ENVIRONMENTAL STEWARDSHIP

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1. INTRODUCTION

> **"Land, air and water resources are indispensable to life and, thus, constitute social values. For example, the water contained in underground aquifers is a valuable resource if not polluted. Prevention of erosion, and visual amenity are two social values of existing vegetation. Recognition of these social values, inherent in natural processes, can serve as the basis for wise land use and environmental management. "**
>
> *Comprehensive Plan*
> *The City of Bonney Lake*
> *October 23, 1985*

The purpose of the Environmental Stewardship Element is to provide a framework to guide decision making in regards to the conservation, management, and utilization of Bonney Lake's natural resources. The topics in this element overlap with other elements in the Comprehensive Plan including the Community Development, Public Facilities and Services, and Mobility. However, the Environmental Stewardship Element distinguishes itself by being primarily oriented to the conservation of natural resources, including air and water quality protection, greenhouse gas reduction, and energy conservation.

While all elements of the Comprehensive Plan have equal weight under the Growth Management Act (GMA) – Chapter 36.70A RCW, four of the fourteen goals of the GMA specifically pertain to environmental conservation:

- **Natural Resource Industries:** Maintain and enhance natural resource-based industries, including productive timber, agricultural, and fisheries industries. Encourage the conservation of productive forestlands and productive agricultural lands, and discourage incompatible uses.

- **Open Space and Recreation:** Encourage the retention of open space and development of recreational opportunities, conserve fish and wildlife habitat, and increase access to natural resource lands and waters.

- **Environment:** Protect the environment and enhance the state's high quality of life, including air and water quality, and the availability of water

- **Citizen participation and coordination:** Encourage the involvement of citizens in the planning process and ensure coordination between communities and jurisdictions to reconcile conflicts.

The Element is divided into five sections. The first section addresses the preservation and protection of environmental critical areas: (1) geological hazards, (2) critical aquifer recharge areas, (3) surface waters, (4) floodplains, (5) wetlands, and (6) fish and wildlife habitat areas. The second section addresses urban forestry and is focused on the steps needed to maintain, preserve, and enhance Bonney Lake's tree canopy. The third section addresses the need for the City to protect agricultural resource lands and promote urban agriculture. The fourth section provides policies related to regulating air pollution, toxic

air contaminates, and greenhouse gas emissions. The final section focuses on building community resilience in the face of inevitable change. The policies in the Element are based on best available science and are meant to guide day-to-day City decisions on topics related to the protection of the environment.

2. ENVIRONMENTAL STEWARDSHIP VISION

Bonney Lake is a City that preserves, enhances, and responsibly uses the areas natural resources, which are critical to maintaining Bonney Lake's natural setting cherished by the City's residents and contributes to the City's general quality of life. Bonney Lake is framed within a beautiful natural setting, with open spaces, an abundance of trees, and scenic mountain vistas for the enjoyment of Bonney Lake residents. Bonney Lake's surface water provides both habitat functions and recreational enjoyment.

Bonney Lake is a City that prides itself for its environmental stewardship, including an emphasis on sustainable land use and development patterns, while still flourishing as a successful community and protecting the rights of property owners'.

3. CRITICAL AREAS

The Washington State Growth Management Act (GMA) and implementing rules require cities to protect environmental critical areas, which include:

- Maintaining functions and values of hydrological ecosystems and watersheds through the protection, preservation, and restoration of wetlands, lakes, rivers, ponds, streams, and floodplains. As part of preventing pollutants from entering the waters of the state, jurisdictions subject to the U.S. Environmental Protection Agency (EPA) National Pollution Discharge Elimination System (NPDES) must also comply with all permit requirements and are encouraged to adopt the Department of Ecology's *Stormwater Manual for Western Washington* or the equivalent, incorporate relevant land-use recommendations from adopted local watershed plans, and adopt a clearing and grading ordinance.

