Lewis County 2045

Shaping the Future of Lewis County

Lewis County Comprehensive Plan 2045 Periodic Update

Adopted [insert date] 2025

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** For appendices, page numbers may be inaccurate. The appendices are combined with other PDF documents.*

Introduction

Acknowledgements

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Terminology and Acronyms

A full glossary of terms can be found in the appendix.

Legal Terms

Countywide Planning Policies (CPPs) - A written policy statement or statements used solely for establishing a countywide framework from which county and city comprehensive plans are developed and adopted pursuant to this chapter. This framework shall ensure that city and county comprehensive plans are consistent as required in RCW 36.70A.100[1].

Growth Management Act (GMA) The Growth Management Act ***(36.70A RCW)*** is the State's governing land use law. This act requires Counties to develop comprehensive plans to manage future population growth, along with many other statutes that regulate the County's land use practices.

Limited Area of More Intense Rural Development (LAMIRD) – These are designated rural areas outside of cities and urban growth areas that characteristically have higher density and development than surrounding rural areas. There are three types of LAMIRDs recognized under the GMA 36.70A.070(5)(d) and WAC 365-196-425(6) with unique purposes and regulations.

Natural Resource Lands (NRL) – Referred to in this document as resource lands. These are areas designated for future forest, agriculture or mineral activities to support the State of Washington's strong natural resource industry. These are projected and regulated under by the State under the GMA.

Revised Code of Washington (RCW) – The States compilation of all permanent laws now in force.

Urban Growth Area (UGA) – These are areas designated for future urban growth. UGAs are regulated by State under the GMA 36.70A.110.

Washington Administrative Code (WAC) – The Washington Administrative Code is a set of regulations associated with the State's land use law in the GMA. These regulations are codified and administered by the State Legislature and provide additional information or context to the laws found in the GMA.

Comprehensive Plan Terms

Development Regulations: Land use goals and policies will be implemented through the County's accompanying development regulations. This is Title 17 Land Use and Development Regulations of the Lewis County Code. It is required that development regulations be updated with the Comprehensive Plan to be consisted with new and revised policies.

Element: Elements are chapters of the Comprehensive Plan that focus on a specific topic like land use, housing, and transportation. The following elements are required under the Growth Management Act: land use, rural, housing, transportation, capital facilities, utilities, parks and recreation, economic development and climate and resiliency. See RCW 39.70A.070 Mandatory Elements

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[1] *Revised Code of Washington, 36.70A.210 Countywide planning policies. https://app.leg.wa.gov/RCW/default.aspx?cite=36.70A.210*

Existing Conditions: Relevant data used to inform the goals and policies in the element.

Goals: Future desired states to be achieved. All goals in the Comprehensive Plan are symbolized by a prefix denoting the element and then a whole number. For example: LU 1, T 1, H 1.

Implementation: Refers to actions to help Lewis County achieve the goals and policies in each element. Identifies when potential policies or actions might occur and who is responsible.

Policies: Methods to achieve the associated goal. Policies are symbolized by a prefix denoting the element and then a decimal. number denoting the goal and policy. For example: LU 1.2, T 2.4, H 3.2.

Vision: Identifies the most important features or aspects of Lewis County that should be continued and improved within the next 10-20 years. The vision is meant to uphold a collective vision of the community to enhance residents and visitors' quality of life.

Relevant Documents, Studies, and Plans

2021 Shoreline Master Program
2022 Parks, Recreation, and Open Space (PROS) Plan
2023 Countywide Planning Policies
2023 Public Safety Radio System Engineering Study Report
2024 Economic Development Strategic Plan
2024 Onalaska Subarea Plan
2024 Packwood Subarea Plan
2024-29 Transportation Improvement Plan
2025 Comprehensive Solid and Hazardous Waste Management Plan
2025 Hazard Mitigation Plan

Appendices

Statewide and Regional Planning

It is required in the GMA that the Comprehensive Plan of each County and City shall be coordinated with and consistent with adjacent comprehensive plans[2].

Countywide Planning Policies

Countywide Planning Policies are policies used solely for establishing a countywide framework from which county and city comprehensive plans are developed and adopted[3]. It is the intent of this document to be consistent with the Countywide Planning Policies. The most recent version of Countywide Planning Policies can be found on the Lewis County website on the adopted plans page.

Planned Growth Committee

The Planned Growth Committee (PGC) is made up of the mayor, or their designee, from each city in Lewis County and the Chair of the Board of County Commissioners. The PGC makes recommendations on population and housing allocations to the Lewis County Planning Commission before the Board of County Commissioners (BOCC) adopts the final numbers. This group is another method for continued coordination between cities and Lewis County during the planning period and the Periodic Update. Visit the Lewis County's Boards and Commissions webpage to see details about the Planned Growth Committee.

Statewide Planning

It is Lewis County's intent to uphold the Statewide Planning goals identified in the Growth Management Act[4] through the Comprehensive Plan, as required by state law. There are fifteen unique planning goals identified in RCW 36.70A.020 to assist with the development and adoption of all comprehensive plans.

Tribal Coordination

The County invites tribes to participate in any planning efforts. In accordance with the Growth Management Act and guidance provided by the Department of Commerce, the County sent out letters inviting tribes to participate at the beginning of the periodic update[5].

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[2] *Revised Code of Washington, 36.70A.100 Comprehensive Plans – Must be coordinated., 2024, https://app.leg.wa.gov/RCW/default.aspx?cite=36.70A.100*
[3] *Revised Code of Washington, 36.70A.210 Countywide planning policies., 2024, https://app.leg.wa.gov/RCW/default.aspx?cite=36.70A.210*
[4] *Revised code of Washington, 36.70A.020 Planning Goals., 2024, https://app.leg.wa.gov/RCW/default.aspx?cite=36.70A.020*
[5] *Revised Code of Washington, 36.70.040(8) Who must plan, 2025 https://app.leg.wa.gov/RCW/default.aspx?cite=36.70A.040*

Organization of Document

Each chapter in this comprehensive plan is a required Element regulated under the Growth Management Act 36.70A.070. The required Rural Element is included in the Land Use Element. Economic development and parks and recreation elements are required if the State of Washington provides funds sufficient to cover applicable local government costs. Lewis County has elected to include an Economic Development Element.

Land Use Element 36.70A.070(1)

The Land Use Element translates the implications of the population, development, economic and environmental trends into official land use policy. The element is broken into four major sections:

The urban growth areas section intends to establish a course for Lewis County that promotes the vitality of the cities and urban growth areas.

Rural Element 36.70A.070 (5)

The Rural Element, included in the Land Use Element, is meant to provide a series of goals and policies that preserve the rural character of the County, support healthy small unincorporated settlements, protect parks and recreational areas (36.70A.070(5)), and access to job opportunities for rural residents, which are key components of that character.

The resource lands section is intended to designate and preserve resource lands and encourage the long-term commercial viability of resource-related uses on the lands, commonly referred to as natural resource lands in the Revised Code of Washington.

The natural environment section is meant to articulate goals and policies to protect critical areas, including Frequently Flooded Areas, Critical Aquifer Recharge Areas, Geologically Hazardous Areas, Wetlands, and Fish and Wildlife Habitat Conservation.

Housing Element 36.70A.070 (2)

The Housing Element offers a set of goals and policies to plan for and accommodate housing for all income levels of Lewis County's population. Key goals and policies include strategies to encourage the location of housing near existing facilities and services, and the pursuit of activities to maintain, enhance and/or build low to moderate-income dwellings.

Transportation Element 36.70A.070 (6)

The Transportation Element considers the potential transportation impacts of future growth. Projects to alleviate potential transportation concerns, as well as strategies to promote alternative transportation modes (buses and teleworking) and non-motorized transportation (bicycles and pedestrian travel) are also included.

Utilities and Capital Facilities Element 36.70A.070 (3) (4)

The Capital Facilities Element established goals and policies to guide future capital improvement projects and activities, such as parks and recreation, and a 10-year Capital Improvement Program are also included within the element and coordination between utilities, special service districts and other service providers.

Economic Development Element 36.70A.070 (7)

The Economic Development Element establishes a series of goals and policies to promote economic development.

Climate and Resiliency Element 36.70A.070 (9)

The Climate and Resiliency Element is aimed to reduce impacts of natural hazards in human communities and ecological systems, consistent with best available science and climate projections.

Goals and policies relating to climate and resilience throughout the plan are indicated by this icon.

2025 Community Profile

The community provides existing conditions and a detailed snapshot of the County's demographic, economic, environmental, and social characteristics. It serves as a baseline for understanding current conditions and trends, helping decision-makers craft policies that address community needs and guide future growth. This community profile includes data on population demographics, housing stock and affordability, and economic conditions that define the community's identity. Other existing condition data relating to land use patterns, environmental resources, infrastructure, and public services can be found throughout the Comprehensive Plan in the applicable elements. This information helps identify challenges and opportunities, ensuring that planning efforts are informed by accurate and up-to-date data.

County Overview

Lewis County is located in the southwest part of Washington State. The county borders eight other Washington counties: Grays Harbor, Thurston, and Pierce Counties to the north; Yakima County to the east; Skamania, Cowlitz, and Wahkiakum Counties to the south; and Pacific County to the west. The boundaries of the county are purely political creations except for a portion of the northern boundary that briefly parallels the Nisqually River and the eastern boundary which tracks along the crest of the Cascade Mountains. Lewis County is the largest county in western Washington. The county covers 2,452 square miles and measures about 90 miles (east to west) by 25 miles (north to south). The topography of the area varies widely, from the broad, flat and low-lying western section of the county to the Cascade Mountains to the east. Roughly three-fourths of the county is rugged, mountainous and forested. The remainder is characterized by low rolling hills interspersed with rivers and tributaries including the Cowlitz and Chehalis systems. The major population centers of Centralia, Chehalis, and Napavine, are located on the flood plains of the Chehalis River and its tributaries, including the Skookumchuck and Newaukum rivers.

Population

Historically, Lewis County's population has increased at a constant rate since 1960. The County's population has increased from 41,858 in 1960 to an estimated 84,950 as of April 1st, 2024, released by the Washington Office of Financial Management (OFM). Lewis County is expected to grow in the next twenty years by 12,005 people.

Between 2020 and 2050, the medium projection from the Office of Financial Management estimates the population of Lewis County to grow to nearly 96,000.

In 2024, Lewis County adopted Office of Financial Management's medium population forecast of 95,871 (OFM, 2024) which will require an increase of 6,232 housing units by 2045 (Lewis County, 2025). In summary, an increase of 12,005 population and 6,232 housing units by 2045 are being planned for in this update. These increases were allocated to incorporated cities and unincorporated County areas in coordination with jurisdictions. To see the allocation for communities within Lewis County, please see the latest adopted copy of the Lewis County Countywide Planning Policies (adopted herein by reference).

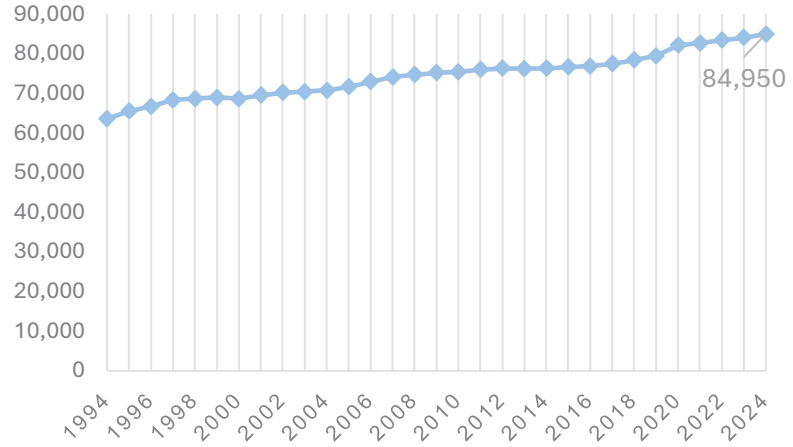


FIGURE 1 POPULATION GROWTH IN LEWIS COUNTY, 1960-2024

Socio Demographic Findings

Lewis County trends higher in populations of people 60 years and older compared to the State of Washington by approximately 7 percent (ACS, 2022) and has a higher old age decency ratio. These populations are concentrated in Eastern Lewis County between Mossyrock and Packwood. The old age dependency ratio in Lewis County 38.6 compared to the State's ratio of 27.1[6].

Lewis County also has a higher population of those living with a disability than the State. Lewis County's percentage of persons with a disability is 19.9 percent compared to the State's 13.5 percent. This again, is more prominent between Mosssyrock and Packwood (ACS, 2022).

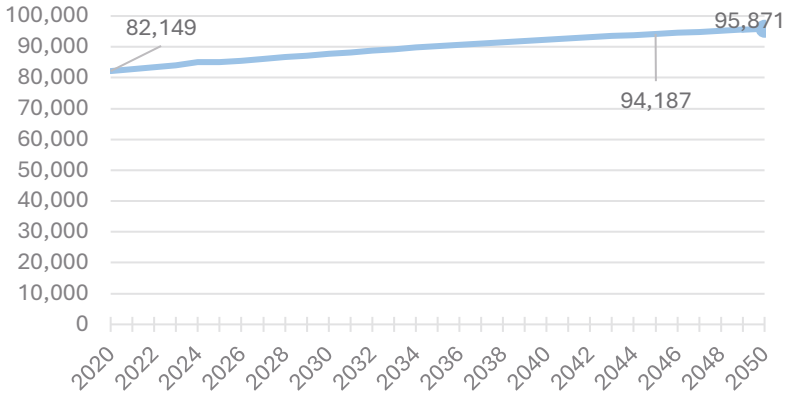


FIGURE 2. POPULATION GROWTH FORECAST IN LEWIS COUNTY, 2020-2050

[6] *U.S. Census Bureau, ACS 2022, Table S0101*

Some areas between Morton and Toledo show a higher trend of socio-economic factors such as higher unemployment rates, no high-school diploma, or low median household income[7] (ACS, 2022).

With a high population of older people and people with a disability on the Eastern side of the County further away from Urban Growth Areas Lewis County will need to consider land use and transportation solutions to avoid displacement of existing populations. The Washington Department of Commerce identified Eastern Lewis County as a high-risk area for displacement that may be caused by gentrification. As Lewis County plans for growth over the next 20 years, it will be important to consider where these populations are heavily concentrated to provide suitable land use policies, appropriate transportation and housing opportunities, and plan for adequate infrastructure to support these efforts.

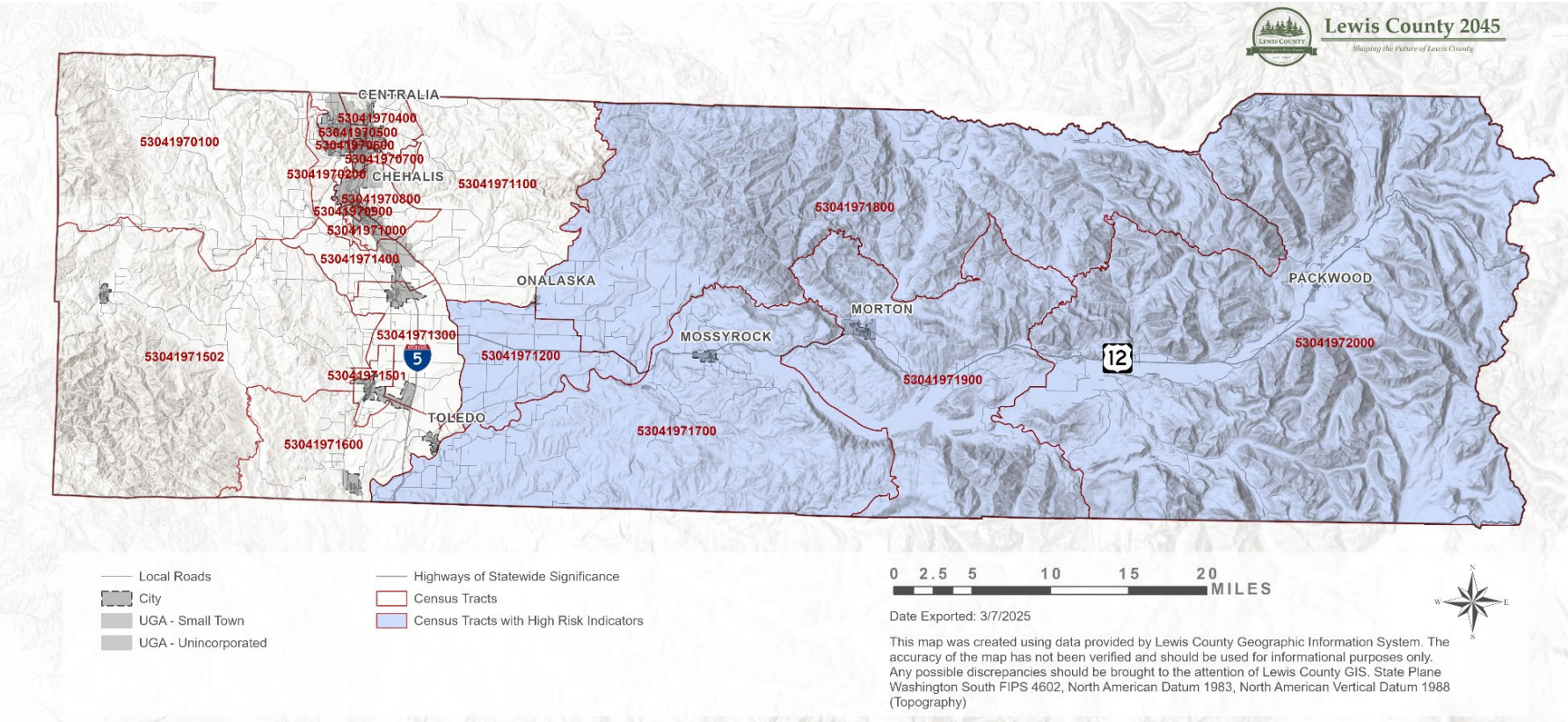


FIGURE 3. SOCIO-DEMOGRAPHIC FINDINGS

[7] *U.S. Census Bureau, ACS 2022, Table S1701*

Housing

Lewis County has a total of 35,604 housing units of which 32,149 are occupied. Over 70 percent of the current housing stock in Lewis County is single-family. The average unit size by bedrooms is three (3) rooms and the average person per household is approximately 2 (two) people. The Housing Needs Assessment found that almost 60 percent of housing is disproportionate to the needs of the current population.

36,370[8]	2.63[9]	77.1%[9]	22.9%[9]	32,149[8]	$69,067[10]
Total Housing Units	Average Household Size	Owner-Occupied Units	Renter-Occupied Units	Occupied Units	Median Household Income

FIGURE 4. OCCUPANCY AND HOUSING CHARACTERISTICS

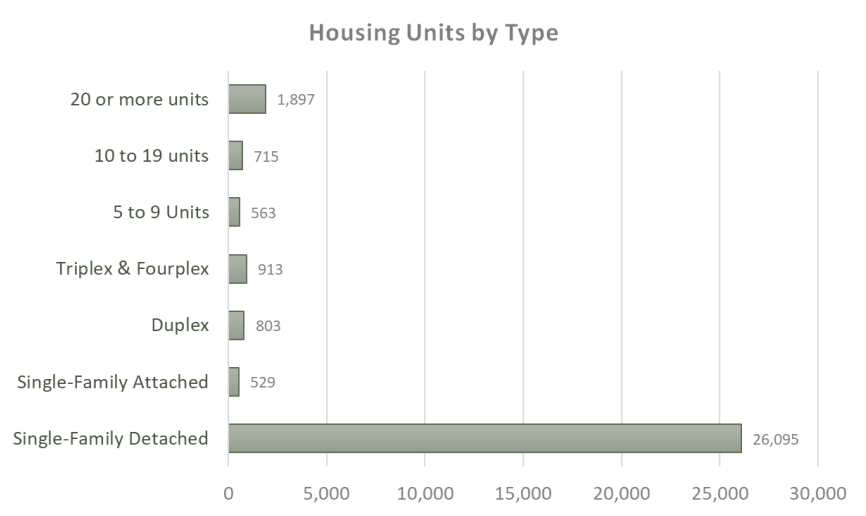


FIGURE 5. HOUSING TYPES CENSUS BUREAU ACS 2022 1-YEAR ESTIMATE TABLE DP04

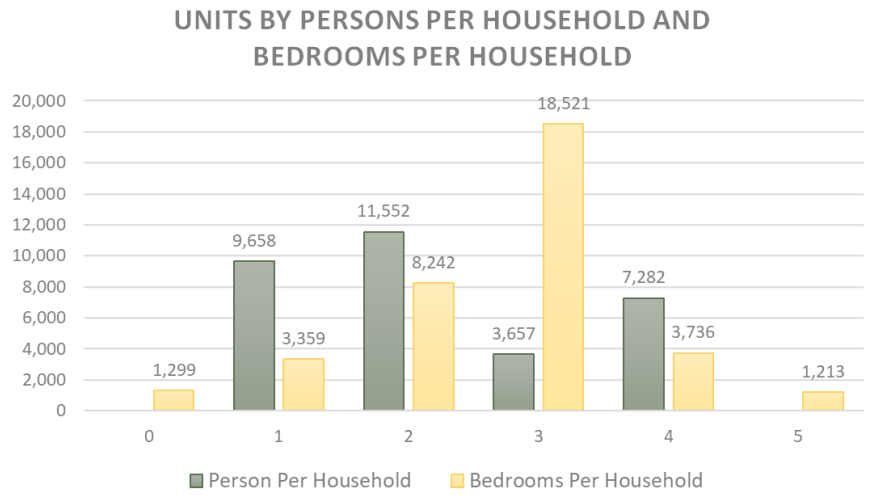


FIGURE 6. PERSONS AND BEDROOMS PER HOUSEHOLD CENSUS BUREAU ACS 2022, 1-YEAR ESTIMATE TABLE S2503

[8] *U.S. Census Bureau, ACS 2022 1-Year Estimate Table S2501*
[9] *U.S. Census Bureau, ACS 2022 1-Year Estimate Table S1101*
[10] *U.S. Census Bureau, ACS 2022 1-Year Estimate Table S2503*

The median single-family home in Lewis County costs $369,300 and the average monthly rent for a multifamily unit is about $1,273 (WA Center for Real Estate Research, 2024). As 2022, 32,149 housing units are owner-occupied or 73 percent and about 7,361 housing units are renter-occupied or 22 percent.

The median household income in the County is $67,247[10] and the expected mortgage payment on a median single-family home is approximately $2,424[11]. This means that households would need to make at least $97,000 to afford the median cost of a single-family home in the County, which is higher than the median household income.

Under these conditions, approximately 8,780 households are cost-burdened (spending more than 30 percent of their income on housing costs) and make between the 0-80 percent area median income range. It is likely these households would not be able to qualify for a mortgage to purchase a home and would be cost-burdened if they are able to. Figure 8 has a snapshot of cost-burdened households according to US HUD affordability data (renter-occupied and owner-occupied households are summarized). The cost-burdened households are shown by income level segments as required by housing requirements under the GMA.

The policy framework in the Land Use Element and Housing Element seeks to plan for and accommodate housing for all income levels. For further information about housing affordability, see the Housing Capacity and Housing Needs Assessment completed as part of the 2025 periodic update in the appendix.

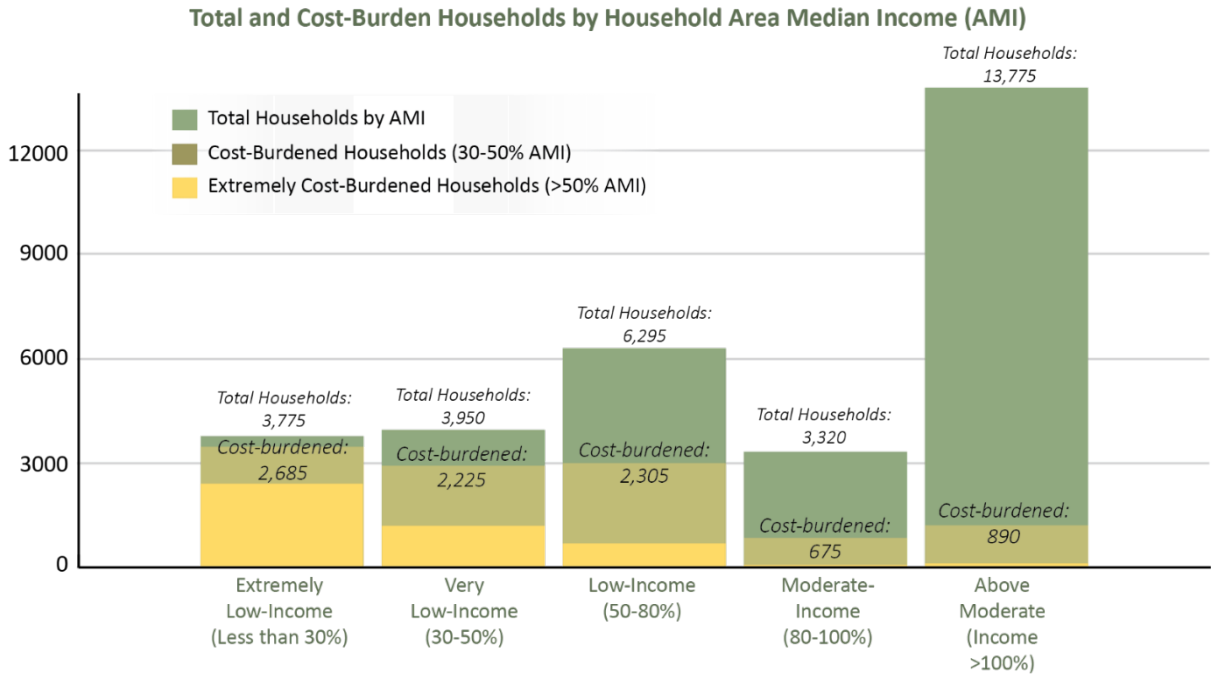


FIGURE 7. COST-BURDENED HOUSEHOLDS

U.S. DEPARTMENT OF URBAN DEVELOPMENT COMPREHENSIVE HOUSING AFFORDABILITY STRATEGY, 2016-2020. DATA IS SUMMARIZING HOUSEHOLDS FOR OWNERS AND RENTERS.

[11] *Washington Center for Real Estate Research 2024, Fannie Mae Mortgage Calculator Assumes 20% down payment and 30-year mortgage at 6% interest rate. Zillow Observed Rental Index 2024*

Economy

To better understand the economic conditions of Lewis County, this section looks at a variety of employment and commuting data. The largest job industries in Lewis County are health care and social assistance, retail trade, manufacturing, and educational services. General jobs that fall under these categories are nurses and physicians, tourism, merchandise dealers of furniture, motor vehicles, and apparel, factory workers, and teachers. This accounts for 52 percent of the jobs in Lewis County. This is aligned with the county's educational attainment, where over 40 percent of the population has some form of college degree or higher. Lewis County has a low unemployment rate of 2.6 percent of the working age population unemployed as of 2024, compared to the national average of 4.2 percent (Bureau of Labor Statistic, 2021).

TABLE 1. EDUCATIONAL ATTAINMENT, POPULATION 25 TO 64 YEARS, U.S. CENSUS BUREAU ACS 5-YEAR 2021, S2301

Educational Attainment	
	Count
Less than high school graduate	4,452
High school graduate (includes equivalency)	12,705
Some college or associate's degree	16,249
Bachelor's degree or higher	7,989

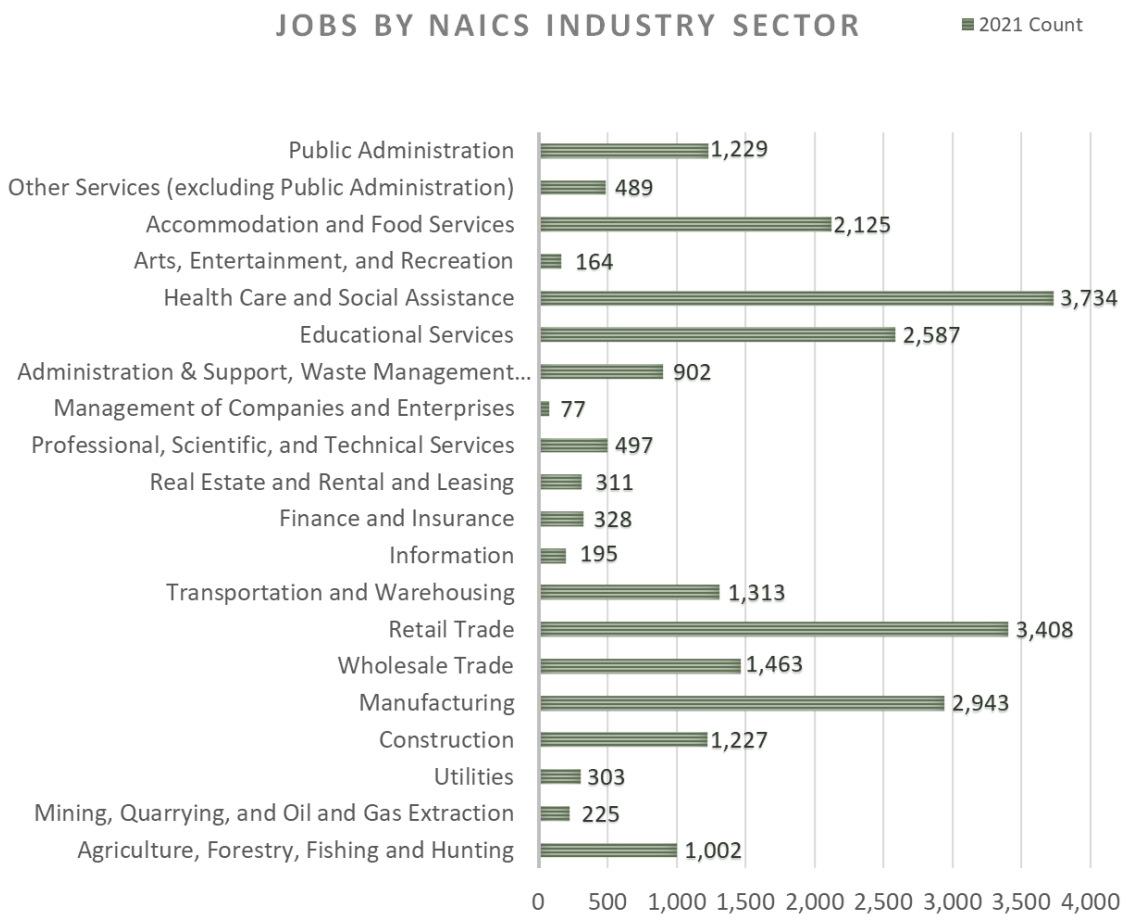


FIGURE 8. JOBS BY INDUSTRY U.S. CENSUS BUREAU, ON THE MAP, 2021

Based on the employment and commuting data for Lewis County, a significant portion of residents—21,733 individuals, commute outside the county for work, while 10,916 workers commute into the county, and 13,606 both live and work in Lewis County (On the Map, 2021). The data also reveals that commuting distances vary widely, with 11,440 residents traveling more than 50 miles for work, and the majority driving alone (25,981 individuals). Understanding these commuting patterns is crucial for Lewis County's comprehensive planning efforts, as long commutes increase household transportation costs, reduce available time for community engagement, and contribute to infrastructure wear. Additionally, the heavy reliance on single-occupancy vehicle travel highlights the need for diversified transportation options. To address these challenges, the policies in the Comprehensive Plan focus on expanding economic opportunities near future growth areas, reducing the need for long-distance commuting, and enhancing local employment options to improve both quality of life and economic resilience for residents.

Table 2. Jobs by Distance, U.S. Census Bureau, On the Map, 2021

Distance to Work	
	Count
Less than 10 miles	9,731
10 to 24 miles	6,634
25 to 50 miles	7,534
Greater than 50 miles	11,440

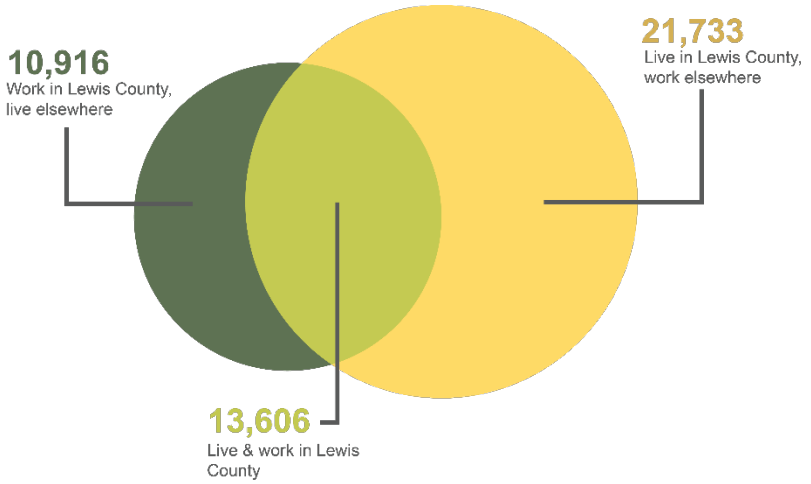


Figure 9. Inflow Outflow Analysis U.S. Census Bureau, On the Map, 2021

Commuting to Work	
	Count
Drove Alone	25,182
Carpooled	3,848
Public Transportation	196
Walked	1,250
Other	417
Worked from Home	2,513

Table 3. Commuting to Work U.S. Censure Bureau, ACS 5-year 2022 Table DP03

2025 Periodic Update

Every ten years Lewis County is required to update the Comprehensive Plan, referred to under the GMA as the periodic update. Each update comes with unique conditions that impact the process, engagement, and final goals and policies in the Comprehensive Plan. It is required during the periodic update that Lewis County review and revise the Comprehensive Plan and Development Regulations to comply with any new state laws passed since the previous update. It is also an opportunity to engage the community and incorporate their goals for the future.

Relevant Legislation

For the 2045 Periodic Update, the following legislation played a critical role in the 2045 Comprehensive Plan process, analysis, and final goals and policies. A full list of legislation that affected the 2045 periodic update can be found on the *Washington Department of Commerce's Periodic Update webpage*.

HB 1220 – Housing Legislation Summary

Passed in 2021, requires counties to identify sufficient land and zoning capacities to accommodate a diversity of housing types for community members at all economic levels: moderate, low, very low, and extremely low- income households; emergency housing, emergency shelters, and permanent supportive housing; and within the UGA, consideration of duplexes, triplexes, and townhomes. This legislation revised the following sections of the GMA: RCW 36.70A.020, .030, .070, .390; chapter 35A.21 RCW; chapter 35.21 RCW.

SB 5275 – Relating to Enhancing Opportunities in LAMIRDs Summary

This bill, passed in 2022, introduces changes to LAMIRD requirements, allowing for development and redevelopment within these areas, provided that there is confirmation of adequate public facilities and services to meet new demands. It also permits changes to land use designations on vacant land, as long as the development aligns with the county's definition of rural character. Commercial development within mixed-use zones is allowed, with size limits on certain types of businesses. Additionally, this legislation modifies RCW 36.70A.070 of the GMA.

HB 1181 – Improving the State's Climate Response Summary

Passed in 2023, this bill requires all cities and counties to adopt a climate element and a resiliency sub-element in the Comprehensive Plan. The resiliency sub-element requires the County to plan for and mitigate climate hazards, advance environmental justice, adapt to and mitigate the effects of climate, and protect and enhance the environment, economy, and human health and safety. The land use, capital facilities, park and recreation, utilities, and transportation elements must be updated to include certain climate related topics. This legislation revised the following sections of the GMA: RCW 36.70A.020, .030, .070, .130, .190, .280, .320, and .480.

Growth, Housing, and Employment

The Planned Growth Committee completed the reconciled population and housing allocations in August 2024. Through this process, Lewis County was allocated the following population and housing numbers.

TABLE 4. LEWIS COUNTY POPULATION ALLOCATIONS

Unincorporated Areas*	2022 Total Population	2045 Population Allocation	20-Year Population Increase	20-Year Growth Rule
Onalaska UGA	562	700	138	24.56%
Packwood UGA	910	1,200	290	31.87%
Other Rural	41,157	41,582	425	1.03%
Total Unincorporated	42,629	43,482	853	2.00%

**Growth Within Unincorporated Areas Around Cities*

TABLE 5. LEWIS COUNTY HOUSING ALLOCATIONS

Unincorporated Areas	Emergency Housing	Non-PSH	PSH	>30-50% AMI	>50-80% AMI	>80-100% AMI	>100-120% AMI	>120% AMI	Total
Onalaska UGA	4	4	2	12	24	16	0	0	58
Packwood UGA	17	13	9	18	56	25	0	0	121
Total Unincorporated	70	310	185	130	73	28	10	5	741

The Planning Growth Committee assigned population and housing targets to each urban growth area. Lewis County worked with cities through the Planned Growth Committee to ensure that during this periodic update population and housing accommodation would be studied in each city's land capacity analysis and include any unincorporated land in the urban growth area boundary. The Land Capacity Analysis for Lewis County's urban growth areas can be found in Appendix A.

Community Engagement

The most important part of the 2025 Periodic Update is providing the community with an opportunity to provide input to help shape the goals for the future of Lewis County. The GMA requires that Lewis County develop a plan for community engagement and provide participation materials, events and other tools throughout to process to amend comprehensive land use plans and development regulations implementing the plans[12].

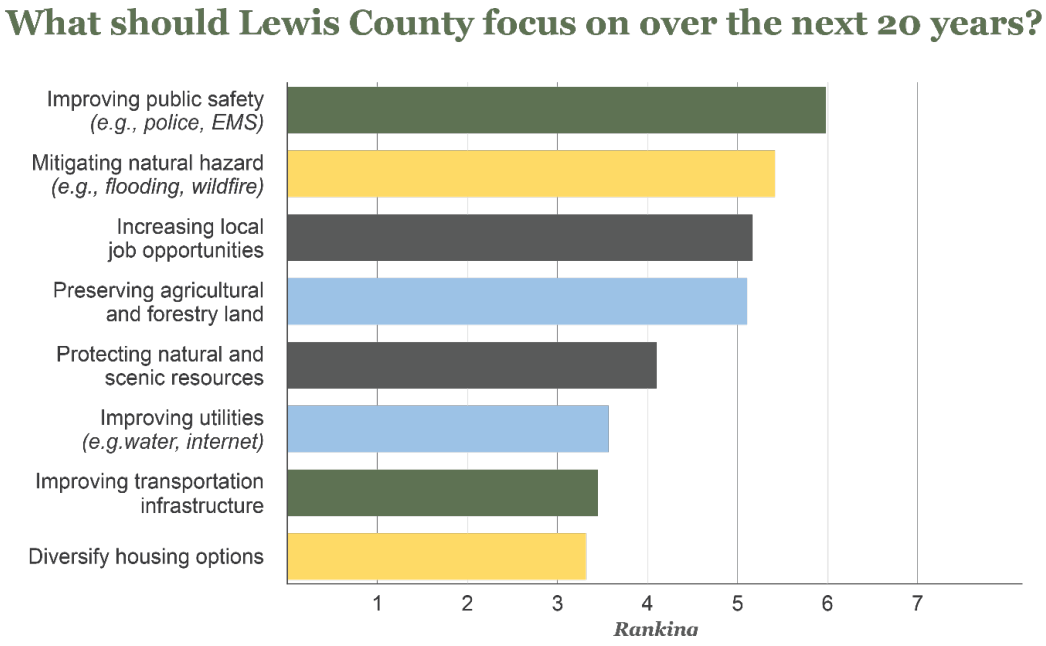
Lewis County established a Community Engagement Plan early 2024 and distributed the plan through community public meetings and online. A copy of the Community Engagement Plan and results can be found in **Appendix H**. Community engagement began in September 2023 until the final adoption of the Comprehensive Plan with the Board of County Commissioners.

5	2	786	3	3	20+
Community Meetings 116 Attendees	Community-wide Surveys	Survey Responses	Pop-Up / Community Events	Open Houses	Public Meetings & Hearings

Community Wide Surveys

In the community survey released between April to May 2024, 736 respondents ranked their top priorities for the next twenty years.

In October 2024, Lewis County released a survey to gather public input on proposed new policies for the 2045 Periodic Update of its Comprehensive Plan. The survey revealed strong community support for key policies across various elements. For the Land Use Element, top priorities included preserving the existing rural character, supporting local farming opportunities on agricultural resource lands, and creating policies to protect urban growth areas from natural hazards. In the Housing Element, respondents favored improving permit processes and regulations,



[12] *RCW 36.70A.140 Comprehensive plans – Ensure public participation. http://app.leg.wa.gov/RCW/default.aspx?cite=36.70A.140*

increasing middle housing, manufactured housing, and ADUs, and ensuring a range of housing options for all income levels, as mandated by the state. The Transportation Element saw strong backing for improving transportation access for disadvantaged populations in small towns and LAMIRDs, creating multi-modal transportation networks, and prioritizing improvements to infrastructure vulnerable to natural hazards. For the Capital Facilities Element, the community supported enhancing broadband and telecommunications projects, protecting facilities from natural hazards, and expanding park networks with better connectivity between communities. The Economic Development Element saw emphasis on expanding telecommunications, integrating economic development into other planning elements, and supporting the transition of IPAT/TransAlta from mining to industrial uses. Lastly, in the Climate and Resiliency Element, policies to ensure continued wildfire planning, provide education on wildfire preparedness, and enhance protections for wildfire-prone areas were highly endorsed. These findings reflect the community's priorities for a resilient, sustainable, and thriving future in Lewis County.

Community Meetings and Open Houses

Between October 2023 and January 2024, the County hosted four (4) community meetings to ask the public to help scope the highest priorities over the next 20 years. The meetings were held in South County near Toledo, Salkum, Mineral and Randle. A total of 86 people attended the meetings.

Participants were asked to write 5-10 statements about what they hope Lewis County will be like in 2045, covering topics such as transportation, housing, land use, recreation, jobs, etc. Next, participants were asked to star the top 3 priorities. The participants paired up and shared their top 3 priorities. Together, each team was asked to agree on a combined 3 and write each priority on a notecard. These were shared with the whole group and organized, by the group, into topics.

The comments from the meetings are summarized below. The top themes were:

1. Protect the rural character of the County by maintaining farms and forests and keeping dense development and big commercial near US Interstate I-5.
2. Make sure infrastructure and services (e.g., roads, EMS, police, schools, internet, etc.) keeps pace with development.

A climate event was hosted by Centralia College in April 2024 as part of their "Climate Connections Film and Speakers Series". The County was requested to speak about Lewis's County's Comprehensive Plan and the Climate and Resiliency Element. There were 30 attendees that participated in the discussion about impacts and concerns from climate related hazards.

Early October 2024 Lewis County hosted three open houses in three separate locations across the County. The open houses were hosted in multiple locations and times to provide more opportunities for residents to have the opportunity to attend. The events were a self-guided format, attendees could walk around and read the posters at their own pace. Staff were available to answer any questions. There was no formal presentation at these open houses. The events had approximately 5 (five) attendees that discussed policy changes with staff. The following comments were collected:

Climate-Related Engagement Concerns

- Flooding risks and riverbank erosion
- Concerns about the response time to wildfires
- Logging impacts related to landslide hazards
- Evacuation routes and education
- Invasive plant species controls

- Multiple comments mentioned the need for increased transit in rural areas to assist with Lewis County rural and low-income populations.
- Multiple comments expressed the need for new job creation to keep younger populations living in rural communities with their families.
- Multiple comments mentioned the support for hazard mitigation and natural hazard preparedness policies.

Multiple comments mentioned that need for stronger regional coordination between cities and small communities. The cities, Centralia and Chehalis, produced the better jobs while the rural communities are where residents would like to continue living. There was a strong desire to be able to live and work in the same place.

Lewis County Vision

The Lewis County Comprehensive Plan seeks to ensure the following vision is continued as the County plans for the next twenty years of growth.

Strong Central Cities

Lewis County seeks a vital central group of cities - Centralia, Chehalis, Winlock, Toledo, Napavine, Vader, Mossyrock, Morton and Pe Ell - that offer a variety of jobs, living arrangements, and activities for individuals to enjoy. The success and vitality of these central cities will influence the communities throughout Lewis County, especially those in the small settlements and rural areas near the communities.

Vital Small Towns and Communities

Lewis County also desires vibrant small communities dispersed through the County. Adna/Doty, Onalaska, Mayfield, Mineral, Glenoma, Randle and Packwood are historic small towns that are unincorporated but provide critical housing, jobs and services for people living and working in rural areas and resource lands. These vibrant communities are designated as Type 1 LAMIRDs and UGA - Small Towns in the land use map.

Vital Small Communities have a rural character that includes housing densities similar to incorporated cities of Mossyrock and Morton, with a mix of single-family houses, accessory dwelling units, duplexes, triplexes, manufactured home parks and small apartment complexes. Services typically include post office, library, community center, grocery story, auto parts store, hardware store, restaurants, breweries, small hotels, doctor office, veterinary clinic, and other business that support the rural population. The communities are typically compact, preserving the farms, forests and open spaces around them.

It is important that in Vital Small Communities the following strategies are encouraged:

- Placemaking – Each Vital Small Community is unique, with its own history and character, which should be preserved, celebrated and incorporated into new development.
- Housing – Part of the rural strategy for providing housing for community members at all economic levels is to encourage infill development in Type I LAMIRDs and UGA – Small Towns.
- Strong retail core – Each of these communities has a main street where locally owned, small business should be supported and a pedestrian environment encouraged.
- Industrial Development – The surrounding farms and forests can be supported by lumber mills, butchers, farmers markets and other businesses located in these communities.
- Recreation – These communities provide access to internationally renowned recreational opportunities, such as Mt. Rainier, which are an important driver of the County's economy.
- Services – Adequate police, fire and ambulance services are necessary to support these communities and help them plan for and react to natural hazards including flooding and wildfire.
- Infrastructure – Centralized water and sewer systems are needed to support expanded housing and employment opportunities; as well as roads designed for a growing population and increased transit options.
- Broadband – The expansion of broadband will support new economic opportunities and support for emergency and communication services.

Retain Resource Lands and Natural Areas

Lewis County envisions linking communities with their surrounding farms, forests, parks and open spaces as a fundamental strategy to preserve rural character, promote the quality of life for area residents, and a means to support the local economy. Enhancements of the connections to these surrounding areas are intended to encourage additional development inside the existing communities and better showcase the resource lands and natural amenities nearby. In the rural areas, strategies like cluster subdivisions will help protect natural and rural character as Lewis County continues to grow in population.

Flourishing Agricultural Industries and Uses

Lewis County envisions additional flexibility in the uses allowed on agricultural lands. Traditionally, Lewis County farmers have held secondary employment to help pay their bills, and often this employment was located off the farm. The County pictures the additional allowance of on-the-farm opportunities to generate income, such as agritourism and agricultural accessory uses, as a key method to promote the continued economic viability of local agriculture[13].

Plan for Facilities for Growth

Lewis County visualizes high quality capital facilities serving targeted areas for future development, and the encouragement of growth where existing underutilized facilities have development capacity. This emphasis on public facilities is intended to encourage responsible growth patterns within the county, while limiting the potential impacts that may occur from a proliferation of individual private facilities (such as wells and septic system).

[13] *Evidence of this secondary employment is available in historic Agricultural Censuses for Lewis County. For example, in 1954, 1,506 of the 2,837 farms in Lewis County (53.1 percent of farms) had other family income that exceeded the value of farm products sold. This total increased to 63.3 percent of Lewis County farms in 1959. Other evidence of off-farm employment, though measured in different ways, is also shown in older agricultural censuses. In 2012, only 24 percent of farms had sales greater than $10,000.*

Land Use

Introduction

The Land Use Element establishes the land use designations for Lewis County to accommodate growth for the next twenty years. The goals and policies in this element are heavily supported by supplemental policies in the other elements.

The Land Use Element includes the following goals and policies to adequately distribute land uses and address Growth Management Act requirements.

Urban Growth Areas[14]: These areas include unincorporated urban growth areas around cities and the small unincorporated towns of Onalaska and Packwood. These are used for the purposes of accommodating the County's projected growth and shall provide adequate urban services and facilities to the community. Urban Growth Areas are planned jointly with cities.

Limited Areas of More Intense Rural Development: Type I LAMIRDs are historic unincorporated communities with a variety of housing, businesses and services that support the surrounding rural lands. Type II LAMIRDs are recreational parks and developments that contribute to the local tourism economy. Type III LAMIRDs are industrial areas that provide manufacturing and energy hubs. LAMIRDs are considered part of the rural element but can have different land use patterns than the County's large rural land areas and rural residential areas.

Rural Lands: Also known as the Rural Element, these areas include Lewis County's low density rural housing, cottage industries and agricultural uses outside of urban growth areas and designated resource lands. These areas provide rural services and facilities to Lewis County's rural residents.

Natural Resource Lands[15]: These areas include Lewis County's designated agricultural, forest, and mineral resources lands.

[14] *RCW 36.70A.110 Comprehensive plans – Urban growth areas.*
[15] *RCW 36.70A.170 Natural resource lands and critical areas—Designations.*

Land Use Element Requirements

The Land Use Element is required to address:

- Distribution and general location of land uses
- Population densities, building intensities, estimates of future population growth
- Provisions for the protection of groundwater
- Consideration of urban planning approaches to promote physical activity, and
- Considerations and review of drainage, flooding, and stormwater

Counties are required to include a Rural Element in the Comprehensive Plan to accommodate for land not designated for urban, agriculture, forest, or mineral resources.

RCW 36.70A.070 Mandatory Elements
WAC 365-196-405 Land Use Element
WAC 365-196-425 Rural Element

Natural Environment: These areas include rivers, streams, wetlands, critical aquifer recharge areas, fish and wildlife habitat conservation areas, frequently flooded areas, and geographically hazardous areas.

Existing Conditions

The land use designation table for Lewis County highlights a contrast between urban and rural land areas. Urban Growth Areas (UGAs), including both city and industrial designations, account for a very small portion of the total land area, with the UGA City (including unincorporated UGA) making up only 1.11 percent and UGA Industrial areas just 0.08 percent. In comparison, the county's rural and natural resource lands dominate the landscape, with forest lands covering the largest portion at 81.08 percent, followed by rural residential areas at 12.54 percent. Smaller rural and nonresidential lands account for a modest 1.06 percent, while agriculture and mineral lands together represent just 4.59 percent of the county's land use. This distribution emphasizes the prominence of rural, forest, and natural resource lands in Lewis County, while urban areas remain limited in size.

TABLE 6. LAND USE DESIGNATION AREA IN ACRES

Urban Growth Areas	Area in Acres	Percent of Total
UGA City (Includes Unincorporated UGA)	26,915	1.7%
UGA Industrial / Major Industrial Development	4,534	0.2%
UGA Small Town	728	0.0004%
Rural Lands		
Rural Small Communities (Type I LAMIRD)	7,098	0.4%
Recreation and Tourism (Type II LAMIRD)	1,216	0.0007%
Rural Nonresidential (Type III LAMIRD)	1,443	0.0009%
Rural Residential	311,453	19.6%
Natural Resource Lands		
Forest	1,118,215	70.6%
Agriculture	92,448	5.8%
Mineral	4,929	0.3%
Lake	13,205	0.8%
Total County Acres	1,582,184	100%

Source: Lewis County GIS Zoning Layer, 2024

Planning for the Future

City Urban Growth Areas

Unincorporated urban growth areas, identified as "UGA – Unincorporated" in Figure 10. Land Use Designations Map are adjacent to incorporated cities and are intended to support cities in their accommodation of projected population, housing, and employment. Over the next 20 years the Unincorporated UGA should be annexed by cities, therefore, these areas are planned jointly with the cities through coordination and collaboration with the Lewis County Planned Growth Committee.

Small Town Urban Growth Areas

The small-town Urban Growth Areas, identified as "UGA – Small Town" in Figure 10, are the UGAs not associated with an incorporated city. These are intended to accommodate Lewis County's projected population growth and employment, including a diversity of low, medium and high-density housing types with urban levels of services and facilities. It is intended that these areas will provide additional services to Lewis County to mitigate the displacement of rural residents. In Lewis County, subarea plans are used to add help add detailed policy guidance around these areas for improved development regulations, like the Onalaska Subarea Plan.

Industrial Urban Growth Areas

Industrial urban growth areas, identified as "UGA – Industrial" in Figure 10. Land Use Designations Map , (Land Use Designations Map) are intended to provide employment and economic opportunities for Lewis County. Some of these areas are known as the Trans Alta Urban Growth Area and the Cardinal Glass Urban Growth Area.

Limited Areas of More Intense Rural Development (LAMIRD)

Lewis County has multiple Type I LAMIRDs, identified as "Rural Small Communities" in Figure 10, which are historic unincorporated towns that provide a diversity of housing and commercial opportunities to rural residents.

Lewis County also has Type 2 and Type 3 LAMIRDs which are identified in Figure 10 as "Recreation and Tourism" (Type II) and "Rural Nonresidential" (Type III).

Rural Areas

Rural areas that are not designated natural resource lands are intended to provide housing at rural densities, a diverse range agricultural and recreational uses, as well as cottage industries.

Natural Resource Lands

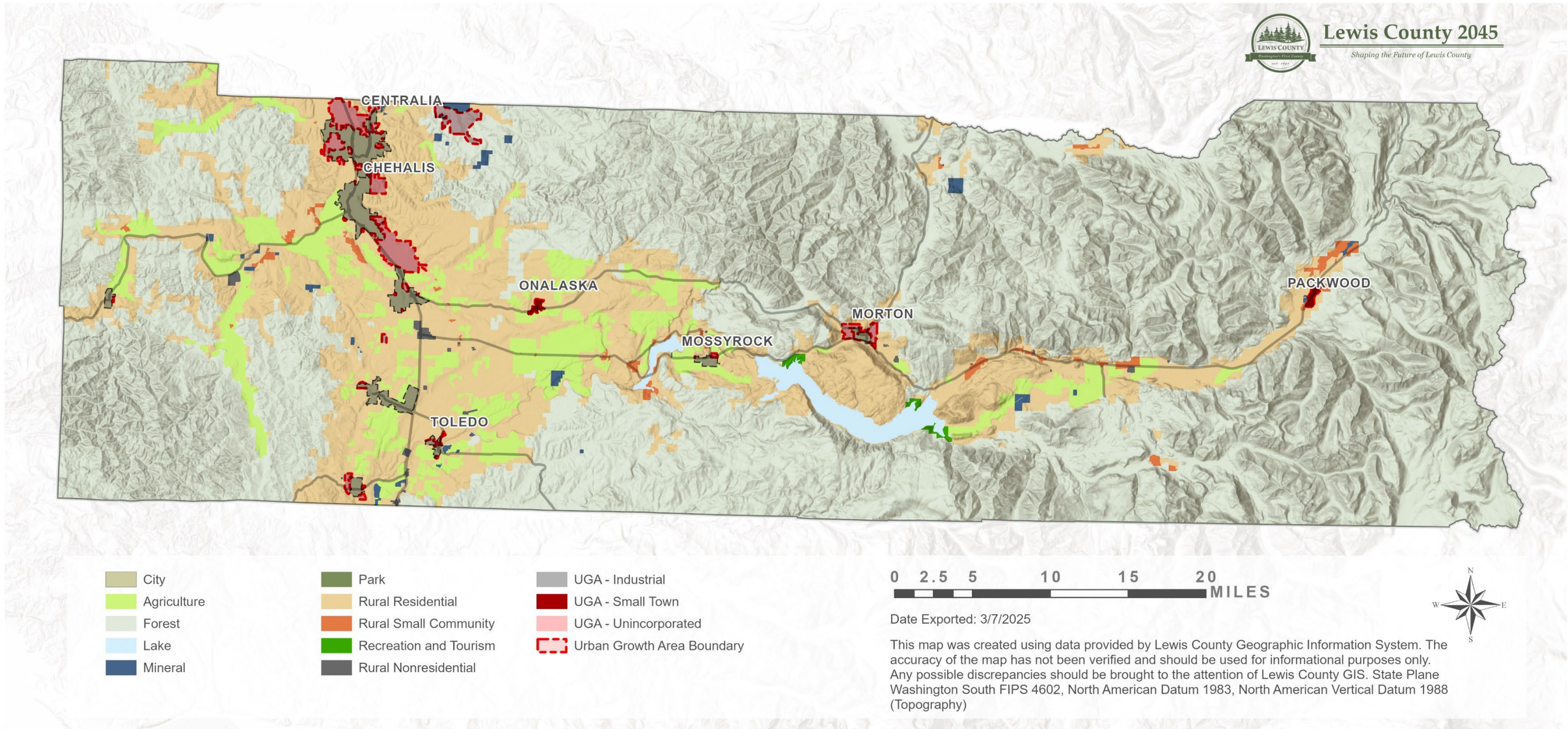
Natural resource lands follow the state mandated designation of natural resources lands under the Growth Management Act[16]. These lands are intended to be preserved to provide vital natural resources and economic opportunities for Lewis County. Lewis County has vital agricultural, forest, and mineral lands that account for more than eighty percent of the County.

Natural Environment

The natural environment section seeks to preserve Lewis County's vital wildlife, habitat, water resources, and mitigate geologic or flood hazards, also known as critical areas. Critical areas located throughout the County across all land use designations and zoning.

[16] *RCW 36.70A.050 Guidelines to classify agriculture, forest, and mineral lands and critical areas.*

FIGURE 10. LAND USE DESIGNATIONS MAP



URBAN GROWTH AREAS GOALS AND POLICIES

Areas where urban density and intensity of development has occurred or is planned to occur are included in an urban growth area, as designated by Lewis County. All cities must have an associated urban growth area. Urban growth areas are also applied to some unincorporated historic small towns with urban-density of development where public facilities and services are planned, and to regional-scale recreational, commercial and industrial areas. Urban growth areas are intended to accommodate a broad range of needs and include greenbelt and open space areas. Urban Growth Areas are subject to all requirements under the GMA, specifically RCW 36.70A.110, and all other applicable sections.

establishes high-level policy approaches to the scale, density, use, form, and administration for the land use designations of Urban Growth Areas. Lewis County's Land Use and Development Regulations Code Title 17 further explains the allowances and limitations of these designations through the implementing zones.

TABLE 7. URBAN GROWTH AREA CHARACTERISTICS

	UGA - City	UGA– Small Towns	UGA – Industrial Major Industrial Development
Characteristics	Provides a variety of urban densities and urban levels of service.	Provides urban densities and urban levels of services, further clarified by Subarea Plans.	Larger manufacturing or industrial buildings in a rural area isolated from another Urban Growth Area.
Density	Low to Very High	Low to High	None
Uses	Commercial, Mixed-use, Residential, Industrial, Public Facilities and Services, Parks, Open Space, Utilities	Commercial, Mixed-use, Residential, Industrial, Public Facilities and Services, Parks, Open Space, Utilities, further clarified by Subarea Plans	Industrial, Manufacturing, and Commercial
Supplemental Information	Unincorporated urban growth areas adjacent to cities are planned jointly between the County and the City to ensure that adequate provisions to accommodate growth and address statewide planning goals with the intent that they will be annexed in the future.	As of 2025, there are two adopted Subarea Plans for the Onalaska and Packwood UGAs that assist with zoning, densities, and other land use administration, allowed under WAC 365.196.445(2).	
Implementing Zone(s)	UGA – Cities, Urban Reserve Overlay District	Commercial Business District (CBZ), Mixed Use (MU) Airport District (AX),	TransAlta / IPAT UGA, Cardinal Glass UGA

		Industrial (IND), Residential Low Density (RL) Residential Medium Density (RM), Residential High Density (RH), Open Space (OS), Airport District (AD).	

URBAN GROWTH AREAS

Goals: Future desired states to be achieved. All goals in the Comprehensive Plan are symbolized by a prefix denoting the element and then a whole number. For example, the first goal in the Land Use Element is delineated LU 1.

Policies: Methods to achieve the associated goal. Policies are symbolized by a prefix denoting the element and then a decimal number denoting the goal and policy. For example, the first policy in the Land Use Element is delineated with LU 1.1.

UGA 1 Ensure sufficient land within urban growth areas, designated for appropriate development densities, to accommodate the county's adopted 20-year population forecast, housing targets, and employment projections allocated to those areas.

UGA 1.1 Review and update urban growth area boundaries every five (5) years based on the Office of Financial Management's population growth forecast.

UGA 1.2 Ensure that Urban Growth Area boundaries for cities and towns shall typically follow and will include the entire rights of way of public streets, roads or highways. And, where right of way is insufficient to implement design standards or other such considerations, the Urban Growth Area boundary shall follow parcel boundaries or logical natural features.

UGA 1.3 Consider application of new Urban Growth Areas to Type I LAMIRDs based on adopted subarea plans to acknowledge existing densities of urban development and projected population growth and need for housing.

UGA 1.4 Allow for annual revisions to urban growth area boundaries based on patterns of development and protection of critical areas and ecosystems.

UGA 1.5 Prioritize amendments to urban growth boundaries where transportation systems have adequate capacity to accommodate anticipated growth or impacts to transportation systems can be mitigated concurrently with development.

UGA 1.6 Evaluate the extent of available industrial and commercial land in Urban Growth Areas to provide goods and services to residents and visitors.

UGA 1.7 Consider the provision of greenbelt and open space areas, fish and wildlife habitat, migration routes, floodways, corridors associated with flooding rivers and related streams, and other environmentally sensitive areas when determining the land requirements for Urban Growth Areas.

UGA 1.8 Review land use maps and identify opportunities and barriers to responding to rapid population growth or decline, rebuilding housing and services after disasters, and other extreme climate impact scenarios.

UGA 1.9 Prioritize amendments to UGA boundaries where adequate public services and facilities are present, or can be provided, concurrently with development.

UGA 1.10 Encourage infill development that promotes pedestrian friendly forms and higher density zoning that promotes pedestrian friendly forms where services have already been provided and/or sufficient infrastructure capacity exists.

UGA 1.11 Prioritize wildfire resilient land use regulations in Urban Growth Areas located in the Wildland Urban Interface and Intermix, as defined by the State of Washington's Department of Natural Resources.

CITY URBAN GROWTH AREAS

UGA 2 Focus development in Urban Growth Areas with adequate public facilities and services.

UGA 2.1 Establish interlocal agreements or other procedures with cities to create compatible development regulations that will support the cities and county's goals and policies for urban development patterns.

UGA 2.2 Coordinate with cities for annexation of the Urban Growth Areas.

UGA 2.3 Allow infill development and higher density zoning where public facilities and services have already been provided or sufficient infrastructure capacity exists.

UGA 2.4 Encourage application of new urban growth areas to Type I LAMIRDs that have adequate public facilities and services for the projected population growth or where public facilities and services are planned over the next (6) six years.

URBAN RESERVE OVERLAY ZONES

UGA 3 Use the Urban Reserve Overlay Zone as a method to prepare for potential urban growth area expansions.

UGA 3.1 Apply urban reserve area overlays at sites well served by existing or planned transportation systems or adjacent to an existing Urban Growth Area.

UGA 3.2 Avoid including critical areas and resource lands within Urban Reserves to the maximum extent possible.

UGA 3.3 Classify lands within designated urban reserve area overlays as Rural or Resource lands that are subject to minimum lot size requirements that will not preclude more intensive future urban development.

UGA 3.4 Expand Urban Growth Areas to include urban reserves when necessary to provide sufficient land to accommodate the adopted 20-year population, housing and employment projections for that jurisdiction.

Joint Coordination for Urban Growth Area Planning

It is required by State Law to jointly coordinate urban growth areas between Cities and Counties.

Goals UGA 2 and UGA 3 are implemented through coordination efforts with the cities and counties through the Planned Growth Committee and other methods. These typically discussed annually unless during the periodic update.

These goals and policies are also reflected in the Countywide Planning Policies.

SMALL-TOWN URBAN GROWTH AREAS

UGA 4 Create vibrant city centers and corridors with complete streets and pedestrian oriented building forms.

UGA 4.1 Encourage a mix of affordable housing options adjacent to employment opportunities and near public transit stops.

UGA 4.2 Encourage mixed-use campus development along primary transportation corridors, near regional transit stops and at US Interstate I-5 interchanges.

UGA 4.3 Support long-term viability of Urban Growth Areas by maintaining public facilities and services.

UGA 4.4 Promote transit-oriented development near major transit stops.

UGA 5 Ensure the long-term economic sustainability of historic unincorporated small towns.

UGA 5.1 Plan, design and implement public facilities and services to support existing and new businesses.

UGA 5.2 Recruit industrial, commercial and tourism development that creates new jobs.

UGA 5.3 Grow a sustainable retail economic base focused around the primary transportation corridors.

UGA 5.4 Design streets to promote multimodal transportation.

UGA 5.5 Preserve the historic character of small towns by minimizing the visual impact of new larger-scale development.

UGA 5.6 Encourage and expand options for home-based businesses.

UGA 5.7 Promote local communities' events.

UGA Small Towns: Subarea Plans

UGA 4, 5, 6, and 7, establish broad goals and policies for urban growth areas Onalaska and Packwood defined as Small Towns on the Land Use Designation Map. However, Subarea plans have been adopted as part of this comprehensive plan that further establish detailed goals and policies to accommodate growth and housing and provide adequate services for the next 20-years. This is allowed under WAC 365-196-445 which allows subarea planning consistent with the Comprehensive Plan.

Adopted Subarea Plans As of 2025

Onalaska UGA Subarea Plan

Packwood UGA Subarea Plan

UGA 6 Support a diversity of housing options that are affordable for people working in and near unincorporated small towns.

UGA 6.1 Plan, design and implement public facilities and services necessary to support middle housing and multifamily housing.

UGA 6.2 Support programs that reduce cost of maintaining existing housing stock.

UGA 6.3 Reduce regulatory barriers to subsidized housing options.

UGA 6.4 Manage short-term rentals to reduce the impact on available and affordable housing.

UGA 7 Promote complete streets, active transportation safety, and transit-oriented development within unincorporated small towns.

UGA 7.1 Coordinate with Washington State Department of Transportation to implement complete street policies within unincorporated small towns.

UGA 7.2 Increase transit services to unincorporated small towns and add stops near community assets such as senior centers, grocery stores, schools and doctor's offices.

UGA 7.3 Designate high-density residential areas within ½-mile of regional transit stops.

Illustration of land use and transportation patterns for small town urban growth areas.

MASTER PLANNED RESORTS

UGA 8 Encourage and plan for Master Planned Resorts throughout Lewis County in areas of significant natural amenities consistent with RCW 36.70A.360 and RCW 36.70A.362.

UGA 8.1 Support the designation of new Master Planned Resorts that provide access to unique outdoor recreational opportunities and that are better suited for a resort than for other rural land uses including forestry or agriculture.

UGA 8.2 Ensure that Master Planned Resorts are self-contained, provide adequate public facilities and services to serve the planned development and will not promote new urban or suburban development near the resort, except within existing Urban Growth Areas or LAMIRDs.

UGA 8.3 Encourage a mix integrated development including short-term visitor accommodations, conference facilities, commercial activities and residential uses associated with a range of indoor and outdoor recreational activities.

UGA 8.4 Preserve at least 40 percent of the land within the Master Planned Resort as open space, which may include outdoor recreational opportunities.

UGA 8.5 Allow development of the Master Planned Resort to be phased overtime, while encouraging continued forestry and agricultural uses to occur during the intervening periods.

UGA 8.6 Ensure transportation corridors that connect to nearby Urban Growth Areas or LAMIRDs can support additional traffic resulting from the Master Planned Resort.

Illustration of land use and transportation patterns for master planned resorts.

MAJOR INDUSTRIAL DEVELOPMENTS

UGA 9 Authorize the siting of specific major industrial developments outside Urban Growth Areas when designed in accordance with relevant state and local requirements.

UGA 9.1 Locate industrial uses in area with adequate transportation and utility infrastructure.

UGA 9.2 Continue to monitor the need for industrial land and the availability of industrial sites within the Urban Growth Areas of Lewis County. Encourage potential industrial applicants to use the monitoring information to help meet the required standard in RCW 36.70A.365(h).

UGA 9.3 Use a master plan process to plan for phased development within the major industrial development area.

UGA 9.4 Avoid siting industrial uses in locations with significant critical areas to the maximum extent possible.

Rural Element

The Rural Element of Lewis County's comprehensive plan is a required component under RCW 36.70.070, which mandates counties to establish policies that guide rural development while preserving the area's character. This element focuses on maintaining the distinct identity of the county's rural communities while accommodating growth in a sustainable manner.

The rural character of Lewis County, as established in the Lewis County Vision section of the Comprehensive Plan, reflects the uniqueness of its Vital Small Communities, each with its own history and identity that should be preserved and celebrated. The county promotes infill housing development in designated areas to provide diverse housing opportunities while supporting locally owned businesses and vibrant, pedestrian-friendly main streets. Rural industries, including lumber mills, butchers, and farmers' markets, play a key role in sustaining local farms and forests.

Additionally, the county's proximity to Mt. Rainier and other renowned recreational sites is a major economic driver. Ensuring adequate police, fire, and emergency services, along with preparing for natural hazards such as floods and wildfires, is essential for community resilience. To accommodate growth, centralized water and sewer systems, improved transportation infrastructure, and expanded public transit options are necessary. Finally, broadband expansion is a priority to support economic opportunities, communication services, and emergency response capabilities. Through these strategies, Lewis County aims to preserve its rural identity while fostering sustainable growth and economic vitality.

Rural Element Requirements

The Rural Element is required to:

- Define and maintain rural character
- Establish rural land use patterns
- Preserve agricultural, forestry, and resource-based industries
- Limit residential and non-agricultural uses
- Provide rural services and facilities

RCW 36.70A.070 Mandatory Elements
WAC 365-196-405 Land Use Element
WAC 365-196-425 Rural Element

Planning for the Future

Lewis County's rural lands include a diversity of land uses and development patterns including agricultural, open spaces, recreational destinations, rural residential development and limited areas of more intense mixed-use, residential, commercial, industrial and recreational rural development.

Table 8. Rural Land Use Designations establishes a high-level policy framework to the scale, density, use, and form for the land use designations of rural areas, which taken together summarize rural character in Lewis County. Lewis County's Land Use and Development Regulations Code Title 17 further explains the allowances and limitations of these designations through the implementing zones.

Table 8. Rural Land Use Designations and Characteristics

	Rural Residential	Rural Small Communities (Type I LAMIRD)	Recreation and Tourism (Type II LAMIRD)	Rural Nonresidential (Type III LAMIRD)
Characteristics	Large lot residential areas with cottage industries and supportive agricultural uses	Clusters of commercial uses, supportive services such as post office, and a mix housing types including single family, accessory dwelling units, duplexes, townhomes and cottage housing, as well as apartments located above commercial establishments	Tourism and recreational service areas with a mix of RV parks, campgrounds, trails, boat launches and supportive commercial uses	Regional-scale industrial uses that support local economy and dense commercial uses focused around US Interstate 5 interchanges
Density	Very Low	Moderate	None	None
General Uses	Residential, Agricultural, Public Facilities, Open Space, Public Lands, Public Utilities, Public Services	Residential, Mixed-Use, Commercial, Public Facilities, Public Utilities, Public Services	Recreation, Open Space, Mixed-Use, Commercial	Industrial, Manufacturing, Commercial, Rural Facilities and Services
Implementing Zone(s)	Rural Development District (RDD), Park	Small Town Mixed-Use (STMU), Crossroads Commercial (CC), Rural Residential Center (RRC)	Tourism Service Area (TSA)	Rural Area Industrial (RAI), Small Town Industrial (STI), Freeway Commercial (FC)

Rural Land Use Characteristics in Implemeting Zones

Rural Residential Center (RRC)	Small Town Mixed Use (STMU)	Commercial Crossroads (CC)

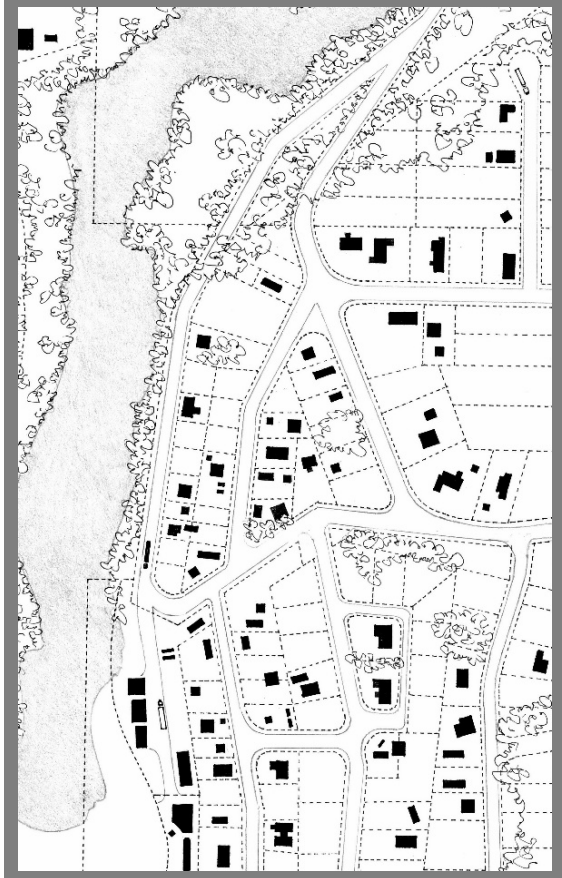
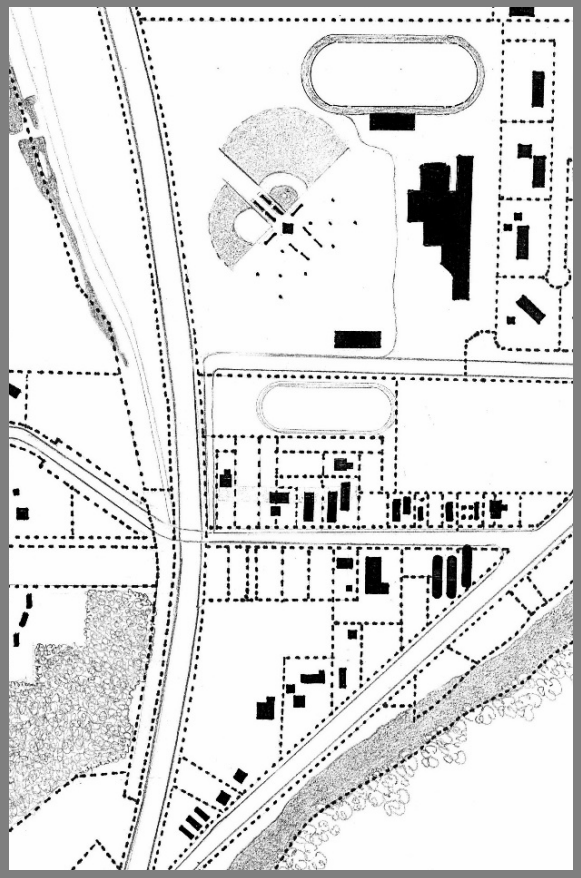
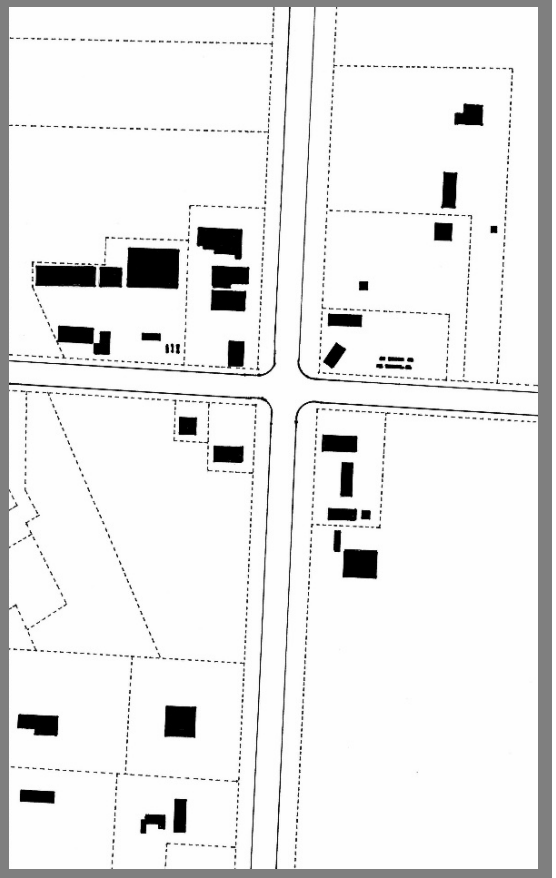

		

Illustration of land use and transportation patterns for Rural Residential Center (RRC).	Illustration of land use and transportation patterns for Small Town Mixed Use (STMU).	Illustration of land use and transportation patterns for Commercial Crossroads (CC).

Other Rural Land Use Designation Characteristics in Implementing Zones

Rural Development District	Tourism Services Areas	Freeway Commercial

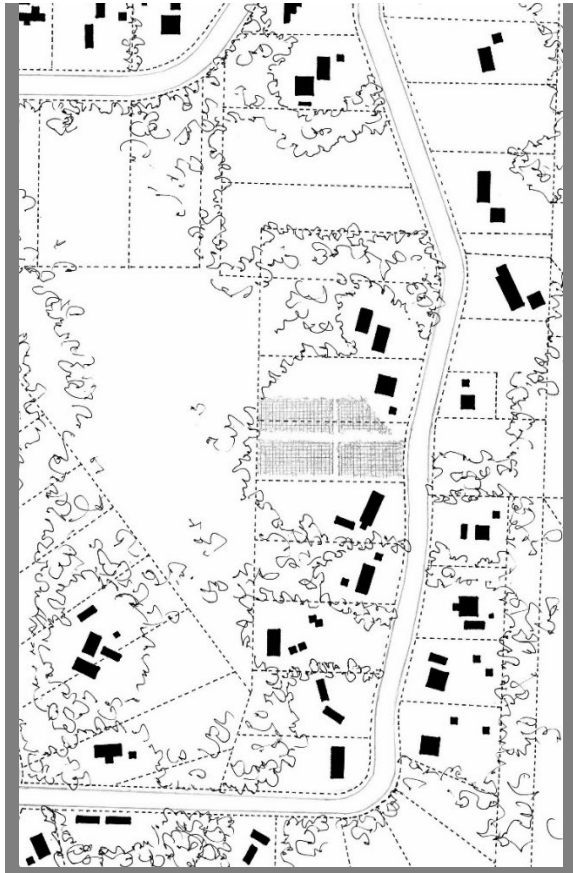


Illustration of land use and transportation patterns for Rural Development District (RDD).

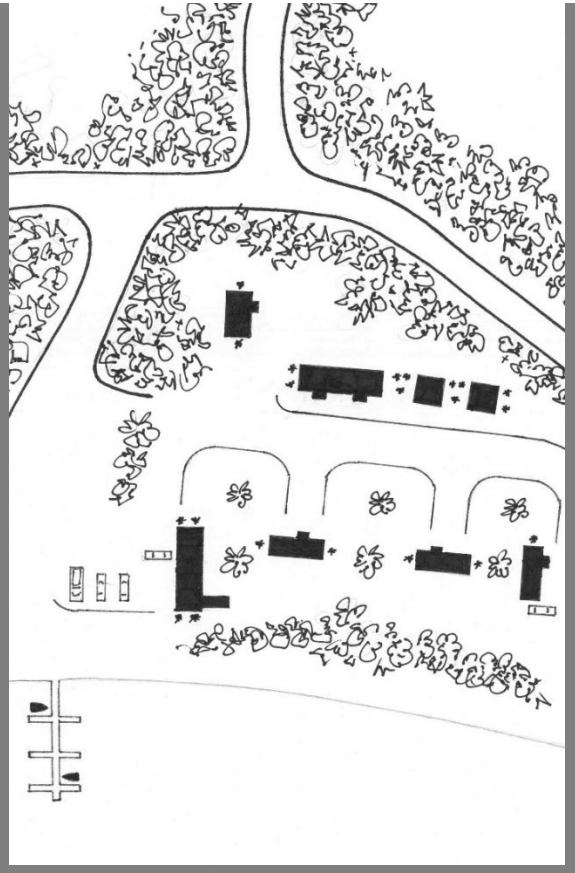


Illustration of land use and transportation patterns for Tourist Services Areas (TSA).

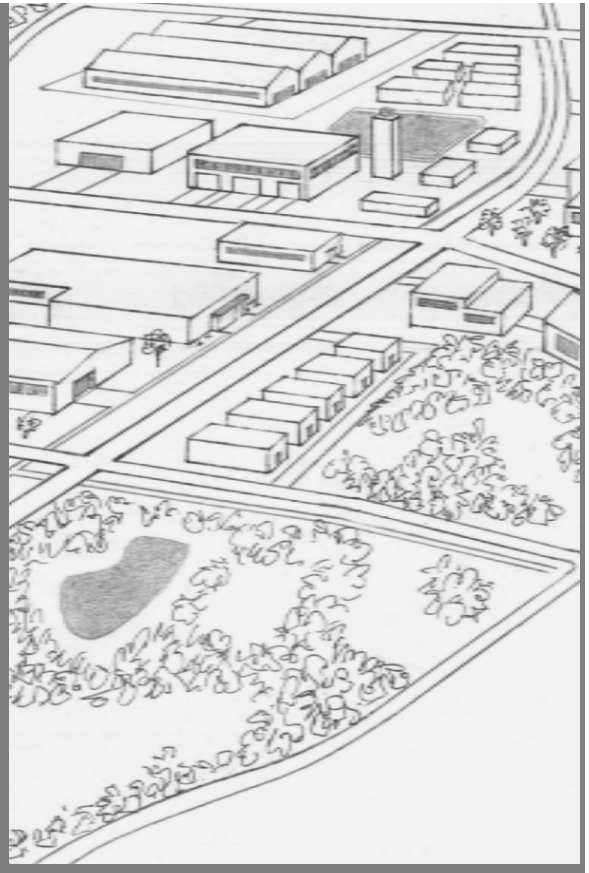


Illustration of land use and transportation patterns for Freeway Commercial (FC).

RURAL LANDS GOALS AND POLICIES

Goals: Future desired states to be achieved. All goals in the Comprehensive Plan are symbolized by a prefix denoting the element and then a whole number. For example, the first goal in the Rural Element is delineated RL 1.

Policies: Methods to achieve the associated goal. Policies are symbolized by a prefix denoting the element and then a decimal number denoting the goal and policy. For example, the first policy in the Rural Element is delineated with RL1.1.

RURAL CHARACTER

RL 1 Encourage rural development, outside of defined Urban Growth Areas and Resource lands, in a pattern and density that:

- Compliments rural character.
- Promotes the natural environment over the built environment.
- Supports the surrounding and prevailing land use pattern.
- Minimizes impacts to resource lands and critical areas.
- Assures the visual compatibility of rural development with the surrounding rural lands (including the preservation of expansive views of nature and natural resource lands).
- Does not create demands for urban services for county taxpayers to support.

RL 1.1 Consider Rural Development District (RDD), Rural Small Communities (Type I LAMIRDs), Recreational and Tourism Areas (Type II LAMIRDs) and Industrial and Commercial Areas (Type III LAMIRDS) as described in this section, as development types that are consistent with the rural character of Lewis County.

RL 1.2 Consider the small unincorporated communities and other Limited Areas of More Intensive Rural Development (LAMIRDs) as key elements of the rural character of Lewis County and as a tool to contain higher density development and to protect surrounding resource lands.

RL 1.3 Continue to zone rural lands for a variety of densities and uses. Consider land capability existing development characteristics proximity to rural facilities and other relevant factors in the zoning of land.

RL 1.4 Encourage rural clustering both at smaller scales (such as farm clusters) and larger scales as a means of balancing growth and the protection of natural resources.

RURAL ECONOMIC DEVELOPMENT

RL 2 Provide a diversity of employment options and increase the number of living wage jobs in Lewis County.

RL 2.1 Promote the development of a vital rural economy in Lewis County with jobs in agriculture, mining, timber production, home occupations, small businesses, ecotourism, recreation, energy production, agritourism, manufacturing, productions of goods and other cottage industries, such as breweries.

RL 2.2 Encourage home occupations that provide goods and services to rural areas.

RURAL SERVICES

RL 3 Ensure that rural development is provided with appropriate rural services and facilities.

RL 3.1 Ensure that public facilities and services are provided concurrent with development and at levels that support rural development and uses and do not promote low-density sprawl.

RL 3.2 Coordinate with special districts, including but not limited to water/sewer, fire and school districts, to incorporate adopted growth projections into district planning.

RL 3.3 Ensure that lots within new land divisions are appropriately sized and configured for private wells and wastewater treatment facilities (when those facilities will be used).

RURAL SMALL COMMUNITIES Type I LAMIRD

RL 4 Support the economic sustainability of small-scale commercial, residential and mixed-use areas designated as Type 1 LAMIRDs.

RL 4.1 Promote and grow businesses and industries that support the local economy and provide goods and services to rural areas.

RL 4.2 Encourage infill, redevelopment and new development that provides a diversity of affordable housing options including single family, accessory dwelling units, duplexes, townhomes and cottage housing, as well as apartments located above commercial establishments.

RL 4.3 Allow new development that is complimentary to existing development in terms of size and scale to existing development.

RL 4.4 Provide public facilities and services that support infill development, redevelopment and new development within the existing boundaries.

RL 4.5 Complete subarea plans for Type 1 LAMIRDs that contain historic downtowns that have a mix of existing uses and that are experiencing significant growth.

RECREATION AND TOURISM Type II LAMIRD

RL 5 Support existing and designated allow new Type 2 LAMIRDs with clustered small-scale recreation and tourist uses that rely on a rural location.

RL 5.1 Prohibit development that requires public facilities or services that are beyond what is available in rural areas.

RL 5.2 Promote and grow ecotourism and recreation as a vital part of the rural economy.

RL 5.3 In existing Type 2 LAMIRDs, encourage infill, redevelopment and new development that is complimentary in terms use, size and scale to existing recreation and tourism development.

RL 5.4 Designate new clustered recreational and tourist areas that are small-scale and rely on a rural location or natural amenities.

RL 5.5 Prohibit residential uses within Type 2 LAMIRDs, except for limited caretaker accommodations.

RL 5.6 Designate natural resource areas for active recreation while preserving the environmental features and functions.

