TREE BOARD
MEETING AGENDA

Online via Zoom and In Person at
Tumwater Fire Department
Headquarters, Training Room, 311 Israel
Rd. SW, Tumwater, WA 98501

Monday, June 09, 2025
7:00 PM

1. Call to Order
2. Roll Call
3. Changes to Agenda
4. Tree Board Member Reports
5. Manager's Report
6. Public Comment
7. 2025 Comprehensive Plan Periodic Update – Conservation
8. Introduce Urban Forester
9. Next Meeting Date - 07/14/2025
10. Adjourn

Meeting Information
The public are welcome to attend in person, by telephone or online via Zoom.

Watch Online
https://us02web.zoom.us/webinar/register/WN_-BCJXR7rQbWon8WHDRamiw

Listen by Telephone
Call (253) 215-8782, listen for the prompts and enter the Webinar ID 844 7844 1595 and Passcode 425874.

Public Comment
The public is invited to attend the hearing and offer comment. The public may register in advance for this webinar to provide comment: https://us02web.zoom.us/webinar/register/WN_-BCJXR7rQbWon8WHDRamiw

After registering, you will receive a confirmation email containing information about joining the webinar.

The public may also submit comments prior to the meeting by sending an email to: AJonesWood@ci.tumwater.wa.us. Please send the comments by 1:00 p.m. on the date of the meeting. Comments are submitted directly to the Commission/Board Members and will not be read individually into the record of the meeting.

If you have any questions, please contact Sustainability Coordinator Alyssa Jones Wood at (360) 754-4140 or AJonesWood@ci.tumwater.wa.us.

Post Meeting
Video of this meeting will be recorded and posted on our City Meeting page: https://tumwater-wa.municodemeetings.com.

Accommodations
The City of Tumwater takes pride in ensuring that people with disabilities are able to take part in, and benefit from, the range of public programs, services, and activities offered by the City. To request an accommodation or alternate format of communication, please contact the City's ADA Coordinator directly, call (360) 754-4129 or email ADACoordinator@ci.tumwater.wa.us. For vision or hearing impaired services, please contact the Washington State Relay Services at 7-1-1 or 1-(800)-833-6384.

What is the Tree Board?

The Tumwater Tree Board is a citizen advisory board that is appointed by and advisory to the City Council on urban forestry issues, including drafting and revising a comprehensive tree protection plan or ordinance, or any other tree matter. Actions by the Tree Board are not final decisions; they are Board recommendations to the City Council who must ultimately make the final decision. If you have any questions or suggestions on ways the Tree Board can serve you better, please contact the Community Development Department at (360) 754-4180.

TO: Tree Board

FROM: Dana Bowers, Associate Planner

DATE: June 9, 2025

SUBJECT: 2025 Comprehensive Plan Periodic Update – Conservation

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1) Recommended Action:

This is a discussion item about the Conservation Element for the 2025 Comprehensive Plan periodic update.

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2) Background:

On a ten-year cycle, the City is required to conduct a Growth Management Act periodic update of its Comprehensive Plan and related development regulations. For the current cycle, the City is required to complete work on the periodic update by December 31, 2025. Work on the periodic update started last fall.

The updated Comprehensive Plan will address diversity, equity, and inclusion throughout the Plan. 2025 Comprehensive Plan Update | City of Tumwater, WA contains links to guidance material and information about the update.

The intent of this work session is to present the complete draft Conservation Element for discussion by the Tree Board.

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4) Alternatives:

- ❑ None.

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6) Attachments:

A. Staff Report
B. Presentation
C. Conservation Element, Part 1 – Goals, Policies, and Implementation Actions
D. Conservation Element, Part 2 – Technical Information
E. Conservation Element, Part 2 – Technical Information – Appendices
F. Conservation Element, Part 2 – Technical Information – Maps

MEMORANDUM

Date: June 9, 2025

To: Tree Board

From: Dana Bowers, Associate Planner, and Erika Smith-Erickson, Housing and Land Use Planner

2025 Comprehensive Plan Update – Conservation Element

On a ten-year cycle, Tumwater is required to conduct a Growth Management Act periodic update of its Comprehensive Plan and related development regulations. For the current cycle, Tumwater is required to complete work on the periodic update by December 31, 2025.

The updated Comprehensive Plan will address diversity, equity, and inclusion throughout the Plan and incorporate many of the State required changes addressing housing, climate change, and other topics.

The intent of the Tree Board meeting on Monday, June 9, 2025, is to discuss the complete draft Conservation Element. The Element consist of two parts.

- **Part 1** contains the Conservation Element's goals, policies, and draft implementation actions. The Tree Board will be asked to consider whether the proposed goals, policies, and draft implementation actions are appropriate and whether the information in the Element is presented effectively.
- **Part 2** contains the Conservation Element's technical information used to update the Element. The Tree Board will be asked to consider whether the information in the Element is presented in an understandable format.

Below are questions for your consideration as you review the element:

- Do you have any general or specific comments that you'd like to share about any goals?
- Are there shifts in action timelines that you'd like to suggest?
- Do you foresee any unintended consequences or burdens associated with policies and/or actions under the goals or policies?
- Do you anticipate anyone in the Tumwater community being left out by any policy and/or action under these goals? If so, how could we fix that?
- Which would/could impact you or the things you care about most?
    - What do you expect that impact might be?

- Do you have any additional thoughts you'd like to share related to the goals and its associated policies and actions?

Contents

1 – Growth Management Act – Conservation Goals

The state Growth Management Act (Chapter 36.70A Revised Code of Washington (RCW)) requires that Tumwater demonstrate that each Element in its Comprehensive Plan meets the relevant fifteen planning goals contained within the Act. The fifteen goals guide the development and adoption of the Comprehensive Plan and development regulations.

The following is a summary of how the updated Conservation Element meets the two goals related to natural resource industries and environment.

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 limited lands that are used for mineral resources, forestry, and urban agriculture that will change uses as Tumwater develops as required by state law into an urban area. While it does not meet the state definitions of agricultural resource lands, Tumwater supports urban agriculture with the Conservation Element's goals and policies.

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 Conservation Element contains specific policies relating to air and water quality, water availability, and protection and preservation of critical areas and addresses how to enhance the environment. If conflict occurs in the implementation of urban growth policy and development regulations, protecting critical areas will be the priority.

2 – Conservation Element

A – Background

As required by the Growth Management Act, the Conservation Element addresses both natural resource lands and critical areas in Tumwater. Natural resources lands, such as agricultural, forestry and mineral resource lands, are typically designated outside of cities and urban growth areas as those types of uses are intended for rural areas under the Growth Management Act. Critical areas include environmentally sensitive spaces such as wetlands, critical aquifer recharge areas, frequently flooded areas, geologically hazardous areas, and fish and wildlife habitat conservation areas.

Areas that are within Tumwater's urban growth area are addressed through the Tumwater and Thurston County Joint Plan in accordance with adopted County-Wide Planning Policies.

The Conservation Element is separated into two parts which are described below.

Part 1 contains the Element's draft goals, policies, and draft implementation actions that will guide the implementation of the Element over the next 20 years. The goals, policies, and actions of the 2016 Conservation Element are found in Appendix B of this staff report.

Part 2 contains an inventory of the natural resource lands and critical areas in Tumwater. Natural resource lands are identified based on state designation listed by the county assessor. Critical areas are identified based criteria provided at the state and federal levels. For example floodways are determined by FEMA and Washington State Department of Ecology provides guidance for wetland identification.

The Conservation Element's maps in Attachment F show where resource lands are designated and the general extent of critical areas in Tumwater. The actual boundaries of critical areas are determined on a project level as directed by the regulations in TMC Title 16 *Environment*.

B – Link to Current Conservation Element

https://www.ci.tumwater.wa.us/departments/community-development-department/tumwater-comprehensive-plan

3 – Structure of the Part 1 of the Element

Part 1 – Goals, Policies, and Implementation Actions of the Element is structured similarly to the Part 1 of the Housing and Land Use Elements. The intent of separating the goals, policies, and draft implementation actions from the technical information for each Element is to make it easier for policymakers and the community to use the document.

Chapter 1 Introduction

Chapter 1 provides a short background to the purpose of the Conservation Element and an explanation of how to read the Element.

Chapter 2 Growth Management Act – Element Goals

Chapter 2 discusses the Element's connection to the conservation goals of the state Growth Management Act.

Chapter 3 County-Wide Planning Policies

Chapter 3 discusses the Element's connection to the Thurston County-Wide Planning Policies.

Chapter 4 Element Goals and Policies

Chapter 4 presents the Conservation Element's goals and policies in detail with an explanation the importance of each goal, what Tumwater department is responsible for implementation, and timeline for those actions. Comments are provided that discuss the source of each of the goals and policies.

The Conservation Element's goals and policies are the policy basis for the draft implementation actions in the Element and those future actions that will be developed over the next 20 years which will be the foundation for Tumwater's annual work programs to address natural resource lands and critical areas.

Appendix A Draft Implementation Actions

Appendix A contains the draft implementation actions, which are intended to be a source of annual work program items that serve to implement the goals and policies of the Element.

The annual work programs will further refine the draft implementation actions prior to their being put into practice. It is expected that draft implementation actions will be further amended, added, or subtracted as needed over the course of the 20 year Comprehensive Plan as new opportunities arise to meet the intent of the Element's goals and policies.

4 – Structure of the Part 2 of the Element

Part 2 – Technical Information of the Conservation Element consists of the following chapters.

Chapter 1 – Introduction

Discusses the State requirements for the Element, how to read the Element, best available science, and how shoreline of the state are addressed in the Comprehensive Plan.

Chapter 2 – Natural Resources

Provides a summary of urban agriculture, forestry and mineral resource lands and uses in Tumwater.

Chapter 3 – Critical Areas

Provides an overview of all the Tumwater managed critical areas including wetlands, critical aquifer recharge areas, frequently flooded areas, geologically hazardous areas, and fish and wildlife habitat areas.

Appendix A – Foundational Documents

Provides a list of the documents used to create the Conservation Element's Technical Summary.

Appendix B – Open Space Taxation Act Summary

Provides basic information about the State criteria, benefits, and penalties associated with forest and agriculture designation.

Appendix C – Tumwater Soils Report

Provides a map, list, and detailed description of all of the soils within Tumwater.

5 – Goals, Policies, and Draft Implementation Actions Review

A – Introduction

Goals and policies describe how Tumwater proposes to address identified needs. Goals are statements of desired outcomes or intended achievements. Policies are specific statements that guide actions and provide a framework for future decision-making. Actions are specific implementations of goals and policies.

Example from the draft Conservation Element:

Goal C-1:	**Recognize the significant role played by natural features and systems in determining the overall environmental quality and livability of Tumwater**
Policy	
C-1.2	Use adopted plans to inform critical area policies, regulations, and implementation actions.
Draft Implementation Action	
C-1.2.1	Implement the actions identified in the Thurston Climate Mitigation Plan.

How key terms are used in goals, policies, and actions:

- "Shall" means implementation of the policy is mandatory and imparts a higher degree of substantive direction than "should."
- "Should" means implementation of the policy is expected but its completion is not mandatory.
- "May" means the actions described in the policy are either advisable or are allowed.
- "Ensure" means actions described in the policy are guaranteed.
- "Must" means implementation of the policy is an obligation.
- "Require" means implementation of the policy is compulsory.
- "Support" means to advocate for implementation of the policy.
- "Promote" means to help bring about implementation of the policy.
- "Encourage" means to foster or help implementation of the policy.
- "Consider" means to take into account.
- "Coordinate" means to bring into a common action, movement, or condition.
- "Implement" means to carry out or accomplish.
- "Integrate" means to form, coordinate, or blend into a functioning or unified whole.
- "Make" means to enact or establish.
- "Engage" means to do or take part in something.

B – Policy Strength Continuum

When developing goals and policies, it is important to understand the policy strength continuum. The Puget Sound Regional Council developed the following example.

Passive	Policy Strength	Active
Statements of Inclination Conveys intent, but establishes no target or definition of success	**Statements of Principle** Describes clear targets or conditions of success	**Statements of Impact** Go further, describing specific situations where protecting critical areas is a priority
Example Tumwater shall encourage the creation of a new City Center.	**Example** Tumwater shall endeavor to designate 100-acres for a new City Center.	**Example** Work with the development community and local agencies to create a new City Center based on framework

		established by Tumwater Center Plan.

For an example of how policies can be written to be more active and how implementation strategies can be established for policies, include identifying who will be responsible for implementing the policy and the timeframes to do so.

Appendix A – Guidance

The State Department of Commerce has provided guidance specific to the periodic update on their Periodic Update webpage.

https://www.commerce.wa.gov/serving-communities/growth-management/periodic-update/

www.commerce.wa.gov/serving-communities/growth-management/growth-management-topics

In addition, the Puget Sound Regional Council is conducting a series of workshops on a variety of topics related to the periodic update.

www.psrc.org/our-work/passport-2044-comprehensive-plan-workshop-series)

The Municipal Research Services Center has a Comprehensive Planning webpage.

https://mrsc.org/getdoc/d7964de5-4821-4c4d-8284-488ec30f8605/Comprehensive-Planning.aspx

Appendix B – Current Conservation Element Goals, Policies, and Actions

4.1 Conservation Goals, Policies, and Actions

Goal C-1 **Recognize the significant role played by natural features and systems in determining the overall environmental quality and livability of Tumwater**

Policy	Action
C-1.1	Protect the ecological integrity of the natural environment while allowing for compatible growth and development
C-1.2	Promote conservation of natural resources and the environment in cooperation with residents, business owners, schools, affected jurisdictions, and tribes.
C-1.3	Encourage and support active measures to protect and enhance Tumwater's natural environment.
C-1.4	Implement the mitigation goals, objectives, and initiatives contained in the most recent version of the adopted Natural Hazards Mitigation Plan for Thurston County.
C-1.5	Maximize retention of a healthy tree cover and native vegetation and encourage restoration, replacement, and enhancement of unhealthy trees and disturbed vegetation.
C-1.6	Reduce communitywide greenhouse gas emissions 45 percent below 2015 levels by 2030 and 85 percent below 2015 levels by 2050 to ensure that local communities do their part to keep the global average temperature from rising more than 2°C.
C-1.7	Implement the strategies contained in the most recent version of the accepted Thurston Climate Mitigation Plan

Goal C-2 **Designate and protect critical areas including wetlands, critical aquifer recharge areas, frequently flooded areas, geologically hazardous areas, and fish and wildlife habitat conservation areas in accordance with the Growth Management Act to protect the functions and values of these areas as well as to protect against threats to health, safety, and property.**

Policy	Action
C.2.1	Include best available science in developing policies and development regulations to protect the functions and values of critical areas and consider conservation or protection measures necessary to preserve or enhance anadromous fisheries, consistent with the Growth Management Act.
C.2.2	Use incentive programs, acquisition, appropriate regulations, and other techniques to preserve critical areas as permanent open space where

development may pose hazards to health, property, or important ecological functions.

C.2.3 Require that prior to any development, critical areas are identified and protected.

C.2.4 Ensure the effectiveness of critical area mitigation by requiring adequate critical area studies and mitigation plans, the application of mitigation sequencing, financial assurances from developers to ensure mitigation success, and by improving City oversight of maintenance and monitoring of mitigation sites.

C.2.5 Require and enforce mitigation to ensure no net loss of critical area functions.

C.2.6 Support restoration of river and stream channels and associated wetland and riparian areas to enhance water quality, improve fish and wildlife habitat, and mitigate flooding and erosion.

C.2.7 Allow public access to wetlands, streams, and lakes for scientific, educational, and recreational use, provided the public access is carefully sited, sensitive habitats and species are protected, and hydrologic continuity is maintained.

C.2.8 Protect wetlands not as isolated units, but as ecosystems, and essential elements of watersheds.

C.2.9 Protect the quality and quantity of groundwater used for public water supplies.

C.2.10 Prevent land alterations that would increase potential flooding and minimize the alteration of natural surface water features that retain or carry floodwaters, such as wetlands, floodplains, rivers, streams, and lakes.

C.2.11 Require mitigation for adverse environmental impacts from engineered flood control measures.

C.2.12 Work cooperatively to meet regulatory standards for floodplain development as these standards are updated for consistency with relevant federal requirements including those related to the Endangered Species Act.

C.2.13 Regulate development intensity, site coverage, and vegetation removal in geologically hazardous areas in order to minimize drainage problems, soil erosion, siltation, and landslides.

C.2.14 Minimize soil disturbance and maximize retention and replacement of native vegetative cover for any land uses permitted in erosion and landslide hazard areas.

C.2.15 Encourage special building design and construction measures in areas with severe seismic hazards to minimize the risk of structural damage, fire, and injury to occupants during a seismic event and to prevent post-seismic collapse.

C.2.16 Protect and preserve habitats for species, which have been identified as endangered, threatened, or sensitive by the state or federal government, giving special consideration: to conservation or protection measures necessary to preserve or enhance anadromous fisheries.

C.2.17 Maintain habitats that support the greatest diversity of fish and wildlife through

conservation and enhancement of critical areas.

C.2.18 Implement salmon habitat protection and restoration priorities in approved Water Resource Inventory Area 13 and 23 plans.

C.2.19 Coordinate with adjacent jurisdictions and tribes to identify, protect, and develop enhancement plans and actions for habitat networks and wetlands that cross-jurisdictional lines.

C.2.20 Promote the enhancement or restoration of streams, rivers, lakes, and wetlands as adjacent development activities occur.

C.2.21 Protect wildlife corridors to minimize habitat fragmentation, especially along existing linkages and in patches of native habitat by enhancing vegetation composition and structure, and incorporating indigenous plant species compatible with the site.

Goal C-3 **In accordance with the Growth Management Act, designate and protect natural resource lands including agricultural, forest, and mineral lands that have long-term significance to conserve and protect these areas.**

Policy **Action**

C-3.1 Recognize the importance of farmland conservation and local food production in maintaining the quality of life and long-term sustainability of Tumwater.

C-3.2 Zone designated agricultural lands at very low densities to ensure the conservation of the resource for continued agricultural use.

C-3.3 Limit non-agricultural development within designated agricultural areas to non-prime farmland soils where possible.

C-3.4 Work with community groups to support the continued viability of agriculture and encourage community support for it.

C-3.4.1 *Support the efforts of the Thurston Food System Council to develop a vibrant food system through access to healthy, local, affordable, culturally appropriate, sustainably produced food to assist the community in having reliable access to sufficient quantity of affordable nutritious food.*

C-3.5 Ensure that harvesting for conversion to other uses occurs in a manner compatible with land uses of the surrounding area and maintenance of water quality and environmentally critical areas.

C-3.6 Allow mineral extraction industries to locate where prime natural resource deposits exist.

C-3.7 Conserve designated mineral resource lands of long-term commercial significance for mineral extraction, and the use of adjacent lands should not interfere with the continued use of the designated mining sites that are being operated in accordance with applicable best management practices and other laws and regulations.

C-3.8 Restore mineral extraction sites as the site is being mined. The site should be restored for appropriate future use and it should blend with the adjacent landscape and contours.

2025 Comprehensive Plan Update
Conservation Element

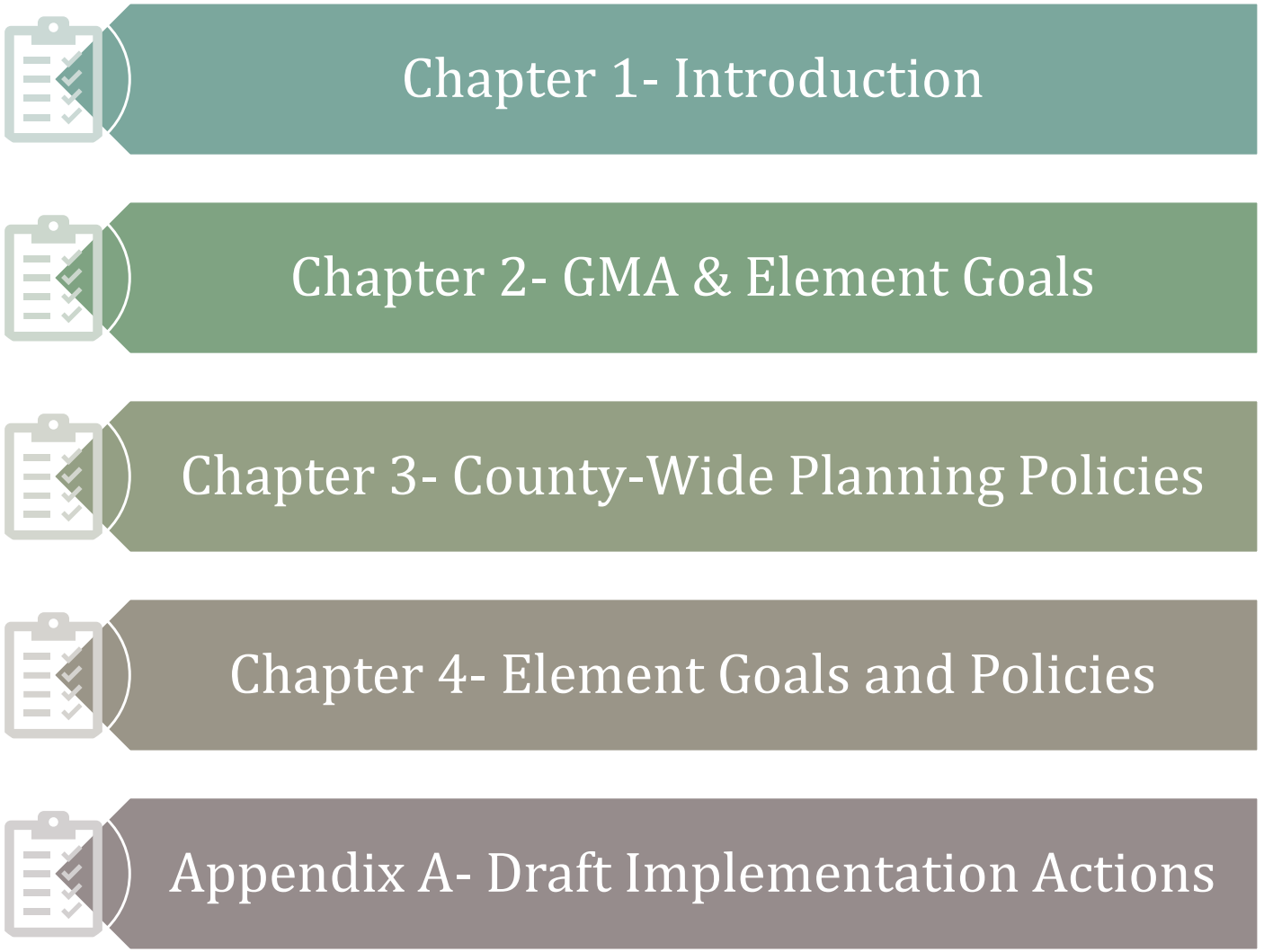
Balancing Nature and Community:
Tumwater's Path to Sustainable Growth

Tree Board June 9, 2025

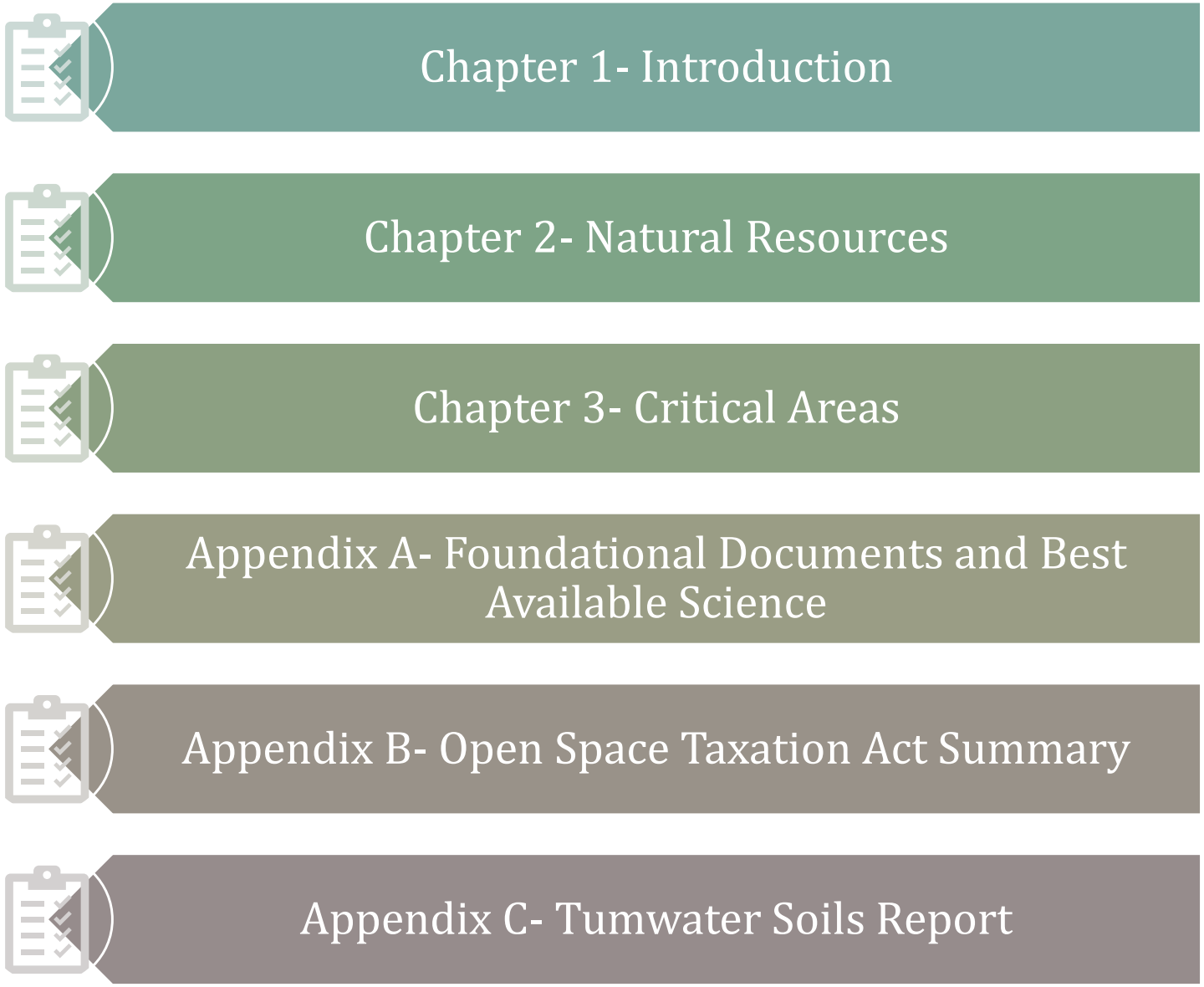
Intent

- Review format of Parts 1 and 2
- Discuss the draft Conservation Element
- Take feedback on goals, policies, and draft implementation actions
- Explain next steps

