



Photo Credit: Mark J. Photography.

Chapter 7

ENVIRONMENT

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Environment Snapshot



Climate Change

The City first adopted climate change goals and policies in 2010 via resolution 2286. These goals and policies focused on managing and reducing energy use, fuel consumption, and greenhouse gases (ghg). In 2023, a Climate Change Vulnerability and Risk Assessment Study (CVA) was conducted. The CVA was adopted as a reference document via resolution 2529 to inform updates to the Environmental Element. New goals and policies which address the social and physical impacts of climate change are incorporated into this plan. By 2029, the City will need to pursue actions to address climate change and to track, measure and reduce ghg emissions.



Water Resources

Water resources comprise surface water, ground water, aquifers, shorelines, floodplains, wetlands and stormwater. Surface water, groundwater and aquifers require protection and proper management for both water quality and supply. Development is required to construct stormwater management facilities to protect these resources from pollutants and prevent flooding. Federal and state regulations govern development near shorelines and floodplains, such as Ebey Slough and Quilceda Creek, to afford additional protections. Lastly, wetlands require protection to preserve their natural water quality functions, wildlife habitat, and stream flow.



Air Quality

Air quality within the Puget Sound Airshed is regulated at both the national and regional level via the clean air act. Vehicles, wildfire, industry and some home heating are the main contributors to air pollution in our region. The United States Environmental Protection Agency (EPA) has established a system to categorize and report air quality based on pollutant concentrations called the Air Quality Index (AQI). The Washington State Department of Ecology (DOE) and Puget Sound Clean Air Agency (PSCAA) jointly regulate and monitor air quality in western Washington. State climate action regulations have also recently been adopted to reduce emissions.



Earth Resources

Earth resources cover geology, soils, and geologically hazardous areas. Geology determines landforms, stream features, and soil types; it also provides insight into how the land was formed. Soils impact: how land can be developed including what structures and foundations are needed, whether the land has agricultural capacity, and what drainage system will work best. Geologically hazardous areas are lands that are prone to landslides and susceptible to earthquakes. Development of these areas must either be avoided or additional reports and measures implemented to mitigate the additional development risks.



Fish and Wildlife Habitat

Quil Ceda Creek, Allen Creek, Ebey Slough and the Qwuloolt Estuary, Twin Lakes, and associated wetlands, streams, and buffers provide crucial fish and wildlife habitat within the City. Quil Ceda and Allen Creek supply important spawning and rearing habitat for Salmonids. A variety of other wildlife use critical areas and buffers. The buffers along these habitats are required to be placed in Native Growth Protection Area (NGPA) tracts for permanent protection, and degraded buffers are required to be replanted with native trees and shrubs with development.



Environmental Stewardship

The City of Marysville endeavors to be a good steward of the environment. Protecting the natural environment entails preserving the ecological balance, improving air and water quality, retaining critical areas in their natural state, and protecting wildlife habitat. The Environmental Element, and the City's Critical Areas Management Ordinance, set forth goals, policies and standards that ensure that our natural resources are protected, and mitigation occurs when impacts cannot be avoided



Section 7.1

INTRODUCTION

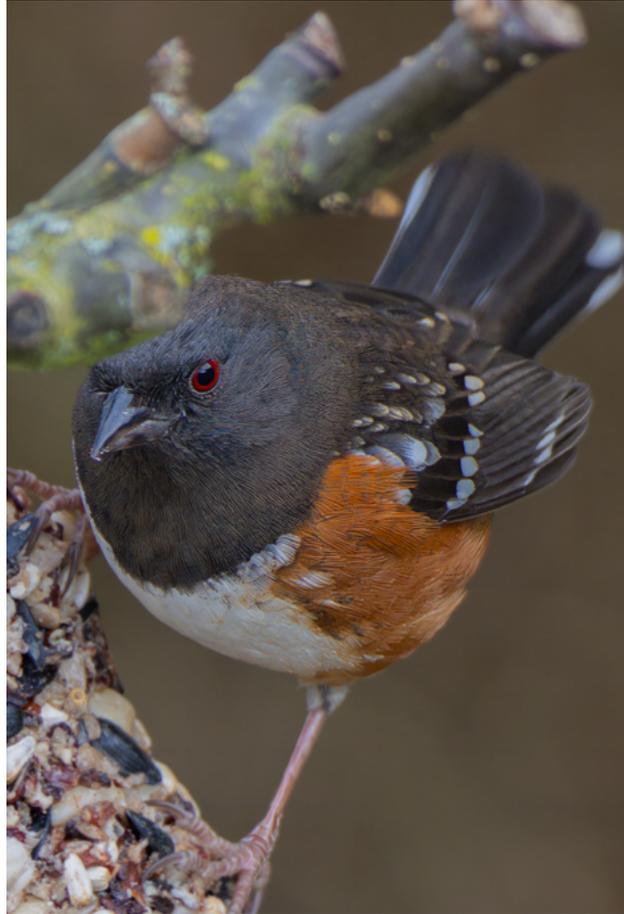
Protecting the natural environment in Marysville requires: preserving the ecological balance, environmentally sensitive areas, and wildlife habitat; improving air and water quality; and providing for public access to natural areas.

Marysville's varied topography and natural features create opportunities, as well as limitations, for development. The geography, geology, soils, hydrology, vegetation, and climate of the City have all contributed to settlement and development patterns. In turn, these natural features have a strong influence on future land use and the image of the community.

Human activity has had a major impact on our vegetation, wildlife, and water resources. City land use policies seek to protect the environment, conserve our resources, and permit future development only in areas that can support it without adverse impact.

Natural resources are an important inheritance not only for recreation and aesthetic purposes, but also for their roles in the ecosystem and natural

processes. The critical areas regulations, urban growth boundary, land use designations, capital facilities plan, and development regulations provide mechanisms for implementing environmental and resource management goals.



Bird roosting on suet. Photo Credit: Mark J. Photography.

Voices from the Community



Environmental impacts were identified as the third greatest concern regarding increased density in the City with 40% of community members identifying this as a concern.

Promoting environmentally sustainable business practices is a way that 16% of survey participants believe that the City should support businesses.

Four out of five (80%) of those polled are concerned about extreme weather events and a majority of them (70%) feel that climate change is a problem now or will be soon.

Marysville residents feel most prepared for extreme heat, with a majority (72%) who indicated that they are concerned feeling at least somewhat prepared for it; however, many do not feel as prepared for drought, flooding, and poor air quality due to smog and wildfire smoke.

Two-thirds of community members are concerned about extreme heat (65%) and poor air quality (63%). A lower number, approximately one third, are concerned about drought (37%) and flooding (37%).

Section 7.2

EARTH RESOURCES

There are a variety of earth related variables that influence potential land use, environmental quality and issues for land development. These include area geology, soils and topography.



Mount Pilchuck towers over the Puget Sound lowland which was formed by glacial events. Photo Credit: Mark J. Photography.

Geology

Geology is important in determining landforms, stream characteristics, and soil types. Runoff processes are characterized by the permeability, depth, and porosity of soil and bedrock. Soils and rock types affect erosion processes and the sediment delivery rate. Geologic features control stream gradient and channel morphology.

The soils and landforms of the Puget Sound area are the result of erosion and deposition of materials associated with the advance and withdrawal of glaciers. Surface geology is shown in Figure 7.1. The Quilceda/Allen Watershed lies in the Puget Sound Lowland Physiographic Province. The province contains the Puget Sound Basin and all areas west of the Snohomish County foothills.

The Puget Sound lowland was formed by several glacial events that occurred during the last million years. Current surface features, landforms, and subsurface layers are related to the most recent of these glacial advances –the Fraser Glaciation. During this glacial period, there were two glacial advances and an intervening glacial retreat. This final advance, locally referred to as the Vashon Stade of the Fraser Glaciation, began approximately 20,000 years ago.

During the Vashon Stade, a large tongue of ice called the Puget Lobe advanced through the Puget Sound lowland. The meltwaters from the advancing glacier deposited sand and gravel, called Vashon advance outwash, directly on top of older glacial and nonglacial soils (transitional beds and tertiary sedimentary rocks). In the watershed advance, outwash material occurs on the Tulalip and Getchell plateaus in thicknesses of up to 350 feet.