RL 5.7 Designate and protect unique areas that have provided or could provide public access to nature.

RL 5.8 Provide limited improvements, such as bathrooms, trails and water access points, to manage and control human impacts.

RL 5.9 Actively maintain areas to encourage native plants and wildlife.

RURAL NONRESIDENTIAL Type III LAMIRD

RL 6 Support existing and designate allow new Type 3 LAMIRDs for small-scale isolated industrial uses, and associated commercial uses, to provide job opportunities to rural residents.

RL 6.1 Promote and grow small-scale industrial and commercial business as a vital part of the rural economy.

RL 6.2 In existing Type 3 LAMIRDs, encourage infill, redevelopment and new development that is complimentary in terms use, size and scale to existing industrial and commercial development.

RL 6.3 Designate new small-scale isolated industrial and commercial uses in rural areas located near major transportation facilities including freeways, highways, railroads and airports.

RL 6.4 Prohibit development that requires public facilities or services that are beyond what is available in rural areas.

RL 6.5 Prohibit residential uses within Type 3 LAMIRDs

RURAL RESIDENTIAL

RL 7 Encourage development that is consistent with existing rural character.

RL 7.1 Maintain lot patterns that are typically (5) five acres in size or larger, except in subareas where the historic lot patterns may be smaller scale.

RL 7.2 Allow a wide range of uses including residential, farming, forestry, cottage industries, home occupations and similar uses the do not rely on urban level of services.

RL 7.3 Encourage farming and forestry uses within the Rural Development District (RDD).

RL 7.4 Allow for clustered development to encourage preservation of open space.

NATURAL RESOURCE LANDS GOALS AND POLICIES[17]

NATURAL RESOURCES LANDS

NRL 1 Maintain agricultural uses, commercial timber production, and mineral resource extraction as fundamental components of the character of Lewis County.

NRL 1.1 View agricultural, timber, and mineral resource lands as an essential feature of Lewis County's identity, contributing to local employment and the retention of natural character.

NRL 1.2 Strive to promote the economic viability of natural resource industries.

NRL 1.3 Encourage resource uses, particularly agricultural and timber uses, in all rural areas.

NRL 1.4 Ensure that the Lewis County Resource Lands Ordinance is consistent with the provisions of this plan.

AGRICULTURAL RESOURCE LANDS

NRL 2 Designate lands that are suitable for long-term natural resource use as resource land.

NRL 2.1 Promote the long-term economic viability of agricultural resource lands.

NRL 2.2 Designate agricultural lands of long-term commercial significance as follows:

1. Identify those lands that are primarily devoted to the commercial production of agricultural products enumerated in RCW 36.70A.030(2) of the Growth Management Act.

2. Identify lands that are classified as having prime farmland soils that occupy a significant portion of the parcel. Prime farmland soils include soils classified by National Resource Conservation Service (NRCS) as "prime farmland," "prime farmland if drained," "prime farmland if drained and either protected from flooding or not frequently flooded during the growing season," and "prime farmland if irrigated." Lands with soils that are classified by NRCS as "prime farmland if drained" or "prime farmland if irrigated" are presumed to be drained or irrigated in the absence of evidence to the contrary.

3. Identify lands that have non-soil dependent agricultural uses such as poultry, Christmas tree, horticulture, and fish hatchery operations.

4. Consider the combined effects of proximity to population areas and the possibility of more intense uses of the land as indicated by:

- The availability of public facilities.
- Tax status.
- The availability of public services.
- Relationship or proximity to urban areas.
- Predominant parcel size (20 acres is considered a suitable predominant parcel size for commercial agriculture).

[17] *For additional information regarding state regulated natural resource lands see WAC 365-196-480.*

- Land use settlement patterns and their compatibility with agricultural practices.
- Intensity of nearby land uses.
- History of land development permits issued nearby.
- Land values under alternative uses.
- Proximity of markets.

NRL 2.3 Encourage the continuation of non-soil dependent agricultural activities through development regulations and, where appropriate, the designation of the land as agricultural land of long-term commercial significance.

NRL 2.4 Allow uses that are complementary with agricultural production on agricultural resource lands.

NRL 2.5 Where possible, establish provisions to allow landowners the opportunity to redesignate portions of their property that contain poor soils or are otherwise not suitable for agricultural purposes.

NRL 2.6 Continue to allow landowners the opportunity to request zoning changes to agricultural resource lands that have been designated in error or based on incorrect information.

FORESTRY RESOURCE LANDS

NRL 3 Continue to designate large blocks of Forest Resource Land in Lewis County.

NRL 3.1 Utilize the following factors to classify forest resource land:

A. Forestlands of Long-Term Commercial Significance: Designate forests with a predominance of forest land grade 2 and forest land grade 3 (see Table **9**. Washington State Private Forest Land Grades), and a minimum block size of 5,000 contiguous acres as forest lands of long-term commercial significance. Additionally, include all federally owned lands that are managed for their forest resources in the designation.

B. Forestlands of Local Importance: Designate forestlands with the general attributes of Forestlands of Long-Term Commercial Significance, but with less than the required minimum of 5,000 contiguous acres, as Forestlands of Local Importance. Forestlands of Local Importance may only be designated by an "Opt-In" process and must generally be a minimum of 20 acres to be considered. Landowners petitioning to opt-in must commit that the property will remain in the designation for a minimum of 10 years.

TABLE 9. WASHINGTON STATE PRIVATE FOREST LAND GRADES

Species	Growth Potential*	Land Grade**
Douglas Fir	136 feet and over	1
	118-135 feet	2
	99-117 feet	3
	84-98 feet	4
	Under 84 feet	5
Western Hemlock	136 feet and over	1
	116-135 feet	2
	98-115 feet	3
	83-97 feet	4
	68-82 feet	5
	Under 68 feet	6
Red Alder	117 feet and over	6
	Under 117 feet	7

**On a fifty-year basis*

***Land Grade 1 = highest; Land Grade 7 = lowest*

NRL 3.2 Expand efforts for education to forest landowners on County rules, buffers for conversions, and other climate related mitigation strategies adopted by the County.

MINERAL RESOURCE LANDS

NRL 4 Classify Mineral Resource Lands in accordance with the standards of the Growth Management Act, following WAC 365-190-070

NRL 4.1 Designate currently permitted surface mining operations as Mineral Resource Lands of Long-Term Commercial Significance[18].

NRL 4.2 Allow the designation of new Mineral Resource Lands as part of a land use application process.

NRL 4.3 Continue to review the latest information regarding the availability of mineral resources in Lewis County and conduct updates to the mineral resource land designations when necessary.

RIGHTS OF RESOURCE LANDOWNERS

NRL 5 Ensure that county policies support property owners that seek to utilize Natural Resource Lands.

NRL 5.1 Continue to protect the interests of landowners who want to utilize the natural resources on their property.

NRL 5.2 Ensure land use activities within or adjacent to Natural Resource Lands are sited and designed to minimize conflicts with the management of the resources and/or other activities on the land.

NRL 5.3 Ensure that new incompatible land uses are appropriately buffered from existing agricultural, forestry, or mineral resource lands.

NRL 5.4 Minimize the possibility that resource management activities, performed in accordance with county, state, and federal laws, are subject to legal action as public nuisances.

ECONOMIC IMPACTS

NRL 6 Strive to minimize the economic impacts of resource land designation for landowners.

NRL 6.1 Encourage Forest and Agricultural Resource Lands to be placed in timber and current use property tax classifications consistent with RCW 84.28 (Property Taxes – Reforestation Lands), 84.33 (Property Taxes – Timber and Forest Lands), and 84.34 (Property Taxes – Open Space, Agricultural, and Timber Lands – Current Use Assessment – Conservation Futures).

NRL 6.2 Discourage the establishment or expansion of special purpose taxing districts and local improvement districts on lands designated for natural resource use.

NRL 6.3 Allow additional land use activities on resource lands, including small business and agritourism ventures, so long as the uses do not jeopardize the long-term viability of the resource use or occur in a manner inconsistent with rural character.

ENVIRONMENTAL IMPACTS

NRL 7 Ensure resource activities protect the environment.

NRL 7.1 Work to ensure that agriculture (including ranching), forestry and mineral resource activities are conducted in a manner that

[18] As part of the 2017 Comprehensive Plan update, Lewis County reviewed the sufficiency of the mineral resource land designation, and the adequacy of mineral resources in Lewis County for future needs. A key component of this review was the consultation of the "Rock Aggregate Resource Inventory Map of Lewis County, Washington" by Daniel Eungard dated July 2015. This report states that at the current yearly per capita usage and total permitted aggregate supply, "Lewis County has a maximum of 45years (until 2060) of accessible aggregate." Given this finding, no change to the existing mineral resource classification was considered necessary.

minimizes their adverse impacts on water quality, habitat, and other environmentally sensitive areas.

NRL 7.2 Cooperate with appropriate agencies to confirm that mineral extraction sites are restored in a manner consistent with Washington State and Lewis County laws and regulations.

NRL 7.3 Strive to implement a voluntary stewardship program to regulate critical areas on agricultural lands.

NATURAL ENVIRONMENT GOALS AND POLICIES

SCENIC BEAUTY

NE 1 Preserve the natural and scenic beauty of Lewis County and minimize the impact of development on the county's environmental resources.

NE 1.1 Encourage development to occur in areas with few environmental hazards to minimize the loss of natural resources due to urbanization and the loss of capital investment and life due to natural disasters.

NE 1.2 Locate new development in areas that have minimal environmental constraints (e.g., soils, steep slopes, bedrock, water table, and flood prone lands).

NE 1.3 Preserve hazardous areas (that are subject to geologic and/or flood hazards) as open space wherever possible.

NE 1.4 Encourage the preservation of natural buffers along the county's rivers, lakes and streams.

NE 1.5 Encourage the use of alternative, cleaner burning fuels and other sources of energy.

NE 1.6 Establish educational programs that address the impacts of wood burning on Lewis County's air.

WATER QUALITY AND QUANTITY

NE 2 Preserve and enhance the quality and quantity of water in Lewis County.

NE 2.1 Encourage development on septic systems to occur in areas with few soil limitations for drain fields to help prevent the contamination of groundwater supplies.

NE 2.2 Nurture the establishment of public education campaigns, septic replacement efforts, and/or septic operation and maintenance programs where surface water bodies are impacted by excess nutrients (as a result of septic systems).

NE 2.3 Encourage developments that are located near surface waters to minimize their impact on water supplies through increased setbacks, buffering and other mitigation techniques.

NE 2.4 Encourage intensive livestock operations to locate in areas with less productive soils and low potential for ground and surface water contamination.

GEOLOGIC HAZARDS[19]

NE 3 Maintain the quality of the county's environmentally sensitive critical areas.

NE 3.1 Reduce risk to life and property from hazards associated with development in geologically hazardous areas.

NE 3.2 Utilize the following measures, among others, to reduce the risk to life and property from geologically hazardous areas:

• Prohibiting, discouraging, and/or mitigating development in areas of steep slopes or other areas with high potential for geological hazards.

[19] *For additional information regarding statewide geologic hazard data and geologic planning refer to WAC 365-190-120 and visit the Washington Department of Natural Resources Geologic Planning website.*

- Limiting the removal of vegetation during development to reduce the impacts of stormwater runoff and erosion.
- Requiring geotechnical studies to determine construction methods and technologies necessary to further public safety in geologically hazardous areas, including landslide areas and steep slopes.
- Utilizing development design and construction technology appropriate to the soil limitations of the particular site in geologically hazardous areas.
- Replanting disturbed hillsides.

FLOOD HAZARDS

NE 4 Ensure the protection and restoration of streams, wetland, riparian zones, and floodplains to achieve healthy watersheds that are resilient to climate related hazards.

NE 4.1 Continue to revise wetland maps as new information becomes available and seek data for accurate flood models, especially for the Chehalis Basin and sub-basins.

NE 4.2 Consult available wetland maps to determine if a proposed development will potentially impact a wetland. Where a wetland impact may occur, require developers/property owners to perform a wetland delineation and mitigate any impacts that may occur as a result of the proposal.

NE 4.3 Require mitigation sequencing (avoidance, minimization, and mitigation) in the development of wetland mitigation plans.

NE 4.4 Promote the clustering of homes and development away from wetlands whenever new projects are proposed. Utilize flexible approaches with regard to allowed densities to permit the maximum flexibility in the design of the proposed projects.

AQUIFER RECHARGE AREAS

NE 5 Protect aquifer recharge areas from floodwater contamination, wildfire, and hazards exacerbated by climate to help ensure a long-term, high-quality supply of water for Lewis County residents, especially rural property owners in.

NE 5.1 Encourage the infiltration of water into the soil near where it falls to help replenish groundwater supplies.

NE 5.2 Continue to apply standards and policies that limit unneeded impervious surfaces, especially in areas of critical aquifer recharge.

FLOOD MITIGATION

NE 6 Protect life and property from increasing flood hazards worsened by climate.

NE 6.1 Support efforts to implement the Chehalis Basin Strategy to limit impacts associated with Chehalis River flooding, as well as other local flood hazard reduction projects.

NE 6.2 Prioritize land uses such as forestry, agriculture, public recreation, and water dependent uses in areas subject to flooding.

NE 6.3 The expansion of an Urban Growth Area is prohibited into the one-hundred-year floodplain of any river or river segment that: (i) is located west of the crest of the Cascade mountains: and (ii) has a mean annual flow of one thousand or more cubic feet per second as determined by the department of ecology, see other exceptions in 36.70A.110(10).

NE 6.4 Evaluate areas with potential for permanent flooding and extreme heat and implement measures that protect public health from arthropod disease vectors and zoonotic disease reservoirs due to climate.

NE 6.5 Prohibit development within floodways, unless a hydraulics and hydrology study shows that the property is not within a floodway or will not impact the pre-project base flood elevations, floodway elevations or floodway data widths.

NE 6.6 Utilize Lewis County flood standards to encourage developments to avoid damage from floods and include compensating design features.

NE 6.7 Coordinate with the Office of Chehalis Basin and reviewing the Aquatic Species Restoration Plan (ASRP) to promote restoration of anadromous fish habitat.

NE 6.8 Coordinate with Local Actions Non-Dam Alternative (LAND) team and use resources like the technical assistance for flood related development codes.

NE 6.9 Continue to explore expansion of green infrastructure opportunities to mitigate flood hazards.

NE 7 Retain the flood storage and transmission capacity of rivers and streams.

NE 7.1 Prohibit fill in wetlands and discourage fill elsewhere in the floodplain. Where filling is permitted, the carrying capacity and storage of the streams shall be retained.

NE 7.2 Continue to regulate flood hazard areas in accordance with LCC 15.35, 17.38.

CRITICAL AREA PROTECTION

NE 8 Ensure the protection and restoration of critical areas to achieve healthy watersheds that are resilient to climate.

NE 8.1 Encourage private forest landowners to increase the climate resilience of forests and streams on their lands.

NE 8.2 Implement actions identified in restoration and salmon recovery plans to improve the climate resilience of streams and watersheds.

NE 8.3 Implement and encourage measures to reduce sedimentation in streams resulting from wildfire damage and the associated impacts of landslides and flooding.

NE 8.4 Create and support natural resource management plans that address existing stressors, consider climate impacts, emphasize taking a precautionary approach to reduce risk of environmental harm, and guide adaptive management for streams, riparian zones, estuaries, wetlands, and floodplains.

NE 8.5 Ensure no net loss of ecosystem composition, structure, and functions, especially in Priority Habitats and Critical Areas, and strive for net ecological gain to enhance climate resilience.

NE 8.6 Evaluate the use of beavers as an adaptation strategy for addressing climate impacts on water quality, streamflow volume, and riparian habitat, and work with partners to develop recommendations on how and where beavers can be incorporated strategically.

NE 8.7 Restore and maintain critical areas and open space areas to maximize the climate resilience benefits they provide.

WILDLIFE

NE 9 Protect and enhance critical resources and habitats.

NE 9.1 Use Best Available Science to preserve and enhance resources for anadromous fish and other local endangered, threatened or sensitive species.

NE 9.2 Ensure the preservation of the functions and values of critical resources, including threatened and endangered species and habitats, through strategies such as:

- Public education about the value of the resource or species.
- Support of reasonable community, non-profit, or government efforts to conserve the species or habitat.
- Monitoring of ongoing research about the species.
- Encouragement of landowners to explore potential site design options to protect the species or habitat.
- Establishment of new regulations (if necessary).

NE 9.3 Strive to promote the restoration of anadromous fish habitat, especially in areas with threatened fish stocks, following best available science.

NE 9.4 Utilize projects from the Lewis County Shoreline Restoration Plan, the Chehalis Basin Strategy Aquatic Species Restoration Plan, studies from the lead entities for salmon recovery, and other applicable reports to promote the restoration of anadromous fish habitat within Lewis County.

WILDFIRES

NE 10 Reduce and mitigate the risk to lives and property posed by wildfires by using land use planning tools and through wildfire preparedness and fire adaptation measures.

NE 10.1 Identify and implement strategies for reducing residential development pressure in the wildland urban interface.

NE 10.2 Implement the Hazard Mitigation Plan and the Community Wildfire Planning for the future.

SHORELINES

NE 11 Manage shorelines that are subject to the state Shoreline Management Act in accordance with the Lewis County Shoreline Master Program.

NE 11.1 Adopt the policies of the Lewis County Shoreline Master Program by reference as part of this Comprehensive Plan.

STORMWATER

NE 12 Strive to ensure that stormwater runoff does not contribute to larger flooding issues or pollute ground or surface waters.

NE 12.1 Work to ensure that existing and new development:

- Maximizes on-site infiltration.
- Avoids altering natural drainage systems.
- Does not increase peak stormwater runoff.
- Minimizes increases in the overall quantity of runoff.

NE 12.2 Verify that increased stormwater runoff from new development will not adversely impact other properties.

NE 12.3 Ensure that land use activities and septic tank discharges do not pollute stormwater runoff that degrades surface or groundwater.

NE 12.4 Promote educational outreach about stormwater management. Focus on strategies that address:

- Potential water quality impacts (including increased sediments, nutrients, oils and grease, pathogens, and trash).
- Potential water quantity impacts (including increased runoff, reduced infiltration, decreased groundwater recharge, and alterations to stream geomorphology).

NATURAL OPEN SPACE

NE 13 Ensure the protection and preservation of streams, riparian zones, wetlands, floodplains, open lands, and habitat areas for the benefit of the county's indigenous fish and wildlife, healthy watersheds resilient to climate, and the quality of life of county residents.

NE 13.1 Promote the human use of open space lands in a manner that balances outdoor recreation, the preservation of fish and wildlife habitat, and the protection of watershed function

Housing

Introduction

The housing policies established in this element are intended to accommodate and provide housing for all incomes in Lewis County. The policies are implemented through development regulations in Lewis County's Land Use Code[20], through public works infrastructure projects and capital facilities management, and through housing programs with Lewis County Public Health and Social Services and other organizations.

Existing Conditions

Over 70 percent of the current housing stock in Lewis County is single-family residential. This includes Urban Growth Area – Small Towns, Onalaska and Packwood. The County's population allocation is by 2.0 percent of the total growth of Lewis County or 1,706 residents in twenty years. Translated to housing units this is 741 units, per new state requirements and guidance from the Department of Commerce. Refer to the community profile for a high-level summary of Lewis County housing data.

Planning for the Future

Overall, the plan reflects a strong focus on improving affordable housing for households earning below 50 percent of the area median income (AMI), with a smaller proportion of units for middle- and higher-income groups. Additionally, a portion of the total housing (38 units) will provide permanent supportive housing for those with special needs. Table 10. 2025 Housing Allocations adopted in the Lewis County Countywide Planning Policies the allocated households by income bracket adopted in the 2025 Countywide Planning Policies.

TABLE 10. 2025 HOUSING ALLOCATIONS ADOPTED IN THE LEWIS COUNTY COUNTYWIDE PLANNING POLICIES

Income Level	Total	Non-PSH	PSH	>30-50%	>50-80%	>80-100%	>100-120%	>120%
All Unincorporated	741	310	185	130	73	28	10	5
Onalaska	58	4	2	12	24	16	0	0

Housing Element Requirements

The Housing Element is required to include the following:

- Inventory and analysis of existing and projected housing needs,
- Goals and policies for the preservation, improvement, and development of housing,
- Identification of land sufficient for housing; and
- Provisions for projected housing needs of all economic segments

RCW 36.70A.070 Mandatory Elements
WAC 365-196-410 Housing Element

[20] *Lewis County Title 17, Land Use and Development Regulations, 2024 https://www.codepublishing.com/WA/LewisCounty/html/LewisCounty17/LewisCounty17.html*

Packwood	121	13	9	18	56	25	0	0

Housing Strategy

To accommodate housing at all incomes, Lewis County intends to focus efforts to improve housing in the Onalaska and Packwood UGA. With the help of the subarea plans, it was adopted as part of the Comprehensive Plan.

Under the land use and zoning framework in the Onalaska and Packwood subarea plans it is estimated the following housing units can be provided at the following income levels.

Allocated v. Provided v. Surplus/Deficit	Area	Emergency Housing	Non-PSH*	PSH*	>30-50%	>50-80%	>80-100%	>100-120%	>120%	Total
Allocated	Onalaska	4	4	2	12	24	16	0	0	58
	Packwood	17	13	9	18	56	25	0	0	121
Provided	Onalaska	358					121		402	881
	Packwood	39				174*	696*		45	954
Surplus (Deficit)	Onalaska	312					105		402	819
	Packwood	0				118	617		45	780

The subarea plans have been drafted with the intent to provide subsidized housing in the RH and MU zones. It is the intent of Lewis County to provide affordable housing opportunities in the UGA Small Town housing zones RM and MU. See Title 17 of the Lewis County code for more details.

Lewis County Housing Initiative

The Lewis County Housing Initiative was started in 2020 with the directive to increase housing availability and affordability.

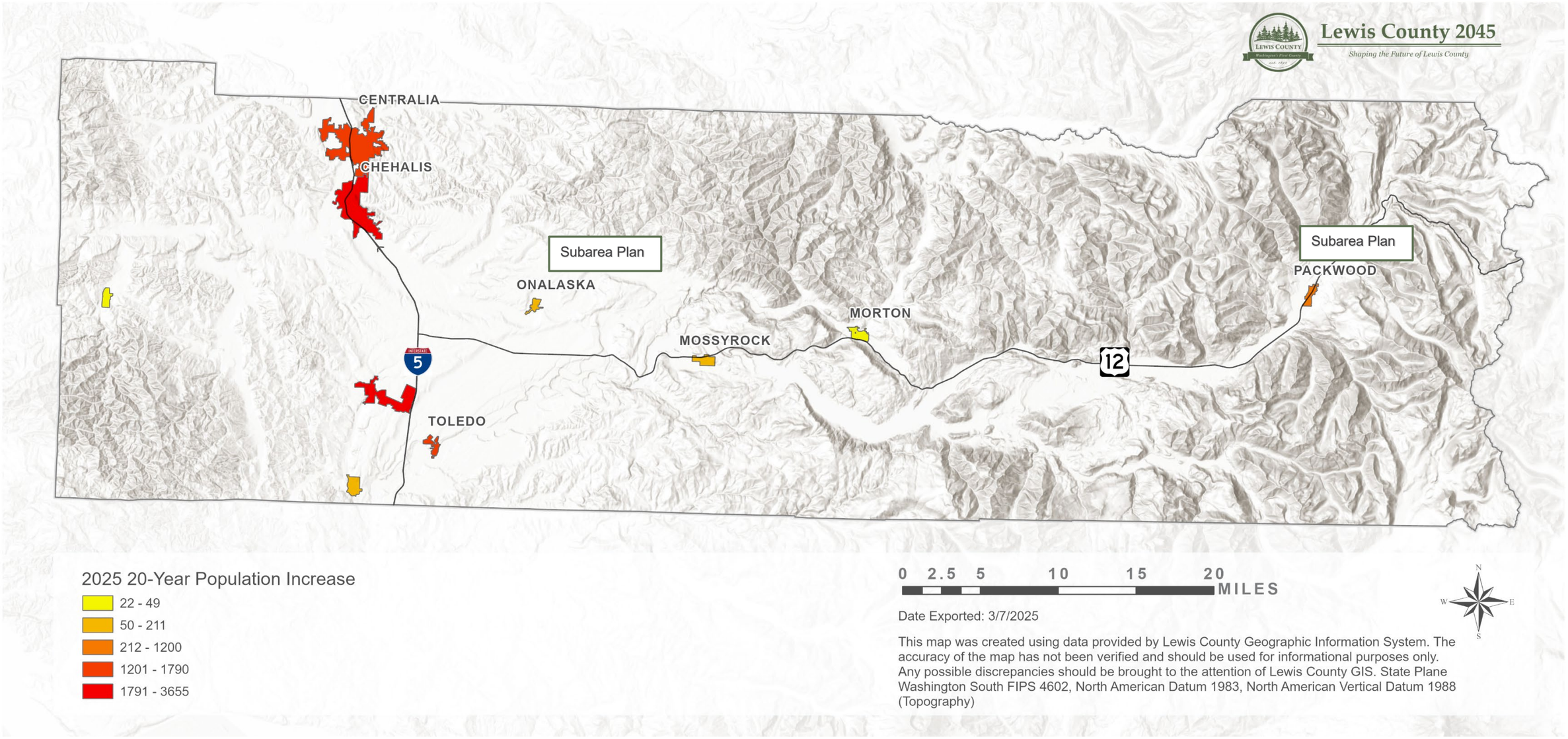
This initiative is a multi-step, countywide strategy that involves revising land use policy and regulations to allow for housing types, provide infrastructure to support new housing, and establish programs to facilitate housing for middle to low-income demographics.

Actions Established

- Night-by-night Shelter and Step-up Facilities
- Infrastructure Assessment
- Multi-Family Housing Proof of Concept
- Packwood Subarea Plan
- Packwood Sewer Project

Visit Lewis County's website for more information.

FIGURE 11. 20-YEAR POPULATION INCREASE



HOUSING GOALS AND POLICIES

Goals: Future desired states to be achieved. All goals in the Comprehensive Plan are symbolized by a prefix denoting the element and then a whole number. For example, the first goal in the Housing Element is delineated H 1.

Policies: Methods to achieve the associated goal. Policies are symbolized by a prefix denoting the element and then a decimal number denoting the goal and policy. For example, the first policy in the Housing Element is delineated with H 1.1.

HOUSING TYPES

H 1 Promote a variety of safe and decent housing types, neighborhood settings, and price ranges to meet the needs of all residents and income levels.

A diversity of housing includes detached and attached single family housing, accessory dwelling units, clustered housing, middle housing (e.g., triplex, quadplex, townhomes, cottage housing) senior housing, cohousing, condominiums, apartments and mixed residential/commercial uses. Prioritize a mix of housing options near employment centers and transit stops.

H 1.1 Plan for housing in rural areas, Limited Areas of More Intense Rural Development (LAMIRD) and Urban Growth Areas – Small Towns. Potential types of housing include detached and attached single family housing, clustered housing, moderate density housing options, like duplexes, senior housing, cohousing, condominiums, and mixed residential/commercial uses.

H 1.2 Encourage Accessory dwelling units (ADU), provided that development standards and design criteria are satisfied.

H 1.3 Permit manufactured housing in the same locations and at the same density as other housing, consistent with state law.

H 1.4 Promote flexibility in the permitting of farm housing units for farm employees and their families in agricultural areas and on working farms.

HOUSING NEAR FACILITIES

H 2 Ensure concentrations of housing units and special housing types, group homes and other unique occupancy conditions, are located close to transportation, employment, shopping, and daily activities, and adequate capital facilities and utilities are present for the dwellings.

H 2.1 Consider access to transportation and proximity to employment, shopping and community services in planning the location of new housing.

H 2.2 Address the impacts of new residential development on transportation infrastructure and other public facilities through the use of SEPA mitigation, development standards, concurrency requirements and/or other approaches.

H 2.3 Encourage the creation of group homes, foster care facilities and housing for other special needs populations near services and public transportation routes wherever possible.

H 2.4 Study housing needs and identify priority areas for housing types, emergency shelters, and temporary supportive housing for

rural populations, accounting for social service program requirements and efficacy.

H 2.5 Allow and encourage the creation of emergency housing, emergency shelters, temporary supportive housing near services and public transportation routes wherever possible.

HOUSING PRESERVATION

H 3 Work toward preservation and improvement of existing housing stock.

H 3.1 Lead a countywide analysis to study the rehabilitation and redevelopment, potential of the County's existing housing stock and the subsidized and low-cost non-subsidized housing that may be lost due to redevelopment deteriorating housing conditions and/or public policies and actions.

H 3.2 Encourage the rehabilitation of substandard housing and the maintenance of older housing that appears to be suited for restoration. Consider identifying priority areas for focused attention and resources.

H 3.3 Seek opportunities to identify, protect, and rehabilitate historic properties to meet housing goals.

HOUSING AVAILABILITY AND AFFORDABILITY

H 4 Provide housing options that are available and affordable to Lewis County residents.

H 4.1 Collaborate with local jurisdictions, non-profits, private developers and other agencies to maintain and enhance affordable housing options.

H 4.2 Work with the private sector, the Lewis County Affordable Housing Network, neighborhood groups, tribes and other affected citizens to facilitate the development of attractive, quality low and moderate-income housing.

H 4.3 Facilitate the development of low-income and special needs housing, through approaches such as:

- Developing an inventory of buildable lands in urban growth areas and Limited Areas of More Intensive Rural Development (LAMIRDs) where additional development could occur.
- Rezoning certain developable lands that have adequate facilities to accommodate additional growth.
- Working with housing advocates and providers to develop sources of funding and strategies to enable the production of affordable housing, including low-income tax credits, multifamily tax exemptions, bond issues and levies, and grants and loan programs.
- Promoting the use of surplus publicly owned vacant lands for special needs or transitional housing, where appropriate.
- Encouraging self-help housing efforts and programs such as Habitat for Humanity and the Community Action Council of Lewis, Mason and Thurston Counties.
- Participating in programs such as the Housing Trust Fund (HTF) to address extremely low income and special needs of housing.

H 4.4 Encourage the retention of existing subsidized housing.

H 4.5 Monitor the impacts of short-term rentals in the County and established policies and regulations.

H 4.6 Remove permitting or other regulatory barriers for construction of affordable housing.

HOUSING EQUITY

H 5 Provide appropriate housing options and programs throughout the community for all demographics and work to

remove barriers previously created through past policies or development regulations.

H 5.1 Areas identified as high risk of displacement should be further analyzed and supported through development regulations and programs.

H 5.2 Encourage housing opportunities for all citizens regardless of race, color, religion, sex, national origin, handicap disability, economic status, familial status, age, sexual orientation, or other discriminatory factors.

H 5.3 Explore ways to promote and adopt equitable development practices in programs and regulations.

H 5.4 Analyze health impacts when considering new areas for County growth, ensure to review health impacts by race.

H 5.5 Consider the demographic makeup of smaller areas in the community, like subarea plans, and collect engagement data from all races and ethnicities in the study area.

H 5.6 Consider cultural differences and cultural assets in neighborhood design.

H 5.7 Consider environmental justice and efforts to avoid worsening environmental health disparities when reviewing land use using considerations for housing growth.

HOUSING DEVELOPMENT

H 6 Plan future development in a manner which promotes quality neighborhood settings and environments.

H 6.1 Minimize residential/non-residential land use conflicts in unincorporated areas of Lewis County through the use of development and performance standards such as buffers and setbacks.

H 6.2 Design and site residential construction adjacent to or within designated natural resource lands in a manner that reduces potential land use conflicts.

GOVERNANCE

H 7 Regulations and permit processes promote and support development and remove unnecessary development.

H 7.1 Strive to improve permit processing services and process permits in a timely manner.

H 7.2 Where appropriate, reduce regulatory barriers and other requirements that add unnecessary costs and/or discourage affordable and market rate housing construction. Strategies to consider include the revision, replacement or elimination of regulations that cause higher than expected costs or extended time periods for the review of a permit.

Transportation

Introduction

The transportation policies established in this element provide guidance on the County's future goals for transportation. As of 2025, the County's priorities for transportation are to improve county roadways and facilities through the TIP and Capital Facilities Plan, improve resilience of facilities against natural hazards and increase transportation options for low-income residents like transit walking and biking.

Existing Conditions and Facilities

Some existing conditions have been highlighted in the element to understand the goals and policies. Other existing conditions for transportation are identified in the Capital Facilities Element, Appendix C Capital Facilities and Appendix D Transportation Technical Appendix.

Road Classification

Lewis County contains over 2,240 miles of roadways. These roads vary in character and the facilities can be categorized in a number of different ways. Among the methods include the Federal Functional Classification System and a classification based on the amount of freight moved along the roadways.

The Federal Functional Classification System breaks roadways into three major types: arterials, collectors and local roads, based on the function of the road.

If a roadway is intended to move traffic as smoothly as possible with the least amount of potential for conflicts (such as onramps or turns), the roadway is designated as an arterial. Interstate Highways, such as US Interstate I-5, are considered the most important type of arterial. A major arterial connects interstate highways to cities and counties. A minor arterial connects major arterials to collectors. Collector roads connect an arterial to a neighborhood area[21]. If a roadway is primarily intended to provide access to adjacent land uses, such as homes along a residential street, the roadway is classified as a local road.

Transportation Element Requirements

The Transportation Element is required to included:

- Land use assumptions
- Estimated traffic impacts
- Facilities and services needs
- An inventory of facilities
- Level of service standards
- State owned facilities
- Projected finances
- Multi-modal facilities
- (6) Six-year plan of projects
- Demand management strategies

For a full inventory of all facilities and the (6) six-year plan of transportation see the Capital Facilities Plan and Transportation Technical Appendix in the Appendices C and D.

RCW 36.70A.070 Mandatory Elements
WAC 365-196-430 Transportation Element

[21] Washington Department of Transportation, WSDOT Glossary, 2024

FIGURE 12. TRANSPORTATION NETWORK

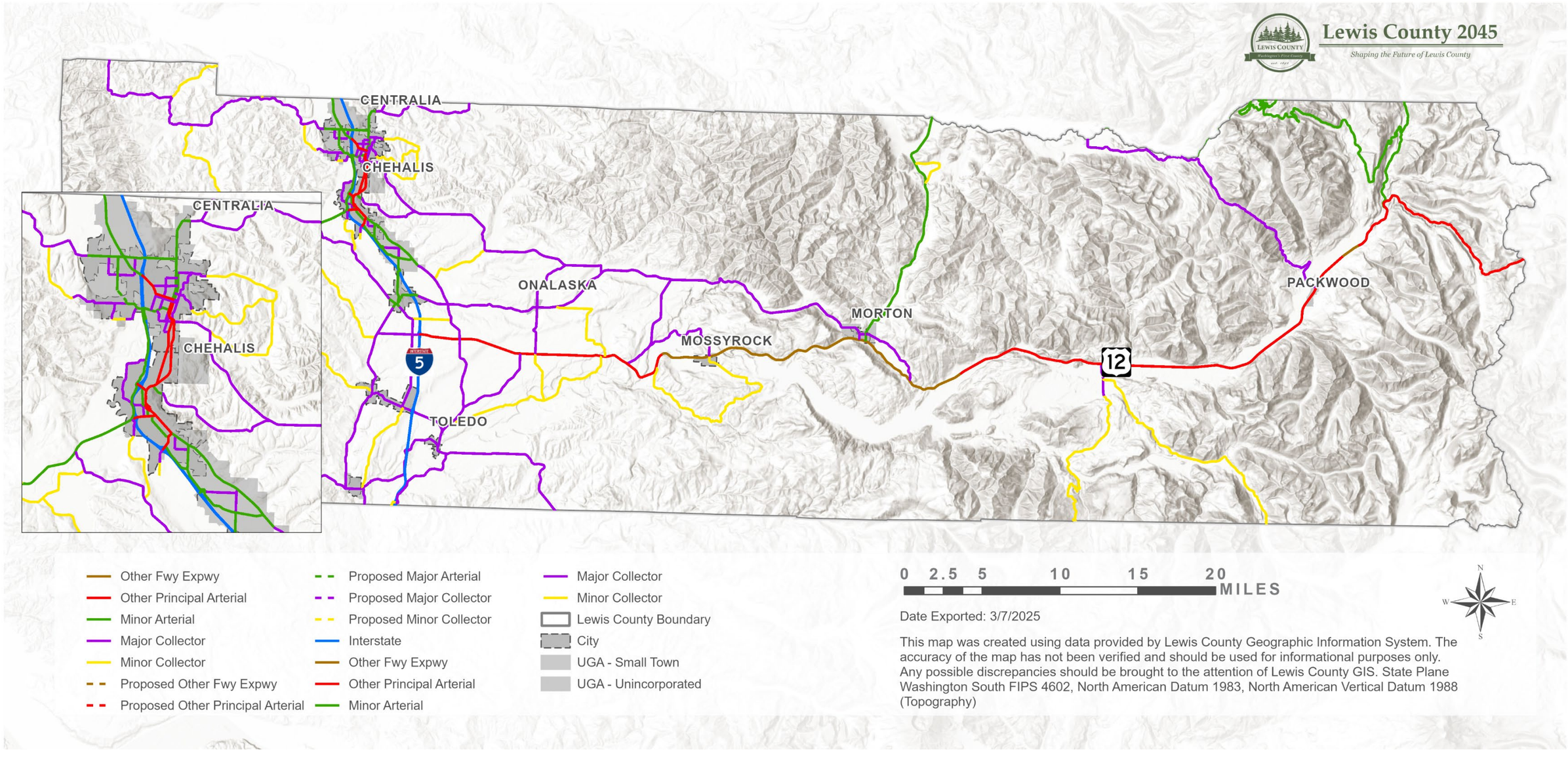
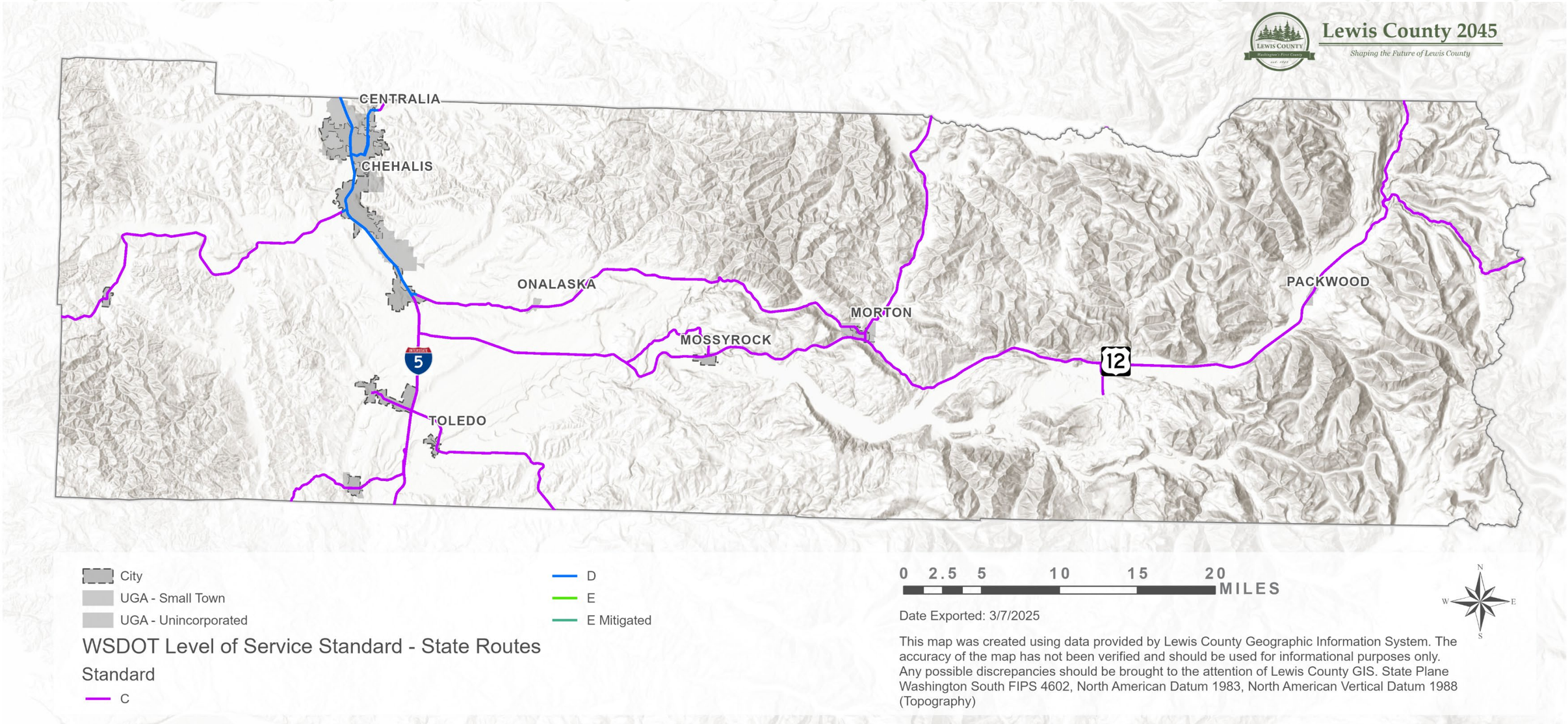


FIGURE 13. LEVELS OF SERVICE FOR STATE ROADS



Transit

All the transit lines in Lewis County are managed by Lewis County Transit. The transit system has six different transit lines that run between Centralia and Chehalis. The transit lines are labeled by colors on the transit website but the colors do not correlate to the map below. The brown route is the only transit line that provides an East West connector between Chehalis and Packwood. The following routes are managed by multiple transit agencies in the area including Twin Transit, Lewis Mountain Highway Transit, Grays Harbor Transit. The blue, yellow, and orange routes provide transportation to Centralia, Chehalis, and Grand Mound. The red line provides transportation around Chehalis. The brown, purple, green lines provide transportation between Centralia and further landmarks like Olympia, Kelso, and Packwood. The frequency of these stops changes annually.

Visit the *Lewis County Transit website* for more information. See the technical appendix for the full list of transit facilities.

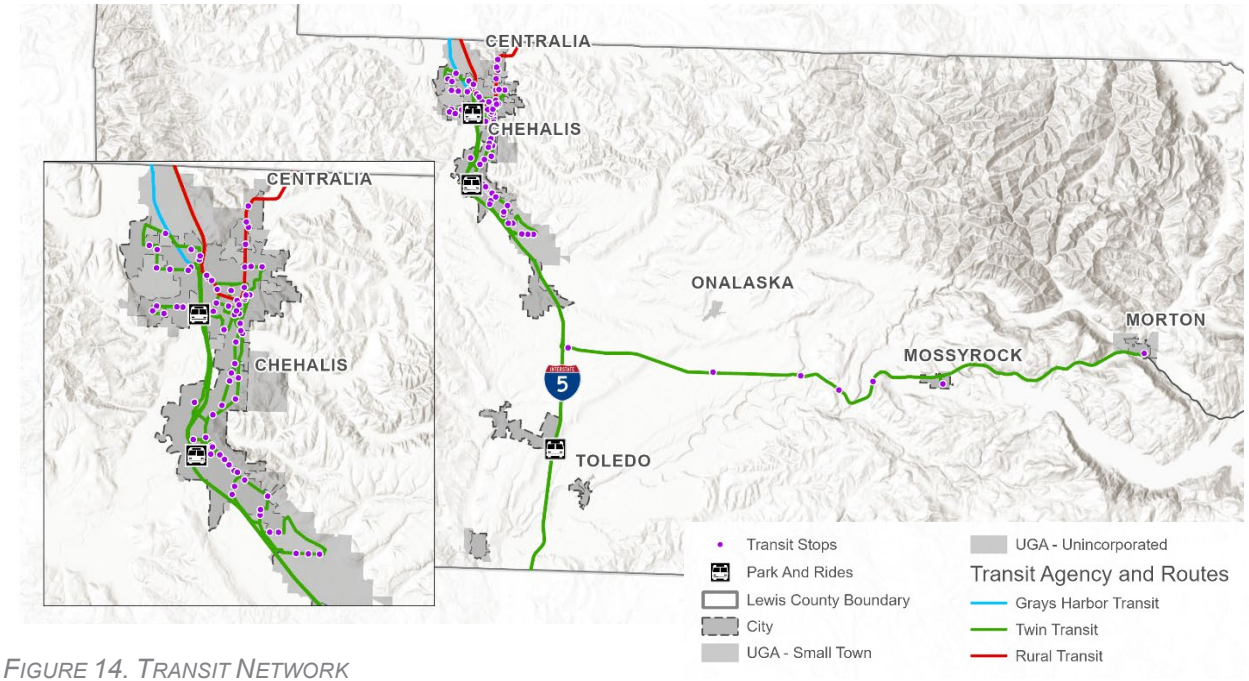


FIGURE 14. TRANSIT NETWORK

Transportation Coordination

Agency Coordination

Lewis County relies on several other agencies for proper coordination of transportation facilities. See the technical appendix for all organizations and their facilities.

Land Use Coordination

It is required that transportation facilities are coordinated between jurisdictions and agencies and are consistent with existing and future land uses. To facilitate coordination the growth and housing allocations that impact transportation facilities are established through the Planned Growth Committee which assembles all jurisdictions within the County to appropriately address where adequate facilities can be provided.

If facilities cannot be provide provided where housing or growth is allocated, the Planned Growth Committee can reassess and reconcile growth targets that can be accompanied by financially feasible capital facilities.

Rail and Freight

Lewis County is located between the two largest metropolitan areas in the Pacific Northwest, Portland and Seattle. It provides several critical routes for rail and freight. The rail line follows US Interstate I-5 and runs North and South on the western side of Lewis County. Freight lines run east-west and north-south across the County between all urban growth areas, municipalities, and other smaller rural population areas, like Mineral.

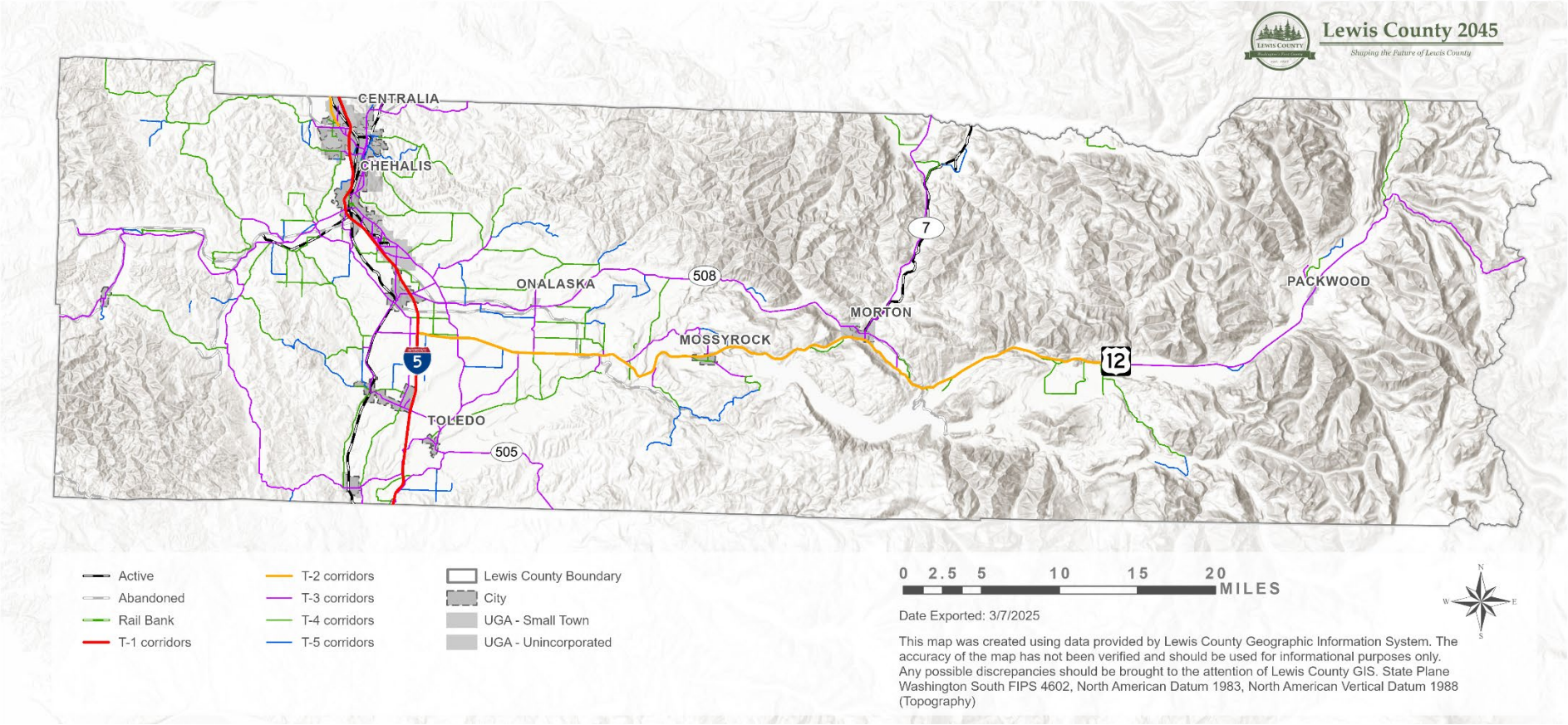


FIGURE 15. RAIL AND FREIGHT ROUTES

Airports

Lewis County is home to four airports that play a critical role in transportation, emergency response, and economic development. These airports include Chehalis-Centralia Airport, located between the cities of Centralia and Chehalis; Ed Carlson Memorial Field – South Lewis County, situated north of Toledo; Strom Field in Morton; and Packwood Airport in Packwood. These facilities provide essential connectivity for residents, businesses, and emergency services, supporting aviation-related commerce, tourism, and disaster response capabilities. Given their significance, resource planning and Capital Facilities Plan must ensure these airports are maintained and developed in alignment with county growth and infrastructure needs. To facilitate the effective administration of these airports, Lewis County has adopted an Airport Obstruction Overlay Zoning (Chapter 17.80 of the Lewis County Code), which regulates building heights, land uses, and other factors to ensure airspace safety and compatibility with surrounding development. Packwood airport is susceptible to increased riverine flooding, Toledo and Chehalis-Centralia airport from wildfire i.e., smoke, ash/debris, etc. due to location refer to the Climate Memo B for data sources. Recommended policy identifies methods to increase or maintain operational efficiencies and sustained revenue.

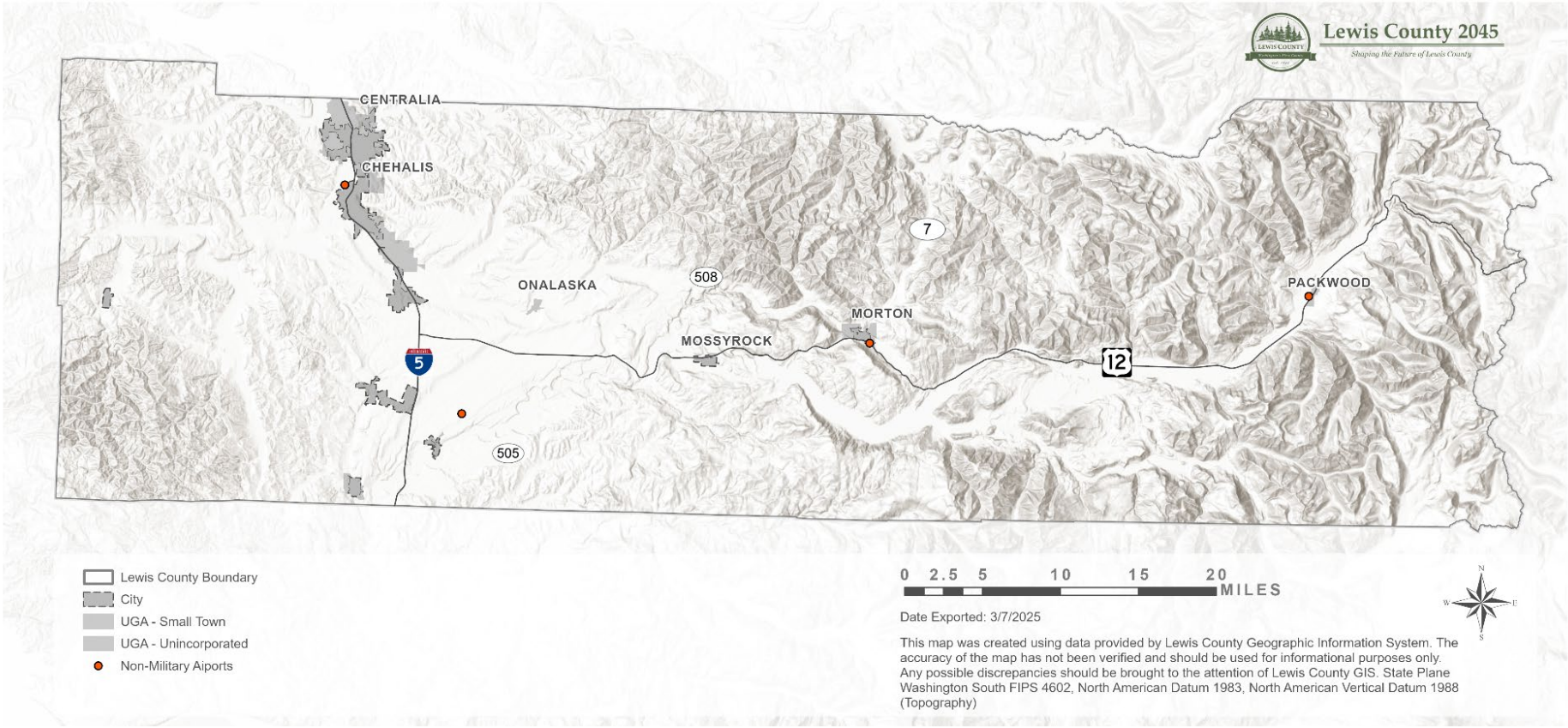


FIGURE 16. AIRPORTS

Levels of Service (LOS)

Lewis County utilizes Level of Service to evaluate the capacity of road segments, intersections and multi-modal transportation facilities. This measure considers the amount of delay or congestion experienced by motorists as they pass through intersections and travel along a road.

Though Level of Service is a qualitative measure of traffic conditions, the analysis is based on quantitative indicators, including the time required to wait at an intersection or the overall congestion of a road.

To evaluate the Level of Service along road segments, the county utilizes the Volume to Capacity ratio (V/C). This measurement considers the overall capacity of the segments, and the volumes that exist or are likely on the facility. When a road segment has sufficient capacity for the traffic it handles (i.e. the road is not full), the Level of Service is high, traffic flows freely and overall driver comfort is maximized. When the volumes of a road approach the capacity of the facility, the LOS decreases, the road is congested, and drivers are forced to slow and/or wait in traffic.

As of 2025, all jurisdictions are required to address multimodal transportation networks and not only vehicle transportation when planning for growth and housing. To address these new requirements, jurisdictions are required to establish new levels of service multimodal transportation.

Area Classifications

Area classifications are as follows, recommended from WSDOT:

- Rural: 0-4 people and/or jobs per acre. No existing fixed-route transit service.
- Suburban: 4-8 people and/or jobs per acre, or, 1-4 people and/or jobs per acre if there is any fixed-route transit service.

LOS	Characteristics of Traffic[22]	Volume to Capacity Ratio
A	Free flow, low volumes and densities. Drivers can maintain their desired speeds with little or no delay and are unaffected by other vehicles.	*Less than 0.60*
B	Reasonably free flow, operating speeds beginning to be restricted somewhat by traffic conditions. Drivers still have. reasonable freedom to select their speed.	*0.60-0.70*
C	Speeds remain near free flow, but freedom to maneuver is noticeably restricted.	*0.70-0.80*
D	Speed begins to decline with increasing volume. Freedom to maneuver is further reduced, and the traffic stream has little space to absorb disruptions.	*0.80-0.90*
E	Unstable flow with volume at or near capacity. Freedom to maneuver is extremely limited, and level of comfort. afforded to the driver is poor.	*0.90-1.00*
F	Breakdown in flow. Both speeds and volumes can drop to zero.	*Above 1.00*

[22] *From Wolfgang Homburger, Jerome Hall, Will Reilly, and Edward Sullivan. Fundamentals of Traffic Engineering. 16th ed.*

- Urban: 8-30 people and/or jobs per acre, OR, 4-8 people and jobs per acre IF the regional share of employment is in the top 5 percent of block groups for employment.
- Urban Core: More than 30 people and/or jobs per acre, OR, 8-30 people and jobs per acre IF there are more than 30 pedestrian links per square mile.
- Freight dependent land use: More than 2,000 freight dependent jobs in the block group. Freight dependent jobs include NAICS sectors 11 (Agriculture, Forestry, Fishing and Hunting), 21 (Mining, Quarrying, and Oil and Gas Extraction), 22 (Utilities), 23 (Construction), 31-33 (Manufacturing), 42 (Wholesale Trade), and 48-49 (Transportation and Warehousing).

State Facilities

The Level of Service standard for state highways in Lewis County is C for rural roadways and D for urban facilities. Figure 13. Levels of Service for State Roads depicts the levels of service for state highway facilities.

Local Roads

Local level of service is Level of Service D for area roadways and intersections.

Multimodal Levels of Service (MMLOS) for Active Modes

The following levels of service have been established between urban and rural areas due to the difference in needs.

Urban

For any areas located in an Urban Growth Areas Boundary the level of traffic stress (LTS) is 2. See the Land Use Element for urban growth area boundaries.

Rural

For any area located outside of an Urban Growth Area boundary the level of traffic is 3. As defined by WSDOT, rural areas have less than 4 people per acre. See the Land Use Element for rural land use designations and their implementing zones for their densities.

Existing and Future Deficiencies

Utilizing these standards, Lewis County evaluated existing (as of 2015) and forecasted future roadway conditions (in 2040) based on the land use from the Land Use Element of this plan. Capacity issues as of 2015 are shown on Maps T-4 (name of map) and T-6 (name of map). Capacity issues projected in 2040 are shown on Maps T-5 (name of map) and T-7 (name of map).

Major roadway capacity issues identified within unincorporated portions of the county by 2040 include:

- The need for additional capacity Jackson Highway in the Chehalis Urban Growth Area.
- The need improvements/replacement at the Rush Road US Interstate I-5 Interchange.
- The need for additional capacity along Harrison Avenue in the Centralia Urban Growth Area.
- The need for an intersection improvement at US Highway 12 and the southbound off-ramp of US Interstate I-5.

TRANSPORTATION GOALS AND POLICIES

Goals: Future desired states to be achieved. All goals in the Comprehensive Plan are symbolized by a prefix denoting the element and then a whole number. For example, the first goal in the Transportation Element is delineated with T1.

Policies: Methods to achieve the associated goal. Policies are symbolized by a prefix denoting the element and then a decimal number denoting the goal and policy. For example, the first policy in the Transportation Element is delineated with T 1.1.

SAFE NETWORKS

T 1 Provide a safe, and well-maintained transportation system.

T 1.1 Maintain a comprehensive inventory of existing transportation facilities including age, condition, use, and useful life maintenance history and maintenance requirements.

T 1.2 Periodically perform condition and operational surveys of roads to prioritize and prepare for county maintenance projects.

T 1.3 Encourage complete streets in Urban Growth Areas and Limited Areas of more Intense Rural Development (LAMIRDs) to provide safe pedestrian and bicycle facilities.

T 1.4 Prioritize safe active transportation networks along Highway 12.

T 1.5 Continue improving ADA facility inventory and revise ADA transition plan to prioritize ADA facility updates near population centers, low-income residents, or overburdened or disadvantaged communities.

RESILIENT

T 2 Provide a transportation system that minimizes flood and wildfire risks for all users.

T 2.1 Design new transportation improvements with safety as a key priority, including safety metrics when designing new improvements.

T 2.2 Identify existing locations in the road system that have access management and/or safety problems and prioritize corrective actions in those locations.

COORDINATED SYSTEMS

T 3 Coordinate the plans, programs and projects of local, regional, state and federal agencies and organizations to ensure consistency between the development of land uses and the availability of transportation facilities and other capital facilities.

T 3.1 Continue to participate in inter-jurisdictional forums, such as the Southwest Regional Transportation Planning Organization (SWRTPO) and the Lewis County Transportation Strategy Council, to coordinate planning and decision-making efforts that benefit the county, cities, and other jurisdictions.

T 3.2 Utilize a coordinated development review process, or similar mechanism, to harmonize transportation improvements that affect multiple jurisdictions or agencies.

T 3.3 Allow County transportation related data to be publicly available.

FINANCIALLY FEASIBLE

T 4 Develop strategies to ensure that sufficient financing is available to maintain countywide transportation facilities.

T 4.1 Strive to implement the projects identified within this Transportation Element and continue to use the (6) Six-Year

Transportation Improvement Program (adopted herein by reference) as the principal implementation tool for carrying out the element's goals, objectives, and policies.

T 4.2 Continue to research and pursue potential options to finance transportation facility projects improvements and maintenance.

T 4.3 Establish a procedure to reassess land use patterns if funding falls short.

State law requires jurisdictions to have policies and procedures in place in case probably funding falls short to plan for land use and transportation needs. RCW 36.70.070(6)(a)(iv)(A), WAC 365-196-430(2)(k)(iv)

ENVIRONMENTALLY SOUND

T 5 Manage the growth of the transportation system in a way that minimizes adverse environmental impacts and incorporates design measures that account for hazards exacerbated by climate.

T 5.1 Utilize sound and environmentally responsible design principles in the construction of transportation facilities.

T 5.2 Use mitigation sequencing to minimize and mitigate unavoidable environmental impacts associated with transportation projects.

PUBLICLY REVIEWED

T 6 Promote public involvement in transportation planning and design to ensure that the county's decisions about the transportation system are reflective of the community's goals and objectives and are sensitive to the special interests of affected individuals and entities.

T 6.1 Ensure that county residents are involved in the planning and design of transportation infrastructure as early as practical to help influence the character of the facilities.

T 6.2 Establish a procedure to coordinate with all jurisdictions with planning in land use and transportation initiatives.

FREIGHT

T 7 Strive to fund and maintain adequate routes to serve rail, air and port facilities.

T 7.1 Partner with a variety of public and private agencies to fund build and maintain routes that support rail, air and port facilities.

AIRPORTS

T 8 Provide adequate capacity and safety for air and emergency services of county airports, especially during hazard events exacerbated by climate.

T 8.1 Use the program in list in (6) Six-year Transportation Improvement Program (TIP) the as supplemented by airport facility plans, as the basis of future improvements to county-owned airports.

T 8.2 Discourage residential development in airport approach zones and adjacent high noise areas.

See Lewis County Code Chapter 17.80 for Airport Obstruction Zoning Washington State Law discourages the siting of incompatible uses to general aviation uses. RCW 36.70.547. Airport planning and associated regulations must be filed with the Aviation Division of WSDOT.

MILITARY TRAINING ROUTES

T 9 Maintain compatibility and minimize conflict between existing military training areas and county land uses.

T 9.1 Coordinate with the United States Armed Forces to resolve potential land use conflicts through the early exchange of project related information when development projects or Comprehensive Plan amendments may affect military operations including Military Training Routes.

RAIL

T 10 Preserve and improve existing rail corridors and facilities that minimize vulnerability and risk worsened by climate.

T 10.1 Maintain sufficient rail capacity to accommodate freight rail traffic storage and passenger service.

T 10.2 Support the long-term beneficial use of rail corridors, either as rail spurs, roads, or trails.

MULTI-MODAL TRANSPORTATION

T 11 Provide a safe multimodal transportation that includes transit, biking, and walking, where possible, to provide opportunities to all populations in the County and reduce vehicles miles traveled.

T 11.1 Focus improvement efforts to enhance the system in or near Urban Growth Areas and Limited Areas of More Intensive Rural Development (LAMIRDs).

T 11.2 Encourage the maintenance of existing park-and-ride lots, and the establishment of new park-and-ride facilities at suitable, convenient locations.

T 11.3 Establish active transportation connections between centers and other population centers and employment.

T 11.4 Plan and develop a multi-modal county transportation system that enhances access and mobility to major destinations. Focus improvement efforts to enhance the system in or near Urban Growth Areas and Limited Areas of More Intense Rural Development (LAMIRD).

T 11.5 Develop strategies to provide low-income individuals, people with disabilities and other disadvantaged individuals, transportation options that allow them to meet their basic needs.

TRANSIT

T 12 Coordinate land use decisions with existing and planned transit services and reduce vehicle miles traveled.

T 12.1 Increase transit availability and frequency in Urban Growth Areas and Limited Areas of more Intense Rural Development (LAMIRDs).

T 12.2 Encourage high density land uses along Twin Transit's transportation corridors.

T 12.3 Encourage expansion of bus service to East Lewis County and establish service in the western and southern portions of the cou nty.

T 12.3 Encourage increased frequency, hours or service, and efficiency of all bus routes.

DESIGN OF ROADWAYS

T 13 Utilize roadway improvements as a method to help enhance the character of Lewis County.

T 13.1 Consider potential pedestrian, bike and aesthetic enhancements (as feasible) in road improvement projects.

WAYFINDING AND SIGNAGE

T 14 Implement new wayfinding and signage to promote safety, community character, and environmental resources.

T 14.1 Create new signage and enhance the use of technology to improve the ease of finding areas such as Mount Rainier, Mount St. Helens, Mount Adams, Riffe and Mayfield Lakes, the various wilderness areas, the national forest lands, and other natural areas.

T 14.2 Seek funding for interpretive signage to promote economic and historic preservation.

CONCURRENCY AND LEVELS OF SERVICE

T 15 Ensure adequate transportation facilities are offered concurrent with development.

T 15.1 Maintain multi-modal LOS on county roadways that is level of service standards consistent with the Land Use Element and the goals and policies of the Comprehensive Plan.

T 15.2 Coordinate with Washington State and Lewis County's incorporated communities to:

- Monitor the level of service standards for transportation facilities in the unincorporated urban growth areas.
- Review traffic volumes and other transportation data for proposed projects.
- Identify potential transportation needs and strategies for required improvements.

T 15.3 Develop and administer transportation concurrency procedures to ensure that adequate transportation facilities and services are in place or are planned and funded to be in place within six (6) years of any development.

Utilities and Capital Facilities

Introduction

This element establishes goals and policies for Capital Facilities. Policies related to county-owned facilities focus on funding, improvements, and future uses and non-county owned facilities focus on coordination, data sharing, support, and joint planning between the two.

Existing Conditions

The required existing conditions and planned projects section of the Utilities and Capital Facilities element is in **Appendix C Capital Facilities Plan** (CFP). The CFP outlines the existing inventory and locations of the Utilities and Capital Facilities currently serving the County's population. This CFP covers all County owned facilities, and the financing plan is updated annually in collaboration with the Department of Public Works. Lewis County is a largely rural county with some facilities (schools, fire, private utilities) serving large portions of the county with very little population. Non-County owned facilities may be difficult to collect due to the size and frequency of communication. The following Table 12 (name of the table) is a summary of the facilities and utilities covered by the CFP.

Table 11. Summary of Facilities and Utilities Covered by the CFP

County Owned	Non-County Owned
Government Services	Schools
Parks and Recreation	Fire Protection
Solid Waste Management	Electricity
Storm Drainage Systems	Natural Gas
Transportation	Telecommunications
Wastewater Systems	Water Systems (all other major systems)
Water Systems (Vader and Middle Fork Water Systems)	Transit

Planning for the Future

The Utilities and Capital Facilities Element of the Lewis County Comprehensive Plan prioritizes improving and funding county-owned facilities while fostering partnerships for non-county-owned infrastructure. Key

Capital Facilities Element Requirements

(a) An inventory of existing Capital Facilities owned by public entities, also referred to as "public facilities," showing the locations and capacities of the Capital Facilities;

(b) A forecast of the future needs for such capital facilities based on the Land Use element;

(c) The proposed locations and capacities of expanded or new Capital Facilities;

(d) At least a six-year plan that will finance such Capital Facilities within projected funding capacities; and

(e) A requirement to reassess the Land Use element if probable funding falls short

The Utilities element shall contain at least the following features: The general location, proposed location, and capacity of all existing and proposed utilities including, but not limited to, electrical lines, telecommunication lines, and natural gas lines.

WAC 365-196-415 Capital Facilities Element
WAC 365-196-420 Utilities Element

county facilities include parks, transportation, wastewater, and storm drainage systems, with an emphasis on enhancing services to meet growth demands, ensure compliance with regulations, and protect public health. For non-county-owned services like schools, fire protection, electricity, and broadband, the county focuses on coordination with providers to align improvements with community needs and leverage shared resources.

Key policies support sustainable and financially responsible infrastructure development. This includes aligning utilities with land use plans, monitoring capacity, and utilizing conservation and renewable energy. Collaboration with external providers aims to improve efficiency, address capacity challenges, and reduce environmental impacts. The plan emphasizes equitable cost-sharing for developments, pursuing grants for major projects, and expanding broadband in underserved areas. Additionally, it promotes resilience through climate-conscious practices and partnerships with fire districts and other agencies to enhance public safety and essential services.

FIGURE 17. LOCATION OF LEWIS COUNTY OWNED PUBLIC FACILITIES

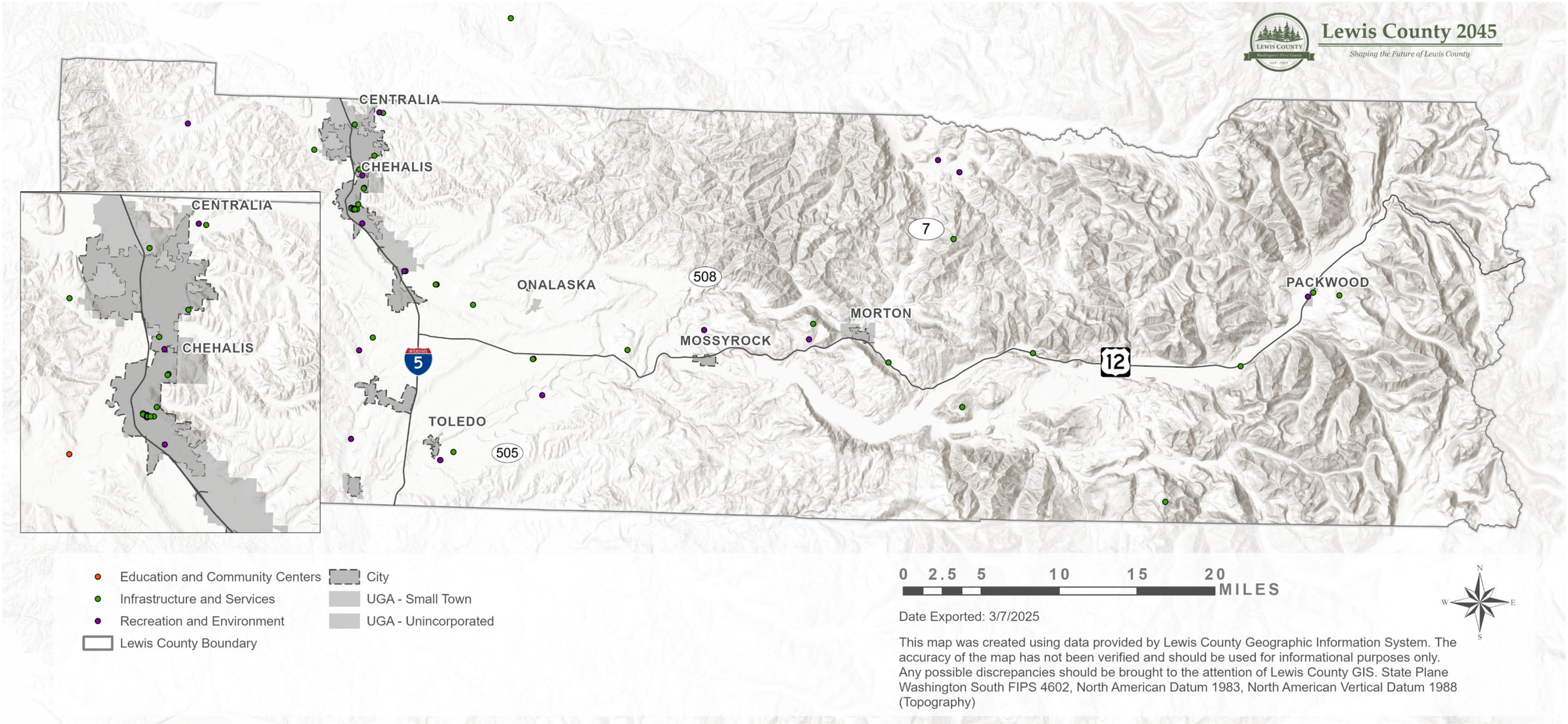
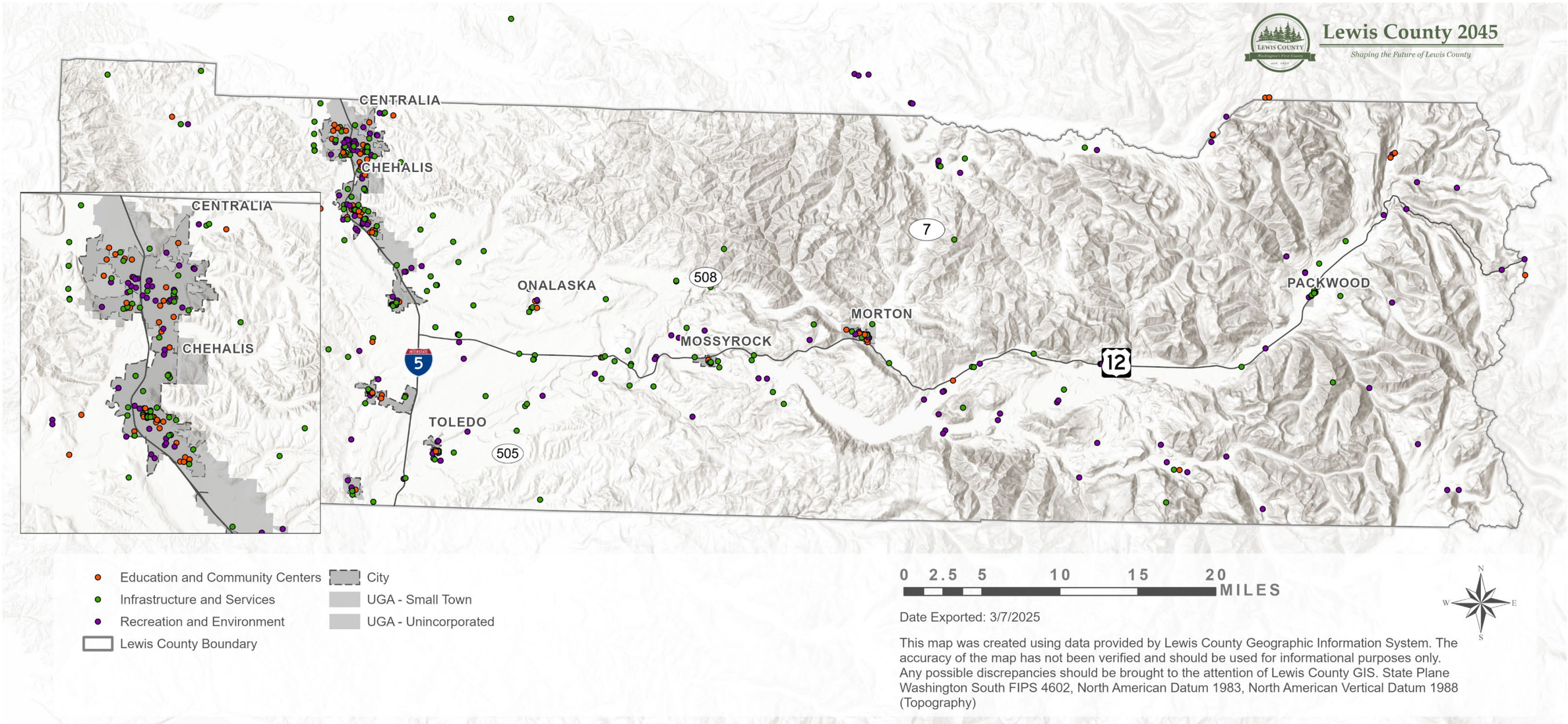


FIGURE 18. ALL PUBLIC FACILITIES



UTILITY AND CAPITAL FACILITIES GOALS AND POLICIES

Goals: Future desired states to be achieved. All goals in the Comprehensive Plan are symbolized by a prefix denoting the element and then a whole number. For example, the first goal in the Capital Facilities and Utilities Element is delineated CF 1.

Policies: Methods to achieve the associated goal. Policies are symbolized by a prefix denoting the element and then a decimal number denoting the goal and policy. For example, the first policy in the Capital Facilities and Utilities Element is delineated with CF 1.1.

CAPITAL FACILITIES AND UTILITIES

CF 1 Develop capital facilities and utilities in a manner that supports the implementation of the Land Use Element, including Urban Growth Areas under the County's jurisdiction where patterns of development have created pressure, and consistent with the Transportation element.

CF 1.1 Plan, design, and operate public facilities and utilities to:

- Accommodate the demands of growth, consistent with the adopted land use and zoning designations.
- Comply with appropriate state and federal laws.
- Protect public health and safety.

CF 1.2 Maintain an inventory of existing public facilities and utilities including (where possible) the locations and capacities of such facilities and systems.

CF 1.3 Ensure that public facilities and utilities are compatible with surrounding areas, adopted design standards and relevant state laws.

CF 1.4 Reassess the Utilities and Capital Facilities Element periodically to ensure that utility and facility needs and financing are consistent with the Land Use Element.

COORDINATION

CF 2 Coordinate the utility, land use, capital facility and transportation plans and designs of the county with other providers to plan for growth, leverage funding opportunities and effectively manage the construction of improvements.

CF 2.1 Make County plans, regulations and standards, including population forecasts and land use designations, available to utility and facility providers to assist in their planning.

CF 2.2 Consider potential concurrent utility or facility improvements when utility or facility providers construct a project. Utilize the projects of service providers as an opportunity to enhance the county facilities when desirable.

CF 2.3 Utilize the agreements between the county, and utility and facility providers, as a means to:

- Coordinate the functional plans of the provider and the capital facility plans of the county.
- Address the joint use of corridors and rights-of-way.
- Ensure that development permit reviews address other affected facilities and utilities.
- Mitigate the impacts of utility and facility improvement projects.

CF 2.4 Establish a procedure for sharing vital data for planning Public Facilities, Land Use, and Transportation between jurisdictions, and public and private agencies.

CF 2.5 Establish a procedure to produce and routinely revise a coordinated transportation, facilities, and land use plan between jurisdictions, and private and public agencies.

CF 2.6 Establish a procedure and communication protocols to consistently talk to Capital Facility and Utility providers for Land Use and Transportation planning efforts.

CONCURRENCY AND LEVELS OF SERVICE

CF 3 Ensure adequate utilities, public facilities and services exist or can be provided concurrent with development.

CF 3.1 Monitor the capacity of county-owned existing utilities and capital facilities to understand when existing facilities are reaching their available capacity.

CF 3.2 Coordinate with external providers to monitor the capacity of non-county-owned existing utilities and capital facilities to understand when existing facilities are reaching their available capacity.

FINANCIALLY FEASIBLE

CF 4 Seek sustainable and economical methods to finance projects that use taxes wisely.

CF 4.1 Use conservation and demand management principles to extend the available capacities of utilities and public facilities.

CF 4.2 Ensure that developments pay their fair share for improvements. Utilize mitigation measures impact fees and a variety of other mechanisms to help collect the necessary funds.

CF 4.3 Weigh operation and maintenance costs as well as the financial impacts of ongoing debt service as part of the overall considerations about whether to build major infrastructure.

CF 4.4 Target a limited number of high priority areas for major facility investments.

CF 4.5 Pursue outside grants for major projects, such as the Packwood sewer system.

CF 4.6 Establish a procedure to reassess land use patterns if funding falls short.

CF 4.7 Study the possible implementation of an equipment rental and revolving fund.

ENERGY AND SUSTAINABILITY

CF 5 Ensure that buildings and facilities use renewable energy, conservation, and efficiency technologies and practices to reduce greenhouse gas emissions.

CF 5.1 Explore ways to implement electric vehicles in Lewis County.

CF 5.2 Retrofit County-owned buildings for energy efficiency.

CF 5.3 Deploy a county surplus program.

ENVIRONMENTALLY SENSITIVE

CF 6 Use environmentally sound approaches to construct, operate and maintain utilities and facilities.

CF 6.1 Promote the conservation of energy, water and other natural resources in the siting and design of new utilities and public facilities.

CF 6.2 Design and construct utility and facility projects, such as storm water drainage, water withdrawals, and sewage disposal, to respect the environmental limits of the area in which they are proposed.

COUNTY BUILDINGS AND FACILITIES

CF 7 Provide county facilities and buildings and prioritize the adaptive reuse of buildings for economic and environmental benefits.

CF 7.1 Concentrate County facilities in two primary locations near the historic County Courthouse and near the Public Works Central Shop on Jackson Highway.

CF 7.2 Implement the (6) six-year and twenty-year Capital Facilities plan and the associated Capital Improvement plans, revise as necessary.

CF 7.3 Continue to proactively review the needs and priorities for improvements to capital facilities.

PARKS

CF 8 Provide a high-quality Park and Open Space system that effectively utilizes existing open lands and minimizes costs for taxpayers.

CF 8.1 Update the Parks, Recreation, and Open Space Plan to provide action items to implement before the next periodic update.

CF 8.2 Partner with agencies such as Tacoma Power, the Washington Department of Fish and Wildlife, Washington State Parks, and the US Forest Service to improve their Park and Recreation Facilities.

SCHOOLS

CF 9 Promote the restoration and construction of schools, while conserving resources, to provide essential community services.

CF 9.1 Encourage school districts to share available facilities and resources particularly for elective activities.

CF 9.2 Urge school districts to act as centers for the surrounding community recognizing that the districts offer indoor and outdoor spaces that are useful to nearby residents and community organizations.

WATER

CF 10 Ensure that water supplies and infrastructure are sufficient to meet the needs of existing and future development in the county.

CF 10.1 Foster improvements to public water systems particularly within unincorporated Urban Growth Areas and Limited Areas of More Intensive Rural Development (LAMIRDs) to ensure that adequate water supplies and infrastructure are available to serve the future development of the areas.

CF 10.2 Develop strategies to support the operation of small water systems and help address the technical managerial and financial difficulties that are experienced by small water providers.

CF 10.3 Coordinate with Department of Health and Commerce for consolidation of water utilities when desirable.

CF 10.4 Require new residential, commercial and industrial development to use existing water systems (when the facilities are available).

CF 10.5 Implement practices to permit domestic groundwater withdrawals, like RCW 36.70A.590.

CF 10.6 Participate in watershed planning for Water Resource Inventory Areas (WRIAs) 11, 13, 23 and 26 to help shape the amount of groundwater withdrawals available for permit-exempt domestic groundwater withdrawals, and the type of projects used to mitigate groundwater and stream impacts.

SEWER

CF 11 Coordinate with water sewer districts to develop or expand wastewater collection and treatment facilities to support development within Urban Growth Areas, certain Limited Areas

of more Intensive Rural Development (LAMIRDs), and areas where known pollution or health hazards exist.

CF 11.1 Establish criteria for when connection will be required for properties within wastewater service areas to hook to the available system.

CF 11.2 Work to construct a sewer system within the Packwood UGA.

STORMWATER

CF 12 Reduce the potential impacts of stormwater on public health, property and safety.

CF 12.1 Use education and outreach to raise community awareness about the benefits of stormwater management, including its assistance in retaining water quality and reducing flood hazards.

CF 12.2 Utilize best management practices, such as those outlined in the regional Road Maintenance Endangered Species Act Guidelines and the Department of Ecology Stormwater Management Manual, to treat stormwater runoff.

CF 12.3 Develop and Implement Phase II Stormwater Program.

SOLID WASTE

CF 13 Provide solid waste services to residents of Lewis County in an efficient and cost-effective manner.

CF 13.1 Implement the strategies for solid waste management (including waste reduction, recycling and energy recovery) identified in the Lewis County Solid and Hazardous Waste Management Plan

ELECTRICITY

CF 14 Facilitate the provision of electricity to residents of Lewis County.

CF 14.1 Coordinate with Lewis County PUD and Centralia City Light in the provision of electricity to customers.

CF 14.2 Encourage underground utility distribution lines where feasible to integrate features that reduce the impacts of climate and increase resilience, especially in new subdivisions, LAMIRDs and unincorporated Urban Growth Areas.

GAS

CF 15 Encourage the use of natural gas within Lewis County.

CF 15.1 Coordinate with Puget Sound Energy and other appropriate agencies to expand the availability of natural gas.

TELECOMMUNICATIONS

CF 16 Promote the development of a high-quality telecommunications network in Lewis County.

CF 16.1 Craft the county's development regulations to be flexible and responsive to innovations and advances in telecommunications technology while accounting for design methods that are adaptable to flooding and wildfire events exacerbated by climate.

CF 16.2 Assure that the regulations for wireless facilities minimize the potential adverse impacts from the facilities. Use adequate setbacks, appropriate landscape screening, and the utilization of existing sites and structures whenever feasible.

BROADBAND

CF 17 Support broadband infrastructure in Lewis County to give more opportunities to residents and reduce vehicle miles traveled.

CF 17.1 Target underserved locations such as Doty, Onalaska, Mineral, Pe Ell, Vader, and Winlock for broadband expansion.

CF 17.2 Partner with appropriate jurisdictions, agencies, and private partners to support broadband infrastructure.

FIRE DISTRICTS

CF 18 Support local fire districts and share resources where possible.

CF 18.1 Coordinate with local fire districts at community meetings.

CF 18.2 Share available data and coordinate on future development and land uses to ensure adequate facilities can be provided in rural areas.

ESSENTIAL PUBLIC FACILITIES

CF 19 Allow the continued maintenance, identification and siting of essential public facilities.

CF 19.1 Ensure that the Comprehensive Plan and development regulations do not preclude the siting of essential public facilities.

CF 19.2 In establishing development regulations for siting essential public facilities, ensure that facilities follow a public participation process, are in conformance with applicable federal, state, and county land use regulations, adhere to applicable environment standards and review, and are reviewed in consultation with affected jurisdictions, agencies, and utilities.