Format for Part 1- Goals, Policies, and Actions



Format for Part 2- Technical Information



Natural Resources

Urban Agriculture

- Introduction/Overview
- Sustainable Agriculture
- Classification
- Identification
- Current Agricultural Uses
- Small Scale Urban Agriculture

Forest Lands

Introduction

Current Forest Land Use

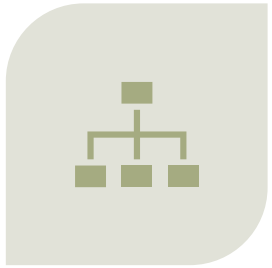
Forest Lands Conservation

Forest Lands in the Urban Area

Urban Forestry Management Plan

Mineral Resource Lands

Introduction

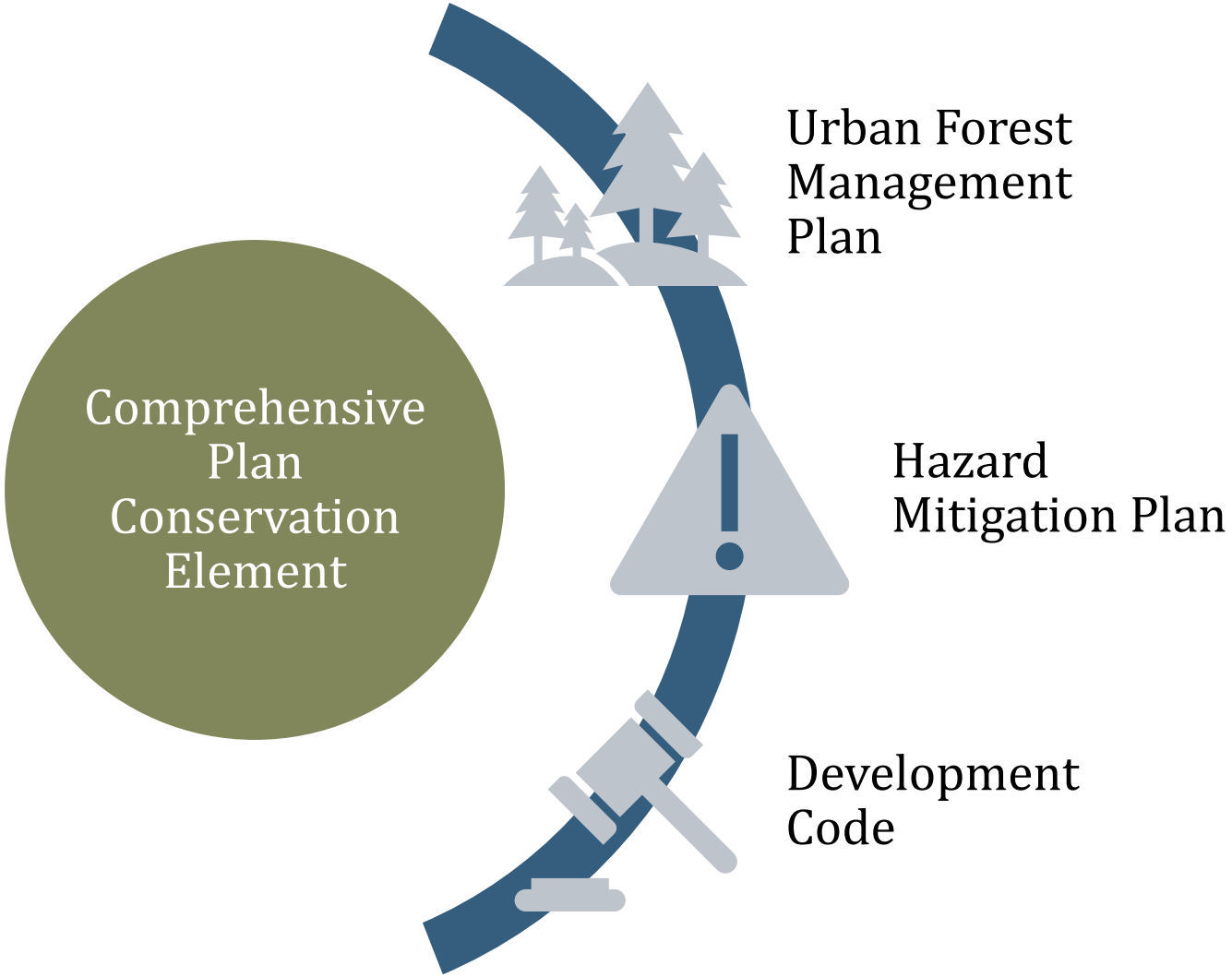


Classification

Identification

Protection

Working Together



Critical Areas

Wetlands

1. Introduction
2. Values and Benefits
3. Policies, Regulations and Inventories
4. Protection and Identification
5. Enhancement

Critical Aquifer Recharge Areas

1. Introduction
2. Classification and Concerns
3. Current Inventory
4. Protection

Frequently Flooded Areas

1. Introduction
2. Classification and Concerns
3. Protection
4. Mapping
5. Groundwater

Geologically Hazardous Areas

1. Introduction
2. Classification
3. Identification
4. Protection

Fish and Wildlife Habitat Conservation Areas

1. Introduction
2. Classification
3. Identification
4. Protection

Overarching Environmental Goals

Goal C-1

Recognize the significant role played by natural features and systems in determining the overall environmental quality and livability of Tumwater

Highlights:

- Natural systems make Tumwater livable
- Protect and enhance environment
- Use adopted plans

Goal C-2

Promote conservation of natural resources and the protection of the environment in cooperation with residents, property owners, other jurisdictions, and tribes

Highlights:

- Support education programs

Natural Resource Areas Goals

Goal C-3

Support urban agriculture for access to local food production

Highlights:

- Work with partners to ensure agricultural viability
- Support local food production

Goal C-5

Support urban forestry

Highlights:

- Canopy retention
- Conversions compatible with surrounding development pattern

Goal C-5

Protect mineral resource lands

Highlights:

- Allow extraction where it won't cause degradation
- Protect sites from incompatible uses
- Restoration extraction sites

Critical Areas Goals

Goal C-6

Protect mineral resource lands

Highlights:

- Allow extraction where it won't cause degradation
- Protect sites from incompatible uses
- Restoration extraction sites

Goal C-7

Protect and enhance water quality

Highlights:

- Enhance ecological functions
- Support restoration of stream channels and wetlands
- Allow public access for monitoring and education
- Balance habitat, water supply, recreation and all needs

Goal C-8

Improve natural drainage systems

Highlights:

- Develop watershed management plans and fish conservation measures
- Improve drainage systems for water quality
- Use best management practices to control erosion through construction and redevelopment

Goal C-9

Improve air quality

Highlights:

- Support and entrust state programs
- Require appropriate vegetation retention
- Reduce vehicle miles traveled

Goal C-10

Protect and enhance rivers, streams, and lakes

Highlights:

- Protect, enhance and restore water channels
- Require mitigation for alterations

Goal C-11

Protect and enhance wetlands

Highlights:

- Protect wetlands where possible
- Use buffers to preserve functions
- Allow reasonable use
- Maintain stormwater treatment facilities and flow control

Goal C-12

Protect groundwater

Highlights:

- Protect aquifers, recharge areas and wellheads
- Protect waterways

Goal C-13

Protect geologically hazardous areas

Highlights:

- Regulate development intensity, site coverage, and vegetation
- Minimize soil disturbance
- Require erosion control throughout construction

Goal C-14

Preserve floodplains and floodways

Highlights:

- Minimize changes that impact flow
- Require mitigation for engineered flood control measures
- Emphasize non- structure flood control
- Allow low-impact development only

Goal C-15

Protect and enhance wildlife habitat

Highlights:

- Minimize fragmentation
- Protect habitat for listed species
- Encourage vegetated buffer areas
- Control invasive species

Next Steps in the Review Process

- General Government Committee Briefing – June 11, 2025
- Complete final round of stakeholder input and engagement – Late Spring 2025
  - Review draft goals, policies, and actions
  - Ensure input and feedback was incorporated
- Comprehensive Plan Adoption Process – Fall 2025 – Winter 2026
- Comprehensive Plan Ordinance Briefing – October 28, 2025

Submitting Comments or Questions

Written comments or questions are welcome at any time during the periodic update process

- Update website: 2025 Comprehensive Plan Update
- Periodic update email: compplan@ci.tumwater.wa.us
- City of Tumwater contact:

  Community Development Department
  555 Israel Road SW
  Tumwater, WA 98501
  Phone: 360-754-4180
  Email: compplan@ci.tumwater.wa.us

Conservation Element

Goals, Policies, and Implementation Actions

City of Tumwater 2025 Comprehensive Plan

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

DRAFT VERSION MAY 20, 2025

December 2025

Ordinance No. O2025-0XX

CITY OF TUMWATER

Conservation Element

Part 1 – Goals, Policies, and Implementation Actions

Table of Contents

Abbreviations Used in Document

CDD – Community Development Department

PRD – Parks, Recreation, and Facilities Department

RCW – Revised Code of Washington

TED – Transportation & Engineering Department

TMC – Tumwater Municipal Code

WRS – Water Resources & Sustainability Department

Conservation Element

Part 1 – Goals, Policies, and Implementation Actions

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.

Tumwater's Vision, Mission, and Belief Statements that provide overarching direction for the future of Tumwater are found in the Comprehensive Plan Summary.

The Conservation Element aligns and is consistent with the other elements of the Comprehensive Plan.

Part 1 – Goals Policies, and Implementation Actions establishes Tumwater's goals and policies to set forth a direction to identify, protect, and conserve critical environmental areas and valuable natural resources in Tumwater.

The goals and policies of the Conservation Element are guided by the state Growth Management Act and the Thurston County-Wide Planning Policies and the vision of a Tumwater that protects and enhances natural resources and the environment. The Element's goals and policies are coordinated with the other Elements and regional plans.

The Conservation Element's goals and policies are the policy basis for the draft implementation actions in Conservation Element and those future actions that will be developed over the next 20 years which will be the foundation for Tumwater's annual work programs to address natural resources and the environment.

Part 2 – Technical Information provides an analysis of natural resource lands appropriate to Tumwater and its critical areas to support the twenty-year growth projections for Tumwater.

Commented [BM1]: This will be the document that has the Comprehensive Plan wide goals and policies.

B. How to Read this Part of the Element

In Part 1, Chapters 2 and 3 discuss the Conservation Element's connection to the goals of the state Growth Management Act and the Thurston County-Wide Planning Policies.

Chapter 4 presents each goal with an explanation of how to read the tables and then presents each of Tumwater's conservation goals in detail with an explanation of the importance of each goal.

Appendix A contains the draft implementation actions, which are intended to be a source of annual work program items that serve to implement the goals and policies of the Conservation Element.

The annual work programs will further refine the implementation actions prior to their being put into practice. It is expected that implementation actions will be further amended, added, or subtracted as needed over the course of the 20-year Comprehensive Plan as new opportunities arise to meet the intent of the Conservation Element's goals and policies.

2. Growth Management Act – Element Goals

Chapter 36.70A RCW requires that Tumwater show how the Conservation Element meets the relevant planning goals contained within the Act. The following is a listing of the two applicable goals for the Conservation Element and an analysis of how the Element addresses these goals:

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. Since these parcels are within Tumwater, it is difficult to determine their long-term significance. Tumwater supports urban agriculture with 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 addresses how to enhance the environment.

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

3. County-Wide Planning Policies

The Growth Management Act requires that Tumwater's Comprehensive Plan be consistent with Thurston County's County-Wide Planning Policies, which were last amended in 2025.

The following is a list of the relevant policies that apply to this Element of the Comprehensive Plan. All County-Wide Planning Policies are adopted as Appendix B to the Comprehensive Plan. The relevant sections of the County-Wide Planning Policies to this Element are cited below.

II. Urban Growth Areas

The resource land and critical area chapters in the Element describe what kinds of development are compatible with the resource or area that chapter covers.

III. Promotion of Contiguous and Orderly Development, Provision of Urban Services, and Protection of Rural Areas

The critical aquifer recharge area policies in the Element support this policy.

VII. Economic Development and Employment

Urban agriculture is discussed in the Element. The critical areas chapters address the protection of crucial areas for both environmental and public health reasons.

X. Environmental Quality

The Conservation Element is based upon the theme of the importance of natural systems and resources to human uses. The portion of the Element related to water resources cover the issues surrounding the balance between meeting future needs for water and protecting water resources.

4. Element Goals and Policies

A. How to Read These Tables

The Conservation Element's goals and policies are not in priority order.

The Conservation Element's goals and policies are associated with one of the three areas of conservation goals:

1. Overarching Environmental Goals
2. Natural Resource Areas Goals
3. Critical Areas Goals

Appendix A provides a list of the draft implementation actions by goal and policy that will be considered when developing annual work programs for implementing the Conservation Element's goals and policies.

1) Department Leads

As noted in the tables below, implementation of the Conservation Element's goals and policies are associated with four different Tumwater departments:

CDD	Community Development Department
PRD	Parks, Recreation, and Facilities Department
TED	Transportation & Engineering Department
WRS	Water Resources & Sustainability Department

2) Period

Each of the Conservation Element's policies is associated with estimated start dates, length of time to complete, and target completion dates, if appropriate based on adequate funding for staff and resources. Most policies are ongoing with no set target completion date.

B. Overarching Environmental Goals

Goal C-1 Recognize the significant role played by natural features and systems in determining the overall environmental quality and livability of Tumwater.

Commented [BM2]: Old Goal C-1.

Natural features and systems perform key environmental functions that enhance the livability of Tumwater and protects its residents from hazards.

Policies		Lead	Period
C-1.1	**Support active measures to protect and enhance Tumwater's natural environment**	CDD	Term of Plan

Commented [BM3]: Modified old Policy C-1.1.

Policies		Lead	Period
C-1.2	**Use adopted plans to inform critical area policies, regulations, and implementation actions.**	CDD WRS	Term of Plan

Commented [BM4]: New policy to replace current Policies C-1.3 and C-1.7.

Goal C-2 Promote conservation of natural resources and the protection of the environment in cooperation with residents, property owners, other jurisdictions, and tribes.

Natural resources are the building blocks to produce all the things we need. Some resources need Tumwater's protection and management to ensure they can continue to provide materials and services into the future.

Human activity has a large impact on the environment, changing the way the landscape meets the needs of others. Collaboration is key to ensuring that everyone's needs can be met in the future.

Policies		Lead	Period
C-2.1	**Support education programs in the community that outline the need for natural resource conservation and protection of critical areas and create opportunities for community action.**	CDD WRS	Term of Plan

Commented [BM5]: New policy.

C. Natural Resource Areas Goals

Goal C-3 Support urban agriculture for access to local food production.

Access to nutritious food is becoming more important as Tumwater residents face issues with the cost of living. Supporting urban agriculture like farmstands, community gardens, and urban farms helps provides residents with access to fresh locally grown products, decreases the cost of transporting goods, protects cultural heritage, and provides open space.

As goals and policies are developed which support urban agriculture, farmers have increased access to markets, as well as opportunities to diversify their products and services. These benefits help make farms more viable at a scale that is compatible with urban environments.

	Policies	Lead	Period
C-3.1	**Support local food production to maintain the quality of life and long-term sustainability of Tumwater.**	CDD	Term of Plan
C-3.2	**Work with community groups to support the continued viability of agriculture and encourage neighborhood and community support.**	CDD	Term of Plan

Commented [BM6]: Modification of current Policy C-3.1.

Commented [BM7]: Modification of current Policy C-3.4.

Goal C-4 Support urban forestry.

Urban forestry is the care and management of the vegetation on public and private properties in Tumwater. It includes native plants and ornamental plants, understory, and canopy. Plants in Tumwater provide benefits to those who live, work, and play in the area.

Trees mitigate pollution, provide habitat for wildlife, sequester carbon, reduce stormwater runoff, and provide socioeconomic and aesthetic benefits. Managing trees to ensure safety and avoiding conflicts with infrastructure is an important part of urban forestry practices. The City Council adopted the Tumwater Urban Forestry Management Plan in 2021 to guide code development and protect trees and improve public safety.

	Policies	Lead	Period
C-4.1	**Maximize retention of a healthy tree cover and native vegetation and encourage restoration, replacement, and enhancement of unhealthy trees and disturbed vegetation as recommended in the adopted *Tumwater Urban Forestry Management Plan* consistent with the Growth Management Act and the requirements of protected habitat.**	WRS	Term of Plan
C-4.2	**Ensure that harvesting for conversion to other uses occurs in a manner compatible with land uses of the surrounding area and maintenance of water quality and critical areas.**	WRS CDD	Term of Plan

Commented [BM8]: Update of current Policy C-1.5.

Commented [BM9]: Update of current Policy C-3.5.

Goal C-5 Protect mineral resource lands.

Modern industry relies on mineral resources. The most abundant mineral resource in Washington State is aggregate which includes sand, gravel, and crushed rock. These products are vital to road construction and other projects that require soil stabilization and additional drainage.

Local mineral sources are especially valuable since they reduce the shipping costs associated with transporting heavy materials. Since

minerals are a non-renewable resource, protecting existing sources in Tumwater is important to ensure they are available locally into the future.

Policies		Lead	Period
C-5.1	**Allow mineral extraction industries to locate where prime natural resource deposits exist and where extraction will not cause the degradation of sensitive areas.**	CDD	Term of Plan
C-5.2	**Conserve designated mineral resource lands of long-term commercial significance for mineral extraction, and the use of adjacent lands should not interfere with the continued use of the designated mining sites that are being operated in accordance with applicable best management practices and other laws and regulations.**	CDD	Term of Plan
C-5.3	**Restore mineral extraction sites as the site is being mined. The site should be restored for appropriate future use, and it should blend with the adjacent landscape and contours.**	CDD	Term of Plan

Commented [BM10]: Current Policy C-3.6.

Commented [BM11]: Current Policy C-3.7.

Commented [BM12]: Current Policy C-3.8.

D. Critical Areas Goals

Goal C-6 Designate and protect critical areas including wetlands, critical aquifer recharge areas, frequently flooded areas, geologically hazardous areas, shorelines of the state, and fish and wildlife habitat conservation areas in accordance with the Growth Management Act to protect their functions and values as well as safeguard against threats to health, safety, and property.

Unwise development of critical areas jeopardizes environmental resource functions and values, puts species at risk of extinction, triggers regulatory burdens, and places people and property in unsafe conditions.

If critical area functions are not protected, attempting to enhance or restore them in the future is likely to be costly, if not impossible.

Policies		Lead	Period
C-6.1	**Base critical areas designations and regulations on best available science to protect and enhance the functions and values of these areas.**	CDD	Term of Plan

Commented [BM13]: Add tooltip to Comprehensive Plan glossary of terms.

Commented [BM14]: Updated current Policy C-2.1.

TMC 16.24.030 defines Critical aquifer recharge areas the same way the RCW defines it; could add this to the Comprehensive Plan glossary.

RCW states "Areas with a critical recharging effect on aquifers used for potable water."

Policies		Lead	Period
C-6.2	Protect critical areas while allowing for compatible growth and development.	CDD	Term of Plan
C-6.3	Require that prior to any development, critical areas are identified and protected.	CDD	Term of Plan

Commented [BM15]: Update of current policy C-1.1.

Commented [BM16]: Current Policy C-2.3.

Goal C-7 Protect and enhance water quality.

Clean water is necessary for life. Everyday activities such as cleaning and driving can have a negative impact on water quality. Reducing the quantity of pollutants on Tumwater's roads and yards decreases the likelihood that they will be washed into waterways or carried into groundwater.

Since most sources of pollution are all around Tumwater's landscape, it is also important to maintain systems that can remove pollution from water.

Policies		Lead	Period
C-7.1	Protect water quality by preserving and enhancing the ecological functions of water features through land use plans, development regulations, and public education.	CDD WRS	Term of Plan
C-7.2	Support restoration of river and stream channels and associated wetland and riparian areas to enhance water quality, improve fish and wildlife habitat, and mitigate flooding and erosion.	CDD WRS	Term of Plan
C-7.3	Allow public access to wetlands, streams, and lakes for scientific, educational, and recreational use, provided access is carefully sited, sensitive habitats and species are protected, and hydrologic continuity is maintained.	CDD	Term of Plan
C-7.4	Manage water resources to preserve ecosystem services, while addressing fish and wildlife habitat, flood protection, water supply, recreation, and open space.	CDD PRD WRS	Term of Plan

Commented [BM17]: New policy.

Commented [BM18]: Update of current Policy C-2.6.

Commented [BM19]: Update of current Policy C-2.7.

Commented [BM20]: New policy.

	Policies	Lead	Period
C-7.5	Work with Olympia, Thurston County, and other affected entities to enhance and protect water quality in the region guided by the Deschutes River Study.	WRS	Term of Plan

Commented [BM21]: New policy.

Goal C-8 Improve natural drainage systems.

Storm and surface waters are a primary concern for urban environments. As impervious surfaces replace the permeable land cover, water travelling across the land accumulates pollutants. As development converts more land, less water is filtered through soil and more pollutants are accumulated.

Drainage systems are also critical to protect the built environment from flood damage. With extreme amounts of stormwater entering the stormwater system within short periods of time, it is imperative that Tumwater expand the system at the rate of land conversion to meet the ever-changing needs.

	Policies	Lead	Period
C-8.1	Develop Watershed Management Plans in partnership with other jurisdictions who are also part of the same watershed.	WRS	Term of Plan
C-8.2	Develop and implement conservation measures necessary to preserve and enhance anadromous fish habitat and fisheries and other state and federally protected species, consistent with the Growth Management Act.	CDD	Term of Plan
C-8.3	Protect and enhance natural drainage systems to maintain and improve water quality and reduce public costs.	CDD WRS	Term of Plan
C-8.4	Prevent environmental degradation by using best management practices and current stormwater treatment and flow control standards on new and redevelopment projects.	CDD TED WRS	Term of Plan
C-8.5	Use current State approved stormwater treatment and flow control standards on development and construction projects.	CDD TED WRS	Term of Plan

Commented [BM22]: New policy.

Commented [BM23]: New policy.

Commented [BM24]: New policy.

Commented [BM25]: New policy.

Commented [BM26]: New policy.

Policies		Lead	Period
C-8.6	**Require resource industries to use management practices that prevent erosion and sedimentation and pollutants from entering ground or surface waters following State regulations.**	CDD	Term of Plan

Commented [BM27]: New policy.

Goal C-9 Improve air quality.

Poor air quality can have serious impacts on health for both people and the environment. Ensuring that air is appropriately filtered by retaining vegetation and reducing the amount of air pollution at the source are two strategies to manage air quality for the next 20 years.

Policies		Lead	Period
C-9.1	**Continue to support and rely on the various State, federal, and local programs to protect and enhance air quality.**	CDD	Term of Plan
C-9.2	**Require appropriate tree and vegetation retention and landscaping to provide filtering of suspended particulates.**	CDD	Term of Plan
C-9.3	**Coordinate with the other Elements in the Comprehensive Plan on actions to reduce vehicle miles traveled, greenhouse gas emissions, and other locally generated air pollutants.**	CDD WRS TED	Term of Plan

Commented [BM28]: New policy.

Commented [BM29]: New policy.

Commented [BM30]: New policy.

Goal C-10 Protect and enhance rivers, streams, and lakes.

Surface waters like rivers, streams and lakes provide necessary transit for water as it flows across the landscape. Measures to protect waterways mitigate erosion and pollution that are ubiquitous in urban areas. Surface water also provides necessary habitat for wildlife. Protecting water quality is important for preserving Tumwater's environments to continue the beneficial ecosystem functions necessary for life.

Policies		Lead	Period
C-10.1	**Protect, enhance, and restore natural stream channels for their hydraulic, ecological, and aesthetic functions through development regulations; land dedications, easements, and acquisitions; incentives; and restoration planning.**	CDD WRS	Term of Plan

Commented [BM31]: New policy.

Policies	Lead	Period
C-10.2 Require any alteration of rivers, streams, and lakes include mitigation and maintenance which address water quality; floodplain protection; fish and wildlife habitat; channel stability and vegetative cover; maintenance of instream flows; and impacts to downstream property owners.	CDD	Term of Plan

Commented [BM32]: New policy.

Goal C-11 Protect and enhance wetlands.

Wetlands play a vital role in the overall natural environment. Wetlands protect water quality, reduce flooding, provide aquifer recharge for drinking water and other uses, and provide critical habitat for fish and wildlife as well as carbon sequestration.

Wetlands also provide many social values including recreational opportunities, aesthetic benefits, places for research and education, and cultural resources important to tribes.

Policies	Lead	Period
C-11.1 Where possible, protect wetlands as ecosystems that provide essential services and functionality within watersheds.	CDD	Term of Plan
C-11.2 Preserve and enhance wetlands from new developments by providing buffers around wetlands adequate to protect natural functions.	CDD	Term of Plan
C-11.3 Allow reasonable use of property containing existing wetlands to avoid a regulatory taking following State guidance.	CDD	Term of Plan
C-11.4 Maintain stormwater treatment and flow control sites associated with wetlands in a manner that ensures the ecological functions of the wetland to minimize impacts to critical area habitat.	CDD WRS	Term of Plan

Commented [BM33]: Update of current Policy C-2.8.

Commented [BM34]: New policy.

Commented [BM35]: New policy.

Commented [BM36]: New policy.

Goal C-12 Protect groundwater.

Commented [BM37]: Update of current Policy C-2.9.

Tumwater's water comes from underground aquifers, which are sand and gravel formations below the ground that "hold" water. These aquifers are replenished by rain and snow infiltrated through the ground and 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. Groundwater contributes to the flow of streams and rivers, providing base flows that are essential for fish and other aquatic life, especially during dry periods.

Policies	Lead	Period
C-12.1 **Protect aquifers, aquifer recharge areas, and wellhead protection areas from contamination.**	CDD WRS	Term of Plan
C-12.2 **Protect streams, wetlands, and lakes that serve to recharge aquifers from contamination.**	CDD WRS	Term of Plan

Commented [BM38]: New policy.

Commented [BM39]: New policy.

Goal C-13 Protect geologically hazardous areas.

Protecting geologically hazardous areas in Tumwater is important because they pose significant threats to public safety and infrastructure. Identifying these areas allows for better planning, mitigation, and emergency response. Washington state is particularly more vulnerable due to its geological location, active faults, and volcanic activity.

