ENVIRONMENT SUPPORTING ANALYSIS

Book 1

Book 1: Environment Supporting Analysis

Introduction

The purpose of this book is to consider the relationship between the built and natural environments. Arlington's natural beauty is a defining feature of the community and draw for residents, employees, and visitors alike. The City is defined by vistas of the Cascade Mountains, mature trees, streams and rivers, open spaces, and agriculture. The City of Arlington has valued environmental protection and enhancement for many years and has numerous programs in place to improve the quality of the natural environment. The Environment Book supports the City's commitment to Arlington's beautiful nature, high quality of life, and resilient natural environment with high-quality natural functions and wildlife habitats.

The Environment Book includes an overview of the existing conditions in Arlington, including an overview of the City's critical areas and other natural features such as fauna of significance including endangered and threatened species, water resources, air quality, noise, This Book also includes an overview of the regulations related to the natural environment which span from federal laws to local requirements.

To learn more about natural hazards and emergency management see the Public Safety Book. For more information related to the protection and enhancement of open spaces and conservation areas see the Parks, Recreation, and Open Space Book.

It is important to note that while this Book does not address the requirement to develop a Climate Element by 2029 the City supports actions that will improve the Arlington's climate resilience and reduce per capita vehicle miles. The goals and policies in this Book support these efforts along with goals and policies associated with the Climate Adaptation and Community Resiliency and Healthy Active Lifestyle foundational principles throughout this plan.

Background

There are several regulations, policies, and agreements that dictate elements of the Environment Book and require Arlington to protect natural resources and wildlife habitat which have a significant impact on the Arlington's residents, employees, visitors, wildlife, and the greater Puget Sound region.

Federal Planning

The Endangered Species Act (ESA) establishes protections for fish, wildlife, and plants and that are listed as threatened or endangered and their habitat. A species may be listed as threatened or endangered under the ESA because of any of the following five factors:

- present or threatened destruction, modification, or curtailment of its habitat or range
- over-utilization of the species for commercial, recreational, scientific, or educational purposes

- disease or predation
- inadequacy of existing regulatory mechanisms
- other natural or manmade factors affecting its continued existence

The Puget Sound Chinook salmon, Puget Sound Steelhead, and Bull Trout were listed as threatened in 1999, 2007, and 1998, respectively. In 2005, the Southern Resident Orcas were designated as endangered. Arlington supports and participates in regional efforts to restore and protect endangered and threatened species their habitats. The City partners with organizations including the Stillaguamish Tribe, Stilly/Snohomish Task Force, Water Resource Inventory Area (WRIA) 5, WRIA 7, and Puget Sound Partnership among others to improve conditions for these species. More about threatened and endangered species in and around Arlington can be found below.

The Clean Water Act (CWA) was established to address water pollution. The CWA directs the State of Washington to establish surface water quality standards, identify impaired waterbodies, procedures to restore impaired waterbodies, and establish the National Pollutant Discharge Elimination System (NPDES).

State Planning

The Growth Management Act (GMA) requires Arlington to adopt critical areas regulations and requires the City to use best available science to designate and protect the functions and values of critical areas with development regulations. The GMA defines critical areas as "(a) Wetlands; (b) areas with a critical recharging effect on aquifers used for potable water; (c) fish and wildlife habitat conservation areas; (d) frequently flooded areas; and (e) geologically hazardous areas". Arlington's critical areas ordinance can be found in Chapter 20.93 of the Arlington Municipal Code and are described in detail below.

The GMA was amended in 2023 with House Bill 1181 with the goal to improve the State's response to climate change by incorporating climate change into local comprehensive plans. This legislation requires that Arlington develop a new Climate Change and Resiliency element which shall include subelements for greenhouse gas emissions reduction and resiliency by 2029. The City must also update the transportation element accordingly by 2029.

The Shoreline Management Act (SMA) was adopted in 1972 with the goal to "prevent the inherent harm in an uncoordinated and piecemeal development of the state's shorelines." The SMA encourages water-dependent and water-oriented uses of the State's shorelines, promotes public access to shorelines, and protects shoreline natural resources. The Stillaguamish River, South Fork Stillaguamish River, Portage Creek, and South Slough are under Arlington's Shoreline Master Program, updated in 2019.

Arlington operates under a Phase II National Pollutant Discharge Elimination System (NPDES) Permit. The NPDES permit addresses several government functions that improve water quality and reduce flooding. The permit calls for the City to manage stormwater through regulations and policies, inspection and enforcement, stormwater planning, illicit discharge detection and elimination, mapping, operations and maintenance, and public education and involvement, among other approaches. An anticipated addition to the NPDES permit will require the City to establish tree canopy goals as a stormwater management tool.

Regional and Countywide Planning

According to Puget Sound Regional Council's VISION 2050 the health of communities and the economy are connected to the health of the environment. VISION 2050 multicounty planning policies (MPPs) and Snohomish County countywide planning policies (CPPs) support protecting and restoring natural systems, habitat, water quality, and air quality; encouraging restoration of shorelines to a natural condition for ecological function and value; reducing greenhouse gas emissions that contribute to climate change; and preparing for climate change impacts. The goals and policies in this Environment Book are aligned with VISION 2050 MPPs and Snohomish County CPPs.

Existing Conditions

Arlington is a growing community that has a wide variety of natural features including critical areas that support the livelihood of the community, including providing potable water. Arlington's regulations, including the critical areas ordinance found in Chapter 20.93 of the Arlington Municipal Code, are periodically reviewed and updated to protect and enhance the City's environment. The existing conditions described below provides background data, needs assessments or analysis, and identifies issues.

Climate and Weather

Climate and weather, while not critical to land use planning, is a consideration in design and engineering. For example, the condition of roadways, public transit, and pedestrian/bicycle pathways is affected by the climate. Temperature variations are significant factors in the level of energy usage, and annual precipitation provides a source of water. The climate also influences economic activity, most notably agricultural production.

Summers in Arlington are mild and warm (average daytime temperature in the 70's) and winters are comparatively mild (average daytime temperature in the mid-40's). The frost-free period for the City generally begins in April and ends near the first of October. Precipitation is in the form of rain and snow, averaging 46.34 inches annually (average low of 1.62 inches in July to an average high of 6.15 inches in December). Relative humidity is fairly high due to the water influences. The prevailing wind is westerly or northwesterly most of the year.

