TABLE OF CONTENTS

This page is intentionally left blank.



CHAPTER 3. NATURAL HAZARDS

3.1 INTRODUCTION

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~~ landslides that demolish~~ed~~ ~~a~~ state highways and blocked ~~the Naches~~ Rivers. 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 extreme weather events, such as drought, wildfire, flooding or severe winter weather, the most notable exception being the 1980 eruption of Mt. St. Helens. Some of these are natural events, others are influenced by human activities. 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 and decisions made under growth management.

When planning for natural hazards, the county must balance public safety with the protection of individual property rights. Goal (6) of the Growth Management Act (GMA) states:

> (6) Property rights. Private property shall not be taken for public use without just compensation having been made. The property rights of landowners shall be protected from arbitrary and discriminatory actions.

In some cases - for example, the identification and designation of landslide hazard areas - a careful balance must be struck between notifying (and protecting) property owners of the hazard, while still protecting the value and use of their property.

3.2 HAZARD MITIGATION PLANNING

3.2.1 Hazard Mitigation Element

The intent of this new Comprehensive Plan Element is to establish goals and policies 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-

Commented [KW1]: Some of these are natural events, others are influenced by human activities. Consider "Environmental Hazards"

Commented [KW2R1]: This was an early suggestion. Makes sense but too many other municipalities and DOE use "natural" so we're back to that.

Commented [TH3]: not new now?

Commented [TH4]: Could it also include economic impacts such as reduced detours around flooded roadways, or health considerations when considering backup of treatment plants that end up limiting services, and those types of things?

Commented [KW5R4]: I don't see why not. That's part of resiliency, being able to deal with hazards in an effective, and cost/time etc. efficient way. Health for sure. In climate change we call these "co-benefits" e.g., reduced childhood respiratory illness as a result of better air quality (GHS reductions).

Commented [KW6R4]: Anyway. looks like we off to a good start with shared comments. I won't respond to all until we're in a work session or joint draft review mode.

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~~2046***, mitigation measures captured in associated plans are integrated into policies. These policies provide a legal basis for implementing mitigation measures though land use regulations.

3.2.2 Yakima County Multi-Jurisdictional Hazard Mitigation Plan

Yakima Valley ~~Office of~~ Emergency Management (YVEM) coordinates the Multi-Jurisdictional Hazard Mitigation Plan (HMP) for Yakima County and other jurisdictions or districts that wish to participate, which is typically updated every five years; the most recent update was adopted on~~in~~ January 17, 2023~~15~~. YVEM strives to capture informal status updates each year for accountability and awareness for the 5-year update. The following jurisdictions and districts are included in the HMP adopted in 2023:

~~INSERT~~

Table 1.2. Yakima County Local Government Agencies

Cities and Towns	
City of Grandview	City of Sunnyside
City of Granger	City of Tieton
Town of Harrah	City of Toppenish
City of Mabton	City of Union Gap
City of Moxee	City of Wapato
Town of Naches	City of Yakima
City of Selah	City of Zillah
	Yakima County (unincorporated areas)
Fire Protection Districts	
Fire District #1 (Highland)	Fire District #6 (Gleed)
Fire District #2 (Selah)	Fire District #7 (Glade)
Fire District #3 (Naches)	Fire District #9 (Naches Heights)
Fire District #4 (East Valley)	Fire District #12 (West Valley)
Fire District #5 (Lower Valley)	Fire District #14 (Nile)
School Districts	
East Valley School District No. 90	Sunnyside School District No. 201
Grandview School District No. 200	Toppenish School District No. 202
Granger School District No. 204	Union Gap School District No. 2
Highland School District No. 203	Wapato School District No. 207
Mabton School District No. 120	West Valley School District No. 208
Mt. Adams School District No. 209	Yakima School District No. 7
Naches Valley School District Jt 3	Zillah School District No. 205
Selah School District No. 119	Education Service District 105
Irrigation Districts	
Ahtanum Irrigation District #11	Snipes Mountain Irrigation District #100
Buena Irrigation District #20	Sunnyside Valley Irrigation District
Grandview Irrigation District #30	South Naches Irrigation District #190
Granger Irrigation District #40	Terrace Heights Irrigation District #120
Selah-Moxee Irrigation District	Union Gap Irrigation District #130
Home Irrigation District #50	Wenas Irrigation District #140
Naches Union Irrigation District #180	Zillah Irrigation District #170
Naches-Selah Irrigation District #60	Yakima-Tieton Irrigation District
Outlook Irrigation District #70	Yakima Valley Canal Company—Congdon Canal
Roza Irrigation District #98	Fruitvale Canal (City of Yakima)
Selah-Moxee Irrigation District #90	

Commented [TH7]: not sure what "associated" means. local hazard mitigation plans, statewide plans, adopted plans, etc?

Commented [KW8R7]: I think this is used to ID projects and programs that support the intent of the chapter. Like: YBIP's groundwater group and the lit. about the value of Managed Aquifer Recharge - something I'm adding to the CARA CAO. Saying "we will work with other 'associated' programs, for coordination's sake at the very least, is one way of saying this. "Comparable" or "Similar" programs in the basin....is another

Commented [TH9]: can we add projects? or is that not appropriate.

Commented [KW10R9]: I think we should both add projects, as examples, and eventually, CITE as another way.

Commented [TH11]: I think they removed these words from their title, but there's been some inconsistency in branding.

Commented [TH12]: This could be valuable in making it clear which districts are not part of the plan and help garner additional participants during the next round but also could become outdated and unnecessary. Curious what everyone thinks.

Figure 3.3.3-1: Table 1.2 Yakima County Local Government Agencies from the Yakima County Multi-Jurisdictional Hazard Mitigation Plan

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, biological, and technological hazards. The ~~mitigation plan~~HMP 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,~~n and~~ hazardous materials and more.

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. 2 &390) provides for States, Tribes, and Local governments to undertake mitigation planning. The National Flood Insurance Program (NFIP) links flood mitigation assistance programs with communities' mitigation plans. Section 322 of the amended Stafford Act states that as a condition of receiving a disaster loan or grant:

"The state ~~and~~ 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~~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~~to be eligible to apply for and/or receive project grants under several ~~the following~~ hazard mitigation assistance programs; a few examples provided below:

- Hazard Mitigation Grant Program (HMGP)
- Pre-Disaster Mitigation (PDM)
- Flood Mitigation Assistance (FMA)
- Fire Management Assistance Grant (FMAG)
- Severe Repetitive Loss (SRL)
- Building Resilient Infrastructure and Communities (BRIC)

Commented [TH13]: This was going for several years, but ended in 2025 by presidential order. Current grants are still alive, but my understanding is that there wont be any future funding opportunities under this title (subject to change).

3.3 SPECIAL DISTRICTS/PROGRAMS

3.3.1 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 (FCZD) under RCW 86.15. The activities of the district can 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 recognize the impacts of flooding, basin wide flood planning, and the identification, engineering, and construction of capital projects to mitigate and/or address flooding problems.

3.3.1.1 Comprehensive Flood Hazard Management Plans (CFHMPs):

Comprehensive Flood Hazard Management Plans contain recommendations on future flood hazard management alternatives for problematic areas and follow Ecology's process for flood hazard management plans redefined by the 1991 Ecology guidelines. ~~.~~ 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~~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. The purpose of this Plan, the first CFHMP adopted in the County, was 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.
- Upper Yakima CFHMP 2018 Cowiche Addendum: This addendum to the 2007 Upper Yakima River CFHMP addresses the flood risks posed by Lower Cowiche Creek and its confluence with the Naches River, located within the original CFHMP study area. These risks were not previously addressed in the earlier CFHMP due to a lack of Available Information. ~~T~~The Plan developed near, short, and long-term recommendations that match the risk with agencies' ability to provide the required concurrent infrastructure modifications that reduce current flood hazard.
- Naches CFHMP: The Naches River Comprehensive Flood Hazard Management Plan (CFHMP) covers the Naches River from the confluence of the Naches and Tieton Rivers to the Twin Bridges northwest of Yakima. The Naches River CFHMP was adopted in 2007. Many of the recommendations have been completed since adoption, and the County wishes to soon update this plan once the flood maps have been updated by FEMA to reflect the suite of flood risk reduction actions implemented by the County.
- 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 adopted by the Board of County Commissioners in 2012.

Commented [KW14]: Updated?

Commented [TH15R14]: This is still relevant. It's the history of the formation of the district.

Commented [KW16]: Continue to include? Consistency with SMP and are they really "up to date" regarding predictability under current and future conditions i.e., extreme weather events under climate change scenario planning and or modeling?

Commented [TH17]: Troy to check if this is a requirement of FbD.

Commented [KW18]: 1998!

Commented [KW19R18]: Cannot possibly reflect current conditions.