CF 19.3 Consider the following for siting essential public facilities:

(a) Specific facility requirements for each essential facility shall be determined and identified for the following:

- Minimum acreage.
- Accessibility.
- Transportation needs and services.
- Supporting public facility and public service needs and the availability thereof.
- Health and safety.
- Site design.
- Zoning.
- Availability of alternative sites.
- Community-wide distribution of facilities.
- Capacity and location of equivalent facilities.

(b) Impacts of the facility:

- Land use compatibility.
- Existing land use and development in adjacent and surrounding areas.
- Existing zoning of the surrounding areas.
- Existing Comprehensive Plan designation for the surrounding areas.
- Present and proposed population density of the surrounding area.
- Environmental impacts and opportunities to mitigate the environmental impacts.
- Effect on agricultural, forest, or mineral lands, critical areas, and historic, archaeological and cultural sites.
- Effect on areas outside of Lewis County.
- Effect on the likelihood of associated development.
- Effect on public costs, including operation and maintenance.

Economic Development

Introduction

The Economic Development Element of this Comprehensive Plan outlines a strategic framework to guide the County's economic growth, sustainability, and resilience over the next twenty years. As the County continues to evolve, this plan seeks to foster a vibrant, diverse, and inclusive economy that benefits all residents and businesses. It reflects the community's values, aspirations, and priorities, providing a blueprint for long-term prosperity while balancing economic growth with environmental stewardship and social equity.

This Economic Development Element builds upon past successes and addresses emerging opportunities and challenges. It provides policies and actions to support business retention and expansion, attract new industries, enhance workforce development, improve infrastructure, and ensure the availability of affordable housing and sustainable development practices. By enhancing the local economy, this element also contributes to broader goals such as improving quality of life, increasing resilience to economic shocks, and ensuring that future generations inherit a vibrant, equitable, and sustainable community.

Existing Conditions

Lewis County has approximately 1,944 businesses and 21,581 employees. The top five major employers in Lewis County are Providence Hospital, Fred Meyer Distribution Center, UNFI, Hampton Lumber Mills, and Cardinal Glass Manufacturing Plant. Refer to the community profile for current economic and demographic data that relates to economic development policies.

Tourism and Recreation Industry

Lewis County is also just South of Mt. Rainer National Park and has approximately 530,000 acres of public land drawing millions of visitors to Lewis County communities each year.

As of 2025, Discover Lewis County (DLC), is a branch of the Economic Alliance of Lewis County, and helps Lewis County in progressing the vital tourism industry in coordination with other supporting industries, like agriculture. Their goal is to balance tourism with local natural resources and cultural

Economic Development Element Requirements

The Economic Development Element is acknowledged as a mandatory element in RCW 36.70A.070(7). Under the Washington Administrative Code, the element should include:

- A summary of local economic data,
- A summary of strengths and weaknesses of the local economy,
- Identification of policies, programs, and projects to foster economic growth for future needs.

RCW 36.70A.070(7) Mandatory Elements
WAC 365-196-435 Economic Development Element

stewardship to protect core assets of the County[23]. This organization is vital in continuing several goals and policies of the Economic Development Element.

535,000+	33	28,900,000	20,200,000	6,100,000
Acres of Public Land	Square Miles of Water	Total Annual Visitors (Centralia and Chehalis areas)	Total Annual Visitors (between Napavine and Toledo)	Total Annual Visitors (between Mossyrock and Packwood)

SOURCE: LEWIS COUNTY TOURISM STRATEGIC PLAN, 2024-2028

With 80 hiking trails totaling almost 680 miles, Lewis County is haven for hikers in a region known for the outdoors. With numerous trails in near Mount Rainer and Mount St. Helens, these trails attract tens of thousands of visitors per year to the county as well as provides residents with an incredible amenity taking advantage of the natural beauty of the area. Most visitors to Lewis County were on day trips or staying overnight with friends or family. Only 22 percent used local lodging options, including hotels, campgrounds, and short-term rentals. The most visited events included the Southwest Washington Fair, Centralia Lighted Tractor Parade, Packwood Flea Market, and Morton Loggers Jubilee. Top outdoor destinations were Gifford Pinchot National Forest, Mayfield Lake, Mount Rainier National Park, White Pass Scenic Byway, and the Cowlitz and Chehalis Rivers[24].

To learn more information about tourism and recreation in Lewis County visit Discover Lewis County's website and read the Tourism Strategic Plan 2024- 2028.

[23] *Discover Lewis County, About DLC, 2024 https://discoverlewiscounty.com/about/contact/*
[24] *Lewis County Tourism Strategic Plan, 2024-2028, https://discoverlewiscounty.com/wp-content/uploads/2024/05/Lewis-County-Tourism-Strategic-Plan-Final_compressed.pdf*

Strengths, Weaknesses, Opportunities, Threats[25]

The Economic Alliance of Lewis County produced the 2022-2024 Comprehensive Economic Alliance Strategy for the County. The SWOT analysis for Lewis County's Comprehensive Economic Development Strategy identifies key strengths, weaknesses, opportunities, and threats based on community feedback.

Strengths include the county's central location along the I-5 corridor, offering convenient access to both Portland and Seattle for transportation and distribution. The area benefits from low utility costs, affordable land and housing, and a low tax burden, particularly on property. The county also has robust natural resources, good transportation infrastructure (including rail access and Highway 12), and a strong educational system with Centralia College offering bachelor's programs. Additionally, Lewis County enjoys a collaborative community culture, strong political support, and outdoor amenities, contributing to a high quality of life.

Weaknesses highlighted in the analysis include challenges related to flooding, limited infrastructure (such as inadequate sewer systems in certain areas), and labor availability, especially in terms of skill levels and work ethics. The county also faces low average wages and a lack of professional office space, which could deter business growth. Other concerns include slow rural development, high development costs, and a perception of limited cultural and entertainment offerings, particularly for younger generations. There is also an issue of brain drain, with local talent leaving for opportunities elsewhere.

Opportunities for economic growth in the county include the development of large-scale industrial sites, utilizing the TransAlta coal transition fund for economic revitalization, and strengthening business retention and expansion efforts. Additionally, there is potential for growth through partnerships with Centralia College, expanding educational programs, particularly in STEM (Science Technology Engineering and Mathematics) fields, and enhancing recreational tourism. The county can also take advantage of its proximity to Portland and Seattle to attract more business investments. Flood mitigation efforts and the promotion of smaller community redevelopment also present growth opportunities.

Threats facing Lewis County include the potential impact of flooding, regulatory constraints such as those from the Growth Management Act, and the risk of economic downturns. The political climate, with potential challenges in cooperation between municipal, county, and economic development organizations, could hinder progress. Additionally, the county faces threats from increasing community polarization and declining enrollment in local school districts, which may affect long-term educational and workforce development.

[25] *WAC 365-196-435 Economic Development Element. https://app.leg.wa.gov/WAC/default.aspx?cite=365-196-435*

Planning for the Future

The Economic Development Element for Lewis County, Washington, for 2045 lays out a clear roadmap to enhance industrial growth and foster a more diverse rural economy, aiming to retain and support its rural residents. One key focus is creating a diverse employment base by attracting industries that provide family-wage jobs, thereby increasing local wages. Policies such as targeting export-oriented industries that bring new revenue to the county and supporting small businesses on agricultural and resource lands highlight the county's commitment to creating sustainable and diversified economic opportunities. The county recognizes the need for education and training to build a skilled workforce that aligns with the changing needs of these industries. Collaboration between local school districts, Centralia College, and other community organizations is key to ensuring that students are prepared for both existing and future job markets. Additionally, programs that retrain workers displaced by industry decline are also a priority, helping to ensure that no community member is left behind.

In tandem with industrial growth, the Economic Development Element emphasizes resilient economic activities that address climate disruption and ensure the county's infrastructure can withstand the effects of climate. Policies support the development of green jobs and incentivize businesses to adapt to climate realities. The county also aims to safeguard its natural resources, such as agriculture, forestry, and mining, through initiatives like promoting value-added production and protecting resource lands from conversion. Finally, expanding tourism and creating Master Planned Resorts are central to attracting a diverse range of visitors while supporting local businesses. With these integrated goals, Lewis County aims to not only diversify its economy but also ensure long-term resilience and prosperity for its rural communities.

Economic Development in Lewis County

The Economic Alliance of Lewis County is a public private partnership organization in the community that assists with increasing jobs and improving quality of life in the community. The organization is responsible for collecting relevant economic data, crowdsourcing community engagement and producing the Lewis County Economic Development Strategy. A document revised every couple of years that outlines future economic development goals across the County.

Largest Industries in Lewis County

- Logistics / Freight
- Wood Products
- Manufacturing
- Healthcare
- Energy
- Food Processing
- Telecommunications

ECONOMIC DEVELOPMENT GOALS AND POLICIES

Goals: Future desired states to be achieved. All goals in the Comprehensive Plan are symbolized by a prefix denoting the element and then a whole number. For example, the first goal in the Economic Development Element is delineated ED 1.

Policies: Methods to achieve the associated goal. Policies are symbolized by a prefix denoting the element and then a decimal number denoting the goal and policy. For example, the first policy in the Economic Development Element is delineated with ED 1.1.

DIVERSE EMPLOYMENT BASE

ED 1 Provide diverse employment opportunities and training to build Lewis County's workforce with increased wages.

ED 1.1 Target business sectors that provide family wage jobs and match the skills mix of the existing workforce.

ED 1.2 Target basic industry sectors that export their goods and services outside the county and attract new dollars into the community.

ED 1.3 Support the development of small businesses and cottage industries on agricultural, forest, or mineral resource lands.

ED 1.4 Utilize the Growth Management Act standards for developments such as Master Planned Resorts, Master Planned Industrial, and Type II and Type III LAMIRDs, among others, to establish new locations for economic development.

ED 1.5 Advocate for collaboration between school districts on items such as class offerings electives apprenticeship training and STEM (Science Technology Engineering and Mathematics) programs to ensure that smaller districts can offer a wide range of educational options for area students.

ED 1.6 Pursue opportunities such as grants and programs to help absorb and retrain displaced workers from declining industries.

ED 1.7 Foster continued collaboration between school districts, Centralia College, the Lewis Economic Development Council, and other organizations to prepare students for existing and future jobs.

RESILIENT ECONOMIC ACTIVITIES

ED 2 Ensure that the local economy is resilient to climate disruptions and fosters business opportunities associated with climate mitigation and adaptation.

ED 2.1 Facilitate a green jobs pipeline for frontline communities.

ED 2.2 Support local businesses' efforts to bolster climate preparedness and continuity of operations.

ED 2.3 Support workers displaced from carbon-intensive industries.

ED 2.4 Consider climate hazard impacts during the development of infrastructure for tourism and goods movement.

ED 2.5 Require review of climate hazard impacts to airport operations, facilities, and infrastructure and identify resilience measures in airport master plans.

ED 2.6 Incentivize public investment into open-access telecommunications infrastructure, especially in new rural developments and redevelopments, LAMIRDs, and unincorporated Urban Growth Areas.

ED 2.7 Collaborate with rail authorities (i.e., BNSF, Amtrak, Union Pacific) that assesses impacts from climate hazards and considers adaptive measures for resiliency.

NATURAL RESOURCE INDUSTRIES

ED 3 Ensure that vital natural resources industries, like agricultural, forestry, and mining are continued and supported.

ED 3.1 Use public benefit taxation, the purchase or transfer of development rights, and other strategies to:

- Protect existing natural resources from the conversion to non-resource uses, and
- Help ensure the long-term vitality of the resource industries.

ED 3.2 Ensure that sufficient agricultural land, support services, and skills are available to encourage a healthy, economically viable and diversified agricultural economy.

ED 3.3 Work with the Washington State University Extension, and other organizations and individuals to encourage agricultural diversity and sustainability within the county.

ED 3.4 Nurture the ability of farms to generate on-farm, non-farming income to help support the economic viability of their agriculture operations.

ED 3.5 Encourage on-farm housing for farm families and workers.

ED 3.6 Promote the expansion of value-added food processing facilities and markets to showcase and support local Lewis County's agricultural products and promote local food security.

ED 3.7 Seek to construct a regional distribution facility/food hub along I-5 to better link farms in Lewis County (particularly on the west and east sides of the county) to markets in Portland and Seattle.

ED 3.8 Support efforts to promote local and regional agricultural producers, events, exhibitions, and farmers' markets.

ED 3.9 Maintain the existing base of commercial forestland to assure the continued vitality of timber production and processing.

ED 3.10 Encourage expanded production of value-added forest products.

ED 3.11 Encourage mineral extraction and processing.

ED 3.12 Allow mineral-related land uses on forest and mineral resource lands, and in other appropriate locations.

ENERGY AND SUSTAINABILITY

ED 4 Encourage energy-related industries and facilities in Lewis County.

ED 4.1 Support the creation of new energy generation facilities, and the establishment of businesses that harness the power of renewable natural resources.

ED 4.2 Promote the increased production and availability of energy.

ED 4.3 Create regulations for energy and storage facilities.

TOURISM

ED 5 Develop the recreational and tourism potential of Lewis County.

ED 5.1 Encourage and support infrastructure and other efforts to attract and support tourists.

ED 5.2 Continue to coordinate with local and regional destination marketing organizations to promote tourism.

ED 5.3 Market cultural, recreational and social activities that showcase the unique natural attractions, historic places, and activities of Lewis County.

ED 5.4 Attract a variety of tourists, including individuals that visit for business, food, nature and recreation.

ED 5.5 Encourage the use and enhancement of county, state and national parks.

ED 5.6 Encourage the creation of Master Planned Resorts.

ED 5.7 Continue to invest lodging tax collections in facilities and programs that maximize tourist activity and spending.

ED 5.8 Support the creation of signage, maps, and other items that showcase area attractions.

BUSINESS RETENTION AND EXPANSION

ED 6 Promote the retention and expansion of existing businesses and the establishment of new small and local businesses.

ED 6.1 Work to improve communication between entrepreneurs and Lewis County.

ED 6.2 Strive to understand common reasons for small business success and failure, and potential methods to encourage success.

ED 6.3 Continue to provide information, resources, and technical assistance to promote the retention and expansion of existing and new businesses.

ED 6.6 Encourage continuing education skills, upgrading mentoring and lifelong learning among area residents.

ED 6.7 Support apprenticeships and job training programs that meet the labor force needs of targeted businesses and industries.

ED 6.8 Pursue opportunities such as grants and programs to help absorb and retrain displaced workers from declining industries.

ED 6.9 Increase opportunities for commercial and light industrial development at interchanges on US Interstate I-5.

PARTNERSHIPS

ED 7 Strengthen partnerships between public and private organizations to advance economic development.

ED 7.1 Encourage public and private partnerships among economic development entities

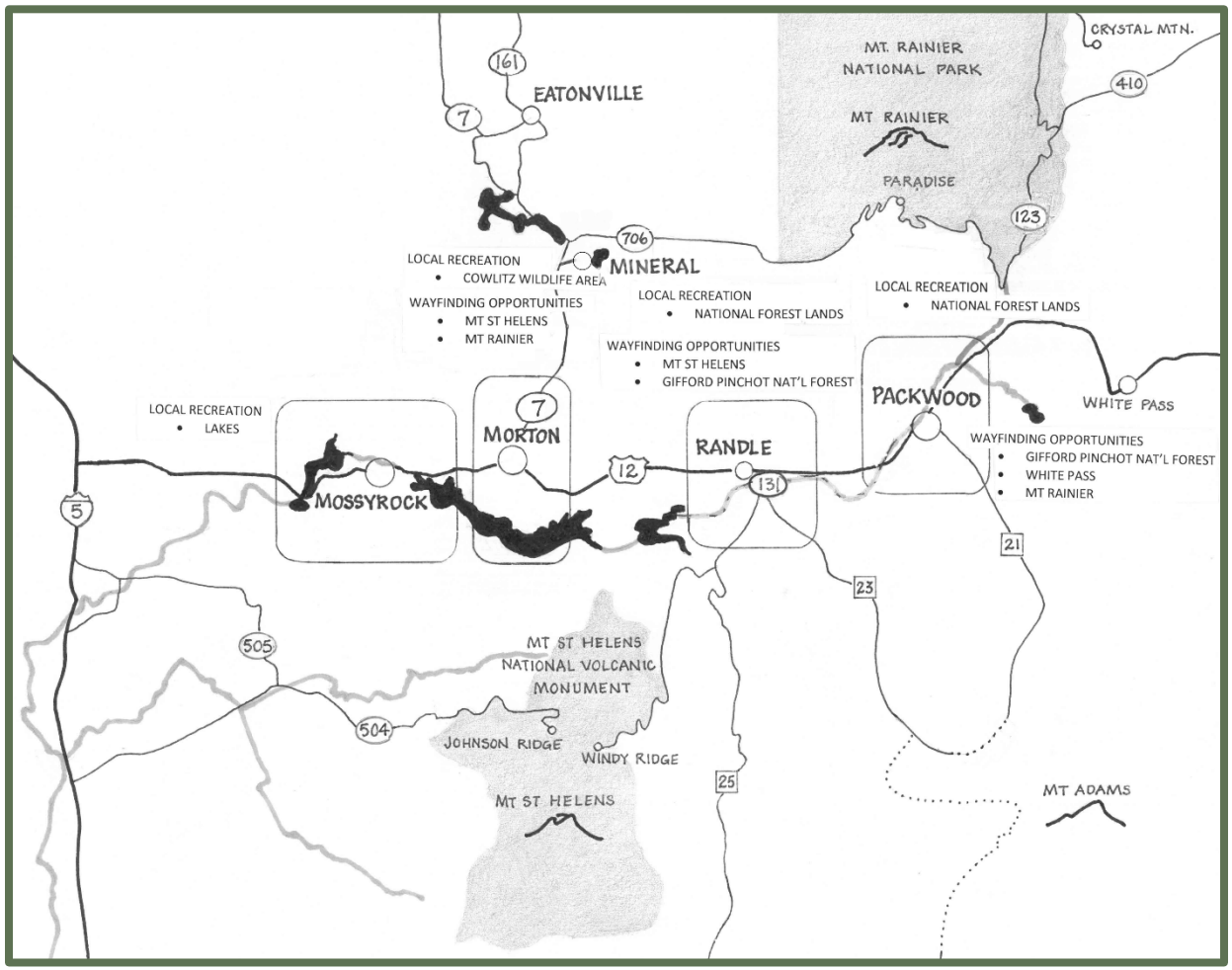


FIGURE 19. RECREATION AND TOURISM OPPORTUNITIES

Tourism and Transportation Connections

The map to the left demonstrates Lewis County's vital recreation opportunities which stimulate Lewis County's economy to support the daily lives of residents. The connections between key cities, towns, and national parks on the East side of Lewis County is critical in Lewis County's growth. Along these routes Lewis County intends to focus economic development and expand transportation improvements like pedestrian facilities, cycling, and transit. Transit options to more remote areas of the County were mentioned during early multiple engagement initiatives with the community.

Climate and Resiliency

Introduction

The Climate and Resiliency Element must maximize economic, environmental, and social co-benefits and prioritize environmental justice in order to avoid worsening environmental health disparities. A Climate and Resiliency Element can take the form of a single comprehensive plan chapter or be integrated into several chapters/elements such as housing, transportation, and land use[26]. Climate-related goals, policies, and strategies are found throughout the other chapters of the Comprehensive Plan. Goals and policies that are specifically related to Climate and Resiliency, rather than incidentally related, appear in this chapter.

Existing Conditions

Based on the review of Best Available Science, analysis recommended by the State, and community engagement data, the following climate hazards were identified as priorities to address in goals and policies:

- Flooding
- Extreme precipitation
- Wildfire
- Reduced snowpack/avalanche

Assets most vulnerable to priority climate hazards are fire stations, airports, county roads, bridges, railways, and civic centers. Assets are most likely to be impacted by hazards from increased flooding and wildfire frequency. Assets are in wildfire interface zones where there is an increased exposure to wildfire conditions, i.e. fuel loads, resulting in wildfire events. Risk of flooding and wildfire hazards are expected to impact communities countywide.

Climate and Resiliency Element Requirements

The climate and resiliency element must:

- enhance resiliency to, and avoid or substantially reduce the adverse impacts of, climate change,
- enhance the resiliency of natural and human systems,
- enhance beneficial opportunities,
- prioritize actions that benefit overburdened communities,
- identify, protect, and enhance natural areas to foster resiliency to climate impacts,
- identify, protect, and enhance community resiliency to climate change impacts, and
- address natural hazards created or aggravated by climate change.

RCW 36.70A.070(9) Mandatory Elements

[26] Washington Department of Commerce, Climate Planning, 2024

Planning for the Future

Lewis County, Washington, is actively working to enhance its climate resiliency and preparedness by establishing a new Climate and Resiliency Element within its planning framework. This initiative focuses on creating policies and strategies that address the increasing climate risks, including extreme weather events, wildfires, flooding, and other hazards. The goal is to ensure that the county's infrastructure, buildings, emergency systems, public health measures, and cultural resources are better prepared to withstand these challenges while minimizing their environmental impacts.

The newly proposed goals and policies for Lewis County cover a wide array of topics, including sustainable design for county buildings, the protection of historic and cultural resources, and improved emergency preparedness. For example, new building designs will integrate climate resilience features, such as fire-resilience standards in high-risk wildfire areas and energy-efficient solutions to maintain safe indoor temperatures during power outages. Additionally, the county aims to enhance emergency preparedness by upgrading communication systems, improving evacuation routes, and ensuring public health protection, particularly for vulnerable communities. These proactive steps reflect a comprehensive approach to safeguarding the county against climate-related threats, improving long-term sustainability, and promoting resilience for future generations.

Lewis County Emergency Management Coordination

In 2023 Lewis County started revising the Countywide Hazard Mitigation Plan. The plan was in final review during the Comprehensive Plan Periodic Update and was used for the most relevant information for climate hazard and asset analysis.

Visit Lewis County's Emergency Management Website to learn more.

CLIMATE AND RESILIENCY GOALS AND POLICIES

Goals: Future desired states to be achieved. All goals in the Comprehensive Plan are symbolized by a prefix denoting the element and then a whole number. For example, the first goal in the Climate and Resiliency Element is delineated CR 1.

Policies: Methods to achieve the associated goal. Policies are symbolized by a prefix denoting the element and then a decimal number denoting the goal and policy. For example, the first policy in the Climate and Resiliency Element is delineated with CR 1.1.

HAZARD READY DESIGN FOR COUNTY BUILDINGS

CR 1 Ensure that County buildings and utilities are designed and built sustainably to reduce environmental impacts and remain resilient to extreme weather and other climate hazards.

CR 1.1 Develop or modify design buildings to integrate exterior building features that reduce the impacts of climate and increase resilience.

CR 1.2 Adopt fire-resilience standards for new and redeveloped sites in high-risk wildfire areas.

CR 1.3 Design County buildings for passive survivability to ensure that they will stay at a safe temperature for occupants if the power goes out.

CR 1.4 Work with energy utilities to improve the safety and reliability of infrastructure vulnerable to climate-exacerbated hazards.

CR 1.5 Require new subdivisions to bury electricity transmission lines and associated infrastructure to reduce damage from storms and wildfire ignition risks.

CR 1.6 Design buildings for passive survivability to ensure that they will stay at a safe temperature for occupants if the power goes out.

HISTORIC AND CULTURAL RESOURCES

CR 2 Ensure that cultural resources and practices throughout the County, including significant historic sites and culturally important traditional foods and natural resources, are resilient to the impacts of extreme weather and other natural hazards worsened by climate.

CR 2.1 Create and implement culturally contextualized outreach and education initiatives and materials that will inform the community about near-term and longer-term climate threats and build resilience.

CR 2.2 Protect significant historic sites prone to floods or other hazards worsened by climate induced hazards.

CR 2.3 Establish and maintain government-to-government relations with Native American tribes for the preservation of archaeological sites and traditional cultural properties that are vulnerable to climate impacts.

EMERGENCY PREPAREDNESS

CR 3 Enhance emergency preparedness, response, and recovery efforts to mitigate risks and impacts associated with extreme weather and other hazards worsened by climate.

CR 3.1 Prioritize operational and infrastructure upgrades to public safety radio systems that consider risks exacerbated by climate.

CR 3.2 Consider the development of a long-term public safety communications strategy or plan that addresses climate and resiliency measures.

CR 3.3 Map transportation infrastructure that is vulnerable to repeated floods, landslides, and other natural hazards, and designate alternative travel routes for critical transportation corridors when roads must be closed.

CR 3.4 Create distribution sites throughout the county utilizing the island map and CERT (Community Emergency Response Team) team placement.

CR 3.5 Develop and implement notification alerts within the community to reduce risk exposure to wildfire smoke and particulate matter.

CR 3.6 Factor climate impacts into the planning of operations and coordination of preparedness, response, and recovery activities among first responders and partners, including public health, law enforcement, fire, school, and emergency medical services (EMS) personnel.

CR 3.7 Incorporate post-wildfire debris flow and flooding hazard information into critical area delineation in fire-prone communities.

CR 3.8 Identify funding mechanisms and design standards to upgrade buildings with sheltering capabilities.

CR 3.9 Consider climate hazards during development and redevelopment of critical public facilities in critical areas with sheltering and emergency response capabilities.

CR 3.10 Update airport master plans to assess climate hazard impacts and incorporate resiliency measures for emergency response operations, facilities upgrades, and other services reliant upon County airports.

CR 3.11 Create evacuation plans and outreach materials to help residents plan and practice actions that make evacuation quicker and safer.

CR 3.12 Study supply chain planning implementation strategies in Lewis County.

CR 3.13 Establish new secondary location with equipment for Emergency Operation Center.

CR 3.14 Work with Lewis County Public Health and Social Services (PHSS) and other departments within the county to establish an emergency sheltering plan during disasters for housed individuals.

EVACUATION SYSTEMS

CR 4 Ensure that the local transportation system — including infrastructure, routes, and travel modes — is able to withstand and recover quickly from the impacts of extreme weather events and other climate-exacerbated hazards.

CR 4.1 Map transportation infrastructure that is vulnerable to repeated floods, landslides, and other natural hazards, and designate alternative travel routes for critical transportation corridors when roads must be closed.

CR 4.2 Identify critical junction points for alternative routing for emergency evacuation.

CR 4.3 Reduce stormwater impacts from transportation and development through watershed planning, redevelopment and retrofit projects, and low-impact development.

CR 4.4 Incorporate hydrologic climate impacts into the design of water-crossing structures (i.e., climate-smart culverts and bridges).

CR 4.5 Create evacuation plans and outreach materials to help residents plan and practice actions that make evacuation quicker and safer.

PUBLIC HEALTH AND WELL-BEING

CR 5 Protect community health and well-being from the impacts of climate-exacerbated hazards — prioritizing focus on overburdened communities — and ensure that the most vulnerable residents do not bear disproportionate health impacts.

CR 5.1 Link climate adaptation strategies with social equity and public health strategies.

CR 5.2 Evaluate and implement habitat reduction and population control for arthropod disease vectors (e.g., mosquitos and ticks) and zoonotic disease reservoirs (e.g., rodents) using integrated pest-management methods.

CR 5.3 Collaborate with tribal governments, water districts, and interagency departments to update water system plans by evaluating vulnerability and risk to existing systems and proposing upgrades for resiliency.

CR 5.4 Collaborate with property owners, school districts, and medical agencies to enhance resiliency of schools and hospitals as emergency shelters by addressing climate hazards and impacts, especially from flooding and wildfire.

CR 5.5 Address the social and mental health needs of displaced populations following disasters.

CR 5.6 Ensure that all community members have equitable access to evacuation routes and shelters in the event that residents are displaced by climate-exacerbated weather events.

CR 5.7 Protect the health and well-being of outdoor workers exposed to wildfire smoke, flooding, extreme heat, and other climate-exacerbated hazards.

CR 5.8 Prioritize at-risk community members for actions that mitigate wildfire smoke, including providing personal protective equipment and filter fans or incentivizing infrastructure updates (e.g., HVAC updates and MERV 13 filters for air intake) for facilities that serve high-risk populations.

GOVERNANCE

CR 6 Manage County administration processes, employees, and resources efficiently to serve County residents.

CR 6.1 Streamline the permitting process to provide education to property owners and businesses on permitting.

CR 6.2 Review resources for County staffing to properly execute comprehensive plan goals related to resilience and emergency management.

CR 6.3 Establish a list of individuals for Lewis County Incident Management Team and Emergency Operation Center team that meets credentialling requirements.

CR 6.4 Establish functional CERT (Community Emergency Response Team) volunteer program throughout the County.

CR 6.5 Establish a list of County employees who can be activated to staff a response operation.

CR 6.6 Develop, implement, and periodically update a plan to mitigate and adapt to climate-exacerbated impacts to the coastline.

CR 6.7 Maintain and update a critical areas ordinance that incorporates climate considerations.

CR 6.8 Evaluate areas with potential for permanent flooding and extreme heat and implement measures that protect public health from arthropod disease vectors and zoonotic disease reservoirs.

CR 7 Seek out and utilize alternative methods of funding for County initiatives.

CR 7.1 Seek funding for emergency management initiatives.

CR 7.2 Explore a Lewis County governmental emergency fund to be utilized during a disaster should it not meet Federal Declaration for funding.

Implementation

Although many policies in this document are implemented through development regulations, this chapter identified several projects and other actions for the County to work toward until the next periodic update. The actions identified in this chapter were based on the feedback collected from the public, County staff, and partner agencies throughout the periodic update process.

The goal of the implementation plan is to:

- Be transparent to the community
- Efficiently use resources
- Efficiently allocate County funds, and
- Manage County staff capacity

Implementation Overview

Over the next twenty years, Lewis County will implement a series of actions aimed at improving the quality of life for its residents through a holistic, collaborative approach. These actions will involve joint planning across multiple departments to ensure that various needs are addressed in a cohesive manner. For instance, the new housing opportunities created through the Onalaska and Packwood Subarea Plans will be supported by infrastructure improvements from Public Works, such as transportation and sewer system upgrades. Economic development efforts will not only help attract new businesses and support existing ones but also create a foundation for new and current residents to thrive. The county's focus on climate and resilience policies, including flood and wildfire mitigation, will be directly informed by public feedback, ensuring the plans are responsive to community concerns. Overall, this integrated approach will promote long-term sustainability and resilience, while enhancing community well-being through improved housing, infrastructure, economic growth, and climate preparedness.

Implementation Requirements

It is not required to include an implementation chapter in the Comprehensive Plan.

However, it is encouraged in the Growth Management Act to monitor and track progress on the Comprehensive Plan to the goals identified to adequately accommodate growth.

Lewis County is committed to transparently achieving goals that improve the community's quality of life and therefore has established an implementation plan to assist with annual planning, resource allocation, and grant funding.

These actions were identified by the Community and County staff identified the following priorities by element that should be worked on until the next periodic update. During the next periodic update policies should be revised to include any new legislation, development regulations, or programs implemented that should be continued as these actions progress.

For the next 10 years, until the next periodic update, the County will execute a series of strategies and actions to support the revised policies in the Comprehensive Plan. The Comprehensive Plan document provides the land use framework and development regulations to support housing, growth, transportation, and economic development but it does not guarantee the real-world application of these policies will be achieved. The following Table 13 Implementation Actions outlines actions that the County may take given the proper resources are available to achieve real-world outcomes for the residents of Lewis County. To expedite the process, for each strategy or action identified, additional information has been provided to help the County plan out what the next 10 years of implementation might look like.

TABLE 12 IMPLEMENTATION ACTIONS

Element	Goals and Policies	Action ID #	Action	Priority	Timing	Responsibility	Key Partners
Land Use	UGA 4 UGA 5 UGA 6	A1	Implement the Onalaska Subarea Plan	High	Short-Term	Community Development	Public Works, PHSS
Land Use	UGA 4 UGA 5 UGA 6	A2	Implement the Packwood Subarea Plan	High	Short-Term	Community Development	Public Works, PHSS
Housing	H1 H 4	A3	Monitor progress to provide low-income housing types	High	Long-Term	Community Development	Department of Commerce
Housing	H 2.4	A4	Study housing needs and identify priority areas for housing types, emergency shelters, and temporary supportive housing for rural populations.	High	Short-Term	PHSS Community Development	Department of Commerce
Housing	H 1 H 4	A5	Increase Housing Programs for populations below 50 percent AMI, prioritize disadvantaged communities	High	Long-Term	PHSS Community Development	Department of Commerce

Element	Goals and Policies	Action ID #	Action	Priority	Timing	Responsibility	Key Partners
Housing	H 4.5	A6	Develop policies and regulations for short-term rentals	High	Short-Term	Community Development	
Housing	H 4	A6	Continue reviewing benefits and impacts of ADUs	Medium	Short-Term	Community Development	
Transportation	T 11	A7	Coordinate to improve transit options or other alternative modes of transportation in rural areas	Medium	Long-Term	Public Works Community Development	Lewis County Transit
Transportation	CR 4 CR 3	A8	Start bridge repair and replacement program	High	Ongoing	Public Works	WSDOT
Transportation	CR 4 CR 3	A9	Prioritize critical routes for evacuation in transportation improvements	High	Short-Term	Public Works	Emergency Management WSDOT
Capital Facilities	UGA 4, 5, 6 H 4 CF 11.2	A10	Complete the Packwood Sewer Plan	High	Short-Term	Public Works	Community Development
Capital Facilities	CF 12.3	A11	Implement Phase II Stormwater Program	High	Short-Term	Public Works	Community Development
Capital Facilities	CF 5	A12	Implement County-wide EV opportunities	Medium	Mid-Term	Public Works	Community Development
Capital Facilities	CF 16	A13	Increased Broadband Connection and Coordination	Medium	Long-Term	Public Works	Private Partners
Capital Facilities	CF 10.3	A14	Complete a coordinated water system consolidation	High	Short-Term	Public Works	Department of Health
Economic Development	ED 3	A15	New businesses/business expansion in all priority sectors	High	Short-Term	Community Development	Discover Lewis County Lewis County Economic Alliance

Element	Goals and Policies	Action ID #	Action	Priority	Timing	Responsibility	Key Partners
Economic Development & Climate	ED 2	A16	Initiate resilience and economic development joint planning efforts	High	Long-Term	Community Development & Emergency Management	Discover Lewis County Lewis County Economic Alliance
Climate and Resiliency	CR 3	A17	Complete projects for evacuation preparedness (plan, sirens, routes, bridge replacements, emergency shelters)	High	Short-Term	Emergency Management	Community Development
Climate and Resiliency	CR 1, 2, 3, 4, 5	A18	Identify future funding for new emergency preparedness and resilience policies	Medium	Long-Term	Emergency Management	PHSS
Climate and Resiliency	CR 3.12	A19	Supply chain planning with local warehouses	High	Short-Term	Emergency Management	Economic Alliance of Lewis County

Implementation Funding

Land Use Element

A significant number of Goals and Policies in this Comprehensive Plan are implemented through the development regulations. Development regulations are updated through this process and they use the County's allocated money and staff resources from the Community Development budget. The Community Development Department is responsible for the ongoing administration, permitting, and updates to the County's development regulations, Lewis County Code - Title 17 Land Use and Development Regulations. For updates and changes to the development regulations, contact the Lewis County Community Development Department.

Housing Element

Housing Goals and Policies not related to development regulations are typically executed through health departments or housing authorities and can be funded in a variety of ways depending on the County's budget limitations and available funding from federal agencies, which can change annually. For updates and changes to housing programs or housing initiatives contact Lewis County Community Development Department.

Transportation, Capital Facilities, and Utilities

The Transportation, Utilities and Capital Facilities Elements Goals and Policies are typically accomplished through a combination of regulations and on-the-ground projects to improve infrastructure. These projects are funded through the County's capital improvements budgets which are reviewed and updated annually. For updates and changes to budgets relating to transportation, infrastructure and capital facilities, contact Lewis County Public Works Department.

Economic Development

Economic Development initiatives in Lewis County are executed through a combination of public and private partnerships between cities, the County, and local economic development groups, like the Economic Alliance of Lewis County and Discover Lewis County. Economic development actions are funded on a case-by-case basis and may be approved by the Board of County Commissioners, or secured through external funding state, federal, or private partnerships.

Climate and Resiliency

As this is a new element starting in 2025 the Goals and Policies in this element will be a shared responsibility between all County Departments impacted or benefitting from the policies. However, goals and policies relating to hazard mitigation or emergency preparedness will be executed through Department of Emergency Management. Special projects identified in the element will need alternative funding sources that may be approved by the Board of County Commissioners or secured through state or federal funding programs. Contact the Lewis County Department of Emergency Management for update on the most recent projects.

Glossary

Accessory Dwelling Unit (ADU) A dwelling unit located on the same lot as a single-family housing unit, duplex, triplex, or other housing unit. RCW 36.70A.696(1)

Active Transportation / Active Modes Describes human scaled and often person powered ways of getting around, such as walking, bicycling, or rolling a wheelchair. Washington Department of Transportation Active Transportation Plan, 2024

Adaptation The process of adjusting to new (climate) conditions in order to reduce risks to valued assets. U.S. Climate Resilience Toolkit

Affordable Housing Residential housing whose monthly costs, including utilities other than telephone, do not exceed 30 percent of the monthly income of a household whose income is:

(a) For rental housing, 60 percent of the median household income adjusted for household size, for the county where the household is located, as reported by the United States department of housing and urban development; or

(b) For owner-occupied housing, 80 percent of the median household income adjusted for household size, for the county where the household is located, as reported by the United States department of housing and urban development. RCW 36.70A.030

Americans with Disabilities Act (ADA) The Americans with Disabilities Act (ADA) is a federal civil rights law that prohibits discrimination against people with disabilities in everyday activities. U.S. Department of Justice Civil Rights Division

American Community Survey (ACS) This is an ongoing nationwide survey conducted by the U.S. Census Bureau. It designed to provide communities with current data about how they are changing. The ACS collects information such as age, race, income, commute time to work, home value, veteran status, and other important data from U.S. households. ACS data is commonly used for the Community Profile section of a housing needs assessment. U.S. Census ACS Information Guide

Assets People, resources, ecosystems, infrastructure, and the services they provide. Assets are the tangible and intangible things people or communities value. U.S. Climate Resilience Toolkit

Area Median Income (AMI) describes the midpoint of an area's income distribution, where 50 percent of households earn above the median figure while 50 percent earn less than the median. U.S. Housing and Urban Development

Capital Facilities Plan (CFP) A capital facilities plan is an inventory of capital facilities owned by any public entities and forecast of future needs of facilities with any associated costs to improve facilities. RCW 36.70A.070

Climate The usual weather of a place. National Aeronautics and Space Administration (NASA)

Climate Resilience The ongoing process of anticipating, preparing for, and adapting to changes in climate and minimizing negative impacts to our natural systems, infrastructure, and communities. RCW 70A.65.010(16)

Climate Stressor A condition, event, or trend related to climate variability and change that can exacerbate hazards. U.S. Climate Resilience Toolkit

Co-benefits The ancillary or additional benefits of policies that are implemented with a primary goal, such as climate mitigation — acknowledging that most policies designed to reduce greenhouse gas emissions also have other, often at least equally important, benefits (for example, energy savings, economic benefits, air quality benefits, public health benefits). Also referred to as "multiple benefits." U.S. Environmental Protection Agency

Community Wildfire Protection Plan (CWPP) It is a comprehensive wildfire safety plan developed by the local citizens, state and federal agencies. Washington Department of Natural Resources

Concurrency (Regulatory) Concurrency requires jurisdictions or a developer to provide any transportation improvements or programs required to reduce demand and meet an established transportation level-of-service within (6) six years of the completion of a development. RCW 36.70A.070 (6)(b)

Critical Areas It includes the following areas and ecosystems: (a) Wetlands; (b) areas with a critical recharging effect on aquifers used for potable water; (c) fish and wildlife habitat conservation areas; (d) frequently flooded areas; and (e) geologically hazardous areas. "Fish and wildlife habitat conservation areas" does not include such artificial features or constructs as irrigation delivery systems, irrigation infrastructure, irrigation canals, or drainage ditches that lie within the boundaries of and are maintained by a port district or an irrigation district or company. RCW 36.70A.030(11)

Critical Infrastructure Systems and assets, whether physical or virtual, so vital that the incapacity or destruction of such may have a debilitating impact on the security, economy, public health or safety, environment, or any combination of these matters, across any local, state, tribal and federal jurisdiction. FEMA

Electric Vehicle (EV) An EV is defined as a vehicle that can be powered by an electric motor that draws electricity from a battery and is capable of being charged from an external source. U.S. Department of Energy

Emergency Housing Temporary indoor accommodations for individuals or families who are homeless or at imminent risk of becoming homeless that is intended to address the basic health, food, clothing, and personal hygiene needs of individuals or families. Emergency housing may or may not require occupants to enter into a lease or an occupancy agreement. RCW 36.70A.030(14)

Emergency Medical Services (EMS) Emergency Medical Services is a system that responds to emergencies in need of highly skilled pre-hospital clinicians. EMS is most recognizable by its vehicles, helicopters and workforce, which respond to emergency incidents. EMS, 2025

Emergency Shelter A facility that provides a temporary shelter for individuals or families who are currently homeless. Emergency shelter may not require occupants to enter into a lease or an occupancy agreement. Emergency shelter facilities may include day and warming centers that do not provide overnight accommodations. RCW 36.70A.030(15)

Exposure The presence of people, assets, and ecosystems in places where they could be adversely affected by hazards. U.S. Climate Resilience Toolkit

Green Infrastructure A wide array of natural assets and built structures within an Urban Growth Area boundary, including parks and other areas with protected tree canopy, and management practices at multiple scales that manage wet weather and that maintain and restore natural hydrology by storing, infiltrating, evapotranspiring, and harvesting and using stormwater. RCW 36.70A.030(21)

Growth Management Act (36.70A RCW) A series of state statutes, first adopted in 1990, that requires fast-growing cities and counties to develop a comprehensive plan to manage their population growth. Municipal Research and Services Center

Hazard An event or condition that may cause injury, illness, or death to people or damage to assets. U.S. Climate Resilience Toolkit

Hazard Mitigation Any sustainable action that reduces or eliminates long-term risk to people and property from future disasters. FEMA

Heating Ventilation and Air Conditioning (HVAC)

Levels of Service (LOS) An established minimum capacity of public facilities or services that must be provided per unit of demand or other appropriate measure of need. Level of service standards are synonymous with locally established minimum standards. WAC 365-196-210(21)

Long-Term Commercial Significance The growing capacity, productivity, and soil composition of the land for long-term commercial production, in consideration with the land's proximity to population areas, and the possibility of more intense uses of the land. RCW 36.70A.030(23)

Multimodal Transportation Includes public transportation, rail and waterways, bicycle and pedestrian. Multimodal access supports the needs of all users whether they choose to walk, bike, use transit or drive. It means more connections and more choices. WSDOT

Multimodal Levels of Service (MMLOS) Standards for all locally owned arterials, locally and regionally operated transit routes that serve urban growth areas, state-owned or operated transit routes that serve urban areas if the department of transportation has prepared such standards, and active transportation facilities to serve as a gauge to judge performance of the system and success in helping to achieve the goals of this chapter consistent with environmental justice.

Natural Resource Conservation Service (NRCS) NRCS helps producers, soil and water conservation districts, and other partners protect and conserve natural resources on private lands throughout the United States. NRCS, 2025

Overburdened Communities A geographic area where vulnerable populations face combined, multiple environmental harms and health impacts, and includes, but is not limited to, highly impacted communities as defined in RCW 19.405.020. RCW 36.70A.030(29)

Permanent Supportive Housing (PSH) Subsidized, leased housing with no limit on length of stay that prioritizes people who need comprehensive support services to retain tenancy and utilizes admissions practices designed to use lower barriers to entry than would be typical for other subsidized or unsubsidized rental housing, especially related to rental history, criminal history, and personal behaviors. Permanent supportive housing is paired with on-site or off-site voluntary services designed to support a person living with a complex and disabling behavioral health or physical health condition who was experiencing homelessness or was at imminent risk of homelessness prior to moving into housing to retain their housing and be a successful tenant in a housing arrangement, improve residents' health status, and connect the resident of the housing with community-based health care, treatment, or employment services. Permanent supportive housing is subject to all of the rights and responsibilities defined in chapter 59.18 RCW. RCW 36.70A.030(31)

Public Facilities Include streets, roads, highways, sidewalks, street and road lighting systems, traffic signals, domestic water systems, storm and sanitary sewer systems, parks and recreational facilities, and schools. RCW 36.70A.030(32)

Public Services Include streets, roads, highways, sidewalks, street and road lighting systems, traffic signals, domestic water systems, storm and sanitary sewer systems, parks and recreational facilities, and schools. RCW 36.70A.030(33)

Public Utility District (PUD) A Public Utility District is a community-owned, locally regulated utility created by a vote of the people under RCW 54. Washington Public Utility District Association

Roadway Functional Classification A grouping of highways, roads, and streets by the character of service they provide and use for transportation planning purposes. Washington Department of Transportation Website, 2024

Resource Lands / Natural Resource Lands

(a) Agricultural lands that are not already characterized by urban growth and that have long-term significance for the commercial production of food or other agricultural products;

(b) Forestlands that are not already characterized by urban growth and that have long-term significance for the commercial production of timber;

(c) Mineral resource lands that are not already characterized by urban growth and that have long-term significance for the extraction of minerals; and

(d) Critical areas.

Risk The potential for negative consequences where something of value is at stake. In the context of the assessment of climate impacts, the term risk is often used to refer to the potential for adverse consequences of a climate-related hazard. Risk can be assessed by multiplying the probability of a hazard by the magnitude of the negative consequence or loss. U.S. Climate Resilience Toolkit

Sensitivity The degree to which a system, population, or resource is or might be affected by hazards. U.S. Climate Resilience Toolkit

Transportation Improvement Program A short-range planning document that is updated every year and shows the funding sources and amounts for transportation improvements projects and programs, including bicycle and pedestrian facilities, planned for the next six years. RCW 36.81.121, MRSC Transportation Plans and Plan Elements

Transportation System All infrastructure and services for all forms of transportation within a geographical area, irrespective of the responsible jurisdiction or transportation provider. RCW 36.70A.030(42)

Transportation Demand Management (TDM) Demand management is defined as a set of strategies aimed at maximizing traveler choices. Managing demand is about providing travelers, regardless of whether they drive alone, with travel choices, such as work location, route, time of travel and mode. In the broadest sense, demand management is defined as providing travelers with effective choices to improve travel reliability. U.S. Department of Transportation

United States Department of Housing and Urban Development (HUD) The United States Department of Housing and Urban Development is one of the executive departments of the U.S. federal government. It administers federal housing and urban development laws. HUD, 2025

Urban Governmental Services / Urban Services Include those public services and public facilities at an intensity historically and typically provided in cities, specifically including storm and sanitary sewer systems, domestic water systems, street cleaning services, fire and police protection services, public transit services, and other

public utilities associated with urban areas and normally not associated with rural areas. RCW 36.70A.030(43)

Urban Growth Area Each county that is required or chooses to plan under RCW 36.70A.040 shall designate an urban growth area or areas within which urban growth shall be encouraged and outside of which growth can occur only if it is not urban in nature. Each city that is located in such a county shall be included within an urban growth area. An urban growth area may include more than a single city. An urban growth area may include territory that is located outside of a city only if such territory already is characterized by urban growth whether or not the urban growth area includes a city, or is adjacent to territory already characterized by urban growth, or is a designated new fully contained community as defined by RCW 36.70A.350. RCW 36.70A.110(1)

Vulnerability The propensity or predisposition of assets to be adversely affected by hazards. Vulnerability encompasses exposure, sensitivity, potential impacts, and adaptive capacity. U.S. Climate Resilience Toolkit

Vulnerable Populations Groups that are more likely to be at higher risk for poor health outcomes in response to environmental harms, due to: adverse socioeconomic factors such as unemployment, high housing and transportation costs relative to income, limited access to nutritious food and adequate health care, linguistic isolation, and other factors that negatively affect health outcomes and increase vulnerability to the effects of environmental harms; and, sensitivity factors, such as low birth weight and higher rates of hospitalization. Vulnerable populations include but are not limited to: racial and ethnic minorities; low-income populations; and, populations disproportionately impacted by environmental harms. RCW 36.70A.030(47)(a)(b)

Washington Department of Transportation (WSDOT) A state agency responsible for managing and improving Washington's transportation system, including highways, bridges, and ferries, and coordinating with local jurisdictions on local transportation system integration. WSDOT Website

Washington Resource Inventory Area (WRIA) Washington is divided into 62 Water Resource Inventory Areas (WRIAs) based on natural watersheds. Due to Washington's varied land uses, hydrology, and precipitation levels, the amount of water available for new water right permits varies dramatically across the state. Ecology, 2025

Wildland Urban Interface (WUI) The geographical area where structures and other human development meets or intermingles with wildland vegetative fuels. RCW 36.70A.030(49)

Lewis County 2045

Shaping the Future of Lewis County

Lewis County Comprehensive Plan Appendices

For appendices, page numbers may be inaccurate. The appendices are combined with other PDF documents.

Appendix A Land Capacity Analysis

Analysis starts on the next page.

Appendix B Housing Capacity and Housing Needs Assessment

Assessment starts on the next page.

Appendix C Capital Facilities Plan

Introduction to Capital Facilities Plan

The Capital Facilities Plan is a six-year planning document showcasing existing conditions of the county's capital facilities, levels of service of each facility, and financing for new or expanding capital facilities that is updated annually. The Capital Facilities Plan is divided into county and non-county facilities and then grouped by type of facility within each division. Each grouping includes an inventory, forecast of future needs over the 20-year planning period, and financing plan for projects within the next six years. Goals and policies specific to the Capital Facilities and Utilities element are within the County's Comprehensive Plan document.

Acronyms

RCW: Revised Code of Washington
WAC: Washington Administrative Code
CFP: Capital Facilities Plan

Planning Context

Growth Management Act

This document, along with the County's Capital Facilities and Utilities Element, implements Goal 12 of the Washington State Growth Management Act ("GMA"), which provides that the County must "[e]nsure that those public facilities and services necessary to support development shall be adequate to serve the development at the time the development is available for occupancy and use without decreasing current service levels below locally established minimum standards."

The GMA (RCW 36.70A.070) specifically requires that the county's Comprehensive Plan include a Capital Facilities Plan Element consisting of the following:

a) *An inventory of existing capital facilities owned by public entities, including green infrastructure, showing the locations and capacities of the capital facilities;*
b) *a forecast of the future needs for such capital facilities;*
c) *the proposed locations and capacities of expanded or new capital facilities;*
d) *at least a six-year plan that will finance such capital facilities within projected funding capacities and clearly identifies sources of public money for such purposes; and*

e) *a requirement to reassess the land use element if probable funding falls short of meeting existing needs and to ensure that the land use element, capital facilities plan element, and financing plan within the capital facilities plan element are coordinated and consistent.*

This Capital Facilities Plan will cover most of the requirements in a) through d) while other comprehensive plan elements (transportation element, parks and recreation element, land use element, and the economic development element) will cover the rest of d) and e).

This Capital Facilities Plan incorporates the County's 6-year Capital Improvement Plan by reference to satisfy the requirement of RCW 36.70A.070(3)(d).

Limitations of the Capital Facilities Plan

This CFP covers all County owned facilities to our best knowledge and the financing plan is updated annually in collaboration with the Department of Public Works. Lewis County is a largely rural county with some facilities (schools, fire, private utilities) serving large portions of the county with very little population. Non-County owned facilities may be difficult to collect due to the size and frequency of communication.

The GMA states that,

"The county or city shall identify all public entities that own capital facilities/utility systems and endeavor in good faith to work with other public entities, such as special purpose districts, to gather and include within its capital facilities element the information required by this subsection. If, after a good faith effort, the county or city is unable to gather the information required by this subsection from the other public entities, the failure to include such information in its capital facilities element cannot be grounds for a finding of noncompliance or invalidity under chapter 228, Laws of 2023. A good faith effort must, at a minimum, include consulting the public entity's capital facility or system plans and emailing and calling the staff of the public entity."

Pursuant to this requirement, the information gathered and displayed within this document is the information that was able to be gathered after a good faith effort in communication with each public entity that owns either capital facilities or utility systems.

Capital Facilities and Utility System Ownership Summary

County Owned	Non-County Owned
Government Services	Schools
Parks and Recreation	Fire Protection
Solid Waste Management	Electricity
Storm Drainage systems	Natural Gas
Transportation	Telecommunications
Wastewater Systems	Water Systems (all other major systems)
Water Systems (Only Vader)	

County Owned Capital Facilities

Government Services

Overview

The government of Lewis County operates several facilities including court buildings, law enforcement, health services, shelters, and storage facilities.

General government buildings are primarily located in downtown Chehalis, while specialized services such as Senior Centers are spread more throughout the county. Each of the facilities operated by the county are listed in **Table CF- 1** and shown in Figure 11.

Existing Inventory

Table CF- 1. Government Services Inventory

Building Name	Address	Location	Ownership*	Built	Square Feet
GENERAL GOVERNMENT					
Courthouse	351 NW North Street	Chehalis	OO	1927	57,166
Health Service Building	360 NW North Street	Chehalis	OO	1953	17,524
Law & Justice Center/Annex	345 W Main	Chehalis	OO	1978	67,054
Motor Pool	476 W Main	Chehalis	OO	1956	10,714
Jail	28 SW Chehalis Ave.	Chehalis	OO	1986	66,964
Evidence/Coroner Building	585 Center Street	Chehalis	OO	1950	18,312
Facilities Building	571 NW Prindle St.	Chehalis	OO	1950	14,000
Public Works/Community Dev.	2025 NE Kresky	Chehalis	OO	1987	12,650
Brick House	19 SW Cascade Ave	Chehalis	OO	1935	2,745
LCSO East County Substation	8901 US Hwy 12	Glenoma	OO	2024	2,232
Unused Building	185 NW Chehalis Ave.	Chehalis	OO	2020	6,000
Community Development	123 NW Chehalis Ave.	Chehalis	OO	2020	11,000
Public Works	57 W Main St	Chehalis	OO	2021	10,055
Night by Night Shelter	2015 Kresky Ave	Chehalis	OO	2022	6,780
Extension Office	17 Cascade	Chehalis	OO	1954	2,269
Lewis County Animal Shelter (Including Storage)	560 Centralia - Alpha Road	Centralia	OO	1980	2,688
Youth Service Center	1255 SW Pacific	Chehalis	OO	1979	18,576
Drug Court House	1258 SE Washington Ave	Chehalis	OO	2022	3,422
SENIOR CENTERS					
Twin Cities Senior Center, Outside Office, and Storage Building	2545 N National Ave	Chehalis	OL	1983	9,788
Morton Senior Citizen Center	103 Westlake Ave (At 1st Ave)	Morton	OL	1983	4,616
Olequa Senior Center	119 SW Kerron	Winlock	OL	1987	4,944
Packwood Senior Center and Storage Building	12931 US Hwy 12	Packwood	OL	1983	4,068

Building Name	Address	Location	Ownership*	Built	Square Feet
Toledo Senior Citizen Center	150 Coal Street	Toledo	OL	1981	4,376

**OO – Owned and Occupied by County, OL – Owned by County and Leased, LH – Not Owned by County and Leased*

Levels of Service

Text.

Future Needs

Government services needs are outlined within the 6-year financial plan in **Table CF- 6**.

Park and Recreation Facilities

Overview

Lewis County contains several parks and recreation facilities (see **Figure 19**). These facilities include parks operated by the federal government, Washington State Parks, Washington Department of Fish and Wildlife, Tacoma Power, Lewis County Public Utility District #1 (PUD), the incorporated cities of the county, and a variety of other agencies.

Existing Inventory

Lewis County owns and operates four parks, two historic museums, and a parks maintenance shop (shown in **Table CF- 2**). The county does not coordinate with other agencies, beyond the general review of permits, on their plans for parks and open space.

Table CF- 2. Parks and Recreations Inventory

Facility Name	Acreage	Address	Location	Facilities
COUNTY PARKS				
South County Park	43.0	212 Ray Road	Toledo	Swimming, fishing, boating, playground and picnic area
Schaefer Park	14.0	822 SR 507	Centralia	River swimming, fishing, group use, playground, picnic area

Facility Name	Acreage	Address	Location	Facilities
Rose Park	20.9	263 Penning Road	Chehalis	Covered picnic/kitchen area, picnic area, playground, volleyball area, horseshoe pit, trail with exercise stations
Back Memorial Park	5.0	146 Dieckman Road	Chehalis	Track, ball fields, playground, and picnic area
Cowlitz River Park	3.5	105 Alta Dr	Packwood	Picnic area, swimming, walking trail, and river access for hand-carried boats
HISTORIC BUILDINGS				
Claquato Church	600 sf	125 Water Street	Chehalis	Historic place museum
St Urban Church	1,656 sf	Military Road	Winlock	Historic building
PARKS MAINTENANCE AND STORAGE				
Onalaska Parks Shop	5,544 sf	951 Hwy 508	Onalaska	Storage and maintenance building

Levels of Service

Text.

Future Needs

The Packwood Park System was identified in the 6-Year capital plan for improvements. The cost, funding source, and expected timing of improvements can be found in **Table CF-2**.

Solid Waste Management Facilities

Overview

Lewis County provides municipal and household solid waste disposal for area residents. The County's Solid Waste Services operates two transfer stations (one in Centralia and the other just east of the City of Morton). Businesses and residential customers may haul their solid waste or recycling to one of the transfer stations, or have their trash collected by private companies as part of a curbside pickup program.

Trash collected in Lewis County is ultimately disposed in Wasco County Landfill in Wasco County, Oregon.

Existing Inventory

Each transfer stations have various accessory buildings to support the stations including office buildings, employee buildings, and storage sheds. Capacity, levels of service, and waste generation rates are analyzed within the County's Solid and Hazardous Waste Management Plan, which is incorporated by reference. **Table CF- 3** gives a summary of existing County owned solid waste facilities.

Table CF- 3. Solid Waste Facility Inventory

Facility Name	Address	Location	Site Area (Acres)	Building size (Square Feet)
SOLID WASTE TRANSFER STATIONS				
Centralia	1411 South Tower Avenue	Centralia	88.50	12,280
Morton	6745 U.S. Hwy 12	Morton	6.98	8,600
ACCESSORY BUILDINGS				
Centralia	1411 South Tower Avenue	Centralia	88.50	6,648
Morton	6745 U.S. Hwy 12	Morton	6.98	399

Levels of Service

See Lewis County Solid and Hazardous Waste Management Plan.

Future Needs

A new transfer station is proposed to be built within the planning period to serve the growing needs of the population in the south part of the County. Estimated funding needs and source of the funding to complete the construction of the new transfer station is still under analysis.

The new transfer station is mentioned in **Table CF-3** as "South County Transfer Station".

Transportation Facilities

Overview

Lewis County operates a variety of facilities that are utilized to maintain existing county transportation infrastructure. These facilities include shop buildings, sand sheds, and pits and quarries, which help to provide materials for area roads. A complete list of these facilities is provided in **Table CF- 4**.

Existing Inventory

Roads, airports, rail, transit and non-motorized transportation are not included in this CFP because the County's Transportation Element includes an inventory and level of service analysis, and the six-year Transportation Improvement Program ("TIP") includes a financing plan. These plans are incorporated by reference.

Table CF- 4. Transportation Facilities Inventory

Building Name	Address	Location	Ownership*	Built	Square Feet
Road Shops, Pits and Quarries, and Sand Sheds					
Central Shop	109 Forest Napavine Road	Chehalis	OO	1955	17,664
Central Shop - Welding Shop	109 Forest Napavine Road	Chehalis	OO	1980	2,200
Equipment Storage - Truck Garage	109 Forest Napavine Road	Chehalis	OO	1957	7,200
Traffic Control	109 Forest Napavine Road	Chehalis	OO	1980	8,300
Bridge Shop	109 Forest Napavine Road	Chehalis	OO	1970	7,764
Wash Rack	109 Forest Napavine Road	Chehalis	OO	1998	1,400
Area Shop 1	148 Big Hanaford Road	Centralia	OO	1970	8,750
Bunker Garage and Shop #2	307 Spooner Road (SR-6)	Chehalis	OO	1961	6,870
Sand/Rock Shed	307 Spooner Road (SR-6)	Chehalis	OO	1999	2,400
Vehicle Wash Building	307 Spooner Road (SR-6)	Chehalis	OO	2010	90
Area Shop # 3	111 Pleasant Valley Road	Winlock	OO	1987	10,222
Area # 5 Road Shop - Vegetation	162 Brim Road	Ethel	OO	1992	2,952
Area #5 Road Shop	162 Brim Road	Ethel	OO	2016	20,060
Area 7 Administration/Shop Building	8911 US Highway 12	Randle	OO	2015	9,828
Vehicle Storage/Wash Rack Building	8911 US Highway 12	Randle	OO	1986	4,040
Sand Shed	8911 US Highway 12	Randle	OO	2004	2,400
Sheriff Storage	187 Kirkland Road	Chehalis	OO	1967	6,346
Toledo Sand Shed	134 Collins Road 125	Toledo	OO	1964	1,300
South County Airport Board Room	5235 Jackson Hwy	Toledo	OO	1960	1,002
South County Airport Hangar #5 50x160 Metal Building	5235 Jackson Hwy	Toledo	OO	1960	7,680
Airport Admin Building and MBR Building	5239 Jackson Hwy	Toledo	OO	2011	3,456
Lighting Control Building	5239 Jackson Hwy	Toledo	OO	2011	192
Packwood Airport	0 Main St W	Packwood	OO	1994	2,400

**OO – Owned and Occupied by County, OL – Owned by County and Leased, LH – Not Owned by County and Leased*

Levels of Service

Transportation-related facilities are built and leased on an as-needed basis to maintain the county's more specific road levels of service (details and methodology can be found in the transportation element of the comprehensive plan).

Future Needs

There are renovations identified and planned for the Central Shop. The cost, funding source, and expected timing of improvements can be found in table CF-X. A full list of planned transportation improvements, extensions, and rehabilitations can be found in the Transportation Improvement Program (separate cover).

Water Systems

Overview

Lewis County is served by several public and private water utilities (see Map CF-4). Of these utilities, Group A water systems are the largest and:

- Have 15 or more service connections, or
- Serve 25 or more people 60 or more days per year.

These Group A water systems are required to prepare a Water System or Small Water System Management Plan to assist in the future planning for their facilities.

Lewis County only directly provides water service to the City of Vader (as a result of a Superior Court decision in 2010) but does review the water plans of each of the Group A systems to ensure consistency with the County's Comprehensive Plan and Countywide Planning Policies.

Due to the volume and complexity of information contained within these various plans, an inventory of existing facilities, necessary improvements, and financing information is not repeated within this Capital Facilities Plan. Instead, a list of basic information about the non-municipal major water systems is provided in **Table CF- 5**.

Copies of the Water System Plans for Group A systems are kept on file with the Lewis County Community Development Department and considered a key component of the background data that has been reviewed in the development of this Comprehensive Plan.

Existing Inventory

Table CF- 5. Large Water System Inventory

System	General Information		Connections		Source
	Plan Date	Governance	Existing	Approved	Water Source
Boistfort Valley Water	2024	Private	850	1,210	Little Mill Creek, Chehalis River, groundwater well
LCWD #1 – Randle	2024	Special District	116	142	Groundwater wells
LCWD #2 – Onalaska	2017	Special District	220	435	Groundwater wells
LCWD #3 – Packwood	2018	Special District	320	486	Groundwater wells
LCWD #5 - Middle Fork Water Sewer System	2020	County	17	100	Groundwater wells
LCWD #6 – Lake Mayfield Village	2006*	Special District	262	270	Groundwater wells
Vader-Enchanted Valley	2016	County	365	369	Cowlitz River

**Updated water system plans were not available, but updated information was obtained from direct communication with District Operator.*

Levels of Service

Each water system plan has detailed methodologies for levels of service specific to each district. These methodologies can be found in the specific water system plans.

Future Needs

Regular water pipe maintenance and flushing is planned in the 6-year finance plan. Each specific water district has a detailed list of planned projects to maintain levels of service within their water system plan.

Wastewater Systems

Overview

Lewis County reviews the sewer plans of jurisdictions and districts within the county. Review of these plans considers the growth forecasts used to project future wastewater flows and the management of areas that are outside incorporated communities and their urban growth areas. The sewer plans are specifically reviewed to ensure that: the district's planning area boundaries are consistent with UGA boundaries and to make sure that urban areas are adequately planned for future service.

Existing Inventory

Beyond the wastewater treatment facilities located in incorporated jurisdictions, six water/sewer districts operate in Lewis County.

Lewis County Water/Sewer District 1 – Randle
District 1 serves the Randle area. At present, the district does not have any facilities to treat wastewater.

Lewis County Water/Sewer District 2 – Onalaska
District 2 serves the Onalaska area. The district operates a wastewater treatment facility with an annual average capacity of 107,000 gallons per day (gpd). The system is detailed further in the subarea plan for Onalaska.

Lewis County Water/Sewer District 3 – Packwood
District 3 serves the Packwood community. The district adopted a Wastewater Facility Plan in 2013 and is in the process of developing a sewer treatment system.

Lewis County Water/Sewer District 4 – Chehalis
District 4 serves the south Chehalis area. Wastewater from the system is treated at the Chehalis Regional Water Reclamation Facility.

Lewis County Water/Sewer District 5 – North Onalaska
District 5 serves the Birchfield area. Wastewater from the system is proposed to be treated by Water/Sewer District 2.

Lewis County Water/Sewer District 6 – Lake Mayfield
District 6 serves the Lake Mayfield Resort and the Mayfield Village LAMIRD. Wastewater from the area is treated at a small treatment plant along the shoreline of Mayfield Lake. The wastewater treatment plant is at capacity and no new growth is allowed or expected at this time in the Lake Mayfield community.

Levels of Service

Each sewer system plan has detailed methodologies for levels of service specific to each district. These methodologies can be found in the specific system plans.

Future Needs

Each specific sewer district has a detailed list of planned projects to maintain levels of service within their system plan.

6-Year Financing Plan Summary

Lewis County maintain an annually updated 6-year capital plan for county owned capital facilities and utility infrastructure. The 6-year Capital Plan and 6-year Transportation Improvement Program are supplementary to each other. **Table CF- 6** shows a snapshot of the planned projects and funding sources in the 2025-2030 Lewis County Capital Plan.

Table CF- 6. 6-Year Financing Plan Snapshot (all amounts in $1,000s)

Project	Total Estimated Cost	Funding Source	2025	2026	2027	2028	2029	2030
GOVERNMENT SERVICES								
Courthouse campus yearly maintenance and improvements	350/yr	REET	350	350	350	350	350	350
Health building parking lot improvements	1,200	Bond/ REET	1,200					
Health Building HVAC and window improvements	2,000	Grant/ REET	650	650	700			
IT Building renovation/ conversion	1,250	Bond/ REET	300					
County elevator upgrades	1,000	REET	265	469.3	368.5			
County Jail yearly maintenance	250/yr	1/10 of 1%	250	250	250	250	250	250
Jail roof replacement	2,250	1/10 of 1%				750	1,500	
New emergency management complex	12,430	TBD	TBD					
Countywide broadband improvements	30,000	ARPA/	TBD					

Project	Total Estimated Cost	Funding Source	2025	2026	2027	2028	2029	2030
and extensions		Grant						
New animal shelter	3,125	Donations	TBD					
Code revisions for Drug Court Transitional Shelter	40	Drug Court funds	TBD					
Night by Night temporary and permanent shelter renovations	2,200	State Cap budget	1,500					
PARKS AND RECREATION								
Yearly parks and fairgrounds maintenance and improvements	500/yr	REET/ Grant	500	500	500	500	500	500
Fairgrounds master plan projects	TBD	REET/ Grant	TBD					
Equestrian Center engineering plans	200	State Cap budget	200					
Packwood Park system	5,000	REET/ Grant	TBD					
OTHER								
Solid Waste: South County Transfer Station	TBD	TBD	TBD					
Waterline rehabilitation	1,250	ARPA	500					

Plans Used for County Owned Facilities

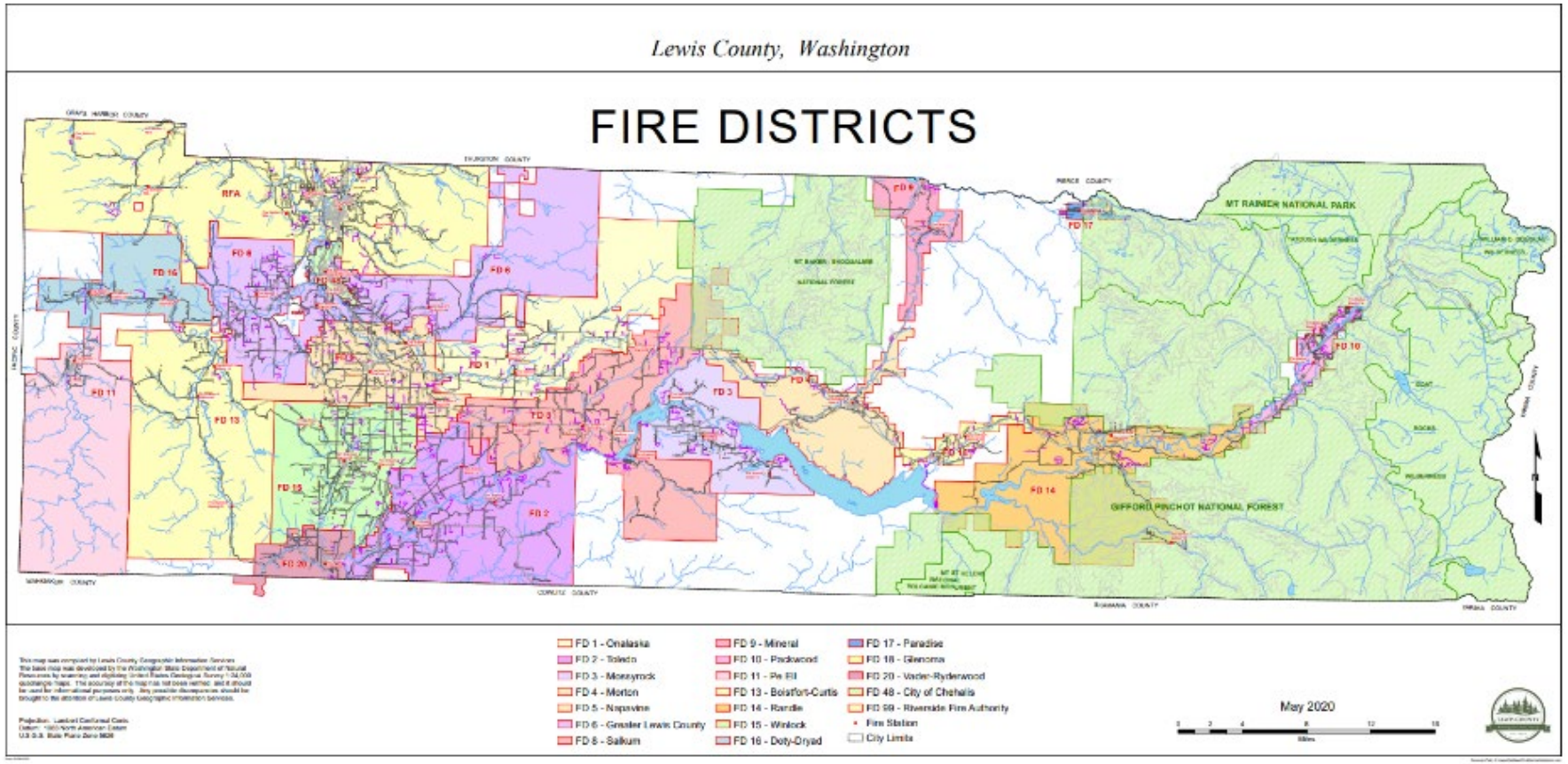
- Lewis County 6-Year Capital Plan and Inventory (excel file)
- Lewis County 6-Year Transportation Improvement Program, 2024
- Vader-Enchanted Valley Water System Plan, 2016
- Lewis County Solid and Hazardous Waste Management Plan, 2023

Non-County Owned Capital Facilities

Fire Districts

Overview

Lewis County contains 18 fire districts. The fire districts serve both unincorporated Lewis County and incorporated cities. Fire District 17 is currently managed by Pierce County Fire District 23 which services approximately 67 square miles in Pierce County in addition to the Fire District 17 service area.



Existing Inventory

A complete inventory of each fire district serving Lewis County is in the County's 2024 Hazard Mitigation Plan. **Table CF- 7** below is a summary of the inventory for each fire district.

Table CF- 7. Fire District Inventory Summary

Fire District	Number of Stations	Staff		Service Area		Facility Inventory			
	Fire stations	Paid Staff	Volun-teer	Population Served	Service Area (sq mi)	Fire Units	EMS Units	Command/ Support	Other
#1	3	6	15	3,573	82	Engine-3 Brush-2 Tender-1	Ambulance-3 Rescue-1	3	Smoke trailer-1 Antique engine-1 Picnic truck-1
#2	3	10		5,400	98	Engine-3 Brush-2 Tender-2	Ambulance-1 Aid-1	2	Watercraft-1 Watercraft Trailer-1 Supply Trailer-1
#3	3	2	20	2,255 (6,500 in summer)	49	Engine-3 Tender-2 Brush-2	Ambulance-2	2	Flatbed Trailer-2 Mowers-2
#4	1	6	10	2,000	70	Engine-2 Tender-2 Brush-2	Ambulance-1 Rescue-2		
#5	3	10	10	9,500	70	Engine-4 Brush-3	Ambulance-3	Staff vehicle-1	
#6	4	13		8,572	145	Engine-5 Tender-2 Brush-1	Ambulance-2	Support/ Staff vehicle-2	Trailers-3
#8	5	10	30	4,200	188	Engines-3 Tenders-3 Engine/ Tender-2	Ambulance-3	3	
#10	3	14		4,400 (30,000 seasonally)	360	Engine-5 Brush-2	Ambulance-2	Aircraft Rescue Truck-1	
#14	2	2	18	3,500	105	Engine-4 Tender-2	Ambulance-3	Staff vehicle-2	
#15	3	14	2	5,000	42	Engine-2	Ambulance-2		

Fire District	Number of Stations	Staff		Service Area		Facility Inventory			
						Tender-1 Brush-2			
#20	2	0	8	2,000	11	Engine-2 Tender-2 Brush-2	Ambulance-2	Command Car-1 Other support vehicles-2	Trailer-1
#48 Chehalis	1	14	0	7,439	5.88	Engine-3 Ladder-1	Aid-1		
#99 RFA	8	31	65	28,000	184	Engine-12 Tender-4 Aerial apparatus-1	Ambulance-5	Support vehicles-8	

Levels of Service and Future Needs

Each fire district has their own analysis of the levels of service that work best for their service area. Each district plans improvements and new apparatus purchases as they are needed to best serve the population they serve and maintain those levels of service. See specific Fire District capital plans for specific information. That information is not repeated within this capital facilities plan but was used as guidance for land use and policy revisions.

School Districts

Overview

Lewis County contains 13 public school districts.

As part of this plan, Lewis County has reviewed each of the school district's adopted facility plans and summarized the school districts' inventories of school capacities and enrollment.

Existing Inventory

Table CF- 8. Lewis County School District Inventory Summary

School District	School Name	School Details		Year Built/Notes
	Name	Current Enrollment	Max Capacity*	
Adna	Adna Elementary	258		1980
	Adna Middle/High	362		1992
Boistfort	Boistfort	274		1936
Centralia	Centralia High	1000	1200	2019
	Centralia Middle	500	600	1906
	Edison	330	400	1889
	Jefferson Lincoln	410	550	2019
	Fords Prairie	400	550	2019
	Oakview	195	450	1978
	Washington	220	400	1950
Chehalis	Chehalis Middle	635	643	1988
	James W. Elementary	591	612	2018
	Orin C. Elementary	665	612	2019
	W.F. West High	912	1190	1950
Evaline	Evaline Elementary	50	60	1925
Mossyrock	Mossyrock Elementary	321		1938
	Mossyrock Junior/Senior High	279		1956
Napavine	Napavine High	390	395	1980
	Napavine Elementary	395	400	1951
Onalaska	Onalaska Elementary	388		1957
	Onalaska Middle	199		1987
	Onalaska High	265		1977
Pe Ell	Pe Ell	267	625	1956
Toledo	Toledo Elementary	436	363	1955
	Toledo Middle	194	223	1930

School District	School Name	School Details		Year Built/Notes
	Name	Current Enrollment	Max Capacity*	
	Toledo High	277	429	1978
White Pass	White Pass Elementary	210	265	1964
	White Pass Junior/High	148	228	2010
Winlock	Winlock Elementary	415	426	1949
	Winlock Middle/High	408	628	1974

**Max/Permanent Capacity data from some schools was not available.*

Levels of Service and Future Needs

Each School District has they own facility plan which has a detailed analysis of enrollment projections, planning projects, and levels of service. That information is not repeated within this capital facilities plan but was used as guidance for land use and policy revisions.

Electricity

Overview

Lewis County Public Utility District No. 1
Lewis County Public Utility District No. 1 (LCPUD) serves all of Lewis County, except the City of Centralia and areas covered by Centralia City Light. The utility provides electricity to over 35,000 individual electric meters. Roughly 84 percent of the energy came from hydropower.

The utility district owns and operates the Cowlitz Falls Hydro Project. The facility:

- Produces an average of 260,000 Mwh of electricity annually.
- Was developed through a partnership between the PUD and the Bonneville Power Administration (BPA). Under the partnership, the district owns the dam, and the BPA purchases the annual output of the facility under a long-term contract which is set to expire in 2032. In exchange for the output of the dam, the BPA pays all costs associated with the operation and maintenance of the facility. Starting in 2032, it is assumed that the Project will be used to serve LCPUD load.

In addition to the Cowlitz Falls Project, the utility has collaborated on or purchased energy shares from a variety of alternative energy projects such as the Packwood Hydro project, the Burton Creek Hydro project, and the 9 Canyon and White Creek Wind projects.

From LCPUD's 2024 Integrated Resource Plan: *"LCPUD is currently meeting the energy demands of its customers with 90% carbon-free electric power, primarily sourced from the FCRPS. On an average energy basis, LCPUD's currently contracted resources are projected to meet or exceed its load throughout the 20-year IRP study horizon. However, on a capacity basis, LCPUD is already at a deficit of roughly 40 MW in winter months relative to the current requirements of the WRAP. Over the 20-year time horizon modeled in this study, load growth is forecast to grow this winter deficit to roughly 105 MW and to cause a summer deficit of up to 80 MW unless LCPUD procures additional capacity resources.*

This analysis concludes that energy storage resources, such as Lithium-Ion batteries, in combination with small additions of wind and market purchases, would be the most economical technology solution to address these deficits, given current regulatory requirements and technology costs. Energy storage resources are particularly well-suited to LCPUD's needs because the utility is deficit on capacity, but adequate on total energy."

Centralia City Light

Centralia City Light supplies power to approximately 10,000 customers in the City of Centralia and nearby areas, including Cooks Hill, Seminary Hill, and Salzer Valley. Of these customers, roughly 84 percent are residential uses, and 16 percent are commercial or industrial uses. Per the 2022 Centralia City Light Resource Plan, the Utility receives federal power from the Bonneville Power Administration (BPA), non-federal power from Northwest Energy Management Services (NEMS), and power from its own Hydroelectric Generation plant in Yelm. In 2021, the Utility had 30.704 aMW of total resources available to serve its TRL. BPA resources provide 75 percent of the available resource to the Utility. Non-federal resources contributed 13 percent. The Utilities Yelm Hydroelectric plant provides 11 percent. The remaining 1 percent comes from Conservation and Renewables.

Natural Gas

Overview

Puget Sound Energy offers natural gas service to nearly 800,000 gas customers in six counties, including consumers in Centralia, Chehalis, Toledo and Winlock. Gas is purchased from regional suppliers and transmitted to customers through local mains and service lines.

All of the natural gas consumed by homes and businesses in the Pacific Northwest comes from western Canada and the U.S. Rocky Mountain states. The majority of this natural gas moves straight to the customer through a network of pipelines, local gas mains, and other utility infrastructure. Northwest consumers, however, also receive a significant share of their natural gas supply—mainly in winter—from underground storage reservoirs.

Puget Sound Energy co-owns and operates the Northwest's largest natural gas storage reservoir, the Jackson Prairie Underground Natural Gas Storage Facility in Lewis County, about 10 miles south of Chehalis. The Jackson Prairie facility is able to store 25 billion cubic feet of working natural gas, with a total storage of 47 billion cubic feet, and is capable of delivering 1.15 billion cubic feet of natural gas per day – enough to meet the peak wintertime natural gas consumption of the 1.2 million households in the Northwest.

PSE and its commercial, sister company Puget LNG, co-own a Liquefied Natural Gas (LNG) facility at the Port of Tacoma. Commissioned in 2022, the facility has the ability to liquefy up to 250,000 gallons of LNG a day and store the product in an 8-million gallon LNG storage tank. This stored gas supply resource can then both serve PSE's natural gas customers and provide fuel to maritime vessels and trucks. The facility is designed to the highest safety standards, including to withstand a once-in-every-2,450-year earthquake.

Telecommunications

Overview

A variety of telecommunications providers offer service in Lewis County. Ongoing changes in cellular and fiber technology have transformed the delivery of telecommunications, and these shifts in equipment and providers have contributed to an industry that offers several options for customers. Anticipating future characteristics given these swiftly shifting conditions is near impossible.

Telecommunication providers are regulated by federal, state and local jurisdictions, and the County often reviews components of the service provision through the development review process.

Moving into the future, improvements to telecommunication infrastructure and services will play an increasingly important role in strategies for transportation demand management and rural economic development in Lewis County. These strategies will require the continued commitment to the development of telecommunications technology throughout the County, especially in underserved areas.

Appendix D Transportation Technical Appendix

ADA Transition Plan

As of 2023, Comprehensive Plans in Washington are required to establish a transition plan for transportation as required in the Americans with Disabilities Act Title II. Perform self-evaluations of current facilities and develop a program access plan to address deficiencies and achieve the identification of physical obstacles, establish methods, perform modifications and identify leadership roles.

At a minimum, the plan must meet the requirements state in 28 CFR 35.150(d)(3) as follows:

1. Identify physical obstacles in the public entity's facilities that limit the accessibility of its program or activities to individuals with disabilities.
2. Describe in detail the methods that will be used to make the facilities accessible.
3. Specify the schedule for taking the steps necessary to achieve compliance with this section. And, if the time period of the transition plan is longer than one year, identify steps that will be taken during each year of the transition period.
4. Indicate the official responsible for the implementation of the plan. [27]

Identify Physical Obstacles

During the periodic update an initial assessment of existing pedestrian facilities was completed. It is intended that this first dataset established in this plan will be reviewed and expanded in the next few years to development a complete dataset.

The following facilities under Lewis County's Jurisdiction were inventoried using Google Earth:

- Intersections
- ADA Facilities in the Public Right of Way
- ADA Facilities at Lewis County Owned Buildings
- Sidewalks
- ADA Parking Stalls
- Crosswalks
- Crosswalk Signals or Lights

[27] *Revised Code of Washington 36.70A.070 (6)(a)(iii)(G) https://app.leg.wa.gov/RCW/default.aspx?cite=36.70A.070*

The following attributes were assigned to each feature identified:

- Land Use Designation – See the Land Use Element for designations.
- Urban Growth Area – Identifies whether the feature is in an Urban Growth Area or unincorporated rural Lewis County.
- ADA Compliance (ADA Comp) – Notes whether the feature is compliant with current ADA standards.
- Pedestrian Facilities – Notes whether the feature is a pedestrian facility in the public right of way.
- Priority – Signifies a low, medium, or high priority for improvements. Facilities with high priorities were in Urban Growth Areas or near public facilities.

Most of the local roads in the County do not have any side treatments of sidewalk, curb, or gutter, it is unlikely these roads will receive such treatments therefore these facilities were not reviewed during the analysis.

Gaps

In Urban Growth Areas and near public facilities there are large gaps in ADA facilities, there are little existing facilities to be improved to current standards.

No field work was performed for this initial analysis, Lewis County will assess high priority facility improvements out in the field before moving forward with implementation of projects.

Park facility improvements are typically included in Parks and Recreation plans and therefore park ADA facilities were not reviewed during this process. See the Lewis County Parks and Recreation Open Space Plan on the Lewis County website.

