

Natural Features Element

Purpose and Relationship to Growth Management Act

The purpose of the Natural Features Element is to expand upon the community's commitment to the stewardship of natural resources as expressed in the vision statement and to provide a policy basis for City decisions, which affect the natural environment.

The natural environment element is not a required element under the Growth Management Act (GMA), but the GMA contains the following goals concerning the environment:

"... protect the environment and enhance the State's high quality of life, including air and water quality, and the availability of water."

Moreover, the GMA contains specific requirements for the designation and protection of "critical areas," defined by the GMA as wetlands, areas with critical recharging effect on aquifers used for potable water, fish and wildlife habitat conservation areas, frequently flooded areas, and geologically hazardous areas. The act requires jurisdictions to adopt interim critical areas regulations prior to the adoption of the Comprehensive Plan, and to finalize such regulations following plan adoption. The City is also required by GMA to address policies relating to Best Available Sciences for protecting Endangered Species specifically and anadromous fish in general.

Profile of Planning Area

The natural environment is a complex system of inter-related components including air, water, soils, plants, and animals. All of these systems are affected by human activity. The goal of this environmental element and the policies within it is to ensure that the relationship between humans and the natural environment is a mutually supportive one that balances competing objectives to the maximum extent possible.

The City of Granite Falls consists of a wide range of soil types and hydrologic systems. Granite Falls is characterized by rolling topography. The City and adjacent areas lie between the Pilchuck and South Fork Stillaguamish Rivers. These river valleys lie in an area shaped and formed by glacial-fluvial processes. Soils have formed in glacial outwash. These valleys originate in terrain overlaid with bedrock to the east where steep mountain peaks of the Cascade Range rise more than 5,000 feet from the valley floors.

Critical areas are lands which are subject to natural hazards; contain significant renewable resources; support unique, fragile or valuable elements of the natural environment; or contain valuable cultural resources and the protective buffers necessary to protect the public health, safety and welfare of residents. More commonly, these are such elements as wetlands, fish and wildlife habitat areas, geologically hazardous areas, aquifer recharge areas, and frequently flooded areas. The following sections discuss the significance of critical areas and identify their location within the Granite Falls area.

Critical areas constitute approximately from 20 to 30 percent of the planning area with wetlands and steep slopes dominating the environment. This does not mean, however, that these areas are not developable with proper mitigation. The policies in this plan promote a review and update of the City's Critical Areas Regulations including the addition of Best Available Sciences for

Endangered Species. Local governments are required to include the "best available sciences" in developing policies and development regulations to protect the functions and values of critical areas as defined in the GMA and must give special consideration to preserving or enhancing anadromous fisheries (ESHB 1724 amendments).

Natural Resources

Granite Falls has several rock quarries near its City limits. These quarries are located on the east side of town and should be protected as resource lands. The City will work with Snohomish County on its resource lands planning and coordinate the protection of these resources.

Wetlands

Wetlands are generally defined as lands that are inundated or saturated long enough during the growing season so that vegetation must adapt to saturated soil conditions. The U.S. Fish and Wildlife Service issued "National Wetlands Inventory Maps" in 1987, which depict general locations of wetlands for the Granite Falls area. These wetlands were identified based on vegetation, hydrology, and geography in accordance with "Classification of Wetlands and Deepwater Habitats of the United States" (Lewis M. Cowardin, December 1979). The approximate wetland boundaries are illustrated on Figure NF-1.

The majority of the wetlands are associated with depressions in the glacial tills and, in some cases, the headwaters to tributaries of the South Fork of the Stillaguamish and Pilchuck Rivers. The primary source of water for these wetlands is floodwater, precipitation, and surface flow. Wetlands provide many beneficial functions such as water quality protection, groundwater and surface water recharge, flood storage, fish and wildlife habitat, food chain support, shoreline stabilization, and recreation.

The wetland classification scheme is based on five distinct systems (Marine, Estuarine, Riverine, Lacustrine, and Palustrine) with modifiers for water regime, water chemistry, and soils. Special modifiers describe wetlands and deep-water habitats that have been either created or highly modified by man or beavers. For the purposes of this analysis, only the two types of systems present in the Granite Falls area are described below:

The **Palustrine System** includes all non-tidal wetlands dominated by trees, shrubs, persistent emergents, emergent mosses or lichens. Emergent plants are characterized as freestanding, non-woody plants. They can be found in either freshwater or saltwater environments. Wetlands containing emergent plants are found particularly in coastal areas and adjacent to major lakes.

