Butte Dam	PGE	1961	300

Facility	Owner/Operator	Date in Service	Current Capacity (MW)
<b>Umpqua/Rogue/Klamath</b>			
Clearwater Dam	PacifiCorp	1953	41
Fish Creek Dam	PacifiCorp	1952	11
Green Springs/Keene Cr. Dam	BuRec	1959	16
John C. Boyle Dam	PacifiCorp	1958	80
Lemolo Dam/Plant No.2	PacifiCorp	1956	29
Lemolo Plant No.1	PacifiCorp	1955	33
Lost Creek/William L. Jess Dam	USACE	1976	32
Prospect Dam	PacifiCorp	1911	44
Slide Creek Dam	PacifiCorp	1951	43
Soda Springs Dam	PacifiCorp	1952	11
Toketee Falls Dam	PacifiCorp	1949	18

Maps from: *Atlas of Oregon, 2nd edition*  
Copyright 2001 by the University of Oregon Press.

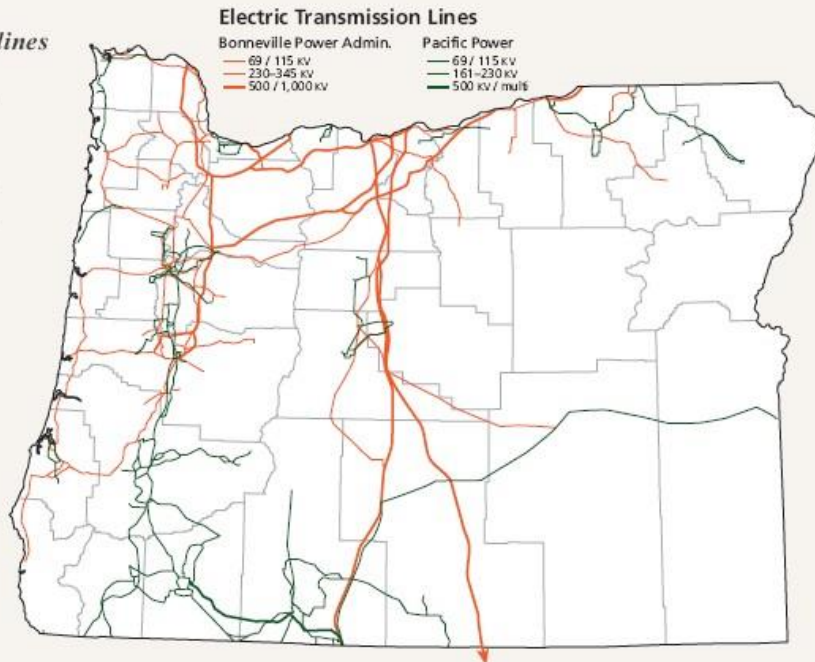
## Energy Distribution

### Power Grid and Pipelines

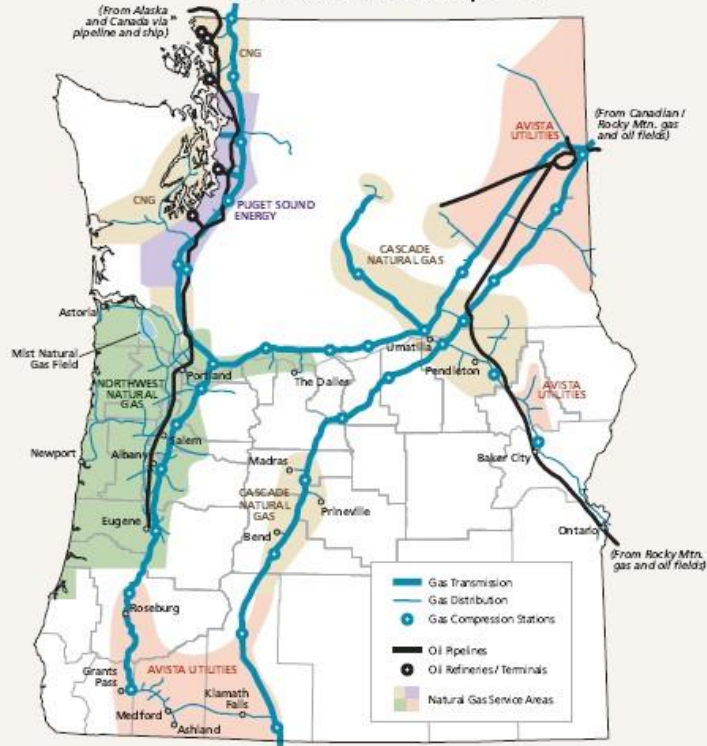
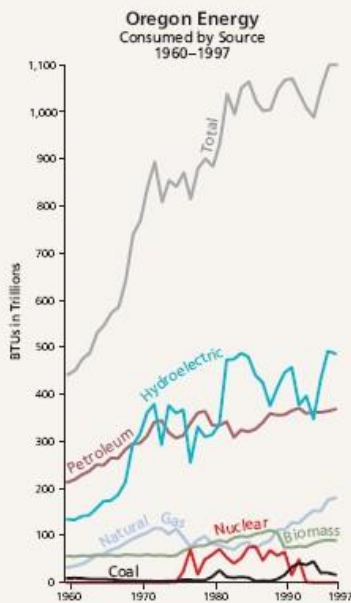
The West Coast power grid consists of numerous electricity-generating facilities and connecting transmission lines. Utilities in Oregon exchange electricity with other states and Canada. The top companies in retail sales revenue are Portland General Electric and Pacific Power and Light.

