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The Chehalis Basin

A History of Flooding

Flooding is a natural part of the Chehalis Basin's ecology, with minor flooding occurring every two to five years and a major flood event occurring approximately every ten years, on average.

The past decades have seen intensive land use and man-made changes to river flows. In addition, climate change has made heavy rains and flooding more common—making the situation potentially catastrophic.

Within the last 50 years, major floods occurred in 1972, 1975, 1986, 1990, 1996, 2007, 2009 and 2022. With the impacts of climate change, flooding has become increasingly severe—the 1996, 2007, 2009 and 2022 floods are the four largest floods on record, and the 2007 and 2009 floods occurred only 14 months apart.

Flooding puts homes, businesses, towns, and fish and wildlife at risk. As flood events become more common and intense, local communities bear the impacts. Much of the damage from recent major floods occurred in Chehalis and Centralia, where there has been more development in the floodplain than in other areas of the Basin. The 1990, 1996, 2007, 2009 and 2022 floods all resulted in the loss of homes, farms and businesses, as well as closures of Interstate 5.

2022 FLOODING DAMAGE IN THE BASIN

Includes impacts to public and private infrastructure and property

Lewis County:
\$5,610,518

Thurston County:
\$4,040,000

Grays Harbor County:
\$4,192,345

Source: Office of Chehalis Basin

Note: Preliminary numbers

Chehalis Basin Timeline: The Last 100 Years

MINOR, MAJOR, CATASTROPHIC?

Minor flooding usually results in minimal or no property damage, but there might be some public threat. Those will likely happen with great regularity.

A major flood (approximately 10-year event) on the Chehalis River is when water is flowing at more than 38,800 cubic feet per second (cfs) at the Grand Mound gauge. A catastrophic flood (100-year event) is when water is flowing at more than approximately 75,000 cfs.







Native Peoples

The Quinault, Chehalis, and other tribes have called the Chehalis Basin home for centuries. This is their ancestral land.

European Settlers

Settlers arriving from points east established townships in the Chehalis Basin starting in the 1850s.

- 1922** Bylaws form early foundations of Quinault Indian Nation
- 1924** Annual production of timber reaches 1 billion board feet
- 1925** Centralia College founded
- 1927** Chehalis-Centralia Airport opens

- 1934 Major Flood Event** 
- 1937 Major Flood Event**
- 1939** Confederated Tribes of the Chehalis Reservation formed
- 1941** Weyehauser opens first tree farm, in Montesano
- 1962** Columbus Day Storm
- 1969** Final section of Highway 5 opens in Washington
- 1971 Major Flood Event**
- 1972 Major Flood Event**
- 1973** Chehalis Reservation amends Constitution
- 1974** Boldt Decision re-affirms tribal access to non-reservation fishing grounds
- 1975** Constitution of the Quinault Indian Nation ratified
- 1975 Major Flood Event**
- 1980** Mount St. Helens erupts
- 1986 Major Flood Event** 
- 1990 Major Flood Events**
 - Quinault Nation implements self-governance
 - Tree sales limited on both private and public lands to protect the Spotted Owl
- 1996 Catastrophic Flood Event** 
- 1996 Catastrophic Flood**
- 2007 Catastrophic Flood Great Coastal Gale** 
- 2009 Major Flood Event** 
- 2010** Chehalis Basin Strategy launches
- 2012** Washington State Office of Financial Management begins funding local Chehalis Basin flood protection projects
- 2013** Aquatic Species Restoration Plan (ASRP) launches
- 2016** State Legislature forms Office of Chehalis Basin (OCB) and Chehalis Basin Board
- 2017** Department of Ecology releases Programmatic Environmental Impact Statement
- 2017-2021**
 - 37 local flood protection projects completed
 - 66 local aquatic species restoration projects completed
- 2019** Draft ASRP released
- 2020** OCB launches Community Flood Assistance and Resilience Program
- 2020** Army Corps of Engineers releases federal Draft Environmental Impact Statement
- 2020** Washington Department of Ecology releases the state Draft Environmental Impact Statement
- 2022 Major Flood Event Major King Tide** 
 - Quinault Indian Nation declares Landslide Emergency

Sources:

- Flood Data: State of Washington Department of Ecology, Proposed Chehalis River Basin Flood Damage Reduction Project, SEPA Draft Environmental Impact Statement, Appendix N: Water Discipline Report, 2020
- Tribal Timeline: Northwest Portland Area Indian Health Board Website, Washington Tribes, Chehalis Tribe and Quinault Indian Nation
- Chehalis Basin Strategy Overview Brochure

Regional Importance

The Chehalis Basin provides tremendous value to the entire region: to residents and visitors, to businesses throughout Washington and Oregon, and to commercial and private transportation along the entire West Coast.

