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ENVIRONMENT + WATERSHED HEALTH



ENVIRONMENT GOALS

GOAL EN-1 Ensure that Tacoma’s built and natural environments function in complementary ways and are resilient to climate change and natural hazards.

GOAL EN-2 Protect people, property and the environment in areas of natural hazards.

GOAL EN-3 Ensure that all Tacomans have access to clean air and water, can experience nature in their daily lives and benefit from development that is designed to lessen the impacts of natural hazards and environmental contamination and degradation, now and in the future.

GOAL EN-4 Achieve the greatest possible gain in environmental health City-wide over the next 25 years through proactive planning, investment and stewardship.

GOAL EN-5 Plan at a watershed scale to restore and protect natural resources that contribute to watershed health.

FOUR

ENVIRONMENT

WHAT IS THIS CHAPTER ABOUT?

The goals and policies in this chapter convey the City's intent to:

- Preserve, protect and improve air and water quality and the city's environmental assets.
- Improve the health and general welfare of the public by promoting the planning, management, restoration and preservation of watershed functions, trees and forests, open space lands and habitat corridors and natural resources including wetlands, streams, lakes, floodplains and groundwater.
- Avoid and minimize the community's exposure to natural hazards, including geologic hazards and flooding hazards.
- Improve air quality for all Tacoma community members, and lower air temperature that is a result of the urban heat island effect.
- Improve water quality in rivers, streams, marine waters, floodplains, groundwater and wetlands.
- Set policy to achieve a net gain in habitat functions and values, and tree canopy coverage.
- Increase public awareness of a healthy urban forest and habitat lands, the benefits of the urban ecosystem and how actions affect the health and livability of Tacoma and the greater Puget Sound.
- Develop an adaptive management strategy for the City of Tacoma for the anticipated impacts from climate change and reduce our contribution to greenhouse gas emissions.
- Facilitate communication and coordination among Tacoma community members and agencies to promote preservation and restoration of Tacoma's valuable environmental assets.

Book I: Goals + Policies

- 1 Introduction + Vision
- 2 Urban Form
- 3 Design + Development
- 4 **Environment + Watershed Health**
- 5 Housing
- 6 Economic Development
- 7 Transportation
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Book II: Implementation

Programs + Strategies

- 1 Shoreline Master Program
- 2 Capital Facilities Program
- 3 Downtown Regional Growth Center Plans
- 4 Historic Preservation Plan

WHY IS THIS IMPORTANT?

Situated in the Puget Sound Lowlands, at the mouth of the Puyallup River Valley and the tidal waters of Commencement Bay, Tacoma's natural resources provide an array of ecologically, economically and aesthetically valuable ecosystem services. Our river, streams, aquifers and floodplains convey and store water and provide critical habitat for native fish and aquatic species. Our natural areas and vegetation clean and cool Tacoma's air and water, soak up rainwater and provide wildlife habitat. The deep waters of Thea Foss support international trade, commerce and sea life. Many of these resources also trap carbon and reduce urban heat island effects. These natural resources are key contributors to Tacoma's identity, economy, reputation and sense of place.



Volunteers from the Tacoma School District work on landscaping at the Tacoma Nature Center during Parks Appreciation Day

The City has made a commitment to restoring and maintaining a high-quality environment; however many of Tacoma's natural resources have been lost over time or are currently at risk. Development increases stormwater runoff which in turn erodes stream channels and pollutes waterways making them unable to support healthy habitat. There is concern that anticipated growth and development will result in substantial tree removal, continued habitat loss and negative impacts on at-risk plant and animal species.

The City's land use plans and investments have been, and will continue to be, instrumental in helping to guide and understand effective approaches to preserving natural resources. In addition, the City has invested time and money to restore our watersheds. The goals and policies in this chapter protect these investments and help the City meet various regulations to protect public health and the environment. With thoughtful guidance, the community can work together to face new challenges, and achieve and sustain healthy watersheds and a healthful environment for all Tacomans as the city grows.

GOALS + POLICIES

PLANNING FOR ENVIRONMENTAL PROTECTION

Tacoma's quality of life depends on maintaining clean air, water, soil and a healthy environment overall. The policies in this section will identify the policy approach to planning for the preservation and maintenance of environmental quality through the proper management of natural resources and their functions, consistent with widely accepted ecological principles and scientific literature. These policies call for an up-to-date natural resource inventory and consideration of tradeoffs in developing environmental protection programs.

GOAL EN-1 Ensure that Tacoma's built and natural environments function in complementary ways and are resilient to climate change and natural hazards.

Planning

Policy EN-1.1 Recognize the multiple benefits of the City's ecosystem services, including economic impacts, pollutant reduction potential, carbon sequestration and the reduction of stormwater runoff.



Thea Foss Waterway and Commencement Bay



*Steep slopes on
Tacoma Narrows*

Policy EN–1.2 Promote equitable, safe and well-designed physical and visual access to nature while also protecting high value natural resources, fish and wildlife.

Policy EN–1.3 Consider the impacts of climate change and the risks to the city’s environmental assets in all phases of planning, programming and investing.

Policy EN–1.4 Maintain self-sustaining populations of native plants, native resident and migratory fish and wildlife species, including at-risk species and beneficial organisms such as pollinators.

Policy EN–1.5 Protect the quantity, quality and function of high value environmental assets identified in the City’s natural resource inventories, including:

- a. Rivers, lakes, streams and associated riparian uplands
- b. Floodplains
- c. Riparian corridors
- d. Wetlands and buffers
- e. Groundwater
- f. Trees and urban forests
- g. Bays, estuaries and marshes
- h. Shorelines
- i. Native and other vegetation species and communities that provide habitat value
- j. Habitat complexes and corridors, rare and declining habitats such as wetlands, native oak and habitats that support special-status or at-risk plant and wildlife species
- k. Other natural resources as identified

Policy EN–1.6 Direct development activities away from critical natural features such as steep slope areas and unstable soils, wooded areas, shorelines, aquatic lands and other unique and high value natural areas when planning for growth.

Policy EN–1.7 Consider Tacoma’s environmental assets as important resources and components of the City’s infrastructure.

Policy EN–1.8 Ensure adequate resources to manage Tacoma’s environmental assets and to educate the public about the benefits of Tacoma’s natural resources.

Policy EN–1.9 Develop hazard mitigation plans that reduce exposure of Tacoma citizens to future disasters or hazards (e.g., flooding, earthquakes, winds).

Policy EN–1.10 Work with partner agencies to encourage informational and educational programs and activities dealing with the protection of wildlife such as the Backyard Wildlife Sanctuary program established by the state’s Department of Fish and Wildlife.

Stewardship + Coordinated Management

Policy EN–1.11 Coordinate and partner with federal, state, regional and local governmental jurisdictions and the public to manage the City’s environmental assets.

Policy EN–1.12 Coordinate plans and investments with other jurisdictions, air and water quality regulators, watershed councils, soil conservation organizations and community organizations and groups to maximize the benefits and cost-effectiveness of watershed environmental efforts and investments.

Policy EN–1.13 Coordinate transportation and stormwater system planning in areas with unimproved or substandard rights of way to improve water quality, prevent localized flooding, enhance pedestrian safety and neighborhood livability.

Policy EN–1.14 Continue to partner with other public and non-profit organizations to inform citizens of the stewardship needs of Tacoma’s environmental assets, and to develop, offer and support restoration training opportunities and practical information resources.

Policy EN–1.15 Work with partners and encourage community members to restore Tacoma’s environmental assets.

Policy EN–1.16 Coordinate with state and federal public agencies and tribal governments when reviewing permits to ensure streamlined permit review and avoid redundant regulatory requirements.



Discovery pond, at the Tacoma Nature Center, is a natural play area for children designed to inspire creative play and environmental learning

VOLUNTEER STEWARDSHIP PROGRAMS

Existing volunteer stewardship programs include those established by the Metro Parks Tacoma (CHIP-in!), Citizens for a Healthy Bay (Adopt-A-Wildlife Area program, Stormwater Education program, and Citizen Keeper program), City of Tacoma Adopt-A-Spot and Make-A-Splash Grant programs, Puget Sound’s depave program, and Washington State Department of Transportation Adopt-A-Highway program.

WHAT ARE THE CLIMATE CHANGE RISKS TACOMA COULD FACE?

Several recent studies have concluded that rising levels of greenhouse gases in the atmosphere (e.g., carbon dioxide, methane, and nitrous oxide) have warmed the earth. These studies also conclude that increases in greenhouse gases are causing rising sea levels; melting snow and ice; and more extreme storms, rainfall, and floods. Changes in temperature and precipitation patterns are projected to have wide-ranging impacts on the Puget Sound region in the coming decades. Anticipated climate change impacts in Tacoma include more extreme precipitation events (i.e., wetter winters and drier summers), an increased risk of mudslides, and greater flood risk in the Green and Puyallup Rivers (Dalton et al. 2014, Snover et al. 2013). Meanwhile, changing amounts and timing of streamflow due to glacial retreat, reduced snowpack, and earlier snowmelt in the Cascades could affect Tacoma's municipal water supply. Sea level rise and storm surge may result in greater coastal flooding, erosion and destabilization of shoreline bluffs. An anticipated 4.3 to 5.8 degree Fahrenheit increase in average temperature by mid-century will be accompanied by more frequent and prolonged summer heat events, contributing to increased wildfire risk as well as increased building cooling costs, and posing risks to the health of elderly residents and other particularly vulnerable individuals (Mote et al. 2013).

Best Available Science

Policy EN–1.17 Assess and periodically review the best available science for managing critical areas and natural resources and utilize the development of plans and regulations while also taking into consideration Tacoma's obligation to meet urban-level densities under the Growth Management Act.

Policy EN–1.18 Evaluate climate data and consider climate risks in the development of regulations, plans and programs.

Policy EN–1.19 Evaluate trends in watershed and environmental health using current and historical data and information to guide improvements in the effectiveness of City plans, regulations and infrastructure investments.

Natural Resource Inventory + Land Acquisition

Policy EN–1.20 Maintain an up-to-date inventory of environmental assets by identifying the location and evaluating the relative quantity and quality of environmental assets.

Policy EN–1.21 Encourage the identification and characterization of all contaminated sites which adversely affect the City's shoreline areas, surface waters, groundwater and soils.

Policy EN–1.22 Develop and maintain a prioritized list of natural resource types, target areas and/or properties desirable for public acquisition to support long-term natural resource protection, and establish a process for coordinating acquisition with other programs including programs to maintain enough land for employment needs, programs to protect water quality and programs to reduce exposure to flooding hazards.

Policy EN–1.23 Assess and reassess Tacoma’s tree canopy coverage on a regular basis so as to be able to track the potential implications on environmental health and inform future policies and practices with regard to preservation and targeted tree planting efforts.

Policy EN–1.24 Develop environmental protection plans, programs and regulations that focus on high value natural resources and the types of protections to be applied, based on best available science, and on an evaluation of allowing conflicting uses.

Watershed Plans

Policy EN–1.25 Develop management plans for each of the City’s watersheds. Evaluate the current conditions of the watersheds in Tacoma and use the findings to inform decisions about future land use, stormwater planning and urban forest and open space management.

Climate Action

Policy EN–1.26 Maintain, implement and periodically update a climate action plan and greenhouse gas inventory, and adjust greenhouse gas emission targets accordingly to ensure successful implementation and consistency with regional and state goals.

Policy EN–1.27 Assess the risks and potential impacts on both City government operations and on the community due to climate change, with regard to social equity.

Policy EN–1.28 Incorporate climate change considerations into City operational plans.

Policy EN–1.29 Protect processes and functions of Tacoma’s environmental assets (wetlands, streams, lakes) in anticipation of climate change impacts.



Tree canopy at Oak Tree Park

Policy EN–1.30 Promote community resilience through the development of climate change adaptation strategies. Strategies should be used by both the public and private sectors to help minimize the potential impacts of climate change on new and existing development and operations, include programs that encourage retrofitting of existing development and infrastructure to adapt to the effects of climate change.