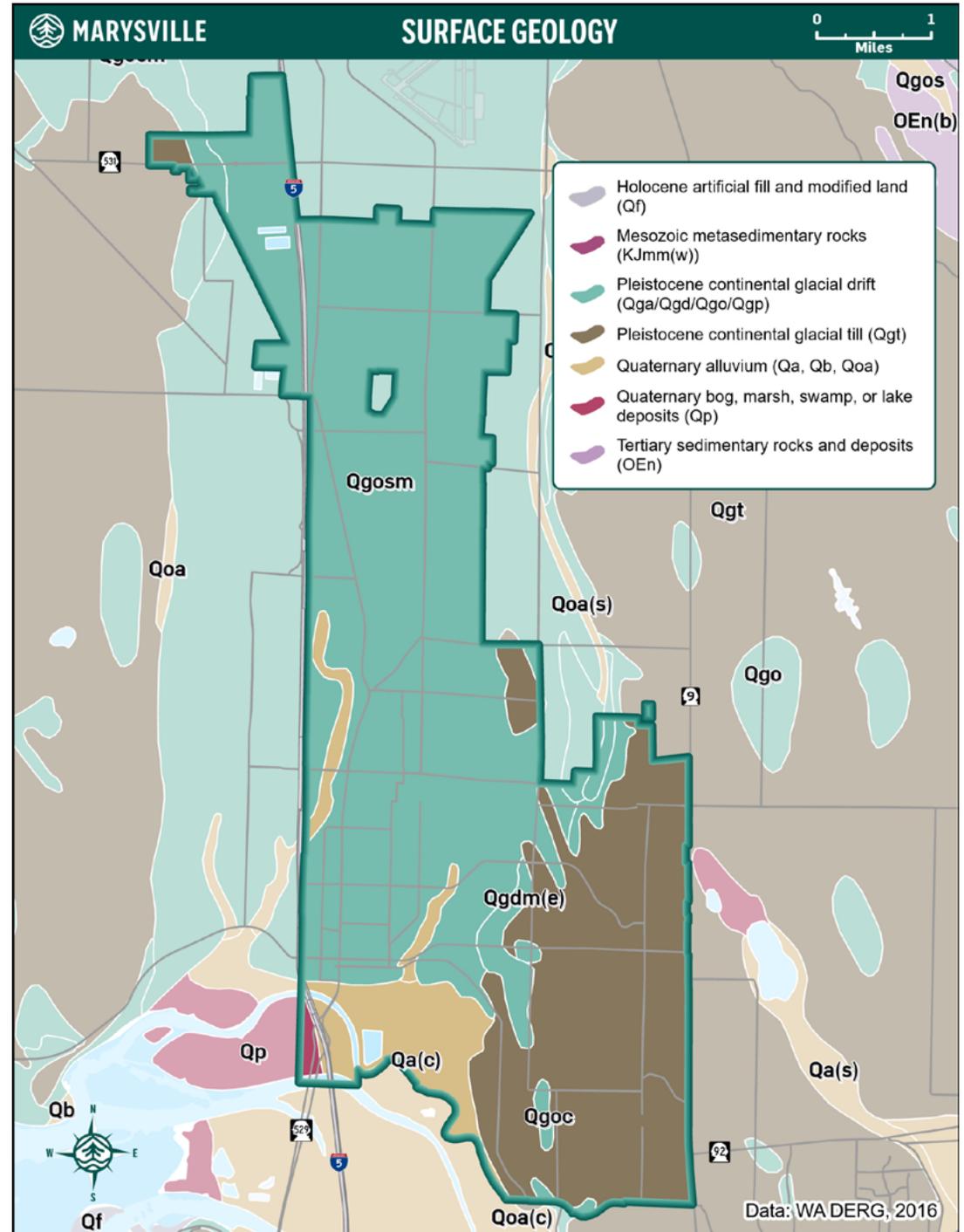
As the ice sheet passed over the area, the sand and gravel materials consolidated with other materials that were directly deposited and overridden by the glacier. This consolidated material is referred to as Vashon Till. The Vashon Till was deposited on top of the advance outwash on hills and plateaus on both sides of the watershed. It also formed an underlying layer in the Marysville Trough.



At some time during this glacial event, the Puget Lobe dammed the Stillaguamish River valley and glacial flow was deflected southward, eroding the Marysville Trough Valley. As the Puget Lobe receded out of the area, extensive deposits of recessional materials were laid down on the Vashon Till. This recessional outwash, termed the Marysville sand member, became very thick and extensive throughout the Marysville Trough.

Alluvial deposits are the most recent geologic deposits in the watershed. They are found at the eastern and western edges of the Marysville Trough. These materials consist of sand and gravel carried by streams down the hillside and deposited in the valley.

Figure 7.1



Soils

The Natural Resource Conservation Service (NRCS), an agency of the United States Department of Agriculture (USDA) mapped and evaluated each soil type within the City in terms of its suitability for septic systems, capability for agricultural production, and structural integrity for siting buildings, and other structures.

Three major soil types can be found within the City. The Marysville Trough contains primarily the Indianola-Hale-Custer and the Indianola-Everett-Ragnar soil series as shown in Figure 7.2.

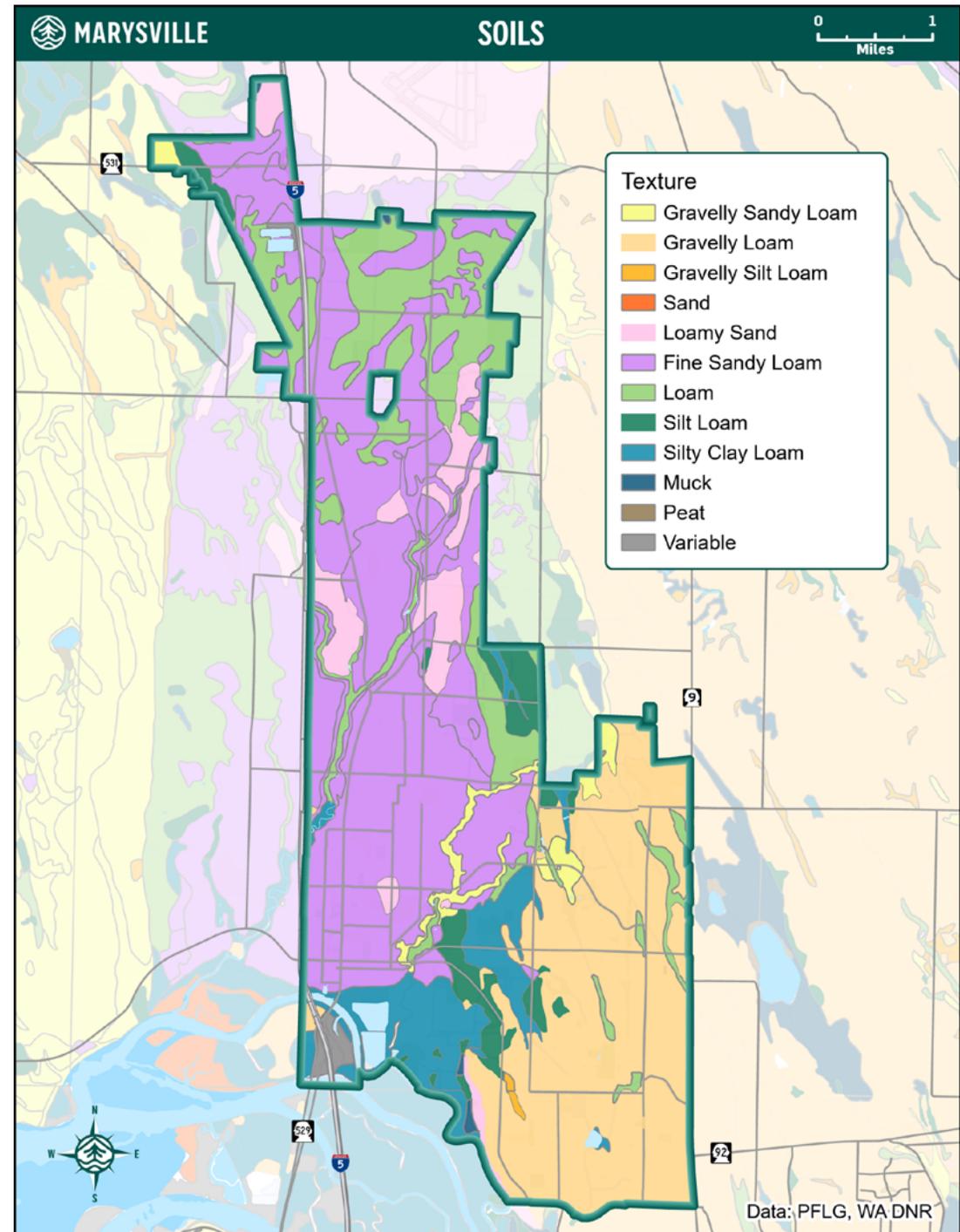
The Indianola-Hale-Custer soil series consists of poorly and somewhat excessively drained soils underlain by sand. The majority of well drained soils in this series have been previously developed while the preponderance of poorly drained soils has remained in agricultural use.

The Indianola-Everett-Ragnar soils series are generally well and somewhat excessively drained soils also underlain by porous sand and gravel and are generally well suited for septic tank and drain fields. The majority of this area is, however, currently developed and sewers are generally available for the remaining area.

All of the Getchell Hill Plateau is covered with moderately well and somewhat excessively drained soils of the Alderwood-Everett series underlain by compact glacial till or glacial outwash.

The capacity of the land to support buildings and other structures is a function of soil texture, density, plasticity, shrink-swell behavior, wetness, and slope. The NRCS has evaluated soils within the City in terms of their capacity to support foundations, settle evenly, and their resistance to slump and landslide. Mapping of the soil limitations for dwellings reveals “no” limitations for dwellings within most of the built-up areas in and around Marysville; “moderate” limitations in the upland areas of the Sisco Heights/Getchell Hill plateau; and “severe” limitations generally for those soils that are also agricultural soils.