Policies	Lead	Period
C-13.1 **Regulate development intensity, site coverage, and vegetation removal in geologically hazardous areas to prevent property damage and environmental degradation; minimize soil erosion, siltation, and landslides; and enhance greenbelt and wildlife habitat values.**	CDD	Term of Plan
C-13.2 **Minimize soil disturbance and maximize retention and replacement of native vegetative cover, such as trees, for land use permitted in erosion and landslide hazard areas.**	CDD	Term of Plan
C-13.3 **Decrease development intensity as slopes increase to mitigate problems of drainage, erosion, siltation, and landslides.**	CDD	Term of Plan
C-13.4 **Require erosion and sedimentation prevention best management practices be used on construction projects by the Development Guide and Drainage Design & Erosion Control Manual.**	CDD	Term of Plan

Commented [BM40]: Modification of current Policy C-2.13.

Commented [BM41]: Current Policy C-2.14.

Commented [BM42]: New policy.

Commented [BM43]: New policy.

Policies		Lead	Period
C-13.5	Require appropriate engineering, building design, and construction measures to minimize the risk of structural damage and fire and injury to occupants, and to prevent post-seismic collapse in areas with severe seismic hazards.	CDD TED	Term of Plan

Commented [BM44]: Current Policy C-2.15.

Goal C-14 Preserve flood plains and floodways.

Floodplains are important for flood protection and ecosystems. Natural floodplains provide flood risk reduction benefits by slowing runoff, storing floodwater, and reducing erosion. Floodplains frequently contain wetlands and provide fish and wildlife habitats.

It is important to protect the functions of floodplains and reduce risk to people and property by limiting development in frequently flooded areas.

Policies		Lead	Period
C-14.1	Minimize land alterations that would increase potential flooding and changes to natural surface water features that retain or carry floodwaters, such as wetlands, floodplains, rivers, streams, and lakes.	CDD	Term of Plan
C-14.2	Require mitigation for adverse environmental impacts from engineered flood control measures.	CDD	Term of Plan
C-11.3	Meet state regulatory standards for floodplain development as these standards are updated for consistency with relevant federal requirements including those related to the Endangered Species Act.	CDD	Term of Plan
C-14.4	Emphasize non-structural methods in planning for flood prevention and damage reduction. Require new developments or land modifications in 100-year floodplains maintain natural flood storage functions and minimize hazards.	CDD	Term of Plan

Commented [BM45]: Current Policy C-2.10.

Commented [BM46]: Current Policy C-2.11.

Commented [BM47]: Current Policy C-2.12.

Commented [BM48]: New policy.

Policies		Lead	Period
C-14.5	**Protect 100-year floodplains by restricting development; encouraging low-impact uses such as open space, trails, and parks; locating infrastructure above the flood level, and requiring new development replace existing flood storage capacity lost due to filling.**	CDD	Term of Plan
C-14.6	**Restrict permanent structures within the floodway due to risks associated with deep and fast-flowing waters unless appropriate flood control measures have been taken.**	CDD	Term of Plan
C-14.7	**Restrict land uses in a floodway that would divert water from the floodway, change flood elevation or obstruct natural flow, unless appropriate flood control measures have been taken such that there are no additional offsite impacts and no degradation of water quality.**	CDD	Term of Plan
C-14.8	**Restrict development in the floodway fringe that would reduce the existing level of flood storage.**	CDD	Term of Plan

Commented [BM49]: New policy.

Commented [BM50]: New policy.

Commented [BM51]: New policy.

Commented [BM52]: New policy.

Goal C-15 Protect and enhance wildlife habitat.

Wildlife habitats, such as prairies, provide essential resources for wildlife and humans. Resources include food, water, shelter, and breeding grounds, ensuring the continuation of diverse species and the health of ecosystems.

Protecting habitats also helps mitigate climate change, conserve biodiversity conservation, and provide health and economic benefits.

Wildlife habitat offers recreation opportunities for the community and has economic benefits as well. Integrating wildlife habitat protection into land use planning decisions can help minimize development impacts on wildlife populations.

Policies		Lead	Period
C-15.1	**Identify, protect, and enhance fish and wildlife habitat corridors to minimize habitat fragmentation, especially along existing linkages by enhancing vegetation composition and structure and incorporating compatible indigenous plant species.**	CDD	Term of Plan

Commented [BM53]: Modification of current Policy C-2.21.

Conservation Element

Part 1 – Goals, Policies, and Implementation Actions

Policies		Lead	Period
C-15.2	Protect and preserve habitats for species identified as endangered, threatened, or sensitive by the State or federal government, giving special consideration to measures necessary to preserve or enhance suitable habitat.	CDD	Term of Plan
C-15.3	Maintain habitats that support the greatest diversity of fish and wildlife through conservation and enhancement of critical areas.	CDD	Term of Plan
C-15.4	When developing forested property adjacent to steep slopes, wetlands, stream ravines, or stream corridors, encourage development to provide additional buffer areas to provide wildlife and fish habitat.	CDD	Term of Plan
C-15.5	Restore native vegetation and control invasive species to preserve and enhance fish and wildlife habitat.	CDD	Term of Plan

Commented [BM54]: Modification of current Policy C-2.16.

Commented [BM55]: Current Policy C-2.17.

Commented [BM56]: New policy.

Commented [BM57]: New policy.

Appendix A – Draft Implementation Actions

Each of the Conservation Element goals and policies in Chapter 4 will require Tumwater to take specific actions to implement over the course of the 20-year term of the Comprehensive Plan.

The draft implementation actions in the tables below were developed in coordination with the stakeholders, the community, and Tumwater staff. The draft implementation actions in the tables below are intended to serve as the start for developing annual Tumwater work programs to address conservation actions.

As the Comprehensive Plan is put into action over the next twenty years, the draft implementation actions will change as new, unforeseen opportunities emerge: new ones may be added, proposed ones may be modified or replaced by other actions.

The draft implementations actions below are intended to be draft work program items that serve to implement the goals and policies of the Element. The draft implementation actions will need further refinement before they are incorporated into annual Tumwater work programs.

1. How to Read These Tables

The Conservation Element goals, policies, and the draft implementation actions associated with them are not in priority order.

The draft implementation actions that can only be undertaken by other entities are not included in this plan.

The Conservation Element's goals, policies, and draft implementation actions are associated with one of the three areas of conservation goals:

1. Overarching Environmental Goals
2. Natural Resource Areas Goals
3. Critical Areas Goals

1) Department Leads

As noted in the tables below, implementation of the Conservation Element's policies and draft implementation actions are associated with four different Tumwater departments:

CDD	Community Development Department
PRD	Parks, Recreation, and Facilities Department
TED	Transportation & Engineering Department
WRS	Water Resources & Sustainability Department

2) Period

Each of the Conservation Element's policies and draft implementation are associated with estimated start dates, length of time to complete, and target completion dates, if appropriate based on adequate funding for staff and resources. Most policies are ongoing with no set target completion date.

2. Overarching Environmental Goals

Goal C-1 Recognize the significant role played by natural features and systems in determining the overall environmental quality and livability of Tumwater.

Commented [BM58]: Old Goal C-1.

Policies and Implementation Actions	Lead	Period
C-1.1 Support active measures to protect and enhance Tumwater's natural environment	CDD	Term of Plan
C-1.2 Use adopted plans to inform critical area policies, regulations, and implementation actions.	CDD WRS	Term of Plan
C-1.2.1 Implement the actions identified in the Thurston Climate Mitigation Plan.	CDD WRS	Term of Plan
C-1.2.2 Implement the actions identified in the most recent version of the Natural Hazards Mitigation Plan for Thurston County.	CDD WRS	Term of Plan
C-1.2.3 Implement the actions identified in the Tumwater Urban Forestry Management Plan.	CDD WRS	Term of Plan

Commented [BM59]: Modified old Policy C-1.1.

Commented [BM60]: New policy to replace current Policies C-1.3 and C-1.7.

Commented [BM61]: Based on current Land Use policy.

Commented [BM62]: Based on current Land Use policy.

Commented [BM63]: Based on current Land Use policy.

Goal C-2 Promote conservation of natural resources and the protection of the environment in cooperation with residents, property owners, other jurisdictions, and tribes.

Policies and Implementation Actions	Lead	Period
C-2.1 Support education programs in the community that outline the need for natural resource conservation and protection of critical areas and create opportunities for community action.	CDD WRS	Term of Plan
C-2.1.1 Support the work of the Stream Team.	WRS	Term of Plan
C-2.1.2 Support the work for the Tumwater Green Team.	WRS	Term of Plan

Commented [BM64]: New policy.

Commented [BM65]: New implementation action.

Commented [BM66]: New implementation action.

	Policies and Implementation Actions	Lead	Period
C-2.1.3	Support water conservation messaging and outreach.	WRS	Term of Plan
C-2.1.4	Support water quality messaging and outreach for wellhead and source protection.	WRS	Term of Plan

Commented [BM67]: New implementation action.

Commented [BM68]: New implementation action.

3. Natural Resource Areas Goals

Goal C-3 Support urban agriculture for access to local food production.

	Policies and Implementation Actions	Lead	Period
C-3.1	**Support local food production to maintain the quality of life and long-term sustainability of Tumwater.**	CDD	Term of Plan
C-3.1.1	Implement and keep the Food System Plan updated.	CDD	Term of Plan
C-3.1.2	Collaborate with local organizations to promote food system resources to improve participation.	CDD	Term of Plan
C-3.2	**Work with community groups to support the continued viability of agriculture and encourage neighborhood and community support.**	CDD	Term of Plan
C-3.2.1	Support the efforts of organizations to develop a vibrant food system through access to healthy, local, affordable, culturally appropriate, sustainably produced food to assist the community in having reliable access to enough affordable nutritious food.	CDD	Term of Plan

Commented [BM69]: Modification of current Policy C-3.1.

Commented [BM70]: New implementation action.

Commented [BM71]: New implementation action.

Commented [BM72]: Modification of current Policy C-3.4.

Commented [BM73]: Modification of current Implementation Action C-3.4.1.

Goal C-4 Support urban forestry.

Policies and Implementation Actions	Lead	Period
C-4.1 Maximize retention of a healthy tree cover and native vegetation and encourage restoration, replacement, and enhancement of unhealthy trees and disturbed vegetation as recommended in the adopted *Tumwater Urban Forestry Management Plan* consistent with the Growth Management Act and the requirements of protected habitat.	**WRS**	**Term of Plan**
C-4.1.1 Implement the actions in the Tumwater Urban Forestry Management Plan.	**WRS**	Term of Plan
C-4.2 Ensure that harvesting for conversion to other uses occurs in a manner compatible with land uses of the surrounding area and maintenance of water quality and critical areas.	**WRS CDD**	**Term of Plan**

Commented [BM74]: Update of current Policy C-1.5.

Commented [BM75]: New implementation action.

Commented [BM76]: Update of current Policy C-3.5.

Goal C-5 Protect mineral resource lands.

Policies and Implementation Actions	Lead	Period
C-5.1 Allow mineral extraction industries to locate where prime natural resource deposits exist and where extraction will not cause the degradation of sensitive areas.	**CDD**	**Term of Plan**
C-5.2 Conserve designated mineral resource lands of long-term commercial significance for mineral extraction, and the use of adjacent lands should not interfere with the continued use of the designated mining sites that are being operated in accordance with applicable best management practices and other laws and regulations.	**CDD**	**Term of Plan**
C-5.3 Restore mineral extraction sites as the site is being mined. The site should be restored for appropriate future use, and it should blend with the adjacent landscape and contours.	**CDD**	**Term of Plan**

Commented [BM77]: Current Policy C-3.6.

Commented [BM78]: Current Policy C-3.7.

Commented [BM79]: Current Policy C-3.8.

4. Critical Areas Goals

Goal C-6 **Designate and protect critical areas including wetlands, critical aquifer recharge areas, frequently flooded areas, geologically hazardous areas, shorelines of the state, and fish and wildlife habitat conservation areas in accordance with the Growth Management Act to protect their functions and values as well as safeguard against threats to health, safety, and property.**

	Policies and Implementation Actions	Lead	Period
C-6.1	**Base critical areas designations and regulations on best available science to protect and enhance the functions and values of these areas.**	**CDD**	**Term of Plan**
C-6.1.1	Update critical area regulations as needed to reflect current best available science and state guidance to minimize impacts from new development.	**CDD**	Term of Plan
C-6.2	**Protect critical areas while allowing for compatible growth and development.**	**CDD**	**Term of Plan**
C-6.2.1	When updating development regulations, review in conjunction with critical areas regulations to ensure compatibility.	**CDD**	Term of Plan
C-6.2.2	Use incentive programs, acquisition, appropriate regulations, and other techniques to preserve critical areas as permanent open space where development may pose hazards to health, property, or important ecological functions.	**CDD**	Term of Plan
C-6.2.3	Apply mitigation sequencing to avoid and minimize impacts to critical areas, and, if necessary, require and enforce mitigation to ensure no net loss of critical area functions.	**CDD**	Term of Plan

Commented [BM80]: Add tooltip to Comprehensive Plan glossary of terms.

Commented [BM81]: Updated current Policy C-2.1.

TMC 16.24.030 defines Critical aquifer recharge areas the same way the RCW defines it; could add this to the Comprehensive Plan glossary.

RCW states "Areas with a critical recharging effect on aquifers used for potable water."

Commented [BM82]: New implementation action.

Commented [BM83]: Update of current policy C-1.1.

Commented [BM84]: New implementation action.

Commented [BM85]: New implementation action based on current Policy C-2.2.

Commented [BM86]: Add tooltip to Comprehensive Plan glossary of terms.

Commented [BM87]: New implementation action based on current Policy C-2.5.

Commented [BM88]: New implementation action based on current Policy C-2.5.

	Policies and Implementation Actions	Lead	Period
C-6.2.4	Ensure the effectiveness of critical area mitigation by requiring adequate critical area studies and mitigation plans, the application of mitigation sequencing, financial assurances to ensure mitigation success, and by improving Tumwater oversight of maintenance and monitoring of mitigation.	CDD	Term of Plan
C-6.3	**Require that prior to any development, critical areas are identified and protected.**	CDD	Term of Plan
C-6.3.1	In reviewing development proposals that may impact a critical area, supplement staff review with a qualified third-party professional as needed to assess potential impacts and require development alternatives or mitigation.	CDD	Term of Plan

Commented [BM89]: New implementation action based on current Policy C-2.4.

Commented [BM90]: Current Policy C-2.3.

Commented [BM91]: New implementation action.

Goal C-7 Protect and enhance water quality.

	Policies and Implementation Actions	Lead	Period
C-7.1	**Protect water quality by preserving and enhancing the ecological functions of water features through land use plans, development regulations, and public education.**	CDD WRS	Term of Plan
C-7.1.1	Require adequate stormwater treatment and flow control for new development, including low impact development techniques.	CDD	Term of Plan
C-7.1.2	Update stormwater regulations as needed to reflect current state guidance, including low impact development provisions.	CDD WRS	Term of Plan
C-7.1.3	Support water quality messaging and outreach for wellhead and source protection.	WRS	Term of Plan

Commented [BM92]: New policy.

Commented [BM93]: New implementation action.

Commented [BM94]: New implementation action.

	Policies and Implementation Actions	Lead	Period
C-7.2	**Support restoration of river and stream channels and associated wetland and riparian areas to enhance water quality, improve fish and wildlife habitat, and mitigate flooding and erosion.**	CDD WRS	Term of Plan
C-7.3	**Allow public access to wetlands, streams, and lakes for scientific, educational, and recreational use, provided access is carefully sited, sensitive habitats and species are protected, and hydrologic continuity is maintained.**	CDD	Term of Plan
C-7.3.1	Work with the Tumwater and Olympia School Districts, LOTT, and other community-based organizations on public education on maintaining water quality.	WRS	Term of Plan
C-7.4	**Manage water resources to preserve ecosystem services, while addressing fish and wildlife habitat, flood protection, water supply, recreation, and open space.**	CDD PRD WRS	Term of Plan
C-7.4.1	Update the Salmon Creek Basin Plan.	CDD TED WRS	Term of Plan
C-7.4.2	Monitor storm drain outfalls on a regular basis and pursue corrective actions, as necessary.	WRS	Term of Plan
C-7.5	**Work with Olympia, Thurston County, and other affected entities to enhance and protect water quality in the region guided by the Deschutes River Study.**	WRS	Term of Plan
C-7.5.1	Coordinate implementation strategies and regulations with Olympia and Thurston County.	CDD TED WRS	Term of Plan

Commented [BM95]: Update of current Policy C-2.6.

Commented [BM96]: Update of current Policy C-2.7.

Commented [BM97]: New implementation action.

Commented [BM98]: New policy.

Commented [BM99]: New implementation action.

Commented [BM100]: New implementation action.

Commented [BM101]: New policy.

Commented [BM102]: New implementation action.

Goal C-8 Improve natural drainage systems.

	Policies and Implementation Actions	Lead	Period
C-8.1	**Develop Watershed Management Plans in partnership with other jurisdictions who are also part of the same watershed.**	WRS	Term of Plan

Commented [BM103]: New policy.

Conservation Element

Part 1 – Goals, Policies, and Implementation Actions

	Policies and Implementation Actions	Lead	Period
C-8.1.1	Work with Olympia and Thurston County to ensure that regulations regarding surface water management provide consistent surface water management.	WRS	Term of Plan
C-8.1.2	Continue involvement with watershed planning efforts through participation in the Salmon Creek Basin and WRIA 13 watershed planning efforts.	WRS	Term of Plan
C-8.2	**Develop and implement conservation measures necessary to preserve and enhance anadromous fish habitat and other state and federally protected species, consistent with the Growth Management Act.**	CDD	**Term of Plan**
C-8.3	**Protect and enhance natural drainage systems to maintain and improve water quality and reduce public costs.**	CDD WRS	**Term of Plan**
C-8.4	**Prevent environmental degradation by using best management practices and current stormwater treatment and flow control standards on new and redevelopment projects.**	CDD TED WRS	**Term of Plan**
C-8.5	**Use current State approved stormwater treatment and flow control standards on development and construction projects.**	CDD TED WRS	**Term of Plan**
C-8.5.1	Update stormwater regulations as needed to reflect current best available science and state guidance.	CDD TED WRS	Term of Plan
C-8.6	**Require resource industries to use management practices that prevent erosion and sedimentation and pollutants from entering ground or surface waters following State regulations.**	CDD	**Term of Plan**
C-8.6.1	Update regulations as needed to meet state standards to minimize the amount of erosion, sedimentation, and water pollutants created by resource industries.	CDD	Term of Plan

Commented [BM104]: New implementation action.

Commented [BM105]: New implementation action.

Commented [BM106]: New policy.

Commented [BM107]: New policy.

Commented [BM108]: New policy.

Commented [BM109]: New policy.

Commented [BM110]: New implementation action.

Commented [BM111]: New policy.

Commented [BM112]: New implementation action.

Goal C-9 Improve air quality.

Policies and Implementation Actions	Lead	Period
C-9.1 Continue to support and rely on the various State, federal, and local programs to protect and enhance air quality.	CDD	Term of Plan
C-9.1.1 Work with the Olympic Region Clean Air Agency and with Federal and State agencies to ensure that air quality is improved and protected within Tumwater.	CDD	Term of Plan
C-9.2 Require appropriate tree and vegetation retention and landscaping to provide filtering of suspended particulates.	CDD	Term of Plan
C-9.2.1 Update regulations as needed to reflect the current best available science and state guidance that allow the use of existing vegetated areas for biofiltration.	CDD	Term of Plan
C-9.3 Coordinate with the other Elements in the Comprehensive Plan on actions to reduce vehicle miles traveled, greenhouse gas emissions, and other locally generated air pollutants.	CDD WRS TED	Term of Plan

Goal C-10 Protect and enhance rivers, streams, and lakes.

Policies and Implementation Actions	Lead	Period
C-10.1 Protect, enhance, and restore natural stream channels for their hydraulic, ecological, and aesthetic functions through development regulations; land dedications, easements, and acquisitions; incentives; and restoration planning.	CDD WRS	Term of Plan
C-10.2 Require any alteration of rivers, streams, and lakes include mitigation and maintenance which address water quality; floodplain protection; fish and wildlife habitat; channel stability and vegetative cover; maintenance of instream flows; and impacts to downstream property owners.	CDD	Term of Plan
C-10.2.1 Rehabilitate degraded river and stream channels and banks using public and private programs, where conditions permit.	CDD WRS	Term of Plan

Commented [BM113]: New policy.

Commented [BM114]: New implementation action.

Commented [BM115]: New policy.

Commented [BM116]: New implementation action.

Commented [BM117]: New policy.

Commented [BM118]: New policy.

Commented [BM119]: New policy.

Commented [BM120]: New implementation action.

	Policies and Implementation Actions	Lead	Period
C-10.2.2	Work with tribes, nonprofit organizations, and other public agencies to implement programs to rehabilitate rivers, streams, and lakes.	WRS	Term of Plan

Commented [BM121]: New implementation action.

Goal C-11 Protect and enhance wetlands.

	Policies and Implementation Actions	Lead	Period
C-11.1	**Where possible, protect wetlands as ecosystems that provide essential services and functionality within watersheds.**	CDD	Term of Plan
C-11.2	**Preserve and enhance wetlands from new developments by providing buffers around wetlands adequate to protect natural functions.**	CDD	Term of Plan
C-11.3	**Allow reasonable use of property containing existing wetlands to avoid a regulatory taking following State guidance.**	CDD	Term of Plan
C-11.4	**Maintain stormwater treatment and flow control sites associated with wetlands in a manner that ensures the ecological functions of the wetland to minimize impacts to critical area habitat.**	CDD WRS	Term of Plan
C-11.4.1	Ensure the water level fluctuations within wetland areas due to stormwater treatment and flow control objectives are maintained like natural conditions as part of new development.	CDD WRS	Term of Plan

Commented [BM122]: Update of current Policy C-2.8.

Commented [BM123]: New policy.

Commented [BM124]: New policy.

Commented [BM125]: New policy.

Commented [BM126]: New implementation action.

Goal C-12 Protect groundwater.

Commented [BM127]: Update of current Policy C-2.9.

	Policies and Implementation Actions	Lead	Period
C-12.1	**Protect aquifers, aquifer recharge areas, and wellhead protection areas from contamination.**	CDD WRS	Term of Plan

Commented [BM128]: New policy.

Policies and Implementation Actions		Lead	Period
C-12.1.1	Work with the State Department of Ecology and others to update the delineation of aquifer recharge areas and regulations.	CDD WRS	Term of Plan
C-12.1.2	Update the wellhead protection plan as new source locations are considered or implemented.	WRS	Term of Plan
C-12.2	**Protect streams, wetlands, and lakes that serve to recharge aquifers from contamination.**	CDD WRS	Term of Plan

Commented [BM129]: New implementation action.

Commented [BM130]: New policy.

Goal C-13 Protect geologically hazardous areas.

Policies and Implementation Actions		Lead	Period
C-13.1	**Regulate development intensity, site coverage, and vegetation removal in geologically hazardous areas to prevent property damage and environmental degradation; minimize soil erosion, siltation, and landslides; and enhance greenbelt and wildlife habitat values.**	CDD	Term of Plan
C-13.2	**Minimize soil disturbance and maximize retention and replacement of native vegetative cover, such as trees, for land use permitted in erosion and landslide hazard areas.**	CDD	Term of Plan
C-13.3	**Decrease development intensity as slopes increase to mitigate problems of drainage, erosion, siltation, and landslides.**	CDD	Term of Plan
C-13.4	**Require contractors to use erosion and sedimentation prevention best management practices on construction projects by the Development Guide and Drainage Design & Erosion Control Manual.**	CDD	Term of Plan
C-13.5	**Require appropriate engineering, building design, and construction measures to minimize the risk of structural damage and fire and injury to occupants, and to prevent post-seismic collapse in areas with severe seismic hazards.**	CDD TED	Term of Plan

Commented [BM131]: Modification of current Policy C-2.13.

Commented [BM132]: Current Policy C-2.14.

Commented [BM133]: New policy.

Commented [BM134]: New policy.

Commented [BM135]: Current Policy C-2.15.

Policies and Implementation Actions	Lead	Period
C-13.5.1 Update building and fire codes as needed to reflect current state standards to account for the severity and frequency of seismic activity in the south Puget Sound area.	CDD	Term of Plan

Commented [BM136]: New implementation action.

Goal C-14 Preserve flood plains and floodways.

Policies and Implementation Actions	Lead	Period
C-14.1 Minimize land alterations that would increase potential flooding and changes to natural surface water features that retain or carry floodwaters, such as wetlands, floodplains, rivers, streams, and lakes.	CDD	Term of Plan
C-14.2 Require mitigation for adverse environmental impacts from engineered flood control measures.	CDD	Term of Plan
C-14.2.1 Prior to authorizing engineered flood control measures, encourage non-structural methods of flood control utilizing best available science.	CDD	Term of Plan
C-14.3 Meet state regulatory standards for floodplain development as these standards are updated for consistency with relevant federal requirements including those related to the Endangered Species Act.	CDD	Term of Plan
C-14.4 Emphasize non-structural methods in planning for flood prevention and damage reduction. Require new developments or land modifications in 100-year floodplains maintain natural flood storage functions and minimize hazards.	CDD	Term of Plan
C-14.5 Protect 100-year floodplains by restricting development; encouraging low-impact uses such as open space, trails, and parks; locating infrastructure above the flood level, and requiring new development replace existing flood storage capacity lost due to filling.	CDD	Term of Plan

Commented [BM137]: Current Policy C-2.10.

Commented [BM138]: Current Policy C-2.11.

Commented [BM139]: New implementation action.

Commented [BM140]: Current Policy C-2.12.

Commented [BM141]: New policy.

Commented [BM142]: New policy.

Policies and Implementation Actions	Lead	Period
C-14.5.1 Update regulations as needed to reduce development in floodplains following Federal Emergency Management Agency standards.	CDD	Every five years. Next update 2028.
C-14.6 Restrict permanent structures within the floodway due to risks associated with deep and fast-flowing waters unless appropriate flood control measures have been taken.	CDD	Term of Plan
C-14.7 Restrict land uses in a floodway that would divert water from the floodway, change flood elevation or obstruct natural flow, unless appropriate flood control measures have been taken such that there are no additional offsite impacts and no degradation of water quality.	CDD	Term of Plan
C-14.8 Restrict development in the floodway fringe that would reduce the existing level of flood storage.	CDD	Term of Plan

Commented [BM143]: New implementation action.

Commented [BM144]: New policy.

Commented [BM145]: New policy.

Commented [BM146]: New policy.

Goal C-15 Protect and enhance wildlife habitat.

Policies and Implementation Actions	Lead	Period
C-15.1 Identify, protect, and enhance fish and wildlife habitat corridors to minimize habitat fragmentation, especially along existing linkages by enhancing vegetation composition and structure and incorporating compatible indigenous plant species.	CDD	Term of Plan
C-15.2 Protect and preserve habitats for species identified as endangered, threatened, or sensitive by the State or federal government, giving special consideration to measures necessary to preserve or enhance suitable habitat.	CDD	Term of Plan
C-15.2.1 Implement salmon habitat protection and restoration priorities in approved Water Resource Inventory Area 13 and 23 plans.	CDD WRS	Term of Plan

Commented [BM147]: Modification of current Policy C-2.21.