Commented [TH20]: Insert language about this (recent)

- Lower Yakima River Watershed CFHMP: The State of Washington and Yakama Nation identified the Lower Yakima Watershed as a priority for FEMA's Risk MAP program that includes a portion of Yakima County and the Yakama Nation Reservation. The state determines it's priorities based on population at risk to hazards, recent events, and community interest. FEMA, State and Yakima County community stakeholders have been participating in Discovery and subsequent Flood Study meetings since 2016. Draft Maps for this area are anticipated to be generated and available for the community to analyze in 2026. These maps and the underlying 2-dimensional hydraulic model will lead to key insights on areas of mitigation interest that could be further underscored through a Lower Yakima River CFHMP process with stakeholders. The hydraulic model will serve as a key tool to exploring mitigation alternatives for the area.

- Other CFHMPs: A few watersheds within Yakima County do not have CFHMPs, including Wenas, Cowiche, and the Upper Naches (Nile). These areas could benefit from more robust planning based on population at risk, recent events, and community interest which should be explored.

3.3.1.2~~1.15~~ National Flood Programs

The National Flood Insurance Program (NFIP) was created in 1968 and is now managed by FEMA. There are currently 22,600 participating communities in the country, one of which is Yakima County with participation dating to 1985. The NFIP provides affordable insurance opportunities to property owners within participating ~~communities~~ communities and ~~encourag~~requires communities to adopt and enforce floodplain management regulations as part of participation. Community ~~P~~participation in the NFIP provides eligibility for federal disaster relief funds as~~access to~~ well as several FEMA grant ~~program~~programs, including grants related to planning, hazard mitigation, disaster relief, and resilient infrastructure. The Washington State Military Department ~~adminsters~~administers these FEMA grants through the Emergency Management Division.

3.3.1.3 Community Rating System

The Community Rating System (CRS) is a voluntary program for communities to enter for discounted flood insurance for residents. The CRS program encourages community floodplain management practices that exceed the minimum requirements of the NFIP. CRS has rigid administrative requirements and strict deadlines for participating communities, making inter-departmental cooperation necessary for communities to stay active. ~~This makes cooperation from multiple Departments and Divisions within the County necessary, and can be a substantial amount of work... NOT SURE IF WE SHOULD PUT THIS IN HERE>>>~~

~~SHOULD WE TALK ABOUT THE NFIP SOMEWHERE? BRIEF HISTORY AND WHY IT IS VALUABLE?~~

Commented [NS21]: @Troy Havens my stab at the NFIP comment

Commented [TH22R21]: I just added disaster relief funds and some clarification.

Commented [NS23]: moved proposed CRS paragraph over here (from under "project pipeline"), created a new section for CRS/NFIP, and added 2 sentences for review (highlighted in green).

Commented [TH24]: It's not a plan, so probably doesn't fit in here but wondering if it should be somewhere...

Commented [KW25R24]: It seems important w/I the context of existing, and planned, CFHMP's. For the Lower Yakima, right?

Commented [TH26R24]: no, the National Flood Insurance Program - participation therein since 1985

Commented [KW27R24]: Thanks

3.3.1.4~~2~~ Hazus Mapping Efforts

Since 2011, Yakima County FCZD has been using FEMA's Hazus program, 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.

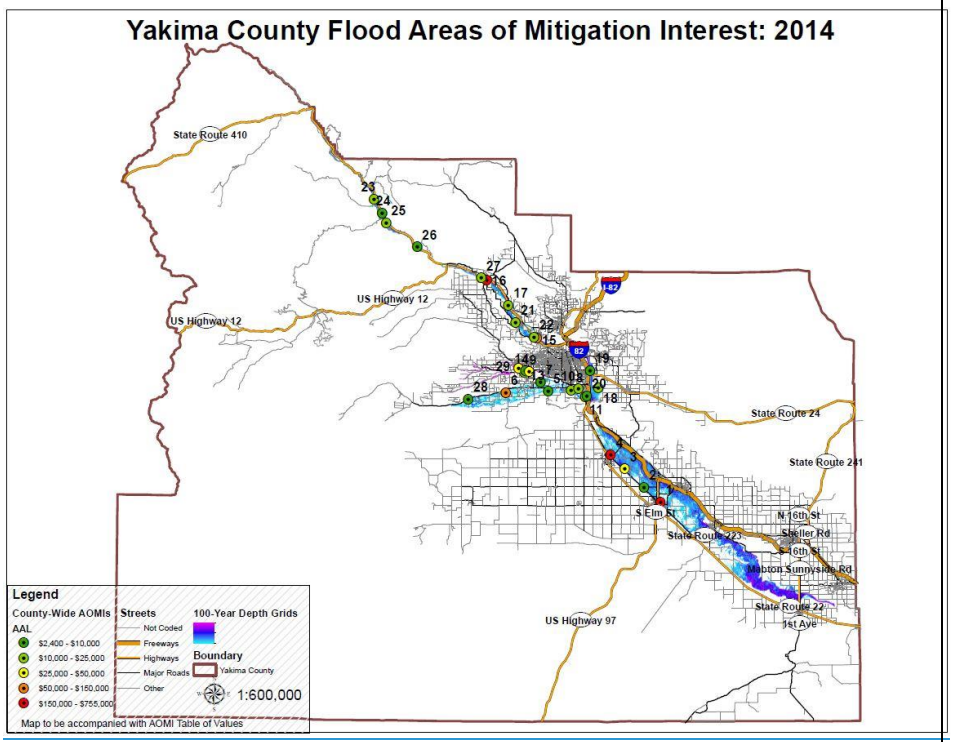
Yakima County uses level-2 user defined inputs including building locations, elevations, and values and a combination of multiple flow-dependent flood depth grids from the best available riverine flood models on file. Hazus then calculates a variety of loss scenarios across the various annual exceedance probabilities to generate an Average Annualized Loss. This output informs loss costs structure by structure, allowing development of conceptual mitigation scenarios to determine effectiveness and cost benefits. In most cases, flood risk mitigation strategies can be evaluated at the reach based level to account for ~~mutliple~~multiple structures or neighborhoods. The Table below shows priority areas and status of these mitigation priority Hazus outputs <INSERT TABLE>.

Commented [KW28]: Current? HECRAS?

Commented [KW29R28]: Appeas so….need to add significantly here to descript the process and its output relative to its use for monitoring impacts, and importantly, how it is used to "change" or reduce hazards.

Commented [TH30R28]: The only way it is used to monitor impacts is assuming the project is completed and you have a future benefit.

Commented [TH31]: may be able to delete this and incorporate below.


Yakima County Flood Areas of Mitigation Interest: 2014
State Route 410
US Highway 12
US Highway 12
State Route 24
State Route 241
S Elm St
N 16th St
State Route 223
Keller Rd
S 16th St
Mabton Sunnyside Rd
State Route 22
1st Ave
US Highway 97
Legend
County-Wide AOMIs
AAL
$2,400 - $10,000
$10,000 - $25,000
$25,000 - $50,000
$50,000 - $150,000
$150,000 - $755,000
Streets
Not Coded
Freeways
Highways
Major Roads
Other
100-Year Depth Grids
Boundary
Yakima County
1:600,000
Map to be accompanied with AOMI Table of Values

1

Table 1: County-wide Hazus Level 2 Risk Assessment - 2016 Areas of Mitigation Interest (AOMI) and Average Annualized Loss (AAL)

Modeled Area	Average Annualized Loss (AAL)*	Area of Mitigation Interest (AOMI)	Comments/Current Status	Model Notes	Number of Structures	Average Annualized Loss/Structure*	AOMI Map Reference #
Naches River - Upper Reach	$22,426	Elk Valley Lane - Right Bank of River	Requires homeowner meetings Not Simple	Preliminary Depth Grids: Created Summer 2014	58	$387	23
	$12,144	Left Bank above DOT Levee	Simple Solution not evident		10	$1,214	26
	$9,822	Left Bank across from Nile Creek Ln	Simple Solution not evident		21	$468	24
Naches River - Lower Reach	$264,252	S. Naches Rd Bridge Near Town (= 1/2 mile reach)	Floodplains by Design grant underway	Final Effective 2009 DHI Model	101	$2,616	16
	$135,610	Pence Road near Suntides	Floodplains by Design grant underway		88	$1,541	15
	$47,000	Low Road near City Water Treatment Plant	reassess Eschbach Park Project impacts		8	$5,875	17
	$44,170	Craig Road and Jennings Lane	Floodplains by Design grant underway		78	$566	27
	$39,330	S. Naches Road N. of Young Grade near fish hatchery (both sides of S. Naches Rd)	Needs analysis		11	$3,575	21
	$39,186	Powerhouse Road - 2 wrecking yards and adjacent residential structures	Floodplains by Design grant underway		12	$3,266	22
Yakima River - Gap to Gap Reach	$46,168	Bell Rd. and Riverside Rd.	Currently Pursuing USACE Section 1135	100-Year FIS Supplemented With a Locally Developed Model	9	$5,130	18
Yakima River - Lower Reach	$1,507,620	Northeast Wapato	Reassess mitigation from Wrecking Yard removal and Bridge replacement projects	Depth Grids From Unknown Source - Effective Model Not Available	470	$3,208	4
	$528,826	Northeast Toppenish	Reassess mitigation from Wrecking Yard removal and Bridge replacement projects		867	$610	1
	$51,598	Track Rd. and Phillip John Rd.	Relatively Dense Community for Area		13	$3,969	3
Wide Hollow Creek	$30,800	Union Gap Main Street near I-82	No Simple Solution	Final Effective Model July 2012	10	$3,080	11
	$20,540	Bay Street and Ahtanum Road	No Simple Solution		6	$3,423	10
	$20,044	S. 80th and Wide Hollow Road	Reassess during PDM grant		6	$3,341	9
	$15,354	Holiday and Spring Ave - South Union Gap			7	$2,193	20
Shaw Creek	$93,418	72nd Ave. and Viola Ave. S. of Nob Hill Blvd.	Engaged in Mitigation - FEMA PDM grant	Final Effective Model December 2008	54	$1,730	14
	$61,928	South of 88th Ave. and Tieton Dr.	Engaged in Mitigation - FEMA PDM grant		39	$1,588	12
	$12,634	80th Ave. and Nob Hill Blvd.	Engaged in Mitigation - FEMA PDM grant		71	$178	13
Ahtanum Creek - Lower Reach	$19,978	Emma Lane	FEMA HMGP grant cancelled by Yakama Nation	Revised Preliminary Model 10-01-13	15	$1,332	5
	$15,020	52nd Ave. and Washington St.			16	$939	7

