Enumclaw Comprehensive Plan

NATURAL ENVIRONMENT

DRAFT

CITY OF Enumclaw

6. NATURAL ENVIRONMENT + CLIMATE RESILIENCE

Purpose

This chapter identifies Enumclaw's environmental conditions and describes the link between the natural environment, climate resilience and the community's future. This element addresses protection of critical areas (wetlands, critical aquifer recharge areas, frequently flooded areas, geologically hazardous areas, and fish and wildlife habitat conservation areas) and resources of long-term significance (agricultural, forest, and mineral lands). The City believes these areas are valuable assets for the ecological balance they provide and for the aesthetics and quality of life expected by community residents.

The climate resilience sub-element is designed to help Enumclaw achieve its vision for a city that is resilient to climate hazards and to meet the planning goals of the Growth Management Act. Increasing resiliency involves strengthening the community and governance systems so that they can respond to and recover from disruption caused by climate hazard events.

State Planning Context

The Washington State Growth Management Act (GMA) requires all towns, cities, and counties adopt a comprehensive plan that includes goals and policies to protect and enhance the environment and to retain and enhance open space and recreational opportunities. These requirements are incorporated into the GMA as goal "(9) Open space and recreation. Retain open space and green space, enhance recreational opportunities, enhance fish and wildlife habitat, increase access to natural resource lands and water, and develop parks and recreation facilities" and goal "(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." In addition to goals and policies, the GMA requires cities to develop policies and regulations consistent with "Best Available Science" (BAS) to protect critical areas, which are defined as wetlands, critical aquifer recharge areas, frequently flooded areas, geologically hazardous areas, and fish and wildlife habitat conservation areas. Cities must also conserve natural resource lands (i.e., agricultural, forest, and mineral lands) of long-term commercial significance.

Resilience: The ability of a community, business or natural environment to adapt to changing conditions, such as those driven by a changing climate. Adaptation may include strategies to prevent, withstand, respond to and recover from a disruption or challenge.

Climate resiliency and greenhouse gas (GHG) mitigation are newly required components for comprehensive plans incorporated into the Growth Management Act (GMA) as Goal 14 and a new climate change and resiliency element under RCW 36.70A.070(9). Climate mitigation focuses on reducing emissions of greenhouse gases, and resiliency focuses on increasing a community's ability to adapt to the anticipated changes. RCW 36.70A.070(9) requires the climate change and resiliency element to include a greenhouse gas emissions reduction and a resiliency sub-element. The greenhouse gas reduction sub-element should include policies to reduce overall greenhouse gas emissions generated by transportation and

land use, result in reductions in per capita vehicle miles traveled and prioritize reductions that benefit overburdened communities. The resiliency sub-element must include goals and policies to identify, protect and enhance natural areas to increase resiliency, and address natural hazards created or aggravated by climate changes. Many GMA requirements indirectly address climate mitigation and resiliency, for example requirements that focus growth into urban growth areas and limit sprawl mitigate greenhouse gas emissions by reducing vehicle miles traveled.

Regional Planning Context

The City's comprehensive plan is required to be consistent with the King County Countywide Planning Policies (KCCPP) and Puget Sound Regional Council (PSRC) Vision 2050 and Regional Transportation Plan. Both contain policies addressing the natural environment, climate resilience and climate mitigation.

KING COUNTY COUNTYWIDE PLANNING POLICIES

The KCCPP include 32 natural environment policies focused on preservation and restoration of critical areas and ecosystems; flood hazard reduction; preserving open space and habitat corridors; equitable provision of parks, trails and open space; environmental justice; climate resilience and mitigation. Many policies focus on pollution prevention and protection and restoration of ecosystems, habitat, and open space.

The KCCPP include climate mitigation policies that promote development patterns that minimize air pollution and greenhouse gas emissions, support mass transit, and facilitate modes of travel other than single occupancy vehicles by directing growth into urban centers. Additionally, the KCCPP encourages energy saving practices in infrastructure and construction, as well as carbon sequestration, through the protection of natural resource lands and sustainable energy sources. It is King County's policy to implement policies and programs to reduce countywide sources of greenhouse gas emissions by 95% below 2007 levels by the year 2050.

VISION 2050 MULTICOUNTY PLANNING POLICIES

The Vision 2050 Multicounty Planning Policies (MPP) include 22 environment policies to protect and restore air and water quality, soils, and natural systems to ensure the health and wellbeing of people, wildlife, and plants. Policies support use of BAS, protection of critical areas and ecosystems, pollution reductions, environmental equity, identification and protection of open space and habitat corridors, and preservation and enhancement of the native vegetation and the urban forest canopy.

Adaptation: The process of adjusting to new (climate) conditions in order to reduce risks to valued assets.

Vision 2050 also includes 12 climate change policies (MPP-CC-1 through 12) with mitigation and adaptation measures to reduce greenhouse gas emissions and promote climate adaptation. Mitigation policies include energy use reduction via conservation, building retrofit, alternative energy sources, energy management technology; and reducing vehicle miles traveled by prioritizing transportation investments and increasing alternatives to driving alone. Adaptation policies

include advancing state, regional and local actions to support resilience and adaptation, addressing impacts to vulnerable populations and areas disproportionately affected by climate change, identifying, and addressing the impact of climate change on the region's hydrological systems, and addressing rising seawater. The MPCC mitigation goal is to implement the Puget Sound Clean Air Agency greenhouse gas reduction goal of 80% reduction below 1990 levels by 2050).

Local Planning Context

Enumclaw is located on the relatively flat Enumclaw Plateau between the Green and White Rivers in the shadow of Mount Rainier and the Cascade Mountains. The City has an agricultural past and is surrounded by agricultural resource lands to the north, west and south, and bounded by forest resource lands to the east. Newaukum and Boise Creek riparian areas and their tributaries, floodplains, wetlands, and habitat are the primary critical areas present within the City. These resources within the City provide habitat for fish and wildlife, including elk, Chinook, steelhead, Pink salmon, Coho and bull trout. The rural, agricultural, and natural environment surrounding the City is a valued community asset.

City efforts to plan for the natural environment include a critical area ordinance (CAO) which identifies and protects critical areas and includes a climate vulnerability assessment to inform climate resilience policies and strategies. The climate vulnerability assessment identified priority climate hazards likely to impact community assets, the extent to which assets are likely to be impacted and identified policies to increase community resilience to the expected hazards. The City's planning efforts are focused on adaptation and resilience at the local level since greenhouse gas mitigation has been extensively addressed by state, county and regional transportation and land use policies which require land use patterns that reduce greenhouse gas emissions and by the Washington State Energy Code (WAC 51-11C and -11R) which requires energy conservation measures to be incorporated into new buildings.

Introduction

Enumclaw's residents perceive their community as set in a rural place with immediate access to the surrounding fields and undeveloped forest areas. Preservation and continued support of the surrounding natural environment is a vital aspect of the community. A healthy natural environment offers benefits to the community related to health, economics, and safety. Quality of life is enhanced through environmental stewardship by providing:

- Improved air and water quality
- Protection from naturally occurring events such as flooding and landslides
- Opportunities for recreational activities
- Preserved open spaces
- Critical fish and wildlife habitat
- Enhanced community resilience
- Unmeasured social and ecological benefits
- A sense of community pride and well-being

Goals and Policies

NATURAL ENVIRONMENT

Goal NE-1: Maintain open space networks within the City including wildlife habitat corridors, stormwater management, trails, and critical areas.

Policy NE-1.1 Increase public awareness of the City's open space system.

A. *Consider a program for education of natural systems and the open spaces of the City.*
B. *Standardize signing and other visual components typical in park development for critical areas.*
C. *New Ensure that signage and other educational components are designed to be accessible to vulnerable, historically underserved, or marginalized members of the community.*

Policy NE-1.2 Encourage corridor development for pedestrian and wildlife routes.

A. *Keep the City's Parks and Recreation Plan comprehensive and updated, outlining current and future requirements for open space.*
B. *Provide incentives for encouraging habitat restoration and corridors with new development as practicable.*

Policy NE-1.3 New Evaluate proposed open space corridors and improvements to ensure that they are equitably distributed throughout the community and prioritize new improvements and corridors in areas that are underserved.

Goal NE-2: Use the community's existing and future natural open space in a manner that preserves the ecological processes of the natural environment, preserves the rural character of the City, and maximizes recreational benefits

Policy NE-2.1 Enhance all City parks and recreational facilities and programs with ecological process education.

A. *Consider as necessary municipal ordinances and development regulations to allow and encourage private and/or public-private partnerships where critical areas are protected.*
B. *Maintain land use regulations that include provisions for setting aside land for park and recreation and natural/critical areas with new development.*

Goal NE-3: Protect people, property, and environment in areas of natural hazards.