MANAGE ENVIRONMENTAL HAZARDS

The following policies promote the protection and appropriate management of environmental hazards to avoid or minimize risks to public safety and property. Managing growth within potentially hazardous natural areas prevents environmental and life safety problems as well as preserves open space. For example, steep slopes that are potentially hazardous provide scenic corridors and greenbelts when retained in a natural state. Development patterns and practices that preserve or enhance natural features add to community quality as well as protect water quality, wildlife and property. The approach to managing environmental hazards established by the policies in this section may reduce needless public and private expenditures related to landslides, erosion, floods or other disruptions. Furthermore, if development activities are to occur, undue hardships should be avoided on adjacent property owners; and land owners, developers and buyers should be made aware of natural constraints. Figure 9 shows environmental hazards citywide.

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GOAL EN–2 Protect people, property and the environment in areas of natural hazards.

Geologic Hazards

Policy EN–2.1 Minimize the risk of damage to life and property by establishing robust development standards that ensure avoidance and/or minimization of potential geologic hazards.

Policy EN–2.2 Require appropriate levels of study, technical analysis, best available science and all known available and reasonable methods of prevention control and treatment (AKART) as a condition to permitting construction within geologically hazardous areas, ensure sound

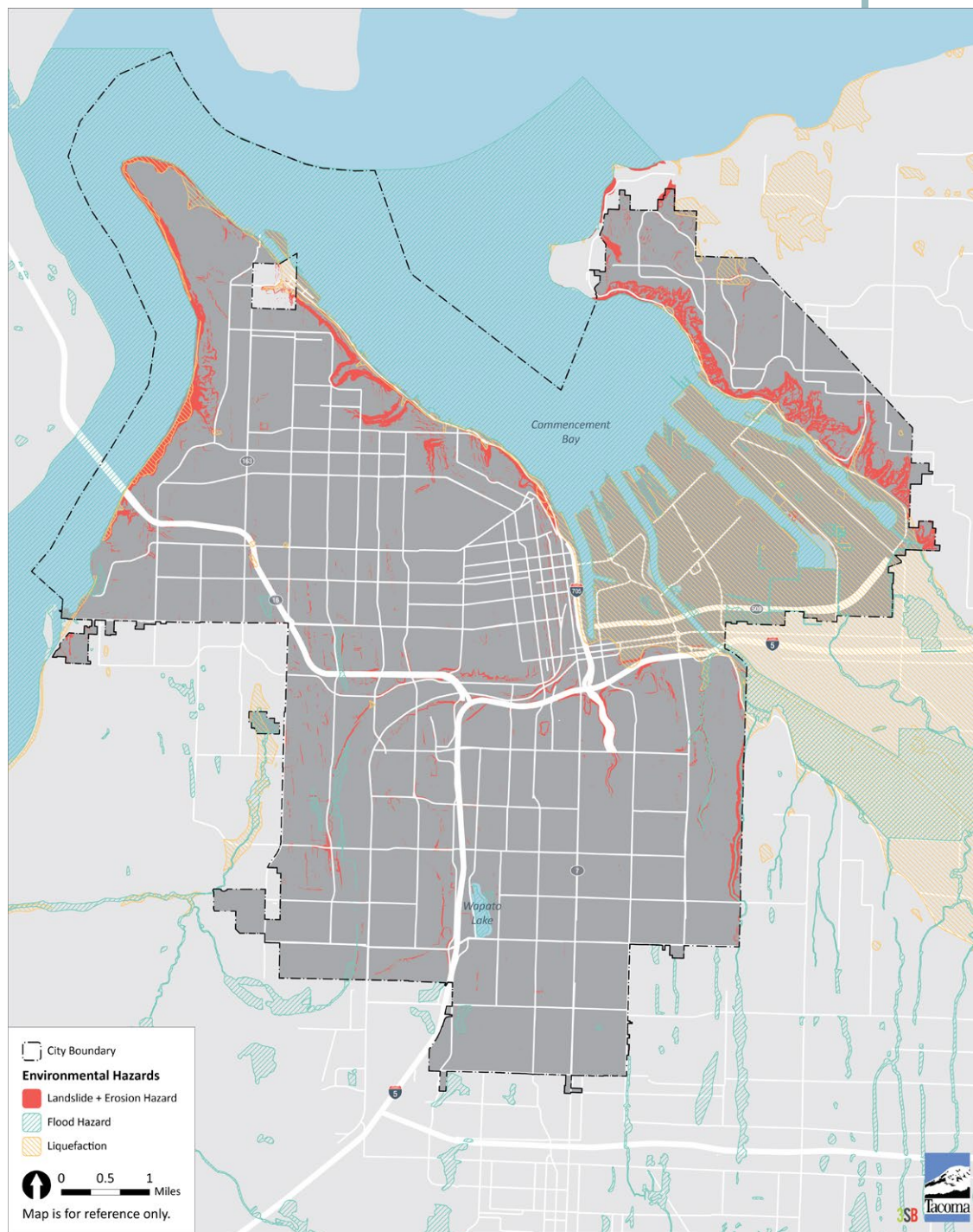


FIGURE 9. Environmental Hazards, Citywide

Sources: City of Tacoma (Flood Hazard, 2015), GeoEngineers (Erosion Hazards, 2003; Landslides, 2003; Liquefaction, 2003)

The **STORMWATER MANAGEMENT MANUAL** provides guidance on the measures necessary to control the quantity and quality of stormwater produced by new development and redevelopment.

MASS WASTING, also known as slope movement or mass movement, is the geomorphic process by which soil, sand, regolith, and rock move downslope typically as a mass, largely under the force of gravity, but frequently affected by water and water content as in submarine environments and mudslides.

engineering principles are used based on the associated risk in these areas and limit land uses within or near geologically hazardous areas.

Policy EN-2.3 Employ special building design, construction, maintenance and operational measures and critical area regulations to minimize the risk of structural damage, fire and injury to occupants, impacts to natural resources and to prevent post-seismic collapse in areas with severe seismic hazards.

Policy EN-2.4 Require site-specific seismic hazard preparedness studies for essential public facilities and services that are vital to the health and safety of the community (such as power lines, water lines, roads and communication channels).

Policy EN-2.5 Promote soil stability by retaining vegetation in erosion-prone areas.

Policy EN-2.6 Protect existing natural gulches, watercourses, ravines and similar land features from the adverse erosional effects of increased storm water runoff that is generated by new development, consistent with the Stormwater Management Manual.

Policy EN-2.7 Establish setbacks around the perimeter of site-specific landslide hazard areas to avoid the potential to undermine these areas, cause erosion and sedimentation problems to downstream or downhill land uses and avoid the risk to human life and safety. Establish broader setbacks in areas at risk for mass wasting.

Flood Hazards

Policy EN-2.8 Regulate development in the 100-year floodplain to avoid substantial risk and damage to life, public and private property, infrastructure, and fish and wildlife habitat. Ensure these regulations, as a minimum, comply with state and federal requirements for floodplain regulations.

Policy EN-2.9 Direct uses that require substantial improvements or structures away from areas within the 100-year floodplain.

Policy EN-2.10 Encourage compensatory floodplain storage for all projects constructed within the 100-year floodplain.

Policy EN-2.11 Discourage locating essential public facilities or services, such as hospitals and schools, within the 500-year floodplain.

PROTECT TACOMA'S ENVIRONMENTAL ASSETS IN DEVELOPMENT SITUATIONS

The following policies provide guidance for land use regulations that address natural resources where new development is proposed. This will help ensure that the potential adverse impacts of development are well understood and avoided where practicable. These policies also call for an evaluation of design alternatives to minimize impacts, and mitigation approaches that fully mitigate unavoidable impacts. Preventing or minimizing environmental degradation will be more successful and cost-effective than addressing problems as they increase in severity. Figure 10 on the following page shows environmental assets citywide.

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GOAL EN-3 Ensure that all Tacomans have access to clean air and water, can experience nature in their daily lives and benefit from development that is designed to lessen the impacts of natural hazards and environmental contamination and degradation, now and in the future.

Avoiding or Minimizing Impacts

Policy EN-3.1 Ensure that the City achieves no-net-loss of ecological functions over time.

Policy EN-3.2 Evaluate the potential adverse impacts of proposed development on Tacoma's environmental assets, their functions and the ecosystem services they provide.

Policy EN-3.3 Require that developments avoid and minimize adverse impacts, to the maximum extent feasible, to existing natural resources, critical areas and shorelines through site design prior to providing mitigation to compensate for project impacts.

WHAT ARE CRITICAL AREAS?

Critical areas in Tacoma include marine habitats, freshwater rivers, streams and lakes, wetlands, aquifer recharge areas, frequently flooded areas, geologic hazardous areas, and fish and wildlife habitat areas. To see if you live, work or own a business near an identified critical area, see the City's Critical Areas Map at the end of this chapter. The City regulates development in or near critical areas through their Critical Areas Ordinance.

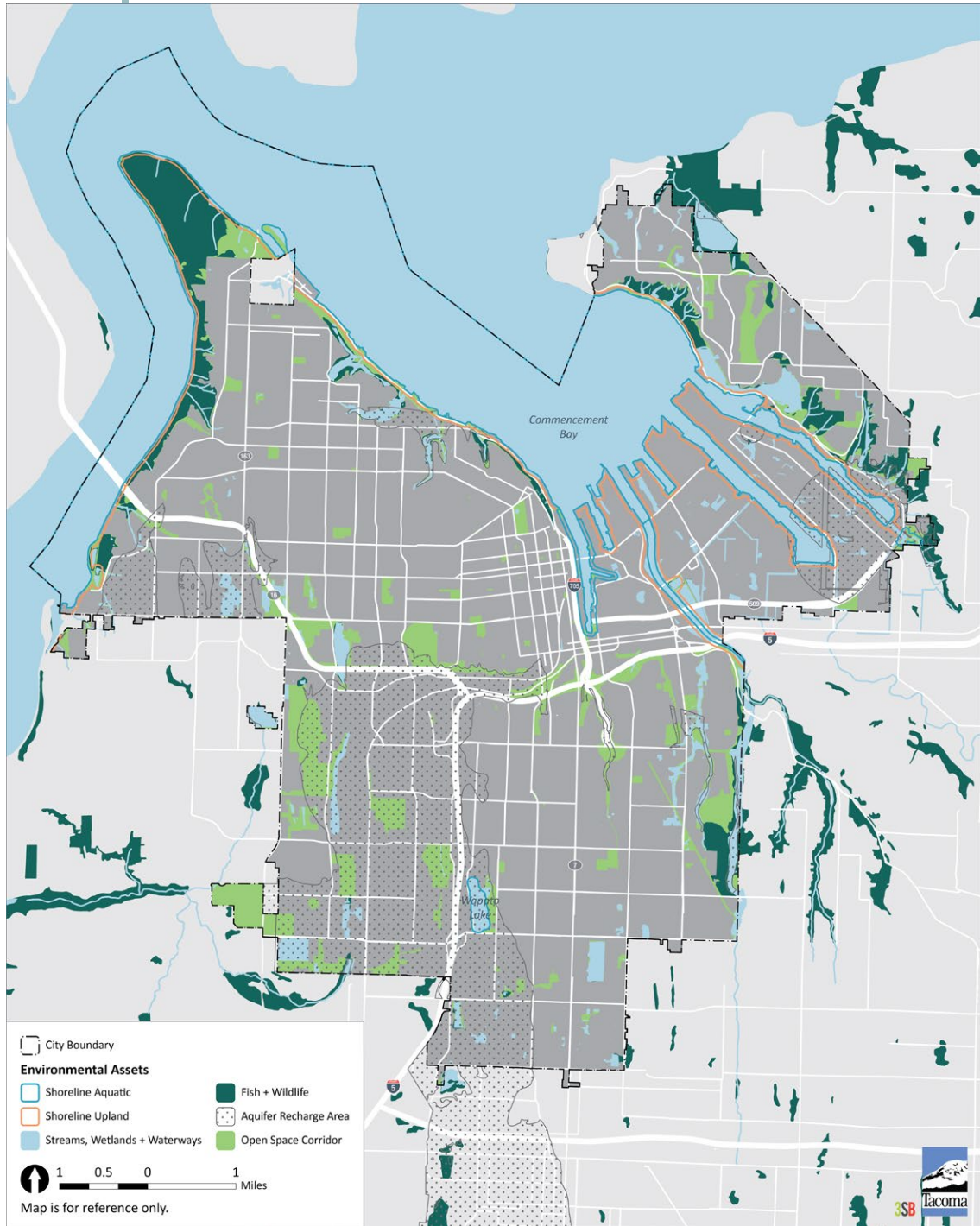


FIGURE 10. Environmental Assets, Citywide

Sources: City of Tacoma (Aquifer Recharge Areas, 2015; Open Space Corridor, 2015; Shoreline Districts, 2011; Streams, 2015; Waterways, 2015; Wetlands, 2015), Washington Department of Fish and Wildlife (Fish and Wildlife, 2010)

Policy EN-3.4 Encourage mitigation approaches when preservation is not feasible that maximize the intended ecosystem benefits. Require on-site or use of established approved mitigation banks versus off-site mitigation; unless off-site mitigation within the same watershed will improve mitigation effectiveness.

