



Chapter X. Hazard Mitigation

1.1 Natural Hazards in Yakima County

Over the years, residents of Yakima County have dealt with a variety of disasters, most notably several major floods, ash fallout from Mt. St. Helens, and a landslide that demolished a state highway and blocked the Naches River. According to the Washington Department of Emergency Management, there have been 13 federal disaster declarations in Yakima County since 1956. The vast majority of the disaster declarations have been due to flooding or severe winter weather, with the exception of the eruption of Mt. St. Helens. While comprehensive planning cannot prevent a volcano from erupting, there are many ways in which planning policies can prevent loss of life and damage to property from natural disasters.



Image 1.1 City of Toppenish, February 1996 (Source: Yakima County FCZD)

1.2 Hazard Mitigation Planning

The intent of this new Comprehensive Plan Element is to establish goals and polices resulting in development that minimizes loss of life and property from natural disasters. Including hazard mitigation in the Comprehensive Plan establishes hazard mitigation planning as a priority in Yakima County.

Mitigation is an action taken with the intention of permanently reducing or alleviating losses of life, property, and injuries resulting from hazards through long and short-term strategies. While the timing of natural hazards is often unpredictable, planners and emergency management professionals can identify areas that are at risk of a natural hazard within a reasonable timeframe.

By including hazard mitigation into Horizon 2040, mitigation measures captured in associated plans are integrated into policies. These policies provide a legal basis for implementing mitigation measures through land use regulations.

1.3 Yakima County Multi-Jurisdictional Hazard Mitigation Plan

Yakima Valley Office of Emergency Management coordinates the Multi-Jurisdictional Hazard Mitigation Plan (HMP), which is updated every five years; the most recent update was in 2015. The Yakima County Multi-Jurisdictional Hazard Mitigation Plan includes resources and information to assist county residents, public and private sector organizations, and others interested in participating in planning for natural and technological hazards. The mitigation plan provides a list of activities that may assist Yakima County in reducing risk and preventing loss from future hazard events. The action items address multi-hazard issues, as well as activities for flood, landslide, avalanche, drought, severe winter storm, windstorm, wildfire, extreme temperatures, hail, lightning, tornado, earthquake, volcanic eruption and hazardous materials.

Section 322 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act (Stafford Act) 42 U.S.C. 5165, as amended by the Disaster Mitigation Act of 2000 (DMA) (P.L. 10 & 390) provides for States, Tribes, and Local governments to undertake mitigation planning. The National Flood Insurance Program (NFIP) links flood mitigation assistance programs with community's mitigation plans. Section 322 of the amended Stafford Act states that as a condition of receiving a disaster loan or grant:

“The state **and** local government(s) shall agree that natural hazards in the areas affected shall be evaluated and appropriate action taken to mitigate such hazards, including safe land-use and construction practices. For disasters declared after November 1, 2004, all potential applicants (sub-grantees) must have either their own, or be included in a regional, locally adopted and FEMA approved all hazard mitigation plans in order to be eligible to apply for mitigation grant funds.”

The regulations governing the mitigation planning requirements for local mitigation plans are published under 44 CFR §201.6. Under 44 CFR §201.6, local governments must have a FEMA-approved Local Mitigation Plan in order to apply for and/or receive project grants under the following hazard mitigation assistance programs:

- Hazard Mitigation Grant Program (HMGP)
- Pre-Disaster Mitigation (PDM)
- Flood Mitigation Assistance (FMA)
- Severe Repetitive Loss (SRL)

1.4 Special Districts/Programs

1.4.1 Yakima Countywide Flood Control Zone District/ Yakima County Water Resources Division

In response to damaging floods that occurred in the 1990s, on January 13, 1998, the Board of Yakima County Commissioners established the Yakima Countywide Flood Control Zone District.

"The purpose of the Flood Control Zone District (FCZD) will be to address flood management needs within the county. The activities of the district could include, but are not limited to, flood warning and emergency response, flood proofing and elevation of structures, property acquisition, implementation of consistent development regulations that recognized the impacts of flooding, basin wide flood planning, and the identification, engineering, and construction of capital projects to mitigate and/or address flooding problems".