Figure 7.2



Geologically Hazardous Areas

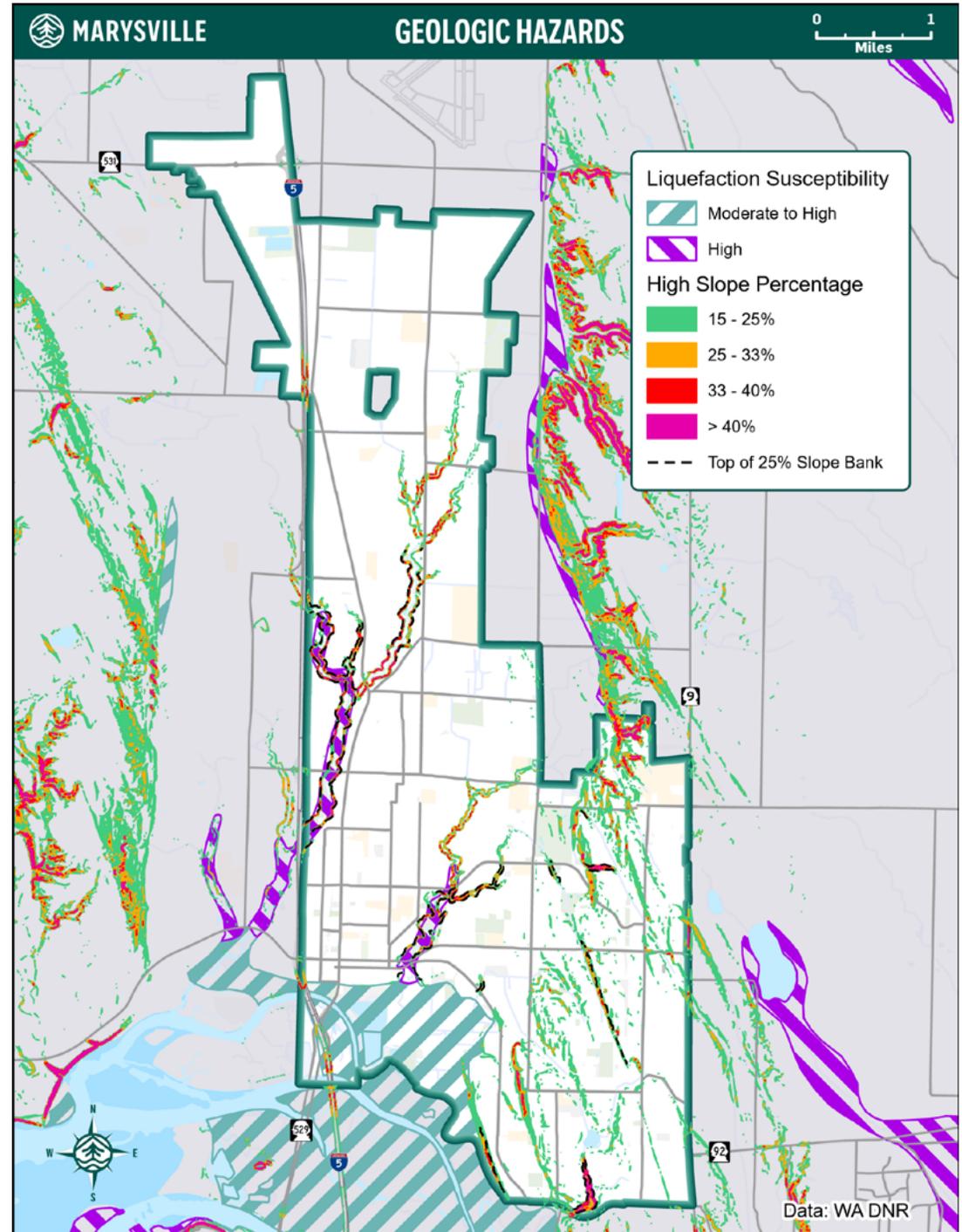
Geologic hazard areas have been defined through the City's critical areas ordinance by mapping created by the City's Geographic Information Systems (GIS) information. Geologic hazard areas include areas prone to landslides and earthquakes as shown in Figure 7.3. Landslide hazard areas are found along the slope of the Getchell plateau and along the banks of Quilceda, Allen and Munson creeks. Steep slopes (ranging from 25 to 75% slopes), soft soils, and ground water seepage make these areas prone to landslides.

Areas susceptible to earthquakes – where soft or loose soils form valley floors and locally in upland areas – have been identified by the City's Geographic Information Systems (GIS) information. Moderate to high seismic (liquefaction) areas have been identified along Quilceda and Allen creeks and in the 100 year floodplain along Ebey Slough. Soil liquefaction may occur during an earthquake in areas where fine to medium grain soil materials (silt and sand) are saturated. When subject to shaking, these soils become like quicksand and lose their capacity to support structures. When development is proposed on a seismic hazard area, the applicant must submit a study which demonstrates that:

1. Evaluation of site-specific subsurface conditions show that the site is not located in a seismic hazard area; or
2. Mitigation is implemented that renders the proposed development as safe as if it were not a seismic hazard area.

Geologic processes and human activities are responsible for slope instability and erosion prone areas. In the Quilceda/Allen watershed, steep, unstable slopes occur along the streams and in ravines. Erosion from increased stream flows and human activity is observable along several reaches in both stream systems.

Figure 7.3



Section 7.3

AIR QUALITY

Air quality within the Puget Sound Airshed is regulated at both the national level and regional level through the Clean Air Act. Air quality is generally assessed in terms of whether concentrations of air pollutants are higher or lower than ambient air quality standards set to protect human health and welfare.

The main sources of air pollution in the Puget Sound region are wood smoke from home heating, vehicles, wildfires and industry. According to the Puget Sound Clean Air Agency, fine particles and smog (ozone) are the greatest concern for the Puget Sound region. Wildfire smoke has contributed to the highest fine particle levels since being initially monitored in 1980.

The United States Environmental Protection Agency (EPA) has established a system to categorize and report air quality based on pollutant concentrations. This system is called the Air Quality Index (AQI) and utilizes a numerical scale

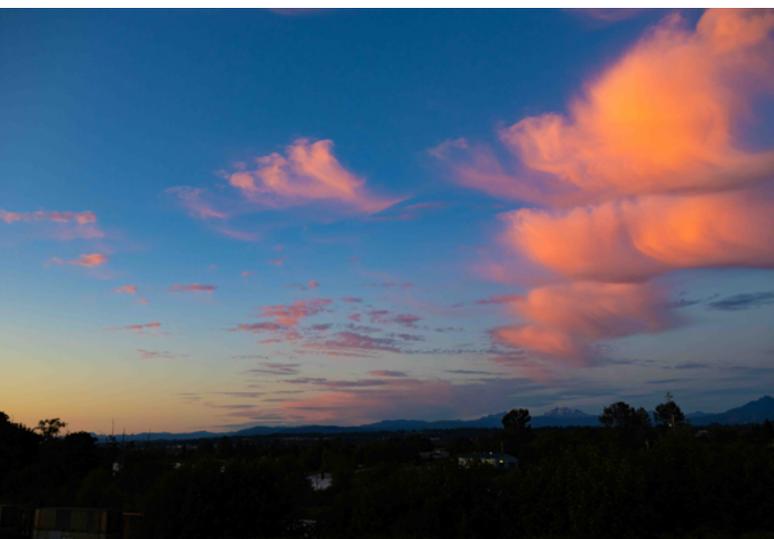
divided into six categories. The air quality index scale is shown in Figure 7.4. For each pollutant, an AQI value of 100 generally corresponds to the national air quality standard for the pollutant, which is the level EPA has set to protect public health.

Within the Puget Sound region, the Washington State Department of Ecology (DOE) and Puget Sound Clean Air Agency (PSCAA) jointly regulate and monitor air quality. Widespread climate action regulations have been recently adopted by Washington State to reduce emissions at State, regional and local levels.

Figure 7.4

Air Quality Index for Air Pollutants

DAILY AQI COLOR	LEVELS OF CONCERN	VALUES OF INDEX	DESCRIPTION OF AIR QUALITY
Green	Good	0 to 50	Air quality is satisfactory, an air pollution poses little to no risk.
Yellow	Moderate	51 to 100	Air quality is acceptable. However, there may be a risk for some people, particularly those who are usually sensitive to air pollution.
Orange	Unhealthy for Sensitive Groups	101 to 150	Members of sensitive groups may experience health effects. The general public is less likely to be effected.
Red	Unhealthy	151 to 200	Some members of the general public may experience health effects; members of sensitive groups may experience more sensitive health
Purple	Very Unhealthy	201 to 300	Health alert: The risk of health effects is increased for everyone.
Maroon	Hazardous	301 and higher	Health warning of emergency conditions: everyone is more likely to be affected.



Air quality is vital to environmental and public health.

Source: Air Quality Index - Washington State Department of Ecology



Section 7.4

WATER RESOURCES

Surface Water

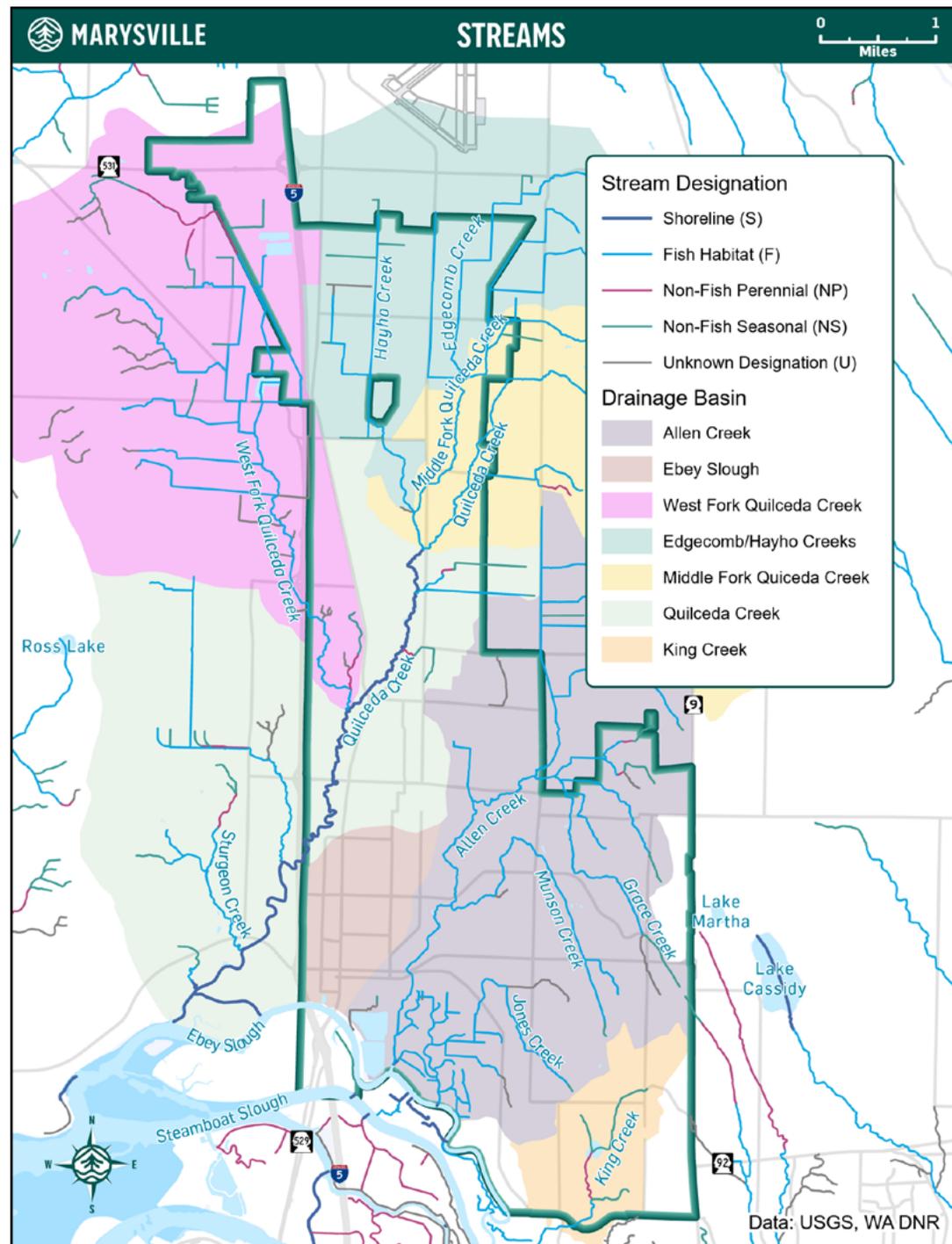
Surface water resources within the City are primarily located within the Quilceda/Allen creek watershed, which covers an area of about 49 square miles. The watershed has two stream systems: Quilceda and Allen Creeks. Quilceda Creek drains approximately 38 square miles and Allen Creek drains approximately 11 square miles; both drain into Ebey Slough and the lower Snohomish River Delta as illustrated in Figure 7.5.