Sustainability and Climate Change

Climate change refers to changes in climate patterns predominantly attributed to human-caused increased levels of atmospheric greenhouse gases.[1] As climate change alters the systems that influence the natural environment Arlington is expected to be exposed to more hazards which could affect the City's infrastructure. Climate change will exacerbate the severity and frequency of storm events, flooding, and wildfires.

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[1] [1] https://www.epa.gov/climate-adaptation/climate-adaptation-and-epas-role#:~:text=Climate%20change%20refers%20to%20changes,projected%20impacts%20of%20climate%20change.

The frequency, duration, and intensity of extreme weather events will increase with climate change. Overall, climate variability is likely to increase meaning temperatures will rise and periods of drought and heavy precipitation will last longer.[2]

A University of Washington report was published in 2021 that analyzed climate change's impacts on river flooding due to declining snowpack and more intense heavy rain events in Snohomish County, including the Stillaguamish River.[3] Snowpack has already declined and is projected to continue declining. Heavy rain events are projected to become more intense particularly in the second half of this century. The *Climate Change and Flooding in Snohomish County* model indicates that peak flows will increase substantially by the 2080s. Due to more water in streams during flood events that there will be increases in flooding in the Stillaguamish River basin.

According to the Federal Emergency Management Agency's (FEMA) 2020 Flood Insurance Rate Map (FIRM) small portions of Arlington's city limits falls within the 100-year floodplain. This area is defined by Snohomish County as "The area flooded by the flood that has a 1-percent chance of being equaled or exceeded each year."[4] The probability of a 100-year flood having a one percent chance of occurring annually is a statistical average only; in fact, it can occur more than once in a short period of time. The frequency of floods in most Western Washington river basins is projected to increase due to warmer, wetter winters.[5] Lives, property, transportation systems, and economic centers will be threatened as the capacity of flood protection facilities are expected to be exceeded during future floods. Projections indicate climate change will increase the occurrence to both low-frequency flood events, such as a 100-year flood, and high-frequency flood events, such as a 10-year flood.[6] A modeling exercise of the Stillaguamish Watershed indicates that for both 10- and 100-year floods the inundation depth and area inundated will increase with climate change in and near Arlington.

Wildfire risk in Washington is being accelerated by climate change. The fire season and areas burned are projected to increase as the climate warms and summers becomes drier in western Washington.[7] Climate change is also expected to reduce soil moisture in Washington as a result of increased temperatures and less summer precipitation.[8] This can increase tree stress and result in disturbances such as insects and pathogens, resulting in tree mortality.

Climate change could also have secondary impacts that will affect natural disasters, public services, and the economy, among other areas. Heavy precipitation events can lead to landslides and sinkholes that

[2] https://nca2018.globalchange.gov/chapter/24/
[3] https://snohomishcountywa.gov/DocumentCenter/View/84836/UW-Climate-Impact-Group-CIG-Hydrology-Report---Snohomish
[4] https://snohomishcountywa.gov/DocumentCenter/View/78298/SnoCo_HMP_Voume-1_09302020_Final?bidId=
[5] https://snohomishcountywa.gov/DocumentCenter/View/78298/SnoCo_HMP_Voume-1_09302020_Final?bidId=
[6] https://snohomishcountywa.gov/DocumentCenter/View/78298/SnoCo_HMP_Voume-1_09302020_Final?bidId=
[7] https://www.dnr.wa.gov/publications/em_climaterresilienceplan_feb2020.pdf?r5qt4w
[8] https://www.dnr.wa.gov/publications/em_climaterresilienceplan_feb2020.pdf?r5qt4w

could compromise the integrity of infrastructure such as roads, railways, and stormwater infrastructure.[9] While the impacts of climate change on earthquakes are unknown the secondary impacts could be magnified as a result of climate change.[10] For example, steep slopes and dams may have a higher likelihood of failing and fire risk could be enhanced although there are currently no modes to estimate these impacts.[11]

Arlington has also initiated projects, plans, and partnerships that will make the City more sustainable in the face of climate change. Arlington was designated as a Tree City in 2003 which means the City has developed a comprehensive community forestry program and spends $2 per capita on trees.[12] Trees store carbon, filter air, help reduce stormwater runoff, improve water quality, increase habitat.[13] The City worked with Western Washington University Sustainable Communities Program to develop a downtown corridor plan that took into account sustainable development practices, climate change, and hazard risk reduction. Snohomish County Public Utility District (PUD) developed the Arlington Microgrid Solar Array as part of an office complex east of the Arlington Municipal Airport. The facility was a "demonstration testbed for several interconnected distributed energy technologies that are constructed to be self-sustaining if disconnected from the electrical grid at large".[14] The office at this site "will serve the entire North county and act as a staging area for recovery in the event of a large-scale disruption of electric service."

The City will continue to assess any information that is relevant to the Stillaguamish and immediate region. The City will implement actions and land use regulations that can help with the adaptation to climate change. The City will seek grants and assistance from organizations like the University of Washington Climate Impacts Group as the risks and impacts of climate change become better understood. Examples of regulations that should allow for adaptive management tools include flood, stormwater, landslide, vegetation species selection and wildfire or Firewise USA programs.

Geology and Soils

The Arlington urban growth area (UGA) occupies a Pleistocene glacial terrace or glacial outwash lobe from the Cordilleran ice sheet recession, rising southeast from the flood plain of the Stillaguamish River and is in the foothills of the north range of the Cascades. It is on a relatively level series of stepped terraces, rising first from the Stillaguamish floodplain and then again east from the Quilceda-Allen

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[9] https://nca2018.globalchange.gov/chapter/24/

[10] https://snohomishcountywa.gov/DocumentCenter/View/78298/SnoCo_HMP_Voume-1_09302020_Final?bidId=

[11] https://snohomishcountywa.gov/DocumentCenter/View/78298/SnoCo_HMP_Voume-1_09302020_Final?bidId=

[12] https://www.arlingtonwa.gov/296/Tree-City

[13] https://www.nature.org/en-us/about-us/where-we-work/united-states/washington/stories-in-washington/urban-trees-climate-change/

[14] Snohomish Public Utility District. (2021). *2021 Integrated Resource Plan.* Retrieved from < https://www.snopud.com/wp-content/uploads/2021/12/Final_2021_IRP.pdf>

drainage basin[15]. There are portions of the City that exist in the floodplain, as well as the burn hill area which provides for some higher elevation glacial till with steep slope topography.