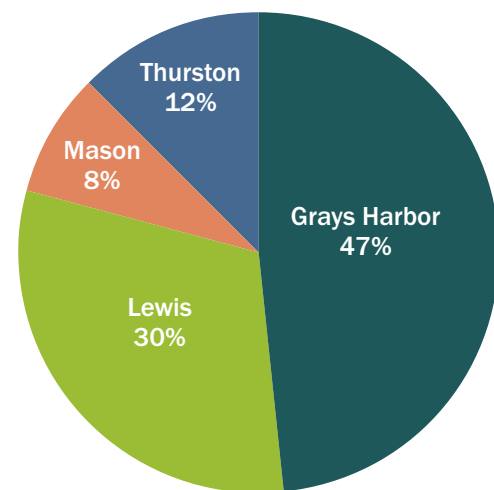
In aiming for a multi-benefit approach to flood damage reduction—balancing water supply, habitat and species conservation, recreation planning, and land use and economic development—the Chehalis Basin Strategy and the LAND Alternative development process seek to balance structural interventions that affect the natural flow of water with programs that minimize negative environmental and cultural impacts.

Navigating diverse cultural, economic, and ecological issues; juggling multiple objectives and stakeholder needs; and addressing the complex challenges of climate change make the Chehalis Basin a microcosm of challenges of the broader region.

The state of Washington prides itself on its commitment to sustainable solutions that combat climate change. Chehalis Basin Strategy’s comprehensive and inclusive approach can provide a template for other communities facing similar concerns.

Communities in the Basin

Over 190,000 people call the 2,700-square-miles of the Chehalis Basin area home. Most of the population lives in Grays Harbor County, followed by Lewis, Mason, and Thurston County.



Source: United States Census Bureau

The area is planning for growth—approximately 220,000 people are projected to live in the Basin by 2025. Growth is predicted to continue beyond 2025 as well.

The Washington State Employment Security Department estimates that the Basin’s population will increase by about 42,000 people by 2040; Grays Harbor County as a whole will increase about 3%, Lewis County by 12%, Mason County by 27%, and Thurston County by 27%.

Another four counties share a combined total of 3% of population of the Basin: Pacific, Cowlitz, Jefferson, and Wahkiakum.

Census data shows that the Basin has lower population and housing density than the state average, although the average household size is similar to the state. Income is lower than the state average across all metrics. Most of the population has a high school education, followed to a lesser degree with some college but no degree. Most families own the home they live in, but the average median home income is lower than the state average.

Population Characteristics

	Quinault Reservation*	Chehalis Reservation/Off-Reservation	Chehalis Basin	Grays Harbor County**	Lewis County	Washington State
Population	1,272	847	192,881	71,734	75,382	6,899,123
Population Density (sq. mile)	4.1	124.2	71.4	38.3	31.4	101.2
Housing Density (sq. mile)	1.5	41.1	32.4	18.5	14.2	43.4
Average Household Size	3.19	3.47	2.4	2.51	2.52	2.55
Median Household Income	\$29,659	\$39,318	\$50,265	\$43,379	\$42,917	\$60,294
Owner Occupied Housing	61.1%	57%	67.8%	69%	67.8%	62.7%
High School Degree	34%	41.1%	29.5%	31.4%	32.2%	23.3%
BA Degree	9.3%	7.4%	13.4%	10.5%	8.6%	20.6%

Source: USCB 2020a,b,c,d.

*QIN reservation lies outside of the Chehalis Basin

**Countywide population

Population Centers in the Upper Basin



ADNA

Unincorporated Adna, in the rural farm country of Lewis County, is next to the Chehalis River about six miles south of the City of Chehalis. The US Census defines Adna as a “populated place.” The Adna School District serves a population of about 3,500. Adna boasts many acres of fertile farmland and a small commercial center that serves surrounding residents.

CHEHALIS

At a point almost exactly between Seattle and Portland, straddling Interstate 5, is Chehalis. With a population of about 7,700, it is also the county seat of Lewis County. The historic downtown and most of the city’s amenities lie on the east side of the freeway nestled at the base of forested hills. On the west side of the freeway are parks, farms, housing subdivisions and a centralized shopping district, the Twin City Town Center. The Chehalis–Centralia Airport, just west of the freeway, does not have commercial flights but averages about 130 private flights a day.