The **Riverine System** consists of all wetlands and deep-water habitats contained within a channel except those areas dominated by trees and habitats with water containing ocean derived salts. Water is usually flowing in the Riverine System, which is bounded on the landward side by upland or channel banks (including natural and man-made levees). Numerous small Palustrine wetlands are located along the riparian corridors of the headwater tributaries to the Pilchuck, and the smaller unnamed creeks discharging directly into the Stillaguamish River. These series of wetlands fall into Emergent, Scrub-Shrub, Forested, or Unconsolidated Bottom Subsystems. These are further modified as being temporarily or seasonally flooded.

Riverine wetlands are found primarily within the Pilchuck River channel in the Granite Falls area. The subsystems are identified in terms of water permanence, gradient, water velocity,

substrate, and the extent of floodplain development. Within this area, Riverine wetlands are defined as Perennial within the unconsolidated bottom class.

Wetlands and riparian corridors perform valuable functions within the ecosystem. Clearing of vegetation, grading, filling, draining, and other activities associated with land development may destroy and decrease the ability of the riparian zone to provide drainage, stabilize stream banks, provide wildlife habitat, and filter pollutants from the water. Wetlands receive surface water from the surrounding area and filter pollutants entering these ecosystems by a combination of physical, chemical and biological processes.

Wetlands also play a major role in flood control. During flooding, rivers and streams overflow their banks and spread out across the floodplain. Wetland soils act like a groundwater reservoir, storing surplus water as groundwater during wet periods and discharging this stored water into streams later to augment base flow. The wetland area also provides habitat and a source of food for wildlife.

Fish and Wildlife Habitat

The City of Granite Falls area contains a variety of habitats for native animals, which include wetlands, riparian forests, and pasture grasslands. No specific checklist of wildlife species in the Granite Falls area has been compiled. However, the Stillaguamish Watershed Action Plan (Snohomish County, 1989) reported that nearly 75 percent of all wildlife species that occur in western Washington are present in the Stillaguamish River Basin. This abundance of wildlife illustrates the diversity of habitats within the basin, even though not all of these species are present in the Granite Falls area.

Typical wildlife species found in the area include high concentrations of wintering raptors associated with the abundance of wintering waterfowl and small mammals in the agricultural areas of the lower basin. The Federal and State threatened bald eagle and the endangered peregrine falcon winter in significant numbers along the South Fork of the Stillaguamish River and Pilchuck River. Many species of waterfowl use open water in the wetlands and areas adjacent to the River for migratory stops, nesting, feeding, and breeding. Pasturelands are commonly used as feeding areas by gulls and waterfowl and are also used as hunting areas for raptors and other predatory birds.

Small mammals such as rabbits, muskrats, raccoons, and opossum, along with larger mammals including deer, fox, bobcat, black bear, and coyote have been observed in the fields and forested areas in and around Granite Falls.

In 2010, the City of Granite Falls expanded its commitment to the stewardship of the natural resources of the area by becoming a partner with Snohomish County on restoration efforts for a wetland habitat dedicated to the City as Native Growth Protection Area/Open Space (O. Carter, Letter of Concurrence to City, November 3, 2006). This open space area is located on the south side of Quarry Road approximately 1,200 feet west of the Quarry Road/Mountain Loop Highway intersection. The City also welcomed the County's first dedicated wildlife passage, a 4' x 4' box culvert installed underneath, at the time, new Quarry Road alignment, in an effort to maintain safe passage along an established corridor for wildlife between the wetland habitat on the south side of the road and a wetland complex and riparian corridor to the north. In transportation projects where wildlife crossing structures have been incorporated, roadways have become safer for motorists, reducing human and animal mortality rates.

Since 2010, the flora and fauna of this Native Growth Protection Area have been monitored by county officials and college students in an effort to provide the City with Best Available Science for future land use decisions. A two year report was presented to the City in April 2013. The next full progress report will be provided in December 2015. Monitoring continues until June 2020. A partial listing of flora and fauna is provided in Natural Features Appendix NP-1.

The Pilchuck and South Fork Stillaguamish and its tributaries support chinook, coho, pink, and chum salmon, and steelhead trout (Washington Department of Fisheries, 1975). Although utilization by most of the species is limited, the tributaries provide some of the more important coho spawning areas in the lower Stillaguamish River Basin.