Policy EN-3.5 Discourage development on lands where such development would pose hazards to life, property or infrastructure, or where important ecological functions or environmental quality would be adversely affected:

- a. Floodways and 100-year floodplains
- b. Geologic hazard areas
- c. Wetlands
- d. Streams
- e. Fish and wildlife habitat conservation areas
- f. Aquifer recharge areas
- g. Shorelines

Policy EN-3.6 Limit impervious surfaces within open Space Corridors, shorelines and designated critical areas to reduce impacts on hydrologic function, air and water quality, habitat connectivity and tree canopy.

Policy EN-3.7 Encourage site planning and construction techniques that avoid and minimize adverse impacts to environmental assets.

Policy EN-3.8 Manage the quality and quantity of stormwater runoff entering Tacoma waterbodies, so as to protect public health and safety, surface and groundwater quality and the ecological functions of natural drainage systems.

Policy EN-3.9 Encourage building, site and infrastructure design and practices that provide safe fish and wildlife passage and avoid, reduce and/or mitigate hazards to fish and other wildlife.

Policy EN-3.10 Minimize and manage ambient light levels to protect the integrity of ecological systems and public health without compromising public safety.

Policy EN-3.11 Promote the use of integrated pest management plans for both City owned and privately owned properties.



Fencing used around trees to help protect them through construction



Wapato Lake

Policy EN-3.12 Avoid locating new sensitive uses in proximity to sources of pollution (e.g., Interstate-5, Interstate-705, State Route-509, State Route-16, State-Route 7, truck routes, rail yards) and vice versa. Where such uses are located in proximity to sources of air pollution, use building design, construction and technology to mitigate the negative effects of air pollution on indoor air quality.

Urban Forest

Policy EN-3.13 Require best management practices in the siting, design, planting, maintenance and removal of trees and vegetation in public rights-of-way consistent with the City's adopted Urban Forest Manual, Design Manual and land use codes.

Policy EN-3.14 Retain as many mature trees as practicable and appropriate during development of City owned land and street rights-of-way.

Policy EN-3.15 Discourage removal of safe, healthy and appropriate trees located on City property or within rights-of-way, while recognizing the abutting property owners' discretion to remove street trees with proper permitting.

Policy EN-3.16 Protect rare and/or threatened tree species from the impacts of urbanization.

Policy EN-3.17 Seek to prevent human-induced native soil loss, erosion, contamination or other impairments to soil quality and function.

Policy EN-3.18 Encourage retention and use of native soils and discourage compaction of soils in areas intended to be used for plants..

Wetlands, Streams + Lakes

Policy EN-3.19 Protect and retain wetlands, rivers, streams and lakes through use of best management practices, managing and treating stormwater runoff, protecting adjacent native vegetation, removing invasive plant species and limiting the use of fertilizers/pesticides or other chemicals.

WHAT IS LOW IMPACT DEVELOPMENT?

Low impact development is a stormwater and land use management strategy that strives to mimic pre-disturbance hydrologic processes by emphasizing conservation, use of on-site natural features, site planning, and distributed stormwater management practices that are integrated into a project design. Low impact development best management practices emphasize pre-disturbance hydrologic process of infiltration, filtration, storage, evaporation and transpiration. Common low impact development best management practices include: bioretention, rain gardens, permeable pavements, minimal excavation foundations, dispersion, soil quality, vegetated roofs and rainwater harvesting.

Fish + Wildlife Habitat

Policy EN-3.20 Promote integration of development projects into their surrounding environments, promoting a “greenbelt natural corridor” for movement and use by species. These areas should use native plants that support native wildlife.

Policy EN-3.21 Encourage protection of habitat improvement project sites and cleanup sites in perpetuity.

Groundwater

Policy EN-3.22 Protect and preserve the quantity and quality of Tacoma’s groundwater supply.

Policy EN-3.23 Encourage infiltration of stormwater to promote aquifer recharge and assure continuous and adequate groundwater supply.

Policy EN-3.24 Encourage the development and use of alternative mechanisms for preventing and reducing the risk of groundwater contamination and disposal.

Policy EN-3.25 Encourage water reuse and reclamation for irrigation and other non-potable water needs.

Policy EN-3.26 Prevent groundwater contamination through performance criteria and guidelines for siting, design, construction and operation of commercial and industrial structures and activities.

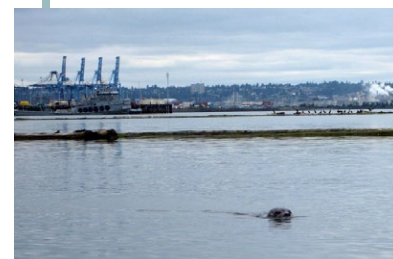
Policy EN-3.27 Support an ongoing effort to monitor groundwater quality in order to determine the effectiveness of the groundwater program over time.



Hummingbird garden in the Puget Creek Natural Area



Tacoma shares its waterways with many wild species



A harbor seal swims in Commencement Bay



The Center for Urban Waters, a UWT-led research institution pioneering innovative and sustainable solutions for protecting the environment

Policy EN-3.28 Protect the quality of groundwater used for public water supplies to ensure adequate sources of potable water for Tacoma and the region. Ensure that the level of protection provided corresponds with the potential for contaminating the municipal water supply aquifer.

IMPROVING ENVIRONMENTAL QUALITY

The following policies are intended to support improving environmental quality over time as the city grows. They provide direction to enhance the condition, capacity and resilience of Tacoma's air, water and natural areas and to improve hydrologic function, water quality, habitat and biological communities. They support an improved urban forest and recognize that healthy natural systems reduce natural hazard risks. They also help the City mitigate and adapt to climate change.

Improving Tacoma's environmental assets will help to offset cumulative impacts resulting from historic development practices and illegal activities. These policies will help the City avoid exacerbating adverse and disproportionate impacts on under-served and under-represented communities. While some of the impact areas listed below are regulated by other agencies, the City's land use plans and investments can help avoid or reduce impacts, while also improving conditions over time.

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GOAL EN-4 Achieve the greatest possible gain in environmental health City-wide over the next 25 years through proactive planning, investment and stewardship.

Policy EN-4.1 Empower Tacomans to actively participate in efforts to maintain and improve the environment, including watershed health.

Policy EN-4.2 Encourage landscaping designed to complement local wildlife and native or climate adapted vegetation and help offset the loss of wildlife habitat areas resulting from past development practices.

Policy EN-4.3 Encourage voluntary cooperation between property owners, community organizations and public agencies to restore or re-create habitat on their property, including removing invasive plants and planting native species.

Policy EN-4.4 Protect native plant communities and discourage the spread of invasive and noxious species.

Policy EN-4.5 Proactively seek not only to reverse the decline but to achieve the greatest possible gain in habitat functions city-wide over the next 25 years.

Policy EN-4.6 Enhance native vegetation along wetlands, rivers, streams and lakes. The City may require new planting of native vegetation and/or removal of non-native species to restore ecological functions of riparian buffers where such activities will enhance the corridor's function.

Air Quality

Policy EN-4.7 Ensure that plans and investments are consistent with, and advance, efforts to improve air quality and reduce exposure to air toxics, criteria pollutants and urban heat island effects. Consider air quality related health impacts on all Tacomans.

Policy EN-4.8 Achieve criteria air pollutant reductions in both municipal operations and the community.

Water Quality

Policy EN-4.9 Ensure that plans and investments are consistent with, and advance, efforts to improve watershed hydrology by achieving more natural flow patterns in rivers, streams, floodplains, wetlands and groundwater aquifers. Minimize impacts from development and encourage restoration of degraded hydrologic functions, where practicable.

Policy EN-4.10 Ensure that plans and investments are consistent with and advance efforts to improve water quality in rivers, streams, marine waters, floodplains, groundwater and wetlands. This includes reducing toxics, bacteria, temperature, metals and sediment pollution. Consider water quality related health impacts on all Tacomans.

Policy EN-4.11 Restore surface waters that have become degraded to provide for fish, wildlife, plants and recreational opportunities.

Policy EN-4.12 Reduce the use of pesticides and chemical fertilizers to the extent feasible and identify alternatives that minimize risks to human health and the environment, including integrated pest management plans.



Tacoma marine waters



Swan Creek salmon



Estuarine habitat, which is rare and declining throughout the Puget Sound, on Ruston Way

Habitat Connectivity + Open Space Corridors

Policy EN–4.13 Ensure that plans and investments are consistent with and advance efforts to improve terrestrial and aquatic habitat connectivity for fish and wildlife by:

- a. Preventing habitat fragmentation
- b. Improving habitat quality
- c. Preserving or creating habitat areas as feasible on new development and redevelopment sites
- d. Creating and enhancing Open Space Corridors that allow fish and wildlife to safely access and move through and between habitat areas

Policy EN–4.14 Ensure that plans and investments are consistent with and advance efforts to improve the diversity, quantity and quality, of fish and wildlife habitat and Open Space Corridors, especially rare and declining habitat types and habitats that support at-risk plant and animal species and communities.

Policy EN–4.15 Ensure that plans and investments are consistent with and advance efforts to prevent the spread of invasive plants, and support efforts to reduce the impacts of invasive animals and insects.

Policy EN–4.16 In open space acquisition, place the highest priority on acquiring properties with the following characteristics:

- a. A high degree of habitat health and quality, location with Open Space Corridors, presence of threatened or endangered species or habitats, presence of wetlands.
- b. Also significant in ranking are the site's habitat potential, offered sale prices, and manageability issues.
- c. Of lesser but still relevant significance are the site's proximity to other protected sites, the presence of a volunteer restoration group, whether the site serves one or more valuable open space functions in addition to providing habitat, whether conservation of the site would support habitat health within or near a designated wetland or stream of local significance, and whether the site is within an area underserved by open space.



Pervious trail at Julia's Gulch

Policy EN-4.17 Encourage public access provisions in Open Space Corridors where such access will complement and avoid negatively disrupting fish, wildlife and plants.

Policy EN-4.18 Target habitat-related resources and programs within the designated Open Space Corridors as depicted on the Open Space Corridors Map by prioritizing areas with the greatest potential to reach their target habitat community and condition.

Policy EN-4.19 Engage in and encourage activities that improve environmental connectivity of and encourage public access to Open Space Corridors.

Policy EN-4.20 Consider goals and policies regarding habitat connectivity in all decisions regarding street vacation requests and disposition of surplus City properties.

Policy EN-4.21 Reconnect shorelines and upland areas and water courses through habitat conservation and restoration efforts, property acquisition and/or easements.



*View of vegetated buffer
along Tacoma's shoreline*

TDR

*Transfer of
Development Rights*

LCLIP

*Landscape Conservation
and Local Infrastructure
Program*



Copper Beech at Wright Park

Policy EN-4.22 Identify potential regulatory approaches to providing greater protection for the habitat functions of habitat lands located within the designated open space corridors.

Policy EN-4.23 Maintain an official inventory of City-owned open space properties. Properties on this inventory shall, whenever feasible, be permanently conserved for open space purposes.

Policy EN-4.24 Utilize dedicated funds generated through surface water fees to conserve, restore and manage the City's natural Open Space Inventory, pursuant to achieving surface water management goals..