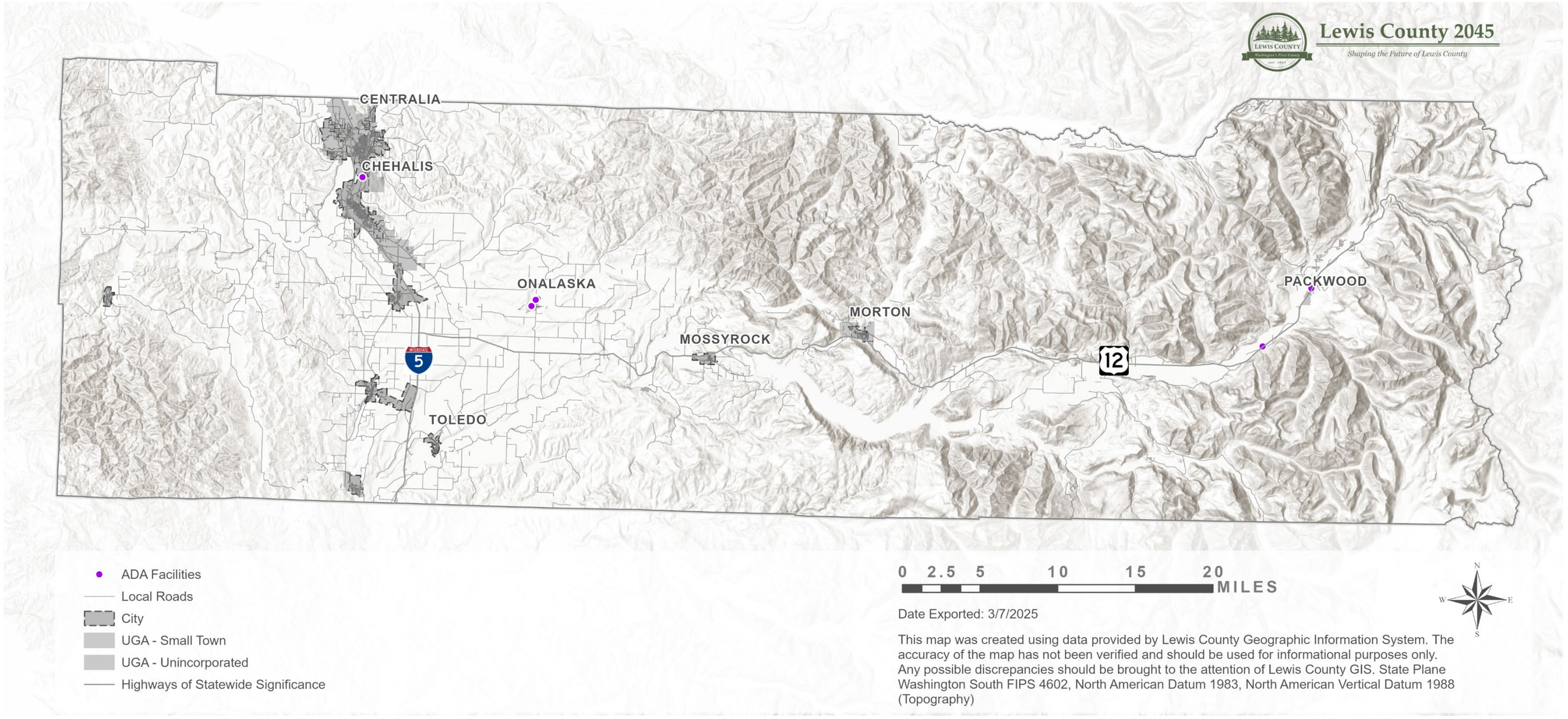
Schedule

Lewis County will prioritize ADA improvements based on greatest need and proximity to Urban Growth Areas or other dense rural areas or facilities with a high volume of visitors, like senior centers. Lewis County will also prioritize ADA facilities that are necessary for climate hazard mitigation or evacuation routes as identified by the Department of Emergency Management.

Implementation

The Public Works department will continue to revise inventory of existing ADA facilities and incorporate transition of ADA in order or highest need for users based on levels of service and proximity to public facilities.

FIGURE 20 PRELIMINARY ASSESSMENT OF ADA FACILITIES



Appendix E Community Engagement Summary Report

Engagement summary report starts on the next page.

Appendix F Climate Memo A. County Assets and Evaluation

Memo starts on the next page.

Kimley»Horn

MEMORANDUM

May 28, 2024

To: Mindy Brooks, Senior Long-Range Planner
Lewis County, Washington

From: Heidi Rous Climate Director, Kimley-Horn

RE: SUMMARY OF CLIMATE HAZARDS AND POLICY GAPS & OPPORTUNITIES, CLIMATE ELEMENT AND RESILIENCY SUB-ELEMENT 2025 COMP PLAN UPDATE, LEWIS COUNTY

Purpose

This memorandum summarizes potential climate impacts to Lewis County assets and potential policy opportunities to address climate impacts. The opportunities provide a basis for assessing current policy gaps and opportunities (provided under separate memo "Policy Gaps & Opportunities") that support the County's Comprehensive Plan update. The memo further informs the new Climate Element and Resiliency Sub-Element, consistent with House Bill 1181 ("HB 1181") and Washington State's Growth Management Act (GMA) . A memo summarizing climate vulnerability and risks of identified assets will be provided separately. Under HB 1181 and the GMA (RCW 36.70A.070(9)) for Lewis County, a resiliency sub element must, among other things, equitably enhance resiliency to, and avoid or substantially reduce the adverse impacts of, climate change in human communities and ecological systems through goals, policies, and programs consistent with the best available science and scientifically credible climate projections and impact scenarios RCW 36.70A.070(9)(e)(i).

Scope

Critical infrastructure located within the County are identified and assessed for exposure to climate hazard scenarios (see "Analysis" section below). Assets identified are located within Lewis County and are either owned and operated by the County, quasi-public agencies, or private entities. Assets include administrative buildings, historical sites, transportation infrastructure and facilities, airports, and radio communications that are owned and managed by the County. Other critical facilities operating under a special purpose district, public utility district, and private entities were assessed including educational institutions, railways, water, sewer, and energy facilities. Identifying local assets owned or managed by non-County entities provides an opportunity to coordinate with responsible agencies and protect critical facilities and communities against climate hazards. Other assets may include community groups, places, and services which will be identified through community stakeholder interviews in mid-June of this year. Other assets identified by stakeholders will be updated in the workbook and incorporated into Climate Element goals and policies.

Methodology

Under the Washington State Department of Commerce's Intermediate Planning Guidance document, Section 3: Resilience Sub-element provides step-by-step guidance for developing a new climate and resiliency element, as shown below:

1. Explore Climate Impacts
2. Audit Plan and Policies
3. Assess Vulnerability and Risk
4. Pursue Pathways
    a. Select and/or adapt existing goals and policies
    b. Develop new goals and policies
    c. Update and adopt hazard mitigation plan
5. Integrate Goals and Policies

Following the guidance document, the Climate Element Workbook was utilized (See **Appendix A: Lewis County Climate Element Workbook**). The intermediary tasks within Steps 1-5 are included below and are further detailed in the Analysis section.

1. Identifying and organizing County and community assets under specific sectors;
2. Identifying potential climate hazards per sector;
3. Pairing assets and hazards;
4. Describing potential climate impacts, asset exposure, non-climate stressors, and climate impact consequences of each asset-hazard pair;
5. Identifying priority climate hazards affecting the County; and
6. Reviewing existing plans for climate gaps and opportunities.

The Climate & Resilience Element is required to have one (1) goal and supportive policy for each climate-exacerbated hazard which is relevant to the County, as required by FEMA and HB 1181. Recommendations include new measures that enhances beneficial opportunities among the eleven sectors which are not typically included in a FEMA-approved hazard mitigation plan.

Analysis

Identify Community Assets

Over 100 County assets were identified, including administrative and civic buildings, senior centers, parks, recreation facilities, historical sites, transportation infrastructure and facilities, airports, solid waste management facilities, water distribution infrastructure, radio communication infrastructure, shorelines, and other critical facilities co-managed with special districts i.e., fire stations, cemeteries, hydroelectrical dams, telecommunication facilities, etc. The assets were pulled from existing reports, documents, and the County website. Existing reports and documents include:

- 2021 Lewis County Comprehensive Plan
- 2021 Shoreline Master Program
- 2023 Public Safety Radio System Engineering Study Report
- 2023 Draft Comprehensive Solid and Hazardous Waste Management Plan
- 2023 Draft Hazard Mitigation Plan
- 2024 Economic Development Strategic Plan

- 2024-29 Transportation Improvement Program
- 2012 Washington State Department of Ecology "Preparing for a Changing Climate" Report
- Lewis County website
- [1] https://lewiscountywa.gov/departments/community-development/adopted-plans/.

It is important to note that the 2023 Draft Comprehensive Solid and Hazardous Waste Management Plan and 2023 Draft Hazard Mitigation Plan, as mentioned above, are nearing the adoption stage; therefore, major changes to these plans are not anticipated and were utilized for this analysis. The community assets were thematically grouped and generalized under a singular term such as "buildings", "transportation", "utilities", "parks", and such. Each term was subsequently assigned a sector based on definitions provided in the Guidance document. One asset may be applicable in multiple sectors; for example, airports are applicable in economic development, emergency management, and transportation sectors.

Exploration of Hazards and Changes in the Climate

Hazards, climate indicators, and climate impacts specific to Lewis County were identified for each sector utilizing the Climate Mapping for a Resilient Washington ("CMRW") webtool. The CMRW tool provided a long list of climate indicators within various sectors such as agriculture, buildings and energy, cultural resources and practices, economic development, ecosystems, emergency management, human health, transportation, waste management, water resources, and zoning and development. Within these sectors, hazards such as drought, extreme heat, extreme precipitation, flooding, reduced snowpack, sea level rise, and wildfire were analyzed under the higher greenhouse gas scenario (RCP 8.5) with its respective climate indicator. The RCP 8.5 scenario was utilized as compared to the lower greenhouse gas scenario (RCP 4.5) as the scenarios do not differ significantly prior to 2050. Selected climate hazards and indicators can be found in **Appendix A.**

Pairing Assets and Hazards

Approximately 75 asset-hazard pairs were identified by selecting the sector in the CMRW tool, which automatically populated select hazard data that would impact the sector. For example, buildings & energy sector yielded hazard data for extreme heat and wildfire, but not sea level rise, extreme precipitation, or drought. Assets were grouped with each hazard data; for example, County administrative buildings (identified within the buildings & energy sector) would be listed as "County buildings – Extreme Heat" and "County buildings – Wildfire". Some pairs were listed several times as some assets had multiple hazards within various sectors. For example, Airports – Flooding was listed twice but were under two different sectors: economic development and emergency management. The asset-hazard pairs were then assessed for climate impacts focusing on how the hazard particularly impacted the asset, how each asset is exposed to the hazard, non-climate stressors that may exacerbate climate impacts, and past/future consequences of previous factors that are specific to the County asset. This exercise builds off the previous two exercises of identifying County assets and potential climate hazards.

Exposure, Impacts, Stressors, Consequences

Climate impacts to the appropriate County assets were assessed based on disruptions to the specific sector under the RCP 8.5 climate scenario.

[1] Lewis County Washington, *Adopted Plans,* Adopted Plans (lewiscountywa.gov) Accessed April, 2024.

The following summarizes key take-aways:

- Extreme heat, wildfire, flooding, extreme precipitation, and reduced snowpack were the most recurring hazards when paired with assets.
- Lewis County is anticipated to experience an increased frequency of annual peak streamflow or "flooding" of 35.3% to 91.8% of stream segments. A return interval of 25-year peak streamflow is anticipated every 0-10 years rather than every 25 years.
- Risk of heat waves, drought, and sea level rise are relatively low.
- East Lewis County has a higher risk of wildfire. A combination of increased time delay interference in County radio communications, increased emergency responses, limited personnel, and more frequent wildfire events exposes eastern County residents to higher wildfire risks.
- Numerous County infrastructure are located in remote areas and are at higher risk of exposure to climate impacts, including roads, bridges, radio towers, transportation facilities, and utility substations.
- Damage to County infrastructure and assets are more likely to occur from secondary hazards such as frequently occurring avalanches from reduced snowpack, bank erosion from riverine flooding, and landslides from extreme weather events.
- Non-climate stressors such as increased impervious surfaces, housing and population increases, aging infrastructure, limited personnel and equipment capabilities, incompatible land uses, invasive species, development in WUI zones, and others can exacerbate climate impacts.
- Snowmelt is projected to shift 3 to 4 weeks earlier than the 20th century average, impacting wildlife migration patterns and hydroelectricity demands.
- Summer stream flows are expected to substantially diminish due to changing snowmelt patterns, shifting energy supply to other sectors or industries.

The list is non-exhaustive and may expand based on the best available science and community input. Future community engagement events may identify other assets such as community groups, places, and services that will be analyzed for climate hazard impacts provided in an updated workbook and memo. A community engagement plan and community engagement summary report will be provided as a separate appendix with the updated memo.

Identify Priority Climate Hazards

Priority climate hazards were identified based on the most common recurrences among asset-hazard pairs. Priority hazards were also identified based on the County's existing plans and anecdotal information. The existing plans include the Comprehensive Plan, Shoreline Master Plan, 2023 Hazard Mitigation Plan, and Countywide Planning Policies. The climate hazards most relevant to the County include:

- Extreme Precipitation
- Flooding
- Reduced snowpack/Avalanche
- Wildfire

Other hazards such as earthquakes and volcanos are relevant to the jurisdiction. However, the impacts of climate change on earthquake and volcanic activity probability cannot be confirmed; thus, such hazards are not assessed for gaps and opportunities.

Kimley»Horn

Policy Audit – Climate Gaps and Opportunities

Existing plans were reviewed to identify gaps, opportunities, and barriers to climate resiliency. Staff identified 60 goals or policies ("measure") that implicit or explicit support climate resilience[2], including related sectors, climate indicators, hazards, climate impacts, and assets affected for each measure. The measure was assessed in the context of climate impacts as to whether the measure can be amended or supplemented to better address local climate hazards and impacts.

The existing measures needed specificity to better address climate hazards and impacts. Next steps were identified for each measure to amend, consolidate, add, or keep the existing measure. Staff recommends the following:

- Amend existing Comprehensive Plan measures to consider climate impacts and add amended measures to the new Climate Resiliency Element[3].
- Amend existing Shoreline Master Plan measures to consider climate impacts or leave as-is and integrate into new climate resiliency element.
- No changes for Hazard Mitigation Plan measures recommended.

New Climate Element measures should remain consistent throughout the Comprehensive Plan. The recommendations include actions to enhance resiliency among all sectors and to advance environmental justice through economic development and land use while ensuring consistency with the Hazard Mitigation Plan, Shoreline Master Plan, and Countywide Planning Policies. A separate memo outlining current policy gaps and opportunities is provided.

Sincerely,

Heidi Rous,
Kimley-Horn

On Behalf of:
County of Lewis, Washington State

[2] Resilience is defined as "The on-going process of anticipating, preparing for, and adapting to changes in climate and minimizing negative impacts to our natural systems, infrastructure, and communities."
[3] These amended measures can be found in the Lewis County Draft Policy Gap Analysis.

References:

1. Raymond, C., M. Rogers, 2022. Climate Mapping for a Resilient Washington. Prepared by the Climate Impacts Group, University of Washington, Seattle and Research Data & Computing Services, University of Idaho, Moscow.

Task 1.1: Identify community assets	
Sectors	**Assets**
Agriculture & Food Systems	
Buildings & Energy	General government (County administrative buildings including maintenance sheds), utility substation, radio communications infra (radio towers), hydroelectrical facilities, Power plant, wind farm, natural gas pipelines
Cultural Resources & Practices	Historic buildings and sites (libraries, religious institutions, museums), etc.
Economic Development	Airports, fiber optics network, etc.
Ecosystems	Shorelines (under SMP): stream/rivers, lakes/reservoirs, water banks/beaches, open space, wetlands, urban tree canopy, etc.
Emergency Management	Public safety radio infrastructure & equipment, fire stations (w/in fire district), airports, etc.
Health & Well-being	Recreation areas (forests, shorelines, boat ramps, fishing, parks), senior centers, hospitals, etc.
Transportation	Airports, County roadways, bridges, Roadway appurtenant structures i.e., culverts, faclilities/warehousing (road shops, pits and quarries, stockpiles, sand sheds), Railways, etc.
Waste Management	Solid waste transfer stations, dump station, sewer infrastructure i.e., mains, etc..
Water Resources	Water infrastructure i.e., distribution pipes, groundwater supplies (reservoirs, wells), water treatment facilities, etc.
Zoning & Development	Civic centers (i.e., senior centers, youth/community centers, public plazas, recreation facilities), Colleges, Cemeteries, etc.

Task 1.2: Explore hazards and changes in the climate

Sector *(Use the CMRW webtool and other resources, as needed, to fill out this column.)*	**Climate Indicator** *(Use the CMRW webtool and other resources, as needed, to fill out this column.)*	**Hazard** *(Use the CMRW webtool and other resources, as needed, to fill out this column.)*	**Climate Impacts** *(Use the CMRW webtool's "Understanding the Importance" tab, Figure 5 of the climate element planning guidance, and other information sources to fill out this column.)*	**Notes** *(Note the emissions scenario(s) and time periods you explored. You may also wish to identify potential information gaps that might warrant further analysis.)*
Agriculture	Increase in precipitation Drought	Drought	Increased likelihood of below normal summer precipitation indicates a greater likelihood of drought in any year. Reduction of the of water available for livestock and irrigation during the same time that warmer temperatures and longer growing seasons are expected to increase the demand for irrigation water.	High emissions scenario. Steady increase of likelihood of a year with summer precipitation below 75% ranges from 0.28 to 0.38. The closer the value to 1, the higher likelihood of snowpack drought; value closer to 0 are a lower likelihood.
Agriculture	Increase in summer maximum temperature	Extreme Heat	Warmer summers directly affect the health and well-being of people and stress and water availability for crops and ecosystems. Increase potential for heat stress on some crops and livestock and decrease crop yield. Agricultural pests are expected to have greater survival rates and population size with warming. Increase demand for irrigation water.	High emissions scenario. Increase in summer maximum temperature. From 2.4 deg F to 12.8 deg F with baseline temperature of 73 deg F.
Agriculture	Increase in extreme precipitation magnitude	Extreme Precipitation	Changes in the intensity of extreme precipitation events are more likely to cause damages to infrastructure and agricultural operations. Heavier precipitation is expected to increase flooding and inundation of agricultural lands, which can delay spring planting, affect crop quality and quantity, increase erosion and runoff, and increase susceptibility to root diseases.	High emissions scenario. Increase in extreme precipitation. Median likelihood is >10% from 2020 - 2099
Agriculture	N/A	Flooding	N/A	N/A
Agriculture	Increase in percentage of stream lengths winter to spring streamflow timing ratio	Reduced Snowpack	Reduced snowpack and more winter rain is expected to increase water availability in winter for multiple uses including agriculture, drinking water and hydropower generation, and decrease water availability in late spring and summer when demand is also expected to increase. A shift in streamflow timing, with more streamflow in winter and early spring, will change the timing of water available for irrigated agriculture. Reduced snowpack may decrease the volume of avalanches but increase the frequency of avalanches.	High emissions scenario. Increase ratio in the future of streamflow in winter and a decrease in spring
Agriculture	N/A	Sea Level Rise	N/A	N/A
Agriculture	Increased wildlife likelihood	Wildfire	Increased likelihood of wildfire indicates a greater potential for wildfire to damage infrastructure, interrupt businesses, or affect public health and well-being. Potential to increase damage to crops, livestock, agriculture infrastructure and operations. Wildfire smoke may reduce the quality of some crops and adversely affect farm workers and other outdoor laborers in the industry	High emissions scenario. Slight increase in wildfire likelihood. Increase starting at median of 0.03 to 0.29. The closer the value to 1, the higher likelihood of wildfire; value closer to 0 are a lower likelihood.
Buildings and Energy	N/A	Drought	N/A	N/A
Buildings and Energy	Decrease in heating degree days and increase in cooling degree days	Extreme Heat	Decrease in heating degree days indicates lower potential energy demand for heating buildings in winter. Decrease in heating degree days is expected to reduce energy demand for heating; potential to reduce energy costs for businesses and residents, but decreases utility revenue to support infrastructure and operations. Increase in cooling degree days indicates greater potential energy demand for cooling buildings in summer. Increase energy demand for air conditioning and industrial cooling systems in summer when regional hydropower supply is expected to decrease. Increase in demand for air conditioning and infrastructure with cooling systems that do not already exist.	High emissions scenario. Negative decrease in heating degree days (-806 to -2203 days). High emissions scenario. Positive increase in cooling degree days (127 to 562 days)
Buildings and Energy	N/A	Extreme Precipitation	N/A	N/A
Buildings and Energy	N/A	Flooding	N/A	N/A
Buildings and Energy	N/A	Reduced Snowpack	N/A	N/A
Buildings and Energy	N/A	Sea Level Rise	N/A	N/A

Buildings and Energy	Increase wildfire likelihood	Wildfire	Increased likelihood of wildfire indicates a greater potential for wildfire to damage infrastructure, interrupt businesses, or affect public health and well-being. Can a affect energy transmission by damaging infrastructure and interrupting transmission and distribution. Can cause property damage and loss. Poor air quality due to wildfire smoke could increase demand for air filtration systems in buildings.	High emissions scenario. Steady increase of likelihood of climate and fuel conditions for wildfire ranging from 0.03 to 0.29. The closer the value to 1, the higher likelihood of wildfire; value closer to 0 are a lower likelihood.
Cultural Resources and Practice	Increase in low streamflow	Drought	Lower streamflow's in summer are expected to reduce habitat quantity and quality for salmonids and other aquatic species that are culturally important to the Northwest Tribes.	High emissions scenario. Steady increase of low streamflow ranging from 25-38% of streams will have 30-50% less streamflow on average during their low summer streamflow and low streamflow ranging from 2-29% of streams will have 50-70% less streamflow.
Cultural Resources and Practice	Increase in August stream temperature	Extreme Heat	Increase in temperature during August (typically the hottest month for most streams) indicates the water quality for salmon and other species that depend on cold water. Warmer stream temperatures are expected to reduce habitat quality for salmonids and other aquatic species that depend on cold water. Can reduce the abundance of and access to these culturally important species for Northwest Tribes.	High emissions scenario. Greater increase of stream temperature with higher percentages and decrease of streams with colder temperature.
Cultural Resources and Practice	N/A	Extreme Precipitation	N/A	N/A
Cultural Resources and Practice	Increase in peak streamflow	Flooding	Increase in annual peak streamflow indicates a potential for higher stream flows and larger areas inundated every year at high flows. Higher stream flows are expected to directly affect salmonid populations and alter salmonid habitat, reducing the quantity of a culturally important species for Northwest Tribes.	High emissions scenario. Steady increase in maximum streamflow ranging from 49-69% increase of stream flows will have 10-30% more streamflow on the day of the year with the highest streamflow.
Cultural Resources and Practice	N/A	Reduced Snowpack	N/A	N/A
Cultural Resources and Practice	N/A	Sea Level Rise	N/A	N/A
Cultural Resources and Practice	Increased wildfire likelihood	Wildfire	Increased likelihood of wildfire indicates a greater potential for wildfire to damage infrastructure, interrupt businesses, or affect public health and well-being. Can have the potential to damage cultural and historical sites, buildings, and cultural resources. More frequent wildfires can also reduce access to culturally important sites and resources for Northwest Tribes.	High emissions scenario. Steady increase of likelihood of climate and fuel conditions for wildfire ranging from 0.03 to 0.29. The closer the value to 1, the higher likelihood of wildfire; value closer to 0 are a lower likelihood.
Economic Development	Decreased snowpack and increased streamflow timing	Drought	Decreased snowpack in the mountains in the beginning of spring indicates the amount of natural water storage in snowpack that will be available in the melt season. April 1st snowpack (snow water equivalent). Reduction in snowpack are expected to decrease opportunities for winter outdoor recreation and shorten the winter recreation season, with adverse effects on the economy and character of some communities. Warm season outdoor recreation opportunities may increase, shifting tourism from one recreation sector to another and into different seasons. Increase in the ratio of winter to spring streamflow is an indicator of the change in the seasonal timing of streamflow. The timing of snowmelt and streamflow influences the seasonal availability of water for hydropower generation and irrigation. A shift in streamflow timing, with more streamflow in winter and early spring, will change the timing of hydropower generation. Timing changes have the potential to affect energy costs for residents and businesses.	High emissions scenario. Steady decrease of April 1st snowpack. High emissions scenario. Steady increase in streamflow that indicates more winter streamflow and drastic decrease in spring streamflow.
Economic Development	Increase in summer maximum temperature	Extreme Heat	Warmer summer temperatures could decrease Warmer summer temperatures could decrease opportunities for warm season recreation activities in some areas and increase them in others. opportunities for warm season recreation activities in some areas and increase them in others.	High emissions scenario. Steady increase of summer maximum temperatures ranging from a median of 3.4 deg F to 9.9 deg F.

Economic Development	Increase in extreme precipitation magnitude	Extreme Precipitation	Changes in the intensity of extreme precipitation events are more likely to cause damages to infrastructure and agricultural operations than changes in seasonal and annual precipitation. Heavier precipitation is expected to increase the extent of flooding in low-lying areas and flood zones. Businesses are expected to have more disruptions to operations and damage to infrastructure.	High emissions scenario. Median likelihood ranges from 7-18% of the county to expect an increase in the total precipitation of the 25-year storm.
Economic Development	Increase of return interval of 25-yr peak streamflow	Flooding	he 25-year peak streamflow is the streamflow that occurs on average every 25 years, similar to the 100-year high flow but more frequent. The return interval of the historical 25-year peak streamflow indicates how much more frequently stream flows of this magnitude are expected to occur in the future with heavier precipitation and more rain in the winter. More frequent high stream flows are expected to increase the frequency of flooding impacts to businesses and the economy by disrupting travel and shipping routes and damaging property. More frequent flooding has the potential to increase insurance premiums or make some properties more difficult to insure.	High emissions scenario. Increased frequency of historical peak streamflow occurring ranging from 35.3% to 91.8% of stream segments in the 0-10 years of return interval will have their historical peak streamflow occur on average once every 0-10 years, rather than once every 25 years. Similarly, 8.2% to 63.5 % of stream segments in the 10-20 years of return interval will have their historical peak streamflow occur on average once every 10-20 years, rather than once every 25 years.
Economic Development	Decrease in snowpack	Reduced Snowpack	Reductions in snowpack are expected to decrease opportunities for winter outdoor recreation and shorten the winter recreation season, with adverse effects on the economy and character of some communities. Warm season outdoor recreation opportunities may increase, shifting tourism from one recreation sector to another and into different seasons. Reduced snowpack may decrease the volume of avalanches but increase the frequency of avalanches, increasing hazard risks for recreational snow activities and emergency response.	High emissions scenario. A decrease in April 1st snowpack indicates that less stored water will be available to supply streams, soils, and reservoirs during the melt season.
Economic Development	N/A	Sea Level Rise	N/A	N/A
Economic Development	Increase in wildfire danger	Wildfire	More high fire danger days indicates a greater potential for wildfire activity, assuming ignition sources and sufficient fuels are present. More days with high wildfire danger are expected to affect businesses through more frequent closures of recreation areas and restrictions on outdoor activities during the wildfire season. More high fire danger days will interrupt timber operations and outdoor recreation.	High emissions scenario. An increase in high fire danger days indicates a greater potential for wildfire danger to damage infrastructure, interrupt businesses, and affect public health and well-being.
Ecosystems	Decrease in late summer precipitation	Drought	Summer precipitation affects water availability for non-irrigated agriculture and fuel moisture during the height of the fire season. Less summer precipitation is expected to affect ecosystem types differently. In freshwater ecosystems, less summer precipitation will contribute to lower stream flows, reduce water quality, and increase water temperatures. In terrestrial ecosystems, less summer precipitation will contribute to drought stress and reduce the growth and productivity of some plants.	High emissions scenario. Steady decrease in late summer precipitation ranging from -10.3% to -26.5% for summer months of July 15 - September 15
Ecosystems	Increase in summer maximum temperature	Extreme Heat	Warming is expected to be greatest in summer months. Warmer summers directly affect the health and well-being of people and stress and water availability for crops and ecosystems. Warmer summers are expected to reduce summer soil moisture and increase physiological stress for some plants and animals. Warmer summer temperatures are expected to reduce tree growth and forest productivity in some areas and increase growth and productivity in mild climates. Outbreaks of some forest pests, such as mountain pine beetles, are expected to increase.	High emissions scenario. Steady increase in summer maximum temperature ranging from 3.4 deg F to 9.9 deg F. 3.4 deg F means the average summer maximum temperature is expected to increase by 3.4 deg F for the county between (June - Aug). The change in average summer maximum temperature is an indicator of heat stress for people, ecosystems, and infrastructure.
Ecosystems	N/A	Extreme Precipitation	N/A	N/A
Ecosystems	Increased peak streamflow	Flooding	Increased percentage of stream lengths indicates a potential for higher stream flows and larger areas inundated every year at high flows. Higher stream flows will scour the streambed and remove or crush salmon eggs, increasing mortality and reducing return rates. Higher stream flows reduce the availability of slow-water habitat and can increase sedimentation that affects habitat quality.	High emissions scenario. 40-69% increase in maximum streamflow. 17-42% increase of stream segments with streamflow above the historical maximum streamflow.

Ecosystems	Increase in streamflow timing	Reduced Snowpack	Earlier spring snowmelt and associated changes in streamflow timing are expected to alter migration timing and survival rates for salmonids. Reduced snowpack may decrease the volume of avalanches but increase the frequency of avalanches.	High emissions scenario. An increase in the ratio in the future means an increase in streamflow in winter and a decrease in spring. Steady increase of winter streamflow and decrease of spring streamflow.
Ecosystems	N/A	Sea Level Rise	N/A	N/A
Ecosystems	Increase in wildfire likelihood	Wildfire	More frequent wildfires have the potential to reduce timber, non-timber forest products, carbon storage, and forest habitat for some wildlife. Wildfires also increase establishment of invasive species. More frequent wildfires have the potential to increase runoff and sediment to streams, which can reduce aquatic habitat quality.	High emissions scenario. Steady increase in the likelihood of climate and fuel conditions for wildfire ranging from 0.03 to 0.29. A value of 0.03 means that there is a 3% change that a year in the time period will have climate and fuel conditions that are favorable for wildfire.
Emergency Management	Increase in precipitation Drought	Drought	Washington State's legal definition of drought for a declaration and associated response is 75% of normal water supply and hardship. Summer precipitation is one component of water supply considered in the determination. A greater likelihood of below normal summer precipitation indicates a greater likelihood of drought in any year. More frequent and severe droughts due to low summer precipitation are expected to increase the need for emergency services to plan, prepare, and respond to water shortages.	High emissions scenario. Steady increase in precipitation drought that a year in a selected 30-year period will have summer precipitation at or below 75% of normal. Ranges from 0.28 to 0. 38 means that there is a 28% will have summer precipitation at or below 75% of normal. Values closer to one are a higher likelihood of snowpack drought; values closer to zero are a lower likelihood.
Emergency Management	Increase in 90 deg F Max Humidex Days	Extreme Heat	An increase in days over a maximum humidex of 90° is an indicator of day-time heat stress for people. More frequent extreme daytime heat events are expected to increase the demand for emergency services to plan, prepare, and respond to human health impacts. Extreme heat may also impact emergency services due to transportation and travel disruptions such as warped and buckling pavement on roads.	High emissions scenario. The humidex is a measure of experienced heat conditions, and takes into consideration both temperature and humidity. The change in the number of 90 deg F maximum humidex days is an indicator of stress on public health. Positive increase of humidex days from 11.7 days to 45.1 days.
Emergency Management	Increase of extreme precipitation magnitude	Extreme Precipitation	Heavier precipitation has the potential to increase the demand for emergency response services by intensifying flood events and increasing other emergencies associated with heavy precipitation.	High emissions scenario. Steady increase in percent change in the magnitude of 25-year storm ranging from 7-18%. Indicates the county is expected to experience an increase in total precipitation of the 25-year storm of 7%. Heavy precipitation is an indicator of flooding that can affect infrastructure and operations.
Emergency Management	Increase in peak streamflow	Flooding	Higher streamflow are expected to increase riverine flooding within existing floodplains and could expand flooding to new areas not currently in existing floodplains. More flooding has the potential to increase the demand for emergency services to plan, prepare, and respond to flood events.	High emissions scenario. Increase in maximum streamflow ranging from 47% to 69% in the 10 to 30 percent change. This indicates that 47% of the stream segments in the 10 to 30 category means that 47% of the streams in the county will have 10% to 30% more streamflow on the day of the year with the highest streamflow.
Emergency Management	N/A	Reduced Snowpack	N/A	N/A
Emergency Management	N/A	Sea Level Rise	N/A	N/A
Emergency Management	Increase in wildfire danger	Wildfire	More days with high fire danger will increase the need for fire bans and associated enforcement and capacity to respond to wildfires.	High emissions scenario. Increase of high fire danger days from 6 - 8 days. A value of 6 means that there are 6 additional days in which the 100-hour fuel moisture is less than the 20th percentile in the county.
Human Health	N/A	Drought	N/A	N/A
Human Health	Increase in summer maximum temperature	Extreme Heat	Warming is expected to be greatest in summer months. Warmer summers directly affect the health and well-being of people and stress and water availability for crops and ecosystems. Warmer summers are expected to increase concentrations of air pollutants, such as ozone and some vector-borne	High emissions scenario. Steady increase in maximum temperature ranging from 3.4 deg F to 9.9 deg F. An increase of 3.4 deg F means that the average summer maximum temperature is expected to increase by 3.4 deg F for the county.
Human Health	N/A	Extreme Precipitation	N/A	N/A
Human Health	N/A	Flooding	N/A	N/A
Human Health	N/A	Reduced Snowpack	N/A	N/A
Human Health	N/A	Sea Level Rise	N/A	N/A

Transportation	Decrease in snowpack	Drought	Reductions in snowpack have the potential to reduce snow-related road maintenance, road closures, and transportation delays. However, as more cold-season precipitation falls as rain rather than snow, transportation routes in mountainous areas may experience more damage from heavier winter rainfall and associated flooding, erosion, and washouts.	High emissions scenario. Steady decrease in April 1st snowpack ranging from 68% to 97%. April 1st snowpack is used as an indicator for the amount of stored water that becomes available during the melt season.
Transportation	Increase in hot days	Extreme Heat	Days with a temperature over 100°F is an indicator of potential damage to transportation infrastructure such as roads and bridges. More very hot days have the potential to damage the surfaces of roads and bridges, leading to greater maintenance and repair costs and more frequent traffic and service disruptions.	High emissions scenario. Steady increase of hot days ranging from 0.2 days to 2.3 days. A value of 0.2 days means that the number of annual hot days in the county is expected to increase by 0.2 days. A increase in the number of days above 100 deg F is an indication of more stress on transportation infrastructure.
Transportation	Increase in heavy precipitation magnitude	Extreme Precipitation	Heavier precipitation events are expected to intensify flooding, landslides, and erosion, which can interrupt transportation routes, damage infrastructure, and increase maintenance and repair costs.	High emissions scenario. Steady increase in heavy precipitation magnitude ranging from 7-18%. A value of 7% means a county is expected to experience an increase in the total precipitation of the 2-year storm of 7%.
Transportation	Increase in peak streamflow	Flooding	Higher stream flows are expected to increase riverine flooding, which can damage roads, bridges, and railways and overwhelm drainage structures, such as culverts.	High emissions scenario. Increase in maximum streamflow ranging from 47% to 69% in the 10 to 30 percent change. This indicates that 47% of the stream segments in the 10 to 30 category means that 47% of the streams in the county will have 10% to 30% more streamflow on the day of the year with the highest streamflow.
Transportation	Decrease in snowpack	Reduced Snowpack	Reductions in snowpack have the potential to reduce snow-related road maintenance, road closures, and transportation delays. However, as more cold-season precipitation falls as rain rather than snow, transportation routes in mountainous areas may experience more damage from heavier winter rainfall and associated flooding, erosion, and washouts. Reduced snowpack may decrease the volume of avalanches but increase the frequency of avalanches and closure of roads.	High emissions scenario. Steady decrease in April 1st snowpack ranging from 68% to 97%. April 1st snowpack is used as an indicator for the amount of stored water that becomes available during the melt season.
Transportation	N/A	Sea Level Rise	N/A	N/A
Transportation	Increase in wildfire likelihood	Wildfire	More frequent wildfires, and related smoke, can disrupt travel, increase road closures and delay construction projects. Wildfire smoke has the potential to affect labor in the transportation sector because of health effects on outdoor laborers. More roadside brush fires can create safety hazards and disrupt transportation.	High emissions scenario. Steady increase in the likelihood of climate and fuel conditions for wildfire ranging from 0.03 to 0.29. A value of 0.03 means that there is a 3% change that a year in the time period will have climate and fuel conditions that are favorable for wildfire.
Waste Management	N/A	Drought	N/A	N/A
Waste Management	N/A	Extreme Heat	N/A	N/A
Waste Management	Increase in extreme precipitation magnitude	Extreme Precipitation	Heavier precipitation has the potential to increase storm damage to infrastructure and generate more waste and debris. More waste will strain municipal cleanup and refuse capacity.	High emissions scenario. Steady increase in heavy precipitation magnitude ranging from 7-18%. A value of 7% means a county is expected to experience an increase in the total precipitation of the 2-year storm of 7%.
Waste Management	Increase in return interval of 25-yr peak streamflow	Flooding	The 25-year peak streamflow is the streamflow that occurs on average every 25 years, similar to the 100-year high flow but more frequent. The return interval of the historical 25-year peak streamflow indicates how much more frequently stream flows of this magnitude are expected to occur in the future with heavier precipitation and more rain in the winter. More frequent high stream flows are expected to increase flooding, which can generate more debris and waste. More waste will strain municipal cleanup and refuse capacity. Flooding of waste management facilities can release contaminants and hazardous materials.	High emissions scenario. Steady increase in return interval of 25-yr peak streamflow for 0-10 and 10-20 categories. In the 0-10 year category, a range of 35.3 % to 91.8% of the stream segments means that 35.3% of the streams in the county will have their historical peak streamflow occur on average once every 0-10 years, rather than once every 25 years. In the 10 to 20 year category, a range of 8.2% to 63.5% of the stream segments means that 8.2% of the streams in the county will have their historical peak streamflow occur on average once every 10-20 years, rather than once every 25 years.
Waste Management	N/A	Reduced Snowpack	N/A	N/A
Waste Management	N/A	Sea Level Rise	N/A	N/A

Waste Management	Increase in wildfire likelihood	Wildfire	More frequent wildfires have the potential to generate greater amounts of debris and waste. More waste will strain municipal cleanup and refuse capacity.	High emissions scenario. Steady increase in the likelihood of climate and fuel conditions for wildfire ranging from 0.03 to 0.29. A value of 0.03 means that there is a 3% change that a year in the time period will have climate and fuel conditions that are favorable for wildfire.
Water Resources	Increase in total annual precipitation	Drought	Total annual precipitation is the total input of water each year which limits the overall amount of water available for human uses and ecosystems. Increases in annual precipitation have the potential to increase groundwater recharge. Changes in the timing and intensity of precipitation and increases in water demand and evaporation are expected to offset increases in groundwater recharge due to more annual precipitation.	High emissions scenario. Steady increase in total annual precipitation ranging from 1.8% to 4.6%. Positive values are an increase in average total annual precipitation.
Water Resources	N/A	Extreme Heat	N/A	N/A
Water Resources	N/A	Extreme Precipitation	N/A	N/A
Water Resources	N/A	Flooding	N/A	N/A
Water Resources	Decrease in snowpack	Reduced Snowpack	Reduced snowpack and more winter rain is expected to increase water availability in winter for multiple uses including drinking water and hydropower generation, and decrease water availability in late spring and summer when demand is also expected to increase.	High emissions scenario. Steady decrease in April 1st snowpack ranging from 68% to 97%. April 1st snowpack is used as an indicator for the amount of stored water that becomes available during the melt season.
Water Resources	N/A	Sea Level Rise	N/A	N/A
Water Resources	Increase in wildfire likelihood	Wildfire	More frequent wildfires have the potential to damage water distribution infrastructure and reduce water quality in reservoirs due to more runoff, erosion, and turbidity. Changes in water quality could increase the need for water treatment and filtration.	High emissions scenario. Steady increase in the likelihood of climate and fuel conditions for wildfire ranging from 0.03 to 0.29. A value of 0.03 means that there is a 3% change that a year in the time period will have climate and fuel conditions that are favorable for wildfire.
Zoning and Development	Decrease in snowpack	Drought	Reductions in snowpack are expected to decrease opportunities for winter outdoor recreation and shorten the winter recreation season with adverse effects on the economy and character of some communities. Warm season outdoor recreation opportunities are expected to increase, shifting tourism revenue from one recreation sector to another.	High emissions scenario. Steady decrease in April 1st snowpack ranging from 68% to 97%. April 1st snowpack is used as an indicator for the amount of stored water that becomes available during the melt season.
Zoning and Development	Increase in August stream temperature	Extreme Heat	Warmer stream temperatures have the potential to reduce the ability to meet water quality standards and the effluent limits (amount discharge to the water body) set on existing wastewater treatment facilities.	High emissions scenario. Steady increase in august stream temperature deg C. This indicated more of the streams are projected to have warmer average August streamflow temperatures.
Zoning and Development	Increase in heavy precipitation magnitude	Extreme Precipitation	Heavier precipitation events are expected to intensify urban flooding and demands on storm water systems, which can affect zoning restrictions on new buildings, and require revised building codes for development in more frequently flooded areas.	High emissions scenario. High emissions scenario. Steady increase in heavy precipitation magnitude ranging from 7-18%. A value of 7% means a county is expected to experience an increase in the total precipitation of the 2-year storm of 7%.
Zoning and Development	Increase in peak streamflow	Flooding	Higher streamflow are expected to increase damage to all types of infrastructure in flood zones and could expand the flood zone in some areas leading to damage of development not currently in flood zones.	High emissions scenario. Increase in maximum streamflow ranging from 47% to 69% in the 10 to 30 percent change. This indicates that 47% of the stream segments in the 10 to 30 category means that 47% of the streams in the county will have 10% to 30% more streamflow on the day of the year with the highest streamflow.
Zoning and Development	Decrease in snowpack	Reduced Snowpack	Reductions in snowpack are expected to decrease opportunities for winter outdoor recreation and shorten the winter recreation season with adverse effects on the economy and character of some communities. Warm season outdoor recreation opportunities are expected to increase, shifting tourism revenue from one recreation sector to another. Reduced snowpack may decrease the volume of avalanches but increase the frequency of avalanches.	High emissions scenario. Steady decrease in April 1st snowpack ranging from 68% to 97%. April 1st snowpack is used as an indicator for the amount of stored water that becomes available during the melt season.
Zoning and Development	N/A	Sea Level Rise	N/A	N/A
Zoning and Development	Increase in wildfire likelihood	Wildfire	More frequent wildfires are expected to increase damage to homes and infrastructure and displace residents.	High emissions scenario. Steady increase in the likelihood of climate and fuel conditions for wildfire ranging from 0.03 to 0.29. A value of 0.03 means that there is a 3% change that a year in the time period will have climate and fuel conditions that are favorable for wildfire.

Task 1.3: Pair assets and hazards, and describe exposure and consequences							
Number	**Asset-Hazard Pair** *(Note applicable sector(s) in parenthesis.)*	**Climate Indicator** *(Use the CMRW webtool and other resources, as needed, to fill out this column.)*	**Climate Impacts** *(Use the CMRW webtool and other resources, as needed, to fill out this column.)* *	**Exposure** *(Describe how each asset is exposed to the hazard, utilizing information from the CMRW webtool's "Understanding the Importance" tab, local knowledge, and other resources)*	**Non-Climate Stressors (Describe non-climate stressors that may exacerbate climate impacts.)**	**Consequences** *(Describe the consequences of the climate impacts, factoring in exposure, non-climate stressors, and your knowledge of how this hazard has impacted your community in the past. You may find it useful to divide consequences into past and future.)*	
1	General Government - Extreme Heat (*Buildings & Energy*)	**Heating Degree Days** *(annual number of degree-days below a threshold of average daily temperature of 65°F)* **Cooling Degree Days (***annual number of degree-days above a threshold of average daily temperature of 65°F)*	Lewis County is expected to experience a decrease of heating degree days indicating increased potential energy demand for heating buildings in winter. Increase in cooling degree days indicates greater potential energy demand for cooling buildings in summer. Annual days with max temperatures above 90 °F is 6.3 days (lower emissions) and 7.1 days (higher emissions). (*Source: CMRW tool, CMRA tool)* . The risk for heat waves in Lewis County is relatively low (*Source: FEMA Nat'l Risk Index*).	A majority of general government/administrative buildings are located in downtown Centralia with little to no tree canopy. County buildings located in this area may experience more heating and cooling degree days from urban heat island effects. Buildings with cooling systems and built to older codes will be more sensitive to higher energy demand for cooling (Source: CMRW tool). [refer to County planning staff for anecdotal info]	Increase in population (more demand on energy use); More impervious surface development	**Future consequences:** Longer durations of heating and cooling degree days are expected to occur. An increase in cooling degree days is expected to increase energy demand for air conditioning and industrial cooling systems in summer when regional hydropower supply is expected to decrease, increasing demand on external energy sources and causing potential widespread power outages (Source: CMRW tool). Power outages may inhibit the County from administering services and emergency relief (see asset details). **Past consequences:** Extreme heat events do not typically impact buildings; however, losses may be associated with the urban heat island effect and overheating of HVAC systems. These extreme heat events can lead to drought, impact water supplies, and lead to an increase in heat-related illnesses and deaths (Source: Haz Mit Plan).	
2	General Government - Wildfire *(Buildings & Energy)*	**Wildfire likelihood** (*average likelihood of climate and fuel conditions being conducive to wildfire in a 30-year period)*	The wildfire probability for Lewis County is extremely low at 0.03, indicating that there is a 3% chance that there will be climate and fuel conditions that are favorable for wildfire. Most wildfires result from "perfect storm" conditions and factors. An increased likelihood of climate and fuel conditions conducive to wildfire indicates greater potential for wildfire danger to damage infrastructure, interrupt businesses, and affect public health and well-being. Buildings and energy infrastructure located in the wildland-urban interface and areas with high wildfire risk historically will be most exposed to increases in the likelihood of wildfire (Source: CMRW tool). Wildfire risk is relatively low (Source: FEMA Risk Index). *Note: A local vulnerability assessment found that eastern County has higher risk of wildfire (Source: Haz Mitigation Plan).	Ash and smoke from wildfires pollute the air, leading to increased demands for air purification tech that may be limited for older buildings (*Source: CMRW tool).* Roads can be blocked and power outages may occur, which will affect all critical facilities that do not have backup power (*Source: Haz Mit Plan).*	Increase in population (more demand on energy use); More impervious surface development; Limited personnel	**Future consequences:** Large wildfires are anticipated to occur more frequently (*Source: Hazard Mitigation Plan).* More frequent wildfires are expected to cause property damage and loss (*Source: CMRW tool)* . **Past consequences:** Wildfires in the past have been small and quickly contained (*Source: Hazard Mitigation Plan).*	According to the most recent Hazard Mitigation Plan, the County plans to create ignition-resistant communities through different programs adopted in WA State (i.e. Firewise, Wildfire Ready Neighbors, Ready, Set, Go!, WUI Code) that targets communities located in high/very high risk wildfire areas.
3	Utility substations - Extreme Heat *(Buildings & Energy)*	**Heating Degree Days; Cooling Degree Days**	Same as General Gov't - Extreme Heat	Substations contain appurtenant equipment that is critical for maintaining utility infrastructure. Increased energy demand from building usage may cause additional stress on infrastructure.	Increase in population (more demand on energy use); Aging utility infrastructure	Increased energy demand from building usage may cause additional stress on infrastructure, leading to power outages and increased stress on PUD personnel, potentially increasing reliance on County or external agency personnel. Increase reliance on back-up generators. Investments in diversified energy sources i.e., solar, wind, etc.	
4	Utility substations - wildfire *(Buildings & Energy)*	**Wildfire likelihood**	Same as General Gov't - Wildfire	More frequent wildfires have the potential to affect energy transmission by damaging infrastructure and interrupting transmission and distribution. More frequent wildfires are expected to cause property damage and loss (*Source: CMRW tool)* . Systems that are flammable, such as wooden structures and power poles, can be destroyed during a fire. Roads can be blocked and power outages may occur, which will affect all critical facilities that do not have backup power (*Source: Haz Mit Plan).*	Increase in population (more demand on energy use); Aging utility infrastructure	With the increasing wildfire danger, exacerbated by east wind events, and limited resources available for initial attack, critical facilities and systems have a greater threat to ignitability and total loss. Should there be damages to critical facilities and systems, many of which do not have redundancies, there will be disruption to surrounding communities and the County. Increased extreme heat events are predicted to cause average of 6 additional fire hazard days per year within the next 30 years. Over the next 50 years, the western portion of the County is predicted to experience 11-12 additional high fire danger days each year (*Source: Haz Mit Plan*).	
5	Radio Communications - Extreme Heat *(Buildings & Energy)*	**Heating Degree Days; Cooling Degree Days**	Same as General Gov't - Extreme Heat	Radio communications include radio towers that are located in remote forested areas.	Aging infrastructure; Limited personnel	Drier vegetation and soils from extreme heat events increase likelihood of wildfires and landslides that may increase destruction of towers.	
6	Radio Communications - Wildfire *(Buildings & Energy)*	**Wildfire likelihood**	Same as General Gov't - Wildfire	Radio communications include radio towers that are located in remote forested areas. Wildfires directly impact radio communications by destroying towers and cutting off radio signal lines/channels. Indirect impacts from heavy precipitation followed by wildfire events can cause landslides that destroy tower foundations and equipment.	Aging infrastructure; Limited personnel	Same as above. Also, limited County personnel and aging infrastructure may result in lack of ability to respond efficiently to emergencies. Increasing climate change events may result in alternatives communication methods. *Implement the IWUI code* for radio towers, upgrade systems, and *hire County staff to support* (*Source: Haz Mit Plan)* .	
7	Hydroelectrical facilities - Extreme Heat (*Buildings & Energy)*	**Heating Degree Days; Cooling Degree Days**	Same as General Gov't - Extreme Heat. Increase energy demand for air conditioning and industrial cooling systems in summer when regional hydropower supply is expected to decrease.	Similar to utility substations, hydro facilities are owned and managed by the PUD. Extreme heat can reduce the amount of stream/river water supply available (drought) that increasingly reduces hydropower supply.	Population increase (more energy demand); Aging infrastructure; Limited personnel; Policy changes	Less hydroelectricity means outsourcing energy supplies from increased demand or unusual supply patterns, increasing stress on PUD staff and potentially increasing reliance on county or external agency personnel.	
8	Hydroelectrical facilities - Wildfire (*Buildings & Energy*)	**Wildfire likelihood**	Same as General Gov't - Wildfire	Similar to utility substations, hydro facilities are owned and managed by the PUD. Heavy precipitation followed by wildfire events can cause landslides that impact water quality. Increased sedimentation may impact performance, and increase maintenance requirements.	Lack of personnel; Aging infrastructure	Increased sedimentation may impact hydroelectric facility maintenance requirements. Implement the IWUI code and hire County staff to support.	

	Power Plant - Extreme Heat (*Buildings & Energy*)	**Heating Degree Days; Cooling Degree Days**	Same as General Gov't - Extreme Heat	Decrease in heating degree days indicates lower potential energy demand for heating buildings in winter. Decrease in heating degree days is expected to reduce energy demand for heating; potential to reduce energy costs for businesses and residents, but decreases utility revenue to support infrastructure and operations. Increase in cooling degree days indicates greater potential energy demand for cooling buildings in summer. Increase energy demand for air conditioning and industrial cooling systems in summer when regional hydropower supply is expected to decrease. Increase in demand for air conditioning and infrastructure with cooling systems that do not already exist.	Decreases in energy demand for heating will depend on current seasonal patterns of demand. Energy utilities with a higher dependence on revenue from winter sales will be more sensitive to this change. Increases in energy demand for cooling will depend on current seasonal patterns of supply and demand and sources of energy. Utilities with greater redundancy and flexibility in energy sources are likely to be less affected.	A decrease in heating degree days is expected to reduce energy demand for heating.This has the potential to reduce energy costs for businesses and residents, but decrease utility revenue to support infrastructure and operations. An increase in cooling degree days is expected to increase energy demand for air conditioning and industrial cooling systems in summer when regional hydropower supply is expected to decrease. Demand for air conditioning and infrastructure with cooling systems is also expected to increase where it does not already exist.
	Power Plant - Wildfire (*Buildings & Energy*)	**Wildfire likelihood**	Same as General Gov't - Wildfire	Increased likelihood of wildfire indicates a greater potential for wildfire to damage infrastructure, interrupt businesses, or affect public health and well-being. Can affect energy transmission by damaging infrastructure and interrupting transmission and distribution. Can cause property damage and loss. Poor air quality due to wildfire smoke could increase demand for air filtration systems in buildings.	Energy infrastructure built to standards that do not account for wildfire risk, such as untreated wooden poles, or with inadequate vegetation management along transmission and distribution lines will be more sensitive. Building design and codes can affect sensitivity to wildfire, including age, construction materials and degree of fire resistance. Older and less well maintained buildings may be more affected by poor air quality from wildfire smoke.	Power plant service may be interrupted and impact service to businesses, residential homes, government buildings, hospitals, etc.
	Wind farm - Extreme Heat	**Heating Degree Days; Cooling Degree Days**	Same as General Gov't - Extreme Heat	Extreme heat can reduce the efficiency of wind farm turbines.	Turbines that are not up to standard and are aging/need to be upgraded.	Wind farm service may be interrupted and impact service to businesses, residential homes, government buildings, hospitals, etc. In addition, components of wind turbines may overheat and increase wind resistance.
	Wind farm - Wildfire	**Wildfire likelihood**	Same as General Gov't - Wildfire	Same as Wind farm - Extreme Heat	Same as Wind Farm - Wildfire	Same as Wind Farm - Extreme Heat
	Natural gas pipelines - Extreme Heat	**Heating Degree Days; Cooling Degree Days**	Same as General Gov't - Extreme Heat	Extreme heat can expose natural gas pipelines to have sharp pressure increases.	Same as Power Plant - Extreme Heat	Natural gas pipelines will require high intensity for cooling, which increases natural gas demand and decreases natural gas flow in pipelines; thus, natural gas production may be interrupeted and service will be affected. In addition, sharp pressure increases in natural gas pipelines can potentially cause leaking or bursting.
	Natural gas pipelines - Wildfire	**Wildfire likelihood**	Same as General Gov't - Wildfire	Same as Natural gas pipelines - Wildfire	Same as Power Plant - Wildfire	Same as Natural gas pipelines - Extreme Heat
9	Historical Buildings & Sites - Flooding *(Cultural Resources & Practices)*	Peak Streamflow (Increase in peak streamflow)	Lewis County maintains three historic buildings (2 churches and 1 museum). Increase in annual peak streamflow indicates a potential for higher stream flows and larger areas inundated every year at high flows. Direct impacts to historical buildings is lack of access and loss of cultural symbol i.e., irreplaceable historic items.	Lack of access and loss of cultural symbols from flooding of historic bldgs. and sites can reduce quality of life and erode community identity.	Lack of personnel; Aging infrastructure; Lack of replacement materials	**Future consequences:** Increased maintenance costs. Longer closures for remodels and sourcing of rare or outdated materials. **Past consequences:** The worst flooding occurred along Chehalis and its tributaries, requiring more than two dozen water rescues (*Source: Haz Mit Plan).*
10	Historical Buildings & Sites - Wildfire *(Cultural Resources & Practices)*	**Wildfire likelihood** Increased wildfire likelihood	Increased likelihood of wildfire indicates a greater potential for wildfire to damage historic buildings, and affect public health and well-being. Can have the potential to damage cultural and historical sites, buildings, and cultural resources.	More frequent wildfires can also reduce access to culturally important sites and resources.		Same as above
11	Airports - Drought *(Economic Dev)*	**Snowpack** Decreased snowpack and increased streamflow timing	N/A	N/A		
12	Airports - Extreme Heat *(Economic Dev)*	**Summer Max Temp** Increase in summer maximum temperature	Lewis County owns and operates two regional airports: Packwood and Ed Carlson Memorial Field in South County. The Packwood Airport is important for aviation activities such as emergency response (e.g., wildfire), air ambulance service, flight training, and personal flying (*Source: Haz Mit Plan).* Longer extreme heat days may lead to a decrease in recreational activities and daytime operations. **Note: Climate impacts to airport emergency mg't is discussed below.*	Exposure to more extreme heat events can lead to decrease in recreational activities.	Policy changes (Federal Aviation Admin); Increased demand throughout County; Lack of funding	Daytime operations may stall towards cooler parts of the day and delay overall efficiencies of the agency, reducing recreational flying activities.
13	Airports - Extreme Precipitation & Flooding *(Economic Dev)*	**Heavy Precip Magnitude** Increase of return interval of 25-yr peak streamflow	Lewis County is anticipated to experience a 7% increase of a 2-year storm event. Heavier precipitation is expected to intensify flooding in low-lying areas and require higher capacity storm water drainage systems.	More frequent high streamflow's are expected to increase the frequency of flooding impacts to businesses and the economy by disrupting travel and shipping routes and damaging property.	same as above	Future consequences: Increased demand for emergency response services. Possible airport closure from flooding. Past consequences: The Centralia/Chehalis airport is protected by a levee system that overtopped several times, resulting in the closing of the airport.
14	Airports - Reduced Snowpack *(Economic Dev)*	n/a	n/a	n/a	n/a	n/a
15	Airports - Wildfire *(Economic Dev)*	**Wildfire danger** Increase in wildfire danger	Potential for more intense and frequent wildfire danger is anticipated.	Closure of recreational/outdoor activities and more frequent interruptions of daily operations.	same as above	Closure of recreational flying and training - lack of revenue. Available fleet is expected to be utilized for wildfire response rather than personal flying.
	Fiber optics - Drought	**Snowpack** Decreased snowpack and increased streamflow timing	n/a	n/a	n/a	n/a

	Fiber optics - Extreme Heat	**Summer Max Temp** Increase in summer maximum temperature	High temperatures can increase the Bit Error rate (BER) in fiber optic cables. In addition, the intrinsic attenuation of the fiber can be increased esepcially at high temperatures. Transmission will not be interfered due to extreme heat; however, the structural integrity of the fiber optics is at higher risk.	Fiber optics are usually hanging from poles or burried underground directly which can influence level of exposure.	Durability and material selection of fiber optic cables	Due to the high temperatures, fiber optics risk increased errors in data transmission, leading to lower quality signals and potential data loss. This may lead to important data breaches for commercial/industrial companies, governments, and a loss of internet for residential areas.
	Fiber optics - Extreme Precipitation & Flooding	**Heavy Precip Magnitude** Increase of return interval of 25-yr peak streamflow	Extreme precipitation may impact the structural integrity of the fiber optics.	Same as Fiber Optics - Extreme Heat.	Same as Fiber Optics - Extreme Heat.	Transmission won't be impacted; however, physical damage to the optics may be occure; thus, data breaches are at high risk for commericial/industrial companies, governments, and a loss of internet for residential areas.
	Fiber optics - Reduced snowpack	n/a	Same as Fiber Optics - Reduced snowpack	Same as Fiber Optics - Extreme Heat.	Same as Fiber Optics - Extreme Heat.	Same as Fiber Optics - Reduced snowpack.
	Fiber optics - Wildfire	**Wildfire danger** Increase in wildfire danger	Same as Fiber Optics - Wildfire.	Same as Fiber Optics - Extreme Heat.	Same as Fiber Optics - Extreme Heat.	Same as Fiber Optics - Extreme Heat.
16	Shorelines - Drought *(Ecosystem)*	Decrease in late summer precipitation	Less summer precipitation is expected to affect ecosystem types differently. In freshwater ecosystems, less summer precipitation will contribute to lower stream flows, reduce water quality, and increase water temperatures. In terrestrial ecosystems, less summer precipitation will contribute to drought stress and reduce the growth and productivity of some plants.	The County contains 16 shoreline management areas that are further classified into 222 shoreline reaches under the SMA - includes waterbodies, 200-ft. buffers, and floodplains. County SMAs are important for Human Health, Access, Recreation, and Intrinsic ecological benefits. Decreased biodiversity may reduce recreation opportunities and increase health risks from pathogen exposure.	Concentrated development; Increased population; Incompatible land uses; Invasive species; Increased logging activity; Human overuse; Policy changes (FEMA)	Rising stream temperatures and lower summer streamflow will reduce the quality and quantity of freshwater habitat for salmon and other coldwater fish (Source: DOE, 2012). Reduced economic revenue from tourism i.e., fishing, kayaking/boating, etc.
17	Shorelines - Extreme Heat *(Ecosystem)*	Increase in summer maximum temperature	Likelihood of increased extreme heat events in the County is low. Warmer summers are expected to reduce summer soil moisture and increase physiological stress for some plants and animals. Generally projected increases in extreme heat events for the 2040s, esp. in south central WA and western WA lowlands (Source: DOE, 2023).	Exposure to extreme heat events may affect trees w/in 200-ft. shore line buffer areas i.e., pine bark beetle disease and affect water quality. Increased soil sterilization - loss in topsoil nutrients that becomes water repellant.		Increased extreme heat events with lower streamflow can affect water quality resulting in algae blooms and increased vector-borne diseases.
18	Shorelines - Flooding *(Ecosystem)*	Increased peak streamflow	Lewis County is anticipated to experience increased annual max streamflow (CMRW). Risk index of riverine flooding is relatively moderate (FEMA). Lewis County experiences historic problems with flooding of the Chehalis, Nisqually, and Cowlitz Rivers, some of which have been presidentially declared disasters (Source: Haz Mit Plan). River bank erosion is also a big problem in Lewis County. Many County-owned parcels are located on	Increased sedimentation; Increased mortality rates for sensitive species and impacts to cultural sites. Significant road closures that may reduce or prevent efficient emergency responses. Flood damage costs to infrastructure.		**Future consequences:** Increasing flood damage costs: losses, damages, clean-up, lost revenue. Possible abandonment of structures due to high cost of insurance premiums. **Past consequences:** Past flood frequencies indicate that County can expect minor river flooding every year and major river flooding every two-five years (Source: Haz Mit Plan).
19	Shorelines - Reduced Snowpack *(Ecosystem)*	Increase in streamflow timing	Lewis County is expected to experience twice the average streamflow in western County area vs eastern County area (CMRW tool). The amount of snow is critical for water supply and environmental needs, but so is the timing of snowmelt runoff into rivers and streams.	Alteration in migration timing and survival rates for salmonids or other species lifecycles.		By 2050, snowmelt is projected to shift three to four weeks earlier than the 20th century average that may not coincide with fish migrations. Result in increased mass fish kills. Loss in culturally significant natural resource, changes in apex predator hunting patterns.
20	Shorelines - Wildfire *(Ecosystem)*	Increase in wildfire likelihood	Wildfires increase establishment of invasive species. More frequent wildfires have the potential to increase runoff and sediment to streams, which can reduce aquatic habitat quality.	Heavy precipitation followed by wildfire events can cause landslides that impact water quality i.e., increased sedimentation, increased water temp & hypoxia, water channel alterations.		Landslides pose a significant risk to the County. Increased wildfire likelihood most likely cause secondary hazards to shorelines - burning of near-shoreline forest areas followed by heavy rain, rapid snowmelt, that causes landslides and affect water quality, bank stabilization, habitat, and cultural sites.
21	Public Safety Radio - Drought *(Emergency Mgmt)*	Increase in below normal summer precipitation - increased likelihood of drought	The County maintains about 20 communication sites to support emergency services (refer to asset list). Lewis County's internal communication system experiences time delay interference (TDI) between east and west County areas due to its vast space 89 miles wide (east-west approach)(*Source: Televate report, 2023)* . More frequent and severe droughts due to low summer precipitation are expected to increase the need for emergency services to plan, prepare, and respond to water shortages.	Response to increased emergency services may result in more frequent TDI - lack of efficiency and quick response. Increased costs and demand for emergency preparedness, response, and recovery activities; Additional costs to human well-being as first responders are constantly on alert.	Lack of personnel; Equipment limitations	More emergency calls may exacerbate existing infrastructure problems and limitations. Drought causes secondary hazards such as increased wildfire likelihood that may destroy radio communication infrastructure.
22	Public Safety Radio - Extreme Heat *(Emergency Mgmt)*	Increase in 90 deg F Max Humidex Days	More frequent extreme daytime heat events are expected to increase the demand for emergency services to plan, prepare, and respond to human health impacts. Extreme heat may also impact emergency services due to poor road conditions, making it difficult for County personnel to maintain tower infrastructure.	More frequent power loss due to extreme storms; Shuttered power generating stations or transmission corridors; Increased costs and demand for emergency preparedness, response, and recovery activities; Additional costs to human well-being as first responders are constantly on alert. Reduce system reliability (disrupt microwave link) with temperatures over 95 degrees (Source: Televate report, 2023).		More emergency calls may exacerbate existing infrastructure problems and limitations. Extreme heat causes secondary hazards such as increased wildfire likelihood that may destroy radio communication infrastructure.
23	Public Safety Radio - Extreme Precipitation *(Emergency Mgmt)*	Increase of extreme precipitation magnitude	Increase of extreme precipitation causes more frequent landslides that damage infrastructure.	Increase of extreme precipitation may increase landslide frequencies which can compromise structural stability of radio towers located on hillside areas.		Increased demand for emergency response services.
24	Public Safety Radio - Flooding *(Emergency Mgmt)*	Increase in peak streamflow	Increase riverine flooding within existing floodplains and could expand flooding to new areas not currently in existing floodplains. More flooding has the potential to increase the demand for emergency services	Radio towers exposed to increased riverine flooding come from secondary hazards like landslides. Radio traffic can become busier from increased demand for emergency services and exacerbates TDI - response to emergencies.		Increased demand for emergency response services that may exacerbate TDI and stall emergency response services.
25	Public Safety Radio - Wildfire *(Emergency Mgmt)*	Increase in wildfire danger	More days with high fire danger will increase the need for fire bans and associated enforcement and capacity to respond to wildfires. Fire coverage is limited in many County areas; Use of a simplex channel for fire hampers the ability of field users to communicate directly with each other and they must relay messages through dispatch in many situations (*Source: Televate repot, 2023).*	Radio traffic can become busier from increased demand for emergency services and exacerbates TDI - delayed response to emergencies and deployment of equipment. Direct impact to radio tower infrastructure.		Increased demand for emergency response services that may exacerbate TDI and stall emergency response services. Relocating towers for better signal strength may increase chances of wildfire danger.

26	Fire Stations - Drought *(Emergency Mgmt)*	Increase in precipitation Drought	Fire stations are located within special districts that coordinate with Lewis County to respond to emergencies. A greater likelihood of below normal summer precipitation indicates a greater likelihood of drought in any year.	Increased likelihood of drought also increases dry vegetative fuel loads and soil sterilization. Frequent maintenance operations such as prescribed burns and implementing fire safe codes through householder education to prevent intense wildfire events.	Development in WUI zones	Drought causes secondary hazards such as increased wildfire likelihood that may directly impact fire stations and personnel. Increased demand for emergency response services.
27	Fire Stations - Extreme Heat *(Emergency Mgmt)*	Increase in 90 deg F Max Humidex Days	More frequent extreme daytime heat events are expected to increase the demand for emergency services to plan, prepare, and respond to human health impacts. Extreme heat may also impact emergency services due to poor road conditions.	Increased costs and demand for emergency preparedness, response, and recovery activities; Additional costs to human well-being as first responders are constantly on alert		Extreme heat causes secondary hazards such as increased wildfire likelihood that may directly impact fire stations and personnel. Increased demand for emergency response services.
28	Fire Stations - Extreme Precipitation *(Emergency Mgmt)*	Increase of extreme precipitation magnitude	Heavier precipitation has the potential to increase the demand for emergency response services by intensifying flood events and increasing other emergencies associated with heavy precipitation. Increased costs and demands for emergency preparedness, response, and recovery activities; Increased	same as above		Extreme precipitation causes secondary hazards such as increased flooding likelihood that may directly impact fire stations and personnel. Increased demand for emergency response services.
29	Fire Stations - Flooding *(Emergency Mgmt)*	Increase in peak streamflow	Increase riverine flooding within existing floodplains and could expand flooding to new areas not currently in existing floodplains. More flooding has the potential to increase the demand for emergency services.	Increased flooding from peak streamflow directly damages fire station buildings and infrastructure.	Changing path/course of waterways; Levee failure	Less resources to respond to emergencies - puts additional stress on other stations
30	Fire Stations - Wildfire *(Emergency Mgmt)*	Increase in wildfire danger	More days with high fire danger will increase the need for fire bans and associated enforcement and capacity to respond to wildfires. East County area experiences more wildfire danger.	Increased costs and demand for emergency preparedness, response, and recovery activities; Increased reliance on special districts to respond to and protect County infrastructure and assets. Additional costs to human well-being as first responders are constantly on alert. Radio communications are limited due to TDI and other equipment failures, and can be exacerbated by increased emergency response and recovery demands.	Equipment li mitations; Lack of personnel i.e., dispatch operators	More severe and frequent wildfires may occur if there are no improvements to radio communication system and personnel availability. Increased reliance on external agencies.
31	Airports - Drought & Extreme Heat *(Emergency Mgmt)*	Increase in precipitation Drought & Increase in 90 deg F Max Humidex Days	Lewis County owns and operates two regional airports: Packwood and Ed Carlson Memorial Field in South County. The Packwood Airport is important for aviation activities such as emergency response (e.g., wildfire), air ambulance service, and flight training (*Source: Haz Mit Plan).* More frequent severe droughts due to low summer precipitation and extreme daytime heat events are expected to increase the need for emergency services to plan, prepare, and respond to human health impacts.	Exposure to more extreme heat events can lead to delays in emergency response. Continual emergency response may add stress to County due to limited personnel and resources.	Lack of personnel	Daytime operations may stall towards cooler parts of the day and delay overall efficiencies of the agency. Increased exposure of personnel to heat related illnesses.
32	Airports - Extreme Precipitation & Flooding (*Emergency Mgmt)*	Increase of extreme precipitation magnitude & Increase in peak streamflow	Increase riverine flooding within existing floodplains and could expand flooding to new areas not currently in existing floodplains.	More flooding has the potential to increase the demand for emergency services. Increased demand for emergency response services.	Aging infrastructure; Limited personnel	Closure of airport due to potential flooding. Should there be damages to critical facilities and systems, many of which do not have redundancies, there will be disruption to surrounding communities and the County.
33	Airports - Wildfire *(Emergency Mgmt)*	Increase in wildfire danger	More days with high fire danger will increase the need for fire bans and associated enforcement and capacity to respond to wildfires.	Direct disruptions to emergency responses for wildfire, evacuations, and air ambulance services. Continual emergency response may add stress to County due to limited personnel and resources.		Packwood airport contains County equipment and personnel necessary for responding to emergencies. Should there be damages to critical facilities and systems, many of which do not have redundancies, there will be disruption to surrounding communities and the County.
34	Recreation facilities - Extreme Heat *(Health & Well-Being)*	Increase in summer maximum temperature	Warmer summers directly affect the health and well-being of people and stress. Warmer summers are expected to increase concentrations of air pollutants, such as ozone and some vector-borne illnesses, such as West	Elderly and youth populations are most vulnerable to heat-related illnesses. Exposure to extreme heat can increase heat-related illness and death.	Aging infrastructure; Increased population	Social isolation and increased short- and long-term emotional trauma and mental health issues. Increased energy demand to cool indoor recreation facilities. Limiting outdoor recreation facility maintenance to seasonal use.
35	Recreation facilities - Wildfire *(Health & Well-Being)*	Increase in wildfire likelihood	More frequent wildfires are expected to reduce human health through loss of life, injury and reduced mental health associated with displacement. Poor air quality due to more wildfire smoke can cause adverse respiratory health effects.	Elderly and youth populations are most vulnerable to poor air quality. Exposure to poor air quality from wildfires can increase adverse respiratory effects.		same as above
36	Senior Centers - Extreme Heat *(Health & Well-Being)*	Increase in summer maximum temperature	Same as Rec facilities - extreme heat	same as above		same as above
37	Senior Centers - Wildfire *(Health & Well-Being)*	Increase in wildfire likelihood	Same as Rec facilities - wildfire	same as above		same as above
	Hospitals - Extreme Heat	Increase in summer maximum temperature	Same as Rec facilities - extreme heat	Increased hospitalizations from climate-induced illnesses - increased reliance on energy grid or backup generators. Can act as community relief center for disasters - exacerbates limited resources and space.	Aging infrastructure; Disease	same as above
	Hospitals - Wildfire	Increase in wildfire likelihood	Same as Rec facilities - wildfire	same as above	same as above	same as above
38	County roads - Drought *(Transportation)*	Decrease in snowpack	The County maintains 1,065 miles of roadways and includes 5,110 culverts. Reductions in snowpack have the potential to reduce snow-related road maintenance, road closures, and transportation delays. However, as more cold-season precipitation falls as rain rather than snow, transportation routes in mountainous areas may experience more damage from heavier winter rainfall and associated flooding, erosion, and washouts.	Snowpack exposure to warming varies by elevation. In your county or community, the exposure of transportation routes and infrastructure will depend on elevation with assets in mountainous areas more exposed. The low-elevation Cascade and Olympic foothills will be exposed first because these areas currently receive substantial snowfall at temperatures near freezing. By the end of the century, snowpack is expected to remain relatively unaffected only in the high-elevations of the Northern Cascade Mountains.	Depends on design standards for winter temperature and precipitation.	Will intensity flooding, landslides, and erosion, which can interrupt transportation routes, damage infrastructure, and increase maintenance and repair costs.
39	County roads - Extreme Heat *(Transportation)*	Increase in hot days	More very hot days have the potential to damage the surfaces of roads and bridges, leading to greater maintenance and repair costs and more frequent traffic and service disruptions.	The exposure of road surfaces to extreme heat will vary locally based on features that exacerbate or ameliorate extreme heat such as the extent of urban heat islands and tree canopy cover for shade.	Depends on age and condition of assets, materials, and heat-related design standards.	More very hot days have the potential to damage the surfaces of roads and bridges, leading to greater maintenance and repair costs and more frequent traffic and service disruptions.

40	County roads - Extreme Precipitation *(Transportation)*	Increase in heavy precipitation magnitude	Change in the intensity of heavy precipitation events are more likely to cause damages to infrastructure and agricultural operations than changes in seasonal and annual precipitation.	Transportation routes and infrastructure located in low-lying areas, within or near current floodplains or regulatory flood zones, or adjacent to unstable slopes are expected to be more exposed to an increase in heavy precipitation.	Depends on the current infrastructure condition and age, design standards, and redundancy in the system. Older assets or those built to older design standards are likely to be more affected by heavier precipitation.	Same consequences as county roads - drought
41	County roads - Flooding *(Transportation)*	Increase in streamflow	An increase in the annual peak streamflow indicates a potential for higher streamflow and larger areas inundated every year at high flows.	Transportation routes and infrastructure located in river valleys and in or near current and historical flood zones will be most exposed to projected increases in high streamflow that can cause the failure, damage, disruption, and reduced capacity of transportation routes.	Depends on how well design standards accommodate flooding. A lack of transportation redundancy in flood prone areas can increase sensitivity to more frequent high stream flows.	Higher stream flows are expected to increase riverine flooding, which can damage roads, bridges, and railways and overwhelm drainage structures, such as culverts. Flooding and drainage problems from heavy storms can happen anywhere in Lewis County, although the major floods are caused by the overflow of Chehalis, Cowlitz, Tilton, and Newaukum Rivers and Coal, Salzer, and Dillenbaugh Creeks. Flooding has been a historic problem in Lewis County, particularly with the rivers mentioned above. The primary north-south transportation corridor passing through Lewis County and the Cities of Centralia and Chehalis is Interstate 5. Interstate 5 passes through Chehalis River floodplain and is affected by flooding. A 100-year flood could displace up to 5,371 people, with 383 of those people needing short-term shelter. (Source: Haz Mit Plan)
42	County roads - Reduced snowpack *(Transportation)*	Decrease in snowpack	Snowpack in the mountains in the beginning of spring indicates the amount of natural water storage in snowpack that will be available in the melt season. April 1st snowpack (snow water equivalent) is one source of water for uses including including hydropower generation, drinking water, irrigation, and instream flows for ecosystems. Reduced snowpack may decrease avalanche severity but increase frequency, leading to road closures and increased repairs/maintenance.	Same as County-Roads Drought exposure.	Same non-climate stressors as county roads - Drought	Reductions in snowpack have the potential to reduce snow-related road maintenance, road closures, and transportation delays. However, as more cold-season precipitation falls as rain rather than snow, transportation routes in mountainous areas may experience more damage from heavier winter rainfall and associated flooding, erosion, and washouts.
43	County roads - Wildfire *(Transportation)*	Increase in wildfire likelihood	More frequent wildfires, and related smoke, can disrupt travel, increase road closures and delay construction projects. Wildfire smoke has the potential to affect labor in the transportation sector because of health effects on outdoor laborers. More roadside brush fires can create safety hazards and disrupt transportation.	Transportation routes and infrastructure wildland-urban interface and areas with high wildfire risk historically will be most exposed to increases in the likelihood of wildfire.	Depends on redundancy in the transportation network.	Indicates a greater potential for wildfire to damage instrastructure, interrupt businesses, or affect public health and well-being.
44	Bridges - Drought *(Transportation)*	Decrease in snowpack	The County maintains 196 bridges which are owned by the County. Same climate impacts as County roads	Same climate impacts as County roads	Same non-climate stressors as county roads - Drought	Same consequences as county roads - reduced snowpack
45	Bridges - Extreme Heat *(Transportation)*	Increase in hot days	Same climate impacts as County roads - Extreme Heat	Same climate impacts as County roads - Extreme Heat	Same non-climate stressors as county roads - extreme heat	Same consequences as county roads - extreme heat
46	Bridges - Extreme Precipitation *(Transportation)*	Increase in heavy precipitation magnitude	Same climate impacts as County roads - Extreme Precipitation	Same climate impacts as County roads - Extreme Precipitation	Same non-climate stressors as county roads - extreme precipitation	Heavier precipitation events are expected to intensify flooding, landslides, and erosion, which can interrupt transportation routes, damage infrastructure, and increase maintenance and repair costs.
47	Bridges - Flooding *(Transportation)*	Increase in peak streamflow	Same climate impacts as County roads - Flooding	Same climate impacts as County roads - Flooding	Same non-climate stressors as county roads - Flooding	Same consequences as county roads - flooding. There are 77 bridges located within the 100-year floodplain and 78 located within the 500-year floodplain. Flooding events can significantly impact road bridges. These are important because they often provide the only ingress and egress to some neighborhoods. (Source: Haz Mit Plan)
48	Bridges - Reduced snowpack *(Transportation)*	Decrease in snowpack	Same climate impacts as County roads - Reduced snowpack	Same climate impacts as County roads - Reduced snowpack	Same non-climate stressors as county roads - Drought	Same consequences as county roads - reduced snowpack
49	Bridges - Wildfire *(Transportation)*	Increase in wildfire likelihood	Same climate impacts as County roads - Wildfire	Same climate impacts as County roads - Wildfire	Same non-climate stressors as county roads - wildfire	Same consequences as county roads - wildfire
50	Appurtenant Structures for Roads - Drought & Extreme Heat *(Transportation)*	Decrease in snowpack & increase in hot days	Same climate impacts as County roads - Drought & Extreme Heat	Same climate impacts as County roads - Drought & Extreme Heat	Same non-climate stressors as county roads - drought and county roads - extreme heat.	Same consequences as county roads - drought and extreme heat
51	Appurtenant Structures for Roads - Extreme Precipitation & Flooding *(Transportation)*	Increase in heavy magnitude and peak streamflow	Same climate impacts as County roads - Extreme Precipitation & Flooding	Same climate impacts as County roads - Extreme Precipitation & Flooding	Same non-climate stressors as county roads - extreme precipitation and flooding	Same consequences as county roads - extreme precipitation and flooding. There would be up to $252 million of flood loss from a 100-year flood event in the planning area. (Source: Haz Mit Plan)
52	Appurtenant Structures for Roads - Reduced snowpack *(Transportation)*	Decrease in snowpack	Same climate impacts as County roads - Reduced snowpack	Same climate impacts as County roads - Reduced snowpack	Same non-climate stressors as county roads - reduced snowpack	Same consequences as county roads - reduced snowpack
53	Appurtenant Structures for Roads - Wildfire *(Transportation)*	Increase in wildfire likelihood	Same climate impacts as County roads - Wildfire	Same climate impacts as County roads - Wildfire	Same non-climate stressors as county roads - wildfire	Same consequences as county roads - wildfire
54	Airports - Drought & Extreme Heat *(Transportation)*	Decrease in snowpack and increase in hot days	Same climate impacts as County roads - Drought & Extreme Heat	Same climate impacts as County roads - Drought & Extreme Heat	Same non-climate stressors as county roads - drought & extreme heat	Same consequences as county roads - drought & extreme heat
55	Airports - Extreme Precipitation & Flooding *(Transportation)*	Increase in heavy precipitation magnitude and peak streamflow	Same climate impacts as County roads - Extreme precipitation and flooding	Same climate impacts as County roads - Extreme precipitation and flooding	Same non-climate stressors as county roads - extreme precipitation and flooding	Same consequences as county roads - extreme precipitation and flooding. The Chehalis-Centralia airport is protected by a dike system, but the dikes were overtopped during the January 1990 and December 2007 flood event, closing the airport. Extreme future flooding may influence similar events to occur. (Source: Haz Mit Plan)
56	Airports - Reduced snowpack *(Transportation)*	Decrease in snowpack	Same climate impacts as County roads - Reduced snowpack	Same climate impacts as County roads - Reduced snowpack	Same non-climate stressors as county roads - reduced snowpack	Same consequences as county roads - reduced snowpack
57	Airports - Wildfire *(Transportation)*	Increase in wildfire likelihood	Same climate impacts as County roads - Wildfire	Same climate impacts as County roads - Wildfire	Same non-climate stressors as county roads - wildfire	Same consequences as county roads - wildfire.
	Railways - Drought & Extreme Heat	Decrease in snowpack and increase in hot days	Same climate impacts as County roads - Drought & Extreme Heat	Same climate impacts as County roads - Drought & Extreme Heat	Aging infrastructure; Limited personnel	Disruptions to economic activity
	Railways - Extreme Precipitation & Flooding	Increase in heavy precipitation magnitude and peak streamflow	Same climate impacts as County roads - Extreme precipitation and flooding	Same climate impacts as County roads - Extreme precipitation and flooding		same as above
	Railways - Reduced snowpack	Decrease in snowpack	Same climate impacts as County roads - Reduced snowpack	Same climate impacts as County roads - Reduced snowpack		same as above
	Railways - Wildfire	Increase in wildfire likelihood	Same climate impacts as County roads - Wildfire	Same climate impacts as County roads - Wildfire		same as above

58	Solid Waste transfer station - Extreme Precipitation *(Waste Mgmt)*	Increase in extreme precipitation magnitude	Heavier precipitation has the potential to increase storm damage to infrastructure and generate more waste and debris. More waste will strain municipal cleanup and refuse capacity.	Waste management services that serve people located in low-lying areas, within current floodplains or regulatory flood zones, or adjacent to unstable slopes are expected to be more exposed to the impacts of heavier precipitation events.	Increases in debris and waste will depend on current capacity. Increase in demand from population increase. Limited personnel and waste hauling capacity. Economic limitations: cost of waste hauling fluctuates, rent prices, etc.	Cause damages to infrastructure and agricultural operations than changes in seasonal and annual precipitation.
59	Solid Waste transfer station - Flooding *(Waste Mgmt)*	Increase in return interval of 25-yr peak streamflow	The 25-year peak streamflow is the streamflow that occurs on average every 25 years, similar to the 100-year high flow but more frequent. The return interval of the historical 25-year peak streamflow indicates how much more frequently streamflows of this magnitude are expected to occur in the future with heavier precipitation and more rain in the winter	Waste management services that serve development located in low-lying areas and in current and historical flood zones will be most exposed to projected increases in the frequency of high streamflows that can cause flooding and generate more waste.	Increases in debris and waste will depend on current capacity. Facilities with older design standards or standards that do not account for flooding will be more affected.	More frequent high streamflows are expected to increase flooding, which can generate more debris and waste. More waste will strain municipal cleanup and refuse capacity. Flooding of waste management facilities can release contaminants and hazardous materials.
60	Solid Waste transfer station - Wildfire *(Waste Mgmt)*	Increase in wildfire likelihood	More frequent wildfires have the potential to generate greater amounts of debris and waste. More waste will strain municipal cleanup and refuse capacity.	Waste management facilities that serve areas in the wildland-urban interface will be more exposed to increases in waste with more wildfire.	Same non-climate stressors as solid waste transfer station - flooding	An increasing likelihood of wildfire indicates a greater potential for wildfire to damage infrastructure, interrupt businesses, or affect public health and well-being.
61	Sewer infrastructure - Extreme Precipitation *(Waste Mgmt)*	Increase in extreme precipitation magnitude	Heavier precipitation has the potential to increase storm damage to infrastructure and generate more waste and debris. More waste will strain municipal cleanup and refuse capacity.	Waste management services that serve people located in low-lying areas, within current floodplains or regulatory flood zones, or adjacent to unstable slopes are expected to be more exposed to the impacts of heavier precipitation events.	Same non-climate stressors as solid waste transfer station - flooding	Likely to cause damages to infrastructure and agricultural operations than changes in seasonal and annual precipitation.
62	Sewer infrastructure - Flooding *(Waste Mgmt)*	Increase in return interval of 25-yr peak streamflow	Same climate impacts as solid waste transfer station - flooding	Same as Solid Waste Transfer Station - Flooding exposure	Same non-climate stressors as solid waste transfer station - flooding	More frequent high stream flows are expected to increase flooding, which can generate more debris and waste. More waste will strain municipal cleanup and refuse capacity. Flooding of waste management facilities can release contaminants and hazardous materials.
63	Sewer infrastructure - Wildfire *(Waste Mgmt)*	Increase in wildfire likelihood	More frequent wildfires have the potential to generate greater amounts of debris and waste. More waste will strain municipal cleanup and refuse capacity.	Same as Solid Waste Transfer Station - Wildfire exposure	Same non-climate stressors as solid waste transfer station - extreme precipitation	Greater potential to damage infrastructure, interrupt businesses, or affect public health and well-being.
64	Dump stations - Extreme Precipitation *(Waste Mgmt)*	Increase in extreme precipitation magnitude	Same climate impacts as Sewer Infrastructure	Same as Solid Waste Transfer Station - Extreme precipitation exposure	Same non-climate stressors as solid waste transfer station - extreme precipitation	Same consequences as sewer infrastructure - extreme precipitation
65	Dump stations - Flooding *(Waste Mgmt)*	Increase in return interval of 25-yr peak streamflow	Same climate impacts as Sewer Infrastructure	Same as Solid Waste Transfer Station - Flooding exposure	Same non-climate stressors as sewer infrastructure - flooding.	Same consequences as sewer infrastructure - flooding
66	Dump stations - Wildfire *(Waste Mgmt)*	Increase in wildfire likelihood	Same climate impacts as Sewer Infrastructure	Same as Solid Waste Transfer Station - Wildfire exposure	Same non-climate stressors as solid waste transfer station - extreme precipitation	Same consequences as sewer infrastructure - wildfire
67	Water infrastructure - Drought *(Water Resources)*	Increase in total annual precipitation	Increases in annual precipitation have the potential to increase groundwater recharge. Changes in the timing and intensity of precipitation and increases in water demand and evaporation are expected to offset increases in groundwater recharge due to more annual precipitation.	The exposure of water resources to changes in annual precipitation in your county or community depends on the presence of critical groundwater aquifer recharge areas and the location of wells.	Depend on the sources of water and the effects of non-climatic stressors on water supplies. Groundwater sources are sensitive to changes in annual precipitation. Non-climatic stressors that increase demand, such as population growth and development, will increase the sensitivity of water resources to changes in annual precipitation.	Can limit the overall amount of water available for human use and ecosystems.
68	Water infrastructure - Reduced snowpack *(Water Resources)*	Decrease in snowpack	Reduced snowpack and more winter rain is expected to increase water availability in winter for multiple uses including drinking water and hydropower generation, and decrease water availability in late spring and summer when demand is also expected to increase. Shifting in snowpack is expected to occur to earlier times of the year.	The exposure of water resources will depend on the location of water sources. The low-elevation Cascade and Olympic foothills will be exposed first because these areas currently receive substantial snowfall at temperatures near freezing. By the end of the century, snowpack is expected to remain relatively unaffected only in the high-elevations of the Northern Cascade Mountains.	Dependent on sources of water and energy. Surface water sources and hydropower are sensitive to changes in snowpack. A lack of redundancy	Can limit the amount of natural water storage in snowpack that will be available in the melt season. April 1st snowpack (snow water equivalent)
69	Water infrastructure - Wildfire *(Water Resources)*	Increase in wildfire likelihood	More frequent wildfires have the potential to damage water distribution infrastructure and reduce water quality in reservoirs due to more runoff, erosion, and turbidity. Changes in water quality could increase the need for water treatment and filtration.	The local exposure of water resources to increases in wildfire will depend on the extent of water distribution infrastructure and water resources located in the wildland-urban interface or wildlands.	Dependent on current condition of water treatment and distribution infrastructure. Surface water sources and systems with limited treatment will be more sensitive to wildfire-related changes in water quality. Older infrastructure with a lack of redundancy will be more sensitive to wildfire damage.	There is a greater potential for wildfire to damage infrastructure, interrupt businesses, or affect public health and well-being.
70	Civic Centers - Drought *(Zoning & Development)*	Decrease in snowpack	Snowpack in the mountains in the beginning of spring indicates the amount of natural water storage in snowpack that will be available in the melt season. April 1st snowpack (snow water equivalent) is one source of water for uses including including hydropower generation, drinking water, irrigation, and instream flows for ecosystems.	Same as Water Infrastructure - Reduced snowpack exposure	Dependance of the recreation sector to snowpack and seasons, as well as flexibility to shift among seasons.	Reductions in snowpack are expected to decrease opportunities for winter outdoor recreation and shorten the winter recreation season with adverse effects on the economy and character of some communities. Warm season outdoor recreation opportunities are expected to increase, shifting tourism revenue from one recreation sector to another.
71	Civic Centers - Extreme Heat *(Zoning & Development)*	Increase in August stream temperature	Stream temperature during August, which is typically the hottest month for most streams, is an indicator of water quality for salmon and other species that depend on cold water.	Undefined	Dependent on non-climatic stressors that also increase water temperatures such as discharge of heated effluents, removal of riparian and upland vegetation, channel alternation, etc.	Warmer stream temperatures have the potential to reduce the ability to meet water quality standards and the effluent limits (amount discharge to the water body) set on existing wastewater treatment facilities.
72	Civic Centers - Extreme Precipitation *(Zoning & Development)*	Increase in heavy precipitation magnitude	Heavier precipitation events are expected to intensify urban flooding and demands on storm water systems, which can affect zoning restrictions on new buildings, and require revised building codes for development in more frequently flooded areas.	Certain land uses and development located in low-lying areas, within current floodplains or regulatory flood zones, or adjacent to unstable slopes are expected to be more exposed to an increase in heavy precipitation.	Dependent on the types of land use, building codes in flood and steep slope zones, and the capacity of stormwater systems.	Changes in the intensity of heavy precipitation events are more likely to cause damages to infrastructure and agricultural operations than changes in seasonal and annual precipitation.

