Conservation Element

Part 2 – Technical Information

City of Tumwater 2025 Comprehensive Plan

Balancing Nature and Community: Tumwater's Path to Sustainable Growth

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CITY OF TUMWATER

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Abbreviations Used in Document

CDD – Community Development Department

RCW – Revised Code of Washington

TMC – Tumwater Municipal Code

WAC – Washington Administrative Code

WRS – Water Resources & Sustainability Department

1. Introduction

A. Background

The Conservation Element is part of Tumwater's Comprehensive Plan. It was created to meet the State Growth Management Act (Chapter 36.70A RCW) requirements to identify and protect critical environmental areas and valuable natural resources.

The Element addresses:

1. **Natural Resource Lands Conservation**
   - Agricultural Lands
   - Forest Lands
   - Mineral Resource Lands
2. **Critical Areas Protection**
   - Wetland Areas
   - Critical Aquifer Recharge Areas
   - Frequently Flooded Areas
   - Geologically Hazardous Areas
   - Fish and Wildlife Habitat Conservation Areas

The Growth Management Act requires that Tumwater demonstrate that each Element in its Comprehensive Plan meets the relevant fifteen planning goals contained within the Act. The fifteen goals in turn guide the development and adoption of Tumwater's Comprehensive Plan and development regulations.

The Conservation Element addresses the two Growth Management Act goals related to the environment and natural resources:

CONSERVATION

State requirements (WAC 365-196-405) that the Comprehensive Plan must meet:

- Designation of the proposed general distribution and general location and extent of the uses of land, where appropriate, for agricultural, timber, and mineral production of long-term commercial significance.
- The general location of any known critical areas that limit the suitability of land for development.
- Provisions for the protection of the quality and quantity of ground water used for public water supplies.
- A review of drainage, flooding, and stormwater runoff in the area covered by the plan and nearby jurisdictions, and guidance for corrective actions to mitigate or cleanse those discharges that pollute waters of the state, including Puget Sound or waters entering Puget Sound.
- Influences or threats to the quality and quantity of ground water used for public water supplies.

8. ***Natural resource industries.*** *Maintain and enhance natural resource-based industries, including productive timber, agricultural, and fisheries industries. Encourage the conservation of productive forestlands and productive*

agricultural lands, and discourage incompatible uses.

The Conservation Element has specific guidelines and policies that ensure the viability of natural resource industries and activities. Additionally, the Conservation Element ensures the viability of natural resource industries in Tumwater through the identification of such lands in the Conservation Element text and maps.

While Tumwater has limited natural resource lands as defined by the Growth Management Act, it does have mineral resources, forestry, and agriculture lands. Tumwater supports urban forestry and agriculture appropriate and compatible with other land use goals, policies, and implementation actions.

10. ***Environment.*** *Protect and enhance the environment and enhance the state's high quality of life, including air and water quality, and the availability of water.*

The State Legislature updated the Growth Management Act environment goal in 2023 to require enhancement of the environment.

The Conservation Element contains specific policies relating to air and water quality, water availability, and protection and preservation of critical areas and enhance the environment. Areas of environmental sensitivity are designated as open space or a lower intensity land use designation than other areas of Tumwater.

If conflict occurs in the implementation of planning and development regulations, the priority of protecting critical areas will be superior to other uses of natural resources.

The Conservation Element and implementing ordinances were developed with public input as described in the Public Outreach Plan required by the Growth Management Act. The Element is based on the updated list of additional supporting plans, documents, and best available science found in Appendix A.

B. How to Read this Part of the Element

Part 2 of the Conservation Element consists of the following chapters.

- **Chapter 2 – Natural Resources**: Provides a summary of Tumwater's current mineral resource lands and discusses urban forestry and urban agriculture.
- **Chapter 3 – Critical Areas**: Provides a summary of critical areas in Tumwater, including wetlands, critical aquifer recharge areas, frequently flooded areas, geologically hazardous areas, and fish and wildlife conservation areas. Each critical area has its own section, discussing regulations, classifications, and locations within Tumwater.
- **Appendix A – Foundational Documents and Best Available Science**: Provides a list of the documents used to create the Conservation Element's Technical Summary.

C. Best Available Science

RCW 36.70A.172 and WAC 365-195-900 through WAC 365-195-925 require Tumwater to use best available science in revising or adopting new policies and regulations related to critical areas.

Utilization of best available science is particularly important to wetland and riparian area protection, floodplain areas and salmon recovery efforts required under the Endangered Species Act. Best available science is a process to assist jurisdictions in ascertaining what science is appropriate for use in basing policy and regulatory decision-making.

Tumwater uses best available science in all revisions and additions to critical areas policies and regulations to protect the functions and values of critical areas.

D. Shorelines of the State

For shorelines of the state, the goals, and policies of the Shoreline Management Act (RCW 90.58.020) were added as one of the goals of the Growth Management Act (RCW 36.70A.020) without creating an order of priority among the fifteen goals. The goals and policies of Tumwater's Shoreline Master Program approved under RCW 90.58 shall be considered an element of the Comprehensive Plan.

The shorelines of the state as identified by the Shoreline Management Act within Tumwater include the Deschutes River, and Black Lake Drainage area as well as Trosper Lake, Barnes Lake, Lake Susan, and Munn Lake. Shorelines of the state within Tumwater's urban growth area include Black Lake.

Shorelines of the state also include the upland or shorelands that extend 200 feet landward from the edge of these waters, and any wetlands, floodways, and floodplain areas associated with such waters.

Tumwater's updated Shoreline Master Program was adopted in 2019 following review and approval from the State Department of Ecology. The Shoreline Master Program incorporated the existing critical area regulations from TMC Chapter 16.20, TMC Chapter 16.28, and TMC Chapter 16.32.

2. Natural Resources

A. Background

Natural resources are the materials that occur in nature and are used by humans to meet their needs. The European settlement of Tumwater was based on its location adjacent an abundant water source for industry and transport. The trees around Tumwater were harvested and used for construction, wood pulp, and other products.

Today, natural resources are still a part of Tumwater's urban environment. Having access to locally grown fresh food, forests for wood products, and mineral resources for transportation and other infrastructure reduces the cost of transporting these essential goods from far away. It also creates jobs in harvesting and manufacturing these raw materials into goods.

Natural Resources serve many benefits besides use. Trees sequester carbon, filter air, provide shade, absorb water, and provide habitat. Agriculture improves soil fertility, manages water infiltration, reduces soil erosion, and provides habitat.

Harvesting natural resources can also have impacts on neighboring ecosystems, properties, and human health. Air pollution, erosion, and habitat loss are some of the more detrimental disturbances.

Identifying lands where humans should extract and use resources that will have less impact on the landscape and on other humans is an important part of planning. This section considers natural resources in Tumwater, their value for residents, and considers which lands are most appropriate for natural resource use in an urban area.

B. Urban Agriculture

1) Introduction

Protecting agricultural resource lands in rural areas is prioritized in the Growth Management Act. While Tumwater is developing to urban levels to protect the long-term sustainability of agricultural resource lands outside of the urban area, there are limited areas of Tumwater that currently contain agricultural uses.

Access to healthy food choices is an important public health issue. Lack of healthy food choices contributes to health problems such as obesity, diabetes, heart disease, and cancer. Access to healthy food and local food production are clearly part of planning for a vital, healthy community.

The Tumwater City Council's Strategic Plan has several goals and policies directly related to environmental sustainability and increasing the availability of healthy, locally grown food. Long distance transportation consumes an enormous amount of fossil fuel and generates a great deal of greenhouse gases. Increased local food production has a direct beneficial effect on the environment by reducing greenhouse gas emissions. Transportation costs are much lower for local food producers.

In addition, a direct benefit to the community is the provision of fresh, healthy, locally grown food. Encouraging a wide range of local food production options compatible with an urban environment are important policy decisions in furthering the sustainability goals of Tumwater.

2) Sustainable Urban Agriculture

Sustainable urban agriculture can take a variety of forms, some of which are listed below.

1. **Urban Farm.** An urban farm is where plants and/or some animals are grown for sale of the plants and animals or their products, and in which the plants and animals or their products are sold either on the lot where they are grown or off site, or both. Examples may include flower and vegetable raising, orchards and vineyards. Urban farms are small-scale agricultural uses that are appropriate for an urban area and compatible with other urban land uses.
2. **Community Garden.** A community garden means land managed by a public or nonprofit organization, or a group of individuals, which is used to grow plants and harvest food or ornamental crops from them for donation or use by those cultivating the land and their households.
3. **Individual Home Garden.** A home garden is a garden grown on a residential lot as an accessory use to the primary use for consumption by the occupants.
4. **Farmers Market.** A farmers market consists of a group of individual venders primarily selling locally grown produce and products drawn from the region. This use typically is seasonal and may be temporary. Some examples are set up on closed streets or on portions of sites used for other primary uses.

3) Agricultural Lands Classification

The Conservation Element's classification and identification of agricultural lands of long-term significance is based upon the land-capability classification system of the U.S. Department of Agriculture Handbook No. 210, which utilizes soil characteristics to determine capacity. The classes of agricultural lands are based upon consideration of growing capacity, productivity, and soil composition of the land.