Both drainage basin surface waters flow generally in a northwesterly direction in the upper reaches of the tributaries, and a southwesterly flow in the lower reaches. The watershed is highly susceptible to a variety of environmental problems. Water pollution is increasing from non-point sources such as agricultural and urban development. Generally, pollutants that flow into the tributary systems consist of pesticides, chemical fertilizers, animal waste, oil, gasoline, heavy metals, and sediments.

Also, although much of Quilceda and Allen Creeks have a protective vegetative buffer, agriculture and timber harvesting in the mid-to-upper reaches have resulted in soil erosion and subsequent loss of spawning areas and reduction of fish rearing habitat throughout much of the system.

The Quilceda-Allen system is within the Tulalip Tribes' usual and accustomed fishing areas; therefore, land use within the watershed is governed by a variety of tribal, state, county and city governments, and ranges from agricultural and timber production to commercial development.

Figure 7.5



Ground Water

Ground water is a limited and variable resource that plays an important role in the watershed. Ground water discharge to streams supports year-round flow, and ground water provides drinking water to watershed residents. The infiltration, movement and storage of ground water are controlled by the soils and geologic materials present below ground surface.

Aquifers are subsurface zones of earth, gravel, or porous stone yielding usable amounts of water. The Marysville UGA encompasses two of three of the aquifers within the Quilceda/Allen Watershed. These are the Marysville Trough Aquifer, and the Getchell-Snohomish Aquifer as shown in Figure 7.6. The Marysville Trough Aquifer is a shallow aquifer; the Getchell-Snohomish Aquifer is an intermediate aquifer.

The Marysville Trough Aquifer is a large unconfined or water table aquifer. It extends from Arlington and the Stillaguamish River in the north and to Marysville and the Snohomish River in the south. The aquifer is contained within the Marysville sand recessional outwash, extending from the surface to 150 feet below the surface. The ground water generally flows in a south to southwest direction, perpendicular to the water table contours.

Figure 7.6

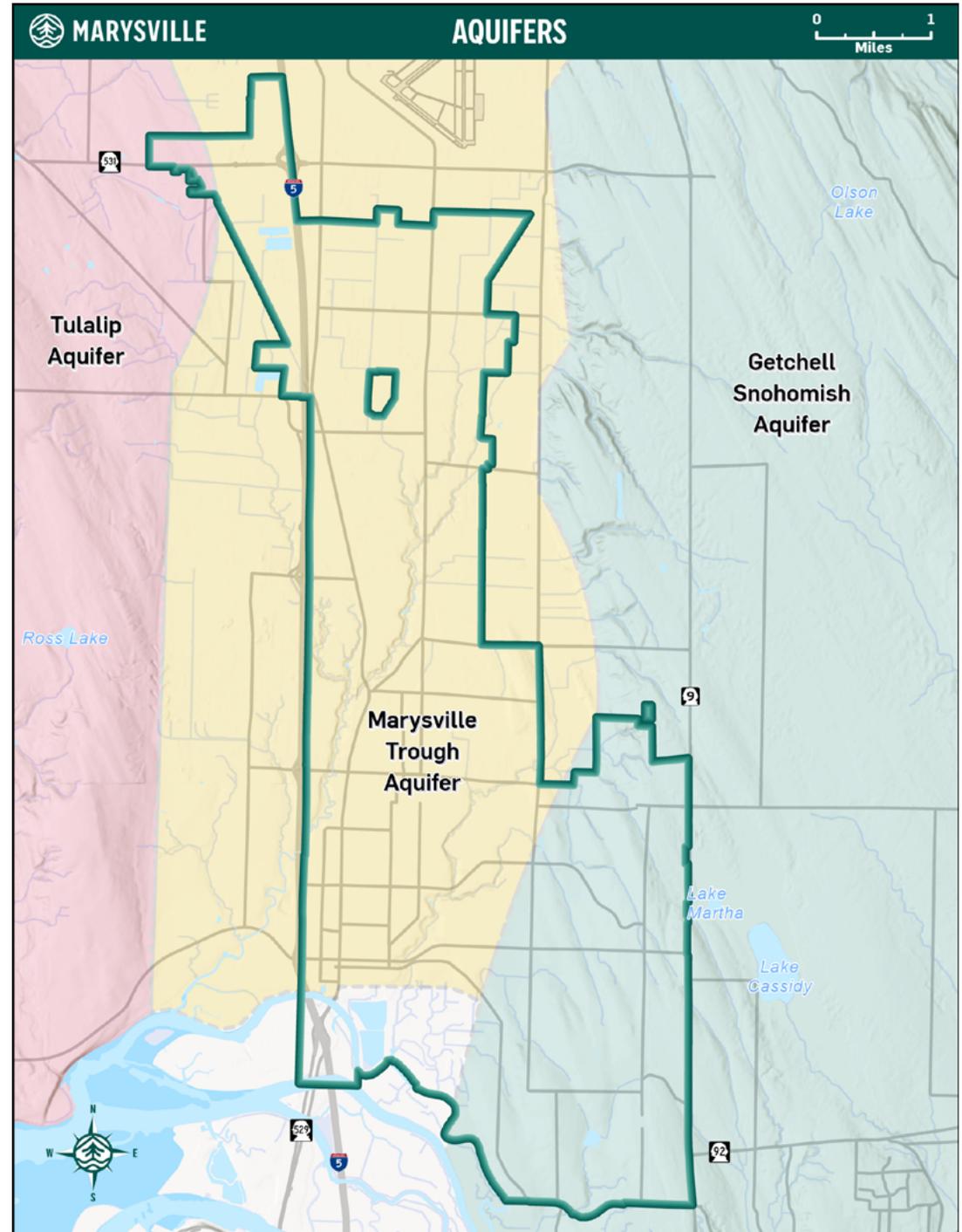
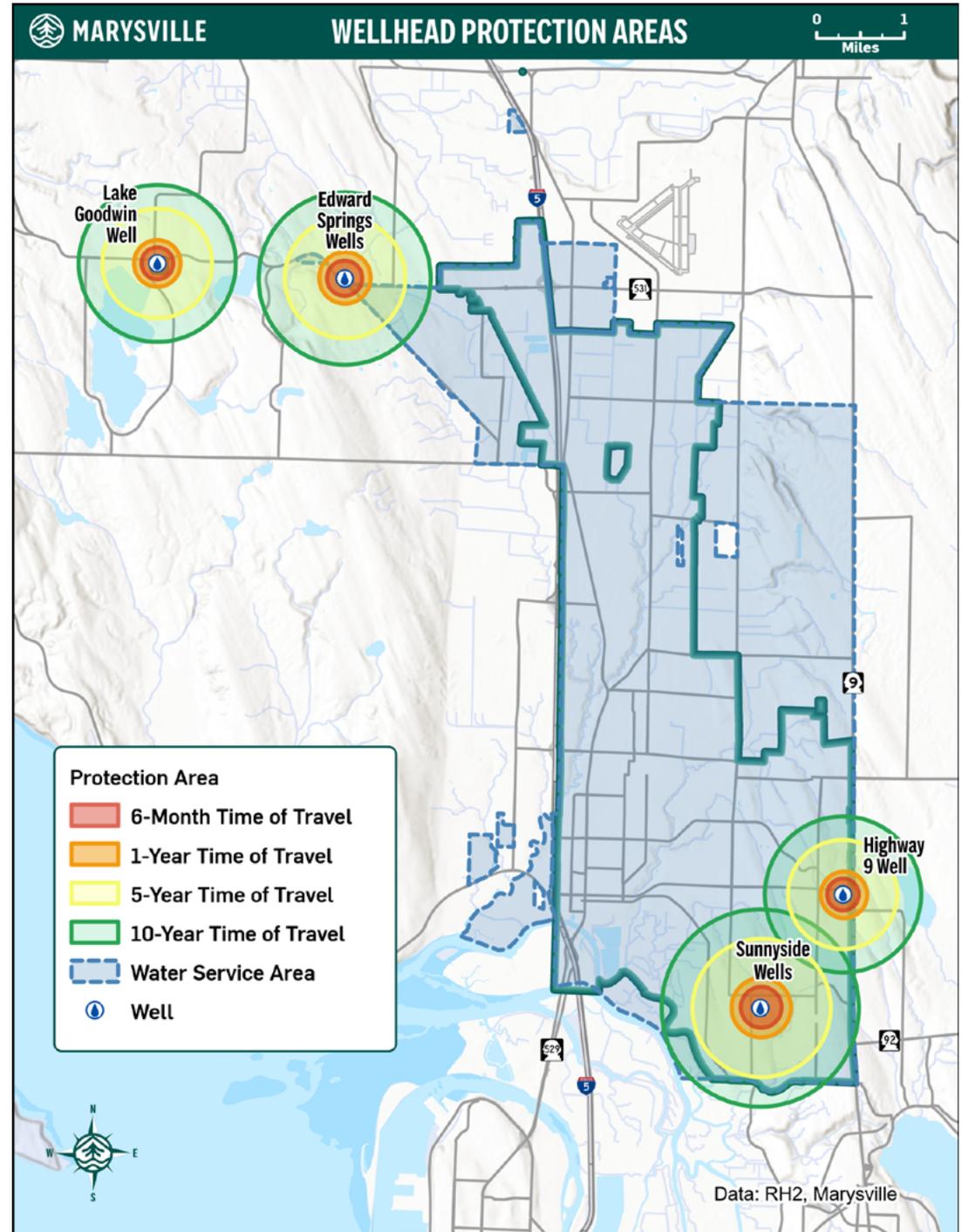


Figure 7.7

The Getchell-Snohomish Aquifer occurs in advance outwash deposits extending from Arlington to Snohomish just east of the Marysville Trough Aquifer. The aquifer is from 50 to several hundred feet deep. Ground water flow from the Getchell-Snohomish Aquifer is generally to the west in the watershed. This aquifer is considered confined even though ground water emerges where the Vashon advance outwash meets transitional beds, forming hillside springs and seeps and discharging into hillside headwater streams.