The load-bearing capacity of soil, the hydric properties, erosion potential, and characteristics with respect to shrink-swell potential all play a significant role in development of land. In particular, the hydric properties determine the potential for stormwater infiltration (LID) usage, indicate the existence of wetlands, and signal the potential for other environmental concerns.

The Soil Survey conducted by the U.S. Soil Conservation Service includes detailed soil maps that can be used for site selection and planning. The survey explains in great detail each soil's suitability for uses such as agricultural, residential, sanitary facilities (septic), recreational, woodland wildlife habitat, and other land uses.

The general soil types in the Arlington area are classified as Everett gravelly sandy loam (hydrologic soil group A), Lynnwood loamy sand (hydrologic soil group A), and Tokul medial loam (hydrologic soil group B). These general soil types are moderately to very deep, moderately well to excessively drained, and level to very steep. Such soils are generally found on till plains and terraces. This soil classification is composed of various primary soils, each with various characteristics and limitations. Note that any development limitations listed are not considered reasons for denying development permits, only that certain precautions must be taken. Such issues are reviewed through the State Environmental Policy Act (SEPA) process during the development permit application process. The survey conducted by the U.S. Soil Conservation Service provides data that is specific enough to be used to determine site development constraints for particular parcels. The Environmentally Critical Areas regulations also regulate development on steep slopes, seismic areas, and other geologically hazardous areas.

Water Resources

The City straddles the divide between the Stillaguamish and the Snohomish river basins which are regionally recognized as Water Resource Inventory Areas (WRIAs) 5 and 7, respectively.[16] Within the City's UGA, there are about 2.2 miles of riverfront and 14.1 miles of streams.[17]

Surface Water and Drainage Basins

Rivers, streams, lakes, and other surface waters may be important means of transportation or valuable environmental, recreational, and/or scenic areas. The quality of water is important to the entire area's habitat value. Reduction in water quality will not only reduce the environmental and recreational value of the area, but it may also threaten the groundwater that is connected to the surface water system.

The most important body of surface water in Arlington is the Stillaguamish River. It is an important regional habitat for various piscine, mammalian, reptilian, amphibian, and avian fauna and aquatic flora. The Stillaguamish River and its conditions are directly linked to the upland uses that modify the historic

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[15] Which was at one time the route of the Stillaguamish River. The south fork of the Stillaguamish River and Pilchuck were connected.
[16] https://www.arlingtonwa.gov/DocumentCenter/View/6832/02--Arlington-Strmwtr-Mgmt-Program_2022
[17] https://www.arlingtonwa.gov/DocumentCenter/View/6832/02--Arlington-Strmwtr-Mgmt-Program_2022

hydrological cycles. The river is also very important to the economic vitality of the City through the associated outdoor recreation activities. The river is used by boaters and fisherman throughout the year who utilize the entire Stillaguamish Valley, with Arlington being a key hub for those activities.

Other important bodies of water in the area include Portage Creek, Prairie Creek, Kruger Creek, Quilceda Creek, Eagle Creek, and March Creek. There are also bodies of water outside of the UGA which the City considers as land uses in their vicinity may have impacts on the UGA. These include upstream and downstream reaches of the tributaries listed above and their associated drainage basins and wetlands. There are also numerous perennial and seasonal wetlands in the UGA (whose importance is discussed below). As with the Stillaguamish River, all of these waterways provide important social, economic, and natural functions that contribute to a healthy living environment and high quality of life.

The City has delineated drainage basins into tiers, with larger basins being broken into sub-basins. The Arlington UGA has ten 4th tier drainage basins that influence the City's receiving waters, the Stillaguamish and Snohomish Rivers. The following 4th tier drainage basins, also seen in Figure 1, are managed by the City's Stormwater Department:

- Old Town
- March Creek
- Dike Road Reach
- Portage Creek
- I-5 Reach
- Eagle Creek
- Old Town Northeast
- Burn Road Creek
- Tviet Loop Reach
- Middle Fork Quilceda Creek

In Arlington the surface waters are in a state of recovery. It is of paramount importance that the river and other waterways be protected and managed to recover aquatic species populations. Any development and many redevelopment projects must be designed to minimize impacts to the water quality and reduce runoff to historic conditions. This includes preservation of the land that constitutes the waterways themselves and their associated buffers, and management of the quality of the water that enters them. Future development must consider point source discharges, non-point source discharges, and soil erosion, as well as development that reduces the instream habitat or changes the flow of the water in ways which damage the viability of the ecological system.

The City is also taking steps to improve water quality, including restoring a wetland park,[18] hosting tree planting events, and litter pickup events. The City also regularly coordinates with partners such as the Stillaguamish Tribe, Sound Salmon Solutions, Snohomish Conservation District, Snohomish County, the Arlington School District, and more entities on stormwater outreach and projects.

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[18] https://www.arlingtonwa.gov/DocumentCenter/View/404/Wetlands-Brochure-PDF?bidId=

Figure 1   Arlington Water Bodies and Drainage Basins

Groundwater

Groundwater is derived from precipitation and surface water filtering through the ground to aquifers. The ground where this filtering process takes place is called an aquifer recharge area. The quality of recharge areas and surface waters needs to be protected to ensure the quality of the groundwater used in the immediate area, as well as the quality of water for users down gradient from the recharge zone. Groundwater pollution is very difficult, often impossible to clean. One of the functions of wetlands is to recharge aquifers and purify the water running through them. Aquifer recharge areas can be found in areas other than wetlands. The surficial geologies made up of recessional outwash found in areas around Arlington provide excellent aquifer recharge and storage areas. More information about aquifer recharge areas and wetlands can be found in the Critical Areas section below.

