CITY OF GEARHART

Staff Report

For Planning Commission Discussion 10/10/2019

Subject - Gearhart Risk Assesment Discussion and Public Comment

Synopsis:
A natural hazards mitigation plan (NHMP) identifies hazards, vulnerabilities, and risks facing a local, state, or tribal government, and prioritizes actions to reduce the risks. An NHMP has two core parts: a risk assessment and a mitigation strategy.

Conducting the risk assessment described in the attached document is a useful step in planning for hazard mitigation, response, and recovery.

At this meeting, the planning commission will open the discussion with a public comment session. The commission will then go through the draft assessment hazard by hazard and then open another post discussion public comment session. The goal is to get public input during this draft process.

Chad Sweet will be on hand to go through the process, discuss the matrix, and answer any questions you may have. This meeting is not a public hearing.

Once the risk assessment draft is complete, the next step is to begin the mitigation strategy process with the planning commission in a future meeting. The mitigation strategy process has four main parts: mitigation goals, a capability assessment, mitigation actions, and an implementation plan.

More information on Hazard Mitigation Planning is at
https://www.oregon.gov/lcd/NH/Pages/Mitigation-Planning.aspx

Attachments:
- Hazard Analysis Methodology.
- Gearhart Draft analysis matrix worksheet.
- Blank analysis worksheet for PC and Public use

Recommendation:
Staff recommends the public and the planning commission study the methodology, and participate in the draft analysis.

Respectfully Submitted,
Chad

CITY OF GEARHART

HAZARD ANALYSIS METHODOLOGY

An Adaptation of: Clatsop County MJNHMP 2020 Plan Update

Adaptation of: Oregon Office of Emergency Management (OEM)

BACKGROUND AND OVERVIEW

This hazard analysis methodology was first developed by FEMA circa 1983, and gradually refined by OEM over the years. During 1984, the predecessor agency to OEM (Emergency Management Division) conducted workshops around the State of Oregon that resulted in all of Oregon's 36 counties (and many cities and districts) producing an analysis using this methodology.

The methodology produces scores that range from 24 (lowest possible) to 240 (highest possible), one order of magnitude from lowest to highest. Vulnerability and probability are the two key components of the methodology. Vulnerability examines both typical and maximum credible events, and probability endeavors to reflect how physical changes in the jurisdiction and scientific research modify the historical record for each hazard. Vulnerability accounts for approximately 60% of the total score, and probability approximately 40%.

For local governments, conducting the hazard analysis described in this document is a useful early step in planning for hazard mitigation, response, and recovery. This method provides the jurisdiction with a sense of hazard priorities, or relative risk. It doesn't predict the occurrence of a particular hazard, but it does "quantify" the risk of one hazard compared with another. By doing this analysis, planning can first be focused where the risk is greatest.

Among other things, this hazard analysis can:

- Help establish priorities for planning, capability development, and hazard mitigation;
- Serve as a tool in the identification of hazard mitigation measures;
- One tool in conducting a hazard-based needs analysis;
- Serve to educate the public and public officials about hazards and vulnerabilities; and
- Help communities make objective judgments about acceptable risk for OEM and other state and regional organizations such as the Oregon Department of Land Conservation & Development, this analysis allows comparison of the same hazard across various local jurisdictions. Each local hazard analysis produced using this methodology is ultimately comprised of two main pieces: a hazard analysis matrix (table) and a narrative.

POSSIBLE HAZARDS TO CONSIDER

NATURAL HAZARDS

In accordance with Statewide Planning Goal 7, jurisdictions must examine the following hazards when they overlap with their legal boundary: earthquakes and related hazards, wildfires, floods (coastal and riverine), landslides and debris flows, coastal erosion, and tsunamis. Jurisdictions should also develop scores, where applicable, for coastal hazards other than erosion, for drought, dust storms, windstorms, winter storms, and for volcanic hazards. With respect to volcanic hazards, score direct hazards such as blast and lahar separately from secondary hazards such as ashfall.

COMPLETING THE HAZARD ANALYSIS MATRIX

The Hazard Analysis Matrix Worksheet on page 5 is provided for you and your team to complete. You would probably benefit by transferring this worksheet onto a large format, such as a flipchart, dry erase board, etc., to assist in facilitating your meeting.