CENTRALIA

Centralia began as the site of a toll ferry at the confluence of the Chehalis and Skookumchuck rivers, and the stopping point for stagecoaches between Kalama and Tacoma. It was primarily a logging and mining town. In 1980, the explosion of Mount St. Helens destroyed or damaged much of the area’s stockpiled lumber and salable timber, which devastated an industry already in decline. The City reinvented itself as a historical district and has found new life as a shopping destination, based on its central location between Seattle and Portland. Centralia is experiencing growth in both its light industry areas as well as its core business district. And new regional distribution and transportation facilities, along with in-migration from retirees from more populated counties to the north, have helped diversify the economy. It’s seen a 60% growth in population during the past four decades; over 18,000 people now live there.

PE ELL

Located high in the hills of the upper Chehalis watershed, Pe Ell has a population of about 650. The site was established by farmers in the 1850s, but the local industry soon switched to logging. The town today is the starting point of the Pe Ell River Run with entrants floating down the Chehalis River in mostly homemade crafts. The proposed FRE would be located just above the town.

LOWER BASIN COMMUNITIES

There are also a number of communities north of Grand Mound in the lower Chehalis Basin. These include Rochester and Oakville, Elma, Satsop, Montesano and Aberdeen at the mouth of the Chehalis River.

Confederated Tribes of the Chehalis Reservation and the Quinault Indian Nation

The Chehalis river system has long been—and continues to be—an integral part of the culture, economy, history and spiritual identity of the Chehalis, Quinault, and other tribes of the region.

Native peoples, many of whom now make up the Confederated Tribes of the Chehalis Reservation (Chehalis Tribe) and the Quinault Indian Nation (QIN), have called the Chehalis Basin home or have traveled to the Basin for spiritual journey and sustenance, for thousands of years. The Chehalis Tribe and QIN originally occupied and traveled throughout an extensive region stretching westward from the Cascade Mountains to the Pacific Ocean. The traditional territories of the Chehalis Tribe were along the entire Chehalis and nearby rivers, as well as near Grays Harbor and the lower Puget Sound. The Quinault Indian Nation’s ancestors historically lived along the Coast of Washington and roamed throughout a traditional territory that included the entire Chehalis River Basin. In the mid-1800’s, the federal government reservations and the Tribe were displaced from their original homes to these locations.

The Chehalis Tribe’s Reservation is about 4,440 acres along the northern banks of the Chehalis River southeast of Oakville and contains about 10 river miles of the Chehalis River and three river miles of the Black River upstream from the mouth. The Chehalis Tribe rejected the unacceptable terms of treaties offered by the U.S. government and are a federally recognized “non-treaty” tribe. Its status as a non-treaty tribe has affected the Chehalis’ hunting and fishing rights.

The Quinault Indian Reservation is about 200,000 acres around Taholah at the mouth of the Quinault River—one of the largest among the 29 federally recognized sovereign tribes in Washington State. The Quinault signed the Treaty of Olympia, in which it reserved the right of “taking fish at all usual and accustomed fishing grounds and stations”—which includes all streams that flow into Grays Harbor—and the right of hunting and gathering, among other rights, in exchange for ceding lands it historically roamed freely.

Source: Office of Chehalis Basin



Transportation Corridors

U.S. Interstate 5 is the major north-south route along the West Coast, from Mexico to Canada. When it is closed, the entire West Coast feels an economic ripple effect. The I-5 corridor was closed for several hours in 1990, for four days in 1996 and again in 2007, for two days in 2009, and for several hours in 2022. Under current conditions, the Washington State Department of Transportation (WSDOT) predicts I-5 could be closed for as many as five days during a catastrophic flood in the Chehalis-Centralia area. A closure that long would drastically affect interstate commerce and impede local access to

critical medical facilities. During flooding events, no viable detours are available because feeder roads and local streets and highways are also flooded or gridlocked with diverted traffic.

Past flooding has also affected State Route 6 and State Route 12 as well as major roadways in Lewis, Thurston, and Grays Harbor counties; the Centralia-Chehalis Airport; and railroad facilities. In addition to extensive cleanup and repair costs, flood closures also result in lost productivity and revenue for businesses each time I-5 is closed.

Economies of the Basin

The 2,700-square mile Chehalis River Basin is a unique mosaic of distinct economic communities: industry and agriculture, forestry, and fishing and all the community-based supporting business and services. These industries, whether large-scale or community-serving, are both economically and culturally important for the identity of the Basin. They also have been instrumental in shaping the physical characteristics of the Basin and how it responds to flooding.