The reference standard for defining categories of agricultural lands of long-term significance is the use of prime and unique farmland soils classifications as mapped by the Natural Resource Conservation Service in the Web Soil Survey.

The Conservation Element recognizes that under the Growth Management Act, the prime agricultural lands in Tumwater and its urban growth areas have developed for urban uses in large part to protect the agricultural lands of long-term significance in rural Thurston County from development pressure.

These circumstances do not allow for a classification of agricultural lands of long-term significance to be applied to Tumwater or its urban growth area, which is intended for urban growth under WAC 365-190-050(3)(a).

4) Agricultural Lands Identification

The U.S. Department of Agriculture updates the soil classification and surveys annually. The

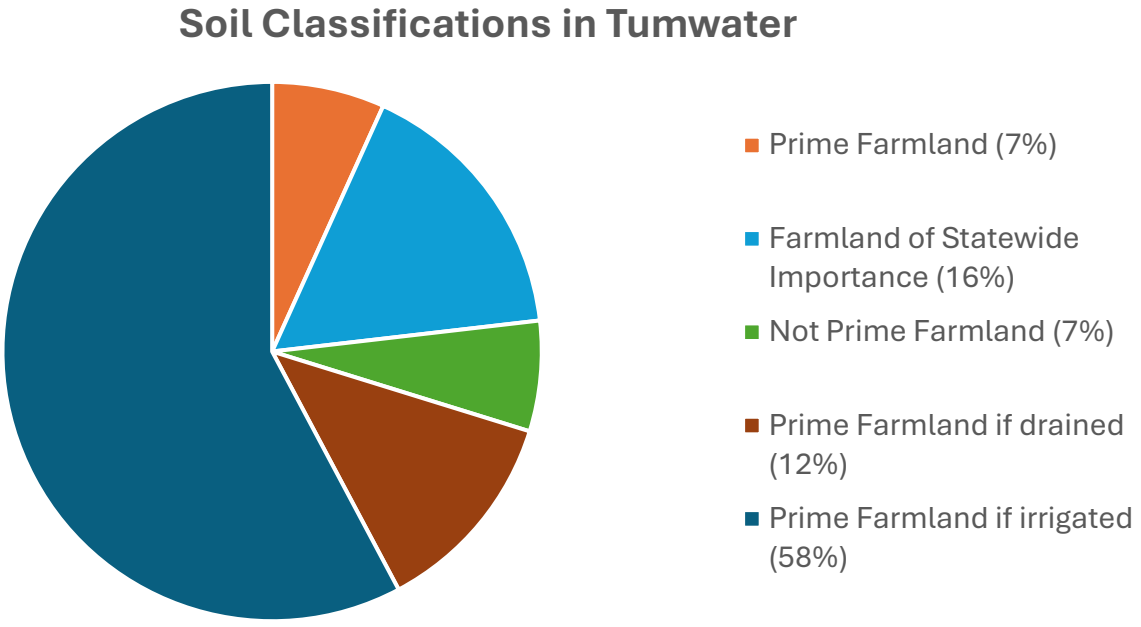
Natural Resource Conservation Service soil survey report for Tumwater is included as Appendix A.

The Natural Resource Conservation Service Soil Survey Report for Tumwater and its urban growth area provides information on the various soils as surveyed in the area. Classifications for soil are contained in the report as well as information about the characteristics of the soil and suitability for land use types. The percentage of prime soil, soils of state significance, and other agriculture land uses classes are provided in Table C-1 below.

While this information is valuable for open space and parcels without development, most of the soil in Tumwater is or will be covered by urban land uses. Information on soil is developed from the Natural Resource Conservation Service Soil Survey of Thurston County. Soils in the classifications including where drained and where irrigated were not included as those actions do not align with other conservation goals within this section.

Urban soils are separately identified as they have different characteristics than natural soils. Part of the reason for this is the impact of human activity from adding fill material to make it more suitable for specific development or to modify the landscape for specific activities.

Figure C-1. Agricultural Soil Classifications in Tumwater.



Source: Web Soil Survey, Natural Resources Conservation Service, U.S. Department of Agriculture. Accessed April 2025.

5) Current Agriculture Uses

Currently within Tumwater there are several agriculture operations identified by the State Department of Agriculture. Several landowners produce hay, pasture, lawn and turf, nursery, and other crops. One of two local farmstand and corn maze agritourism businesses and a grocery retailer focused on local food are located within Tumwater.

Due to the current use, there are parcels within Tumwater that are designated as agriculture and

are eligible for tax reduction programs through the State Department of Revenue.

This incentive-based program promotes the retention of lands used for agriculture by reducing the tax rate for these parcels and restricting the use to agriculture. Future landowners are deterred from changing the land use as doing so results in a penalty. Map C-1 shows the properties enrolled in these programs within Tumwater.

6) Small Scale Urban Agriculture

There are other land use factors that impact small scale agriculture in urban areas and should be considered when regulating food systems. Encouraging small-scale urban farms and community gardens is one way Tumwater can play a role in ensuring food access, food security, and overall environmental sustainability into the future.

While lands for agriculture can be found within Tumwater, the cost of land and the economic pressure for development make it difficult to sustain large scale agriculture businesses within Tumwater.

Existing Tumwater support for small scale agriculture includes:

- The Right-to-Farm Ordinance (Ordinance No. 1276, effective 1991) protected legally established agricultural facilities.
- The Urban Agriculture Ordinance (Ordinance No. O2010-029, effective 2011) established regulations for the following:
    - New agriculture uses are allowed within the Airport Related Industry, Light Industrial, Residential/Sensitive Resource, Single Family Low, Single Family Medium, and Multifamily Medium zone districts provided they are thirty acres or less in size that meet specific requirements.
    - Farmers markets as a permitted use in all commercial and industrial zone districts.
    - Community gardens as a permitted use in all residential, commercial, and industrial zone districts, except for the Manufactured Home Park zone district.
    - Permitting small scale farm animal options such as apiaries, poultry, and rabbits within Tumwater.
    - Taller fences for agricultural uses.

In 2024 the City Council approved a project to review the food system in Tumwater which included a review of regulatory barriers and prepare a plan to address next steps.

C. Forest Lands

1) Introduction

Protecting forest lands in rural areas is prioritized in the Growth Management Act. While Tumwater is developing to urban levels to protect the long-term sustainability of forest resource lands outside of the urban area, there are limited areas of Tumwater that are classified as forest resource

lands.

Applying best management practices on forest land creates environmental benefits such as:

- Improving water and air quality
- Reducing soil erosion
- Decreasing damage from storms and floods
- Protecting wildlife habitat
- Providing scenic and recreational spaces

2) Forest Lands Classification

The Growth Management Act requires Tumwater to classify current forest resource lands. The classification of the forest lands is based upon the private forest land grades of the State Department of Revenue (WAC 458-40-530).

This classification system incorporates consideration of growing capacity, productivity, and soil composition of the land. These factors are calculated and expressed as a site index. Forest lands of long-term commercial significance generally have higher private forest land grades. If lower private forest land grades exist within areas of predominately higher grades, the land may be designation as forest land.

Identifying lands suitable for forest land designation in Tumwater balanced the state requirement that growth occur in urban areas against the review of the dominant species and site index to determine the land grade. Table C-1 shows land grades for Western Washington forests.

Table C-1. State Private Forest Land Grades.

Washington State Species: Westside	Private Forest Site Index	Land Grade
Douglas Fir	136 feet and over	1
	118 to 135 feet	2
	99 to 117 feet	3
	84 to 98 feet	4
	Under 84 feet	5
Western Hemlock	136 feet and over	1
	116 to 135 feet	2
	98 to 115 feet	3
	83 to 97 feet	4
	68 to 82 feet	5
	Under 68 feet	6
Red Alder	117 feet and over	6
	Under 117 feet	7

Washington State Species: Westside	Private Forest Site Index	Land Grade
	Marginal forest productivity	7 or 8
	Noncommercial	8

Source: WAC 458-40-530

Notes: Land Grade 1 = highest, Land Grade 8 = lowest. The marginal forest productivity in Tumwater is Land Grade 8

Forest lands are further defined by operability classes based upon characteristics of soils and slope. The criteria are as follows:

- **Class 1 – Favorable**. Stable soils that slope less than thirty percent. Forest operations do not significantly affect soil productivity and soil erosion. Forest operations, such as road building and logging, are carried out with minimal limitations.
- **Class 2 – Average.** Stable soils that slope less than thirty percent, but on which significant soil erosion, compaction, and displacement may occur because of forest operations.
- **Class 3 – Difficult**. Soils with one or both of the following characteristics:
  a. Stable soils that slope between 30 and 65 percent; and
  b. Soils that slope between zero and 65 percent but display evidence that rapid mass movement may occur as a direct result of forest operations.
- **Class 4 – Extreme**. All soils that slope more than 65 percent.