Most drinking water in the UGA is provided by Arlington. Some of this water is derived from wells. The Haller well supplies approximately 85%, airport well 5%, and Snohomish County PUD provides 10% of Arlington's water supply.[19] Additionally, some residents use wells as their main source of drinking water. The aquifer for the City wells is found in the central portion of the UGA, mostly under the airport and adjacent to the Stillaguamish River at Haller Park (see Figure 2). The depth of the shallow aquifer is approximately 50 feet; however, the deep aquifer is 150 feet[20] (the airport well is 150 feet deep and Haller wells are 35 – 40 feet deep) and most uses should not affect the water quality if best management practices are used. The water quality is good other than occasional concerns for manganese.[21]

Review for potential groundwater contamination is performed at the time of development permit application review through the SEPA process. Additionally, the City's Environmentally Critical Areas regulations protect wetlands and aquifer recharge zones providing groundwater replenishment and filtration. And the Water System Plan has a watershed and wellhead protection program.[22]
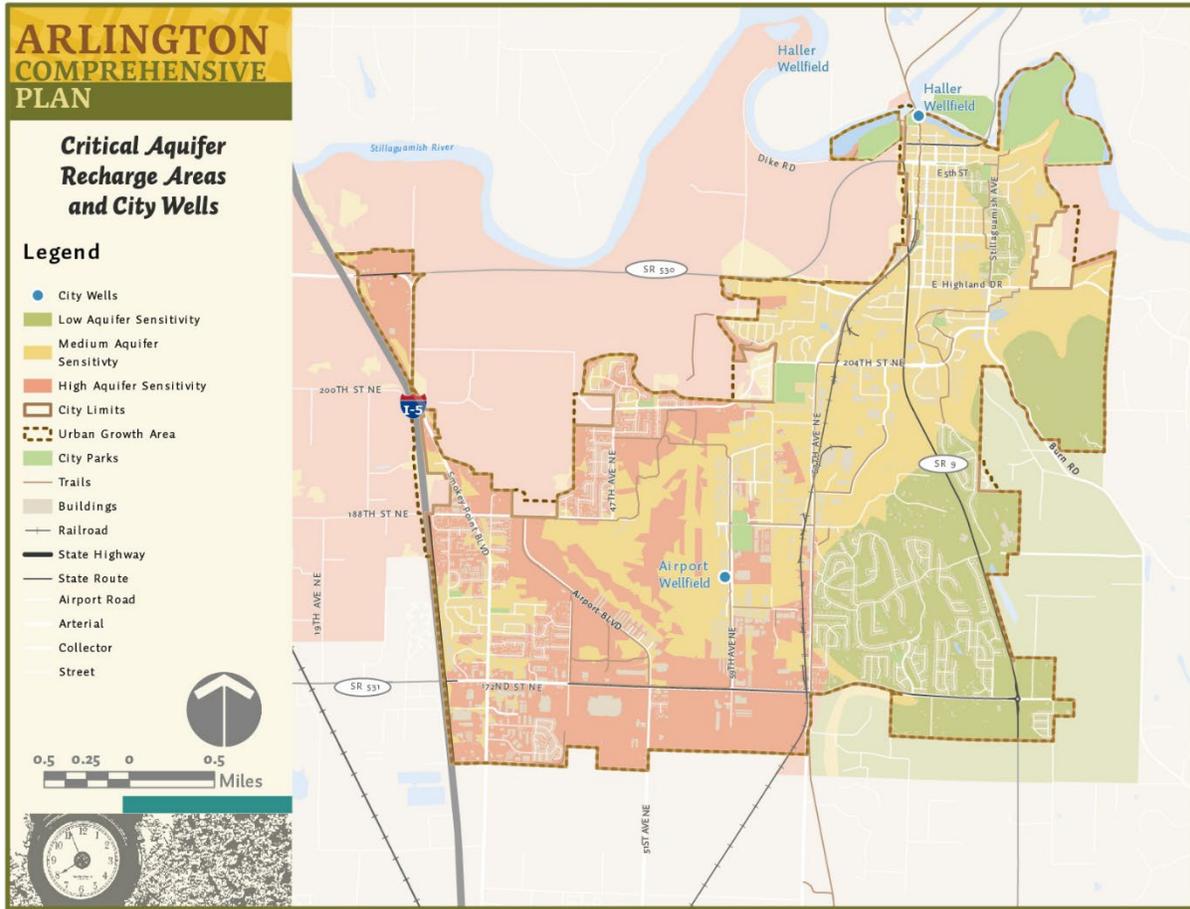
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[19] https://www.arlingtonwa.gov/DocumentCenter/View/3392/Arlington-2019-Amendment-to-2017-Amended-Signed-2015-WSP-Entire-document
[20] The Ground-Water System and Ground-Water Quality in Western Snohomish County, Washington; U.S. Geological Survey-Water Resources Investigations Report 96-4312.
[21] https://www.arlingtonwa.gov/DocumentCenter/View/3392/Arlington-2019-Amendment-to-2017-Amended-Signed-2015-WSP-Entire-document
[22] https://www.arlingtonwa.gov/DocumentCenter/View/3392/Arlington-2019-Amendment-to-2017-Amended-Signed-2015-WSP-Entire-document

Figure 2   Critical Aquifer Recharge Areas and City Wells

Critical Areas

The GMA requires Arlington to adopt development regulations that protect critical areas which are intended to help preserve the natural environment, maintain fish and wildlife habitat, and protect drinking water.[23] The five types of critical areas defined by RCW 36.70A.030(5) are as follows:

- Wetlands
- Areas with a critical recharging effect on aquifers used for potable water (critical aquifer recharge areas)
- Frequently flooded areas
- Geologically hazardous areas
- Fish and wildlife habitat conservation areas

The City is required to designate critical areas and protect their function and values using best available science. As salmonids are important to the ecosystem, are culturally significant, and are an economic resource the City must "give special consideration to conservation and protection measures necessary to preserve or enhance anadromous fisheries."[24] Fish habitat should be protected and improved, at least in part because the federal and state governments have a responsibility to ensure tribal rights are upheld. Protecting the City's critical areas also has a nexus in several federal and state laws including but not limited to the following:

- Federal Clean Water Act
- Safe Drinking Water Act
- Endangered Species Act
- National Environmental Policy Act
- National Floodplain Insurance Program (administered by FEMA)
- Washington State Environmental Policy Act (SEPA)
- Shoreline Management Act
- Watershed Planning Act
- Salmon Recovery Act
- Municipal Water Law
- GMA

Wetlands

Wetlands are fragile ecosystems that assist in the reduction of erosion, siltation, flooding, and ground and surface water pollution. Wetlands also provide an important habitat for wildlife, plants, and fisheries. Numerous wetlands have been identified in Arlington and the UGA – some on a very general basis from aerial mapping, some are shown by the soil survey of Snohomish County, and others have been precisely mapped where development has occurred. Generally, as properties develop the wetlands are more accurately delineated and mapped. The wetlands that have been identified in the UGA can be seen in Figure 3.