1. Comprehensive Flood Hazard Management Plans (CFHMPs):

Comprehensive Flood Hazard Management Plans contain recommendations on future flood hazard management alternatives for problematic areas. Once the plan is adopted by the local government, it serves as a policy document for the County and Cities that adopt it. The Plan itself is not a regulatory document, but identifies and prioritizes flood control and mitigation projects for the community. Adoption of the plans increases the chances of State and Federal funding of projects and post flood disaster relief.

- Upper Yakima CFHMP: The Upper Yakima CFHMP was adopted in 1998 as a response to Yakima County's desire to identify flooding issues along the Yakima River from the Yakima Canyon to Union Gap and along the Naches River from Twin Bridges to its mouth to gain an understanding of flood hazard management alternatives that appropriate and informed management proposals and decisions, and to develop flood hazard management program to address identified flooding issues. The Plan was amended in 2007.
- Naches CFHMP: The Naches River CFHMP covers the Naches River from the confluence of the Naches and Tieton Rivers to the Twin Bridges northwest of Yakima. The Naches River Comprehensive Flood Hazard Management Plan was adopted by the participating agencies on the following dates: Board of County Commissioners – 8/22/06
Naches Town Council 9/11/06; Department of Ecology - 10/12/07
- Ahtanum-Wide Hollow CFHMP: The Ahtanum-Wide Hollow CFHMP covers the entire Ahtanum and Wide Hollow watersheds, focusing on the Ahtanum Valley Floor, West Valley, Union Gap, and parts of Yakima. The Yakama Nation is a partner in the project - Ahtanum Creek forms the northern boundary of the Yakama Reservation. This plan was forwarded to the local governments for adoption in October 2011 and adopted by the Board of County Commissioners 10/16/12.

2. Hazus Mapping Efforts

Since 2011, Yakima County Flood Control District has been using Hazus, a modeling technique, to estimate physical, economic, and social impacts of flooding in Yakima County using Geographic Information Systems (GIS). Hazus provides risk assessments and is used to determine the most beneficial mitigation measures to reduce loss.

1.4.2 Yakima County Fire and Life Safety Division

1. Firewise Program

Firewise is a national program that addresses a community's vulnerability to wildfire, and uses outreach, education, and community events to mitigate the hazard. The mitigation activities include improving access and directional signage for emergency vehicles, implementing landscaping techniques, using fire resistant building materials, and reducing fuel loads. Yakima County dedicated a full-time staff to manage the local Firewise program in 2015.

2. 2014 Yakima County Community Wildfire Protection Plan (CWPP)

Community Wildfire Protection Plans clarify and refine a community's mitigation priorities in the wildland-urban interface. It provides a framework to collaborate with Federal land management agencies on the implementation of strategic forest management and hazardous fuel reduction projects.

3. 2012 Cowychee Mountain Community Wildfire Protection Plan

The Cowychee Mountain CWPP identifies concurrent fire mitigation activities, implementers, and funding opportunities to reduce the risk of and be prepared for future fires. This plan focuses on a shrub-steppe environment, which distinguishes it from the other CWPPs in the region that focus more on forested habitats. The plan focuses on safety, shrub-steppe ecological principles, multijurisdictional collaboration, and education.

4. 2005 State Highway 410 and U.S. Highway 12 CWPP

The Highways 410 and 12 CWPP set goals to improve fire prevention, reduce hazardous fuels, restore fire adopted communities, promote community assistance, recognize and adhere to environmental laws and policies, and tie to existing and approved emergency response plans within Yakima County. This plan is for a specific area within Yakima County; therefore it contains more detail than the County-wide plan.

1.4.3 Federal/State Programs

1. Yakima River Basin Water Enhancement Project/ Yakima River Basin Integrated Water Resource Management Plan

This ongoing U.S. Bureau of Reclamation project aims to provide supplemental water for irrigated lands, water for new lands, water for increased in-stream flows for aquatic life, and a comprehensive plan for efficient management of basin water supplies. The Yakima Basin Plan includes measures to increase water storage and provide water supply reliability for farmers and communities. Strategies include increasing the size of the Bumping Lake reservoir, creating more efficient means to

1.5 Natural Hazard Mitigation

1.5.1 Flood

Flooding is a major concern in Yakima County. A 50- to 70-year flood event in 1996 caused \$18 million worth of damage in the County. Development pressures in the recent years have increased the percentage of impervious surfaces both inside and outside of the floodplain. Without vegetative surfaces, stormwater and meltwater can form streams and flow directly into surface water, instead of being slowly absorbed into the soil. Additional impervious surfaces and development cause the intensity of the floods and subsequent flood damages to increase.