Policy NE-3.1 Protect existing flood storage and conveyance functions and ecological values of frequently flooded areas (100-year floodplain).

Policy NE-3.2 Development within the 100-year floodplain should be designed to minimize risk to people, property, and the environment.

Policy NE-3.3 Avoid placing hazardous land uses and essential public facilities in the 500 year flood plain to increase their climate resiliency.

Revised Policy NE-3.4 Avoid potential impacts to life and property by limiting land disturbance and development in landslide hazard and steep slope areas.

New Policy NE-3.5 Plan for buildings, facilities, utilities, and infrastructure to avoid or withstand natural hazards resulting from future climate conditions.

New goals and policies Goal NE-5: In accordance with the GMA, designate and protect critical areas including wetlands, critical aquifer recharge areas, fish and wildlife habitat conservation areas, frequently flooded areas, and geologically hazardous areas to protect community health, safety and general welfare.

Policy NE-5.1 Use Best Available Science (BAS) to preserve and enhance the functions and values of critical areas through policies, regulations, programs and incentives.

Policy NE- 5.2 Regularly evaluate and update the Critical Area Ordinance (CAO) to incorporate BAS as necessary.

Policy NE- 5.3 Allow reasonable use of private property that reflects appropriate avoidance and minimization measures and provides mitigation that protects people, property, and ecosystems.

Policy NE-5.4 Consider allowing alterations to critical areas as needed to allow public agency or utility development projects that avoid, minimize, and mitigate impacts to the maximum extent feasible.

Revised Goal NE - 6 Protect ecosystems and maintain the ecological functions of wetlands, riparian areas and fish and wildlife habitat.

Policy NE-6.1 Maintain and preserve the quantity and quality of wetlands, riparian areas and fish and wildlife habitat within the City by avoiding impacts and requiring mitigation when avoidance is not feasible.

Policy NE-6.2 To the extent feasible ensure that development adjacent to wetlands, riparian areas and fish and wildlife habitat is sited and designed to protect ecosystem functions and avoid impacts.

Policy NE-6.3 When avoiding impacts is not feasible, safeguard the ecosystem function and value of the wetlands and riparian areas through effective mitigation or wetland mitigation banking.

Policy NE-6.4 In cases of small isolated, low-quality wetlands, consider opportunities for development flexibility, provided that mitigation can be provided to ensure no cumulative impacts to wetland quality and function.

Policy NE-6.5 Consider adopting incentives to encourage the restoration of wetlands, riparian areas and fish and wildlife habitat.

New Policy NE-6.6 Protect and restore riparian vegetation to reduce erosion and flooding, provide shade and support other functions that improve the resilience of fish and wildlife, wetlands and riparian areas to climate change.

New Policy NE-6.7 Prevent the spread and establishment of invasive plant species to enhance the climate resilience of native plant communities.

Goal NE-6: Maintain and protect surface water and groundwater resources that serve the community and enhance the quality of life.

Policy NE-6.1 *Use incentives, regulations, and programs to manage all water resources and to protect and enhance their multiple beneficial uses – including fish and wildlife habitat, flood and erosion control, water quality control and sediment transport, water supply, scenic beauty, and recreational opportunities.*

Policy NE-6.2 *Control stormwater run-off rates, volumes, and water quality from all new development and redevelopment to protect water quality, wetlands, natural drainage features, and as necessary to protect against community hazard.*

Policy NE-6.3 *Support enhancement of water quality through corrective and preventative methods including best management practices (BMPs), education, planning, regulation, enforcement, incentives.*

Revised Policy NE-6.4 *Consider development regulations that incentivize the enhancement of habitat function and appearance of storm retention and detention ponds.*

Policy NE-6.5 *Maintain stormwater ponds and other man-made surface water features for public safety and environmental function to the extent feasible.*

New Policy NE 6.6 Minimize, and where feasible, eliminate the release of substances into the water, soil and groundwater that degrade the quality of these resources.

Goal NE-7: Ensure that land use and development within shoreline areas is consistent with and implements the City's adopted Shoreline Master Program.

Policy NE-7.1 *Review all development within shoreline jurisdiction for compliance with the City's adopted Shoreline Master Program.*

Policy NE-7.2 *Evaluate and update the City's Shoreline Master Program consistent with State mandated review cycles.*

Goal NE-8: Preserve and protect artifacts, historic, and culturally significant sites within the City.

Policy NE-8.1 *The City will coordinate with local tribes and the State Department of Archaeology and Historic Preservation (DAHP) on development issues related to potential archaeological sites.*

New Policy NE-8.2 *Coordinate with DAHP and tribal partners during the pre-application process to determine if cultural resource report is necessary.*

New Policy NE-8.3 *The City will require a cultural resource report for development proposed in or near a known or suspected archaeological sites and for sites with a high probability for containing archaeological resources based on information provided by tribal partners or DAHP.*

New Policy NE-8.4 *Require cultural resource reports to be prepared by a professional archaeologist who meets the Secretary of the Interior's Professional Qualification Standards and State Law.*

New Policy NE-8.5 *Cultural resource reports, when required should be prepared in accordance with Washington State Standards for Cultural Resource Reporting.*

Goal NE-9: Encourage low-impact development techniques that can reduce consumption of resources and improve public health and safety.

Policy NE-9.1 *Encourage green building techniques, such as LEED, Built Green, and Energy Star for all construction.*

Policy NE-9.2 *Encourage, where feasible, low impact development techniques that include pervious paving, bioretention swales and other green building techniques.*

ALL NEW CLIMATE RESILIENCE AND GREENHOUSE GAS REDUCTION

Goal NE-10: Foster community-wide resilience by promoting disaster preparedness, public awareness and supporting vulnerable community members.

Policy NE-10.1 *Promote development of a community-wide emergency management plan that addresses hazards to support a sustainable recovery after a disaster.*

Policy NE-10.2 *Develop resilience hubs - community serving facilities augmented to support residents and coordinate resource distribution and services before, during and after a hazard event.*

Policy NE-10.3 *Coordinate with emergency management providers to develop notification alerts within the community to reduce risk of exposure to hazards such as wildfire smoke and particulate matter.*

Policy NE-10.4 *Continue support for vulnerable community members through the Human Services Advisory Board.*

Policy NE-10.5 *Ensure that emergency management and disaster recovery efforts are equitable and inclusive by developing outreach methods and notification materials designed to assist vulnerable, historically underserved, or marginalized community members.*

Policy NE-10.6 *Support Puget Sound Energy maintenance and operational improvements to the power grid serving the City that increase resilience of the system to hazards and ensure sufficient service capacity to address hazard events.*

Goal NE-11: Promote climate resilient site and building design.

Policy NE-11.1 *Promote fire prevention practices such as use of fire resistive building materials and controlling flammable brush and debris.*

Policy NE-11.2 *Promote use of native drought and pest-resistant trees, shrubs and grasses in landscape areas, parks and riparian areas by updating tree species selection and planting guidance.*

Policy NE-11.3 *Encourage efforts to generate and store renewable electricity on site, which can provide backup power during emergencies and help ensure continuity of operations.*

Policy NE-11.4 *Encourage exterior building features such as awnings and cool roofs that reduce the impacts of heat events and increase resilience.*

Policy NE-11.5 *Evaluate adequacy of stormwater system design requirements to handle hydrologic effects of climate impacts.*

Goal NE-12: Update the urban forestry program to promote carbon storage, moderate temperature, improve air quality and increase forest resiliency.

Policy NE-12.1 Manage tree canopy in streets, parks and to reduce risks from severe wildfires, protect residents, and improve ecosystem health and habitat.

Policy NE-12.2 Promote preservation and increase of tree canopy cover, especially in parking lots, to increase summer cooling and improve air quality.

Policy NE-12.3 Consider developing an urban forestry program to address drought resistant species, preservation of significant trees and increase canopy.

Policy NE-12.4 Consider conducting a tree inventory and canopy assessment to better manage street and park trees and evaluate equitable distribution of tree canopy throughout the community.

Policy NE-12.5 Prioritize new or added canopy and street trees in areas that are underserved.

Goal NE-13: Promote the reduction of greenhouse gases by expanding the use of conservation and alternative energy sources and by reducing vehicle miles traveled by increasing alternatives to driving alone.

Policy NE-13.1 Ensure that City facilities and operations contribute to emission reductions by continuing to implement the city's Green House Gas emission policy in Resolution No. 1399 or here after amended (see appendices).

Policy NE- 13.2 Evaluate the feasibility of including electric vehicle (EV) support infrastructure when city facilities are constructed, upgraded or remodeled.

Policy NE- 13.3 Evaluate development regulations to ensure that they allow for on-site generation of energy from alternative energy such as solar.

Policy NE- 13.4 Evaluate city capital projects for the feasibility of including elements supporting non-motorized transportation. Supporting elements may range from sidewalks and bicycle lanes on streets to support facilities such as bicycle racks, showers and changing rooms at city facilities.