Commented [BM148]: Modification of current Policy C-2.16.

Commented [BM149]: New implementation action from current Policy C-2.118.

Policies and Implementation Actions	Lead	Period
C-15.2.2 Implement suitable habitat protections and restoration priorities for threatened and endangered aquatic and terrestrial plant and animal species.	CDD	Term of Plan
C-15.2.3 Complete and implement the Bush Prairie Habitat Conservation Plan.	CDD	Term of Plan
C-15.3 Maintain habitats that support the greatest diversity of fish and wildlife through conservation and enhancement of critical areas.	CDD	**Term of Plan**
C-15.3.1 Coordinate with adjacent jurisdictions and tribes to identify, protect, and develop enhancement plans and actions for habitat networks and wetlands that cross jurisdictional lines.	CDD	Term of Plan
C-15.3.2 Promote the enhancement or restoration of streams, rivers, lakes, and wetlands as adjacent development activities occur.	CDD	Term of Plan
C-15.4 When developing forested property adjacent to steep slopes, wetlands, stream ravines, or stream corridors, encourage development to provide additional buffer areas to provide wildlife and fish habitat.	CDD	**Term of Plan**
C-15.5 Restore native vegetation and control invasive species to preserve and enhance fish and wildlife habitat.	CDD	**Term of Plan**
C-15.5.1 Develop regulations requiring all new developments to remove invasive plants and use native vegetation in restoration of buffers around wetlands, streams, creeks, and steep slope areas.	CDD	Term of Plan

Commented [BM150]: New implementation action.

Commented [BM151]: New implementation action.

Commented [BM152]: Current Policy C-2.17.

Commented [BM153]: New implementation action based on current Policy C-2.19.

Commented [BM154]: New implementation action.

Commented [BM155]: New policy.

Commented [BM156]: New policy.

Commented [BM157]: New implementation action.

Attachment D

Conservation Element

Part 2 – Technical Information

City of Tumwater 2025 Comprehensive Plan

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

DRAFT VERSION MAY 20, 2025

December 2025

Ordinance No. O2025-0XX

CITY OF TUMWATER

Conservation Element

Part 2 – Technical Information

Table of Contents

List of Tables

List of Figures

List of Maps

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

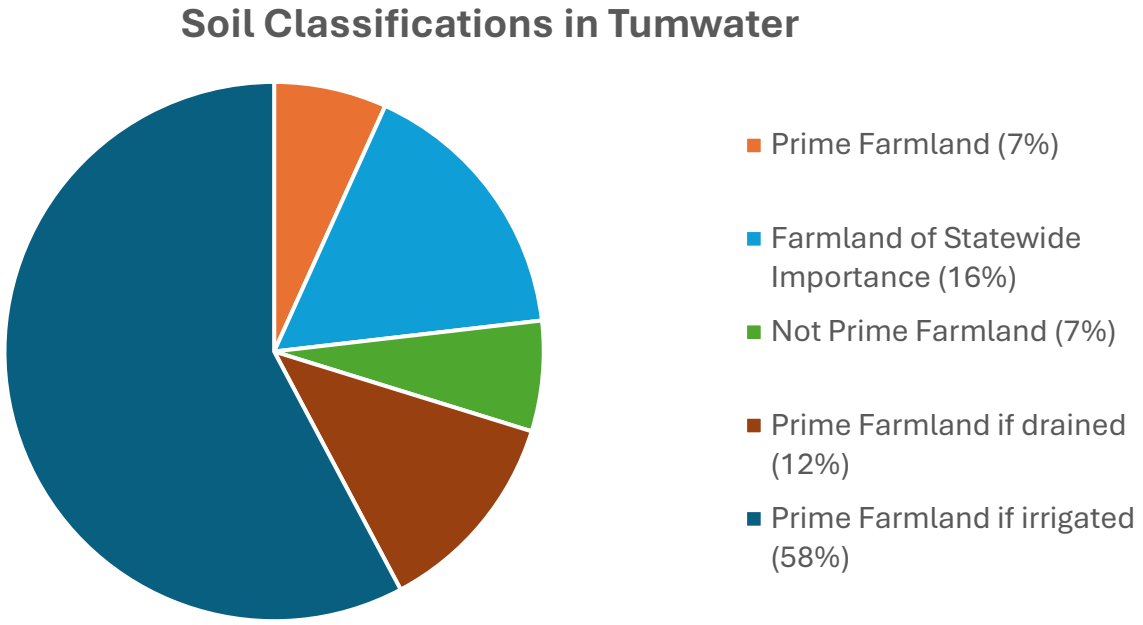
Natural Resource Conservation Service soil survey report for Tumwater is included as Appendix A.

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. 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

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.

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, 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 (1999) • Shoreline Master Program (2014) • 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 (2014) • Wastewater Resource Management Plan, LOTT Clean Water Alliance (2015) • Water System Plan (2010-2015) • Wellhead Protection Plan (2010 informal update, 2016 update underway)

Conservation Element

Part 2 – Technical Information

Topic Index	Supporting Plans and Materials
Frequently Flooded Areas	• Comprehensive Stormwater Implementation Plan (2002, 2016 Plan in development) • Flood Hazard Maps (2024) • Flood Insurance Studies and the Flood Insurance Rate Maps, Federal Emergency Management Agency (2012 – 2016) • Floodplain Overlay Ordinance (2016) • GIS Thurston County Floodplain Mapping • Littlerock-70th Avenue Annexation Area Drainage Study (Part of the Littlerock-70th Avenue Annexation in 2008) (2011) • Natural Hazards Mitigation Plan for the Thurston Region (2009) • 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 – 2016 Tumwater Soil Survey, U.S. Department of Agriculture (2016) • Geologic Map of the Centralia Quadrangle, Washington, State Department of Natural Resources (1987) • Liquefaction Hazards Map, State Department of Natural Resources • Natural Hazards Mitigation Plan for the Thurston Region (2009) • 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 (1999) • 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) • Natural Resource 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

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.

Open Space Taxation Act

JULY 2021

The information and instructions in this publication are to be used when applying for assessment on the basis of current use under the "open space laws," chapter 84.34 RCW and chapter 458-30 WAC.

What is the Open Space Taxation Act?

The Open Space Taxation Act, enacted in 1970, allows property owners to have their open space, farm and agricultural, and timber lands valued at their current use rather than at their highest and best use. The Act states that it is in the best interest of the state to maintain, preserve, conserve, and otherwise continue in existence adequate open space lands for the production of food, fiber, and forest crops and to assure the use and enjoyment of natural resources and scenic beauty for the economic and social well-being of the state and its citizens.

Lands qualifying for current use classification

The law provides three classifications:

Open space land

Farm and agricultural land

Timber land

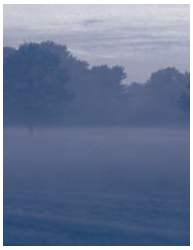
Open space land is defined as any of the following:

1. Any land area zoned for open space by a comprehensive official land use plan adopted by any city or county.

2. Any land area in which the preservation in its present use would:
   - **a.** Conserve and enhance natural or scenic resources.
   - **b.** Protect streams or water supply.
   - **c.** Promote conservation of soils, wetlands, beaches or tidal marshes. (As a condition of granting open space classification, the legislative body may not require public access on land classified for the purpose of promoting conservation of wetlands.)
   - **d.** Enhance the value to the public of neighbouring parks, forests, wildlife preserves, nature reservations or sanctuaries or other open space.
   - **e.** Enhance recreation opportunities.
   - **f.** Preserve historic sites.
   - **g.** Preserve visual quality along highway, road, and street corridors or scenic vistas.
   - **h.** Retain in its natural state tracts of land not less than one acre situated in an urban area and open to public use on such conditions as may be reasonably required by the legislative authority granting the open space classification.

3. Any land meeting the definition of "farm and agricultural conservation land," which means either:
   - **a.** Land previously classified under the farm and agricultural classification that no longer meets the criteria and is reclassified under open space land; or
   - **b.** "Traditional farmland," not classified, that has not been irrevocably devoted to a use inconsistent with agricultural uses, and that has a high potential for returning to commercial agriculture.

This fact sheet provides general information regarding the Open Space Taxation Act. The information is current at the date of publication. Please note subsequent law changes may supersede or invalidate some of this information.



Farm and agricultural land is defined as any of the following:

1. Any parcel of land that is 20 or more acres, or multiple parcels of land that are contiguous and total 20 or more acres, and are:
   - **a.** Devoted primarily to the production of livestock or agricultural commodities for commercial purposes.
   - **b.** Enrolled in the federal conservation reserve program (CRP) or its successor administered by the United States Department of Agriculture.
   - **c.** Other commercial agricultural activities established under chapter 458-30 WAC.

2. Any parcel of land that is five acres or more but less than 20 acres, is devoted primarily to agricultural uses, and has produced a gross income equivalent to:
   - **a.** Prior to January 1, 1993, $100 or more per acre per year for three of the five calendar years preceding the date of application for classification.
   - **b.** On or after January 1, 1993, $200 or more per acre per year for three of the five calendar years preceding the date of application for classification.

3. Any parcel of land that is five acres or more but less than 20 acres, is devoted primarily to agricultural uses, and has standing crops with an expectation of harvest within:
   - **a.** Seven years and a demonstrable investment in the production of those crops equivalent to $100 or more per acre in the current or previous calendar year.
   - **b.** Fifteen years for short rotation hardwoods and a demonstrable investment in the production of those crops equivalent to $100 or more per acre in the current or previous calendar year.

4. For parcels of land five acres or more but less than 20 acres, "gross income from agricultural uses" includes, but is not limited to, the wholesale value of agricultural products donated to nonprofit food banks or feeding programs.

5. Any parcel of land less than five acres devoted primarily to agricultural uses and has produced a gross income of:
   - **a.** Prior to January 1, 1993, $1,000 or more per year for three of the five calendar years preceding the date of application for classification.
   - **b.** On or after January 1, 1993, $1,500 or more per year for three of the five calendar years preceding the date of application for classification.

6. "Farm and agricultural land" also includes any of the following:
   - **a.** Incidental uses compatible with agricultural purposes, including wetland preservation, provided such use does not exceed 20 of the classified land.
   - **b.** Land on which appurtenances necessary for production, preparation, or sale of agricultural products exist in conjunction with the lands producing such products.
   - **c.** Any non-contiguous parcel one to five acres, that is an integral part of the farming operations.
   - **d.** Land on which housing for employees or the principal place of residence of the farm operator or owner is sited provided the use of the housing or residence is integral to the use of the classified land for agricultural purposes, the housing or residence is on or contiguous to the classified land, and the classified land is 20 or more acres.
   - **e.** Land that is used primarily for equestrian-related activities for which a charge is made, including, but not limited to, stabling, training, riding, clinics, schooling, shows, or grazing for feed. Depending on the number of classified acres, the land may be subject to minimum gross income requirements.
   - **f.** Land that is primarily used for commercial horticultural purposes, including growing seedlings, trees, shrubs, vines, fruits, vegetables, flowers, herbs, and other plants in containers, whether under a structure or not. For additional criteria regarding this use, please refer to RCW 84.34.020(2)(h).

Timber land is defined as the following:

Any parcel of land five or more acresor multiple parcels of land that are contiguous and total five or more acres which is or are devoted primarily to the growth and harvest of timber for commercial purposes. Timber land means the land only and does not include a residential homesite. The term includes land used for incidental uses that are compatible with the growing and harvesting of timber but no more than 10% of the land may be used for such incidental uses.

It also includes the land which appurtenances necessary for the production, preparation, or sale of the timber products exist in conjunction with land producing these products.

The timber land classification may be unavailable in some counties. As a result of the passage of Senate Bill 6180 in 2014, counties have the option to merge their timber land classification into their designated forest land program under chapter 84.33 RCW. To determine whether your county offers the timber land classification, you may contact the county assessor or visit the Department of Revenue's website at: www.dor.wa.gov.

Who may apply?

An owner or contract vendee may apply for current use assessment. However, all owners or contract vendees must sign the application for classification, and any resulting agreement.

When may I apply?

Applications may be made for classification at any time during the year from January 1 through December 31. If approved, current use assessment will begin on January 1 following the year the application was submitted.

Where do I get the application?

Application forms for the farm and agricultural land classification are available from the county assessor's office. Application forms for the open space and timber land classifications are available from either the county assessor's office or by contacting the county legislative authority.

Where do I file the application?

An application for open space classification is filed with the county legislative authority.

An application for farm and agricultural land classification is filed with the county assessor.

An application for timber land classification is filed with the county legislative authority. Timber land applications require that a timber management plan also be filed.

Is there an application fee?

The city or county legislative authority may, at their discretion, establish a processing fee to accompany each application. This fee must be in an amount that reasonably covers the processing costs of the application.

What happens after I file my application for open space classification?

Applications for classification or reclassification as "open space land" are made to the appropriate agency or official called the "granting authority." If the land is located in the county's unincorporated area, the county legislative authority is the granting authority on the application. If the land is located within an incorporated area of the county, the application is acted upon by both the county and city legislative authorities.

If the application is subject to a comprehensive plan that has been adopted by any city or county it will be processed in the same manner in which an amendment to the comprehensive plan is processed. If the application is not subject to a comprehensive land use plan, a public hearing on the application will be conducted, but a notice announcing the hearing must be published at least 10 days prior to the hearing.

The granting authority must approve or reject the application within six months of receiving the application. In determining whether an application made for classification or reclassification should be approved or denied, the granting authority may consider the benefits to the general welfare of preserving the current use of the property.

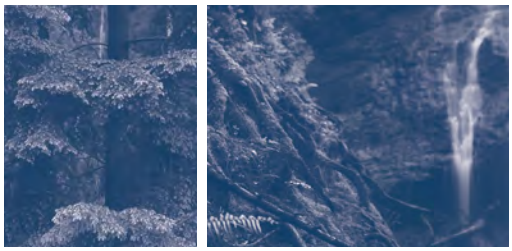
They may require that certain conditions be met including but not limited to the granting of easements.

If the application is approved, the granting authority will, within five calendar days of the approval date, send an agreement to the applicant for signature showing the land classification and conditions imposed. The applicant may accept or reject the agreement. If the applicant accepts, he or she must sign and return the agreement to the granting authority within 30 days after receipt.

The approval or denial of the application for classification or reclassification is a legislative determination and is reviewable only for arbitrary and capricious actions. Appeal can be made only to the superior court of the county where the application was filed.

Within 10 days of receiving notice of classification of the land from the granting authority, the assessor submits the notice to the county auditor for recording in the place and manner provided for the public recording of state tax liens on real property.

If approved, current use assessment will begin on January 1 following the year the application was submitted. The criteria for classification continue to apply after classification has been granted.



How does a public benefit rating system work?

If the county legislative authority has established a public benefit rating system (PBRS) for the open space classification, the criteria contained within the rating system governs the eligibility and valuation of the land subject to the application.

When a county creates or amends a PBRS, all classified open space land will be rated under the new PBRS. Land that no longer qualifies for classification will not be removed from classification, but will be rated according to the PBRS. Within 30 days of receiving notification of the new assessed value established by the PBRS, the owner may request removal of classification of the land without imposition of additional tax, interest, and penalty.

What happens after I file my application for farm and agricultural land classification?

Upon application for classification or reclassification, the assessor may require applicants to provide data regarding the use of the land, including, but not limited to, the productivity of typical crops, sales receipts, federal income tax returns, other related income and expense data, and any other information relevant to the application.

The application will be considered approved unless the assessor notifies the applicant in writing prior to May 1 of the year after the application was submitted. The criteria for classification continue to apply after classification has been granted.

What is an "advisory committee"?

The county legislative authority must appoint a five member committee representing the active farming community within the county. This committee will serve in an advisory capacity to the assessor in implementing assessment guidelines as established by the Department of Revenue for the assessment of open space lands, farm and agricultural lands, and timber lands.

How do I appeal a denial of my farm and agricultural land application?

The owner may appeal the assessor's denial to the board of equalization in the county where the land is located. The appeal must be filed with the board on or before July 1 of the year of the determination or within 30 days after the mailing of the notice of denial, or within a time limit of up to 60 days adopted by the county legislative authority, whichever is later.

What happens after I file my application for timber land classification?

Applications for timber land classification or reclassification are made to the county legislative authority. A timber management plan is required at the time of application or when a sale or transfer of timber land occurs and a notice of continuance is signed.

The application form requests information about forest management, restocking, fire protection, insect and disease control, weed control, and any other summary of experience and activity that supports the growth and harvest of timber for commercial purposes.

The application is acted upon in a manner similar to open space land applications and within six months of receiving the application.

Approval or denial of a timber land application is a legislative determination and is reviewable only for arbitrary and capricious action. Appeal can be made only to the superior court of the county where the application was filed.

Within 10 days of receiving notice of classification of the land from the granting authority, the assessor submits the notice to the county auditor for recording in the place and manner provided for the public recording of state tax liens on real property.

If approved, current use assessment will begin on January 1 following the year the application was submitted. The criteria for classification continue to apply after classification has been granted.

How is the value of classified land determined?

The assessor is required to maintain two values for each parcel that is classified. The first is the value that would be placed on the land if it was not classified. This is commonly referred to as the "fair market value." The second is the current use land value based on its current use, not highest and best use , as classified by the granting authority.

Open space land located within a county that has adopted a public benefit rating system will be valued according to the criteria of the rating system.

In the absence of a rating system, the per acre value can be no less than the lowest per acre value of classified farm and agricultural land in the county.

In determining the current use value of farm and agricultural land, the assessor considers the earning or productive capacity of comparable lands from crops grown most typically in the area averaged over not less than five years. This earning or productive capacity is the "net cash rental" and is capitalized by a "rate of interest" charged on long term loans secured by a mortgage on farm or agricultural land plus a component for property taxes.

Timber land is valued according to a schedule prepared by the Department of Revenue according to chapter 84.33 RCW. The Department of Revenue annually adjusts and certifies timber land values to be used by county assessors in preparing assessment rolls. The assessors assign the timber land values to the property based upon land grades and operability classes.

When are taxes due on classified lands?

Land classified as open space, farm and agricultural, or timber land is assessed at its current use value and placed on the assessment rolls the year after the application was submitted. Taxes on classified land are due and payable the year after the current use value was placed on the assessment rolls.

How long does the classification last?

The land continues in its classification until a request for removal is made by the owner, the use of land no longer complies, a sale or transfer to an owner that causes land to be exempt from property taxes, or the ownership has changed and the new owner has not signed a Notice of Continuance. The notice of removal is recorded with the county auditor in the same manner as the recording of state tax liens on real property. Additional tax, interest, and penalties will apply if the land is removed and the removal does not meet one of the exceptions listed in RCW 84.34.108(6).

How do I withdraw from classification?

If intending to withdraw all or a portion of the land from classification after 10 years of classification, the owner must complete a withdrawal form with the county assessor.

If a portion of the land is removed from classification, the remaining portion must meet the requirements of original classification unless the remaining land has different income or investment criteria.

What happens after I file a request to withdraw?

Upon receipt of a request for withdrawal, the assessor notifies the granting authority that originally approved the classification, and, the assessor withdraws the land from classification. The land withdrawn from classification is subject to seven years of additional tax and interest, but not a 20% penalty.

What happens if the classified land is sold or transferred?

When classified land is sold or transferred, the seller or transferor becomes liable at the time of sale for the additional tax, interest, and penalty unless the new owner(s) signs the Notice of Continuance which is attached to or shown on the real estate excise tax affidavit. The county auditor cannot accept an instrument of conveyance on any classified land unless the Notice of Continuance has been signed or the additional tax, interest, and penalty has been paid. The assessor determines if the land qualifies for continued classification

What if I want to change the use of my classified property?

An owner changing the use of land from a classified use must notify the county assessor within 60 days of this action. The assessor will remove the land from classified status and impose an additional tax equal to the difference between the tax paid on the current use value and the tax that would have been paid on the land had it not been classified. The additional tax is payable for the last seven tax years, plus interest at the same rate as charged on delinquent property taxes, plus a penalty of 20% of the total amount.

If the assessor removes my land from classification, may I appeal?

Yes, the owner may file an appeal of the removal from classification to the county board of equalization on or before July 1 of the year of the determination, or within 30 days of the date the notice was mailed by the assessor, or within a time limit of up to 60 days adopted by the county legislative authority, whichever is later.

Upon removal from classification, what taxes are due?

At the time the land is removed from classification, any taxes owing from January 1 of the removal year through the removal date, and any additional tax, applicable interest, and penalty owing are due and payable to the county treasurer within 30 days of the owner being notified.

What if the additional taxes are not paid?

Any additional tax, applicable interest, and penalty become a lien on the land at the time the land is removed from classification. This lien has priority over any other encumbrance on the land. Such a lien may be foreclosed upon expiration of the same period after delinquency in the same manner as delinquent real property taxes. If unpaid, interest is charged on the total amount due at the same rate that is applied by law to delinquent property taxes. Interest accrues from the date of the delinquency until the date the total amount is paid in full.

What is done with the additional tax, interest, and penalty paid when land is removed from classification?

Upon collection, the additional tax is distributed by the county treasurer in the same manner in which current taxes applicable to the subject land are distributed. The applicable interest and penalties are distributed to the county's current expense fund.



How do I change the classification of my property?

Land may be reclassified, upon request by the owner, subject toall applicable qualifications for each classification, without additional tax, interest, and penalty for the following:

1. Land classified as farm and agricultural land may be reclassified to timber land; timber land may be reclassified to farm and agricultural land.
2. Land classified as either farm and agricultural land or timber land under chapter 84.34 RCW, or forest land under chapter 84.33 RCW may be reclassified to open space land.
3. Land classified as farm and agricultural land or timber land may be reclassified to forest land under chapter 84.33 RCW.
4. Land previously classified as farm and agricultural land may be reclassified to open space land as "farm and agricultural conservation land" and subsequently be reclassified back to farm and agricultural land.

Applications for reclassification are acted upon in the same manner as approvals for initial classification. The county assessor approves all applications for farm and agricultural classifications and reclassifications. The county legislative authority (and in some cases, the city legislative authority)approves all land classifications or reclassifications for timber land and open space land, including farm and agricultural conservation land.

Is supporting information required to change classifications?

The assessor may require an owner of classified land to submit data regarding the use of the land, productivity of typical crops, income and expense data, and similar information regarding continued eligibility.

Laws and Rules

It is helpful to read the complete laws, Revised Code of Washington, chapters 84.33 and 84.34 (RCW) and rules, Washington Administrative Code, chapter 458-30 (WAC) to understand requirements of the classifications and the tax liabilities incurred.

Need More Information?

Requirements for making application for current use classification are available at the county assessor's office or by contacting the county legislative authority.

For general information contact:

- **Department of Revenue, Property Tax Division**
  P. O. Box 47471
  Olympia, Washington 98504-7471
  360-534-1400
- **Website: dor.wa.gov**
- **Telephone Information Center**
  360-705-6705
- For tax assistance or to request this document in an alternate format, visit dor.wa.gov or call 360-705-6705. Teletype (TTY) users may use the Washington Relay Service by calling 711.