Flood Plain Delineation

A Flood Insurance Study was conducted by the Federal Emergency Management Agency (FEMA) of the Federal Insurance Administration for the City of Granite Falls and investigated the existence and severity of flood hazards. In 2010, a flood boundary map was published that indicated areas subject to 100-year and 500-year floods. The 100-year flood has been adopted as the base flood for the purpose of establishing flood plain management measures. A 100-year flood area is defined as those lands which are subject to a one percent or greater chance of flooding in any one year. The 500-year flood is employed to indicate additional areas of flood risk in the community. The data from the engineering study was transformed into flood insurance criteria. This process includes the determination of reaches, Flood Hazard Factors (FHF), and flood insurance zone designations for each flooding source studied in detail.

After the determination of reaches and their respective FHF, the entire incorporated area of Granite Falls was divided into zones, each having a specific flood potential or hazard. Flood hazard areas designated as "A" zones include only those areas which are inundated by the 100-year flood. "B" zones include areas between "A" zones and the limit of the 500-year flood. "C" zones are areas of minimal flooding. As shown in Figure NF-2, the City of Granite Falls lies outside of most of the flood plain zone designations. Only the Stillaguamish and Pilchuck River flood plains lie within "A" and "B" zones.

Aquifer Recharge Areas

The groundwater resources found in and around the City of Granite Falls consist of layers of discontinuous aquifers surrounded by zones of lower permeable sediments. This pattern was created by the advance and retreat of four glacial periods that shaped the surface of the land by depositing coarse sands and gravels throughout the region. These layers provided the structure for many of today's aquifers. Other types of deposits left by the glaciers created silt and clay layers that impede water movement.

Groundwater is recharged by rain falling on the surface of the land. Rainfall either evaporates back into the atmosphere, runs off into adjacent water bodies, or infiltrates downward until a zone of saturation is reached. In the Granite Falls area, this zone is often less than 5 feet deep, due to layers of lower permeability such as glacial till or silt and clay deposits. Generally, the low permeability of these deposits is still high enough to allow most of the infiltrated water to continue downward.

Granite Falls' groundwater has been the source of controversy because of naturally occurring arsenic. As a result, the City buys water from Snohomish County PUD. The Granite Falls area and aquifer recharge areas are shown on Figure NF-3.

Geologically Hazardous Areas

During the advance and retreat of the glaciers, various layers of soils were deposited throughout the region. Subsequent erosional actions created several "step benches" in the Granite Falls area. These "benches" are characterized by escarpments with slopes that are greater than 25 percent. The floodplain of the Stillaguamish and Pilchuck Rivers defines the "bench" north and south of the City. Another bluff is found at the east end of the City near the Gun Club and Miller Shingle where slopes exceed 40 percent and soils may be unstable.

Geologically hazardous areas are defined by the Growth Management Act as those "areas that because of their susceptibility to erosion, sliding, earthquake, or other geologic events, are not suited to the siting of commercial, residential, or industrial development consistent with public health and safety concerns." In some cases, the risk to development from geologic hazards can be minimized or mitigated by engineering design or modified construction practices.

Landslide, Erosion, and Seismic hazards in the Granite Falls Planning Area are shown in Figure NF-1.

Erosion Hazard Areas

Erosion hazard areas are those areas identified as having a severe rill and inter-rill erosion hazard. The Soil Conservation Service defines rill as a steep-sided channel resulting from accelerated erosion and is generally a few inches deep. Rill erosion tends to occur on slopes, particularly slopes with poor vegetative cover.

Seismic Hazard Areas

Seismic hazard areas are those areas subject to severe risk of damage as a result of earthquake-induced ground shaking, slope failure, settlement, soil liquefaction, or surface faulting. Natural and artificial unconsolidated materials such as clay and silt deposits, sediments in river deltas, and material used as landfill, generally amplify ground shaking more than consolidated sediments and bedrock.

Landslide Hazard Areas

Landslide hazard areas include areas potentially subject to landslides based on a combination of geologic, topographic, and hydrological factors. Steep slopes, coupled with certain soils, indicate potential areas of landslide. The following areas are considered to be subject to landslide hazards:

1. Any area with a combination of:
 - a. Slopes 25 percent or greater;
 - b. Impermeable subsurface material (typically silt and clay), frequently embedded with granular soils (predominantly sand and gravel);
 - c. Presence of springs or seeping water during the wet season.

2. Steep slopes of 40 percent or greater.
3. Any areas located on a landslide feature that has shown movement during the past 10,000 years or which is underlain by mass wastage debris.

Air Quality and Climate Change

State, regional and local governments throughout the United States are adopting emission reduction targets and programs. Many local governments throughout the nation are reducing the production of global warming pollutants through programs that provide economic and quality of life benefits such as reduced energy bills, green space preservation, air quality improvements, reduced traffic congestion, improved transportation choices, and economic development and job creation through energy conservation and new energy.