Sunnyside Wells 1R and 2 currently draw groundwater from the Getchell-Snohomish Aquifer, for potable use. The City began to utilize these wells for potable water, after the Sunnyside Water Treatment Facility was constructed in 2017. The Highway 9 Well is currently designated as an emergency backup, however, the City intends to maximize the water right to this source at a future date. Sunnyside and the Highway 9 Wells (shown in Figure 7.7) are classified as Critical Aquifer Recharge Areas (CARAs)^{137,138}. The City is required to classify, designate and regulate CARAs according to the State regulations.



137. Note: the City expects to eventually serve the properties on private wells with a public water system.

138. Critical Aquifer Recharge Areas (CARA) are defined under the GMA as "areas with a critical recharging effect on aquifers used for potable water, including areas where an aquifer that is a source of drinking water is vulnerable to contamination that would affect the potability of the water, or is susceptible to reduced recharge."

Shoreline and Floodplain Management

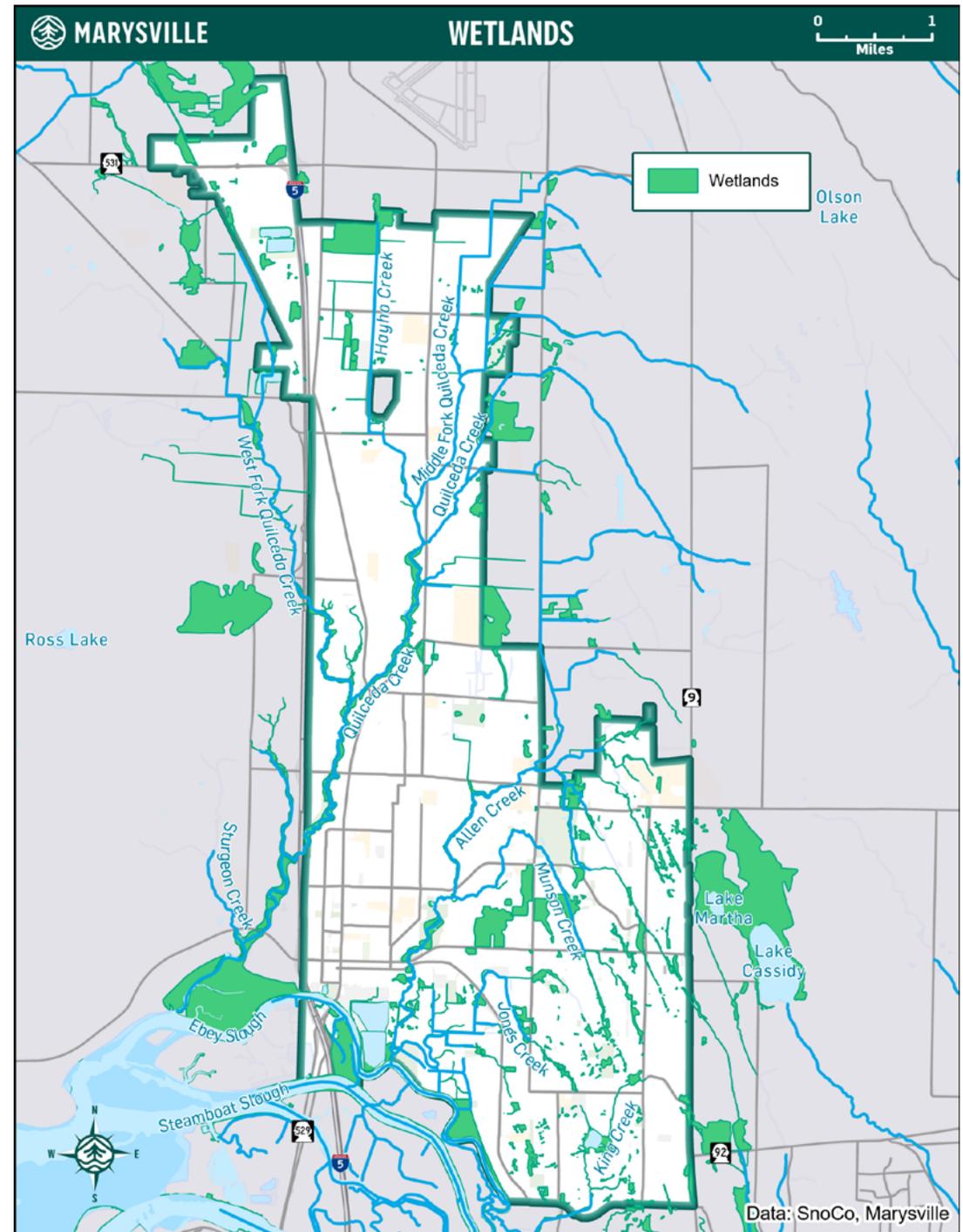
Streams and water bodies that fall within shoreline jurisdiction include Ebey Slough, Quilceda Creek, which flows from its confluence with the Middle Fork downstream to the mouth of Ebey Slough, and the West Fork Quilceda Creek along the eastern boundary of Interstate 5 to its confluence with the Mainstem Quilceda. Land use activities within these boundaries must obtain shoreline permits or shoreline substantial development permits regulated by the City and State Department of Ecology. Ebey Slough provides the single point of shoreline access (as opposed to creeks) within city limits.

The Federal Emergency Management Agency (FEMA) designated the reaches of Quilceda Creek downstream from 101st Place NE; Allen Creek downstream from 76th Place NE together with an upland bog immediately west of SR 9 and north of 108th Street NE; and the limits of the 100-year flood area associated with Ebey Slough as flood hazard zones. Any structures proposed to be constructed in any area designated as a flood hazard zone are required to be flood-proofed to assure that the City may continue to qualify for participation in the National Flood Insurance Program.

Wetlands

Wetlands provide many functions within the watershed. These include fish and wildlife habitat; water quality protection; groundwater recharge/discharge; and flood water storage and attenuation or desynchronization. There have been a number of surveys by Snohomish County, Marysville, and private surveys completed within the Marysville UGA to identify and classify wetlands. These inventories, however, represent only a portion of area wetlands. Of those identified, the majority of Category I, II and III wetland habitats are located within existing stream corridors. Most wetlands in the watershed are hydrologically connected either by ditch or as part of the stream as shown in Figure 7.8. Consequently, a high percentage of the wetlands in the watershed are significant for providing base flow to streams.

Figure 7.8



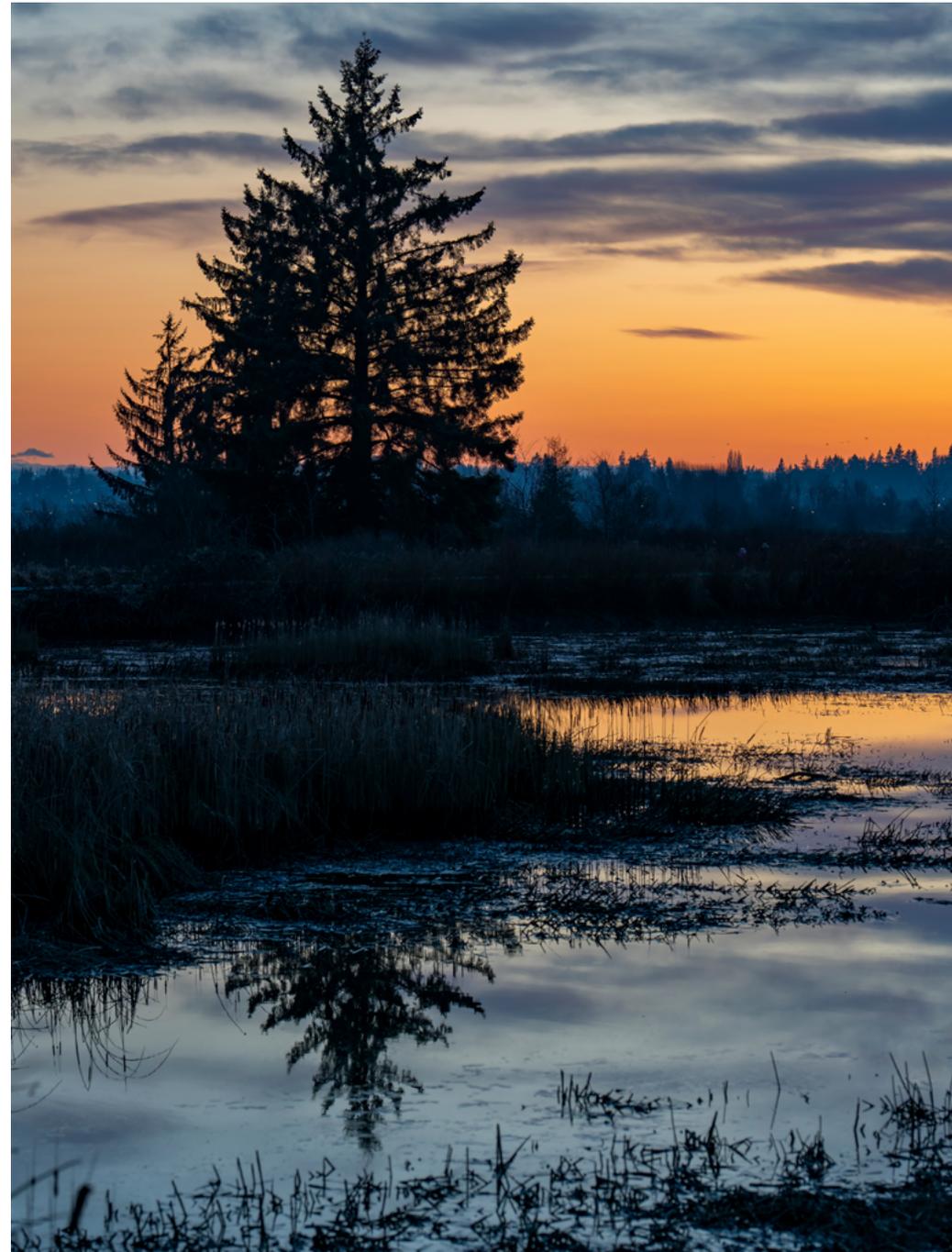
Stormwater

Residential, commercial and industrial development have both short-term and long-term effects upon the quality of surface and ground water resources. Increased storm water runoff results from removal of natural vegetation, draining and filling wetlands, disturbing soil structures by grading and compacting, and by covering land with impervious surfaces such as streets, parking lots, and structures. The unmitigated increased volume and rate of subsequent storm water runoff carries greater quantities of silt, debris, and chemical pollutants into the Quilceda and Allen Creek drainage system.