Policy EN-4.25 Utilize the Open Space Fund for the acquisition, restoration, development and management of open space lands and facilities, with a smaller portion allocated toward planning, outreach and education. The Wetland Mitigation Fund will be used to acquire property and/or enhance wetland and/or stream functions in order to achieve a net gain in such functions.

Policy EN-4.26 Utilize the City's TDR Program to conserve valuable city and regional assets, and continue to develop and enhance the program. Lands meeting the City's criteria for conservation which are located within the designated Open Space Corridors, and lands achieving other open space goals of this Plan, are appropriate "sending areas" for the transfer of development rights to other locations in the City, county and region.

Policy EN-4.27 Implement LCLIP, a state authorized policy tool combining TDR with tax increment financing, to bring resources to bear that can support Tacoma's conservation goals.

Policy EN-4.28 Promote incentive-based approaches to conserve designated Open Space Corridors, such as the use of the Open Space Current Use Assessment.

Urban Forest

Policy EN-4.29 Ensure that plans and investments are consistent with and advance efforts to improve the quantity, quality and equitable distribution of Tacoma's urban forest:

- a. Strive to achieve a citywide tree canopy cover of 30 per cent by the year 2030 ("30-by-30")

- b. Require or encourage the preservation of large healthy trees, native trees and vegetation, tree groves and forested areas as an element of discretionary land use reviews
- c. Coordinate plans and investments with efforts to improve tree species diversity and age diversity
- d. Invest in tree planting and maintenance, especially in low canopy areas, neighborhoods with underserved or under-represented communities and within and near Open Space Corridors
- e. Promote the restoration of native trees and vegetation in Open Space Corridors, buffers and shorelines
- f. Encourage planting of native or climate adapted trees and vegetation generally, especially in Open Space Corridors
- g. Identify priority areas for tree preservation and planting in the development of subarea, neighborhood and watershed plans

Policy EN-4.30 Increase awareness of urban forest best management practices, including proper plant selection, planting practices and maintenance, invasive species, insects and diseases and appropriate use of native species. Provide public education about the detriment of invasive and noxious weed species to the urban forest.

Policy EN-4.31 Recognize and increase the awareness of the benefits of street trees and the urban forest and the threats to their health.

Policy EN-4.32 Continue to participate in the Tree City USA program which helps the City manage Tacoma's urban forest and educate the community about the value of tree resources.

Policy EN-4.33 Work with the Washington State Department of Commerce and Department of Natural Resources Urban and Community Forestry Program to manage and improve Tacoma's urban forest as part of the Evergreen Communities Act.

Policy EN-4.34 Plan and/or implement effective programs and/or actions that can effectively achieve multiple urban forestry, open space, water quality and stormwater management objectives.

Policy EN-4.35 Encourage residents and property owners to plant and maintain trees on their own property.



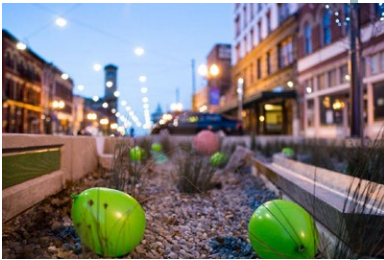
Titlow Park



Volunteers removing invasive plants



A property owner moves a tree during a neighborhood group planting



Rain garden on
Pacific Avenue

Policy EN-4.36 Encourage the identification and preservation of specimen trees of historic merit and/or outstanding size and heritage trees.

Policy EN-4.37 Contribute to, and preserve the integrity of, the native remnant forest both within and adjacent to the right-of-way. Encourage the planting of native species or climate adapted trees and plants.

Policy EN-4.38 Encourage the selection of project, location and site condition appropriate species as well as a diverse set of plant species, especially those that support wildlife habitat.

Policy EN-4.39 Encourage use of soil amendments to be supportive of tree health and other plants.

Low Impact Development/Stormwater

Policy EN-4.40 Encourage use of low-impact development, habitat-friendly development and green infrastructure, both for existing private development and for City-owned, managed or funded infrastructure.

Climate Change

Policy EN-4.41 Support the reduction of Tacoma's greenhouse gas emissions consistent with the City's adopted targets.

Policy EN-4.42 Conduct City operations and practices that reduce municipal greenhouse gas emissions and lead the community in reducing greenhouse gas emissions, with attention given to social equity.

Policy EN-4.43 Reduce greenhouse gas emissions associated with single-occupant vehicles and trucks hauling freight by creating a safe, clean and integrated multimodal transportation system.

Policy EN-4.44 Enhance compact and livable neighborhoods by instituting smart growth principles and by increasing tree canopy and open space.

Policy EN-4.45 Encourage energy efficient buildings and installation of renewable energy sources and technologies.

Policy EN-4.46 Encourage waste reduction and cost-effective reuse and recycling by residents, businesses and City employees through education, incentives, and increased availability of recycling options.

WATERSHEDS

A watershed is a geographic region within which water drains into a particular river, stream or body of water. Tacoma is located within the lower watershed of Puyallup and Chambers/Clover Watersheds. The upper watershed receives the highest amount of rain and snow which feed numerous small, steep mountain streams. In the middle watershed, smaller streams flow together to form larger streams. These streams are less steep, often located in small valleys with wetlands, and provide fish and wildlife habitat. The lower watershed has larger rivers with broader floodplains that drain into the Puget Sound. The Puget Sound and the rivers and their floodplains provide critical salmon habitat. There are eight different basins, or watersheds, located within the city limits of Tacoma.

WATERSHED HEALTH

The following policies address unique critical issues affecting the health of the nine different watersheds in Tacoma by identifying approaches to restoring degraded natural resources and protecting intact watershed functions. Actions proposed in the watershed planning effort will benefit the receiving waters.

GOAL EN-5 Plan at a watershed scale to restore and protect natural resources that contribute to watershed health.

Policy EN-5.1 Develop a watershed-based assessment of the city's existing conditions to determine the existing ecosystem health, existing hydrology and water quality and fish and wildlife habitat processes and functions.

Policy EN-5.2 Improve protections to watershed processes by tailoring zoning and subdivision regulations, sensitive area protections, clearing and grading limitations and stormwater mitigation requirements that are appropriate for each watershed based on the findings of the watershed-based analysis, the community's vision for population and job growth and the requirements of the Growth Management Act.

Policy EN-5.3 Maintain the educational outreach program and voluntary incentives that encourage property owners to use low impact development best management practices for improved stormwater systems, and continue to rely on partnerships with not-for-profit organizations and governmental agencies.

Policy EN-5.4 Develop watershed plans in partnership with adjacent jurisdictions.

BACKGROUND INFORMATION

WATERSHEDS

The nine watersheds located in Tacoma are described below.

Figure 11 through Figure 19 are organized by Tacoma's nine watersheds and identify known environmental assets (including wetlands, streams, open space corridors, aquifer recharge areas, shorelines, fish and wildlife habitat conservation areas and potential restoration sites) and environmental hazards (including geologically hazardous areas, flood hazard areas and contaminated sites).

Flett Creek

The Flett Creek watershed is the second largest watershed in the City (7,153 acres) and is one of two watersheds in Tacoma that do not contain saltwater shorelines. The watershed is predominately residential with commercial and light industrial uses in localized areas. Flett Creek itself occurs within the City of Lakewood and flows into Chambers Creek, but the historic headwaters of the creek were located in Tacoma. Snake Lake and associated wetlands provide important habitat for fish and wildlife as well as educational opportunities at the Tacoma Nature Center.

Critical issues in the Flett Creek watershed include chronic water quality issues in Wapato Lake that currently keep the lake closed to fishing and swimming, and loss of wetlands and riparian forest.

Leach Creek

The Leach Creek watershed within the City boundaries covers 1,728 acres and comprises residential and commercial land uses. Like the Flett Creek watershed, this watershed does not contain any saltwater shorelines.

Critical issues in the Leach Creek watershed include degradation of riparian corridors that are important for salmon spawning.



*Wapato Lake in the Flett
Creek Watershed*

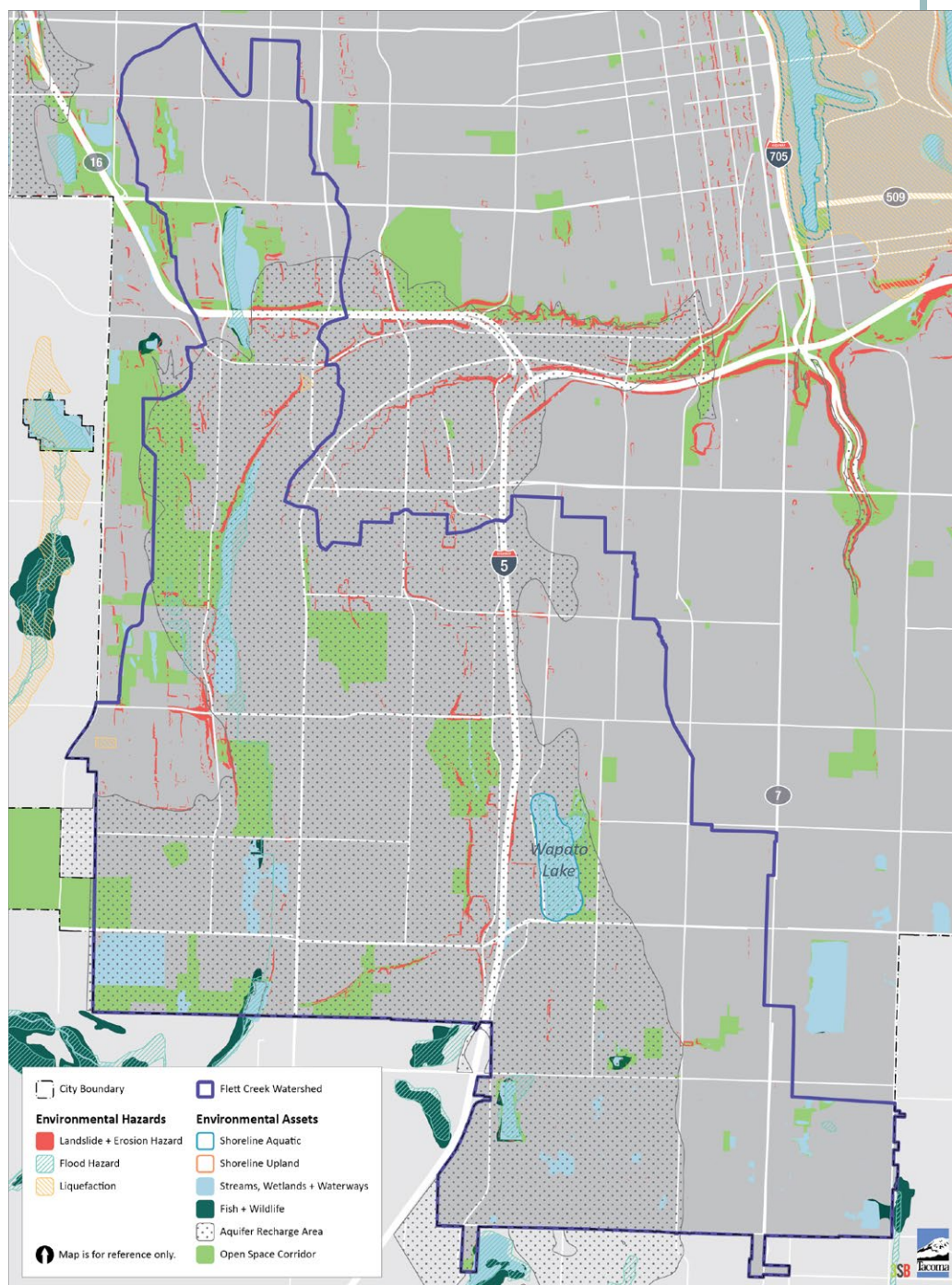


FIGURE 11. Environmental Assets and Hazards, Flett Creek Watershed

Sources: City of Tacoma (Aquifer Recharge Areas, 2015; Flood Hazard, 2015; Open Space Corridor, 2015; Shoreline Districts, 2011; Streams, 2015; Waterways, 2015; Wetlands, 2015), GeoEngineers (Erosion Hazards, 2003; Landslides, 2003; Liquefaction, 2003), Washington Department of Fish and Wildlife (Fish and Wildlife, 2010)