Snohomish County's countywide planning policies call for the support of the state's climate change initiative and to work cooperatively with cities to establish a planning framework in local plans and coordinate regionally to address global warming.

The Granite Falls community enjoys a year-round high level of air quality. This is due in part by the City's comparatively small size and the fact the City abuts extensive forest lands on one side and rural Snohomish County on the other. Also, Granite Falls is located well away from the more densely populated and industrialized areas along the I-5 corridor where air quality has been an issue. The only potential local air quality issue identified by the Puget Sound Air Quality Agency was one related to wood burning for heat during winter-time air inversion that cause stagnation at and near the surface. According to US Census information, a significant amount of Granite Falls' homes have wood burning as a primary or secondary heat source. Trapped wood smoke during an air inversion event can cause serious health problems for the elderly and people with on-going breathing difficulties.

In the interest of maintaining the community's high level of air quality, the City has adopted a Greenhouse Gas Emissions Reduction Policy (Resolution 2011-03). This policy resolution includes the following policy and procedures:

Policy - It shall be the policy of the City of Granite Falls to support the reduction of greenhouse gas emissions.

Procedures -

- Maximize the reduction of vehicle miles traveled.
- Limit resources required to conduct business, including electricity and structures.
- Minimize the use of printed materials to the extent possible.
- Reduce energy consumption in buildings and infrastructure.
- Promote and support the generation and use of alternative energy.
- Reduce consumption of fossil fuels associated with equipment procurement.
- Support workforce commute trip reduction.
- Promote and support development patterns that encourage compact and transit-friendly communities and protect natural resources.

Natural Features Goals, Policies, and Actions

The following goals, policies, and actions were developed in public meetings with the Planning Commission and interested citizens during the development of the Comprehensive Plan. Please reference the Parks, Recreation & Open Space Element and Capital Facilities Element for goals, policies, and actions affecting open space within the natural environment.

Natural Features (NF) Goals and Policies

GOAL NF-1 - To achieve a harmonious relationship between the built and natural environments.

NF-1.1 - Concentrate urban land uses in areas with no environmental constraints to reduce intrusion into natural areas.

NF-1.2 - Choose land use alternatives (where they exist) to maintain sensitive and critical areas in a natural state.

NF-1.3 - Consider the carrying capacity of the land when reviewing proposals intended to intensify land uses.

NF-1.4 - Promote improved air quality through land use decisions and public facility sightings which create a compact and efficient community design, insofar as such design reduces the quantity and length of single occupancy vehicle trips.

GOAL NF-2 - To promote community-wide stewardship of the natural environment for future generations.

NF-2.1 - Retain and protect critical areas, unique, or fragile natural features to maintain scenic, educational, and natural resource values.

NF-2.2 - Integrate sensitive areas into a linear park and trail system.

GOAL NF-3 - To protect, preserve and enhance natural features most sensitive to human activities and most critical to fish and wildlife survival and propagation.

NF-3.1 - Seek to protect and enhance a diverse fish and wildlife habitat, preferably in corridors as designated by the land use element.

NF-3.2 - Preserve and enhance the Pilchuck and South Stillaguamish Rivers as wildlife and vegetation habitats.

NF-3.3 - Work with other jurisdictions on regional environmental issues such as surface and ground water quality and the maintenance/enhancement of the Stillaguamish and Pilchuck Rivers.

NF-3.4 - Preserve and maintain sensitive and critical areas in as natural a state as possible, discouraging alterations when alternatives exist.

NFP-3.5 - Apply sensitive site design and construction methods to protected environmental areas.

NF-3.6 - Granite Falls will work with local health districts to reduce and ultimately eliminate pollution from dysfunctional on-site septic systems.

NF-3.7 - Encourage new development to be compatible with sensitive links in ecological systems such as streams and rivers, aquifers, wetlands, hillsides and woodlands.

NF-3.8 - Refer to the City of Granite Falls Shoreline Management Master Program for policies regarding development near the Pilchuck River and South Fork Stillaguamish River (Ord. No. 844-2013).

NF-3.9 - Cooperate with County and regional efforts to preserve and improve the water quality and the conditions of area streams to provide water for human and wildlife use.

NF-3.10 - Cooperate with the State in their efforts to manage or improve conditions for wildlife in streams and drainage ways.

NF-3.11 - Maintain a critical areas ordinance that is consistent with Snohomish County's to provide predictability with regard to the protection for critical areas when considering development.

NF-3.12 - Maintain a mix of over story and under story plants within the required greenbelt. Native vegetation is preferred such as water tolerant species in the flood hazard area and less water tolerant plants farther up the bank.