Department of Revenue
Washington State

dor.wa.gov

PTFS0046 06/21

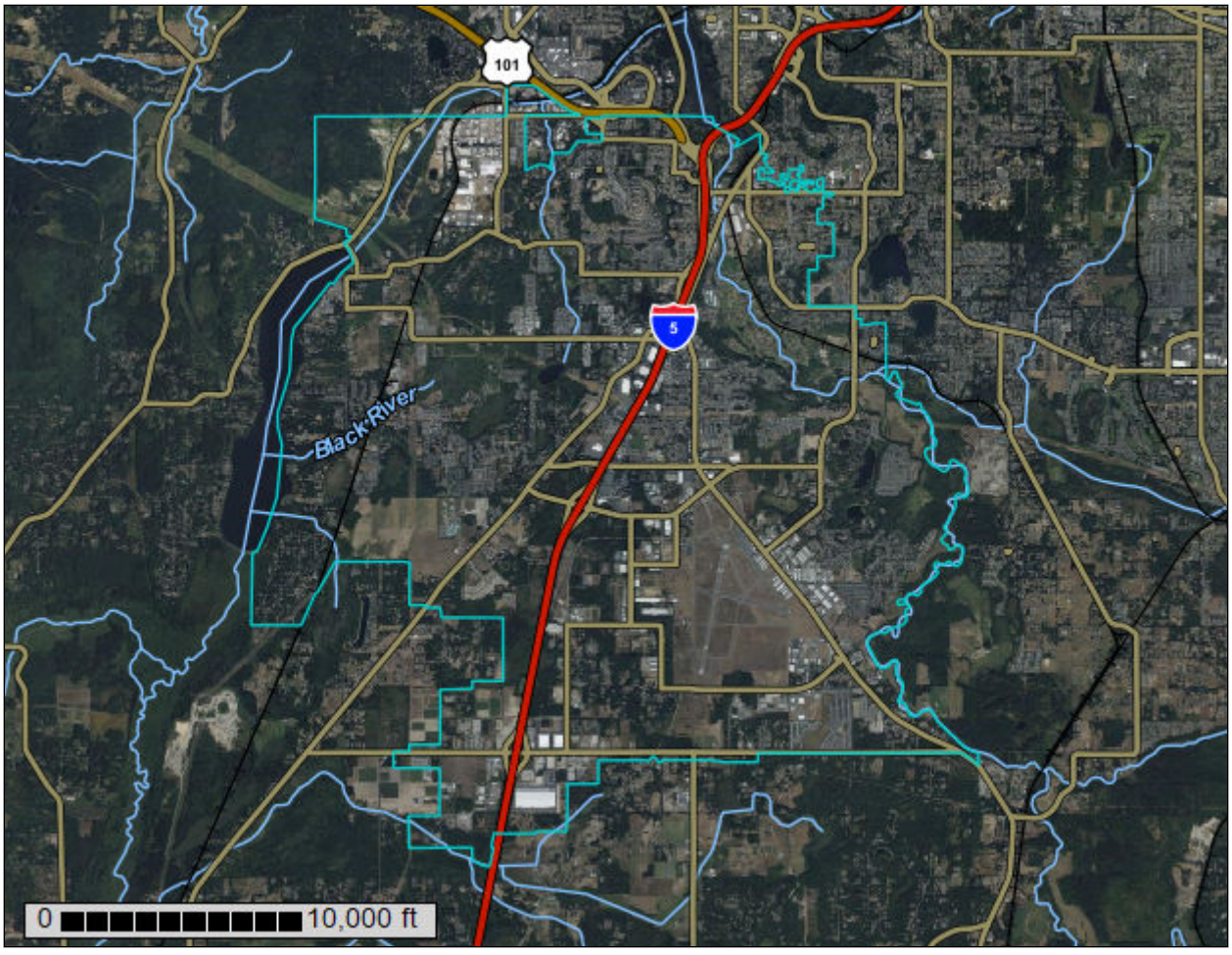
United States Department of Agriculture

NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for Thurston County Area, Washington



Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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Contents

How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

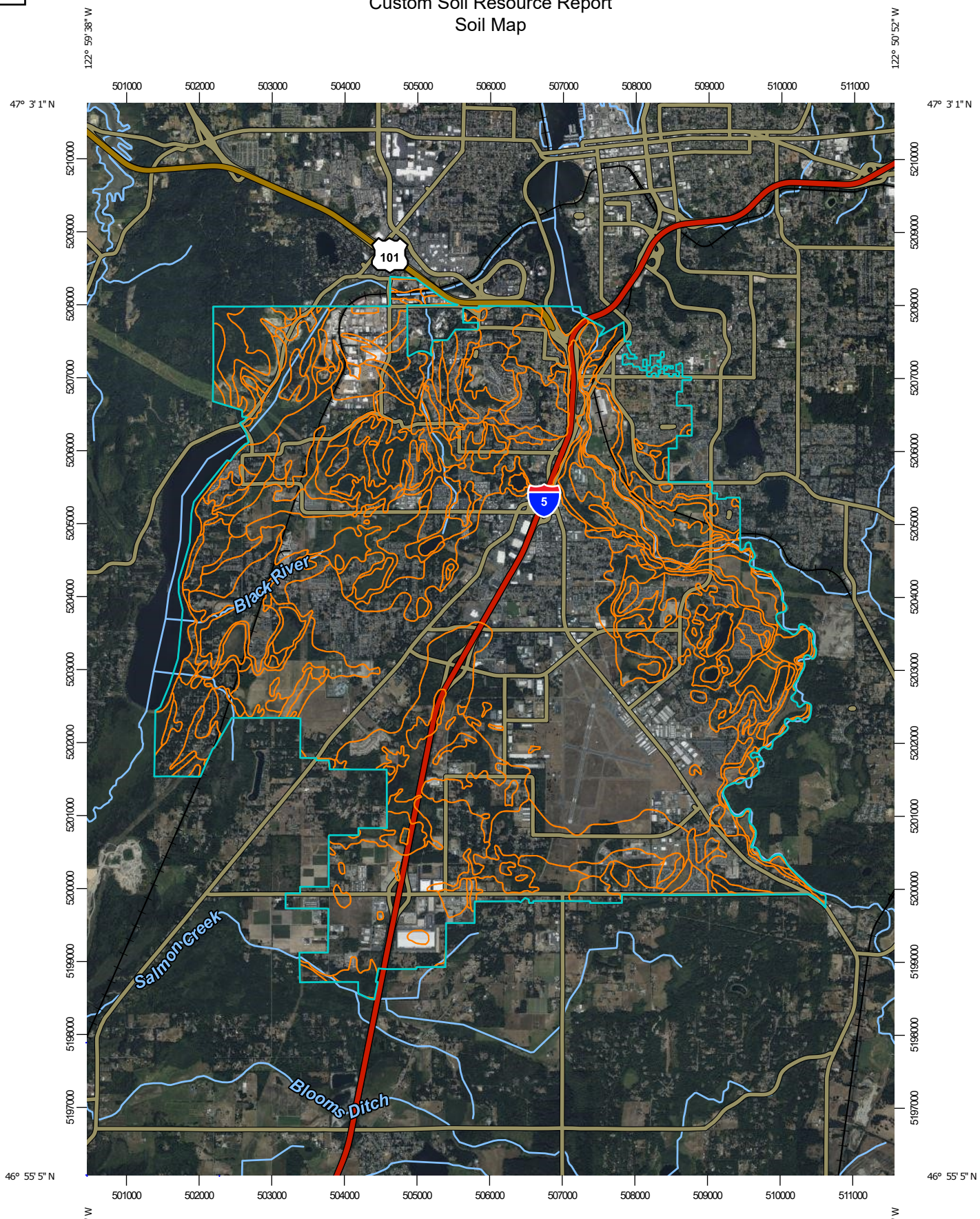
After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report
Soil Map



Map Scale: 1:71,500 if printed on A portrait (8.5" x 11") sheet.

N

0 1000 2000 4000 6000 Meters

0 3000 6000 12000 18000 Feet

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 10N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Thurston County Area, Washington
Survey Area Data: Version 18, Aug 27, 2024

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jul 18, 2020—Aug 14, 2023

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
1	Alderwood gravelly sandy loam, 0 to 8 percent slopes	173.8	1.2%
2	Alderwood gravelly sandy loam, 8 to 15 percent slopes	321.7	2.2%
3	Alderwood gravelly sandy loam, 15 to 30 percent slopes	36.9	0.3%
20	Cagey loamy sand	2,116.9	14.8%
27	Delphi very gravelly loam, 3 to 15 percent slopes	116.2	0.8%
30	Dystric Xerochrepts, 60 to 90 percent slopes	20.7	0.1%
32	Everett very gravelly sandy loam, 0 to 8 percent slopes	862.6	6.0%
33	Everett very gravelly sandy loam, 8 to 15 percent slopes	169.6	1.2%
34	Everett very gravelly sandy loam, 15 to 30 percent slopes	29.4	0.2%
35	Everett very gravelly sandy loam, 30 to 50 percent slopes	111.8	0.8%
38	Giles silt loam, 0 to 3 percent slopes	16.9	0.1%
39	Giles silt loam, 3 to 15 percent slopes	107.4	0.8%
40	Giles silt loam, 15 to 30 percent slopes	8.9	0.1%
41	Godfrey silty clay loam	47.4	0.3%
45	Hydraquents, tidal	1.5	0.0%
46	Indianola loamy sand, 0 to 5 percent slopes	1,432.1	10.0%
47	Indianola loamy sand, 5 to 15 percent slopes	378.0	2.6%
48	Indianola loamy sand, 15 to 30 percent slopes	471.5	3.3%
51	Kapowsin silt loam, 3 to 15 percent slopes	127.7	0.9%
52	Kapowsin silt loam, 15 to 30 percent slopes	267.5	1.9%
53	Kapowsin silt loam, 30 to 50 percent slopes	23.0	0.2%
65	McKenna gravelly silt loam, 0 to 5 percent slopes	159.7	1.1%
69	Mukilteo muck	212.3	1.5%
70	Mukilteo muck, drained	227.8	1.6%

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
73	Nisqually loamy fine sand, 0 to 3 percent slopes	3,613.9	25.2%
74	Nisqually loamy fine sand, 3 to 15 percent slopes	14.2	0.1%
75	Norma fine sandy loam	40.5	0.3%
76	Norma silt loam	707.2	4.9%
84	Pilchuck loamy sand	36.3	0.3%
85	Pits, gravel	69.4	0.5%
88	Puget silt loam	69.2	0.5%
89	Puyallup silt loam	293.6	2.1%
98	Salkum silty clay loam, 8 to 15 percent slopes	3.6	0.0%
102	Schneider very gravelly loam, 20 to 40 percent slopes	271.5	1.9%
103	Schneider very gravelly loam, 40 to 65 percent slopes	386.2	2.7%
104	Semiahmoo muck	232.2	1.6%
106	Shalcar variant muck	11.4	0.1%
108	Skipopa silt loam, 3 to 15 percent slopes	12.7	0.1%
109	Spana gravelly loam	10.1	0.1%
110	Spanaway gravelly sandy loam, 0 to 3 percent slopes	21.3	0.1%
115	Sultan silt loam	213.4	1.5%
120	Tisch silt loam	25.9	0.2%
125	Xerorthents, 0 to 5 percent slopes	43.8	0.3%
126	Yelm fine sandy loam, 0 to 3 percent slopes	423.9	3.0%
127	Yelm fine sandy loam, 3 to 15 percent slopes	36.4	0.3%
128	Yelm fine sandy loam, 15 to 30 percent slopes	33.6	0.2%
129	Water	308.0	2.2%
Totals for Area of Interest		**14,319.9**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic

class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Thurston County Area, Washington

1—Alderwood gravelly sandy loam, 0 to 8 percent slopes

Map Unit Setting

National map unit symbol: 2t625
Elevation: 50 to 800 feet
Mean annual precipitation: 25 to 60 inches
Mean annual air temperature: 48 to 52 degrees F
Frost-free period: 160 to 240 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Alderwood and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Alderwood

Setting

Landform: Hills, ridges
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Crest, talf
Down-slope shape: Convex, linear
Across-slope shape: Convex
Parent material: Glacial drift and/or glacial outwash over dense glaciomarine deposits

Typical profile

A - 0 to 7 inches: gravelly sandy loam
Bw1 - 7 to 21 inches: very gravelly sandy loam
Bw2 - 21 to 30 inches: very gravelly sandy loam
Bg - 30 to 35 inches: very gravelly sandy loam
2Cd1 - 35 to 43 inches: very gravelly sandy loam
2Cd2 - 43 to 59 inches: very gravelly sandy loam

Properties and qualities

Slope: 0 to 8 percent
Depth to restrictive feature: 20 to 39 inches to densic material
Drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: About 18 to 37 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Very low (about 2.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4s
Hydrologic Soil Group: B
Ecological site: F002XA004WA - Puget Lowlands Forest
Forage suitability group: Limited Depth Soils (G002XS301WA), Limited Depth Soils (G002XF303WA), Limited Depth Soils (G002XN302WA)

Other vegetative classification: Limited Depth Soils (G002XS301WA), Limited Depth Soils (G002XF303WA), Limited Depth Soils (G002XN302WA)
Hydric soil rating: No

Minor Components

Everett
Percent of map unit: 5 percent
Landform: Moraines, eskers, kames
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Crest, interfluve
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

Mckenna
Percent of map unit: 5 percent
Landform: Drainageways, depressions
Landform position (three-dimensional): Dip
Down-slope shape: Linear, concave
Across-slope shape: Concave
Hydric soil rating: Yes

Shalcar
Percent of map unit: 3 percent
Landform: Depressions
Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Norma
Percent of map unit: 2 percent
Landform: Drainageways, depressions
Landform position (three-dimensional): Dip
Down-slope shape: Linear, concave
Across-slope shape: Concave
Hydric soil rating: Yes

2—Alderwood gravelly sandy loam, 8 to 15 percent slopes

Map Unit Setting
National map unit symbol: 2t626
Elevation: 50 to 800 feet
Mean annual precipitation: 20 to 60 inches
Mean annual air temperature: 46 to 52 degrees F
Frost-free period: 160 to 240 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition
Alderwood and similar soils: 85 percent

Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Alderwood

Setting

Landform: Hills, ridges
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Nose slope, talf
Down-slope shape: Convex, linear
Across-slope shape: Convex
Parent material: Glacial drift and/or glacial outwash over dense glaciomarine deposits

Typical profile

A - 0 to 7 inches: gravelly sandy loam
Bw1 - 7 to 21 inches: very gravelly sandy loam
Bw2 - 21 to 30 inches: very gravelly sandy loam
Bg - 30 to 35 inches: very gravelly sandy loam
2Cd1 - 35 to 43 inches: very gravelly sandy loam
2Cd2 - 43 to 59 inches: very gravelly sandy loam

Properties and qualities

Slope: 8 to 15 percent
Depth to restrictive feature: 20 to 39 inches to densic material
Drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: About 18 to 37 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Very low (about 2.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4s
Hydrologic Soil Group: B
Ecological site: F002XA004WA - Puget Lowlands Forest
Forage suitability group: Limited Depth Soils (G002XS301WA), Limited Depth Soils (G002XF303WA), Limited Depth Soils (G002XN302WA)
Other vegetative classification: Limited Depth Soils (G002XS301WA), Limited Depth Soils (G002XF303WA), Limited Depth Soils (G002XN302WA)
Hydric soil rating: No

Minor Components

Indianola

Percent of map unit: 5 percent
Landform: Terraces, kames, eskers
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Everett

Percent of map unit: 5 percent
Landform: Moraines, eskers, kames

Landform position (two-dimensional): Shoulder, footslope
Landform position (three-dimensional): Crest, base slope
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

Shalcar

Percent of map unit: 3 percent
Landform: Depressions
Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Norma

Percent of map unit: 2 percent
Landform: Drainageways, depressions
Landform position (three-dimensional): Dip
Down-slope shape: Linear, concave
Across-slope shape: Concave
Hydric soil rating: Yes

3—Alderwood gravelly sandy loam, 15 to 30 percent slopes

Map Unit Setting

National map unit symbol: 2t627
Elevation: 0 to 1,000 feet
Mean annual precipitation: 25 to 60 inches
Mean annual air temperature: 46 to 52 degrees F
Frost-free period: 160 to 240 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Alderwood and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Alderwood

Setting

Landform: Hills, ridges
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Nose slope, side slope, talf
Down-slope shape: Convex, linear
Across-slope shape: Convex
Parent material: Glacial drift and/or glacial outwash over dense glaciomarine deposits

Typical profile

A - 0 to 7 inches: gravelly sandy loam
Bw1 - 7 to 21 inches: very gravelly sandy loam

Bw2 - 21 to 30 inches: very gravelly sandy loam
Bg - 30 to 35 inches: very gravelly sandy loam
2Cd1 - 35 to 43 inches: very gravelly sandy loam
2Cd2 - 43 to 59 inches: very gravelly sandy loam

Properties and qualities

Slope: 15 to 30 percent
Depth to restrictive feature: 20 to 39 inches to densic material
Drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: About 18 to 37 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Very low (about 2.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: B
Ecological site: F002XA004WA - Puget Lowlands Forest
Forage suitability group: Limited Depth Soils (G002XS301WA), Limited Depth Soils (G002XF303WA), Limited Depth Soils (G002XN302WA)
Other vegetative classification: Limited Depth Soils (G002XS301WA), Limited Depth Soils (G002XF303WA), Limited Depth Soils (G002XN302WA)
Hydric soil rating: No

Minor Components

Everett

Percent of map unit: 5 percent
Landform: Moraines, eskers, kames
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

Indianola

Percent of map unit: 5 percent
Landform: Terraces, kames, eskers
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Shalcar

Percent of map unit: 3 percent
Landform: Depressions
Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Norma

Percent of map unit: 2 percent
Landform: Drainageways, depressions

Landform position (three-dimensional): Dip
Down-slope shape: Linear, concave
Across-slope shape: Concave
Hydric soil rating: Yes

20—Cagey loamy sand

Map Unit Setting

National map unit symbol: 2nd8d
Elevation: 330 to 980 feet
Mean annual precipitation: 40 to 60 inches
Mean annual air temperature: 50 degrees F
Frost-free period: 165 to 195 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Cagey and similar soils: 85 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Cagey

Setting

Landform: Terraces
Parent material: Sandy glacial drift

Typical profile

H1 - 0 to 6 inches: loamy sand
H2 - 6 to 28 inches: loamy sand
H3 - 28 to 60 inches: fine sand

Properties and qualities

Slope: 0 to 4 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 19.98 in/hr)
Depth to water table: About 18 to 30 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 4.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: A
Ecological site: F002XA005WA - Puget Lowlands Moist Forest
Forage suitability group: Seasonally Wet Soils (G002XS201WA)
Other vegetative classification: Seasonally Wet Soils (G002XS201WA)
Hydric soil rating: No

Minor Components

Mckenna

Percent of map unit: 5 percent
Landform: Depressions
Other vegetative classification: Wet Soils (G002XS101WA)
Hydric soil rating: Yes

27—Delphi very gravelly loam, 3 to 15 percent slopes

Map Unit Setting

National map unit symbol: 2nd8m
Elevation: 330 to 3,280 feet
Mean annual precipitation: 50 to 75 inches
Mean annual air temperature: 50 degrees F
Frost-free period: 165 to 195 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Delphi and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Delphi

Setting

Landform: Till plains
Parent material: Continental basal till

Typical profile

H1 - 0 to 8 inches: very gravelly loam
H2 - 8 to 13 inches: very gravelly loam
H3 - 13 to 48 inches: very gravelly silt loam
H4 - 48 to 52 inches: extremely gravelly clay loam

Properties and qualities

Slope: 3 to 15 percent
Depth to restrictive feature: 40 to 55 inches to densic material
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: About 39 to 54 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 6.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4s
Hydrologic Soil Group: B
Ecological site: F002XA007WA - Puget Lowlands Wet Forest

Forage suitability group: Droughty Soils (G001XY402WA)
Other vegetative classification: Droughty Soils (G001XY402WA)
Hydric soil rating: No

30—Dystric Xerochrepts, 60 to 90 percent slopes

Map Unit Setting

National map unit symbol: 2nd8r
Elevation: 0 to 3,280 feet
Mean annual precipitation: 50 inches
Mean annual air temperature: 50 degrees F
Frost-free period: 180 days
Farmland classification: Not prime farmland

Map Unit Composition

Dystric xerochrepts and similar soils: 85 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Dystric Xerochrepts

Setting

Landform: Escarpments
Parent material: Colluvium and glacial till

Typical profile

H1 - 0 to 4 inches: very gravelly sandy loam
H2 - 4 to 30 inches: very gravelly sandy loam
H3 - 30 to 34 inches: very gravelly sandy loam

Properties and qualities

Slope: 60 to 90 percent
Depth to restrictive feature: 20 to 72 inches to densic material
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Very low (about 2.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: C
Hydric soil rating: No

Minor Components

Skipopa

Percent of map unit: 5 percent
Hydric soil rating: No

32—Everett very gravelly sandy loam, 0 to 8 percent slopes

Map Unit Setting

National map unit symbol: 2t629
Elevation: 30 to 900 feet
Mean annual precipitation: 35 to 91 inches
Mean annual air temperature: 48 to 52 degrees F
Frost-free period: 180 to 240 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Everett and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Everett

Setting

Landform: Kames, moraines, eskers
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Crest, interfluve
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Sandy and gravelly glacial outwash

Typical profile

Oi - 0 to 1 inches: slightly decomposed plant material
A - 1 to 3 inches: very gravelly sandy loam
Bw - 3 to 24 inches: very gravelly sandy loam
C1 - 24 to 35 inches: very gravelly loamy sand
C2 - 35 to 60 inches: extremely cobbly coarse sand

Properties and qualities

Slope: 0 to 8 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat excessively drained
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 3.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4s
Hydrologic Soil Group: A
Ecological site: F002XA004WA - Puget Lowlands Forest
Forage suitability group: Droughty Soils (G002XS401WA), Droughty Soils (G002XF403WA), Droughty Soils (G002XN402WA)

Other vegetative classification: Droughty Soils (G002XS401WA), Droughty Soils (G002XF403WA), Droughty Soils (G002XN402WA)
Hydric soil rating: No

Minor Components

Indianola
Percent of map unit: 10 percent
Landform: Terraces, kames, eskers
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Alderwood
Percent of map unit: 10 percent
Landform: Hills, ridges
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Crest, talf
Down-slope shape: Convex, linear
Across-slope shape: Convex
Hydric soil rating: No

33—Everett very gravelly sandy loam, 8 to 15 percent slopes

Map Unit Setting
National map unit symbol: 2t62b
Elevation: 30 to 900 feet
Mean annual precipitation: 35 to 91 inches
Mean annual air temperature: 48 to 52 degrees F
Frost-free period: 180 to 240 days
Farmland classification: Farmland of statewide importance

Map Unit Composition
Everett and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Everett

Setting
Landform: Moraines, eskers, kames
Landform position (two-dimensional): Shoulder, footslope
Landform position (three-dimensional): Crest, base slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Sandy and gravelly glacial outwash

Typical profile
Oi - 0 to 1 inches: slightly decomposed plant material
A - 1 to 3 inches: very gravelly sandy loam

Bw - 3 to 24 inches: very gravelly sandy loam
C1 - 24 to 35 inches: very gravelly loamy sand
C2 - 35 to 60 inches: extremely cobbly coarse sand

Properties and qualities

Slope: 8 to 15 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat excessively drained
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 3.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4s
Hydrologic Soil Group: A
Ecological site: F002XA004WA - Puget Lowlands Forest
Forage suitability group: Droughty Soils (G002XS401WA), Droughty Soils (G002XF403WA), Droughty Soils (G002XN402WA)
Other vegetative classification: Droughty Soils (G002XS401WA), Droughty Soils (G002XF403WA), Droughty Soils (G002XN402WA)
Hydric soil rating: No

Minor Components

Alderwood

Percent of map unit: 10 percent
Landform: Hills, ridges
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Nose slope, talf
Down-slope shape: Convex, linear
Across-slope shape: Convex
Hydric soil rating: No

Indianola

Percent of map unit: 10 percent
Landform: Terraces, kames, eskers
Landform position (three-dimensional): Riser
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

34—Everett very gravelly sandy loam, 15 to 30 percent slopes

Map Unit Setting

National map unit symbol: 2t62c
Elevation: 30 to 900 feet
Mean annual precipitation: 35 to 91 inches

Mean annual air temperature: 48 to 52 degrees F
Frost-free period: 180 to 240 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Everett and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Everett

Setting

Landform: Moraines, eskers, kames
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Sandy and gravelly glacial outwash

Typical profile

Oi - 0 to 1 inches: slightly decomposed plant material
A - 1 to 3 inches: very gravelly sandy loam
Bw - 3 to 24 inches: very gravelly sandy loam
C1 - 24 to 35 inches: very gravelly loamy sand
C2 - 35 to 60 inches: extremely cobbly coarse sand

Properties and qualities

Slope: 15 to 30 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat excessively drained
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 3.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: A
Ecological site: F002XA004WA - Puget Lowlands Forest
Forage suitability group: Droughty Soils (G002XS401WA), Droughty Soils (G002XN402WA)
Other vegetative classification: Droughty Soils (G002XS401WA), Droughty Soils (G002XN402WA)
Hydric soil rating: No

Minor Components

Alderwood

Percent of map unit: 10 percent
Landform: Hills, ridges
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Nose slope, side slope, talf
Down-slope shape: Convex, linear
Across-slope shape: Convex

Hydric soil rating: No

Indianola

Percent of map unit: 10 percent
Landform: Terraces, kames, eskers
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

35—Everett very gravelly sandy loam, 30 to 50 percent slopes

Map Unit Setting

National map unit symbol: 2t62d
Elevation: 30 to 900 feet
Mean annual precipitation: 35 to 91 inches
Mean annual air temperature: 48 to 52 degrees F
Frost-free period: 180 to 240 days
Farmland classification: Not prime farmland

Map Unit Composition

Everett and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Everett

Setting

Landform: Moraines, eskers, kames
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Sandy and gravelly glacial outwash

Typical profile

Oi - 0 to 1 inches: slightly decomposed plant material
A - 1 to 3 inches: very gravelly sandy loam
Bw - 3 to 24 inches: very gravelly sandy loam
C1 - 24 to 35 inches: very gravelly loamy sand
C2 - 35 to 60 inches: extremely cobbly coarse sand

Properties and qualities

Slope: 30 to 50 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat excessively drained
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None

Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 3.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: A
Ecological site: F002XA004WA - Puget Lowlands Forest
Hydric soil rating: No

Minor Components

Indianola

Percent of map unit: 10 percent
Landform: Terraces, kames, eskers
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Alderwood

Percent of map unit: 10 percent
Landform: Hills, ridges
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Nose slope, side slope, talf
Down-slope shape: Convex, linear
Across-slope shape: Convex
Hydric soil rating: No

38—Giles silt loam, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: 2ndbv
Elevation: 160 to 1,640 feet
Mean annual precipitation: 35 to 60 inches
Mean annual air temperature: 50 degrees F
Frost-free period: 170 to 200 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Giles and similar soils: 85 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Giles

Setting

Landform: Terraces
Parent material: Volcanic ash and glacial outwash

Typical profile

H1 - 0 to 10 inches: silt loam
H2 - 10 to 48 inches: silt loam
H3 - 48 to 60 inches: silt loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Very high (about 14.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 1
Hydrologic Soil Group: B
Ecological site: F002XA004WA - Puget Lowlands Forest
Forage suitability group: Soils with Few Limitations (G002XS501WA)
Other vegetative classification: Soils with Few Limitations (G002XS501WA)
Hydric soil rating: No

Minor Components

Yelm

Percent of map unit: 3 percent
Landform: Terraces
Hydric soil rating: No

Norma

Percent of map unit: 2 percent
Landform: Depressions
Other vegetative classification: Wet Soils (G002XS101WA)
Hydric soil rating: Yes

39—Giles silt loam, 3 to 15 percent slopes

Map Unit Setting

National map unit symbol: 2ndbw
Elevation: 160 to 1,640 feet
Mean annual precipitation: 35 to 60 inches
Mean annual air temperature: 50 degrees F
Frost-free period: 170 to 200 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Giles and similar soils: 85 percent

Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Giles

Setting
Landform: Terraces
Parent material: Volcanic ash and glacial outwash

Typical profile
H1 - 0 to 10 inches: silt loam
H2 - 10 to 48 inches: silt loam
H3 - 48 to 60 inches: silt loam

Properties and qualities
Slope: 3 to 15 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Very high (about 14.6 inches)

Interpretive groups
Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: B
Ecological site: F002XA004WA - Puget Lowlands Forest
Forage suitability group: Soils with Moderate Limitations (G002XN602WA)
Other vegetative classification: Soils with Moderate Limitations (G002XN602WA)
Hydric soil rating: No

Minor Components

Yelm
Percent of map unit: 5 percent
Hydric soil rating: No

40—Giles silt loam, 15 to 30 percent slopes

Map Unit Setting
National map unit symbol: 2nd8v
Elevation: 160 to 1,640 feet
Mean annual precipitation: 35 to 60 inches
Mean annual air temperature: 50 degrees F
Frost-free period: 170 to 200 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Giles and similar soils: 85 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Giles

Setting

Landform: Escarpments
Parent material: Volcanic ash and glacial outwash

Typical profile

H1 - 0 to 10 inches: silt loam
H2 - 10 to 48 inches: silt loam
H3 - 48 to 60 inches: silt loam

Properties and qualities

Slope: 15 to 30 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Very high (about 14.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: B
Ecological site: F002XA004WA - Puget Lowlands Forest
Forage suitability group: Sloping to Steep Soils (G002XN702WA)
Other vegetative classification: Sloping to Steep Soils (G002XN702WA)
Hydric soil rating: No

Minor Components

Yelm

Percent of map unit: 5 percent
Landform: Terraces
Hydric soil rating: No

41—Godfrey silty clay loam

Map Unit Setting

National map unit symbol: 2nd8w
Elevation: 20 to 300 feet
Mean annual precipitation: 40 to 65 inches
Mean annual air temperature: 50 to 54 degrees F

Frost-free period: 150 to 200 days
Farmland classification: Prime farmland if drained

Map Unit Composition

Godfrey, drained, and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Godfrey, Drained