* - Based on model calibration and verification in Yakima County Recommended Average Annualized Loss (AAL) values are twice the Hazus Level 2 generated values.
Note: Map and Table assume that the Federal Project Levees (Yakima River - Gap to Gap Reach) do not fail. All other levees fail.
Note: Risk Assessment was limited to FEMA mapped floodplains and floodways with available hydraulic models. The Yakima River above Selah gap, Cowiche Creek, Satus Creek, Toppenish Creek, Wenas Creek, Tieton River and the upper reach of the Ahtanum Creek were not included in the risk assessment. Cottonwood Creek was assessed however only $1 AAL was identified.
Note: Average Annualized Loss (AAL) include local depth grids and georeferenced building data such as footprint, location, type, replacement cost, etc. AAL includes building and content losses computed for an annual average loss through risk assessments from 10-year, 25-year, 50-year, 100-year, and 500-year flooding events.
Note: Level 2 Risk Assessment Average Annualized Loss values were based on 2012 dollars.
Note: AOMIs 2, 6, 8, 19, and 25 have been removed due to prioritization.
Note: Comments/Current Status last updated May 2016.

Once projects are completed, it is assumed that the specific identified risks the project addressed are now mitigated.

3.3.1.5 Project Pipeline with Partners

~~**Project Pipeline "Plan or Database"?**~~

Yakima County has been involved in efforts by American Rivers and BEF, etc. to insert many of their floodplain restoration/flood risk reduction projects into a "project pipeline". The intent here is to show potential funders where money is needed and for what kind of projects. This isn't a plan, should we mention that?

~~NEW SECTION: Community Rating System~~

~~The Community Rating System is a voluntary program for communities to enter for discounted flood insurance for residents. This program requires cooperation from multiple Departments and Divisions within the County, and can be a substantial amount of work… NOT SURE IF WE SHOULD PUT THIS IN HERE>>>~~

3.3.2 Yakima County Fire and Life Safety Division

Yakima Valley Fire Adapted Communities Coalition

Fire Adapted Communities (FAC) are communities within wildfire prone areas that collaborate between residents, businesses, government agencies, and non-profit organizations to prepare

Commented [TH32]: Discussion item.

Commented [KW33R32]: Yeah, this doesn't really fit now, especially as a doc that will rep. current - 2046. We can allude to partnerships (continuing) and intent in the Purpose, Policy and Goals.

Commented [TH34R32]: ok, delete

Commented [KW35]: Spoke to Doug Werts about this as part of the "fire, flood and drought" climate change/resiliency/sustainability section inserts. Still valid?

Commented [KW36R35]: Ask Doug to take a look, and provide access to update material, or update this section.

for the effects of wildland fires. These communities acknowledge the risks associated with living in or among fire prone ecosystems. FACs address wildfire risks through activities that prevent destructive wildfires, provide recovery from wildfire damage, and increase resilience to the effects of wildfires. In 2014, Yakima County Fire and Life Safety Division, in collaboration with other agencies, organizations, and community members, launched the Yakima Valley Fire Adapted Communities Coalition to promote and enhance wildfire mitigation activities across the county. In addition, Yakima County adopted the first Wildland Urban Interface building code in Washington. Other FAC programs and plans adopted by Yakima County include:

- Firewise Program: Firewise is a national program that addresses a community's vulnerability to wildfire, and uses outreach, education, and community events to empower communities to mitigate for 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.
- 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.
- 2012 Cowiche~~ychee~~ Mountain Community Wildfire Protection Plan: The Cowiche~~ychee~~ 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.
- 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, 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.

3.3.3 Federal/State Programs

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 convey water, ground water injection, and a water trading system.~~

Commented [KW37]: Updates? Its 2025 all y'all!

Commented [NS38R37]: I know a lot of fire districts are participating in DNR's "wildfire ready neighbors" program, but I don't know if it replaces this.

Commented [KW39R37]: I'll continue to follow up with Doug W. and once I get a USFS contact, will bring them in and get their program detail. Maybe WA DNR too?

Commented [KW40]: SPP [SIC] ?

Commented [TH41]: Old Language - New language proposed below.

Commented [KW42R41]: This one, because of its scope and long term commitment makes sense to cite for sure.

The Yakima Basin Integrated Plan (YBIP) is a collaboration of state, federal, tribal, business, and community organizations committed to addressing water, fishery, habitat and climate variability challenges to ensure a robust Yakima River Basin within its built and natural systems.

The Yakima Basin Integrated Plan works toward a future with robust agriculture, abundant fisheries, outstanding recreation, healthy forests, and thriving communities. In 2009, a diverse group of interests in the basin came together with a desire to build a framework for resource management that would address the community's needs and put long-standing conflicts over water and fisheries behind them. The Yakima Basin Integrated Plan was born: a common-sense, pragmatic approach. The Integrated Plan covers thirty years, divided into three ten-year implementation phases. Work on the Initial Development Phase is now underway.

The Yakima Basin Integrated Plan offers a thirty-year approach to meeting the basin's water needs – now and in the future. Goals for the Integrated Plan are:

- Provide opportunities for comprehensive watershed protection, ecological restoration, and enhancement addressing instream flows, aquatic habitat, and fish passage;
- Improve water supply reliability during drought years for agricultural and municipal needs;
- Develop a comprehensive approach for efficient management of water supplies for irrigated agriculture, municipal and domestic uses, and power generation;
- Improve the ability of water managers to respond and adapt to a changing hydrograph; and
- Contribute to the vitality of the regional economy and sustain the riverine environment.

Figure 3.3.3-~~1~~2 City of Toppenish Flooding, February 1996
Source: Yakima County FCZD

3.4 Stormwater in Yakima County

The Clean Water Act, enacted in 1972, contains the legal requirement for protecting the quality of waters of the nation. The Act authorizes the USEPA Administrator to carry out its requirements. USEPA initially focused water quality improvement efforts on reducing discharges of pollutants from pipes (point sources), primarily wastewater from industrial processes and municipal sewer treatment facilities.

Diffuse sources of pollutants (non-point sources) also contribute to water pollution nationwide. Runoff from stormwater can collect pollutants as it flows across the landscape and discharges to surface and ground water. As a result, USEPA regulates urban stormwater discharges by requiring municipalities to obtain National Pollutant Discharge Elimination System (NPDES) permits for stormwater. The Department of Ecology regulates the NPDES Municipal Stormwater Permits for the State of Washington.

Phase I of the NPDES Stormwater Program began in 1990. Large and medium sized municipalities with populations greater than 100,000 were required to develop and implement SWMPs. Phase II of the regulations requires small municipalities (<100,000) and contiguous areas with smaller – but still urban – communities to develop and implement SWMPs. In February 2007, the Department of Ecology issued the Eastern Washington Phase II Municipal Stormwater Permit, requiring permittees to submit a Notice of Intent (NOI) seeking coverage and to comply with the terms of the permit. Ecology requires permittees and co-permittees to submit an NOI for coverage and to comply with the current Phase II Municipal Stormwater Permit every five years to remain compliant.

Yakima County established a Stormwater Authority to provide for the protection of the citizens of Yakima County from stormwater and drainage damage through planning and the regulation of site drainage and discharges to stormwater control facilities, Underground Injection Control (UIC) wells, and waters of the state. All new development and redevelopment shall provide for drainage such that it does not conflict with present drainage patterns, or create a drainage, water quality or water quantity problem within itself, for its neighbors, or to stormwater control facilities.

Permittees must develop SWMPs that contain minimum performance measures in eight required program elements: Public Education and Outreach, Public Involvement and Participation, Illicit Discharge Detection and Elimination, Construction Site Stormwater Runoff Control, Post-Construction Stormwater Management, Municipal Operations and Maintenance, Compliance with TMDL Requirements, and Monitoring and Assessment. Descriptions of the performance measures that Yakima County will perform are the core of this document. For context, the regulatory and physical environment as related to stormwater is provided to support the performance measures. Each performance measure identifies whether it is part of the ILA, contains a goal, describes existing or related activities, presents measurable activities to meet the goal, identifies documentation needed for assessment and describes responsibilities.
The SWMP and the permit do not focus on specific pollutants. The permit assumes that required activities will reduce stormwater pollution, unless water quality impairment has been identified

by Ecology and a specific pollutant reduction is required under the Total Maximum Daily Load (TMDL) program. The SWMP will address new and emerging pollutants.