- Identifying and providing policies to conserve, connect, restore, and prevent impacts to fish and wildlife habitat conservation areas (FWHCA); however, not every parcel of land that provides habitat for wildlife constitutes fish and wildlife habitat. [1] FWHCA only include areas where endangered, threatened, and sensitive species have a primary association; habitats and species of local importance (determined locally); commercial and recreational shellfish areas; kelp and eelgrass beds; herring, smelt, and other forage fish spawning areas; naturally occurring ponds under twenty acres and submerged aquatic beds that provide fish or wildlife habitat; waters of the state; lakes, ponds, streams, and rivers planted with game fish by a governmental or tribal entity; and state natural area preserves, natural resource conservation areas, and wildlife areas.[2]

- Designating and providing policies to protect the functions and values of geological hazardous areas and preventing impacts associated with development within geological hazardous areas. Geological hazardous areas are areas that because of their susceptibility to erosion, sliding,

earthquake, or other geological events, are not suited to the siting of commercial, residential, or industrial development. There is no affirmative mandate associated with this definition except to "protect the functions and values." However, if a local jurisdiction, as the City has, requires lower densities in geologically hazardous areas, the geologically hazardous areas must be mapped using "best available science."

- Designating and providing policies to protect the functions and values of Critical Aquifer Recharge Areas (CARAs) and preventing impacts associated with development within CARAs. CARAs are established to protect sources of drinking water that are vulnerable to contamination that would affect the potability of the water or are susceptible to reduced recharging.[3] Potable water is an essential life sustaining element for people and once contaminated it is difficult, costly, and sometimes impossible to clean up. Preventing contamination is necessary to avoid exorbitant costs, hardships, and potential physical harm to people and ecosystems.[4] Therefore, WAC 365-190-100(3) requires cities to classify recharge areas for aquifers according to aquifer vulnerability.

Policies to protect the functions and value of critical areas are mandated to be based on "best available science."[5] The CPSGMHB in *DOE/CTED v. City of Kent* referencing *Honesty in Environmental Analysis and Legislation v. Seattle*, 96 Wn. App. 522, 979 P.2d 864 (1999) stated, that the"…purpose of the best available science requirement is to ensure that critical areas regulations are not based on speculation and surmise, but on meaningful, reliable, relevant evidence."[6] The CPSGMHB also found in Kent that there is no bright-line definition of "best available science" but rather a requirement to consider the following factors as established in *Ferry County v. Concerned Friends of Ferry County, et al.*, 155 Wn.2d 824, 123 P.3d 102 (2005):

> (1) The scientific evidence contained in the record; (2) Whether the analysis by the local decision-maker of the scientific evidence and other factors involved a reasoned process; and (3) Whether the decision made by the local government was within the parameters of the Act as directed by the provisions of RCW 36.70A.172(1).

In other words, a jurisdiction is not required to win the scientific argument, but only demonstrate that the jurisdiction's policies and regulations are based on reliable evidence reviewed through a reasoned process. In 2019, the City participated in a robust update of its critical areas ordinance using best available science to update and change the ordinance to better serve and protect the community.

Maps presented in this Element are for reference purposes only and not intended to identify precise locations of critical areas or environmental features. At the time of development, best available information including site-specific analysis will determine the presence or absence of such features.

3.1 GEOLOGICALLY HAZARDOUS AREAS

The geological foundation of the Bonney Lake area consists of impermeable sedimentary bedrock formed by volcanic activity during the Eocene to Miocene age. Receding glaciers left 5 to 100 feet of till, ranging from porous sand and gravel to hardpan composites. Glaciers, glacial meltwater, and rivers created the Puyallup and Fennel Creek valleys.

The soil map in Figure 7-1 illustrates soil associations within the City of Bonney Lake. Soil associations consist of one or more major soils and other minor soils, but named for the major soils. Soil association maps provide a broader perspective of the soils in order to identify areas that have soil properties that are either favorable or unfavorable for certain land uses.[7]

Eighty-two percent (82%) of the soils within Bonney Lake are within in the Alderwood - Everett association. This soil association consist of Alderwood, Everett, Indianola Kitsap and small amounts of other soil types and is poor for farming but good for pasture and timber. The soil association is well suited for urban residential and industrial development. Onsite sewerage disposal systems are suited to as much as one-third of this association.[8]

Seventeen percent (17%) of the soils are within the Buckley association. The parent material of this soil association is the lobe of the Osceola mudflow, a portion of Mount Rainier, which liquefied and flowed into the Puyallup River valley through Fennel Creek approximately 5,700 years ago[9]. Buckley loam soils make up nearly 70% of this association but includes small amounts of Alderwood, and other minor soil types making it a hydric soil that is favorable for pasture and hay farming. The soil can support residential developments if there is access to community sewage facilities.[10]