NF-3.13 - All land uses allowed in a particular designated land use classification are allowed in the flood prone overlay designation, subject to the following limitations and conditions:

- a. The provisions of the national Flood Insurance Program.
- b. New construction or substantial improvements (as defined by the program) or residential structures shall have the lowest floor (including basement) elevated to or above the level of the one hundred year flood.
- c. New construction or substantial improvement of non-residential structures shall have the lowest floor (including basement) elevated to or above the one hundred year flood or, together with utility and sanitary facilities, shall be flood proofed up to the level of the one hundred year flood.
- d. Design new or replacement water supply systems and/or sanitary sewer systems to minimize or eliminate infiltration of flood waters into the systems and discharges from the systems into flood waters. Locate on-site waste disposal systems to protect them from being impaired or contaminated during flooding.

GOAL NF-4 -To integrate Best Available Science rules into the City's Critical Area Regulations.

NF-4.1 - Granite Falls will use Best Management Practices when appropriate to reduce or eliminate stormwater quantity and quality problems.

NF-4.2 - Maintain and update as necessary critical area regulations that include best available sciences and that emphasize the protection of anadromous fish.

GOAL NF-5 – To respond to the challenge of climate change and maintaining air quality that reflects the unique situation of the Granite Falls community.

NF-5.1 - The City shall support the implementation of the State's climate change and greenhouse gas reduction initiatives.

NF-5.2 - The City shall work cooperatively with Snohomish County and other cities to establish a regionally coordinated planning framework to anticipate, prepare for, and adopt as necessary mitigation measures to address the impacts of climate change.

NF-5.3 - Develop a program to implement the mitigation procedures contained in the City's Greenhouse Gas Emissions Reduction Policy pursuant to Resolution 2011-03.

NF-5.4 - The City shall coordinate with Snohomish County Fire District No. 17 with alerting the community when wood burning needs to be curtailed during local air stagnation events.