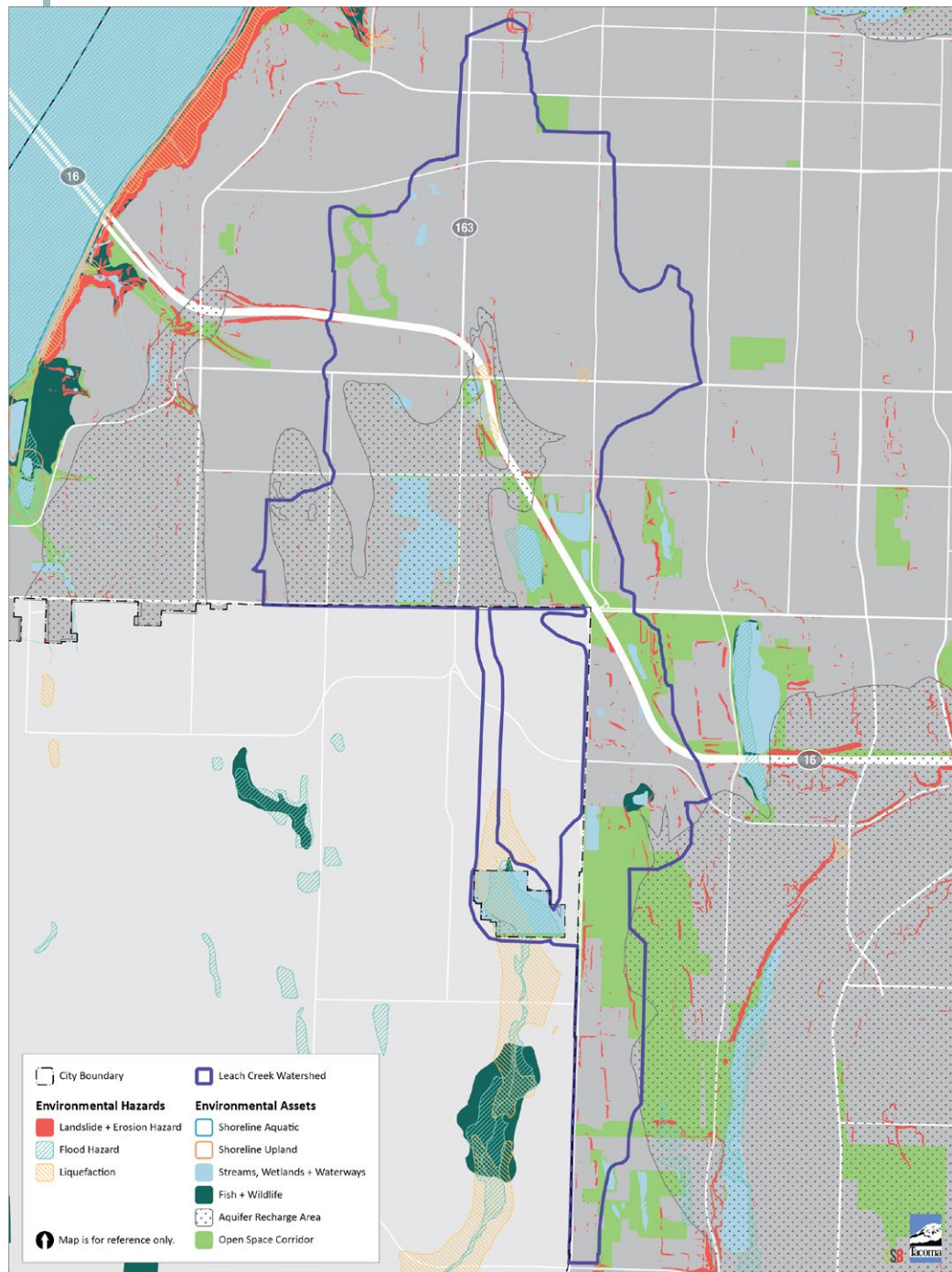


FIGURE 12. Environmental Assets and Hazards, Leach Creek Watershed

Sources: City of Tacoma (Aquifer Recharge Areas, 2015; Flood Hazard, 2015; Open Space Corridor, 2015; Shoreline Districts, 2011; Streams, 2015; Waterways, 2015; Wetlands, 2015), GeoEngineers (Erosion Hazards, 2003; Landslides, 2003; Liquefaction, 2003), Washington Department of Fish and Wildlife (Fish and Wildlife, 2010)

Northeast Tacoma + Joe's Creek

The Northeast Tacoma watershed covers 2,641 acres. The upper watershed consists primarily of residential land uses with open spaces and undeveloped land while the lower watershed supports industrial uses along the Hylebos Waterway, which connects Hylebos Creek with Commencement Bay. Much of the watershed contains steep slopes and bluffs and several intermittent streams that flow into Commencement Bay. Joe's Creek watershed is the smallest in the City at just 157 acres. It contains single and multiple-family residential land uses with some open space and undeveloped land. Joe's Creek supports salmonids.

Critical issues in the Northeast Tacoma include erosion and sediment problems caused by flooding from heavy rain events in the upper watershed and improving habitat for salmon while continuing industrial uses in the Hylebos Waterway. A critical issue in Joe's Creek watershed is degradation of riparian conditions.

North Tacoma

On the west shoreline of Commencement Bay the North Tacoma watershed covers 4,766 acres and includes residential and commercial land uses. Major features include Point Defiance Park, the North End Wastewater Treatment Plant and the former ASARCO smelting site, which is part of the Commencement Bay Nearshore/Tideflats Superfund Site. There are several water bodies including Ruston Creek, Asarco Creek, Puget Creek, Mason Creek and the stream associated with Garfield Gulch. Puget and Mason Creeks are perennial and have steep slopes associated with them.

Critical issues in the North Tacoma watershed include impaired nearshore habitats along the shoreline of Commencement Bay, erosion and sediment problems on steep slopes in the northern portion of the watershed, historic contamination, and fish access.

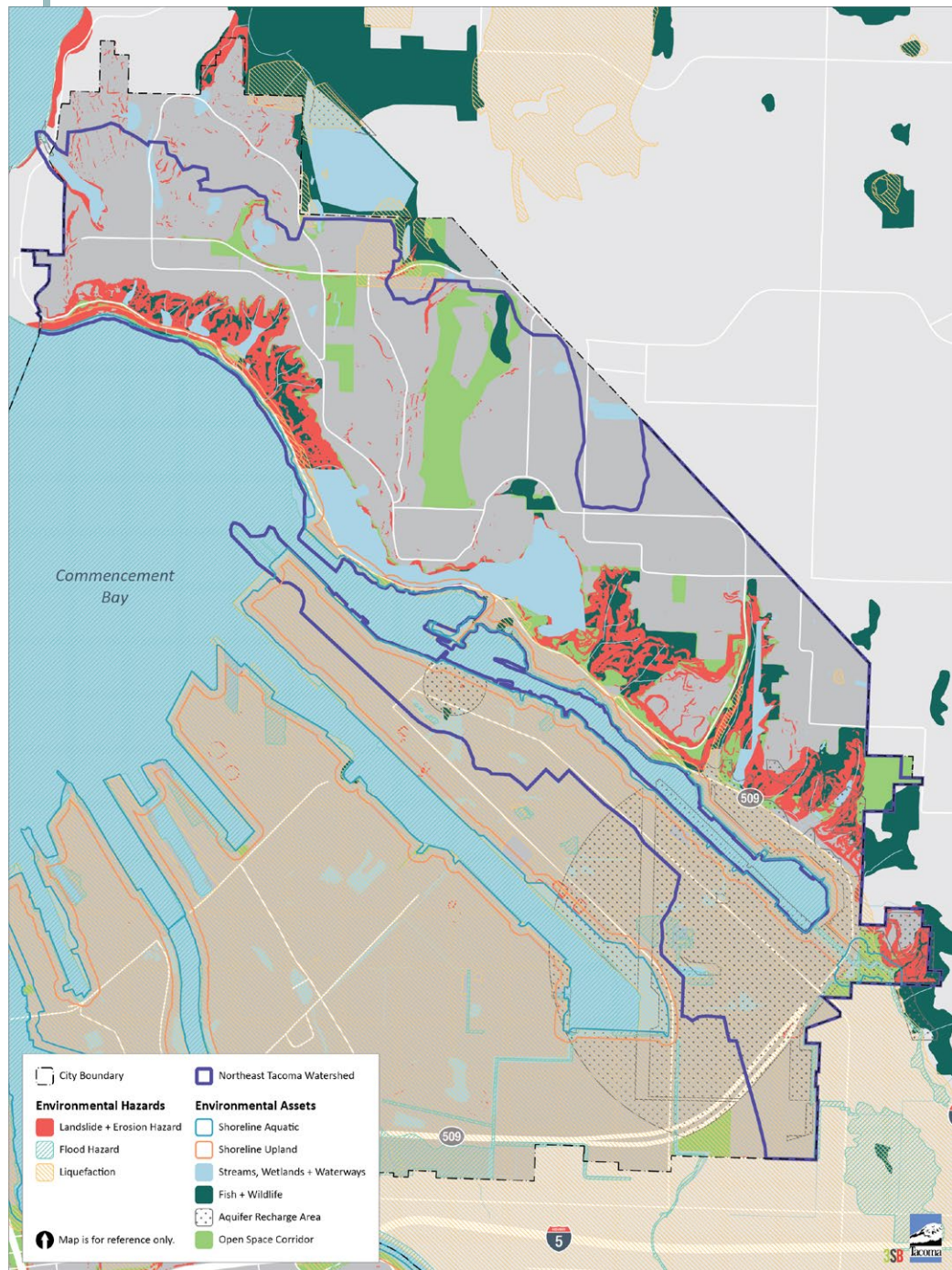


FIGURE 13. Environmental Assets and Hazards, Northeast Tacoma Watershed

Sources: City of Tacoma (Aquifer Recharge Areas, 2015; Flood Hazard, 2015; Open Space Corridor, 2015; Shoreline Districts, 2011; Streams, 2015; Waterways, 2015; Wetlands, 2015), GeoEngineers (Erosion Hazards, 2003; Landslides, 2003; Liquefaction, 2003), Washington Department of Fish and Wildlife (Fish and Wildlife, 2010)