Current Conditions According to Hazus analysis, Yakima County expects an average annualized loss due to flood damage of over \$3 million. The Yakima FCZD and FEMA have addressed flood hazards through updating flood maps, land purchases, and levee setbacks. Yakima County's existing Critical Area Ordinance and the Shoreline Master Plan protect streams, wetlands, and vegetative buffers from development. These areas provide floodwater storage, a critical function during flood events. In 2015, Yakima County had 51,556 acres of land in the floodplain or floodway, including 6,124 acres of residentially zoned land in 2,421 separate parcels.

Yakima Countywide Flood Control Zone District, with funding from the Washington Department of Ecology, has taken steps to both improve floodwater conveyance and fish habitat as part of the Floodplain by Design program. The County has begun to purchase land along the Yakima and Naches Rivers and remove or set back existing levees. Many of these levees, some of them existing since the 1940s, act to constrict the natural flow of the rivers and cause additional erosion and flooding in unprotected areas. Additionally, the levees cause water to flow faster and deeper through the smaller space. Moving the levees away from the river reduces the constriction, slowing the flow and reducing the amount of property damage up and downstream of the constrictions. In addition, levee set-backs improve fish and wildlife habitat and allow the river to flow more naturally. The more space the water has to travel unimpeded, the less a community will suffer from property losses and flood safety concerns.

Goal NH1: Prevent the loss of life or property and minimize public and private costs associated with repairing or preventing flood damages from development in frequently flooded areas.

Policies:

NH 1.1 Support comprehensive flood control planning.

NH 1.2 Yakima County should conduct additional analysis and mapping of frequently flooded areas in cases where the 100-year floodplain maps prepared by the Federal Emergency Management Agency do not adequately reflect the levels of risk or the geographic extent of flooding.

NH 1.3 Direct new critical facility development away from areas subject to catastrophic, life-threatening flood hazards where the hazards cannot be mitigated.

NH 1.4 Where the effects of flood hazards can be mitigated, require appropriate standards for subdivisions, parcel reconfigurations, site developments and for the design of structures.
{Amended 12/98}

NH 1.5 Plan for and facilitate returning rivers to more natural hydrological conditions, and recognize that seasonal flooding is an essential natural process.

NH 1.6 When evaluating alternate flood control measures on rivers:

1) consider the removal or relocation of structures in the FEMA 100-year floodplain;

2) where feasible, give preference to nonstructural flood hazard reduction measures over structural measures;

3) structural flood hazard reductions measures should be consistent with the County's comprehensive flood hazard management plan. NH 1.7 New development or new uses, including the subdivision of land, should not be established when it would be reasonably foreseeable that the development or use would require structural flood hazard reduction measures within the channel migration zone or floodway.

NH 1.8 Restrict subdivisions in areas subject to flooding.

Goal NH2: Prevent increased flooding from stormwater runoff.

Policies:

NH 2.1 Require on-site retention of stormwater.

NH 2.2 Preserve natural drainage courses.

NH 2.3 Minimize adverse storm water impacts generated by the removal of vegetation and alteration of land forms.

NH 2.4 Encourage the use of Low-Impact Development and other best management practices for capturing and infiltrating stormwater

Goal NH3: Protect the hydrologic functions of natural systems to store and slowly release floodwaters, reduce flood velocities, and filter sediment.

Policies:

NH 3.1 Flood control measures should not be authorized if they obstruct fish passage or result in the unmitigated loss or damage of fish and wildlife resources.

NH 3.2 Encourage and support the retention of natural open spaces or land uses which maintain hydrologic functions and are at low risk to property damage from floodwaters within frequently flooded areas.

1.5.2 Geologic Hazards

Geologic hazards, such as volcanic eruption, earthquakes, and erosion, occur at a scale and timeframe beyond the scope of most land use plans. Mitigating for events with a low probability of occurring in a generation can be time-consuming, costly, and unreasonable.

Portions of Yakima County are subject to geologic hazards. These hazards include landslides, earthquakes, volcanic eruption, and erosion. Earthquakes and volcanoes are rare occurrences in the area, but the impacts can be wide ranging and impact the entire county, while landslides are more localized events that could cause damage to properties, loss of life, and transportation systems. Erosion is generally a slower process and may have impacts on buildings and infrastructure.