3) Current Forest Land Use

Forestry occurs at many different scales in Tumwater. Common forestry activities include maintaining existing trees through pruning and non-native plant removal, planting new trees in parks and streetscaping, and tree removal.

Within Tumwater, there are also stands of trees which are currently used for commercial harvest. These stands of trees are harvested and replanted to harvest again in cycles to produce timber for the many wood products made, purchased, or used locally.

There are parcels within Tumwater that are designated for forestry use and are eligible for tax reduction programs through the State Department of Revenue Open Space Program. This incentive-based program promotes the retention of land used for forestry by reducing the tax rate for these parcels and restricting the use to agriculture.

Future landowners are deterred from changing the land use as doing so results in a penalty. Map C-2 and Table C-2 show the properties enrolled in these programs within Tumwater.

Thurston County Assessor public records show that seven parcels within Tumwater and its urban growth area are designated forest land. The total area of all designated forest land in Tumwater is 371.81 acres. More than half of the parcels are owned by a large timber company that manages many parcels for forest products.

There are also lands which are not identified by the assessor nor enrolled in the program where forest practices occur.

Table C-2. Forest Resource Land Identification.

Parcel Number	Parcel Area	Adjacent Land Use Designation	Adjacent Current Land Use
11718330000	37.95	Low Density Residential, Neighborhood Commercial, Open Space	Residential
12721330000	38	Light Industrial	Residential, Commercial, Industrial
12820340000	120	Light Industrial, Low Density Residential, Heavy Industrial	Natural Resource, Residential
12829210000	30	Light Industrial, Low Density Residential, Heavy Industrial	Natural Resource, Residential
12829230000	120	Light Industrial, Low Density Residential, Heavy Industrial	Natural Resource, Residential
12829410000	16.01	Green Belt, Low Density Residential, Light Industrial	Residential, Parks, Vacant
12832420500	9.85	Low Density Residential	Residential, Vacant, Commercial, Industrial, Utilities
51620100100	9.59	Light Industrial	Residential, Commercial, Industrial

Sources: Thurston County Assessor and Thurston Regional Planning Council, 2025.

4) Forest Lands Conservation

Development and urbanization are the leading causes of forest lands conversion. The Growth Management Act protects forest resources in the rural areas by directing urban development within Tumwater and its urban growth area.

Table C-2 shows the conditions for conversion of forest lands to urban land uses.

Table C-3. Forest Lands Designation Considerations.

Considerations	Tumwater Conditions
The availability of transportation and other necessary public services and facilities	Services and facilities available
Forest lands are located outside the urban and suburban areas and rural settlements	Located within an urban area
Parcel size: forest lands consist of predominantly large parcels	Parcels identified are small to medium in size
The compatibility of adjacent and nearby land use and settlement patterns with forest lands of long-term commercial significance	Adjacent land uses of urban land use intensity
Property is assessed as open space or forest land	Seven parcels identified

pursuant to Chapter 84.33 RCW or Chapter 84.34 RCW	
Local economic conditions	Not supportive in the long term of forest land designation
History of land development permits issued nearby	Parcels harvested under state conversion permits are processed by Tumwater

5) Forest Lands in the Urban Area

The Growth Management Act (WAC 365-190-060(2)) locates forests of long-term commercial significance outside of urban growth areas. Forest lands in Tumwater and its urban growth area are not considered in the Conservation Element to be of long-term significance and are not planned for designation as protected resource lands.

Tumwater continues to manage urban forest resources for the many benefits they provide to residents and the larger region. Several goals and policies in the Comprehensive Plan align urban forest practices with other planning requirements and community interests.

While no forest lands of long-term significance are currently identified, the parcels of land that are currently forested are encouraged to remain forested for their environmental and open space benefits, as long as possible, before conversion to urban land uses.

6) Urban Forestry Management Plan

The Tumwater Urban Forest Management Plan establishes goals to ensure healthy trees on Tumwater's urban landscape into the future. The Plan identified a number of action items to support its goals, which include:

- Restore and enhance the community and urban forest.
- Protect and preserve the community and urban forest, which includes trees, understory, habitat, and soils.
- Balance the protection and support of the community and urban forest with other City strategic priorities, which include, in part, providing affordable housing, developing a walkable urban community, economic development, addressing climate change, and protecting endangered species.

C. Mineral Resource Lands

1) Introduction

While metallic, nonmetallic and coal are found and mined in the state, currently the most valuable mineral resource is aggregate. Gravel, sand, and crushed stone are examples of aggregate resources used for transportation, residential, commercial, and industrial construction. The state is the seventh highest sand and gravel producer in the nation. Identifying and conserving local sources for aggregate is important since hauling these materials requires large amounts of fuel due to the weight and heavy vehicle route maintenance.

As with other types of resource lands discussed in this plan, the identification and conservation of mineral resource lands is a requirement of the Growth Management Act. The Conservation Element identifies and classifies mineral resource lands from which the extraction of minerals currently occurs or may occur in the future as well as a strategy to ensure a future supply of these minerals is maintained.

2) Mineral Resources Lands Classification

In defining what lands qualify as mineral resource lands, the Conservation Element bases its methodology upon WAC 365-190-070(3) with modification to include consideration of environmentally sensitive areas, existing land uses, and land ownership.

Tumwater classifies mineral resource lands using the following minimum guidelines:

- **Geology** – The land in question should contain deposits consisting of sand and gravel, coal, sandstone, basalt, or other igneous rock that is recoverable and marketable, based on U.S. Geological Survey maps or site-specific information prepared by a geologist, or as indicated by the State Department of Natural Resources mining permit data.
- **Projected Life of the Resource** – To be designated as mineral resource land there should be sufficient mineral resource to be commercially sustainable for a number of years under market conditions present when the designation is being considered.
- **Proximity to Point of Use or Market** – Consideration for the energy cost of transporting the extracted materials to the market or end user.
- **Infrastructure** – Consideration for the availability of public roads and whether there is a source of water.
- **Current and Future Land Use** – Extractive industries should locate where prime natural resource deposits exist, provided these sites are separated by buffer strips from existing residential areas and restored for appropriate re-use after removing the resource material.

When classifying these areas, maps and information on the location and extent of mineral deposits provided by the State Department of Natural Resources, U.S. Geological Service and any relevant information provided by property owners should be utilized. Critical areas, other environmentally sensitive areas, and cultural resources are also important criterion to consider.

3) Mineral Resources Lands Identification

The Conservation Element identifies lands with long-term commercial significance for extracting mineral resources.

The State Department of Natural Resources maintains maps and classification systems for mineral resources which aligns with state guidance for mineral lands designation in WAC 365.190.040(4) and WAC 365.190.070(3). Aggregate Resource Maps are made using existing geologic maps, subsurface data, materials-testing data, and publicly available mining data to classify potential sources of aggregate. These classifications vary based on size, quality, and uncertainty of the resource. Table C-4 and Map C-

3 show the mineral resources in Tumwater and its urban growth area.

Table C-4. Mineral Resource Land Identification.

Parcel Number	Parcel Area	Adjacent Land Use Designation	Adjacent Current Land Use
11706320100	23.75	Open Space	Natural Resource, Undeveloped Land
11706330000	21.85	Open Space	Natural Resource, Undeveloped Land
11706330100	42.28	Open Space	Natural Resource, Undeveloped Land
12713240100	13.03	Open Space, Light Industrial, Low Density Residential	Parks, residential, Undeveloped Land
12715120900	6.00	Light Industrial, Medium Density Residential, Low Density Residential	Natural Resource
12829120200	15.03	Light Industrial, Heavy Industrial	Commercial, Industrial, Natural Resource
12829130200	3.74	Heavy Industrial, Light Industrial Green Belt	Natural Resource, Undeveloped Land
12829130201	9.10	Heavy Industrial, Light Industrial Green Belt	Natural Resource, Undeveloped Land
12829130202	0.90	Heavy Industrial, Light Industrial Green Belt	Natural Resource, Undeveloped Land
12829130203	5.81	Heavy Industrial, Light Industrial Green Belt	Natural Resource, Undeveloped Land
12829210100	10.06	Heavy Industrial, Light Industrial	Natural Resource,
12829310000	36.57	Heavy Industrial, Light Industrial, Low Density Residential	Natural Resource, Undeveloped Land, Commercial, Industrial
12829320200	27.40	Heavy Industrial, Low Density Residential	Natural Resource, Undeveloped Land
12829320201	12.72	Heavy Industrial, Low Density Residential	Natural Resource, Undeveloped Land
12829340200	4.97	Heavy Industrial, Low Density Residential	Natural Resource, Undeveloped Land, Commercial, Industrial
63050001900	13.55	Light Industrial	Natural Resource, Commercial, Industrial, Residential, Undeveloped Land

Sources: Thurston County Assessor and Thurston Regional Planning Council, 2025.

In Tumwater, the Heavy Industrial land use designation and associated zoning district was specifically created to support the existing rock quarry use on Black Lake Boulevard. New mineral extraction uses are not permitted anywhere else in Tumwater.

Mineral resource lands identified are subject to consideration of the effects of proximity to population areas and the possibility of more intense uses of land as shown in Table C-5.