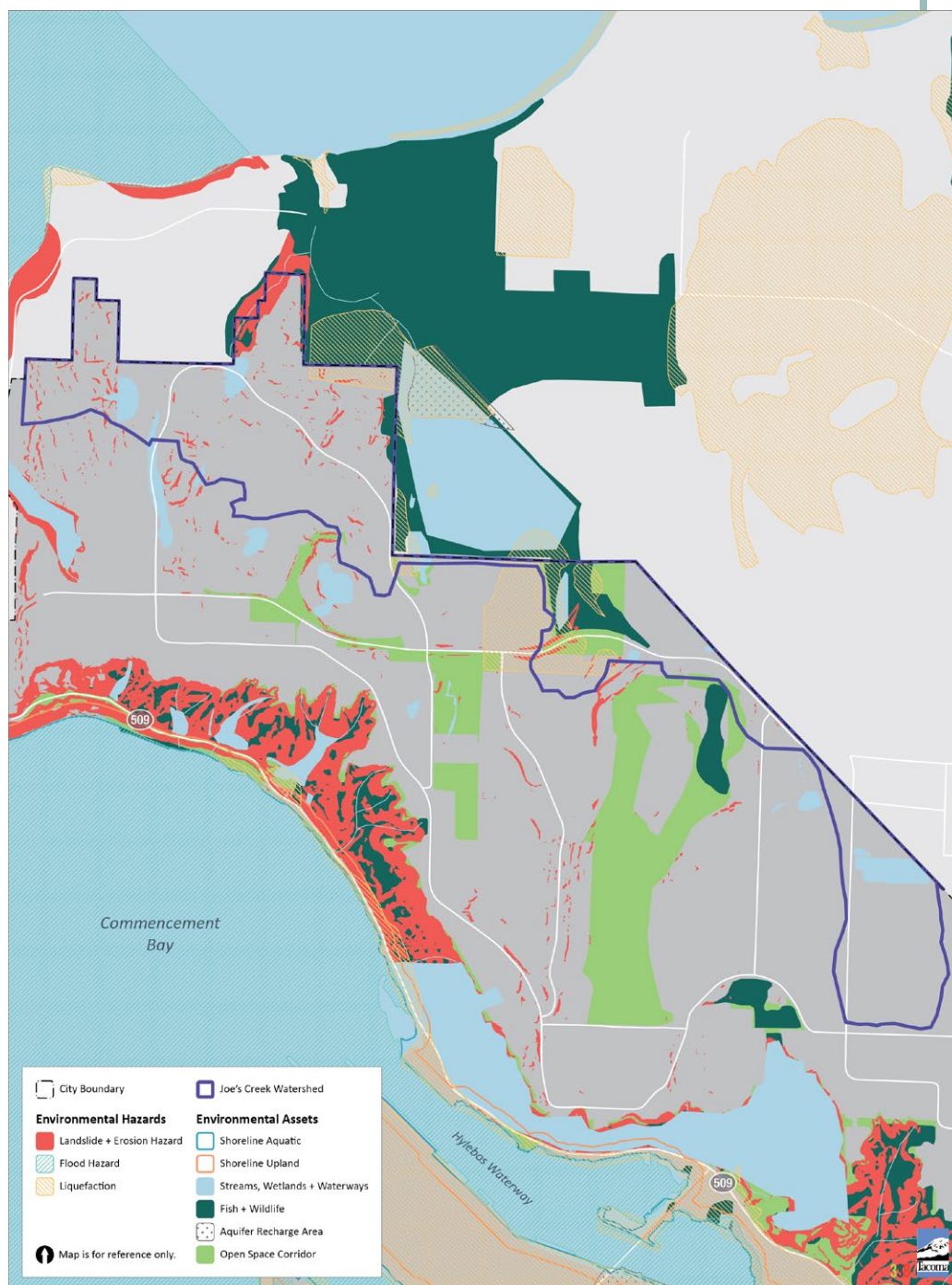


FIGURE 14. Environmental Assets and Hazards, Joe's Creek Watershed

Sources: City of Tacoma (Aquifer Recharge Areas, 2015; Flood Hazard, 2015; Open Space Corridor, 2015; Shoreline Districts, 2011; Streams, 2015; Waterways, 2015; Wetlands, 2015), GeoEngineers (Erosion Hazards, 2003; Landslides, 2003; Liquefaction, 2003), Washington Department of Fish and Wildlife (Fish and Wildlife, 2010)

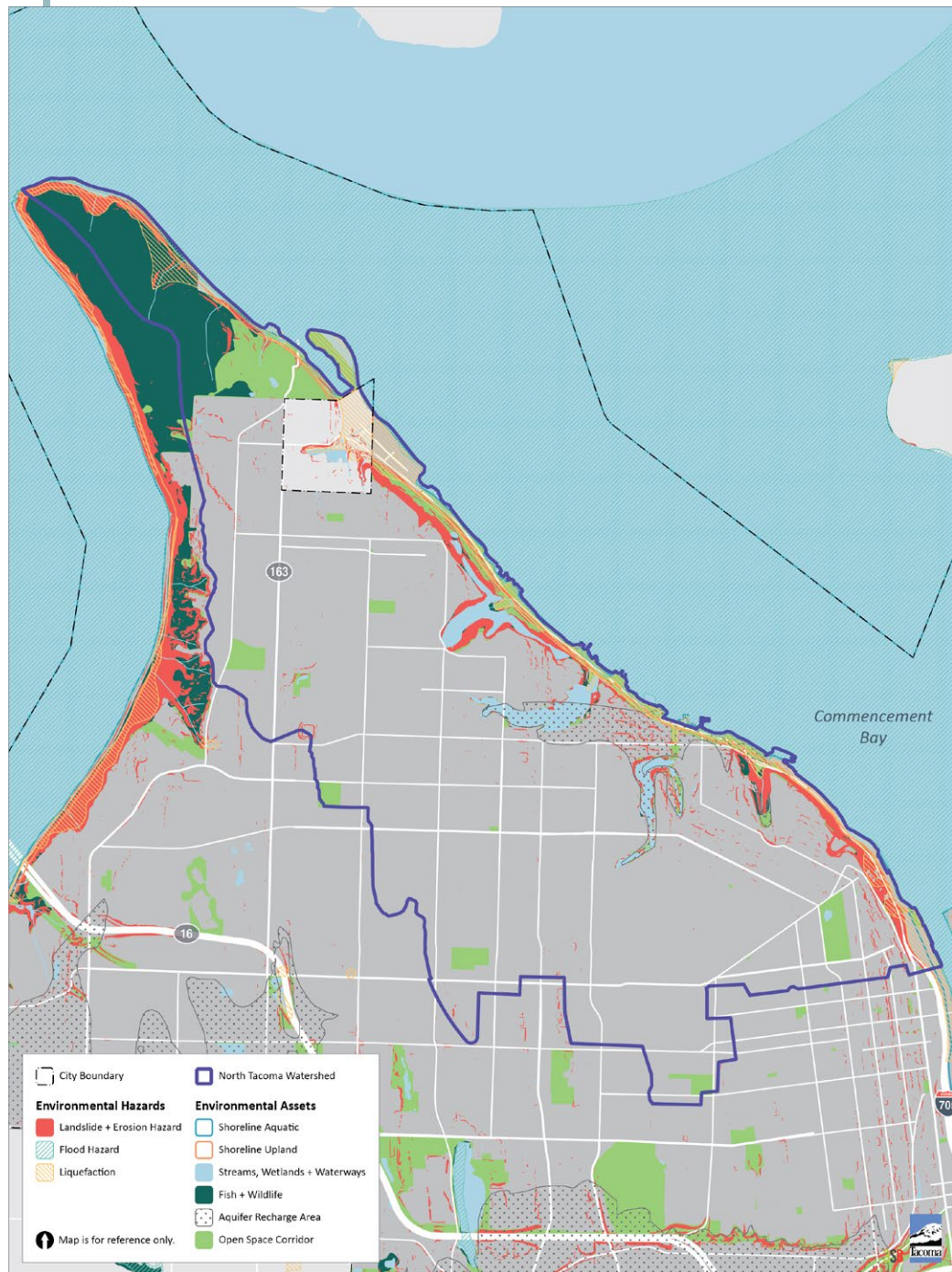


FIGURE 15. Environmental Assets and Hazards, North Tacoma Watershed

Sources: City of Tacoma (Aquifer Recharge Areas, 2015; Flood Hazard, 2015; Open Space Corridor, 2015; Shoreline Districts, 2011; Streams, 2015; Waterways, 2015; Wetlands, 2015), GeoEngineers (Erosion Hazards, 2003; Landslides, 2003; Liquefaction, 2003), Washington Department of Fish and Wildlife (Fish and Wildlife, 2010)

Thea Foss Waterway

The Thea Foss watershed is one of Tacoma's larger watersheds (approximately 5,751 acres) and includes residential and commercial land uses, the I-5 corridor and the Thea Foss Waterway that supports industrial and commercial businesses.

Critical issues include water quality and degraded conditions along the nearshore and adjacent upland areas.

Tideflats

The Tideflats watershed covers 2,112 acres and is the most highly industrialized and commercialized portion of the city. The majority of the city's heavy industrial facilities are located here along the Sitcum, Blair and Hylebos Waterways. Hylebos and Wapato Creeks are present. The Milwaukee Waterway was filled and capped during 1993–1995.

Critical issues include water quality and degraded conditions along the nearshore and adjacent upland areas.

Lower Puyallup

The Lower Puyallup watershed covers 2,971 acres and contains the Puyallup River, a critical waterbody for a variety of salmonids including spring Chinook and bull trout which are listed as endangered. Portions of the watershed are predominately residential with some undeveloped open space and a few small commercial areas while industrial activity dominates the former estuary.

Critical issues in the Lower Puyallup watershed include degraded estuary and nearshore habitat and riparian habitat for salmonids.

Western Slopes

The Western Slopes watershed covers 2,090 acres and is the only Tacoma watershed that drains to the Narrows Passage. The watershed is predominately residential with many steep slopes that contain underground springs and near surface groundwater. Several small creeks are present.

Critical issues include development near steep slopes and interruption of sediment delivery processes from bulkhead installation.

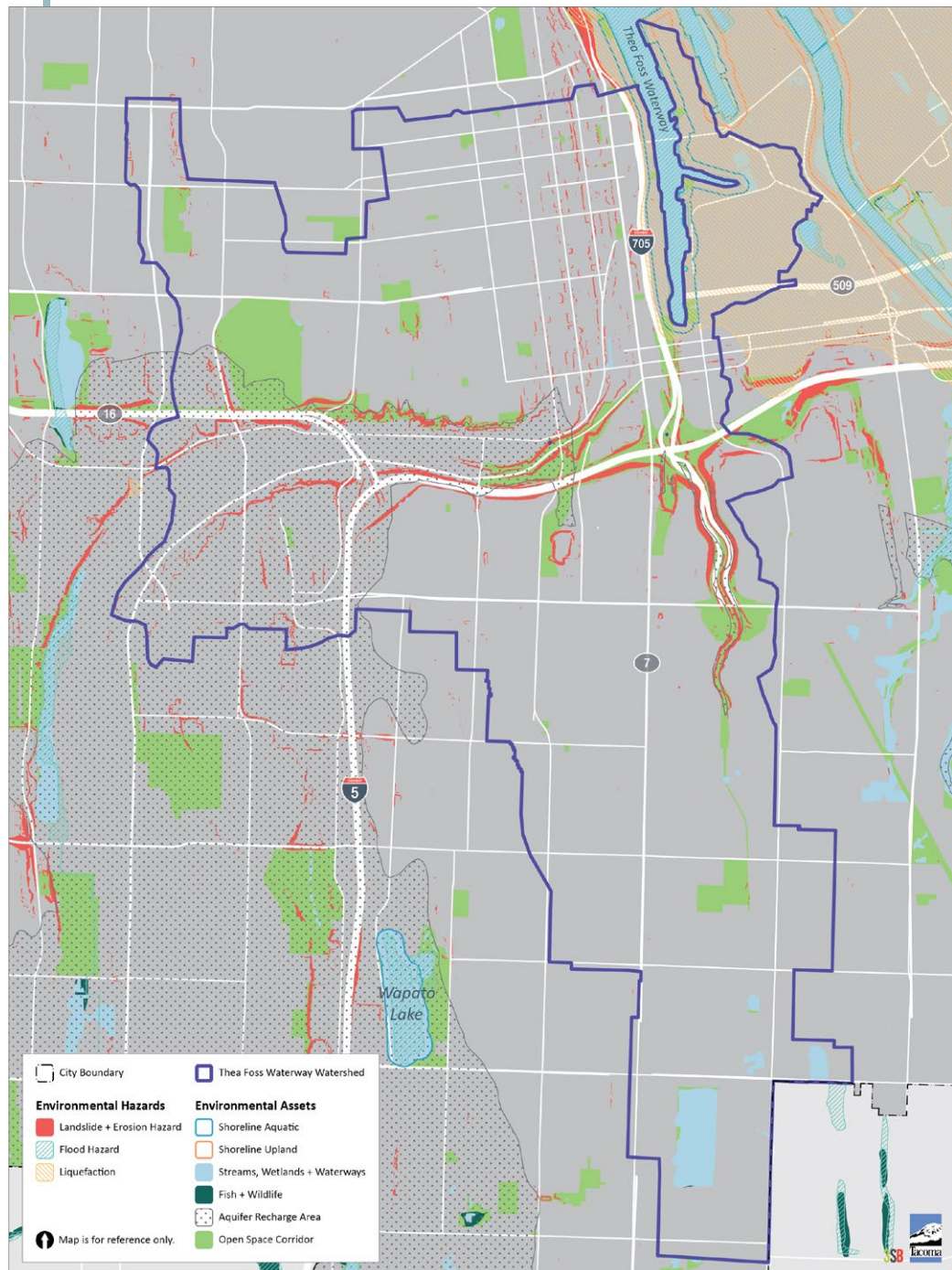


FIGURE 16. Environmental Assets and Hazards, Thea Foss Waterway Watershed

Sources: City of Tacoma (Aquifer Recharge Areas, 2015; Flood Hazard, 2015; Open Space Corridor, 2015; Shoreline Districts, 2011; Streams, 2015; Waterways, 2015; Wetlands, 2015), GeoEngineers (Erosion Hazards, 2003; Landslides, 2003; Liquefaction, 2003), Washington Department of Fish and Wildlife (Fish and Wildlife, 2010)