The timber industry plays a huge role in the Basin's economy. The dense forests

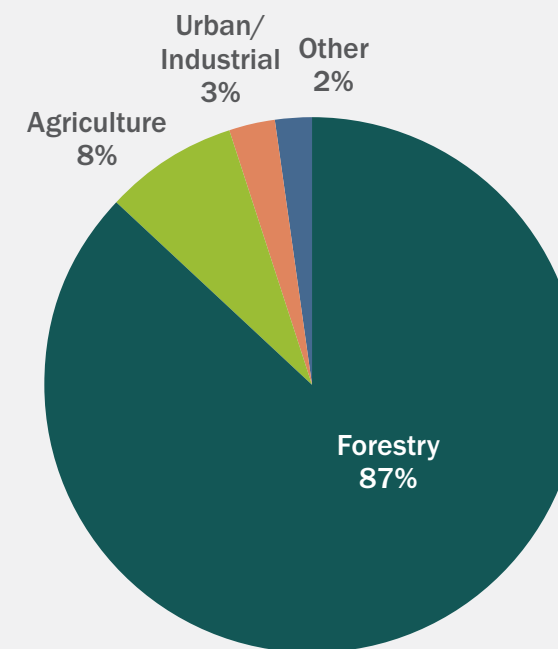
of cedar—along with spruce, hemlock and Douglas fir—attracted large numbers of loggers and mill operators from the 1800s to the early 1900s, eager to harvest as much as they could, as quickly as they could, clear-cutting old growth forests.

The last 150 years of human development have altered the natural operations of the Basin's ecosystem. While flooding has been documented in the region for hundreds of years, salmon populations have declined precipitously since European settlement.

Source: Shutterstock

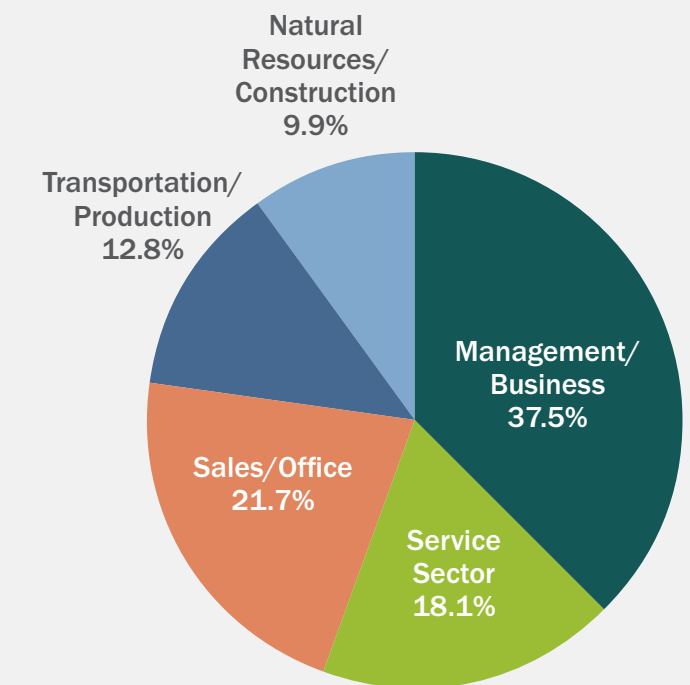


Percentage of Basin Lands



Source: Office of Chehalis Basin

Employed Population in the Basin



Note: Civilian sector, 16 years and older.

Source: Resource Dimensions, 2020 (USCB, 2019c)

Fisheries and Wildlife

The Chehalis Basin is a fertile ecosystem with abundant wildlife. The Chehalis River and its tributaries are home to some of the most culturally and ecologically important species in the region, including steelhead, Chinook, coho, and chum salmon. The Chehalis Basin is also unique in Washington in that no salmonids are listed as threatened or endangered, although spring Chinook are currently being evaluated to determine if they should be listed. Also important to the ecosystem are freshwater shellfish and the aquatic macroinvertebrates that fish feed on, as well as the local bird species that rely on the availability of fish for food. These waters also provide important habitats for the largest array of amphibians in the state, including the Oregon spotted frog which is listed as endangered or threatened species.

Fishing and shell fishing are a core part of the Basin's identity, both in terms of economic sectors (Tribal and non-Tribal commercial fishing industries and sport fishing) as well as for their cultural significance for Tribal and non-Tribal fishers. Salmon runs have declined precipitously, due to a combination of lost and damaged habitat, changing climate conditions, and development. Estimates show that habitat for salmon production has already been reduced by as much as 80-87% from historic levels.