73	Civic Centers - Flooding *(Zoning & Development)*	Increase in peak streamflow	Higher streamflow are expected to increase damage to all types of infrastructure in flood zones and could expand the flood zone in some areas leading to damage of development not currently in flood zones.	Development located in river valleys and in or near current and historical flood zones will be most exposed to projected increases in high streamflow that cause flooding.	Dependent on the types of land use in flood zones and the extent of flood protection.	An increase in the annual peak streamflow indicates a potential for higher streamflow and larger areas inundated every year at high flows.
74	Civic Centers - Reduced snowpack *(Zoning & Development)*	Decrease in snowpack	Reductions in snowpack are expected to decrease opportunities for winter outdoor recreation and shorten the winter recreation season with adverse effects on the economy and character of some communities. Warm season outdoor recreation opportunities are expected to increase, shifting tourism revenue from one recreation sector to another. Reduced snowpack may decrease the volume of avalanches but increase the frequency of avalanches.	Same as Water Infrastructure - Reduced snowpack exposure	Dependance of the recreation sector to snowpack and seasons, as well as flexibility to shift among seasons.	Decrease in snowpack indicates a decreased amount of natural water storage in snowpack that will be available in the melt season. This may impact hydropower generation, drinking water, irrigation, and instream flows for ecosystems.
75	Civic Centers - Wildfire *(Zoning & Development)*	Increase in wildfire likelihood	More frequent wildfires are expected to increase damage to homes and infrastructure and displace residents.	The extent of development and the types of land use in the wildland-urban interface will affect local exposure to increases in the likelihood of wildfire.	Types of land use in the wildland-urban interface and population growth.	An increasing likelihood of wildfire indicates a greater potential for wildfire to damage infrastructure, interrupt businesses, or affect public health and well-being.
	Colleges - Drought & Extreme Heat		Changes in stream temperature affects ecosystem habitats which impact learning abilities.	Student learning outcomes may be inhibited by extreme weather. Increased energy consumption for cooling or heating may exacerbate infrastructure limitations.	Aging infrastructure; Limited personnel; Increased student body presence	Multi-use of college campuses or facilities for emergency response; Need for alternative energy source; Connection with greater community requires more collaboration and networking during extreme weather events.
	Colleges - Extreme Precipitation & Flooding		Increaed peak streamflows and precip magnitude affects ecosystem habitats and human safety which impacts learning abilities.	Student learning outcomes may be inhibited by extreme weather. Increased energy consumption for cooling or heating may exacerbate infrastructure limitations.		same as above
	Colleges - Wildfire		Increased costs for maintenance, Increased damage to infrastructure	same as above		same as above

EXAMPLES

1	Roadways-Extreme Heat *(Transportation)*	**Hot Days** *(change in annual hot days, or the average number of days per year with a maximum temperature greater than 100°F)*	**More hot days: Pullman is expected to experience about 2 additional days annually with a maximum temperature greater than 100°F in the 2030s (early century); 5 additional days in the 2040s; 9 additional days annually in the 2050s (midcentury); and 20 additional days annually in the 2080s (late century), compared to 1980-2009, under a high-emissions scenario. More hot days have the potential to damage the surfaces of roads and bridges (Source: UW CIG tool, Climate Mapping for a Resilient Washington).**	The exposure of road surfaces to extreme heat will vary locally based on features that exacerbate or ameliorate extreme heat such as the extent of urban heat islands and tree canopy cover for shade *(Source: UW CIG tool, Climate Mapping for a Resilient Washington)* . Many of Pullman's major streets do not have street trees, causing those areas to feel hotter than other areas in the city (*Source: Pullman Planner Ariel Medeiros*).	Population growth, along with more vehicle traffic and associated wear and tear on transportation infrastructure	**Future Consequences:** Higher temperatures can put stress on bridge infrastructure through thermal expansion of bridge joints and paved surfaces, and deterioration of steel, asphalt, protective cladding, coats, and sealants. Extreme heat can accelerate the deterioration or threaten the integrity of some types of asphalt pavement through softening, rutting, and migration of liquid asphalt. Hotter summer days can pose risks to the health and safety of maintenance and construction crews, limiting working hours *(Source: American Association of State Highway and Transportation Officials white paper, Extreme Weather and the Transportation System)* . Consequences for Pullman could include greater transportation infrastructure maintenance and repair costs and more frequent traffic and service disruptions. Road crews will be affected by the increase in temperature as they are forced to work in the heat conditions with the lack of shade trees (*Source: Pullman Planner Ariel Medeiros*).	*COMMERCE NOTE: This example is from Pullman's 2023 pilot test of the resilience guidance.*
2	Wellbeing 1-Extreme Heat *(Health)*	**65°F Min. Humidex Days** *(indicator of nighttime heat stress);* **90°F Max Humidex Days** *(indicator of daytime heat stress)*	**More warm and humid days and nights: The humidex is a measure of experienced heat conditions and takes into consideration of both temperature and humidity. The average number of days a year with a maximum humidex greater than 90°F is expected to increase by about 16 days annually in Pullman for the 2030s (early century), 30 days annually for the 2050s (midcentury), and 55 days annually for the 2080s (late century), compared to the 1980-2009 period, under a high-emissions scenario. The average number of days a year with a minimum humidex greater than 65°F is expected to increase by about 7 days annually for the 2030s (early century), 20 days annually for the 2050s (midcentury), and 41 days annually for the 2080s (late century), compared to the 1980-2009 period, under a high-emissions scenarios (Source: UW CIG tool, Climate Mapping for a Resilient Washington).**	Exposure will vary locally based on features that exacerbate or ameliorate extreme heat, such as the extent of paved surfaces, tree canopy for shade, or proximity to water bodies *(Source: UW CIG tool, Climate Mapping for a Resilient Washington)* . Newer subdivisions will have the most exposure, as street trees are young and don't provide much shade. Apartment land (Norteast area) also has high impervious surface and low canopy cover, based on maps BERK created. Many places on WSU campus also have low canopy cover with high impervious surfaces (*Source: Pullman Planner Ariel Medeiros*).	Development of urban forests and other natural areas; Increase in the % of residents age 65+; Aging housing stock	**Future Consequences:** The elderly, very young, people with preexisting health conditions, and people without housing, substandard housing or without cooling systems are likely to be more affected by the expected increase in warm and humid days and nights (*Source: UW CIG tool, Climate Mapping for a Resilient Washington*). Strenuous activities in dangerous temperatures and humidity can quickly cause heat-related illness, but exposure to high temperatures over a long period of time and during the night also has a detrimental impact on human health *(Source: APA report-- Planning for Urban Heat Resilience).* Consequences could include more heat-related medical emergencies for Pullman residents and more demand and costs for municipal emergency services (police, fire) and hospitals (*Source: Pullman Fire Chief Mike Heston*). **Past Consequences:** Past extreme heat events have limited when emergency services personnel can do outdoor training (*Source: Pullman Fire Chief Mike Heston*). Various groups, including the City, open their doors as cooling centers. The parks and rec. buildng and the library were open in 2021 for cooling centers. Two of our senior-living facilities are in areas with high urban heat island that might cause higher heat-related illnesses (*Source: Pullman Planner Ariel Medeiros*).	*COMMERCE NOTE: This example is from Pullman's 2023 pilot test of the resilience guidance.*
3	*Gateway Transit Center-SLR (transportation sector)*	**Change in Sea Level Rise**	**Likely Sea Level Rise:** For Port Angeles, modeling projects a "likely" sea level rise estimate (corresponding to a 50% chance that absolute sea level will rise by at least that amount) — of about 0.3 feet by 2030, 0.5 feet by 2050, and 1.3 feet by 2100, relative to the average sea level for 1991-2009, for a low emissions scenario. For a high emissions scenario, "likely" sea level rise is projected to be about 0.3 feet by 2030, 0.6 feet by 2050, and 1.8 feet by 2100. **High Sea Level Rise:** The modeling projects a 1% probability that absolute sea level rise will reach or exceed about 0.5 feet by 2030, 1.2 feet by 2050, and 3.9 feet by 2100, relative to the average sea level for 1991-2009, for a lower greenhouse gas scenario. For a higher emissions scenario, "high" sea level rise will reach or exceed about 0.5 feet by 2030, 1.3 feet by 2050, and 4.6 feet by 2100. *(Source: UW CIG tool, Climate Mapping for a Resilient Washington)*	The Gateway Transit Center sits between Railroad Avenue and Front Street/U.S. Hwy. 101. The publicly owned transit center is a hub for Clallam Transit and Greyhound buses, and the facility includes a farmers' market. The transit center's proximity to the marine shoreline (about 250 feet) and low elevation (see map) expose it to potential coastal inundation. The center also has a below-grade parking garage with an entrance that abuts Railroad Avenue at grade and ramps down to a basement garage level beneath the center. The center is also adjacent the Peabody Creek estuary, where a conjunction of flooding and a king tide event could cause issues in the future (*Source: Port Angeles Sr. Planner Ben Braudrick*).	Bluff Erosion	**Future Consequences:** Inundation of Front Street/U.S. Hwy 101 (the downtown couplet's westbound route) could block access to this facility and affect transit service routes and reliability throughout Clallam County.	*COMMERCE NOTE: This example is from Port Angeles' 2023 pilot test of the resilience guidance.*
4	*Olympic Discovery Trail-SLR (transportation sector)*	**Change in Sea Level Rise**	" (*see above*)	The Olympic Discovery Trail is highly exposed to rising sea levels, as the multiuse trail runs along downtown's marine shoreline -- either directly along the water or behind the ferry terminal and other piers. The trail is protected by rip rap, with the exception of stream ravines where bridges are required (*Source: Port Angeles Planner Ben Braudrick*).		Future Consequences: Rising sea levels, coupled with storm surge, heavy precipitation, and high tide events, could lead to inundation of the trail. This could cut off an important active-transportation route through downtown. Sea level rise could potentially undermine the trail behind the rip rap, inundate and destroy culverts draining the southern upland side of the trail that drains the bluffs, and undermine bridge abutments. Past Consequences: We do have an example of trail failure due to prevailing easterly waves near Morse Creek to the east: There were $80K of emergency repairs/repairs related to storm events; this includes adding in woody debris, rip-rap and geotextile bank stabilization. (Source: Port Angeles Sr. Planner Ben Braudrick).	*COMMERCE NOTE: This example is from Port Angeles' 2023 pilot test of the resilience guidance.*
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Task 1.4: Identify priority climate hazards

Hazard	**Relevant to your jurisdiction?** *(Mark Yes or No.)*	**Notes** *(Explain why you determined this hazard is or is not relevant to your jurisdiction.)*
Drought	*No*	*Jurisdiction has significant agricultural land and industry; however, jurisdiction does not have managing authority over agricultural land and rather responds to emergencies/natural hazard events that occur on agricultural land.*
Extreme heat	*No*	*Jurisdiction's exposure to increased extreme heat events is low.*
Extreme precipitation	Yes	*Jurisdiction is more likely to experience secondary hazards such as landslides and overtopping of levees that flood protected areas.*
Flooding	Yes	*Jurisdiction has various rivers, lakes, streams, scattered across the county; high stream flows are expected to increase or alter floodplain zones that destroy infrastructure (river bank erosion, landslides), render County property undevelopable, and increase emergency responses/demand.*
Reduced snowpack	Yes	*Jurisdiction is surrounded by various mountainous regions. Reduced snowpack impacts streamflow timing which affects hydroelectrical facilities, fisheries, and recreation activities that rely on predictable snowmelt.*
Sea level rise	*No*	*Jurisdiction is not immediately along the coastline.*
Wildfire	Yes	*Eastern County has higher risk of wildfire likelihood; Jurisdiction is likely to experience more intense and frequent wildfire events.*
Other - please list		
Earthquake	*No*	*Jurisdiction experiences earthquakes due to its location near the Juan de Fuca and Pacific plates; however, the impacts of climate change on earthquake probability are unknown.*
Volcano	*No*	*Nearby volcano includes Mount Adams (active), Mount Rainer, Mount Saint Helens which has not erupted in more than 1000 years. The impacts of climate change on volcanic probability are unknown.*
Avalanche		*Jurisdiction is surrounded by various mountainous regions and risk of avalanche is high. Jurisdiction is expected to experience reduced snowpack or altered timing of available snowpack during a season. Volume of avalanches may decrease but frequency is expected to increase. East county higher risk.*
Other - please list		

Task 2.1: Review existing plans for climate gaps and opportunities									
ID	**Measure**	**Document**	**Sector**	**Climate Indicator**	**Hazards**	**Climate Impacts**	**Assets**	**Gaps and Opportunities**	**Next Step**
	List existing measure (goal or policy) that implicitly or explicitly supports climate resilience.	*List the document where the measure is found (comprehensive plan, hazard mitigation plan, shoreline master program, stormwater management plan, etc.).*	*List the most appropriate sector(s) for the measure [select all that apply].) OPTIONS: Buildings & Energy, Cultural Resources & Practices; Economic Development; Emergency Management; Health & Well-being; Ecosystems; Transportation; Agriculture & Food Systems; Waste Management; Water Resources; Zoning & Development*	***Information from Step 1:*** *List the climate indicator(s) that are relevant to the measure (changes in snowpack, streamflow, sea level, etc.).*	***Information from Step 1:*** *List the climate-related hazard(s) that the measure addresses.*	***Information from Step 1:*** *List climate impacts that the measure addresses now or could be addressed via changes. Also, consider whether the measure is maladaptive and could increase climate vulnerability and risk.*	***Information from Step 1:*** *List assets (forests, orchards, bridges, etc.) that are affected by the climate impacts you listed.*	*If applicable, note how the existing measure could be amended or supplemented by a new goal or policy to better address your local climate hazards and impact(s).*	*Note desired next step (e.g., amend an existing measure; consolidate with a similar measure; add a new measure; keep existing measure as-is in comprehensive plan).*
1	**POLICY URBAN 1.4** Consider greenbelt and open space areas and other environmentally sensitive areas when determining urban growth areas.	*Lewis County Comp Plan (2021)*	Ecosystems; Zoning & Development	Increased peak streamflow	Flooding	Lewis County is anticipated to experience increased annual max streamflow and risk of riverine flooding. River bank erosion is also a big problem in Lewis County. Many County-owned parcels are located on floodplains - see assets list. Summer stream flows are expected to substantially diminish due to shifting of projected snowmelt patterns.	Roads, Parks, Recreation facilities, Utilities	Add specificity.	Amend existing measure to consider climate impacts such as riverine flooding. Add to climate resiliency element.
2	**Policy Urban 4B.5 -** Minimize potential adverse impacts of commercial development on nearby resource uses and critical areas.	*Lewis County Comp Plan (2021)*	Ecosystems; Zoning & Development	Increased peak streamflow	Flooding	Lewis County is anticipated to experience increased annual max streamflow and risk of riverine flooding. River bank erosion is also a big problem in Lewis County. Many County-owned parcels are located on floodplains - see assets list. Summer stream flows are expected to substantially diminish due to shifting of projected snowmelt patterns.	County administrative buildings, parks, recreation facilities	Add specificity.	Amend existing policy to consider climate impacts. Add measures to Hazard Mitigation Plan or ensure consistency with HMP
3	**Policy Urban 5A.1** - Locate sites for industrial use in areas: where major enviro constraints, such as unsuitable soils, floodplains or wetlands, are minimal or able to be mitigated.	*Lewis County Comp Plan (2021)*	Emergency Mgm't; Zoning & Development	Increased peak streamflow	Flooding	Lewis County is anticipated to experience increased annual max streamflow and risk of riverine flooding. River bank erosion is also a big problem in Lewis County. Many County-owned parcels are located on floodplains - see assets list. Summer stream flows are expected to substantially diminish due to shifting of projected snowmelt patterns.	County appurtenant structures	Add specificity.	Amend existing policy to consider climate impacts. Add measures to Hazard Mitigation Plan or ensure consistency with HMP.
4	**Policy Urban 6.5 -** Ensure that future developments within urban reserve areas provide employment with competing prevailing wages and consider environmental sensitivity.	*Lewis County Comp Plan (2021)*	Economic Development; Zoning & Development	Increase in wildfire danger, Increase of return interval of 25-yr peak streamflow	Wildfire, Flooding, Reduced snowpack (Avalanche)	An increased likelihood of climate and fuel conditions conducive to wildfire indicates greater potential for wildfire danger to damage infrastructure, interrupt businesses, and affect public health and well-being. Buildings and energy infrastructure located in the wildland-urban interface and areas with high wildfire risk historically will be most exposed to increases in the likelihood of wildfire. Eastern County has higher risk of wildfire and avalanches. Reduced snowpack may decrease the volume of avalanches but increase the frequency of avalanches, resulting in seasonal employment rather than permanent employment in environ sensitive areas. Additionally, Lewis County is anticipated to experience increased annual max streamflow and risk of riverine flooding.	All County assets	Add specificity.	Amend existing policy to consider climate impacts and hazards. Add provisions for advancing environmental justice per HB 1181. Add to new climate resiliency element.

5	**POLICY RURAL 3.1** Preserve rural character by providing adequate public facilities and services. Ensure water, wastewater treatment and other services are consistent with development standards.	*Lewis County Comp Plan (2021)*	Health & Well-being; Waste Mgm't; Water Resources; Zoning & Development	Increase in wildfire likelihood, Increase in extreme precipitation magnitude, Increase in return interval of 25-yr peak streamflow, Decrease in snowpack	Wildfire, Extreme Precipitation, Flooding, Reduced snowpack	Lewis County is anticipated to experience increased annual max streamflow and risk of riverine flooding. Heavier precipitation is expected to intensify flooding in low-lying areas and require higher capacity storm water drainage systems. May also overwhelm treatment facilities. Lewis County is expected to experience twice the average streamflow in western County area vs eastern County area.	Hydroelectric facilities, Water wells, Roadway culverts	Add specificity - climate impacts	Integrate the resiliency element with the land use element, housing, and capital facilities elements.
6	Policy Rural 9.1-9.2 - Rural development to have a variety of uses and densities consistent with rural character. Allow wide range of rural economic activities that do no cause environmental degradation.	*Lewis County Comp Plan (2021)*	Economic Development; Zoning & Development	Increase in wildfire danger, Increase of return interval of 25-yr peak streamflow	Wildfire, Flooding, Reduced snowpack (Avalanche)	An increased likelihood of climate and fuel conditions conducive to wildfire indicates greater potential for wildfire danger to damage infrastructure, interrupt businesses, and affect public health and well-being. Buildings and energy infrastructure located in the wildland-urban interface and areas with high wildfire risk historically will be most exposed to increases in the likelihood of wildfire. Eastern County has higher risk of wildfire and avalanches. Reduced snowpack may decrease the volume of avalanches but increase the frequency of avalanches, resulting in seasonal employment rather than permanent employment in environ sensitive areas. Additionally, Lewis County is anticipated to experience increased annual max streamflow and risk of riverine flooding.	All County assets	Add specificity.	Amend existing policy to consider climate impacts and hazards. Integrate with economic development element. Add provisions for advancing environmental justice per HB 1181.
7	**NR Goal 5.0 |** Ensure resource activities protect the environment. **Policy NR 5.1** - Natural resource activities - ranching, farming, forestry, mining, etc. - minimizes adverse environ impacts.	*Lewis County Comp Plan (2021)*	Economic Development; Ecosystems; Agriculture & Food Systems	Increased peak streamflow, Increase in streamflow timing, Increase in wildfire likelihood, Increase in heavy precipitation magnitude	Extreme Precipitation, Flooding, Reduced snowpack, Wildfire	Agriculture, carpentry, construction, natural resources harvesting, transportation and warehousing, or other related jobs may be reduced to operating seasonally or to different times of the year. Increases in emergency responses may increase stress on personnel and equipment. Shift in water supply and energy demands, shift in energy source - government spendings and investments on alternative energy industries. Climate impacts exacerbate vulnerabilities of low-income, unemployed households in rural neighborhoods. Increased demand on County's Work Opportunities department.	All assets.	Add specificity regarding climate impacts.	Integrate with Economic Development element.
8	**POLICY UCF 16.3** Craft the county's development regulations to be flexible and responsive to innovations and advances in telecommunications technology.	*Lewis County Comp Plan (2021)*	Buildings & Energy; Zoning & Development	Increased peak streamflow, Increase in streamflow timing, Increase in wildfire likelihood, Increase in heavy precipitation magnitude	Extreme Precipitation, Flooding, Reduced snowpack, Wildfire	More frequent power loss, shuttered power generating stations or transmission corridors. Increased cost and demand for emergency preparedness/response/recovery. Additional stress on personnel and equipment. Wildfire and flooding can lead to secondary hazards such as landslides that destroy utility infrastructure, requiring the siting and design of facilities in non-hazard areas or with minimum exposure to hazard.	Utility substations, Hydroelectric facilities, Radio communications	Add specificity - climate impacts.	Integrate into Economic Development element.
9	**NE Goal 1.0 |** Preserve natural/scenic beauty. Minimize development impact on environ. **Policies NE 1.1-1.4** - Develop in areas with few environ hazards to prevent loss of life and property. Preserve hazardous areas as open space. Preserve natural buffers along waterways.	*Lewis County Comp Plan (2021)*	Ecosystems; Zoning & Development	Increased peak streamflow, Increase in streamflow timing, Increase in wildfire likelihood, Increase in heavy precipitation magnitude	Flooding, Reduced snowpack (Avalanche), Wildfire, Extreme Precipitation	Lewis County is anticipated to experience increased annual max streamflow. River bank erosion is also a big problem in Lewis County. Summer stream flows are expected to substantially diminish due to shifting of projected snowmelt patterns. Reduced snowpack may decrease the volume of avalanches but increase the frequency. More flooding and avalanches events will increase the demand for emergency services. Closure of roads and buckling/warping of road infrastructure. Eastern County has higher risk of wildfire likelihood due to steep topography and "perfect storm" conditions. More frequent extreme weather events can disrupt travel, increase road closures and delay construction projects. Some existing developed areas would be considered hazardous from increasingly frequent flooding, avalanche, and potential wildfire damage.	All assets. Many County-owned vacant parcels are located on floodplains - see assets list.	Add specificity.	Amend existing policy to consider climate impacts. Add measures to Hazard Mitigation Plan or ensure consistency with HMP.
10	**POLICY NE 2.1** Require activities that produce air pollutants and odors to comply with adopted air quality standards.	*Lewis County Comp Plan (2021)*	Health & Well-being	Increase in wildfire likelihood	Wildfire	More frequent wildfires are expected to reduce human health through loss of life, injury and reduced mental health associated with displacement. Poor air quality due to more wildfire smoke can cause adverse respiratory health effects and can be exacerbated by GHG emissions from County assets.	Transportation fleet; County administrative buildings, Solid waste facilities	Add specificity	Amend existing policy to consider climate impacts on vulnerable neighborhoods or communities. Integrate into economic development, transportation, and utilities/capital facilities elements.

11	**POLICY NE 2.2** Encourage the use of alternative, cleaner burning fuels and other sources of energy.	*Lewis County Comp Plan (2021)*	Buildings & Energy;	Increase in wildfire likelihood	Wildfire	More frequent wildfires are expected to reduce human health through loss of life, injury and reduced mental health associated with displacement. Poor air quality due to more wildfire smoke can cause adverse respiratory health effects and can be exacerbated by GHG emissions from County assets.	Transportation fleet; County administrative buildings, Solid waste facilities	Add specificity	Amend existing policy to consider climate impacts on vulnerable neighborhoods or communities. Integrate into economic development, transportation, and utilities/capital
12	**NE Goal 3.0 |** Preserve and enhance the quality of water in Lewis County. **Policies NE 3.1 thru 3.4 |** Encourage septic system development and livestock operations in a way that does not contaminate groundwater and surface waters.	*Lewis County Comp Plan (2021)*	Health & Well-being; Waste Management; Water Resources	Increased peak streamflow, Increase in streamflow timing, Increase in heavy precipitation magnitude	Extreme Precipitation, Flooding, Reduced snowpack	Changes in the timing and intensity of precipitation and water supply from snowpack; Increases in water demand and evaporation are expected to offset increases in groundwater recharge due to more annual precipitation. Snowmelt is projected to shift three to four weeks earlier in Lewis County, resulting in lower summer peak stream flows that may temporarily impact water quality due to contamination or excess nutrient levels.	Shorelines, Water wells	No changes needed	Adopt into comprehensive plan
13	**LU Goal 4.0 |** Maintain the quality of the county's environmentally sensitive critical areas. **Obj 4B** - Preserve wetland functions and values | Seek to retain the function and values of wetlands in the County.	*Lewis County Comp Plan (2021)*	Health & Well-being; Ecosystems	Increased peak streamflow, Increase in streamflow timing, Increase in wildfire likelihood	Flooding, Reduced snowpack, Wildfire	County ESAs include shorelines, waterways, and buffers along waterways. Shifting of projected snowmelt patterns is expected, resulting in shifting of peak stream flows for ESA habitat. Changing habitat quality could lead to mass fish kills and degradation of habitat. Wildfire and incompatible land uses can also increase runoff and sediment to streams, which can reduce aquatic habitat quality. Invasive species spread through wildfire threatens county's ESAs.	Shorelines, Parks	Add specificity.	Amend existing measure to consider climate impacts.
14	**OBJ 4C – PROTECTED GROUNDWATER SOURCES** Protect aquifer recharge areas to help ensure a long-term, high quality supply of water for Lewis County residents.	*Lewis County Comp Plan (2021)*	Health & Well-being; Water Resources	Increased peak streamflow, Increase in streamflow timing, Increase in wildfire likelihood	Flooding, Reduced snowpack, Wildfire	Recharge and distribution areas include Cowlitz River and Middle Fork. Cowlitz floods during high precip and snowmelt events. Wildfire events may increase sedimentation and affect water quality, increasing stress on groundwater infrastructure.	Hydroelectric facilities, Water wells	Add specificity.	Amend existing measure to consider climate impacts.
15	**OBJ 4D** - Protect life and property from flood hazards. **Policies NE 4D.1 thru 4D.5** - Avoid development in floodplains. Prioritize compatible land uses.	*Lewis County Comp Plan (2021)*	Zoning & Development	Increased peak streamflow	Flooding	More flooding and avalanches events will increase the demand for emergency services. More frequent extreme weather events can cause buckling/warping of road infrastructure, resulting in disrupted travel, increased road closures, and delayed construction projects. Some existing developed areas would be considered hazardous from increasingly frequent flooding, avalanche, and potential wildfire damage. Levees overtopping and flash floods from built up sediment may occur more frequently. Interagency collaboration to respond to large scale flooding events.	All assets.	Add specificity	Amend existing policy to consider climate impacts. Add measures to Hazard Mitigation Plan or ensure consistency with HMP.

16	**Obj 4E** - Retain flood storage and transmission capacity of rivers and streams. **Policies NE 4E.1-4E.2** - Prohibit wetland and floodplain fill. Regulate flood hazard areas per LCC 15.35, 17.35, 17.35A.	*Lewis County Comp Plan (2021)*	Emergency Management; Water Resources	Increased peak streamflow, Increase in streamflow timing, Increase in wildfire likelihood, Increase in heavy precipitation magnitude	Flooding, Reduced snowpack (Avalanche), Wildfire, Extreme Precipitation	Lewis County is anticipated to experience increased annual max streamflow. River bank erosion is also a big problem in Lewis County. Summer stream flows are expected to substantially diminish due to shifting of projected snowmelt patterns. Reduced snowpack may decrease the volume of avalanches but increase the frequency. More flooding and avalanches events will increase the demand for emergency services. Closure of roads and buckling/warping of road infrastructure. Eastern County has higher risk of wildfire likelihood due to steep topography and "perfect storm" conditions. More frequent extreme weather events can disrupt travel, increase road closures and delay construction projects. Some existing developed areas would be considered hazardous from increasingly frequent flooding, avalanche, and potential wildfire damage.	Hydroelectric facilities, water wells, Shorelines	Add specificity.	Amend existing policy to consider climate impacts. Add measures to Hazard Mitigation Plan or ensure consistency with HMP.
17	**OBJ 4F** - Protect and enhance critical resources and habitats. **Policies NE 4F.1 thru 4F.4** - Preserve and restore endangered, threatened, or sensitive species habitat.	*Lewis County Comp Plan (2021)*	Ecosystem	Increased peak streamflow, Increase in streamflow timing, Increase in wildfire likelihood	Flooding, Reduced snowpack, Wildfire	County ESAs include shorelines, waterways, and buffers along waterways. Shifting of projected snowmelt patterns is expected, resulting in shifting of peak stream flows for ESA habitat. Changing habitat quality could lead to mass fish kills and degradation of habitat. Wildfire and incompatible land uses can also increase runoff and sediment to streams, which can reduce aquatic habitat quality. Invasive species spread through wildfire threatens county's ESAs.	Shorelines, Parks	Add specificity.	Amend existing measure to consider climate impacts.
18	**NE Goal 5.0 |** Manage shorelines consistent with the shoreline master program and restoration plan.	*Lewis County Comp Plan (2021)*	Health & Well-being; Ecosystems; Zoning & Development	Increased peak streamflow, Increase in streamflow timing, Increase in wildfire likelihood	Flooding, Reduced snowpack, Wildfire	County ESAs include shorelines, waterways, and buffers along waterways. Shifting of projected snowmelt patterns is expected, resulting in shifting of peak stream flows for ESA habitat. Changing habitat quality could lead to mass fish kills and degradation of habitat. Wildfire and incompatible land uses can also increase runoff and sediment to streams, which can reduce aquatic habitat quality. Invasive species spread through wildfire threatens county's ESAs.	Shorelines, Parks	Add specificity.	Amend existing measure to consider climate impacts.
19	**NE Goal 6.0 |** Strive to ensure stormwater runoff does not contribute to larger flooding issues or pollution. **Policies NE 6.1 thru 6.4** - Minimize adverse impacts of new/existing development on water quality via stormwater runoff.	*Lewis County Comp Plan (2021)*	Emergency Management; Water Resources; Zoning & Development	Increase in heavy precipitation magnitude, Increase in peak streamflow	Extreme Precipitation, Flooding	Extreme precip events that coincide with non-climate stressors (mismanagement of waste, increase of impervious surface, lack of adequate stormwater infrastructure) can impact stormwater runoff that leads to localized urban flooding. Such events that coincide with riverine flooding can cause significant damage to life and property.	All assets.	Add specificity.	Amend existing measure to consider climate impacts such as impacts. Ensure consistency with 2009 flood hazard management plan and 2023 hazard mitigation plan.
20	**NE Goal 7.0 |** Encourage the preservation of wetlands, open lands, and habitat areas for the benefit of indigenous fish/wildlife, and quality of life of residents. Balance recreation, habitat preservation, and watershed functions.	*Lewis County Comp Plan (2021)*	Ecosystem; Health & Well-being	Increased peak streamflow, Increase in streamflow timing, Increase in wildfire likelihood, Increase in heavy precipitation magnitude	Flooding, Reduced snowpack (Avalanche), Wildfire, Extreme Precipitation	Lewis County is anticipated to experience increased annual max streamflow. River bank erosion is also a big problem in Lewis County. Summer stream flows are expected to substantially diminish due to shifting of projected snowmelt patterns. Reduced snowpack may decrease the volume of avalanches but increase the frequency. More flooding and avalanches events will increase the demand for emergency services. Closure of roads and buckling/warping of road infrastructure. Eastern County has higher risk of wildfire likelihood due to steep topography and "perfect storm" conditions. More frequent extreme weather events can disrupt travel, increase road closures and delay construction projects. Some existing developed areas would be considered hazardous from increasingly frequent flooding, avalanche, and potential wildfire damage.	All assets. Many County-owned vacant parcels are located on floodplains - see assets list.	No changes needed	Adopt into comprehensive plan

21	**T Goal 1.0 |** Provide well-maintained transport system. **Policies T1.1-1.2** - Maintain inventory and surveying of transport facilities' conditions/age/useful life/maintenance records.	*Lewis County Comp Plan (2021)*	Transportation	Increased peak streamflow, Increase in streamflow timing, Increase in wildfire likelihood, Increase in heavy precipitation magnitude	Extreme Precipitation, Flooding, Reduced snowpack, Wildfire	Road infrastructure degradation i.e., potholes, buckling, erosion, making it difficult to access remote areas. Wildfire events can lead to road and bridge closures and/or delays in traffic and construction. Flooding and reduced snowpack cause secondary hazards such as landslides and riverine erosion that may compromise nearby road and bridge infrastructure - increase in damages. Reduced snowpack may decrease the volume of avalanches but increase the frequency of avalanches, leading to road/bridge closures and increased emergency responses. Wash out or destruction of road maintenance facilities i.e., pits and quarries, road shops, stock pile sites, etc., requiring longer drives to fix roads.	Roads, Culverts, Roadway appurtenant structures, Bridges	No changes needed	Adopt into comprehensive plan. Add to climate resiliency element.
22	**T Goal 2.0 |** Provide transport system that minimizes risks for all users. **Policies T2.1-2.2** - Safety is key priority. Prioritize corrective actions.	*Lewis County Comp Plan (2021)*	Emergency Management; Transportation	Increased peak streamflow, Increase in streamflow timing, Increase in wildfire likelihood, Increase in heavy precipitation magnitude	Extreme Precipitation, Flooding, Reduced snowpack, Wildfire	County fleet located at various facilities throughout the County. Lewis County Transit serves cities of Centralia and Chehalis in west County, which experiences more flooding and extreme weather hazards than wildfire or avalanche. Flooding and extreme precipitation can degrade road infrastructure, and secondary hazards can increase road damage and potentially lead to road closures.	Roads, Culverts, Roadway appurtenant structures, Bridges	Add specificity.	Amend existing policy to consider climate impacts. Add measures to Hazard Mitigation Plan or ensure consistency with HMP.
23	**T Goal 10.0 |** Provide adequate capacity and safety for air service of county airports. **Policies T 10.1 thru 10.3** - Long-term viability of airports thru partnership, appropriate road/rail connections for passenger, freight, and other services movement.	*Lewis County Comp Plan (2021)*	Economic Development; Emergency Mgm't; Transportation	Increased peak streamflow, Increase in streamflow timing, Increase in wildfire likelihood, Increase in heavy precipitation magnitude	Extreme Precipitation, Flooding, Reduced snowpack, Wildfire	Increased maintenance costs of airstrip and other airport infrastructure. Increase in emergency response and stress on personnel and equipment due to lack of adequate capacity anticipated. Secondary hazards may result in closure of airport.	Airports	Add specificity.	Amend existing measure to consider climate impacts. Integrate into Economic Development element.
24	**UCF Goal 6.0 |** Use environmentally sound approaches to construct, operate, and maintain utilities and facilities. **Policies UCF 6.1 thru 6.3 -** Promote sensitive design and siting of facilities.	*Lewis County Comp Plan (2021)*	Buildings & Energy; Zoning & Development	Increased peak streamflow, Increase in streamflow timing, Increase in wildfire likelihood, Increase in heavy precipitation magnitude	Extreme Precipitation, Flooding, Reduced snowpack, Wildfire	More frequent power loss, shuttered power generating stations or transmission corridors. Increased cost and demand for emergency preparedness/response/recovery. Additional stress on personnel and equipment. Wildfire and flooding can lead to secondary hazards such as landslides that destroy utility infrastructure, requiring the siting and design of facilities in non-hazard areas or with minimum exposure to hazard.	Utility substations, Hydroelectric facilities, Radio communications	Add specificity - climate impacts.	Integrate into Economic Development element.
25	**Policy UCF 12.1** Use education and outreach to raise community awareness about the benefits of stormwater management to reduce flood hazards.	*Lewis County Comp Plan (2021)*	Emergency Mgm't; Health & Well-being	Increase in heavy precipitation magnitude, Increase in peak streamflow	Extreme Precipitation, Flooding	Extreme precip events that coincide with non-climate stressors (mismanagement of waste, increase of impervious surface, lack of adequate stormwater infrastructure) can impact stormwater runoff that leads to localized urban flooding. Such events that coincide with riverine flooding can cause significant damage to life and property.	All assets.	Add specificity.	Amend existing measure to consider climate impacts.
	Policy UCF 13.1 Implement strategies for solid waste management including waste reduction, recycling and energy recovery identified in the Solid and Hazardous Waste Management Plan.	*Lewis County Comp Plan (2021)*	Waste Management	Increased heavy precipitation magnitude, Increased peak streamflow, Increase wildfire likelihood	Extreme Precipitation, flooding, wildfire	Heavier precipitation has the potential to increase storm damage to infrastructure and generate more waste and debris. More waste will strain municipal cleanup and refuse capacity.	Centralia and Morton solid waste transfer stations	No changes needed	Keep as is - integrate into new climate resiliency element.

26	**ED Goal 2.0 |** Promote a diverse range of jobs in a variety of sectors.	*Lewis County Comp Plan (2021)*	Economic Development	Increased peak streamflow, Increase in streamflow timing, Increase in wildfire likelihood, Increase in heavy precipitation magnitude	Extreme Precipitation, Flooding, Reduced snowpack, Wildfire	Agriculture, carpentry, construction, natural resources harvesting, transportation and warehousing, or other related jobs may be reduced to operating seasonally or to different times of the year. Increases in emergency responses may increase stress on personnel and equipment. Shift in water supply and energy demands, shift in energy source - government spendings and investments on alternative energy industries. Climate impacts exacerbate vulnerabilities of low-income, unemployed households in rural neighborhoods. Increased demand on County's Work Opportunities department.	All assets.	Add specificity.	Amend existing measure to consider climate impacts and environmental justice measures.
27	**ED Goal 15.0 |** Enhance quality of life for County residents. **Policy ED 15.3** - Support programs/agencies that address community needs, quality of life.	*Lewis County Comp Plan (2021)*	Economic Development; Health & Well-being	Increased peak streamflow, Increase in streamflow timing, Increase in wildfire likelihood, Increase in heavy precipitation magnitude	Extreme Precipitation, Flooding, Reduced snowpack, Wildfire	Agriculture, carpentry, construction, natural resources harvesting, transportation and warehousing, or other related jobs may be reduced to operating seasonally or to different times of the year. Increases in emergency responses may increase stress on personnel and equipment. Shift in water supply and energy demands, shift in energy source - government spendings and investments on alternative energy industries. Climate impacts exacerbate vulnerabilities of low-income, unemployed households in rural neighborhoods. Increased demand on County's Work Opportunities department.	All assets.	Add specificity.	Amend existing measure to consider climate impacts, OR remove and consolidate with ED Goal 2.0 above.
28	6.2 - Encourage diversified economic base to minimize economic fluctuations and local economy vulnerabilities.	*Countywide Planning Policies*	Economic Development	Increased peak streamflow, Increase in streamflow timing, Increase in wildfire likelihood, Increase in heavy precipitation magnitude	Extreme Precipitation, Flooding, Reduced snowpack, Wildfire	Agriculture, carpentry, construction, natural resources harvesting, transportation and warehousing, or other related jobs may be reduced to operating seasonally or to different times of the year. Increases in emergency responses may increase stress on personnel and equipment. Shift in water supply and energy demands, shift in energy source - government spendings and investments on alternative energy industries. Climate impacts exacerbate vulnerabilities of low-income, unemployed households in rural neighborhoods. Increased demand on County's Work	All assets.	Add specificity.	Amend existing measure to consider climate impacts and environmental justice measures.
29	6.10 - Encourage efforts to expand workforce training and alternative energy industry labor training i.e., "green collar" jobs.	*Countywide Planning Policies*	Economic Development	Increased peak streamflow, Increase in streamflow timing, Increase in wildfire likelihood, Increase in heavy precipitation magnitude	Extreme Precipitation, Flooding, Reduced snowpack, Wildfire	Agriculture, carpentry, construction, natural resources harvesting, transportation and warehousing, or other related jobs may be reduced to operating seasonally or to different times of the year. Increases in emergency responses may increase stress on personnel and equipment. Shift in water supply and energy demands, shift in energy source - government spendings and investments on alternative energy industries. Climate impacts exacerbate vulnerabilities of low-income, unemployed households in rural neighborhoods. Increased demand on County's Work	All assets.	Add specificity.	Amend existing measure to consider climate impacts and environmental justice measures.
30	10 - Encourage open space and development of recreational opportunities, conserve habitat, increase access, and develop parks.	*Countywide Planning Policies*	Health & Well-being; Ecosystems	Increased peak streamflow, Increase in streamflow timing, Increase in wildfire likelihood, Increase in heavy precipitation magnitude	Flooding, Reduced snowpack (Avalanche), Wildfire, Extreme Precipitation	Lewis County is anticipated to experience increased annual max streamflow. River bank erosion is also a big problem in Lewis County. Summer stream flows are expected to substantially diminish due to shifting of projected snowmelt patterns. Reduced snowpack may decrease the volume of avalanches but increase the frequency. More flooding and avalanches events will increase the demand for emergency services. Closure of roads and buckling/warping of road infrastructure. Eastern County has higher risk of wildfire likelihood due to steep topography and "perfect storm" conditions. More frequent extreme	All assets. Many County-owned vacant parcels are located on floodplains - see assets list.	No changes needed	Adopt into comprehensive plan
31	11.6 - Water resources i..e, floodplains, lakes, rivers, etc. should be managed for multiple beneficial uses and preserved to the fullest extent possible. Promote opportunities for other uses.	*Countywide Planning Policies*	Economic Development; Emergency Mgm't; Health & Well-being; Ecosystems; Agriculture & Food Systems; Water Resources	Increase in total annual precipitation, decrease in snowpack	Drought and reduced snowpack,	Increases in annual precipitation have the potential to increase groundwater recharge. Changes in the timing and intensity of precipitation and increases in water demand and evaporation are expected to offset increases in groundwater recharge due to more annual precipitation. Reduced snowpack and more winter rain is expected to increase water availability in winter for multiple uses including drinking water and hydropower generation, and decrease water availability in late spring and summer when demand is also expected to increase.	Water infrastructure, County buildings, Roads, Utilities	No changes needed	add to comp plan - integrate to new climate resiliency element.
32	14 - Identify and encourage preservation of lands, sites, and structures that have historical or archaeological significance.	*Countywide Planning Policies*	Cultural Resources & Practices	Increase in peak streamflow; Increase in wildfire likelihood	Flooding, Wildfire	Increase in annual peak streamflow indicates a potential for higher stream flows and larger areas inundated every year at high flows. Increased wildfire likelihood may permanently destroy buildings - lack of access and loss of cultural symbol i.e., irreplaceable historic items. Culturally significant sites can be damaged by flooding and wildfire.	Historic buildings	Add specificity.	Amend existing measure to consider climate impacts.

33	Goal ED-1 Utilize shoreline resources to improve the standard of living for residents of the County, while assuring that the resources are utilized in a manner consistent with minimizing adverse effects to the shoreline environment.	*Shoreline Master Program (SMP)*	*Economic Development*	Decreased snowpack and increased streamflow timing, Increase in summer maximum temperature, Increase in extreme precipitation magnitude, Increase of return interval of 25-yr peak streamflow, increase in wildfire danger	Drought, extreme heat, extreme precipitation, flooding, reduced snowpack, wildfire	Reduction in snowpack are expected to decrease opportunities for winter outdoor recreation and shorten the winter recreation season, with adverse effects on the economy and character of some communities. Warm season outdoor recreation opportunities may increase, shifting tourism from one recreation sector to another and into different seasons. The timing of snowmelt and streamflow influences the seasonal availability of water for hydropower generation and irrigation. A shift in streamflow timing, with more streamflow in winter and early spring, will change the timing of hydropower generation. Timing changes have the potential to affect energy costs for residents and businesses.	Airports, hydroelectrical facilities, Shorelines	Add specificity	Add specificity. Amend existing measure to consider climate impacts.
34	Goal SU-1. Assure that shoreline development in the County corresponds with the character and physical limitations of the land and water. Promote a viable pattern of land and water use without disrupting environmental quality.	*Shoreline Master Program (SMP)*	Water Resources	Increase in total annual precipitation, decrease in snowpack	Drought and reduced snowpack,	Increases in annual precipitation have the potential to increase groundwater recharge. Changes in the timing and intensity of precipitation and increases in water demand and evaporation are expected to offset increases in groundwater recharge due to more annual precipitation. Reduced snowpack and more winter rain is expected to increase water availability in winter for multiple uses including drinking water and hydropower generation, and decrease water availability in late spring and summer when demand is also expected to increase.	Water infrastructure	Add specificity	Add specificity
35	Goal HSCE-1 Protect, preserve, and restore areas and sites having historic, cultural, educational, or scientific values.	*Shoreline Master Program (SMP)*	Cultural Resources & Practices	Increase in low streamflow, increase in August stream temperature, increase in peak streamflow, increase in wildfire likelihood.	Drought, extreme heat, flooding, wildfire	Lower stream flows in summer are expected to reduce habitat quantity and quality for salmonids and other aquatic species that are culturally important to the Northwest Tribes. Warmer stream temperatures are expected to reduce habitat quality for salmonids and other aquatic species that depend on cold water. Can reduce the abundance of and access to these culturally important species for Northwest Tribes. Higher stream flows are expected to directly affect salmonid populations and alter salmonid habitat, reducing the quantity of a culturally important species for Northwest Tribes. Increased wildfire can have the potential to damage cultural and historical sites, buildings, and cultural resources. More frequent wildfires can also reduce access to culturally important sites and resources for Northwest Tribes. Lack of access and loss of cultural symbols from flooding/wildfire hazards leads to loss of historic buildings and sites (from irreplacable materials) which can reduce quality of life and erode community identity.	Historical Buildings, Shorelines	Add specificity	Add specificity. Amend existing measure to consider climate impacts.
36	Goal FHP-1. Recognize the hydrologic functions of floodplains, and protect frequently flooded areas.	*Shoreline Master Program (SMP)*	Water Resources, Zoning & Development	Increase in total annual precipitation, decrease in snowpack, increase in peak streamflow	Drought and reduced snowpack, extreme precipitation, flooding	Increases in annual precipitation have the potential to increase groundwater recharge- but increased impervious surfaces from development exacerbates flooding. Changes in the timing and intensity of precipitation and increases in water demand and evaporation are expected to offset increases in groundwater recharge due to more annual precipitation. Reduced snowpack and more winter rain is expected to increase water availability in winter for multiple uses including drinking water and hydropower generation, and decrease water availability in late spring and summer when demand is also expected to increase.	Water infrastructure, County buildings, Roads	Add specificity	Add specificity. Amend existing measure to consider climate impacts.
37	Aquatic Management Policy 3. Encourage multiple uses of overwater facilities to reduce the impacts of development and increase effective use of water resources in shoreline jurisdiction.	*Shoreline Master Program (SMP)*	Buildings & Energy, water resources	Increase in total annual precipitation, decrease in snowpack	Drought and reduced snowpack,	Increases in annual precipitation have the potential to increase groundwater recharge. Changes in the timing and intensity of precipitation and increases in water demand and evaporation are expected to offset increases in groundwater recharge due to more annual precipitation. Reduced snowpack and more winter rain is expected to increase water availability in winter for multiple uses including drinking water and hydropower generation, and decrease water availability in late spring and summer when demand is also expected to increase.	Water infrastructure, County buildings, Roads, Utilities	No changes needed	add to comp plan - integrate to new climate resiliency element.
38	Aquatic Management Policy 5. Design and manage shoreline uses and modifications to prevent degradation of water quality and alteration of natural hydrographic conditions.	*Shoreline Master Program (SMP)*	Water Resources	Increase in total annual precipitation, decrease in snowpack, increase in peak streamflow	Drought and reduced snowpack, flooding, extreme precipitation	Increases in annual precipitation have the potential to increase groundwater recharge. Changes in the timing and intensity of precipitation and increases in water demand and evaporation are expected to offset increases in groundwater recharge due to more annual precipitation. Reduced snowpack and more winter rain is expected to increase water availability in winter for multiple uses including drinking water and hydropower generation, and decrease water availability in late spring and summer when demand is also expected to increase.	Water infrastructure, Shorelines, Parks, Recreation facilities	No changes needed	add to comp plan - integrate to new climate resiliency element.

39	Aquatic Management Policy 7. Reserve space in shoreline jurisdiction for shoreline preferred uses, while considering upland and in-water uses, water quality, navigation, presence of aquatic vegetation, existing critical habitats, aesthetics, public access, and views.	*Shoreline Master Program (SMP)*	Water Resources, Zoning & Development, Ecosystems	Increase in total annual precipitation, decrease in snowpack	Drought and reduced snowpack, extreme precipitation, flooding, wildfire	Increases in annual precipitation have the potential to increase groundwater recharge. Changes in the timing and intensity of precipitation and increases in water demand and evaporation are expected to offset increases in groundwater recharge due to more annual precipitation. Reduced snowpack and more winter rain is expected to increase water availability in winter for multiple uses including drinking water and hydropower generation, and decrease water availability in late spring and summer when demand is also expected to increase. Shorelines provide buffers for development against flooding hazards and other multiple benefits/uses. Shorelines change due to secondary hazards - river bank erosion, landslides, changing locations of cultural and/or recreational sites and impacting infrastructure i.e., boat launch areas, picnic areas, spur access roads, etc.	Water infrastructure, Shorelines, Parks, Recreation facilities, Roads	No changes needed	add to comp plan - integrate to new climate resiliency element and land use element (resource land goals/policies).
40	High Intensity Management Policies 5. Restore visual and remediate shoreline areas within new development sites consistent with State and Federal laws.	*Shoreline Master Program (SMP)*	Buildings & Energy, water resources	Increase in total annual precipitation, decrease in snowpack	Drought and reduced snowpack, extreme precipitation, flooding, wildfire	Increases in annual precipitation have the potential to increase groundwater recharge. Changes in the timing and intensity of precipitation and increases in water demand and evaporation are expected to offset increases in groundwater recharge due to more annual precipitation. Reduced snowpack and more winter rain is expected to increase water availability in winter for multiple uses including drinking water and hydropower generation, and decrease water availability in late spring and summer when demand is also expected to increase.	Water infrastructure, Recreation facilities, Shorelines	Add specificity	Add specificity - integrate with new climate resiliency element. Consider climate impacts.
41	Natural Management Policies. 3. Scientific, historic, cultural, educational research uses, and low-intensity water-oriented recreational uses that do not affect ecological functions may be allowed.	*Shoreline Master Program (SMP)*	Cultural Resources & Practices; Zoning and development	Increase in low streamflow, increase in peak streamflow, decrease in snowpack, increase in heavy precipitation magnitude	Drought, flooding, extreme precipitation,	Increase in annual peak streamflow indicates a potential for higher stream flows and larger areas inundated every year at high flows. Heavier precipitation events are expected to intensify urban flooding and demands on storm water systems, which can affect zoning restrictions on new buildings, and require revised building codes for development in more frequently flooded areas.	Recreation facilities, Parks, Shorelines	Add specificity	add to comp plan - integrate to new climate resiliency element and land use element.
42	Rural Conservancy Management Policies. 7. Construction of new structural shoreline stabilization and flood control works should be allowed when the documented need exists to protect an existing primary structure or ecological functions. Mitigation may be necessary for such construction. New development should be designed and located to preclude the need for such work. Shoreline stabilization measures shall infringe on private property rights to the minimum extent necessary.	*Shoreline Master Program (SMP)*	Buildings & Energy, water resources	Increase in total annual precipitation, decrease in snowpack, Increased peak streamflow	Drought and reduced snowpack, flooding	Increases in annual precipitation have the potential to increase groundwater recharge. Changes in the timing and intensity of precipitation and increases in water demand and evaporation are expected to offset increases in groundwater recharge due to more annual precipitation. Reduced snowpack and more winter rain is expected to increase water availability in winter for multiple uses including drinking water and hydropower generation, and decrease water availability in late spring and summer when demand is also expected to increase. Riverine flooding combined with stormwater flooding exacerbates peak streamflow hazards that may expand shorelines and designated 100-year floodplains over larger areas. Consider climate impacts in mitigation measures.	Water infrastructure, County buildings, Roads, Utilities, Hydroelectrical facilities	No changes needed	add to comp plan - integrate to new climate resiliency element and land use element.

43	Shoreline Residential Management Policies. 1. Preserve ecological functions by establishing development standards for shoreline height, shoreline buffers, building setbacks, density, impervious surface coverage, shoreline stabilization, critical area protection, and water quality protection to assure no net loss of ecological functions in shoreline jurisdiction.	*Shoreline Master Program (SMP)*	Buildings & Energy, water resources, Ecosystem	Increase in total annual precipitation, decrease in snowpack	Drought and reduced snowpack, extreme precipitation, flooding	Increases in annual precipitation have the potential to increase groundwater recharge. Changes in the timing and intensity of precipitation and increases in water demand and evaporation are expected to offset increases in groundwater recharge due to more annual precipitation. Reduced snowpack and more winter rain is expected to increase water availability in winter for multiple uses including drinking water and hydropower generation, and decrease water availability in late spring and summer when demand is also expected to increase.	Water infrastructure, Shorelines, Roads, County buildings	No changes needed	Integrate with new climate resiliency element, housing element, land use element.
44	Urban Conservancy Management Policy. 1. Allow uses that preserve the natural character of the shoreline environment, promote preservation of open space, floodway, floodplain, or critical areas directly, or over the long-term as the primary allowed uses. Allow uses that result in restoration of ecological functions if the use is otherwise compatible with the purpose of the environment and setting.	*Shoreline Master Program (SMP)*	Water Resources, Ecosystem, Zoning & Development	Increase in total annual precipitation, decrease in snowpack	Drought and reduced snowpack, flooding, extreme precipitation, wildfire	Increases in annual precipitation have the potential to increase groundwater recharge. Changes in the timing and intensity of precipitation and increases in water demand and evaporation are expected to offset increases in groundwater recharge due to more annual precipitation. Reduced snowpack and more winter rain is expected to increase water availability in winter for multiple uses including drinking water and hydropower generation, and decrease water availability in late spring and summer when demand is also expected to increase.	Water infrastructure, Shoreline	No changes needed	add to comp plan - integrate with new climate resiliency element and land use element.
45	Archaeological and Historic Resources E. Where development or demolition activity is proposed adjacent to an identified archaeological or historic site, design and operate the proposed development to be compatible with the continued protection of the site.	*Shoreline Master Program (SMP)*	Cultural Resources & Practices	Increase in peak streamflow and wildfire likelihood	Flooding and wildfire	Increase in annual peak streamflow indicates a potential for higher stream flows and larger areas inundated every year at high flows. Increased wildfire likelihood can have the potential to damage cultural and historical sites, buildings, and cultural resources. More frequent wildfires can also reduce access to culturally important sites and resources for Northwest Tribes.	Historical Buildings	Add specificity	Add specificity - consider climate impacts
46	Flood Hazard Management. D. Prefer nonstructural flood hazard management measures to structural measures where feasible. New structural flood hazard reduction measures should only be allowed when demonstrated to be necessary, nonstructural methods are insufficient, and mitigation is accomplished.	*Shoreline Master Program (SMP)*	Water Resources, Zoning & Development	Increase in total annual precipitation, decrease in snowpack	Drought and reduced snowpack	Increases in annual precipitation have the potential to increase groundwater recharge. Changes in the timing and intensity of precipitation and increases in water demand and evaporation are expected to offset increases in groundwater recharge due to more annual precipitation. Reduced snowpack and more winter rain is expected to increase water availability in winter for multiple uses including drinking water and hydropower generation, and decrease water availability in late spring and summer when demand is also expected to increase.	Water infrastructure, County building, Roads	No changes needed	add to comp plan - integrate to new climate resiliency element.

47	Water Quality Policy. A. Use existing regulations to protect surface water quality and quantity within Lewis County.	*Shoreline Master Program (SMP)*	Water Resources, Ecosystem	Increase in total annual precipitation, decrease in snowpack	Drought and reduced snowpack, extreme precipitation, flooding, wildfirre	Increases in annual precipitation have the potential to increase groundwater recharge. Changes in the timing and intensity of precipitation and increases in water demand and evaporation are expected to offset increases in groundwater recharge due to more annual precipitation. Reduced snowpack and more winter rain is expected to increase water availability in winter for multiple uses including drinking water and hydropower generation, and decrease water availability in late spring and summer when demand is also expected to increase.	Water infrastructure, Shorelines	No changes needed	add to comp plan - integrate with land use element (natural environment goals/policies).
48	Agriculture. B. Locate and design new agricultural activities on land not currently used for agricultural activity to assure no net loss of ecological functions and not to have a significant adverse impact on other resources and values in shoreline jurisdiction.	*Shoreline Master Program (SMP)*	Agriculture & food systems	Extreme precipitation, increase in percentage of stream lengths winter to spring streamflow timing ratio	Drought and reduced snowpack, extreme precipitation, flooding	Reduction of water available for livestock and irrigation during the same time that warmer temperatures and longer growing seasons are expected to increase the demand for irrigation water. Flooding hazards have direct impacts to agricultural activities and incurs economic losses in the region.	N/A	No changes needed	Keep as is - consider climate impacts on agriculture in new climate resiliency element.
49	Forests Policy. A. Effectively balance timber harvesting with the preservation of shoreline ecological functions, public access to shorelines, and other shoreline goals.	*Shoreline Master Program (SMP)*	Ecosystems	Increase in wildfire likelihood	Wildfire	More frequent wildfires have the potential to reduce timber, non-timer forest products, carbon storage, and forest habitat for some wildfire. Potential increase in runoff and sediment to streams, which can reduce aquatic habitat quality.	Shorelines	No changes needed	add to comp plan - integrate with natural resource goals/policies of land use element.
50	Forest Policy. F. Promote proper road and bridge design, location and construction, and maintenance practices to prevent development of roads and structures that would adversely affect shoreline resources.	*Shoreline Master Program (SMP)*	Transportation	Increase in hot days, increase in heavy precipitation magnitude, increase in peak streamflow, increase in wildfire likelihood	Extreme heat, extreme precipitation, flooding, wildfire	More hot days will have potential to damage the surfaces of roads and bridges, leading to greater maintenance and repair costs and more frequent traffic and service disruptions. Heavy precipitation events expected to intensify flooding, landslides, and erosion, which can interrupt transportation routes, and damage infrastructure. Higher streamflow can increase riverine flooding, which can damage roads, bridges, and railways, and overwhelm drainage structures, such as culverts.	County roads and bridges	Add specificity	Add specificity - integrate measure with new climate resiliency element and transportation element.
51	Industrial Development Policy. B. Locate, design, and construct industrial development in a manner that assures no net loss of shoreline ecological functions and does not have significant adverse impacts to other shoreline resources and values.	*Shoreline Master Program (SMP)*	Buildings & Energy, water resources	Decrease in heating degree days and increase in cooling degree days	Extreme Heat	Decrease in heating degree days expected to reduce energy demand for heating. Increase in cooling degree days indicates greater potential energy demand for cooling buildings in summer.	General government buildings, utility substations, radio communications, hydroelectrical buildings	No changes needed	Keep as is
52	Transportation Facilities Policy. A. Plan, locate, and design new transportation facilities where routes will have the least adverse effect on shoreline features, shoreline ecological functions, and existing or planned water-dependent uses.	*Shoreline Master Program (SMP)*	Transportation	Decrease in snowpack, increase in heavy precipitation magnitude, increase in peak streamflow	Drought, extreme precipitation, flooding, reduced snowpack	Transportation routes and facilities in mountainous areas may experience more damage from heavier winter rainfall and associated flooding, erosion, and washouts.	Bridges, county roads, road facilities i.e., sheds, pits/quarrries, stockpiles, etc.	No changes needed	Add to comp plan - integrate with new climate resiliency element.

53	Structural Flood Hazard Reduction Measures Policy. A. Establish standards for structural flood hazard reduction measures to minimize environmental impacts and ensure no net loss of shoreline ecological functions.	*Shoreline Master Program (SMP)*	Emergency Management	Increase in peak streamflow; increase of extreme precipitation magnitude	Flooding, Extreme precipitation	Heavier precipitation can intensify flood events and increase other emergencies associated with heavy precipitation. Higher stream flows are expected to increase riverine flooding within existing floodplains and could expand flooding to new areas not currently in existing floodplains.	Shorelines, County buildings, Roads/Bridges	Add specificity	Add specificity
54	**16.2 Goal** - Minimize injuries and loss of life, property damage, infrastructure, env impact, and economic loss caused by natural disasters.	*2023 Hazard Mitigation Plan*	All Sectors	Decrease in snowpack, increase in heavy precipitation magnitude, increase in peak streamflow, Increased wildfire likelihood	Extreme Precipitation, Wildfire, Flooding, Reduced snowpack (Avalanche)	Hazards directly damage infrastructure and increases emergency response. Hazards are anticipated to become more frequently occurring throughout the County especially flooding in western County area and wildfire risk in eastern County area. Non-climate stressors such as increased impervious surfaces also exacerbate climate impacts.	All assets.	No changes needed	Integrate to new climate resiliency element.
55	**Objective 16.3.1.** Incorporate mitigation measures into repairs, major alterations, new development, and redevelopment practices, especially in substantial hazard risk areas.	*2023 Hazard Mitigation Plan*	Zoning & Development	Decrease in snowpack, increase in heavy precipitation magnitude, increase in peak streamflow, Increased wildfire likelihood	Extreme Precipitation, Wildfire, Flooding, Reduced snowpack	Heavier precipitation events are expected to intensify urban flooding and demands on storm water systems, which can affect zoning restrictions on new buildings. May require revised building codes for development in more frequently flooded areas, which may epand the flood zone in some areas not currently in flood zones. Reduced snowpack lessens riverine flooding. Wildfire hazard areas may expand to previously non-hazard areas and increase damage to homes and infrastructure and displace residents in expanded WUI zones.	Civic buildings, Roads/Bridges, Utilities	Define parameters and geography of substantial hazard risk areas.	Amend to add specificity
56	Obj 16.3.2. Integrate hazard mitigation policies into comprehensive plans within planning area.	*2023 Hazard Mitigation Plan*	Zoning & Development	N/A	N/A	N/A	N/A	N/A	N/A
57	16.2 Goal - Increase public awareness and enhance partnership efforts. Obj 16.3.3. Promote and enhance outreach/education with hazard mitigation plans and programs to actively encourage stakeholder engagement i.e., homeowners, private sector, ngo's, etc.	*2023 Hazard Mitigation Plan*	All Sectors	N/A	N/A	N/A	N/A	N/A	N/A
58	Obj 16.3.4. Improve and expand systems that provide warning and emergency communications.	*2023 Hazard Mitigation Plan*	Emergency Management	Increase in heavy precipitation magnitude, Increase in wildfire likelihood, Increase in peak streamflow, Increased avalanche frequency	Extreme Precipitation, Flooding, Wildfire, Avalanche	County radio communications experience significant TDI in certain areas - hazards would exacerbate tech issues by increasing emergency response calls and increasing TDI/time to respond to emergencies by relying on dispatch services. Increased hazard occurrences can also expose more County infrastructure to damage.	Radio towers & appurtenant structures; Emergency fleet and equipment	No changes needed	Adopt into comprehensive plan. Add to climate resiliency element.
59	Obj 16.3.5. Retrofit, purchase, relocate structures in high hazard areas and those that experience repetitive losses.	*2023 Hazard Mitigation Plan*	Zoning & Development	Decrease in snowpack, increase in heavy precipitation magnitude, increase in peak streamflow, Increased wildfire likelihood	Extreme Precipitation, Wildfire, Flooding, Reduced snowpack	Heavier precipitation events are expected to intensify urban flooding and demands on storm water systems, which can affect zoning restrictions on new buildings. May require revised building codes for development in more frequently flooded areas, which may epand the flood zone in some areas not currently in flood zones. Reduced snowpack lessens riverine flooding. Wildfire hazard areas may expand to previously non-hazard areas and increase damage to homes and infrastructure and displace residents in expanded WUI zones.	Civic buildings, Roads/Bridges, Utilities	Define parameters and geography of substantial hazard risk areas.	Consolidate with Objective 16.3.1.
60	Obj 16.3.6. Support protection of vital records, strengthen/replace buildings, infrastructure, and lifelines to minimize post-disaster disruption. Facilitate short- and long-term recovery.	*2023 Hazard Mitigation Plan*	All Sectors	Decrease in snowpack, increase in heavy precipitation magnitude, increase in peak streamflow, Increased wildfire likelihood	Extreme Precipitation, Wildfire, Flooding, Reduced snowpack	Heavier precipitation events are expected to intensify urban flooding and demands on storm water systems, which can affect zoning restrictions on new buildings. May require revised building codes for development in more frequently flooded areas, which may epand the flood zone in some areas not currently in flood zones. Reduced snowpack lessens riverine flooding. Wildfire hazard areas may expand to previously non-hazard areas and increase damage to homes and infrastructure and displace residents in expanded WUI zones.	Civic buildings, Roads/Bridges, Utilities	No changes needed	Adopt into comprehensive plan. Add to climate resiliency element.

Task 2.2: Determine next step		
Instructions: *For each climate hazard (flooding, drought, etc.) that you identified in Step 1 as relevant to your jurisdiction make a copy of the table below and answer the questions to help determine whether a more detailed vulnerability and risk assessment is warranted for your jurisdiction.*		
Question	**Answer**	**Discussion Notes**
1. Has your jurisdiction already completed a localized study for this hazard and its impacts?	X Yes ☐ No	The 2015 Climate Change Preparedness Plan for North Olympic Peninsula contains localized sea level rise projections. Page 70 of this plan contains a summary of impacts to critical infrastructure in Port Angeles, but this is not a detailed localized study of impacts.
2. If yes to Q1, does it provide enough information to address the hazard through goals and policies? If yes, move to Step 5 of this checklist.	☐ Yes X No ☐ Not sure ☐ N/A	The information provided in the 2015 Climate Change Preparedness Plan is insufficient for localized policy development, although it does provide a helpful overview of potential impacts that may be worth studying further.
3. Are certain geographic areas in your jurisdiction more vulnerable to this hazard than others?	X Yes ☐ No ☐ Not sure	Port Angeles has variable elevations. Much of the City's waterfront is elevated above sea level due to the presence of the marine bluff, but a significant portion containing extensive critical infrastructure is located at or near sea level. This includes much of the working waterfront of the town, Ediz Hook, and some of the most frequented areas of the City such as the shoreline adjacent to downtown. Even elevated areas are vulnerable to sea level rise due to the potential for bluff erosion, which will eventually impact development elevated significantly above sea level but near the bluff edge.
4. If yes to Q3, have these areas already been identified at a scale that is relevant to setting goals and policies?	☐ Yes X No ☐ N/A	The City has contour data that provides information on elevation in a specific location. However, no analysis has been completed of what critical infrastructure at lower elevations would be susceptible and in what order it would be compromised. Such an analysis would lead to goals and policies about how to prioritize repairs, where to reinforce the shoreline (e.g., sea walls) and retain the infrastructure, and when to retreat to higher elevations and abandon the infrastructure.
5. Are certain built, natural, or social assets in your jurisdiction more vulnerable to this hazard or more at risk from this hazard?	X Yes ☐ No ☐ Not sure	The portion of the City shoreline extending from the McKinley Paper Company Mill site to where the bluff once again abuts the shoreline east of the City Pier is especially vulnerable to sea level rise due to its elevation. The Rayonier Mill site is also vulnerable to impacts. Much of the natural shoreline has been developed, but there still remains essential natural segments that would be vulnerable to sea level rise. Cultural resources, including those of the Lower Elwha Klallam Tribe, are present in this segment.
6. If yes to Q5, has the vulnerability and risk to these assets been identified at a scale that is relevant to setting goals and policies?	☐ Yes X No ☐ N/A	Other than the 2015 Climate Change Preparedness Plan mentioned in Q1, the risk to assets from sea level rise and the cost of the impacts to the City and community have not been identified at a sufficient scale. The City's Emergency Mitigation Plan will be useful in helping identify vulnerable infrastructure.
7. Are certain sectors in your jurisdiction more vulnerable to this hazard or more at-risk from this hazard?	X Yes ☐ No ☐ Not sure	Economic activities that rely on the waterfront are especially vulnerable. This includes key facilities such as the ferry terminal which facilitates international connection, productive waterfront industrial sites, the marina, public transit infrastructure, Ediz Hook (including the Coast Guard Air Station), and the McKinley Paper Mill site. Utility infrastructure associated with all these uses (water, sewer, electrical, etc.) will be impacted. Cultural resources of local tribes are also vulnerable to impacts. Environmental resources that contribute to a healthy shoreline would also be compromised.
8. If yes to Q7, has the vulnerability and risk to these sectors been identified at a scale that is relevant to setting goals and policies?	☐ Yes X No ☐ N/A	Multiple agencies and City departments would need to provide input in order for actual vulnerability (in terms of monetary value) to be determined. In implementing goals and policies, it would also be important to incorporate community stakeholders to allow identification of vulnerability from their perspective.
9. Are certain populations in your jurisdiction more vulnerable to this hazard or more at-risk from this hazard?	X Yes ☐ No ☐ Not sure	Low-income populations are always more vulnerable when their housing is located in areas susceptible to impact. Business owners and workers in facilities located in the segment described in Q7 are are also vulnerable and subject to loss of assets needed for livelihood. Non-human populations may also be vulnerable resulting from damage to shoreline environmental resources.
10. If yes to Q9, has the vulnerability and risk to these populations been identified at a scale that is relevant to setting goals and policies?	☐ Yes X No ☐ N/A	There would be a need to consider the disparate impacts of each (potentially overlapping) population. Goals and policies would need to be based on these risks and formulated to ensure future development avoids exacerbating vulnerability and risk to these populations.
11. Does your jurisdiction plan to update its local hazard mitigation plan and submit it for FEMA approval?	X Yes ☐ No	The City is focused on implementation of the 2019 Hazard Mitigation Plan, as identified in the City's Climate Resiliency Plan, but regular updates will be necessary as available information evolves.
12. Based on the answers to these questions, have you identified a need for a vulnerability and risk assessment for this hazard?	X Yes ☐ No	Not only do these questions lead staff to believe that a sea level rise vulnerability assessment is necessary, but the City has already committed to conducting one as an action item in the Climate Resiliency Plan adopted in June of 2022. This process will help to implement that action item (Action #CRW-1.6).
12. If yes to Q12, does your jurisdiction intend to conduct a vulnerability and risk assessment of this hazard -- or all applicable hazards -- at this time?	X Yes ☐ No	Conducting an assessment will help fulfill the action item mentioned in Q12, while providing useful information for development of goals and policies in the 2023 Comprehensive Plan Update, thereby helping to integrate the two planning processes and provide a foundation for further prevention and adaptation actions.
12. If yes to Q12, proceed to Step 3. If no to Q12, proceed to Step 4.		

COMMERCE NOTE: This example -- which looks at sea-level rise inundation -- is from Port Angeles' 2023 pilot test of the resilience guidance.

Appendix G Climate Memo B. Climate Risk and Vulnerability Assessment

Memo starts on the next page.

Kimley»Horn

MEMORANDUM

July 31, 2024

To: Mindy Brooks, Senior Long-Range Planner
Lewis County, Washington

From: Heidi Rous
Climate Director, Kimley-Horn

RE: SUMMARY OF POTENTIAL CLIMATE IMPACTS/RISKS/VULNERABILITIES & POTENTIAL OPPORTUNITIES, CLIMATE ELEMENT AND RESILIENCY SUB-ELEMENT 2025 COMPREHENSIVE PLAN UPDATE, LEWIS COUNTY

Purpose

As a follow-up to the current policy gaps and opportunities memorandum submitted earlier, this memorandum summarizes potential impacts, risks, and vulnerabilities to key assets in the County. Due to a changing climate, the memorandum identifies potential opportunities for the County to take actions to improve the resiliency of those assets. This memo informs new Climate Element and Resiliency Sub-Element, consistent with House Bill 1181 ("HB 1181") and Washington state's Growth Management Act (GMA) policies, that is part of the Comprehensive Plan update (RCW 36.70A.070(9)). Under HB 1181 and the GMA for Lewis County, a resiliency sub element must, among other things, equitably enhance resiliency to, and avoid or substantially reduce the adverse impacts of, climate change in human communities and ecological systems through goals, policies, and programs consistent with the best available science and scientifically credible climate projections and impact scenarios (RCW 36.70A.070(9)(e)(i)).

Scope

Critical infrastructure located within the County are assessed for vulnerability and risk to prioritize climate hazards (see "Analysis" section below). Assets identified are the same as those mentioned in the previous memorandum, *Summary of Climate Hazards and Policy Gaps & Opportunities, Climate Element and Resiliency Sub-Element 2025 Comp Plan Update Lewis County* ("Assets Memorandum"). According to the 2023 DOE Guidance, assets are defined as community groups, places, natural resources, infrastructure, and services that the community finds valuable and wants to protect against climate-exacerbated hazardous events. This analysis characterizes the exposure of each asset to a climate hazard ("sensitivity") along with how frequent the hazard will occur (probability), how adaptive the asset is to disturbances (adaptive capacity), and how significant functional and physical costs would be (magnitude). This memorandum strives to describe the findings and provide a basis for developing goals and policies that make up the Climate Element and Resiliency Sub-Element.

Methodology

Following the guidance document from the Washington State Department of Commerce's Intermediate Planning Guidance document, the Climate Element Workbook was utilized to assess climate impacts, risk, and vulnerabilities, and develop recommended actions. For this assessment, each asset-hazard pair from the Assets Memorandum was

assessed in terms of infrastructure sensitivity or exposure and adaptive capacity. Both sensitivity and adaptive capacity characterized vulnerability outcomes on a low, medium, and high rating (see definitions in "Analysis" section below). As determined by analysis, outreach, and review of the County's existing plans (such as Comprehensive Emergency Management Plan, Flood Management Plan, and those further mentioned in the "Analysis" section below), the climate hazards most relevant to the County are:

- Extreme precipitation,
- Flooding,
- Reduced snowpack/avalanche, and
- Wildfire

Based on these specific climate hazards, a total of 56 asset-hazard pairs were analyzed for sensitivity and adaptive capacity using a qualitative rating system (Low, Medium, and High). Ratings were determined based on indicators such as age, asset condition, physical design, social assets, economic costs, etc. Based on the sensitivity and adaptive ratings, an appropriate vulnerability risk rating (Low, Medium, High) was determined. For example, a low sensitivity and a low adaptive capacity would suggest a medium vulnerability for an asset-hazard pair.

Similarly, the same 56 asset-hazard pairs were analyzed for its probability or frequency of hazard occurrence and the magnitude of potential losses/consequences using a low, medium, and high rating. The ratings were determined based on indicators such as location, social assets, revenue, operations, and safety, etc. Using both the probability and magnitude rating, a composite risk rating was calculated. Based on the composite risk rating, a decision of "Take Action" or "Accept Risk" was identified for each asset-hazard pair. For example, a high probability with a medium magnitude for an asset would indicate a high composite risk rating; thus, a "Take Action" decision was indicated.

Analysis

Vulnerability Characterization

Existing reports, documents, and the County Website were used to gather relevant data pertaining to each hazard. Existing reports and documents include:

- Lewis County Comprehensive Plan Periodic Update
- Lewis County Public Utility District (PUD) Outage Map
- Lewis County Public Utility District (PUD) No.1 2020 Integrated Resource Plan
- Federal Emergency Management Agency (FEMA) Flood Maps
- National Oceanic and Atmospheric Administration (NOAA) Advanced Hydrologic Prediction Service
- Lewis County Risk Factor Website
- Lewis County Hazard Mapper Website
- Lewis County Municipal code
- 2009 Comprehensive Flood Hazard Management Plan
- 2016 Water System Plans for Vader-Enchanted Valley
- 2020 Community Strategic Plan
- 2022 Lewis County Public Works Annual Bridge Report
- 2022 Comprehensive Economic Development Strategic Plan
- 2023 Department of Ecology Inventory of Dams Report
- 2023 Televate Public Safety Radio System Engineering Study Report
- 2023 Lewis County Long Range Strategic Plan
- 2023 Lewis County Draft Comprehensive Solid and Hazardous Waste Management Plan

- 2016 Lewis County Comprehensive Emergency Management Plan
- 2020 Lewis County Public Utility District Broadband Assessment
- 2024 Packwood Airport Master Plan
- 2023 Ed Carlson Memorial Field Airport Master Plan Update

Through utilization of data found in the above documents, the sensitivity and adaptive capacity for each asset-hazard pair were determined based on a low, medium, and high rating according to the appropriate indicators. In accordance with DOE guidance, indicators are identified to qualitatively rank the sensitivity and adaptive capacity of each asset. **Table 1: Sensitivity and Adaptive Capacity Definitions** describes examples of key indicators that exhibit low, medium, and high sensitivity and adaptive capacity.

Table 1: Sensitivity and Adaptive Capacity Definitions

Example Key Indicators of "Sensitivity"		Example Key Indicators of "Adaptive Capacity"	
Low	• Minor repairs and accommodations required. • Slight inconveniences and temporary loss of services. • Minor disruption to business continuity and minimal loss of revenue and wages. • Little to no increase in costs and demands to respond to emergency events.	**Low**	• Adaptive solutions are innovative but costly. • Adaptive solutions may require coordination with multiple agencies to implement, leading to disruptions in service and longer implementation times. • Solutions require change in lifestyle or changes in political decisions. • Ability to avoid damage is limited.
Medium	• Temporary loss of food production, transportation, and distribution. • Temporary loss of functionality and operations closure of emergency response services. • Moderate repairs and replacements required. • Moderate increase in costs and demands to respond to emergency events.	**Medium**	• Impacts can be reduced or mitigated to a certain extent; however, adaptive solutions are only feasible for limited assets. • Some assets may face difficulties in adapting in terms of cost and implementation. • Coordination with third party agencies may be necessary for adaptivity measures. • Solutions require some change in systematic operations but are somewhat executable.
High	• Significant impact requiring reconstruction of parts or an entirety of an asset. • Extensive rehabilitation of assets resulting in long-term or permanent loss of functionality or operations closure. • Significant impact to vulnerable populations due to flooding and	**High**	• Assets can adapt with little to no difficulty. • Direct influence on the implementation of strategies or solutions for the asset is apparent. • Adaptive solutions are highly feasible for most, if not all assets with affordable costs.

Table 1: Sensitivity and Adaptive Capacity Definitions			
	extreme precipitation-related deaths and illnesses, population displacement, or migration. • Permanent loss of species not able to adapt to weather events exacerbated by climate change.		• Solutions are implemented immediately and face little to no resistance.
Sources: Orange County Transportation Authority, *Vulnerability Assessment*, Kimley Horn 2023.			

Based on the definitions above and relevant indicators, each asset-hazard pair was evaluated and given an appropriate sensitivity and adaptive capacity rating. Using the sensitivity and adaptive rating, an appropriate vulnerability rating was determined. Each asset-hazard pair describes climate indicators to determine sensitivity, adaptive capacity, and vulnerability ratings (Refer to **Appendix A: Lewis County Climate Element Workbook** for more details).

Risk Characterization

Similar to the Vulnerability Characterization described above, the same resources were used to determine the probability and magnitude ratings for each asset-hazard pair. The definitions for a low, medium, and high probability and magnitude rating are shown in **Table 2: Probability and Magnitude Definitions**.

Table 2: Probability and Magnitude Definitions[1]			
Probability		**Magnitude**	
Low	Very limited historic events recorded. Frequency of hazardous events to occur is periodic with likelihood of future events to occur episodically. For example, the likelihood of hazardous event(s) to occur once in 20 years.	Low	Minimal destruction to applicable assets with adequate functionality. In addition, minimal injuries and functionality to daily livelihood. Applicable assets may be easily repaired with available resources within a short duration of time without complications.
Medium	Limited, but some available historic events recorded. Frequency of hazardous events to occur is somewhat periodic. For example, likelihood of hazardous event(s) to occur once in 5 to 20 years.	Medium	Moderate destruction to applicable assets with decreased functionality. Injuries and functionality to daily livelihood are moderately heightened. Applicable assets may have increased difficulty for repair and functionality due to increased restoration times and complications. Health concerns are also a higher likelihood with strong suggestions for evacuation plans.
High	Recent, multiple historic events recorded. Hazardous events occur frequently. For example, likelihood of hazardous event(s) to occur within 5 years.	High	Extreme destruction to applicable assets with little to no functionality. Injuries and functionality to daily livelihood are extremely heightened. Applicable assets will have significant challenges for repair and elongated periods of construction before functionality can be

Table 2: Probability and Magnitude Definitions[1]			
			resumed. Health concerns are at an extreme likelihood with strong coercion for evacuation plans.

1. Definitions for low, medium, and high probability and magnitude were derived from the U.S. Climate Resilience Toolkit, https://toolkit.climate.gov/steps-to-resilience/assess-vulnerability-risk. Accessed June 2024.

Based on the definitions above and relevant indicators, each asset-hazard pair were evaluated and given an appropriate rating. Each asset-hazard pair describes climate indicators to determine probability, magnitude, and climate risk (Refer to **Appendix A** for more details). It is also important to note that the recommended decisions of "Take Action" or "Accept Risk" should be not understood as a "final" decision for the County. These decisions are strictly based on the structure of the climate workbook analysis.

Summary of Analysis

Based on the vulnerability and risk analysis, **Table 3: Asset Vulnerability and Climate Hazard Risks** showcase which asset/critical infrastructure are exposed to a priority climate hazard throughout the County. An asset-hazard pair which received a composite risk rating of medium or high are denoted with color scales associated with low (yellow), medium (orange), and high (red) ratings. Composite risk is comprised of an asset's level of vulnerability to a climate hazard and the probability and magnitude of impact to the asset from a climate hazard. A summary of asset vulnerability and climate hazard risks to critical infrastructure within the County is further provided below.

Table 3: Asset Vulnerability and Climate Hazard Risks					
	Priority Climate Hazards				
	Assets	Extreme Precipitation	Flooding	Reduced Snowpack/ Avalanche	Wildfire
COMMUNITY ASSETS	General Government				
	Utility Substations				
	Radio Communications				
	Energy Facilities				
	Historic buildings & sites				
	Airports				
	Fiber optics				
	Fire stations				
	Shorelines				
	Civic centers				
	County Roads				
	Bridges & Railways				
	Solid waste infrastructure				
	Wastewater infrastructure				
	Water Supply				
	Educational Institutions				
1. Composite risk ratings are based on a low (yellow), medium (orange), and high (red). Boxes that are grey were not analyzed because of a lack of data from the CMRW tool.					