The remaining 1% consist of the Puyallup-Sultan association, which is well suited to both farming and residential development.[11]

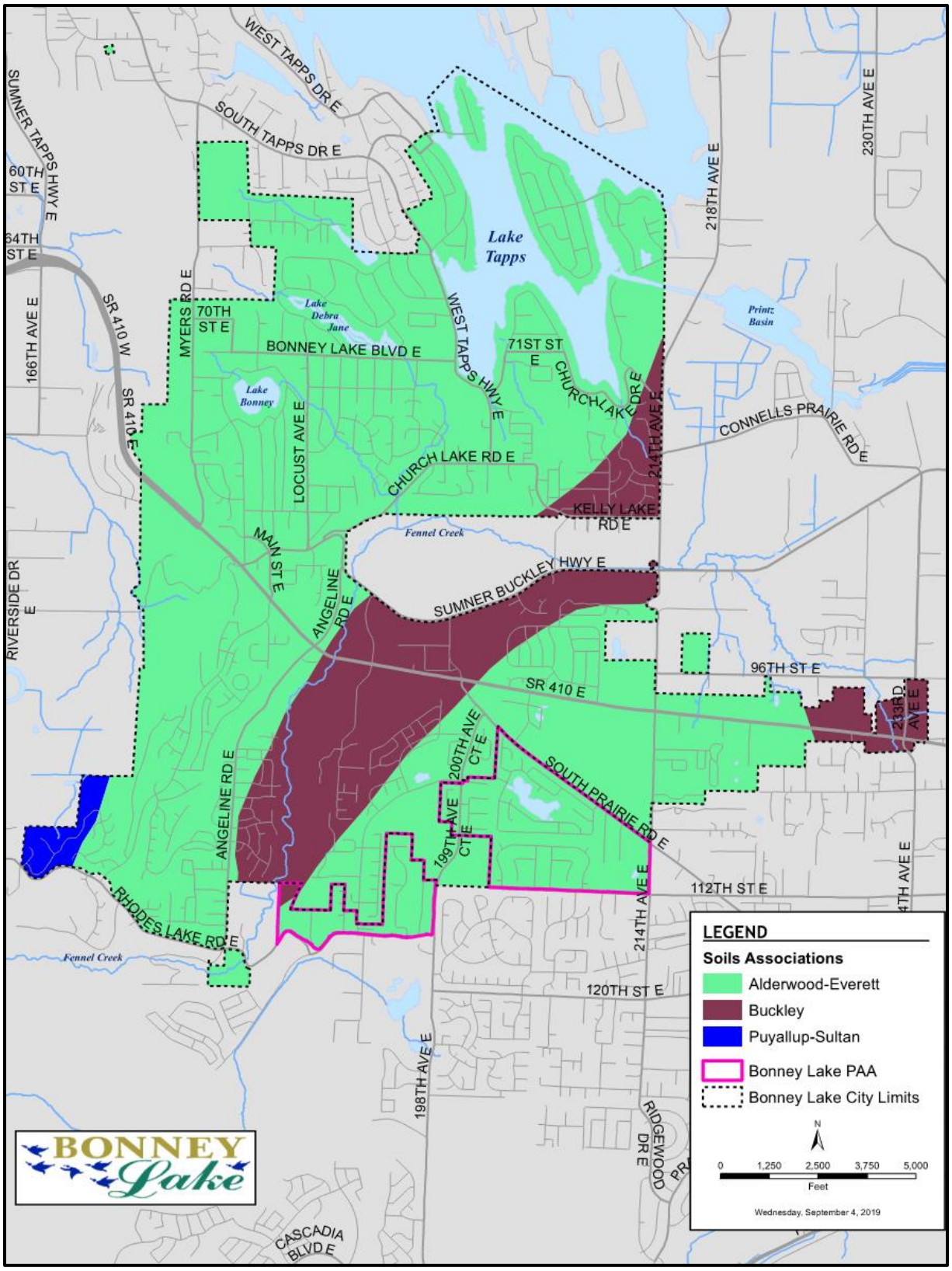

Figure 7-1: Soil Associations

According to RCW 36.70A.030, Geologically Hazardous Areas are "those areas that are susceptible to erosion, sliding, earthquake, or other geological events and are not suited to the siting of commercial, residential, or industrial development consistent with public health and safety concerns". Below is a discussion of the four main geological hazards in Bonney Lake:

> **"Bonney Lake is surround by land that is on slopes exceeding 25 percent. These slopes should be retained in their natural state and will help delineate the urban areas since land having slopes exceeding 15 percent are difficult to develop…"**
>
> ***Plan for Bonney Lake,***
> **Washington May 2, 1964**

Landslide Hazards

The soils in the Bonney Lake area are susceptible to landslide at slopes of 15% or more. The slopes bordering the Puyallup valley are highly dangerous because of the steepness of the slope and the presences of unconsolidated glacial materials. Slopes generally collapse when rainstorms oversaturated the soil on the slope. Such failure is especially likely where a permeable layer lies atop a less permeable layer because percolating water seeps out at the layer boundary. Figures 7-2 and 7-3 illustrates the areas of Bonney Lake with a high and moderate susceptibility to shallow or deep landslides**.** The data contained in Figures 7-2 and 7-3 was created based on modeling developed by the Department of Natural Resources and not site specific evaluations. Therefore, Figures 7-2 and 7-3 should only be used as a screening tool to highlight areas where further site-specific investigation is needed to determine if there is truly susceptibility to either a shallow or deep landslide[12].

The City categorizes landslide hazard areas into two categories. Class 1 landslide hazard areas have slopes that are 40 percent or greater with a vertical relief of 10 feet or more or have slopes that are 25 percent or greater with a vertical relief of 10 feet or more and two or more limiting factors detailed in the Critical Areas Ordinance. These class 1 landslide hazard areas are undevelopable.

Class 2 landslide hazard areas have slopes of 25 percent to 39 percent with a vertical relief of 10 feet or more but do not have two or more additional limiting factors and areas with slopes of 15 to 25 percent with a vertical relief of 10 feet or more and additional risk factors. Class 2 landslide hazard areas also include engineered slopes like those in the Sky Island, Panorama Heights, and Panorama West developments. Class 2 landslide hazard areas may be buildable but require some special precautions. These categories are designed to protect citizens and their private property from damage during natural disasters.

Erosion Hazards

In addition to landslides, land clearing, earth movement, and unmanaged stormwater can cause erosion, which damages the site itself, the downstream drainage network, and aquatic habitat. The finer the soil and the steeper the slope, the greater the erosion hazard. The City utilizes the U.S. Department of Agriculture's Natural Resources Conservation Service data to identify these areas,

Seismic Hazards

The Puget Sound area is also seismically active. An earthquake could cause improperly built structures to collapse, trigger landslides, and cause liquefaction. Liquefaction occurs when increasing water pressure during an earthquake or other ground vibration causes loose, fine sandy and silty sediments layers below the water table to behave as a liquid, similar to quick sand.[13] The City utilizes data from the Washington Department of Natural Resources to identify these areas. The majority of the City has a low risk of liquefaction as illustrated in Figure 7-4.

Volcanic Hazards

Mount Rainier, a dormant volcano, is the highest peak in the Cascade Range and carries a larger load of glacier ice than any other mountain in the contiguous United States, posing geologic hazards during both future eruptions and periods without eruptive activity especially given the Mountain's great topographic relief.[14] Bonney Lake is far enough away to avoid lava flows and landslides. However, in addition to these associated hazards, lahars that originate on Mount Rainier or an eruption of Mount Rainier could affect the plateau. There are four types or cases of lahars:

- **Case M:** This is a low-probability and high-consequence lahar. The Osceola Mudflow is an example in this category which occurred about 5,600 years ago and has occurred on Mount Rainier only once in in the last 10,000 years. [15]
- **Case I:** This type of lahar has occurred once every 500 to 1,000 years during the last 5,600 years. The annual probability of such a flow originating somewhere on Mount Rainier is about 0.1 to 0.2 percent. The Electron Mudflow, which reached the Puget Lowland about 600 years ago via the Puyallup River, is the most recent example.[16]
- **Case II:** The typical recurrence interval of this type of lahar is near the lower end of the 100 to 500 year range. The annual probability of such a flow is close to 1 percent for the volcano as a whole. For planning purposes, Case II flows are analogous to the 100-year flood commonly considered in engineering practice. Some Case II flows have inundated flood plains well beyond the volcano and a few have reached the Puget Lowland. Case II flows have a very low clay content. The most common origin for this class of flow is melting of snow and glacier ice caused by hot rock fragments during a volcanic eruption. An example is the National Lahar, which occurred about 2,000 years ago in the Nisqually River valley.[17]
- **Case III:** This type of lahar is small but has a recurrence interval of 1 to 100 years for the volcano as a whole. This class of flow includes small debris avalanches as well as lahars. Case III flows are not triggered by an eruption, but are largely restricted to the slopes of the volcano and rarely move beyond the National Park boundary.[18]

