

## Chapter 2. Unincorporated Kittitas County Annex

### 2.1. HAZARD MITIGATION PLAN POINT OF CONTACT

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### 2.2. JURISDICTION PROFILE

The following is a summary of key information about Kittitas County and its history:

**Date of Incorporation**— November 1883.

**Current Population**— The population of Kittitas County was 46,205 as of July 1<sup>st</sup>, 2017 based on the US Census population estimates.

**Population Growth**— Kittitas County was the fifth fastest growing county based on populations in the 2000 and 2010 census, with a growth rate of 2.3 percent. Between 2010 and 2017, Kittitas County experienced a 1.8 percent growth rate.

**Location and Description**— Kittitas County is located in the center of Washington State. It is bounded to the west by the crest of the Cascade Range, separating Kittitas County from the Seattle/Puget Sound region. It is bounded to the north by the Wenatchee National Forest and Alpine Lakes Wilderness region. The eastern boundary is the Columbia River, separating Kittitas County and the agricultural lands of the Columbia Plateau region. Its southern boundary is the urban and agricultural region of the Yakima Valley. The county has a total area of 2,333 square miles, 36 square miles of which is water.

Kittitas County has a diverse landscape, ranging from forested Alpine Lakes Wilderness and snow-capped Cascade Mountains in the north and west areas of the County to the scabland and cliff-lined canyons of the Columbia River and Yakima River in the east and south areas. In the valleys are rich farmlands that produce the County's largest cash crop-timothy hay. Timothy hay is grown commercially by estimated 200-250 farmers on 25,000 to 30,000 acres of land at an estimated annual value of more than \$30 million.

**Jurisdiction Vulnerability to Hazards**— Unincorporated Kittitas County has an overall low vulnerability to avalanche, drought, and volcano hazards, and an overall high vulnerability to severe weather events. While many areas of Unincorporated Kittitas County are exposed to an avalanche hazard, vulnerability is relatively low due to minimal development in the Cascade Range. Based on the three dam failure scenarios used in this plan, 10% of the population and 6% of property is at risk of dam failure. The area has high exposure to earthquakes, and various earthquake scenarios result in losses up to 3% of building value. Unincorporated Kittitas County has 772 buildings (5% of assessed building value) located in the 100- or 500-year floodplain, and therefore a moderate vulnerability to flood events. It is the only jurisdiction within Kittitas County with buildings exposed to Landslide Hazard Areas. 365 buildings are exposed, which represent 3.6% of the area's assessed value. The areas also has a high vulnerability to wildfires, with 34% of buildings exposed to the 0-30 Year Fire Interval.

**Brief History**— The County was organized in November 1883 by the Washington Territorial Legislature. It was partitioned from what was then the northern part of Yakima County. There are numerous interpretations of the name, which is from the language of the Kittitas American Indians. According to one source, it “has been said to mean everything from ‘white chalk’ to ‘shale rock’ to ‘shoal people’ to ‘land of plenty.’ Most anthropologists and historians concede that each interpretation has some validity depending upon the particular dialect spoken.”

**Climate**— Kittitas County has a wide range of annual precipitation: from 147 inches in western Kittitas County to 6 inches in eastern Kittitas County. The average seasonal snowfall varies from 434 inches each season at Snoqualmie Pass to less than 30 inches in eastern Kittitas County.

Countywide, the average winter maximum temperature is around 30 degrees F and the average daily minimum temperature is around 20 degrees F. The lowest temperature on record, which occurred at Snoqualmie Pass on February 1, 1922, is –48 degrees F. In summer, the average maximum temperature is around 65 degrees F and the average daily minimum temperature is around 50 degrees F. The highest temperature, which occurred in Ellensburg on July 26, 1928, is 110 degrees.

**Governing Body Format**— Kittitas County has three elected Commissioners who are empowered to set county policy, adopt laws, implement them, and, except for the responsibilities of other elected officials, carry out day-to-day operations of the County.

**Development Trends**— With its proximity to the Seattle metropolitan area and vast supply of recreational land, Kittitas County has been called “Seattle’s backyard.” Most development in the Cle Elum area has been for recreation or second homes. Most of the development has occurred in mountainous and forested areas, and many hillsides have been cleared and roads constructed to provide access to these lands. The County has also seen a rise over the past decade of families buying houses in the Cle Elum area and commuting daily to the Seattle area. In the Ellensburg area, growth and development have been steady. Much development has been on the flat lands of the Kittitas Valley on what was previously farmland.

