VI. ENVIRONMENTAL ELEMENT

INTRODUCTION

Protecting the natural environment, including environmentally sensitive lands in developed areas of Marysville requires: preserving the ecological balance, improving air and water quality, retaining some open space in its natural state, protecting groundwater from pollution, providing public access to and setbacks from environmentally sensitive lands, and protecting wildlife habitat.

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 Study Area 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 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.

A. BACKGROUND[1]

I. 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.

a. Geology

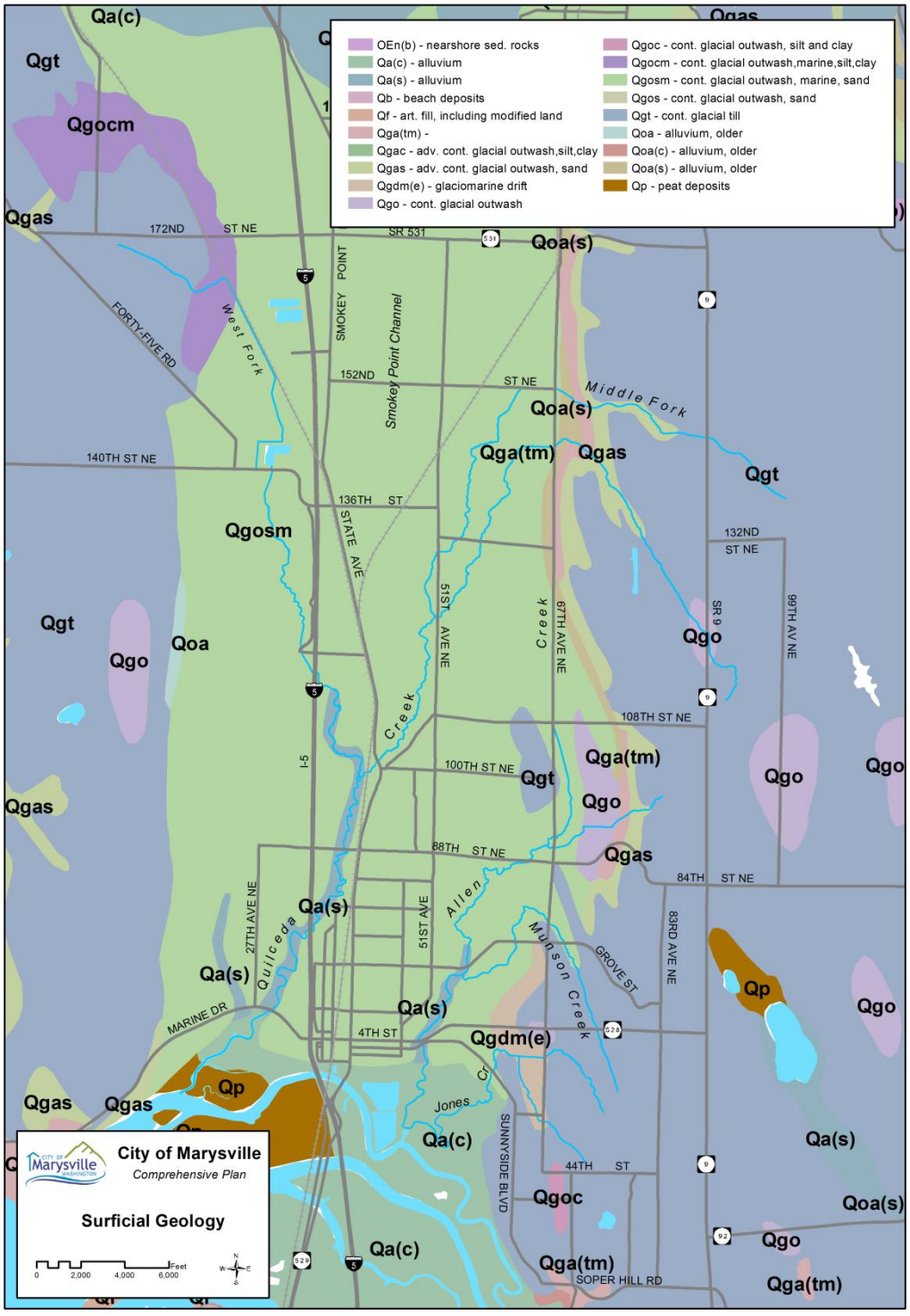
Geology is important in determining landforms, stream characteristics, and soil types. Runoff processes are characterized by the permeability, depth, and porosity of soil and bedrock. Soils and rock types affect erosion processes and the sediment delivery rate. Geologic features control stream gradient 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. Surficial geology is shown in Figure 6-1. 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.

[1] Source: Quilceda/Allen Watershed Management Plan

Figure 6-1 Surficial Geology



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.