Table C-5. Considerations for Mineral Lands Designation in Tumwater.

Considerations for Mineral Lands Designation	Conditions in Tumwater
General land use patterns in the area	Urban
Availability of utilities	Available
Availability and adequacy of water supply	Available
Surrounding parcel sizes and surrounding uses	Small-medium sized parcels, land uses industrial and commercial in nature
Availability of public roads and other public services	Available
Division or zoning for urban or small lots	Yes
Accessibility and/or distance from point of use	Close to use sites
Physical and topographic characteristics of the mineral resource site	Accommodating to low operating costs
Depth of the resource	Exposed at surface
Depth of the overburden	Exposed materials
Physical properties of the resource	High grade gravel, sand, and rock
Life of the resource	10 to 100 years
Resource availability in the region	Good for sand/gravel, limited to rock
Surrounding critical areas	Site by site variation
Impact to endangered species habitat	Site by site variation
Energy costs of transporting minerals	Dependent upon location

4) Mineral Resources Lands Protection

TMC Chapter 16.16 protects legally established mineral resource extraction facilities.

Future discoveries of mineral resources, or market conditions that are conducive, may encourage the opening of new mineral resource extraction operations. What or where these facilities would be located cannot be accurately gauged. A newly established mineral resource extraction facility must be a land use identified within the land use designations and zone districts applying to the site.

3. Critical Areas

A. Background

Tumwater's environment is comprised of both natural and built features. Lakes, mature trees, steep slopes, natural vegetation, streams, wetlands, and prairies are parts of the natural environment within Tumwater. Tumwater's history and name reflects the importance of the natural environment to the community identity.

As the need for more jobs, housing, public services, transportation, utilities, and recreation increase, the protection of the natural environment becomes more important.

Tumwater must continually assess the relationship between the natural and built environments and evaluate the potential impacts of development on the environment and the community. Maintaining a quality natural environment in Tumwater depends on coordinated actions between government, the private sector, and individuals.

The Conservation Element guides City effort to balance nature and community, creating a path to sustainable growth. It is intended to meet the objectives of the Growth management Act, the federal Endangered Species Act, State Environmental Policy Act, County-Wide Planning Policies for Thurston County, and other applicable federal, state, and county policies.

This Element also provides guidance for reducing the risks to people, property, and the environment posed by geological and flood hazard areas. Tumwater's Appendix to the Thurston County Hazard Mitigation Plan provides additional mitigation strategies and background information about natural hazards.

TMC Title 16 promotes the maintenance, enhancement, and preservation of critical areas and environmentally sensitive natural systems by avoiding or minimizing adverse impacts from construction and development.

Under the Growth Management Act, Tumwater is required to use the best available science when reviewing and revising policies and regulations for critical areas. The plans and regulations designed to protect critical areas are not intended to deny reasonable use of private and public property, but to assure that development on or near critical areas is accomplished in a manner that is sensitive to the environmental resources of the community.

B. Wetland Areas

1) Introduction

Wetlands serve many important ecological functions. They act as natural reservoirs for flooding and stormwater runoff; protect water quality by filtering out pollutants; help stabilize shorelines; provide areas for groundwater recharge; provide fish and wildlife habitat; provide open space and recreation opportunities; and provide areas for scientific study and education.

Wetlands preservation can significantly reduce public and private costs associated with

downstream flooding, poor water quality, and diminished wildlife habitat.

Through the Conservation Element and associated regulations, Tumwater will:

- Preserve, protect, manage, and regulate wetlands for the purpose of promoting public health, safety and general welfare while conserving fish, wildlife, and other natural resources;
- Protect the ecological and economic benefits to the public of wetlands functions and values;
- Regulate property use and development to maintain the natural and economic benefits provided by wetlands;
- Protect private property rights consistent with the public interest; and
- Provide for protection against direct and indirect wetlands impacts by providing regulatory authority for management of wetland buffers.

It is the short-term goal of this policy to achieve no net loss of the remaining wetlands in Tumwater, defined by acreage and function. It is the long-term goal to improve the health of Tumwater's existing wetlands and create wetlands, where feasible, to increase the quantity and quality of wetlands in Tumwater.

2) Wetland Values and Benefits

Wetlands serve many important ecological functions. A summary of wetland benefits follows:

- Wetlands slow and store floodwater. Riverine wetlands and floodplains provide flat areas where floodwaters can spread out and slow down, reducing the height and velocity of floods. Floodwater trapped in wetlands may then slowly drain, reducing stream bank erosion and downstream peaks.
- Wetlands provide erosion control for shorelines by dissipating the water's energy and stabilizing shorelines with the root systems of plants commonly found in wetlands.
- Wetlands improve water quality by their ability to filter out sediments, nutrients, and toxic chemicals. Moving water carries suspended sediments and other materials. As the water enters a wetland and slows down, these sediments tend to settle down. The sediments are then trapped by wetland vegetation, which in turn reduces the amount of siltation deposited in lakes and reservoirs.
- Wetlands allow water to soak into the underlying soil, which adds to the supply of groundwater.
- Wetlands provide essential areas for waterfowl and migratory shorebirds to rest and feed.
- Wetlands provide essential escape covers and feeding, nesting, and breeding habitat for many species of fish and wildlife, including the Oregon spotted frog. Wetland plants help protect juvenile fish, thereby serving to increase the anadromous fish population.
- Wetlands furnish areas for education and research of a variety of flora and fauna that cannot be found in other

environments.

- Wetlands provide open space and recreation opportunities, including fishing, hiking, boating, and bird watching.

3) Existing Wetland Policies, Regulations, and Inventories

Several federal, state, and local wetland policies, regulations, and inventories currently form a patchwork for wetlands protection.

a) Federal Clean Water Act

The Federal Clean Water Act is a broad-based law covering water pollution control in general. Section 404 of the Act requires the Army Corp of Engineers to regulate the dredging and filling of waters of the United States, including the tributaries and wetlands. However, the dredging, draining or land clearing of wetlands without a nexus to waters of the United States, including their tributaries and wetlands, is not addressed by the Act.

b) State Shoreline Management Act

The State Shoreline Management Act regulates activities in shorelines of the state, which include lakes over 20 acres in size, rivers, and streams with flows more than 20 cubic feet per second (c.f.s.), and all lands within 200 feet of the ordinary high water mark and any wetlands, floodways, and/or floodplain areas associated with such waters.

The Act excludes wetlands not associated with shorelines of the state, including isolated wetlands and riparian wetlands associated with lakes less than 20 acres and streams with flows less than 20 c.f.s. It also exempts most agricultural and forest practices from permit requirements.

Tumwater adopted an updated Shoreline Master Program in April 2014, and it was subsequently amended on December 3, 2019.

Tumwater's Shoreline Master Program requires that wetland buffers be determined by the category and function level of the wetland as stated in the version of TMC Chapter 16.28 adopted as part of the Shoreline Master Program.

c) State Hydraulics Code

Any work that uses, diverts, obstructs, or changes the natural flow or bed of any salt or freshwaters of the state requires Hydraulics Project Approval. The State Department of Fish and Wildlife administers the State Hydraulics Code through Hydraulic Project Approval process. The intent of the Code is to protect fish and fish habitat.

Wetlands outside the ordinary high-water mark and isolated wetlands without fish life are excluded. A Hydraulic Project Approval does not address impacts to wetland functions and values other than fish and fish habitat.

d) State Wetland Rating System for Western Washington

The manual is currently the definitive methodology for determining when a wetland is present and where a wetland boundary is located. It is based on the functional values present in the wetland, sensitivity to disturbance, significance, rarity, and ability to replace. The use of the most current manual during project review is consistent with using the best available science.

e) National Wetlands Inventory

Conducted on a national level using aerial photographs, the National Wetlands Inventory depicts wetland locations, approximate boundaries, and includes classification by wetland type. The inventory is available for Tumwater, but

it should not be presumed to locate every wetland area in Tumwater. Often the only reliable method for wetland identification is a site visit by a qualified wetland biologist following the process in TMC Chapter 16.28. This is typically done in conjunction with a development proposal.

f) Wetland Mapping for the Thurston Region

The Thurston Regional Planning Council has identified wetlands in Thurston County based on color infrared aerial photographs. In many cases, the results of aerial photography have been verified by field surveys. The result is digitized maps showing wetlands boundaries and types. This inventory must be supplemented with site specific field surveys to verify wetland boundaries at the time of development permit review.

g) Environmental Policy

TMC Chapter 16.04 adopts the State Environmental Policy Act with amendments. The intent of this code is to identify and if necessary, mitigate the environmental impacts associated with a variety of actions.

h) Wetlands Protection Standards

TMC Chapter 16.28 establishes standards for the protection of wetlands. Wetlands in Tumwater are regulated under this chapter. Exemptions include intentionally created wetlands, such as stormwater treatment ponds, and certain unintentionally created wetlands.

i) Protection of Trees and Vegetation

TMC Chapter 16.08 regulates the clearing of land in Tumwater, including trees and vegetation located in wetlands. The Urban Forestry Management Plan was adopted on March 2, 2021. The intent of the plan was to guide policies and implementation actions for the maintenance and improvement of the urban tree canopy in Tumwater over the next 20 years.

j) Floodplain Regulations

Floodplains are regulated by TMC Chapter 18.38. The Floodplain Overlay prohibits or strictly limits filling and development in designated floodplains, including wetlands located within these areas. This reduces the height and velocity of floods and lessens bank erosion.