Setting

Landform: Flood plains
Parent material: Alluvium

Typical profile

H1 - 0 to 8 inches: silty clay loam
H2 - 8 to 52 inches: silty clay
H3 - 52 to 60 inches: silty clay

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 in/hr)
Depth to water table: About 12 to 24 inches
Frequency of flooding: Occasional
Frequency of ponding: None
Available water supply, 0 to 60 inches: High (about 9.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4w
Hydrologic Soil Group: C/D
Ecological site: F002XA008WA - Puget Lowlands Riparian Forest
Forage suitability group: Seasonally Wet Soils (G002XS201WA)
Other vegetative classification: Seasonally Wet Soils (G002XS201WA)
Hydric soil rating: Yes

Minor Components

Sultan

Percent of map unit: 5 percent
Hydric soil rating: No

Godfrey, undrained

Percent of map unit: 5 percent
Landform: Depressions
Other vegetative classification: Wet Soils (G002XS101WA)
Hydric soil rating: Yes

Newberg

Percent of map unit: 3 percent
Hydric soil rating: No

Puget, undrained

Percent of map unit: 2 percent
Landform: Depressions
Other vegetative classification: Wet Soils (G002XS101WA)

Hydric soil rating: Yes

45—Hydraquents, tidal

Map Unit Setting

National map unit symbol: 2nd90
Elevation: 0 to 100 feet
Mean annual precipitation: 20 to 30 inches
Mean annual air temperature: 48 to 52 degrees F
Frost-free period: 170 to 210 days
Farmland classification: Not prime farmland

Map Unit Composition

Hydraquents, tidal, and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Hydraquents, Tidal

Setting

Landform: Tidal flats
Parent material: Alluvium

Typical profile

H1 - 0 to 6 inches: fine sandy loam
H2 - 6 to 60 inches: stratified fine sandy loam to silty clay loam

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: Very frequent
Frequency of ponding: None
Maximum salinity: Moderately saline to strongly saline (8.0 to 16.0 mmhos/cm)
Sodium adsorption ratio, maximum: 10.0
Available water supply, 0 to 60 inches: High (about 10.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6w
Hydrologic Soil Group: B/D
Hydric soil rating: Yes

46—Indianola loamy sand, 0 to 5 percent slopes

Map Unit Setting

National map unit symbol: 2t62k
Elevation: 0 to 980 feet
Mean annual precipitation: 30 to 81 inches
Mean annual air temperature: 48 to 50 degrees F
Frost-free period: 170 to 210 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Indianola and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Indianola

Setting

Landform: Terraces, eskers, kames
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Sandy glacial outwash

Typical profile

Oi - 0 to 1 inches: slightly decomposed plant material
A - 1 to 6 inches: loamy sand
Bw1 - 6 to 17 inches: loamy sand
Bw2 - 17 to 27 inches: sand
BC - 27 to 37 inches: sand
C - 37 to 60 inches: sand

Properties and qualities

Slope: 0 to 5 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat excessively drained
Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 99.90 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 3.9 inches)

Interpretive groups

Land capability classification (irrigated): 4s
Land capability classification (nonirrigated): 4s
Hydrologic Soil Group: A
Ecological site: F002XA004WA - Puget Lowlands Forest
Forage suitability group: Droughty Soils (G002XS401WA), Droughty Soils (G002XF403WA), Droughty Soils (G002XN402WA), Droughty Soils (G002XV402WA)

Other vegetative classification: Droughty Soils (G002XS401WA), Droughty Soils (G002XF403WA), Droughty Soils (G002XN402WA), Droughty Soils (G002XV402WA)
Hydric soil rating: No

Minor Components

Alderwood
Percent of map unit: 5 percent
Landform: Ridges, hills
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Crest, talf
Down-slope shape: Linear, convex
Across-slope shape: Convex
Hydric soil rating: No

Everett
Percent of map unit: 5 percent
Landform: Eskers, moraines, kames
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Interfluve, crest
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

Norma
Percent of map unit: 5 percent
Landform: Depressions, drainageways
Landform position (three-dimensional): Dip
Down-slope shape: Concave, linear
Across-slope shape: Concave
Hydric soil rating: Yes

47—Indianola loamy sand, 5 to 15 percent slopes

Map Unit Setting
National map unit symbol: 2t635
Elevation: 0 to 980 feet
Mean annual precipitation: 30 to 81 inches
Mean annual air temperature: 48 to 50 degrees F
Frost-free period: 170 to 210 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition
Indianola and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Indianola

Setting

Landform: Terraces, kames, eskers
Landform position (three-dimensional): Riser
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Sandy glacial outwash

Typical profile

Oi - 0 to 1 inches: slightly decomposed plant material
A - 1 to 6 inches: loamy sand
Bw1 - 6 to 17 inches: loamy sand
Bw2 - 17 to 27 inches: sand
BC - 27 to 37 inches: sand
C - 37 to 60 inches: sand

Properties and qualities

Slope: 5 to 15 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat excessively drained
Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 99.90 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 3.9 inches)

Interpretive groups

Land capability classification (irrigated): 4e
Land capability classification (nonirrigated): 4s
Hydrologic Soil Group: A
Ecological site: F002XA004WA - Puget Lowlands Forest
Forage suitability group: Droughty Soils (G002XS401WA), Droughty Soils (G002XN402WA)
Other vegetative classification: Droughty Soils (G002XS401WA), Droughty Soils (G002XN402WA)
Hydric soil rating: No

Minor Components

Alderwood

Percent of map unit: 8 percent
Landform: Hills, ridges
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Nose slope, talf
Down-slope shape: Convex, linear
Across-slope shape: Convex
Hydric soil rating: No

Everett

Percent of map unit: 5 percent
Landform: Moraines, eskers, kames
Landform position (two-dimensional): Shoulder, footslope
Landform position (three-dimensional): Crest, base slope
Down-slope shape: Convex

Across-slope shape: Convex
Hydric soil rating: No

Norma

Percent of map unit: 2 percent
Landform: Drainageways, depressions
Landform position (three-dimensional): Dip
Down-slope shape: Linear, concave
Across-slope shape: Concave
Hydric soil rating: Yes

48—Indianola loamy sand, 15 to 30 percent slopes

Map Unit Setting

National map unit symbol: 2t639
Elevation: 0 to 980 feet
Mean annual precipitation: 30 to 81 inches
Mean annual air temperature: 48 to 50 degrees F
Frost-free period: 170 to 210 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Indianola and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Indianola

Setting

Landform: Terraces, kames, eskers
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Sandy glacial outwash

Typical profile

Oi - 0 to 1 inches: slightly decomposed plant material
A - 1 to 6 inches: loamy sand
Bw1 - 6 to 17 inches: loamy sand
Bw2 - 17 to 27 inches: sand
BC - 27 to 37 inches: sand
C - 37 to 60 inches: sand

Properties and qualities

Slope: 15 to 30 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat excessively drained
Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 99.90 in/hr)
Depth to water table: More than 80 inches

Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 3.9 inches)

Interpretive groups

Land capability classification (irrigated): 6e
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: A
Ecological site: F002XA004WA - Puget Lowlands Forest
Forage suitability group: Droughty Soils (G002XS401WA), Droughty Soils (G002XN402WA)
Other vegetative classification: Droughty Soils (G002XS401WA), Droughty Soils (G002XN402WA)
Hydric soil rating: No

Minor Components

Alderwood

Percent of map unit: 8 percent
Landform: Hills, ridges
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Nose slope, side slope, talf
Down-slope shape: Convex, linear
Across-slope shape: Convex
Hydric soil rating: No

Everett

Percent of map unit: 5 percent
Landform: Moraines, eskers, kames
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

Norma

Percent of map unit: 2 percent
Landform: Drainageways, depressions
Landform position (three-dimensional): Dip
Down-slope shape: Linear, concave
Across-slope shape: Concave
Hydric soil rating: Yes

51—Kapowsin silt loam, 3 to 15 percent slopes

Map Unit Setting

National map unit symbol: 2ndbx
Elevation: 50 to 900 feet
Mean annual precipitation: 30 to 50 inches
Mean annual air temperature: 48 to 52 degrees F
Frost-free period: 150 to 220 days

Farmland classification: Farmland of statewide importance

Map Unit Composition

Kapowsin and similar soils: 85 percent
Minor components: 8 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Kapowsin

Setting

Landform: Till plains
Parent material: Compact basal till

Typical profile

H1 - 0 to 4 inches: silt loam
H2 - 4 to 22 inches: silt loam
H3 - 22 to 30 inches: gravelly loam
H4 - 30 to 34 inches: gravelly loam

Properties and qualities

Slope: 3 to 15 percent
Depth to restrictive feature: 20 to 40 inches to densic material
Drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: About 12 to 24 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 6.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: C/D
Ecological site: F002XA004WA - Puget Lowlands Forest
Forage suitability group: Limited Depth Soils (G002XN302WA)
Other vegetative classification: Limited Depth Soils (G002XN302WA)
Hydric soil rating: No

Minor Components

Norma

Percent of map unit: 5 percent
Landform: Depressions
Other vegetative classification: Wet Soils (G002XS101WA)
Hydric soil rating: Yes

Skipopa

Percent of map unit: 3 percent
Other vegetative classification: Seasonally Wet Soils (G002XN202WA)
Hydric soil rating: No

52—Kapowsin silt loam, 15 to 30 percent slopes

Map Unit Setting

National map unit symbol: 2ndby
Elevation: 50 to 900 feet
Mean annual precipitation: 30 to 50 inches
Mean annual air temperature: 48 to 52 degrees F
Frost-free period: 150 to 220 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Kapowsin and similar soils: 85 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Kapowsin

Setting

Landform: Till plains
Parent material: Compact basal till

Typical profile

H1 - 0 to 4 inches: silt loam
H2 - 4 to 22 inches: silt loam
H3 - 22 to 30 inches: gravelly loam
H4 - 30 to 34 inches: gravelly loam

Properties and qualities

Slope: 15 to 30 percent
Depth to restrictive feature: 20 to 40 inches to densic material
Drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: About 12 to 24 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 6.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: C/D
Ecological site: F002XA004WA - Puget Lowlands Forest
Forage suitability group: Limited Depth Soils (G002XN302WA)
Other vegetative classification: Limited Depth Soils (G002XN302WA)
Hydric soil rating: No

Minor Components

Hoogdal

Percent of map unit: 5 percent
Hydric soil rating: No

Indianola

Percent of map unit: 5 percent
Hydric soil rating: No

53—Kapowsin silt loam, 30 to 50 percent slopes

Map Unit Setting

National map unit symbol: 2ndbz
Elevation: 50 to 900 feet
Mean annual precipitation: 30 to 50 inches
Mean annual air temperature: 48 to 52 degrees F
Frost-free period: 150 to 220 days
Farmland classification: Not prime farmland

Map Unit Composition

Kapowsin and similar soils: 85 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Kapowsin

Setting

Landform: Till plains
Parent material: Compact basal till

Typical profile

H1 - 0 to 4 inches: silt loam
H2 - 4 to 22 inches: silt loam
H3 - 22 to 30 inches: gravelly loam
H4 - 30 to 34 inches: gravelly loam

Properties and qualities

Slope: 30 to 50 percent
Depth to restrictive feature: 20 to 40 inches to densic material
Drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: About 12 to 24 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 6.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e

Hydrologic Soil Group: C/D
Ecological site: F002XA004WA - Puget Lowlands Forest
Hydric soil rating: No

Minor Components

Hoogdal
Percent of map unit: 5 percent
Hydric soil rating: No

65—McKenna gravelly silt loam, 0 to 5 percent slopes

Map Unit Setting
National map unit symbol: 2nd9g
Elevation: 50 to 500 feet
Mean annual precipitation: 30 to 60 inches
Mean annual air temperature: 48 to 52 degrees F
Frost-free period: 150 to 180 days
Farmland classification: Prime farmland if drained

Map Unit Composition
Mckenna and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Mckenna

Setting
Landform: Depressions, drainageways
Parent material: Glacial drift

Typical profile
H1 - 0 to 9 inches: gravelly silt loam
H2 - 9 to 13 inches: gravelly silt loam
H3 - 13 to 36 inches: very gravelly loam
H4 - 36 to 40 inches: very gravelly loam

Properties and qualities
Slope: 0 to 5 percent
Depth to restrictive feature: 20 to 39 inches to densic material
Drainage class: Poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: About 0 to 6 inches
Frequency of flooding: None
Frequency of ponding: Frequent
Available water supply, 0 to 60 inches: Low (about 5.4 inches)

Interpretive groups
Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6w

Hydrologic Soil Group: D
Ecological site: F002XA007WA - Puget Lowlands Wet Forest
Forage suitability group: Wet Soils (G002XS101WA)
Other vegetative classification: Wet Soils (G002XS101WA)
Hydric soil rating: Yes

Minor Components

Bellingham, undrained
Percent of map unit: 5 percent
Landform: Depressions
Other vegetative classification: Wet Soils (G002XN102WA)
Hydric soil rating: Yes

Norma
Percent of map unit: 5 percent
Landform: Depressions
Other vegetative classification: Wet Soils (G002XS101WA)
Hydric soil rating: Yes

Skipopa
Percent of map unit: 5 percent
Other vegetative classification: Seasonally Wet Soils (G002XN202WA)
Hydric soil rating: No

69—Mukilteo muck

Map Unit Setting
National map unit symbol: 2nd9l
Elevation: 0 to 1,000 feet
Mean annual precipitation: 40 to 70 inches
Mean annual air temperature: 48 to 52 degrees F
Frost-free period: 150 to 250 days
Farmland classification: Prime farmland if drained

Map Unit Composition
Mukilteo, undrained, and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Mukilteo, Undrained

Setting
Landform: Depressions
Parent material: Herbaceous organic material

Typical profile
Oa - 0 to 6 inches: muck
Oe - 6 to 60 inches: mucky peat

Properties and qualities
Slope: 0 to 2 percent

Depth to restrictive feature: More than 80 inches
Drainage class: Very poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: None
Frequency of ponding: Frequent
Available water supply, 0 to 60 inches: Very high (about 26.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 5w
Hydrologic Soil Group: B/D
Ecological site: R002XA003WA - Puget Lowlands Bogs and Fens
Forage suitability group: Wet Soils (G002XS101WA)
Other vegetative classification: Wet Soils (G002XS101WA)
Hydric soil rating: Yes

Minor Components

Shalcar

Percent of map unit: 10 percent
Landform: Depressions
Other vegetative classification: Wet Soils (G002XS101WA)
Hydric soil rating: Yes

70—Mukilteo muck, drained

Map Unit Setting

National map unit symbol: 2ndc5
Elevation: 0 to 1,000 feet
Mean annual precipitation: 40 to 70 inches
Mean annual air temperature: 48 to 52 degrees F
Frost-free period: 150 to 250 days
Farmland classification: Prime farmland if drained

Map Unit Composition

Mukilteo, drained, and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Mukilteo, Drained

Setting

Landform: Depressions
Parent material: Herbaceous organic material

Typical profile

Oa - 0 to 6 inches: muck
Oe2 - 6 to 60 inches: mucky peat

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Very poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: About 0 to 24 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Very high (about 26.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 5w
Hydrologic Soil Group: B/D
Ecological site: R002XA003WA - Puget Lowlands Bogs and Fens
Forage suitability group: Seasonally Wet Soils (G002XS201WA)
Other vegetative classification: Seasonally Wet Soils (G002XS201WA)
Hydric soil rating: Yes

Minor Components

Shalcar

Percent of map unit: 5 percent
Landform: Depressions
Other vegetative classification: Wet Soils (G002XS101WA)
Hydric soil rating: Yes

Mukilteo, undrained

Percent of map unit: 5 percent
Landform: Depressions
Other vegetative classification: Wet Soils (G002XS101WA)
Hydric soil rating: Yes

73—Nisqually loamy fine sand, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: 2ndc8
Elevation: 160 to 1,310 feet
Mean annual precipitation: 40 to 60 inches
Mean annual air temperature: 50 degrees F
Frost-free period: 150 to 200 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Nisqually and similar soils: 85 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Nisqually

Setting

Landform: Terraces
Parent material: Sandy glacial outwash

Typical profile

H1 - 0 to 5 inches: loamy fine sand
H2 - 5 to 31 inches: loamy fine sand
H3 - 31 to 60 inches: loamy sand

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat excessively drained
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 4.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3s
Hydrologic Soil Group: A
Ecological site: R002XA006WA - Puget Lowlands Prairie
Forage suitability group: Droughty Soils (G002XS401WA)
Other vegetative classification: Droughty Soils (G002XS401WA)
Hydric soil rating: No

Minor Components

Yelm

Percent of map unit: 3 percent
Hydric soil rating: No

Norma

Percent of map unit: 2 percent
Landform: Depressions
Other vegetative classification: Wet Soils (G002XS101WA)
Hydric soil rating: Yes

74—Nisqually loamy fine sand, 3 to 15 percent slopes

Map Unit Setting

National map unit symbol: 2ndc9
Elevation: 160 to 1,310 feet
Mean annual precipitation: 40 to 60 inches
Mean annual air temperature: 50 degrees F
Frost-free period: 150 to 200 days

Farmland classification: Farmland of statewide importance

Map Unit Composition

Nisqually and similar soils: 85 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Nisqually

Setting

Landform: Terraces
Parent material: Sandy glacial outwash

Typical profile

H1 - 0 to 5 inches: loamy fine sand
H2 - 5 to 31 inches: loamy fine sand
H3 - 31 to 60 inches: loamy sand

Properties and qualities

Slope: 3 to 15 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat excessively drained
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 4.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: A
Ecological site: R002XA006WA - Puget Lowlands Prairie
Forage suitability group: Droughty Soils (G002XS401WA)
Other vegetative classification: Droughty Soils (G002XS401WA)
Hydric soil rating: No

Minor Components

Yelm

Percent of map unit: 3 percent
Hydric soil rating: No

Norma

Percent of map unit: 2 percent
Landform: Depressions
Other vegetative classification: Wet Soils (G002XS101WA)
Hydric soil rating: Yes

75—Norma fine sandy loam

Map Unit Setting

National map unit symbol: 2ndcb
Elevation: 0 to 1,000 feet
Mean annual precipitation: 35 to 60 inches
Mean annual air temperature: 48 to 52 degrees F
Frost-free period: 150 to 200 days
Farmland classification: Prime farmland if drained

Map Unit Composition

Norma, fine sandy loam, and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Norma, Fine Sandy Loam

Setting

Landform: Depressions, drainageways
Parent material: Alluvium

Typical profile

H1 - 0 to 7 inches: fine sandy loam
H2 - 7 to 25 inches: fine sandy loam
H3 - 25 to 60 inches: sandy loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)
Depth to water table: About 0 to 12 inches
Frequency of flooding: None
Frequency of ponding: Frequent
Available water supply, 0 to 60 inches: Moderate (about 8.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 5w
Hydrologic Soil Group: A/D
Ecological site: F002XA007WA - Puget Lowlands Wet Forest
Forage suitability group: Wet Soils (G002XS101WA)
Other vegetative classification: Wet Soils (G002XS101WA)
Hydric soil rating: Yes

Minor Components

Norma, silt loam

Percent of map unit: 5 percent

Landform: Depressions
Other vegetative classification: Wet Soils (G002XS101WA)
Hydric soil rating: Yes

Alderwood
Percent of map unit: 5 percent
Hydric soil rating: No

76—Norma silt loam

Map Unit Setting
National map unit symbol: 2ndcc
Elevation: 0 to 1,000 feet
Mean annual precipitation: 35 to 60 inches
Mean annual air temperature: 48 to 52 degrees F
Frost-free period: 150 to 200 days
Farmland classification: Prime farmland if drained

Map Unit Composition
Norma, silt loam, and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Norma, Silt Loam

Setting
Landform: Depressions, drainageways
Parent material: Alluvium

Typical profile
H1 - 0 to 8 inches: silt loam
H2 - 8 to 30 inches: sandy loam
H3 - 30 to 60 inches: sandy loam

Properties and qualities
Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: About 0 to 12 inches
Frequency of flooding: None
Frequency of ponding: Frequent
Available water supply, 0 to 60 inches: Moderate (about 8.9 inches)

Interpretive groups
Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 5w
Hydrologic Soil Group: B/D
Ecological site: F002XA007WA - Puget Lowlands Wet Forest
Forage suitability group: Wet Soils (G002XS101WA)

Other vegetative classification: Wet Soils (G002XS101WA)
Hydric soil rating: Yes

Minor Components

Norma, fine sandy loam
Percent of map unit: 5 percent
Landform: Depressions
Other vegetative classification: Wet Soils (G002XS101WA)
Hydric soil rating: Yes

Alderwood
Percent of map unit: 5 percent
Hydric soil rating: No

84—Pilchuck loamy sand

Map Unit Setting
National map unit symbol: 2nd9t
Elevation: 70 to 1,970 feet
Mean annual precipitation: 35 to 60 inches
Mean annual air temperature: 48 to 52 degrees F
Frost-free period: 160 to 210 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition
Pilchuck and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Pilchuck

Setting
Landform: Flood plains
Parent material: Alluvium

Typical profile
H1 - 0 to 6 inches: loamy sand
H2 - 6 to 60 inches: fine sand

Properties and qualities
Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat excessively drained
Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 19.98 in/hr)
Depth to water table: About 24 to 48 inches
Frequency of flooding: Occasional
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 4.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: A
Ecological site: F002XA008WA - Puget Lowlands Riparian Forest
Forage suitability group: Droughty Soils (G002XS401WA)
Other vegetative classification: Droughty Soils (G002XS401WA)
Hydric soil rating: No

Minor Components

Puget, undrained

Percent of map unit: 5 percent
Landform: Depressions
Other vegetative classification: Wet Soils (G002XS101WA)
Hydric soil rating: Yes

Sultan

Percent of map unit: 5 percent
Hydric soil rating: No

Newberg

Percent of map unit: 5 percent
Hydric soil rating: No

85—Pits, gravel

Map Unit Composition

Pits: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Pits

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8
Hydric soil rating: No

88—Puget silt loam

Map Unit Setting

National map unit symbol: 2nd9y
Elevation: 10 to 650 feet
Mean annual precipitation: 35 to 55 inches
Mean annual air temperature: 48 to 50 degrees F
Frost-free period: 160 to 180 days
Farmland classification: Prime farmland if drained

Map Unit Composition

Puget, drained, and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Puget, Drained

Setting

Landform: Flood plains
Parent material: Alluvium

Typical profile

H1 - 0 to 9 inches: silt loam
H2 - 9 to 60 inches: silt loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: About 12 to 35 inches
Frequency of flooding: Occasional
Frequency of ponding: None
Available water supply, 0 to 60 inches: High (about 12.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: C
Ecological site: F002XA008WA - Puget Lowlands Riparian Forest
Forage suitability group: Soils with Few Limitations (G002XS501WA)
Other vegetative classification: Soils with Few Limitations (G002XS501WA)
Hydric soil rating: Yes

Minor Components

Puget, undrained

Percent of map unit: 5 percent
Other vegetative classification: Wet Soils (G002XS101WA)
Hydric soil rating: Yes

Newberg

Percent of map unit: 5 percent
Hydric soil rating: No

Semiahmoo, undrained

Percent of map unit: 3 percent
Landform: Depressions
Other vegetative classification: Wet Soils (G002XS101WA)
Hydric soil rating: Yes

Sultan

Percent of map unit: 2 percent
Hydric soil rating: No

89—Puyallup silt loam

Map Unit Setting

National map unit symbol: 2nd9z
Elevation: 70 to 1,970 feet
Mean annual precipitation: 35 to 60 inches
Mean annual air temperature: 50 degrees F
Frost-free period: 170 to 200 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Puyallup and similar soils: 85 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Puyallup

Setting

Landform: Terraces, flood plains
Parent material: Alluvium

Typical profile

H1 - 0 to 10 inches: silt loam
H2 - 10 to 19 inches: fine sandy loam
H3 - 19 to 60 inches: sand

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: 14 to 20 inches to strongly contrasting textural stratification
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: Occasional
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 3.2 inches)

Interpretive groups

Land capability classification (irrigated): 3w
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: B
Ecological site: F002XA008WA - Puget Lowlands Riparian Forest
Forage suitability group: Droughty Soils (G002XS401WA)
Other vegetative classification: Droughty Soils (G002XS401WA)
Hydric soil rating: No

Minor Components

Newberg
Percent of map unit: 5 percent
Hydric soil rating: No

Semiahmoo, undrained
Percent of map unit: 3 percent
Landform: Depressions
Other vegetative classification: Wet Soils (G002XS101WA)
Hydric soil rating: Yes

Sultan
Percent of map unit: 2 percent
Hydric soil rating: No

98—Salkum silty clay loam, 8 to 15 percent slopes

Map Unit Setting
National map unit symbol: 2ndcq
Elevation: 200 to 1,000 feet
Mean annual precipitation: 40 to 70 inches
Mean annual air temperature: 48 to 50 degrees F
Frost-free period: 150 to 210 days
Farmland classification: Farmland of statewide importance

Map Unit Composition
Salkum and similar soils: 95 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Salkum

Setting
Landform: Terraces
Parent material: Highly weatherd glacial drift

Typical profile
H1 - 0 to 12 inches: silty clay loam
H2 - 12 to 51 inches: silty clay
H3 - 51 to 60 inches: silty clay

Properties and qualities
Slope: 8 to 15 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None

Available water supply, 0 to 60 inches: High (about 9.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: B
Ecological site: F002XA005WA - Puget Lowlands Moist Forest
Forage suitability group: Soils with Moderate Limitations (G001XY602WA)
Other vegetative classification: Soils with Moderate Limitations (G001XY602WA)
Hydric soil rating: No

Minor Components

Scamman

Percent of map unit: 5 percent
Landform: Terraces
Other vegetative classification: Seasonally Wet Soils (G003XF203WA)
Hydric soil rating: No

102—Schneider very gravelly loam, 20 to 40 percent slopes

Map Unit Setting

National map unit symbol: 2nd7p
Elevation: 50 to 1,800 feet
Mean annual precipitation: 60 to 75 inches
Mean annual air temperature: 48 to 52 degrees F
Frost-free period: 150 to 200 days
Farmland classification: Not prime farmland

Map Unit Composition

Schneider and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Schneider

Setting

Landform: Mountains

Typical profile

H1 - 0 to 6 inches: very gravelly loam
H2 - 6 to 32 inches: very gravelly silt loam
H3 - 32 to 55 inches: extremely gravelly silt loam
H4 - 55 to 59 inches: unweathered bedrock

Properties and qualities

Slope: 20 to 40 percent
Depth to restrictive feature: 40 to 60 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches

Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 4.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: B
Ecological site: F002XA005WA - Puget Lowlands Moist Forest
Hydric soil rating: No