## 2.3. JURISDICTION-SPECIFIC NATURAL HAZARD EVENT HISTORY

Table 2-1 lists all past occurrences of natural hazards in the county. Repetitive loss records are as follows:

- Number of FEMA Identified Repetitive Flood Loss Properties: 14 in Kittitas County, 3 of which are in unincorporated areas.
- Number of Repetitive Flood Loss Properties that have been mitigated: 0

## 2.4. HAZARD RISK RANKING

Table 2-2 presents the ranking of the hazards of concern.

## 2.5. CAPABILITY ASSESSMENT

The assessment of the jurisdiction’s legal and regulatory capabilities is presented in Table 2-3. The assessment of the jurisdiction’s administrative and technical capabilities is presented in Table 2-4. The assessment of the jurisdiction’s fiscal capabilities is presented in Table 2-5. Classifications under various community mitigation programs are presented in Table 2-6.

## 2.6. HAZARD MITIGATION ACTION PLAN AND EVALUATION OF RECOMMENDED INITIATIVES

Table 2-7 lists the initiatives that make up the jurisdiction’s hazard mitigation plan. Table 2-8 identifies the priority for each initiative. Table 2-9 summarizes the mitigation initiatives by hazard of concern and the six mitigation types.

## 2.7. FUTURE NEEDS TO BETTER UNDERSTAND RISK/VULNERABILITY

Kittitas County has prioritized the collection of LIDAR data, and will continue to do so in the future. Preliminary Flood Insurance Rate Maps (FIRMs) for Kittitas County were available at the time of the 2019 plan update. The County will continue to update flood maps and regulations with any updated FIRMs or other relevant flood data. The County will also prioritize updating data on critical facilities. This will include developing a process for collecting and maintaining the data, adopting a database to store the data, and coordinating with GIS staff to create geospatial records of the critical facilities.

## 2.8. HAZARD AREA EXTENT AND LOCATION

Hazard area extent and location maps for the Kittitas County area are included in Volume 1 of this hazard mitigation plan. These maps are based on the best available data at the time of the preparation of this plan, and are considered to be adequate for planning purposes.

**Table 2-1. Natural Hazard Events**

Type of Event	Date	Preliminary Damage Assessment*
Landslide	06/07/1970	A steep hillside about 7 miles northwest of Ellensburg tumbled down, tore out an irrigation flume, destroyed a half mile of roadway and pushed about 1,000 feet of the highway into the Yakima River.
Landslide	08/28/1971	N/A
Severe Storms And Flooding (DR-492)	12/13/1975	N/A
Drought	3/31/1977	N/A
Severe Storms, Mudslides, & Flooding (DR-545)	12/10/1977	N/A
Volcanic Eruption, Mt. St. Helens (DR-623)	5/21/1980	N/A
Severe Storms & Flooding (DR-883)	11/26/1990	N/A
Landslide	4/24/1995	A slide and debris flow 120 feet wide and 800 feet long took out a large section of Kittitas Reclamation District main canal about 12 miles west of Ellensburg south of the Bristol Flats area, sending debris into the Yakima River.
Severe Storms, High Wind, And Flooding (DR-1079)	1/3/1996	N/A
High Winds, Severe Storms, & Flooding (DR-1100)	2/9/1996	N/A