Although certain assets may not be exposed to a particular climate hazard, they may be affected by secondary hazards such as wildfire smoke/ash, landslides from riverine flooding and exposed soil following wildfire and precipitation events, flooding from overtopping of levees and unpredictable snowmelt, and heat waves from prolonged extreme heat events. The section below focuses on asset-hazard pairs with a Medium to High vulnerability rating and Medium to High composite risk rating. Additional details can be found in **Appendix A.**

Vulnerability

- ***Sensitivity***[1]***:*** Assets most vulnerable to priority climate hazards are fire stations, airports, roadway infrastructure, and civic centers. Rural households with mobility difficulties are also exposed and vulnerable to climate hazards. Assets are most likely to be impacted by hazards from increased flooding and wildfire frequency. Assets are in wildfire interface zones where there is an increased exposure to wildfire conditions i.e., fuel loads, resulting in wildfire events. Risk of flooding and wildfire hazards are expected to impact communities Countywide. Examples of climate impacts to assets are further described below:
    - Airports located in a 100-yr FEMA floodplain zones are potentially at risk of facing a temporary loss of functionality and operations.
    - The broadband pilot area of unincorporated County west of Chehalis to Pe Ell is located in wildfire interface zones, exposing fiber cables and towers to wildfire risk and resulting in potential destruction and loss of internet services to approximately 900 households and businesses.

[1] Information for this section is derived from the County's updated Multi-Jurisdictional Hazard Mitigation Plan.

- Hazards may cause irreparable damage to historic buildings and sites due to limited resources for replacement of damaged structures.
- Rail lines are exposed to flooding potential in 100-Year FEMA flood zones (Chehalis River in west, Newaukum River to southwest, and tributaries in south) and wildfire interface zones, particularly in northern County area. Rail lines may become structurally unstable and not operable, disrupting services that impacts the economy.
- UGA census tracts with high rates of mobility disabilities and low-income are more susceptible to being stranded and need to rely on relationships and emergency services for care – limited County resources in east and south County area, rural environment, far from care centers: Unincorporated Census tracts (530-419-70-700, -400), UGA census tracts (530-419-71-300, -200, -800, -900).
- Many bridges are located in floodplains, 25 of which are structurally deficient and functionally obsolete and 84 of which are experiencing critical scouring. 77 bridges are located within the 100-year floodplain and 78 bridges are located within the 500-year floodplain (2020 County Bridge Report). Structurally deficient and functionally obsolete bridges are more vulnerable to flood impacts and can delay evacuation for rural communities.

- ***Adaptive Capacity:*** Exposed assets can adjust to hazards by retrofitting older buildings and infrastructure and implementing design features that consider increased climate hazards. Other methods such as land use controls may be enforced to site assets in non-hazardous areas and create development standards that can withstand climate hazard events. Adaptive capacity measures are intended to increase climate resiliency and are further provided in "Recommended Actions" section below.

Composite Risk Characterization

- ***Probability:*** The frequency of priority climate hazards is anticipated to increase and become more unpredictable among all assets.
  - *Frequency of Extreme Precipitation*: Total precipitation from 25-year extreme precipitation storm events are expected to increase by an average of 6% by the end of the century.
  - *Frequency of Flooding*: Peak streamflow is anticipated to increase by 10-30% by the end of the century along the Cowlitz River, Tilton River lower tributaries, and Cispus River. Historical records predict that minor flooding may occur each winter, moderate flooding may occur every 2-5 years on the Chehalis and Cowlitz Rivers, and major flooding may occur every 5-7 years.
  - *Frequency of Reduced snowpack/avalanche*: Streamflow from reduced snowpack is projected to shift three to four weeks earlier than the 20th century average by mid-century.
  - *Frequency of Wildfire*: Increased extreme heat events are predicted to cause an average of 6 additional fire hazard days per year within the next 30 years. Wildfire risk is anticipated to increase by 26% by the end of the century, where areas east of I-5 freeway are 17-77% more likely to have conditions that are favorable to wildfire.
- ***Magnitude:*** Moderate destruction to certain assets will result in potential losses and consequences. Some assets are anticipated to experience significant destruction resulting in permanent losses. Some examples are included below:
  - Increased extreme precipitation events can destroy households through flooding from overtopping levees and may result in permanent displacement of more than 22,000 households by mid-century.

- More than 4,300 individuals who live in high wildfire risk areas (Morton, Randle, Packwood, Mossyrock), not including tourists and absentee landlords. Approximately 2,118 buildings are exposed valuating at $572.2 million.
- Broadband service zones correspond with a PUD electrical substation area, indicating that internet and electrical services located in east County and west County may be simultaneously interrupted. There is an existing fiber optic system along the eastern border of Lewis County.
- Airport closures due to climate-hazard events reduces revenue from recreational flying opportunities and firefighting-related activities. Operating expenses may increase due to additional labor and maintenance costs from climate hazard events. For example, extreme weather can damage pavement that more frequent airstrip maintenance.
- Flooding in Chehalis River basin is anticipated to experience an increase in FEMA 100-year floods by 33% by mid-century and is anticipated to impact more than 13,000 households.

Recommended Actions

This section is preliminary for discussion purposes only. Recommended actions are based on cumulative factors in the climate hazard analysis and is subject to change based on further discussions with the County and community members.

- Municipal code and other regulatory documents should consider updating development standards for buildings and infrastructure located in expanded FEMA 100-year flood zones and wildfire interface zones.
- Airport master plans should consider including climate adaptation measures for assets such as levees and siting of airstrips since hazards could impact the County's ability to respond to emergencies.
- Although emergency drinking water is provided separately by third party contractors (Red Cross, Salvation Army), water system plans should consider measures for recovering from climate hazard scenarios. Design standards for water treatment facilities should be flexible and account for contamination from landslides and liquefaction.
- Municipal code requirements on design, siting, and other development criteria for broadband infrastructure should consider future wildfire impacts. Construction of broadband infrastructure is primarily driven by the private market.
- Consider secondary evacuation routes at critical junctions. Investigate the possibility of a Study Plan that evaluates redundancy and contingencies for how individuals evacuate at critical junctions i.e., east County alternative evacuation route when bridge fails.
- Bridges should be reconstructed for increased flood and wildfire loads. Adaptation measures include applying fire blankets to bridges in high fire risk areas.

Kimley-Horn looks forward to collaborating with the County to identify potential opportunities to identify priority climate hazard impacts and increase resiliency among all sectors within the community.

Sincerely,

Heidi Rous
Climate Director, Kimley-Horn

On Behalf of County of Lewis, Washington State

Tasks 3.1-3.3: Assess sensitivity and adaptive capacity to characterize vulnerability						
Number	**Asset-Hazard Pair** *(from Column B of Task 1.3 tab)*	**Sensitivity — Task 3.1 (Low, Medium, or High)** ***refer to definitions for Low, Medium, or High in Cell H2**	**Adaptive Capacity — Task 3.2 (Low, Medium, or High)** ***refer to definitions for Low, Medium, or High in Cell N2**	**Vulnerability — Task 3.3** (*Low, Medium, or High*)	Notes *(The CMRW tool used in Step 1 describes general factors that affect a given sector's sensitivity (susceptibility to change). To qualitatively rate the sensitivity and adaptive capacity of a specific local asset or a broader asset category, start with a core question and then select indicators and available information (e.g., online census data, local plans, and community knowledge) to answer the question. Use the sensitivity and adaptive capacity ratings -- and other information, as desired -- to characterize the asset's vulnerability.)*	**Indicators Discussion** *(If desired, use this column to discuss your indicators and how they affected your ratings.)* For physical assets: 1. Age (What's the asset's age relative to its design life?); 2. Condition (What's the condition of the asset — poor, good, or excellent?); 3. Physical design (Is the asset physically protected from the hazard?) For environmental assets (i.e., fragmentation of forest, temperature range, exposure to pests & disease, etc.)
1	*General Government - Wildfire*	**Low**	**Low**	**Medium**	A majority of general government/administrative buildings are located in downtown Centralia with little to no tree canopy. Buildings are more likely to experience increased demands for air purification tech or building closure from wildfire events and may be limited for older buildings. Majority of County buildings in urban center of Centralia was built in mid-1900s, some in early 2000s. Retrofitting County buildings with air purification tech is a relatively low-cost adaptive solution, but can be high-cost from other construction activities i.e., mold infection, lead walls, etc. = **L (adaptive capacity).** Repairs/maintenance costs vary depending on building conditions, not in wildfire intermix zone (fuels loads) but in wildfire interface (exposure to wildfire effects i.e., smoke) zone = **L (sensitivity).**	Age; Condition; Physical design, Wildfire zone
2	Utility substations - wildfire *(Buildings & Energy)*	**Medium**	**Medium**	**Medium**	Increased energy demand from building usage may cause additional stress on infrastructure, leading to power outages and increased stress on PUD personnel, potentially increasing reliance on County or external agency personnel, but upgrades increase capacity of dealing with stressors = **L (sensitivity).** Increase reliance on back-up generators or other forms of energy, Substations are being upgraded by Lewis County PUD from 2021-2025. Unknown as to whether the upgrades include protection against climate hazards = **L (adaptive capacity).** Substations are more susceptible to wildfire damage in high wildfire risk areas. A local vulnerability assessment found that wildfire risk is higher in eastern County.	Age, Condition
3	Radio Communications - Wildfire *(Buildings & Energy)*	**Medium**	**Medium**	**Medium**	Drier vegetation and soils from extreme heat events increase likelihood of wildfires and landslides that may increase destruction of towers. Increased extreme heat events are predicted to cause average of 6 additional fire hazard days per year within the next 30 years, towers located in eastern County are more vulnerable = **M (sensitivity).** Towers are made of metal or wood. Equipment are typically located in concrete, brick, custom block bldgs, or fire station bldgs. Backup power mainly using batteries and generator, some using solar and UPS = **M (adaptive capacity).**	Condition, Physical design, Building material
4	Power Plant - Wildfire (*Buildings & Energy*)	**Low**	**Medium**	**Low**	Part of power plant is located in wildfire interface zone and in close proximity to intermix zone **= L (sensitivity)**. Plant will be completely decommissioned in 2025. Wildfire impacts power grid (poles, towers, power lines, etc.) which may stop power generation at power plant facilities. Would require alternative power sources = **M (adaptive capacity).**	Condition, Physical design, Building material

5	Wind farm - Wildfire	**Low**	**Low**	**Medium**	Not located in wildfire interface or intermix zone = **L (sensitivity)** - more susceptible to earthquake damage. Project lease contracts to third party to suppress wildfire on mitigation forest lands, wildfire suppression strategy per state natural conservation dept. Wildfire is unpredictable and unprecedented in the surrounding area per Skookumchuck wind energy project HCP; no design element that considers wildfire damage = **L (adaptive capacity).**	Condition, Wildfire zone, Conservation, Physical Design
6	Natural gas pipelines - Wildfire	**Medium**	**Medium**	**Medium**	Olympic and Williams pipelines distribute liquid petroleum and natural gas, respectively, throughout County. Pipelines run parallel to highways and large transportation corridors, exposing pipelines to wildfire risk = **M (sensitivity).** There may be extensive pipeline failure, taking hours, days, or weeks to repair resulting in temporary loss of service = **M (adaptive capacity).**	Physical design
7	Historical Buildings & Sites - Flooding *(Cultural Resources & Practices)*	**Low**	**Low**	**Medium**	Buildings constructed in mid-1800s or early 1900s, conditions may vary and are sensitive to changes but not located in flood hazard zones **= L. (Sensitivity)** More frequent flooding events can reduce access to culturally important sites and resources. Limited availability of physical resource (i.e., historic wood type, etc.) for rehabilitation = **L (adaptive capacity)**	Age, Condition
8	Historical Buildings & Sites - Wildfire *(Cultural Resources & Practices)*	**Medium**	**Low**	**High**	Buildings located in wildfire interface zones = **M (sensitivity).** More frequent wildfires can also reduce access to culturally important sites and resources; limited availability of physical resources to replace damaged historic buildings = **L (adaptive capacity).**	Age, Physical design
9	Airports - Extreme Precipitation & Flooding *(Economic Dev)*	**Medium**	**Medium**	**Medium**	Lewis County GOP is $2,573.06 million per year. Extreme precipitation events can warp pavement i.e., potholes, undulating surfaces, etc., requiring more frequent airstrip maintenance. $346,164 of damages at Chehalis-Centralia Airport. Packwood airport is located in a 100-yr FEMA floodplain where 1-3 ft. of flood can occur = **M (sensitivity).** Somewhat adaptive - can use recreational aircraft for critical needs. Packwood airport is situated close to Mt. Rainier NP - tourism dollars generate revenue = **M (adaptive capacity)**	Age, Condition, Physical design
10	Airports - Reduced Snowpack/Avalanche *(Economic Dev)*	**Low**	**Medium**	**Low**	Avalanche prone hillsides exist in high elevation mountainous areas in eastern County. County has high vulnerable population exposure to avalanche risk (WA state Enhanced haz mit plan). Airports are sited away from mountainous areas and within UGAs = **L (sensitivity).** Reduced snowpack affects peak streamflow timing which can result in temporary flooding during earlier months of the year, impacting general aviation activities such as emergency response, air ambulance service, flight training, and personal flying - about 85% of total operations are GA itinerant i.e., skydive operation, flying club, transient flying. Non-fire year annual operating revenue at Packwood airport is less than $2,000, fire-related years more than double annual operating revenue. Operating expenses total ~$30,000 for labor, maintenance, and internal/County transfers. Packwood airport master plan lists CIP projects that do not include climate adaptation measures i.e., levees, siting, etc., may increase maintenance costs and capital expenditures = **L (adaptive capacity)**	Airport activity, Physical design; Revenue

11	Airports - Wildfire *(Economic Dev)*	**Medium**	**Medium**	**Medium**	Airports located in wildfire interface zones (wildland fuel) = **M (sensitivity).** Loss of tourism/non-emergency related revenue but increases fire-related revenue = **M (adaptive capacity).**	Airport activity, Physical design; Revenue
12	Fiber optics - Extreme Precipitation & Flooding	**Medium**	**Medium**	**Medium**	Rural UGAs of the County are in need of fiber optic connections, the 2020 broadband assessment shows a pilot area in Pe Ell/western County area that will have updated broadband infrastructure, some areas exposed to 100-year FEMA floodplain = **M (sensitivity).** Site location, development standards, and design does not consider climate impacts per Chap. 15.50 of municipal code = **M (adaptive capacity).**	Location, Physical design, Municipal code
13	Fiber optics - Reduced snowpack/Avalanche	**Low**	**Medium**	**Low**	Reduced snowpack and avalanche less likely to occur in western County area where new broadband infrastructure is slated for development = **L (sensitivity)**. Code does not consider climate impacts to design, siting, etc. = **M (adaptive capacity)**	Location, Physical design, Municipal code
14	Fiber optics - Wildfire	**High**	**Low**	**High**	Broadband infrastructure located in wildfire interface zones in UGAs exposes fiber cables, towers, etc. to wildfire risk, can result in destruction and loss of service to internet **= H (sensitivity).** Code does not consider design, siting, etc. for future wildfire impacts, siting limited to pilot area; construction of infrastructure is private market driven **= L (adaptive capacity).**	Location, Physical design, Municipal code, Market
15	Shorelines - Flooding *(Ecosystem)*	**Low**	**High**	**Low**	SMP classifies shorelines for different uses - some uses allow recreation and development "high intensity, shoreline residential" while others conserve "rural/urban conservancy", "natural", and "aquatic" = **L (sensitivity).** SMP considers impacts of flooding to shoreline i.e., prohibit chemicals from agriculture and mining in shoreline areas subject to flooding, limit dredging to safety/restoration activities, etc. SMP uses 2010 FEMA flood zone maps and is outdated = **H (adaptive capacity)**	Use type, Shoreline classification, Flood zones
16	Shorelines - Reduced Snowpack/ Avalanche *(Ecosystem)*	**Low**	**High**	**Low**	Altered peak streamflow from reduced snowpack impacts all use types within shoreline areas. Streams/rivers with mean annual flow greater than 20 cubic feet per sec is a protected shoreline. Reduced peak streamflow impacts protection status and interpretation of allowed uses i.e., aquaculture, mining, recreation, etc. Increased maintenance needs for private facilities and public recreation facilities utilizing shoreline areas = **L (sensitivity).** Shoreline maps updated regularly to accommodate different uses and protection status = **H (adaptive capacity).**	Use type, Shoreline classification, Peak streamflow volume
17	Shorelines - Wildfire *(Ecosystem)*	**Low**	**High**	**Low**	Shoreline segments located in wildfire interface zones, wildfire intermix located throughout County due to fragmentation of forest = **L (sensitivity).** Wildfire impacts to shoreline varies depending on uses, increased impact for "high intensity", "shoreline residential", and "aquatic" shorelines due to residential and commercial developments; SMP does not consider impact of wildfire hazard on these developments, but County code and fire districts provide materials and education for fire risk prevention and mitigation = **H (adaptive capacity).**	Use type, Shoreline classification, Wildfire zone, Municipal code
18	Public Safety Radio - Extreme Precipitation *(Emergency Mgmt)*	**Medium**	**Medium**	**Medium**	Cost-prohibitive budget constraints associated with system upgrades (changing frequency) and equipment upgrades - limits ability to respond to emergencies and may require frequent maintenance and temporary loss of communication **= M (sensitivity).** Radio infra is limited to high elevation hillside areas and may be exposed to landslide hazard, does not require significant upgrades as frequency from channels can be altered to improve communications (source: 2023 Elevate report) = **M (adaptive capacity).**	Location, Radio upgrades

19	Public Safety Radio - Flooding *(Emergency Mgmt)*	**Medium**	**Medium**	**Medium**	Flooding can knock over towers and stop radio signals from being emitted and received. Costs associated with system upgrades (changing frequency) and equipment upgrades (law enforcement user radios for P25 capability) required, temporary loss of function from flooding of radio tower infrastructure = **M (sensitivity).** UGA census tracts with high rates of mobility disabilities and low-income are more susceptible to being stranded and need to rely on relationships and emergency services for care - limited County resources in east and south County area, rural environment, far from care centers = **M (adaptive capacity).** Unincorporated Census tracts (530-419-70-700, -400), UGA census tracts (530-419-71-300, -200, -800, -900) are disadvantaged: above 65th percentile low-income households, above 10% of adults have high school education or less. 96th percentile unemployed (CT -900). 19.41% of County has a disability.	Social assets, Natural disasters
20	Public Safety Radio - Wildfire *(Emergency Mgmt)*	**Medium**	**High**	**Low**	Fire coverage is limited in many County areas; Use of a simplex channel for fire hampers the ability of field users to communicate directly with each other and they must relay messages through dispatch in many situations - delayed response to emergencies and deployment of life-saving equipment. Delayed response and service to vulnerable populations i.e., elderly, mobility impaired persons, etc. = **M (sensitivity).** Destruction to radio towers adaptable by changing frequencies - County coordinates with ARES/RACES to augment radio communication during emergencies. Emergency mgm't plan lists channels, communication methods, and users for emergency support including safety and backup procedures = **H (adaptive capacity).** County's senior population (65+) = 20.69% Owner-occupied HH = 63.64% Hospitals per 10,000 people = 0.37	Social assets, Radio channel, Emergency response

21	Fire Stations - Extreme Precipitation *(Emergency Mgmt)*	**Medium**	**Medium**	**Medium**	Peak streamflow changes from extreme precip events cause secondary hazards like riverbank erosion and landslides that can undermine bldg structure stability; stations in flood plain/landslide hazard areas more likely to experience significant impact and loss of entirety of asset = **M (sensitivity).** Stations habitable space typically in upper stories while emergency response equipment in lower stories, loss of life can be mitigated = **M (adaptive capacity).**	Physical design
22	Fire Stations - Flooding *(Emergency Mgmt)*	**Medium**	**Low**	**High**	Flooding directly damages or destroys fire station buildings and infrastructure. 2007 flood is 100-year flood that resulted in 10 fire district vehicles damaged, 5 fire stations damaged, total costs of damages to all infra $ 166 million to replace infrastructure and equipment. Temporary loss of service and functionality to serve vulnerable populations = M (sensitivity). Fire station not designed for flood mitigation, protection zones i.e., levees or other structures = **L (adaptive capacity).**	Social assets, Costs
23	Fire Stations - Wildfire *(Emergency Mgmt)*	**Medium**	**Low**	**High**	Wildfire directly damages or destroys fire station buildings and infrastructure. Potential high costs to replace infrastructure and equipment. Temporary loss of service and functionality to serve vulnerable populations = **M (sensitivity).** Fire station designed for fire safety such as safe space buffers surrounding buildings = **L (adaptive capacity).**	Social assets, Costs
24	Airports - Extreme Precipitation & Flooding (*Emergency Mgmt)*	**Medium**	**Low**	**High**	Packwood Airport is located in Cowlitz River FEMA 100-Year flood zone and subject to 1-3 feet of flooding; closure of airport to runway activities; other airports are not in flood zone = **M (sensitivity).** Extreme precipitation events can warp pavement, requiring more frequent airstrip maintenance; divert emergency response services to other airports i.e., Chehalis-Centralia airport serves as primary local airport. Packwood airport master plan lists CIP projects that do not include climate adaptation measures i.e., levees, siting, etc., impacts ability to respond to emergencies = **L (adaptive capacity)**	Flood zone, Capital improvement programs
25	Airports - Wildfire *(Emergency Mgmt)*	**Medium**	**Low**	**High**	Airports located in wildfire interface zones (wildland fuel) - loss of emergency response services would occur or diverted to other airport i.e., Chehalis-Centralia airport = **M (sensitivity).** Potential wildfire damage; Fire stations and ARFF facilities located nearby to respond to aerial wildfire emergencies within 15 minutes = **L (adaptive capacity).**	Wildfire zone, Timing response
26	County roads - Extreme Precipitation *(Transportation)*	**Medium**	**Medium**	**Medium**	Extreme precipitation events can warp pavement or cause sinkholes, requiring more frequent road maintenance = **M (sensitivity).** Road closures impact evacuation routes, goods delivery, etc., pavement tech such as all-weather asphalt is available = **M (adaptive capacity)**	Physical design, Costs
27	County roads - Flooding *(Transportation)*	**Medium**	**Low**	**High**	Exposure and therefore sensitivity varies = **M (Sensitivity)** (Physical infrastructure damage is very costly - $4,479,000 of damages to state highway. Interstate 5 is frequently affected by flooding in the Chehalis River floodplain. Freight delays negatively impact economy - $47,070,000 economic impact from four-day I-5 closure). Road closures from flooding disrupt services, 7.1% unemployment, Percent Below Poverty Level: 13.17% Median HH Income: $60,581 = **L (adaptive capacity)**	Loss of revenue; Unemployment rates; Low income rates
28	County roads - Reduced snowpack/ Avalanche *(Transportation)*	**Low**	**Medium**	**Low**	Reduced snowpack may decrease avalanche severity but increase frequency, leading to road closures and increased repairs/maintenance. Avalanche damage to roads limited to remote hillside areas in eastern County = **L (sensitivity).** National weather service issues avalanche warnings, County public works closes roads that expose people to danger and fixes roads = **M (adaptive capacity).**	Communications; Location;
29	County roads - Wildfire *(Transportation)*	**Low**	**Low**	**Medium**	Conditions of County roads vary and are widespread = M; Roads can withstand wildfire events and is important for evacuation = **L (sensitivity);** If damaged from burned vegetation, becomes inaccessible and not adaptable to wildfire conditions = **L (adaptive capacity)**; Evacuation from disadvantaged census tracts make travel more burdensome and long, exposing to more hazards.	Condition; Physical design; Social assets

30	Bridges - Extreme Precipitation *(Transportation)*	**Low**	**Medium**	**Low**	Similar to roads, extreme precipitation can cause bridge deck material to deteriorate i.e., potholes, divots, etc. but would still be functional = L. Bridge repair and maintenance can be costly and labor intensive = **M (adaptive capacity).**	Condition

31	Bridges - Flooding *(Transportation)*	**Medium**	**Medium**	**Medium**	Many bridges are located in floodplains (77 bridges located within the 100-year floodplain and 78 located within the 500-year floodplain). Conditions vary b/c engineering design based on varying flood levels (1 bridge identified as structurally deficient, 24 identified as functionally obsolete, 84 as scour critical (2022 Bridge Report, Lewis County)). Ceres Hill bridge (#102) built in 1948 is most structurally deficient - not located in disadvantaged area, mostly agricultural and open space uses. May be important for evacuation = **M (sensitivity)**. Bridge repair or construction is expensive and labor intensive, new engineer standards set for increase flood levels to mitigate scouring and climate impacts, limited by funding and personnel = **M (adaptive capacity).**	Age; Condition; Physical design; Social assets
32	Bridges - Reduced snowpack/ Avalanche *(Transportation)*	**Medium**	**Medium**	**Medium**	Reduced snowpack may decrease avalanche severity but increase frequency, leading to bridge closures and increased repairs/maintenance. Snowmelt is projected to shift three to four weeks earlier than the 20th century average by the year 2050, snowmelt events that coincide with heavy rainfall events exacerbate bridge scouring = **M (sensitivity).** Bridge repair or construction is expensive and labor intensive, new engineer standards can be set for increased flood levels to mitigate scouring - new bridge designs are limited by available funding and personnel = **M (adaptivity).**	Condition; Physical design
33	Bridges - Wildfire *(Transportation)*	**High**	**High**	**Medium**	Bridges that are located throughout County are exposed to wildfire. Eastern County has higher wildfire risk than western County. There are more bridges in western County than eastern County, bridges are non-functional if burned = **H (sensitivity).** Only one main highway (HWY 12) from west to east County, which may be a critical evacuation route, and access for personnel to respond to emergencies. Adaptation measures include designing for fire loads, and applying fire blankets to bridges in high fire risk areas, no mention of fire mitigation in 2022 bridge report = **H (adaptive capacity).**	Physical design; Location in high fire risk zones; Asset serves disadvantaged census areas
34	Airports - Extreme Precipitation & Flooding *(Transportation)*	**Medium**	**Medium**	**Medium**	Airports used for transportation of goods and emergency services. Flooding would prevent transportation and interrupt business and stall responsiveness. Extreme precip can also cause interruptions by creating sinkholes on runway, stopping operations and requiring maintenance = **M (sensitivity).** Airports can be protected with levees/dikes or other measures = **M (adaptive capacity).**	Physical design; Location in flood zones; Loss of revenue
35	Airports - Reduced snowpack/ Avalanche *(Transportation)*	**Low**	**Medium**	**Low**	Avalanche prone hillsides exist in high elevation mountainous areas in eastern County. Airports are sited away from mountainous areas and within UGAs = **L (sensitivity).** Reduced snowpack affects peak streamflow timing which can result in temporary flooding during earlier months of the year, impacting general aviation activities such as emergency response, air ambulance service, flight training, and personal flying - about 85% of total operations are GA itinerant reasons. Emergency response i.e., military, evacuation, etc. planned = **M (adaptive capacity).**	Location; Aviation operations type
36	Airports - Wildfire *(Transportation)*	**Low**	**Medium**	**Low**	Airports located in wildfire interface zones (wildland fuel) - closure of airport for 6 months to recreational flying for aerial wildfire fighting = **L (sensitivity).** Airports are general aviation airports that connect to other airports within region for emergency response and military operations i.e., Chehalis-Centralia, Morton, Toledo = **M (adaptive capacity).**	Wildfire zone; Operations
37	Railways - Extreme Precipitation & Flooding	**Medium**	**Low**	**High**	Flooding of rail lines would temporarily pause delivery of goods and impact economy/business. Rail lines are located in 100-Yr FEMA flood zones (Chehalis river in west, Newaukum river to southwest, and tributaries in south) = **M (sensitivity).** Mitigation methods include relocating ralline, elevating rails, or decommissioning rail usage, which can be costly and labor intensive = **L (adaptive capacity).**	Exposure to frequent flooding, Location, Physical design
38	Railways - Reduced snowpack/ Avalanche	**Low**	**Medium**	**Low**	Reduced snowpack may decrease avalanche severity but increase frequency, leading to closures and increased repairs/maintenance. Railways are not located in avalanche-prone zones. Streamflow timing from snowpack runoff has limited impacts to railways = **L (sensitivity)**. No adaptation measures = **M (adaptive capacity)**	Location

39	Railways - Wildfire	**Medium**	**Low**	**High**	Portions of rail lines located in wildfire interface zones, particularly in northern County where the Industrial Access Transportation Study is taking place for future improvements. Significant impacts to economy would occur, fires destroys wood foundation making rail lines structurally unstable and inoperable = **M (sensitivity).** Mitigation includes utilizing other materials, fireproofing existing foundations, but are costly and labor intensive = **L (adaptive capacity).**	Physical design, Location in fire zones, Loss of revenue, Opportunity costs
40	Solid Waste transfer station - Extreme Precipitation *(Waste Mgmt)*	**Low**	**Medium**	**Low**	Located in low risk liquefaction area. Decreased capacity due to waste generated from other storm events = **L (sensitivity).** Transfer stations allow waste to be temporarily housed in facilities before being transported to landfills out of the County, stations have a maximum capacity which may overfill due to post hazard event clean up = **M (adaptive capacity).**	Physical design
41	Solid Waste transfer station - Flooding *(Waste Mgmt)*	**Low**	**Medium**	**Low**	Not located in 100-year FEMA floodplain. Decreased capacity due to waste generated from other storm events = **L (sensitivity).** Transfer stations allow waste to be temporarily housed in facilities before being transported to landfills out of the County, stations have a maximum capacity which may go over due to post hazard event clean up = **M (adaptive capacity).**	Physical design
42	Solid Waste transfer station - Wildfire *(Waste Mgmt)*	**Low**	**Medium**	**Low**	Not located in wildfire interface zone. Decreased capacity due to waste generated from other hazard events **= L (sensitivity).** Transfer stations allow waste to be temporarily housed in facilities before being transported to landfills out of the County, stations have a maximum capacity which may go over due to post hazard event clean up = **M (adaptive capacity).**	Physical design
43	Sewer infrastructure - Extreme Precipitation *(Waste Mgmt)*	**Low**	**High**	**Low**	Infrastructure = Private septics, Middle Fork Water Sewer system, Onalaska Wastewater Treatment Plant ("OWTP" - built in 1975). OWTP collection system has 3 basins. Consists of an oxidation ditch, secondary clarifier, and sludge holding with chlorine disinfection prior to discharge to the Newaukum River. Sludge disposal method is to have a septic tank pumper pump an aerobic digestor out once every 2 months and dispose of in landfill or other proper methods. Discharge outfall pipe is 8-in. diameter suspended above an overflow channel before going to river (wet conditions) or percolating thru a gravel bar (dry conditions). Heavy precip would have limited impacts, private septics can contaminate groundwater due to high precip infiltration = **L (sensitivity).** Efficiency upgrades to system was proposed under a NPDES permit = **H (adaptive capacity).**	Age, Condition, Physical design
44	Sewer infrastructure - Flooding *(Waste Mgmt)*	**Medium**	**Medium**	**Medium**	Increased frequency of peak streamflow events may impact outfall pipe and discharge functions. Private septics can experience backup and temporary loss of function, contamination of drinking water. Part of the facility is in 1% annual chance climate change flood zone = **M (sensitivity).** Adaptation may include other treatment methods or temporary shutdown of facilities **= M (adaptive capacity).**	Condition, Physical design
45	Sewer infrastructure - Wildfire *(Waste Mgmt)*	**Low**	**Medium**	**Low**	Not located in wildfire interface zone. Located in wildfire intermix zone, similar to most County areas. Temporary loss of functionality if wildfire damages infrastructure, UV sanitation tech system includes a power distribution center and warning system. Failure scenarios considered in NPDES permit **= L (sensitivity).** Unsure if failure scenarios include climate hazards, would require consideration in new permit and infrastructure upgrades which may be costly and labor intensive = **M (adaptive capacity)**	Condition, Physical design, Cost
46	Dump stations - Extreme Precipitation *(Waste Mgmt)*	**Low**	**Medium**	**Low**	Items are "dropped off" by individuals at transfer stations/Packwood Community drop off center. Located in low risk liquefaction area. Decreased capacity due to waste generated from other storm events = **L (sensitivity).** Transfer stations allow waste to be temporarily housed in facilities before being transported to landfills out of the County. Increased hazard events, individuals may increase disposal of weather-damaged personal property, resulting in stations having a maximum capacity which may overfill = **M (adaptive capacity).**	Physical design

47	Dump stations - Flooding *(Waste Mgmt)*	**Low**	**Medium**	**Low**	Not located in 100-year FEMA floodplain. Decreased capacity due to waste generated from other storm events = **L (sensitivity).** Increased hazard events, individuals may increase disposal of weather-damaged personal property, resulting in stations having a maximum capacity which may overfill = **M (adaptive capacity).**	Physical design
48	Dump stations - Wildfire *(Waste Mgmt)*	**Low**	**Medium**	**Low**	Not located in wildfire interface zone. Decreased capacity due to waste generated from other storm events = **L (sensitivity)**. Increased hazard events, individuals may increase disposal of weather-damaged personal property, resulting in stations having a maximum capacity which may overfill = **M (adaptive capacity).**	Physical design
49	Water infrastructure - Reduced snowpack/Avalanche *(Water Resources)*	**Low**	**Medium**	**Low**	Vader-Enchanted Valley water treatment plant (source Cowlitz River), County wells (Middle Fork Newaukum river), private wells. Unpredictable peak streamflow's leading to temporary flooding, higher water temperatures, and/or seasonal drought, which can contaminate drinking water supplies = **L (sensitivity).** VEV drinking water is stored in 250,000-gal steel reservoir built in 1979 at ground level but elevated from ground at 315 ft. Wells are required to have a 100-ft. buffer to prevent contamination, pump house is routinely monitored. Design flexibility: design standards are set in Title 13 of County municipal code, water mains equipped with backflow prevention valves = **M (adaptive capacity).**	Age, Condition, Physical design, Design flexibility, Hazard type (exposure to landslide)
50	Water infrastructure - Wildfire *(Water Resources)*	**Medium**	**Low**	**High**	Debris from wildfires or mudslides/landslides resulting from wildfire damaged areas can contaminate water sources. VEV transmission main goes thru an area that experiences a lot of landslides, slowing down raw water supply which may temporarily impact potable water and firefighting supply = **M (sensitivity).** Design flexibility: design standards account for limiting contamination, does not account for climate hazards. Lewis County Comp Emergency Mgm't Plan outlines that Dept. of Emergency Mgm't contracts with third parties (Red Cross, Salvation Army) to provide bulk drinking water during emergencies = **L (adaptive capacity).**	Condition, Physical design, Hazard type, Design flexibility
51	Civic Centers - Extreme Precipitation *(Zoning & Development)*	**Low**	**Medium**	**Low**	Civic centers include recreation centers with large concentrations of people who may be exposed to hazard events and include vulnerable individuals i.e., children, elderly, special needs, etc. = **L (sensitivity).** Civic centers with appropriate facilities may act as temporary shelters for extreme hazard events, requires collaboration with Am Red Cross, NGOs, faith based orgs, Salvation Army, law enforcement/other County depts, Nat'l Guard = **M (adaptive capacity).**	Vulnerable groups, Population density
52	Civic Centers - Flooding *(Zoning & Development)*	**High**	**Medium**	**High**	Civic centers located thru-out County, and may be flooded in unincorporated City-adjacent areas/UGAs. Fixed buildings/civic centers located in 100-year FEMA floodplains would experience peak stream flows resulting in loss of building functions and services and possibly reconstruction = **H (sensitivity).** Certain sites may be selected as a secondary/alternate emergency operations center, in collab with above-mentioned organizations - limited to facilities with large indoor area, plumbing, road connectivity, and bldg design accessibility = **M (adaptive capacity).**	Building, Site selection, Vulnerable groups
53	Civic Centers - Reduced snowpack/ Avalanche *(Zoning & Development)*	**Low**	**Medium**	**Low**	Civic centers can act as temporary evacuation shelters, located in UGAs and cities. Avalanches occur in remote hillside areas away from UGAs and cities. Reduced snowpack affects peak streamflow timing that may temporarily flood, impacting civic centers in urban areas. Some bldgs located in 1% annual chance climate change flood **= L (sensitivity).** Civic centers that have capacity as evac shelter: Centralia college, Red Cross, Morton Hospital, Providence Hospital = **M (adaptive capacity)**	Flood zone, Shelters
54	Civic Centers - Wildfire *(Zoning & Development)*	**High**	**Medium**	**High**	UGAs located in wildfire interface zones expose fixed buildings/civic centers to wildfire risk. Would result in complete loss of building functions and services, reconstruction needed = **H (sensitivity).** EMP describes emergency/warning notification method and evacuation routes. County continues to collaborate with fire districts to educate property owners on defensible space and other prevention methods = **M (adaptive capacity)**	Site selection, Multiple agency collaboration, Communications

55	Colleges - Extreme Precipitation & Flooding	**Low**	**Medium**	**Low**	College campuses such as Centralia college and WSU extension are located in incorporated areas outside of 100-year FEMA flood zone = **L (sensitivity).** Campuses may act as a secondary facility for emergency operations, but are limited to non-flood areas **= M (adaptive capacity).**	Multiple agency collaboration
56	Colleges - Wildfire	**High**	**Medium**	**High**	College campuses are located in wildfire interface zones and exposing students, faculty, and staff to wildfire risk = **H (sensitivity).** Wildfires may significantly impact buildings even with fireproof designs i.e., defensible space, fireproof bldg materials, etc. = **M (adaptive capacity) .**	Physical design, fragmentation of forest, vulnerable populations

Tasks 3.4-3.5: Characterize risk and decide course of action

In Column B [*below*], list the assets you identified in Task 3.3 as having *medium* or *high* vulnerability. In Column C, characterize the **Probability** of hazard occurrence for each asset as *low, medium, or high* . In Column E, characterize the **Magnitude** of the potential loss/consequences as *low, medium, or high.* Put each asset's number [*from Column A*] in the appropriate cell of the Risk Characterization Matrix [*right*], and note the composite risk rating in Column G. Based on the asset's risk characterization, note your decision [*Take Action of Accept Risk*] in Column H.

Number	**Asset-Hazard Pair** *(Note applicable sector(s) in parenthesis.)*	**Probability** ***refer to definitions for**	**Notes** *(Note the indicators, data, and ruleset used to characterize probability of loss.)*	**Magnitude** ***refer to definitions**	**Notes** *(Note the indicators, data, and ruleset used to characterize magnitude of loss.)*	**Composite Risk Rating** *(Low = Green;*	**Decision** (*Take Action* or *Accept Risk*)
1	*General Government - Wildfire*	**High**	**Costly retrofitting.** Repairs/maintenance costs for HVAC/air filtering vary depending on building conditions since asset is exposed to wildfire smoke**.** **Probability:** Wildfires occur every year in Lewis County, average of at least 10 wildfires a year (2008-2023, no record for 2022). In 2022-2023, ~6,917 acres burned comprising 85% of total acres burned since 2008 (1,207.98 acres burned 2008-2022). Large fires have been infrequent. **Future Likelihood Indicator: Location.** Climate change is projected to increase high fire danger days contributed from hotter dryer summers/east wind events and increase the likelihood of fires. County admin buildings are predominantly located in west County area which has low wildfire risk (average of less than 4,000 acres burned annually in western WA since 1984). However, large wildfires are anticipated to occur more frequently in Lewis County - western County is predicted to experience 11-12 additional high fire danger days each year (by late century). Eastern county will have a 30% chance each year that there will be climate and fuel conditions conducive to wildfires (by mid century). Larger east county areas will have a 30-50% chance of being conducive to wildfire conditions each year (by late century).	**Medium**	More than 4,244 people who live in high wildfire risk areas (Morton, Randle, Packwood, Mossyrock) = **H (Probability).** This does not include tourists and absentee landlords who would need effective communication and evacuation plans/knowledge. ~2,118 buildings exposed, valuating $572.2 million = **M (Magnitude)**	**High**	**Take Action**
2	Utility substations - wildfire *(Buildings & Energy)*	**Medium**	Increased reliance on backup generators or other forms of energy. Substations are being upgraded by Lewis County PUD from 2021-2025, increasing chances of withstanding climate hazard events. **Probability:** Wildfires occur every year in Lewis County, average of at least 10 wildfires a year (2008-2023, no record for 2022). In 2022-2023, ~6,917 acres burned comprising 85% of total acres burned since 2008 (1,207.98 acres burned 2008-2022). Large fires have been infrequent. **Future Likelihood: Location, Operations.** Climate change is projected to increase high fire danger days contributed from hotter dryer summers/east wind events and increase the likelihood of fires. Electricity provided by the Lewis County Public Utility District No. 1 (PUD) serves all of Lewis County, except the City of Centralia and areas covered by Centralia City Light. Centralia City Light supplies power to customers in the City of Centralia and nearby areas, including Cooks Hill, Seminary Hill, and Salzer Valley. Puget Sound Energy offers natural gas service to customers in Centrali, Chehalis, Toledo, and Winlock. As described above, utility substations are spread throughout Lewis County. Increased extreme heat events are predicted to cause average of 6 additional fire hazard days per year by mid-century. Large wildfires are anticipated to occur more frequently in Lewis County - western County is predicted to experience 11-12 additional high fire danger days each year (by late century). Eastern county will have a 30% chance each year that there will be the climate and fuel conditions conducive to wildfires (by mid-century). Larger east county areas will have a 30-50% of conducive wildfire conditions each year (by late century). Higher chance that substations located in high risk areas experience wildfire damage even with upgrades.	**Medium**	More than 4,244 people who live in high wildfire risk areas (Morton, Randle, Packwood, Mossyrock) can experience temporary disruption in livelihood via mandatory evacuations = **M (Probability).** This does not include tourists and absentee landlords in eastern County (near Mount Rainier) who would need effective communication and evacuation plans/knowledge. Approximately 2,118 buildings are exposed, valuating at $572.2 million = **M (Magnitude).**	**Medium**	**Take Action**

3	Radio Communications - Wildfire *(Buildings & Energy)*	**Medium**	**Delayed emergency response services.** Increased likelihood of wildfires and landslides that may increase destruction of towers located throughout the County. Radio towers are sometimes made of flammable material. **Probability:** Wildfires occur every year in Lewis County, average of at least 10 wildfires a year (2008-2023, no record for 2022). In 2022-2023, ~6,917 acres burned comprising 85% of total acres burned since 2008 (1,207.98 acres burned 2008-2022). Large fires have been infrequent. **Future Likelihood: <u>Social Assets</u>** Climate change is projected to increase high fire danger days contributed from hotter dryer summers/east wind events and increase the likelihood of fires. Large wildfires are anticipated to occur more frequently in Lewis County - western County is predicted to experience 11-12 additional high fire danger days each year (by late century). Eastern county will have a 30% chance each year that there will be the climate and fuel conditions conducive to wildfires (by mid-century). Larger east county areas will have a 30-50% of conducive wildfire conditions each year (by late century) = M (Probability). Higher chance that radio communication towers located in high risk areas in eastern County experience wildfire damage - more remote locations.	**Low**	More than 4,244 people who live in high wildfire risk areas (Morton, Randle, Packwood, Mossyrock) can experience temporary disruption in livelihood via mandatory evacuations. This does not include tourists and absentee landlords in eastern County (near Mount Rainier) who would need effective communication and evacuation plans/knowledge. There are a variety of telecommunications providers that offer service in Lewis County. Ongoing changes in cellular and fiber technology have transformed the delivery of telecommunications, and these shifts in equipment and providers have contributed to an industry that offers several options for customers. Anticipating future characteristics given these shifting conditions is highly unlikely. Moving into the future, improvements to telecommunication infrastructure and services will play an increasingly important role especially in underserved areas. The magnitude of wildfire on radio communications may impact how underserved areas improve their telecommunications; however, there are many shifts in equipment and providers for telecommunications that could accommodate these areas **= L (Magnitude);** Indicator: Social Assets	**Low**	**Accept Risk**
4	Power Plant - Wildfire (*Buildings & Energy*)	**Low**	**Decreased power supply.** Wildfire impacts power grid (poles, towers, power lines, etc.) which may temporarily stop/shut-down power generation and distribution at power plant facilities. Plant is planned to decommission by 2025. **Probability:** Wildfires occur every year in Lewis County, average of at least 10 wildfires a year (2008-2023, no record for 2022). In 2022-2023, ~6,917 acres burned comprising 85% of total acres burned since 2008 (1,207.98 acres burned 2008-2022). Large fires have been infrequent. **Future Likelihood: <u>Location</u>** Climate change is projected to increase high fire danger days contributed from hotter dryer summers/east wind events and increase the likelihood of fires. Large wildfires are anticipated to occur more frequently in Lewis County - western County is predicted to experience 11-12 additional high fire danger days each year (by late century). Hydroelectrical facilities are mostly located on the western side of the County = **L (Probability).**	**Low**	Columbia Generating Station (CGS) is a nuclear project with generating capacity of 1,150 MW that is owned and operated by Energy Northwest (ENW). Based on the 2020 Integrated Resource Plan for Lewis County, under the current Bonneville Power Administration (BPA) power contract, Lewis PUD's contract high-water mark (HWM) is 115.4 aMW. The wildfire magnitude for power plants was based on the county's contracted load of nuclear power and the county's PUD fuel mix = **L (Probability).** The contracted nuclear power load compared to the generating capacity of the CGS is approximately 10% and nuclear in the PUD fuel mix is also 10.02% in 2021. Therefore, the magnitude of wildfire impacts to power plants is low as the county does not heavily rely on this power source = **L (Magnitude)**	**Low**	**Accept Risk**
5	Wind farm - Wildfire	**Low**	**Other hazard risk.** Skookumchuck wind energy farm is not highly susceptible to wildfire risk. Hires third party to suppress wildfire on mitigation forest lands, wildfire suppression strategy per state natural conservation dept. **Probability:** Wildfires occur every year in Lewis County, average of at least 10 wildfires a year (2008-2023, no record for 2022). In 2022-2023, ~6,917 acres burned comprising 85% of total acres burned since 2008 (1,207.98 acres burned 2008-2022). Large fires have been infrequent. **Future Likelihood: <u>Location</u>** Climate change is projected to increase high fire danger days contributed from hotter dryer summers/east wind events and increase the likelihood of fires. Large wildfires are anticipated to occur more frequently in Lewis County - western County is predicted to experience 11-12 additional high fire danger days each year (by late century). Eastern county will have a 30% chance each year that there will be the climate and fuel conditions conducive to wildfires (by mid-century). Larger east county areas will have a 30-50% of conducive wildfire conditions each year (by late century). Lewis County PUD receives wind energy from the White Creek Wind Project and the Nine Canyon Wind Project which are located in Klickitat County and ten miles southeast of Kennewick, respectively. =**L (Probability)**	**Low**	Lewis County PUD receives about 6 average MW of power through its 10% share of the White Creek Wind Project. The project is located in southeast of Lewis County and has 89 turbines with a nameplate capacity of 204 MWs. Lewis County PUD's share is approximately 6 MW of the Nine Canyon Wind Project which has 63 turbines with a installed capacity of 95.9 MW, located east of Lewis County in Kennewick. The magnitude of wildfire on wind farms rely Lewis County's reliance to wind power and the location of the wind power sources. As described, the wind farms that source Lewis County PUD are not within the county and a small MW is shared with Lewis County for both projects; therefore, magnitude is low. = **L (Magnitude)**	**Low**	**Accept Risk**

6	Natural gas pipelines - Wildfire	**Low**	**Temporary loss of service.** Pipelines run parallel to highways and large transportation corridors, exposing pipelines to wildfire risk. There may be extensive pipeline failure, taking hours, days, or weeks to repair resulting in temporary loss of service. **Probability:** Wildfires occur every year in Lewis County, average of at least 10 wildfires a year (2008-2023, no record for 2022). In 2022-2023, ~6,917 acres burned comprising 85% of total acres burned since 2008 (1,207.98 acres burned 2008-2022). Large fires have been infrequent. **Future Likelihood**: **Location** Climate change is projected to increase high fire danger days contributed from hotter dryer summers/east wind events and increase the likelihood of fires. Large wildfires are anticipated to occur more frequently in Lewis County - western County is predicted to experience 11-12 additional high fire danger days each year (by late century). All of the natural gas consumed by homes and businesses in the Pacific Northwest comes from western Canada and the U.S. Rocky Mountain States. All the majority of natural gas moves straight to the customer through network of pipelines, local gas mains, and other utility infrastructure. Northwest consumers, however, also receive a share a significant share of their natural gas supply - mainly in winter - from underground storage reservoirs. =**L (Probability)**	**Low**	As natural gas is derived from western Canada and the U.S. Rocky Mountain States, the magnitude of wildfire impacting the pipelines that deliver this natural gas is low. Further, in winter where there is a lesser likelihood of wildfire, natural gas supply from underground storage reservoirs will have a lower magnitude of effects. = **L (Magnitude)**	**Low**	**Accept Risk**
7	Historical Buildings & Sites - Flooding *(Cultural Resources & Practices)*	**Low**	**Loss of cultural identity.** Not located in flood zones; however, more frequent flooding events can reduce access to culturally important sites and resources. Limited availability of physical resource (i.e., historic wood type, etc.) for rehabilitation. **Probability:** There are certain areas of Lewis County that are in more flood areas than others. According to the Lewis County GIS Web Map, there are multiple flood zones near Centralia, Chehalis, and Napavine. However, flooding and drainage problems from heavy storms can happen anywhere in Lewis County. The major floods are caused by the overflow of the Chehalis and Newaukum Rivers and Coal, Salzer, and Dillenbaugh Creeks, as well as the Cowlitz and Tilton Rivers. Flooding is most common from October through April, when storms from the Pacific Ocean, bring intense rainfall to the area. The earliest documented flood on the Chehalis River occurred in December 1887 and since then, there have been major floods every 10-15 years. There have been 13 Presidential Declarations for flooding in the County between 1971 and 2012. **Future Likelihood: Location** Climate change is projected to increase the stream flows which is expected to increase riverine flooding within existing floodplains and could expand flooding to new areas not currently in existing floodplains. In addition, there are 17,626 properties in Lewis County that have risk of flooding over the next 30 years,. This represents 31.7% of properties in Lewis County will have risk of flooding with major impacts for residential and severe for commercial, infrastructure, and road assets. Historic buildings/cultural sites are vulnerable to flooding from dam and levee failure w/in dam inundation areas: Skookumchuck Dam* (Condition = satisfactory), Mossyrock* (Condition = unsatisfactory) and Mayfield* (Condition = unsatisfactory) Dams. Percentage of affected properties w/ historic structures is unknown. *Dams have updated Emergency Action Plan.	**Low**	Buildings constructed in mid-1800s or early 1900s, conditions may vary and are sensitive to changes due to outdated building codes. Percentage of affected properties w/ historic structures or sites are unknown. Dam failure and high streamflow magnitude affecting historic sites/buildings is likely = **L (Probability);** thus, there is a low magnitude for impacts. = **L (Magnitude).**	**Low**	**Accept Risk**
8	Historical Buildings & Sites - Wildfire *(Cultural Resources & Practices)*	**Medium**	**Loss of cultural identity.** Buildings are located in wildfire interface zones. More frequent wildfires can reduce access to culturally important sites and resources. Rehabilitation efforts may be limited due to the availability of physical resources to replace damaged historic buildings. **Probability**: Wildfires occur every year in Lewis County, average of at least 10 wildfires a year (2008-2023, no record for 2022). In 2022-2023, ~6,917 acres burned comprising 85% of total acres burned since 2008 (1,207.98 acres burned 2008-2022). Large fires have been infrequent. **Future Likelihood: Location** Climate change is projected to increase high fire danger days contributed from hotter dryer summers/east wind events and increase the likelihood of fires. Large wildfires are anticipated to occur more frequently in Lewis County - western County is predicted to experience 11-12 additional high fire danger days each year (by late century). Historical buildings are subject to increased wildfire risk.	**High**	Buildings constructed in mid-1800s or early 1900s, conditions may vary and are sensitive to changes. Most historical buildings are located in wildfire prone areas = **H (Probability);** therefore the magnitude of impacts should be highly considered for the goal of preserving historical buildings and sites.= **H (Magnitude)**	**High**	**Take Action**

9	Airports - Extreme Precipitation & Flooding *(Economic Dev)*	**Medium**	**Decreased revenue.** Some airports i.e., Packwood is located in a 100-yr FEMA floodplain where 1-3 ft. of flood can occur, warping pavement i.e., potholes, undulating surfaces, etc. and requiring more frequent airstrip maintenance. **Probability:** There are certain areas of Lewis County that are in more flood areas than others. According to the Lewis County GIS Web Map, there are multiple flood zones near Centralia, Chehalis, and Napavine. However, flooding and drainage problems from heavy storms can happen anywhere in Lewis County. The major floods are caused by the overflow of the Chehalis and Newaukum Rivers and Coal, Salzer, and Dillenbaugh Creeks, as well as the Cowlitz and Tilton Rivers. Flooding is most common from October through April, when storms from the Pacific Ocean, bring intense rainfall to the area. The earliest documented flood on the Chehalis River occurred in December 1887 and since then, there have been major floods every 10-15 years. There have been 13 Presidential Declarations for flooding in the County between 1971 and 2012. In terms of precipitation, the total average annual precipitation ranges from 47 inches at Centralia to 62 inches at Packwood. On the average, annual precipitation is 46.7 inches, with annual records showing a range from a low of 28 inches to a high of 60 inches. Rainfall is light during the summer and frequent during the remainder of the year. **Future Likelihood: <u>Location, Revenue, Operations</u>** Climate change is projected to steadily increase the magnitude of 25-year storm, increasing total precipitation by 7-18%. This increase indicates that Lewis County is expected to experience an increase in total precipitation of the 25-year storm. Heavier precipitation increases riverine streamflow within existing floodplains and could expand flooding to new areas not currently in existing floodplains, which could affect infrastructure and operations. In addition, in 30 years, 31.7% of properties in Lewis County will have risk of flooding with major impacts for residential and severe for commercial, infrastructure, and road assets, making it more costly to repair and maintain airport infrastructure. = **M (Probability)**	**Medium**	The magnitude of extreme precipitation regarding airports was determined based on the rate of heavier precipitation. With the steady increase of precipitation in the future, the magnitude of extreme precipitation regarding airports is medium as the operations of airports may be impacted with severe rain conditions = **M (Magnitude)**. In addition, the magnitude of flooding for airports is determined based on the flood history and proximity of major rivers that are near operating airports. = **M (Magnitude).**	**Medium**	**Take Action**

10	Airports - Reduced Snowpack *(Economic Dev)*	**Low**	**Other hazard risk.** Airports are sited away from avalanche-prone mountainous areas and within UGAs. Airports are located in flood zones that may experience temporary closures from riverine flooding due to earlier snowmelt. **Probability**: On average, snowfall in the region is not heavy, but the potential exists for extremely large amounts of occasion. The average annual snowfall is approximately 9 inches, with recorded extreme annual maximums at 45 inches. Most of the snowfall occurs in the month of January, with the monthly average at about 4.5 inches. **Future Likelihood: Location** Based on the April 1st snowpack readings, there is steady decrease in this snowpack with a decrease ranging from 68% to 97%. April 1st snowpack readings are an indicator of water storage capacities - airports are not affected by water storage capacities from reduced snowpack = **L (Probability).**	**Low**	The magnitude of reduced snowpack on airports is evaluated based on how operations would be impacted. Reduced snowpack would indicate that there would be less flooding and precipitation; thus, operations would not be affected heavily as operations should be conducted regularly. =**L (Magnitude)**	**Low**	**Accept Risk**
11	Airports - Wildfire *(Economic Dev)*	**Medium**	**Increased operational costs/decreased revenue.** Airports are located in wildfire interface zones and subject to wildfire risk. Tourism continues to provide revenue to cover added costs. Airport master plans should address wildfire risk and exposure. **Probability**: Wildfires occur every year in Lewis County, average of at least 10 wildfires a year (2008-2023, no record for 2022). In 2022-2023, ~6,917 acres burned comprising 85% of total acres burned since 2008 (1,207.98 acres burned 2008-2022). Large fires have been infrequent. **Future Likelihood: Location, Revenue**, Climate change is projected to increase high fire danger days contributed from hotter dryer summers/east wind events and increase the likelihood of fires. Large wildfires are anticipated to occur more frequently in Lewis County - western County is predicted to experience 11-12 additional high fire danger days each year (by late century). Airports are scattered all across Lewis County =**M (Probability) .** The County may experience Increased direct (fire damage to airports) and indirect costs (firefighting activities).	**Medium**	Airports are located in wildfire zones. As such, in the events of wildfires, operations would need to be halted and evacuations would occur. This may also increase flight cancelations and delayed restoration of the airports which decreases overall revenue and increases maintenance costs = **M (Magnitude)**	**Medium**	**Take Action**
12	Fiber optics - Extreme Precipitation & Flooding	**Medium**	**Site Constraints.** The pilot area in Pe Ell/western County area that will have updated broadband infrastructure, some portions of this area are exposed to 100-year FEMA floodplain. **Probability:** There are certain areas of Lewis County that are in more flood areas than others. According to the Lewis County GIS Web Map, there are multiple flood zones near Centralia, Chehalis, and Napavine. However, flooding and drainage problems from heavy storms can happen anywhere in Lewis County. The major floods are caused by the overflow of the Chehalis and Newaukum Rivers and Coal, Salzer, and Dillenbaugh Creeks, as well as the Cowlitz and Tilton Rivers. Flooding is most common from October through April, when storms from the Pacific Ocean, bring intense rainfall to the area. The earliest documented flood on the Chehalis River occurred in December 1887 and since then, there have been major floods every 10-15 years. There have been 13 Presidential Declarations for flooding in the County between 1971 and 2012. In terms of precipitation, the total average annual precipitation ranges from 47 inches at Centralia to 62 inches at Packwood. On the average, annual precipitation is 46.7 inches, with annual records showing a range from a low of 28 inches to a high of 60 inches. Rainfall is light during the summer and frequent during the remainder of the year. **Future Likelihood: Location, Operations** Climate change is projected to steadily increase the magnitude of 25-year storm, increasing total precipitation by 7-18%. This increase indicates that Lewis County is expected to experience an increase in total precipitation of the 25-year storm. Heavier precipitation increases riverine streamflow within existing floodplains and could expand flooding to new areas not currently in existing floodplains, which could affect infrastructure and operations. In addition, in 30 years, 31.7% of properties in Lewis County will have risk of flooding with major impacts for residential and severe for commercial, infrastructure, and road assets. Heavier precipitation is an indicator of flooding which could affect infrastructure and operations. = **M (Probability).**	**Medium**	According to the Lewis County PUD, service territory of fiber optics are divided into 17 broad service zones. Each of the broadband service zone correspond with a PUD electrical substation area. As there are multiple electrical substations throughout Lewis County, this indicates that the fiber optics associated with each substation may be impacted as it could interrupt service for many people= **M (Magnitude).**	**Medium**	**Take Action**
13	Fiber optics - Reduced snowpack	**Low**	**Other hazard impacts.** Reduced snowpack and avalanche are less likely to occur in western County area where new broadband infrastructure is slated for development (little to no exposure). **Probability:** On average, snowfall in the region is not heavy, but the potential exists for extremely large amounts of occasion. The average annual snowfall is approximately 9 inches, with recorded extreme annual maximums at 45 inches. Most of the snowfall occurs in the month of January, with the monthly average at about 4.5 inches. **Future Likelihood: Location, Operations** Based on the April 1st snowpack readings, there is steady decrease in this snowpack with a decrease ranging from 68% to 97% =**L (Probability).**	**Low**	Reduced snowpack is less likely to occur in western County area where new broadband infrastructure is slated for development; however, existing fiber optic networks associated with electrical substations may be impacted as it could interrupt service for many people. **= L (Magnitude)**	**Low**	**Accept Risk**

14	Fiber optics - Wildfire	**Medium**	**Site Constraints.** Broadband infrastructure is located in wildfire interface zones in UGAs and exposes fiber cables, towers, etc. to wildfire risk. Site location, development standards, and design does not consider climate impacts per Chap. 15.50 of municipal code. **Probability**: Wildfires occur every year in Lewis County, average of at least 10 wildfires a year (2008-2023, no record for 2022). In 2022-2023, ~6,917 acres burned comprising 85% of total acres burned since 2008 (1,207.98 acres burned 2008-2022). Large fires have been infrequent. **Future Likelihood: <u>Location, Operations</u>** Climate change is projected to increase high fire danger days contributed from hotter dryer summers/east wind events and increase the likelihood of fires. Large wildfires are anticipated to occur more frequently in Lewis County - western County is predicted to experience 11-12 additional high fire danger days each year (by late century). = **M (Probability).** Increasing exposure to wildfire risk results in destruction of infrastructure and loss of service to internet/emergency communications.	**High**	Broadband infrastructure located in wildfire interface zones in UGAs exposes fiber cables, towers, etc. to wildfire risk, can result in destruction and loss of service to internet = **H (Magnitude).**	**High**	**Take Action**
15	Shorelines - Flooding *(Ecosystem)*	**Medium**	Riverine and lake shorelines experience flooding and bank erosion from flooding. The County's Shoreline Master Plan considers impacts of flooding to the shoreline i.e., prohibit chemicals from agriculture and mining in shoreline areas subject to flooding, limit dredging to safety/restoration activities, etc. **Probability:** There are certain areas of Lewis County that are in more flood areas than others. According to the Lewis County GIS Web Map, there are multiple flood zones near Centralia, Chehalis, and Napavine. However, flooding and drainage problems from heavy storms can happen anywhere in Lewis County. The major floods are caused by the overflow of the Chehalis and Newaukum Rivers and Coal, Salzer, and Dillenbaugh Creeks, as well as the Cowlitz and Tilton Rivers. Flooding is most common from October through April, when storms from the Pacific Ocean, bring intense rainfall to the area. The earliest documented flood on the Chehalis River occurred in December 1887 and since then, there have been major floods every 10-15 years. There have been 13 Presidential Declarations for flooding in the County between 1971 and 2012. **Future Likelihood: <u>Ecosystem Health</u>** Climate change is projected to increase the stream flows which is expected to increase riverine flooding within existing floodplains and could expand flooding to new areas not currently in existing floodplains. Vegetation and habitat that exist along shorelines would be impacted, including cultural resources and recreational uses. In addition, in 30 years, 31.7% of properties in Lewis County will have a risk of flooding with major impacts for residential and severe for commercial, infrastructure, and road assets. = **M (Probability).**	**High**	The shore master plan (SMP) considers impacts of flooding to shoreline i.e., prohibit chemicals from agriculture and mining in shoreline areas subject to flooding, limit dredging to safety/restoration activities, etc. SMP uses 2010 FEMA flood zone maps and is outdated. Higher likelihood of flooding may indicate more episodic events of bank erosion and landslides that damage existing shorelines = **H (Magnitude)**	**High**	**Take Action**
16	Shorelines - Reduced Snowpack *(Ecosystem)*	**Low**	**Conflicting uses and changing ecosystem health.** Reduced peak streamflow impacts protection status and interpretation of allowed uses i.e., aquaculture, mining, recreation, etc. **Probability:** On average, snowfall in the region is not heavy, but the potential exists for extremely large amounts on occasion. The average annual snowfall is approximately 9 inches, with recorded extreme annual maximums at 45 inches. Most of the snowfall occurs in the month of January, with the monthly average at about 4.5 inches. **Future Likelihood: <u>Ecosystem Health</u>** Based on the April 1st snowpack readings, there is steady decrease in this snowpack with a decrease ranging from 68% to 97% = **L (Probability).** Decreased snowpack reduces peak streamflows that impact existing habitat and tribal resources. Enforcing allowable uses would require a Master Plan update to avoid conflicting uses that impact ecosystem habitat. Increased maintenance needs may increase for private facilities and public recreation facilities utilizing shoreline areas.	**Low**	Reduced snowpack indicates a lesser likelihood of flooding which impacts shorelines = **L (Magnitude)**	**Low**	**Accept Risk**
17	Shorelines - Wildfire *(Ecosystem)*	**Low**	**Other hazard risks - landslides, erosion**. Shoreline segments located in wildfire interface zones (wildfire risk) throughout the County. Wildfire impacts vary depending on uses. SMP does not consider impact of wildfire hazard on these developments, but County code and fire districts provide materials and education for fire risk prevention and mitigation. **Probability**: Wildfires occur every year in Lewis County, average of at least 10 wildfires a year (2008-2023, no record for 2022). In 2022-2023, ~6,917 acres burned comprising 85% of total acres burned since 2008 (1,207.98 acres burned 2008-2022). Large fires have been infrequent. **Future Likelihood: <u>Ecosystem Health</u>** Climate change is projected to increase high fire danger days contributed from hotter dryer summers/east wind events and increase the likelihood of fires. Large wildfires are anticipated to occur more frequently in Lewis County - western County is predicted to experience 11-12 additional high fire danger days each year (by late century). = **L (Probability).** Increased wildfire risk is an indicator for dry vegetation and soils that degrade ecosystem habitat and erode from flooding events.	**Low**	Wildfire impacts to shoreline varies depending on uses, increased impact for "high intensity", "shoreline residential", and "aquatic" shorelines due to residential and commercial developments = **L (Magnitude).**	**Low**	**Accept Risk**

18	Public Safety Radio - Extreme Precipitation *(Emergency Mgmt)*	**Medium**	Radio infrastructure is limited to high elevation hillside areas and may be exposed to landslides as a result of extreme precipitation events and dry soils/vegetation. **Probability:** In terms of precipitation, the total average annual precipitation ranges from 47 inches at Centralia to 62 inches at Packwood. On the average, annual precipitation is 46.7 inches, with annual records showing a range from a low of 28 inches to a high of 60 inches. Rainfall is light during the summer and frequent during the remainder of the year. **Future Likelihood: <u>Communications, Operations</u>** There is a steady increase in percent change in the magnitude of 25-year storm ranging from an increase of precipitation that falls in the range of 7-18%. This increase indicates that Lewis County is expected to experience an increase in total precipitation of the 25-year storm. Heavier precipitation is an indicator of flooding which could affect infrastructure and operations. =**M (Probability)**	**Medium**	Public Safety radios are crucial for evacuation notices, regular news, weather updates, etc. Extreme precipitation may impact the telecommunications associated with the public safety radio; thus impacting the operational capacity and system reliability of public safety radios = **M (Magnitude)**	**Medium**	**Take Action**
19	Public Safety Radio - Flooding *(Emergency Mgmt)*	**Medium**	**Emergency services delay.** Radio towers are located throughout the County. Towers are typically located in remote hillside areas and are less susceptible to riverine flooding. Radio infrastructure needs to be updated - existing conditions include limited ability to respond to emergencies and may require frequent maintenance and temporary loss of communication. **Probability:** There are certain areas of Lewis County that are in more flood areas than others. According to the Lewis County GIS Web Map, there are multiple flood zones near Centralia, Chehalis, and Napavine. However, flooding and drainage problems from heavy storms can happen anywhere in Lewis County. The major floods are caused by the overflow of the Chehalis and Newaukum Rivers and Coal, Salzer, and Dillenbaugh Creeks, as well as the Cowlitz and Tilton Rivers. Flooding is most common from October through April, when storms from the Pacific Ocean, bring intense rainfall to the area. The earliest documented flood on the Chehalis River occurred in December 1887 and since then, there have been major floods every 10-15 years. There have been 13 Presidential Declarations for flooding in the County between 1971 and 2012. **Future Likelihood: <u>Communications, Operations</u>** Climate change is projected to increase the stream flows which is expected to increase riverine flooding within existing floodplains and could expand flooding to new areas not currently in existing floodplains. In addition, in 30 years, 31.7% of properties in Lewis County will have risk of flooding with major impacts for residential and severe for commercial, infrastructure, and road assets. = **M (Probability)**. Increased flooding events destroy radio infrastructure, resulting in communication losses and delays in emergency services.	**Medium**	Public safety radios are crucial for evacuation notices, regular news, weather updates, etc. Flooding may impact the structural integrity that house public safety radio; thus impacting the operational capacity and system reliability of public safety radios = **M (Magnitude)**	**Medium**	**Take Action**
20	Public Safety Radio - Wildfire *(Emergency Mgmt)*	**Medium**	**Emergency services delay.** Radio towers are located in wildfire risk areas throughout the County. **Probability**: Wildfires occur every year in Lewis County, average of at least 10 wildfires a year (2008-2023, no record for 2022). In 2022-2023, ~6,917 acres burned comprising 85% of total acres burned since 2008 (1,207.98 acres burned 2008-2022). Large fires have been infrequent. **Future Likelihood: <u>Communications, Operations</u>** Climate change is projected to increase high fire danger days contributed from hotter dryer summers/east wind events and increase the likelihood of fires. Large wildfires are anticipated to occur more frequently in Lewis County - western County is predicted to experience 11-12 additional high fire danger days each year (by late century). = **M (Probability).** Direct impacts include destruction of radio towers. Indirect impacts include delayed emergency response and deployment of emergency services/resources. Evacuation routes for mobility-impaired in rural areas subject to increased wildfire risk is necessary.	**Medium**	Fire coverage is limited in many County areas; Use of a simplex channel for fire hampers the ability of field users to communicate directly with each other and they must relay messages through dispatch in many situations, resulting in delayed responses to emergencies and deployment of equipment = **M (Magnitude).** Delayed response and service to vulnerable populations i.e., elderly, mobility impaired persons, etc. may be an issue, resulting in strong implications for identifying options in an evacuation plan = **M (Magnitude)**	**Medium**	**Take Action**

21	Fire Stations - Extreme Precipitation *(Emergency Mgmt)*	**Medium**	Peak streamflow changes from extreme precipitation events cause secondary hazards like riverbank erosion and landslides that can undermine the structural stability of fire stations. Stations located in flood plain/landslide hazard areas are more likely to experience significant damages and loss of entirety of asset. **Probability:** In terms of precipitation, the total average annual precipitation ranges from 47 inches at Centralia to 62 inches at Packwood. On the average, annual precipitation is 46.7 inches, with annual records showing a range from a low of 28 inches to a high of 60 inches. Rainfall is light during the summer and frequent during the remainder of the year. **Future Likelihood: Operations, Structural stability, Response Time** There is a steady increase in percent change in the magnitude of 25-year storm ranging from an increase of precipitation that falls in the range of 7-18%. This increase indicates that Lewis County is expected to experience an increase in total precipitation of the 25-year storm. Heavier precipitation is an indicator of flooding which could affect infrastructure and operations. = **M (Probability)**	**Medium**	Extreme precipitation could lead to flooding in areas where fire stations are stationed. This may impact the structural integrity of fire stations; thus, hindering operations and decreasing response time in the event of emergencies = **M (Magnitude)**	**Medium**	**Take Action**
22	Fire Stations - Flooding *(Emergency Mgmt)*	**Medium**	**Delays in emergency response**. Stations located in flood plain/landslide hazard areas are more likely to experience significant damages and loss of entirety of asset. Stations located in flood zones are susceptible to riverine and stormwater flooding. **Probability:** There are certain areas of Lewis County that are in more flood areas than others. According to the Lewis County GIS Web Map, there are multiple flood zones near Centralia, Chehalis, and Napavine. However, flooding and drainage problems from heavy storms can happen anywhere in Lewis County. The major floods are caused by the overflow of the Chehalis and Newaukum Rivers and Coal, Salzer, and Dillenbaugh Creeks, as well as the Cowlitz and Tilton Rivers. Flooding is most common from October through April, when storms from the Pacific Ocean, bring intense rainfall to the area. The earliest documented flood on the Chehalis River occurred in December 1887 and since then, there have been major floods every 10-15 years. There have been 13 Presidential Declarations for flooding in the County between 1971 and 2012. **Future Likelihood: Operations, Structural Stability, Response Time** Climate change is projected to increase the stream flows which is expected to increase riverine flooding within existing floodplains and could expand flooding to new areas not currently in existing floodplains. In addition, in 30 years, 31.7% of properties in Lewis County will have risk of flooding with major impacts for residential and severe for commercial, infrastructure, and road assets. = **M (Probability).** Stations are anticipated to experience more frequent destruction of buildings that delay emergency response and is costly to recover.	**Medium**	Flooding of fire stations will inhibit smooth operations in the case of an emergency and increase response time durations = **M (Magnitude)**. In addition, the structural integrity of fire stations is compromised. = **M (Magnitude)**	**Medium**	**Take Action**
23	Fire Stations - Wildfire *(Emergency Mgmt)*	**Medium**	Stations located in wildfire risk areas are more likely to experience significant damages and loss of entirety of asset from wildfire events. **Probability**: Wildfires occur every year in Lewis County, average of at least 10 wildfires a year (2008-2023, no record for 2022). In 2022-2023, ~6,917 acres burned comprising 85% of total acres burned since 2008 (1,207.98 acres burned 2008-2022). Large fires have been infrequent. **Future Likelihood: Operations, Structural Stability, Response Time, Siting** Climate change is projected to increase high fire danger days contributed from hotter dryer summers/east wind events and increase the likelihood of fires. Large wildfires are anticipated to occur more frequently throughout Lewis County - western County is predicted to experience 11-12 additional high fire danger days each year (by late century). = **M (Probability).** Destruction of asset results in temporary loss of service and functionality to serve vulnerable populations. Fire stations are designed for fire safety such as safe space buffers surrounding buildings.	**Medium**	Wildfires will directly damage the structure of fire stations; thus inhibiting operations and decreasing the likelihood of smooth dispatchments to emergency events in need of their assistance. = **M (Magnitude)**	**Medium**	**Take Action**

24	Airports - Extreme Precipitation & Flooding (*Emergency Mgmt)*	**Medium**	**Delays in emergency services.** Some airports i.e., Packwood are located in 100-Yr FEMA flood zones and are subject to 1-3 inches of flooding, resulting in temporary closure of airport and delays in emergency services. **Probability**: According to the Lewis County GIS Web Map, there are multiple flood zones near Centralia, Chehalis, and Napavine. However, flooding and drainage problems from heavy storms can happen anywhere in Lewis County. The major floods are caused by the overflow of the Chehalis and Newaukum Rivers and Coal, Salzer, and Dillenbaugh Creeks, as well as the Cowlitz and Tilton Rivers. Flooding is most common from October through April, when storms from the Pacific Ocean, bring intense rainfall to the area. The earliest documented flood on the Chehalis River occurred in December 1887 and since then, there have been major floods every 10-15 years. There have been 13 Presidential Declarations for flooding in the County between 1971 and 2012. In terms of precipitation, the total average annual precipitation ranges from 47 inches at Centralia to 62 inches at Packwood. On the average, annual precipitation is 46.7 inches, with annual records showing a range from a low of 28 inches to a high of 60 inches. Rainfall is light during the summer and frequent during the remainder of the year. **Future Likelihood: <u>Location, Operations, Response Time</u>** Climate change is projected to steadily increase the magnitude of 25-year storm, increasing total precipitation by 7-18%. This increase indicates that Lewis County is expected to experience an increase in total precipitation of the 25-year storm. Heavier precipitation increases riverine streamflow within existing floodplains and could expand flooding to new areas not currently in existing floodplains, which could affect infrastructure and operations. In addition, in 30 years, 31.7% of properties in Lewis County will have risk of flooding with major impacts for residential and severe for commercial, infrastructure, and road assets, making it more costly to repair and maintain airport infrastructure. = **M (Probability).**	**Medium**	Packwood Airport is located in Cowlitz River FEMA 100-Year flood zone and subject to 1-3 feet of flooding; closure of airport to runway activities; other airports are not in flood zone = **M (Magnitude)**. Extreme precipitation events can warp pavement, requiring more frequent airstrip maintenance; divert emergency response services to other airports i.e., Chehalis-Centralia airport serves as primary local airport. = **M (Magnitude)**.	**Medium**	**Take Action**
25	Airports - Wildfire *(Emergency Mgmt)*	**Medium**	**Delayed emergency response times.** Airports are located in wildfire risk areas throughout the County. Fire stations and ARFF facilities located nearby to respond to aerial wildfire emergencies within 15 minutes. **Probability**: Wildfires occur every year in Lewis County, average of at least 10 wildfires a year (2008-2023, no record for 2022). In 2022-2023, ~6,917 acres burned comprising 85% of total acres burned since 2008 (1,207.98 acres burned 2008-2022). Large fires have been infrequent. **Future Likelihood: <u>Location, Operations, Response Time</u>** Climate change is projected to increase high fire danger days contributed from hotter dryer summers/east wind events and increase the likelihood of fires. Large wildfires are anticipated to occur more frequently in Lewis County - western County is predicted to experience 11-12 additional high fire danger days each year (by late century). = **M (Probability).** Airports are anticipated to experience increased wildfire risk, resulting in damage to structure or loss of services during wildfire events. Loss of emergency response services would occur or services diverted to other airport i.e., Chehalis-Centralia airport, delaying emergency services.	**Medium**	Airports located in wildfire interface zones (wildland fuel) increase chances of wildfire events resulting in loss of emergency response services. Services may stop or be diverted to other airport i.e., Chehalis-Centralia airport further delaying service response times **= M (Magnitude).**	**Medium**	**Take Action**
26	County roads - Extreme Precipitation *(Transportation)*	**Medium**	**Costly repairs and disruption to services.** Extreme precipitation events can damage pavement i.e., potholes, sinkholes, etc. on roads located throughout the County. **Probability:** In terms of precipitation, the total average annual precipitation ranges from 47 inches at Centralia to 62 inches at Packwood. On the average, annual precipitation is 46.7 inches, with annual records showing a range from a low of 28 inches to a high of 60 inches. Rainfall is light during the summer and frequent during the remainder of the year. **Future Likelihood: <u>Safety, Structural Integrity, Location</u>** There is a steady increase in percent change in the magnitude of 25-year storm ranging from an increase of precipitation that falls in the range of 7-18%. This increase indicates that Lewis County is expected to experience an increase in total precipitation of the 25-year storm. Heavier precipitation is an indicator of flooding which could affect infrastructure and operations. = **M (Probability).** Increased extreme precipitation events means requiring more frequent road maintenance that is costly to repair and disrupt services. Interstate 5 is frequently affected by flooding in the Chehalis River floodplain. Freight delays negatively impact economy. For example, $47,070,000 economic impact occurred from a four-day I-5 closure due to the Chehalis river flood.	**Medium**	Extreme precipitation events can warp pavement or cause sinkholes, requiring more frequent road maintenance and potential for increased road accidents (hydroplaning) = **M (Magnitude).** Road closures impact evacuation routes, goods delivery, etc. Pavement technology such as all-weather asphalt is available but may be costly to implement = **M (Magnitude).**	**Medium**	**Take Action**

27	County roads - Flooding *(Transportation)*	**High**	**Economic opportunity loss.** Roads throughout County are subject to flooding, including I-5 freeway and roads within 100-Yr floodplains. Flooded roads are subject to road closures and evacuation, disrupting services. **Probability:** There are certain areas of Lewis County that are in more flood areas than others. According to the Lewis County GIS Web Map, there are multiple flood zones near Centralia, Chehalis, and Napavine. However, flooding and drainage problems from heavy storms can happen anywhere in Lewis County. The major floods are caused by the overflow of the Chehalis and Newaukum Rivers and Coal, Salzer, and Dillenbaugh Creeks, as well as the Cowlitz and Tilton Rivers. Flooding is most common from October through April, when storms from the Pacific Ocean, bring intense rainfall to the area. The earliest documented flood on the Chehalis River occurred in December 1887 and since then, there have been major floods every 10-15 years. There have been 13 Presidential Declarations for flooding in the County between 1971 and 2012. **Future Likelihood: <u>Operations, Structural Stability, Flood Prone Zone</u>** Climate change is projected to increase peak stream flows which is expected to increase riverine flooding within existing floodplains and could expand flooding to new areas not currently in existing floodplains. In addition, in 30 years, 31.7% of properties in Lewis County will have risk of flooding with major impacts for residential and severe for commercial, infrastructure, and road assets. Interstate 5 is frequently affected by flooding in the Chehalis River floodplain. = **H (Probability).** Other major impacts include freight delays that negatively impact the economy (for example, $47,070,000 economic impact from four-day I-5 closure).	**High**	Flooding may lead to the potential for increased road accidents and roadway closures= **H (Magnitude)**. Road closures impact evacuation routes, goods delivery, etc., pavement tech such as all-weather asphalt is available = **H (Magnitude).**	**High**	**Take Action**
28	County roads - Reduced snowpack *(Transportation)*	**Low**	**Operations:** Snowpack accumulation may lead to lane and road obstruction which reduces capacity and increases travel delay time. **Probability:** The considered hazard risks associated with county roads concentrate on the level of safety and structural stability of the roads. For instance, on average, snowfall in the region is not heavy, but the potential exists for extremely large amounts of occasion. The average annual snowfall is approximately 9 inches, with recorded extreme annual maximums at 45 inches. Most of the snowfall occurs in the month of January, with the monthly average at about 4.5 inches. As the probability of snowpack is low within Lewis County, it is unlikely county roads will have a high risk of impact from snowpack. **Future Likelihood: <u>Safety, structural stability</u>** Based on the April 1st snowpack readings, there is steady decrease in this snowpack with a decrease ranging from 68% to 97% = **L (Probability)**. Thus, snowpack is projected to heavily decrease. The April 1st snowpack is used as an indicator for the amount of stored water that becomes available during the melt season.	**Low**	Snowpack may not significantly increase the magnitude of impacts regarding county roads as there is a projected decrease in snowpack. However, it is important to note that snowpack would impact the structural stability and safety of county roads as there is increased likelihood of ice on the road which may lead to dangerous road conditions; however, with reduced snowpack, this is unlikely. = **L (Magnitude)**	**Low**	**Accept Risk**
29	County roads - Wildfire *(Transportation)*	**Medium**	**Operations:** Commonly after a wildfire, county roads may develop an increased susceptibility to erosion and can generally alter the terrain and ground conditions of the affected county road(s). This may lead to unsafe travel conditions during normal travel and emergency evacuations. Existing conditions of county roads are very varied and widespread. Additionally, roads can generally withstand wildfire events as a means for emergency evacuation. **Probability:** Wildfires occur every year in Lewis County, average of at least 10 wildfires a year (2008-2023, no record for 2022). In 2022-2023, ~6,917 acres burned comprising 85% of total acres burned since 2008 (1,207.98 acres burned 2008-2022). Large fires have been infrequent. Despite large fires being infrequent, wildfires can still be anticipated to have a medium probability of impacting county roads. **Future Likelihood: <u>Safety, Structural stability</u>** Climate change is projected to increase high fire danger days contributed from hotter dryer summers/east wind events and increase the likelihood of fires. Large wildfires are anticipated to occur more frequently in Lewis County - western County is predicted to experience 11-12 additional high fire danger days each year (by late century). **= M (Probability)**	**Medium**	Wildfires will directly damage road surfaces, cause road closures, and increase safety precautions. This may cause drivers to avoid certain roads due to safety concerns which leads to longer travel times. Further, emergency evacuation routes may become harder to reach; thus, increasing the human risk significantly. Repair of roads will also take certain durations of time and materials depending on the severity of the wildfire. = **M (Magnitude)**	**Medium**	**Take Action**

30	Bridges - Extreme Precipitation *(Transportation)*	**High**	**Structural Integrity:** Extreme precipitation may lead to flooding. Flooding can also cause scour around piers and abutments, which can damage bridges and cause structural integrity issues. These issues may range from insignificant to significant and may need varied construction times. Heavily damaged bridges from flooding may take extremely long periods of construction; thus, operations may halt for long periods of time. To combat this risk, updated engineer standards may need to be adopted to increase flood design measures and mitigate scouring. **Probability:** In terms of precipitation, the total average annual precipitation ranges from 47 inches at Centralia to 62 inches at Packwood. On the average, annual precipitation is 46.7 inches, with annual records showing a range from a low of 28 inches to a high of 60 inches. Rainfall is light during the summer and frequent during the remainder of the year. **Future Likelihood: <u>Operations, Safety, Structural Integrity, Location</u>** There is a steady increase in percent change in the magnitude of 25-year storm ranging from an increase of precipitation that falls in the range of 7-18%. This increase indicates that Lewis County is expected to experience an increase in total precipitation of the 25-year storm. Heavier precipitation is an indicator of flooding which could affect infrastructure and operations. Within Lewis County's Bridge inventory there are 204 NBI reportable bridges and 17 short span bridges. One of the County's bridges is classified as structurally deficient (SD), 24 are classified as functionally obsolete (FO) , and 84 are coded as scour critical. Bridges classified as FO and structurally deficient bridges that should be considered for future replacement or rehabilitation. =**H (Probability)**	**High**	Due to the various structurally categorized bridges, the magnitude of extreme precipitation varies. However, the damage mainly focusses on the weakening of the structural integrity of bridges (especially the already weakened ones) which could lead to expediated bridge collapses =**H (Magnitude).** In addition, the compose of bridge integrity emphasizes that bridges are not able to inadequately carry its intended traffic load; thus, operational usage of bridges due to extreme precipitation is decreased and safety concerns increase. Severe damage to bridges from extreme precipitation will take long durations of repair and resources which could halt the operation of specific bridges for long periods of time; thus significantly halting usability for many people. = **H (Magnitude)**	**High**	**Take Action**