Most of Oregon's petroleum products, including gasoline, come from Northern Alaska. Natural gas burned in Oregon comes mostly from Alberta, Canada. Although a small amount of natural gas is produced in Columbia County, most comes by pipeline from Canada and several Rocky Mountain states. Long-distance gas transmission service is provided throughout the state.

Loy, W.G., ed. 2001. *Atlas of Oregon, 2nd edition*. Eugene: University of Oregon Press. pp. 102-103



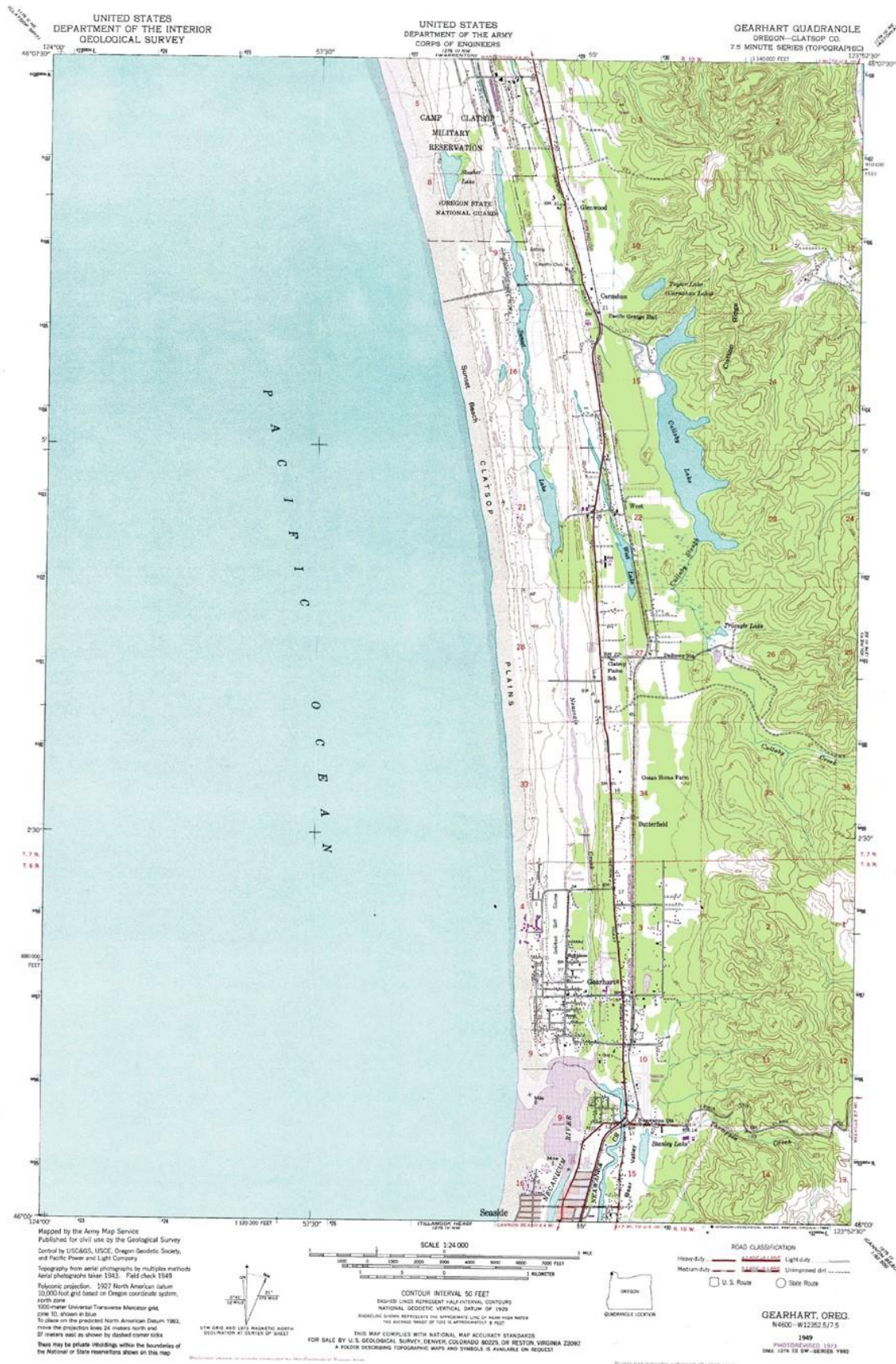
### Oil and Natural Gas Pipelines



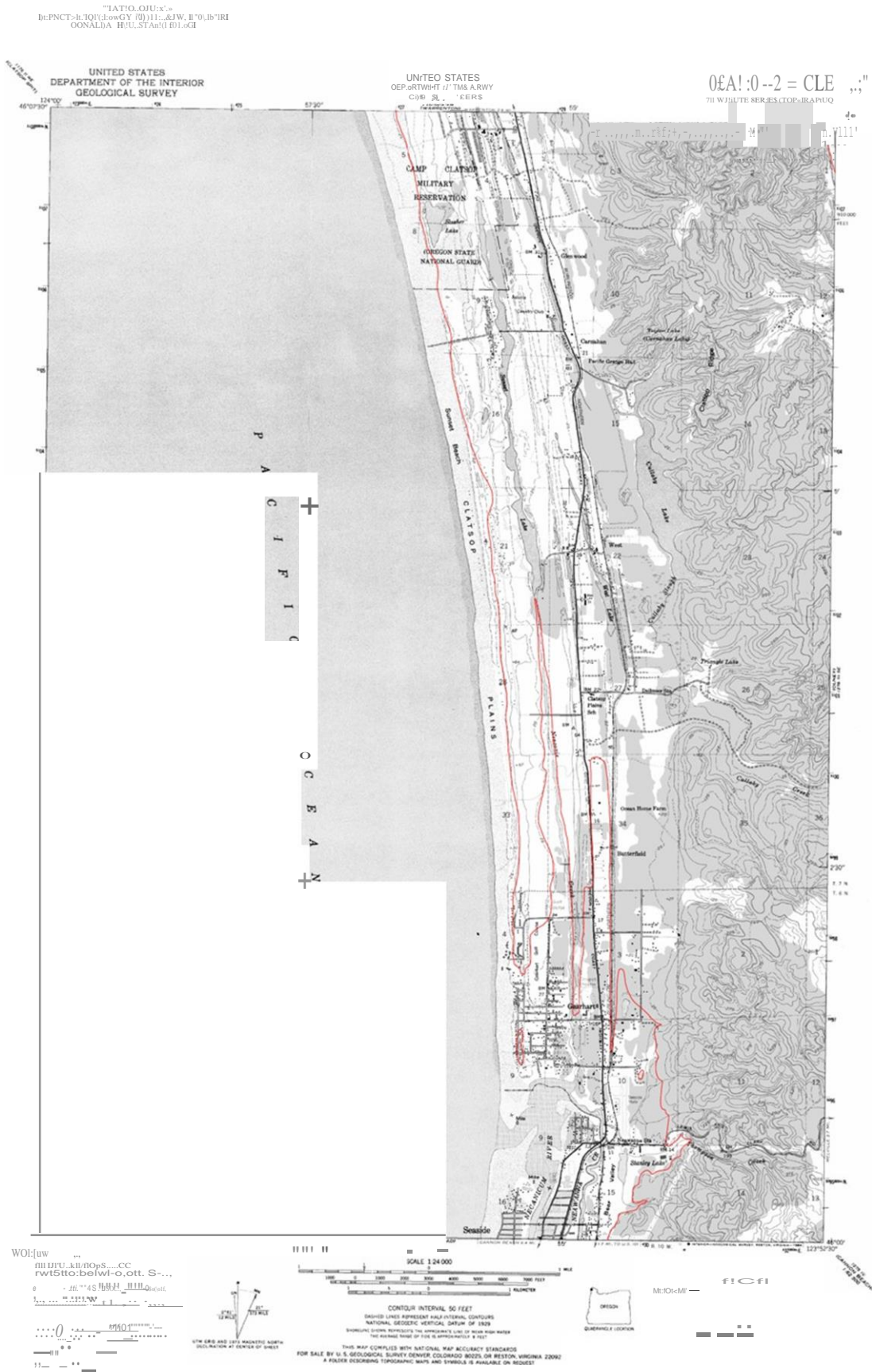
Maps from: *Atlas of Oregon, 2nd edition*  
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# City of Gearhart Natural Hazard Mitigation Plan



# City of Gearhart Natural Hazard Mitigation Plan



# City of Gearhart Natural Hazard Mitigation Plan

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GEARHART, OREG.

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## Oregon Coast/Lower Columbia Region

Comprised of the state's costal line and the lower Columbia River, the Oregon Coast/Lower Columbia region has experienced an eight percent increase in population since 1990. This represents a lower rate of growth than other regions of the state. Just over half of the region's population lives in incorporated areas. Thirty percent of the region's houses were built before 1960, 35% between 1960 and 1980, and 35% were built after 1980. Transportation networks are an even greater consideration for the coastal region given the physical boundary of the ocean to the west and the Coast Range to the east. The average commute for workers in this region is 22 minutes each way. Seventy-five percent of the region's workers drive alone to work, 13% carpool, and five percent work from home. Most bridges in the area have not been seismically retrofitted, creating significant risk to the commuting population in areas at risk from earthquakes.

### REGION FACTS

Population:  
 Total ..... 208,000  
 Rural ..... 93,010  
 Urban ..... 114,990

Housing:  
 Single-Family ..... 55%  
 Multi-Family ..... 16%  
 Mobile Homes ..... 18%  
 Boat, RV, Van, etc. .... 2%



County	# of Hospitals	# of Hospital Beds	Police Stations	Fire & Rescue Stations	Power Plants	Dams	Bridges
Clatsop	2	60	7	19	2	6	186
Coos	3	152	9	19	0	14	258
Curry	1	24	5	13	0	4	91
Douglas	1	17	1	1	0	0	12
Lane	1	21	1	1	0	0	19
Tillamook	1	30	6	9	0	2	242

### Critical Infrastructure

- School
- Hospital
- Power Substation
- x Bridge
- | Dam

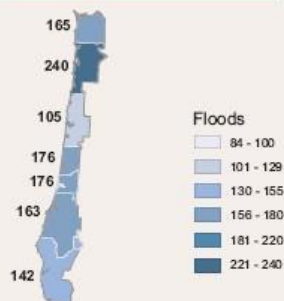


## County Hazard Analysis

As part of the County Hazard Risk Analysis, each county develops risk scores for Oregon's major natural hazards. This score, ranging from 24 (low) to 240 (high), reflects the County's perceived risk for the particular hazard. Scores are current as of July 2003.

To obtain the most current scores, see <http://www.oregonshowcase.org> or contact Oregon State Police – Office of Emergency Management <http://www.osp.state.or.us/oem/>.

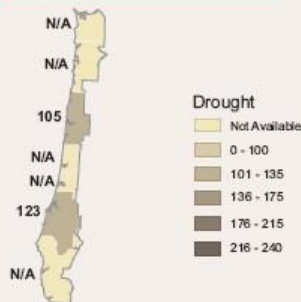
### Floods



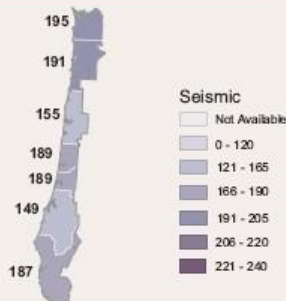
### Landslides



### Drought



### Seismic



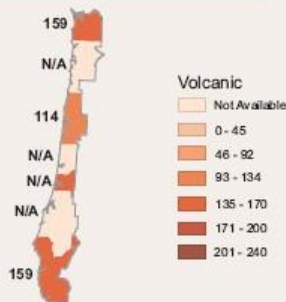
### Windstorms



### Wildfires



### Volcanic



### **10. Multi-Jurisdiction Risk Assessment**

*Provides a local jurisdiction risk assessment where they differ from the entire planning area.*

#### **Increased Natural Hazard Risk**

The City of Gearhart is subject to increased disaster risk from:

1. Flood/Heavy Rain
2. Windstorm
3. Winter Storm
4. El Nino/La Nina
5. Earthquake
6. Tsunami
7. Forest Fire/Wildfire
8. Landslide/Subsidence
9. Dust Storm
10. Volcanic
11. Drought

#### **Assessing Risk**

Identifying hazard risks involves collecting historical data and reviewing scientific knowledge including geographic and geologic evaluation. This knowledge can be further enhanced by utilizing technical evaluation tools such as Geographic Information Systems Mapping technologies.

#### **Evaluating Concurrent Hazards that can Compound Disasters**

When considering the impacts of natural hazards on development, it is important to understand that depending on the triggering event, other hazards can be triggered as well. For example, heavy rainfall can cause landslides and floods. Earthquakes can trigger landslides, tsunamis, and volcanic eruption. A major landslide, earthquake, tsunami or flood could destroy a road, damage utility systems, and isolate an area. Sometimes a proposed solution for one hazard can aggravate another hazard. Multi-hazard risk analysis is therefore recommended where more than one hazard exists.



### 11. Local Hazard Mitigation Goals

*The hazard mitigation strategy shall include a description of mitigation goals to reduce or avoid long-term vulnerabilities to the identified hazards.*

The following goals and objectives apply comprehensively to each potential hazard

GOAL 1: Develop and implement mitigation initiatives as potential projects to reduce hazards to human life, businesses, public and private property, and environmental systems.

1. Evaluate applicable city ordinances and capital improvement plans to ensure that they guide development that reduces potential for hazard
2. Promote insurance coverage to provide economic recovery after a disaster
3. Preserve environmental systems to serve natural hazard mitigation functions
4. Continuously develop and update natural hazard related data

GOAL 2: Implement effective mitigation projects and activities

1. Evaluate mitigation projects and activities for benefit/cost analysis and cost effective solutions
2. Educate the public about hazard risks and mitigation project implementation
3. Consistently seek diverse funding and resource partnerships for mitigation project and activity implementation

GOAL 3: Enhance emergency services and local first responders

1. Enhance community self-sustainability
2. Prepare first responders with training and equipment
3. Strengthen emergency operations through improvements to communication and coordination
4. Coordinate hazard mitigation with emergency operations plans and procedures

GOAL 4: Improve regional coordination and communication

1. Participate in the Regional Hazard Mitigation Steering Committee
2. Maintain an active emergency preparedness committee
3. Survey neighboring communities and develop coordinated response plans for each potential hazard

### 12. Identification and Analysis of Mitigation Measures: Action Items

*For multi-jurisdiction plans, there must be identifiable action items specific to the jurisdiction requesting FEMA approval or credit of the plan.*

The City of Gearhart addendum includes action items that, when implemented, will reduce the city's vulnerability to natural hazards. Many of these recommendations are consistent with the goals and objectives of the city's existing plans and policies. Implementing the addendum's action items through existing plans and policies increases their likelihood of being supported and getting updated, and maximizes the city's resources.

#### All Hazards

1. Review, revise, and update the natural hazard mitigation plan with local and multi-jurisdiction plan adoption by resolution at least once every five years calculated from the date of local plan and county multi-jurisdiction plan approval.
2. Use a cost benefit analysis to ensure that mitigation action items are efficient and meet mitigation criteria.
3. Evaluate city ordinances and capital improvement plans at least once every five years to ensure that they require new development and provide incentives for existing development to reduce the potential for hazard.
4. Evaluate the construction of critical facilities and structures and relocate structures and facilities in disaster impacted areas where possible
  - a. Rebuild the fire station to withstand earthquakes and aid in recovery
  - b. Rebuild Gearhart City Hall to withstand earthquakes and aid in recovery
5. Evaluate the construction of critical facilities, public utilities and services and retrofit, relocate, or bury as necessary to withstand the impact of disaster events.
  - a. Provide generators, stand-by power capabilities, fuel sources for critical facilities, emergency equipment, and public utilities and services. Ensure that disaster gathering sites are accessible to those with special needs.
  - b. Develop a local water facility capital improvement plan that incorporates failsafe and safe-to-fail systems.
6. Develop a Gearhart Self-Sustainability Program to provide food, shelter, water, communication, and public utilities and services in the event of a disaster.
  - a. Conduct an annual census of Gearhart to identify those with special skills, special equipment and resources, and identify those with special needs.
  - b. Develop and identify neighborhood suitability programs. Identify leaders in each neighborhood. Encourage each community member to have disaster event communication equipment and supplies.
  - c. Strengthen emergency operations by developing a disaster event communication plan. Improve communication equipment. Ensure improvements to communication and coordination.
  - d. Identify and enhance disaster evacuation routes; practice mass emergency evacuation.
  - e. Prepare Gearhart Community Emergency Response Team (CERT) with training and equipment to act as first responders and deputize necessary persons.
  - f. Identify disaster gathering sites and improve their identified functions.

## City of Gearhart Natural Hazard Mitigation Plan

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7. Develop and implement a community disaster preparedness program.
  - a. Conduct a periodic survey to identify and mitigate, or encourage the mitigation, of potential hazardous trees.
  - b. Encourage retrofitting of external building features such as awnings, signs, propane tanks, etc, and interior features such as water heaters.
8. Educate the community about hazard risks and hazard mitigation. Encourage participation in mitigation and community sustainability programs by holding a periodic/annual open house or town hall meeting.

### **Flood/Heavy Rain**

1. Comply with FEMA Floodplain recommendations for development within a floodplain.

### **Windstorm**

1. Encourage the maintenance of trees to prevent tree hazards.
2. Develop an emergency shelter and operation center.
3. Train Gearhart CERT for each neighborhood.

### **Winter Storm**

1. Retrofit structures, infrastructure, and critical facilities to reduce vulnerability to storms.
2. Develop and practice an evacuation plan.
3. Develop an emergency shelter and operation center.
4. Train Gearhart CERT for each neighborhood.

### **El Nino/La Nina**

1. Comply with FEMA floodplain recommendations.
2. Implement a water conservation plan to ensure adequate water supply.
3. Ensure that run-off does not pollute ground water supplies.
4. Implement winter storm preparation standards.

### **Earthquake**

1. Retrofit structures, infrastructure, and critical facilities to reduce vulnerability to seismic activities as identified by Gearhart city staff.
2. Develop and practice an evacuation plan.
3. Develop an emergency shelter and operation center.

### **Tsunamis**

1. Retrofit structures, infrastructure, and critical facilities to reduce vulnerability to seismic activities.
2. Develop and practice an evacuation plan.
3. Develop an emergency shelter and operation center.
4. Train Gearhart CERT for each neighborhood.

## **City of Gearhart Natural Hazard Mitigation Plan**

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### **Forest fire/Wildfire**

1. Provide information about smoke alarms, fire safety, and fire sprinkler systems for individual structures.
2. Ensure adequate space between structures to reduce vulnerability
3. Construct fire access roadways and turnarounds within vulnerable neighborhoods and purchase land where rights-of-way are not available.
4. Retrofit sources of potential fires such as fuel tanks.
5. Initiate and maintain routine fire inspection and prevention within neighborhoods.
6. Conduct a periodic fire inspection for vegetative fuels reduction and vegetation maintenance program to provide fire buffer to structures.

### **Landslide/Subsidence**

1. Install drainage systems where necessary to prevent soil erosion.
2. Require the maintenance of vegetation on bare soils.
3. In areas of slope hazard, require site investigation reports and soils engineering.

### **Dust Storm**

1. Conduct a periodic survey of the vegetation on the dune and exposed sand areas. Require the maintenance of vegetation on exposed sand dune areas to increase resilience.

### **Volcanic Hazard**

1. Develop and practice an evacuation plan.
2. Develop an emergency shelter and operation center.
3. Train Gearhart CERT for each neighborhood.

### **Drought**

1. Develop a water conservation plan to be used during a drought event.

## City of Gearhart Natural Hazard Mitigation Plan

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*This form is a template to use when developing the above natural hazard mitigation action items.*

### PRE-DISASTER MITIGATION ACTION ITEM

<b>Proposed Action Item:</b>		<b>Alignment with Plan Goals:</b>	
<b>Rationale for Proposed Action Item:</b>			
<b>Ideas for Implementation:</b>			
<b>Coordinating Organization:</b>			
<b>Internal Partners:</b>		<b>External Partners:</b>	
<b>Timeline:</b>		<b>If available, estimated cost:</b>	
Short Term (0-2 years)	Long Term (2-4 or more years)		
<b>Form Submitted by:</b>	<b>City of Gearhart</b>		

### **13. Implementation of Mitigation Measures:**

*The mitigation strategy section shall include an action plan describing how the actions identified shall be prioritized, implemented, and administered by the city. Prioritization shall include a special emphasis on the extent to which benefits are maximized according to a cost benefit review of the proposed projects and their associated costs.*

Hazard mitigation follows an orderly process that includes:

Step 1: Identify the hazard risks

Step 2: Characterize the location, probability, and potential severity of the hazards

Step 3: Educate the community about the hazards

Step 4: Define acceptable risks

Step 5: Identify appropriate hazard mitigation measures

Step 6: Use a cost benefit review to review mitigation measures.

Hazard mitigation consists of activities with one overriding goal: to lessen future losses from hazard events. Hazard mitigation actions coordinate public policy, intergovernmental relations, public-private partnerships, economics, acceptable risk and a wide range of activities and programs all based on the evaluation of the risk, probability, and severity of the potential hazard.

*“Hazard mitigation means any action taken to reduce or eliminate the long-term risk to human life and property from hazards.” 44 CFR Subpart M 206.401*

The easiest, but often not the most feasible hazard mitigation action, is to avoid the hazard. This takes a combination of knowledge and a willingness by public and private decision-makers to define such situations as unacceptable risks. For example, often it is much safer and less environmentally disruptive to avoid construction improvements in high velocity floodplains and to avoid landslide prone hillsides than it is to build expensive structures to control flooding or landslides.

There are societal benefits to be achieved by developing and implementing effective hazard mitigation strategies and programs. Actions taken by local, regional, and federal governments, the private sector, public utilities, and others who invest in hazard mitigation help ensure the continuity and survivability of assets at risk from hazards. Some of the most apparent benefits of hazard mitigation include reduced human and structural losses, lower response costs and demands on emergency services, and reduced losses to the economy. Further benefits of hazard mitigation include maintaining or improving natural, recreational, and environmental assets such as water quality and agricultural and forest productivity.

### **Economic Analysis for Natural Hazard Mitigation**

Much of the loss from natural disasters comes in the form of property damage, additional living and business interruption costs, and other costs directly related to the impacts of hazard events. It is usually important to determine the economic feasibility of preventative actions that may lessen future losses. Governmental agencies should ensure that the benefits of hazard mitigation exceed the costs.

### **Cost Benefit Review and Analysis**

If federal funding is involved in hazard mitigation projects, a cost to benefits analysis must determine that the benefits exceed the costs. Cost benefit analysis methods and training have been developed and guidance is available from OEM in Appendix 9 of the State of Oregon Natural Hazards Mitigation Plan (SNHMP). A cost benefit ratio of 1:1 is required to meet the minimum review criteria.

Cost benefit analysis by itself does not address the full range of considerations, including non-economic impacts such as but not limited to community values, historic properties, habitat and environmental issues, and especially important or critical facilities.

The City of Gearhart currently distributes the responsibility for the prioritization, implementation, and administration of existing plans, policies, ordinances, and the natural hazard mitigation plan including the action items among the police, fire, public works, planning commission, city council, and CERT.

### **Government Structure:**

The City of Gearhart is led by a mayor and a four-member city council. The city council meets a minimum of one time per month on the first Wednesday of each month in Gearhart City Hall Council Chambers at 7 pm.

### **Administration:**

The Gearhart city administrator serves the council and administrates the city zoning ordinances.

Two office employees work under the direction of the city administrator. An administrative assistant-treasurer handles the office work and a city clerk works with the local court and the planning commission.

Public works employees work under the direction of the city administrator. Professional consultants serve Gearhart exclusively under the direction of the city administrator. Consultants include an attorney to serve council; the planner to review land use applications and work with the planning commission; and a land use attorney to review land use issues at the request of the planning commission.

### **Police:**

Gearhart has one police department with four officers, one of whom is a reserve officer.

### **Fire:**

The Gearhart Fire Department has two stations and one full-time fire chief. The remaining 26 members of the Gearhart Fire Department are volunteers.

### **Land Use:**

Land use applications are administered under the direction of the Gearhart city administrator with the technical assistance of the city planner and attorney. Input may be given by the city clerk, the planning commission, the city council.

### **The Planning Commission:**

The Gearhart Planning Commission, a committee of the city council, is established to study and make recommendations to the city council, public officials, and individuals regarding matters relating to planning and development of Gearhart and the surrounding area.

### **Hazard Mitigation Plan:**

The Gearhart Planning Commission and City Council function as public review bodies. City staff including the planner, the administrator, the public works director, the fire chief and police chief provide technical information and review of the hazard mitigation plan.

### **Hazard Mitigation Plan and Emergency Preparedness Committee:**

Gearhart has established a hazard mitigation and emergency preparedness committee including the fire chief, city administrator, public works director, police chief, planner, building official, a member of the planning commission, and a member of the city council.

### **Prioritization, Implementation, and Administration of Action Items:**

The Gearhart Hazard Mitigation Committee will meet no fewer than two times each year. The committee will review, prioritize, and implement action items through applicable funding mechanisms and programs. A reference document with these programs is provided by FEMA. These meetings will be open to the public. Notice will be published and posted consistent with public meeting requirements. Minutes of this public meeting will be taken and distributed. Periodically, surveys will be sent to the public requesting information critical to hazard mitigation and emergency preparedness planning. Emergency preparedness information will be available at city hall.



### **14. Multi-Jurisdiction Mitigation Strategy**

*For multi-jurisdiction plans, there must be identifiable action items specific to the jurisdiction requesting FEMA approval or credit of the plan.*

A member of the Gearhart Hazard Mitigation and Emergency Preparedness Committee will meet with the Clatsop County Multi-Jurisdiction Mitigation Steering Committee in May and November of each year.

#### **Building Permits:**

Building permits are reviewed by the Gearhart administrator and the city building official for consistency with Oregon building codes/IBC, the National Floodplain Insurance Program, the Gearhart fire code, zoning ordinances, public works standards, and general ordinances.

#### **Community Organizations and Programs:**

Community organizations and programs provide social and community-based services, such as health care or housing assistance, to the public. In planning for natural hazard mitigation, it is important to know what social systems exist within the community because of their existing connections to the public. Actions identified by the plan include the establishment of communication channels with the public and specific subgroups within the population such as the elderly and school children.

Clatsop County and Gearhart can use existing social systems as resources for implementing such communication-related activities because these service providers already work directly with the public on a number of issues, one of which is natural hazard mitigation and emergency preparedness.

#### **Clatsop County Multi-Jurisdiction Hazard Mitigation Plan:**

A Clatsop County Community Organizations and Programs Guide is provided in Section 2 of the Clatsop County Multi-Jurisdiction Hazard Mitigation Plan. The guide highlights organizations that are active within the county and may be potential partners for implementing mitigation actions.

### **15. Monitoring, Evaluating, and Updating the Plan: Five-year cycle**

*The plan maintenance process shall include a section describing the method of monitoring, evaluating, and updating the plan within a five year cycle.*

Gearhart shall review the hazard mitigation plan at no fewer than two public meetings per year. Currently, the planning commission and city council serve as the public meeting review bodies. These meetings are currently scheduled to be held at the regular April and September planning commission meetings. Meetings shall be noticed to the public consistent with public meetings laws. Minutes shall be taken of each meeting. Gearhart staff including, but not limited to, the city administrator, public works superintendent, planner, fire chief and the police chief will provide technical input for the Gearhart Hazard Mitigation Plan and will review each draft.

Gearhart will participate in the Clatsop County Multi-Jurisdiction Hazard Mitigation Plan meetings no fewer than two times per year. Multi-jurisdiction plan meetings are currently scheduled to be held on a date to be determined each May and November. Meetings shall be set by the steering committee members who shall also set the time and place. Special meetings may be called by the steering committee. Meetings shall be noticed to the public consistent with public meetings laws. Minutes shall be taken of each meeting. Committee members receive no compensation for their membership.

The Gearhart Hazard Mitigation Plan shall be reviewed, revised if appropriate, and resubmitted to the Oregon State Hazard Mitigation Officer for approval within five years of the date that the Clatsop County Multi- Jurisdiction Plan is approved in order to continue to be eligible for HMGP project grant funding. The state will then send the plan to the appropriate FEMA regional office for formal review and approval. When Gearhart is notified that their plan is approved, the city shall adopt the plan by resolution.

At the public meetings to be held, the review body shall review the Gearhart Hazard Mitigation Plan and shall incorporate the requirements of the hazard mitigation plan, existing plans, studies, reports, and technical information into planning mechanisms such as the comprehensive plan, zoning ordinances, or capital improvement plans where appropriate.

### **16. Implementation through Existing Programs**

*The plan shall describe the process by which the local government incorporates the requirements of the mitigation plan into other mechanisms such as comprehensive plans or capital improvement plans when appropriate.*

Implementing the natural hazards mitigation plan's action items through existing plans and policies increases their likelihood of being supported and updated, and maximizes the city's resources. Linking existing plans and policies to the natural hazard mitigation plan helps identify what resources already exist that can be used to implement the action items identified in the plan to reduce natural hazard risk.

Gearhart shall review the plan and, at regularly scheduled public meetings, shall provide recommendations to incorporate the requirements of the hazard mitigation plan into other mechanisms such as comprehensive plans or capital improvement plans when appropriate. The planning commission shall undertake a post acknowledgement plan amendment process when processing a zoning ordinance or comprehensive plan amendment. The city council shall follow public meeting and public hearing processes when incorporating mitigation plans into capital improvement plans and city ordinances.

### **17. Continued Public Involvement: Ensure continued public participation**

*The plan shall explain how continued public participation will be obtained.*

Gearhart shall review the hazard mitigation plan at no fewer than two public meetings per year. Currently, the planning commission and city council serve as the public meeting review bodies. These meetings are currently scheduled to be held at the regular April and September planning commission meetings. Meetings shall be noticed to the public consistent with public meetings laws. Minutes shall be taken of each meeting. Gearhart staff including, but not limited to, the city administrator, public works superintendent, planner, fire chief and the police chief will provide technical input for the hazard plan. Gearhart will participate in the Multi-Jurisdiction Hazard Mitigation Plan meetings and will review each draft.

Gearhart will participate in the Clatsop County Multi-Jurisdiction Hazard Mitigation Plan meetings no fewer than two times per year. Multi-jurisdiction plan meetings are currently scheduled to be held on a date to be determined each May and November. Meetings shall be set by the steering committee who shall also set the time and place. Special meetings may be called by the steering committee. Meetings shall be noticed to the public consistent with public meetings laws. Minutes shall be taken of each meeting. Committee members receive no compensation for their membership.

At the public meetings to be held, the review body shall review the Gearhart Hazard Mitigation Plan with the public, neighboring communities, and local and regional agencies involved in hazard mitigation activities. The review body shall note and address concerns about hazard risks. In this manner, the plan will be reviewed regularly by the public during the drafting stage and prior to adoption.

## City of Gearhart Natural Hazard Mitigation Plan

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<sup>ii</sup> Sunset Empire Transportation District, *Pink Salmon Route*, <http://www.ridethebus.org/routes/rt101.html>.

<sup>iii</sup> National Weather Service Forecast Office. 2007, [http://www.wrh.noaa.gov/pqr/climate/ast\\_clisummary.php](http://www.wrh.noaa.gov/pqr/climate/ast_clisummary.php)>

<sup>iv</sup> United States Department of Agriculture. Natural Resources Conservation Service, *Web Soil Survey*, <http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx>

<sup>v</sup> City of Gearhart. <http://www.ci.gearhart.or.us/cityhall.html>.

<sup>vi</sup> National Register of Historic Places. 2008, <http://www.nps.gov/nr/research/nris.htm>.

*U. S. Census Bureau, 2010 Census Profile, Portland State University, Population Research Center*

*U.S. Census Bureau, American Fact Finder, 2008-2012 American Community Survey, census.gov*