Type of Event	Date	Preliminary Damage Assessment*
Severe Winter Storms, Land & Muds Slides, & Flooding (DR-1159)	1/17/1997	N/A
Severe Storm & Landslide	7/3/1998	A severe thunderstorm dropped more than 3 inches of rain in less than 1 hour on the flanks of Manastash Ridge and caused swift-moving debris flows in scoured channels down the slopes of the Yakima River Canyon.
Earthquake (DR-1361)	3/1/2001	N/A
Wind	5/19/2001	\$20,000 <sup>a</sup>
Wind	10/23/2001	\$30,000 <sup>a</sup>
Winter Weather	11/28/2001	\$50,000 <sup>a</sup>
Elk Heights Fire	7/30/2004	N/A
Avalanche	1/7/2009	\$500,000 <sup>a</sup>
Severe Winter Storm, Landslides, Mudslides, & Flooding (DR-1817)	1/30/2009	\$10,000,000 <sup>a</sup>
Severe Winter Storm And Record And Near Record Snow (DR-1825)	3/2/2009	N/A
Landslide	10/10/2009	\$12,500,000 <sup>a</sup>
Lightning	09/19/2010	\$60,000 <sup>a</sup>
Wind	11/15/2010	\$33,333 <sup>a</sup>
Severe Winter Storm, Flooding, Landslides, And Mudslides (DR-1963)	2/25/2011	N/A
Severe Storm & Flooding	5/15/2011	
Wildfire (Taylor Bridge)	8/13/2012	\$59.8 Million Dollars
Wildfire (Table Mountain)	9/19/2012	\$3.2 Million Dollars
Wildfire (Colockum Tarps)	7/29/2013	\$7.6 Million Dollars
Wildfire (Saddle Mountain)	7/18/2014	
Wildfire (Snag Canyon)	8/2/2014	\$14 Million Dollars
Wildfire (Jolly Mountain)	7/2/2017-7/22/2017	\$55 Million Dollars
Wildfire (Ryegrass Coulee)	7/10/2018	\$3 Million Dollars

\*Damage estimates from SHEL DUS

**Table 2-2. Hazard Risk Ranking**

Rank	Hazard Type	Risk Rating Score (Probability x Impact)
1	Wildfire	54
2	Flood	39
3	Earthquake	36
4	Drought	27
4	Severe Weather	27
5	Landslide	18
6	Avalanche	18
7	Dam Failure	13
8	Volcano	9
9	Seiche	6

**Table 2-3. Legal and Regulatory Capability**

Capability Category	Local Authority	State or Federal Prohibitions	Other Jurisdictional Authority	State Mandated	Comments
<b>Codes, Ordinances &amp; Requirements</b>					
Building Code	Yes	No	No	Yes	KCC 14.04 Building Code-adopts the 2015 edition of the IBC
Zoning Code	Yes	No	No	Yes	KCC 17 Zoning
Subdivisions	Yes	No	No	Yes	KCC 16 Subdivisions
Post Disaster Recovery	No	No	No	No	
Real Estate Disclosure	No	No	No	Yes	RCW 64.06.020
Growth Management	Yes	No	No	Yes	RCW 36.70A
Site Plan Review	Yes	No	No	No	KCC 14.04 Building Code
Special Purpose (flood management, critical areas)	Yes	Yes	No	Yes	KCC 14.08 Flood Damage Protection, 2003; Flood Control Zone District
Critical Areas	Yes	Yes	No	Yes	KCC 17A.05 Critical Areas (2018 Draft Form)
<b>Planning Documents</b>					

General Plan	Yes	No	No	Yes	The Kittitas County Comprehensive Plan is mandated by the Growth Management Act. Updated annually.
Floodplain or Basin Plan	Yes	No	No	No	Kittitas County Flood Control Zone District
Stormwater Plan	No	No	No	No	Eastern WA Stormwater Management Plan
Capital Improvement Plan	No	No	No	No	The 2011 Capital Facilities Plan, is adopted as part of the 2016 Comprehensive Plan.
Habitat Conservation Plan	No	No	No	No	
Economic Development Plan	Yes	No	No	No	The Economic Development Plan is a part of the Comprehensive Plan, and the Economic Development Strategic Plan prepared by the Economic Development Group of Kittitas County has been adopted by reference into the 2016 Kittitas County Comprehensive Plan.
Emergency Response Plan	Yes	No	No	Yes	Kittitas County Comprehensive Emergency Management Plan, 2012
Shoreline Management Plan	Yes	No	No	Yes	Shoreline Master Program, 2016
Post Disaster Recovery Plan	No	No	No	No	

**Table 2-4. Administrative and Technical Capability**

Staff/Personnel Resources	Available?	Department/Agency/Position
Planners or engineers with knowledge of land development and land management practices	Yes	Kittitas County Public Works (PW): Director, County Engineer, Planner. Kittitas County Community Development Services (CDS): Planner.
Engineers or professionals trained in building or infrastructure construction practices	Yes	PW: County Engineer, Construction Manager, Director.
Planners or engineers with an understanding of natural hazards	Yes	PW: Director, County Engineer, Planner.
Staff with training in benefit/cost analysis	Yes	PW: Planner.