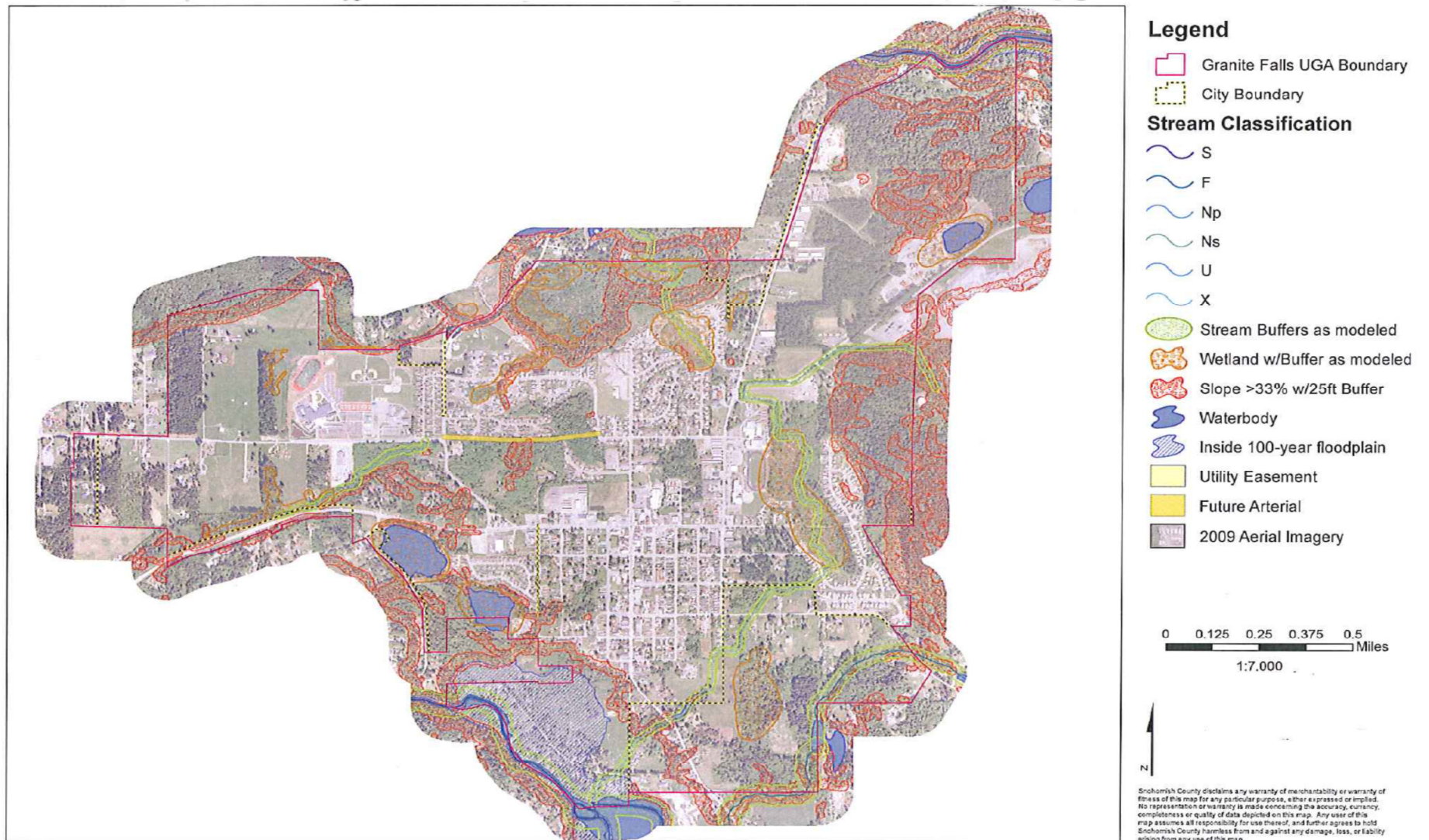
Actions

NFA1 - Enforce codes intended to protect stream corridors, land clearing, and critical area protection.

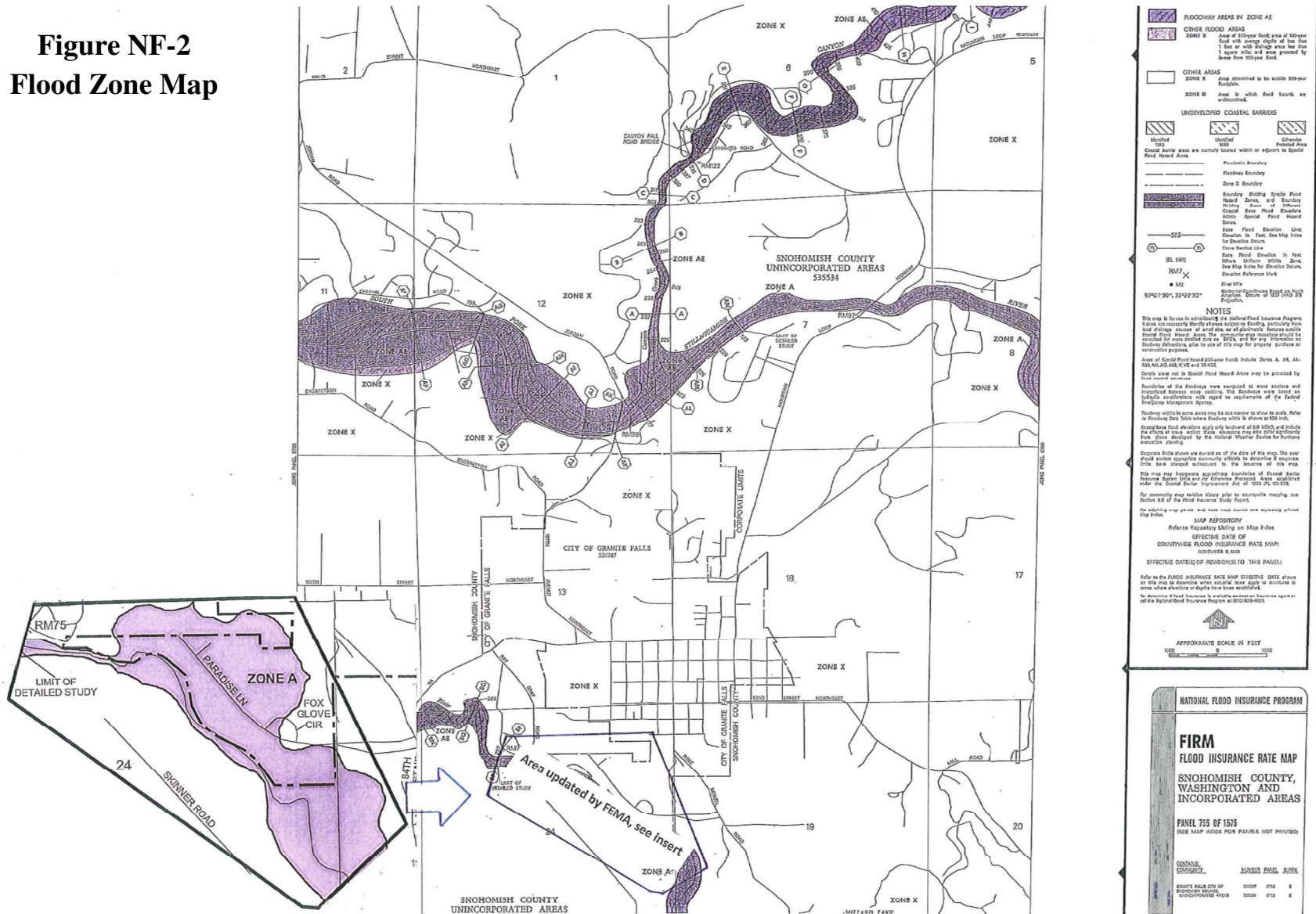
NFA2 - Participate with Snohomish County in planning for surface water management and other environmental concerns.