Policy NE- 13.5 Encourage and facilitate, where possible, installation of energy efficient appliances and retrofit of older homes to conserve energy.

Policy NE- 13.6 Evaluate and consider the feasibility of designating carpool parking areas, including possible park and rides, within city owned parking lots to encourage carpooling as an alternative to driving alone.

Policy NE- 13.7 Increase public awareness of the availability of food waste composting services provided by the Public Works solid waste division.

Policy NE- 13.8 Encourage city operations to implement commute trip reduction measures such as alternative work schedules and remote work options where feasible.

Existing Natural Environmental Characteristics

The City of Enumclaw is located within the Puget Lowlands and Cascades ecoregions which means its geomorphology includes floodplains and terraces as well as rolling moraines and foothills. The City sits on the Enumclaw Plateau (approximately 750 feet above sea level) which was formed by a volcanic mudflow from Mount Rainier around 5,700 years ago. Enumclaw maintains a pastoral setting located between the plateau farmlands and the Cascade Mountains and Mount Rainier to the east and southeast. The White River defines Enumclaw's southern boundary. Newaukum Creek and Boise Creek (both considered "Shorelines of the State") flow along the City's northwesterly and southwesterly Urban Growth Area (UGA) boundary, respectively. Both waterbodies originate in the Cascade foothills above the Enumclaw plateau.

Enumclaw is underlain by the Buckley-Alderwood soil association, which consists of poorly drained and moderately well drained soils. These soils are nearly level to rolling and have dense, slowly permeable, and very slowly permeable glacial till. Soils this association include: Alderwood gravelly sandy loam; Buckley silt loam; Alderwood-Kitsap soil; Beausite gravelly, sandy loam; Ovall gravelly loam; and Pilchuck loamy fine sand (NRCS 1973). These soils may experience severe to very severe erosion hazard. In the White River Basin, soils formed on mudflow deposits (Mount Rainier Osceola Mudflow) are poorly drained and have a slow permeability. Per Washington's Department of Ecology (Ecology), these mudflow deposits have created an aquitard that confines the underlying aquifer and perches water tables in the overlying aquifers. Water moves laterally along the top of the contact until it intercepts a stream channel after initial infiltration.

These attributes generally represent Enumclaw's natural environment. The combination of the community's topography and surface water behavior increases its environmental susceptibility, which is why it is important to identify and designate critical areas; for both preservation and protection.

SHORELINES

The Washington State Shoreline Management Act (SMA) was adopted in 1972 to "prevent the inherent harm in an uncoordinated and piecemeal development of the state's shorelines. The SMA required jurisdictions to develop shoreline master programs (SMP) for areas with significant shorelines. Washington state, in partnership with Ecology requires cities with areas designated as "Shorelines of the State" to update their SMPs in accordance with the SMA. Under the Growth Management Act (GMA) a community's shoreline master program goals and policies are considered part of the Comprehensive Plan.

The City of Enumclaw adopted its first Shoreline Master Program (SMP) via Ordinance 2509 in June of 2012 and updated in August 2019 (Ordinance No. 2665). The SMP implements the requirements of the Washington State Shoreline Management Act (SMA) (RCW 90.58) within the City of Enumclaw. The SMP contains goals, policies and regulations that address shoreline use, environmental protection of shoreline areas and public access to areas within shoreline jurisdiction. Shoreline jurisdiction is mapped in the SMP. The goals and policies in the City's SMP as adopted by Ordinance No. 2665, or as subsequently amended, are hereby incorporated by reference as an element of this Comprehensive Plan.

CRITICAL AREAS

In 1995, an amendment to the Washington State Growth Management Act (GMA) (as detailed in Revised Code of Washington (RCW) 30.70A.172) mandated that cities shall utilize "Best Available Science" when developing policies and regulations to protect critical areas and give "special consideration" to "measures necessary to preserve or enhance anadromous fisheries." Critical areas need special consideration during the comprehensive planning process because of their distinctive environmental characteristics. These areas are considered critical because their natural state often has unique, fragile, and valuable environmental and ecological processes or resources that are vulnerable to development and other human influences.

The GMA identifies five critical areas:

- Wetlands
- Critical Aquifer Recharge Areas
- Frequently Flooded Areas
- Geologically Hazardous Areas
- Fish and Wildlife Habitat Conservation Areas

Preserving and protecting critical areas from negative impacts of development enhances the public health, safety, and welfare and protects private property from natural disasters, such as flooding and landslides. Enumclaw has development regulations requiring that certain precautions be followed during development adjacent or within critical areas. The regulations require special review before any critical area can be altered, requiring that there be no net loss to the critical area's ecological function. Site-specific situations may not allow for permit alteration or development to occur at all.

WETLANDS

Wetlands are those areas inundated or saturated by ground or surface water at a frequency and duration sufficient to support (and during normal conditions do support) a prevalence of vegetation typically adapted for life in saturated soil conditions. Where the vegetation was removed or altered, a wetland can be determined by presence or evidence of hydric or organic soil, or by documentation of previous wetland vegetation. Wetlands function at both a landscape and site scale to improve water quality, flood storage, and serve as valuable habitat for plants and animals (Shelton et al 2005). These functions are particularly valuable in urban settings, though urbanization has the potential to stress and degrade wetland systems.

Wetland buffers are vegetated areas directly adjacent to wetlands. These buffers can reduce the impacts to wetlands from adjacent land uses through physical, chemical, and/or biological processes (Hruby 2013). Buffers also offer terrestrial habitat for species that are primarily aquatic but require terrestrial environments for their survival, such as amphibians. Requiring specific buffer widths is one of the methods employed by local jurisdictions to preserve the functions and values of wetlands.

Exhibit NE-1 identifies potential wetlands surrounding and within the City. Wetlands may be identified and delineated beyond the mapped inventory. All wetlands are regulated by the Enumclaw CAO or the SMP which also include development standards.

CRITICAL AQUIFER RECHARGE AREAS

Aquifers are areas below the earth's surface that store and/or have the potential to store ground water. Critical aquifer recharge areas are intended to protect groundwater that serves as a supply for drinking water and freshwater for streams, lakes, estuaries, wetlands, and springs, as well as the ecosystems that these resources support.

Aquifers occur as either confined or unconfined sources of ground water. An unconfined aquifer is able to receive water that infiltrates the ground surface, while a confined aquifer is located deeper underground and is separated from the surface by an aquitard or aquiclude. This separation, often the result of impermeable materials such as clay or bedrock, inhibits the infiltration of groundwater into the aquifer. Much of the Enumclaw area has an unconfined aquifer over another confined aquifer because the Osceola mudflow is impervious. This creates a high-water table (i.e., unconfined aquifer) near the surface.

Aquifer recharge occurs when precipitation, infiltration from water bodies (such as lakes, wetlands, streams, irrigation, etc.), and/or snowmelt seeps into the ground. Generally, shallow unconfined aquifers (usually overlying confined aquifers) are recharged as unobstructed water moves downward from the surface. Contrastingly, discharge areas are locations where groundwater intersects the ground surface and flows out through sources such as wetlands, streams, lakes, estuaries, or ocean shores. Wells, particularly those employed by municipalities to extract larger volumes of water, can function as discharge areas.

The vulnerability of an aquifer is based on its susceptibility to contamination and the quantity of contaminants present. An aquifer's susceptibility relates to the ease of which water can infiltrate from the surface into the aquifer. Aquifer protection is essential to community, public health, and safety. Once groundwater is contaminated it becomes difficult and costly, if not impossible, to clean up. Exhibit NE-2 shows Wellhead protection zones and identifies potential aquifer recharge areas.

FREQUENTLY FLOODED AREAS

Frequently flooded are floodplains and flood prone areas which are subject to a one percent or greater chance of flooding in any given year. Frequently flooded areas include, but are not limited to, streams, rivers, lakes, coastal areas, wetlands, and areas where high groundwater forms ponds on the ground surface.

Flooding is a naturally occurring process that leads to the formation of floodplains. Floodplains provide numerous valuable functions including flood storage, flood conveyance, reduction of excessive erosion, reduction of sediment deposition into waterbodies, groundwater recharge and discharge, interception and treatment pollutants, fish, wildlife, and plant habitat, carbon sequestration, micro-climate modification, and they can provide recreational and educational opportunities. While frequently flooded areas benefit the

community, as well fish and wildlife in terms of habitat, they can also pose a potential risk to public safety. Frequently flooded areas are based on the mapped Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps (FIRM), catalogued by King County GIS.