In 2022 the City of Marysville completed the Marysville Watershed Planning Basin Assessment and Prioritization which describes stream conditions inside city boundaries, and ranks areas for stormwater retrofits to improve stream water quality. This plan subsequently developed the Stormwater Management Action Plan (SMAP) describing the stormwater retrofits. These retrofits will be incorporated into subsequent Comprehensive Surface Water Plan updates.

The City of Marysville adopted its Comprehensive Surface Water Management Plan and adopted a rate structure in 2003 to address capital facility needs. The Comprehensive Surface Water Plan was updated in 2009 and 2017, with a future update scheduled to begin in 2024.

Coordination between Arlington, Marysville, Snohomish County and the Tulalip Tribes should occur to prevent further degradation of the natural system and property damage due to flooding and erosion.



Wetlands perform many important functions including enhancing water quality. Photo Credit: Mark J. Photography.

Section 7.5

VEGETATION

Certain areas within the City remain forested. No area has old growth timber since it was logged in the late 1800s and early 1900s; therefore, these areas are of second growth forest. They are found on undeveloped tracks, along creeks, ravines, and some wetlands, and as significant buffers along Interstate 5 and Highway 9. They have important functions as visual buffers, erosion prevention and maintaining topsoil, help with the conversion of carbon dioxide to oxygen, and provide habitat for wildlife. Most of the wildlife habitats coincide with the forested areas or areas with heavy vegetation. However, a significant stand of older trees, known as Mother Nature's Window, is situated at 55th Avenue NE and 100th Street NE.



Mature cedar trees and native understory along Quil Ceda Creek.



Section 7.6

FISH AND WILDLIFE HABITAT

The condition of fish habitat in watershed streams is variable. Coho spawning and good rearing habitat are found toward the headwaters (Figure 7.9); the heavily altered middle sections have significantly reduced habitat value; and the lower sections with their large ravines generally have good habitat value for an urban stream system. There is one lake within the Marysville UGA. Largemouth bass, pumpkinseed and rainbow trout are planted in Twin Lakes by the Washington Department of Fish & Wildlife and other parties.

The majority of the City's wildlife habitat is found in areas with dense vegetation or second growth forests. This covers the habitat that is suitable for salmonid spawning and rearing at the headwaters of numerous tributaries of Allen Creek and Quilceda Creek. Along with resident cutthroat trout habitat in the Edgecomb Creek headwaters, numerous areas of the Quilceda Creek system provide healthy habitat for spawning and rearing Coho and Chum salmon. Due to the rarity of buffers in agricultural fields, fish habitat in agricultural areas has decreased. Erosion has reduced the amount of spawning habitat in the Allen Creek system, resulting in stream beds becoming filled with mud and silt, canary reed grass growing in streambeds and channelized areas of the system, and the elimination of wetlands. Though not as much as the aforementioned species, chinook salmon, steelhead, and rainbow trout also make use of the streams in the Quilceda and Allen Creek watersheds.

Quil Ceda Creek System

Quilceda Creek and its tributaries provide good spawning and rearing habitat for salmonids, as well as supplying resident fish habitat. The mainstem Quilceda Creek provides about one and a half miles of spawning habitat towards the headwaters. Very good salmon rearing habitat and resident fish habitat are found throughout the stream. A riparian buffer of from 100 to 200 feet in width, and adjacent wetlands, protect the creek along most of the length except as it passes through agricultural land.

The West Fork Quilceda Creek has patchy spawning and good rearing habitat in the lower and middle sections. Coho and chum spawning habitat occurs east of I-5. Coho and chum also spawn in some of the tributaries and channeled streams. Most of the stream sections that flow through agricultural lands have been highly modified, significantly reducing habitat values.



Streams provide important fish and wildlife habitat.



Salmon rely on streams for spawning and rearing.

Fish spawning habitat occurs throughout the Middle Fork Quilceda Creek in both long reaches and isolated spots. Chum spawning occurs north of the confluence of the Middle Fork with Quilceda Creek. A 75 to 100 foot riparian buffer exists along the creek through portions of residential development, but has been removed where the creek flows through farm fields.

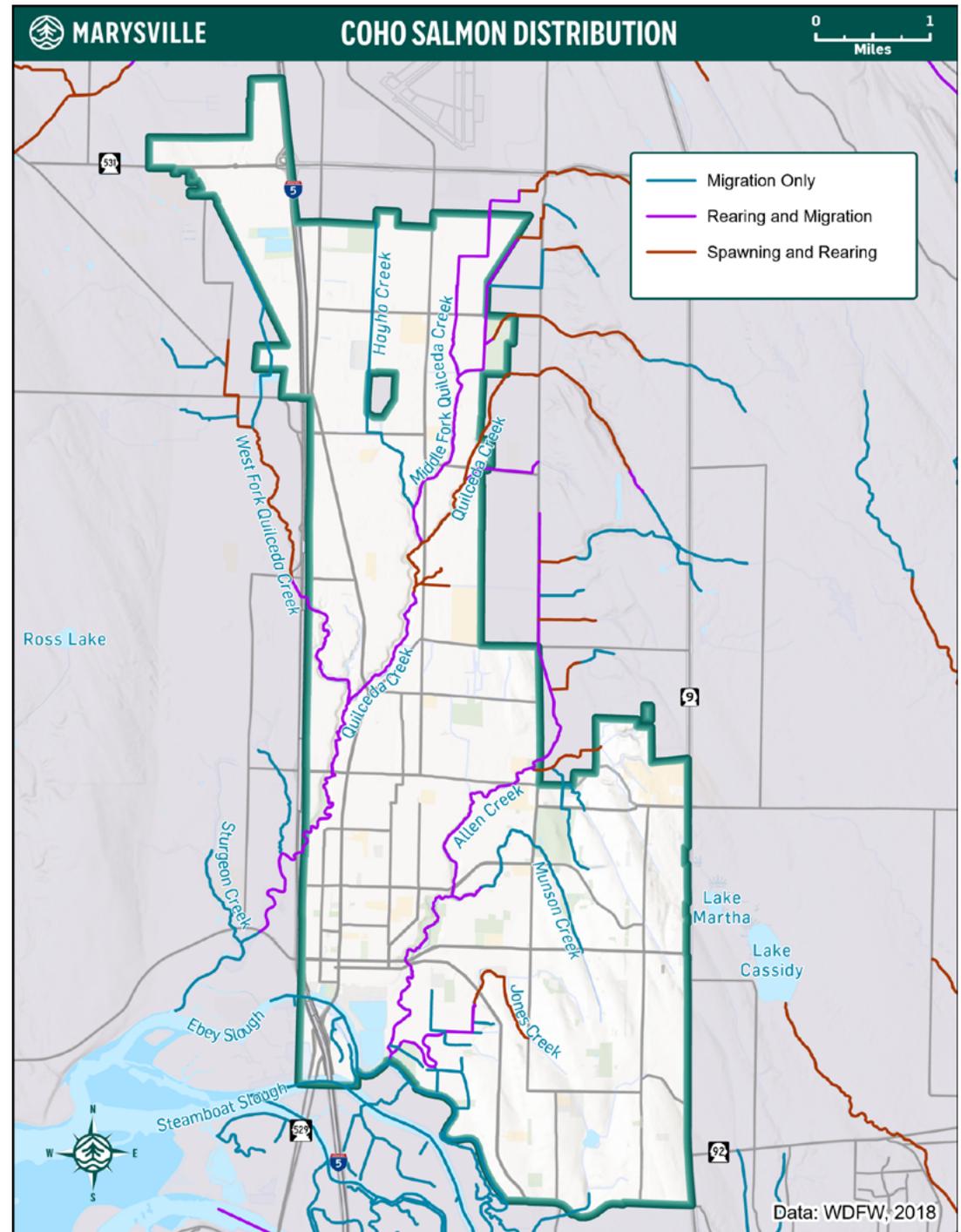
The headwaters of Edgecomb Creek, a tributary to the Middle Fork, contains spawning habitat for coho salmon and resident cutthroat. The spawning habitat extends south of 172nd Street NE, for over two miles through a newly relocated and enhanced stream and wetland mitigation corridor. This stream flows through Arlington and Marysville, west of 67th Avenue NE following the west side of the BNSF railroad tracks. Additional spawning habitat for chum salmon has been identified from the confluence with the Middle Fork Quilceda Creek for about a half mile of stream.

Olaf Strad Creek, another Middle Fork tributary, is spring fed and provides good spawning habitat at its headwaters. Steelhead redds have been observed in this stream. The headwaters are protected with forested vegetation, but there is little overstory vegetation where the stream enters farmland.

Allen Creek System

Salmon spawning habitat occurs toward the headwaters of Allen Creek east of 67th Avenue NE and along the stream south of 108th to 88th Streets NE. The creek has good rearing habitat in many sections including some of the east bank tributaries. Below its confluence with Munson Creek, the stream bottom is mud and silt, and spawning habitat is lacking. A small wooded buffer and wetland system protect the creek from Jennings Park south to Sunnyside Boulevard. North of Jennings Park, the buffer is 100 to 200 feet, but shrinks as it nears agricultural land and 67th Avenue NE, where little vegetation has been retained. Below Sunnyside Boulevard, Allen Creek flows through floodplain farmland where much of the channel is choked with sediment and reed canarygrass.