Commented [NS43]: Just wanted to get Jack's work in here. may not be the right placement.

Commented [KW44R43]: We'll worry about document placement and flow (HA!) later.

Commented [KW45]: Proposed language

3.5 Yakima County's Strategy for Resilient and Sustainable Growth

Introduction and Purpose

This Climate Resiliency Element is adopted pursuant to Second Engrossed Substitute House Bill 1180 (2023), which amended the Growth Management Act (GMA) under RCW 36.70A.070(8) to require mandatory climate change planning. This element establishes a comprehensive framework for identifying, preparing for, and adapting to the significant climate-related risks facing Yakima County.

The Growth Management Act mandates that Yakima County's Horizon 2026 Comprehensive Plan integrate resiliency and sustainability principles to address 21st-century challenges. The County will do this while preserving the region's agricultural heritage and natural resources. This recognizes that traditional planning approaches must evolve to accommodate rapid environmental and demographic changes.

Comprehensive Plan Elements: Climate considerations must be integrated into Land Use (directing growth away from high-risk areas), Housing (ensuring climate-resilient building standards), Transportation (designing for extreme heat and flooding), Utilities (water supply reliability, stormwater management), Economic Development (agricultural adaptation, economic diversification), and Parks and Recreation (protecting natural systems that provide climate adaptation benefits).

Overarching Goal: Ensure the resilience and sustainability of critical areas, shorelines, property, life, health, and the economy through preparation for, survival of, and recovery from extreme weather events and cumulative natural hazards. This Climate Resiliency Element aligns with the Strategy's four goals:

1. Communities Goal: Foster healthy, safe, equitable, and economically vibrant communities
2. Infrastructure Goal: Advance infrastructure that supports natural systems and provides reliable services
3. Natural and Working Lands Goal: Protect, restore, and manage natural systems and working lands to provide continued benefits under climate impacts
4. Governance Goal: Develop efficient processes for strategic alignment, collaboration, and accountability

In 2024, the Washington State Department of Ecology published the Washington State Climate Resilience Strategy pursuant to RCW 70A.05, in partnership with nine state agencies including the Departments of Agriculture, Commerce, Health, Natural Resources, Fish and Wildlife, Transportation, the State Conservation Commission, Emergency Management Division, and

Puget Sound Partnership. Yakima County will coordinate implementation of this element with relevant state agency programs and funding opportunities identified in the Climate Resilience Strategy, including conservation technical assistance, forest health and wildfire resilience programs, irrigation efficiency grants, riparian restoration programs, and climate-informed water resource planning.

Regional Context and Climate Baseline. Yakima County is situated within the Yakima River Basin, a 15,900 square-kilometer (6,150 square-mile) watershed that drains the eastern slopes of the central Washington Cascade Mountains. The basin's economy is fundamentally dependent on irrigated agriculture, with over 180,000 hectares (450,000 acres) of highly productive farmland generating the largest agricultural economy in Washington State. The region's agricultural success—including tree fruits, wine grapes, hops, mint, hay, and specialty crops—relies on carefully managed water resources supplied through the U.S. Bureau of Reclamation's five-reservoir system (Bumping Lake, Cle Elum, Kachess, Keechelus, and Rimrock).

The basin's hydrology is characterized by strong seasonal variability. Mean annual precipitation ranges from 203 to 356 centimeters (80 to 140 inches) along the Cascade Crest headwaters to less than 25 centimeters (10 inches) at lower elevations in the county. Between 61 and 81 percent of annual precipitation falls during the cool season (October through March), with much of it stored as mountain snowpack that traditionally provides sustained runoff during the spring and summer irrigation season. The reservoir system, with combined storage capacity of approximately 1.2 billion cubic meters (1.07 million acre-feet), represents roughly 30 percent of the river's mean annual flow—a relatively modest storage-to-runoff ratio that makes the system highly sensitive to changes in snowpack accumulation and timing of spring melt.

This dependence on snowpack as a "sixth reservoir" creates significant vulnerability to climate warming. Research conducted by the University of Washington Climate Impacts Group indicates that 78 percent of the Yakima River Basin lies within the elevation "transition zone" where winter precipitation frequently transitions between rain and snow, making the basin exceptionally sensitive to even modest temperature increases.

Observed and Projected Changes to Extreme Weather and Events

Historical Trends: Analysis of historical observations demonstrates that climate change is already affecting the Yakima Basin. Declining April 1st snowpack, earlier snowmelt timing, and shifts in streamflow patterns have been documented across the Washington Cascades. These changes have contributed to increased frequency of water supply shortfalls: between 1970 and 2005, water allocations were restricted for junior water rights holders in 13 of 35 years (approximately 37 percent), with particularly severe shortages occurring in 1977, 1992-1994, 2001, and 2005.

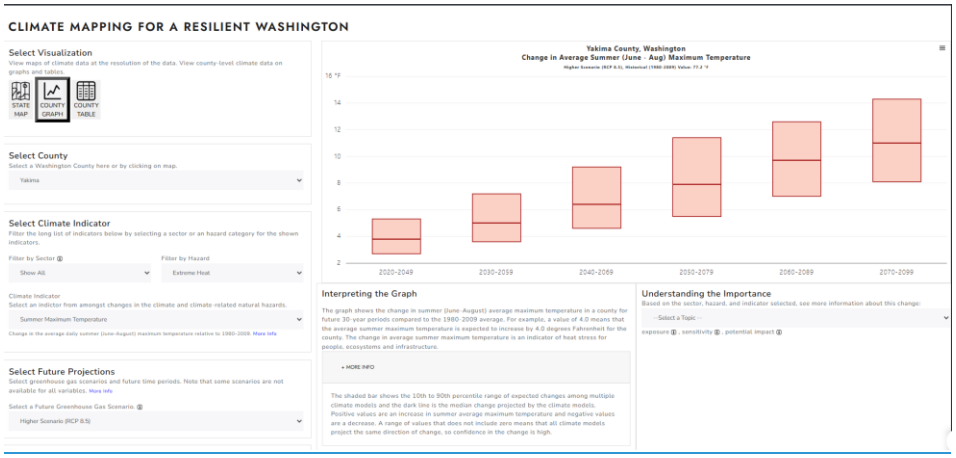
Climate Projections for Yakima County: Pursuant to RCW 36.70A.172, this element incorporates best available science from multiple authoritative sources, including climate projections developed by the University of Washington Climate Impacts Group using downscaled outputs from 20 global climate models archived by the Intergovernmental Panel on Climate Change (IPCC)

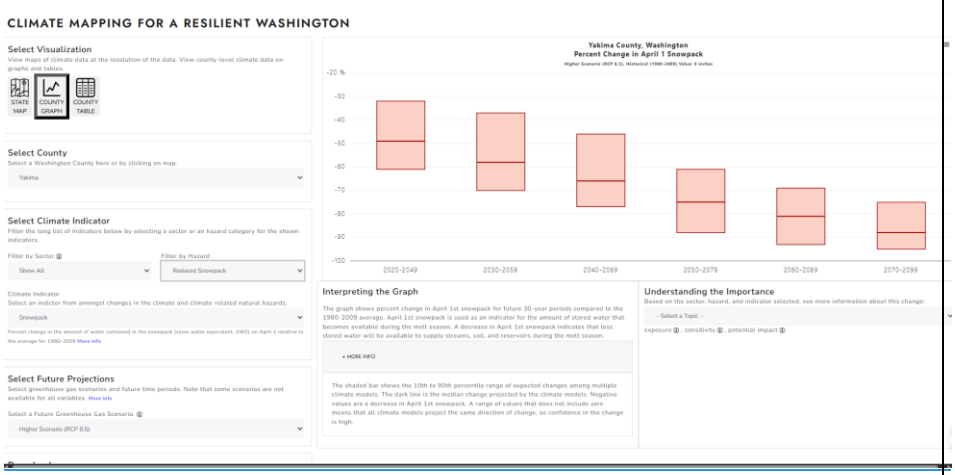
Fourth Assessment Report, analyzed for both the A1B (moderate-high emissions) and B1 (lower emissions) scenarios.