Staff/Personnel Resources	Available?	Department/Agency/Position
Floodplain manager	Yes	PW: Planner.
Surveyors	Yes	PW: Survey crew.
Personnel skilled or trained in GIS applications	Yes	PW: Planners, Floodplain Managers, Engineering Techs. CDS: Planners. Information Services: GIS Analyst. Assessor: Cadastral Technician. Various other county departments have employees with GIS experience.
Scientist familiar with natural hazards in local area	Yes	By contract: CWU, WSDOT, NOAA, WDFW.
Emergency manager	Yes	Sheriff's Office: Emergency Management Operations Commander, Kittitas County Search and Rescue
Grant writers	Yes	Numerous Kittitas County employees with grant writing experience.

**Table 2-5. Fiscal Capability**

Financial Resources	Accessible or Eligible to Use?
Community Development Block Grants	Yes
Capital Improvements Project Funding	Yes
Authority to Levy Taxes for Specific Purposes	Yes
User Fees for Water, Sewer, Gas or Electric Service	No
Incur Debt through General Obligation Bonds	Yes
Incur Debt through Special Tax Bonds	Yes
Incur Debt through Private Activity Bonds	Yes
Withhold Public Expenditures in Hazard-Prone Areas	No
State Sponsored Grant Programs	Yes
Development Impact Fees for Homebuyers or Developers	Eligible: Yes Accessible: No

**Table 2-6. Community Classifications**

Program	Participating?	Classification	Date Classified
Community Rating System	Yes	—	—
Building Code Effectiveness Grading Schedule	Yes	4/4	—
Public Protection			
Fire District #1	Yes	6	—
Fire District #2	Yes	8	—
Fire District #3	Yes	7	—
Fire District #4	Yes	8	—
Fire District #6	Yes	7	—
Fire District #7	Yes	8	—
Fire District #8	Yes	8	—
Storm Ready	No	—	—
Firewise	Yes	High	2018

**Table 2-7. Hazard Mitigation Action Plan Matrix**

Applies to new or existing assets	Hazards Mitigated	Objectives Met	Lead Agency	Estimated Cost	Sources of Funding	Timeline
<b>Initiative #KC-1</b> —Maintain and readopt, as necessary, the Kittitas County Flood Control Zone District.						
New and Existing	Flood	1, 2, 3, 4, 6, 7, 8, 9, 10	Public Works	10,000 Medium	General Fund, Road Fund	Short-term
<b>Initiative #KC-2</b> —Enhance the flood warning system on major rivers and streams within Kittitas County including strengthening the computer interface and upgrading and increasing the number of weather stations.						
New and Existing	Flood	1, 6, 9	Sheriff, Public Works	100,000 Medium	Grants, Road Fund, General Fund, Other agency funds	Short-term
<b>Initiative #KC-3</b> —Continue participation and improve rating in the Community Rating System.						
New and Existing	Flood	All	Public Works, CDS	10,000 Low	General Fund	Short-term, ongoing
<b>Initiative #KC-4</b> —Where appropriate, support retrofitting, purchase, or relocation of structures in hazard-prone areas to protect them from future damage, with priority for properties exposed to repetitive losses.						