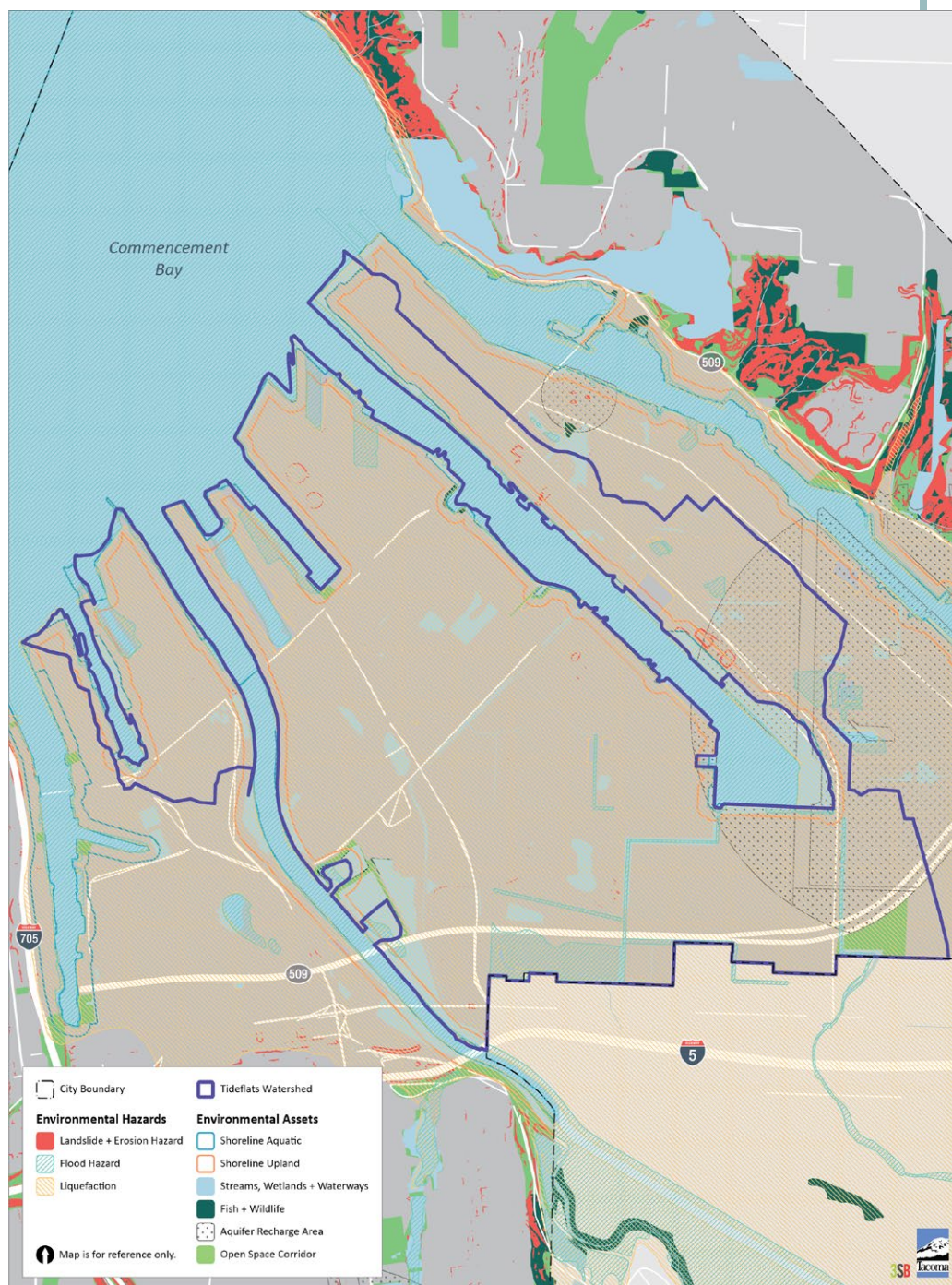


FIGURE 17. Environmental Assets and Hazards, Tideflats Watershed

Sources: City of Tacoma (Aquifer Recharge Areas, 2015; Flood Hazard, 2015; Open Space Corridor, 2015; Shoreline Districts, 2011; Streams, 2015; Waterways, 2015; Wetlands, 2015), GeoEngineers (Erosion Hazards, 2003; Landslides, 2003; Liquefaction, 2003), Washington Department of Fish and Wildlife (Fish and Wildlife, 2010)

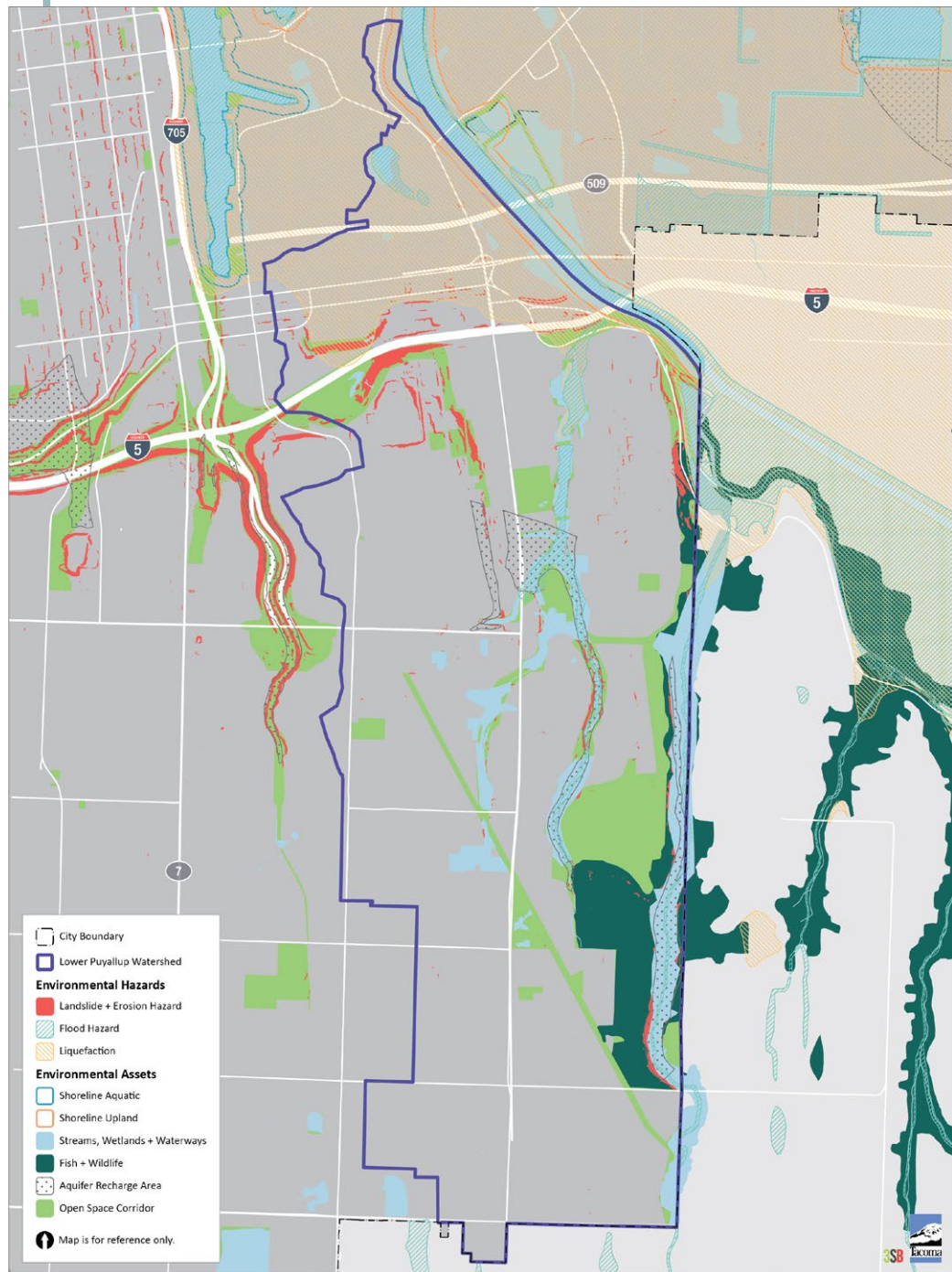


FIGURE 18. Environmental Assets and Hazards, Lower Puyallup Watershed

Sources: City of Tacoma (Aquifer Recharge Areas, 2015; Flood Hazard, 2015; Open Space Corridor, 2015; Shoreline Districts, 2011; Streams, 2015; Waterways, 2015; Wetlands, 2015), GeoEngineers (Erosion Hazards, 2003; Landslides, 2003; Liquefaction, 2003), Washington Department of Fish and Wildlife (Fish and Wildlife, 2010)

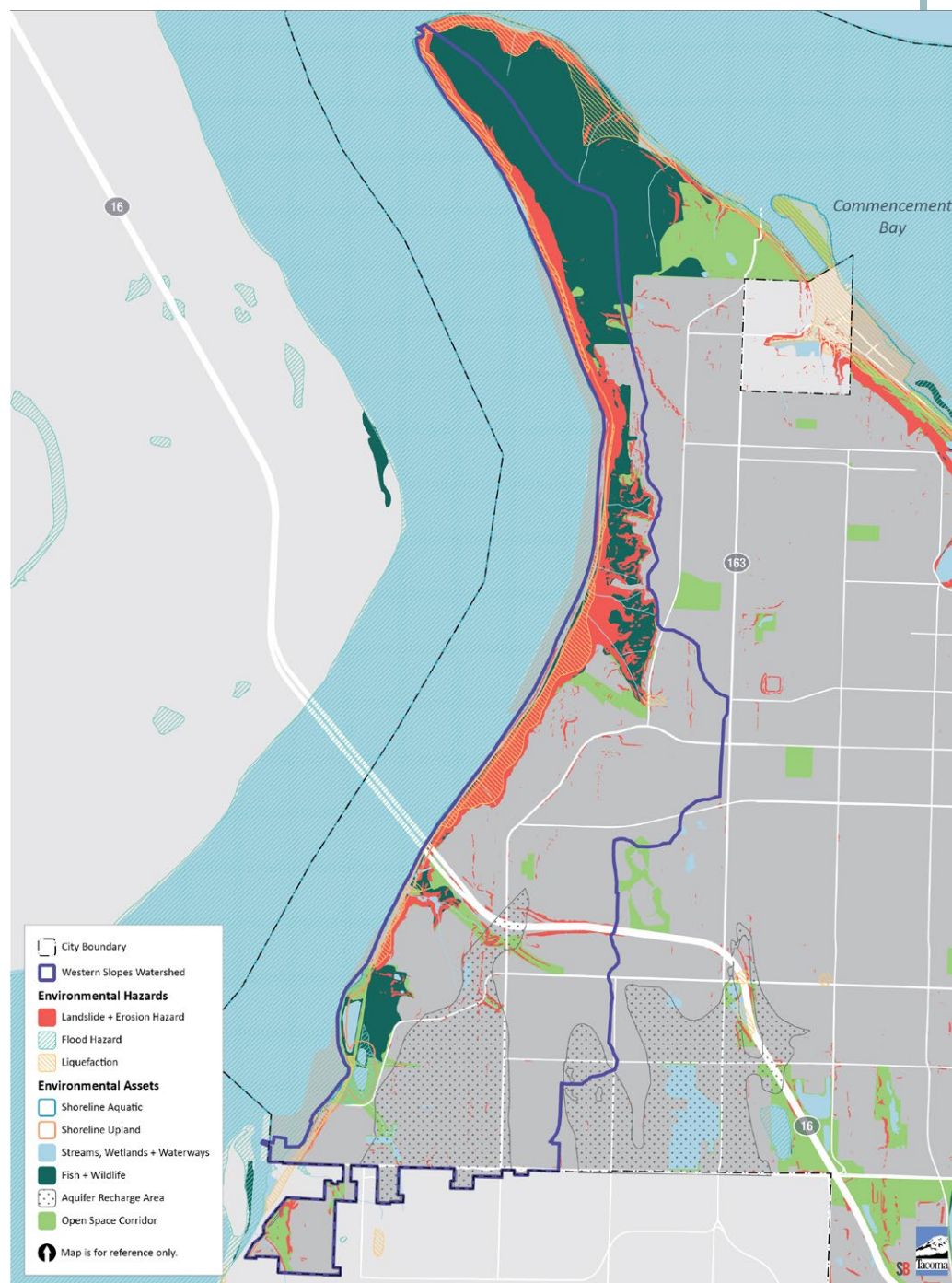


FIGURE 19. Environmental Assets and Hazards, Western Slopes Watershed

Sources: City of Tacoma (Aquifer Recharge Areas, 2015; Flood Hazard, 2015; Open Space Corridor, 2015; Shoreline Districts, 2011; Streams, 2015; Waterways, 2015; Wetlands, 2015), GeoEngineers (Erosion Hazards, 2003; Landslides, 2003; Liquefaction, 2003), Washington Department of Fish and Wildlife (Fish and Wildlife, 2010)