4) Wetland Protection Areas Classification

The Growth Management Act requires Tumwater to classify wetlands according to their sensitivity to disturbance, rarity, functions, and irreplaceability. Tumwater uses the *Washington State Wetland Rating System for Western Washington* for classifying wetlands as outlined below, which is further identified in TMC Chapter 16.28.

5) Wetland Identification

Identification of wetlands is undertaken by the permit application at the time an application for development is made, using the *Washington State Wetland Rating System for Western Washington* in its current form, and as hereafter amended.

6) Wetland Protection Techniques

Techniques used to protect wetland areas include:

- Using the *Washington State Wetland Rating System for Western Washington* for wetland classification based on function and value.
- Requiring a qualified wetland biologist to

determine wetland type and boundary for development sites containing wetlands.

- Establishing wetland buffers based on the relative value of the wetland in which no development or disturbance should occur.
- Striving to achieve no net loss of wetland areas and functions.
- Striving to create wetlands in the long term, where feasible, to increase the quantity and quality of wetlands.
- Attempting to avoid impacts to wetlands altogether if practicable.
- If impact avoidance is impossible, attempting to reduce wetland impacts through mitigation.
- If impact avoidance and reduction are impossible, accomplishing wetland compensation.
- Providing education on the value of wetlands to developers and homeowners.

7) Wetland Protection

WAC 365-190-040(1) states that when critical areas, including wetland areas, cannot be readily identified, these areas should be designated by performance standards or definitions. In this way, such areas can be specifically identified during the processing of a site-specific permit or development authorization.

For the purposes of wetland protection, a performance standard based process is followed.

The wetland protection standards in TMC Chapter 16.28 classify, designate, and protect wetlands and their associated buffers from on-site and off-site activities impacts. These regulations have provisions for reasonable wetland buffer areas and the means for avoidance and reduction of wetland impacts. Attributes of the wetland protection standards in TMC Chapter 16.28 include the following.

a) Wetland Buffer Areas

Wetland buffer areas are required to be adjacent to regulated wetlands to protect wetland functions and values. All wetland buffer widths are measured from the wetland boundary as established by a field survey conducted by a qualified wetland biologist. Wetland buffers are the primary means by which wetland functions and values are protected.

Wetland buffer widths may be increased, reduced, or averaged on a case-by-case basis in accordance with best available science when an altered buffer is necessary to protect wetland functions and values in accordance with TMC Chapter 16.28.

b) Wetland and Wetland Buffer Areas – Allowed Activities

Certain limited low-intensity activities may be permitted in wetland buffer areas without a wetlands permit provided that these activities are not prohibited by any other chapter or law, and they are conducted using best management practices, such as:

- Conservation or preservation of soil, water, vegetation, fish, shellfish, and other wildlife that does not entail changing the structure or functions of the existing wetland.
- Outdoor recreational activities, including fishing, bird watching, hiking, boating, horseback riding, swimming, canoeing, and bicycling.

- The harvesting of wild crops in a manner that is not injurious to natural reproduction of such crops and provided the harvesting does not require tilling of soil, planting of crops, or alteration of the wetland by changing existing topography, water conditions, or water sources.
- The maintenance of drainage ditches.
- Education, scientific research, and use of nature trails.
- Navigation aids and boundary markers.
- Site investigative work necessary for land use application submittals such as surveys, soil logs, percolation tests, and other related activities. In every case, wetland impacts should be minimized and disturbed areas should be immediately restored.
- Normal maintenance, repair, or operation of existing serviceable structures, facilities, or improved areas. Maintenance and repair do not include any modification that changes the character, scope, or size of the original structure, facility, or improved area and does not include construction of a maintenance road.
- Minor modification of existing serviceable structures within a buffer where modification does not adversely impact wetland functions.

c) Reasonable Use of Wetlands and Wetland Buffers

Following state law, if an applicant for a proposed development demonstrates that application of these regulations would deny all reasonable use of the property, conditioned development may be allowed if the applicant demonstrates that the criteria in TMC Chapter 16.28 are met.

d) Wetland Replacement Ratios

As a condition of any permit allowing alteration of wetlands or wetland buffers, the applicant should engage in the restoration, creation, or enhancement of wetlands and their buffers to offset loss of wetland function and value. It is recognized that the alteration of wetlands and/or wetland buffers is not desirable. Creation, restoration and enhancement of wetlands or wetland buffers are extremely difficult to achieve. Wetland alteration should only occur when impact avoidance and reduction are impossible.

Wetland restoration, creation, and enhancement acreage replacement ratios are identified in TMC Chapter 16.28.

8) Wetland Enhancement

The Growth Management Act requires that Tumwater not only protects but enhances its critical areas. As part of that process, the Conservation Element's goals, policies, and implementation actions in Part 1 address how Tumwater will be enhancing wetland resources.

C. Critical Aquifer Recharge Areas

1) Introduction

All of Tumwater's drinking water supply comes from underground aquifer areas. The goal of establishing Critical Aquifer Recharge Areas is to protect the functions and values of Tumwater's drinking water by preventing pollution and maintaining supply.

Tumwater's water comes from underground

aquifers, which are gravel formations below the ground that hold water. These aquifers are replenished by rain and snow as they infiltrate through the ground and are filtered by the soil and trillions of microbes. The many layers of soil, rock, and microbes that sit above the aquifers act to cleanse the water as it passes and helps prevent contamination from the surface.

Tumwater's water system draws water out of these aquifers from multiple sources located around the City. As the water seeps into the aquifers, contaminants from above-ground activities can get into the water. Critical aquifer recharge areas are areas identified where groundwater seeps through the layers and collects. Certain land uses and organic and inorganic materials must be regulated to protect the water and keep it safe.

Public drinking water supply systems are regulated by the State Department of Health under the Safe Drinking Water Act. Generally, the state regulates systems with 15 or more residential connections, known as a Group A system.

Tumwater coordinates with Thurston County Environmental Health to monitor groundwater and report on conditions, including notification of any identified hazards. Periodic inspections have also been completed every few years of businesses that use hazardous materials onsite to ensure they are handled, stored, and disposed of properly.

2) Critical Aquifer Recharge Area Classification

The Growth Management Act requires Tumwater to protect public groundwater supplies so contamination can be avoided. Drinking water depends on groundwater availability, and so the amount of water in aquifers must be monitored to ensure water sources are replenished and are not depleted.

In addition, Chapter 246-290 WAC requires water protection and standards that address vulnerable sources of drinking water, such as Tumwater's Wellhead Protection Program.

All groundwater is vulnerable. Using criteria to create classifications or categories of vulnerability helps Tumwater apply the appropriate measures for the risks involved. Vulnerability is the combined effect of hydrogeologic susceptibility to contamination based on characteristics of the aquifer and the contamination potential.

Vulnerability and hydrogeologic susceptibility to contamination can be determined by using the guidance in WAC 365-190-100(a), such as the following:

- Depth to groundwater.
- Aquifer properties such as hydraulic conductivity, gradients, and size.
- Soil, including texture, permeability, and contaminant attenuation properties.
- Characteristics of the vadose zone including permeability and attenuation properties.
- Other relevant factors.

The following have been considered to evaluate vulnerability based on the contaminant loading potential outlined in WAC 365-190-100:

- General land use.
- Waste disposal sites.

- Agriculture activities.
- Well logs and water quality test results.
- Proximity to marine shorelines.
- Other information about the potential for contamination.

The goals of Tumwater's classification strategy for critical aquifer recharge areas and wellhead protection are to maintain the quality of the groundwater effectively by preventing contamination, with particular attention to recharge areas of high susceptibility. Classification of these areas includes:

- Consideration of the degree to which the aquifer is used, now or in the future, as a potable (drinking) water source.
- Protective measures to preclude further degradation.
- Practicability of treatment measures to maintain potability.
- Availability of alternative potable water sources.
- The degree of sensitivity of contaminants entering the aquifer.

The aquifers within Tumwater provide drinking water and require an Aquifer Protection Overlay based on TMC Chapter 18.39. The intent of the Aquifer Protection Overlay is to identify, classify, and protect critical aquifer recharge areas within Tumwater and its urban growth area. This overlay imposes additional restrictions on development in order to protect public health and safety by preserving the existing and future groundwater supply for Tumwater and its urban growth area.

TMC Chapter 16.24 regulates land uses and activities within the critical aquifer recharge areas. These areas are identified using a mapping system, Geodata, maintained by Thurston County. There are three levels of critical aquifer recharge areas, TMC Chapter 16.24 standards apply to all critical aquifer recharge area designations.