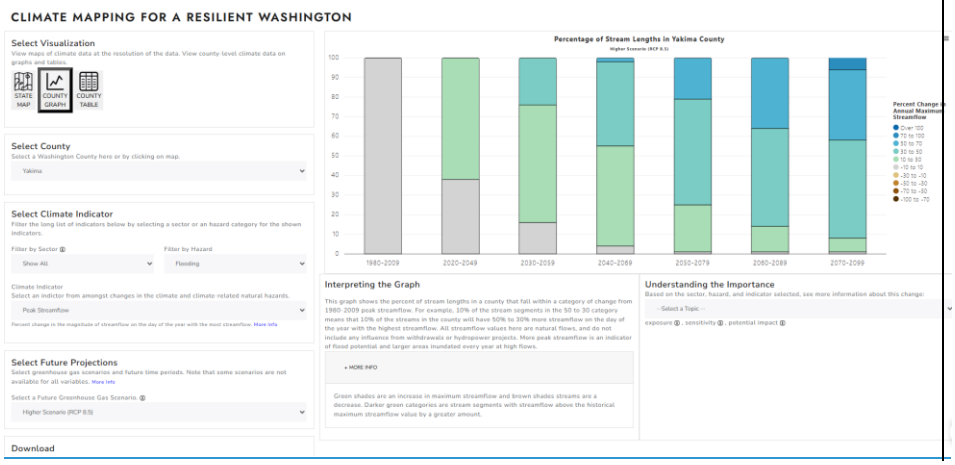
Temperature Increases: Projections indicate substantial warming throughout the 21st century:

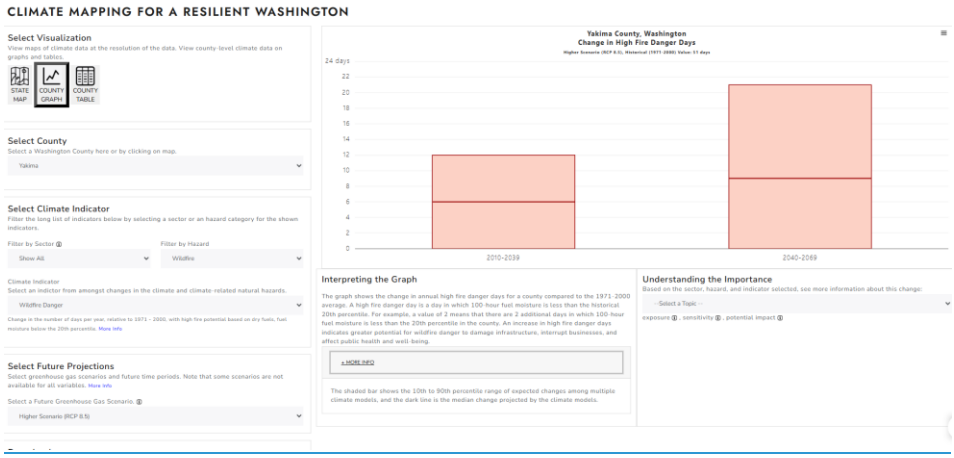
- 2020s (2010-2039): Annual temperatures increase by +1.18°C (+2.1°F) under A1B scenarios and +1.08°C (+1.9°F) under B1 scenarios
- 2040s (2030-2059): Annual temperatures increase by +2.05°C (+3.7°F) under A1B and +1.57°C (+2.8°F) under B1
- 2080s (2070-2099): Annual temperatures increase by +3.52°C (+6.3°F) under A1B and +2.49°C (+4.5°F) under B1

Example Resilient Washington Climate modeling (University of WA. IPCC 2025) for Yakima County Change in Average Summer Temperature, Snowpack Peak Flooding and Wildfire (ksw 10282025 model run).




CLIMATE MAPPING FOR A RESILIENT WASHINGTON
Select Visualization
STATE MAP
COUNTY GRAPH
COUNTY TABLE
Select County
Yakima
Select Climate Indicator
Filter by Sector
Show All
Filter by Hazard
Reduced Snowpack
Snowpack
Select Future Projections
Higher Scenario (RCP 8.5)
Yakima County, Washington
Percent Change in April 1 Snowpack
2020-2049
2030-2059
2040-2069
2050-2079
2060-2089
2070-2099
Interpreting the Graph
+ MORE INFO
Understanding the Importance
-- Select a Topic --


CLIMATE MAPPING FOR A RESILIENT WASHINGTON
Select Visualization
STATE MAP
COUNTY GRAPH
COUNTY TABLE
Select County
Yakima
Select Climate Indicator
Filter by Sector
Show All
Filter by Hazard
Flooding
Peak Streamflow
Select Future Projections
Higher Scenario (RCP 8.5)
Download
Percentage of Stream Lengths in Yakima County
1980-2009
2020-2049
2030-2059
2040-2069
2050-2079
2060-2089
2070-2099
Interpreting the Graph
+ MORE INFO
Understanding the Importance
-- Select a Topic --



Warm season temperature increases (April through September) are projected to be slightly higher than cool season increases, with 2080s warm season temperatures rising by +3.79°C (+6.8°F) under A1B scenarios.

Precipitation Changes: While annual precipitation is projected to increase modestly (between 0.22 and 4.9 percent depending on scenario and timeframe), the seasonal distribution shifts significantly:

- Cool season precipitation (October through March) increases by 2.3 to 9.6 percent
- Warm season precipitation (April through September) decreases by 0.9 to 4.7 percent
- Critically, warmer temperatures cause an increasing proportion of winter precipitation to fall as rain rather than snow

Cumulative Natural Hazards

Climate change does not occur in isolation but rather compounds and interacts with multiple natural hazards that affect Yakima County:

Wildfire: Increasing temperatures, longer fire seasons, declining summer soil moisture, and more frequent drought conditions substantially elevate wildfire risk across forest and shrub steppe landscapes. Climate-driven forest stress increases vulnerability to insect outbreaks (such as mountain pine beetle), creating additional fuel loads. Post-fire conditions dramatically increase risks of debris flows, flooding, and erosion.

Flooding: While declining snowpack reduces spring snowmelt flood risk in some scenarios, climate change increases flood risks through intensified precipitation events, rain-on-snow events at higher elevations, and post-wildfire conditions that reduce watershed infiltration

capacity and increase runoff velocity. Channel migration and erosion risks increase with altered flow regimes. Additionally, invasive species like Crack Willow increase localized flooding, creating dense thickets and produce fallen branches that choke waterways, blocking water flow and trapping debris.

Stormwater: Heightened temperatures will cause more frequent and intense rainfall. This has the potential to overwhelm infrastructure and magnify flood events. An increase in stormwater activity will also lead to more toxins and pollutants in Yakima County waterways. This will adversely affect fish, aquatic plants, and wildlife in the area.

Drought: Extended periods of below-average precipitation, combined with reduced snowpack storage, higher evapotranspiration rates from warming, and earlier depletion of soil moisture, create more frequent and severe agricultural and hydrological drought conditions. Drought impacts cascade through reduced surface water availability, declining groundwater levels, increased competition for limited water resources, crop stress and losses, and ecosystem degradation.

Extreme Heat: Projected temperature increases will result in more frequent, longer duration, and more intense heat waves. Extreme heat threatens public health (particularly for elderly, children, outdoor workers, and those without access to cooling), reduces agricultural productivity, increases irrigation demand, stresses infrastructure (electrical grids, transportation systems), and creates compounding effects when combined with drought and wildfire smoke.

Geologic Hazards: Climate change exacerbates landslide and debris flow risks through changing precipitation patterns (more intense rainfall events), post-wildfire conditions that destabilize slopes, and altered groundwater conditions. Unstable slopes identified in critical areas regulations face increased failure probability under projected climate conditions.

Ecosystem and Habitat Stress: Temperature increases affect cold-water fisheries (particularly salmonids), cause habitat shifts and species range changes, alter phenology (timing of biological events like flowering and migration), increase invasive species pressure, and create cumulative stresses that reduce ecosystem resilience.

Surface Water Resources. Surface water from the Yakima River and its tributaries is delivered to agricultural lands through an extensive network of irrigation districts and canals, supporting approximately 464,000 acres of irrigated cropland throughout the basin.

Groundwater Resources and Critical Aquifer Recharge Areas. Groundwater resources constitute an essential and increasingly important component of the basin's water supply system. Yakima County's aquifer systems provide critical functions for both agricultural production and municipal water supply.

Agricultural Reliance on Groundwater: Beyond the surface water irrigation system, the region's agricultural economy is substantially dependent on groundwater. Thousands of agricultural wells

Commented [NS46]: don't know if this needs to be in here, and it's clunky.

Commented [KW47R46]: Agree...its going into CH3 !! I'll make it less clunky

Commented [KW48R46]: Oh wait...is this Jack's stuff?

Commented [KW49R46]: I was looking at the climate change stuff

Commented [KW50R46]: THe "Heightened Temperatures" stuff should stay. He;;lps us talk about upsizing pipes etc. so we don't have overflow into receiving waters etc.

supplement surface water supplies, particularly during drought years when surface water allocations are curtailed. Groundwater provides approximately 20-30 percent of total irrigation water in the basin, with this proportion increasing significantly during water-short years. Many farmers with junior water rights—who experience the most severe surface water curtailments—rely on groundwater wells as drought emergency backup supplies. The economic viability of substantial acreage of farmland, particularly in areas outside primary irrigation district service boundaries, depends entirely on reliable groundwater availability.

Agriculture Climate Resilience Planning. The Washington State Department of Agriculture's *Climate Resilience Plan for Washington Agriculture* (2025) provides a companion framework specifically addressing agricultural adaptation. Recognizing Yakima County's position as the state's leading agricultural producer, this element incorporates the Agriculture Plan's priorities: safeguarding operational resilience through enhanced emergency preparedness and recovery, supporting agricultural innovation through research and workforce development, and encouraging voluntary adoption of climate-smart practices that enhance farm resilience while maintaining productivity.