Applies to new or existing assets	Hazards Mitigated	Objectives Met	Lead Agency	Estimated Cost	Sources of Funding	Timeline
Existing	All Hazards	1, 2, 8, 10	Public Works, CDS	5,000,000 High	HMGP	Long-term
<b>Initiative #KC-5</b> —Adopt appropriate regulatory standards that will reduce the risk to natural hazards through updates to existing code affecting critical areas regulations, flood hazard regulations, shoreline regulations, and to the county’s growth management comprehensive plan.						
New and Existing	All Hazards	1, 3, 4, 9, 10	Public Works, CDS	25,000 Low	General Fund, grants	Short-term
<b>Initiative #KC-6</b> —Annually disseminate a floodplain information brochure to all floodplain area or flood risk households.						
New and Existing	Flood	1, 2, 6, 10	Public Works, CDS	10,000/year	General Fund	Short-term, ongoing
<b>Initiative #KC-7</b> —Retrofit, rehabilitate or replace vulnerable road facilities, bridges and infrastructure throughout Kittitas County.						
Existing	All except drought and severe weather	1, 8	Public Works	High	HMGP, Roads Fund	Long-term
<b>Initiative #KC-8</b> —Replace undersized bridges and culverts throughout Kittitas County.						
Existing	Flood	1, 8	Public Works	High	HMGP, Roads Fund	Long-term
<b>Initiative #KC-9</b> —Continue to maintain compliance and good standing under the National Flood Insurance Program.						
New and Existing	Flood	1, 2, 3, 4, 6, 8, 10	CDS, Public Works	10,000	General Fund	Short-term, ongoing
<b>Initiative #KC-10</b> —Update the Kittitas County Comprehensive Flood Management Plan.						
New and Existing	Flood	All	CDS, Public Works	250,000 Medium	General Fund	Short-term
<b>Initiative #KC-11</b> —Where feasible, seek to elevate at-risk structures within the floodplain to an adequate freeboard that is commensurate with the flood risk. The measure of feasibility will be willing participation by the property owner and the cost-effectiveness of the project.						
Existing	Flood	1, 8	Public Works	5,000,000 High	HMGP, Road Fund	Short-term
<b>Initiative # KC-12</b> —Upgrade or install stream gauges on rivers and streams with a flow greater than 20 cubic feet per second.						
New and Existing	Flood, Dam Failure	1, 7	Public Works, CDS	100,000 Medium	HMGP, grants	Short-term, ongoing
<b>Initiative # KC-13</b> —Conduct a study of all County-owned facilities to determine their vulnerability to natural hazards. Conduct a seismic retrofit or other mitigation to identified vulnerable structures.						
Existing	Earthquake	1, 8	Facilities	Medium	HMGP, General Fund	Long-term
<b>Initiative # KC-14</b> —Begin a public outreach effort to educate landowners about Firewise and Fire Adapted Communities programs, defensible space around structures, non-combustible building materials, fuel reduction and other wildfire prevention tactics. Place information boards in key areas of the County.						

Applies to new or existing assets	Hazards Mitigated	Objectives Met	Lead Agency	Estimated Cost	Sources of Funding	Timeline
New and Existing	Wildfire	1, 6	County Fire Marshal	20,000 Low	HMGP, grants	Short-term, ongoing
<b>Initiative # KC-15</b> —Perform fuel reduction projects in high wildfire risk areas and areas with identified need throughout Kittitas County.						
New and Existing	Wildfire	1, 2, 3, 6, 10	County Fire Marshal	\$70,000 Low	HMGP, grants	Short-term, ongoing
<b>Initiative # KC-16</b> —Enhance the subdivision code and building code to include updated fire code requirements.						
New	Wildfire	1, 2, 3, 4, 10	County Fire Marshal, CDS	Low	General Fund	Short-term
<b>Initiative # KC-17</b> —Continue to improve and preserve fire apparatus access throughout the County, including access through private gates.						
New and Existing	All Hazards	1, 2, 8	Fire Marshal, Public Works	Medium	HMGP, Road Fund	Short-term, Long-term, Ongoing
<b>Initiative # KC-18</b> —Identify seiche hazard areas and adopt higher regulatory standards to protect structures within the identified areas.						
New	Seiche	1, 2, 3, 7, 8, 10	Public Works, CDS	Medium	General Fund	Long-term
<b>Initiative # KC-19</b> —Continue to adopt land use policies that prohibit the placement of habitable structures in high risk landslide and avalanche areas.						
New	Landslide & Avalanche	1, 2, 3, 4, 10	CDS	25,000	General Fund	Short-term
<b>Initiative # KC-20</b> —Strengthen/harden critical road facilities from the impacts of all hazards for which they have exposure and vulnerability.						
New and Existing	All Hazards	1, 8	Public Works	High	HMGP, Road Fund	Long-Term depends on funding
<b>Initiative # KC-21</b> —Proactively manage hazardous tree removal from public areas, and educate private property owners about management of their own trees.						
Existing	Severe Storm	1, 9, 10	Public Works, CDS	Low	General Fund, Road Fund	Short-term, ongoing
<b>Initiative # KC-22</b> —Use the best available data and science to continually update the County risk assessment as new information becomes available (hydrologic, geologic, topographic, etc.).						
New and Existing	All Hazards	1, 3, 7	Public Works, CDS		HMGP, General Fund, Road Fund	Short-term
<b>Initiative # KC-23</b> —Integrate the hazard mitigation plan into future updates of the Kittitas County Comprehensive Plan.						
New	All Hazards	All	CDS	250,000	General Fund	Short-term
<b>Initiative # KC-24</b> —Continue to support the implementation, monitoring, maintenance and updating of this plan.						