Notably, a landslide occurred in the Nile Valley in October 2009. The landslide, approximately 16 million cubic yards in size, destroyed State Route 410, blocked the Naches River, and uplifted the Naches River bed by 30 to 50 feet. No lives were lost, but reconstructing the road cost over \$8 million and took three years. The river level was low at the time of the landslide, but a similar event in the spring, when the river levels are much higher, could lead to damaging floods in nearby residential areas.

Landslide hazards are difficult to predict. Mapping of potential landslide and debris flow areas, such as over-steepened slopes and alluvial fans, can identify the locations of these hazards. Development in potential hazards can further exacerbate those risks. The removal of vegetation can impact the surface soils ability to maintain a slope, since roots are vital to holding soil in place. Grading for roads and housing sites can change the integrity of the slope. Changes to the moisture regime caused by inadequate drainage and watering

In 1980, Mt. Saint Helens erupted. Yakima County was spared lahar flows, but the county was covered by ash deposit. The ash caused major damage to the stormwater drainage system. Open spaces were used to collect ash removed from the roadways. Nearly 600,000 tons of ash were removed from the City of Yakima in the aftermath of the eruption. Clean up from the eruption cost the city \$5.4 million dollars, and economic losses were estimated at \$12 million.

Current Conditions

Yakima County has identified and mapped geologic hazards, specifically areas at risk for landslides and debris flows. In 2015, Yakima County contained 635,833 acres in or within 50 feet of a geologically

hazardous area, including 6,300 parcels comprising 16,665 residential acres in or within 50 feet of a geologically hazardous area. An additional 515,651 acres of geologically hazardous areas allow for residential development at a low density.

Goal NH4: Protect the public from personal injury, loss of life or property damage from geologic hazards.

Policies:

NH 4.1: Ensure that land use practices in geologically hazardous areas do not cause or exacerbate natural processes which endanger lives, property, or resources.

NH 4.2 Locate development within the most environmentally suitable and naturally stable portions of the site.

NH 4.3 Classify and designate areas on which development should be prohibited, conditioned, or otherwise controlled because of danger from geological hazards.

NH 4.4 Prevent the subdividing of known or suspected landslide hazard areas, side slopes of stream ravines, or slopes 40 percent or greater for development purposes.

NH 4.5 Maintain the integrity and moisture regimes of oversteepened slopes and other areas at risk for landslides

NH 4.6 Ensure that geologic hazard information is readily available to the public.

1.5.3 Wildfire

Wildfire is a risk for several areas in Yakima County. As Yakima County's population has increased, development has expanded into traditionally rural and resource lands. Expansion into these areas has increased the threat of wildfires to life and property while also straining the capabilities of existing fire protection systems/fire districts. Wildfire risk increases in years with low snowpack and drought-like conditions. A dry winter and spring leads to less moisture in the soils and more vulnerability for wildfires. Invasive species, such as cheatgrass, can increase risk of wildfires spreading in the shrub-steppe habitat. Native vegetation in shrub-steppe plant communities involve bunch grasses, which grow in distinct clumps, generally with spaces of soil in between. The cheatgrass grows in continuous sections, which means a fire can rapidly spread through the area.

Current Conditions

Recent wildfires in Yakima County have caused \$4 million dollars in property damage. Additional impacts of wildfire, such as the costs of fighting the fires and the indirect impacts to the economy and air quality, can be much higher. Yakima County's Firewise program serves to address wildfire risks in partner communities. As of 2015, several communities along the Highway 410 and 12 corridor were

participating in the program. Firewise serves to reduce the economic impact of wildfires, as well as reduce the risk to personal safety and private property.

Goal NH5: Protect life and property in rural Yakima County from fire hazards.

Policies:

NH 5.1 Encourage the development of an adequate water supply/storage for new development which is not connected to a community water/hydrant system. A storage facility/fire well should be accessible by standard firefighting equipment and adequate for the needs of the structure(s) and people being protected.

NH 5.2 Roofing used in the construction of residential development shall be of a Class "A" fire retardant material when located outside of 5 road miles of a full service fire station.

NH 5.3 Encourage, where feasible, the undergrounding of electrical utilities to reduce their exposure to fire.

NH 5.4 Require new residential construction to provide for a fuel break around structures.

NH 5.5 Require proposed developments to provide sufficient access for heavy-duty firefighting equipment.