Figure 7.9



Rearing habitat is available in the unnamed east bank tributary to Allen Creek (WRIA 07-0079) that has been channeled along 112th Street NE. There is some spawning habitat, but much of the stream has filled in with reed canarygrass. Habitat projects built in the stream channel no longer function properly.

Munson Creek has spawning and rearing habitat throughout, but construction activities and urban impact has severely degraded the stream and eliminated wetlands.

Wetlands play a critical role in protection of fish and wildlife habitat. Wetlands provide a steady water source and reduce stream degradation from uncontrolled stormwater runoff. A significant portion of wildlife species occurring in western Washington, use wetlands or riparian habitat during their life cycle. Many wildlife species occur only in wetlands, while many more spend a portion of their life cycle in wetlands. They improve water quality through biofiltration of surface water, nutrient uptake by vegetation, binding by soils particles, and/or by providing a settling basin for suspended solid deposition. Wetland soils can extend stream flow and recharge over long time periods, and they can act as recharge areas for stream channels during dry periods. Wetlands also assist in reducing runoff quantity and velocity during storms. Wetland flood storage plays a critical role in tempering downstream flooding impacts within the watershed and can also be important in preventing scouring of salmonid spawning beds in stream gravels.



*Critical areas and buffers provided important habitat for both fish and wildlife.
Photo Credit: Mark J. Photography.*

Qwuloolt Estuary Restoration Project

The Qwuloolt Estuary Restoration Project is a combined effort among the Tulalip Tribes, Army Corp of Engineers, Department of Ecology, National Oceanic and Atmospheric Administration (NOAA), Washington Department of Fish and Wildlife (WDFW) and the City of Marysville to restore approximately 400 acres of tidally influenced estuary. This restored ecosystem includes both wetland and riverine habitats in the Allen creek basin. This area is located at the southern edge of Marysville, at the confluence of Allen Creek and Ebey Slough. The area was diked for farming in the 1800s, dramatically changing the floodplains' vegetation and wildlife regimes. Restoration of the site began in 2012, with the creation of tidal channels, mowing and tilling of existing invasive vegetation, and planting of native species to form plant communities. The Army Corp of Engineers began construction in 2014 of a new levee system to protect the Industrial Park at 56th Place NE and 48th Drive NE and the historic levee was breached August 28, 2015. The city continues collaborating with Tulalip tribes to monitor and control invasive species within the wetlands. The Department of Ecology and the Army Corps of Engineers monitor the site periodically. The next monitoring date is 2025.



The Qwuloolt Estuary Restoration restored over 400 acres of tidally influenced estuary.

CLIMATE CHANGE

Marysville Climate Change Initiatives – History and Background

In May of 2010, the Marysville City Council formally adopted Resolution 2286 establishing a strategy to manage and reduce energy, fuel consumption and greenhouse gasses (GHG). During the review process, the Council expressed some concern regarding the uncertainty of climate change, but recognized that although there is not clear consensus about exactly what will occur, some changes are likely inevitable. Components from Resolution 2286 were incorporated into the 2015 Comprehensive Plan update.

The existing climate change section is now expanded to: address Puget Sound Regional Council (PSRC) Vision 2050 requirements; plan for approaching mandatory State regulations; and address Marysville-specific climate change issues. The Growth Management Act regulations require Marysville to adopt a formal (and more elaborate) Climate Change and Resiliency Element by 2029 including providing measurable actions to reduce greenhouse gas (GHG) emissions.

In May of 2023, the Marysville City Council approved Resolution 2529, to utilize the Climate Change and Vulnerability and Risk Assessment Study (CVA) prepared by Cascadia Consulting as a resource to further inform the City's Comprehensive Plan in order to address issues surrounding the environment and climate change.

Extreme weather events such as droughts, flooding, and extreme heat pose risks to health, infrastructure, natural areas, and the economy in Marysville. Planning is necessary to address future impacts that could occur as a result of these events. The following sections will summarize the findings of the CVA.



Trees and parks provide a reprieve from extreme heat.

Climate Vulnerability Assessment (CVA) Summary

The CVA was prepared to analyze Marysville's communities, economy, natural areas and infrastructure and the potential climate change effects to these areas. The study assessed four areas including; the physical vulnerability of infrastructure and natural areas, as well as the social vulnerability of neighborhoods (or communities) and economy. Impacts to these four areas anticipated are, increasing winter storms and flooding, higher temperatures and extreme heat, changing stream flows, rising sea levels, and more frequent and intense wildfires and smoke events.



CVA Key Findings

The CVA's key findings identified areas of vulnerability within Marysville as it relates to the social and physical realms.

The social impacts identified are summarized below.

The CVA found that certain areas and communities (located in the northeastern and central census tracts of Marysville) are more vulnerable to climate change because of:

- Higher rates of respiratory illness and mortality related to poor air quality for longer periods of times;
- Food access and security due to proximity to grocery stores; and
- Fewer areas with open spaces and tree canopy coverage.

Areas in the southern part of Marysville are exposed more to flooding impacts which are anticipated to occur more often and more intense within the 100-year and 500-year floodplain (floodplain).

Disruptions (short term and long term) will occur to businesses and the workforce as a result of sea level rise, flooding and extreme heat events. Businesses and workers located in the floodplain are most at risk for flood damage. Outdoor occupations (such as construction) will see reduced labor during extreme heat events. The ability to adapt to climate change related monetary impacts will be more difficult for small businesses, and for residents who are unemployed, elderly, low income and/or disabled.

The physical impacts identified are summarized below.

- Ebey Slough and the associated critical areas and habitat areas face more risk of erosion and flooding. The City received grant funding to increase levee heights to address: 2023 sea level rise projections, flood mitigation, and estuary restoration.



The City received grant funding to increase levee heights to address sea level rise projections, flood mitigation, and estuary restoration.

- Increasing temperatures and more intense rainfall patterns cause risks for forested areas and salmon. Elevated stream temperatures and insufficient flows in streams can harm salmon migration and spawning. Mortality of trees can occur in the floodplain, near the shoreline or land hazard areas when there is an extreme weather event.
- Marysville's transportation systems, roads, wastewater treatment plant, stormwater conveyance infrastructure and sewer facilities, within the floodplain or near the shoreline area, are subject to risk due to flooding and sea level rise.
- Very hot summers or heat events (occurring more often and more extreme) will cause a surge in energy usage (from air-conditioning) causing strains on the electricity systems resulting in potential power outages. Residents with low income have a higher chance of occupying housing with poor insulation or limited weatherproofing and will be overburdened by higher power bills.
- The majority of the electricity supply in Marysville is from hydropower. Increasing temperatures and extreme rainfall can cause damage to dams due to overtopping. Diversifying the City's energy options is included in the policy section below.
- Portions of the British Petroleum (BP) Pipeline are within the floodplain which poses a risk of pipe damage due to flooding.

Existing and Proposed CVA Policies

Marysville previously adopted several climate change adaption policies within the 2015 Comprehensive Plan. Additional policies are included to address the CVA results, PSRC requirements and to plan for approaching climate change State mandates. By 2029, the City will be required to modify the climate change section within its Comprehensive Plan and municipal codes to further elaborate on these policies, create action items to address climate change, and to track, measure, and reduce GHG emissions.



Infrastructure and structures near the shoreline or floodplain are subject to risk of flooding and sea level rise. Photo Credit: Mark J. Photography.

GOALS AND POLICIES

Environmental Goals and Policies Format

Please note, in other chapters, the goals and policies format includes one goal followed by the related policies for that goal. In this chapter, the goals and policies format includes one category (such as General Environmental Goals and Policies, Environmentally Sensitive Lands Goals and Policies, etc.) followed by a group of goals and a group of policies that relate to the overarching category. Goals are numbered as EN X and policies as EN O.X.

General Environment

GOALS

EN 1 Pursue effective policies, regulations, management practices, and capital projects that result in improvements, preservation and/or enhancement of the natural environment.

EN 2 Protect life and property from floods, landslides, erosion, uneven settlement, and other disruptions that may be associated with natural hazard areas.

EN 3 Design and build developments in a manner that respects and retains ecosystem services, natural elements, vegetation and critical areas, with emphasis on streams, creeks and other bodies of water; and on wetlands, and steep slopes.

EN 4 Promote innovative and environmentally sensitive development practices informed by Best Available Science in siting, design, materials selection, construction, and maintenance.

EN 5 Recognize the benefits provided by ecosystem services and incorporate these functions into developments by using applicable green infrastructure tactics.

EN 6 Support programs to ensure that all residents, regardless of race, social, or economic status, have clean air, clean water, and other elements of a healthy environment and prioritize the reduction of impacts to vulnerable populations that have been disproportionately affected.

EN 7 Support and incentivize environmental stewardship on private and public lands.

EN 8 Advance integrated and interdisciplinary approaches for environmental planning and assessments



POLICIES

- EN 0.1** Recognize the natural environment as an integrated unit composed of interacting land, water, and air resources. Make every effort to ensure that the health and stability of this resource system is protected and maintained.
- EN 0.2** Recognize the interrelationship of habitat corridors with parks and open space and prioritize the connection and enhancement of these valuable linkages in order to promote no net loss of ecological function while enhancing recreational opportunities.
- EN 0.3** Educate the public concerning the importance of maintaining and conserving environmentally sensitive lands, natural resources, climate change impacts on health and safety, flood risk, practices that maintain or improve air quality, and the cultural environment.
- EN 0.4** Encourage property owners to utilize the Open Space Current Use Assessment Program to preserve significant areas of environmental concern, particularly wetlands.
- EN 0.5** Identify open space, trails (including pedestrian and bicycle trails), and park resources and needs, and develop programs for protecting and enhancing these areas.
- EN 0.6** Regulatory programs developed for the protection of the natural environment shall provide certainty, clarity, flexibility, efficiency, public outreach, and education so that: people understand the requirements, permits are processed quickly, and alternative approaches that provide equal or greater protection to the environment may be considered.
- EN 0.7** Create programs and/or development regulations that allow for flexible site design for innovative solutions for critical area protection, and consideration of site constraints and characteristics.
- EN 0.8** Encourage all future development to occur in a manner that will first avoid critical areas impacts where such avoidance is feasible and reasonable. In appropriate circumstances, impacts to critical areas resulting from regulated activities may be minimized, rectified, reduced or compensated for, consistent with the requirements of the City's Critical Areas Ordinance.