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[23] https://www.commerce.wa.gov/serving-communities/growth-management/growth-management-topics/critical-areas/
[24] https://www.commerce.wa.gov/serving-communities/growth-management/growth-management-topics/critical-areas/

Review for potential impacts to wetlands is performed at the time of development permit application review through the SEPA process. Additionally, the City's Critical Areas Ordinance protects wetlands and their buffers (Chapter 20.93 of the Arlington Municipal Code). Wetlands in the City of Arlington are protected because they are part of an important natural biological/flood prevention/water provision system that should not be irreversibly altered. Further, the wet soil severely limits structural development. Because of the specificity used in defining wetlands and the quality of available maps, site-specific evaluations performed at the time of project application are necessary for the evaluation of specific parcels per the Critical Areas Regulations. Arlington will continue to restore or re-create wetlands to mitigate for those that were lost during the early years of development.

Figure 3   Critical Areas

Critical Aquifer Recharge Areas

Groundwater supplies a significant portion of the City's drinking water. The quality the groundwater found in an aquifer is inextricably linked to the aquifer's recharge area. The City is required by the GMA to classify and designate critical aquifer recharge areas (CARA) where information is available, either through studies or existing soil, geologic, and well log information. While there are no CARAs currently designated in Arlington the City's Critical Areas Ordinance (Chapter 20.93 of the Arlington Municipal Code) requires developers to conduct hydrogeologic site evaluations, develop best management practices (BMP) plans, and mitigation plans to protect aquifers or groundwater.

Frequently Flooded Areas

The Federal Emergency Management Agency (FEMA) has defined areas showing the extent of the 100-year flood boundary in order to establish actuarial flood insurance rates and assist communities in efforts to promote sound floodplain management. Development on floodplains reduces water absorption, restricts the flow of water, and causes hazards downstream by causing higher water and creating flood debris. Arlington participates in the National Flood Insurance Program (NFIP) which aims to reduce the impact of flooding. This program provides insurance to property owners. As a participant in the NFIP program the City has adopted floodplain management regulations Chapter 20.64 of the Arlington Municipal Code.

FEMA's Flood Insurance Rate Maps (FIRM) show only one 100-year floodplain within the City, that being along the Stillaguamish River and generally defined by the toe of the slope of the plateau surrounding the Stillaguamish Valley (though there are some areas of the valley that are high enough to be out of the floodplain (see Figure 2). Generally only small portions of the City limits extend into this area although there is a large 110 acre portion referred to as Island Crossing that is located in the 100-year floodplain. A copy of the FIRM is located at City Hall. The City may require landowners to perform additional modeling of anticipated flood impacts for project proposals in the floodplain.

Not being listed on the FIRM does not mean that some of the smaller creeks running through Arlington could not also experience flooding during 100-year (or lesser or greater) storm events, FEMA just does not map these smaller areas. All development permits are reviewed for potential flooding hazards at the time of development permit application review. Additionally, the City's critical area regulations Chapter 20.93 of the Arlington Municipal Code and floodplain development regulations Chapter 20.64 of the Arlington Municipal Code prohibit most types of development within the 100-year floodway, allowing only those types of uses that are non-impactive.

Geologically Hazardous Areas

Geologically hazardous areas are susceptible to erosion, sliding, seismic activity, or other geological events. They pose a threat to the health and safety of citizens when used as sites for incompatible development. These areas are classified by Arlington based on the history of landslides, unstable soils, steep slopes, high erosion potential, or seismic hazards. The City has defined the following geologically hazardous areas in Chapter 20.93 of the Arlington Municipal Code: erosion hazard areas, landslide hazard areas, slopes, and seismic hazard areas. Erosion hazard areas are unstable areas prone to erosion and slides. Landslide hazard areas include areas at severe risk of a landslide. Slopes greater than or equal to a

slope greater than 33 percent are considered steep slopes. Moderate slopes are areas with slopes between 15 and 33 percent. Seismic hazard areas are areas subject to severe risk of earthquake damage due to settlement, shaking, slope failure, or soil liquefaction.

Arlington contains areas of steep and moderate slopes, most notably in the eastern portion of the city near city limits (see Figure 4). We also have seismic hazard areas subject to liquefaction. Everything within the floodplain of the Stillaguamish River (including Island Crossing) is rated as high potential for liquefaction, and everything on the 2nd geologic tier (on which the airport and most of Arlington sits) is rated as low to moderate potential.

Due to instability, visual impacts, and fire hazard, areas of steep slopes or unstable soils are not recommended for development without specific measures being taken to reduce or eliminate these potential impacts. Chapter 20.93 of the Arlington Municipal Code contains restrictions on development in these areas.

