

# CHAPTER FOUR

# NATURAL ENVIRONMENT ELEMENT

TUKWILA COMPREHENSIVE PLAN



# NATURAL ENVIRONMENT

## WHAT YOU WILL FIND IN THIS CHAPTER:

- A description of the natural resources and sensitive environmental areas present in the City of Tukwila;
- A discussion of local City efforts and citizen volunteer programs to protect Tukwila's natural resources;
- An overview of State, Federal, and local environmental protection regulations; and
- Goals and Policies for protecting sensitive natural resources, including the urban forest.

## PURPOSE

This element of the Comprehensive Plan addresses the City's natural environment - air, land, and water resources- by guiding future development in a manner that protects the community's environment, improves the quality of life in the City and provides reasonable protection of community residents from natural hazards

To be healthy and sustainable a community must integrate the natural environment into urban development design. The natural environment and its associated ecological processes provide many benefits to Tukwila including:

- visual relief from the hard, constructed surfaces of urban development;
- fish and wildlife habitat;
- air and water quality;
- surface water runoff management;
- recreational opportunities for interaction with nature; and
- aesthetic and economic benefits.



## Development of the Natural Environment Element

To assist with the update of this Comprehensive Plan Chapter, the City formed the Tukwila Tree and Environment Advisory Committee, made up of members of the business and residential community. The Committee, working for over 9 months between 2012 and 2013, reviewed previous Comprehensive Plan policies in the Natural Environment and Community Image Elements and provided input for revisions and new goals, policies and implementation strategies.



## Archaeological Resources

Goals and Policies for the protection of paleontological and archaeological resources previously listed in this element have been moved to Element 1 - Community Image.

Trees and vegetation also provide critical environmental services, which, in turn, affect the quality of life of residents, visitors, daytime workers, and neighboring communities. Some of the benefits of trees are shown in the graphic below.

The Natural Environment Element sets forth goals and policies to guide the protection and management of wetlands, watercourses, fish and wildlife habitat areas, and geologically hazardous areas – collectively called “sensitive areas”. It also includes goals and policies related to flood management, surface water management, water quality, and the urban forest (the combination of trees, shrubs, and other plants that make up the formal landscaped areas of the city and the natural areas in our parks and on private property).

### BENEFITS OF TREES

#### Environmental:

- Fish & wildlife habitat
- Improved air quality
- Storm water mitigation
- Reduced energy consumption
- Sequestration of carbon
- Stabilization of slopes

#### Social:

- Lower crime rates
- Mental health benefits
- Improved physical health
- Aesthetics and quality of life

#### Economic:

- Consumer satisfaction/ increased spending
- Increased property values
- Reduced maintenance of road surfaces (shade)
- Green infrastructure – reduced cost over installing and maintain surface water infrastructure

## THE STATE OF TUKWILA'S URBAN ENVIRONMENT

Tukwila encompasses about 9 square miles, and much of the city lies within an extensive valley centered on the Lower Green/Duwamish River watershed. The valley is virtually flat and almost entirely built out except for the newly annexed Tukwila South area, which is slated for development over the next 10 to 15 years. The upland areas of the City have rolling topography and numerous areas with steep and potentially unstable slopes. Many of the steep hillsides are forested with second or third growth trees and understories with a mix of native and invasive vegetation. These areas, together with the City's numerous water resources, provide important fish and wildlife habitat that coexist with the built environment. The following is a summary of conditions in the constituent elements of Tukwila's environment – more detail is found in the Background Report.

### WETLANDS AND WATERCOURSES

As urban development has occurred, natural drainage corridors have been altered or placed in culverts, and wetlands have been filled. Remnant wetlands remain in some of the City's parks, on undeveloped slopes (formed by springs and groundwater seeps), in freeway interchanges, and in other areas of the City. The City has purchased Tukwila Pond and Macadam wetland for preservation. Tukwila Pond serves as both a wetland and temporary storm water storage pond for commercial development on its north side. Macadam wetland collects mostly natural surface water from the steep slopes located on its east side.

Stream alterations have affected wildlife and fish habitat. There are few remaining open channels in the four main streams in



*Tukwila Pond serves as both wetland habitat and temporary stormwater storage.*



*Southgate Creek is an example of a watercourse with little riparian protection from urban impacts.*

## Fish Species in Tukwila

Fish species found in the Green/Duwamish River include the following:

- Cutthroat trout
- Chinook salmon
- Chum salmon
- Coho salmon
- Pink salmon
- Sockeye salmon
- Bull trout

Resident Cutthroat trout are found in Tukwila's streams, as well as other fish and aquatic species.



*Cutthroat trout photo courtesy of Washington Department of Fish & Wildlife.*

Tukwila (Johnson Creek, Gilliam Creek, Southgate Creek and Riverton Creek), which have been channelized, relocated and piped for much of their length. Construction of urban streets and highway systems and driveways required watercourses to be placed in culverts, which have blocked or made fish passage difficult. All the streams discharge into the Green/Duwamish River.

Run-off coupled with steep slopes in the upper reaches of Gilliam, Southgate and Riverton Creeks has caused scouring and erosion in the stream channels, resulting in deepened ravines with steep banks, instability, bank erosion and downstream sedimentation. The lower reaches of Tukwila's streams are generally lacking in pools and woody debris, which are important for good fish habitat. Thus, the open reaches of Tukwila's streams are generally in deteriorated conditions with generally poor riparian habitat and narrow buffers. In fact, many tributaries of the urban watercourses flow in roadside ditches with little protection from urban impacts.

### FISH AND WILDLIFE

The Washington Department of Fish and Wildlife (WDFW) has mapped and identified priority habitats and species in Tukwila to ensure their protection and management. They include: the Green/Duwamish River; reaches of Gilliam Creek, Southgate Creek and Riverton Creek; riparian areas (areas adjacent to streams and rivers) and freshwater wetlands. Also mapped are wetland complexes and Johnson Creek in Tukwila South.

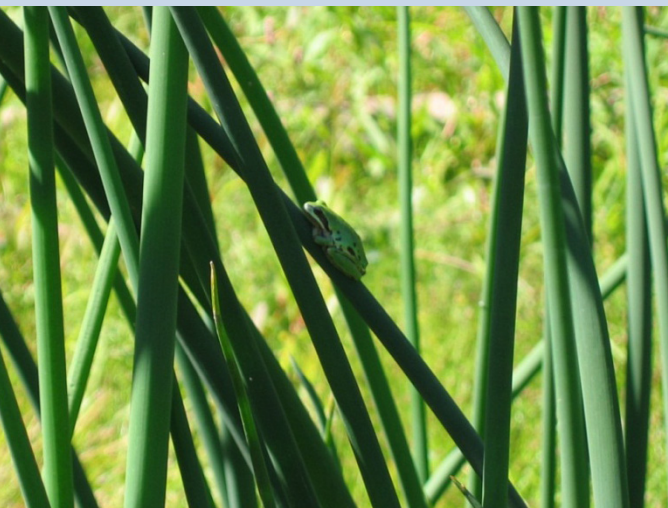




*Volunteers removing invasive blackberry - Duwamish River Shoreline Restoration Project*



*Community volunteers stocking Coho salmon in Southgate Creek.*



*Pacific tree frog at wetland restoration site.*

The Shoreline Master Program provides more detail on the City's involvement with the Water Resource Inventory Area 9 (WRIA 9) and the Green/Duwamish River Salmon Habitat Enhancement Plan, which is intended to restore habitat for Chinook salmon and other species.

Tukwila citizens are actively involved in wildlife protection and enhancement activities, such as the Backyard Wildlife Program, projects to restore habitat, and a salmon rearing project that involves school children, state wildlife officials and local businesses in annual stocking of Coho salmon in Southgate Creek.

Waterfowl areas in Tukwila include Tukwila Pond and the wetlands in Tukwila South, which provide important winter habitat for migrating water fowl and permanent habitat for other waterfowl. Over 50 species of birds have been recorded at Tukwila Pond. Other bird species found in Tukwila include osprey, which regularly nest near the Green/Duwamish River; hawks; and passerine birds. Other wildlife species in Tukwila include coyotes, Eastern Grey squirrels, beaver, otter, nutria, turtles (mostly non-native red-eared sliders), garter snakes, amphibians (non-native bullfrogs, native Pacific Tree frogs, and salamanders), opossum, and raccoons.

#### FLOOD MANAGEMENT

Tukwila's urban center, the light industrial and manufacturing area south of S. 180th Street, part of Tukwila South, and Fort Dent Park are protected from flooding of the Green River by levee systems. The City participates in the National Flood Insurance Program administered by the Federal Emergency Management Agency (FEMA), which has mapped regulated flood plains in Tukwila. Mapped floodplains and the levee systems are explained in more detail in the Shoreline Element of the Comprehensive Plan.

Impervious surfaces and the elimination of natural wetland functions have caused localized flooding from streams periodically at varying levels of severity on some areas of public right-of-way, as well as private properties where inadequate or no surface water infrastructure exists. The City has resolved many of the flooding problems through improvements to surface water infrastructure. For example, periodic flooding from Gilliam Creek near Southcenter Boulevard was resolved through the construction of a regional detention facility that serves the area of Southcenter Boulevard west of Interstate 5. The surface water management system (surface water utility) is described in more detail in the Utilities Element of the Comprehensive Plan. More detailed information on localized flooding problems is provided in the City's Comprehensive Surface Water Management Plan.

#### EARTH RESOURCES AND GEOLOGIC HAZARDS

The City has mapped areas with steep and unstable slopes, including active landslide areas and springs to ensure that there is adequate review of slope stability if development is proposed in these areas. In addition, there are coal formations on the southwest side of Interurban Avenue South, some of which have been mined and are defined as sensitive areas based on the City of Tukwila Abandoned Underground Coal Mine Hazard Assessment, May 1990.

#### WATER QUALITY

Although the City does not have ongoing monitoring programs, periodic studies have indicated that Tukwila's streams and the Green/Duwamish River suffer from poor water quality due to surface water runoff. Rain events wash contaminants off rooftops, driveways, sidewalks, parking lots, and roads into the watercourses. Runoff from these areas can contribute to high temperatures in urban streams and can carry contaminants into streams and wetlands. Many newer developments have flow control and water quality treatment facilities such as sediment removal and oil water separators that moderate the discharges that flow directly into streams, but there are still areas of Tukwila where runoff from impervious surfaces discharges directly to streams and the river with no treatment. (See Background Report for more information on water quality.)

Riparian habitat plays a valuable role in protecting stream water quality. Adequately-sized and healthy riparian buffers help filter out a variety of pollutants, including substances that can lead to the depletion of oxygen in streams. Riparian vegetation can also shade streams, reducing water temperatures. However, most of Tukwila's streams have poor quality, narrow riparian areas.

## AIR QUALITY

Tukwila lies in the air quality region made up of King, Kitsap, Pierce, and Snohomish counties. Air quality is monitored and managed by the Puget Sound Clean Air Agency. Through the efforts of the Clean Air Agency, all of King County currently has good air quality, except for occasional periods when air quality in our area is considered a risk to health, particularly for members of the population with respiratory conditions.

## CLIMATE CHANGE

The impacts of climate change in Tukwila could affect several aspects of the natural environment as well as the provision of utilities to its citizens. Climate change could cause rising sea levels which would affect the tidally- influenced portions of the Green/Duwamish River, raising water levels in the river and causing tidal waters to reach further up river and into streams. This, in turn, could impact flood control measures and fish and wildlife habitat, with particular detriment to salmon. Other possible effects of climate change could include new and increased insect infestations in the City's urban forest; changes in wildlife behavior and diversity; and, reduced availability of water supplies for drinking water, irrigation of gardens, landscaped areas, street trees, and parks.

## TUKWILA'S URBAN FOREST

The "City of Tukwila Urban Tree Canopy Assessment," completed in 2012, quantifies existing urban tree canopy as well as impervious surfaces, surface water, grasslands, and bare soils. The assessment forms the basis for several new goals and policies related to the urban forest. See the assessment report appended to this chapter of the Comprehensive Plan.

The results of the study show that Tukwila has a current overall city-wide average tree canopy cover of 25% and impervious surface of 51%. The residential zones range from 33% to 51% canopy across 1,869 acres, while the industrial and commercial zones have tree canopy ranging from 9% to 49% across 2,780 acres.





*A tree engulfed by invasive English ivy.*

The City is fortunate to have remnant stands of second or third-growth native forests and high canopy coverage in its single family residential areas, on undeveloped steep slopes, and in some of its parks (for example, Crystal Springs Park and Tukwila Park). However, trees and understory vegetation in many of our parks and natural areas are plagued with infestations of invasive plants like blackberry and ivy. Trees in undeveloped areas are threatened by future development. Aging trees in already developed residential and commercial areas become hazardous and require removal, and are not always replaced with new trees.

The City has street trees of varying species, sizes, health and maturity planted on City rights-of-way throughout Tukwila. They range from large canopy trees to small canopy or young trees that do not provide many benefits. Street trees often do not get replaced when they are damaged or removed and do not all get the level of care or the conditions they need to thrive.

Shade trees are generally lacking in most of the City's commercial parking lots and other landscaped areas. Trees in these areas are often improperly pruned or removed and not replaced. Trees throughout the City are frequently damaged by installation or maintenance of infrastructure and new development.

The Green/Duwamish River and the City's streams generally have narrow riparian buffers that have been impacted by urbanization over the years, reducing the amount of urban forest in these areas. Some reaches of the river are characterized by large native canopy trees (Foster Golf Course, for example), while in other areas, there is little to no tree canopy and large expanses of invasive vegetation instead. Trees have been removed from the Green River levee, south of SR 405, to meet Corps of Engineers requirements.

## How Much Are Tukwila's Trees Worth?

The value that Tukwila's trees provide to the community in terms of air quality improvements is \$493,000, as detailed in the table below.

### Pollution Benefits of Tukwila's Trees -by the Numbers

• Stored Carbon ~ 71,000 Tons	→	\$1.4M
• Sequestered Carbon ~ 2300 Ton/yr	→	\$48K
• Carbon Monoxide (CO) ~ 4.3 Ton/yr	→	\$4K
• Nitrogen Dioxide (NO <sub>2</sub> ) ~ 10 Ton/yr	→	\$89K
• Ozone (O <sub>3</sub> ) ~ 4.3 Ton/yr	→	\$240K
• Sulfur Dioxide (SO <sub>2</sub> ) ~ 8.5 Ton/yr	→	\$18K
• Particulate Matter ~ 15.7 Ton/yr	→	\$94K
Yearly Benefit	→	\$493K

## Natural Environment Regulatory Agencies

### Federal

- EPA
- Corps of Engineers
- National Marine Fisheries Service & US Fish and Wildlife Service
- FEMA

### State

- Department of Ecology
- Washington Department of Fish and Wildlife
- Department of Natural Resources

### Regional/Local

- Puget Sound Clean Air Agency
- Puget Sound Partnership
- Puget Sound Regional Council
- King County (planning policies, water quality)
- King County Flood Control District
- King Conservation District

Several environmental restoration projects to enhance the urban forest have been completed or are underway in the City's parks, wetlands and streams, and along the Duwamish River. Trees have been planted along the river by the County as mitigation for removal of trees elsewhere. The City also plants hundreds of trees in its parks each year; requires trees as part of landscaping for commercial, industrial, office and multi-family developments; and requires tree replacement in sensitive areas.

However, the City does not have a comprehensive written urban forestry plan, street tree, or other program in place to ensure a healthy urban forest across all areas of the City. A program to improve the urban forest should include the following aspects:

- Preserve existing trees and forest;
- Preserve and improve the "tree-growing" environment (i.e. provide adequate growing conditions for trees); and
- Plant for the long-term (ensure the right tree in the right place, sufficient provisions for tree maintenance and care).

## REGULATIONS

In addition to the State Growth Management Act, many regulations at the federal, state, and local levels apply to the management of Tukwila's natural environment. More information can be found in the Background Report for this Element.

## ISSUES

There are several key issues that reflect new community priorities and respond to new regulations at the local, regional, state and federal levels addressed in the Natural Environment Element. The goals and policies that follow respond to these identified issues.

### ENVIRONMENTAL QUALITY, COMMUNITY EDUCATION AND ENVIRONMENTAL STEWARDSHIP

In order to foster best practices for protecting Tukwila's environmental quality, improve the protection and restoration of the City's sensitive areas and fish and wildlife habitat, and improve air and water quality, the City needs to provide information and education to the community in various forms. In addition, the City should continue to expand efforts, in collaboration with other organizations and businesses, to engage the community through hands-on environmental stewardship and restoration activities. Policies regarding the protection of fish and wildlife and climate change are also important to incorporate into the Natural Environment Chapter.

### SENSITIVE AREAS

Although Tukwila enacted significant revisions to its Sensitive Areas regulations in 2004 and again in 2010, new policies are needed to reflect the most current best available science information and new federal and state regulations and guidelines. Tukwila also needs to improve the protection of watercourses and find mechanisms to ensure that compensatory mitigation is successful for the long term.

### FISH AND WILDLIFE HABITAT

The listing of Puget Sound Chinook salmon and Bull Trout under the Endangered Species Act has underscored the need for the City to protect and restore habitat for fish and other wildlife. New policies, continued restoration efforts, and new sources of funding are needed to carry out restoration of habitat on the Green/Duwamish River and its tributaries. The City must continue to be actively involved in shaping policies and programs and helping implement the WRIA 9 Salmon Habitat Enhancement Plan, in collaboration with other local jurisdictions and County, State and Federal government agencies.



## WATER QUALITY

More efforts are needed to improve and protect water quality in the City's wetlands, watercourses and the Green/Duwamish River. Programs for monitoring water quality, retrofitting surface water management systems where there are water quality problems, and improving riparian buffers are important actions for the City to carry out.

## SURFACE WATER MANAGEMENT

With new state requirements for the management of surface water, the City must modify its surface water regulations and begin implementing and requiring low impact development techniques for surface water system retrofits and for new development.

## FLOOD MANAGEMENT

Because the City has levees along parts of the Green/Duwamish River to reduce flood potential, it is necessary for the City to coordinate with County and federal officials and neighboring local jurisdictions on maintenance and rebuilding of the levees and ensuring that federal certification is continued, where applicable. Also, due to the listing of Chinook salmon under the Endangered Species Act and Corps of Engineers policies restricting vegetation on levees, the City needs to be involved in efforts to achieve good riparian conditions, while not compromising the integrity of levees or losing federal certification.

## EARTH RESOURCES

The definition of steep slopes should be clarified, and new policies are needed to require setbacks and better protect trees on steep slopes.

## TREES AND THE URBAN FOREST

The City needs to establish policies and programs to protect and enhance the urban forest including establishing improved policies for protecting trees, increasing tree canopy, and ensuring sufficient resources to properly maintain trees, improve tree health, and reduce potential hazards to the public. This Element provides new goals and policies to address these issues.

## GOALS AND POLICIES - ENVIRONMENTAL QUALITY AND STEWARDSHIP

### Goal 4.1

The City's air, land and water resources are restored and protected for future generations.

### Policies

- 4.1.1 Anticipate the effects of climate change by keeping abreast of current scientific data and plan for adapting City regulations and internal procedures, as needed.
- 4.1.2 Collaborate with Federal and State fish and wildlife agencies to identify priority species (endangered, threatened, sensitive, and candidate species) and priority habitats to determine appropriate protection and wildlife access measures.
- 4.1.3 Identify impacts to wildlife from new development and ensure protection of existing priority wildlife habitat, including Osprey and Bald Eagle nests and Chinook and Bull Trout habitat, when issuing permits for development.
- 4.1.4 Assist applicants in complying with Federal and State wildlife and endangered species regulations for all public and private sector projects.
- 4.1.5 Develop and implement programs that encourage Tukwila residents and businesses to take active measures to protect and enhance Tukwila's natural environment. Such measures could include the use of Low Impact Development (LID) techniques, natural streambank restoration, non-toxic lawn care, composting, recycling, among others.

## Goal 4.2

An educated public that understands the importance of protecting sensitive areas, wildlife and fish habitat in the City's natural areas, wetlands, watercourses and the Green/Duwamish River and assists in their stewardship.

### Policies

- 4.2.1 Expand free or low cost educational programs and materials for the community about the multiple benefits of the City's sensitive areas, flood plains, the urban forest, and wildlife habitat and about individual responsibilities for their stewardship.
- 4.2.2 Provide individualized education and technical support to residential property owners and general guidance to businesses regarding environmental stewardship.
- 4.2.3 Develop and continue to support community-oriented wildlife educational programs such as the Tukwila Backyard Wildlife Program.

## Goal 4.3

Increased number of Tukwila residents who are trained as environmental stewards and actively participate in environmental restoration and maintenance.

### Policies

- 4.3.1 Sponsor joint City and citizen cleanup and restoration projects and expand the citizen volunteer base in Tukwila for restoration and maintenance of the City's natural areas.
- 4.3.2 Collaborate with environmental organizations and businesses to support recruiting and training of environmental stewards, identify restoration projects, and provide logistical support for their work.



## ENVIRONMENTAL QUALITY AND STEWARDSHIP IMPLEMENTATION STRATEGIES

- Assign responsibilities for tracking climate change issues and develop recommendations for new City management policies, as needed.
- Update and expand the City's website to post information on environmental stewardship, green building techniques and standards, recycling and re-use of construction waste, LID techniques, and other related topics. Distribute information to applicants and contractors during permit reviews.
- Expand the availability of brochures on environmentally friendly lawn care, recycling and other environmental stewardship information, as funding permits.
- Incorporate green construction and low impact development techniques into City construction or retrofit projects as a tool for educating Tukwila residents, businesses and developers about their benefits.
- Develop and mail topic-specific fact sheets to property owners on environmental stewardship in a variety of languages.
- Publish articles on environmental stewardship in the Tukwila Reporter and/or Hazelnut.
- Team with other environmental organizations such as Forterra, Earth Corps, National Wildlife Federation, and the Washington Native Plant Society to train environmental stewards, help recruit and manage volunteers and carry out environmental restoration projects.
- Engage youth and school groups in restoration projects.
- Seek grants and donations to fund publications, volunteer environmental restoration projects and citizen stewardship training.
- Maintain contact with Washington Department of Fish and Wildlife and the federal resource agencies to stay up to date on wildlife management policies, permit requirements and requirements for preparing biological assessments.

## GOALS AND POLICIES - WATER RESOURCES

### Goal 4.4

Water resources that function as a healthy, integrated system; provide a long-term public benefit from enhanced environmental quality, and have the potential to reduce public infrastructure costs.

### Wetlands/Watercourses/Fish and Wildlife Habitat

### Goal 4.5

Vital and self-sustaining fish and wildlife habitat areas that provide, where appropriate, opportunities for recreational and educational uses.

### Policies

- 4.5.1 Restore watershed function through sensitive area restoration projects on publicly owned lands and by working with property owners to restore/improve sensitive areas on private property.
- 4.5.2 Recognize , protect and enhance the value of watercourse and river riparian zones and other natural areas as wildlife corridors.
- 4.5.3 Develop best management practices for surface water drainage and street maintenance activities to avoid disturbing or destroying native riparian vegetation. Where riparian vegetation is disturbed through maintenance activities, restore vegetation with native species.

- 4.5.4 Identify staff and financial support for restoration projects, wherever feasible, to enhance salmonid habitat in watercourses, wetlands and the Green/Duwamish River, including projects identified in the Shoreline Master Program Habitat Restoration Program and the Water Resource Inventory Area 9 Salmon Habitat Plan.
- 4.5.5 Prohibit piping of watercourses except where unavoidable for access purposes. Where feasible and practical to create healthy riparian habitat, encourage removal of piped sections of watercourses as part of new or redevelopment and public projects.
- 4.5.6 Prohibit creation of new fish barriers and, where possible, eliminate existing barriers to fish passage through implementation of capital improvement projects and by providing incentives to private sector development.

## **Goal 4.6**

Watercourses and their buffers, wetlands and wetland buffers protected from encroachment and degradation and improved through mitigation, enhancement and restoration projects.

### **Policies**

- 4.6.1 Regulate land use and development, using Best Available Science, to protect and improve natural vegetation and hydrology in order to prevent significant erosion, sedimentation, or degradation of areas of potential geologic instability, wetlands, watercourses, fish and wildlife habitat areas and their associated buffers.
- 4.6.2 Ensure mitigation sequencing is applied to avoid or minimize impacts to sensitive areas consistent with Federal and State guidelines.



- 4.6.3 Require and enforce mitigation in order to ensure no net loss of sensitive area functions as well as mitigation designed to replace sensitive area acreage lost due to development.
- 4.6.4 Ensure the effectiveness of sensitive area mitigation by requiring adequate sensitive area studies and mitigation plans, the application of mitigation sequencing, financial assurances from project proponents to ensure mitigation success, and by improving City oversight of maintenance and monitoring of mitigation sites.
- 4.6.5 Allow off-site wetland mitigation only when there is greater functional benefit, no significant adverse impact to the adjacent property, and no significant adverse impact to existing wetlands or watercourses. Preference shall be given first to mitigation sites within Tukwila's portion of the Green/Duwamish watershed, followed by sites located elsewhere in the watershed.
- 4.6.6 Consider allowing payment into an in-lieu fee program for mitigation outside of Tukwila where ecological benefits of such actions will be significantly greater than mitigation locations in the City.
- 4.6.7 Consider creating a City in-lieu fee program for future wetland mitigation or collaborate with King County to establish in-lieu fee sites in Tukwila for wetland restoration projects, including projects along the Green/Duwamish River shoreline.
- 4.6.8 In collaboration with other agencies, develop a program to provide guidance to property owners interested in using their property for sensitive area mitigation or shoreline mitigation

#### WETLANDS/WATERCOURSES/FISH AND WILDLIFE HABITAT IMPLEMENTATION STRATEGIES

- Continue implementation of the Sensitive Areas Regulations and improve tracking and monitoring, and develop other mechanisms to improve compliance with maintenance requirements. Update the regulations as necessary to ensure they reflect current Best Available Science.
- Develop guidelines and provide training to surface water and street maintenance staff in best management practices for work in sensitive areas.
- Periodically offer special workshops or classes for property owners on sensitive areas stewardship, regulations, stream bank enhancement and other related topics.
- Publish articles on sensitive areas stewardship in the Tukwila Reporter and/or Hazelnut.
- Encourage off-site wetland mitigation and offer assistance to property owners interested in providing mitigation sites, where appropriate.
- Evaluate opportunities and Federal and State requirements for in-lieu fee wetland mitigation programs, and discuss options for using County-designated sites in Tukwila. Provide recommendations to decision-makers.
- Continue implementation of the Surface Water Management Plan and individual watercourse Basin Plans to remove identified fish barriers during surface water and street maintenance and upgrade projects, where possible.
- Continue to coordinate with the Department of Fish and Wildlife and the Tribes regarding projects that impact fish and the design of watercourse restoration projects.

## Water Quality and Quantity

### Goal 4.7

The water quality in Tukwila's wetlands, watercourses, fish and wildlife habitat areas and the Green/Duwamish River is improved over time.

### Policies

- 4.7.1 Improve surface water management and ensure provision of water quality treatment where required.
- 4.7.2 Prevent and reduce streambank and channel erosion and sedimentation of water resources through implementation of surface water and land clearing regulations and inspections.
- 4.7.3 Initiate educational and management programs to reduce the use of chemicals having negative impacts on the environment or human health. Prohibit the application of pesticides (insecticides , herbicides, fungicides, algaecides, rodenticides, etc.) to surface water systems or their buffers unless warranted to protect ecological functions of the system, and inform applicators about State pesticide licensing regulations.
- 4.7.4 To protect water quality, promote natural yard care, alternatives to grass lawns, and proper waste management through educational programs and publicity.
- 4.7.5 Continue City monitoring for illicit surface water discharges and ensure that action is taken to eliminate any such discharges.
- 4.7.6 Retrofit existing City surface water systems, including ditches conveying stormwater, to improve the water quality of discharges where there are significant water quality benefits.

## Goal 4.8

Surface water generated by urban development does not exceed pre-development discharge rates.

### Policies

- 4.8.1 Demonstrate implementation of low-impact development techniques through grant-funded public projects. Where feasible, incorporate such techniques into City capital facilities projects. Provide technical assistance to developers and encourage the use of such techniques for stormwater management.
- 4.8.2 Require that all proposed development applications identify hydrologic features, both on-and off-site, that could be impacted by the project. Evaluate project impacts on on-site and off-site watercourses, wetlands, drainage features and springs to avoid adverse impacts to existing sensitive area hydrology.
- 4.8.3 Continue inspection programs to ensure proper maintenance of public and private surface water management systems.

### WATER QUALITY AND QUANTITY IMPLEMENTATION STRATEGIES

- Implement water quality testing, as required under the City's new National Pollutant Discharge System permit and develop action plans for identifying and eliminating sources of pollution when problems are identified.
- Provide training and written information on low-impact development techniques to developers, contractors, City staff and City officials.
- Set up internal procedures for evaluating development projects to ensure no adverse impacts to wetland or stream hydrology.
- Publish articles on environmental stewardship and water quality protection in the Tukwila Reporter and/or Hazelnut.



## Flood Control

### Goal 4.9

The natural flood attenuation functions of wetlands, floodplains and floodways are protected and severe flooding is reduced to help prevent damage to life, property and public safety.

### Policies

- 4.9.1 Restrict or prohibit development that could create a danger to health, safety and property due to potential flood hazards, by complying with federal regulations.
- 4.9.2 Minimize the alteration of natural surface water features that retain or carry floodwaters (such as wetlands, natural flood plains and streams) and prevent land alterations that would increase potential flooding.
- 4.9.3 Reduce flooding that adversely affects public health, safety and general welfare and protect against flood damage through surface water and flood management projects.
- 4.9.4 Minimize adverse impacts to water resources by requiring the use of bioengineering and natural solutions for bank stabilization or flood control projects, wherever feasible.
- 4.9.5 Require mitigation to reduce adverse environmental impacts from engineered flood control measures on a case-by-case basis.

### Goal 4.10

The levee system south of I-405 is constructed, maintained and certified to meet the accreditation standards of the Federal Emergency Management Administration.

## Policies

- 4.10.1 Coordinate with King County Flood Control District and the U.S. Army Corps of Engineers to inspect and maintain the City's levee system.
- 4.10.2 Restrict levee encroachments by adjacent property owners.
- 4.10.3 Continue to work with the U.S. Army Corps of Engineers to develop levee vegetation policies that enhance habitat while at the same time protecting public safety.
- 4.10.4 Coordinate with the City of Kent on flood control projects that affect both jurisdictions.

### FLOOD CONTROL IMPLEMENTATION STRATEGIES

- Regulate uses, development and redevelopment, including essential facilities, in flood plains consistent with federal regulations.
- Prevent cumulative effects of obstructions in a flood zone by restricting development and other actions to zero increase in flood elevation.
- Require flood-proofing or elevation of structures above the base flood elevation when built in a flood zone.
- Encourage the use of LID for surface water management for new development or redevelopment, where appropriate.
- Prohibit placement of structures or fill in the floodplain that would cause an increase in the elevation of the "zero rise" floodway.
- Increase City staff expertise in bioengineering techniques for bank stabilization.
- Participate in county-wide flood control meetings sponsored by King County Flood Control District, the U.S. Army Corps of Engineers, and other applicable organizations.

## GOALS AND POLICIES - EARTH RESOURCES

### Goal 4.11

Potential impacts and liabilities associated with development in areas of potential geologic instability and coal mine hazard areas are minimized, erosion is prevented and natural surface water features are protected from loss, disruption or channelization.

### Policies

- 4.11.1 Require geotechnical studies for any development proposal on slopes over 15% to ensure that design takes into account geologic characteristics, surface and groundwater, and the presence of trees and native vegetation and their role in slope stabilization.
- 4.11.2 In geologically hazardous areas, require areas where vegetation must remain undisturbed, land disturbance minimized and cut and fill construction limited to protect slope stability on sites cleared for development. Require significant replanting and maintenance upon completion of development.
- 4.11.3 Require setbacks for buildings and other infrastructure where needed from the top and/or toe of steep slopes to reduce risks of slope failure and risks to public safety.
- 4.11.4 Require the use of erosion control measures, and where warranted, written erosion and sediment control plans to minimize erosion during and after construction activities on steep slopes or other erosion-prone areas.
- 4.11.5 Incorporate information from geotechnical reports and documented landslide and erosion-prone areas into the City's GIS data.
- 4.11.6 Ensure that proposed development projects in mapped coal mine hazard areas adequately consider and mitigate for possible risks.

## EARTH RESOURCES IMPLEMENTATION STRATEGIES

- Modify requirements for geotechnical evaluations under the Sensitive Areas Regulations to expand the assessment of trees' function in slope stability.
- Review and consider revising the SAO definition of steep slopes.
- Ensure that erosion control plans are adequate and that erosion control measures are implemented through inspections conducted as part of land clearing permits and NPDES permits.
- Update the City's GIS system to reflect data submitted in geotechnical studies.

## GOALS AND POLICIES - URBAN FORESTRY

### Goal 4.12

Trees are recognized by Tukwila citizens, businesses, City staff and decision-makers for their benefits to the environment, urban infrastructure and their aesthetic value.

### Policies

- 4.12.1 Develop a formal urban forest management plan to promote and guide preservation, restoration and maintenance of a sustainable urban forest, using the goals and policies of this chapter (as a basis) for guidance.
- 4.12.2 Ensure that the benefits of trees are factored into site design and permit decisions.
- 4.12.3 Ensure that regulations recognize that larger trees provide more benefits than small trees.
- 4.12.4 Seek to create and fund an urban forester/municipal arborist position within the City, or contract for such services, to provide expertise for urban forest management planning, oversight of tree planting and maintenance, and assistance to all City departments that have responsibilities for tree management.



- 4.12.5 Educate the public, elected officials and City staff about the importance of and benefits provided by trees in Tukwila.
- 4.12.6 Develop tree valuation methods to reflect the value trees provide, for use in assessing fines, determining damages or estimating loss of tree benefits.
- 4.12.7 Identify funding sources to support urban forestry planning and management and establish an urban forestry budget and account.
- 4.12.8 Consider developing an “exceptional” or “heritage” tree program to foster tree appreciation in the community.
- 4.12.9 Encourage public involvement in urban forest stewardship through volunteer events, free training workshops, and other means.

## Goal 4.13

Overall city-wide tree canopy for the zoning categories indicated below has increased to a total of 29% by 2034 by achieving the following City-wide goals for different land use categories:

### Goals for Increasing Canopy

Light Industrial zones: 3% increase from 20% to achieve 23% cover

Heavy Industrial zones: 1% increase from 9% to achieve 10% cover

Tukwila Urban Center and Tukwila South: 5% increase from 13%to achieve 18% cover

Office and Commercial: 3% increase from 29 %to achieve 32% cover

Parks: 5% increase from 38% to achieve 43% cover

Public Rights-of-Way:<sup>1</sup> increase canopy coverage through street tree planting. Specific canopy goal to be established based on future assessment.

<sup>1</sup> Note: Some public rights-of-way (such as WSDOT's) are not included in the total city-wide canopy calculation. Rights-of-way adjacent to public streets (i.e., where street trees would be planted) are included in each zoning category.

## Goals for No Net Loss of Canopy

Low Density Residential: Maintain current City-wide canopy coverage of 47%

Medium and High Density Residential: Maintain current City-wide coverage of 40%

## Policies

- 4.13.1 Promote tree retention throughout the City by:
- a. implementing educational programs for property owners and managers regarding tree selection and care, applicable regulations, selecting a qualified arborist, and other issues;
  - b. except for hazard trees, prohibiting removal of any tree four inches or larger in diameter at breast height (dbh) on all undeveloped property without an approved development or other land use permit;
  - c. promoting the mutual goals of tree protection and urban development through the implementation of incentive programs and flexible site development regulations, especially to retain tree groves; and
  - d. requiring financial assurances for required tree replanting and maintenance.
- 4.13.2 Improve retention of trees on steep slopes through modifications in regulations, by requiring the evaluation of the role that trees play in slope stability during geotechnical reviews, and by providing incentives for tree retention.
- 4.13.3 Continue to protect trees in sensitive areas and the shoreline through relevant regulations.
- 4.13.4 Ensure that required replacement trees at maturity will have equivalent or larger canopies than the removed tree(s), except where existing or future infrastructure impedes the planting of large trees.

- 4.13.5 Develop mechanisms for protecting tree roots for public and private surface and underground infrastructure installation, including in some cases, requiring the presence of a certified arborist when working in the critical root zone; replacement of trees where damage is unavoidable; and either requiring replanting or payment into a tree replacement fund as compensation if planting on-site is not feasible. Establish reasonable procedures to ensure consideration of tree root protection during routine or emergency maintenance of existing utilities and provide training to City and other public utility maintenance staff on root protection techniques.
- 4.13.6 Establish criteria for requiring professional assessment and corrective actions by property owners who damage code-required landscaping, street trees, or other required trees by topping, poor pruning practices, or root disturbance.
- 4.13.7 Where trees are regulated and required replacement trees cannot be accommodated on a site, establish procedures for off-site planting of replacement trees or payment into a dedicated tree replacement fund.
- 4.13.8 Develop tree planting and urban forest rehabilitation programs for City parks and other publicly owned lands. Collaborate with other agencies, such as Washington Department of Transportation, to promote planting in highway interchanges and other locations.
- 4.13.9 Collaborate with other government, non-profit organizations and private sector entities to promote urban forest management and restoration.
- 4.13.10 Provide flexibility in the landscape code to promote increased tree planting and/or planting of large canopy trees, and reward the preservation of existing healthy trees to assist in meeting the City's canopy goals.
- 4.13.11 Evaluate current parking lot landscape requirements to identify opportunities to increase tree canopy.

## Goal 4.14

Tukwila's streetscapes and landscaped areas are sustainable and attractive, and its urban forest is healthy, diverse, and safe.

### Policies

- 4.14.1 Develop tree/urban forest inventories and assess the health of trees and forests in Tukwila's public spaces.
- 4.14.2 Develop maintenance plans and programs for trees on City property or rights-of-way to ensure that maintenance pruning is properly carried out, that diseases and pest infestations are managed, that hazardous trees are identified and managed in a timely manner to reduce risks, and that invasive vegetation is properly managed.
- 4.14.3 Modify landscape code and educate property owners, property managers, landscape maintenance companies and tree companies to promote best practices for soil preparation, planting techniques, pruning, trenching, and general tree care.
- 4.14.4 Ensure that landscaping and replacement trees in new development or re-development are properly cared for and thrive in perpetuity , through such means as maintenance agreements, monitoring and enforcement.
- 4.14.5 Develop a mechanism to ensure that tree removal and maintenance companies have the necessary qualifications and liability insurance to work in Tukwila.
- 4.14.6 Modify landscape code to require diversity of tree species in landscape plantings and consideration of species already present in the vicinity.
- 4.14.7 Establish minimum standards and landscape specifications to ensure long-term tree health for street trees, required landscape trees and required replacement trees,



including: minimum soil volume, soil quality, plant quality, planting techniques, irrigation, mulching, tree pruning, and prohibition of topping.

- 4.14.8 Develop an approved or recommended tree list for street trees, landscape perimeter planting and parking lots that takes into account the importance of species diversity, available planting space and infrastructure conflicts, climate conditions, canopy coverage goals, allergy issues, urban wildlife benefits, and tolerance of urban conditions.

#### URBAN FORESTRY IMPLEMENTATION STRATEGIES

- Prepare and publish technical specifications for landscape professionals and landscape contractors reflecting best management practices/standards for achieving adequate soil conditions, plant quality specifications, proper planting techniques, proper mulch placement, tree care and pruning and other relevant information.
- Prepare and make available technical guidance for homeowners on tree selection, planting, care, pruning, selecting a good arborist, identifying and controlling invasive plants.
- Conduct volunteer activities in parks and other public areas to help carry out urban forest restoration plans to remove invasive plants and plant native trees and other vegetation.
- Create “Adopt-an-Urban-Forest,” “Ivy Removal Team” or similar programs to actively remove invasive plants and promote ongoing stewardship of urban forests in the City’s parks and other public areas.
- Add an urban forestry page to the City’s web site that contains information about programs, regulations, technical guidance, how to find a certified arborist and other relevant issues.
- Expand the annual Arbor Day celebration to widen public participation;
- Evaluate other jurisdiction’s heritage tree programs and reach out to business and resident community to determine interest in a heritage tree program in Tukwila.
- Develop mechanisms for monitoring tree canopy growth, removal and replacement, in addition to periodic tree canopy assessments using GIS and remote sensing methods;

- Review and amend, as necessary, SAO and Shoreline regulations to ensure consideration of tree retention, particularly in steep slope areas.
- Provide ongoing training for City staff from all departments on tree selection, site preparation, proper planting techniques, and protection of tree roots during construction activities, proper pruning, and general tree care.
- Prepare and publish technical specifications manuals for utility companies and City staff to identify techniques to protect tree roots during installation of public and private surface and underground infrastructure.
- Revise City regulations to allow assessment of fines or requirement of financial guarantees in the enforcement of corrective actions.
- Prepare an urban forest inventory for publically owned trees in the City.
- Notify property owners about applicable tree regulations via inclusion of fliers in storm water utility bill, direct mailings, and media announcements.
- Improve the frequency of landscape and tree replacement inspections and increase enforcement.
- Develop street tree plans for various parts of the City, taking into account the need for diversity for tree health and urban design issues.
- Modify landscape, tree and right-of-way vegetation regulations, including consideration of a point system for landscape requirements, clarification of responsibilities for trees on City ROW, identifying incentive programs, and allowing for fines based on the value of trees damaged or removed.