NH 5.6 Bridges, culverts, road drains and other structures shall be constructed and maintained in a manner to accommodate firefighting apparatus on a year around basis.

NH 5.7 Residences and driveways shall be clearly marked and visible with the appropriate address assigned by Yakima County.

NH 5.8 Encourage cluster developments and reduce density in wildfire hazard areas.

1.5.4 Drought

Drought is defined as a prolonged period of abnormal dryness that impacts people, agriculture, and habitats. Washington state law (RCW Chapter 43.83B.400) identifies drought conditions as: 1) water supply in the area is below 75 percent of normal and 2) water uses and users in the area will likely incur undue hardships because of the water shortage. Drought is different than other natural hazards because the onset can occur slowly and it can last for years. Yakima County is one of Washington State's counties most vulnerable to drought. Historically, Yakima County has been in some form of drought 10 to 15 percent of the time.

Climate models predict that Washington State will become warmer and wetter in the Cascades in the coming years. Warmer, wetter Cascades means while there may be more precipitation falling on the mountains, it will be in the form of rain instead of snow. Yakima Valley depends on snowpack in the Cascades to act as a reservoir for irrigation; over half of the irrigation water Yakima Valley farmers

depend is stored as snow in the mountains. A lower snowpack in the Cascades leads to less water available for irrigation in Yakima Valley. Meanwhile, drought in the Yakima Valley is expected to become more common in these climate models.

Drought can have devastating effects on Yakima County's economy. A 2001 drought caused \$140 million in economic losses; a similar drought in 2005 caused losses upwards of \$195 million within the Yakima River Basin. Perennial crops, such as apples and cherries, are especially sensitive to drought; fruit trees can take several years to mature, so a loss of an orchard will have economic impacts that last for many years afterward. Extreme drought can cause problems with municipal water and sewer systems. In addition, prolonged drought can have health impacts. Water restrictions may cause reductions in sanitation options. A reduced amount of water can lead to higher concentration of contaminants in water, which can lead to water being dangerous or unhealthy for consumption. The combination of these factors can cause excess stress, which has its own health implications.

Goal NH 6: Limit the impact of drought on property and safety. (Be prepared for drought?)

Policies:

NH 7.1 Collaborate with interested agencies to develop a drought mitigation and response plan.

NH 7.2 Ensure sufficient water quantity for new developments

NH 7.3 Encourage xeriscaping and other landscaping options that limit the need for irrigation

NH 7.4 Promote design that captures and infiltrates stormwater, meltwater, and irrigation runoff

1.5.5 Multi-Hazard

Natural hazards have the potential to compound. A drought can increase wildfire risk; in turn, wildfire can lead to fall floods and spring landslides because of fire damage to vegetation. A landslide can block a river channel and lead to upstream flooding. Certain areas of Yakima County, such as the Nile Valley, are susceptible to cumulative hazards.

Goal NH7: Protect property, life, and health from impacts of multiple and cumulative natural hazards.

Policies:

NH 7.1 Ensure proposed subdivisions, other development, and associated infrastructure are designed at a density, level of site coverage, and occupancy to preserve the structure, values, and functions of the natural environment or to safeguard the public from hazards to health and safety.

NH 7.2 Encourage mechanisms to restrict or minimize development in high-risk hazard areas to protect public health and safety.

NH 7.3 Maintain existing infrastructure to reduce the risk of infrastructure fail during a natural disaster

NH 7.4 Locate critical facilities and infrastructure outside of high-risk hazard areas

NH 7.5 Ensure new developments in high-risk hazard areas include secondary egress

1.5.6 Recovery

Despite the best efforts of planning officials, emergency management personnel, and others to mitigate for loss, natural disasters will occur. The Yakima County Multi-Hazard Mitigation Plan outlines mitigation efforts undertaken prior to a disaster and relief responsibilities in the immediate aftermath of a disaster. Recovery plans, created prior to the disaster and implemented after the disaster, provide a framework for long-term resiliency in the face of calamity. A recovery plan allows community leaders and the public to identify the next steps in rebuilding once the immediate threat has passed. These plans are the final step in being fully prepared, should a major disaster strike the community.

Goal NH8: Be prepared for major natural disaster.

Policies:

NH 8.1 Develop a Recovery Plan to guide the redevelopment, public participation process, and long-term recovery after a natural disaster.