GEOLOGICALLY HAZARDOUS AREAS

Geologically hazardous areas are areas where the potential for erosion, landslides, earthquakes, or other geological events make them unsuitable for locating development in alignment with public health and safety considerations. Three of the geologically hazardous areas listed in WAC 365-190-120 are present within the City of Enumclaw: erosion hazard areas, landslide hazard areas and seismic hazard areas. See Exhibit NE-3. Volcanic hazard areas and mine hazard areas are not present within the City boundary or urban growth area.

EROSION HAZARD AREAS

All soils and bare rock surfaces are subject to the natural erosive forces of chemical weathering, and physical erosion. Erosion is the natural process of wearing away the land as a result of water and wind. Wind erosion occurs when the wind blows exposed soils, resulting from excavation and construction activities, farming activities, and any other activities where vegetative cover has been removed, leaving the soil exposed. Severe and very severe erosion hazard in Enumclaw are correlated to certain soil types including: Alderwood gravelly, Sandy loam; Alderwood-Kitsap soil; Beausite gravelly, Sandy loam; Ovall Gravelly loam; and Pilchuck loamy fine sand. Within the City of Enumclaw, erosion hazard areas are most likely to occur within riverine environments, where erosion is usually related to the channel migration zone. Channel migration zones are where a stream or river is expected to move naturally over time, within the floodplain.

LANDSLIDE HAZARD AREAS

Landslides encompass a variety of processes that involve the downward and outward movement (i.e., sliding, toppling, falling, or spreading) of materials that compose slopes. Three landslide types are common within the Puget Sound region and include rapid-shallow landslides, block fall landslides, and deep-seated landslides. The most common type of landslide in this region is the rapid-shallow landslide, which usually occur in response to heavy rainfall. Slope stability is dependent on the interaction of many factors, including soils, climate, slope of underlying geologic material, vegetative cover, proximity to surface water, ground water content, and proximity to earthquake fault activity. When one or more of these factors is altered, unstable slope conditions may occur, and when these factors are altered by development activity, landslide potential is increased, even in historically stable areas. Soils listed in the King County soil survey that have severe building limitations are also considered landslide hazard areas.

SEISMIC HAZARD AREAS

Seismic hazard areas as those areas "subject to severe risk of damage as a result of earthquake induced ground shaking, slope failure, settlement or subsidence, soil liquefaction, surface faulting, debris flows, lahars, or tsunamis" per WAC 365-190-030(18)

and 190-120(7). Areas with the greatest risks associated with seismic activity (including settlement and soil liquefaction) are underlain by low density, cohesionless soils, and usually associated with a shallow groundwater table. Seismic activity can cause direct and indirect damage through ground shaking, surface faulting, subsidence and uplift, ground failure, landslides, liquefaction, differential compaction, and water waves The Puget Sound region is seismically active and with its soils of unconsolidated glacial and alluvial deposits, is highly susceptible to earthquake damage. The U.S. Geological Survey (USGS) identifies four seismic risk zones in the U.S. with the Puget Sound Basin classified in Zone 3 (major earthquake frequency and damage). Enumclaw is in a local subzone of the USGS Zone 3.

VOLCANIC AND MINE HAZARD AREAS

Enumclaw's risk from volcanic activity is not high, according to the USGS Preliminary Assessment of Potential Hazards from Future Volcanic Eruptions in Washington map and Washington Geological Survey's Washington Geologic Information Portal. The community is near a zone of "Low Risk" lahar (clay-rich mudflow) from Mt. Rainier running along the White river. The City is also in the "Low to High" tephra- hazard zone for Mt. St. Helens of 5-35 centimeters. There are no mapped volcanic hazards within the city boundary or urban growth area.

There are no mapped mine hazard areas within the City of Enumclaw.

FISH AND WILDLIFE HABITAT CONSERVATION AREAS

Fish and wildlife habitat conservation areas (FWHCAs) include both terrestrial and aquatic habitats that support the survival of specific fish and wildlife. FWHCAs include areas that endangered, threatened and sensitive species primary association areas, Washington Department of Fish and Wildlife (WDFW) priority habitats and species association areas, naturally occurring ponds under 20 acres with submerged aquatic beds that provide fish or wildlife habitat, waters planted with game fish, and riparian areas and buffers.

As habitat loss poses the greatest threat to many endangered, threatened, rare, and sensitive species, the protection of FWHCAs is critical. To protect this habitat, efforts must be taken to preserve existing habitat corridors, establish new ones, minimize fragmentation to habitat patches, and minimize edge effects where development adjoins habitat areas. Habitat quality, including water quality necessary to support salmonids, must also be preserved and enhanced.

Habitats and species mapped in and around the City include:

- Priority species Rocky Mountain elk (*Cervus elaphus nelson*) and elk (*Cervus elaphus*) (identified as Green/Cedar river winter elk range and White River elk range, respectively) (WDFW n.d.).
- Salmonid species including bull trout, steelhead, Chinook, Coho, chum and pink;
- Waterfowl (including dabbling ducks, geese, and swans); and
- Endangered, threatened, and sensitive species including the gray wolf, Marbled Murrelet, Streaked Horned Lark, Yellow-billed cuckoo, bull trout, steelhead, Chinook, Coho, and monarch butterfly.

NATURAL RESOURCE LANDS

Natural resource lands play a vital role in the region. Resource lands are distributed among three categories: agricultural lands, forest lands, and mineral resource lands. The State requires lands with commercial significance to be protected and conserved.

AGRICULTURAL RESOURCE LANDS

Agricultural resource lands are those lands not already characterized by urban growth and are of long-term significance for the commercial production of horticultural, viticulture, floricultural, dairy, apiary, vegetable, and animal products, or the food and fiber for the consumption of livestock, or other products and processes normally associated with farming.

Agricultural activity near Enumclaw is distributed on the land to the west, north, and south. Land within the city limits and the UGA is fertile but has given way to urban or suburban use. The agricultural lands surrounding the UGA are socially and culturally important to the community and should be preserved for their long-term economic and cultural significance.

FOREST RESOURCE LANDS

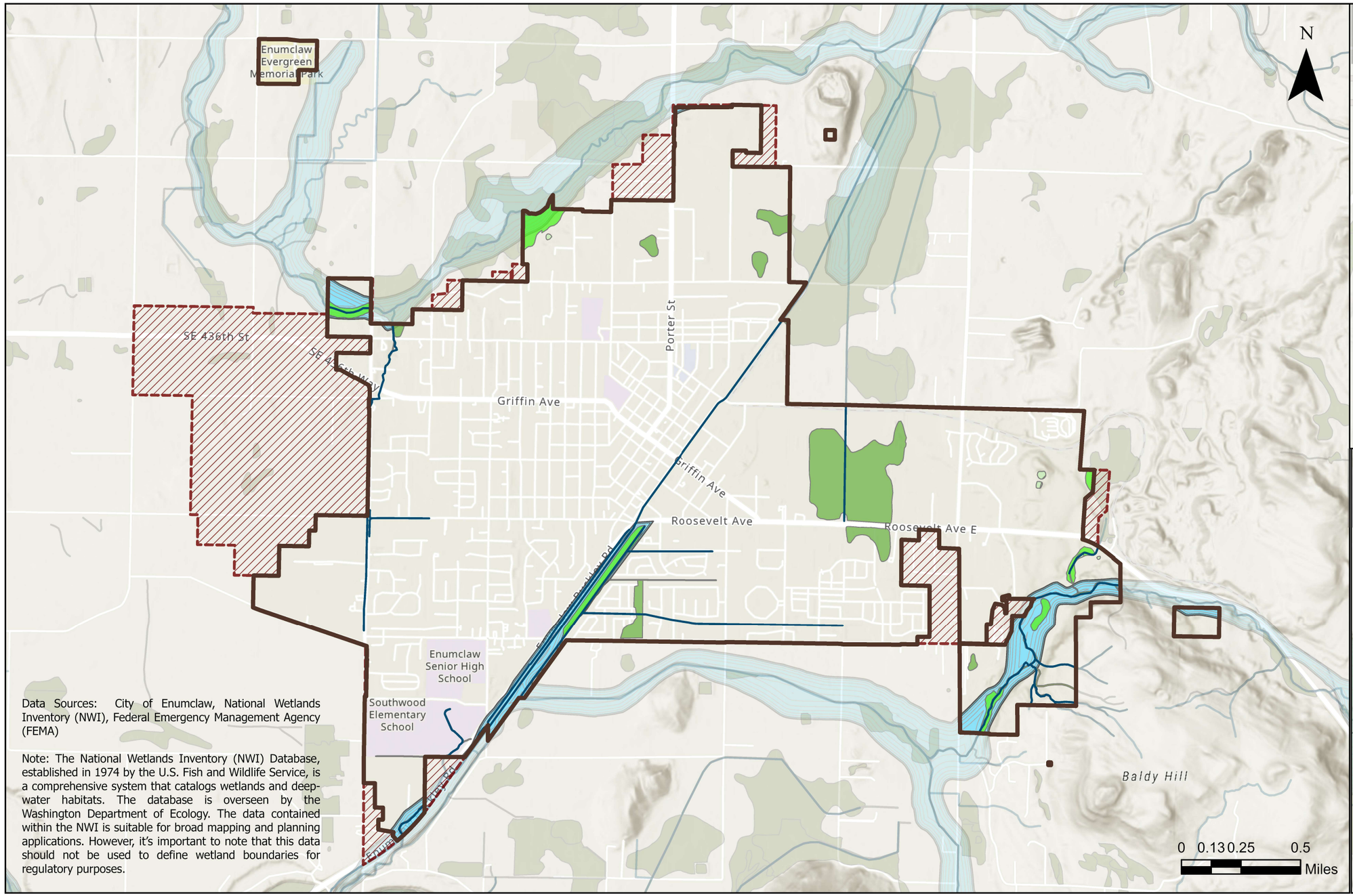
Forest resource lands are those lands not already characterized by urban growth and are of long- term significance for the commercial production of timber and other wood fiber normally associated with forestry practices. The City of Enumclaw does not have commercially viable forestlands within its boundaries, but to the east are vast tracts of timber lands.