Capital Facilities Plans: Infrastructure planning under RCW 36.70A.070(3) must address climate resilience, ensuring that public facilities, transportation systems, stormwater management, water supply, and other infrastructure are designed for projected future climate conditions over their expected functional lifespan.

Municipal and Domestic Water Supply: Groundwater serves as the primary source of drinking water for most rural Yakima County residents, numerous small communities, and supplemental supply for larger municipalities. Thousands of domestic wells, Group A and Group B public water systems, and municipal supply wells depend on the quantity and quality of groundwater resources. Protection of groundwater recharge functions is therefore essential not only to agricultural sustainability but also to public health and residential water security.

Critical Aquifer Recharge Areas (CARAs): Under the Growth Management Act and Yakima County's Critical Areas Ordinance, Critical Aquifer Recharge Areas are designated and regulated to protect groundwater quantity and quality. CARAs are defined as areas with a critical recharging effect on aquifers used for potable water supplies, including: highly permeable soils and geologic formations that allow precipitation and surface water to infiltrate rapidly to underlying aquifers; areas where aquifers are vulnerable to contamination due to shallow depth to groundwater, high permeability, or direct connection between surface water and groundwater; wellhead protection areas for public drinking water sources; and sole source aquifers designated by the Environmental Protection Agency.

Dual Function for Flood Management and Recharge: Critical Aquifer Recharge Areas perform the dual essential functions of storing floodwaters during high precipitation events and facilitating groundwater recharge that sustains summer base flows, well yields, and aquifer levels. Areas with highly permeable glacial outwash, alluvial deposits, fractured basalt, and other hydrogeologic formations act as natural infrastructure—infiltrating stormwater and snowmelt,

reducing downstream flood peaks, filtering potential contaminants, and replenishing aquifers that support both agricultural and domestic water needs. This natural storage and infiltration capacity becomes increasingly valuable under climate change scenarios that project more intense precipitation events in winter months combined with reduced summer moisture availability. The loss of recharge capacity through conversion to impervious surfaces, compaction of soils, or contamination that prevents beneficial use of groundwater represents a permanent reduction in the basin's water supply resilience.

Groundwater-Surface Water Interaction: The Yakima Basin's aquifer systems are hydraulically connected to surface water bodies, with groundwater discharge providing critical base flows to streams during low-flow periods and supporting cold-water refugia essential for salmon and steelhead survival. This interconnection means that groundwater depletion affects not only well yields and aquifer storage but also in-stream flows, water temperatures, and riparian ecosystem health. Conversely, declining surface water levels and reduced infiltration from canals and irrigated fields affect aquifer recharge rates.

Integrated Water Resource Challenges. The basin's hydrology is characterized by strong seasonal variability. Mean annual precipitation ranges from 203 to 356 centimeters (80 to 140 inches) along the Cascade Crest headwaters to less than 25 centimeters (10 inches) at lower elevations in the county. Between 61 and 81 percent of annual precipitation falls during the cool season (October through March), with much of it stored as mountain snowpack that traditionally provides sustained runoff during the spring and summer irrigation season.

Climate change impacts to this integrated surface water-groundwater system include: reduced snowpack storage leading to earlier and lower peak stream flows; decreased summer surface water availability requiring increased groundwater pumping; potentially altered groundwater recharge patterns as the timing and form (rain versus snow) of precipitation changes; increased competition for limited water resources between agricultural, municipal, domestic, and in-stream ecological needs; and potential groundwater level declines from increased pumping demand during more frequent drought periods. These interconnected stresses on both surface water and groundwater resources threaten the agricultural economy, municipal water security, domestic well reliability, and aquatic ecosystem health that define Yakima County's character and prosperity.

Snowpack Decline: Temperature increases are expected to result in approximately 20 percent loss of April 1st snowpack for each 1°C (1.8°F) of warming. Studies specific to the Yakima Basin project snowmelt reductions of 12 percent with +1°C warming and 27 percent with +2°C warming compared to the 1981-2005 baseline. By the 2080s under A1B scenarios, spring snowpack is projected to decline dramatically, with peak snowmelt shifting from late May to mid-February.

Streamflow Timing: Hydrologic modeling indicates that peak streamflow in the Yakima River near Parker historically occurs in late May at approximately 340 cubic meters per second (12,000 cubic feet per second). Under projected climate scenarios:

- By the 2020s, peak flows decline to approximately 280-310 cms (10,000-11,000 cfs) and shift earlier
- By the 2080s under A1B, peak flows decline to 225 cms (8,000 cfs) and shift to mid-February
- Summer low flows decrease, with June through October flows consistently below historical levels

Implications for Water Supply and Agriculture: Climate modeling of the Yakima River Basin reservoir system projects significant increases in water supply stress. Under historical conditions (1970-2005), "water shortage years"—defined as years when Total Water Supply Available (TWSA) prorating for junior water rights holders falls to 75 percent or less—occurred in 14 percent of years. Without adaptation measures:

- 2020s A1B scenarios: Water shortage years increase to 32 percent (range: 15 to 54 percent across ensemble members)
- 2040s A1B scenarios: Increase to 36 percent
- 2080s A1B scenarios: Increase to 77 percent
- B1 scenarios: Show slightly lower but still substantial increases (27 percent in 2020s, 33 percent in 2040s, 50 percent in 2080s)

Most critically, projections show increasing frequency of the historically unprecedented condition where senior water rights holders also experience supply shortfalls—a situation that would create systemic stress across the entire agricultural economy.

Economic analysis of climate impacts on Yakima Basin perennial crops (apples and sweet cherries, representing 48 percent of regional crop value) projects annual losses in production value ranging from $23 million to $70 million depending on timeframe and emissions scenario, representing 5 to 16 percent of historical production value for these crops. These estimates account for both direct climate effects on growing conditions and water supply curtailments, but do not capture additional losses from permanent tree damage, carryover effects, or impacts to other crops.

Equity and Vulnerable Populations. Consistent with GMA requirements under RCW 36.70A.070(8)(c), this element explicitly addresses equity considerations in climate adaptation. Climate change impacts are not distributed equally to certain populations who face disproportionate risks due to factors including:

- Agricultural workers and farmworker communities facing extreme heat exposure during outdoor labor, housing conditions that lack adequate cooling, language and cultural barriers to accessing emergency information and services, and economic vulnerability to crop failures and reduced employment
- Low-income households with limited resources for emergency preparation, higher energy cost burdens, housing stock more vulnerable to extreme weather, and reduced adaptive capacity

- Elderly residents with greater physiological vulnerability to extreme heat, potential mobility limitations affecting evacuation, and higher rates of chronic health conditions exacerbated by climate stresses
- Rural communities with longer emergency response times, limited access to cooling centers and clean air spaces, dependence on private wells vulnerable to drought, and economic dependence on climate-sensitive sectors

Climate adaptation planning, resource allocation, infrastructure investments, and emergency management must prioritize these vulnerable populations and ensure equitable distribution of climate resilience benefits and adaptive capacity.

Cascading Natural Hazards: An Existential Challenge.

Human activities and climate change require that Yakima County fundamentally rethink how it manages growth, protects critical resources, and builds adaptive capacity for an uncertain future. The county faces an interconnected web of natural hazards that threaten every aspect of community life, economic stability, and environmental health.

Wildfire: The Accelerating Threat. Wildfires now pose an existential risk to Yakima County's communities and economy. The 2020 Pearl Hill Fire consumed over 223,000 acres, destroying homes in Malaga and forcing evacuations across the Wenatchee Valley border. The 2021 Schneider Springs Fire burned 108,000 acres of prime timber and grazing land, while the Evans Canyon Fire threatened Yakima's western suburbs and shut down Interstate 82 for days, disrupting the region's transportation lifeline.

These fires demonstrate wildfire's all-encompassing impact: residential areas face direct destruction and chronic smoke exposure affecting public health; critical infrastructure including power transmission lines, and cell towers, and transportation corridors suffer repeated damage and costly rebuilding; agricultural operations lose crops, livestock, irrigation infrastructure, and processing facilities, with smoke taint devastating wine grape harvests worth millions annually. The economic cascade extends beyond immediate fire damage. Tourism to recreational areas diminishes due to air quality concerns and facility closures. Insurance costs skyrocket, making development and business operations financially challenging. Forest industries face supply chain disruptions as timber harvests are delayed or rendered impossible. Most critically, wildfire threatens the county's water supply infrastructure, with post-fire erosion and debris flows compromising watershed quality and reservoir capacity for years following major burns.

Drought: Historic Levels and Repeated Emergency Declarations

Drought conditions, intensified by climate change and competing water demands, create a slow-moving economic and environmental catastrophe. The 2015 drought declared the Yakima Basin in emergency status, forcing farmers to fallow 164,000 acres of productive farmland—equivalent to 14% of irrigated acreage. Junior water rights holders received zero allocation, while senior rights holders faced 47% curtailment, triggering $54 million in federal drought assistance. In April

of 2025, Ecology declared a drought emergency that includes Yakima County for the third year in a row.