Figure 4   Geologically Hazardous Areas
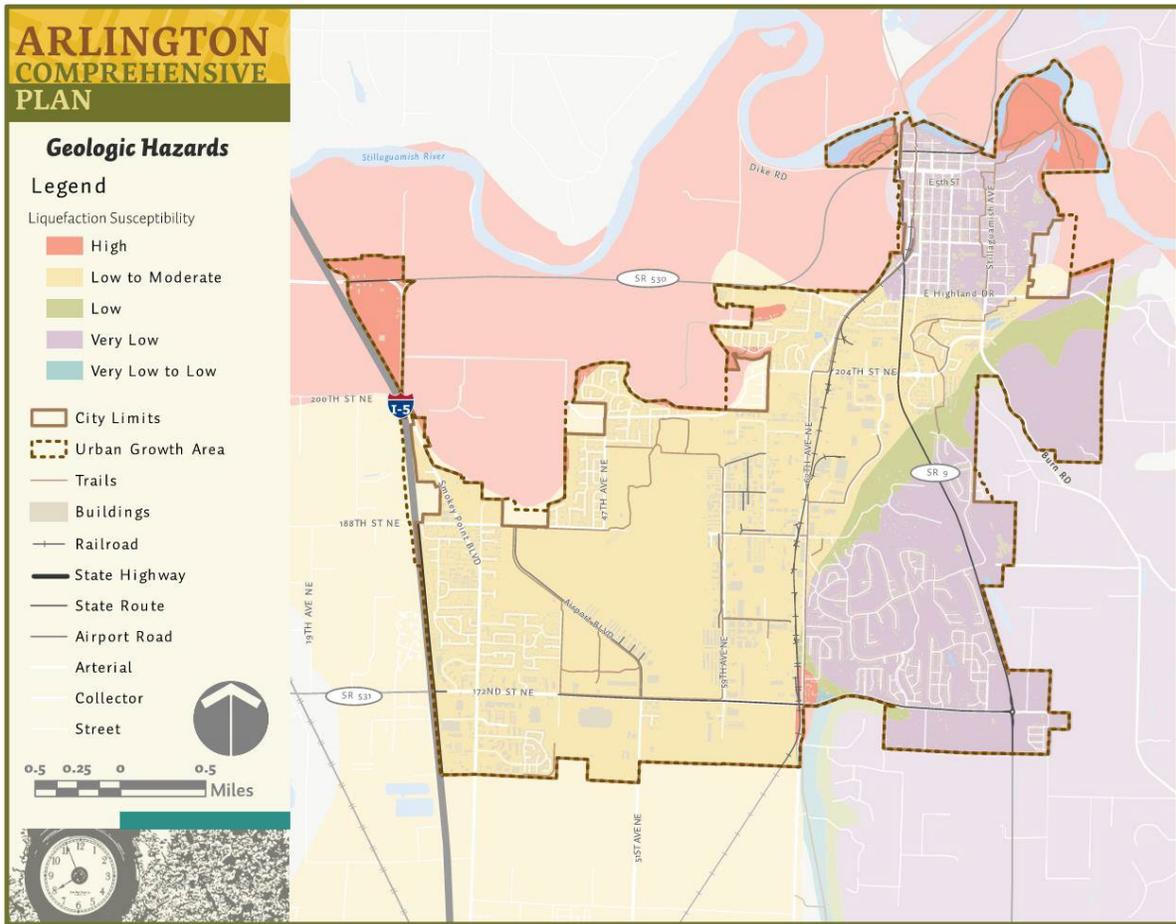
Fish and Wildlife Habitat Conservation Areas

Fish and wildlife habitat conservation areas are habitats maintained for species within their natural geographic distribution so that isolated subpopulations are not created. Cooperative and coordinated land use planning is critically important among counties and cities in this region.

Arlington defines fish and wildlife habitat of local importance as follows:

A seasonal range or habitat element with which a given species has a primary association, and which, if altered, may reduce the likelihood that the species will maintain and reproduce over the long-term. These might include areas of relative density or species richness, breeding habitat, seasonal range, and movement corridors. These also include habitats of limited availability or high vulnerability to alteration, such as cliffs and wetlands.

Disturbance of ecological communities and division into isolated habitats are the major causes for the decline in animal and plant species. Conserving viable ecological habitats in an interconnected system is the most effective way of conserving vegetation and wildlife. Many habitats that are conserved for environmental or scenic reasons cannot survive division into small, isolated land parcels. The concept of managing wildlife habitat on a regional scale is one of the precepts on which the GMA is based. The theory is that regionally significant habitats and wildlife corridors would be protected by limiting development in the County by concentrating growth within urbanized UGAs where significant habitat no longer exists or is difficult to maintain due to the effects of growth.

The Washington Department of Fish and Wildlife (WDFW) Priority Habitats and Species Program provides information on which species in Arlington's region are priority species and which habitats should be managed and conserved. WDFW has identified twenty priority habitat types, five of which are found in Arlington UGA: freshwater pond, freshwater emergent wetland, freshwater forested/shrub wetland, riverine, and wetlands.[25]

The City and UGA have deciduous and coniferous trees (Douglas fir, cedar, and maple, among others)[26] as well as native shrubs, herbs, grasses, and wetland plants. Large and medium animals such as deer and bald eagles[27] are still found occasionally within the City limits, but more frequently in some of the rural areas outside of the UGA. The riverine habitat and streams support seasonal and year-round fish and waterfowl.[28] Even though many of the habitat areas had been greatly impacted by humans, many of our stream corridors (riparian areas) are healing through the maturing of past stream and wetland restoration projects. It is important to minimize further impacts, and review for potential impacts to wildlife and habitat is performed at the time of development permit application review through the SEPA process. Additionally, the City's Critical Areas regulations are intended to protect wildlife and habitat.

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[25] https://geodataservices.wdfw.wa.gov/hp/phs/
[26] https://www.arlingtonwa.gov/DocumentCenter/View/3807/Heritage-Tree-Walk-2020-
[27] https://geodataservices.wdfw.wa.gov/hp/phs/
[28] https://geodataservices.wdfw.wa.gov/hp/phs/

Fauna

The Arlington area supports moderate numbers of numerous species of fish, birds, amphibians, reptiles, and insects and other invertebrates, some of which are state and federal listed. Please refer to Table 1 for a listing of all such species that the Washington Department of Fish and Wildlife knows of in Region 4 (North Puget Sound), which includes Arlington, that are state endangered, state threatened, state sensitive, state candidate, or species of concern, as well as species listed or proposed for listing by the U.S. Fish and Wildlife Service or the National Marine Fisheries Service. This list does not include insects or mollusks.

Most species on this list do not live in Arlington, and there is low probability of finding them here. However, some may have a relationship with the ecological functions affected by actions in Arlington, such as feeding on salmon from our local streams.

Some sensitive species have been observed but are not on the WDFW database, probably due to the historical lack of reporting of such species.