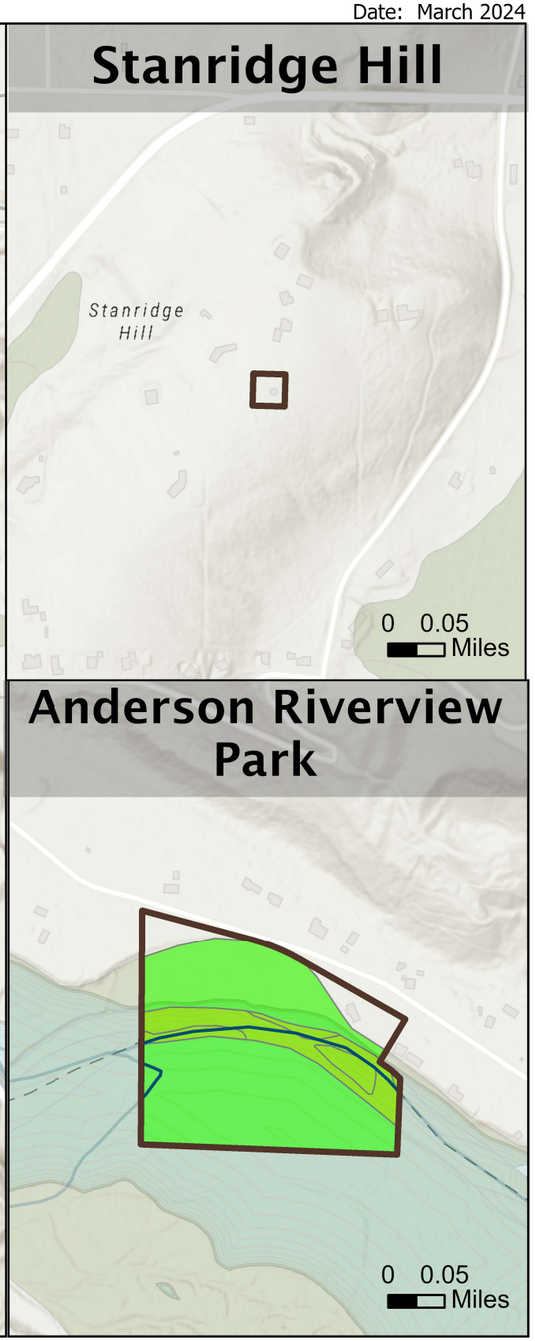
MINERAL RESOURCE LANDS

Mineral resource lands are those lands not already characterized by urban growth and are of long-term significance for the production or extraction of aggregate and other mineral substances, including sand, gravel, and other valuable metals. Careful consideration in addressing mining operations is needed so that adjacent land uses are not severely impacted. It is also important to consider the value of new mineral extraction, as well as alternative land uses in and adjacent to mining areas. There are no mining activities with long-term commercial significance in Enumclaw.

EXHIBIT NE-1 Floodplain, Streams, and Wetlands

Date: March 2024





Data Sources: City of Enumclaw, National Wetlands Inventory (NWI), Federal Emergency Management Agency (FEMA)

Note: The National Wetlands Inventory (NWI) Database, established in 1974 by the U.S. Fish and Wildlife Service, is a comprehensive system that catalogs wetlands and deep-water habitats. The database is overseen by the Washington Department of Ecology. The data contained within the NWI is suitable for broad mapping and planning applications. However, it's important to note that this data should not be used to define wetland boundaries for regulatory purposes.

CITY OF Enumclaw

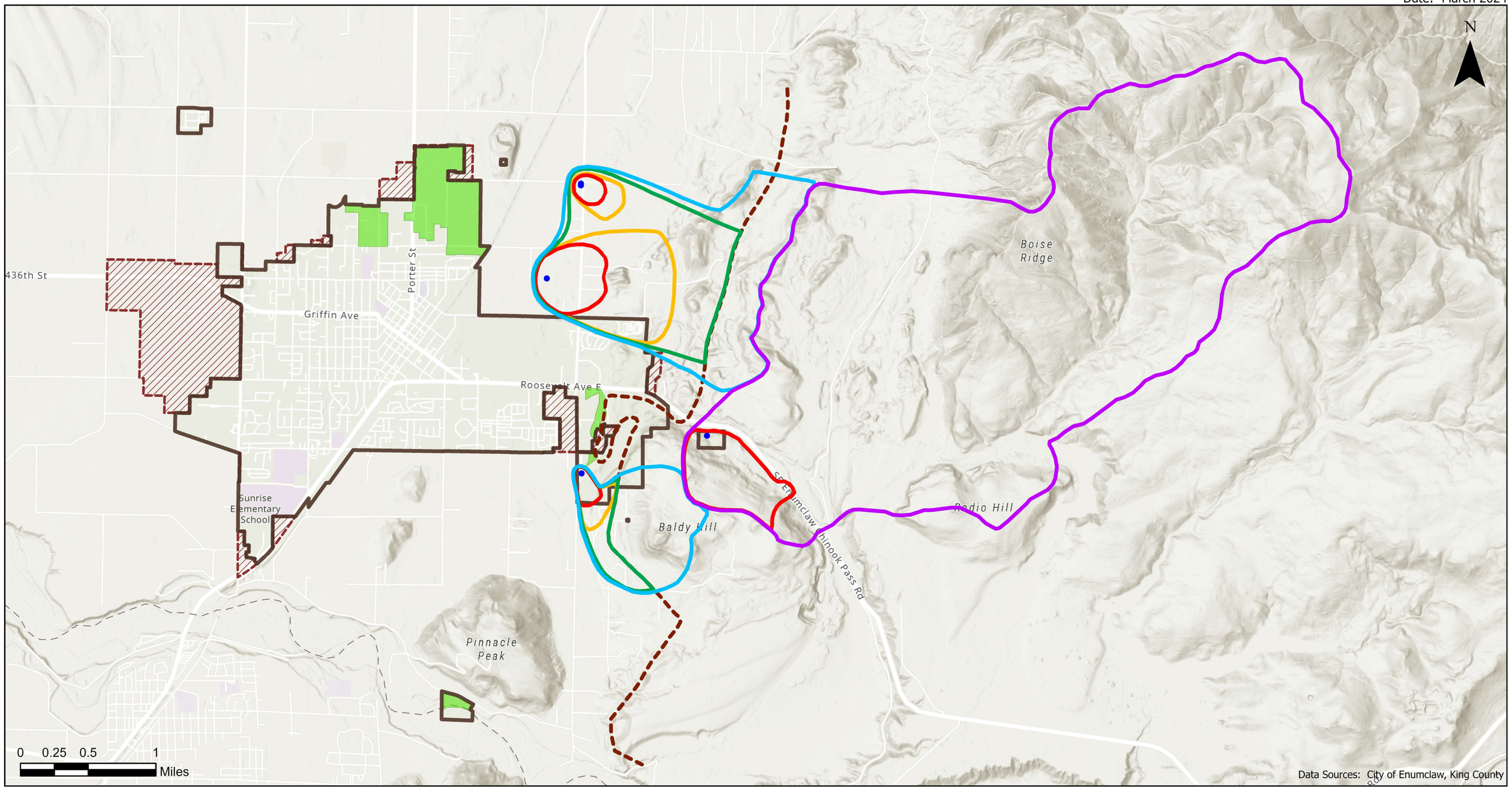
- City Limits
- Urban Growth Area
- 100-Year Floodplain
- Streams
- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Riverine

Disclaimers: This map is a visual representation derived from the Geographic Information System of the City of Enumclaw and does not represent survey level accuracy. This map is based on the best information available as of the date shown on this map. The City of Enumclaw makes every effort to provide correct information, but makes no representation as to the completeness or accuracy of this map.