Wellhead protection areas are the surface and subsurface areas surrounding a well or well field of a public water system. These areas have higher vulnerability to contamination from potential land uses. They are classified or rated by the amount of time it would take groundwater to reach a pumping well.

Tumwater's wellhead protection areas are divided into six-month, one-year, five-year, and ten-year time of travel zones. A raindrop landing in the one-year time of travel should reach the well within one year. These areas have extra protections and regulations found in TMC Chapter 16.26. Wellhead protection areas and the Aquifer Protection Overlay are identified using Thurston County Geodata maps.

3) Critical Aquifer Protection Concerns

Concerns about ground water in Tumwater and the Thurston region, in general, include:

- Few alternative sources of drinking water exist.
- Geological conditions in the region leave aquifers unprotected and ground water extremely vulnerable to pollution.
- Septic systems, stormwater runoff, chemical spills, pesticides, and fertilizers can add contaminants to ground water.
- Though the region's ground water is

generally of good quality, it is showing increasing effects of human activities.

- Urbanization and population growth are placing increased demands on limited ground water resources.

Potential sources of ground water pollution include pesticides and fertilizers, septic systems, hazardous materials, contaminated storm water and leaking underground storage tanks.

Gas stations and other land uses that utilize hazardous chemicals are prohibited within the one year and six-month wellhead protection areas. The types of hazardous chemicals that need to be addressed are defined in TMC Chapter 16.24 Aquifer Recharge Standards and TMC Chapter 16.26 Wellhead Protection Standards and are updated based on adopted federal and state standards, whichever is more stringent.

Wellhead protection areas are the surface or subsurface areas surrounding municipal water wells or well fields through which contaminants are reasonably likely to move toward and reach such water well or well field within six months, one year, five years, and ten years.

4) Wells and Critical Aquifers in Tumwater

a) Bush Wellfield

The Bush Wellfield is located in southwest Tumwater, near George Washington Bush Middle School. The wellfield is currently Tumwater's largest producer of drinkable water.

b) Lakeland Manor Water System

The Lakeland Manor Water System is operated and maintained by Tumwater, but it is a Satellite Management Water System that is a separate system from Tumwater's main distribution system. All drinking water for Lakeland Manor comes from its own well located on 60th Avenue Southwest. Tumwater provides an emergency interconnection with Lakeland Manor, if the well were to lose power or experience another emergency, the development will receive water from Tumwater's main distribution system.

c) Palermo Wellfield

Tumwater's Palermo Wellfield is one of Tumwater's oldest and most important wellfields, and up until the early 1990s, provided close to 100 percent of Tumwater's drinking water. Palermo wells deliver high quality groundwater from six wells to customers throughout Tumwater, blending with water from Tumwater's Bush and Port Wellfields. To help keep the water clean, Tumwater has implemented aeration treatment, which is suitable for removing volatile organic compounds coming from the Southgate and Littlerock Road and Trosper Road areas.

d) Port Wellfield

Tumwater operates several wells in the general area of the Olympia Airport and Israel Road. Many of these wells and the associated water rights were acquired by Tumwater from the Port of Olympia in 1991. As with the Palermo water rights, in 2001 Tumwater negotiated with the State Department of Ecology to review the quantities associated with previously issued water rights and determine whether the amounts were correctly established. As a result, the State Department of Ecology issued a superseding permit that increased Tumwater's water right portfolio.

e) Olympia Brewery Wellfield

The Olympia Brewery Wellfield does not currently provide drinking water to the Community of Tumwater, but it is an aquifer within Tumwater that has been carbon dated to be over 3,000 years old. It is part of the Tumwater Sand unit of the Vashon recessional outwash formation.

5) Critical Aquifer Protection

Wellhead protection is a high priority. Tumwater's first wellhead protection areas were drawn in 1997 and adopted the Wellhead Protection Ordinance. There have been many changes to the wellhead protection ordinance as water protection updates were needed, and Tumwater acquired more wells.

In 2016, Tumwater completed a new Wellhead Protection Area Plan. This plan included new groundwater flow technology which more accurately drew the protection areas. The program identifies risks of contamination with potential to impact city wells. Once identified, it finds ways to reduce or eliminate those risks. The ordinance also defines what development and/or uses within the wellhead protection areas are allowed. For example, the ordinance does not allow dry cleaners to use chemical cleaning methods on site within the designated six-month and one-year wellhead protection areas.

Tumwater also has a wellhead protection program that supports Tumwater's mission of keeping high quality drinking water. This program ensures businesses who use, store, and dispose of hazardous materials do so in the safest manner possible. City staff work with Thurston County Environmental Health to inspect and educate businesses about proper material storage and disposal.

Quarterly groundwater monitoring is conducted at wells throughout the wellhead protection areas. Tumwater's well monitoring network serves as an early warning system against issues that could impact Tumwater's drinking water. If the system detects contamination, Tumwater can take measures to lessen the impact.

To help educate and inform the public on the importance of water protection and best practices, the Water Resources & Sustainability Department maintains a website with maps, information, and a quarterly "One Water Newsletter."

The Tumwater aquifer protection classification regime measures susceptibility to pollution in terms of vulnerability. TMC Chapter 16.24 and TMC Chapter 16.26 protect areas of high vulnerability through the Aquifer Protection Overlay, which is geographically applied Citywide. In addition, these chapters maintain specific standards applied citywide.

D. Frequently Flooded Areas

1) Introduction

Protection of life and property during floods is a vital part of Tumwater's responsibility to public safety. Many of Tumwater's rivers, streams, and lakes are subject to flooding during periods of heavy rainfall.

Tumwater has had extensive research and study completed regarding frequently flooded areas within Tumwater. Since August of 1980, Tumwater has participated in the National Flood Insurance Program, as authorized by the National Flood Insurance Act of 1968, and updated its Floodplain Ordinance in 2024.

2) Frequently Flooded Areas Classification

The Growth Management Act requires Tumwater to classify frequently flooded areas known as the 100-year floodplain based on the one percent flood designations of the Federal Emergency Management Agency and the National Flood Insurance Program. In addition, the Act requires Tumwater to provide guidance for corrective actions to mitigate or cleanse those discharges that pollute the waters of the state.

Tumwater considered the following when designating and classifying frequently flooded areas:

1. Effects of flooding on human health and safety, and to public facilities and services.
2. Available documentation, including federal, state, and local laws, regulations, and programs, local studies and maps, and federal flood insurance programs.
3. Future flow floodplain, defined as the channel of the stream and that portion of the adjoining floodplain that is necessary to contain and discharge the base flood flow at buildout without measurable increase in flood heights.
4. The potential effects of tsunami, high tides with strong winds, sea level rise resulting from global climate change.
5. Greater surface runoff caused by increasing impervious surfaces.

The frequently flooded areas within Tumwater are mainly along the Deschutes River and valley. Other areas include Trosper Lake, Barnes Lake, Munn Lake, and Black Lake. City staff utilize Thurston County Geodata mapping, which was updated May 8, 2024, to match the 2024 Flood Insurance Study and Flood Insurance Maps for Thurston County, completed by Federal Emergency Management Agency and adopted by Tumwater to locate frequently flooded areas.

3) Frequently Flooded Areas Concerns

Concerns about frequently flooded areas in Tumwater include:

1. Heavy rains project to increase from climate change can cause sudden river and stream rises and out-of-bank flows.
2. Out-of-bank flows can cause damage to life, dwellings, and industrial, commercial, agricultural, recreational facilities, and Tumwater owned utilities such as drinking wells.
3. Groundwater flooding of low-lying areas

when there is higher than normal precipitation.

4) Frequently Flooded Areas Protection

Tumwater last updated its Floodplain Overlay Ordinance in 2024. Ordinance No. 02023-017 amended floodplain regulations to be more consistent with the state model ordinance for Floodplain Management under the Nation Flood Insurance Program and the Endangered Species Act.

Continued enforcement of the floodplain management ordinance allows Federal Emergency Management Agency to make federally backed flood insurance available to property owners within Tumwater. Properties mapped in the Floodplain Overlay are subject to the regulations in TMC Chapter 18.38 to protect life and property.

In 2023 Tumwater adopted the fourth edition of the Hazards Mitigation Plan. This plan includes the Tumwater Appendix and outlines in detail the extent, impacts, risks, and mitigation measures to protect against damage from floods.

5) Flood Insurance Maps

Flood Insurance Rate Maps from the Federal Emergency Management Agency clearly delineate frequently flooded areas. These maps are used to designate the Floodplain Overlay. The Flood Insurance Rate Maps and Flood Insurance Study were updated in 2024.

The Floodplain Overlay identifies and defines the special flood hazard area within Tumwater, which is the area subject to flooding by the base flood and subject to the provisions of TMC Chapter 18.38. The Floodplain Overlay has served Tumwater well in minimizing the undesirable impacts of flooding.

Frequently flooded areas are identified by the Federal Emergency Management Agency in a scientific and engineering report entitled, "Flood Insurance Study for Thurston County, Washington and Incorporated Areas," dated May 8, 2024, and any revisions thereto, with an accompanying Flood Insurance Rate Map for Thurston County, Washington and Incorporated Areas, dated May 8, 2024, and any subsequent revisions.