Endangered species (listed under the Endangered Species Act), Threatened, and other notable species that are known to exist in the UGA include:

- Bull trout (Salvelinus confluentis) – A federally listed threatened species under the Endangered Species Act,[29] bull trout habitat has been listed in Arlington's UGA. According to WDFW'S PHS map the mainstem, north fork, and south fork of the Stillaguamish River is habitat for the bull trout.[30] The presumed use would be only rearing or refuge, as Bull trout spawning is believed to occur in the upper reaches of the Stillaguamish watershed in the cooler headwater streams.

- Chinook Salmon (Oncorhynchus tschawytscha) – Chinook salmon are considered a threatened species under the Endangered Species Act.[31] Chinook are considered to use the Stillaguamish River, larger streams, side channels, and riverine wetlands rather than the smaller streams traveling through Arlington. Therefore, the areas of town that lay alongside the main stem and south fork Stillaguamish River are considered areas of Chinook usage. The majority of Chinook spawning occurs in the upstream areas but there are normally occasional redds found in lower areas of the river. A majority of the juvenile population travel downriver during the spring high flows to spend time growing in the highly productive estuary. A small percentage (5-8%) of the juveniles are considered riverine and will over-winter to head for the estuary as a one-year old smolt. The current population of Chinook is around 1,400 annually returning adults[32].

- Steelhead (Onchorhynchus mykiss) – May 7, 2007 Puget Sound Steelhead were listed as Threatened under the Endangered Species Act.[33] Steelhead are considered to use the Stillaguamish River, larger streams, side

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[29] https://ecos.fws.gov/ecp/species/8212
[30] https://geodataservices.wdfw.wa.gov/hp/phs/
[31] https://www.fisheries.noaa.gov/west-coast/endangered-species-conservation/puget-sound-chinook-salmon
[32] Technical Assessment and Recommendations for Chinook Salmon Recovery in the Stillaguamish Watershed, Stillaguamish Technical Advisory Group, September 2000.
[33] https://www.fisheries.noaa.gov/species/steelhead-trout

channels and potentially the streams in Arlington's City Limits.[34] National Marine Fisheries Service completed the ESA Recovery Plan for the Puget Sound Steelhead in 2019which provides guidance to jurisdictions on how to participate in the recovery of the species.[35] Steelhead are different that salmon in that they can return multiple times to spawn and move from freshwater to saltwater multiple times throughout their life span. Similar to bull trout due to physical ability and habits a steelhead may travel anywhere a coho salmon will travel.

Table 1   WDFW Snohomish County Species of Concern (Including Arlington)

Common Name	Status	
	Federal	**State**
Found in Arlington		
Bull Trout	T	C
Chinook Salmon	T	
Steelhead	T	C
A Small Chance of Being Found in Arlington		
Chum Salmon	T	
Bocaccio Rockfish	E	
Canary Rockfish	T	
Yelloweye Rockfish	T	
River Lamprey		C
Olympic Mudminnow		S
Oregon Spotted Frog	T	E
Western Toad		C
Western Pond Turtle (formerly Pacific Pond Turtle)		E
Common Loon		S
Marbled Murrelet	T	T
Western grebe		C
Golden Eagle		C
Northern Goshawk		C

[34] https://geodataservices.wdfw.wa.gov/hp/phs/
[35] https://media.fisheries.noaa.gov/dam-migration/final_puget_sound_steelhead_recovery_plan.pdf

Common Name	Status	
	Federal	**State**
Yellow-billed Cuckoo	T	E
Northern Spotted Owl (formerly called Spotted Owl)	T	E
Black-backed Woodpecker		C
Oregon Vesper Sparrow		E
Gray Whale	E	E
Orca (Killer Whale)	E	E
Harbor Porpoise (formerly called Pacific Harbor Porpoise)		C
Townsend's Big-eared Bat		C
Keen's Myotis (formerly Keen's Long-eared Bat)		C
Cascade Red Fox		E
Fisher		E
Grizzly Bear	T	E
Lynx	T	T
Wolverine		C
Western Bumble Bee		C
Johnson's Hairstreak		C

Key: E = Endangered, T = Threatened, C = Candidate, P = Proposed, S = Sensitive, SC = Species of Concern

Air Quality

Three agencies have jurisdiction over the ambient air quality in the Puget Sound area: the U.S. Environmental Protection Agency (EPA), the State of Washington Department of Ecology (Ecology), and the Puget Sound Clean Air Agency (PSCAA).[36] These agencies establish regulations that govern both the allowable concentrations of pollutants in the outdoor air (i.e., ambient air) and allowable contaminant

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[36] https://www.pscleanair.gov/DocumentCenter/View/1525/2003-Washington-State-Compliance-Assurance-Agreement-for-Air-Programs-PDF?bidId=

emissions from air pollution sources.[37, 38] Although their regulations are similar in terms of stringency, each agency has established its own standards.

Unless the state or local jurisdiction has adopted more stringent standards, the EPA standards apply. Table 3 lists the national ambient air quality standards (NAAQS) as adopted by EPA and Ecology. The NAAQS consist of primary standards designed to protect public health and secondary standards designed to protect public welfare (e.g., preventing air pollution damage to vegetation).[39]

Table 2   National and State of Washington Ambient Air Quality Standards

Average Time	Air Quality Standards[40]	
	Primary	**Secondary**
Carbon Monoxide (ppm)		
8-hour Average[a]	9	
1-hour Average[a]	35	
Particulate Matter (µg/m^3)		
PM^{10}		
24-hour Average[b]	150	150
PM$^{2.5}$		
Annual Average[c]	12	15
24-hour Average[d]	35	35
Lead (µg/m^3)		
Rolling 3 Month Average[e]	0.15	0.15
Sulfur Dioxide		
3-hour Average[a]	No standard	0.5 ppm
1-hour Average[f]	75 ppb	No standard
Ozone (ppm)		
8-hour Average[g]	0.07	0.07
Nitrogen Dioxide (ppb)		

[37] https://ecology.wa.gov/Air-Climate/Air-quality/Air-quality-targets

[38] https://ecology.wa.gov/Air-Climate/Air-quality/Business-industry-requirements