The process of data collection is continuous and the information displayed should not be considered complete. This map is not intended for regulatory purposes, as the scale, accuracy, and completeness are not sufficient to determine regulatory implications at a site-specific level. The presence of environmental features and critical areas, as defined in the Growth Management Act, must be verified at the site-specific level. These maps are intended to provide a generalized overview of the extent and distribution of key environmental features and critical areas throughout the City. This map represents the best available data at the time of publication.

EXHIBIT NE-2 Critical Aquifer Recharge Areas and Wellhead Protection Areas

Date: March 2024



CITY OF Enumclaw

- City Limits
- Urban Growth Area
- Critical Aquifer Recharge Areas
- City of Enumclaw Water Source Location

Wellhead Protection Areas

- Zone 1 (Travel-Time)
- Zone 2 (Travel-Time)
- Zone 3 (Travel-Time)
- Zone 4 (Buffer Area)
- Zone 4 (Surface Drainage Buffer Area)
- Bedrock Boundary (Per Booth, et al. 2006)

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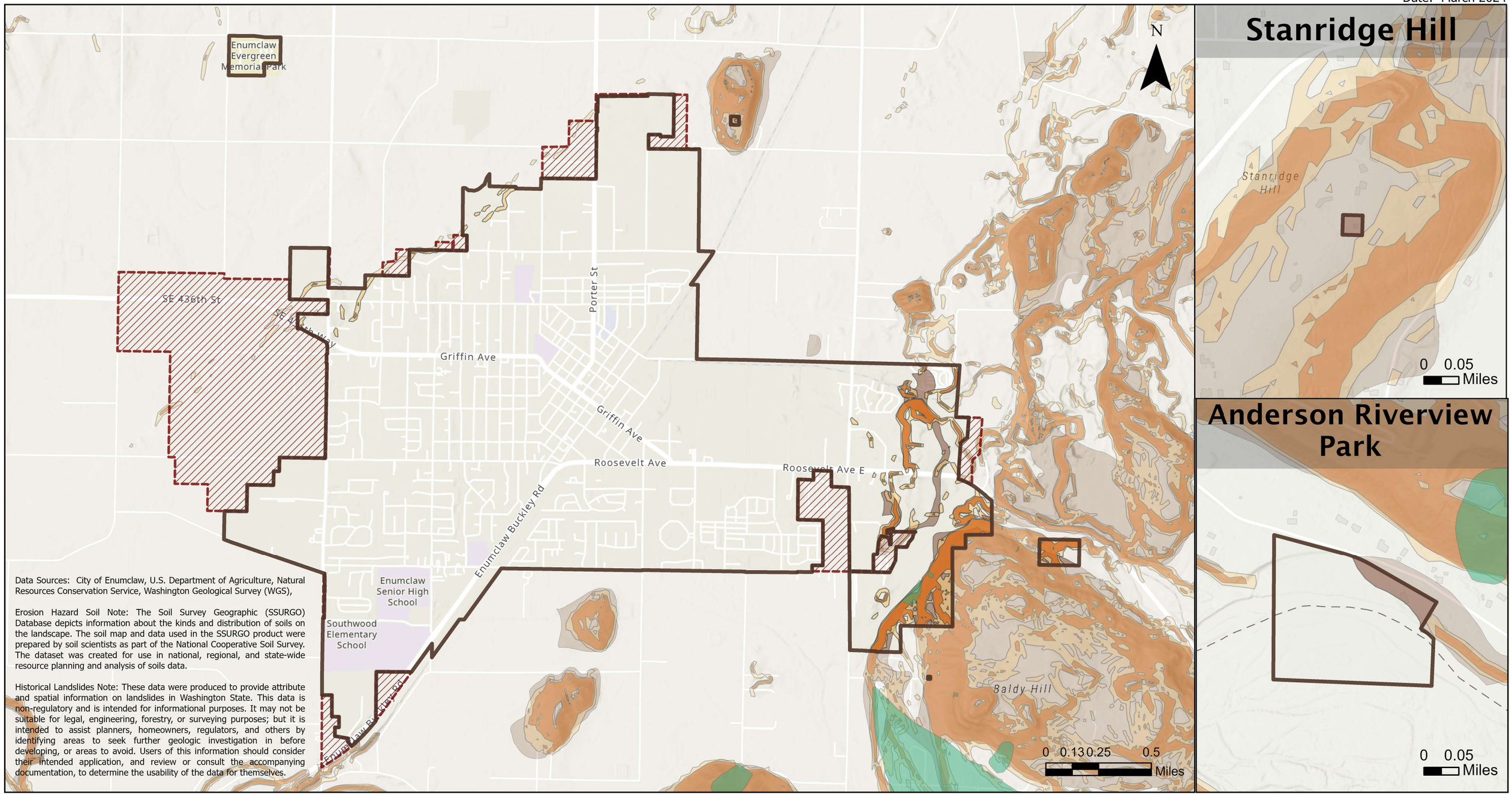
EXHIBIT NE-3 Geologic Hazards

Date: March 2024



Stanridge Hill

Anderson Riverview Park

Data Sources: City of Enumclaw, U.S. Department of Agriculture, Natural Resources Conservation Service, Washington Geological Survey (WGS),

Erosion Hazard Soil Note: The Soil Survey Geographic (SSURGO) Database depicts information about the kinds and distribution of soils on the landscape. The soil map and data used in the SSURGO product were prepared by soil scientists as part of the National Cooperative Soil Survey. The dataset was created for use in national, regional, and state-wide resource planning and analysis of soils data.

Historical Landslides Note: These data were produced to provide attribute and spatial information on landslides in Washington State. This data is non-regulatory and is intended for informational purposes. It may not be suitable for legal, engineering, forestry, or surveying purposes; but it is intended to assist planners, homeowners, regulators, and others by identifying areas to seek further geologic investigation in before developing, or areas to avoid. Users of this information should consider their intended application, and review or consult the accompanying documentation, to determine the usability of the data for themselves.

CITY OF Enumclaw

- City Limits
- Urban Growth Area
- Slopes >= 40%
- Slopes >= 80%
- Erosion Hazard Soil
- Historical Landslides

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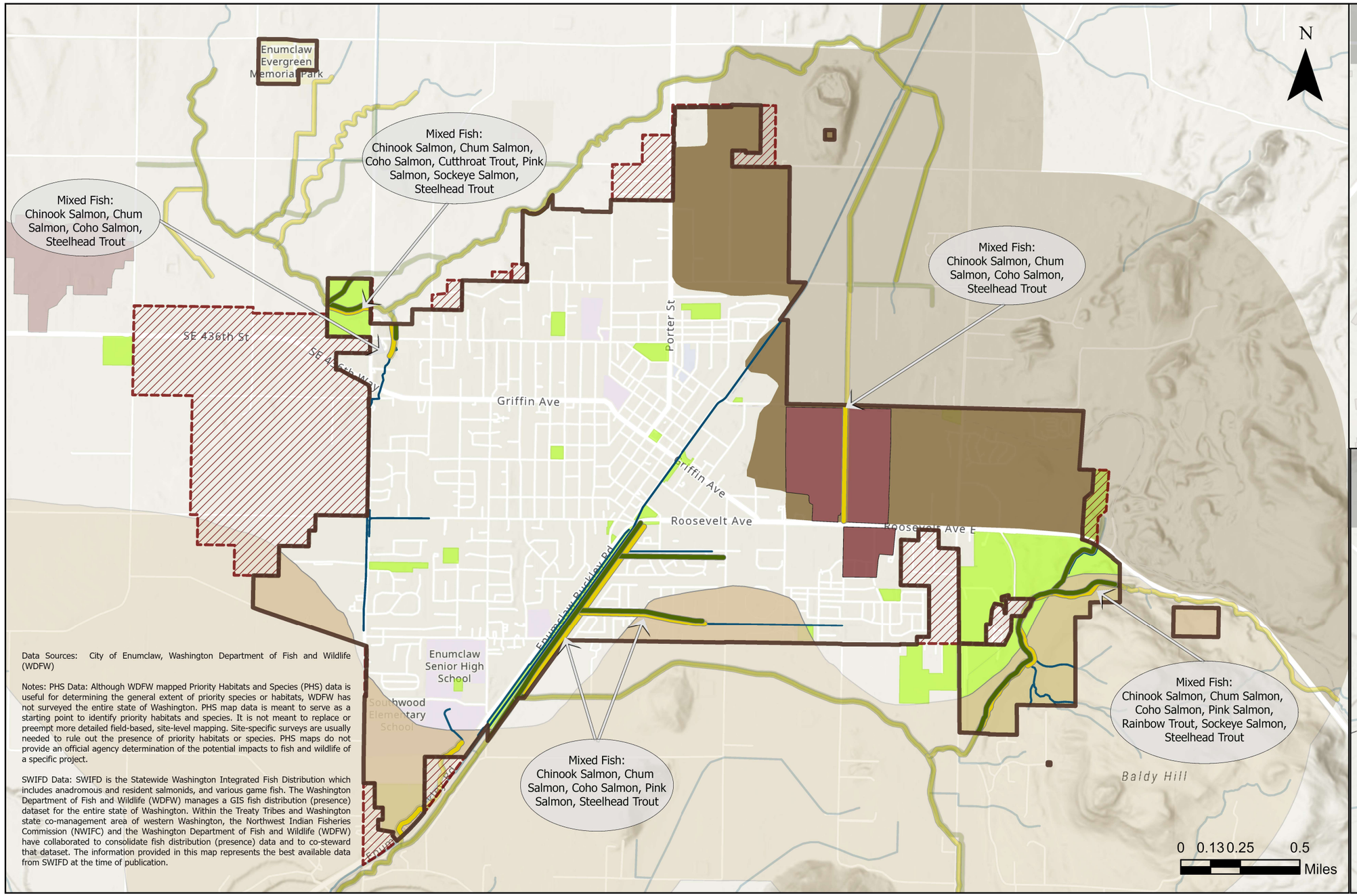
EXHIBIT NE-4 Fish and Wildlife Habitat Conservation Areas