31	Bridges - Flooding *(Transportation)*	**High**	**Structural Integrity:** Flooding can erode and damage bridge approach slabs and abutments. Flooding can also cause scour around piers and abutments, which can damage bridges and cause structural integrity issues. These issues may range from insignificant to significant and may need varied construction times. Heavily damaged bridges from flooding may take extremely long periods of construction; thus, operations may halt for long periods of time. To combat this risk, updated engineer standards may need to be adopted to increase flood design measures and mitigate scouring. **Probability:** In terms of precipitation, the total average annual precipitation ranges from 47 inches at Centralia to 62 inches at Packwood. On the average, annual precipitation is 46.7 inches, with annual records showing a range from a low of 28 inches to a high of 60 inches. Extreme precipitation may eventually lead to flooding. Rainfall is light during the summer and frequent during the remainder of the year. However, it is important to note that many bridges are located in floodplains (approximately 77 bridges located within the 100-year floodplain and approximately 78 located within the 500-year floodplain). = **H (Probability)** **Future Likelihood: <u>Operations, Safety, Structural Integrity, Location</u>** There is a steady increase in percent change in the magnitude of 25-year storm ranging from an increase of precipitation that falls in the range of 7-18%. This increase indicates that Lewis County is expected to experience an increase in total precipitation of the 25-year storm. Heavier precipitation is an indicator of flooding which could affect infrastructure and operations. Within Lewis County's Bridge inventory there are 204 NBI reportable bridges and 17 short span bridges. One of the County's bridges is classified as structurally deficient (SD), 24 are classified as functionally obsolete (FO) , and 84 are coded as scour critical. Bridges classified as FO and structurally deficient bridges that should be considered for future replacement or rehabilitation. As such, this indicates that the impacts associated with flooding may heavily affect bridges.= **H (Probability)**	**High**	Due to the various structurally categorized bridges, the magnitude of flooding varies. However, the damage mainly concentrates on the weakening of the structural integrity of bridges (especially the already weakened ones) which could lead to expediated bridge collapses = **H (Magnitude).** In addition, the composition of bridge integrity emphasizes that bridges are not able to adequately carry its intended traffic load; thus, operational usage of bridges due to flooding is decreased and safety concerns increase. = **H (Magnitude)** Severe damage to bridges from extreme precipitation will take long durations of repair and resources which could halt the operation of specific bridges for long periods of time; thus significantly halting usability for many people. = **H (Magnitude)**	**High**	**Take Action**
32	Bridges - Reduced snowpack *(Transportation)*	**Low**	**Structural Integrity:** Snowpack may lead to increased erosion and degrade bridges. Further, transportation with bridges may become dangerous for travel as ramps may become extra slippery as snow adheres to ground more quickly. To combat snowpack impacts to bridges, updated standardized engineering standards can be set for increased flood levels to mitigate scouring. **Probability:** On average, snowfall in the region is not heavy, but the potential exists for extremely large amounts of occasion. The average annual snowfall is approximately 9 inches, with recorded extreme annual maximums at 45 inches. Most of the snowfall occurs in the month of January, with the monthly average at about 4.5 inches. = **L (Probability)** **Future Likelihood: <u>Operations, Safety, Structural Integrity, Location</u>** Based on the April 1st snowpack readings, there is steady decrease in this snowpack with a decrease ranging from 68% to 97% = L (Probability). The April 1st snowpack is used as an indicator for the amount of stored water that becomes available during the melt season. Within Lewis County's Bridge inventory there are 204 NBI reportable bridges and 17 short span bridges. One of the County's bridges is classified as structurally deficient (SD), 24 are classified as functionally obsolete (FO) , and 84 are coded as scour critical. Bridges classified as FO and structurally deficient bridges should be considered for future replacement or rehabilitation. =**L (Probability)**	**Low**	Reduced snowpack indicates a decrease in flooding which helps decrease bridge impacts relating to snowpack. Further as there is reduced snowpack, there is a less likelihood of increased erosion which usually increases bridge degradation. **L = (Magnitude)**	**Low**	**Accept Risk**

33	Bridges - Wildfire *(Transportation)*	**High**	**Structural Integrity:** Wildfires burning undergrowth along valleys and washes can damage bridges by burning underneath them; thus, resulting in prolonged damage assessments and unsafe structural integrity. These impacts lead to unsafe travel utilizing bridges; as such, business destinations may be harder to reach, transportation of goods is delayed, and travel risks increase. Measures to combat wildfire risk include designing bridges for fire loads, and applying fire blankets to bridges in high fire risk areas. **Probability:** Wildfires occur every year in Lewis County, average of at least 10 wildfires a year (2008-2023, no record for 2022). In 2022-2023, ~6,917 acres burned comprising 85% of total acres burned since 2008 (1,207.98 acres burned 2008-2022). Large fires have been infrequent. Generally, bridges that are located throughout Lewis County are exposed to wildfire. There are more bridges in western County than eastern County. It is important to note that, burned bridges are non-functional as transportation on them may vary in risk. = **H (Probability)** **Future Likelihood: Safety, Structural stability, Operations** Climate change is projected to increase high fire danger days contributed from hotter dryer summers/east wind events and increase the likelihood of fires. Large wildfires are anticipated to occur more frequently in Lewis County - western County is predicted to experience 11-12 additional high fire danger days each year (by late century). Within Lewis County's Bridge inventory there are 204 NBI reportable bridges and 17 short span bridges. One of the County's bridges is classified as structurally deficient (SD), 24 are classified as functionally obsolete (FO) , and 84 are coded as scour critical. Bridges classified as FO and structurally deficient bridges should be considered for future replacement or rehabilitation. = **H (Probability)**	**High**	The magnitude of wildfires will impact the structural integrity of bridges heavily as it will weaken the materials composed in the bridge. Consequently, the structural integrity of the bridge is compromised. This indicates potential bridge operation closures due to increased safety concerns. = **H (Magnitude)** Bridge closures will increase travel time and inconvenience for destinations as alternate routes will need to be utilized. **H (Magnitude)**	**High**	**Take Action**
34	Airports - Extreme Precipitation & Flooding *(Transportation)*	**High**	**Operations:** Extreme precipitation can usually lead to flooding. Extreme precipitation may halt operations as poor visibility increases. In turn, flight delays or cancellations may be increased during these severe weather events. Flooding may also damage airport infrastructure such as landing lights, radar and navigation installations, and communications networks will also inhibit the passage of aircraft. All these impacts may lead to severe economic losses in terms of passenger and freight traffic. To combat extreme precipitation and flooding, some measures such as utilization of levees/dikes or other measures may be used. **Probability:** According to the Lewis County GIS Web Map, there are multiple flood zones near Centralia, Chehalis, and Napa vine. However, flooding and drainage problems from heavy storms can happen anywhere in Lewis County. The major floods are caused by the overflow of the Chehalis and Wewaykum Rivers and Coal, Selzer, and Dille Baugh Creeks, as well as the Cowlitz and Tilton Rivers. The earliest documented flood on the Chehalis River occurred in December 1887 and since then, there have been major floods every 10-15 years. There have been 13 Presidential Declarations for flooding in the County between 1971 and 2012. In terms of precipitation, the total average annual precipitation ranges from 47 inches at Centralia to 62 inches at Packwood. On the average, annual precipitation is 46.7 inches, with annual records showing a range from a low of 28 inches to a high of 60 inches. **Future Likelihood: Operations, Flood Prinze Zone** Climate change is projected to increase the stream flows which is expected to increase riverine flooding within existing floodplains and could expand flooding to new areas not currently in existing floodplains. In addition, in 30 years, 31.7% of properties in Lewis County will have risk of flooding with major impacts for residential and severe for commercial, infrastructure, and road assets. = **H (Probability)** There is a steady increase in percent change in the magnitude of 25-year storm ranging from an increase of precipitation that falls in the range of 7-18%. This increase indicates that Lewis County is expected to experience an increase in total precipitation of the 25-year storm. Heavier precipitation is an indicator of flooding which could affect infrastructure and operations. = H (Probability). Most airports are protected by a dike systems in events of flooding; however, flood events have occurred in the past (e.g. January 1990 flood event) which closed the Chehalis-Centralia Airport. = **H (Probability)**	**Medium**	Transportation in airports is impacted by extreme precipitation and flooding as airport closures may occur due to risky departure and landing conditions. This indicates that the magnitude of extreme precipitation and flooding to airport transportation is high as operations is halted; thus, travel, delivery of goods, medical supplies, and etc. are halted. New flight arrival and departure times will be necessary and delays should be accepted more frequently due to these weather conditions = **M (Magnitude)**	**High**	**Take Action**

35	Airports - Reduced snowpack *(Transportation)*	**Low**	**Operations:** Snowpack reduces visibility, clings to surfaces, and prompts runway maintenance procedures. Additionally, heavy snow may lead to roadways requiring more frequent maintenance. This may cause increased delays and decrease operation efficiency for airports. **Probability:** On average, snowfall in the region is not heavy, but the potential exists for extremely large amounts of occasion. The average annual snowfall is approximately 9 inches, with recorded extreme annual maximums at 45 inches. Most of the snowfall occurs in the month of January, with the monthly average at about 4.5 inches. It is also important to note that airports are sited away from mountainous areas and within UGA's. **Future Likelihood: Operations** Based on the April 1st snowpack readings, there is steady decrease in this snowpack with a decrease ranging from 68% to 97% = **L (Probability).** The April 1st snowpack is used as an indicator for the amount of stored water that becomes available during the melt season. = **L (Probability)**	**Low**	As mentioned in the probability notes, snowpack generally impacts many airport operations; however as Lewis County is projected to have a decrease of snowpack, the magnitude of snowpack impacts may be low. = **L (Magnitude)**	**Low**	**Accept Risk**
36	Airports - Wildfire *(Transportation)*	**High**	**Operations:** Wildfires will emit smoke from burning which leads to two immediate hazards: turbulence and reduced visibility. Thus, flight delays may become more frequent during wildfires as safety concerns are significantly increased. In addition to flight risk, airports impacted by wildfires may face structurally damage that may take long periods of reconstruction; therefore, lowering operation efficiency and general operations. **Probability:** Wildfires occur every year in Lewis County, average of at least 10 wildfires a year (2008-2023, no record for 2022). In 2022-2023, ~6,917 acres burned comprising 85% of total acres burned since 2008 (1,207.98 acres burned 2008-2022). Large fires have been infrequent. However, airports are located in wildfire interface zones and will likely face impacts related to wildfire risks. **Future Likelihood Indicator: Location, Operations, Safety.** Climate change is projected to increase high fire danger days contributed from hotter dryer summers/east wind events and increase the likelihood of fires. County admin buildings are predominantly located in west County area which has low wildfire risk (average of less than 4,000 acres burned annually in western WA since 1984). However, Large wildfires are anticipated to occur more frequently in Lewis County - western County is predicted to experience 11-12 additional high fire danger days each year (by late century). Eastern county will have a 30% chance each year that there will be the climate and fuel conditions conducive to wildfires (by mid-century). Larger east county areas will have a 30-50% of conducive wildfire conditions each year (by late century). **= H (Probability)**	**High**	The magnitude of wildfires could burn down sections or all of an airport which would halt operations and repairs would need to begin as soon as possible. Repairs may need various resources and time which delays operation of airports. This may impact the travel of many people and supplies. In addition, as airports are located in wildfire interface zones, the magnitude of wildfire risks on the operations of airports may be significant. = **H (Magnitude)**	**High**	**Take Action**
37	Railways - Extreme Precipitation & Flooding	**High**	**Structural integrity and Operations:** Extreme precipitation can usually lead to flooding. Extreme precipitation can destabilize terrain, resulting in dirt or rocks on the tracks. Further, events of flooding can wash away railway tracks or even push train cars off the rails. Flooding may also lead to damage to rail infrastructure which can take days, weeks, or months to repair based on severity. Railway mitigation methods to prevent hazard damage include relocating ralline, elevating rails, or decommissioning rail usage; however, these methods are all costly and labor intensive. **Probability:** According to the Lewis County GIS Web Map, there are multiple flood zones near Centralia, Chehalis, and Napavine. However, flooding and drainage problems from heavy storms can happen anywhere in Lewis County. The major floods are caused by the overflow of the Chehalis and Newaukum Rivers and Coal, Salzer, and Dillenbaugh Creeks, as well as the Cowlitz and Tilton Rivers. The earliest documented flood on the Chehalis River occurred in December 1887 and since then, there have been major floods every 10-15 years. There have been 13 Presidential Declarations for flooding in the County between 1971 and 2012. In terms of precipitation, the total average annual precipitation ranges from 47 inches at Centralia to 62 inches at Packwood. On the average, annual precipitation is 46.7 inches, with annual records showing a range from a low of 28 inches to a high of 60 inches. **Future Likelihood: Operations, Flood Pronze Zone** Climate change is projected to increase the stream flows which is expected to increase riverine flooding within existing floodplains and could expand flooding to new areas not currently in existing floodplains. In addition, in 30 years, 31.7% of properties in Lewis County will have risk of flooding with major impacts for residential and severe for commercial, infrastructure, and road assets. = **H (Probability)** There is a steady increase in percent change in the magnitude of 25-year storm ranging from an increase of precipitation that falls in the range of 7-18%. This increase indicates that Lewis County is expected to experience an increase in total precipitation of the 25-year storm. Heavier precipitation is an indicator of flooding which could affect infrastructure and operations. = H (Probability). A main railroad line (Burlington Northern Railway) crosses the floodplain from east to west on the Chehalis River near Chehalis. The tracks are subject to damage at various locations during large floods. = **H (Probability)**	**High**	The magnitude of extreme precipitation and flooding on railways would demonstrate a high magnitude as railways are located on a floodplain. This indicates a high potential for damaged rail infrastructure. This indicates that operations of this railroad will be severely impacted which could lead to long closure times for repair and return of functionality. = **H (Magnitude).**	**High**	**Take Action**

38	Railways - Reduced snowpack	**Low**	**Operations:** Snowpack has generally (either direct snowfall or drifting) can prevent rail operations from performing efficiently or at all. This is because the quantity of snowpack can be too much for the train to punch its way through without derailing or coming to other issues. On the contrary, reduced snowpack would not pose as a risk for trains to travel on railways effectively as blockages are unlikely. **Probability:** On average, snowfall in the region is not heavy, but the potential exists for extremely large amounts of occasion. The average annual snowfall is approximately 9 inches, with recorded extreme annual maximums at 45 inches. Most of the snowfall occurs in the month of January, with the monthly average at about 4.5 inches. As snowpack is anticipated to reduce, operations of railways are not anticipated to face increased closures and/or delays. Further, there is a low probability of reduced snowpack risk to railways based on data mentioned above. Further, existing railways are also not located in avalanche-prone zones.**= L (Probability)** **Future Likelihood: Operations** Based on the April 1st snowpack readings, there is steady decrease in this snowpack with a decrease ranging from 68% to 97%**= L (Probability).** The April 1st snowpack is used as an indicator for the amount of stored water that becomes available during the melt season. As there is an increased percentage of snowpack decrease, operations are significantly anticipated to have fewer operational issues. **= L (Probability)**	**Low**	The magnitude of reduced snowpack on railways is low as railways will be able to operate under "normal" conditions as reduced snowpack would not likely increase blockages. = **L (Magnitude)**	**Low**	**Accept Risk**
39	Railways - Wildfire	**High**	**Operations:** Wildfires pose track damage to railways as stock damage and derailments, power and communication disruptions, and destabilization of track beds increase as soil erosion increases. Wildfire increases the potential for accelerated erosion primarily through its effects on vegetation and soil. Therefore, with damaged railways, operations may be delayed heavily for reconstruction. **Probability:** Wildfires occur every year in Lewis County, average of at least 10 wildfires a year (2008-2023, no record for 2022). In 2022-2023, ~6,917 acres burned comprising 85% of total acres burned since 2008 (1,207.98 acres burned 2008-2022). Large fires have been infrequent. Portions of rail lines are located in wildfire interface zones, particularly in northern County; thus, based on historically wildfire data and existing conditions, there is high probability of wildfire risk for railways. = **H (Probability)** **Future Likelihood Indicator: Operations, Structural Integrity** Climate change is projected to increase high fire danger days contributed from hotter dryer summers/east wind events and increase the likelihood of fires. County admin buildings are predominantly located in west County area which has low wildfire risk (average of less than 4,000 acres burned annually in western WA since 1984). However, Large wildfires are anticipated to occur more frequently in Lewis County - western County is predicted to experience 11-12 additional high fire danger days each year (by late century). Eastern county will have a 30% chance each year that there will be the climate and fuel conditions conducive to wildfires (by mid-century). Larger east county areas will have a 30-50% of conducive wildfire conditions each year (by late century). Intense heat and flames can damage railway tracks and signal systems, forcing service interruptions. Further, the Industrial Access Transportation Study in northern County where portions of existing rail lines are located is taking place for future improvements. **= H (Probability)**	**High**	The magnitude of wildfire on railways focuses on service/operations being halted. Wildfires have historically damaged railway tracks and signal systems which compromise smooth operations in terms of travel and communications. Further, as mentioned there are a lot of existing and future rail in wildfire zones= **H (Magnitude)**	**High**	**Take Action**

40	Solid Waste transfer station - Extreme Precipitation *(Waste Mgmt)*	**Low**	**Pollution:** Extreme precipitation can potentially lead to flooding of a solid waste transfer station. Flooding of a solid waste transfer station may increase the volume of leachate generated by raising the percolation and piezometric head of the leachate, which will cause the leachate leakage to increase. Surges of debris from solid waste transfer stations may also increase. With increased hazard events, it is likely for an increase in disposal of weather-damaged personal property, resulting in stations having a maximum capacity which may overfill. **Probability:** According to the Lewis County GIS Web Map, there are multiple flood zones near Centralia, Chehalis, and Napavine. However, flooding and drainage problems from heavy storms can happen anywhere in Lewis County. The major floods are caused by the overflow of the Chehalis and Newaukum Rivers and Coal, Salzer, and Dillenbaugh Creeks, as well as the Cowlitz and Tilton Rivers. The earliest documented flood on the Chehalis River occurred in December 1887 and since then, there have been major floods every 10-15 years. There have been 13 Presidential Declarations for flooding in the County between 1971 and 2012. In terms of precipitation, the total average annual precipitation ranges from 47 inches at Centralia to 62 inches at Packwood. On the average, annual precipitation is 46.7 inches, with annual records showing a range from a low of 28 inches to a high of 60 inches. **Future Likelihood: <u>Operations, Contaminants</u>** Climate change is projected to increase the stream flows which is expected to increase riverine flooding within existing floodplains and could expand flooding to new areas not currently in existing floodplains. In addition, in 30 years, 31.7% of properties in Lewis County will have risk of flooding with major impacts for residential and severe for commercial, infrastructure, and road assets. = **L (Probability)** There is a steady increase in percent change in the magnitude of 25-year storm ranging from an increase of precipitation that falls in the range of 7-18%. This increase indicates that Lewis County is expected to experience an increase in total precipitation of the 25-year storm. Heavier precipitation is an indicator of flooding which could affect infrastructure and operations. Solid waste facilities in flood prone areas may increase the risk of unwanted waste distribution and increased lag time of solid waste collection times =**L (Probability).**	**Medium**	Located in low risk liquefaction area. Decreased capacity due to waste generated from other storm events which lowers the risk of solid waste contaminants= **M (Magnitude).** Transfer stations allow waste to be temporarily housed in facilities before being transported to landfills out of the County, stations have a maximum capacity which may overfill due to post hazard event clean up and hinder smooth operations = **M (Magnitude).**	**Low**	**Accept Risk**
41	Solid Waste transfer station - Flooding *(Waste Mgmt)*	**Low**	**Pollution:** Flooding of a solid waste transfer station may increase the volume of leachate generated by raising the percolation and piezometric head of the leachate, which will cause the leachate leakage to increase. Surges of debris from transfer stations may also increase. With increased hazard events, it is likely for an increase in disposal of weather-damaged personal property, resulting in stations having a maximum capacity which may overfill. Transfer stations also allow waste to be temporarily houses in facilities before being transported to landfills out of the County; however, as mentioned, stations have a maximum capacity. **Probability:** According to the Lewis County GIS Web Map, there are multiple flood zones near Centralia, Chehalis, and Napavine. However, flooding and drainage problems from heavy storms can happen anywhere in Lewis County. The major floods are caused by the overflow of the Chehalis and Newaukum Rivers and Coal, Salzer, and Dillenbaugh Creeks, as well as the Cowlitz and Tilton Rivers. The earliest documented flood on the Chehalis River occurred in December 1887 and since then, there have been major floods every 10-15 years. There have been 13 Presidential Declarations for flooding in the County between 1971 and 2012. In terms of precipitation, the total average annual precipitation ranges from 47 inches at Centralia to 62 inches at Packwood. On the average, annual precipitation is 46.7 inches, with annual records showing a range from a low of 28 inches to a high of 60 inches. **Future Likelihood: Operations, Flood Pronze Zone, Contaminants** Climate change is projected to increase the stream flows which is expected to increase riverine flooding within existing floodplains and could expand flooding to new areas not currently in existing floodplains. In addition, in 30 years, 31.7% of properties in Lewis County will have risk of flooding with major impacts for residential and severe for commercial, infrastructure, and road assets. = **L (Probability)** There is a steady increase in percent change in the magnitude of 25-year storm ranging from an increase of precipitation that falls in the range of 7-18%. This increase indicates that Lewis County is expected to experience an increase in total precipitation of the 25-year storm. Heavier precipitation is an indicator of flooding which could affect infrastructure and operations. Solid waste facilities in flood prone areas may increase the risk of unwanted waste distribution = **L (Probability).**	**Medium**	Not located in 100-year FEMA floodplain. Decreased capacity and contaminant risk due to waste generated from other storm events = **L (Magnitude). T**ransfer stations allow waste to be temporarily housed in facilities before being transported to landfills out of the County, stations have a maximum capacity which may go over due to post hazard event clean up and inhibit effective operations **= M (Magnitude).**	**Low**	**Accept Risk**

42	Solid Waste transfer station - Wildfire *(Waste Mgmt)*	**Low**	**Toxic contaminants:** Wildfire at solid waste transfer stations threaten the environment there through toxic pollutants emitted into the air, water, and soil. Further, wildfires that spread to solid waste transfer stations pose a risk to firefighters and civilians who are exposed to the hazardous chemical compounds they emit. The degree of risk is dependent on the contents buried in the landfill, the geography of the landfill, and the nature of the fire. For instance, in increased hazard events, individuals may increase disposal of weather-damaged personal property; thus, resulting in transfer stations having a maximum capacity which may overfill and exacerbate impacts. It is also important to note, transfer stations allow waste to be temporarily housed in facilities before being transported to landfills out of the County. **Probability:** According to the Lewis County GIS Web Map, there are multiple flood zones near Centralia, Chehalis, and Napavine. However, flooding and drainage problems from heavy storms can happen anywhere in Lewis County. The major floods are caused by the overflow of the Chehalis and Newaukum Rivers and Coal, Salzer, and Dillenbaugh Creeks, as well as the Cowlitz and Tilton Rivers. The earliest documented flood on the Chehalis River occurred in December 1887 and since then, there have been major floods every 10-15 years. There have been 13 Presidential Declarations for flooding in the County between 1971 and 2012. In terms of precipitation, the total average annual precipitation ranges from 47 inches at Centralia to 62 inches at Packwood. On the average, annual precipitation is 46.7 inches, with annual records showing a range from a low of 28 inches to a high of 60 inches. **Future Likelihood: Operations, Flood Pronze Zone, Contaminants** Climate change is projected to increase the stream flows which is expected to increase riverine flooding within existing floodplains and could expand flooding to new areas not currently in existing floodplains. In addition, in 30 years, 31.7% of properties in Lewis County will have risk of flooding with major impacts for residential and severe for commercial, infrastructure, and road assets. = **L (Probability)** There is a steady increase in percent change in the magnitude of 25-year storm ranging from an increase of precipitation that falls in the range of 7-18%. This increase indicates that Lewis County is expected to experience an increase in total precipitation of the 25-year storm. Heavier precipitation is an indicator of flooding which could affect infrastructure and operations. Solid waste facilities in flood prone areas may increase the risk of unwanted waste distribution = **L (Probability).**	**Medium**	Not located in wildfire interface zone. Decreased capacity and contaminant risk due to waste generated from other hazard events **= M (Magnitude).** Transfer stations allow waste to be temporarily housed in facilities before being transported to landfills out of the County, stations have a maximum capacity which may go over and impact operation schedules due to post hazard event clean up **= M (Magnitude).**	**Low**	**Accept Risk**
43	Sewer infrastructure - Extreme Precipitation *(Waste Mgmt)*	**Low**	**Structural integrity and treatment quality:** Extreme precipitation influences the effects of flooding. As such, flooding or surge can damage sewer infrastructure and destroy process equipment, communications controls, field equipment, and important data records while blocking access to the plant. These impacts will result in decreased treatment quality as process equipment may be damaged; thus lowering, process efficiency and treated effluent quality. Adaptation for these impacts may include other treatment methods or temporary shutdown of facilities. **Probability:** According to the Lewis County GIS Web Map, there are multiple flood zones near Centralia, Chehalis, and Napavine. However, flooding and drainage problems from heavy storms can happen anywhere in Lewis County. The major floods are caused by the overflow of the Chehalis and Newaukum Rivers and Coal, Salzer, and Dillenbaugh Creeks, as well as the Cowlitz and Tilton Rivers. The earliest documented flood on the Chehalis River occurred in December 1887 and since then, there have been major floods every 10-15 years. There have been 13 Presidential Declarations for flooding in the County between 1971 and 2012. In terms of precipitation, the total average annual precipitation ranges from 47 inches at Centralia to 62 inches at Packwood. On the average, annual precipitation is 46.7 inches, with annual records showing a range from a low of 28 inches to a high of 60 inches. **Future Likelihood: Operations, Structures, Contaminants, Health** Climate change is projected to increase the stream flows which is expected to increase riverine flooding within existing floodplains and could expand flooding to new areas not currently in existing floodplains. In addition, in 30 years, 31.7% of properties in Lewis County will have risk of flooding with major impacts for residential and severe for commercial, infrastructure, and road assets. = **L (Probability)** There is a steady increase in percent change in the magnitude of 25-year storm ranging from an increase of precipitation that falls in the range of 7-18%. This increase indicates that Lewis County is expected to experience an increase in total precipitation of the 25-year storm. Heavier precipitation is an indicator of flooding which could affect infrastructure and operations. Older sewer infrastructure may not be upgraded with larger inflow and outflow volumes which may impact operations. = **L (Probability).**	**Medium**	Sewer infrastructures are normally built to handle 25, 50, 100-year storm volumes; however, older treatment plants may have decreased in efficiency and structural integrity; as such, a higher magnitude of damage may affect older plants and plants that are near floodplains. Older plants may need to be decommissioned or undergo construction for plant upgrades to decrease the magnitude of impacts from extreme precipitation. = **M (Magnitude)** In addition to impacts to operations and structural integrity, chemical contaminants utilized in different processes of sewer infrastructure may be leaked due to the extreme precipitation and impact waterways. = **M (Magnitude).**	**Low**	**Accept Risk**

44	Sewer infrastructure - Flooding *(Waste Mgmt)*	**Low**	**Structural integrity and treatment quality:** Flooding or surge can damage sewer infrastructure and destroy process equipment, communications controls, field equipment, and important data records while blocking access to the plant. These impacts will result in decreased treatment quality as process equipment may be damaged; thus lowering, process efficiency and treated effluent quality. Adaptation for these impacts may include other treatment methods or temporary shutdown of facilities. **Probability**: According to the Lewis County GIS Web Map, there are multiple flood zones near Centralia, Chehalis, and Napavine. However, flooding and drainage problems from heavy storms can happen throughout Lewis County. The major floods are caused by the overflow of the Chehalis and Newaukum Rivers and Coal, Salzer, and Dillenbaugh Creeks, as well as the Cowlitz and Tilton Rivers. The earliest documented flood on the Chehalis River occurred in December 1887 and since then, there have been major floods every 10-15 years. There have been 13 Presidential Declarations for flooding in the County between 1971 and 2012. In terms of precipitation, the total average annual precipitation ranges from 47 inches at Centralia to 62 inches at Packwood. On the average, annual precipitation is 46.7 inches, with annual records showing a range from a low of 28 inches to a high of 60 inches. Exiting facilities are located in a 1% annual chance climate change flood zone; thus, there is a low probability of risk for sewer infrastructure from flooding. **Future Likelihood: Operations, Flood Prone Zone, Contaminants, Health**. Climate change is projected to increase the streamflows which is expected to increase riverine flooding within existing floodplains and could expand flooding to new areas not currently in existing floodplains. In addition, by mid-century, 31.7% of properties in Lewis County will have risk of flooding with major impacts for residential and severe for commercial, infrastructure, and road assets. =**L (Probability)** Most in County rely on private septic systems. There is a steady increase projected in percent change in the magnitude of 25-year storm ranging from an increase of precipitation that falls in the range of 7-18%. This increase indicates that Lewis County is expected to experience an increase in total precipitation of the 25-year storm. Heavier precipitation is an indicator of flooding which could affect infrastructure and operations. Centralia's new wastewater treatment plant on Goodrich road is out of the 100-year floodplain and should remain operable through any floods up to and including the 100-year event. =**L (Probability).**	**Medium**	Sewer infrastructures are normally built to handle 25, 50, 100-year storm volumes; however, older treatment plants may have decreased in efficiency and structural integrity; as such, a higher magnitude of damage may affect older plants and plants that are near floodplains. Flooding of sewer infrastructure may impact inflow and outflow of sewage as some sewer infrastructures may not be built to handle extremely large volumes of sewage. Large influxes of sewage may lead to overflow of systems and sewage spillage which would impact waterways that lead to residential, commercial, and industrial pipes. = **M (Magnitude).**	**Low**	**Accept Risk**
45	Sewer infrastructure - Wildfire *(Waste Mgmt)*	**Low**	**Water contamination and structural integrity:** Wildfires may disrupt sewage infrastructure with impacts such as: direct structural damage to the infrastructure/facilities due to the fire or firefighting activities, loss of power, debris/contaminants in waste stream, and blockage and dirtying of pumps. It is also important to note, backup protocols for sewer infrastructure may not include climate hazard impacts; thus, new protocols, permits, and infrastructure upgrades may be costly and labor intensive. **Probability:** Wildfires occur every year in Lewis County, average of at least 10 wildfires a year (2008-2023, no record for 2022). In 2022-2023, ~6,917 acres burned comprising 85% of total acres burned since 2008 (1,207.98 acres burned 2008-2022). Large fires have been infrequent. Additionally, as most sewer infrastructure are not are located in wildfire intermix zones similar to the rest of Lewis county **Future Likelihood Indicator: Operations, Structural Integrity** Climate change is projected to increase high fire danger days contributed from hotter dryer summers/east wind events and increase the likelihood of fires. County admin buildings are predominantly located in west County area which has low wildfire risk (average of less than 4,000 acres burned annually in western WA since 1984). However, Large wildfires are anticipated to occur more frequently in Lewis County - western County is predicted to experience 11-12 additional high fire danger days each year (by late century). Eastern county will have a 30% chance each year that there will be the climate and fuel conditions conducive to wildfires (by mid century). Larger east county areas will have a 30-50% of conducive wildfire conditions each year (by late century). =**L (Probability)**	**Medium**	The magnitude of wildfire impacts on sewer infrastructure may be detrimental as operations may significantly halt due to operational malfunctions as described in the probability notes section. However, as most sewer infrastructure is not located in wildfire interface zone, the magnitude of these impacts are decreased significantly. Further, it is located in a wildfire intermix zone, similar to most County areas. **= M (Magnitude)**	**Low**	**Accept Risk**

46	Dump stations - Extreme Precipitation *(Waste Mgmt)*	**Low**	**Pollution:** Extreme precipitation can potentially lead to flooding of a dump station. Flooding of a dump station may increase the volume of leachate generated by raising the percolation and piezometric head of the leachate, which will cause the leachate leakage to increase. In addition, erosion from historic dump stations pose a greater threat than leaching. Surges of debris from dump stations may also increase. With increased hazard events, it is likely for an increase in disposal of weather-damaged personal property, resulting in stations having a maximum capacity which may overfill. **Probability:** According to the Lewis County GIS Web Map, there are multiple flood zones near Centralia, Chehalis, and Napavine. However, flooding and drainage problems from heavy storms can happen anywhere in Lewis County. The major floods are caused by the overflow of the Chehalis and Newaukum Rivers and Coal, Salzer, and Dillenbaugh Creeks, as well as the Cowlitz and Tilton Rivers. The earliest documented flood on the Chehalis River occurred in December 1887 and since then, there have been major floods every 10-15 years. There have been 13 Presidential Declarations for flooding in the County between 1971 and 2012. In terms of precipitation, the total average annual precipitation ranges from 47 inches at Centralia to 62 inches at Packwood. On the average, annual precipitation is 46.7 inches, with annual records showing a range from a low of 28 inches to a high of 60 inches. **Future Likelihood: <u>Physical Design, Operations</u>** Climate change is projected to increase the streamflows which is expected to increase riverine flooding within existing floodplains and could expand flooding to new areas not currently in existing floodplains. In addition, in 30 years, 31.7% of properties in Lewis County will have risk of flooding with major impacts for residential and severe for commercial, infrastructure, and road assets. =**L (Probability)** There is a steady increase in percent change in the magnitude of 25-year storm ranging from an increase of precipitation that falls in the range of 7-18%. This increase indicates that Lewis County is expected to experience an increase in total precipitation of the 25-year storm. Heavier precipitation is an indicator of flooding which could affect infrastructure and operations. =**L (Probability).**	**Medium**	The magnitude of impacts would concentrate on the level of pollution that occurs; resulting in increased cleanups, equipment improvements, and operation costs. Items are "dropped off" by individuals at transfer stations/Packwood Community drop off center. Located in low risk liquefaction area**. = M (Magnitude).** Transfer stations allow waste to be temporarily housed in facilities before being transported to landfills out of the County. Increased hazard events, individuals may increase disposal of weather-damaged personal property, resulting in stations having a maximum capacity which may overfill and lead to a decrease in operations/efficiency **= M (Magnitude).**	**Low**	**Accept Risk**
47	Dump stations - Flooding *(Waste Mgmt)*	**Low**	**Pollution:** Flooding of a dump station may increase the volume of leachate generated by raising the percolation and piezometric head of the leachate, which will cause the leachate leakage to increase. In addition, erosion from historic dump stations pose a greater threat than leaching. Surges of debris from dump stations may also increase. With increased hazard events, it is likely for an increase in disposal of weather-damaged personal property, resulting in stations having a maximum capacity which may overfill. **Probability:** According to the Lewis County GIS Web Map, there are multiple flood zones near Centralia, Chehalis, and Napavine. However, flooding and drainage problems from heavy storms can happen anywhere in Lewis County. The major floods are caused by the overflow of the Chehalis and Newaukum Rivers and Coal, Salzer, and Dillenbaugh Creeks, as well as the Cowlitz and Tilton Rivers. The earliest documented flood on the Chehalis River occurred in December 1887 and since then, there have been major floods every 10-15 years. There have been 13 Presidential Declarations for flooding in the County between 1971 and 2012. In terms of precipitation, the total average annual precipitation ranges from 47 inches at Centralia to 62 inches at Packwood. On the average, annual precipitation is 46.7 inches, with annual records showing a range from a low of 28 inches to a high of 60 inches. However, dump stations in Lewis County are not located in a 100-year FEMA floodplain; thus, the probability of flood events impacting dump stations is low. **Future Likelihood: <u>Operations, Flood Pronze Zone, Structure</u>** Climate change is projected to increase the streamflows which is expected to increase riverine flooding within existing floodplains and could expand flooding to new areas not currently in existing floodplains. In addition, in 30 years, 31.7% of properties in Lewis County will have risk of flooding with major impacts for residential and severe for commercial, infrastructure, and road assets. =**L (Probability)** In addition, as flooding is an impact influenced by extreme precipitation, there is a steady increase in percent change in the magnitude of 25-year storm ranging from an increase of precipitation that falls in the range of 7-18%. This increase indicates that Lewis County is expected to experience an increase in total precipitation of the 25-year storm. Heavier precipitation is an indicator of flooding which could affect infrastructure and operations. Solid waste facilities in flood prone areas may increase the risk of unwanted waste distribution = **L (Probability).**	**Low**	The magnitude of impacts would concentrate on the level of pollution that occurs; resulting in increased cleanups, equipment improvements, and operation costs. However, the magnitude of impacts from flooding to dump stations is low as dump stations are not located in 100-year FEMA floodplain and are in a low risk liquefaction area. **= L (Magnitude).**	**Low**	**Accept Risk**

48	Dump stations - Wildfire *(Waste Mgmt)*	**Low**	**Toxic contaminants:** Wildfire at dump stations threaten the environment there through toxic pollutants emitted into the air, water, and soil. Further, wildfires that spread to dump stations pose a risk to firefighters and civilians who are exposed to the hazardous chemical compounds they emit. The degree of risk is dependent on the contents buried in the landfill, the geography of the landfill, and the nature of the fire. For instance, in increased hazard events, individuals may increase disposal of weather-damaged personal property; thus, resulting in stations having a maximum capacity which may overfill and exacerbate impacts. **Probability:** Wildfires occur every year in Lewis County, average of at least 10 wildfires a year (2008-2023, no record for 2022). In 2022-2023, ~6,917 acres burned comprising 85% of total acres burned since 2008 (1,207.98 acres burned 2008-2022). Large fires have been infrequent and dump stations are not located in fire interface zone. **Future Likelihood Indicator: Operations, Structural Integrity, Fire Prone Area** Climate change is projected to increase high fire danger days contributed from hotter dryer summers/east wind events and increase the likelihood of fires. County admin buildings are predominantly located in west County area which has low wildfire risk (average of less than 4,000 acres burned annually in western WA since 1984). However, Large wildfires are anticipated to occur more frequently in Lewis County - western County is predicted to experience 11-12 additional high fire danger days each year (by late century). Eastern county will have a 30% chance each year that there will be the climate and fuel conditions conducive to wildfires (by mid century). Larger east county areas will have a 30-50% of conducive wildfire conditions each year (by late century). However, as mentioned above, dump stations are generally not located in fire interface zone(s)= **L (Probability)**	**Low**	Toxic contaminants emitted from wildfires that have spread to dump stations pose health, environmental, and economical impacts. These impacts may drastically influence the operations of dump stations; However, as stated, dump stations in Lewis County are not located in wildfire interface zone and the magnitude of these impacts are low = **L (Magnitude).**	**Low**	**Accept Risk**
49	Water infrastructure - Reduced snowpack *(Water Resources)*	**High**	**Water scarcity:** Reduced snowpack would lead to a decreased water supply for water infrastructure. A decreased supply of water for treatment can have a pronounced effect on process efficiency as well as associated operational costs. It is important to note that design standards set in Title 13 of the Lewis County municipal code, states water mains are to be equipped with backflow prevention valves. **Probability:** On average, snowfall in the region is not heavy, but the potential exists for extremely large amounts on occasion. The average annual snowfall is approximately 9 inches, with recorded extreme annual maximums at 45 inches. Most of the snowfall occurs in the month of January, with the monthly average at about 4.5 inches. **Future Likelihood: Operations** Based on the April 1st snowpack readings, there is steady decrease in this snowpack with a decrease ranging from 68% to 97% = **H (Probability)**. The April 1st snowpack is used as an indicator for the amount of stored water that becomes available during the melt season, indicating decreased water storage capabilities Countywide. =**H (Probability).**	**High**	Reduced process efficiency may lead to reduced water quality; thus, can lead to reduced water which can lead to serious effects on aquatic organisms and plants, as well as potential human costs. The magnitude of impact regarding reduced snowpack to water infrastructure focuses on reduced process efficiency and operational costs. As there is a high probability of reduced snowpack affecting water infrastructure, the magnitude of decreased process efficiency and operation costs is heightened. Treated water faces a higher risk of being treated improperly; thus, impacting the subjects listed above. = **H (Magnitude)**	**High**	**Take Action**

50	Water infrastructure - Wildfire *(Water Resources)*	**Medium**	**Water contamination and structural integrity:** Wildfires have been historically known to compromise water quality during active burning and for months and years after the fire has been extinguished. Water infrastructures may face increased treatment costs, need for alternative supplies, and potentially diminished reservoir capacities. Extensive water system damage and related water quality contamination to water infrastructure may significantly impact the operations of the system; thus, leaving many businesses, residents, etc. loss of water for long periods of time. It is also important to note that many design standards account for limiting contamination, but it does not account for climate hazards. **Probability:** Wildfires occur every year in Lewis County, average of at least 10 wildfires a year (2008-2023, no record for 2022). In 2022-2023, ~6,917 acres burned comprising 85% of total acres burned since 2008 (1,207.98 acres burned 2008-2022). Large fires have been infrequent. **Future Likelihood Indicator: <u>Operations, Structural Integrity, Contaminants</u>** Climate change is projected to increase high fire danger days contributed from hotter dryer summers/east wind events and increase the likelihood of fires. County admin buildings are predominantly located in west County area which has low wildfire risk (average of less than 4,000 acres burned annually in western WA since 1984). However, Large wildfires are anticipated to occur more frequently in Lewis County - western County is predicted to experience 11-12 additional high fire danger days each year (by late century). Eastern county will have a 30% chance each year that there will be the climate and fuel conditions conducive to wildfires (by mid century). Larger east county areas will have a 30-50% of conducive wildfire conditions each year (by late century). =**M (Probability)**	**High**	Debris (soot) from wildfires may compromise treatment of water and expediate filter deterioration in water treatment processes. Further, compromised treatment of water may impact outflow of water which may contaminate groundwater aquifers and nearby waterways. = **H (Magnitude).**	**High**	**Take Action**

51	Civic Centers - Extreme Precipitation *(Zoning & Development)*	**Low**	**Structural damage:** Civic centers may face increased problems regarding building stormwater management systems in place, vegetation (e.g. mold) issues, and roof damage due to extreme precipitation. In addition, with extreme precipitation, there is an increased potential of flooding. In civic centers, sheet flooding may cause structural damage to the buildings such as loose or buckling floors and foundation cracks. These impacts may significantly affect civic center operations. It is also important to note that many civic centers with appropriate facilities may act as temporary shelters for extreme hazard events, requires collaboration with American Red Cross, NGOs, faith based organizations, Salvation Army, and law enforcement/other County departments. **Probability:** According to the Lewis County GIS Web Map, there are multiple flood zones near Centralia, Chehalis, and Napavine. However, flooding and drainage problems from heavy storms can happen anywhere in Lewis County. The major floods are caused by the overflow of the Chehalis and Newaukum Rivers and Coal, Salzer, and Dillenbaugh Creeks, as well as the Cowlitz and Tilton Rivers. The earliest documented flood on the Chehalis River occurred in December 1887 and since then, there have been major floods every 10-15 years. There have been 13 Presidential Declarations for flooding in the County between 1971 and 2012. In terms of precipitation, the total average annual precipitation ranges from 47 inches at Centralia to 62 inches at Packwood. On the average, annual precipitation is 46.7 inches, with annual records showing a range from a low of 28 inches to a high of 60 inches. **Future Likelihood: <u>Vulnerable Groups, Population Density, Operations</u>** Climate change is projected to increase the streamflows which is expected to increase riverine flooding within existing floodplains and could expand flooding to new areas not currently in existing floodplains. In addition, in 30 years, 31.7% of properties in Lewis County will have risk of flooding with major impacts for residential and severe for commercial, infrastructure, and road assets. = **L (Probability)** There is a steady increase in percent change in the magnitude of 25-year storm ranging from an increase of precipitation that falls in the range of 7-18%. This increase indicates that Lewis County is expected to experience an increase in total precipitation of the 25-year storm. Heavier precipitation is an indicator of flooding which could affect infrastructure and operations. **= L (Probability).**	**Medium**	Civic centers include recreation centers with large concentrations of people who may be exposed to hazard events and include vulnerable individuals i.e., children, elderly, special needs, etc. Many communities may utilize civic centers as part of their daily lives; however, extreme precipitation may hinder their ability to use these centers. Further, as described with increased extreme precipitation, the effects of structural damage to civic centers is greater; thus, further impacting the operations of these buildings as reconstruction would potentially take extended periods of time. = **M (Magnitude).**	**Low**	**Accept Risk**
52	Civic Centers - Flooding *(Zoning & Development)*	**Medium**	**Structural Damage:** Civic centers may face increased problems regarding building stormwater management systems in place and vegetation (e.g. mold) issues. Further, sheet flooding may cause structural damage to the buildings such as loose or buckling floors and foundation cracks. These impacts may significantly affect the structural aspects of civic centers; thus, a secondary impact of impacting the operations of civic centers. It is also important to note that many civic centers have been designated as evacuation shelters (Centralia College, Red Cross, Morton Hospital, Providence Hospital to name a few). **Probability:** According to the Lewis County GIS Web Map, there are multiple flood zones near Centralia, Chehalis, and Napavine. However, flooding and drainage problems from heavy storms can happen anywhere in Lewis County. The major floods are caused by the overflow of the Chehalis and Newaukum Rivers and Coal, Salzer, and Dillenbaugh Creeks, as well as the Cowlitz and Tilton Rivers. The earliest documented flood on the Chehalis River occurred in December 1887 and since then, there have been major floods every 10-15 years. There have been 13 Presidential Declarations for flooding in the County between 1971 and 2012. **Future Likelihood: <u>Operations, Flood Pronze Zone, Structure</u>** Climate change is projected to increase the streamflows which is expected to increase riverine flooding within existing floodplains and could expand flooding to new areas not currently in existing floodplains. In addition, in 30 years, 31.7% of properties in Lewis County will have risk of flooding with major impacts for residential and severe for commercial, infrastructure, and road assets. = **M (Probability)**	**Medium**	Civic centers located thru-out County, and may be flooded in unincorporated City-adjacent areas/UGAs. Fixed buildings/civic centers located in 100-year FEMA floodplains would experience peak streamflows resulting in loss of building functions and services and possibly reconstruction. Civic centers not located in floodplain zones would be able to resume operations sooner than civic centers that are located in floodplain zones as structural damages may not be as significant as reconstruction periods are much shorter. However, civic centers located on floodplain zones may face increased structural damage; thus, will need to undergo longer periods of reconstruction, halting operations. **= M (Magnitude).**	**Medium**	**Take Action**

53	Civic Centers - Reduced snowpack *(Zoning & Development)*	**High**	**Water scarcity:** Reduced snowpack indicates changes in streamflows; thus, water supply that may be diverted for use in civic centers. For instance, civic centers need water supply for on-site facilities, recreational uses, sewage flow, etc. Reduced water supply could potentially pose restrictions on the water budget for civic centers to conserve supply. It is also important to note that many civic centers have been designated as evacuation shelters (Centralia College, Red Cross, Morton Hospital, Providence Hospital to name a few). **Probability:** On average, snowfall in the region is not heavy, but the potential exists for extremely large amounts of occasion. The average annual snowfall is approximately 9 inches, with recorded extreme annual maximums at 45 inches. Most of the snowfall occurs in the month of January, with the monthly average at about 4.5 inches. **Future Likelihood: <u>Operations</u>** The April 1st snowpack is used as an indicator for the amount of stored water that becomes available during the melt season. Based on the April 1st snowpack readings, there is steady decrease in this snowpack with a decrease ranging from 68% to 97% =**H (Probability).** Based on the projection, there is a high probability of reduced snowpack; thus, water scarcity is more likely to occur and impact the operations of civic centers located in Lewis County.	**Medium**	The magnitude of reduced snowpack on civic centers would focus on the operational uses of civic centers. Water uses of civic centers are diverted into many purposes. Some of which include: landscape irrigation, fire sprinkler systems, toilet flushing, HVAC cooling, etc. As there is a high probability of reduced snowpack occurring for Lewis County, the magnitude of these activities being halted is a medium as some activities may not be necessary (e.g., landscape irrigation) for the full functionality of civic centers. However, activities such as HVAC cooling and fire sprinkler systems cannot be removed from the operations of a civic center. = **M (Magnitude)**	**High**	**Take Action**
54	Civic Centers - Wildfire *(Zoning & Development)*	**Medium**	**Probability:** Wildfires occur every year in Lewis County, average of at least 10 wildfires a year (2008-2023, no record for 2022). In 2022-2023, ~6,917 acres burned comprising 85% of total acres burned since 2008 (1,207.98 acres burned 2008-2022). Large fires have been infrequent. County collaboration with fire districts to educate property owners on defensible space and other prevention methods will be more consistent. **Future Likelihood Indicator: <u>Location</u>** Climate change is projected to increase high fire danger days contributed from hotter dryer summers/east wind events and increase the likelihood of fires. County admin buildings are predominantly located in west County area which has low wildfire risk (average of less than 4,000 acres burned annually in western WA since 1984). However, Large wildfires are anticipated to occur more frequently in Lewis County - western County is predicted to experience 11-12 additional high fire danger days each year (by late century). Eastern county will have a 30% chance each year that there will be the climate and fuel conditions conducive to wildfires (by mid century). Larger east county areas will have a 30-50% of conducive wildfire conditions each year (by late century). =**M (Probability)**	**Medium**	UGAs located in wildfire interface zones expose fixed buildings/civic centers to wildfire risk. Would result in complete loss of building functions and services, reconstruction needed **= M (Magnitude).**	**Medium**	**Take Action**

55	Colleges - Extreme Precipitation & Flooding	**Low**	**Structural damage:** College buildings may face increased problems regarding building stormwater management systems in place, vegetation (e.g. mold) issues, and roof damage due to extreme precipitation. In addition, with extreme precipitation, there is an increased potential of flooding. In college campuses, sheet flooding may cause structural damage to the buildings such as loose or buckling floors and foundation cracks. These impacts may significantly affect college operations. Campuses may act as secondary facilities for emergency operations (staging areas), but are limited to non-flood areas. **Probability:** According to the Lewis County GIS Web Map, there are multiple flood zones near Centralia, Chehalis, and Napavine. However, flooding and drainage problems from heavy storms can happen anywhere in Lewis County. College campuses such as Centralia college and WSU extension are located in incorporated areas outside of 100-year FEMA flood zone. **Future Likelihood: <u>Operations, Location</u>** Climate change is projected to increase the streamflows which is expected to increase riverine flooding within existing floodplains and could expand flooding to new areas not currently in existing floodplains. In addition, in 30 years, 31.7% of properties in Lewis County will have risk of flooding with major impacts for residential and severe for commercial, infrastructure, and road assets. However, as mentioned above, colleges within Lewis County are located outside of the 100-year FEMA flood zone.**= L (Probability)**	**Low**	As mentioned, structural damage would potentially occur with extreme precipitation and flooding. The magnitude of these hazards for instance may include long periods of time for reconstruction. This may lead to loss of revenue for colleges for a long duration of time. However, as colleges within Lewis County are outside of the 100-year FEMA flood zone, the magnitude of these effects impacting the colleges is low. = **L (Magnitude).**	**Low**	**Accept Risk**
56	Colleges - Wildfire	**Medium**	**Structural damage:** Wildfires have historically burned down structures, including homes. Structures that are impacted by wildfires may range in severity in terms of acreages destroyed and renovations required. College campuses are located in wildfire interface zones; therefore, exposing students, faculty, and staff to wildfire risk. Wildfires may significantly impact buildings even with fireproof designs i.e., defensible space, fireproof building materials, etc. **Probability:** Wildfires occur every year in Lewis County, average of at least 10 wildfires a year (2008-2023, no record for 2022). In 2022-2023, ~6,917 acres burned comprising 85% of total acres burned since 2008 (1,207.98 acres burned 2008-2022). Large fires have historically been infrequent. **= M (Probability)** **Future Likelihood Indicator: <u>Operations, Location, Structure</u>** Climate change is projected to increase high fire danger days contributed from hotter dryer summers/east wind events; thus, increasing the likelihood of fires. Additionally, large wildfires are anticipated to occur more frequently in Lewis County - western County is predicted to experience 11-12 additional high fire danger days each year (by late century). Eastern county will have a 30% chance each year that there will be the climate and fuel conditions conducive to wildfires (by mid century). Larger east county areas will have a 30-50% of conducive wildfire conditions each year (by late century). The nearest college in Lewis County is located in the North Western part of Lewis County which includes Centralia County. Despite not having many college campuses, the likelihood of wildfire impacting the college is likely based on data described above. **= M (Probability)**	**High**	College campuses such as Centralia college and WSU extension may be impacted due to wildfires that have spread onto the campus/near campus. This can lead to indefinite closures of the campus; thus, halting education. Further, wildfire would lead to immediate evacuations of the college campuses and cease of operation for a duration of days for repairs and safety check-ups. = **H (Magnitude).**	**High**	**Take Action**

3	Radio Communications - Wildfire *(Buildings & Energy)*	**Medium**	**Delayed emergency response services.** Increased likelihood of wildfires and landslides that may increase destruction of towers located throughout the County. Radio towers are sometimes made of flammable material. **Probability:** Wildfires occur every year in Lewis County, average of at least 10 wildfires a year (2008-2023, no record for 2022). In 2022-2023, ~6,917 acres burned comprising 85% of total acres burned since 2008 (1,207.98 acres burned 2008-2022). Large fires have been infrequent. **Future Likelihood: Social Assets** Climate change is projected to increase high fire danger days contributed from hotter dryer summers/east wind events and increase the likelihood of fires. Large wildfires are anticipated to occur more frequently in Lewis County - western County is predicted to experience 11-12 additional high fire danger days each year (by late century). Eastern county will have a 30% chance each year that there will be the climate and fuel conditions conducive to wildfires (by mid-century). Larger east county areas will have a 30-50% of conducive wildfire conditions each year (by late century) = M (Probability). Higher chance that radio communication towers located in high risk areas in eastern County experience wildfire damage - more remote locations.	**Low**	More than 4,244 people who live in high wildfire risk areas (Morton, Randle, Packwood, Mossyrock) can experience temporary disruption in livelihood via mandatory evacuations. This does not include tourists and absentee landlords in eastern County (near Mount Rainier) who would need effective communication and evacuation plans/knowledge. There are a variety of telecommunications providers that offer service in Lewis County. Ongoing changes in cellular and fiber technology have transformed the delivery of telecommunications, and these shifts in equipment and providers have contributed to an industry that offers several options for customers. Anticipating future characteristics given these shifting conditions is highly unlikely. Moving into the future, improvements to telecommunication infrastructure and services will play an increasingly important role especially in underserved areas. The magnitude of wildfire on radio communications may impact how underserved areas improve their telecommunications; however, there are many shifts in equipment and providers for telecommunications that could accommodate these areas **= L (Magnitude);** Indicator: Social Assets	**Low**	**Accept Risk**
4	Power Plant - Wildfire (*Buildings & Energy*)	**Low**	**Decreased power supply.** Wildfire impacts power grid (poles, towers, power lines, etc.) which may temporarily stop/shut-down power generation and distribution at power plant facilities. Plant is planned to decommission by 2025. **Probability:** Wildfires occur every year in Lewis County, average of at least 10 wildfires a year (2008-2023, no record for 2022). In 2022-2023, ~6,917 acres burned comprising 85% of total acres burned since 2008 (1,207.98 acres burned 2008-2022). Large fires have been infrequent. **Future Likelihood: Location** Climate change is projected to increase high fire danger days contributed from hotter dryer summers/east wind events and increase the likelihood of fires. Large wildfires are anticipated to occur more frequently in Lewis County - western County is predicted to experience 11-12 additional high fire danger days each year (by late century). Hydroelectrical facilities are mostly located on the western side of the County = **L (Probability).**	**Low**	Columbia Generating Station (CGS) is a nuclear project with generating capacity of 1,150 MW that is owned and operated by Energy Northwest (ENW). Based on the 2020 Integrated Resource Plan for Lewis County, under the current Bonneville Power Administration (BPA) power contract, Lewis PUD's contract high-water mark (HWM) is 115.4 aMW. The wildfire magnitude for power plants was based on the county's contracted load of nuclear power and the county's PUD fuel mix = **L (Probability).** The contracted nuclear power load compared to the generating capacity of the CGS is approximately 10% and nuclear in the PUD fuel mix is also 10.02% in 2021. Therefore, the magnitude of wildfire impacts to power plants is low as the county does not heavily rely on this power source = **L (Magnitude)**	**Low**	**Accept Risk**
5	Wind farm - Wildfire	**Low**	**Other hazard risk.** Skookumchuck wind energy farm is not highly susceptible to wildfire risk. Hires third party to suppress wildfire on mitigation forest lands, wildfire suppression strategy per state natural conservation dept. **Probability:** Wildfires occur every year in Lewis County, average of at least 10 wildfires a year (2008-2023, no record for 2022). In 2022-2023, ~6,917 acres burned comprising 85% of total acres burned since 2008 (1,207.98 acres burned 2008-2022). Large fires have been infrequent. **Future Likelihood: Location** Climate change is projected to increase high fire danger days contributed from hotter dryer summers/east wind events and increase the likelihood of fires. Large wildfires are anticipated to occur more frequently in Lewis County - western County is predicted to experience 11-12 additional high fire danger days each year (by late century). Eastern county will have a 30% chance each year that there will be the climate and fuel conditions conducive to wildfires (by mid-century). Larger east county areas will have a 30-50% of conducive wildfire conditions each year (by late century). Lewis County PUD receives wind energy from the White Creek Wind Project and the Nine Canyon Wind Project which are located in Klickitat County and ten miles southeast of Kennewick, respectively. = **L (Probability)**	**Low**	Lewis County PUD receives about 6 average MW of power through its 10% share of the White Creek Wind Project. The project is located in southeast of Lewis County and has 89 turbines with a nameplate capacity of 204 MWs. Lewis County PUD's share is approximately 6 MW of the Nine Canyon Wind Project which has 63 turbines with a installed capacity of 95.9 MW, located east of Lewis County in Kennewick. The magnitude of wildfire on wind farms rely Lewis County's reliance to wind power and the location of the wind power sources. As described, the wind farms that source Lewis County PUD are not within the county and a small MW is shared with Lewis County for both projects; therefore, magnitude is low. = **L (Magnitude)**	**Low**	**Accept Risk**

6	Natural gas pipelines - Wildfire	**Low**	**Temporary loss of service.** Pipelines run parallel to highways and large transportation corridors, exposing pipelines to wildfire risk. There may be extensive pipeline failure, taking hours, days, or weeks to repair resulting in temporary loss of service. **Probability:** Wildfires occur every year in Lewis County, average of at least 10 wildfires a year (2008-2023, no record for 2022). In 2022-2023, ~6,917 acres burned comprising 85% of total acres burned since 2008 (1,207.98 acres burned 2008-2022). Large fires have been infrequent. **Future Likelihood**: **Location** Climate change is projected to increase high fire danger days contributed from hotter dryer summers/east wind events and increase the likelihood of fires. Large wildfires are anticipated to occur more frequently in Lewis County - western County is predicted to experience 11-12 additional high fire danger days each year (by late century). All of the natural gas consumed by homes and businesses in the Pacific Northwest comes from western Canada and the U.S. Rocky Mountain States. All the majority of natural gas moves straight to the customer through network of pipelines, local gas mains, and other utility infrastructure. Northwest consumers, however, also receive a share a significant share of their natural gas supply - mainly in winter - from underground storage reservoirs. = **L (Probability)**	**Low**	As natural gas is derived from western Canada and the U.S. Rocky Mountain States, the magnitude of wildfire impacting the pipelines that deliver this natural gas is low. Further, in winter where there is a lesser likelihood of wildfire, natural gas supply from underground storage reservoirs will have a lower magnitude of effects. = **L (Magnitude)**	**Low**	**Accept Risk**
7	Historical Buildings & Sites - Flooding *(Cultural Resources & Practices)*	**Low**	**Loss of cultural identity.** Not located in flood zones; however, more frequent flooding events can reduce access to culturally important sites and resources. Limited availability of physical resource (i.e., historic wood type, etc.) for rehabilitation. **Probability:** There are certain areas of Lewis County that are in more flood areas than others. According to the Lewis County GIS Web Map, there are multiple flood zones near Centralia, Chehalis, and Napavine. However, flooding and drainage problems from heavy storms can happen anywhere in Lewis County. The major floods are caused by the overflow of the Chehalis and Newaukum Rivers and Coal, Salzer, and Dillenbaugh Creeks, as well as the Cowlitz and Tilton Rivers. Flooding is most common from October through April, when storms from the Pacific Ocean, bring intense rainfall to the area. The earliest documented flood on the Chehalis River occurred in December 1887 and since then, there have been major floods every 10-15 years. There have been 13 Presidential Declarations for flooding in the County between 1971 and 2012. **Future Likelihood: Location** Climate change is projected to increase the stream flows which is expected to increase riverine flooding within existing floodplains and could expand flooding to new areas not currently in existing floodplains. In addition, there are 17,626 properties in Lewis County that have risk of flooding over the next 30 years,. This represents 31.7% of properties in Lewis County will have risk of flooding with major impacts for residential and severe for commercial, infrastructure, and road assets. Historic buildings/cultural sites are vulnerable to flooding from dam and levee failure w/in dam inundation areas: Skookumchuck Dam* (Condition = satisfactory), Mossyrock* (Condition = unsatisfactory) and Mayfield* (Condition = unsatisfactory) Dams. Percentage of affected properties w/ historic structures is unknown. *Dams have updated Emergency Action Plan.	**Low**	Buildings constructed in mid-1800s or early 1900s, conditions may vary and are sensitive to changes due to outdated building codes. Percentage of affected properties w/ historic structures or sites are unknown. Dam failure and high streamflow magnitude affecting historic sites/buildings is likely = **L (Probability);** thus, there is a low magnitude for impacts. = **L (Magnitude).**	**Low**	**Accept Risk**
8	Historical Buildings & Sites - Wildfire *(Cultural Resources & Practices)*	**Medium**	**Loss of cultural identity.** Buildings are located in wildfire interface zones. More frequent wildfires can reduce access to culturally important sites and resources. Rehabilitation efforts may be limited due to the availability of physical resources to replace damaged historic buildings. **Probability**: Wildfires occur every year in Lewis County, average of at least 10 wildfires a year (2008-2023, no record for 2022). In 2022-2023, ~6,917 acres burned comprising 85% of total acres burned since 2008 (1,207.98 acres burned 2008-2022). Large fires have been infrequent. **Future Likelihood: Location** Climate change is projected to increase high fire danger days contributed from hotter dryer summers/east wind events and increase the likelihood of fires. Large wildfires are anticipated to occur more frequently in Lewis County - western County is predicted to experience 11-12 additional high fire danger days each year (by late century). Historical buildings are subject to increased wildfire risk.	**High**	Buildings constructed in mid-1800s or early 1900s, conditions may vary and are sensitive to changes. Most historical buildings are located in wildfire prone areas = **H (Probability);** therefore the magnitude of impacts should be highly considered for the goal of preserving historical buildings and sites.= **H (Magnitude)**	**High**	**Take Action**

9	Airports - Extreme Precipitation & Flooding *(Economic Dev)*	**Medium**	**Decreased revenue.** Some airports i.e., Packwood is located in a 100-yr FEMA floodplain where 1-3 ft. of flood can occur, warping pavement i.e., potholes, undulating surfaces, etc. and requiring more frequent airstrip maintenance. **Probability:** There are certain areas of Lewis County that are in more flood areas than others. According to the Lewis County GIS Web Map, there are multiple flood zones near Centralia, Chehalis, and Napavine. However, flooding and drainage problems from heavy storms can happen anywhere in Lewis County. The major floods are caused by the overflow of the Chehalis and Newaukum Rivers and Coal, Salzer, and Dillenbaugh Creeks, as well as the Cowlitz and Tilton Rivers. Flooding is most common from October through April, when storms from the Pacific Ocean, bring intense rainfall to the area. The earliest documented flood on the Chehalis River occurred in December 1887 and since then, there have been major floods every 10-15 years. There have been 13 Presidential Declarations for flooding in the County between 1971 and 2012. In terms of precipitation, the total average annual precipitation ranges from 47 inches at Centralia to 62 inches at Packwood. On the average, annual precipitation is 46.7 inches, with annual records showing a range from a low of 28 inches to a high of 60 inches. Rainfall is light during the summer and frequent during the remainder of the year. **Future Likelihood: <u>Location, Revenue, Operations</u>** Climate change is projected to steadily increase the magnitude of 25-year storm, increasing total precipitation by 7-18%. This increase indicates that Lewis County is expected to experience an increase in total precipitation of the 25-year storm. Heavier precipitation increases riverine streamflow within existing floodplains and could expand flooding to new areas not currently in existing floodplains, which could affect infrastructure and operations. In addition, in 30 years, 31.7% of properties in Lewis County will have risk of flooding with major impacts for residential and severe for commercial, infrastructure, and road assets, making it more costly to repair and maintain airport infrastructure. = **M (Probability)**	**Medium**	The magnitude of extreme precipitation regarding airports was determined based on the rate of heavier precipitation. With the steady increase of precipitation in the future, the magnitude of extreme precipitation regarding airports is medium as the operations of airports may be impacted with severe rain conditions = **M (Magnitude)**. In addition, the magnitude of flooding for airports is determined based on the flood history and proximity of major rivers that are near operating airports. = **M (Magnitude).**	**Medium**	**Take Action**

10	Airports - Reduced Snowpack *(Economic Dev)*	**Low**	**Other hazard risk.** Airports are sited away from avalanche-prone mountainous areas and within UGAs. Airports are located in flood zones that may experience temporary closures from riverine flooding due to earlier snowmelt. **Probability**: On average, snowfall in the region is not heavy, but the potential exists for extremely large amounts of occasion. The average annual snowfall is approximately 9 inches, with recorded extreme annual maximums at 45 inches. Most of the snowfall occurs in the month of January, with the monthly average at about 4.5 inches. **Future Likelihood: Location** Based on the April 1st snowpack readings, there is steady decrease in this snowpack with a decrease ranging from 68% to 97%. April 1st snowpack readings are an indicator of water storage capacities - airports are not affected by water storage capacities from reduced snowpack = **L (Probability).**	**Low**	The magnitude of reduced snowpack on airports is evaluated based on how operations would be impacted. Reduced snowpack would indicate that there would be less flooding and precipitation; thus, operations would not be affected heavily as operations should be conducted regularly. = **L (Magnitude)**	**Low**	**Accept Risk**
11	Airports - Wildfire *(Economic Dev)*	**Medium**	**Increased operational costs/decreased revenue.** Airports are located in wildfire interface zones and subject to wildfire risk. Tourism continues to provide revenue to cover added costs. Airport master plans should address wildfire risk and exposure. **Probability**: Wildfires occur every year in Lewis County, average of at least 10 wildfires a year (2008-2023, no record for 2022). In 2022-2023, ~6,917 acres burned comprising 85% of total acres burned since 2008 (1,207.98 acres burned 2008-2022). Large fires have been infrequent. **Future Likelihood: Location, Revenue**, Climate change is projected to increase high fire danger days contributed from hotter dryer summers/east wind events and increase the likelihood of fires. Large wildfires are anticipated to occur more frequently in Lewis County - western County is predicted to experience 11-12 additional high fire danger days each year (by late century). Airports are scattered all across Lewis County = **M (Probability) .** The County may experience Increased direct (fire damage to airports) and indirect costs (firefighting activities).	**Medium**	Airports are located in wildfire zones. As such, in the events of wildfires, operations would need to be halted and evacuations would occur. This may also increase flight cancelations and delayed restoration of the airports which decreases overall revenue and increases maintenance costs = **M (Magnitude)**	**Medium**	**Take Action**
12	Fiber optics - Extreme Precipitation & Flooding	**Medium**	**Site Constraints.** The pilot area in Pe Ell/western County area that will have updated broadband infrastructure, some portions of this area are exposed to 100-year FEMA floodplain. **Probability:** There are certain areas of Lewis County that are in more flood areas than others. According to the Lewis County GIS Web Map, there are multiple flood zones near Centralia, Chehalis, and Napavine. However, flooding and drainage problems from heavy storms can happen anywhere in Lewis County. The major floods are caused by the overflow of the Chehalis and Newaukum Rivers and Coal, Salzer, and Dillenbaugh Creeks, as well as the Cowlitz and Tilton Rivers. Flooding is most common from October through April, when storms from the Pacific Ocean, bring intense rainfall to the area. The earliest documented flood on the Chehalis River occurred in December 1887 and since then, there have been major floods every 10-15 years. There have been 13 Presidential Declarations for flooding in the County between 1971 and 2012. In terms of precipitation, the total average annual precipitation ranges from 47 inches at Centralia to 62 inches at Packwood. On the average, annual precipitation is 46.7 inches, with annual records showing a range from a low of 28 inches to a high of 60 inches. Rainfall is light during the summer and frequent during the remainder of the year. **Future Likelihood: Location, Operations** Climate change is projected to steadily increase the magnitude of 25-year storm, increasing total precipitation by 7-18%. This increase indicates that Lewis County is expected to experience an increase in total precipitation of the 25-year storm. Heavier precipitation increases riverine streamflow within existing floodplains and could expand flooding to new areas not currently in existing floodplains, which could affect infrastructure and operations. In addition, in 30 years, 31.7% of properties in Lewis County will have risk of flooding with major impacts for residential and severe for commercial, infrastructure, and road assets. Heavier precipitation is an indicator of flooding which could affect infrastructure and operations. = **M (Probability).**	**Medium**	According to the Lewis County PUD, service territory of fiber optics are divided into 17 broad service zones. Each of the broadband service zone correspond with a PUD electrical substation area. As there are multiple electrical substations throughout Lewis County, this indicates that the fiber optics associated with each substation may be impacted as it could interrupt service for many people= **M (Magnitude).**	**Medium**	**Take Action**
13	Fiber optics - Reduced snowpack	**Low**	**Other hazard impacts.** Reduced snowpack and avalanche are less likely to occur in western County area where new broadband infrastructure is slated for development (little to no exposure). **Probability:** On average, snowfall in the region is not heavy, but the potential exists for extremely large amounts of occasion. The average annual snowfall is approximately 9 inches, with recorded extreme annual maximums at 45 inches. Most of the snowfall occurs in the month of January, with the monthly average at about 4.5 inches. **Future Likelihood: Location, Operations** Based on the April 1st snowpack readings, there is steady decrease in this snowpack with a decrease ranging from 68% to 97% = **L (Probability).**	**Low**	Reduced snowpack is less likely to occur in western County area where new broadband infrastructure is slated for development; however, existing fiber optic networks associated with electrical substations may be impacted as it could interrupt service for many people. **= L (Magnitude)**	**Low**	**Accept Risk**

14	Fiber optics - Wildfire	**Medium**	**Site Constraints.** Broadband infrastructure is located in wildfire interface zones in UGAs and exposes fiber cables, towers, etc. to wildfire risk. Site location, development standards, and design does not consider climate impacts per Chap. 15.50 of municipal code. **Probability**: Wildfires occur every year in Lewis County, average of at least 10 wildfires a year (2008-2023, no record for 2022). In 2022-2023, ~6,917 acres burned comprising 85% of total acres burned since 2008 (1,207.98 acres burned 2008-2022). Large fires have been infrequent. **Future Likelihood: Location, Operations** Climate change is projected to increase high fire danger days contributed from hotter dryer summers/east wind events and increase the likelihood of fires. Large wildfires are anticipated to occur more frequently in Lewis County - western County is predicted to experience 11-12 additional high fire danger days each year (by late century). = **M (Probability).** Increasing exposure to wildfire risk results in destruction of infrastructure and loss of service to internet/emergency communications.	**High**	Broadband infrastructure located in wildfire interface zones in UGAs exposes fiber cables, towers, etc. to wildfire risk, can result in destruction and loss of service to internet = **H (Magnitude).**	**High**	**Take Action**
15	Shorelines - Flooding *(Ecosystem)*	**Medium**	Riverine and lake shorelines experience flooding and bank erosion from flooding. The County's Shoreline Master Plan considers impacts of flooding to the shoreline i.e., prohibit chemicals from agriculture and mining in shoreline areas subject to flooding, limit dredging to safety/restoration activities, etc. **Probability:** There are certain areas of Lewis County that are in more flood areas than others. According to the Lewis County GIS Web Map, there are multiple flood zones near Centralia, Chehalis, and Napavine. However, flooding and drainage problems from heavy storms can happen anywhere in Lewis County. The major floods are caused by the overflow of the Chehalis and Newaukum Rivers and Coal, Salzer, and Dillenbaugh Creeks, as well as the Cowlitz and Tilton Rivers. Flooding is most common from October through April, when storms from the Pacific Ocean, bring intense rainfall to the area. The earliest documented flood on the Chehalis River occurred in December 1887 and since then, there have been major floods every 10-15 years. There have been 13 Presidential Declarations for flooding in the County between 1971 and 2012. **Future Likelihood: Ecosystem Health** Climate change is projected to increase the stream flows which is expected to increase riverine flooding within existing floodplains and could expand flooding to new areas not currently in existing floodplains. Vegetation and habitat that exist along shorelines would be impacted, including cultural resources and recreational uses. In addition, in 30 years, 31.7% of properties in Lewis County will have a risk of flooding with major impacts for residential and severe for commercial, infrastructure, and road assets. = **M (Probability).**	**High**	The shore master plan (SMP) considers impacts of flooding to shoreline i.e., prohibit chemicals from agriculture and mining in shoreline areas subject to flooding, limit dredging to safety/restoration activities, etc. SMP uses 2010 FEMA flood zone maps and is outdated. Higher likelihood of flooding may indicate more episodic events of bank erosion and landslides that damage existing shorelines = **H (Magnitude)**	**High**	**Take Action**
16	Shorelines - Reduced Snowpack *(Ecosystem)*	**Low**	**Conflicting uses and changing ecosystem health.** Reduced peak streamflow impacts protection status and interpretation of allowed uses i.e., aquaculture, mining, recreation, etc. **Probability:** On average, snowfall in the region is not heavy, but the potential exists for extremely large amounts on occasion. The average annual snowfall is approximately 9 inches, with recorded extreme annual maximums at 45 inches. Most of the snowfall occurs in the month of January, with the monthly average at about 4.5 inches. **Future Likelihood: Ecosystem Health** Based on the April 1st snowpack readings, there is steady decrease in this snowpack with a decrease ranging from 68% to 97% = **L (Probability).** Decreased snowpack reduces peak streamflows that impact existing habitat and tribal resources. Enforcing allowable uses would require a Master Plan update to avoid conflicting uses that impact ecosystem habitat. Increased maintenance needs may increase for private facilities and public recreation facilities utilizing shoreline areas.	**Low**	Reduced snowpack indicates a lesser likelihood of flooding which impacts shorelines = **L (Magnitude)**	**Low**	**Accept Risk**
17	Shorelines - Wildfire *(Ecosystem)*	**Low**	**Other hazard risks - landslides, erosion**. Shoreline segments located in wildfire interface zones (wildfire risk) throughout the County. Wildfire impacts vary depending on uses. SMP does not consider impact of wildfire hazard on these developments, but County code and fire districts provide materials and education for fire risk prevention and mitigation. **Probability**: Wildfires occur every year in Lewis County, average of at least 10 wildfires a year (2008-2023, no record for 2022). In 2022-2023, ~6,917 acres burned comprising 85% of total acres burned since 2008 (1,207.98 acres burned 2008-2022). Large fires have been infrequent. **Future Likelihood: Ecosystem Health** Climate change is projected to increase high fire danger days contributed from hotter dryer summers/east wind events and increase the likelihood of fires. Large wildfires are anticipated to occur more frequently in Lewis County - western County is predicted to experience 11-12 additional high fire danger days each year (by late century). = **L (Probability).** Increased wildfire risk is an indicator for dry vegetation and soils that degrade ecosystem habitat and erode from flooding events.	**Low**	Wildfire impacts to shoreline varies depending on uses, increased impact for "high intensity", "shoreline residential", and "aquatic" shorelines due to residential and commercial developments = **L (Magnitude).**	**Low**	**Accept Risk**

18	Public Safety Radio - Extreme Precipitation *(Emergency Mgmt)*	**Medium**	Radio infrastructure is limited to high elevation hillside areas and may be exposed to landslides as a result of extreme precipitation events and dry soils/vegetation. **Probability:** In terms of precipitation, the total average annual precipitation ranges from 47 inches at Centralia to 62 inches at Packwood. On the average, annual precipitation is 46.7 inches, with annual records showing a range from a low of 28 inches to a high of 60 inches. Rainfall is light during the summer and frequent during the remainder of the year. **Future Likelihood: Communications, Operations** There is a steady increase in percent change in the magnitude of 25-year storm ranging from an increase of precipitation that falls in the range of 7-18%. This increase indicates that Lewis County is expected to experience an increase in total precipitation of the 25-year storm. Heavier precipitation is an indicator of flooding which could affect infrastructure and operations. = **M (Probability)**	**Medium**	Public Safety radios are crucial for evacuation notices, regular news, weather updates, etc. Extreme precipitation may impact the telecommunications associated with the public safety radio; thus impacting the operational capacity and system reliability of public safety radios = **M (Magnitude)**	**Medium**	**Take Action**
19	Public Safety Radio - Flooding *(Emergency Mgmt)*	**Medium**	**Emergency services delay.** Radio towers are located throughout the County. Towers are typically located in remote hillside areas and are less susceptible to riverine flooding. Radio infrastructure needs to be updated - existing conditions include limited ability to respond to emergencies and may require frequent maintenance and temporary loss of communication. **Probability:** There are certain areas of Lewis County that are in more flood areas than others. According to the Lewis County GIS Web Map, there are multiple flood zones near Centralia, Chehalis, and Napavine. However, flooding and drainage problems from heavy storms can happen anywhere in Lewis County. The major floods are caused by the overflow of the Chehalis and Newaukum Rivers and Coal, Salzer, and Dillenbaugh Creeks, as well as the Cowlitz and Tilton Rivers. Flooding is most common from October through April, when storms from the Pacific Ocean, bring intense rainfall to the area. The earliest documented flood on the Chehalis River occurred in December 1887 and since then, there have been major floods every 10-15 years. There have been 13 Presidential Declarations for flooding in the County between 1971 and 2012. **Future Likelihood: Communications, Operations** Climate change is projected to increase the stream flows which is expected to increase riverine flooding within existing floodplains and could expand flooding to new areas not currently in existing floodplains. In addition, in 30 years, 31.7% of properties in Lewis County will have risk of flooding with major impacts for residential and severe for commercial, infrastructure, and road assets. = **M (Probability)**. Increased flooding events destroy radio infrastructure, resulting in communication losses and delays in emergency services.	**Medium**	Public safety radios are crucial for evacuation notices, regular news, weather updates, etc. Flooding may impact the structural integrity that house public safety radio; thus impacting the operational capacity and system reliability of public safety radios = **M (Magnitude)**	**Medium**	**Take Action**
20	Public Safety Radio - Wildfire *(Emergency Mgmt)*	**Medium**	**Emergency services delay.** Radio towers are located in wildfire risk areas throughout the County. **Probability**: Wildfires occur every year in Lewis County, average of at least 10 wildfires a year (2008-2023, no record for 2022). In 2022-2023, ~6,917 acres burned comprising 85% of total acres burned since 2008 (1,207.98 acres burned 2008-2022). Large fires have been infrequent. **Future Likelihood: Communications, Operations** Climate change is projected to increase high fire danger days contributed from hotter dryer summers/east wind events and increase the likelihood of fires. Large wildfires are anticipated to occur more frequently in Lewis County - western County is predicted to experience 11-12 additional high fire danger days each year (by late century). = **M (Probability).** Direct impacts include destruction of radio towers. Indirect impacts include delayed emergency response and deployment of emergency services/resources. Evacuation routes for mobility-impaired in rural areas subject to increased wildfire risk is necessary.	**Medium**	Fire coverage is limited in many County areas; Use of a simplex channel for fire hampers the ability of field users to communicate directly with each other and they must relay messages through dispatch in many situations, resulting in delayed responses to emergencies and deployment of equipment = **M (Magnitude).** Delayed response and service to vulnerable populations i.e., elderly, mobility impaired persons, etc. may be an issue, resulting in strong implications for identifying options in an evacuation plan = **M (Magnitude)**	**Medium**	**Take Action**

21	Fire Stations - Extreme Precipitation *(Emergency Mgmt)*	**Medium**	Peak streamflow changes from extreme precipitation events cause secondary hazards like riverbank erosion and landslides that can undermine the structural stability of fire stations. Stations located in flood plain/landslide hazard areas are more likely to experience significant damages and loss of entirety of asset. **Probability:** In terms of precipitation, the total average annual precipitation ranges from 47 inches at Centralia to 62 inches at Packwood. On the average, annual precipitation is 46.7 inches, with annual records showing a range from a low of 28 inches to a high of 60 inches. Rainfall is light during the summer and frequent during the remainder of the year. **Future Likelihood: Operations, Structural stability, Response Time** There is a steady increase in percent change in the magnitude of 25-year storm ranging from an increase of precipitation that falls in the range of 7-18%. This increase indicates that Lewis County is expected to experience an increase in total precipitation of the 25-year storm. Heavier precipitation is an indicator of flooding which could affect infrastructure and operations. = **M (Probability)**	**Medium**	Extreme precipitation could lead to flooding in areas where fire stations are stationed. This may impact the structural integrity of fire stations; thus, hindering operations and decreasing response time in the event of emergencies = **M (Magnitude)**	**Medium**	**Take Action**
22	Fire Stations - Flooding *(Emergency Mgmt)*	**Medium**	**Delays in emergency response**. Stations located in flood plain/landslide hazard areas are more likely to experience significant damages and loss of entirety of asset. Stations located in flood zones are susceptible to riverine and stormwater flooding. **Probability:** There are certain areas of Lewis County that are in more flood areas than others. According to the Lewis County GIS Web Map, there are multiple flood zones near Centralia, Chehalis, and Napavine. However, flooding and drainage problems from heavy storms can happen anywhere in Lewis County. The major floods are caused by the overflow of the Chehalis and Newaukum Rivers and Coal, Salzer, and Dillenbaugh Creeks, as well as the Cowlitz and Tilton Rivers. Flooding is most common from October through April, when storms from the Pacific Ocean, bring intense rainfall to the area. The earliest documented flood on the Chehalis River occurred in December 1887 and since then, there have been major floods every 10-15 years. There have been 13 Presidential Declarations for flooding in the County between 1971 and 2012. **Future Likelihood: Operations, Structural Stability, Response Time** Climate change is projected to increase the stream flows which is expected to increase riverine flooding within existing floodplains and could expand flooding to new areas not currently in existing floodplains. In addition, in 30 years, 31.7% of properties in Lewis County will have risk of flooding with major impacts for residential and severe for commercial, infrastructure, and road assets. = **M (Probability).** Stations are anticipated to experience more frequent destruction of buildings that delay emergency response and is costly to recover.	**Medium**	Flooding of fire stations will inhibit smooth operations in the case of an emergency and increase response time durations = **M (Magnitude)**. In addition, the structural integrity of fire stations is compromised. = **M (Magnitude)**	**Medium**	**Take Action**
23	Fire Stations - Wildfire *(Emergency Mgmt)*	**Medium**	Stations located in wildfire risk areas are more likely to experience significant damages and loss of entirety of asset from wildfire events. **Probability**: Wildfires occur every year in Lewis County, average of at least 10 wildfires a year (2008-2023, no record for 2022). In 2022-2023, ~6,917 acres burned comprising 85% of total acres burned since 2008 (1,207.98 acres burned 2008-2022). Large fires have been infrequent. **Future Likelihood: Operations, Structural Stability, Response Time, Siting** Climate change is projected to increase high fire danger days contributed from hotter dryer summers/east wind events and increase the likelihood of fires. Large wildfires are anticipated to occur more frequently throughout Lewis County - western County is predicted to experience 11-12 additional high fire danger days each year (by late century). = **M (Probability).** Destruction of asset results in temporary loss of service and functionality to serve vulnerable populations. Fire stations are designed for fire safety such as safe space buffers surrounding buildings.	**Medium**	Wildfires will directly damage the structure of fire stations; thus inhibiting operations and decreasing the likelihood of smooth dispatchments to emergency events in need of their assistance. = **M (Magnitude)**	**Medium**	**Take Action**
24	Airports - Extreme Precipitation & Flooding (*Emergency Mgmt)*	**Medium**	**Delays in emergency services.** Some airports i.e., Packwood are located in 100-Yr FEMA flood zones and are subject to 1-3 inches of flooding, resulting in temporary closure of airport and delays in emergency services. **Probability**: According to the Lewis County GIS Web Map, there are multiple flood zones near Centralia, Chehalis, and Napavine. However, flooding and drainage problems from heavy storms can happen anywhere in Lewis County. The major floods are caused by the overflow of the Chehalis and Newaukum Rivers and Coal, Salzer, and Dillenbaugh Creeks, as well as the Cowlitz and Tilton Rivers. Flooding is most common from October through April, when storms from the Pacific Ocean, bring intense rainfall to the area. The earliest documented flood on the Chehalis River occurred in December 1887 and since then, there have been major floods every 10-15 years. There have been 13 Presidential Declarations for flooding in the County between 1971 and 2012. In terms of precipitation, the total average annual precipitation ranges from 47 inches at Centralia to 62 inches at Packwood. On the average, annual precipitation is 46.7 inches, with annual records showing a range from a low of 28 inches to a high of 60 inches. Rainfall is light during the summer and frequent during the remainder of the year. **Future Likelihood: Location, Operations, Response Time** Climate change is projected to steadily increase the magnitude of 25-year storm, increasing total precipitation by 7-18%. This increase indicates that Lewis County is expected to experience an increase in total precipitation of the 25-year storm. Heavier precipitation increases riverine streamflow within existing floodplains and could expand flooding to new areas not currently in existing floodplains, which could affect infrastructure and operations. In addition, in 30 years, 31.7% of properties in Lewis County will have risk of flooding with major impacts for residential and severe for commercial, infrastructure, and road assets, making it more costly to repair and maintain airport infrastructure. = **M (Probability).**	**Medium**	Packwood Airport is located in Cowlitz River FEMA 100-Year flood zone and subject to 1-3 feet of flooding; closure of airport to runway activities; other airports are not in flood zone = **M (Magnitude)**. Extreme precipitation events can warp pavement, requiring more frequent airstrip maintenance; divert emergency response services to other airports i.e., Chehalis-Centralia airport serves as primary local airport. = **M (Magnitude)**.	**Medium**	**Take Action**