Kildeer eggs.

Environmentally Sensitive Lands

GOALS

EN 9 Ensure no net loss of ecological function of natural features in areas potentially sensitive to development. This includes areas that have features such as steep slopes, severe erosion, foundation instability, seasonally wet soils, or any other critical areas.

EN 10 Areas of significantly forested and vegetated areas should be maintained. These areas provide shade over impervious surfaces – reduce heat island effects, increase filtration of harmful road-related runoff, provide habitat for avian and terrestrial wildlife species, contribute to aesthetic value, assist in noise buffering, and more.

POLICIES

EN 0.9 Utilize natural features to provide visual variety, community identity, and open space areas.

EN 0.10 Encourage development to consider the inherent characteristics of the predominant soil type(s).

Earth

GOAL

EN 11 Restrict clearing and grading on steep slopes, near streams, or high-predisposition Tokul soils. The City and County should collaborate to identify areas unsuitable for urban development and future UGA expansions due to soils, topography, ecosystem service value, and watershed impact.

POLICIES

EN 0.11 Utilize natural features to provide visual variety, community identity, and open space areas.

EN 0.12 Encourage development to consider the inherent characteristics of the predominant soil type(s).





Sunrise paints the sky over the Qwuloolt Estuary and Cascade Mountain range. Photo Credit: Mark J. Photography.

Water Quality, Wetland and Watershed Protection, Stormwater Runoff and Drainage

GOALS

EN 12 Coordinate with adjacent jurisdictions, tribes, countywide planning groups and watershed groups to protect critical areas, habitat, water quality, and Critical Aquifer Recharge Areas (CARAs).

EN 13 Promote the preservation and improvement of water quality by recognizing the importance of land within and adjacent to streams, shorelines, and watercourses to provide and sustain water resources for humans, natural processes, and wildlife use.

EN 14 Continue to deliver on the goals and actions outlined in the Marysville Watershed Planning Basin Assessment and Prioritization report and the Marysville Watershed Planning Stormwater Action Plan, prioritizing areas with a high level of environmental importance that have also been impacted by development.

POLICIES

- EN 0.13** Protect, restore and/or enhance natural systems, critical areas, hydrological functions and water quality, including restoring shorelines and estuaries, removing fish-blocking culverts, reducing use of toxic products, and retrofitting basins to manage stormwater.
- EN 0.14** Density credits should be given when vegetation is retained and open space or buffer areas provided, above and beyond what code requires.
- EN 0.15** Utilize the natural drainage system where it is possible to do so without significantly altering the natural drainage ways or upgrading a public storm drainage system.
- EN 0.16** Recognize the inter-jurisdictional characteristics of storm drainage management problems and work with Snohomish County, other jurisdictions, and area-wide residents to improve storm drainage.
- EN 0.17** Promote advanced planning and subsequent monitoring to mitigate development impacts through area wide wetland surveys, wetland banking and mitigation projects.
- EN 0.18** Review and update development codes and design standards to comply with State stormwater requirements, pursue nature-based solutions and low-impact development, and minimize impervious surface areas in private development and city capital improvements.
- EN 0.19** Account for climate change impacts in planning, designing, and operating stormwater management approaches, including infrastructure and best management practices.
- EN 0.20** Improve real-time forecasting of water delivery and basin yields to improve management of stored water.
- EN 0.21** Improve provision of technical assistance and incentives to increase storage capacity and to improve conservation, reuse, and water use efficiency among all consumptive water uses.

Wildlife

GOAL

- EN 15** Encourage the preservation of wildlife, their habitats and refuges.

POLICY

- EN 0.22** Preserve fish and wildlife habitats conservation areas by requiring adequate setbacks of development from creeks and tributaries and by limiting alterations to natural vegetative cover through development restrictions. Also coordinate with other agencies to manage or improve conditions for wildlife and habitat in streams, anadromous fisheries, drainage ways, wetlands, and other watercourses.



Cultural Resources

GOAL

EN 16 Protect and enhance Marysville’s cultural heritage.

POLICIES

EN 0.23 Encourage coordination between public and private entities to identify, preserve and restore buildings, structures, objects, and sites having historical and cultural significance or interest.

EN 0.24 Protect scenic views and sites so present and future generations may enjoy them.

EN 0.25 Archeological and historic resources should be surveyed as part of the development review process.

EN 0.26 Work with the Washington State Department of Archaeology and Historic Preservation (DAHP) and local tribes to help identify cultural resources and coordinate when cultural resources are identified.

Climate Change

GOALS

EN 17 Work with public and private partners to develop strategies and programs, that can be used by both the public and private sectors, to prepare for and mitigate the potential impacts of climate change.

EN 18 Account for climate change impacts when planning, siting, designing, and operating capital facility, utility, and infrastructure projects.

EN 19 Develop programs and strategies that will encourage the retrofitting of existing development and infrastructure to mitigate and adapt to the effects of climate change.

EN 20 Develop policies, programs, and projects that equitably reduce climate change impacts on vulnerable communities and increase resilience.

Air Quality

- EN 0.27** To protect local and regional air quality, the City shall coordinate with county, regional, state, and federal agencies with air quality responsibilities, and seek to ensure that the City's programs and transportation projects are designed and implemented to conform to the provisions of the state and federal Clean Air Act.
- EN 0.28** Ensure all federal and state air quality standards are met to reduce emissions of air toxics and greenhouse gases.
- EN 0.29** Develop policies and strategies to reduce greenhouse gas emissions.
- EN 0.30** Continue cooperative education efforts with the Marysville Fire District regarding burn bans and outdoor burning to promote air quality improvements.
- EN 0.31** Protect, restore and manage native vegetation, tree canopy and forests (including parks, greenbelts and urban forests).
- EN 0.32** Protect and restore natural resources that sequester and store carbon.

Energy Efficiency

- EN 0.33** Promote the use of conservation, alternative energy sources including solar energy, and energy management technology where feasible.
- EN 0.34** Prioritize EPA Energy Star-certified and high-efficiency devices to reduce electricity consumption.
- EN 0.35** Promote sustainable building practices such as Leader in Energy and Environmental Design (LEED), Evergreen Sustainable Development Standard (ESDS) or a similar system.
- EN 0.36** Staff shall recycle, and reduce paper consumption and plastic bottle use.
- EN 0.37** The City will continue to participate in the Commute Trip Reduction (CTR) program.

Planning and Risk Assessment

- EN 0.38** Develop a comprehensive approach to manage low flow conditions and drought response, taking into consideration the needs of the environment, agriculture, and vulnerable communities.
- EN 0.39** Support enhanced data collection for hazard events to provide a fuller understanding of the community's hazard characteristics—including identifying demographic groups/community members most vulnerable to hazard events.

Natural Emergency Preparedness

- EN 0.40** Improve capability to rapidly assess and repair damaged transportation infrastructure, in order to ensure rapid reopening of transportation corridors.
- EN 0.41** Integrate local climate impacts risk assessment, as applicable, into hazard mitigation planning.
- EN 0.42** Implement an urban heat resilience plan, incorporating heat mitigation and management actions, informed by heat island mapping, and involving cooling centers, early warning systems, and energy grid resilience.
- EN 0.43** Revise land use codes to promote passive cooling, energy-efficient technologies, and green spaces to mitigate urban heat island effects.
- EN 0.44** Prioritize equitable access to emergency preparedness resources for vulnerable populations and areas. Develop and distribute tools and resources for the community to stay safe during extreme heat events.



Wildfire Risk

- EN 0.45** Develop short- and medium-term adaptation strategies for urban forests and other fire-prone habitats, and improve development standards.
- EN 0.46** Collaborate with community partners to establish resilience hubs as clean air centers for public use during wildfire smoke events, especially in areas with poor air quality and limited air filtration access.
- EN 0.47** Provide community education and outreach on wildfire smoke mitigation practices.
- EN 0.48** Develop community wildfire preparedness, response, and recovery plans.

Prioritize Green Spaces and Shade Coverage

- EN 0.49** Review, update, and implement tree protection codes to increase tree retention. Encourage the protection, maintenance, and expansion of tree canopy throughout the community, prioritizing residential and mixed-use areas with the least current tree canopy to equitably distribute benefits.
- EN 0.50** Actively manage municipal forests (e.g., parks and greenbelts) to protect residents, and improve ecosystem health and habitat.

Shorelines and Flood areas

- EN 0.51** Collaborate with scientific community, agencies, and jurisdictions to develop science-based estimates of coastal flooding impacts, incorporating future climate conditions in land use, Flood Hazard Management, and comprehensive planning.
- EN 0.52** Prioritize coastal restoration to promote ecosystem resilience, considering sea level rise impacts.
- EN 0.53** Increase resilience to flooding, and protect, restore, and enhance existing flood storage, conveyance, and the ecological functions and values of floodplains, wetlands, and riparian corridors.

- EN 0.54** Maintain existing water levels of perennial water bodies and update local land use codes to reduce the risks of sea level rise for shoreline development.
- EN 0.55** Preserve and develop direct and visual public access to water, including public docks, aquatic recreation, marine facilities, and scenic vistas, where consistent with the Shoreline Management Act.
- EN 0.56** Discourage construction in designated flood hazard areas, and prohibit it in floodway areas. Developments in designated flood hazards areas shall be adequately flood-proofed.
- EN 0.57** Provide continued maintenance of established flood control facilities along rivers and creeks that protect existing populations and developments.
- EN 0.58** Identify and reduce flooding through improvements to drainage systems and reductions in impervious surfaces and runoff.
- EN 0.59** Conserve and utilize shoreline and flood plain areas within the City consistent with the City's Shoreline Management Master Program.



Native plants contribute to a healthy environment. Photo Credit: Mark J. Photography.