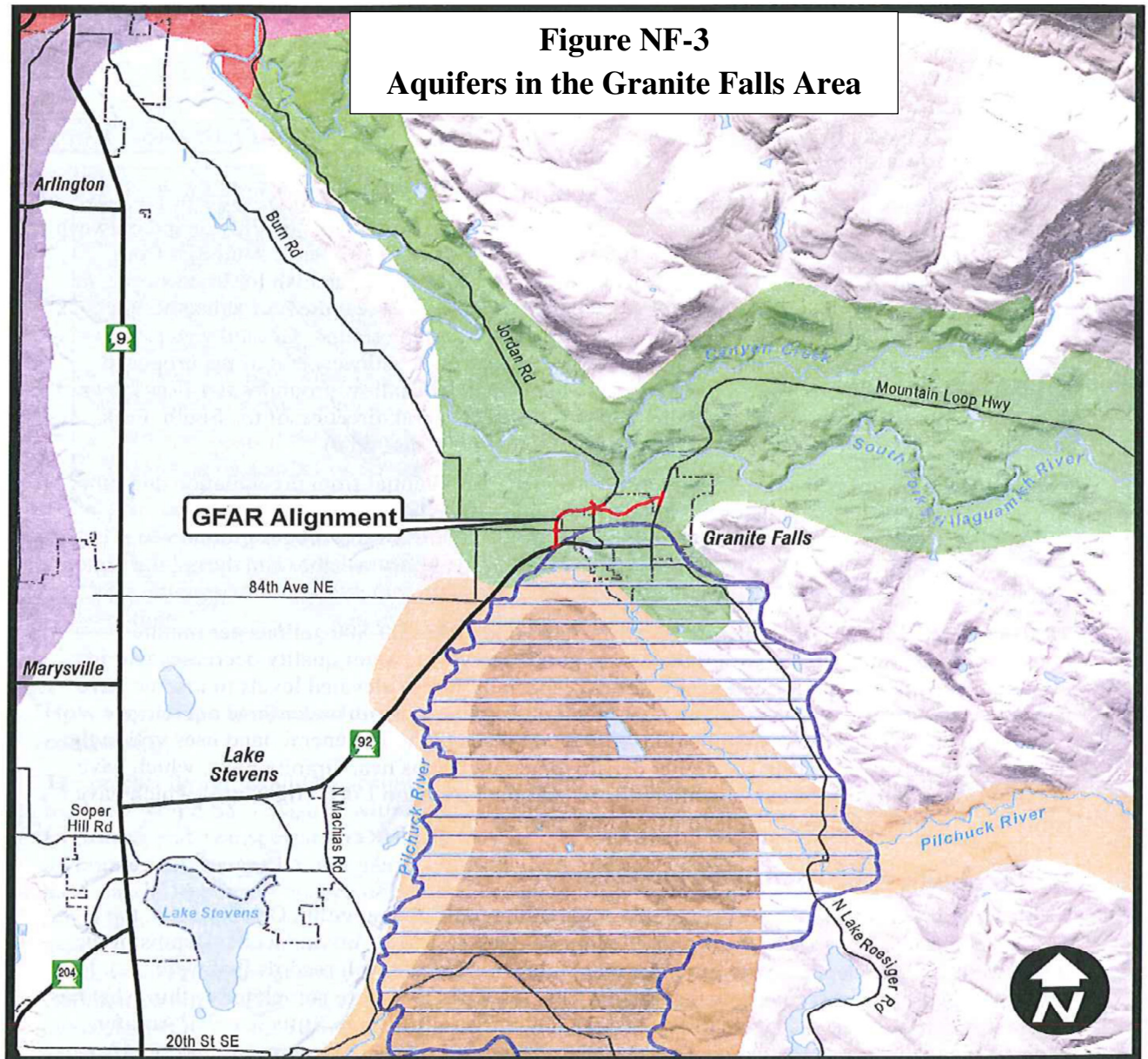
NFA3 - Identify sensitive areas needing reclamation, restoration, or preservation and include them in the City's open space system.