Existing salmon populations are now less than 50% of their historic run sizes, with spring Chinook salmon currently just 23% of historic run sizes in the Chehalis Basin overall.

Other estimates indicate even more significant reductions. Recent modeling shows salmon declines in the Upper Chehalis as high as 97.9% for spring Chinook, highly prized as the first salmon species to return to the rivers in the spring. Modeling also shows salmon in the Upper Chehalis River are down 92.4% for coho, 81.4% for fall Chinook and 76.7% for steelhead.

Scientists, researchers, and technical specialists say if no action is taken the Basin could lose Chehalis River spring Chinook salmon entirely in 60 years. The Basin could also lose a significant percent of the economically-vital steelhead runs in that same period. In most years, both Tribal and non-Tribal fishers have had to limit harvests or forego them entirely to protect the most vulnerable species. In the future, without aggressive protection and restoration, Upper Basin salmon and steelhead populations are predicted to drop 70% from current levels, and by the late century spring-run Chinook, coho, and steelhead could disappear entirely from Rainbow Falls to Crim Creek. Future flood damage reduction projects could also have an impact on the health of the Basin's fisheries.

Salmon Loss in the Chehalis River

Species	2016 Analysis		
	Historic Levels	Current Levels	% Loss
Coho	538,000	41,000	92.4%
Fall Chinook	140,000	26,000	81.4%
Spring Chinook	70,000	1,500	97.9%
Winter Steelhead	30,000	7,000	76.7%

Source: 2016 Report to the Quinault Indian Nation by Larry Lestelle
 Note: Based on EDT modeling; numbers are from ICFI. Chum not included.

Source: Chronicle



Current Agricultural Activity

The Chehalis Basin has rich soil, a mild climate, and proximity to large population centers for access to local markets. As a result, the ~200 working farms in the Basin—providing both livestock and crops—produce \$650 million in revenue annually (including the “economic multiplier” effect from local job creation).

The value of livestock surpassed crops in all counties except Grays Harbor, where the value of crops and livestock production are about equal (as of 2017).

Most agricultural land—just under 300 square miles—are located within low-lying valleys west of the Chehalis River and along its major tributaries (the South Fork Chehalis, Newaukum, Skookumchuck, Black, Satsop, and Wynoochee Rivers and Scatter Creek). When the rivers flood, this agricultural land also floods.

Although cultivated cropland represents less than one percent of the total land area in the Basin, almost half the land along the mainstem of the Chehalis River is used for agricultural purposes (including pasture for livestock). Principal crops include fruits such as blueberries, cranberries, and grapes; alfalfa, Christmas trees, hay and silage, corn with some nursery stock, vegetables, and small grains. Impacts to agriculture are highly dependent on the scale and severity of flooding. While some areas may benefit from periodic flooding, other areas can be adversely affected by debris and damage brought by floodwaters, as well as the negative economic impacts brought about by road closures and lack of access to markets.

Recreation

Both Basin residents and visitors from Washington and Oregon enjoy the fishing, hiking, camping, birdwatching, kayaking, canoeing, whitewater rafting, hunting, and golfing that the area offers. On the Chehalis River, three main recreational facilities have experienced severe damage during flooding: Rainbow Falls State Park, Southwest

Washington Fairgrounds, and the Willapa Hills State Park Trail. Others have experienced less severe flooding that can often damage and close the facility. With continued flooding, more users would be affected by closures, which would also have an economic impact on communities like Chehalis, Centralia, and Pe Ell.

Ecosystem Services

The Quinault Indian Nation sponsored a 2020 study by Resource Dimensions, whose findings were published in a technical report titled “Economic Value of Chehalis Basin Ecosystem Services.” The report states:

“From an ecological economics perspective, the goods and services provided by the Chehalis Basin landscapes are both vital to the functioning of the regions ecosystems and contribute significantly to the human welfare of the Basin’s residents. For example, salmon is a cultural foundation, as well as economic, with important cultural ties to local customs and traditions and identity.”

Ecological economics addresses the relationships between natural ecosystems and human economic systems by accounting for the natural environment as a form of natural capital and valuing the goods and services delivered by those ecological systems. “The Chehalis Basin provides an estimated minimum of \$1.1 billion to upwards of \$15.7 billion in ecosystem service benefits annually,” the study finds. And during the next 100 years, the Chehalis Basin will provide “\$49.1 billion to \$233.7 billion.” The wide range reflects a conservative approach, and the study notes that even the high range may be an underestimate.

Source: Chronicle

