

# **CHAPTER 20.**

## **PLANNING AREA RISK RANKING**

### **20.1 HAZARD RISK RATING**

A risk ranking was done for the hazards described in this risk assessment. The ranking served two purposes: To describe the probability of occurrence for each hazard and to describe the impact each would have on the people, property and economy of Humboldt County. Estimates of risk for Humboldt County were developed using methodologies promoted by FEMA's hazard mitigation planning guidance. This risk ranking exercise is for the entire planning area. Each planning partner has ranked risks specific to its jurisdiction utilizing this same methodology. These can be found in each of the Jurisdictional annexes, included in Volume 2 of this plan. This risk ranking exercise works under the following parameters:

- Impacts are evaluated with an emphasis on property. The primary purpose for this is that FEMA mitigation programs focus on loss reduction to improved property, critical facilities and critical infrastructure. Stafford Act mitigation programs focus on property because it is generally accepted that life safety initiatives are addressed in the preparedness and response components of FEMA and DHS Emergency Management programs.
- Quantitatively ranking risk requires measurable components to quantify. For improved property, this can be done by applying an estimated damage function to a determined value of property to get a loss estimate. Since buildings are stationary, they can be inventoried based on their location to determine exposure. These approaches are measurable, quantifiable, and regionally consistent. The same cannot be said for less tangible components such as life safety or economics.
- Quantitatively ranking risk creates a consistent platform that can be justified for all the partners in this planning effort. A more subjective approach reduces consistency. Regional consistency is a primary objective for multi-jurisdictional planning effort. With quantifiable results generated using substantiated data, initiatives and their priorities can be justified.

### **20.2 PROBABILITY OF OCCURRENCE**

The probability of occurrence of a hazard event provides an estimation of how often the event occurs. This is generally based on past hazard events in the area and the forecast of the event occurring in the future. This is done by assigning a probability factor, which is based on yearly values of occurrence. The numerical value assigned to each category is used to determine the risk rating of each hazard. Table 20-1 lists the probability of occurrence for each hazard. These values were assigned as follows:

- High—Hazard event is likely to occur within 25 years (Numerical value 3)
- Medium—Hazard event is likely to occur within 100 years (Numerical value 2)
- Low—Hazard event is not likely to occur within 100 years (Numerical value 1)
- No exposure—If there is no exposure to a hazard, there is no probability of occurrence (Numerical value = 0)

<b>TABLE 20-1. PROBABILITY OF HAZARDS</b>		
Hazard Event	Probability	Numerical Value
Dam Failure	Low	1
Drought	High	3
Earthquake	High	3
Fish Losses	Medium	2
Flood	High	3
Landslide	High	3
Severe Weather	High	3
Tsunami	Medium	2
Wild Fire	High	3

### 20.3 IMPACT

The impact of each hazard was divided into three categories: impacts on people, property or the economy. Tables 20-2, 20-3 and 20-4 summarize the identified impacts for each hazard. A numerical value was assigned for impact based on the following definitions:

- High Impact (numerical value = 3)
- Medium Impact (numerical value = 2)
- Low Impact (numerical value = 1)
- No impact (numerical value = 0)

These categories were also assigned weighted values. Impact on people was given a weight of 3, impact on property was given a weight of 2 and impact on the economy was given a weight of 1.

<b>TABLE 20-2. HAZARD IMPACT ON PEOPLE</b>			
Hazard Event	Impact	Numerical Value	Multiplied by weighted value of 3
Dam Failure	Medium	2	6
Drought	Low	1	3
Earthquake	High	3	9
Fish Losses	Low	1	3
Flood	Medium	2	6
Landslide	Low	1	3
Severe Weather	Medium	2	6
Tsunami	Medium	2	6
Wild Fire	Low	1	3

<b>TABLE 20-3. HAZARD IMPACT ON PROPERTY</b>			
Hazard Event	Impact	Numerical Value	Multiplied by weighted value of 2
Dam Failure	Medium	2	4
Drought	Low	0	0
Earthquake	High	3	6
Fish Losses	Low	0	0
Flood	Medium	2	4
Landslide	Low	1	2
Severe Weather	High	3	6
Tsunami	Medium	2	4
Wild Fire	Low	1	2