Residential communities experience water shortages requiring usage restrictions, well failures forcing expensive drilling deeper wells, and deteriorating water quality as aquifer levels drop.

Municipal infrastructure strains under increased demand while facing reduced supply, forcing costly emergency water purchases and system upgrades.

Agricultural impacts extend far beyond immediate crop losses. Permanent crops like fruit trees and vineyards, representing decades of investment, die during extended drought, requiring complete replanting and years of recovery. Processing facilities face supply shortages, leading to reduced operations and job losses. Ranchers sell livestock at distressed prices when grazing lands fail, disrupting multi-generational ranch operations.

The **economic multiplier effect** is devastating: for every dollar of agricultural loss, rural communities lose $2-3 in related economic activity. Food processing plants, equipment dealers, trucking companies, and agricultural service businesses face reduced demand. Rural banks experience increased loan defaults as agricultural borrowers struggle with reduced income and increased costs.

Flooding: Our Rivers, Streams, Aquifers and Floodplains

Yakima County's flood vulnerability became tragically evident during the November 1996 floods, when record rainfall and rapid snowmelt caused $270 million in damages, destroyed hundreds of homes, and resulted in nine fatalities. The Yakima River at Umtanum reached 164,700 cubic feet per second—nearly three times flood stage—while the Naches River crested at double its previous record.

Residential areas face not only immediate displacement and property destruction but long-term health risks from contaminated floodwaters and mold growth. Lower Valley communities, including portions of Sunnyside, Grandview, and Mabton, remain chronically vulnerable, with flood insurance claims averaging $2.5 million annually even in non-disaster years.

Critical infrastructure suffers cascading failures during major floods. Transportation networks become impassable, severing connections between communities and markets. The closure of State Route 410, Interstate 82, and numerous county roads during flood events isolates rural communities and disrupts agricultural supply chains worth hundreds of millions annually. Wastewater treatment facilities overwhelmed by floodwaters discharge untreated sewage, contaminating drinking water supplies and requiring expensive emergency responses.

Agricultural infrastructure faces complete destruction during major flood events. Irrigation systems, farm buildings, equipment, and stored crops suffer losses exceeding $100 million during severe floods. Topsoil erosion removes the foundation of agricultural productivity, while debris deposition renders fields unusable for multiple growing seasons. Livestock losses compound

economic impacts, with dairy operations particularly vulnerable to extended power outages and facility damage.

Interconnected Vulnerabilities. These hazards create compounding effects that threaten the county's fundamental viability. Post-fire landscapes become more flood-prone, as burned watersheds generate debris flows and increased runoff. Drought conditions increase wildfire risk while making communities more vulnerable to water infrastructure failures. Flooding damages water treatment facilities just as drought increases demand for clean water supplies.

Aquifer Protection: The Foundation of Ecosystem and Water Resource Integrity

Aquifer protection and groundwater recharge represent far more than safeguarding drinking water supplies—they constitute the fundamental life-support system for Yakima County's interconnected terrestrial and aquatic ecosystems. Groundwater serves as the critical hydrological bridge between surface water bodies and deep subsurface systems, maintaining the delicate hyporheic zones where streams and aquifers exchange water, nutrients, and dissolved organic matter essential for aquatic ecosystem health. These hyporheic environments support specialized biological communities that process nutrients, regulate water temperature, and provide spawning and rearing habitat for salmon and steelhead during crucial life stages.

Throughout the county's riparian corridors, phreatophytic vegetation—including native cottonwoods, willows, and shrub communities—depends on shallow groundwater access to survive the region's arid summers, creating the green ribbons of habitat that support wildlife movement corridors and provide critical ecosystem services including carbon sequestration, flood mitigation, and stream shading. The intricate connectivity between groundwater and surface water systems means that aquifer depletion or contamination cascades through entire watersheds, reducing baseflows that sustain fish populations during low-flow periods, compromising the water temperature regulation that prevents thermal stress in aquatic species, and eliminating the subsurface water sources that maintain wetland hydroperiods essential for migratory waterfowl and amphibian reproduction. Protecting aquifer recharge areas through strategic land use planning, maintaining natural infiltration processes, and preventing groundwater contamination thus represents a cornerstone strategy for preserving the biological diversity and ecological resilience that underpin Yakima County's environmental and economic sustainability.

Infrastructure systems designed for historical conditions fail under contemporary stresses. The county's electrical grid, built for moderate weather, suffers cascading failures during extreme events. Telecommunication networks experience repeated damage, hampering emergency response and economic continuity. Transportation infrastructure faces simultaneous pressure from flood damage, fire closures, and increased maintenance needs due to extreme weather.

Economic resilience erodes as businesses face repeated disruption. Agricultural operations struggle with crop insurance gaps that fail to cover specialty crops and emerging climate risks. Tourism, increasingly important for economic diversification, suffers from air quality impacts and

facility closures. The county's competitive advantage in food processing becomes vulnerable as reliable water supplies and transportation access face chronic threats.

The Imperative for Integrated Planning

Climate projections for the Yakima Basin indicate temperature increases of 3-5°F by 2050, earlier snowmelt reducing summer water availability, and more frequent drought conditions coinciding with extended fire seasons. These changes will stress existing infrastructure, alter flood patterns, and challenge traditional water management practices that have sustained the region's prosperity.

The Horizon 2046 Comprehensive Plan must therefore weave resiliency and sustainability into every element—from transportation networks designed to withstand extreme weather, to land use patterns that preserve carbon sequestration capacity and reduce fire risk, to economic development strategies that build diversified, climate-adaptive local economies. This integration requires moving beyond compliance to embrace innovation, ensuring that Yakima County's unique assets—its agricultural productivity, natural beauty, cultural heritage, and strategic location—remain viable despite escalating environmental challenges.

By embedding resiliency and sustainability principles into its comprehensive planning framework, Yakima County positions itself not merely to meet Growth Management Act requirements, but to lead Washington State in demonstrating how rural and agricultural communities can thrive while adapting to environmental change and managing responsible growth. This approach recognizes that true sustainability requires balancing economic vitality, environmental stewardship, and social equity—creating a foundation for prosperity that can endure the intensifying challenges and evolving opportunities of the decades ahead.

The county's survival and prosperity depend on this transformation. Without comprehensive adaptation, the recurring cycle of drought, wildfire, and flood will eventually overwhelm the community's capacity to recover, threatening not just individual livelihoods but the entire regional economy that depends on Yakima County's agricultural production and strategic location in the Pacific Northwest.

Often this analysis can be done in terms of outright dollars and cents. Yet our actions should also be evaluated for their effects on the quality of life we enjoy today and want to see for our children. Sustainability means leaving something for the next time, the next generation. This practice applies equally to the streams we divert water from. We need to look closer at the long term costs and benefits of our activities. This includes the operation of large scale extractive industries and our individual daily actions.

3.4 ~~NATURAL~~ HAZARD MITIGATION

3.4.1 Flood

Commented [KW51]: One possible, and likely place for climate change/resiliency/sustainability section. Will also appear in CAO, Chapter 2 to protection of the five critical areas. Repetition is not the intent, but flood, wildfire and drought are the agents of threat, so…. We need to discuss how to deal with the term "natural" when climate change is not entirely a natural phenomenon.

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.

~~With current conditions, according~~According to Hazus analysis, the top 25 AOMIs in Yakima County expect~~s~~ 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 contained 51,556 acres of land in 7,774 separate parcels within a floodplain or floodway, including 7,329 acres of land designated by ***Horizon 2040***20462046 for residential and/or urban development (Table 3.4-1).~~

~~**Table 3.4-1 Yakima County Land within FEMA Floodplain and Floodway (Zoning)**~~

~~Zoning~~	~~Acres within 100-year floodplain and floodway~~	~~Parcels within 100-year floodplain and floodway~~
~~Urban (UGA)~~	~~3,037~~	~~2,661~~
~~Forest Resource~~	~~286~~	~~905~~
~~Agricultural Resource~~	~~9,956~~	~~2,323~~
~~Fed/Trust Lands/Closed Areas~~	~~18,850~~	~~864~~
~~Rural Settlement LAMIRD~~	~~40~~	~~184~~
~~Rural Self-Sufficient~~	~~2,696~~	~~2,153~~
~~Rural Remote/Ltd. Dev~~	~~8,737~~	~~2,433~~
~~Rural Transitional~~	~~772~~	~~862~~
~~**Totals**~~	~~**44,374**~~	~~**12,385**~~

Table 3.4-1 Yakima County Zoning within FEMA Floodplain and Floodway

	Acres within 100-yr floodplain and floodway	Parcels within 100-yr floodplain and floodway
Urban (UGA)	3037	2661
Forest Resource	286	905
Agricultural Resource	9956	2323
Fed/Trust Lands/Closed Areas	18850	864
Rural Settlement LAMIRD	40	184
Rural Self-Sufficient	2696	2153
Rural Remote/Ltd. Dev.	8737	2433
Rural Transitional	772	862
Total		

Commented [TH52]: some 1933 documentation shows even more historic floods. should we include these? this prompted levee construction in the valley.