Applies to new or existing assets	Hazards Mitigated	Objectives Met	Lead Agency	Estimated Cost	Sources of Funding	Timeline
New and Existing	All Hazards	All	Public Works	Low	HMGP, General Fund, Road Fund	Short-term, ongoing
<b>Initiative # KC-25</b> —Integrate goals, objectives and initiatives of the Kittitas County Hazard Mitigation Plan into existing County regulations and programs where appropriate.						
New and Existing	All Hazards	All	All County regulatory agencies	Low	General Fund, Road Fund	Short-term
<b>Initiative #KC-26</b> —Maintain an active public outreach strategy using available multiple media to inform the public how to personally prepare for and mitigate the hazards of concern.						
New and Existing	All Hazards	1, 6	Public Works, CDS, Sheriff	Low	General Fund	Short-term Ongoing
<b>Initiative #KC-27</b> —Support detailed ash fall studies.						
New and Existing	Volcano	1, 7, 9	Public Works, CDS	Low	HMGP, General Fund, Road Fund	Long-term
<b>Initiative #KC-28</b> —Identify and create new impounded water sources.						
New and Existing	Drought	1, 7	Public Works	Medium	HMGP, Grant, Other	Long-term
<b>Initiative #KC-29</b> —Educate the public on drought resistance and encourage the use of water saving landscaping, irrigation methods and farming practices.						
New and Existing	Drought	1, 6, 7, 9, 10	CDS, Kittitas County Conservation District	Low	General Fund, Grants	Short-term
<b>Initiative #KC-30</b> —Improve irrigation conveyance systems to reduce water loss through earthen canals and ditches.						
New and Existing	Drought	1, 8, 9, 10	CDS, Kittitas County Conservation District	High	HMGP, Irrigation Districts and Companies	Long-term
<b>Initiative #KC-31</b> —Enhance the existing dam failure early warning system.						
New and Existing	Dam Failure	1, 6	CDS, Public Works	Medium	HMGP, Grants	Long-term
<b>Initiative #KC-32</b> —Set the course for sustained operations of critical county functions by the development of a continuity of operations plan and/or a post-disaster recovery plan.						
New and Existing	All Hazards	1,6,9	Emergency Management	Medium	General Fund, DHS grant funding	Long term
<b>Initiative #KC-33</b> —Continue to support through active participation the “county-wide” initiatives identified in Volume 1 of the Kittitas County Hazard Mitigation Plan.						
New and Existing	All Hazards	5,6,9	All County Agencies	Low	General Fund	Short-term Ongoing

Applies to new or existing assets	Hazards Mitigated	Objectives Met	Lead Agency	Estimated Cost	Sources of Funding	Timeline
<b>Initiative #KC-34</b> —Consider participation in the National Weather Service “Storm Ready” program.						
New and Existing	Flood, Severe Weather	6,7,9	Emergency Management	Low	General Funding, NWS grant funding	Short-term

**Table 2-8. Mitigation Strategy Priority Schedule**

Initiative #	# of Objectives Met	Benefits	Costs	Do Benefits Equal or Exceed Costs?	Is Project Grant-Eligible?	Can Project Be Funded Under Existing Programs/Budgets?	Priority*
KC-1	10	High	Medium	Yes	No	Yes	High
KC-2	3	High	Medium	Yes	Yes	No	Medium
KC-3	10	Medium	Low	Yes	No	Yes	High
KC-4	4	High	High	Yes	Yes	No	Medium
KC-5	5	High	Low	Yes	Now	Yes	High
KC-6	4	Low	Low	Yes	No	Yes	High
KC-7	2	High	High	Yes	Yes	No	Medium
KC-8	2	High	High	Yes	Yes	No	Medium
KC-9	7	Medium	Low	Yes	No	Yes	High
KC-10	10	Medium	Medium	Yes	Yes	No	Medium
KC-11	2	High	High	Yes	Yes	No	Medium
KC-12	2	High	Medium	Yes	Yes	No	Medium
KC-13	2	Medium	Medium	Yes	Yes	No	Medium
KC-14	5	Low	Low	Yes	No	Yes	High
KC-15	2	High	Low	Yes	Yes	Yes	High
KC-16	5	Medium	Low	Yes	No	Yes	High
KC-17	5	Medium	Medium	Yes	Yes	Yes	High
KC-18	3	Medium	Medium	Yes	Yes	No	Medium
KC-19	3	Medium	Low	Yes	No	Yes	High
KC-20	6	High	High	Yes	Yes	No	Medium
KC-21	5	Medium	Low	Yes	Yes	Yes	High
KC-22	2	Medium	Medium	Yes	Yes	Yes	High
KC-23	3	Medium	Low	Yes	No	Yes	High
KC-24	3	Medium	Low	Yes	Yes	Yes	High
KC-25	10	Medium	Low	Yes	No	Yes	High
KC-26	10	Low	Low	Yes	No	Yes	High
KC-27	10	Low	Low	Yes	No	No	Low
KC-28	2	Medium	Medium	Yes	No	No	Medium