The methodology and detail of these studies is accepted as best available science. TMC Chapters 16.28 and 18.38 serve to designate frequently flooded areas. If allowed, any structures permitted in the designated flood areas are subject to strict development regulations. The existing regulations were put in place after careful study, and they fulfill the requirements of the Growth Management Act regarding designation, classification, and protection of frequently flooded areas.

6) Salmon Creek Groundwater Flooding

Above average rainfall caused localized flooding in Salmon Creek Basin in the rainy seasons of 1996-97 and 1998-99. Property owners experienced a range of inconveniences from high water around and under homes to failed septic systems, contaminated drinking water, and restricted access to property. Salmon Creek Basin is located in Thurston County, Washington, in the southern portion of Tumwater.

The basin is relatively flat and slopes gently toward Salmon Creek, which flows into Black River. The basin boundary encompasses

approximately 12 square miles (7,500 acres) from the Tumwater on the northern boundary, to 113th Avenue on its southernmost edge. The western boundary lies along Littlerock Road, and the eastern boundary extends just past Brooks Lane. The area of the basin is defined by the surface and groundwater sources that contribute to recharge of Salmon Creek.

A comprehensive study of the area was completed in late 1999. As a result, Tumwater and several other jurisdictions in Thurston County completed and adopted the Salmon Creek Comprehensive Drainage Basin Plan.

The development review process within the Salmon Creek Comprehensive Drainage Basin Plan was adopted by resolution but Tumwater and was incorporated into the Drainage Design and Erosion Control Manual for Tumwater, WA.

E. Geologically Hazardous Areas

1) Introduction

The Conservation Element defines geologically hazardous areas as those areas susceptible to erosion, landslides, earthquakes, and other geological events, which pose a threat to public safety. This section discusses the proper design and location of development to remove or reduce incompatibility with underlying geology. Appropriate engineering, design, or construction can be used to achieve this goal of land use and geological harmony.

It must also be recognized that even the best of efforts in proper design and application of technology, at times, will not adequately reduce the risks of geological damage. In these instances, building in such extreme geologically hazardous areas should be avoided.

2) Geologically Hazardous Areas Classification

Areas in Tumwater that are prone to one or more of the following hazards are defined as geologically hazardous:

1. Erosion.
2. Landslides.
3. Earthquakes.
4. Volcanic hazards (slight risk in Tumwater).
5. Tsunami Hazard (slight risk in Tumwater).
6. Stream channel migration zones.
7. Other geologic events, including mass wasting, debris flows, rock falls, and differential settlement.

The Conservation Element identifies areas with the above-described hazards and subsequently classifies areas within Tumwater in one of three categories:

1. Known or suspected risk.
2. No risk.
3. Risk unknown (because of lack of information).

3) Geologically Hazardous Areas Identification

The identification methodology used in the Conservation Element to define geologically hazardous areas is as follows:

a) Erosion

Identified by the U.S. Department of Agriculture Soil Conservation Service as the breakdown, detachment, transport, and redistribution of soil particles by forces of water, wind, or gravity. Erosion hazard areas include areas likely to become unstable, such as bluffs, steep slopes, and areas with unconsolidated soils.

b) Landslides

A landslide generally refers to the downhill movement of rock, soil, or debris. The term landslide can also refer to the deposit that is created by a landslide event. Landslide areas are at risk of mass movement due to a combination of geologic, topographic, and hydrologic factors. They include any areas susceptible to landslide because of any combination of bedrock, soil, slope (gradient), slope aspect, structure, hydrology, or other factors found in WAC 365-190-120(6). Landslide hazard areas are further defined in TMC Chapter 16.20.

c) Earthquakes

Earthquakes or seismic hazard areas are those which are subject to severe risk of damage because of ground shaking, slope failure, settlement, soil liquefaction, or surface faulting, debris flows, lahars, or tsunamis. Within the region, the historic damage inducement has been ground shaking which results in settlement and soil liquefaction. The amount of ground shaking is affected by earthquake magnitude, distance from the earthquake epicenter, cohesionless soils of low density, shallow ground water tables, and sub-surface geologic structure.

4) Geologically Hazardous Areas in Tumwater

a) Erosion

The two major soil groupings within Tumwater are the Alderwood-Everett and Spanaway-Nisqually series. These soil types are identified as having severe erosion hazard characteristics when disturbed. Erosion risk is dependent on-site conditions and locations outlined in TMC Chapter 16.20.

b) Landslides

Areas of slope over 15 percent and groundwater seepage exist on Tumwater Hill, the Deschutes River valley slopes, and Bush Mountain. Steep slope risk is the combination of slope, soil, and other factors. A geotechnical report is required in certain areas based on conditions outlined in TMC Chapter 16.28, drainage, and site development reviews, and building plan review.

c) Earthquakes

Tumwater is identified in the International Building Code as being located within the Zone D seismic zone map of the United States. Zone A is the lowest and Zone E is the highest. Zone D is a high-risk area for earthquakes and IBC standards for building construction set out stringent structural performance standards.

Liquefaction is primarily addressed through implementation of International Building Code requirements, local amendments, and structural engineering principles. Liquefaction issues associated with the poor soil bearing capacity in Tumwater are addressed with commonly accepted engineering principles such as “pin piles” or “aggregate piers” to ensure structures of up to approximate six stories can accommodate the impacts of a seismic event.

The 2024 update to the Hazard Mitigation Plan for Thurston County identifies areas of liquefaction based on the fault lines in the region. The entire Deschutes Valley from Henderson Boulevard SE to the former Olympia Brewery has high liquefaction susceptibility. Percival Creek vicinity from Trosper Road SW to Sapp Road SW have areas of moderate to high liquefaction.

d) Volcanic Hazards

According to the 2014 U.S. Geological Survey Mt. Rainier Lahar Hazard Map, Tumwater is not in a Volcanic Hazard zone. Only ash fall from a volcanic eruption is expected to affect Tumwater.

5) Development within Geologically Hazardous Areas

TMC Chapter 16.20 sets forth standards for construction in areas identified as susceptible to earthquake and landslide conditions.

F. Fish and Wildlife Habitat Conservation Areas

1) Introduction

Preservation of fish and wildlife habitats is critical to the protection of suitable environments for animal species and in providing a natural beauty and healthy quality of life for Tumwater and its residents.

The conservation of habitat means active land management for maintaining species within their preferred habitats and accustomed geographic distribution. These areas may include, but are not limited to, rare or vulnerable ecological systems, communities, and habitat or habitat elements including seasonal ranges, breeding habitat, winter range, and movement corridors; and areas with high relative population density or species richness. If these areas are altered, it may reduce the likelihood of the species survival.

2) Habitat Conservation Classification

The Growth Management Act requires Tumwater to classify seasonal ranges and habitats that are critical to the survival of endangered, threatened, and sensitive species. Within Tumwater, habitats and species are identified which are of local importance. Tumwater must include best available science when classifying these areas according to WAC 365-195.

A listing of the types of fish and wildlife habitat areas to be protected by state-mandate in Tumwater include:

- Areas where endangered, threatened, and sensitive species have a primary association.
- Habitats and species of local importance, as determined locally.
- Naturally occurring ponds under twenty acres and their submerged aquatic beds, which provide fish or wildlife habitat.
- Waters of the state as defined in WAC Title 222.
- Lakes, ponds, streams, and rivers planted with game fish by a governmental or tribal entity.
- State natural area preserves and natural resource conservation areas.
- All areas within Tumwater meeting one or more of the criteria in this section,

regardless of any formal identification, are subject to the provisions of TMC Chapter 16.32 and should be managed consistent with the best available science, which includes the "Washington State Department of Fish and Wildlife's Management Recommendations for Priority Habitat and Species" as written or hereafter amended.

3) Habitat Protection Techniques

After classifying and designating fish and wildlife areas in Tumwater, the following protection techniques are pursued:

- Creating a system of fish and wildlife habitat with connections between larger habitat blocks and open spaces, integrating with open space corridor planning where appropriate.
- Limiting the level of human activity in such areas including presence of roads and level of recreation type after site specific analysis and planning passive or active recreation may be appropriate for certain areas and habitats.
- Protecting riparian ecosystems and salmonid habitat.
- Evaluating land uses surrounding ponds and fish and wildlife habitat areas that may negatively or positively impact these areas and functions.
- Establishing buffer areas around these areas to separate incompatible uses from habitat areas.
- Restoration of lost and impaired salmonid habitat.

4) Habitat Identification

A review of state and local records and studies on habitats and species indicates that the following habitat categories exist within Tumwater:

1. Seasonal ranges and habitats with which federal and state listed endangered, threatened, and sensitive species have a primary association and which, if altered, may reduce the likelihood that the species will maintain and reproduce over the long term.
2. Naturally occurring ponds under twenty acres and their submerged aquatic beds which provide fish or wildlife habitat.