[39] https://www.epa.gov/criteria-air-pollutants/naaqs-table

[40] https://www.epa.gov/criteria-air-pollutants/naaqs-table

Average Time	Air Quality Standards[40]	
	Primary	Secondary
Annual Average[h]	53	53
1-hour Average[f]	100	No standard

Notes:
ppb = partners per billion by volume
ppm = parts per million by volume
PM10 = particles 10 microns or less in size
PM2.5 = particles 2.5 microns or less in size
µg/m3 = micrograms per cubic meter
[a] = Not to be exceeded more than once per year
[b] = Not to be exceeded more than once per year on average over 3 years
[c] = annual mean, averaged over 3 years
[d] = 98th percentile, averaged over 3 years
[e] = Not to be exceeded
[f] = 99th percentile of 1-hour daily maximum concentrations, averaged over 3 years
[g] = Annual fourth-highest daily maximum 8-hour concentration, averaged over 3 years
[h] = Annual Mean

Ecology and PSCAA operate ambient air quality monitors throughout the Puget Sound region.[41] Most of the monitors have intentionally been placed at locations most likely to experience degraded air quality (e.g., near industrial facilities or at heavily-congested downtown areas). A few monitors have been operated in outlying areas to measure ambient concentrations in typical suburban or rural settings where concentrations are acknowledged to be low.

The Puget Sound Clean Air Agency (PSCAA) monitors air quality. PSCAA's the nearest air quality monitor is in Marysville, WA. According to that agency's available documentation air quality in the Arlington area is of good to moderate quality though there are periodic concerns. Summary data for this site indicate PM2.5 exceeded the agency's health goal of 25 micrograms per cubic meter 11 times in 2019, 15 times in 2020, 3 times in 2021, and 18 times in 2022.

While no specific data exists for the immediate Arlington area, one can assume that air quality is better than in the areas that are monitored. The PSCAA indicates there are two criteria air pollutants that remain of concern for the region. These are:

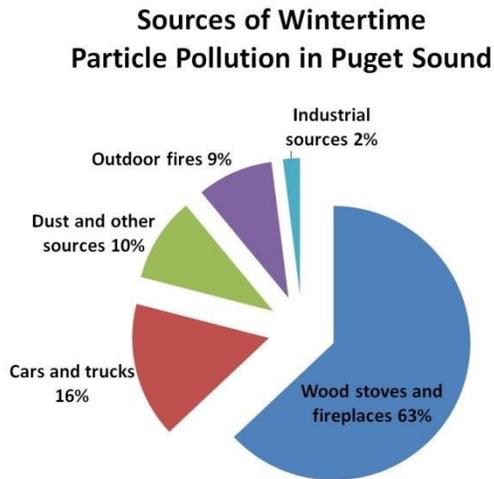### Particulate Matter (PM$_{2.5}$ and PM$_{10}$)
Particulate matter is particles of solid or aerosol particles of dust, soot, organic matter and compounds containing sulfur, nitrogen, and metals. Particulates enter the air directly from industrial operations, motor vehicles (automobiles, buses, and trucks), fuel combustion (woodstoves and fireplaces), construction, and other sources. Smaller particles are of particular concern for our health.

Particle matter (PM) is measured in two ways: PM2.5 which includes fine particles below 2.5 microns (µm), and PM10 which includes particles below 10 microns in diameter. PM2.5 can be breathed deeply into the lungs, producing injury by itself or in conjunction with gases. The elderly, those suffering from respiratory illness, and young children are especially prone to the deleterious effects of particulates.

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[41] http://map.pscleanair.gov/?lat=47.6768311&lon=-122.4756425&z=9

Soiling of buildings and other property, and reduced visibility are other results of high particulate matter levels.

Although the region has made progress in reducing particulate matter pollution wood smoke continues to be a major source of particle pollution, particularly in colder months. Additionally, transportation sources continue to be a significant source, including from cars and trucks.

Sources of Wintertime Particle Pollution in Puget Sound

- Industrial sources 2%
- Outdoor fires 9%
- Dust and other sources 10%
- Cars and trucks 16%
- Wood stoves and fireplaces 63%

Source: Puget Sound Clean Air Agency[42]

Ozone (O3)

Ozone is a pungent smelling, colorless gas produced in the atmosphere when nitrogen oxides and volatile organic compounds chemically react under the effect of strong sunlight. It is a pulmonary irritant that affects lung tissues and respiratory functions. Ozone impairs the normal function of the lung and, at concentration between 0.15 and 0.25 ppm, causes lung tightness, coughing, and wheezing. Other oxidants that often accompany ozone cause eye irritation. Persons with chronic respiratory problems, such as asthma, seem most sensitive to increases in ozone concentration. Ironically, ozone is beneficial when it occurs very high in the atmosphere, miles above the earth, where it protects us from harmful ultraviolet radiation. The highest levels are measured on hot days from mid-May to mid-September, and because of weather patterns the highest ozone values normally occur south to southeast of the major cities or source areas. There are no monitoring stations in Snohomish County; the closest are in Anacortes and Seattle. According to the Washington Department of Ecology, between 2020 and 2022 Seattle's ozone level was below the national standard and Seattle is usually in the "good" air quality index range.[43] However, Seattle does at times range into the "moderate" or "unhealthy for sensitive groups" range during extreme heat or wildfire events.

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[42] https://pscleanair.gov/163/Criteria-Air-Pollutants
[43] https://apps.ecology.wa.gov/publications/documents/2302115.pdf

Noise

By urban standards, Arlington is relatively quiet, and this is one of the amenities mentioned when people talk about why they have moved here. Unfortunately, we have no measurements of ambient noise levels within the City limits, or the means to conduct them. The most noise is generated by traffic, especially along the federal and state highways and major arterials. This is particularly true along I-5 in Smokey Point, where more houses have been built along the freeway and traffic has increased. Other noise is generated by industrial uses within the industrial zone. Lastly, there are somewhat frequent sounds of airplanes using the airport. None of these noise sources has been a major issue up to this point. However, it is anticipated that as more residential development continues to occur adjacent to the highways or around the border of the industrial zone noise will become a greater concern. Additionally, we would expect that as the airport receives more traffic and the areas surrounding develop airplane noise would become a bigger issue. The land use plan should take into account any potential noise problems generated by incompatible land uses and appropriate designators should be placed on subjected properties.