Initiative #	# of Objectives Met	Benefits	Costs	Do Benefits Equal or Exceed Costs?	Is Project Grant-Eligible?	Can Project Be Funded Under Existing Programs/Budgets?	Priority*
KC-29	2	Low	Low	Yes	No	No	Medium
KC-30	5	High	High	Yes	Yes	No	Medium
KC-31	4	High	Medium	Yes	No	Yes	High
KC-32	3	High	Medium	Yes	Yes	No	Medium
KC-33	3	High	Low	Yes	Yes	Yes	High
KC-34	3	High	Low	Yes	Yes	Yes	High

\* See Section 1.3 for definitions of high, medium and low priorities.

**Table 2-9. Analysis of Mitigation Initiatives: Initiative Addressing Hazard, by Mitigation Type**

Hazard Type	1. Prevention	2. Property Protection	3. Public Education and Awareness	4. Natural Resource Protection	5. Emergency Services	6. Structural Projects
Avalanche	5, 19, 23, 24, 25, 33	4, 7, 20	22, 24, 26, 33	5	17, 20, 32	
Dam failure	5, 23, 24, 25, 33	4, 7, 11, 20	22, 24, 26, 33	5	12, 20, 31, 32	
Drought	5, 23, 24, 25, 33	4	22, 24, 26, 29, 33	5	32	28, 30
Earthquake	5, 13, 23, 24, 25, 33	4, 7, 13, 20	22, 24, 26, 33	5	17, 20, 32	13
Flood	1, 3, 5, 9, 10, 23, 24, 25, 33	1,3,4, 7, 8, 9, 10, 11, 20	1,3, 6, 9, 10, 22, 24, 26, 33	1,3, 5, 10	1, 2, 3, 9, 10, 12, 17, 20, 31, 32,34	1, 3, 10
Landslide	5, 19, 23, 24, 25, 33	4, 7, 20	22, 24, 26, 33	5	17, 20, 32	
Severe Weather	5, 23, 24, 25, 33	4, 20	22, 24, 26, 33	5, 21	12, 17, 20, 32, 34	
Seiche	5, 18, 23, 24, 25, 33	4, 7, 18, 20	18, 22, 24, 26, 33	5	17, 20, 32	
Volcano	5, 23, 24, 25, 27, 33	4, 20	22, 24, 26, 33	5	17, 20, 32	
Wildfire	5, 15, 16, 23, 24, 25, 33	4, 7, 15, 20	14, 22, 24, 26, 33	5, 15	17, 20, 32	

1. Prevention: Government, administrative or regulatory actions that influence the way land and buildings are developed to reduce hazard losses. Includes planning and zoning, floodplain laws, capital improvement programs, open space preservation, and stormwater management regulations.
2. Property Protection: Modification of buildings or structures to protect them from a hazard or removal of structures from a hazard area. Includes acquisition, elevation, relocation, structural retrofit, storm shutters, and shatter-resistant glass.
3. Public Education and Awareness: Actions to inform citizens and elected officials about hazards and ways to mitigate them. Includes outreach projects, real estate disclosure, hazard information centers, and school-age and adult education.
4. Natural Resource Protection: Actions that minimize hazard loss and preserve or restore the functions of natural systems. Includes sediment and erosion control, stream corridor restoration, watershed management, forest and vegetation management, and wetland restoration and preservation.
5. Emergency Services: Actions that protect people and property during and immediately after a hazard event. Includes warning systems, emergency response services, and the protection of essential facilities.
6. Structural Projects: Actions that involve the construction of structures to reduce the impact of a hazard. Includes dams, setback levees, floodwalls, retaining walls, and safe rooms.