   Naturally occurring ponds do not include ponds deliberately designed and created from dry sites, such as canals, detention facilities, wastewater treatment facilities, farm ponds, temporary construction ponds of less than three years duration and landscape amenities. However, naturally occurring ponds may include those artificial ponds intentionally created from dry areas to mitigate conversion of ponds, if permitted by a regulatory authority.
3. Waters of the state. Waters of the state are defined in WAC Title 222; the forest practices rules and regulations. Tumwater uses the water typing system established in WAC 222-16-030 to classify waters of the state.

   The following factors are considered when classifying waters of the state as fish and wildlife habitats:

   a. Species present in Tumwater that are

endangered, threatened, or sensitive, and other species of concern.

b. Species present which are sensitive to habitat manipulation.

c. Historic presence of priority species.

d. Existing surrounding land uses that are incompatible with salmonid habitat.

e. Presence and size of riparian ecosystems.

f. Existing water rights.

g. The intermittent nature of some of the higher classes of waters of the state.

4. Lakes, ponds, streams, and rivers planted with game fish. This includes game fish planted in these water bodies under the auspices of a federal, state, local, or tribal program or which supports priority fish species as identified by the State Department of Fish and Wildlife.

5) Sensitive Species Identification

The State Department of Fish and Wildlife maintains a listing of the priority habitats and species for Tumwater. This database is the reference document to be used by Tumwater in the protection of habitats and species identified within Tumwater.

6) Fish and Wildlife Habitat Protection

Given Tumwater's diversity of fish and wildlife habitats in terms of geographic location, biological sensitivity, species hierarchy, and current and future adjacent land uses, the Conservation Element proposes a regulation and protection process based upon performance standards to be applied to site-specific development.

These performance standards are to be implemented on site-specific projects through TMC Chapter 16.32 and associated development permits. If there are any conflicts between the Shoreline Master Program and the standards in TMC Chapter 16.32, the requirements of the Shoreline Master Program apply.

In addition, Tumwater's Flood Ordinance incorporates federal recommendations for protection of aquatic species. Tumwater has also upgraded the fish capture facility at the head of Tumwater Falls and is planning a new hatchery with the State Department of Fish and Wildlife to help stabilize South Sound salmon populations.

a) Threatened and Endangered Species

Tumwater has critical habitat for several federally designated, threatened, or endangered species including:

- Bull Trout (threatened).
- Oregon Spotted Frog (threatened).
- Mazama Pocket Gopher – Olympia Subspecies (threatened).
- Puget Sound Chinook Salmon (threatened).
- Streaked Horned Lark (threatened).
- Taylor's Checkerspot Butterfly (endangered).
- Water howellia (threatened).

Tumwater has critical habitat for several state designated, threatened, or endangered species including:

- Mazama Pocket Gopher – Olympia Subspecies (threatened).
- Oregon Spotted Frog (endangered).
- Oregon vesper sparrow (threatened).
- Streaked Horned Lark (endangered).
- Western gray squirrel (threatened).

b) Habitat Conservation Plan

The southern portion of Tumwater is located in a glacial prairie that has been historically called Bush Prairie. Most of Bush Prairie has been converted to agriculture or forestry, residences, and businesses, but part of it still remains and provides a home for the unique flora and fauna of the South Puget Sound Prairie ecosystem.

A Habitat Conservation Plan will provide for the long-term preservation and management of three species, protected or soon to be protected under the federal Endangered Species Act that occurs in Tumwater: Olympia pocket gopher subspecies of the Mazama pocket gopher, the streaked horned lark, the Oregon spotted frog, and the Oregon vesper sparrow.

As of 2025, Tumwater in cooperation with the Port of Olympia is preparing the Bush Prairie Habitat Conservation Plan for prairie species. When that plan is completed, the Comprehensive Plan and the Tumwater Municipal Code will need to be amended to reflect the Plan.

Appendix A Foundational Documents and Best Available Science

The table below identifies the foundational planning documents that form the basis for the Conservation Element of the Comprehensive Plan.

1. General Policy

Table C-6. General Policy Foundational Documents for the Conservation Element.

Topic Index	Supporting Plans and Materials
General Policy	• Land Use Element (2025) • County-Wide Planning Policies, Thurston County (2015) • Sustainable Thurston, Thurston Regional Planning Council (2013)

2. Critical Areas

Table C-7. Critical Areas Foundational Documents for the Conservation Element.

Topic Index	Supporting Plans and Materials
Wetland Areas	• Best Available Science for Freshwater Wetlands, State Department of Fish and Wildlife and State Department of Ecology (2005 and 2013) • Custom Soil Resource Report for Thurston County Area, Washington – 2016 Tumwater Soil Survey, U.S. Department of Agriculture (2016) • Priority Habitats and Species Data Base, State Department of Fish and Wildlife (Updated annually) • Priority Habitats and Species List, State Department of Fish and Wildlife (2024) • Shoreline Master Program (2019) • Soil Conservation Service Soil Survey of Thurston County, U.S. Department of Agriculture (1958) • Wetland Mapping for the Thurston Region, Thurston Regional Planning Council (2004)
Critical Aquifer Recharge Areas	• Lands for Public Purposes Element • Thurston County On-Site Sewage Management Plan (2021) • Wastewater Resource Management Plan, LOTT Clean Water Alliance (2015) • Water System Plan (2010-2015) • Wellhead Protection Plan (2016)

Topic Index	Supporting Plans and Materials
Frequently Flooded Areas	• Comprehensive Stormwater Implementation Plan (2018) • Flood Hazard Maps (2024) • Flood Insurance Studies and the Flood Insurance Rate Maps, Federal Emergency Management Agency (2024) • Floodplain Overlay Ordinance (2024) • GIS Thurston County Floodplain Mapping • Littlerock-70th Avenue Annexation Area Drainage Study (Part of the Littlerock-70th Avenue Annexation in 2008) (2011) • Hazards Mitigation Plan for the Thurston Region (2024) • Salmon Creek Comprehensive Drainage Basin Plan (2004)
Geologically Hazardous Areas	• Coastal Zone Atlas, State Department of Ecology (2014) • Custom Soil Resource Report for Thurston County Area, Washington – 2025 Tumwater Soil Survey, U.S. Department of Agriculture (2025) • Geologic Map of the Centralia Quadrangle, Washington, State Department of Natural Resources (1987) • Liquefaction Hazards Map, State Department of Natural Resources • Hazards Mitigation Plan for the Thurston Region (2024) • Steep Slopes Map, State Department of Natural Resources

Fish and Wildlife Conservation Areas	• Habitat Conservation Plan (In development 2016-25) • Landscape Planning for Washington's Wildlife: Managing for Biodiversity in Developing Areas, State Department of Fish and Wildlife (2009) • Management Recommendations for Priority Habitat and Species (Multiple Documents), State Department of Fish and Wildlife (1991 – 2011) • Priority Habitats and Species Data Base, State Department of Fish and Wildlife (Updated annually) • Priority Habitats and Species List, State Department of Fish and Wildlife (2024) • Determination of Threatened Status for Bull Trout in the Coterminous United States, Federal Register (64):58910-58933, U.S. Fish and Wildlife Service (1999) • Endangered and Threatened Species: Regulations Consolidation, Final Rule, Code of Federal Regulations Volume 50 Part 223.102, National Oceanic and Atmospheric Administration (1999) (Chinook Salmon) • Endangered and Threatened Wildlife and Plants, Threatened Status for Oregon Spotted Frog, Final Rule, Federal Register Volume 79:51658, U.S. Fish and Wildlife Service (2014) • Threatened Species Status for the Olympia Pocket Gopher, Roy Prairie Pocket Gopher, Tenino Pocket Gopher, and Yelm Pocket Gopher, With Special Rule, Federal Register Volume 79:19759, U.S. Fish and Wildlife Service (2014) • Endangered and Threatened Wildlife and Plants, Endangered Status for Taylor's Checkerspot Butterfly and Threatened Status for the Streaked Horned Lark, Final Rule, Federal Register Volume 78:61452, U.S. Fish

Topic Index	Supporting Plans and Materials
	and Wildlife Service (2013) • Multiple Additional ESA Documents described in the Environmental Conservation Online System

3. Resource Lands

Table C-8. Resource Lands Foundational Documents for the Conservation Element.

Topic Index	Supporting Plans and Materials
Agricultural Lands	• Custom Soil Resource Report for Thurston County Area, Washington – 2025 Tumwater Soil Survey, U.S. Department of Agriculture (2025) • Handbook No. 210, U.S. Department of Agriculture (1961) • Soil Conservation Service Soil Survey of Thurston County, U.S. Department of Agriculture (1958)
Forest Lands	• Private Forest Land Grades (WAC 458-40-530), State Department of Revenue
Mineral Resource Lands	• Mineral Resource Lands (WAC 365-190-070), State Department of Natural Resources • Thurston County Assessor Land Use Data (2025)

Appendix B Open Space Taxation Act Summary

The Open Space Taxation Act Summary is attached as a separate document.

Appendix C Tumwater Soils Report

The Custom Soils Resource Report for Tumwater is attached as a separate document.