103—Schneider very gravelly loam, 40 to 65 percent slopes

Map Unit Setting

National map unit symbol: 2nd7q
Elevation: 50 to 1,800 feet
Mean annual precipitation: 60 to 75 inches
Mean annual air temperature: 48 to 52 degrees F
Frost-free period: 150 to 200 days
Farmland classification: Not prime farmland

Map Unit Composition

Schneider and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Schneider

Setting

Landform: Mountains

Typical profile

H1 - 0 to 6 inches: very gravelly loam
H2 - 6 to 32 inches: very gravelly silt loam
H3 - 32 to 55 inches: extremely gravelly silt loam
H4 - 55 to 59 inches: unweathered bedrock

Properties and qualities

Slope: 40 to 65 percent
Depth to restrictive feature: 40 to 60 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 4.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: B
Ecological site: F002XA005WA - Puget Lowlands Moist Forest
Hydric soil rating: No

104—Semiahmoo muck

Map Unit Setting

National map unit symbol: 2nd7r
Elevation: 10 to 1,300 feet
Mean annual precipitation: 4 to 70 inches
Mean annual air temperature: 46 to 50 degrees F
Frost-free period: 125 to 250 days
Farmland classification: Prime farmland if drained

Map Unit Composition

Semiahmoo, drained, and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Semiahmoo, Drained

Setting

Landform: Flood plains
Parent material: Herbaceous organic material

Typical profile

Oa1 - 0 to 6 inches: muck
Oa2 - 6 to 60 inches: muck

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Very poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: About 0 to 12 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Very high (about 26.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 5w
Hydrologic Soil Group: B/D
Ecological site: R002XA003WA - Puget Lowlands Bogs and Fens
Forage suitability group: Wet Soils (G002XS101WA)
Other vegetative classification: Wet Soils (G002XS101WA)
Hydric soil rating: Yes

Minor Components

Shalcar variant

Percent of map unit: 5 percent
Landform: Depressions
Other vegetative classification: Wet Soils (G002XS101WA)
Hydric soil rating: Yes

Semiahmoo, undrained
Percent of map unit: 5 percent
Other vegetative classification: Wet Soils (G002XS101WA)
Hydric soil rating: Yes

Puget, undrained
Percent of map unit: 3 percent
Landform: Depressions
Other vegetative classification: Wet Soils (G002XS101WA)
Hydric soil rating: Yes

Sultan
Percent of map unit: 2 percent
Hydric soil rating: No

106—Shalcar variant muck

Map Unit Setting
National map unit symbol: 2nd7t
Elevation: 70 to 980 feet
Mean annual precipitation: 40 to 60 inches
Mean annual air temperature: 50 degrees F
Frost-free period: 150 to 200 days
Farmland classification: Prime farmland if drained

Map Unit Composition
Shalcar variant and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Shalcar Variant

Setting
Landform: Flood plains
Parent material: Organic material over alluvium

Typical profile
Oa1 - 0 to 6 inches: muck
Oa2 - 6 to 20 inches: muck
H3 - 20 to 60 inches: clay

Properties and qualities
Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Very poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: Occasional
Frequency of ponding: Frequent
Available water supply, 0 to 60 inches: Very high (about 15.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 5w
Hydrologic Soil Group: C/D
Ecological site: R002XA003WA - Puget Lowlands Bogs and Fens
Forage suitability group: Wet Soils (G002XS101WA)
Other vegetative classification: Wet Soils (G002XS101WA)
Hydric soil rating: Yes

Minor Components

Sultan

Percent of map unit: 5 percent
Hydric soil rating: No

Puget, undrained

Percent of map unit: 5 percent
Landform: Depressions
Other vegetative classification: Wet Soils (G002XS101WA)
Hydric soil rating: Yes

Semiahmoo, undrained

Percent of map unit: 5 percent
Landform: Depressions
Other vegetative classification: Wet Soils (G002XS101WA)
Hydric soil rating: Yes

108—Skipopa silt loam, 3 to 15 percent slopes

Map Unit Setting

National map unit symbol: 2nd7w
Elevation: 490 to 980 feet
Mean annual precipitation: 30 to 50 inches
Mean annual air temperature: 48 to 50 degrees F
Frost-free period: 160 to 200 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Skipopa and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Skipopa

Setting

Landform: Terraces
Parent material: Volcanic ash over glaciolacustrine deposits

Typical profile

H1 - 0 to 8 inches: silt loam
H2 - 8 to 18 inches: silt loam

H3 - 18 to 60 inches: clay

Properties and qualities

Slope: 3 to 15 percent
Depth to restrictive feature: 10 to 20 inches to abrupt textural change
Drainage class: Somewhat poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 in/hr)
Depth to water table: About 12 to 24 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 5.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4w
Hydrologic Soil Group: D
Ecological site: F002XA007WA - Puget Lowlands Wet Forest
Forage suitability group: Seasonally Wet Soils (G002XN202WA)
Other vegetative classification: Seasonally Wet Soils (G002XN202WA)
Hydric soil rating: No

Minor Components

Yelm

Percent of map unit: 10 percent
Hydric soil rating: No

109—Spana gravelly loam

Map Unit Setting

National map unit symbol: 2nd7x
Elevation: 330 to 1,640 feet
Mean annual precipitation: 25 to 45 inches
Mean annual air temperature: 48 to 52 degrees F
Frost-free period: 150 to 200 days
Farmland classification: Prime farmland if drained

Map Unit Composition

Spana and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Spana

Setting

Landform: Drainageways, outwash plains
Parent material: Glacial outwash

Typical profile

H1 - 0 to 22 inches: gravelly loam
H2 - 22 to 26 inches: gravelly loam
H3 - 26 to 38 inches: gravelly loam

H4 - 38 to 60 inches: extremely gravelly sandy loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat poorly drained
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)
Depth to water table: About 12 to 35 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 6.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: B
Ecological site: R002XA006WA - Puget Lowlands Prairie
Forage suitability group: Soils with Few Limitations (G002XS501WA)
Other vegetative classification: Soils with Few Limitations (G002XS501WA)
Hydric soil rating: No

110—Spanaway gravelly sandy loam, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: 2ndb6
Elevation: 330 to 1,310 feet
Mean annual precipitation: 35 to 65 inches
Mean annual air temperature: 50 degrees F
Frost-free period: 150 to 200 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Spanaway and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Spanaway

Setting

Landform: Terraces, outwash plains
Parent material: Volcanic ash over gravelly outwash

Typical profile

H1 - 0 to 15 inches: gravelly sandy loam
H2 - 15 to 20 inches: very gravelly loam
H3 - 20 to 60 inches: extremely gravelly sand

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat excessively drained
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)

Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 3.8 inches)

Interpretive groups

Land capability classification (irrigated): 3s
Land capability classification (nonirrigated): 3s
Hydrologic Soil Group: A
Ecological site: R002XA006WA - Puget Lowlands Prairie
Forage suitability group: Droughty Soils (G002XS401WA)
Other vegetative classification: Droughty Soils (G002XS401WA)
Hydric soil rating: No

115—Sultan silt loam

Map Unit Setting

National map unit symbol: 2ndbc
Elevation: 0 to 150 feet
Mean annual precipitation: 35 to 55 inches
Mean annual air temperature: 48 to 50 degrees F
Frost-free period: 150 to 200 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Sultan and similar soils: 85 percent
Minor components: 8 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Sultan

Setting

Landform: Flood plains
Parent material: Alluvium

Typical profile

H1 - 0 to 7 inches: silt loam
H2 - 7 to 60 inches: silt loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: About 24 to 48 inches
Frequency of flooding: Occasional
Frequency of ponding: None
Available water supply, 0 to 60 inches: High (about 11.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3w

Hydrologic Soil Group: C
Ecological site: F002XA008WA - Puget Lowlands Riparian Forest
Forage suitability group: Seasonally Wet Soils (G002XS201WA)
Other vegetative classification: Seasonally Wet Soils (G002XS201WA)
Hydric soil rating: No

Minor Components

Godfrey, undrained
Percent of map unit: 5 percent
Landform: Depressions
Other vegetative classification: Wet Soils (G002XS101WA)
Hydric soil rating: Yes

Puget, undrained
Percent of map unit: 3 percent
Landform: Depressions
Other vegetative classification: Wet Soils (G002XS101WA)
Hydric soil rating: Yes

120—Tisch silt loam

Map Unit Setting
National map unit symbol: 2nd82
Elevation: 50 to 1,000 feet
Mean annual precipitation: 20 to 60 inches
Mean annual air temperature: 48 to 52 degrees F
Frost-free period: 150 to 250 days
Farmland classification: Prime farmland if drained

Map Unit Composition
Tisch, drained, and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Tisch, Drained

Setting
Landform: Depressions, drainageways
Parent material: Alluvium, volcanic ash, and diatomaceous earth

Typical profile
H1 - 0 to 11 inches: silt loam
H2 - 11 to 50 inches: silt loam
Oa - 50 to 60 inches: muck

Properties and qualities
Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Very poorly drained

Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: About 0 to 12 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Very high (about 25.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 5w
Hydrologic Soil Group: C/D
Ecological site: F002XA007WA - Puget Lowlands Wet Forest
Forage suitability group: Wet Soils (G002XS101WA)
Other vegetative classification: Wet Soils (G002XS101WA)
Hydric soil rating: Yes

Minor Components

Tisch, undrained

Percent of map unit: 5 percent
Other vegetative classification: Wet Soils (G002XS101WA)
Hydric soil rating: Yes

Everson, undrained

Percent of map unit: 5 percent
Landform: Depressions
Other vegetative classification: Wet Soils (G002XS101WA)
Hydric soil rating: Yes

Dupont, undrained

Percent of map unit: 5 percent
Landform: Depressions
Other vegetative classification: Wet Soils (G002XS101WA)
Hydric soil rating: Yes

Mckenna

Percent of map unit: 4 percent
Landform: Depressions
Other vegetative classification: Wet Soils (G002XS101WA)
Hydric soil rating: Yes

Giles

Percent of map unit: 1 percent
Hydric soil rating: No

125—Xerorthents, 0 to 5 percent slopes

Map Unit Setting

National map unit symbol: 2nd87
Elevation: 0 to 2,620 feet
Mean annual precipitation: 30 to 60 inches
Mean annual air temperature: 39 to 50 degrees F

Frost-free period: 150 to 200 days
Farmland classification: Not prime farmland

Map Unit Composition
Xerorthents and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Xerorthents

Setting
Landform: Tidal flats
Parent material: Sandy and loamy cut and fill material

Typical profile
H1 - 0 to 60 inches: variable

Properties and qualities
Slope: 0 to 5 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat excessively drained
Depth to water table: About 24 inches
Frequency of flooding: None
Frequency of ponding: None

Interpretive groups
Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydric soil rating: No

126—Yelm fine sandy loam, 0 to 3 percent slopes

Map Unit Setting
National map unit symbol: 2nd88
Elevation: 80 to 980 feet
Mean annual precipitation: 30 to 60 inches
Mean annual air temperature: 50 degrees F
Frost-free period: 170 to 200 days
Farmland classification: All areas are prime farmland

Map Unit Composition
Yelm and similar soils: 85 percent
Minor components: 13 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Yelm

Setting
Landform: Outwash terraces
Parent material: Glacial outwash

Typical profile
H1 - 0 to 8 inches: fine sandy loam
H2 - 8 to 46 inches: fine sandy loam

H3 - 46 to 60 inches: loamy sand

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)
Depth to water table: About 18 to 36 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: High (about 11.0 inches)

Interpretive groups

Land capability classification (irrigated): 3w
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: B
Ecological site: F002XA005WA - Puget Lowlands Moist Forest
Forage suitability group: Seasonally Wet Soils (G002XS201WA)
Other vegetative classification: Seasonally Wet Soils (G002XS201WA)
Hydric soil rating: No

Minor Components

Everson, undrained

Percent of map unit: 5 percent
Landform: Depressions
Other vegetative classification: Wet Soils (G002XS101WA)
Hydric soil rating: Yes

Norma

Percent of map unit: 5 percent
Landform: Depressions
Other vegetative classification: Wet Soils (G002XS101WA)
Hydric soil rating: Yes

Skipopa

Percent of map unit: 3 percent
Other vegetative classification: Seasonally Wet Soils (G002XN202WA)
Hydric soil rating: No

127—Yelm fine sandy loam, 3 to 15 percent slopes

Map Unit Setting

National map unit symbol: 2nd89
Elevation: 80 to 980 feet
Mean annual precipitation: 30 to 60 inches
Mean annual air temperature: 50 degrees F
Frost-free period: 170 to 200 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Yelm and similar soils: 85 percent
Minor components: 3 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Yelm

Setting

Landform: Outwash terraces
Parent material: Glacial outwash

Typical profile

H1 - 0 to 8 inches: fine sandy loam
H2 - 8 to 46 inches: fine sandy loam
H3 - 46 to 60 inches: loamy sand

Properties and qualities

Slope: 3 to 15 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)
Depth to water table: About 18 to 36 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: High (about 11.0 inches)

Interpretive groups

Land capability classification (irrigated): 4e
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: B
Ecological site: F002XA005WA - Puget Lowlands Moist Forest
Forage suitability group: Soils with Moderate Limitations (G002XS601WA)
Other vegetative classification: Soils with Moderate Limitations (G002XS601WA)
Hydric soil rating: No

Minor Components

Skipopa

Percent of map unit: 3 percent
Other vegetative classification: Seasonally Wet Soils (G002XN202WA)
Hydric soil rating: No

128—Yelm fine sandy loam, 15 to 30 percent slopes

Map Unit Setting

National map unit symbol: 2nd8b
Elevation: 80 to 980 feet
Mean annual precipitation: 30 to 60 inches
Mean annual air temperature: 50 degrees F

Frost-free period: 170 to 200 days
Farmland classification: Farmland of statewide importance

Map Unit Composition
Yelm and similar soils: 85 percent
Minor components: 2 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Yelm

Setting
Landform: Outwash terraces
Parent material: Glacial outwash

Typical profile
H1 - 0 to 8 inches: fine sandy loam
H2 - 8 to 46 inches: fine sandy loam
H3 - 46 to 60 inches: loamy sand

Properties and qualities
Slope: 15 to 30 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)
Depth to water table: About 18 to 36 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: High (about 11.0 inches)

Interpretive groups
Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: B
Ecological site: F002XA005WA - Puget Lowlands Moist Forest
Forage suitability group: Sloping to Steep Soils (G002XS701WA)
Other vegetative classification: Sloping to Steep Soils (G002XS701WA)
Hydric soil rating: No

Minor Components

Hoogdal
Percent of map unit: 2 percent
Hydric soil rating: No

129—Water

Map Unit Composition
Water: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Water

Setting

Landform: Alluvial cones

Soil Information for All Uses

Soil Reports

The Soil Reports section includes various formatted tabular and narrative reports (tables) containing data for each selected soil map unit and each component of each unit. No aggregation of data has occurred as is done in reports in the Soil Properties and Qualities and Suitabilities and Limitations sections.

The reports contain soil interpretive information as well as basic soil properties and qualities. A description of each report (table) is included.

Land Classifications

This folder contains a collection of tabular reports that present a variety of soil groupings. The reports (tables) include all selected map units and components for each map unit. Land classifications are specified land use and management groupings that are assigned to soil areas because combinations of soil have similar behavior for specified practices. Most are based on soil properties and other factors that directly influence the specific use of the soil. Example classifications include ecological site classification, farmland classification, irrigated and nonirrigated land capability classification, and hydric rating.

Prime and other Important Farmlands

This table lists the map units in the survey area that are considered important farmlands. Important farmlands consist of prime farmland, unique farmland, and farmland of statewide or local importance. This list does not constitute a recommendation for a particular land use.

In an effort to identify the extent and location of important farmlands, the Natural Resources Conservation Service, in cooperation with other interested Federal, State, and local government organizations, has inventoried land that can be used for the production of the Nation's food supply.

Prime farmland is of major importance in meeting the Nation's short- and long-range needs for food and fiber. Because the supply of high-quality farmland is limited, the U.S. Department of Agriculture recognizes that responsible levels of government, as well as individuals, should encourage and facilitate the wise use of our Nation's prime farmland.

Prime farmland, as defined by the U.S. Department of Agriculture, is land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops and is available for these uses. It could be cultivated land, pastureland, forestland, or other land, but it is not urban or built-up land or water areas. The soil quality, growing season, and moisture supply are those needed for the soil to economically produce sustained high yields of crops when proper management, including water management, and acceptable farming methods are applied. In general, prime farmland has an adequate and dependable supply of moisture from precipitation or irrigation, a favorable temperature and growing season, acceptable acidity or alkalinity, an acceptable salt and sodium content, and few or no rocks. The water supply is dependable and of adequate quality. Prime farmland is permeable to water and air. It is not excessively erodible or saturated with water for long periods, and it either is not frequently flooded during the growing season or is protected from flooding. Slope ranges mainly from 0 to 6 percent. More detailed information about the criteria for prime farmland is available at the local office of the Natural Resources Conservation Service.

For some of the soils identified in the table as prime farmland, measures that overcome a hazard or limitation, such as flooding, wetness, and droughtiness, are needed. Onsite evaluation is needed to determine whether or not the hazard or limitation has been overcome by corrective measures.

A recent trend in land use in some areas has been the loss of some prime farmland to industrial and urban uses. The loss of prime farmland to other uses puts pressure on marginal lands, which generally are more erodible, droughty, and less productive and cannot be easily cultivated.

Unique farmland is land other than prime farmland that is used for the production of specific high-value food and fiber crops, such as citrus, tree nuts, olives, cranberries, and other fruits and vegetables. It has the special combination of soil quality, growing season, moisture supply, temperature, humidity, air drainage, elevation, and aspect needed for the soil to economically produce sustainable high yields of these crops when properly managed. The water supply is dependable and of adequate quality. Nearness to markets is an additional consideration. Unique farmland is not based on national criteria. It commonly is in areas where there is a special microclimate, such as the wine country in California.

In some areas, land that does not meet the criteria for prime or unique farmland is considered to be *farmland of statewide importance* for the production of food, feed, fiber, forage, and oilseed crops. The criteria for defining and delineating farmland of statewide importance are determined by the appropriate State agencies. Generally, this land includes areas of soils that nearly meet the requirements for prime farmland and that economically produce high yields of crops when treated and managed according to acceptable farming methods. Some areas may produce as high a yield as prime farmland if conditions are favorable. Farmland of statewide importance may include tracts of land that have been designated for agriculture by State law.

In some areas that are not identified as having national or statewide importance, land is considered to be *farmland of local importance* for the production of food, feed, fiber, forage, and oilseed crops. This farmland is identified by the appropriate local agencies. Farmland of local importance may include tracts of land that have been designated for agriculture by local ordinance.

Report—Prime and other Important Farmlands

Prime and other Important Farmlands–Thurston County Area, Washington		
Map Symbol	**Map Unit Name**	**Farmland Classification**
1	Alderwood gravelly sandy loam, 0 to 8 percent slopes	Prime farmland if irrigated
2	Alderwood gravelly sandy loam, 8 to 15 percent slopes	Prime farmland if irrigated
3	Alderwood gravelly sandy loam, 15 to 30 percent slopes	Farmland of statewide importance
20	Cagey loamy sand	Prime farmland if irrigated
27	Delphi very gravelly loam, 3 to 15 percent slopes	Farmland of statewide importance
30	Dystric Xerochrepts, 60 to 90 percent slopes	Not prime farmland
32	Everett very gravelly sandy loam, 0 to 8 percent slopes	Farmland of statewide importance
33	Everett very gravelly sandy loam, 8 to 15 percent slopes	Farmland of statewide importance
34	Everett very gravelly sandy loam, 15 to 30 percent slopes	Farmland of statewide importance
35	Everett very gravelly sandy loam, 30 to 50 percent slopes	Not prime farmland
38	Giles silt loam, 0 to 3 percent slopes	All areas are prime farmland
39	Giles silt loam, 3 to 15 percent slopes	Farmland of statewide importance
40	Giles silt loam, 15 to 30 percent slopes	Farmland of statewide importance
41	Godfrey silty clay loam	Prime farmland if drained
45	Hydraquents, tidal	Not prime farmland
46	Indianola loamy sand, 0 to 5 percent slopes	Prime farmland if irrigated
47	Indianola loamy sand, 5 to 15 percent slopes	Prime farmland if irrigated
48	Indianola loamy sand, 15 to 30 percent slopes	Farmland of statewide importance
51	Kapowsin silt loam, 3 to 15 percent slopes	Farmland of statewide importance
52	Kapowsin silt loam, 15 to 30 percent slopes	Farmland of statewide importance
53	Kapowsin silt loam, 30 to 50 percent slopes	Not prime farmland
65	McKenna gravelly silt loam, 0 to 5 percent slopes	Prime farmland if drained
69	Mukilteo muck	Prime farmland if drained
70	Mukilteo muck, drained	Prime farmland if drained
73	Nisqually loamy fine sand, 0 to 3 percent slopes	Prime farmland if irrigated
74	Nisqually loamy fine sand, 3 to 15 percent slopes	Farmland of statewide importance
75	Norma fine sandy loam	Prime farmland if drained
76	Norma silt loam	Prime farmland if drained
84	Pilchuck loamy sand	Prime farmland if irrigated
85	Pits, gravel	Not prime farmland
88	Puget silt loam	Prime farmland if drained
89	Puyallup silt loam	All areas are prime farmland
98	Salkum silty clay loam, 8 to 15 percent slopes	Farmland of statewide importance
102	Schneider very gravelly loam, 20 to 40 percent slopes	Not prime farmland
103	Schneider very gravelly loam, 40 to 65 percent slopes	Not prime farmland
104	Semiahmoo muck	Prime farmland if drained
106	Shalcar variant muck	Prime farmland if drained
108	Skipopa silt loam, 3 to 15 percent slopes	Farmland of statewide importance
109	Spana gravelly loam	Prime farmland if drained

Prime and other Important Farmlands–Thurston County Area, Washington		
Map Symbol	**Map Unit Name**	**Farmland Classification**
110	Spanaway gravelly sandy loam, 0 to 3 percent slopes	Prime farmland if irrigated
115	Sultan silt loam	All areas are prime farmland
120	Tisch silt loam	Prime farmland if drained
125	Xerorthents, 0 to 5 percent slopes	Not prime farmland
126	Yelm fine sandy loam, 0 to 3 percent slopes	All areas are prime farmland
127	Yelm fine sandy loam, 3 to 15 percent slopes	Farmland of statewide importance
128	Yelm fine sandy loam, 15 to 30 percent slopes	Farmland of statewide importance
129	Water	Not prime farmland

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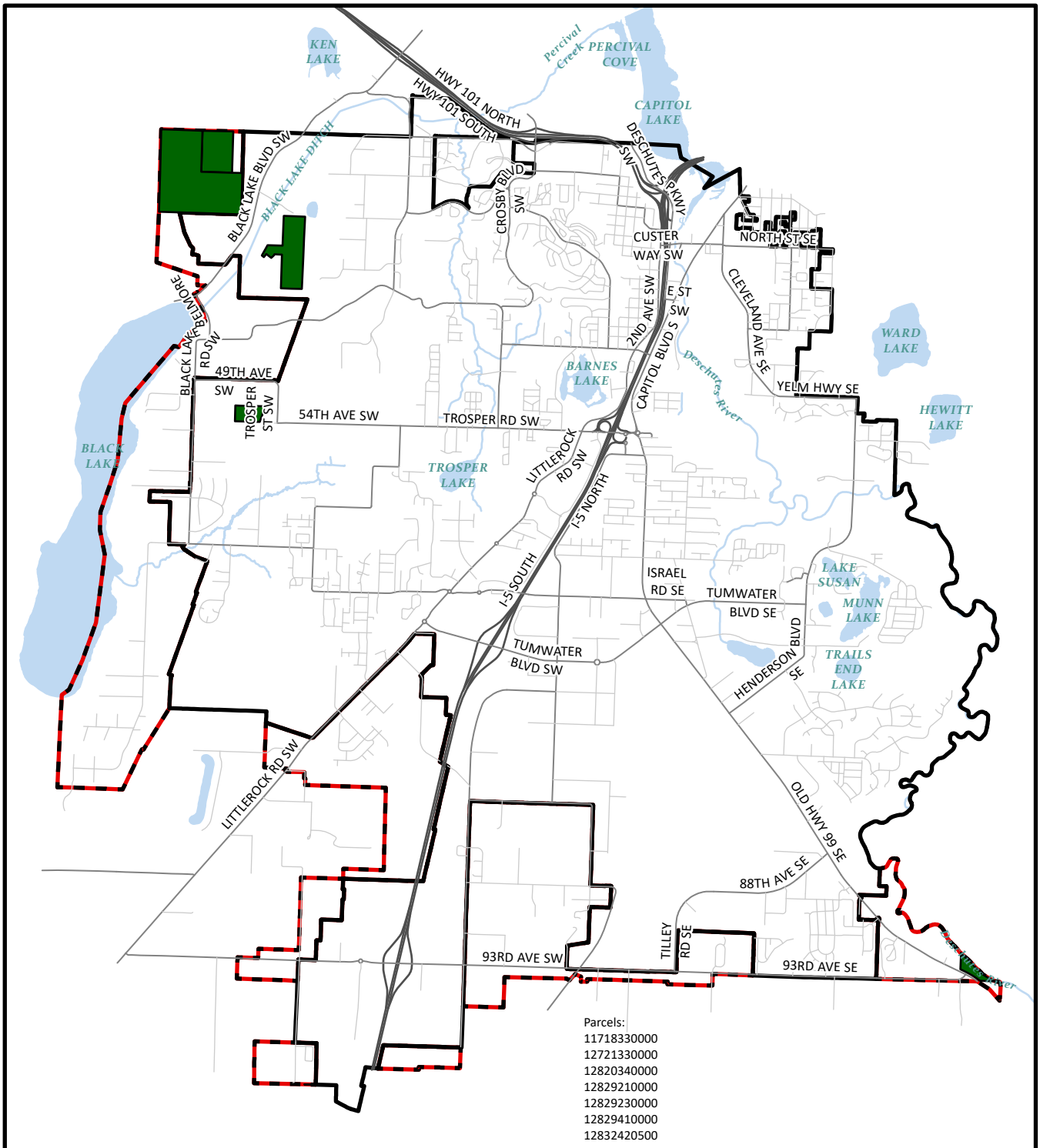
Attachment E

Map C-1



Designated Forest Resource Lands

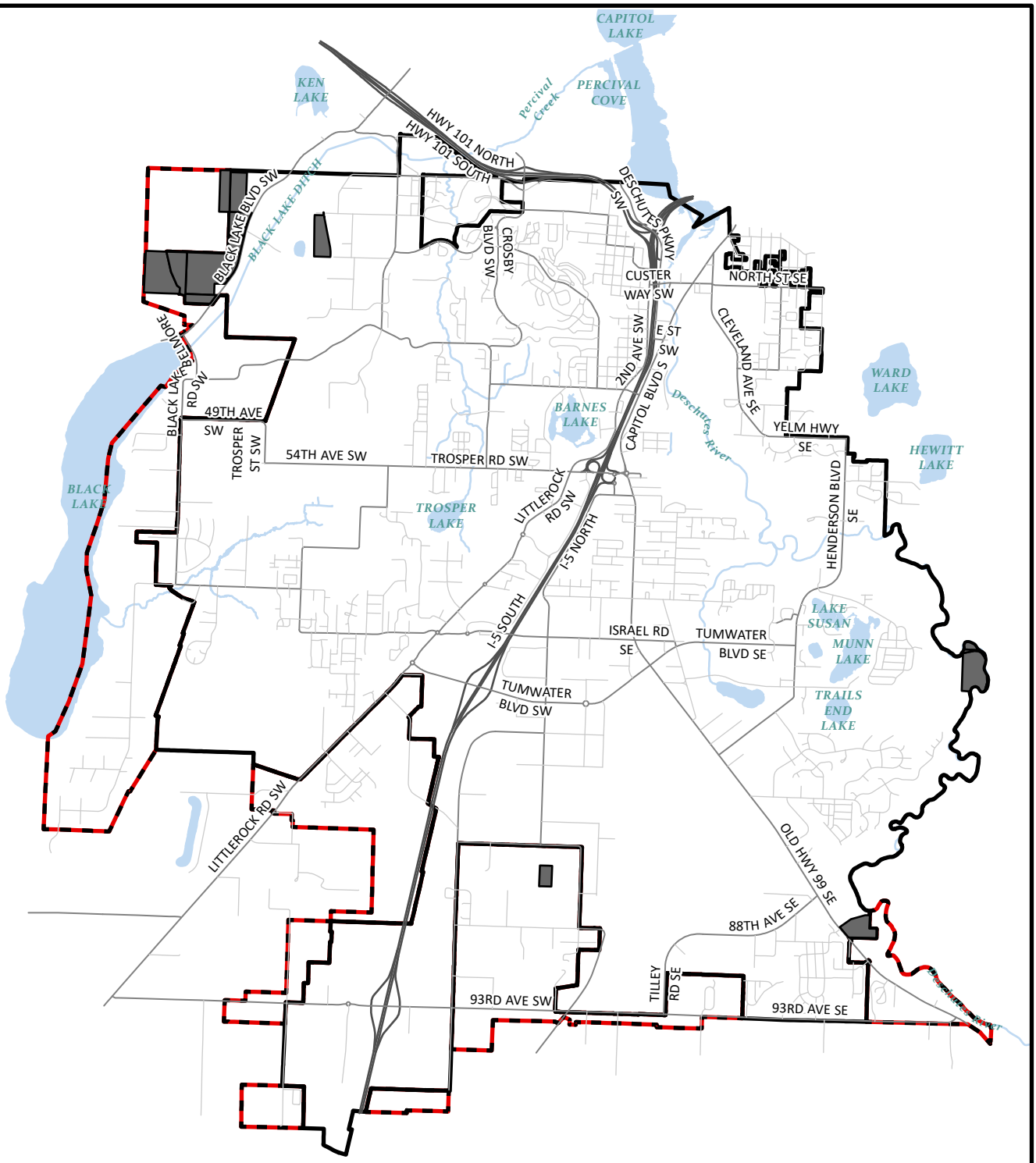
0 0.25 0.5 1 Miles

N

- Designated Forest Lands
- Tumwater City Limits
- Tumwater Urban Growth Area

Map created by the City of Tumwater Transportation and Engineering Department using ArcGIS Pro 3.3.2.
Data courtesy City of Tumwater Transportation and Engineering Department and Thurston County.
DISCLAIMER: The City of Tumwater does not warrant, guarantee, or accept any liability for the accuracy, precision, or completeness of any information shown hereon or for any inferences made therefrom.