<b>TABLE 20-4. HAZARD IMPACT ON ECONOMY</b>			
Hazard Event	Impact	Numerical Value	Multiplied by weighted value of 1
Dam Failure	Medium	2	2
Drought	Low	1	1
Earthquake	High	3	3
Fish Losses	Low	1	1
Flood	Medium	2	2
Landslide	Low	1	1
Severe Weather	High	3	3
Tsunami	Medium	2	2
Wild Fire	Medium	2	2

For impact on people, the values were assigned based on the percentage of the total population jurisdiction that may be directly impacted by a hazard event. For the purposes of this exercise, “impacted” means exposed. People who are exposed to a hazard because they live in a hazard zone will be impacted when that event occurs. The degree of that impact will vary and is not measurable. Therefore, this step focuses on exposure. For example, if 50 percent or more of the population is exposed to a hazard, then the impact on people for that hazard is high. If 25 percent to 49 percent of the population is exposed to a hazard, then the impact is considered to be medium, and the impact is low if 25 percent or less of the population is exposed to the hazard. No impact would mean that there is no exposure to a hazard.

For impact on property, the values represent the value of the property exposed to a hazard in comparison to the total assessed value of property within the community. For the purposes of this exercise, a building is defined as an improvement to real property that has four walls, a roof, and a replacement cost value of

\$1,000 or more. For example, if the exposure of property is 50 percent or more of the total assessed property value for the community, the impact on property is high. If the vulnerability of property is between 15 percent and 49 percent of the total assessed property value for the community, the impact on property is medium, and if the vulnerability is 14 percent or less of the total assessed property value for the community, the impact on property is low. No impact would mean that there is no exposure to the hazard or that the impact of the hazard typically will not cause damage to property. For example, droughts do not damage buildings; therefore they have no impact on buildings.

For the economic impact, the values represent estimates of what the loss would be from a major event of each hazard. Once again, this is a comparison with the total assessed property value for your community. For example, if the loss potential of property is 25 percent or more of the total assessed property value for the community, the impact on property is high. If the loss potential of property is between 10 percent and 24 percent of the total assessed property value for the community, the impact on property is medium, and if the loss potential is 9 percent or less of the total assessed property value for the community, the impact on property is low. No impact would mean that there is no exposure to the hazard, or that the occurrence of the hazard would not cause measurable damages to improved property. It should be noted that for some of the hazards such as wildfire, landslide and severe weather, vulnerability was considered to be the same as exposure due to the lack of loss estimation tools specific to those hazards. Loss estimations were generated for the earthquake, flood and tsunami hazards using the HAZUS-MH, loss estimation tool.

## 20.4 RISK RANKING

The risk ranking for each hazard was determined by multiplying the assigned numerical value for probability by the sum of the weighted numerical values of impact on people; property and economy (see Table 20-5). The following equation shows the risk rating calculation:

$$\text{Risk Rating} = \text{Probability} + \text{Impact (people + property + economy)}$$

From the risk rating, hazards were divided into risk categories of high, medium and low. Table 20-6 shows the hazard risk ranking.

<b>TABLE 20-5. RISK RATING</b>			
<b>Hazard Event</b>	<b>Probability</b>	<b>Impact</b>	<b>Total= (Probability x Impact)</b>
Dam Failure	1	6+4+2+=12	12
Drought	3	3+0+1=4	12
Earthquake	3	9+6+3=18	54
Fish Losses	2	3+0+1=4	8
Flood	3	6+4+2=12	36
Landslide	3	3+2+1=6	18
Severe Weather	3	6+6+3=15	45
Tsunami	2	6+4+2=12	24
Wild Fire	3	3+2+2=8	24

<b>TABLE 20-6. HAZARD RISK RANKING</b>		
<b>Hazard Ranking</b>	<b>Hazard Event</b>	<b>Category</b>
1	Earthquake	High
2	Severe Weather	High
3	Flood	High
4	Wildland Fire	High
4	Tsunami	Medium
5	Landslide	High
5	Drought	High
6	Dam Failure	Low
6	Fish Losses	Low