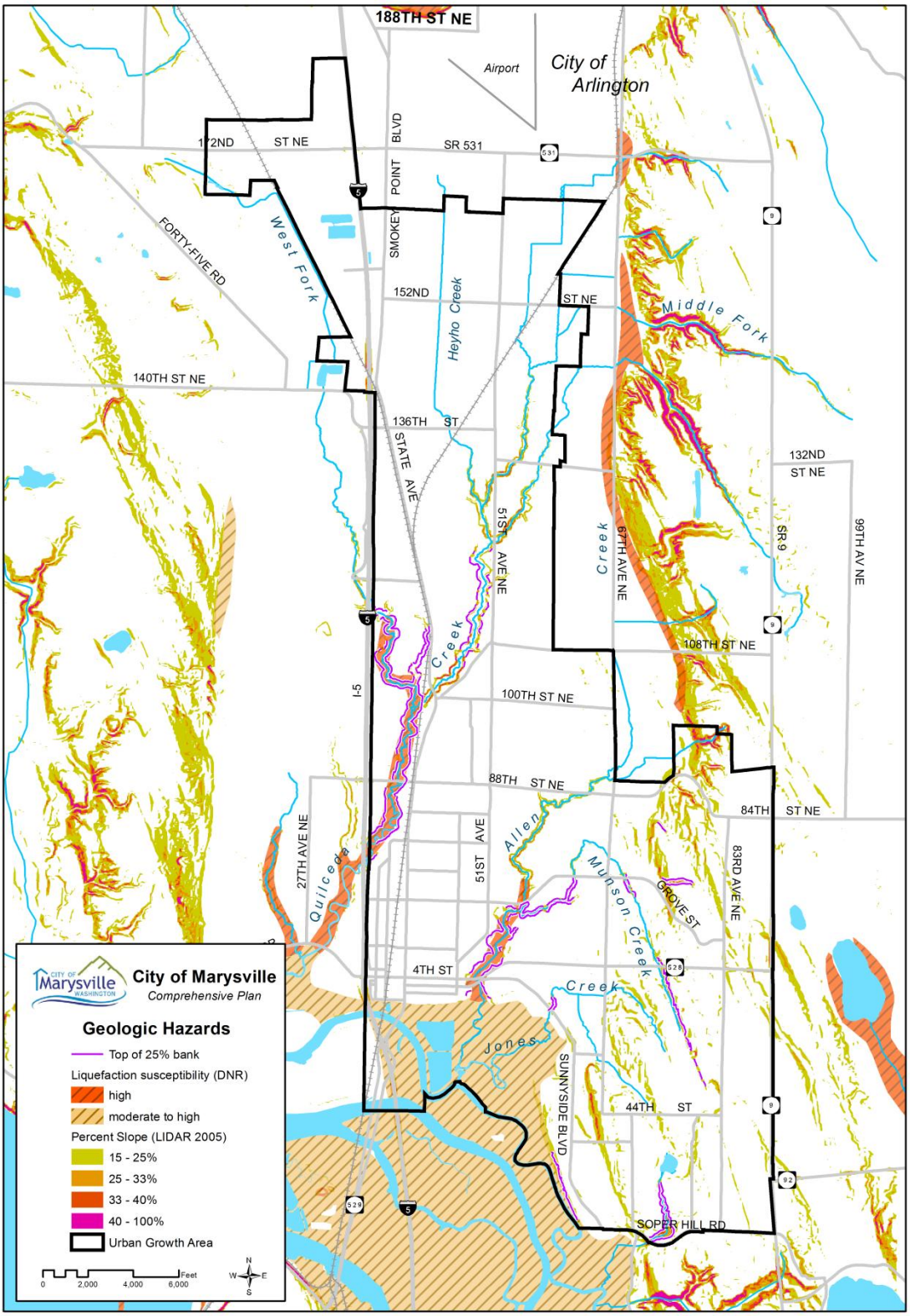
At some time during this glacial event, the Puget Lobe dammed the Stillaguamish River valley and glacial flow was deflected southward, eroding the Marysville Trough Valley. As the Puget Lobe receded out of the area, extensive deposits of recessional materials were laid down on the Vashon Till. This recessional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

b. 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 6-2. 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.

Figure 6-2 Geologic Hazards



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.

c. 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 Study Area 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 Study Area. The Marysville Trough contains primarily the Indianola-Hale-Custer and the Indianola-Everett-Ragnar soil series as shown in Figure 6-3.

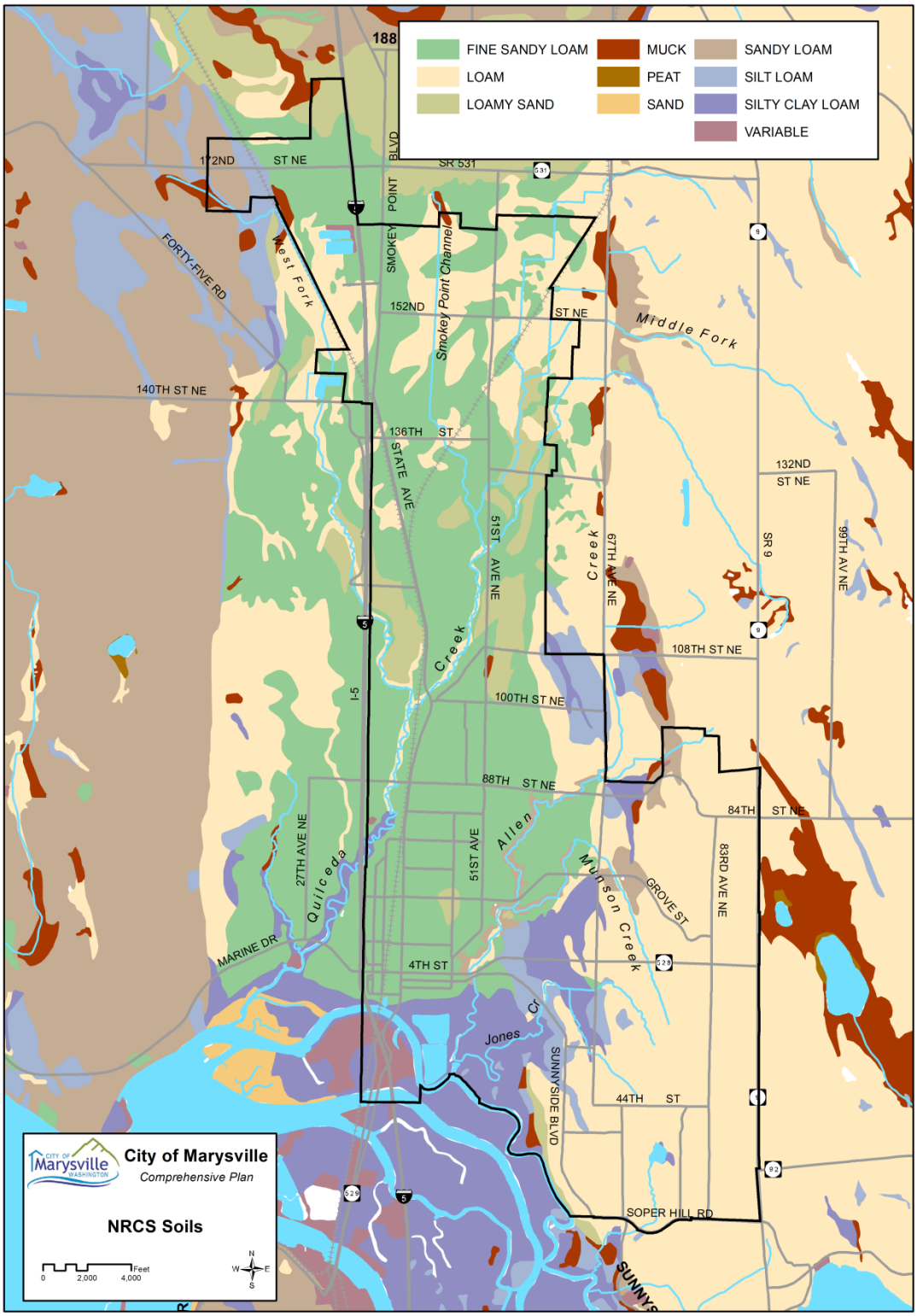
The Indianola-Hale-Custer soil series consists of poorly and somewhat excessively drained soils underlain by sand. The majority of well drained soils in this series have been previously developed while the preponderance of poorly drained soils has remained in agricultural use.