Commented [KW53R52]: Absolutely. The more non-anomalous these events are - the better. That's a little gallows, but you know what I mean!

Commented [TH54]: should we talk about the FCZD history of formation? How it's funded?

Commented [KW55R54]: I think so, especially since it will persist for the long term.

Commented [KW56R54]: Mentioning funding, w/i the long term context of this Chapter and the Comp. Plan seems to be something that will help support long term funding

Commented [KW57R54]: This is also a direct link to SMA and the SMP, and the integration of both required in GMA.

Commented [KW58R54]: The interaction of RMZ, CMZ, Shorelines of the State, wetlands, floodplain, floodway etc. is something I haven't yet tried to explain. I think we need to try. Maybe supported by some sort of graphic. Maybe it's just me, but the distinction between and among these areas is confusing. I do know that we'll have to describe these together (to be inclusive) and separately showing which GMA/SMA, CFR ++ apply. There's overlap for sure.

Commented [KW59]: Still used? Can you explain a bit about this? Qualitative/Quantitative? How can I describe/access to document BAS?

Commented [KW60]: Well need a 2025/2026 model run and analysis here.

Commented [TH61R60]: The model hasnt been run for nearly a decade. Many things on the model side could have changed (depth/damage equations, etc), and I'm not sure if GIS has the capability or memory (re-learning curve) to do it. last I heard they had to keep an old computer around to run that version and I'm not sure if they still have it...not feasible in my opinion. Perhaps run new anaylsis for Lower Yakima River or Lower Naches River when we get the new model...

Commented [KW62]: At the time of this draft, the SMP is "to be adopted" but we expect this to be done by the June 2026 deadline.

Commented [KW63]: Update

Commented [KW64]: Update Table 3.4-1

Commented [NS65R64]: Troy and Kory are working on updating this data.

Commented [KW66R64]: yay!

Formatted: Centered

~~Table 3.4-2 Yakima County Land within FEMA Floodplain and Floodway~~			
~~FEMA Designation~~	~~Acreage~~	~~Parcels~~	~~Buildings~~
~~Floodway~~	~~7,838~~	~~3054~~	~~550~~
~~100-year floodplain~~	~~18,869~~	~~7,797~~	~~3,885~~
~~500- year floodplain~~	~~2280~~	~~4968~~	~~1,377~~
~~Totals~~	~~28,987~~	~~15,819~~	~~5,812~~

Formatted: Centered

Table 3.4-2 Yakima County Land Within FEMA Floodplain and Floodway			
	Acreage	Parcels	Buildings
Floodway	7838	3054	550
100-year floodplain	18869	7797	3885
500-year floodplain	2280	4968	1377
	28987	15819	5812

~~Land subject to Yakima County Planning Jurisdiction. Fee title land not including Yakima Training Center and reservation lands not in fee.~~

~~**Table 3.4-1 Yakima County Land within FEMA Floodplain and Floodway**~~

~~Plan Designations~~	~~Acres within 100yr Floodway and Floodplain~~	~~Number Parcels within 100yr Floodway and Floodplain~~
~~Urban (Urban Growth Area)~~	~~3,398~~	~~2,136~~
~~Forest Resource~~	~~1,124~~	~~300~~
~~Agricultural Resource~~	~~9,857~~	~~1,456~~
~~Fed/Trust Lands/Closed Areas~~	~~19,018~~	~~303~~
~~Rural Settlement LAMIRD~~	~~43~~	~~105~~
~~Rural Self Sufficient~~	~~3,223~~	~~1,498~~
~~Rural Remote/Ltd. Dev.~~	~~8,728~~	~~1,491~~
~~Rural Transitional~~	~~665~~	~~485~~
~~Total~~	~~46,057~~	~~7,774~~

Commented [NS67]: for some reason I can't get rid of the old table- Maybe it will work better in the word version vs. the online version

~~Add 500, 100, 10 year and w/ structures. Up to date.~~

Yakima Countywide Flood Control Zone District, with funding from the Washington Department of Ecology, has taken steps to both improve floodwater conveyance, irrigation withdrawal and delivery, and fish habitat~~,~~ as part of ~~the Floodplain by Design program~~several programs. These programs include Washington State Ecology Floodplains by Design, Salmon Recovery Funding Board, FEMA BRIC, USBR WaterSmart, USFWS National Fish Passage, etc. The County has ~~begun to~~ purchased hundreds of acres of land along the Yakima and Naches Rivers, ~~and~~ removed and/or set ~~-~~back existing levees, contructed pilot channels and side channels, removed a run of river dam, modernized irrigation withdrawals, etc. Many of these levees that were removed or setback, some of them existing since the 1940s, act to constrict the natural flow of the rivers and cause additional erosion, levee flanking, 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

Commented [KW68]: List these, or are these those provide in the succeeding sentences? Is the list complete through 2025?

Commented [KW69R68]: This is dimensionless - how many?

Commented [KW70R68]: As in "levee setback, breaching, or removal?"

Commented [KW71R68]: AWK: rewrite proposed:

Commented [NS72]: would you like to add something about habitat restoration and dam removal as well, or just stick to levees? Troy knows more specifics about the projects, but they're big ticket projects that help with flood storage, related loss, property damage, etc.

Commented [KW73R72]: Likely no for restoration and removal; that'll get zeroed in on. WDFW and YN will urge, and we'll add this stuff in then, but with their tag. Levees, yes! Water/drought/floods, yes. Wildfire, yes also but this will be a team effort with multiple commenters, include WR for sure.

Commented [KW74R72]: Gap to Gap for sure. I'll also be updating CH 2 Natural Settings to include YBIP, G2G, etc. So….yes. A future Tues. work session should have these updates tee'd up for discussion and eventual cross checking.

damage up and downstream of the constrictions. In addition, levee set-backs improve fish and wildlife habitat and allow the river to flow and interact with the floodplain more naturally. The following levees have been modified over the past 30 years to improve resiliency:

Naches River: Ramblers (N1), McCormick (N2), Upper McCormick (N14), Town of Naches (N7), Craig Road (N9)

Yakima River: Yakima Authorized Right Bank, Yakima Authorized Left Bank

~~The more space the water has to travel unimpeded, the less a community will suffer from property losses and flood safety concerns.~~

The more unobstructed space water must travel, the lower the risk of property damage and flood-related losses. or,

Allowing water to move freely across open space reduces the threat of property damage and the severity of flood events.

3.4.2 Wildfire

Commented [KW75]: These existing sections may be a repeat of the new proposed. Cross check

Wildfire is a risk for several areas in Yakima County. As Yakima County's population has increased, development has expanded into ~~traditionally~~traditional 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.

~~Recent wildfires in Yakima County have caused $4 million dollars in property damage. Additional~~ ~~i~~mpacts 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 along the highway. ~~As of 2015, several communities along the Highway~~ 410 and 12 corridors that~~were~~ participate~~ing~~ in the program. Firewise serves to reduce the economic impact of wildfires, as well as reduce the risk to personal safety and private property.

Commented [KW76]: Update to most recent

3.4.3 Drought

In 2025, the Department of Ecology declared a drought in Yakima County for the third consecutive year. 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 ~~natura~~l hazards because the onset can occur ~~slowly~~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. A warmer, wetter weather pattern in the Cascades means while there may be more precipitation falling on the mountains, it may be in the form of rain instead of snow. The Yakima Valley depends on snowpack in the Cascades ~~to act as a reservoir~~ for irrigation purposes; over half of the irrigation water Yakima Valley farmers depend is stored as snow in the mountains and to fill the five reservoirs in the Yakima Project. ~~A lower snowpack in the Cascades leads to less water available for irrigation in Yakima Valley. Meanwhile~~, D~~d~~rought in the Yakima Valley is expected to become more common in ~~these~~ climate model analysis (citation and results here).

Drought ~~can have~~has 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, grapes, and hops 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~~ have significant impacts on ~~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. Much of Washington's electricity is produced by hydroelectric dams. Extreme and lingering drought conditions may impact the dams' ability to produce sufficient electricity for a growing population. The combination of these factors can cause excess stress, which has its own health implications.

3.4.4 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.

3.4.5 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~~ an extreme weather or other natural or (or non-natural ?) event. 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.

Commented [KW77]: Citations needed

Commented [KW78R77]: Dimensionless: Which models?

Commented [KW79]: Citations needed

Commented [KW80]: KSW will provide some on "critical areas "geologically unstable areas" and on a code scrub from 16C.08.03 and 06C.06 RE: landslide runout and buffers... here?

Commented [KW81]: Add Yak Tieton stuff and oth3er comp0ounting intyegrtatoin

Commented [KW82R81]: I think I was aiming to add additional examples of interaction between and among wildfires, floods and droughts...I can't decipher my own writing here... How about the paper you or I found on the debris flood flows - Lahars!

Commented [KW83R81]: Certainly these wildfires threatened/destroyed public infrastructure (Tieton) and cost m/Billions. It isn't a lift to tell this comprehensive story about the threats/hazards, but examples will help us get past politics, especially if they are irrigation, AG, etc.

INSERT GOALS AND POLICIES HERE: