

ENVIRONMENT

Draft-Environmental Element

The Environmental Development Element emphasizes the following Framework Goals:

FRAMEWORK GOALS

- FG1: Accommodate anticipated levels of growth and enhance the quality of life within the City of Shoreline.**
- FG2: Promote quality building and development that is compatible with the surrounding environment.**
- FG3: Support diverse and affordable housing opportunities which provide for Shoreline's population growth.**
- FG4: Pursue a strong and diverse economy and assure economic development that complements neighborhood character.**
- FG5: Protect the natural environment and preserve environmentally sensitive areas.**
- FG6: Promote improvements to human services.**
- FG7: Assure effective and efficient public investment for quality public services, facilities, and utilities.**
- FG8: Improve multi-modal transportation systems which provide for Shoreline's present and future population.**
- FG9: Provide for wide involvement in community planning decisions.**

Intent

The intent of the Environmental Element is to guide the formation of regulations to protect and enhance the natural environment for present and future residents by identifying critical areas, preserving significant natural areas, regulating development to better integrate human development with natural features and conditions, and educating the public about the potential impacts of development on natural systems. This element provides a framework to achieve land use and development practices that are more compatible with the natural environment than those of the past.

The environmental element is intended to meet the objectives of the State Growth Management Act (GMA) as well as other federal, state, and county policies including the State Environmental Policy Act (SEPA), the Shoreline Management Act (SMA), and the King County Countywide Planning Policies (KCCPP).

The following goals in the State Growth Management Act relate to the natural environment:

“Encourage the retention of open space and development of recreational opportunities, conserve fish and wildlife habitat, increase access to natural resource lands and water, and develop parks.”

“Protect the environment and enhance the state’s high quality of life, including air and water quality, and the availability of water.”

Background and Context

Environmental goals and policies contained in this element address substantive issues such as development on steep slopes, as well as procedural issues such as what further steps the City should take towards establishing policy direction and regulatory authority for the protection of large mature trees. These goals and policies will be implemented through such things as: economic development decisions, sensitive area regulations, development review guidelines, stormwater ordinances and programs, and incentives programs for environmental protection, and economic development decisions.

Shoreline’s environment is comprised of both natural and built features. Puget Sound vistas, mature trees, natural vegetation, streams, wetlands, lakes, and tidelands are just some of the aspects of the natural environment that Shoreline citizens value. The relationships between these features, development, and natural processes, and the quality of the resulting environment, have profound impacts on the quality of life in Shoreline. Shoreline is not a pristine landscape, but the very name of the City reflects the importance of the natural environment to the community identity. Preserving the quality of the environment depends on government, corporate, and individual decisions, and coordinated actions to

minimize the adverse environmental impacts that are caused by human development.

As pressure for increased residential and commercial development intensifies in Shoreline, the protection of the natural environment becomes more challenging. The City must continually evaluate the relationship between the natural and built environments, including: the potential impacts of development on slope stability and erosion; the susceptibility to contamination of its air, water, and soil; the amounts of noise, emissions, and waste it generates; the rate at which it consumes resources; its dependence on the automobile; and the open space, wildlife habitat, and recreation opportunities it provides.

Existing Conditions

Shoreline is a community that developed mostly as a suburban residential area with the associated mix of commercial centers, parks, schools, and natural areas. Natural areas are comprised of the Puget Sound shoreline, bluffs, steep slopes, ravines, natural reserves, wetlands, streams, lakes, native growth easements, and stands of mature trees. These areas are found on both private property and public property, such as larger single family residential lots and City parks.

Shoreline is known to have the following environmentally sensitive areas (also known as critical areas): landslide hazard areas, erosion hazard areas, seismic hazard areas, 100 year floodplains, steep slopes, streams, and wetlands, and critical wildlife habitats. Known features have been identified and mapped. ~~in Figures EN-1 and EN-2 at the end of this element. Unmapped~~ Whether mapped or not, features which meet sensitive area definitions are regulated as environmentally sensitive areas under the Shoreline Municipal Code (SMC 18.24). Shoreline has adopted (and subsequently revised) the King County Sensitive Areas Ordinance to protect environmentally sensitive areas in the City. Upon completion of the Comprehensive Plan, the City will revise regulations pertaining to environmentally sensitive areas. These revised regulations will be referred to as the Sensitive Critical Areas Ordinance and will be comprised of existing sensitive areas regulations and additional or modified regulations developed under the guidance of the Comprehensive Plan.

The City does not contain any known critical aquifer recharge areas that supply potable water. Almost without exception, residents get their drinking water from surface systems that originate in the Cascade Mountains and are operated by the Shoreline Water District and the City of Seattle. However, the City's lakes and wetlands contribute to aquifer recharge.

General Goals and Policies

The following general goals and policies provide a framework for Shoreline's continued commitment to the preservation and appropriate restoration of the environment. They provide a basis for the more specific policy direction contained

in the subsequent sections for each environmental area. They affirm the City's role to regulate land use, implement federal and state statutes, obtain funding from state and local jurisdictions and consistently manage impacts to the natural environment.

Goal EN I: Through leadership, policy, and regulation, the City shall strive to minimize its impacts on the natural environment. The City shall lead and support efforts to protect and improve the natural environment, protect and preserve environmentally sensitive areas, and minimize pollution and the waste of energy and materials.

Policies

- EN1:** Lead and support regulatory efforts, incentives, and projects to protect and improve the natural environment and preserve environmentally sensitive areas consistent with federal and state policies. Where different state and federal requirements exist, the more stringent of the two shall be applied.
- EN2:** Consider and evaluate the immediate, long-range, and cumulative environmental impacts of policy and development decisions consistent with the SEPA and GMA.
- EN3:** Conduct all City operations in a manner that minimizes adverse environmental impacts to the community and promotes a safe workplace for employees. The City should reduce its consumption and waste of energy and materials, minimize its use of toxic and polluting substances, reuse and recycle, and dispose of all waste in a safe and responsible manner. The City should give preference to recycled products, within budget constraints.
- EN4:** Support, promote, and lead public education and involvement programs to raise public awareness about environmental issues, advocate respect for the environment, encourage individual and community efforts to protect the environment, and provide opportunities for the community and visitors to respect and enjoy Shoreline's unique environmental features.
- EN5:** Provide incentives for development that is designed, sited, and constructed to minimize environmental impacts. Incentives may include density bonuses for cluster development and a transfer of development rights (TDR) program.
- EN6:** Cooperate with local, state, and federal governments, tribal governments, international agencies, and non-profit organizations to protect and enhance the environment, especially on issues that affect areas beyond Shoreline's boundaries.

- EN7:** The following shall be considered environmentally sensitive areas and regulated through the Shoreline Municipal Code: 100 year floodplains, landslide hazard areas, steep slopes, erosion hazard areas, seismic hazard areas, wetlands, streams, and critical wildlife habitat areas.
- EN8:** Environmentally sensitive areas may be designated as open space and should be conserved and protected from loss or degradation wherever practicable.
- EN9:** Develop, actively participate in, and help publicize, local and regional programs to conserve open space and protect environmentally sensitive areas, including future transfer of development rights (TDR) programs, conservation efforts of the Land Conservancy of Seattle and King County, and King County's Public Benefit Rating System.
- EN10:** Provide standards in the subdivision code that restrict the creation of new lots in areas which contain sensitive areas or sensitive area buffers.
- EN11:** Regulations should limit noise to levels that protect the public health and that allow residential, commercial, and manufacturing areas to be used for their intended purposes. Noise walls or other effective mitigation measures should be required when noise levels exceed adopted standards.
- EN12:** Work with the State Department of Transportation and other appropriate agencies and groups to mitigate freeway and arterial noise and address aesthetic concerns.

Goals and Policies for Specific Environmental AreasConcerns

Citizens, City decision-makers and staff have expressed concerns throughout the planning process about the relationship between the built and natural environments and elements of those natural environments that may sustain impacts from growth and development. These concerns have been grouped into the following environmental areas: earth resources and geologic hazards; vegetation and wildlife habitat; air quality; stormwater and drainage; and water resources and shorelines. The following goals and policies are organized by these environmental areas. Each subsection begins with a more detailed description of the environmental area, followed by the primary goal and specific policies which will guide the City's actions. These policies are intended to ensure that the City acts to protect and enhance the natural environment enjoyed by the community.

Earth Resources and Geologic Hazards

Continental glaciers extended many times into central Puget Sound over the past two million years depositing layers of silt-clay, gravel and till in a rolling plateau known as the Seattle drift plain. The City is located on this plateau which drops irregularly to Puget Sound and Lake Washington through a series of basins formed by small streams that flow through the area. A number of steep bluffs are located

along the shores of Puget Sound within The Highlands and Innis Arden neighborhoods. The size of these bluffs diminish in the Richmond Beach neighborhood. Hazards, including landslides and mudslides, are associated with these steep bluffs (see Figure EN-1 at the end of this element). Steep bluffs are also found along the eastern edges of the City. The majority of the remaining areas of the City are located on a rolling plateau with a north/south topographical orientation. Development on or adjacent to severe slopes and highly erodable soils can have a negative impact on slope stability.

Soil type and degree of slope affect the suitability of a site for development. The City is predominately covered with the Alderwood series of soils (U.S. Geological Survey Maps). Alderwood soils have drainage problems during periods of heavy seasonal rainfall. Erosion can be severe and accelerated if vegetation (including trees) and forest litter, which protects the soils from rain, are removed for development. According to the King County Sensitive Areas Map Folio (King County, 1990), the City of Shoreline contains geologic hazard areas prone to landslide, seismic, and erosion hazards. Most of these hazard areas are located on the bluffs along Puget Sound or along creek beds (see Figure EN-1 ~~at the end of this element~~). Policies which specify the type, place, and manner of development on or adjacent to landslide hazard areas, seismic hazard areas, and erosion hazard areas provide a framework for specific development regulations in the Sensitive Areas Ordinance and other sections of the Shoreline Municipal Code.

Landslide Hazards

Many of the bluffs along Puget Sound consist of severe slopes and isolated glacial deposits that are susceptible to landslides. These unstable slopes are a major hazard to people, structures, and other land uses and improvements (such as railroad tracks). The identification of areas susceptible to landslides is necessary to effectively regulate grading, building, foundation design, housing density, drainage and to implement other regulations to reduce or eliminate the risk of property damage and personal injury.

The City contains areas that are susceptible to landslides. These areas are identified on the King County Sensitive Areas Map Folio (King County, 1990). Landslide hazard areas are defined as areas with a combination of slopes with greater than a 15 percent gradient, impermeable soils, and groundwater seepage (see Figure EN-1 ~~at the end of this element~~). Areas showing a history of rapid stream incision, stream bank erosion or undercutting by wave action are also included, as well as areas with a geologic history indicating landslide susceptibility. Within the City these areas include the bluffs along Puget Sound, the Boeing Creek ravine and the hillsides along McAleer Creek.

Seismic Hazards

Seismic hazard areas are those areas subject to severe risk of earthquake damage as a result of settlement or soil liquefaction. These conditions occur in areas underlain by soils with low cohesion and density, usually in association with a shallow groundwater table. When shaken by an earthquake, certain soils lose their

ability to support a load. Some soils will actually flow like a fluid; this process is called liquefaction. Loss of soil strength can also result in failure of the ground surface and damage to structures supported in or on the soil. Loose, water-saturated materials are the most susceptible to ground failure due to earthquakes.

The King County Sensitive Areas Map Folio (King County, 1990) identifies two small areas of seismic hazard within the City (see Figure EN-1 ~~at the end of this element~~). One area is located along Puget Sound in Richmond Beach Saltwater Park. In this area, park structures and the Burlington Northern railroad tracks may be at risk. The other seismic hazard area is located along McAleer Creek between ~~Northeast~~N.E. 196th Street and ~~Northeast~~N.E. 205th Street. Roads, single family residences, and other public and private improvements may be affected in this area. A small area near 24th Avenue ~~Northeast~~N.E. is susceptible to both landslides and seismic hazards.

Erosion Hazards/Sedimentation

Erosion is a natural process where rain, running water, and wind loosen and eliminate or reduce soil coverage and deposit it elsewhere. Of these natural forces, erosion by rain and running water is by far the most common within the Puget Sound region. The susceptibility of any soil type to erosion depends upon the physical and chemical characteristics of the soil, its protective vegetative cover, slope length and gradient, intensity of rainfall, and the velocity of water runoff. During storms, water runoff saturates the upper layers of till and sand-gravel. When the water migrates to the less permeable layer of silt-clay below the layer of sand-gravel it begins to flow laterally toward Puget Sound or Lake Washington. Erosion and slides occur as the sand-gravel layer washes away or slides on top of the slippery silt-clay layer. Runoff also erodes topsoil, which contributes to the erosion and landslide hazards.

The City contains areas that are prone to erosion activity. These areas include the bluffs along Puget Sound, the Boeing Creek ravine, and the hillsides along McAleer Creek, near the eastern boundary of the City. Erosion hazards also include hillsides in the Richmond Beach neighborhood, the vicinity of Paramount Park, east of Holyrood Cemetery, and the vicinity of Hamlin Park and Shorecrest High School. A large portion of the Boeing Creek Basin, which includes Shoreview Park, is both an erosion hazard area and a landslide area. Other small erosion hazard areas are variously located within the City (see Figure EN-1 ~~at the end of this element~~).

Goal EN II: Conserve soil resources throughout the City and protect steep slope areas, landslide hazard areas, seismic hazard areas, and erosion hazard areas from disturbance and development.

Policies

- EN13:** Mitigate drainage, erosion, siltation, and landslide impacts by:
- clustering development,

- decreasing development intensity, building site coverage and impervious surfaces, and
- limiting vegetation removal as slope increases.

Development regulations and required mitigation shall fit the specific type and level of potential impact.

- EN14:** Development shall be prohibited on steep slopes and steep slope buffer areas, unless both of the following conditions are met:
- the slope has a vertical elevation change of 20 feet or less, and
 - no adverse impact will result from the exemption based on the City's review of and concurrence with a soils report prepared by a geologist or geotechnical engineer.
- EN15:** Development of geologic hazard areas shall be discouraged and closely regulated. Where development is allowed on or adjacent to slopes which are less than 40% and have not experienced documented landslide activity, land uses shall be designed and sited to prevent property damage and environmental degradation, and to protect wildlife habitat to the maximum extent practicable by:
- preserving existing native vegetation,
 - preventing soil saturation, and
 - preventing overland flows of water.
- EN16:** Minimize and control soil erosion during and after construction through the use of the best available technology and development restrictions. The period of time that soil is exposed and the total area of exposed soil at any one time should be minimized. Seasonal limitations on site work may be appropriate in some circumstances. Construction and erosion control standards and regulations will be actively enforced.
- EN17:** Minimize the risk of structural damage, fire, injury to occupants, damage to adjacent properties and persons, and prevent post-seismic collapse by requiring pre-development risk analysis and appropriate building design and construction measures in landslide hazard areas, steep slopes, and seismic hazard areas.
- EN18:** Allow land alteration, such as clearing, grading, and filling only for approved development proposals or approved mitigation plans. The City shall investigate regulatory means of restricting land-clearing activities which do not meet the current size and volume thresholds for obtaining a grading permit. Regulations shall exclude activities defined as routine property maintenance.
- EN19:** Promote educational efforts to inform landowners about site development, drainage, and yard maintenance practices which impact slope stability.

Vegetation and Wildlife Habitat

~~Residents characterize the City of Shoreline as a wooded community; this is often cited as a key reason for locating in the area. Large evergreen trees can be seen rising above residential neighborhoods, on hilltops, and on the periphery of Aurora Avenue. As the City has become more urbanized, native vegetation has become increasingly scarce. Wooded areas, steep slopes, wetlands, and other areas containing natural vegetation provide an important resource which should be preserved. Wooded areas help stabilize soils on steep slopes and act as barriers to wind and sound. Plants replenish the soil with nutrients, generate oxygen, and clean pollutants from the air. Native vegetation provides habitat for wildlife. The native vegetation found near creeks, lakes, and saltwater areas offer habitats for many migrating and resident birds and other wildlife. Less developed wooded areas and City parks also provide habitats for many birds and mammals.~~

~~Aerial photos show that the community is a mosaic of various types of vegetation. Areas of significant vegetation have been classified into two types:~~

~~*Primary areas* are areas of predominantly contiguous, native vegetation with little or no physical development. These areas are found on steep hillsides and within native growth easements, natural reserves, and parks. These areas serve as habitat for animals which include birds, rodents, and small mammals.~~

~~*Secondary areas* contain sparser and less continuous vegetative cover and include a mix of residential neighborhoods, larger lots, and areas with large significant trees. These areas also provide some animal habitat.~~

~~Primary and secondary areas of significant vegetation were preliminarily designated by observing vegetated areas on an aerial photo, then by conducting site visits to determine if the vegetation could be considered significant (see Figure EN-3 at the end of this element). The current map of these areas should be considered a preliminary reconnaissance effort. The criteria and delineation of these areas need to be updated before they can be used to regulate vegetation protection. Specific regulations pertaining to these goals and policies will be detailed in the Shoreline Municipal Code.~~

Residents characterize the City of Shoreline as a wooded community; this is often cited as a key reason for locating in the area. Large evergreen trees can be seen rising above residential neighborhoods, on hilltops, and even on the periphery of Aurora Avenue. As the City has become more urbanized, the area covered by native ground cover and/or shaded by native trees has been vastly reduced.

Forested open space, wetlands, and native vegetation found on steep slopes and larger residential lots are important resources which should be preserved. Trees help stabilize soils on steep slopes and act as barriers to wind and sound. Plants replenish the soil with nutrients and generate oxygen and clean pollutants from the

air. Native vegetation provides habitat for wildlife; the native vegetation found near creeks, lakes, and saltwater areas offer habitats for many migrating and resident birds and other wildlife. Less developed wooded areas and City parks also provide habitats for many birds and mammals. Wetlands and riparian vegetation provide surface water storage and help clean surface water of pollutants and sediment.

Aerial photos show that the community is a mosaic of various types of vegetation. The largest, most contiguous areas of native vegetation in Shoreline are primarily found in City parks, publicly owned open space, privately owned designated open space (such as the Boeing Creek area of The Highlands) and designated sensitive areas (such as steep slopes along the Puget Sound shoreline). These areas provide the highest quality wildlife habitat found in the City. However, areas of less intensive residential development also contain mature trees and other native vegetation which provide secondary wildlife habitat and substantially contribute to the quality of life in our City. Native vegetation in residential areas which may be subdivided or otherwise more intensely developed is at the greatest risk of being lost.

Increased development standards and incentives would help protect native vegetation during the development process. For example, these standards could include the requirement that the developer file a vegetation management plan which specifies how they will reduce the amount of vegetation which is cleared from the site and where they will plant trees to replace the ones which are lost. Incentives could include density bonuses for cluster housing which protects areas of undisturbed open space or expedited permit review. Other tools which can be used to protect vegetation include public education, habitat enhancement assistance, conservation easements, open space designation and property tax reduction under the Public Benefit Rating System, transfer or purchase of development rights, and outright acquisition. The goals and policies contained in this Plan would be used to develop specific regulations, incentives, and programs which will be identified in the Municipal Code.

The process of urbanization results in the conversion of wildlife habitat to other uses. The loss of certain types of habitat can have significant, adverse effects on the health of certain species. These types of habitat are referred to as critical wildlife habitats. Critical wildlife habitats include lands important for the protection, management, or public enjoyment of certain wildlife species. These include habitats of species which state or federal agencies have designated as endangered, threatened, sensitive, candidate, or priority species, anadromous fish habitat, waterfowl and raptor nests, heron rookeries and habitats of local importance which are identified and designated through a wildlife conservation plan.

Currently in the Puget Sound, chinook salmon are proposed for threatened status and coho salmon are a candidate species for listing by the federal government under the Endangered Species Act. Salmon runs throughout the Puget Sound and the northwest are critically depressed. All local governments which border the

Puget Sound or streams which flow to the Sound will be affected by federal fisheries management in the near future. To help restore healthy salmon runs, local governments and the State government must work proactively to address salmon habitat protection and restoration.

~~The Washington State Department of Fish and Wildlife (WDFW) has identified several wetlands and an area of urban natural open space within the City of Shoreline as priority habitats. The Priority Habitats and Species (PHS) Program is designed to help guide growth in a manner that will preserve the best and most important habitats and provide for the life requirements of fish and wildlife. According to WDFW, priority habitats within Shoreline are located within City Parks, public open space, and/or designated sensitive areas. Therefore, these areas are currently afforded a relatively high level of protection.~~

~~The City has requested detailed maps displaying the exact locations of PHS areas, waterfowl breeding areas and raptor nests, and related data and management guidelines from WDFW. WDFW management recommendations are intended to assist landowners, users, and managers in conducting land use activities in a manner that incorporates the needs of fish and wildlife. Management recommendations are developed through a comprehensive review and synthesis of the best scientific information available. The City is currently gathering more detailed information about wildlife habitats from WDFW and King County Department of Natural Resources.~~

The Washington Department of Fish and Wildlife (WDFW) has developed the Priority Habitats and Species (PHS) Program to help guide growth in a manner that will preserve the best and most important habitats and provide for the life requirements of fish and wildlife. Priority species are fish and wildlife species which require protective measures and/or management guidelines to ensure their perpetuation. Priority habitats are habitat types with unique or significant value to many species. The WDFW has documented the locations of priority habitats and species within the City. These PHS areas include wetlands, urban natural open space, habitat for a priority bird species, and the point location of a priority bird species siting. These areas combined comprise less than 5% of the total land area of the City and are primarily found within existing City parks, public open space, designated private open space, and designated sensitive areas. PHS areas are considered critical wildlife habitats.

The City has received detailed maps displaying the exact location of PHS areas and related data and management guidelines from WDFW. WDFW management recommendations are intended to assist landowners, users, and managers in conducting land-use activities in a manner that incorporates the needs of fish and wildlife. Management recommendations are developed through a comprehensive review and synthesis of the best scientific information available. The City will review the PHS management recommendations developed by WDFW and adapt these to fit the existing conditions and limitations of our relatively urbanized

environment. Management guidelines for priority habitats and species will be established in the Municipal Code.

~~Although WDFW has not designated any species-specific PHS areas in the City, priority species and additional priority habitats~~Additional priority habitats and species may occur in areas not currently known to WDFW biologists or in areas for which comprehensive surveys have not been conducted. PHS data can only show that a species or habitat type may be present. These data do not show that a species or habitat type is not present. Site-specific surveys may be necessary to rule out the presence of priority species and priority habitats on an individual project site. WDFW has established guidelines which enable local governments to designate and protect species of local importance. The designation criteria for species of local importance will be defined in the Shoreline Municipal Code. The City will work with WDFW, residents and other interested parties to identify and protect native wildlife species and habitats from the adverse impacts of current land use and future development.

Goal EN III: Provide habitat of sufficient diversity and abundance to sustain existing indigenous fish and wildlife populations. Balance the conditional right of private property owners to develop and alter land with the protection of native vegetation.

Policies

~~**EN20:** Designate primary and secondary areas of significant vegetation within the City. Develop educational materials, incentives, policies, and regulations to protect native vegetation on public and private land for wildlife habitat and human enjoyment. As a general rule, the City would seek a higher level of protection for primary areas of significant vegetation and native vegetation on public lands.~~

EN21: ~~The City shall establish regulations to protect mature trees and other native vegetation from the negative impacts of residential and commercial development, including short-plat development~~Develop educational materials, incentives, policies, and regulations to conserve native vegetation on public and private land for wildlife habitat and human enjoyment. The city shall establish regulations to protect mature trees and other native vegetation from the negative impacts of residential and commercial development, including short-plat development.

EN22: The removal of healthy trees should be minimized, particularly when they are located in environmentally sensitive areas.

EN23: The City shall encourage the replacement of removed trees on private land and require the replacement of removed trees on public land, wherever practicable. Trees which are removed should be replaced with a suitable number of native trees that are of a size and species which will survive over the long term and provide adequate screening in the short term. The City may require tree replacement on private property as required project

mitigation or subject to terms and limitations in a vegetation conservation and management ordinance.

- EN24:** Trees that are a threat to public safety should be removed by property owners or designated maintenance providers at property owner expense.
- EN25:** If development is allowed in an environmentally sensitive area or sensitive area buffer, clearing and grading should be restricted to building footprints, roads, and small areas immediately adjacent to these improvements. Native vegetation outside of these areas should be preserved, wherever practicable, or replanted.
- EN26:** Manage aquatic and riparian habitats to preserve native vegetation, natural function, and habitat for diverse species.
- EN27:** Identify and protect wildlife corridors prior to and during land development through public education, incentives, ~~and regulation,~~ and code enforcement.
- EN28:** Encourage the use of native and low maintenance vegetation in residential and commercial landscapes to provide additional secondary habitat, reduce water consumption, and reduce the use of pesticides, herbicides, and fertilizer.
- EN29:** Actively participate in regional species protection efforts, including salmon habitat protection and restoration.
- EN30:** Critical wildlife habitat, including habitats or species that have been identified as priority species or priority habitats by the Washington Department of Fish and Wildlife, will be preserved through regulation, acquisition, incentives and other techniques. Habitats and species of local importance will also be protected in this manner.

Air Quality

One of the basic characteristics of a livable city is clean air. Numerous federal, state, regional, and local agencies enact and enforce legislation to protect air quality. Good air quality in Shoreline, and in the region, requires controlling emissions from all sources, including: internal combustion engines, industrial operations, indoor and outdoor burning, and wind-borne particles from land clearing and development. In the Puget Sound region vehicle emissions are the primary source of air pollution. Local and regional components must be integrated in a comprehensive strategy designed to improve air quality through transportation system improvements, vehicle emissions reductions, and demand management strategies.

Air quality is measured by the concentration of chemical compounds and particulate matter in the air outside of buildings. Air that contains carbon monoxide, ozone, and particulate matter can degrade the health of humans, animals, and plants. Human health risks from poor air quality range in severity from headaches and dizziness to cancer, respiratory disease, and other serious illnesses, to premature death. Potential ecological impacts include damage to trees and other types of vegetation. Quality of life concerns include degradation of visibility and deposition of soot and other particulate matter on homes and other property.

The City seeks long-term strategies to address air quality problems, not only on the local level, but in the context of the entire Puget Sound Basin with coordination and major direction from the Puget Sound Air Pollution Control Agency.

Goal EN IV: Ensure clean air for present and future generations through the promotion of efficient and effective solutions to transportation issues, clean industries, and compact human development.

Policies

- EN31:** Support federal, state, and regional policies intended to protect clean air in Shoreline and the Puget Sound Basin. The City will support the active enforcement of air quality policies and ordinances by the Puget Sound Air Pollution Control Agency.
- EN32:** Encourage the arrangement of activities which will generate the fewest necessary automobile trip miles while providing for the necessary separation of conflicting land uses.
- EN33:** Support the expansion of public mass transit and encourage cycling and walking in the City as an alternative to dependence on individual vehicles.
- EN34:** Reduce the amount of air-borne particulates through continuation and possible expansion of the street-sweeping program, dust abatement on construction sites, efforts to reduce wood burning for home heating, and other methods to address particulate sources.

Stormwater and Drainage

Drainage in the City, which includes the annexation areas, consists of seven separate areas or drainage basins: Lyon Creek, McAleer Creek, Thornton Creek, Boeing Creek, West Lake Washington, and two separate areas of the Middle Puget Sound Basin (north and south), see Figure EN-2. Along the west half of the City, the Boeing Creek Basin empties directly into Puget Sound and the Middle Puget Sound basins drain into Puget Sound via small creeks and stormwater systems. The McAleer Creek Basin in the northeastern portion of the City drains into Echo Lake and Lake Ballinger and eventually into Lake Washington. The approximate eastern half of the City from Interstate 5 drains to Lake Washington via Thornton Creek. A portion of Annexation Area A drains to Lake Washington via Lyon Creek. Small

portions of the City at the north and northeastern edges drain into Lake Washington through small creeks and stormwater systems.

Drainage facilities in the City consist of a combination of stormwater conveyance pipes, ditches, and stream channels. Most of the development in the City took place in the 1940s and 1950s, prior to the implementation of effective stormwater mitigation regulations in the early 1970s. Efforts by King County and the Washington State Department of Transportation to improve drainage conditions have had only limited success. The efforts include a number of stormwater mitigation systems to control excess volumes of stormwater.

~~Efforts by King County and the Washington State Department of Transportation to improve drainage conditions have had only limited success. The efforts include a number of stormwater mitigation systems to control excess volumes of stormwater.~~ Many natural creek systems have been stabilized or reconstructed to repair and prevent slope erosion or bank failures that result in sedimentation of lakes and streams. However, water quality mitigations have not been adequate to protect natural waterways and the water quality of the lakes and streams in the City has been negatively impacted by the large volumes of polluted stormwater that they regularly receive. Although open vegetated drainage ways are generally the preferred option from a water quality standpoint, the construction of curbs, gutters, and sidewalks may be appropriate in areas with urban densities, high vehicular traffic, schools, parks, bus stops, shopping or employment concentrations.

Goal EN V: Manage the storm and surface water system through a combination of engineered solutions and the preservation of natural systems in order to:

- provide for public safety
- prevent property damage
- protect water quality
- preserve and enhance fish and wildlife habitat and sensitive areas
- maintain a hydrologic balance

Policies

EN35: Where a variety of stormwater project alternatives will provide for public safety, protect property, and protect water quality, the City should seek the solution which will result in the least amount of environmental modification and preserves natural features or constructed features with habitat values.

EN36: Restrict the water runoff rate to predevelopment levels and restore water quality to predevelopment levels for all new development and redevelopment. Additional requirements which are more restrictive ~~may~~ than this general policy may apply for the substantial redevelopment of parcels which were originally developed under non-existent or outdated stormwater control standards and contain large areas of ~~be established as~~

~~mitigation measures for substantial redevelopment of parcels which contain large impervious surfaces, have a high percentage of total impervious surfaces, or have identified drainage or water quality problems.~~

Note: In order to avoid confusion, some clarification of the language in this policy is necessary. In the case of redevelopment, "predevelopment" means the use existing on the parcel prior to redevelopment. In the case of new development, "predevelopment" refers to the water runoff rate and water quality resulting from the land cover which existed on the parcel prior to residential or commercial development. Levels may be estimated using accepted hydrologic models and coefficients.

- EN37:** Maintain surface water quality as defined by federal and state standards and rehabilitate degraded surface water through reduction of non-point source pollution and stormwater system improvements and erosion and the development of stormwater system improvements.
- EN38:** Actively pursue state and federal grants to improve surface water management and water quality.
- EN39:** Support enhanced water quality and the percolation of water at natural rates near where it falls where it won't result in soil instability or damage roadways or other improvements. Measures may include appropriate landscaping, swales, natural retention facilities, pollution control devices, and improved storm water facilities.
- EN40:** Protect water quality through the continuation and possible expansion of the street sweeping program.
- EN41:** Protect water quality by educating citizens about proper waste disposal and eliminating pollutants that enter the stormwater system as a result of lawn and garden maintenance, car cleaning or maintenance, roof cleaning or maintenance, or direct disposal into storm drains.
- EN42:** Promote development design which minimizes runoff rate and volume by limiting the size of the building footprint and total site coverage, maximizing the protection of permeable soils and native vegetation, and encouraging use of permeable pavements and surfaces.
- EN43:** Maintain and enhance natural drainage systems, to protect water quality, reduce public costs, protect property, and prevent environmental degradation.
- EN44:** Property owners shall be responsible for the maintenance of stormwater management facilities and pollution control structures which are located within the boundaries of their property. The City shall monitor and

enforce this maintenance requirement and shall generally be responsible for the maintenance of facilities within City owned property and public right of ways. The City ~~shall ensure that all~~ will work with property owners and maintenance providers to see that the waste associated with the maintenance of stormwater these facilities and pollution control structures is disposed of properly.

EN45: Cooperate with the Department of Ecology and neighboring jurisdictions, including participation in regional forums and committees, to improve regional surface water management, water quality, and resolve related inter-jurisdictional concerns.

EN46: Where practicable, stormwater facilities, such as retention and detention ponds, should be designed to provide multiple benefits, including wildlife habitat and opportunities for passive recreation.

Water Resources and Shorelines

Wetlands

Wetlands perform valuable functions which include storm and floodwater storage, water quality improvement, groundwater exchange, stream base flow augmentation, and biological habitat support. A review of background information, including aerial photos from 1992, identified 17 individual wetlands within the City. These wetlands range from the large estuarine system (a mixture of salt and fresh waters) adjacent to Puget Sound, to lakes and small excavated ponds. With the exception of the Puget Sound estuarine system, all wetlands in the City are palustrine systems (freshwater). The largest palustrine system is Echo Lake located in the north-central portion of the City. Other large wetlands include ponds within Ronald Bog Park, Twin Ponds Park, Paramount Park, and the Seattle Country Club, as well as numerous undocumented wetlands of .5 acres or less ~~(see Figure EN-2 at the end of this element)~~. Most wetlands in the City are relatively isolated systems and are surrounded by development.

Under the current Shoreline Municipal Code, wetlands are classified from 1 to 3 based on size, vegetative complexity, and the presence of threatened or endangered species. This classification system was developed by King County and was adopted by the City shortly after incorporation. This system is somewhat unique in that it uses a three tiered classification system instead of a four tiered system used by virtually every other local government. In the future, the City may choose to adopt a four-tiered system that could facilitate regional cooperation and consistency in regulating wetlands.

Development restrictions, including minimum buffers, vary by class. Class I wetlands receive the highest level of protection. The entire Puget Sound shoreline is classified as a Class I wetland. This wetland includes approximately 150 acres of aquatic bed and shoreline habitat. No other wetlands in the City have received a Class I rating. Some of the documented wetlands in the City have not been rated. All wetlands, regardless of size, are regulated under the Shoreline Municipal Code,

whether or not they are mapped. When a development is proposed on a site with known or suspected wetlands, a wetland evaluation is required to verify and classify wetlands and delineate boundaries and buffer areas.

All of the documented wetlands within the City have experienced some level of disturbance as a result of development and human activity. Most of the disturbances have included major alterations such as wetland excavation or water impoundment. Disturbances in many wetland systems appear to be ongoing. Most of the wetland areas occur within parks and receive constant use by people. Trash and altered and trampled buffer areas were documented problems in many areas.

Lakes

There are three lakes in the City of Shoreline: Echo Lake, Ronald Bog, and Twin Ponds (see Figure EN-2 at the end of this element). Data on water quality is largely unavailable and, therefore, it is difficult and expensive to determine if the current water quality in these lakes meets state water quality standards. The City ~~is~~ will ~~continue to pursue grant funding~~ currently pursuing a grant to conduct baseline water quality studies in these lakes. Like most small urban lakes, Shoreline's lakes contain pollutants from stormwater runoff, including fertilizers and pesticides from lawns and gardens; oils, greases, and heavy metals from vehicles; and fecal coliform bacteria. The quality of the water in the lakes is a concern to many residents and City staff. Ronald Bog and Twin Ponds were historically bogs and have been dredged. As urban development in the City has occurred, the process by which the nutrient level and vegetation in these lakes increases has accelerated. Ronald Bog and Twin Ponds will eventually revert to bogs again unless action is taken.

Hidden Lake is currently regulated as a stormwater management facility and has been significantly altered to accommodate this function. King County completely reconstructed this feature to serve as a stormwater detention pond by removing the sediment eroded from sites further upstream in the basin. Hidden Lake has served as a sink for this sediment and has protected the water quality and potential fish habitat in the lower reaches of Boeing Creek. During the 1996 winter storm and subsequent washout of ~~North~~ N.W. 175th Street, Hidden Lake was again filled with sediment and is once again being reconstructed.

Sedimentation will continue to negatively impact Hidden Lake unless action is taken to stabilize the upper reaches of Boeing Creek and/or reduce run-off rates in the upper reaches of the basin. If future stabilization of Boeing Creek includes rocking of the channel, the habitat values associated with the upper reaches of the Creek could be reduced. Some community members would like to see Hidden Lake restored to a more natural condition. However, this could limit the ability of the City to continue to use this feature for stormwater management and could increase sedimentation and habitat degradation in the lower reaches of Boeing Creek. Hidden Lake is a community asset and the City should attempt to achieve a balance between stormwater management and other uses of this resource.

Currently, the City is developing a Master Trail Plan for Shoreview Park. This plan will guide the City as it acts to close and rehabilitate user created trails and access points to Hidden Lake and establish public access in a suitable location(s). This will reduce erosion and sedimentation in and around this feature. The City is also working with King County in an effort to remove barriers to fish passage along the lower reaches of Boeing Creek. The restoration of viable fish habitat will make the protection of the lower reaches of the Creek from sedimentation (a role played by Hidden Lake) a higher priority.

Streams and Creeks

Numerous small stream and creeks are found within or adjacent to the City of Shoreline and Annexation Area A. Many of these streams have been placed in culverts, channels, or otherwise altered and degraded. Boeing Creek flows to the Puget Sound and drains an area which includes Shoreview Park. Thornton Creek originates in Ronald Bog, near the geographic center of the City, flows to Twin Ponds, crosses the City limits, and emerges as an open channel in the City of Seattle's Jackson Park Golf Course. McAleer Creek flows in the southeasterly direction and passes through the extreme northeast corner of the City and runs through Annexation Area A. Lyon Creek flows in a similar direction just outside of Annexation Area A. Other features include small unnamed creeks which flow into the Puget Sound in the Richmond Beach, Innis Arden, and Highlands neighborhoods (see Figure EN-2 at the end of this element).

Large portions of the watersheds drained by creeks in the City have been paved or otherwise developed. This development dramatically increases the volume of water in the creeks during storm surges and reduces in-stream flows during drier periods of the year. This combination of more intense storm surges and overall lower flows causes numerous environmental problems, including: increased bank erosion, scouring and deepening of the stream channel, reduced water quality, sedimentation of gravels, damage to stream-side vegetation, and reduction or elimination of habitat for wildlife, fish, and the insects that fish feed on.

McAleer Creek and Thornton Creek are currently on the Washington State list of water features which do not meet water quality standards due to high levels of fecal coliform. It is believed that Boeing Creek does not meet State standards for sediment. Creeks continue to be damaged as a result of large quantities of stormwater as well as by pollutants they may contain. Policies related to streams and creeks address the following concerns: increased data collection and monitoring of water quality, the protection of buffer areas, preservation of natural function and habitat, and the appropriate restoration of creeks which have been modified for surface water management and/or development.

Groundwater

Groundwater aquifers are used for supplying water to lakes, wetlands, and streams during the dry season and for a few private wells that supply water for irrigation and possibly drinking water in a few isolated instances. Wetlands and lakes are thought to be the main groundwater recharge areas in the City.

Shorelines

The Puget Sound shoreline extends the entire length of the City's western edge. Much of the shoreline is relatively undeveloped and provides important plant and animal habitat for aquatic and terrestrial life. The shoreline and the adjacent uplands provide important nesting and foraging habitat for waterfowl. The Puget Sound shoreline is also an important recreational resource.

Access to this environmentally and recreationally significant resource is restricted due to limited public access points, the Burlington Northern railroad tracks, and rugged terrain. Many of the property owners near Puget Sound feel that public access should be restricted to Richmond Beach Park, and that illegal trespassing should be curtailed and the use of the public Innis Arden Reserve limited. Concerns about illegal trespassing and minimal public access routes also limit the accessibility of streams and other natural features. In some circumstances, increased public access can conflict with the protection of natural areas.

Other shorelines in the city are found around Echo Lake, Twin Ponds, and Ronald Bog. Public access to Echo Lake is currently restricted to a small City park at the northeast corner of this highly developed shoreline. The City has identified an additional desired future access point at the south end of the lake. City parks provide access to the entire shoreline of Twin Ponds and Ronald Bog. All of these lakes provide important waterfowl habitat.

Goal EN VI: Preserve, protect, and, where practicable, restore wetlands, shorelines, surface water, and ground water for wildlife, appropriate human use, and the maintenance of hydrological and ecological processes.

Policies

- EN47:** Preserve aquatic and riparian habitats in a natural state. Appropriate buffers will be maintained around natural areas of the Puget Sound shoreline, wetlands, lakes, creeks, and streams to protect native vegetation, water quality, habitat for fish and wildlife, and hydrologic function. Minimum buffer widths for surface water features will be specified in the Shoreline Municipal Code.
- EN48:** Preserve and maintain wetlands in a natural state. Alterations to wetlands may be considered only if they:
- are necessary to provide a reasonable economic use of a property, provided all wetland functions are evaluated, impact to the wetland is minimized to the maximum extent practicable, and affected significant functions are appropriately mitigated;
 - are absolutely necessary for a public agency or utility development; or
 - provide necessary road or utility crossings.

- EN49:** Use the manual adopted in RCW 90.58.380 ("1987 U.S. Army Corps of Engineers Wetland Delineation Manual" or state adopted successor) in conjunction with current state approved regional guidance manuals as minimum standards for the delineation of wetlands.
- EN50:** Implement a ranking and classification system for wetlands which rates wetlands based on size, vegetative complexity, ecological and hydrological function, and presence of threatened or endangered species. The City should work with other jurisdictions to establish a consistent regional classification system for wetlands that allows for the designation of both regionally important and locally unique wetlands.
- EN51:** Establish regulations for wetlands that:
- recognize and protect the functions and values of all wetlands where practicable;
 - provide increasingly stronger protection to wetlands according to the ranking and classification system hierarchy;
 - recognize and protect wetlands of significant size;
 - preserve appropriate buffers to facilitate infiltration and maintain stable water temperatures, limit the rate at which stormwater enters the wetland, and provide wildlife habitat;
 - protect the natural water quality and regime;
 - preserve native wetland vegetation and allow the removal of noxious weeds; and
 - limit public access based on the importance and sensitivity of the wetland.
- EN52:** Achieve a no net loss of wetlands function and value within each drainage basin over the long term. Shoreline should seek to maintain total wetlands acreage over the long term.
- EN53:** When development may impact wetlands, the following hierarchy should be followed in deciding the appropriate course of action:
- avoid impacts to wetland;
 - minimize impacts to the wetland;
 - restore the wetland when impacted; and
 - recreate the wetland at a ratio which will provide for its assured viability and success.

On-site, in-kind mitigation shall be generally preferred. Because it is difficult to replace or restore many natural wetland values and functions after a site has been degraded, a significantly larger mitigation area than the wetland area impacted should generally be required.

- EN54:** If wetlands are used as part of a storm drainage system, assure that water level fluctuations will be similar to fluctuations under natural conditions

and that water quality standards are met prior to discharging stormwater into a wetland.

- EN55:** All wetlands in the City should be identified and preliminarily classified. The City shall identify all wetlands on public property and establish and implement a voluntary program to identify wetlands on private land.
- EN56:** Existing degraded wetlands should be restored where practicable. Restoration of degraded wetlands may be required as a condition of redevelopment.
- EN57:** The City should continue to study the issues concerning Hidden Lake and develop a management plan for this resource. The following issues should be considered when formulating plans and implementing projects which have the potential to impact this body of water: public access, respect for private property, restoration of the feature to a more natural state, retention of native vegetation, improvement of surface water management in the basin upstream of Hidden lake, improvement of fish habitat in Boeing Creek and in Hidden Lake, stabilization of the Boeing Creek channel, and continued use of the feature for stormwater management.
- EN58:** Actively pursue funding for baseline monitoring and improvement of water quality in lakes and streams in the City.
- EN59:** Streams shall not be filled or permanently altered except where no other practicable alternative exists or for approved mitigation projects. Where practicable, streams should be allowed to return to natural channel migration patterns. In cases where stream alteration is necessary, channel stabilization techniques shall generally be preferred over culverting.
- EN60:** Identify surface water features with restoration potential and attempt to obtain citizen involvement and community consensus on any future attempt to restore features which have been altered. Restoration efforts may include the daylighting of streams which have been diverted into underground pipes or culverts.
- EN61:** The City shall work with citizen volunteers, state and federal agencies, and tribal governments to identify, prioritize, and eliminate physical barriers and other impediments to anadromous fish spawning and rearing habitat.
- EN62:** The City shall take a leadership role in protecting water quality through regulation, educational outreach, and by adhering to state and federal environmental standards in all City funded projects.
- EN63:** Protect natural surface water storage sites that help regulate service flows and recharge groundwater.

- EN64:** Conserve and protect groundwater resources by informing the Washington Department of Ecology of major increases in groundwater withdraws by public and private parties, appropriate regulation of surface water quality, and facilitating enforcement of waste disposal ordinances by appropriate agencies.
- EN65:** Use the Washington State Shoreline Management Act to guide protection efforts for shorelines of statewide significance and to guide protection efforts for other water features in the City which do not qualify for Shoreline Management Act regulations.
- EN66:** Shoreline shall cooperate with King County, Snohomish County, and other local governments and state agencies, and tribal governments in developing and implementing Watershed Action Plans and other types of basin plans for basins which include or are upstream or downstream from the City of Shoreline.
- EN67:** Provide additional public access to Shoreline's natural features, including the Puget Sound shoreline. The City will attempt to reach community and neighborhood consensus on any proposal to improve access to natural features which has the potential to negatively impact private property owners.
- EN68:** Protect ~~the 100-year floodplains of Beeing Creek~~ by limiting new development. All new permanent structures and roadways should be located above the 100-year flood level, wherever practicable. New development should be required to replace existing flood storage capacity lost due to filling. The City should not increase the allowed housing density of residential areas within the 100-year floodplain.

Figure EN-1: Geologic Features