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 Study Area 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 6-3 Soils



II. 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 vehicular and marine traffic, industrial emissions, wood stoves and fireplaces, outdoor burning, and other sources such as lawnmowers, aircraft, trains, and other recreational vehicles. Motor vehicles contribute approximately 57% of the air pollution in the State of Washington. The primary pollutants are PM10/PM2.5 (particulate matter), carbon monoxide, nitrogen dioxide, ozone, sulfer dioxide, and lead.

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 health categories. The air quality index scale is shown in Table 6-1.

Table 6-1 Air Quality Index

AQI Value	Rating
0 to 50	Good
51 to 100	Moderate
101to 150	Unhealthy for sensitive groups
151 to 200	Unhealthy
201 to 300	Very unhealthy
301 and above	Hazardous

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. When necessary, the agency calls an air pollution watch to reduce particulate matter pollution by voluntary curtailment of wood burning. Burn bans are issued when real-time monitoring data shows "impaired air quality" as defined by State law. An ozone "smog watch" is called to target mobile combustion sources for voluntary reductions to prevent ozone standard exceedances.

A geographical area is designated as a "nonattainment area" if any one of the federal air quality standards if violated. A nonattainment area must develop and follow a plan to meet and maintain the federal air standards. Once the standards are met, the area is redesignated as a "maintenance area". Puget Sound (King, Pierce, and Snohomish Counties) are maintenance areas for ozone and carbon monoxide.

III. Water Resources

a. Surface Water

Surface water resources within the Study Area 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 6-4.

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.

b. 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 6-5. 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.

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 through ground water emerges where the Vashon advance outwash meets transitional beds, forming hillside springs and seeps and discharging into hillside headwater streams.

The aquifers underlying the City are not used for public potable water supplies, and where there are private wells, the City expects to eventually serve the properties with a public water system. Therefore, the aquifers are not "critical areas" as defined by RCW 36.70A. However, the aquifers are important for stream base flow and associated fish and wildlife conservation areas, and measures exist for stream and wetland protection in the City's critical areas regulations.

c. Shoreline and Floodplain Management

Streams and water bodies that fall within shoreline jurisdiction include Ebey Slough, Quilceda Creek, which has a mean annual flow of 20 cfs 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.

Figure 6-4 Streams

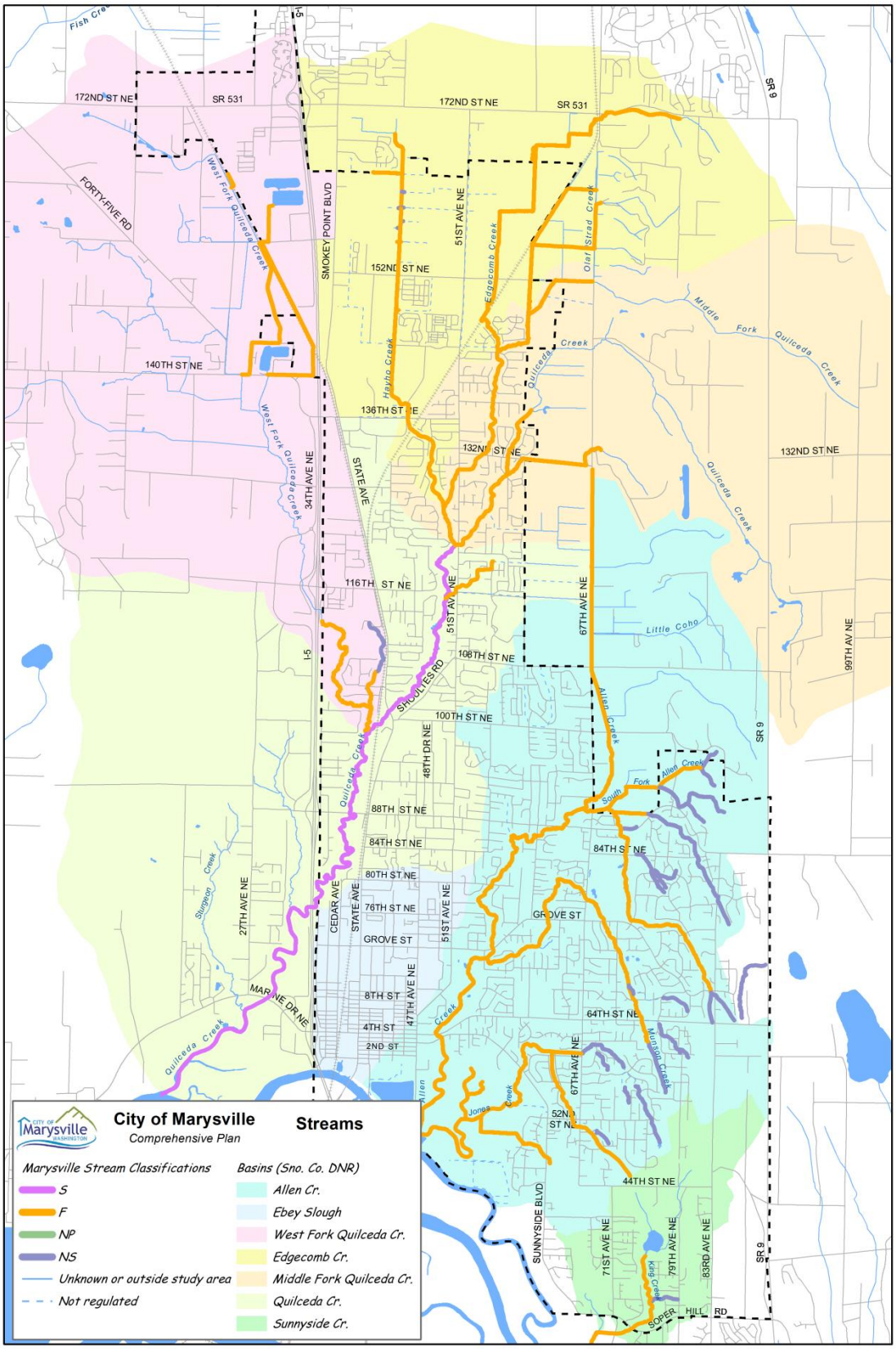
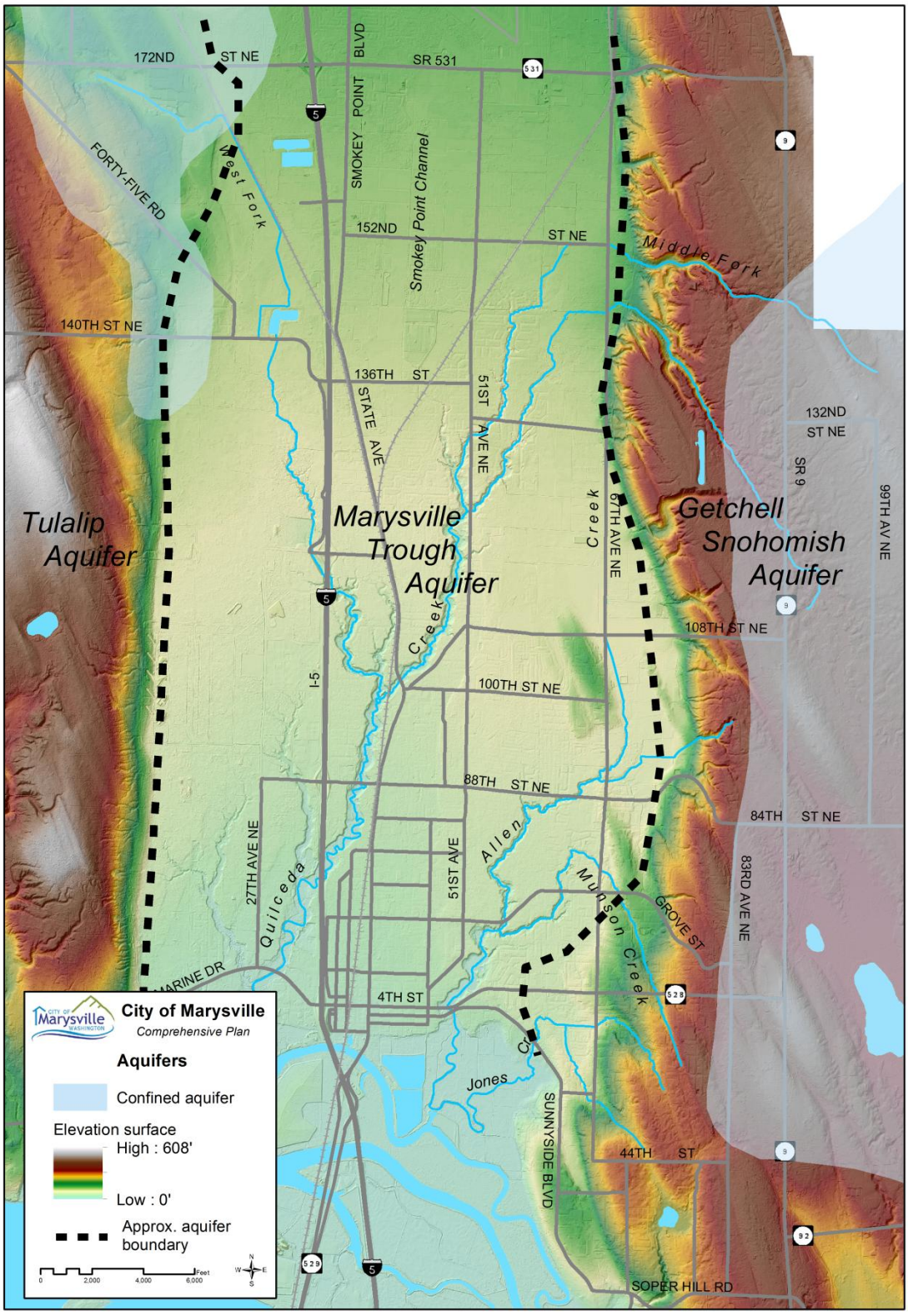


Figure 6-5 Aquifer Boundaries



d. 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 6-6. Consequently, a high percentage of the wetlands in the watershed are significant for providing base flow to streams.

e. Stormwater

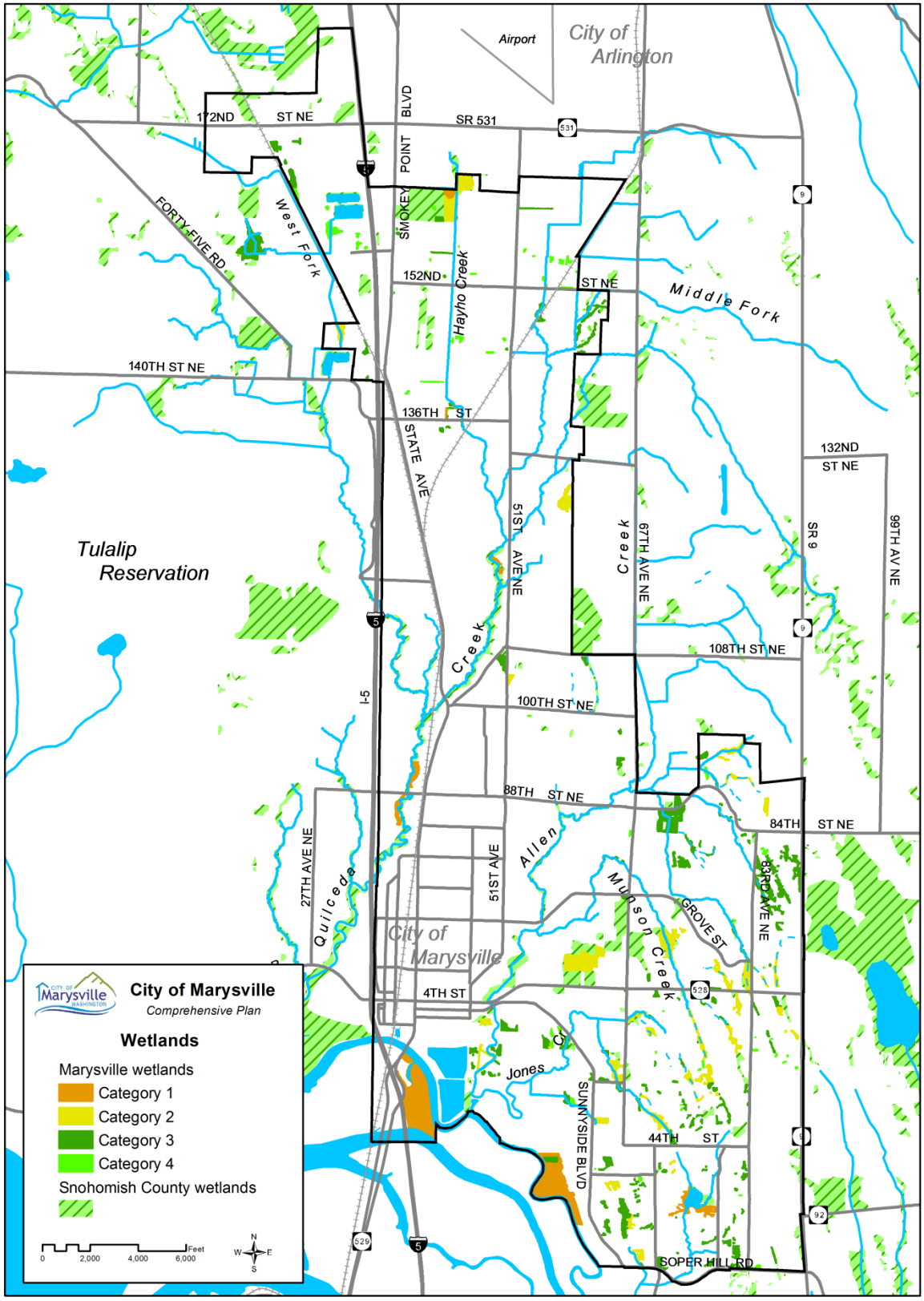
Residential, commercial and industrial development have both short-term and long-term effects upon the quality of surface water resources. Increased storm water runoff results from removal of natural vegetation, draining and filling wetlands, disturbing soil structures by grading and compacting, and 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.

Snohomish County completed a Drainage Needs Report in 2003, identifying key management strategies and issues for watershed planning.

The City of Marysville adopted its Comprehensive Surface Water Management Plan and adopted a taxing structure in 2003 to address capital facility needs.

An interlocal agreement between Arlington, Marysville, Snohomish County and the Tulalip Tribes should be developed and implemented to prevent further degradation of the natural system and property damage due to flooding and erosion.

Figure 6-6 Wetlands



a. Quilceda 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.

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, currently appears to be healthy, even though untreated road runoff is directed to the creek from 172nd Street NE. This stream's headwaters have good spawning habitat for coho salmon and resident cutthroat. The spawning habitat extends for about one and a half miles and includes part of the creek in the agricultural land just west of 67th Avenue NE. 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.

b. 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, 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.

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 stomwater runoff. Of the wildlife species occurring in western Washington, 75 percent 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.

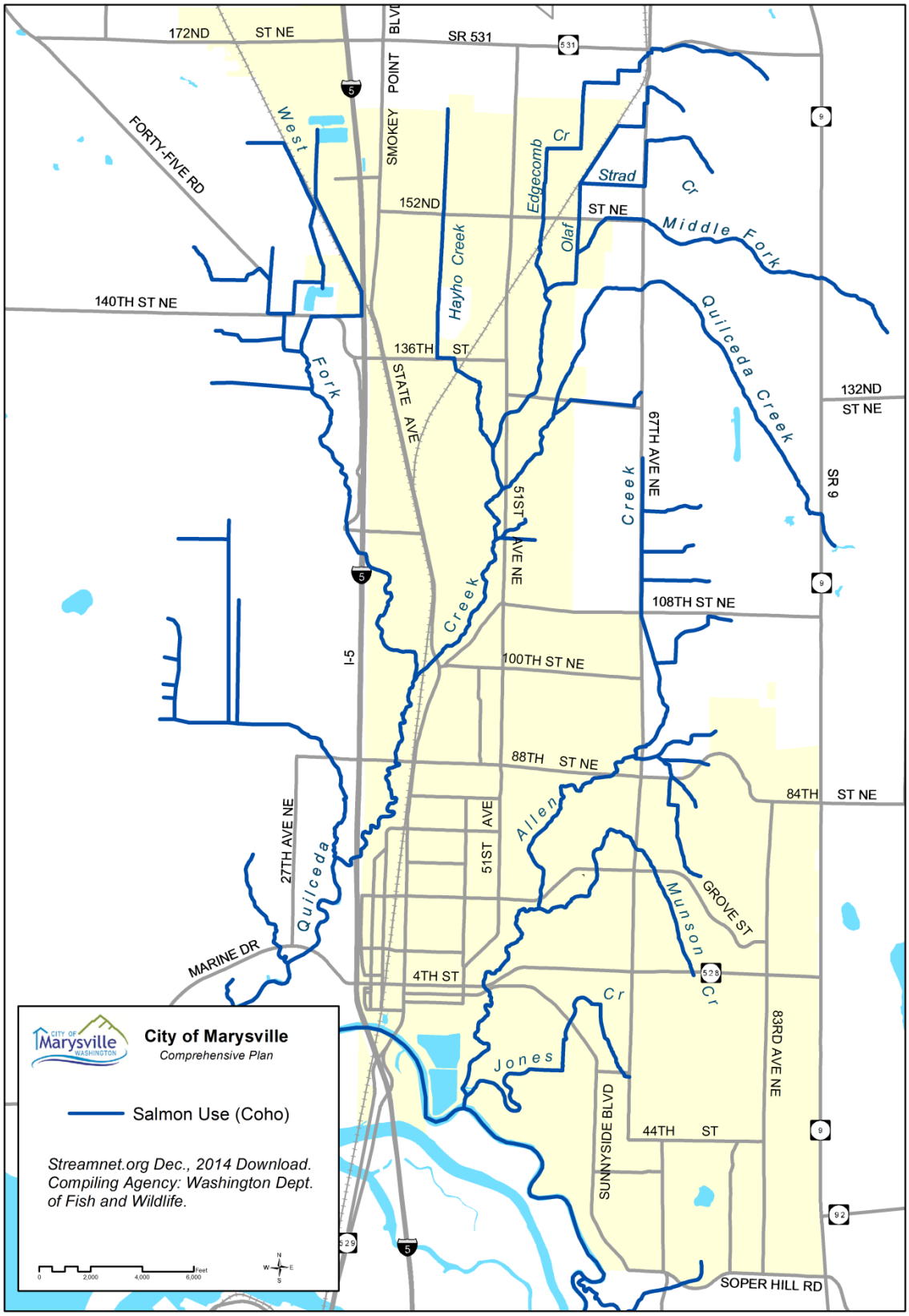
IV. Vegetation

Certain areas within the Study Area 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.

V. 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 6-7); 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. Approximately 24 percent of the salmon production in the Puget Sound region comes from the Snohomish River Basin, and the Quilceda/Allen system, while showing significant decline in recent years, still contributes to salmon production in this system. Coho and chum salmon and cutthroat trout are the predominant species that spawn in both Quilceda and Allen Creeks and their tributaries. The chum salmon appear to be dominated by straying hatchery fish from the Bernie Kai-Kai Gobin Hatchery on the Tulalip Reservation. The streams are also used to a much lesser degree by Chinook salmon, steelhead, and rainbow trout. Salmon have easy access to the Quilceda Creek system. A tidegate at the mouth of Allen Creek must be negotiated by salmon entering the Allen Creek system.

Figure 6-7 Salmonid Habitat



B. ENVIRONMENTAL RESOURCE STRATEGIES

I. Earth Resources

The Growth Management Act requires local governments to consider Best Available Science (BAS) in their critical areas ordinances to protect the functions of critical areas. This comprehensive plan is accompanied by the City's critical areas regulations. The accompanying ordinance regulates development of steep slopes and other geologic hazard areas. Considerations for the plan will be lower gross densities or cluster developments in difficult terrain, in order to allow protection and retention of steeper slopes and native vegetation and forested cover and to minimize required site grading. Additionally, local regulations should provide seasonal limitations or restrictions for clearing and grading activities on sites with steep slopes, adjacent to streams and water bodies, or Tokul soils with high predisposition for sediment transfer. Longer-term, the City should work with the County to identify areas that are not appropriate for urban development and future UGA expansions due to soils, topography and impact on the watershed.

II. Air Quality

The City's air quality is similar to other communities in the Puget Sound region. In the past, as part of a pilot program for nonattainment areas, Marysville has worked cooperatively with Department of Ecology staff to educate its citizens on air quality issues and burn ban restrictions. The Marysville Fire District regulates outdoor burning in the City and Fire District 12 boundary. The City should continue cooperative education efforts regarding burn bans and outdoor burning to promote improvements to air quality within the community.

III. Water Resources

There are a number of strategies the City can pursue and continue to protect and improve water quality and area water resources. These include revisions to the Critical Areas Ordinance to address Best Available Science; update to the Shoreline Management Plan and Regulations; identification of stream improvements in project developments; incorporation of stream improvements or enhancements in the Capital Facilities Plan through road and stormwater construction projects; educational efforts with the community and schools; and long-term protection of critical resource areas by transfer of development rights or wetland/headwater banking.

IV. Vegetation

Areas of significantly forested and vegetated areas should be maintained within the Urban Growth Area. These not only provide habitat but also are visually appealing and useful in providing environmental balance.

V. Fish and Wildlife Habitat

Strategies for fish and wildlife habitat reinforce those listed for earth and water resources, above. They are listed again as it is significant to note the overlapping benefit that these actions can provide towards best management of earth resources, water quality and fish and wildlife habitat. These strategies include revisions to the Critical Areas Ordinance to address Best Available Science; update to the Shoreline Management Plan and Regulations; identification of stream improvements in project developments; incorporation of stream improvements or enhancements in the Capital

Facilities Plan through road and stormwater construction projects; educational efforts with the community and schools; and long-term protection of critical resource areas by transfer of development rights or wetland/headwater banking. Seasonal restrictions should be enforced for clearing and grading activities on sites with steep slopes, adjacency to streams and water bodies, or affecting Tokul soils with high predisposition for sediment transfer.

VI. Climate Change

Recognizing the importance of addressing the issues surrounding the environment and climate change, in May of 2010 the Marysville City Council formally adopted Resolution 2286 establishing a strategy to manage and reduce energy and fuel consumption and greenhouse gasses. 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. One potential scenario for the Puget Sound region could result in hotter, drier summers; wetter winters with increasing rainfall and rain intensity; and increases in extreme weather events. Planning for climate change should not be deferred until perfect information about future conditions is available. Such information will never be available, and the costs of *not* planning for future climate conditions are potentially high.

Additional potential hazards include increased chance of wildland/urban interface fires, heat waves, infestation, drought, potable water shortages, flooding, erosion, and landslides.

There are two categories of potential response to human-caused climate change. *Mitigation* efforts aim to reduce the magnitude of climate change that occurs by decreasing the causes of that change, (e.g., by reducing greenhouse gas emissions). *Adaptation* efforts focus on addressing the consequences of a changing climate, e.g., adjusting practices, processes, or structures of systems to reduce the negative consequences of climate change. Although appearing to some as an avenue to consider only if mitigation efforts become insufficient, the need for adaptation is becoming more widely recognized.

For example:

Marysville – The United States Army Corp of Engineers (USACE) incorporated sea level rise into the design of the new levee currently under construction adjacent to Brashler Industrial Park and the City's wastewater treatement plant (WWTP) for the Qwuloolt Project. The USACE raised the levee an additional six inches (6") to account for future sea level rise. The levee is being constructed to protect Brashler Industrial Park and the east side of the WWTP lagoons. The new levee, which is currently under construction, has an average elevation of approximately 14' 6" in height and is constructed to protect adjacent properties from a 10-year flood. Based on a 2011 survey, the existing levee along the south and west sides of the WWTP and along the slough west of State Avenue has an average height of 11.52 feet (Figure 2) along the south end of the WWTP west to I-5. With a current projected sea level rise of between -2 to +9 inches by 2030, Marysville's WWTP is vulnerable in the low-lying coastal area. To prepare for future conditions, improvements to public infrastructure in high risk areas could be incorporated into existing work plans. For example, new permanent structures could be elevated in height and in anticipation of sea level rise; undersized culverts can be replaced in areas with high vulnerability; and levees could be raised and incorporated

into a scheduled work/maintenance program in response to actual sea level rise overtime.

Locally - NW public water utilities were among the first natural resource management agencies in the region to consider climate change impacts and several have since organized nationally to provide input into climate change research priorities and develop adaptation strategies. Numerous cities, counties and government entities (e.g. King County, Seattle, Olympia, Snohomish, and Port of Bellingham) have assessed climate risks, developed response strategies, and/or implemented adaptive actions at various levels and for various sectors within local government.

State – Both Washington and Oregon have developed state level climate change response strategies aligned with commissioned assessments of climate change impacts on sectors of interest. These set out overarching objectives across all issue areas, and are intended to inform the development of more targeted plans by state agencies and local jurisdictions.

Federal – Consistent with President Obama's 2009 Executive Order (E.O. 13514), which required federal agency adaptation planning, NW federal entities are incorporating climate change information in assessment and planning, and developing innovative approaches to integrating risks into planning.

Tribal – Numerous NW tribes have begun addressing adaptation. Among these, the Swinomish Indian Tribal Community is a national leader in evaluating tribal climate change vulnerabilities and adaptation needs from a multi-risk, multi-sector, multi-timescale perspective. Other tribes addressing climate change risks include the Nez Perce, the Coquille, and the Port Gamble S'Klallam and Jamestown S'Klallam Tribes.

C. ENVIRONMENTAL GOALS & POLICIES

General Environmental Goals and Policies

Goals:

1. Preserve and enhance the natural environment.
2. Protect life and property from floods, landslides, erosion, uneven settlement, and other disruptions that may be associated with natural hazard areas.
3. Recognize the amenity and utilitarian functions provided by natural elements, and to incorporate these functions into developments.
4. Promote environmentally responsible development through policies, development regulations, capital facility programs, and management practices.
5. Pursue effective policies, regulations, capital projects that result in improvements and protection of the natural environment.

Policies:

EN-1 Recognize the natural environment as an integrated unit composed of interacting land, water, and air resources. Make every effort to insure that the health and stability of this resource system is maintained.

EN-2 Recognize the interrelationship of adjacent terrain features and avoid destroying these valuable linkages.

EN-3 Educate the public concerning the importance of maintaining and conserving environmentally sensitive lands and natural resources.

EN-4 Encourage property owners to utilize the Open Space Current Use Assessment Program to preserve significant areas of environmental concern, particularly wetlands identified by this plan.

EN-5 Locate, develop, and retain features of the natural and cultural environment to help all citizens acquire knowledge, attitudes, and skills necessary to solve environmental problems.

EN-6 Where appropriate, provide pedestrian and bicycle trails in association with open spaces and natural areas.

EN-7 Streamline environmental processes and regularly monitor results to ensure their effectiveness.

EN-8 Pursue programs that offer creative solutions to enhance, improve and/or protect the natural environment. Stormwater facility design, low impact development options, wetland banking, and dual use facilities should be pursued whenever possible.

Environmentally Sensitive Lands: General Goals and Policies

Goal:

6. Preserve, as much as possible, natural features in areas potentially sensitive to development. That is areas that have features such as steep slopes, severe erosion, foundation instability, seasonally wet soils, or soils with agricultural capability.

Policies:

EN-9 Designate and protect environmentally sensitive lands using the best available science.

EN-10 Apply strict controls to areas identified as ecologically sensitive by the City

EN-11 Maintain an inventory of environmentally sensitive lands to be used in making land use decisions.

EN-12 For areas that are potentially sensitive to development, require site studies to determine site development problems.

EN-13 For areas that are determined to be sensitive to development, require any development that occurs to meet performance standards to minimize adverse impacts associated with such development.

EN-14 Strongly encourage clustered residential, and planned commercial and industrial developments in areas containing unique natural features or determined by site studies to be sensitive to development.

EN-15 Development adjacent to wetlands, creek corridors, or steep slopes should utilize lot size averaging or a planned development to mitigate the impacts of such development on these sensitive areas. Strongly encourage development and buildings to be located on adjacent areas or peripheral portions of properties determined by site studies to be sensitive to development.

Earth Goals and Policies

Goal:

7. Regard land as an irreplaceable resource. Manage it so irreparable damage is not done to natural systems.

Policies:

EN-16 Protect natural systems of the environment.

EN-17 Utilize land forms and natural systems to provide variety, community identity, and open space areas.

EN-18 All developments should be sensitive to land forms and natural systems, recognizing the natural beauty and character of the land and its vegetation.

EN-19 Encourage all future development to occur in a manner that will reduce or minimize and mitigate adverse environmental impacts.

EN-20 Design and build developments in a manner that respects and retains natural vegetation. Density credits should be given when vegetation is retained and open space or buffer areas provided.

EN-21 Encourage development to consider the inherent characteristics of the predominant soil type(s).

Air Quality Goals and Policies

Goal:

8. Attain a high level of air quality.

Policies:

EN-22 Encourage practices that maintain or improve air quality, such as encouraging emissions testing; use of alternative transportation; appropriate relationship of land uses; and discouraging slash burning, burning of yard wastes, and use of uncertified wood stoves and fireplaces.

EN-23 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 with the provisions of the state and federal Clean Air Act.

EN-24 Provide an information program to citizens on ways to help keep the air clean.

Water: Quality, Wetland and Watershed Protection, Storm Water Runoff, Drainage, Shoreline Goals and Policies

Goals:

9. Attain a high level of water quality.

10. Promote the preservation and improvement of the water quality and conditions of area streams and watercourses to provide water resources for human and wildlife use.

Policies:

Protect natural systems, such as aquifers, bodies of water, flood plains, wetlands, and other important aspects of the natural environment.

EN-25 Utilize natural systems to provide variety, community identity, and open space areas.
EN-26 Maintain existing water levels of perennial water bodies.
EN-27 Protect and enhance surface water quality and the natural character of shorelines for drainage control.
EN-28 All developments should be sensitive to natural systems, recognizing the natural beauty and character of the land and its vegetation.
EN-29 Discourage development of wetlands. Any development in wetland areas should be sensitive to their importance as wildlife habitats, and to their hydrologic function. Minimize potential disruption of these sites through appropriate setbacks, buffers, limits on grading, filling and impervious surfaces, storm water treatment, and similar measures.
EN-30 Preserve existing vegetation as much as possible due to its vital role in the recharge of ground water, and in order to prevent additional storm water runoff or soil erosion from new developments. Density credits should be given when vegetation is retained and open space or buffer areas provided.
EN-31 Prevent adverse alterations to flow characteristics, siltation, and polluting or disrupting spawning beds by control of mining, dredging, or removal of gravel, fill, or similar materials from streams and ground water recharge or other surface water areas.
EN-32 Encourage the management of storm water runoff and urban drainage to protect the man-made and natural environment. Utilize the natural drainage system where it is possible to do so without significantly altering the natural drainage ways and/or by upgrading a public storm drainage system. Require the design of future developments to utilize natural drainage patterns and incorporate means to entrap storm water and water pollutants before they are carried down slope or before they enter watercourses.
EN-33 Recognize the inter-jurisdictional characteristics of storm drainage management problems and work with Snohomish County, Diking District No. 3, other jurisdictions, and area-side residents to improve storm drainage.
EN-34 Conserve and utilize shoreline and flood plain areas within the City in accordance with the provisions of the City's Shoreline Management Master Program; and in planning for areas outside the City limits, consideration should be given to the County Shoreline Management Master Program.
EN-35 Preserve and develop direct and visual public access to water, including public docks, aquatic recreation, marine facilities, and scenic vistas, in a manner consistent with the Shoreline Management Act.
EN-36 Restrict developments in designated flood hazard areas only to uses that can be adequately flood-proofed. Discourage construction in designated flood hazard areas, and prohibit it in floodway areas.
EN-37 Provide continued maintenance of established flood control facilities along rivers and creeks that provide flood protection to existing populations and developments, provided this policy is consistent with environmental guidelines and necessary river maintenance practices.
EN-38 Encourage the use of native plant materials, rather than imported or exotic plants, as well as drought tolerate plants to decrease water usage as well as provide habitats for wildlife.
EN-39 Promote advance planning to mitigate development impacts through areawide wetland surveys, wetland banking and mitigation projects.

Wildlife Goals and Policies

Goal:

11. Encourage the preservation of wildlife, their habitats and refuges.

Policies:

EN-40 Design and build developments in a manner that respects and retains natural vegetation, with emphasis on streams, creeks and other bodies of water; and on wetlands, steep slopes, and areas adjacent to major and minor arterials. Density credits should be given when vegetation is retained and open space or buffer areas provided.

EN-41 Preserve existing vegetation as much as possible due to its vital role in providing a habitat for wildlife. Minimize removal of vegetation resulting from development or other activities, and/or replace after construction. Encourage selective thinning rather than indiscriminate clearing of trees and heavily wooded areas designated for development. Require development proposals to provide plans for review and approval describing the extent of retention of existing vegetation together with a reforestation and revegetation plan.

EN-42 Retain some open space in its natural state, both within and outside of Urban Growth Areas. Unique natural areas should be preserved as natural areas.

EN-43 Protect and enhance the natural character of shorelines for wildlife habitat.

EN-44 Protect streams and drainage ways that provide habitats for fish spawning, rearing, and transportation from adverse impacts of land development that might decrease low flows or increase high peak flows, reduce recharge areas for streams, increase bank or bed erosion, or increase turbidity of the water.

EN-45 Important fish and wildlife habitats identified by the Washington State Wildlife and Fisheries Departments should be preserved by requiring adequate setbacks of development from creeks and tributaries and by limiting alterations to natural vegetative cover through restrictive development controls in these buffer areas. Also coordinate with the State Departments of Fisheries, Wildlife and Ecology and the federal Army Corps of Engineers to manage or improve conditions for wildlife and habitat in streams, drainage ways, wetlands, and other watercourses.

Cultural Resources Goals and Policies

Goal:

12. Protect and enhance Marysville's cultural heritage.

Policies:

EN-46 Encourage public and private entities to identify, preserve and restore buildings, structures, objects, and sites having historical and cultural significance or interest.

EN-47 Protect scenic views and sites so present and future generations may enjoy them.

EN-48 Archeological and historic resources should be surveyed as part of the application process for new development.

EN-49 Historic resources should be incorporated into economic development and tourism activities in the City.

Work with the Washington State Office of Archaeology (OAHP) and local tribes to help identify cultural resources and develop a process when cultural resources are identified.

Climate Change Goals and Policies

Goals:

13. Work with public and private partners to develop strategies and programs to prepare for and mitigate the potential impacts of climate change, both on city government operations and on the general Marysville community.

14. Develop mitigation strategies that can be used by both the public and private sectors to help mitigate the potential impacts of new and ongoing development and operations.
15. Develop programs and strategies that will encourage the retrofitting of existing development and infrastructure to mitigate and adapt to the effects of climate change.

Policies:

EN-50 Maintain healthy urban forests; promote tree planting to increase shading and absorb CO_2; and support the City's participation in the Tree City USA program.

EN-51 Purchase only EPA Energy Star-certified and other high efficiency devices whenever possible, and consolidate duplicative devices to further reduce electricity consumption.

EN-52 Make energy efficiency a priority through retrofitting City facilities with energy efficient lighting; where available, use programmable systems to automatically idle electronic equipment; and urge employees to conserve energy and save money.

EN-53 Conserve fossil fuels. Staff should practice efficient driving habits, carpool, avoid idling vehicles for longer than 30 seconds, and use appropriately-sized vehicles. The City should continue to participate in the Commute Trip Reduction (CTR) program.

EN-54 Promote the reduction of greenhouse gas emissions from the transportation sector by encouraging alternative modes of travel such as transit, bicycling, and walking; reducing vehicle miles traveled; and increasing use of transportation demand management strategies such as expanding the availability of sustainable transportation alternatives; reducing demand for the single occupancy vehicle; and incentivizing sustainable travel habits.

EN-55 Practice and promote sustainable building practices using the U.S. Green Building Council's LEED program or a similar system.

EN-56 Conserve natural resources. Staff shall reduce paper consumption and plastic bottle use, and recycle all recyclable materials.

EN-57 Promote the use of alternative energy sources where feasible.

EN-58 Develop policies and strategies for land use and development that result in reduced green house gas emissions for new development as well as redevelopment activities.

EN-59 Monitor and evaluate opportunities to utilize State tools and resources to support the local program and to stay compliant with State environmental and energy laws.

EN-60 Support appropriate Federal and State policies and legislation that will lead to the reduction of greenhouse gas emissions.

EN-61 Enhance and sustain public health system capacity to prepare for and respond to heat waves and smoke emergencies, and improve delivery of information on heat events and cooling centers, especially of isolated and vulnerable populations.

EN-62 Continue to provide assistance to landowners to restore wetlands, uplands, and riparian zones to increase the capacity for natural water storage.

EN-63 Improve real-time forecasting of water delivery and basin yields to improve management of stored water.

EN-64 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.

EN-65 Develop short- and medium-term climate change adaptation strategies for urban forests and other fire-prone habitats, and improve development standards.

EN-66 Inventory past flood conditions and define and map future flood conditions.

EN-67 Improve capability to rapidly assess and repair damaged transportation infrastructure, in order to ensure rapid reopening of transportation corridors.

EN-68 Undertake a policy review of City comprehensive, strategic and specific plans to assure that City policies are appropriately targeted to prepare for and mitigate potential impacts of climate change. These reviews may be done to correspond with scheduled plan updates, or accelerated where either a higher priority is identified or the next update is not specifically scheduled.