Date: March 2024

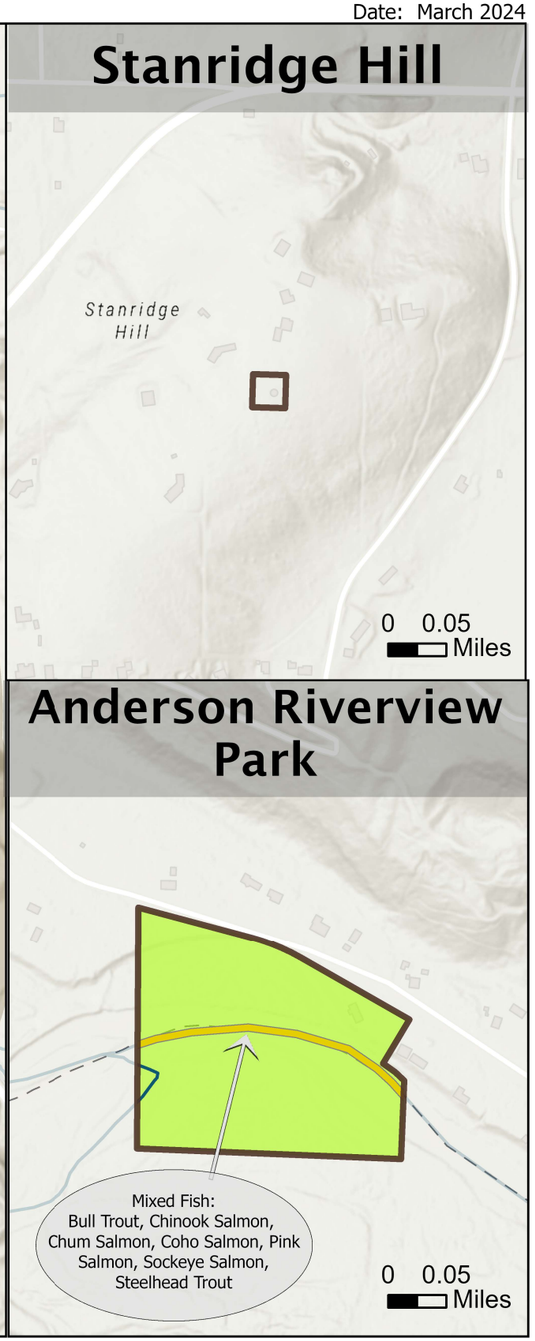


Data Sources: City of Enumclaw, Washington Department of Fish and Wildlife (WDFW)

Notes: PHS Data: Although WDFW mapped Priority Habitats and Species (PHS) data is useful for determining the general extent of priority species or habitats, WDFW has not surveyed the entire state of Washington. PHS map data is meant to serve as a starting point to identify priority habitats and species. It is not meant to replace or preempt more detailed field-based, site-level mapping. Site-specific surveys are usually needed to rule out the presence of priority habitats or species. PHS maps do not provide an official agency determination of the potential impacts to fish and wildlife of a specific project.

SWIFD Data: SWIFD is the Statewide Washington Integrated Fish Distribution which includes anadromous and resident salmonids, and various game fish. The Washington Department of Fish and Wildlife (WDFW) manages a GIS fish distribution (presence) dataset for the entire state of Washington. Within the Treaty Tribes and Washington state co-management area of western Washington, the Northwest Indian Fisheries Commission (NWIFC) and the Washington Department of Fish and Wildlife (WDFW) have collaborated to consolidate fish distribution (presence) data and to co-steward that dataset. The information provided in this map represents the best available data from SWIFD at the time of publication.

Stanridge Hill



Anderson Riverview Park

CITY OF Enumclaw

- City Limits
- Urban Growth Area
- Parks
- Streams
- Mixed Fish
- Salmonid Fish
- Elk
- Rocky Mountain Elk
- Waterfowl

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Climate Resilience

Climate is the usual weather patterns of a place established over long time periods.

Projected changes to climate as a result of changes in precipitation and temperature are making it increasingly important for local comprehensive planning to prioritize climate resilience policies and measures to increase the community's resilience – its capacity to adapt to hazards magnified by a changing climate. Adaptation may include strategies to prevent, withstand, respond and recover from a disruption or challenge. The City of Enumclaw conducted a climate vulnerability analysis (Jacobs 2023) to understand expected climate hazards and vulnerabilities and explore potential adaptation strategies.

REGIONAL CLIMATE TRENDS

Enumclaw is in the Puget Sound region, a coastal area of the Pacific Northwest including Puget Sound, the Puget Sound lowlands, and the surrounding region roughly west of the Cascade Range and east of the Olympic Mountains.

The Puget sound region is projected to warm rapidly during the 21st century. Annual temperatures are projected to rise between 4.2 degrees F and 5.5 degrees Fahrenheit (F) by the year 2050 and between 5.5 and 9.1 degrees F by the year 2080. Changes in annual and fall, winter, and spring precipitation will continue to be primarily driven by year-to-year variations rather than long-term trends. All models project a decline in summer precipitation for the Puget Sound region.

PRIORITY CLIMATE HAZARDS

Warming trends for temperature and increases in heavy precipitation magnitude and frequency are projected to result in climate hazards that may impact community assets like streets, bridges, buildings, water resources and air quality. The vulnerability assessment identified the following priority climate hazards for Enumclaw that are likely to result from warming temperatures and changing precipitation patterns:

Hazard: An event or condition that may cause injury, illness, or death to people or damage to assets.

- Extreme precipitation events;
- Flood events;
- Wildfire smoke events
- Wildfire; and
- Extreme heat events.

Enumclaw's location in an area with few natural hazards means that it has few vulnerabilities. It is not located adjacent to saltwater shorelines subject to sea level rise and has limited exposure to floodplains and geologically hazardous areas. Its location in western Washington means that extreme heat events and wildfire, while increasing, are not expected to become frequent events.

Vulnerable assets are summarized below. Overall, extreme precipitation is the hazard that is projected to have the largest future impact due to Enumclaw's relatively flat topography, poorly draining Osceola mudflow soils, and reliance on bridge crossings of rivers and streams. Wildfire smoke is also a concern, as it is the largest source of particle pollution in Washington state and wildfire smoke events are projected to increase due to increasing temperatures and drier summers.

Asset: People, resources, ecosystems, infrastructure and the services they provide. Assets are tangible and intangible things people or communities value.

VULNERABILITY ASSESSMENT

The planning study area for the vulnerability assessment was defined by the City's urban growth area (UGA) limits established in the Comprehensive Plan. Since critical components of the City's transportation and water systems extend beyond the UGA, the evaluation included assets such as the water system spring sources and bridges (Green River and White River) serving emergency evacuation routes that are located outside of the UGA.

Assessed were 111 site specific and community-wide assets in 11 asset sectors of these, approximately 28% of assets were found to be moderately vulnerable and 20% were found to be highly vulnerable. Assets found to be highly vulnerable include those that are highly sensitive to hazard exposure and have limited capacity to adapt. Possible hazard events and vulnerable assets are described below.

Adaptive capacity: The ability of a person, asset or system to adjust to a hazard, take advantage of new opportunities or cope with changes.