Figure NF-1 Critical Areas



**Figure NF-2
Flood Zone Map**





Key to Features:

	Stillaguamish		Arlington Heights		Getchell-Snohomish
	South Fork Stillaguamish		Lakes		Pilchuck
	Marysville		Newburg Sole Source Aquifer		

Source: Snohomish County Groundwater Characterization Study, July 1991.

Appendix NF-1

Natural Features Appendix NF-1
Natural Features Documented at GFAR Wetland AKA Logan Bog
November 2010-November 2014
(N47.551.661. W122.05.094)

Birds:

American Robin (*Turdus migratorius*)
American Crow (*Corvus brachyrhynchos*)
Bald Eagle (*Haliaeetus leucocephalus*)
Swallow, unknown variety
Black-capped Chickadee
California Quail
Cardinal Meadowhawk (*Sympetrum illotum*)
Chestnut-backed Chickadee (*Poecile rufescens*)
Cowbird
Dark-eyed Junco
Dusky Grouse
Golden-crowned Sparrow
Great Blue Heron
Mallard
Northern Flicker
Pileated Woodpecker
Pine Siskin
Purple Finch
Red-tailed Hawk
Red-winged Blackbird (*Agelaius phoeniceus*)
Ruby Crowned Kinglet
Sharp-shinned Hawk
Song Sparrow
Stellar's Jay (*Cyanocitta stelleri*)
Varied Thrush (*Ixoreus naevius*)

Fish:

Puget Sound Chinook Salmon (ESA Threatened 1999, Critical Habitat Designated 1993-2005)
Puget Sound Steelhead Trout (ESA Threatened 2007, Critical Habitat Proposed 2013)
Coastal Puget Sound Bull Trout (ESA Threatened 1999, Critical Habitat Designated 2010)

Mammals:

Beaver (*Castor canadensis*)
Bobcat (*Lynx rufus*)
Columbian Black-Tailed Deer (*Odocoileus hemionus columbianus*)
Coyote (*Canis latrans*)
Domestic Cat (*Felis catus*)
Domestic Dog (*Canis lupus familiaris*)
Eastern Cottontail Rabbit (*Sylvilagus floridanus*)
Meadow Vole (*Microtus* spp most likely *townsendii*)

Norway Rat (*Rattus norvegicus*)
Townsend's Mole (*Scapanus townsendii*)
Virginia Opossum (*Didelphis virginiana*)
Raccoon (*Procyon lotor*)

Other:

Blue-eyed Darner Dragonfly (*Aeshna multicolor*)
Brown-lipped snail or grove snail (*Cepaea nemoralis*)
Common Garter Snake (*Thamnophis sirtalis*)
European Red Slug (*Arion rufus*)
Fingered dagger moth (*Acronicta dactylina* syn. *A. hesperida*)
Isabella tiger moth/Banded woolly bear (caterpillar) (*Pyrrharctia isabella*)
Orb Weaver spider (*Arraneus* spp.)
Pacific Chorus Frog (*Pseudacris regilla*)
Red-legged Frog (*Rana aurora*)
Red-legged Grasshopper (*Melanoplus femurrubrum*)
Spruce Beetle (*Dendroctonus rufipennis*)
Stone centipede (*Lithobiomorpha* spp)
Native Plants:
Beaked Hazelnut (*Corylus cornuta*)
Big Leaf Maple (*Acer macrophyllum*)
Common Horsetail (*Equisetum arvense*)
Common Salal
Douglas Fir (*Pseudotsuga menziesii*)
Dull Oregon Grape (*Mahonia nervosa*)
Foxglove (*Digitalis purpurea*)
Hardhack (*Spiraea douglasii*)
Oceanspray (*Holodiscus discolor*)
Red Alder (*Alnus rubra*)
Red Huckleberry (*Vaccinium parvifolium*)
Salmonberry (*Rubus spectabilis*)
Serviceberry (*Amelanchier alnifolia*)
Sitka Spruce (*Picea sitchensis*)
Skunk Cabbage / Swamp Lantern (*Lysichiton americanum*)
Snowberry
Sword Fern
Tall Oregon Grape
Thimbleberry (*Rubus parviflorus*)
Trailing Blackberry (*Rubus arsinus*)
Vine Maple
Western Hemlock
Western Red Cedar (*Thuja plicata*)
Witch's Butter