25	Airports - Wildfire *(Emergency Mgmt)*	**Medium**	**Delayed emergency response times.** Airports are located in wildfire risk areas throughout the County. Fire stations and ARFF facilities located nearby to respond to aerial wildfire emergencies within 15 minutes. **Probability**: Wildfires occur every year in Lewis County, average of at least 10 wildfires a year (2008-2023, no record for 2022). In 2022-2023, ~6,917 acres burned comprising 85% of total acres burned since 2008 (1,207.98 acres burned 2008-2022). Large fires have been infrequent. **Future Likelihood: Location, Operations, Response Time** Climate change is projected to increase high fire danger days contributed from hotter dryer summers/east wind events and increase the likelihood of fires. Large wildfires are anticipated to occur more frequently in Lewis County - western County is predicted to experience 11-12 additional high fire danger days each year (by late century). = **M (Probability).** Airports are anticipated to experience increased wildfire risk, resulting in damage to structure or loss of services during wildfire events. Loss of emergency response services would occur or services diverted to other airport i.e., Chehalis-Centralia airport, delaying emergency services.	**Medium**	Airports located in wildfire interface zones (wildland fuel) increase chances of wildfire events resulting in loss of emergency response services. Services may stop or be diverted to other airport i.e., Chehalis-Centralia airport further delaying service response times = **M (Magnitude).**	**Medium**	**Take Action**
26	County roads - Extreme Precipitation *(Transportation)*	**Medium**	**Costly repairs and disruption to services.** Extreme precipitation events can damage pavement i.e., potholes, sinkholes, etc. on roads located throughout the County. **Probability:** In terms of precipitation, the total average annual precipitation ranges from 47 inches at Centralia to 62 inches at Packwood. On the average, annual precipitation is 46.7 inches, with annual records showing a range from a low of 28 inches to a high of 60 inches. Rainfall is light during the summer and frequent during the remainder of the year. **Future Likelihood: Safety, Structural Integrity, Location** There is a steady increase in percent change in the magnitude of 25-year storm ranging from an increase of precipitation that falls in the range of 7-18%. This increase indicates that Lewis County is expected to experience an increase in total precipitation of the 25-year storm. Heavier precipitation is an indicator of flooding which could affect infrastructure and operations. = **M (Probability).** Increased extreme precipitation events means requiring more frequent road maintenance that is costly to repair and disrupt services. Interstate 5 is frequently affected by flooding in the Chehalis River floodplain. Freight delays negatively impact economy. For example, $47,070,000 economic impact occurred from a four-day I-5 closure due to the Chehalis river flood.	**Medium**	Extreme precipitation events can warp pavement or cause sinkholes, requiring more frequent road maintenance and potential for increased road accidents (hydroplaning) = **M (Magnitude).** Road closures impact evacuation routes, goods delivery, etc. Pavement technology such as all-weather asphalt is available but may be costly to implement = **M (Magnitude).**	**Medium**	**Take Action**
27	County roads - Flooding *(Transportation)*	**High**	**Economic opportunity loss.** Roads throughout County are subject to flooding, including I-5 freeway and roads within 100-Yr floodplains. Flooded roads are subject to road closures and evacuation, disrupting services. **Probability:** There are certain areas of Lewis County that are in more flood areas than others. According to the Lewis County GIS Web Map, there are multiple flood zones near Centralia, Chehalis, and Napavine. However, flooding and drainage problems from heavy storms can happen anywhere in Lewis County. The major floods are caused by the overflow of the Chehalis and Newaukum Rivers and Coal, Salzer, and Dillenbaugh Creeks, as well as the Cowlitz and Tilton Rivers. Flooding is most common from October through April, when storms from the Pacific Ocean, bring intense rainfall to the area. The earliest documented flood on the Chehalis River occurred in December 1887 and since then, there have been major floods every 10-15 years. There have been 13 Presidential Declarations for flooding in the County between 1971 and 2012. **Future Likelihood: Operations, Structural Stability, Flood Prone Zone** Climate change is projected to increase peak stream flows which is expected to increase riverine flooding within existing floodplains and could expand flooding to new areas not currently in existing floodplains. In addition, in 30 years, 31.7% of properties in Lewis County will have risk of flooding with major impacts for residential and severe for commercial, infrastructure, and road assets. Interstate 5 is frequently affected by flooding in the Chehalis River floodplain. = **H (Probability).** Other major impacts include freight delays that negatively impact the economy (for example, $47,070,000 economic impact from four-day I-5 closure).	**High**	Flooding may lead to the potential for increased road accidents and roadway closures= **H (Magnitude)**. Road closures impact evacuation routes, goods delivery, etc., pavement tech such as all-weather asphalt is available = **H (Magnitude).**	**High**	**Take Action**
28	County roads - Reduced snowpack *(Transportation)*	**Low**	**Operations:** Snowpack accumulation may lead to lane and road obstruction which reduces capacity and increases travel delay time. **Probability:** The considered hazard risks associated with county roads concentrate on the level of safety and structural stability of the roads. For instance, on average, snowfall in the region is not heavy, but the potential exists for extremely large amounts of occasion. The average annual snowfall is approximately 9 inches, with recorded extreme annual maximums at 45 inches. Most of the snowfall occurs in the month of January, with the monthly average at about 4.5 inches. As the probability of snowpack is low within Lewis County, it is unlikely county roads will have a high risk of impact from snowpack. **Future Likelihood: Safety, structural stability** Based on the April 1st snowpack readings, there is steady decrease in this snowpack with a decrease ranging from 68% to 97% = **L (Probability)**. Thus, snowpack is projected to heavily decrease. The April 1st snowpack is used as an indicator for the amount of stored water that becomes available during the melt season.	**Low**	Snowpack may not significantly increase the magnitude of impacts regarding county roads as there is a projected decrease in snowpack. However, it is important to note that snowpack would impact the structural stability and safety of county roads as there is increased likelihood of ice on the road which may lead to dangerous road conditions; however, with reduced snowpack, this is unlikely. = **L (Magnitude)**	**Low**	**Accept Risk**

29	County roads - Wildfire *(Transportation)*	**Medium**	**Operations:** Commonly after a wildfire, county roads may develop an increased susceptibility to erosion and can generally alter the terrain and ground conditions of the affected county road(s). This may lead to unsafe travel conditions during normal travel and emergency evacuations. Existing conditions of county roads are very varied and widespread. Additionally, roads can generally withstand wildfire events as a means for emergency evacuation. **Probability:** Wildfires occur every year in Lewis County, average of at least 10 wildfires a year (2008-2023, no record for 2022). In 2022-2023, ~6,917 acres burned comprising 85% of total acres burned since 2008 (1,207.98 acres burned 2008-2022). Large fires have been infrequent. Despite large fires being infrequent, wildfires can still be anticipated to have a medium probability of impacting county roads. **Future Likelihood: <u>Safety, Structural stability</u>** Climate change is projected to increase high fire danger days contributed from hotter dryer summers/east wind events and increase the likelihood of fires. Large wildfires are anticipated to occur more frequently in Lewis County - western County is predicted to experience 11-12 additional high fire danger days each year (by late century). = **M (Probability)**	**Medium**	Wildfires will directly damage road surfaces, cause road closures, and increase safety precautions. This may cause drivers to avoid certain roads due to safety concerns which leads to longer travel times. Further, emergency evacuation routes may become harder to reach; thus, increasing the human risk significantly. Repair of roads will also take certain durations of time and materials depending on the severity of the wildfire. = **M (Magnitude)**	**Medium**	**Take Action**
30	Bridges - Extreme Precipitation *(Transportation)*	**High**	**Structural Integrity:** Extreme precipitation may lead to flooding. Flooding can also cause scour around piers and abutments, which can damage bridges and cause structural integrity issues. These issues may range from insignificant to significant and may need varied construction times. Heavily damaged bridges from flooding may take extremely long periods of construction; thus, operations may halt for long periods of time. To combat this risk, updated engineer standards may need to be adopted to increase flood design measures and mitigate scouring. **Probability:** In terms of precipitation, the total average annual precipitation ranges from 47 inches at Centralia to 62 inches at Packwood. On the average, annual precipitation is 46.7 inches, with annual records showing a range from a low of 28 inches to a high of 60 inches. Rainfall is light during the summer and frequent during the remainder of the year. **Future Likelihood: <u>Operations, Safety, Structural Integrity, Location</u>** There is a steady increase in percent change in the magnitude of 25-year storm ranging from an increase of precipitation that falls in the range of 7-18%. This increase indicates that Lewis County is expected to experience an increase in total precipitation of the 25-year storm. Heavier precipitation is an indicator of flooding which could affect infrastructure and operations. Within Lewis County's Bridge inventory there are 204 NBI reportable bridges and 17 short span bridges. One of the County's bridges is classified as structurally deficient (SD), 24 are classified as functionally obsolete (FO) , and 84 are coded as scour critical. Bridges classified as FO and structurally deficient bridges that should be considered for future replacement or rehabilitation. = **H (Probability)**	**High**	Due to the various structurally categorized bridges, the magnitude of extreme precipitation varies. However, the damage mainly focusses on the weakening of the structural integrity of bridges (especially the already weakened ones) which could lead to expediated bridge collapses = **H (Magnitude).** In addition, the compose of bridge integrity emphasizes that bridges are not able to inadequately carry its intended traffic load; thus, operational usage of bridges due to extreme precipitation is decreased and safety concerns increase. Severe damage to bridges from extreme precipitation will take long durations of repair and resources which could halt the operation of specific bridges for long periods of time; thus significantly halting usability for many people. = **H (Magnitude)**	**High**	**Take Action**

31	Bridges - Flooding *(Transportation)*	**High**	**Structural Integrity:** Flooding can erode and damage bridge approach slabs and abutments. Flooding can also cause scour around piers and abutments, which can damage bridges and cause structural integrity issues. These issues may range from insignificant to significant and may need varied construction times. Heavily damaged bridges from flooding may take extremely long periods of construction; thus, operations may halt for long periods of time. To combat this risk, updated engineer standards may need to be adopted to increase flood design measures and mitigate scouring. **Probability:** In terms of precipitation, the total average annual precipitation ranges from 47 inches at Centralia to 62 inches at Packwood. On the average, annual precipitation is 46.7 inches, with annual records showing a range from a low of 28 inches to a high of 60 inches. Extreme precipitation may eventually lead to flooding. Rainfall is light during the summer and frequent during the remainder of the year. However, it is important to note that many bridges are located in floodplains (approximately 77 bridges located within the 100-year floodplain and approximately 78 located within the 500-year floodplain). = **H (Probability)** **Future Likelihood: Operations, Safety, Structural Integrity, Location** There is a steady increase in percent change in the magnitude of 25-year storm ranging from an increase of precipitation that falls in the range of 7-18%. This increase indicates that Lewis County is expected to experience an increase in total precipitation of the 25-year storm. Heavier precipitation is an indicator of flooding which could affect infrastructure and operations. Within Lewis County's Bridge inventory there are 204 NBI reportable bridges and 17 short span bridges. One of the County's bridges is classified as structurally deficient (SD), 24 are classified as functionally obsolete (FO) , and 84 are coded as scour critical. Bridges classified as FO and structurally deficient bridges that should be considered for future replacement or rehabilitation. As such, this indicates that the impacts associated with flooding may heavily affect bridges.= **H (Probability)**	**High**	Due to the various structurally categorized bridges, the magnitude of flooding varies. However, the damage mainly concentrates on the weakening of the structural integrity of bridges (especially the already weakened ones) which could lead to expediated bridge collapses = **H (Magnitude).** In addition, the composition of bridge integrity emphasizes that bridges are not able to adequately carry its intended traffic load; thus, operational usage of bridges due to flooding is decreased and safety concerns increase. = **H (Magnitude)** Severe damage to bridges from extreme precipitation will take long durations of repair and resources which could halt the operation of specific bridges for long periods of time; thus significantly halting usability for many people. = **H (Magnitude)**	**High**	**Take Action**
32	Bridges - Reduced snowpack *(Transportation)*	**Low**	**Structural Integrity:** Snowpack may lead to increased erosion and degrade bridges. Further, transportation with bridges may become dangerous for travel as ramps may become extra slippery as snow adheres to ground more quickly. To combat snowpack impacts to bridges, updated standardized engineering standards can be set for increased flood levels to mitigate scouring. **Probability:** On average, snowfall in the region is not heavy, but the potential exists for extremely large amounts of occasion. The average annual snowfall is approximately 9 inches, with recorded extreme annual maximums at 45 inches. Most of the snowfall occurs in the month of January, with the monthly average at about 4.5 inches. = **L (Probability)** **Future Likelihood: Operations, Safety, Structural Integrity, Location** Based on the April 1st snowpack readings, there is steady decrease in this snowpack with a decrease ranging from 68% to 97% = L (Probability). The April 1st snowpack is used as an indicator for the amount of stored water that becomes available during the melt season. Within Lewis County's Bridge inventory there are 204 NBI reportable bridges and 17 short span bridges. One of the County's bridges is classified as structurally deficient (SD), 24 are classified as functionally obsolete (FO) , and 84 are coded as scour critical. Bridges classified as FO and structurally deficient bridges should be considered for future replacement or rehabilitation. = **L (Probability)**	**Low**	Reduced snowpack indicates a decrease in flooding which helps decrease bridge impacts relating to snowpack. Further as there is reduced snowpack, there is a less likelihood of increased erosion which usually increases bridge degradation. **L = (Magnitude)**	**Low**	**Accept Risk**
33	Bridges - Wildfire *(Transportation)*	**High**	**Structural Integrity:** Wildfires burning undergrowth along valleys and washes can damage bridges by burning underneath them; thus, resulting in prolonged damage assessments and unsafe structural integrity. These impacts lead to unsafe travel utilizing bridges; as such, business destinations may be harder to reach, transportation of goods is delayed, and travel risks increase. Measures to combat wildfire risk include designing bridges for fire loads, and applying fire blankets to bridges in high fire risk areas. **Probability:** Wildfires occur every year in Lewis County, average of at least 10 wildfires a year (2008-2023, no record for 2022). In 2022-2023, ~6,917 acres burned comprising 85% of total acres burned since 2008 (1,207.98 acres burned 2008-2022). Large fires have been infrequent. Generally, bridges that are located throughout Lewis County are exposed to wildfire. There are more bridges in western County than eastern County. It is important to note that, burned bridges are non-functional as transportation on them may vary in risk. = **H (Probability)** **Future Likelihood: Safety, Structural stability, Operations** Climate change is projected to increase high fire danger days contributed from hotter dryer summers/east wind events and increase the likelihood of fires. Large wildfires are anticipated to occur more frequently in Lewis County - western County is predicted to experience 11-12 additional high fire danger days each year (by late century). Within Lewis County's Bridge inventory there are 204 NBI reportable bridges and 17 short span bridges. One of the County's bridges is classified as structurally deficient (SD), 24 are classified as functionally obsolete (FO) , and 84 are coded as scour critical. Bridges classified as FO and structurally deficient bridges should be considered for future replacement or rehabilitation. = **H (Probability)**	**High**	The magnitude of wildfires will impact the structural integrity of bridges heavily as it will weaken the materials composed in the bridge. Consequently, the structural integrity of the bridge is compromised. This indicates potential bridge operation closures due to increased safety concerns. = **H (Magnitude)** Bridge closures will increase travel time and inconvenience for destinations as alternate routes will need to be utilized. **H (Magnitude)**	**High**	**Take Action**

34	Airports - Extreme Precipitation & Flooding *(Transportation)*	**High**	**Operations:** Extreme precipitation can usually lead to flooding. Extreme precipitation may halt operations as poor visibility increases. In turn, flight delays or cancellations may be increased during these severe weather events. Flooding may also damage airport infrastructure such as landing lights, radar and navigation installations, and communications networks will also inhibit the passage of aircraft. All these impacts may lead to severe economic losses in terms of passenger and freight traffic. To combat extreme precipitation and flooding, some measures such as utilization of levees/dikes or other measures may be used. **Probability:** According to the Lewis County GIS Web Map, there are multiple flood zones near Centralia, Chehalis, and Napa vine. However, flooding and drainage problems from heavy storms can happen anywhere in Lewis County. The major floods are caused by the overflow of the Chehalis and Wewaykum Rivers and Coal, Selzer, and Dille Baugh Creeks, as well as the Cowlitz and Tilton Rivers. The earliest documented flood on the Chehalis River occurred in December 1887 and since then, there have been major floods every 10-15 years. There have been 13 Presidential Declarations for flooding in the County between 1971 and 2012. In terms of precipitation, the total average annual precipitation ranges from 47 inches at Centralia to 62 inches at Packwood. On the average, annual precipitation is 46.7 inches, with annual records showing a range from a low of 28 inches to a high of 60 inches. **Future Likelihood: Operations, Flood Prinze Zone** Climate change is projected to increase the stream flows which is expected to increase riverine flooding within existing floodplains and could expand flooding to new areas not currently in existing floodplains. In addition, in 30 years, 31.7% of properties in Lewis County will have risk of flooding with major impacts for residential and severe for commercial, infrastructure, and road assets. = **H (Probability)** There is a steady increase in percent change in the magnitude of 25-year storm ranging from an increase of precipitation that falls in the range of 7-18%. This increase indicates that Lewis County is expected to experience an increase in total precipitation of the 25-year storm. Heavier precipitation is an indicator of flooding which could affect infrastructure and operations. = H (Probability). Most airports are protected by a dike systems in events of flooding; however, flood events have occurred in the past (e.g. January 1990 flood event) which closed the Chehalis-Centralia Airport. = **H (Probability)**	**Medium**	Transportation in airports is impacted by extreme precipitation and flooding as airport closures may occur due to risky departure and landing conditions. This indicates that the magnitude of extreme precipitation and flooding to airport transportation is high as operations is halted; thus, travel, delivery of goods, medical supplies, and etc. are halted. New flight arrival and departure times will be necessary and delays should be accepted more frequently due to these weather conditions = **M (Magnitude)**	**High**	**Take Action**
35	Airports - Reduced snowpack *(Transportation)*	**Low**	**Operations:** Snowpack reduces visibility, clings to surfaces, and prompts runway maintenance procedures. Additionally, heavy snow may lead to roadways requiring more frequent maintenance. This may cause increased delays and decrease operation efficiency for airports. **Probability:** On average, snowfall in the region is not heavy, but the potential exists for extremely large amounts of occasion. The average annual snowfall is approximately 9 inches, with recorded extreme annual maximums at 45 inches. Most of the snowfall occurs in the month of January, with the monthly average at about 4.5 inches. It is also important to note that airports are sited away from mountainous areas and within UGA's. **Future Likelihood: Operations** Based on the April 1st snowpack readings, there is steady decrease in this snowpack with a decrease ranging from 68% to 97% = **L (Probability).** The April 1st snowpack is used as an indicator for the amount of stored water that becomes available during the melt season. = **L (Probability)**	**Low**	As mentioned in the probability notes, snowpack generally impacts many airport operations; however as Lewis County is projected to have a decrease of snowpack, the magnitude of snowpack impacts may be low. = **L (Magnitude)**	**Low**	**Accept Risk**
36	Airports - Wildfire *(Transportation)*	**High**	**Operations:** Wildfires will emit smoke from burning which leads to two immediate hazards: turbulence and reduced visibility. Thus, flight delays may become more frequent during wildfires as safety concerns are significantly increased. In addition to flight risk, airports impacted by wildfires may face structurally damage that may take long periods of reconstruction; therefore, lowering operation efficiency and general operations. **Probability:** Wildfires occur every year in Lewis County, average of at least 10 wildfires a year (2008-2023, no record for 2022). In 2022-2023, ~6,917 acres burned comprising 85% of total acres burned since 2008 (1,207.98 acres burned 2008-2022). Large fires have been infrequent. However, airports are located in wildfire interface zones and will likely face impacts related to wildfire risks. **Future Likelihood Indicator: Location, Operations, Safety.** Climate change is projected to increase high fire danger days contributed from hotter dryer summers/east wind events and increase the likelihood of fires. County admin buildings are predominantly located in west County area which has low wildfire risk (average of less than 4,000 acres burned annually in western WA since 1984). However, Large wildfires are anticipated to occur more frequently in Lewis County - western County is predicted to experience 11-12 additional high fire danger days each year (by late century). Eastern county will have a 30% chance each year that there will be the climate and fuel conditions conducive to wildfires (by mid-century). Larger east county areas will have a 30-50% of conducive wildfire conditions each year (by late century). = **H (Probability)**	**High**	The magnitude of wildfires could burn down sections or all of an airport which would halt operations and repairs would need to begin as soon as possible. Repairs may need various resources and time which delays operation of airports. This may impact the travel of many people and supplies. In addition, as airports are located in wildfire interface zones, the magnitude of wildfire risks on the operations of airports may be significant. = **H (Magnitude)**	**High**	**Take Action**

37	Railways - Extreme Precipitation & Flooding	**High**	**Structural integrity and Operations:** Extreme precipitation can usually lead to flooding. Extreme precipitation can destabilize terrain, resulting in dirt or rocks on the tracks. Further, events of flooding can wash away railway tracks or even push train cars off the rails. Flooding may also lead to damage to rail infrastructure which can take days, weeks, or months to repair based on severity. Railway mitigation methods to prevent hazard damage include relocating ralline, elevating rails, or decommissioning rail usage; however, these methods are all costly and labor intensive. **Probability:** According to the Lewis County GIS Web Map, there are multiple flood zones near Centralia, Chehalis, and Napavine. However, flooding and drainage problems from heavy storms can happen anywhere in Lewis County. The major floods are caused by the overflow of the Chehalis and Newaukum Rivers and Coal, Salzer, and Dillenbaugh Creeks, as well as the Cowlitz and Tilton Rivers. The earliest documented flood on the Chehalis River occurred in December 1887 and since then, there have been major floods every 10-15 years. There have been 13 Presidential Declarations for flooding in the County between 1971 and 2012. In terms of precipitation, the total average annual precipitation ranges from 47 inches at Centralia to 62 inches at Packwood. On the average, annual precipitation is 46.7 inches, with annual records showing a range from a low of 28 inches to a high of 60 inches. **Future Likelihood: Operations, Flood Pronze Zone** Climate change is projected to increase the stream flows which is expected to increase riverine flooding within existing floodplains and could expand flooding to new areas not currently in existing floodplains. In addition, in 30 years, 31.7% of properties in Lewis County will have risk of flooding with major impacts for residential and severe for commercial, infrastructure, and road assets. = **H (Probability)** There is a steady increase in percent change in the magnitude of 25-year storm ranging from an increase of precipitation that falls in the range of 7-18%. This increase indicates that Lewis County is expected to experience an increase in total precipitation of the 25-year storm. Heavier precipitation is an indicator of flooding which could affect infrastructure and operations. = H (Probability). A main railroad line (Burlington Northern Railway) crosses the floodplain from east to west on the Chehalis River near Chehalis. The tracks are subject to damage at various locations during large floods. = **H (Probability)**	**High**	The magnitude of extreme precipitation and flooding on railways would demonstrate a high magnitude as railways are located on a floodplain. This indicates a high potential for damaged rail infrastructure. This indicates that operations of this railroad will be severely impacted which could lead to long closure times for repair and return of functionality. = **H (Magnitude).**	**High**	**Take Action**
38	Railways - Reduced snowpack	**Low**	**Operations:** Snowpack has generally (either direct snowfall or drifting) can prevent rail operations from performing efficiently or at all. This is because the quantity of snowpack can be too much for the train to punch its way through without derailing or coming to other issues. On the contrary, reduced snowpack would not pose as a risk for trains to travel on railways effectively as blockages are unlikely. **Probability:** On average, snowfall in the region is not heavy, but the potential exists for extremely large amounts of occasion. The average annual snowfall is approximately 9 inches, with recorded extreme annual maximums at 45 inches. Most of the snowfall occurs in the month of January, with the monthly average at about 4.5 inches. As snowpack is anticipated to reduce, operations of railways are not anticipated to face increased closures and/or delays. Further, there is a low probability of reduced snowpack risk to railways based on data mentioned above. Further, existing railways are also not located in avalanche-prone zones. **= L (Probability)** **Future Likelihood: Operations** Based on the April 1st snowpack readings, there is steady decrease in this snowpack with a decrease ranging from 68% to 97% **= L (Probability).** The April 1st snowpack is used as an indicator for the amount of stored water that becomes available during the melt season. As there is an increased percentage of snowpack decrease, operations are significantly anticipated to have fewer operational issues. **= L (Probability)**	**Low**	The magnitude of reduced snowpack on railways is low as railways will be able to operate under "normal" conditions as reduced snowpack would not likely increase blockages. = **L (Magnitude)**	**Low**	**Accept Risk**
39	Railways - Wildfire	**High**	**Operations:** Wildfires pose track damage to railways as stock damage and derailments, power and communication disruptions, and destabilization of track beds increase as soil erosion increases. Wildfire increases the potential for accelerated erosion primarily through its effects on vegetation and soil. Therefore, with damaged railways, operations may be delayed heavily for reconstruction. **Probability:** Wildfires occur every year in Lewis County, average of at least 10 wildfires a year (2008-2023, no record for 2022). In 2022-2023, ~6,917 acres burned comprising 85% of total acres burned since 2008 (1,207.98 acres burned 2008-2022). Large fires have been infrequent. Portions of rail lines are located in wildfire interface zones, particularly in northern County; thus, based on historically wildfire data and existing conditions, there is high probability of wildfire risk for railways. = **H (Probability)** **Future Likelihood Indicator: Operations, Structural Integrity** Climate change is projected to increase high fire danger days contributed from hotter dryer summers/east wind events and increase the likelihood of fires. County admin buildings are predominantly located in west County area which has low wildfire risk (average of less than 4,000 acres burned annually in western WA since 1984). However, Large wildfires are anticipated to occur more frequently in Lewis County - western County is predicted to experience 11-12 additional high fire danger days each year (by late century). Eastern county will have a 30% chance each year that there will be the climate and fuel conditions conducive to wildfires (by mid-century). Larger east county areas will have a 30-50% of conducive wildfire conditions each year (by late century). Intense heat and flames can damage railway tracks and signal systems, forcing service interruptions. Further, the Industrial Access Transportation Study in northern County where portions of existing rail lines are located is taking place for future improvements. **= H (Probability)**	**High**	The magnitude of wildfire on railways focuses on service/operations being halted. Wildfires have historically damaged railway tracks and signal systems which compromise smooth operations in terms of travel and communications. Further, as mentioned there are a lot of existing and future rail in wildfire zones= **H (Magnitude)**	**High**	**Take Action**

40	Solid Waste transfer station - Extreme Precipitation *(Waste Mgmt)*	**Low**	**Pollution:** Extreme precipitation can potentially lead to flooding of a solid waste transfer station. Flooding of a solid waste transfer station may increase the volume of leachate generated by raising the percolation and piezometric head of the leachate, which will cause the leachate leakage to increase. Surges of debris from solid waste transfer stations may also increase. With increased hazard events, it is likely for an increase in disposal of weather-damaged personal property, resulting in stations having a maximum capacity which may overfill. **Probability:** According to the Lewis County GIS Web Map, there are multiple flood zones near Centralia, Chehalis, and Napavine. However, flooding and drainage problems from heavy storms can happen anywhere in Lewis County. The major floods are caused by the overflow of the Chehalis and Newaukum Rivers and Coal, Salzer, and Dillenbaugh Creeks, as well as the Cowlitz and Tilton Rivers. The earliest documented flood on the Chehalis River occurred in December 1887 and since then, there have been major floods every 10-15 years. There have been 13 Presidential Declarations for flooding in the County between 1971 and 2012. In terms of precipitation, the total average annual precipitation ranges from 47 inches at Centralia to 62 inches at Packwood. On the average, annual precipitation is 46.7 inches, with annual records showing a range from a low of 28 inches to a high of 60 inches. **Future Likelihood: <u>Operations, Contaminants</u>** Climate change is projected to increase the stream flows which is expected to increase riverine flooding within existing floodplains and could expand flooding to new areas not currently in existing floodplains. In addition, in 30 years, 31.7% of properties in Lewis County will have risk of flooding with major impacts for residential and severe for commercial, infrastructure, and road assets. = **L (Probability)** There is a steady increase in percent change in the magnitude of 25-year storm ranging from an increase of precipitation that falls in the range of 7-18%. This increase indicates that Lewis County is expected to experience an increase in total precipitation of the 25-year storm. Heavier precipitation is an indicator of flooding which could affect infrastructure and operations. Solid waste facilities in flood prone areas may increase the risk of unwanted waste distribution and increased lag time of solid waste collection times = **L (Probability).**	**Medium**	Located in low risk liquefaction area. Decreased capacity due to waste generated from other storm events which lowers the risk of solid waste contaminants= **M (Magnitude).** Transfer stations allow waste to be temporarily housed in facilities before being transported to landfills out of the County, stations have a maximum capacity which may overfill due to post hazard event clean up and hinder smooth operations = **M (Magnitude).**	**Low**	**Accept Risk**
41	Solid Waste transfer station - Flooding *(Waste Mgmt)*	**Low**	**Pollution:** Flooding of a solid waste transfer station may increase the volume of leachate generated by raising the percolation and piezometric head of the leachate, which will cause the leachate leakage to increase. Surges of debris from transfer stations may also increase. With increased hazard events, it is likely for an increase in disposal of weather-damaged personal property, resulting in stations having a maximum capacity which may overfill. Transfer stations also allow waste to be temporarily houses in facilities before being transported to landfills out of the County; however, as mentioned, stations have a maximum capacity. **Probability:** According to the Lewis County GIS Web Map, there are multiple flood zones near Centralia, Chehalis, and Napavine. However, flooding and drainage problems from heavy storms can happen anywhere in Lewis County. The major floods are caused by the overflow of the Chehalis and Newaukum Rivers and Coal, Salzer, and Dillenbaugh Creeks, as well as the Cowlitz and Tilton Rivers. The earliest documented flood on the Chehalis River occurred in December 1887 and since then, there have been major floods every 10-15 years. There have been 13 Presidential Declarations for flooding in the County between 1971 and 2012. In terms of precipitation, the total average annual precipitation ranges from 47 inches at Centralia to 62 inches at Packwood. On the average, annual precipitation is 46.7 inches, with annual records showing a range from a low of 28 inches to a high of 60 inches. **Future Likelihood: Operations, Flood Pronze Zone, Contaminants** Climate change is projected to increase the stream flows which is expected to increase riverine flooding within existing floodplains and could expand flooding to new areas not currently in existing floodplains. In addition, in 30 years, 31.7% of properties in Lewis County will have risk of flooding with major impacts for residential and severe for commercial, infrastructure, and road assets. = **L (Probability)** There is a steady increase in percent change in the magnitude of 25-year storm ranging from an increase of precipitation that falls in the range of 7-18%. This increase indicates that Lewis County is expected to experience an increase in total precipitation of the 25-year storm. Heavier precipitation is an indicator of flooding which could affect infrastructure and operations. Solid waste facilities in flood prone areas may increase the risk of unwanted waste distribution = **L (Probability).**	**Medium**	Not located in 100-year FEMA floodplain. Decreased capacity and contaminant risk due to waste generated from other storm events = **L (Magnitude). T**ransfer stations allow waste to be temporarily housed in facilities before being transported to landfills out of the County, stations have a maximum capacity which may go over due to post hazard event clean up and inhibit effective operations **= M (Magnitude).**	**Low**	**Accept Risk**

42	Solid Waste transfer station - Wildfire *(Waste Mgmt)*	**Low**	**Toxic contaminants:** Wildfire at solid waste transfer stations threaten the environment there through toxic pollutants emitted into the air, water, and soil. Further, wildfires that spread to solid waste transfer stations pose a risk to firefighters and civilians who are exposed to the hazardous chemical compounds they emit. The degree of risk is dependent on the contents buried in the landfill, the geography of the landfill, and the nature of the fire. For instance, in increased hazard events, individuals may increase disposal of weather-damaged personal property; thus, resulting in transfer stations having a maximum capacity which may overfill and exacerbate impacts. It is also important to note, transfer stations allow waste to be temporarily housed in facilities before being transported to landfills out of the County. **Probability:** According to the Lewis County GIS Web Map, there are multiple flood zones near Centralia, Chehalis, and Napavine. However, flooding and drainage problems from heavy storms can happen anywhere in Lewis County. The major floods are caused by the overflow of the Chehalis and Newaukum Rivers and Coal, Salzer, and Dillenbaugh Creeks, as well as the Cowlitz and Tilton Rivers. The earliest documented flood on the Chehalis River occurred in December 1887 and since then, there have been major floods every 10-15 years. There have been 13 Presidential Declarations for flooding in the County between 1971 and 2012. In terms of precipitation, the total average annual precipitation ranges from 47 inches at Centralia to 62 inches at Packwood. On the average, annual precipitation is 46.7 inches, with annual records showing a range from a low of 28 inches to a high of 60 inches. **Future Likelihood: Operations, Flood Pronze Zone, Contaminants** Climate change is projected to increase the stream flows which is expected to increase riverine flooding within existing floodplains and could expand flooding to new areas not currently in existing floodplains. In addition, in 30 years, 31.7% of properties in Lewis County will have risk of flooding with major impacts for residential and severe for commercial, infrastructure, and road assets. = **L (Probability)** There is a steady increase in percent change in the magnitude of 25-year storm ranging from an increase of precipitation that falls in the range of 7-18%. This increase indicates that Lewis County is expected to experience an increase in total precipitation of the 25-year storm. Heavier precipitation is an indicator of flooding which could affect infrastructure and operations. Solid waste facilities in flood prone areas may increase the risk of unwanted waste distribution = **L (Probability).**	**Medium**	Not located in wildfire interface zone. Decreased capacity and contaminant risk due to waste generated from other hazard events **= M (Magnitude).** Transfer stations allow waste to be temporarily housed in facilities before being transported to landfills out of the County, stations have a maximum capacity which may go over and impact operation schedules due to post hazard event clean up **= M (Magnitude).**	**Low**	**Accept Risk**
43	Sewer infrastructure - Extreme Precipitation *(Waste Mgmt)*	**Low**	**Structural integrity and treatment quality:** Extreme precipitation influences the effects of flooding. As such, flooding or surge can damage sewer infrastructure and destroy process equipment, communications controls, field equipment, and important data records while blocking access to the plant. These impacts will result in decreased treatment quality as process equipment may be damaged; thus lowering, process efficiency and treated effluent quality. Adaptation for these impacts may include other treatment methods or temporary shutdown of facilities. **Probability:** According to the Lewis County GIS Web Map, there are multiple flood zones near Centralia, Chehalis, and Napavine. However, flooding and drainage problems from heavy storms can happen anywhere in Lewis County. The major floods are caused by the overflow of the Chehalis and Newaukum Rivers and Coal, Salzer, and Dillenbaugh Creeks, as well as the Cowlitz and Tilton Rivers. The earliest documented flood on the Chehalis River occurred in December 1887 and since then, there have been major floods every 10-15 years. There have been 13 Presidential Declarations for flooding in the County between 1971 and 2012. In terms of precipitation, the total average annual precipitation ranges from 47 inches at Centralia to 62 inches at Packwood. On the average, annual precipitation is 46.7 inches, with annual records showing a range from a low of 28 inches to a high of 60 inches. **Future Likelihood: Operations, Structures, Contaminants, Health** Climate change is projected to increase the stream flows which is expected to increase riverine flooding within existing floodplains and could expand flooding to new areas not currently in existing floodplains. In addition, in 30 years, 31.7% of properties in Lewis County will have risk of flooding with major impacts for residential and severe for commercial, infrastructure, and road assets. = **L (Probability)** There is a steady increase in percent change in the magnitude of 25-year storm ranging from an increase of precipitation that falls in the range of 7-18%. This increase indicates that Lewis County is expected to experience an increase in total precipitation of the 25-year storm. Heavier precipitation is an indicator of flooding which could affect infrastructure and operations. Older sewer infrastructure may not be upgraded with larger inflow and outflow volumes which may impact operations. = **L (Probability).**	**Medium**	Sewer infrastructures are normally built to handle 25, 50, 100-year storm volumes; however, older treatment plants may have decreased in efficiency and structural integrity; as such, a higher magnitude of damage may affect older plants and plants that are near floodplains. Older plants may need to be decommissioned or undergo construction for plant upgrades to decrease the magnitude of impacts from extreme precipitation. = **M (Magnitude)** In addition to impacts to operations and structural integrity, chemical contaminants utilized in different processes of sewer infrastructure may be leaked due to the extreme precipitation and impact waterways. = **M (Magnitude).**	**Low**	**Accept Risk**

44	Sewer infrastructure - Flooding *(Waste Mgmt)*	**Low**	**Structural integrity and treatment quality:** Flooding or surge can damage sewer infrastructure and destroy process equipment, communications controls, field equipment, and important data records while blocking access to the plant. These impacts will result in decreased treatment quality as process equipment may be damaged; thus lowering, process efficiency and treated effluent quality. Adaptation for these impacts may include other treatment methods or temporary shutdown of facilities. **Probability**: According to the Lewis County GIS Web Map, there are multiple flood zones near Centralia, Chehalis, and Napavine. However, flooding and drainage problems from heavy storms can happen throughout Lewis County. The major floods are caused by the overflow of the Chehalis and Newaukum Rivers and Coal, Salzer, and Dillenbaugh Creeks, as well as the Cowlitz and Tilton Rivers. The earliest documented flood on the Chehalis River occurred in December 1887 and since then, there have been major floods every 10-15 years. There have been 13 Presidential Declarations for flooding in the County between 1971 and 2012. In terms of precipitation, the total average annual precipitation ranges from 47 inches at Centralia to 62 inches at Packwood. On the average, annual precipitation is 46.7 inches, with annual records showing a range from a low of 28 inches to a high of 60 inches. Exiting facilities are located in a 1% annual chance climate change flood zone; thus, there is a low probability of risk for sewer infrastructure from flooding. **Future Likelihood: Operations, Flood Prone Zone, Contaminants, Health** Climate change is projected to increase the streamflows which is expected to increase riverine flooding within existing floodplains and could expand flooding to new areas not currently in existing floodplains. In addition, by mid-century, 31.7% of properties in Lewis County will have risk of flooding with major impacts for residential and severe for commercial, infrastructure, and road assets. = **L (Probability)** Most in County rely on private septic systems. There is a steady increase projected in percent change in the magnitude of 25-year storm ranging from an increase of precipitation that falls in the range of 7-18%. This increase indicates that Lewis County is expected to experience an increase in total precipitation of the 25-year storm. Heavier precipitation is an indicator of flooding which could affect infrastructure and operations. Centralia's new wastewater treatment plant on Goodrich road is out of the 100-year floodplain and should remain operable through any floods up to and including the 100-year event. = **L (Probability).**	**Medium**	Sewer infrastructures are normally built to handle 25, 50, 100-year storm volumes; however, older treatment plants may have decreased in efficiency and structural integrity; as such, a higher magnitude of damage may affect older plants and plants that are near floodplains. Flooding of sewer infrastructure may impact inflow and outflow of sewage as some sewer infrastructures may not be built to handle extremely large volumes of sewage. Large influxes of sewage may lead to overflow of systems and sewage spillage which would impact waterways that lead to residential, commercial, and industrial pipes. = **M (Magnitude).**	**Low**	**Accept Risk**
45	Sewer infrastructure - Wildfire *(Waste Mgmt)*	**Low**	**Water contamination and structural integrity:** Wildfires may disrupt sewage infrastructure with impacts such as: direct structural damage to the infrastructure/facilities due to the fire or firefighting activities, loss of power, debris/contaminants in waste stream, and blockage and dirtying of pumps. It is also important to note, backup protocols for sewer infrastructure may not include climate hazard impacts; thus, new protocols, permits, and infrastructure upgrades may be costly and labor intensive. **Probability:** Wildfires occur every year in Lewis County, average of at least 10 wildfires a year (2008-2023, no record for 2022). In 2022-2023, ~6,917 acres burned comprising 85% of total acres burned since 2008 (1,207.98 acres burned 2008-2022). Large fires have been infrequent. Additionally, as most sewer infrastructure are not are located in wildfire intermix zones similar to the rest of Lewis county **Future Likelihood Indicator: Operations, Structural Integrity** Climate change is projected to increase high fire danger days contributed from hotter dryer summers/east wind events and increase the likelihood of fires. County admin buildings are predominantly located in west County area which has low wildfire risk (average of less than 4,000 acres burned annually in western WA since 1984). However, Large wildfires are anticipated to occur more frequently in Lewis County - western County is predicted to experience 11-12 additional high fire danger days each year (by late century). Eastern county will have a 30% chance each year that there will be the climate and fuel conditions conducive to wildfires (by mid century). Larger east county areas will have a 30-50% of conducive wildfire conditions each year (by late century). = **L (Probability)**	**Medium**	The magnitude of wildfire impacts on sewer infrastructure may be detrimental as operations may significantly halt due to operational malfunctions as described in the probability notes section. However, as most sewer infrastructure is not located in wildfire interface zone, the magnitude of these impacts are decreased significantly. Further, it is located in a wildfire intermix zone, similar to most County areas. **= M (Magnitude)**	**Low**	**Accept Risk**

46	Dump stations - Extreme Precipitation *(Waste Mgmt)*	**Low**	**Pollution:** Extreme precipitation can potentially lead to flooding of a dump station. Flooding of a dump station may increase the volume of leachate generated by raising the percolation and piezometric head of the leachate, which will cause the leachate leakage to increase. In addition, erosion from historic dump stations pose a greater threat than leaching. Surges of debris from dump stations may also increase. With increased hazard events, it is likely for an increase in disposal of weather-damaged personal property, resulting in stations having a maximum capacity which may overfill. **Probability:** According to the Lewis County GIS Web Map, there are multiple flood zones near Centralia, Chehalis, and Napavine. However, flooding and drainage problems from heavy storms can happen anywhere in Lewis County. The major floods are caused by the overflow of the Chehalis and Newaukum Rivers and Coal, Salzer, and Dillenbaugh Creeks, as well as the Cowlitz and Tilton Rivers. The earliest documented flood on the Chehalis River occurred in December 1887 and since then, there have been major floods every 10-15 years. There have been 13 Presidential Declarations for flooding in the County between 1971 and 2012. In terms of precipitation, the total average annual precipitation ranges from 47 inches at Centralia to 62 inches at Packwood. On the average, annual precipitation is 46.7 inches, with annual records showing a range from a low of 28 inches to a high of 60 inches. **Future Likelihood: <u>Physical Design, Operations</u>** Climate change is projected to increase the streamflows which is expected to increase riverine flooding within existing floodplains and could expand flooding to new areas not currently in existing floodplains. In addition, in 30 years, 31.7% of properties in Lewis County will have risk of flooding with major impacts for residential and severe for commercial, infrastructure, and road assets. = **L (Probability)** There is a steady increase in percent change in the magnitude of 25-year storm ranging from an increase of precipitation that falls in the range of 7-18%. This increase indicates that Lewis County is expected to experience an increase in total precipitation of the 25-year storm. Heavier precipitation is an indicator of flooding which could affect infrastructure and operations. = **L (Probability).**	**Medium**	The magnitude of impacts would concentrate on the level of pollution that occurs; resulting in increased cleanups, equipment improvements, and operation costs. Items are "dropped off" by individuals at transfer stations/Packwood Community drop off center. Located in low risk liquefaction area**. = M (Magnitude).** Transfer stations allow waste to be temporarily housed in facilities before being transported to landfills out of the County. Increased hazard events, individuals may increase disposal of weather-damaged personal property, resulting in stations having a maximum capacity which may overfill and lead to a decrease in operations/efficiency **= M (Magnitude).**	**Low**	**Accept Risk**
47	Dump stations - Flooding *(Waste Mgmt)*	**Low**	**Pollution:** Flooding of a dump station may increase the volume of leachate generated by raising the percolation and piezometric head of the leachate, which will cause the leachate leakage to increase. In addition, erosion from historic dump stations pose a greater threat than leaching. Surges of debris from dump stations may also increase. With increased hazard events, it is likely for an increase in disposal of weather-damaged personal property, resulting in stations having a maximum capacity which may overfill. **Probability:** According to the Lewis County GIS Web Map, there are multiple flood zones near Centralia, Chehalis, and Napavine. However, flooding and drainage problems from heavy storms can happen anywhere in Lewis County. The major floods are caused by the overflow of the Chehalis and Newaukum Rivers and Coal, Salzer, and Dillenbaugh Creeks, as well as the Cowlitz and Tilton Rivers. The earliest documented flood on the Chehalis River occurred in December 1887 and since then, there have been major floods every 10-15 years. There have been 13 Presidential Declarations for flooding in the County between 1971 and 2012. In terms of precipitation, the total average annual precipitation ranges from 47 inches at Centralia to 62 inches at Packwood. On the average, annual precipitation is 46.7 inches, with annual records showing a range from a low of 28 inches to a high of 60 inches. However, dump stations in Lewis County are not located in a 100-year FEMA floodplain; thus, the probability of flood events impacting dump stations is low. **Future Likelihood: <u>Operations, Flood Pronze Zone, Structure</u>** Climate change is projected to increase the streamflows which is expected to increase riverine flooding within existing floodplains and could expand flooding to new areas not currently in existing floodplains. In addition, in 30 years, 31.7% of properties in Lewis County will have risk of flooding with major impacts for residential and severe for commercial, infrastructure, and road assets. = **L (Probability)** In addition, as flooding is an impact influenced by extreme precipitation, there is a steady increase in percent change in the magnitude of 25-year storm ranging from an increase of precipitation that falls in the range of 7-18%. This increase indicates that Lewis County is expected to experience an increase in total precipitation of the 25-year storm. Heavier precipitation is an indicator of flooding which could affect infrastructure and operations. Solid waste facilities in flood prone areas may increase the risk of unwanted waste distribution = **L (Probability).**	**Low**	The magnitude of impacts would concentrate on the level of pollution that occurs; resulting in increased cleanups, equipment improvements, and operation costs. However, the magnitude of impacts from flooding to dump stations is low as dump stations are not located in 100-year FEMA floodplain and are in a low risk liquefaction area. **= L (Magnitude).**	**Low**	**Accept Risk**

48	Dump stations - Wildfire *(Waste Mgmt)*	**Low**	**Toxic contaminants:** Wildfire at dump stations threaten the environment there through toxic pollutants emitted into the air, water, and soil. Further, wildfires that spread to dump stations pose a risk to firefighters and civilians who are exposed to the hazardous chemical compounds they emit. The degree of risk is dependent on the contents buried in the landfill, the geography of the landfill, and the nature of the fire. For instance, in increased hazard events, individuals may increase disposal of weather-damaged personal property; thus, resulting in stations having a maximum capacity which may overfill and exacerbate impacts. **Probability:** Wildfires occur every year in Lewis County, average of at least 10 wildfires a year (2008-2023, no record for 2022). In 2022-2023, ~6,917 acres burned comprising 85% of total acres burned since 2008 (1,207.98 acres burned 2008-2022). Large fires have been infrequent and dump stations are not located in fire interface zone. **Future Likelihood Indicator: Operations, Structural Integrity, Fire Prone Area** Climate change is projected to increase high fire danger days contributed from hotter dryer summers/east wind events and increase the likelihood of fires. County admin buildings are predominantly located in west County area which has low wildfire risk (average of less than 4,000 acres burned annually in western WA since 1984). However, Large wildfires are anticipated to occur more frequently in Lewis County - western County is predicted to experience 11-12 additional high fire danger days each year (by late century). Eastern county will have a 30% chance each year that there will be the climate and fuel conditions conducive to wildfires (by mid century). Larger east county areas will have a 30-50% of conducive wildfire conditions each year (by late century). However, as mentioned above, dump stations are generally not located in fire interface zone(s)= **L (Probability)**	**Low**	Toxic contaminants emitted from wildfires that have spread to dump stations pose health, environmental, and economical impacts. These impacts may drastically influence the operations of dump stations; However, as stated, dump stations in Lewis County are not located in wildfire interface zone and the magnitude of these impacts are low = **L (Magnitude).**	**Low**	**Accept Risk**
49	Water infrastructure - Reduced snowpack *(Water Resources)*	**High**	**Water scarcity:** Reduced snowpack would lead to a decreased water supply for water infrastructure. A decreased supply of water for treatment can have a pronounced effect on process efficiency as well as associated operational costs. It is important to note that design standards set in Title 13 of the Lewis County municipal code, states water mains are to be equipped with backflow prevention valves. **Probability:** On average, snowfall in the region is not heavy, but the potential exists for extremely large amounts on occasion. The average annual snowfall is approximately 9 inches, with recorded extreme annual maximums at 45 inches. Most of the snowfall occurs in the month of January, with the monthly average at about 4.5 inches. **Future Likelihood: Operations** Based on the April 1st snowpack readings, there is steady decrease in this snowpack with a decrease ranging from 68% to 97% = **H (Probability)**. The April 1st snowpack is used as an indicator for the amount of stored water that becomes available during the melt season, indicating decreased water storage capabilities Countywide. = **H (Probability).**	**High**	Reduced process efficiency may lead to reduced water quality; thus, can lead to reduced water which can lead to serious effects on aquatic organisms and plants, as well as potential human costs. The magnitude of impact regarding reduced snowpack to water infrastructure focuses on reduced process efficiency and operational costs. As there is a high probability of reduced snowpack affecting water infrastructure, the magnitude of decreased process efficiency and operation costs is heightened. Treated water faces a higher risk of being treated improperly; thus, impacting the subjects listed above. = **H (Magnitude)**	**High**	**Take Action**

50	Water infrastructure - Wildfire *(Water Resources)*	**Medium**	**Water contamination and structural integrity:** Wildfires have been historically known to compromise water quality during active burning and for months and years after the fire has been extinguished. Water infrastructures may face increased treatment costs, need for alternative supplies, and potentially diminished reservoir capacities. Extensive water system damage and related water quality contamination to water infrastructure may significantly impact the operations of the system; thus, leaving many businesses, residents, etc. loss of water for long periods of time. It is also important to note that many design standards account for limiting contamination, but it does not account for climate hazards. **Probability:** Wildfires occur every year in Lewis County, average of at least 10 wildfires a year (2008-2023, no record for 2022). In 2022-2023, ~6,917 acres burned comprising 85% of total acres burned since 2008 (1,207.98 acres burned 2008-2022). Large fires have been infrequent. **Future Likelihood Indicator: Operations, Structural Integrity, Contaminants** Climate change is projected to increase high fire danger days contributed from hotter dryer summers/east wind events and increase the likelihood of fires. County admin buildings are predominantly located in west County area which has low wildfire risk (average of less than 4,000 acres burned annually in western WA since 1984). However, Large wildfires are anticipated to occur more frequently in Lewis County - western County is predicted to experience 11-12 additional high fire danger days each year (by late century). Eastern county will have a 30% chance each year that there will be the climate and fuel conditions conducive to wildfires (by mid century). Larger east county areas will have a 30-50% of conducive wildfire conditions each year (by late century). = **M (Probability)**	**High**	Debris (soot) from wildfires may compromise treatment of water and expediate filter deterioration in water treatment processes. Further, compromised treatment of water may impact outflow of water which may contaminate groundwater aquifers and nearby waterways. = **H (Magnitude).**	**High**	**Take Action**

51	Civic Centers - Extreme Precipitation *(Zoning & Development)*	**Low**	**Structural damage:** Civic centers may face increased problems regarding building stormwater management systems in place, vegetation (e.g. mold) issues, and roof damage due to extreme precipitation. In addition, with extreme precipitation, there is an increased potential of flooding. In civic centers, sheet flooding may cause structural damage to the buildings such as loose or buckling floors and foundation cracks. These impacts may significantly affect civic center operations. It is also important to note that many civic centers with appropriate facilities may act as temporary shelters for extreme hazard events, requires collaboration with American Red Cross, NGOs, faith based organizations, Salvation Army, and law enforcement/other County departments. **Probability:** According to the Lewis County GIS Web Map, there are multiple flood zones near Centralia, Chehalis, and Napavine. However, flooding and drainage problems from heavy storms can happen anywhere in Lewis County. The major floods are caused by the overflow of the Chehalis and Newaukum Rivers and Coal, Salzer, and Dillenbaugh Creeks, as well as the Cowlitz and Tilton Rivers. The earliest documented flood on the Chehalis River occurred in December 1887 and since then, there have been major floods every 10-15 years. There have been 13 Presidential Declarations for flooding in the County between 1971 and 2012. In terms of precipitation, the total average annual precipitation ranges from 47 inches at Centralia to 62 inches at Packwood. On the average, annual precipitation is 46.7 inches, with annual records showing a range from a low of 28 inches to a high of 60 inches. **Future Likelihood: <u>Vulnerable Groups, Population Density, Operations</u>** Climate change is projected to increase the streamflows which is expected to increase riverine flooding within existing floodplains and could expand flooding to new areas not currently in existing floodplains. In addition, in 30 years, 31.7% of properties in Lewis County will have risk of flooding with major impacts for residential and severe for commercial, infrastructure, and road assets. = **L (Probability)** There is a steady increase in percent change in the magnitude of 25-year storm ranging from an increase of precipitation that falls in the range of 7-18%. This increase indicates that Lewis County is expected to experience an increase in total precipitation of the 25-year storm. Heavier precipitation is an indicator of flooding which could affect infrastructure and operations. **= L (Probability).**	**Medium**	Civic centers include recreation centers with large concentrations of people who may be exposed to hazard events and include vulnerable individuals i.e., children, elderly, special needs, etc. Many communities may utilize civic centers as part of their daily lives; however, extreme precipitation may hinder their ability to use these centers. Further, as described with increased extreme precipitation, the effects of structural damage to civic centers is greater; thus, further impacting the operations of these buildings as reconstruction would potentially take extended periods of time. = **M (Magnitude).**	**Low**	**Accept Risk**
52	Civic Centers - Flooding *(Zoning & Development)*	**Medium**	**Structural Damage:** Civic centers may face increased problems regarding building stormwater management systems in place and vegetation (e.g. mold) issues. Further, sheet flooding may cause structural damage to the buildings such as loose or buckling floors and foundation cracks. These impacts may significantly affect the structural aspects of civic centers; thus, a secondary impact of impacting the operations of civic centers. It is also important to note that many civic centers have been designated as evacuation shelters (Centralia College, Red Cross, Morton Hospital, Providence Hospital to name a few). **Probability:** According to the Lewis County GIS Web Map, there are multiple flood zones near Centralia, Chehalis, and Napavine. However, flooding and drainage problems from heavy storms can happen anywhere in Lewis County. The major floods are caused by the overflow of the Chehalis and Newaukum Rivers and Coal, Salzer, and Dillenbaugh Creeks, as well as the Cowlitz and Tilton Rivers. The earliest documented flood on the Chehalis River occurred in December 1887 and since then, there have been major floods every 10-15 years. There have been 13 Presidential Declarations for flooding in the County between 1971 and 2012. **Future Likelihood: <u>Operations, Flood Pronze Zone, Structure</u>** Climate change is projected to increase the streamflows which is expected to increase riverine flooding within existing floodplains and could expand flooding to new areas not currently in existing floodplains. In addition, in 30 years, 31.7% of properties in Lewis County will have risk of flooding with major impacts for residential and severe for commercial, infrastructure, and road assets. = **M (Probability)**	**Medium**	Civic centers located thru-out County, and may be flooded in unincorporated City-adjacent areas/UGAs. Fixed buildings/civic centers located in 100-year FEMA floodplains would experience peak streamflows resulting in loss of building functions and services and possibly reconstruction. Civic centers not located in floodplain zones would be able to resume operations sooner than civic centers that are located in floodplain zones as structural damages may not be as significant as reconstruction periods are much shorter. However, civic centers located on floodplain zones may face increased structural damage; thus, will need to undergo longer periods of reconstruction, halting operations. **= M (Magnitude).**	**Medium**	**Take Action**

53	Civic Centers - Reduced snowpack *(Zoning & Development)*	**High**	**Water scarcity:** Reduced snowpack indicates changes in streamflows; thus, water supply that may be diverted for use in civic centers. For instance, civic centers need water supply for on-site facilities, recreational uses, sewage flow, etc. Reduced water supply could potentially pose restrictions on the water budget for civic centers to conserve supply. It is also important to note that many civic centers have been designated as evacuation shelters (Centralia College, Red Cross, Morton Hospital, Providence Hospital to name a few). **Probability:** On average, snowfall in the region is not heavy, but the potential exists for extremely large amounts of occasion. The average annual snowfall is approximately 9 inches, with recorded extreme annual maximums at 45 inches. Most of the snowfall occurs in the month of January, with the monthly average at about 4.5 inches. **Future Likelihood: Operations** The April 1st snowpack is used as an indicator for the amount of stored water that becomes available during the melt season. Based on the April 1st snowpack readings, there is steady decrease in this snowpack with a decrease ranging from 68% to 97% = **H (Probability).** Based on the projection, there is a high probability of reduced snowpack; thus, water scarcity is more likely to occur and impact the operations of civic centers located in Lewis County.	**Medium**	The magnitude of reduced snowpack on civic centers would focus on the operational uses of civic centers. Water uses of civic centers are diverted into many purposes. Some of which include: landscape irrigation, fire sprinkler systems, toilet flushing, HVAC cooling, etc. As there is a high probability of reduced snowpack occurring for Lewis County, the magnitude of these activities being halted is a medium as some activities may not be necessary (e.g., landscape irrigation) for the full functionality of civic centers. However, activities such as HVAC cooling and fire sprinkler systems cannot be removed from the operations of a civic center. = **M (Magnitude)**	**High**	**Take Action**
54	Civic Centers - Wildfire *(Zoning & Development)*	**Medium**	**Probability:** Wildfires occur every year in Lewis County, average of at least 10 wildfires a year (2008-2023, no record for 2022). In 2022-2023, ~6,917 acres burned comprising 85% of total acres burned since 2008 (1,207.98 acres burned 2008-2022). Large fires have been infrequent. County collaboration with fire districts to educate property owners on defensible space and other prevention methods will be more consistent. **Future Likelihood Indicator: Location** Climate change is projected to increase high fire danger days contributed from hotter dryer summers/east wind events and increase the likelihood of fires. County admin buildings are predominantly located in west County area which has low wildfire risk (average of less than 4,000 acres burned annually in western WA since 1984). However, Large wildfires are anticipated to occur more frequently in Lewis County - western County is predicted to experience 11-12 additional high fire danger days each year (by late century). Eastern county will have a 30% chance each year that there will be the climate and fuel conditions conducive to wildfires (by mid century). Larger east county areas will have a 30-50% of conducive wildfire conditions each year (by late century). = **M (Probability)**	**Medium**	UGAs located in wildfire interface zones expose fixed buildings/civic centers to wildfire risk. Would result in complete loss of building functions and services, reconstruction needed **= M (Magnitude).**	**Medium**	**Take Action**

55	Colleges - Extreme Precipitation & Flooding	**Low**	**Structural damage:** College buildings may face increased problems regarding building stormwater management systems in place, vegetation (e.g. mold) issues, and roof damage due to extreme precipitation. In addition, with extreme precipitation, there is an increased potential of flooding. In college campuses, sheet flooding may cause structural damage to the buildings such as loose or buckling floors and foundation cracks. These impacts may significantly affect college operations. Campuses may act as secondary facilities for emergency operations (staging areas), but are limited to non-flood areas. **Probability:** According to the Lewis County GIS Web Map, there are multiple flood zones near Centralia, Chehalis, and Napavine. However, flooding and drainage problems from heavy storms can happen anywhere in Lewis County. College campuses such as Centralia college and WSU extension are located in incorporated areas outside of 100-year FEMA flood zone. **Future Likelihood: Operations, Location** Climate change is projected to increase the streamflows which is expected to increase riverine flooding within existing floodplains and could expand flooding to new areas not currently in existing floodplains. In addition, in 30 years, 31.7% of properties in Lewis County will have risk of flooding with major impacts for residential and severe for commercial, infrastructure, and road assets. However, as mentioned above, colleges within Lewis County are located outside of the 100-year FEMA flood zone. **= L (Probability)**	**Low**	As mentioned, structural damage would potentially occur with extreme precipitation and flooding. The magnitude of these hazards for instance may include long periods of time for reconstruction. This may lead to loss of revenue for colleges for a long duration of time. However, as colleges within Lewis County are outside of the 100-year FEMA flood zone, the magnitude of these effects impacting the colleges is low. = **L (Magnitude).**	**Low**	**Accept Risk**
56	Colleges - Wildfire	**Medium**	**Structural damage:** Wildfires have historically burned down structures, including homes. Structures that are impacted by wildfires may range in severity in terms of acreages destroyed and renovations required. College campuses are located in wildfire interface zones; therefore, exposing students, faculty, and staff to wildfire risk. Wildfires may significantly impact buildings even with fireproof designs i.e., defensible space, fireproof building materials, etc. **Probability:** Wildfires occur every year in Lewis County, average of at least 10 wildfires a year (2008-2023, no record for 2022). In 2022-2023, ~6,917 acres burned comprising 85% of total acres burned since 2008 (1,207.98 acres burned 2008-2022). Large fires have historically been infrequent. **= M (Probability)** **Future Likelihood Indicator: Operations, Location, Structure** Climate change is projected to increase high fire danger days contributed from hotter dryer summers/east wind events; thus, increasing the likelihood of fires. Additionally, large wildfires are anticipated to occur more frequently in Lewis County - western County is predicted to experience 11-12 additional high fire danger days each year (by late century). Eastern county will have a 30% chance each year that there will be the climate and fuel conditions conducive to wildfires (by mid century). Larger east county areas will have a 30-50% of conducive wildfire conditions each year (by late century). The nearest college in Lewis County is located in the North Western part of Lewis County which includes Centralia County. Despite not having many college campuses, the likelihood of wildfire impacting the college is likely based on data described above. **= M (Probability)**	**High**	College campuses such as Centralia college and WSU extension may be impacted due to wildfires that have spread onto the campus/near campus. This can lead to indefinite closures of the campus; thus, halting education. Further, wildfire would lead to immediate evacuations of the college campuses and cease of operation for a duration of days for repairs and safety check-ups. = **H (Magnitude).**	**High**	**Take Action**

Appendix H Community Engagement Plan

Engagement plan starts on the next page.

Lewis County 2045

Shaping the Future of Lewis County

Comprehensive Plan Periodic Update

Community Engagement Plan

Public Review Draft
April 2024

How to Comment

You may submit comments to the Lewis County Community Development staff on the Comprehensive Plan Update by:

Email: mindy.brooks@lewiscountywa.gov

U.S. Mail: Community Development, Planning Division 2025 NE Kresky Avenue Chehalis, WA 98532 Attention: Mindy Brooks

For more information visit:

tinyurl.com/LewisCounty2045

Executive Summary

Lewis County is preparing a Comprehensive Plan Periodic Update in accordance with the requirements of the Washington State Growth Management Act. The comprehensive plan is a document used by the County, created with input from the community, to establish a vision for the future. The vision will influence actions taken by the County over the next 20 years to manage land use, housing, transportation, economic development, and environmental conditions in the community.

Community engagement is the core of this Comprehensive Plan Periodic update, also called Lewis County 2045. Engagement with the community throughout this effort will help shape vision, goals and planning policy in Lewis County for the next 20 years. County staff will collect input from elected officials, Lewis County residents, business owners, stakeholders, and other governmental agencies and combine that with the best available data to assess conditions in the community. Community engagement in support of Lewis County 2045 will take place from April 2024 to November 2024. Staff will also present project progress updates at public meetings and hearings, such as the Board of County Commissioners and others throughout the project (Figure 1).

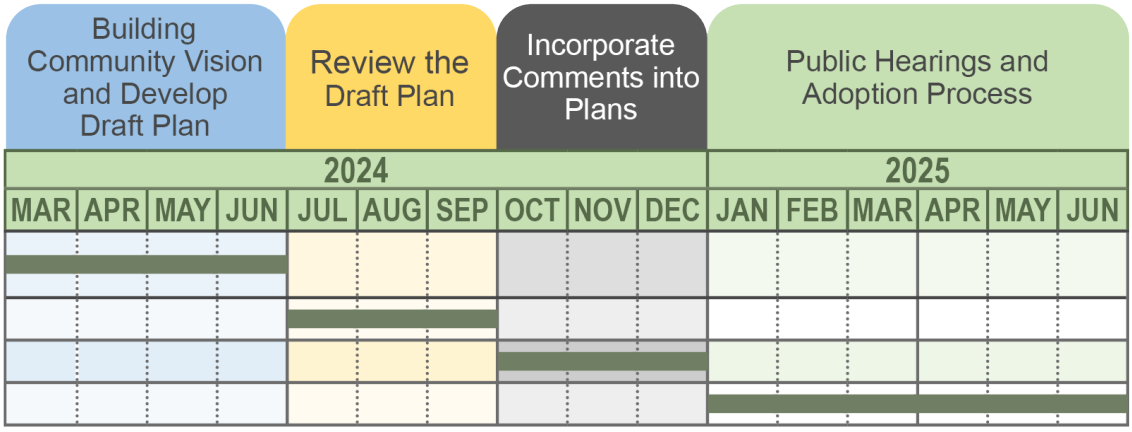

Figure 1 Engagement Schedule

This Community Engagement Plan will outline the approach and tools to inform, involve, and consult with members of the community. The purpose of community engagement is to understand diverse viewpoints and visions for the future. All County residents are encouraged to participate. Staff will use the results of engagement to update the plan.

Project Description

Lewis County 2045 is an opportunity for the community to review the current conditions, reevaluate goals, values and policy and look ahead to the next 20 years. Building on the existing comprehensive plan, the update will consider how the County will plan for people, jobs, housing, parks, transportation, and the infrastructure needed to support growth. The anticipated adoption of the updated comprehensive plan is June 30, 2025.

Lewis County 2045 will not only be an opportunity to meet the requirements of state law but to create a new community vision. Building a strong and defensible community vision based on continuous and accessible community engagement will allow for streamlined implementation of the comprehensive plan. This will help administrators, elected officials and agencies make informed decisions moving forward. Consistent with the County's Community Engagement Framework, the goal of the community engagement plan (CEP) is to describe how the community will be engaged and at what points specific tools will be used.

Promise to the Public

Community engagement takes many different forms and can be viewed as a spectrum ranging from informing the community about projects to fully collaborating with the community to develop the plan (see Figure 2). This CEP will employ a variety of engagement approaches to provide the community members the ability to select their preferred level of participation.

Figure 2 Lewis County Engagement Spectrum

The engagement tactics used for this effort will focus on informing, involving, and collaborating with stakeholders. The extent to which each stakeholder participates will depend on the stakeholders themselves.

County staff and consultants involved throughout this process will be mindful of the following engagement promises:

- Promise to inform: We will keep the community well informed from start to finish.
- Promise to involve: We will consult with specific stakeholders and make sure that their needs and concerns are directly reflected in the plan where possible.
- Promise to collaborate: We will gather advice and innovative ideas from the community and incorporate them into the plan's decisions to the maximum extent possible.

- Promise to circle back: We will share how feedback was used to demonstrate the importance of community engagement process. We will acknowledge people's time and participation after each activity (surveys, interviews, community meetings, etc.). The County and consultant team will summarize feedback and input gathered and make these engagement summaries available through the report titled Engagement Results on the project website.
- Promise to provide adequate public notice: We will inform the public of opportunities to participate in a timely manner, at least a week in advance of a meeting or activity where feedback is sought. When applicable, we will follow public notice requirements according to the rules of Washington Administrative Code (WAC 365-196-600). The County will consider the following notification channels to keep the community informed:
    - County website
    - Email
    - Public/commercial local radio
    - Posting on community boards
    - Utility notices and other city/County communication
    - Social Media
- Promise to be transparent: The Board of County Commissioners will have ultimate power of decision to adopt the plan. The public is invited to every meeting with the Board and may provide comments about the topics we are presenting. .

Interests and Impacts

The comprehensive planning process is complex, and it can be difficult to communicate the nexus between planning policy and changes which might impact the community as the plan is implemented.

Lewis County 2045 will focus technical work and community engagement on understanding concerns and opportunities in the following areas:

Growth

Residents and business owners may be impacted by population growth in the following ways: traffic and proposed transportation solutions, changes to density of housing, access to quality community services (e.g., police, school, internet), and impacts on public facilities (e.g., water districts.

Agricultural and Forestry Lands

People who own farms or forestry land may be concerned about how growth and development could impact the economic use of their property.

Housing

Existing and new residents may be interested in changes to housing regulations and how that may impact the housing choices in the future.

Critical Areas

Those who own property near identified critical areas regulated by the state (e.g., wetlands, streams, floodplains) may be concerned about impacts that would hinder their ability to use their property.

Hazard Mitigation

Those impacted by flooding, wildfire or other natural hazards may want to understand their risks and know what mitigation options will be considered to help them build resiliency over time.

Lewis County 2045 Roles and Responsibilities

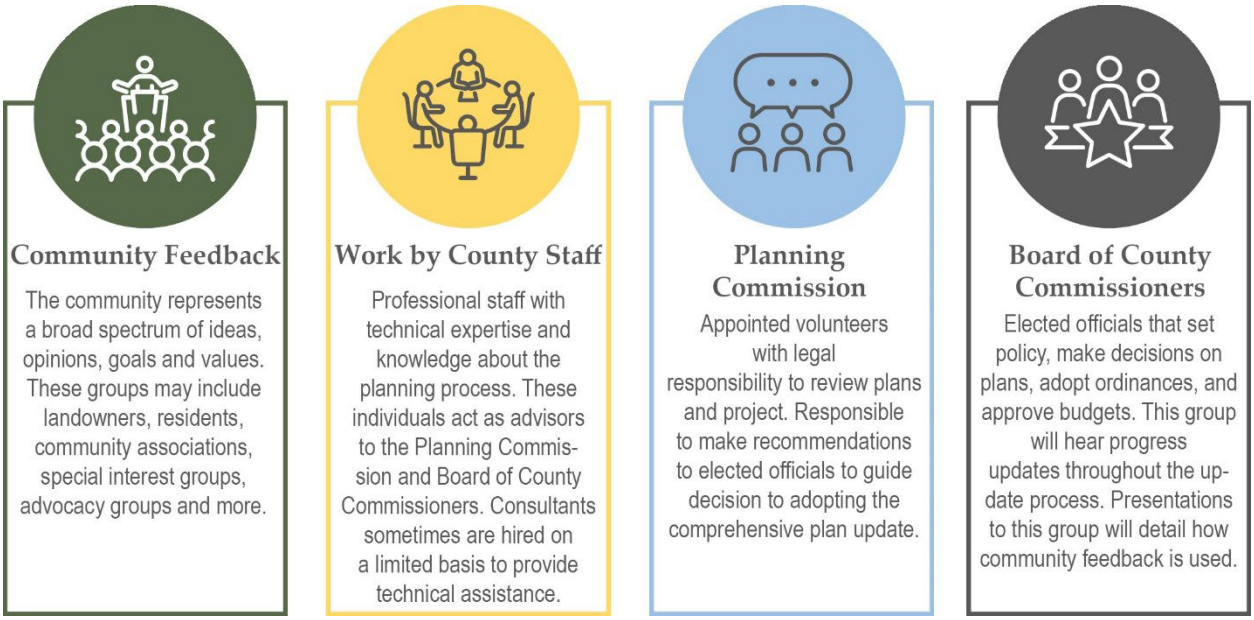

Figure 3 Roles and Responsibilities

Community Stakeholders

This section includes the types of stakeholders in Lewis County. A stakeholder is any individual who may have an interest in the future of Lewis County. Most stakeholders may fall into more than one group. All stakeholders are equally valuable to this process and the County desires to engage with community members from all areas. County staff are especially interested in hearing from stakeholders who have never participated in planning efforts, and those living in areas vulnerable to natural hazards.

This list is not comprehensive and may be updated as the project progresses.

Key stakeholder groups

- Property owners
- Residents
- Part Time Residents
- Renters
- Business owners
- Employees
- Elected officials (including County Commissioners)
- Developers
- Tribes
- People with Limited English Proficiency
- Communities with Disabilities
- Churches
- Schools and school districts
- Library
- Individual cities, towns, unincorporated communities
- Community organizations

- Fire Departments
- Police Departments
- Water/Sewer Districts
- Tourists/Visitors
- Agricultural industry
- Seniors
- Youth
- Students
- Religious organizations

Previous Engagement

This strategy will build on engagement work carried about by the County in the Winter of 2023-2024. The County held facilitated workshops with the goal of asking the community to help prioritize the most important topics to address during Lewis County 2045. Meetings were held in the following locations:

- **Salkum** - Salkum Timberland Library
- **Mineral**- Mineral American Legion Building
- **Toledo** - Cowlitz Prairie Grange
- **Randle** - Randle Fire Station

During the workshops, County staff asked attendees "What is your vision for Lewis County in 20-years?" The attendees identified priorities in several relevant topics. Meeting notes are available in a separate document titled "Engagement Results" which is available on the County website.

Key themes identified in the workshops include:

- Rural character
- Transportation
- Economic development
- Housing
- Infrastructure
- Critical areas
- Public health
- Natural hazards
- Recreation and tourism
- Forestry and farms
- Land use

This feedback, including all feedback gathered during the events and opportunities identified in this plan, will be shared with the Lewis County Planning Commission and Board of County Commissioners to help staff inform Lewis County 2045.

Engagement Strategy

This engagement approach will prioritize making project details interesting, accessible, and relevant to the communities. This CEP aims to create a program for participation to "involve a broad cross-section of the community, so groups not previously involved in planning become involved" (WAC 365-196-600). Staff will seek opportunities to meet the public where they are by participating in existing community-hosted events, interest groups' reoccurring meetings (e.g., Farm Bureau), and other public meetings, as well as planning community 'pop- ups' in frequently visited locations.

The community engagement strategy goals are to:

- Engage with stakeholders early in the planning process.
- Understand community character, what makes Lewis County special.
- Build long-term, collaborative working relationships with community partners and stakeholders.
- Capture community vision.
- Balance state law and with community vision.
- Clearly communicate how feedback is used.
- Engage with the community in its full diversity to promote inclusivity.

Lewis County 2045 will rely on a set of clear messages to explain the process, needs and outcomes of the comprehensive plan update.

- Every 10 years, the communities of Lewis County will come together to create a vision for the County's future.
- The comprehensive plan is a tool that will help the County respond to growth and change over the next 20 years.
- The plan anticipates the needs of current and future residents, business owners and visitors to Lewis County.
- The plan will cover a range of issues including housing, land use, transportation, utilities, public facilities, parks, resiliency, economic development, and more. The comprehensive plan will guide growth in Lewis County over the next 20 years.
- Good policy should reflect input and experience of stakeholders.
- Interested members of the community are encouraged to join in the effort and help shape the future of Lewis County.
- The Lewis County Board of County Commissioners will formally adopt Lewis County 2045 and staff will use it as a framework for guiding growth and development.
- The Engagement Report will summarize stakeholder feedback and how it was used to craft policy.

Part of the CEP strategy is to coordinate with Tribal Governments associated with Lewis County including:

- Confederated Tribes of the Chehalis Reservation
- Cowlitz Tribe
- Nisqually Indian Tribe
- Quinault Tribe
- Puyallup Tribe
- Squaxin Island Tribe
- Steilacoom Tribe

The County recognizes that Tribal Governments may engage at their discretion. The County will include interested Tribal Governments in Lewis County 2045 to the extent they are able and willing to participate.

Mindful of HB 1717 (2022) requirements, Lewis County will:

- Invite Tribal Governments to voluntarily participate in the comprehensive planning process.
- Share process updates and continue to invite, regardless of their level of participation in the process.
- Share draft materials as they are available.
- Facilitate communication between tribes and the County, including support to resolve issues related to plan changes and regulations.
- Invite tribal governments to participate in the development of countywide policies, including policies that allow for the protection for cultural resources if desired.

Engagement Approach

Staff, and their consultant, "pledge consistent, meaningful, and timely engagement of the Lewis County community." The project will take place over four key phases, which include: Building the community vision and creating the draft plan, reviewing the draft plan, incorporating comments, and public hearings and adoption. Different tactics will be used in different phases to encourage the most meaningful participation. The County has identified a range of engagement tactics to connect with stakeholders. These engagement tactics may be used at different times throughout the project. This section will outline the engagement tactics to be used throughout the update process.

Figure 4 Engagement Tactics

Community Meetings – Collaborate

County staff will hold community meetings to collaborate with the public. The project team will prioritize attending existing community events that are widely and regularly attended to reach as many stakeholders as possible.

Meeting types will vary by need and phase but may include:

- Community events – use regularly scheduled meetings as an opportunity to share project details (e.g., Realtor's Lunch and Learn).

- Community interviews – The County will hold one-on-one conversations with certain groups or individuals who may have specific interest or expertise in a particular topic. These conversations may be held virtually, in-person or over email. These conversations will be organized as needed.
- Open house events – The County may hold open house events where the public can attend to learn about the project and provide input on goals and policies. These events will provide an open format to allow stakeholders to talk to County staff, learn more about the project and provide feedback.
- Climate resilience focused interviews – The County will hold one-on-one discussions with individuals who may have a specific interest in natural hazard mitigation efforts.

Survey – Involve

Lewis County will host two community-wide surveys throughout the planning process. These will be short, informal surveys to encourage community members to share their feedback. Surveys will include a targeted 5-6 questions. The first will coincide with the visioning phase (April to May 2024). The purpose of this survey is to understand the interests and values of the stakeholders. The second survey will coincide with the draft plan release (timeframe to be determined). The purpose of this survey will be gathering feedback on the draft plan and make updates leading to a final plan.

Webpage – Inform

A project webpage has been created on lewiscountywa.gov titled: Comprehensive Plan Periodic Update. This webpage will host project documents, updates, schedule of events are more.

Navigate directly to the webpage using this link: tinyurl.com/LewisCounty2045

There are three main purposes for the website:

- Provide timely updates and materials to learn about the comprehensive plan document and process in greater detail.
- Advertise upcoming opportunities to get the community involved.
- Report back to the community on collected engagement data.

Social Media – Inform

There will not be a social media account for Lewis County 2045, instead staff will share information to existing platforms to encourage participation. Social media will be used to share project information, public meetings, and comment opportunities.

Platforms to share information with include, but are not limited to:

- East Lewis County News
- Lewis County News and Events
- Living Lewis County
- Lewis County Happenings 2.0

Community Engagement Summaries – Inform

Engagement summaries will be completed for each activity to detail conversations, feedback, and next steps (e.g. survey, meeting, interview, or pop-up series). These summaries will be available on the County website in a document titled Engagement Results, which will be updated throughout the project. Summaries will also be shared with the Lewis County Planning Commission and the Board of County Commissioners. Staff will notify email subscribers when these summaries are available.

Educational Materials - Inform

County staff will work with local colleges and districts to create learning materials to engage students and prepare materials to distribute to parents and guardians of students. In addition to coordination with students, the County may use these materials to engage and encourage conversations with community groups and organizations such as:

- Youth councils
- Senior center
- Agriculture organizations
- Farms
- Major employers
- Health departments
- Social services

Community Pop-ups – Involve

Staff and consultants will host pop-up tabling activities at specific community locations, (e.g., grocery stores). Each pop-up tabling opportunity will provide project information in an informal setting with the aim of connecting with groups who may not otherwise participate.

Community Events – Involve

The County will partner with organizations throughout Lewis County to host a table or booth to engage with stakeholders who may not participate in public meetings or online surveys. Staff will prioritize attending existing community events that are widely and regularly attended to reach as many stakeholders as possible. Examples are the Onalaska Apple Festival or the Packwood Mountain Festival.

Presentations to Board of County Commissioners and Others – Inform

Throughout the project, County staff will provide updates to interested groups of elected officials, including the County Commission to describe the process, communicate engagement efforts and outcomes and give updates on the plan development.

Translation and interpretation - Inform

The County intends to reach and engage with those who may not speak English fluently. In Lewis County, Spanish is the most common primary language after English. The County will provide all basic project information, surveys, and other significant outreach materials will be translated into Spanish. Interpreters may also be included for in-person meetings and open houses.

	Building Community Vision and Develop Draft Plan				Review the Draft Plan			Incorporate Comments into Plans			Public Hearings and Adoption Process					
Task	**MAR**	**APR**	**MAY**	**JUN**	**JUL**	**AUG**	**SEP**	**OCT**	**NOV**	**DEC**	**JAN**	**FEB**	**MAR**	**APR**	**MAY**	**JUN**
Inform	• Website, email and social media • Translation • Engagement summaries • Educational Materials				• Website, email and social media • Translation • Engagement summaries • Educational Materials			• Website, email and social media • Translation			• Website, email and social media • Translation • Engagement summaries					
Involve	• Community Events and pop-ups • Survey				• Community Events and pop-ups • Survey						• Community Events and pop-ups					
Collaborate	• Community Meetings, including interviews • Board of County Commissioners and Planning Commission meetings				• Community Meetings, including interviews • Board of County Commissioners and Planning Commission meetings			• Community Meetings, including interviews • Board of County Commissioners and Planning Commission meetings			• Community Meetings, including interviews • Public Hearings • Board of County Commissioners and Planning Commission meetings					

Figure 5 Engagement Tactics and Phases

Anticipated Barriers to Participation

The County understands that there may be existing barriers to participation. This CEP has identified potential barriers and strategies to overcome these. Engagement will be mindful of these barriers and strategies to maintain an accessible process.

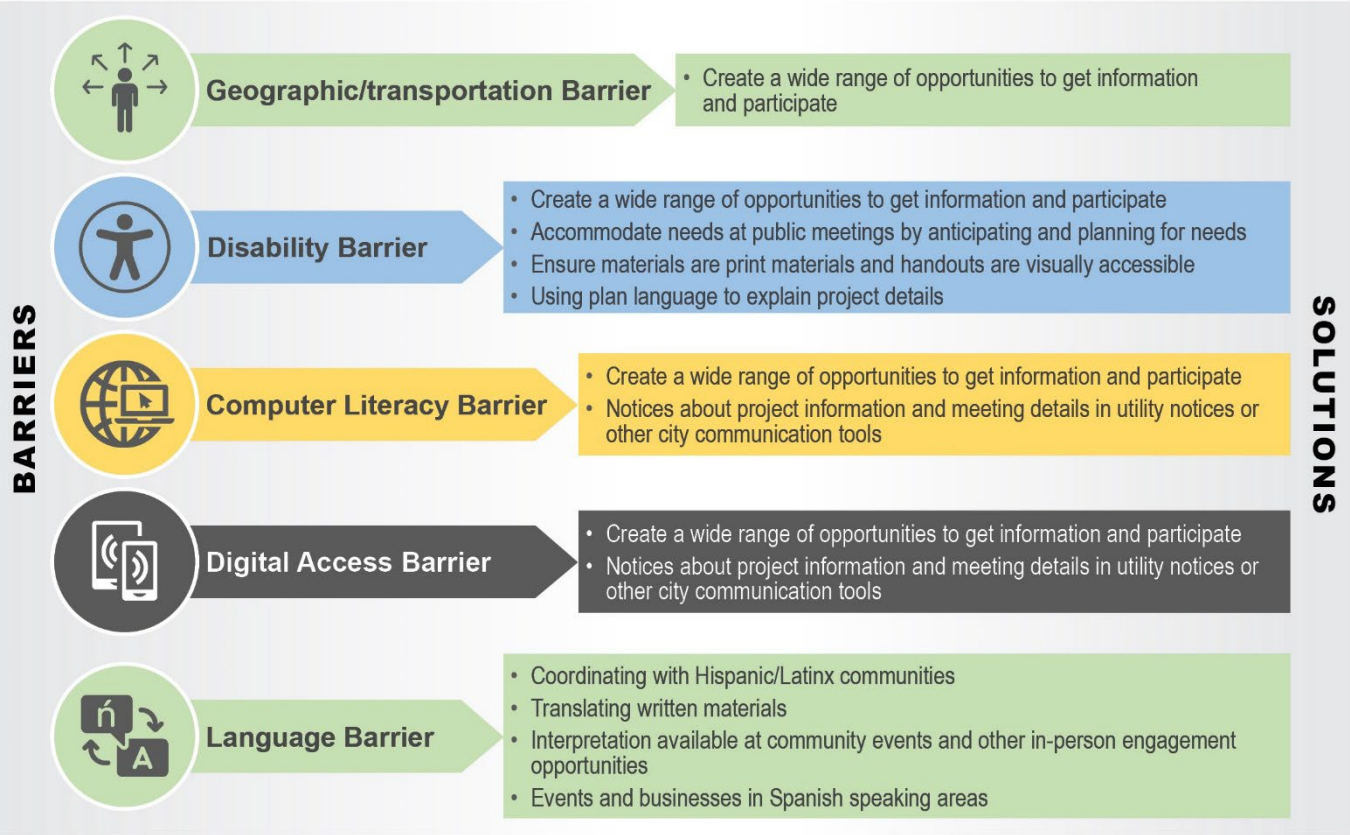

Figure 6 Engagement Barriers and Solutions

Climate Resilience Element

In 2023, the Washington Growth Management Act (GMA) was amended to require Comprehensive Plans begin including the climate change and resiliency element to ensure local governments prepare to adapt to and mitigate the effects of a changing climate. This new requirement requires goals and policies to improve climate preparedness, response, and recovery efforts. Lewis County 2045 will define climate and resilience as: strategies to cope with and manage the impact of severe weather events and associated natural hazards to prevent impacts from getting worse. This will build on two key studies completed by the County:

- 2023 Lewis County Hazard Mitigation Plan Update
- Flooding information/studies around I-5

The County aims to create a climate and resilience element in the plan that reflects the community priorities and values and increases the chance of community buy-in. Lewis County will conduct

engagement in support of this element concurrently with other engagement efforts and identify specific opportunities for members of the community living in areas identified has having risks associated with natural hazards including flooding, wildfire, extreme heat, etc.

Engagement goals

- Educate the community about climate resilience and hazard mitigation throughout the engagement process.
- Educate the community about their role in the planning effort and the importance of their input.
- Focus on communities most impacted by natural hazards for targeted interviews, focus groups, and community advisory committees.
- Integrate community feedback into the development of the climate and resilience element and clearly communicate how feedback is being used.

Key messages

- The community has an opportunity to shape the vision and direction of the County's climate resiliency planning efforts.
- The climate and resilience elements are not guidance, they will be integrated into Lewis County 2045 documents to support the County in mitigating risks associated with natural hazards.
- Feedback will help guide the development of the County's climate resiliency strategies.

Engagement approaches

- Develop key messages to implement and share during community engagement events.
- Develop specific survey questions to aid in the development of climate and resilience section.
- Climate resilience focus groups/interviews.
- Prepare educational materials or presentations to share at schools and community colleges.

Budget

The County does not expect large direct expenses for this engagement effort. Any funds allocated to engagement are expected to go toward print materials (e.g. public meeting boards, fliers, signs) and providing light refreshments for in-person meetings (Figure 7).

ITEM	ESTIMATED COST
Print Materials (Including signs and fliers)	$1,000.00
Food for Events	$500.00
Event Space / Rental	No Cost Anticipated
Total	$1,500.00

Figure 7 Anticipated Budget