SEVERITY RATING: In this analysis, severity ratings are applied to the four categories of: **history**, **vulnerability**, **maximum threat** (or, worst-case scenario), and **probability**. Your jurisdiction can choose to score as ONE of the following: low – medium – high; and assign a number to each category by choosing one of the numbers in the range, based on the ranges below:

LOW = 1 point (or a number between 1-3)

MEDIUM = 5 points (or a number between 4-7)

HIGH = 10 points (or a number between 8-10)

WEIGHT FACTORS: *Weight factors* also apply to each of the four categories as shown below.

HISTORY (weight factor for category = **2**) History is the record of previous occurrences. Events to include in assessing history of a hazard in your jurisdiction are events for which the following types of activities were required:

- The EOC or alternate EOC was activated;
- Three or more EOP functions were implemented;
- An extraordinary multi-jurisdictional response occurred; and/or
- A "Local Emergency" was declared.

LOW – 1 point (or a number between 1-3} based on 0 - 1 event past 100 years.

MEDIUM – 5 points (or a number between 4-7} based on 2 - 3 events past 100 years.

HIGH – 10 points (or a number between 8-10} based on 4 + events past 100 years.

VULNERABILITY (weight factor for category = **5**) Vulnerability is the percentage of population and property likely to be affected under an "average" occurrence of the hazard.

LOW – 1 point (or a number between 1-3) based on< 1% affected.

MEDIUM – 5 points (or a between 4-7) based on 1- 10% affected.

HIGH – 10 points (or a number between 8-10} based on> 10% affected.

MAXIMUM THREAT (weight factor for category = **10**) Maximum threat is the highest percentage of population and property that could be impacted under a worst-case scenario.

LOW – 1 point (or a number between 1-3} based on < 5% affected.

MEDIUM – 5 points (or a between 4-7) based on 5 - 25% affected.

HIGH – 10 points (or a number between 8-10) based on > 25% affected.

PROBABILITY (weight factor for category = **7**) Probability is the likelihood of future occurrence within a specified period of time.

LOW -1 point (or between 1-3) based one incident likely within 75 to 100 years.

MEDIUM -5 points (or between 4-7) based on one incident likely within 35 to 75 years.

HIGH -10 points (or between 8-10) based on one incident likely within 10 to 35 years.

By multiplying the *weight factors* associated with the categories by the severity ratings, we can arrive at a subscore for history, vulnerability, maximum threat, and probability for each hazard. Adding the subscores will produce a total score for each hazard.

For example*, [we will reference the included "Gearhart Hazard Analysis Matrix Worksheet" dated 5/9/2019 → "windstorm". The great coastal gale of 2007 inspired examination of this hazard. **History** has a *weight factor* of two (**2**); a High history was selected and scored at a point value of ten (10) – 2 X 10 = subscore of 20. **Vulnerability** has a *weight factor* of five (**5**) and was also assigned High with a point value of ten (10) since > 10% of the population and property were/would be affected – 5 X 10 = subscore of 50. After figuring **maximum threat** and **probability** in the same manner, the total score for "windstorm" was 240. After calculating all hazards, we were able to numerically rank them in priority order with (1) being the greatest risk; "windstorm" was ranked #1 receiving the maximum number of points possible.]

The total score isn't as important as how it compares with the total scores for other hazards the jurisdiction faces. By comparing scores, the jurisdiction can determine priorities: Which hazards should the jurisdiction be most concerned about? Which ones less so?

ATTACHMENTS

*Gearhart Hazard Analysis Matrix Worksheet – 1 page

We have chosen to remove a sample worksheet originally cited in the methodology and include the assessment version done for Gearhart on May 9, 2019 as a sample instead.

*blank Hazard Analysis Matrix Worksheet with instructions – 2 pages

During our May hazard risk methodology assessment, we ended up splitting "tsunami" into two separate hazards (local and distant) and adding "drought" to the list. Therefore, we have created a clean version of the matrix worksheet for future use. A cheat sheet of the methodology instructions is also included.

DRAFT

HAZARD ANALYSIS MATRIX WORKSHEET Jurisdiction: Gearhart Date: 5/9/2019

Hazards	*Calculation*	History WF = 2	Vulnerability WF = 5	Maximum Threat WF = 10	Probability WF = 7	Total Score	Ranking Order
FLOOD	SR type	Low	Low	Low	Med	**52**	**7**
	WF x SR	2 1	5 1	10 1	7 5		
	Subscore	2	5	10	35		
WILDFIRE	SR type	High	Med	Med	High	**165**	**3**
	WF x SR	2 10	5 5	10 5	7 10		
	Subscore	20	25	50	70		
EARTHQUAKE	SR type	Low	High	High	Med	**187**	**2**
	WF x SR	2 1	5 10	10 10	7 5		
	Subscore	2	50	100	35		
WINDSTORM	SR type	High	High	High	High	**240**	**1**
	WF x SR	2 10	5 10	10 10	7 10		
	Subscore	20	50	100	70		
LANDSLIDE	SR type	Low	Med	Low	Med	**72**	**5**
	WF x SR	2 1	5 5	10 1	7 5		
	Subscore	2	25	10	35		
TSUNAMI/local	SR type	Low	High	High	Med	**187**	**2**
	WF x SR	2 1	5 10	10 10	7 5		
	Subscore	2	50	100	35		
TSUNAMI/distant	SR type	Med	Med	Med	Med	**120**	**4**
	WF x SR	2 5	5 5	10 5	7 5		
	Subscore	10	25	50	35		
COASTAL EROSION	SR type	Low	Low	Low	Low	**24**	**8**
	WF x SR	2 1	5 1	10 1	7 1		
	Subscore	2	5	10	7		
DROUGHT	SR type	Low	Low	Low	Low	**24**	**8**
	WF x SR	2 1	5 1	10 1	7 1		
	Subscore	2	5	10	7		
VOLCANIC ASH	SR type	Low	High	High	Low	**69**	**6**
	WF x SR	2 1	5 10	10 1	7 1		
	Subscore	2	50	10	7		

HAZARD ANALYSIS MATRIX WORKSHEET

Participant: Jurisdiction: Date:

Hazards	*Calculation*	History WF = 2	Vulnerability WF = 5	Maximum Threat WF = 10	Probability WF = 7	Total Score	Ranking Order
FLOOD	SR type	L M H	L M H	L M H	L M H		
	WF x SR	2 x	5 x	10 x	7 x		
	Subscore	=	=	=	=		
WILDFIRE	SR type	L M H	L M H	L M H	L M H		
	WF x SR	2 x	5 x	10 x	7 x		
	Subscore	=	=	=	=		
EARTHQUAKE	SR type	L M H	L M H	L M H	L M H		
	WF x SR	2 x	5 x	10 x	7 x		
	Subscore	=	=	=	=		
WINDSTORM	SR type	L M H	L M H	L M H	L M H		
	WF x SR	2 x	5 x	10 x	7 x		
	Subscore	=	=	=	=		
LANDSLIDE	SR type	L M H	L M H	L M H	L M H		
	WF x SR	2 x	5 x	10 x	7 x		
	Subscore	=	=	=	=		
TSUNAMI/local	SR type	L M H	L M H	L M H	L M H		
	WF x SR	2 x	5 x	10 x	7 x		
	Subscore	=	=	=	=		
TSUNAMI/distant	SR type	L M H	L M H	L M H	L M H		
	WF x SR	2 x	5 x	10 x	7 x		
	Subscore	=	=	=	=		
COASTAL EROSION	SR type	L M H	L M H	L M H	L M H		
	WF x SR	2 x	5 x	10 x	7 x		
	Subscore	=	=	=	=		
DROUGHT	SR type	L M H	L M H	L M H	L M H		
	WF x SR	2 x	5 x	10 x	7 x		
	Subscore	=	=	=	=		
VOLCANIC ASH	SR type	L M H	L M H	L M H	L M H		
	WF x SR	2 x	5 x	10 x	7 x		
	Subscore	=	=	=	=		

WF = weight factor; preset!

SR = severity rating; *see below*

SR type = circle one type, **L M H**

SEVERITY RATINGS
(to be applied to the four categories)

SR type

Low = 1 - 3 points
Med = 4 - 7 points
High = 8 - 10 points

The following four categories are used in developing the scores for this analysis:

HISTORY (record of previous occurrences)

Low 0 - event per 100 years
Med 2 - 3 events per 100 years
High 4+ events per 100 years

VULNERABILITY (% of pop./prop. likely to be affected)

Low < 1% affected
Med 1 - 10% affected
High > 10% affected

MAX. THREAT (% of pop./prop. if worst-case scenario)

Low < 5% affected
Med 5 - 25% affected
High > 25% affected

PROBABILITY (likelihood to occurr w/i specified time)

Low 1 incident likely w/i 75 - 100 year period
Med 1 incident likely w/i 35 - 75 year period
High 1 incident likely w/i 10 - 35 year period

**HAZARD ANALYSIS MATRIX WORKSHEET INSTRUCTIONS; cited May 2019*