Hylebos Creek

CRITICAL AREAS

Critical areas as defined by the Growth Management Act are described below. Figure 9 on page 4-11, Figure 10 on page 4-14 and Figure 11 through Figure 19 show the location of known critical areas

Aquifer Recharge Areas

The Clover-Chambers Creek Watershed aquifer system is a large groundwater resource area which encompasses central Pierce County, areas to the south and west of Tacoma and extends into Tacoma city limits, most notably in the South Tacoma area.

Numerous individual and public water systems in Pierce County, including the City of Tacoma, use this aquifer as a water supply. The aquifer provides a significant amount of drinking water for Tacoma, supplying as much as 40 percent of the total water demand during periods of peak summer use. Therefore, protection of both the quantity and quality of this groundwater aquifer is imperative.

Climate change has and will continue to impact water resources in Tacoma, led by changes to the timing and quantity of snow accumulation in the Cascade mountains, soil moisture and streamflow. Changes in water availability in turn will impact all resources that rely on surface water such as aquifer recharge areas. In general, higher temperatures will likely cause an increasing portion of precipitation to fall as rain rather than snow, resulting in continued decreases in spring snowpack and earlier snowmelt to west side rivers. At this time it is unknown if these changes will have any effect on the City's drinking water supply.

Fish + Wildlife Habitat Conservation Areas

Tacoma provides habitat for many common fish and wildlife species including amphibians, reptiles and small mammals as well as sensitive species and species listed under the Endangered Species Act (salmonids). Fish and wildlife habitat areas are located in open spaces, parks, steep slopes, stream corridors, lakes, wetlands, the Puget Sound coastline and other natural areas throughout the city. Lakes, streams and wetlands provide a natural drainage system in the city. They also provide opportunity

for recreation and habitat for fish and wildlife (such as coho salmon, cutthroat trout, beaver, wood duck and other diving ducks).

Habitat conservation areas provide habitat for resident species, seasonal migratory species or both. Native plant cover and its dependent wildlife species have been severely reduced from historic conditions and in some cases restricted to relatively small, often steep-sloped or marshy areas. Because of steepness, unstable soil or high ground water conditions, such areas are generally difficult and expensive to use for building purposes but lend themselves well to open space, greenbelt and wildlife preservation. Their relatively small area and linear configurations, however, limit the type and amount of vegetation and wildlife able to exist there. Consequently, what is found in these areas is a complex of native and invasive species of plants and animals able to withstand exposure and competition with limited territorial requirements.

The changing climate affects fish and wildlife habitats in many ways including changes in water availability, temperature and precipitation that affect forest species composition and overall plant assemblages, growing season for some plants and the volume and timing of stream flows and stream temperatures. Among other effects, these changes are expected to affect the habitat needs of aquatic species and alter the timing of migration for some salmonid species (Snover et al. 2013).

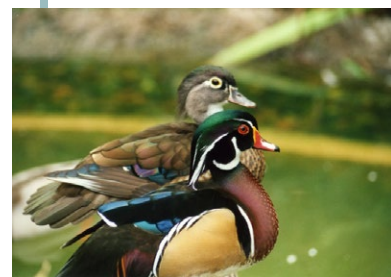
Wetlands + Estuaries

Wetlands typically include small lakes, ponds, streams, wet meadows, shallow or deep marshes, bogs swamps and other areas that are inundated or saturated by surface or ground water at a frequency and duration to support a prevalence of vegetation typically adapted for life in saturated soil conditions.

Wetlands are productive biological systems and are extremely important to the food chain. They can slow or retain stormwater runoff which can reduce downstream erosion potential and help recharge groundwater supplies. Wetlands function naturally to improve water quality by filtering out sediments, using excess nutrients, and breaking down some toxic chemicals. Wetlands are a scenic destination and also provide important educational and research opportunities.



Cutthroat trout



Wood duck



*Lake Goodwin
Beaver Pond*

Loss of wetlands can result in degraded water quality, soil erosion, increased public safety and property damage risk, and loss of open space and wildlife habitat.

Many Federal and State laws are now in effect which help protect wetlands and control net loss. The rate of loss from conversion of wetlands to other uses has greatly decreased since implementation of these laws. The majority of the city's wetlands were filled and developed for commercial, industrial or residential land uses prior to these regulations.

Climate change may lead to different weather patterns, reductions in the extent of wetlands and ponds due to reduced snowpack and the altered runoff timing as described previously. Coastal wetlands are under additional risk from increased inundation and erosion due to sea level rise, which are expected to cause habitat loss and shifts in habitat types (NRC, 2012).



*View of Tacoma
Narrows from
the Tacoma
Narrow's Bridge*

Geologically Hazardous Areas

Geologically hazardous areas include the following:

- Landslide hazard areas: areas potentially subject to landslides based on a combination of geologic, topographic and hydrologic factors. They include areas susceptible because of any combination of bedrock, soil, slope, slope aspect, structure, hydrology or other factors. Inappropriately managed development activities may disturb these areas and trigger landslides, which in turn may result in threats to human health and welfare, property damage, high stormwater run-off and stream siltation.
- Erosion hazard areas: areas where the combination of slope and soil type makes the area susceptible to erosion by water flow, either by precipitation or by water runoff. Concentrated stormwater runoff is a major cause of erosion and soil loss. These are areas where urban development is typically not appropriate.



*Marine Park beach (left)
and walkway (right) on
Commencement Bay*

- Seismic hazard areas: areas subject to severe risk of damage as a result of seismic-induced settlement, shaking, lateral spreading, surface faulting, slope failure or soil liquefaction.
- Volcanic hazard areas: areas subject to pyroclastic flows, lava flows, debris avalanche and inundation by debris flows, lahars, mudflows or related flooding resulting from volcanic activity.

Geologically hazardous areas have been mapped along much of the Puget Sound shoreline, along stream corridors and in limited pockets throughout the city.

Climate change is expected to increase rainfall intensity and raise sea level, both of which could cause an increase in landslides in Tacoma. Increased rainfall intensity could also make erosion-sensitive areas more susceptible to erosion.

Flood Hazard Areas

Flood hazard areas generally include the 100-year floodplain and other known frequently flooded areas. Consideration for these areas is important for minimizing adverse impact to public health, safety, and public infrastructure. Frequently flooded areas may provide habitat for fish and wildlife, including listed protected fish species such as salmon.

Climate change is expected to increase the risk of flooding which will increase the chance of damage to infrastructure located in or near current floodplains. For coastal areas, such as Commencement Bay and Puget Sound, sea level rise will exacerbate these risks. Direct impacts may increase storm surge resulting in temporary flooding of low-lying areas.

Mineral Resources Lands

Mineral resources in Tacoma consist of rock and gravel deposits. These resources support industries that are an important part of Tacoma's economy, providing jobs and needed products for local use and export.

OPEN SPACE

Open space lands in Tacoma provide for multiple benefits that contribute to a complete and livable urban environment. Benefits of having open space lands include:

- Habitat value for rare or endangered species
- Opportunity for low-impact recreation (such as bird and wildlife observation), community stewardship and surveillance
- Increased property values
- Heightened sense of community ownership and recognized value
- Stormwater retention and treatment
- Increased air and water quality
- Aesthetic relief from an urbanized environment
- Improved public health as a result of better air and water quality and opportunities for a more active lifestyle

These benefits are often referred to as "ecosystem services," and without functional and healthy habitat areas, benefits would not be available or would have to be provided by human intervention. Open space lands in Tacoma include:

- Parks and recreational lands with active uses like trails and viewpoints
- Natural areas regulated under the City's Critical Areas Preservation Ordinance
- Washington State Department of Fish and Wildlife priority habitats and/or biodiversity corridors
- Areas used for the conservation of plant and animal life, including habitat for fish and wildlife species
- Areas used for ecologic and other scientific study purposes
- Areas of outstanding scenic, historic, cultural, scientific and/or educational value
- Areas providing a natural separation or buffer between land-uses



Lake Goodwin Beaver Pond

- Rivers, streams, wetlands, bays and estuaries
- Forested areas, oak woodlands, meadows
- Areas providing important habitat connectivity, including utility easements and unimproved rights-of-way
- Marine beaches, lake shores, banks of rivers and streams and watershed lands

Many of the functions and values provided by habitat areas are dependent on connectivity with other habitat areas and the quality of habitat. Open Space Corridors often contain critical areas such as streams, wetlands, steep slopes and animal and plant habitat. Thus, there is a strong link between the City's critical area and open space goals.

URBAN FOREST

Trees are an integral part of our communities and the ecological systems in which they exist. They provide significant economic, social and ecological benefits, such as carbon sequestration, reduction of the urban heat island effect, energy savings, reduction of stormwater runoff, improvement of water quality, psychological healing and calming qualities and increased value of business and residential properties. Planting and maintaining trees helps a city become more sustainable and offset the negative impacts on the ecosystem from urban development. Trees are as necessary as water, infrastructure and energy to sustaining healthy communities. The health of the urban forest is directly linked to the health of the Puget Sound.

Our urban forest is a collection of individual trees and plants that could be living in traditional landscape settings, forest remnants in parks, open spaces and private property. It encompasses the living components of the complex urban landscape and is an integral part of Tacoma's infrastructure. Our urban forest influences and is influenced by the built environment that surrounds it.

Tacoma's urban forest exists on different types of property that are managed differently depending on ownership (public vs. private), uses (commercial, residential, industrial, open spaces, etc.) and the vegetation present (invasive, native, climate-adapted). Properties where the urban forest can be found include City-owned property, and other publicly-owned property such as parks and schools.



Fall colors at Point Defiance Park

Urban forests and forests in developing areas face a number of challenges that rural or wilderness forests do not. A rural forest area is often owned by a single owner or limited number of owners and can be managed through relatively simple single-purpose policies. In contrast, our urban forest is overlaid with a complex set of ownerships, values and goals with differing maintenance levels and approaches towards tree planting and preservation. Urban forest growing conditions vary greatly from the natural forest processes and are often in conflict with other needs and management goals; therefore, a multi-faceted approach to management of our urban forest needs to be utilized to create a high-quality human habitat and to strike a balance between a healthy forest, the needs of the community and the needs of individuals.

Climate influences the structure and function of forest ecosystems. The projected changes in climate may affect the species composition of urban forests as some species could be lost or gained depending on their climatic suitability (Snover et al. 2013). It is expected that periods of drought could increase or become longer, which may affect the growth, reproduction and physical location of some species, but overall the potential impacts to urban forests in Tacoma are unknown at this time.



*Volunteer helping to
plant native vegetation
at Julia's Gulch*