EXTREME PRECIPITATION EVENTS

Extreme precipitation events are expected to exceed the range of variability shortly after mid-century. Precipitation events are projected to be larger, more intense, and more frequent (USGCRP 2023).[1] More intense and frequent events may increase landslide hazards and erosion damage to transportation infrastructure, overwhelm the storm and wastewater systems, and scour stream channels. The assets vulnerable to extreme precipitation events include ecosystems supporting aquatic habitat, city ballfields, the stormwater system, transportation infrastructure including the SR 169/Green River Bridge, and the wastewater system.

MAJOR FLOOD EVENTS

Flooding can be influenced by changes in snowpack and streamflow, which are driven by changes in temperature, heavy rainfall, and seasonal precipitation. Streamflows are projected to have larger, earlier peak flows in response to warming and more intense heavy rain events, resulting in flooding that may impact assets in the 100-year and 500-year FEMA

1 USGCRP, 2023: Fifth National Climate Assessment. Crimmins, A.R., C.W. Avery, D.R. Easterling, K.E. Kunkel, B.C. Stewart, and T.K. Maycock, Eds. U.S. Global Change Research Program, Washington, DC, USA. https://doi.org/10.7930/NCA5.2023

floodplains. Assets vulnerable to flooding include some residential zoned areas, transportation infrastructure, including roads and crossings adjacent to Newaukum and Boise Creeks, and some components of the City water and wastewater systems.

WILDFIRE

In the Puget sound lowland, including Enumclaw, there is low, but increasing, probability of direct exposure to wildfires. The wildfire probability and the number of fire danger days are both predicted to increase with rising temperatures. Wildfire is included as a priority hazard due to the proximity of the City to forested areas in the Cascade foothills, which have higher risk of wildfire than the Puget Sound lowlands, and recent local history of wildfires. Assets vulnerable to wildfire include water system components that are located in the forested foothills east of the City.

WILDFIRE SMOKE EVENTS

Wildfire smoke events are an indirect effect of wildfires that can occur hundreds or thousands of miles away from the source of the wildfire. The frequency of smoke events is expected to increase as regional wildfire risk grows and temperatures rise. Assets vulnerable to wildfire smoke events include the emergency management system, Enumclaw senior center, schools, and aging support services.

EXTREME HEAT EVENTS

Extreme heat events are predicted to occur more often and last longer. Extreme heat is defined above average number of hot days per year with a maximum temperature greater than 90° Fahrenheit (F). Extreme heat events are record setting heat waves consisting of a period with temperatures above 100° F for three or more days. While not frequent or lengthy in western Washington, local communities are typically not accustomed to or prepared for such extremes. When combined with expected drier summer conditions, heat events cause stream temperatures to rise increasing mortality of aquatic species, stress street trees and native vegetation and increase demand for emergency services and shelters. Assets found vulnerable to extreme heat events include ecosystems, the emergency response system and emergency shelters.

Climate Mitigation

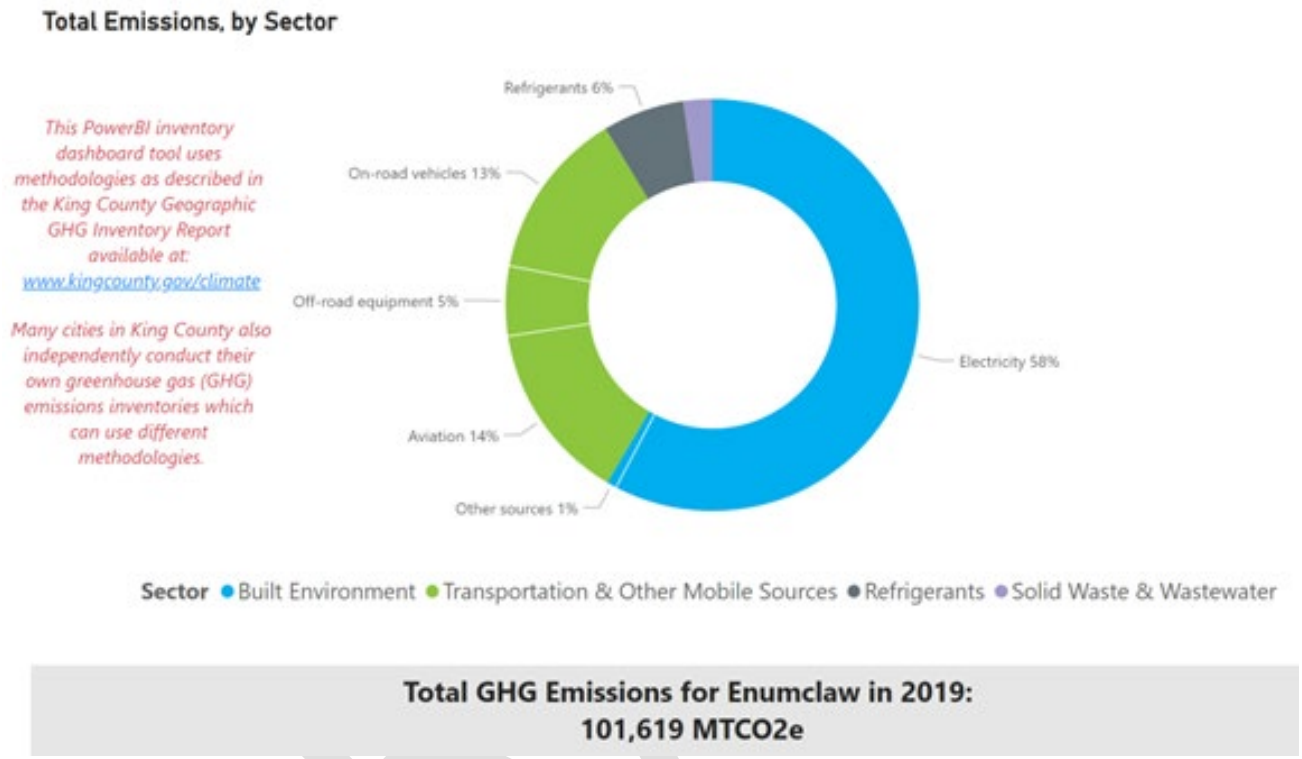
The GMA requires the City to adopt climate mitigation goals and policies to reduce greenhouse gas (GHG) emissions and Vehicle Miles Travelled. The largest sources of emissions will yield the largest potential reductions, so understanding the sources of GHG emissions is an important step to craft an effective policy framework.

SOURCES OF GREENHOUSE GAS (GHG) EMISSIONS

King County led the "Puget Sound Regional Emissions Analysis Project" completed in 2022 that provides comprehensive GHG emission data for central Puget Sound cities and King, Kitsap, Pierce and Snohomish Counties. Data for Enumclaw is included in the Geographic GHG Emissions Inventory Database for the year 2019. Based on this database, total GHG

emissions in Enumclaw in 2019 were estimated to be 101,619 million tons of carbon dioxide (MTCO2e). The majority of emissions (58%) result from energy use in commercial, residential and industrial buildings, followed by transportation (32%) from vehicles and air travel, with refrigerants (6%) and solid waste and wastewater and other sources making up the remainder.

Exhibit NE-5 GHG emissions by Sector, 2019.



Source: Puget Sound Regional Emissions Analysis Project Geographic GHG inventory database.

EFFECTIVE REDUCTION MEASURES

Since most GHG emissions in Enumclaw are a result of energy use in buildings and air and vehicle transportation, goals and policies intended to promote energy conservation and reduce vehicle miles traveled will result in the largest reductions in GHG emissions.

Measures of emission reduction for common strategies are published in the California Air Pollution Control Officers Association "Handbook for Analyzing Greenhouse Gas Emission Reductions, Assessing Climate Vulnerabilities, and Advancing Health and Equity." This handbook includes measurable and estimated reduction measures. Measures which are estimated are described as small, moderate, or large reductions. Potential reduction strategies applicable to Enumclaw and included in the policy framework are summarized below:

Transportation measures:

- Increase residential densities to 15 units per acre (up to 30% reduction)
- Integrate affordable and below market rate housing (up to 28.6% reduction)
- Improve street connectivity to more than 36 intersections per square mile (up to 30% reduction)
- Implement commute trip reduction programs (up to 4% reduction)
- Provide end -of-trip bicycle facilities (up to 4.4% reduction)
- Rideshare programs (up to 8% reduction)
- Provide electrical vehicle charging infrastructure (up to 11.9% reduction)
- Provide pedestrian network improvement (up to 6.4% reduction)
- Construct or improve bicycle facilities (up to 0.8% reduction on adjacent road0
- Extend transit network coverage (up to 4.6% reduction)
- Increase transit service frequency (up to 11.3% reduction)

Energy conservation measures:

- Exceed state building envelope energy efficiency standards (up to 99% reduction)
- Require installation of energy efficient (energy star) appliances (up to 15% reduction)
- Require higher efficacy public street and area lighting (moderate reduction)
- Establish onsite renewable energy systems (variable)

Solid Waste

- Institute recycling and organics diversion services (small reduction)