Map C-2



Designated Mineral Resource Lands

0 0.25 0.5 1 Miles

N

- Mineral Resource Lands
- Tumwater City Limits
- Tumwater Urban Growth Area

Map created by the City of Tumwater Transportation and Engineering Department using ArcGIS Pro 3.3.2.
Data courtesy City of Tumwater Transportation and Engineering Department and Thurston County.
Mineral resource lands were identified from County parcels with the property use code of "85".
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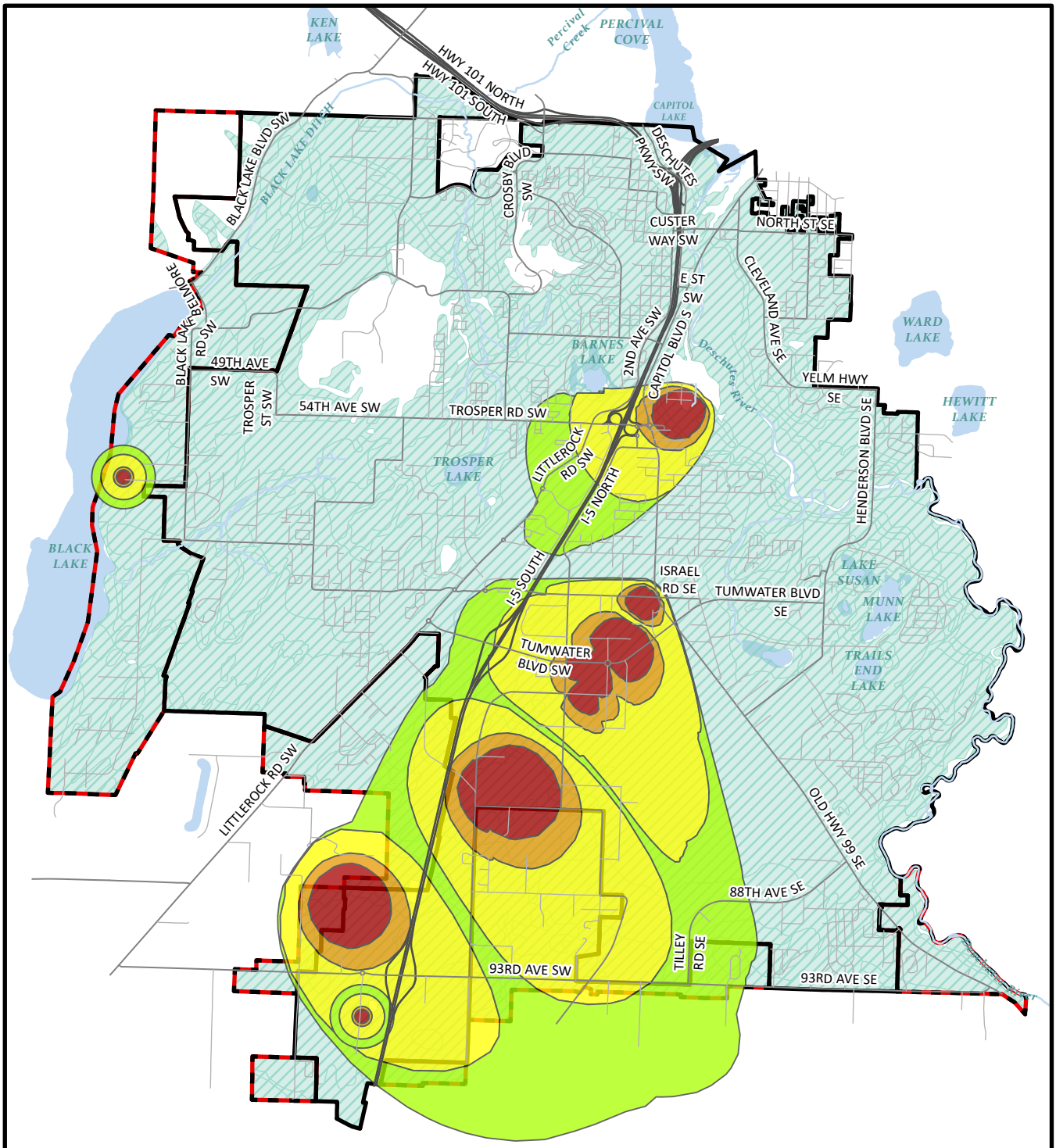
Map C-3



Critical Aquifer Recharge Areas

N

Wellhead Protection Area Capture Zones

- 6 month
- 1 year
- 5 year
- 10 year
- Critical Aquifier Recharge Areas
- Tumwater City Limits
- Tumwater Urban Growth Area

0 0.25 0.5 1 Miles

Map created by the City of Tumwater Transportation and Engineering Department using ArcGIS Pro 3.2.1.
Data courtesy City of Tumwater Transportation and Engineering Department, Golder Associates Inc., and Thurston County.
Wellhead Protection Area capture zones were delineated for each of the City's four wellfields using a groundwater flow model to simulate capture zones by Golder Associates Inc. in 2014. These zones are effective as of September 22, 2018 and were adopted under ordinance O2018-010.
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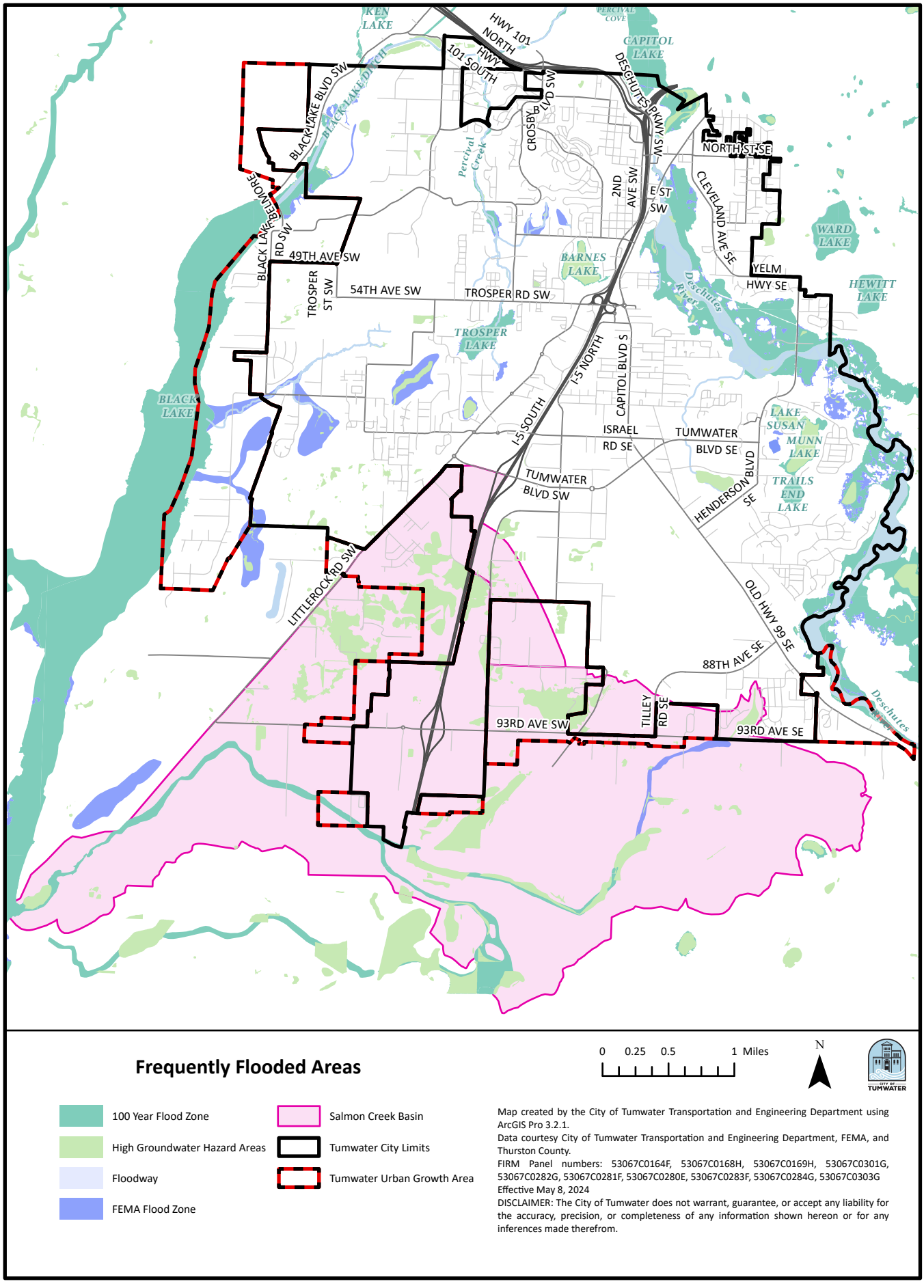
Map C-4



Frequently Flooded Areas

0 0.25 0.5 1 Miles

N

- 100 Year Flood Zone
- High Groundwater Hazard Areas
- Floodway
- FEMA Flood Zone
- Salmon Creek Basin
- Tumwater City Limits
- Tumwater Urban Growth Area

Map created by the City of Tumwater Transportation and Engineering Department using ArcGIS Pro 3.2.1.
Data courtesy City of Tumwater Transportation and Engineering Department, FEMA, and Thurston County.
FIRM Panel numbers: 53067C0164F, 53067C0168H, 53067C0169H, 53067C0301G, 53067C0282G, 53067C0281F, 53067C0280E, 53067C0283F, 53067C0284G, 53067C0303G
Effective May 8, 2024
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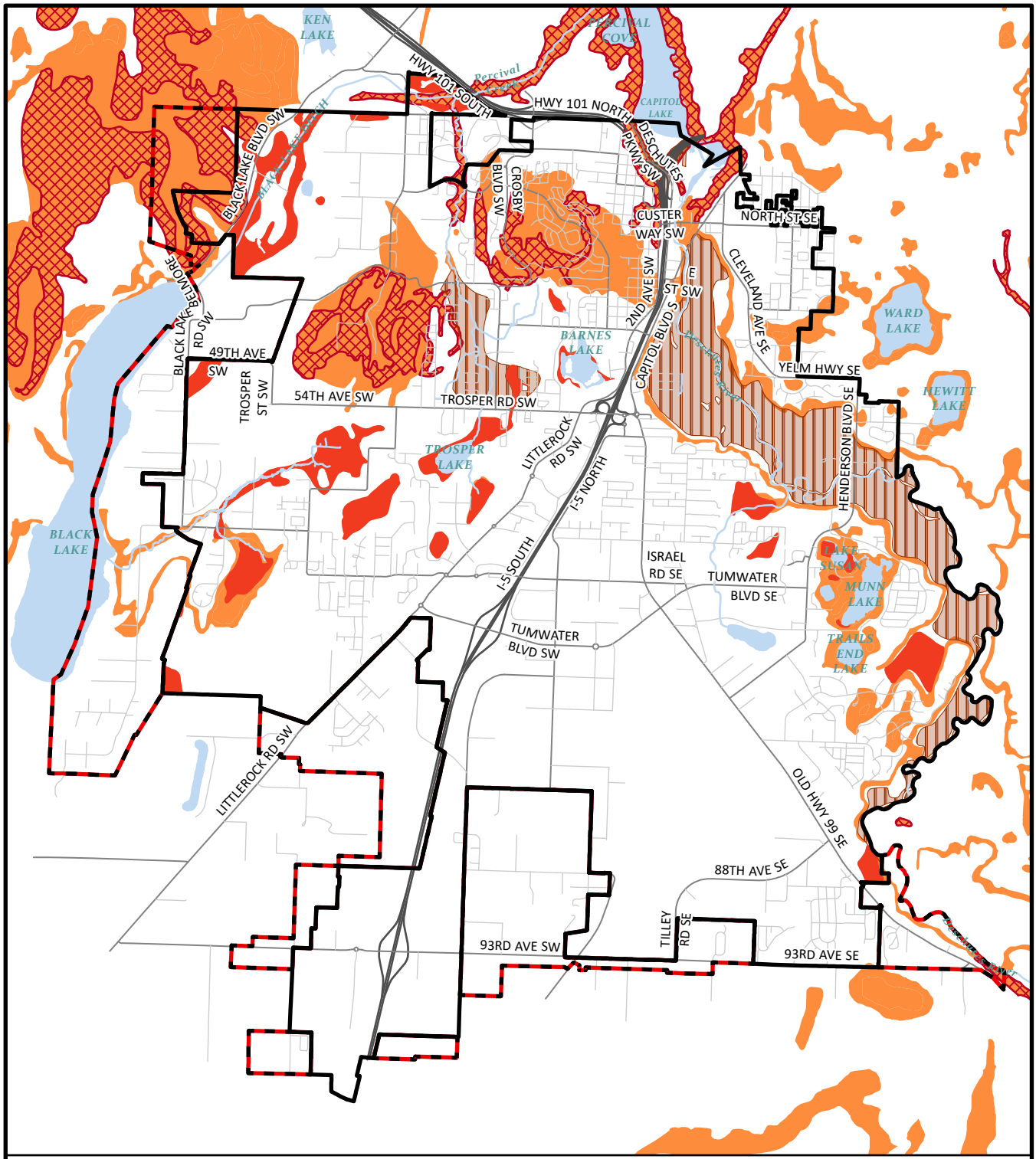
Map C-5



Geologically Hazardous Areas

N

- Peat
- High Liquefaction
- Landslide Hazard Areas
- Steep Slopes
- Tumwater City Limits
- Tumwater Urban Growth Area

0 0.25 0.5 1 Miles

Map created by the City of Tumwater Transportation and Engineering Department using ArcGIS Pro 3.2.1.
Data courtesy City of Tumwater Transportation and Engineering Department, Thurston County, and WA State Department of Natural Resources.
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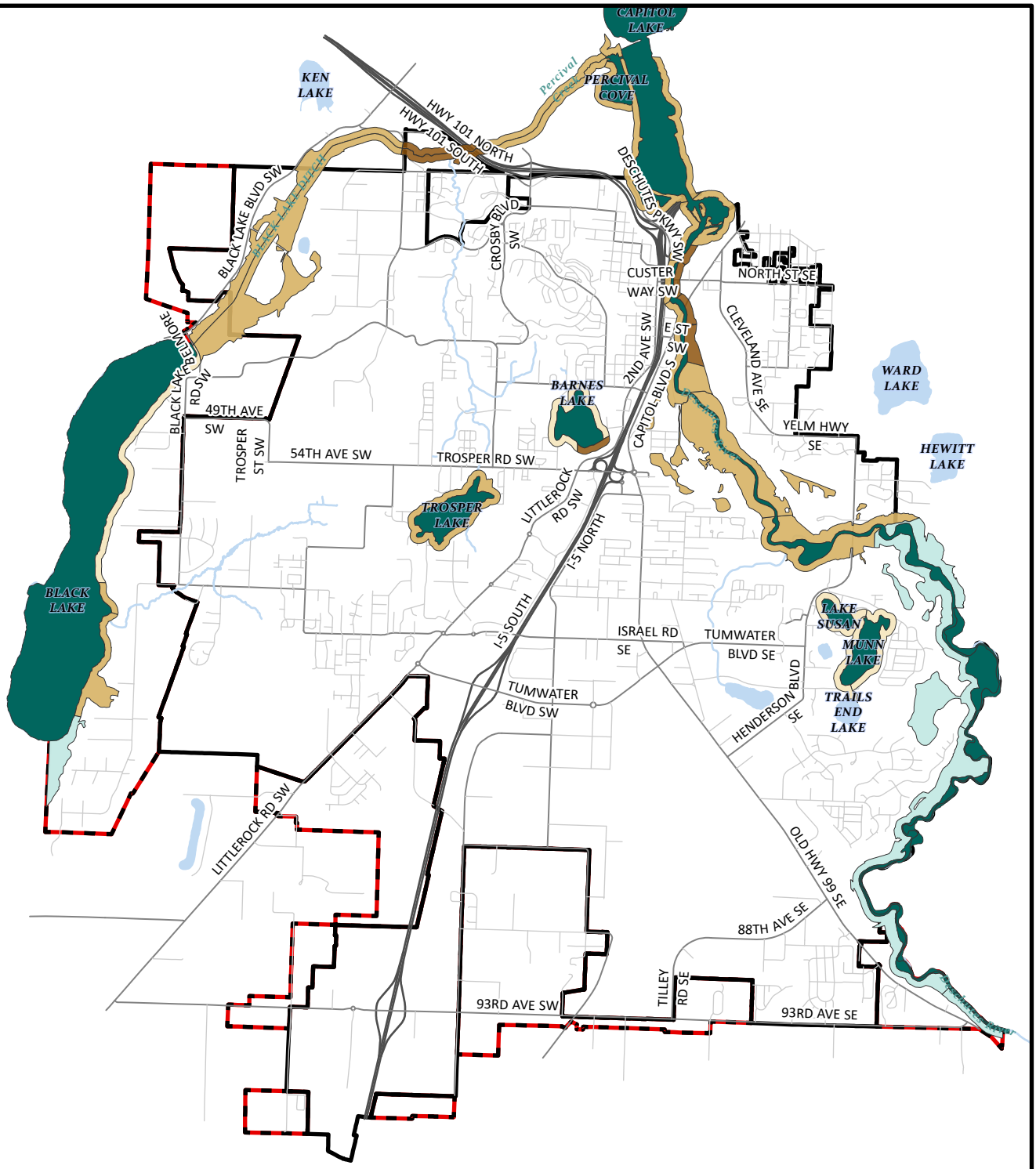
Map C-6



Shorelines of the State

N

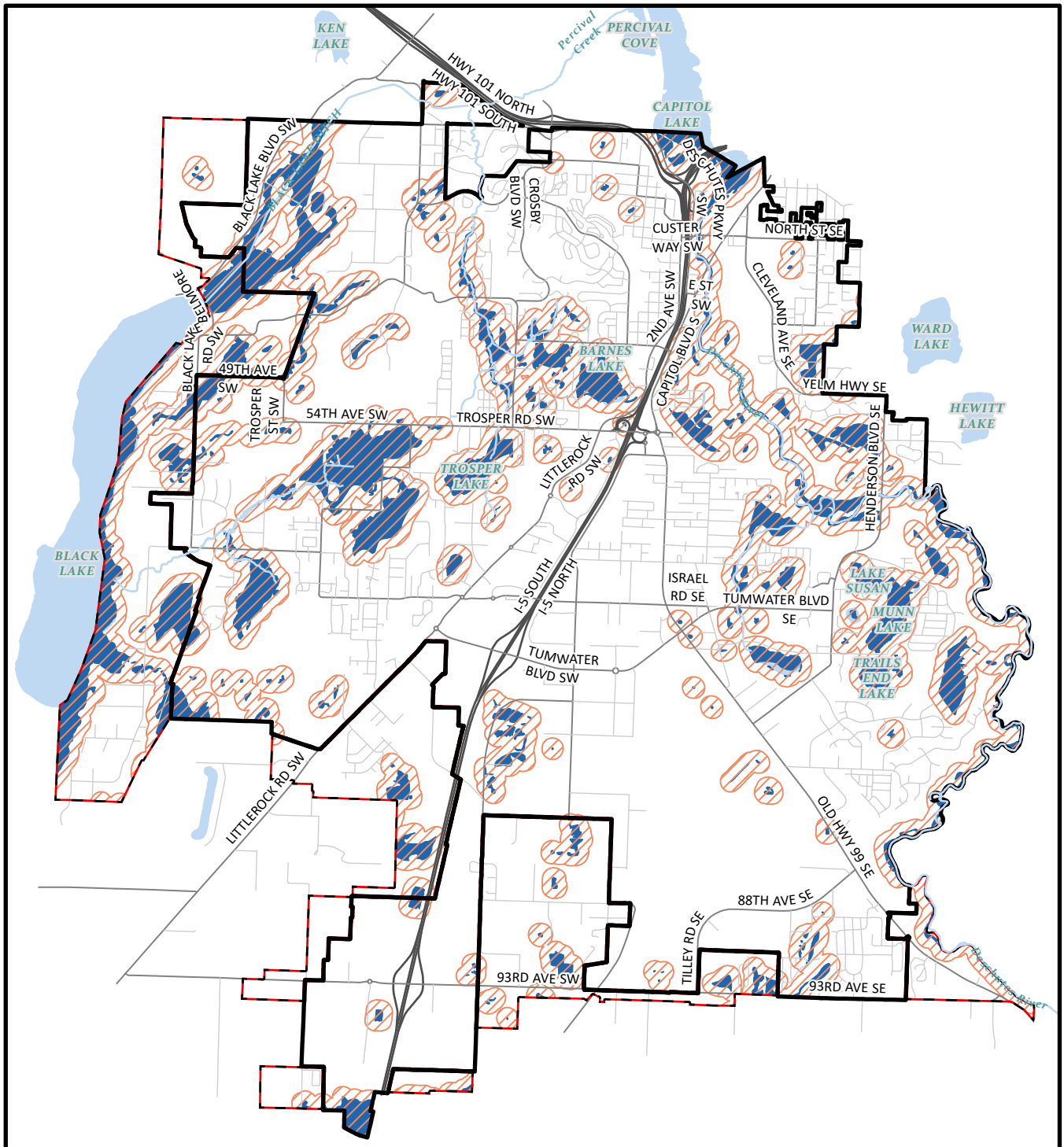
Tumwater Shoreline Designations

- Aquatic
- Natural
- Shoreline Residential
- Urban Conservancy
- Urban Intensity
- Tumwater City Limits
- Tumwater Urban Growth Area

0 0.25 0.5 1 Miles

Map created by the City of Tumwater Transportation and Engineering Department using ArcGIS Pro 3.2.1.
Data courtesy City of Tumwater Transportation and Engineering Department.
Shoreline designations are sourced from the Tumwater Shoreline Master Program, last amended in 2019.
DISCLAIMER: The City of Tumwater does not warrant, guarantee, or accept any liability for the accuracy, precision, or completeness of any information shown hereon or for any inferences made therefrom.

Map C-7



Wetlands

N

Wetlands

Wetland Review Areas

Tumwater City Limits

Tumwater Urban Growth Area

0 0.25 0.5 1 Miles

Map created by the City of Tumwater Transportation and Engineering Department using ArcGIS Pro 3.2.1.

Data courtesy City of Tumwater Transportation and Engineering Department and Thurston County.

Wetlands are a composite of new wetland standards and old wetland (pre-2017) delineations identified by the Thurston Regional Planning Council (TRPC) staff and the National Wetlands Inventory data. Edits to the data are made using verified wetland reports that have been submitted to and accepted by the Thurston County Community Planning and Economic Development Department. Last updated July 2, 2024.

Wetland Review Areas contains areas 300 feet around mapped wetland areas identified by TRPC, the National Wetlands Inventory, and wetland delineations from approved Thurston County permit applications.

DISCLAIMER: The City of Tumwater does not warrant, guarantee, or accept any liability for the accuracy, precision, or completeness of any information shown hereon or for any inferences made therefrom.