Portions of the City could be impacted by a Case I lahar that flows down either the Carbon River or Puyallup River valleys or by Case M lahars that flowed down the White River valley. Case I, Case II, Case

III lahars that flowed down the White River or by Case M lahars that flowed down either the Puyallup River or Carbon River valleys would not affect the Bonney Lake.[19]

Given the extremely low-probability of a Case M lahar, less than 0.1% of all lahars that have originated on Mount Rainier, areas impacted only by this case of lahar are not considered to be within the volcanic hazard area zone as delineated by the Washington State Department of Natural Resources as illustrated in Figure 7-5. Areas impacted by a Case M lahar and the blast zone for an eruption of Mount Rainier, while not officially designated as a volcanic hazard area due to the low annual probability of these events are illustrated in Figure 7-6.

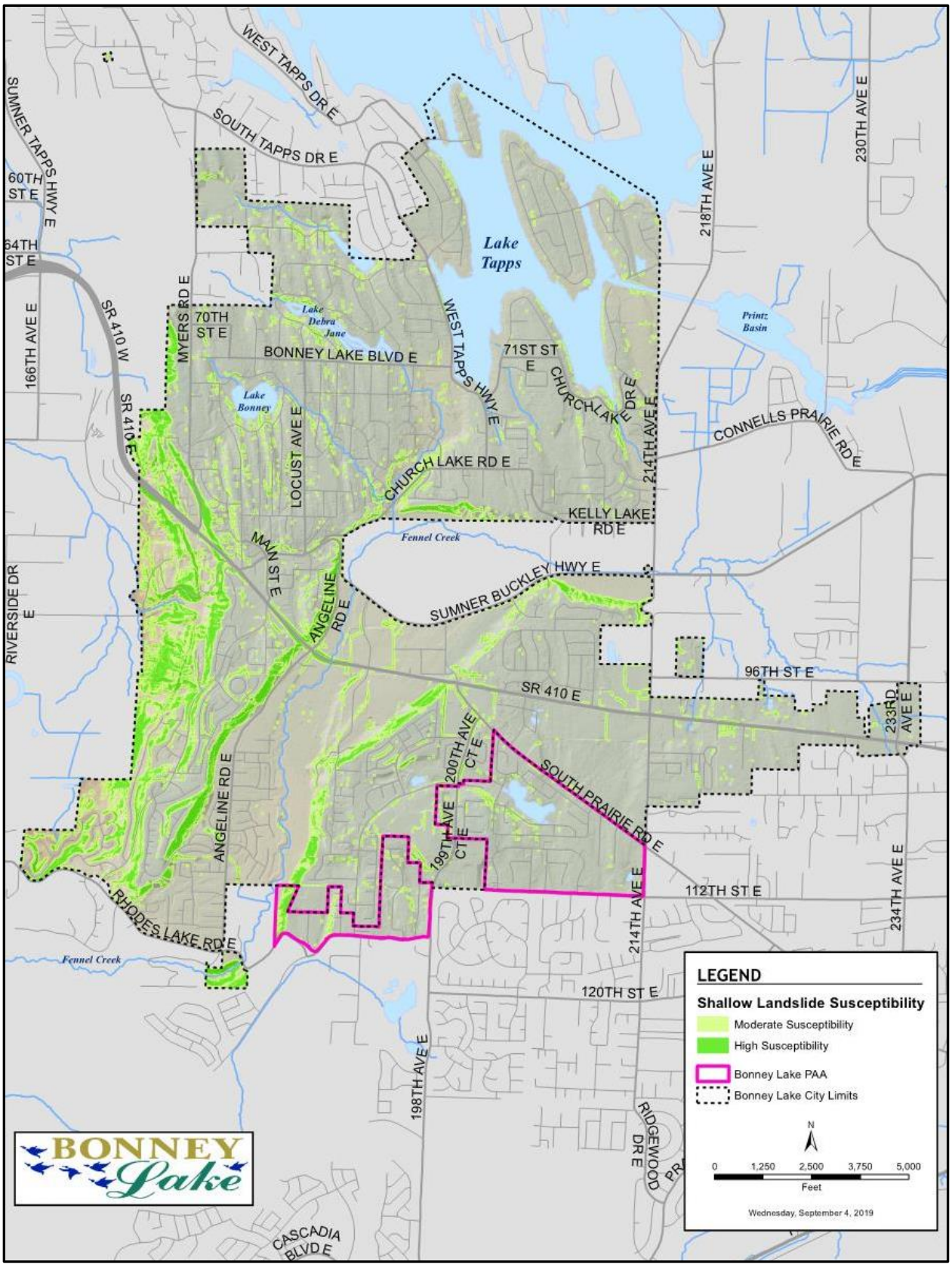

Figure 7-2: Shallow Landslide Susceptibility

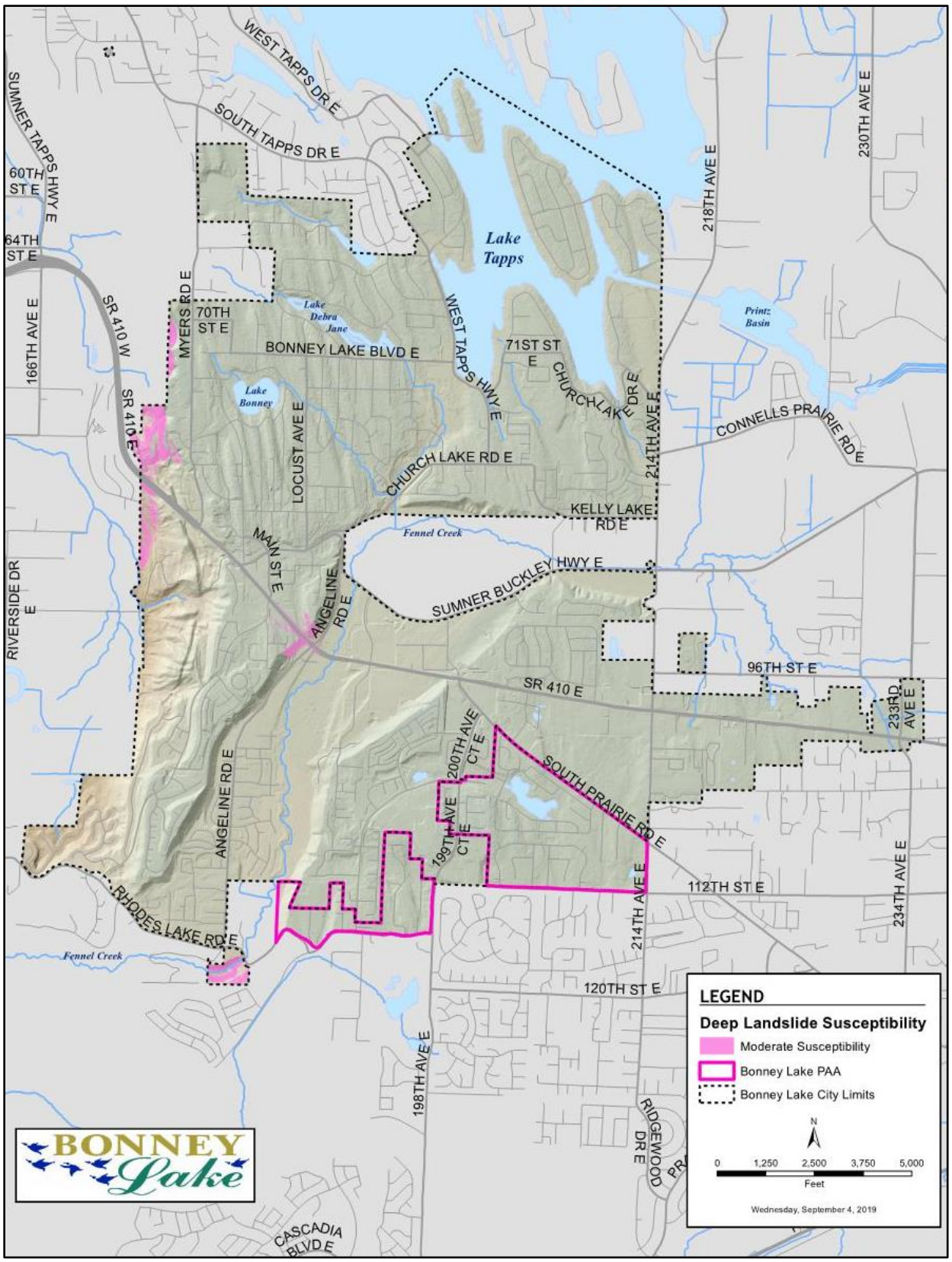

Figure7-3: Deep Landslide Susceptibility

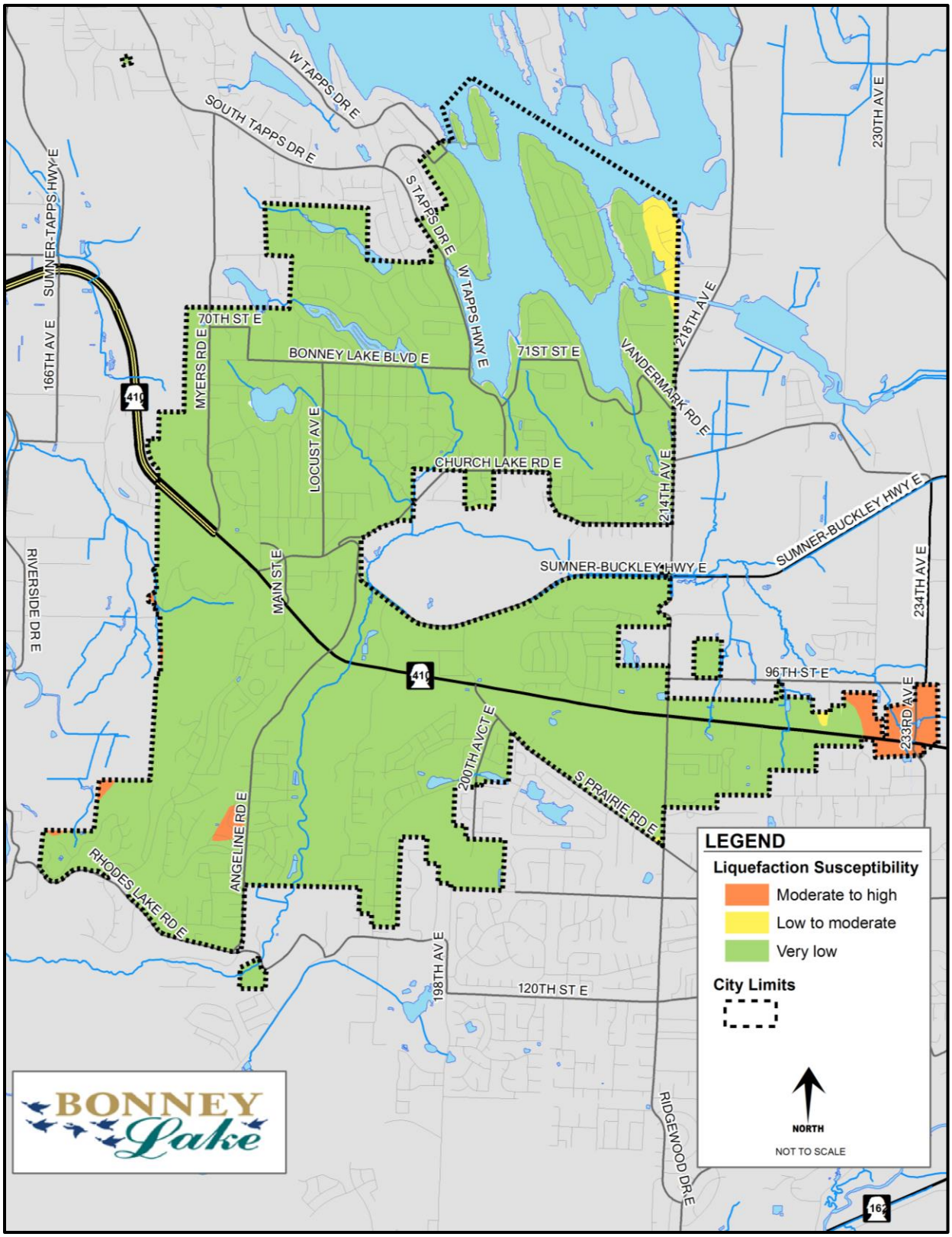

Figure 7-4: Liquefaction Susceptibility

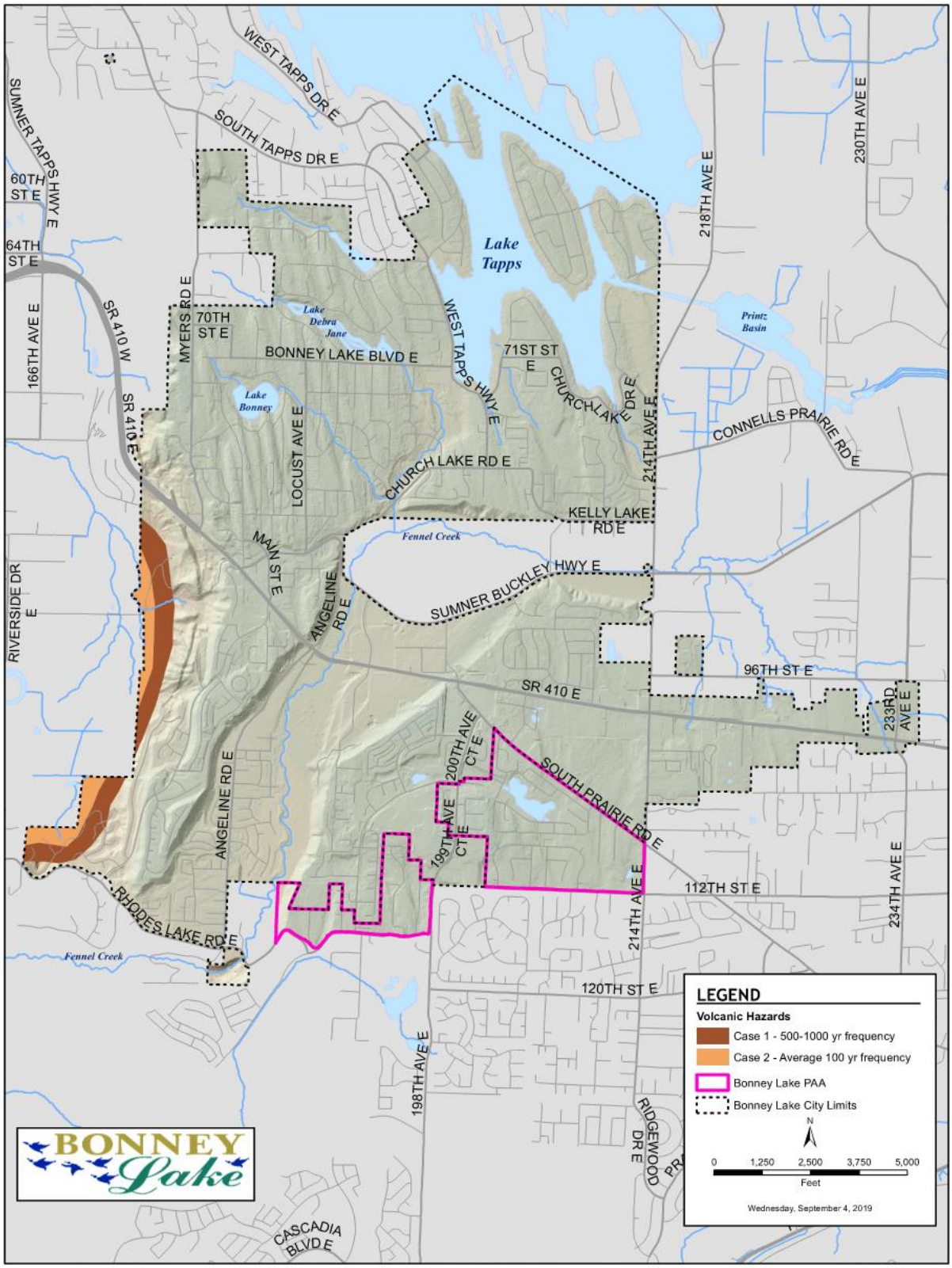

Figure 7-5: Volcano Hazard Zone

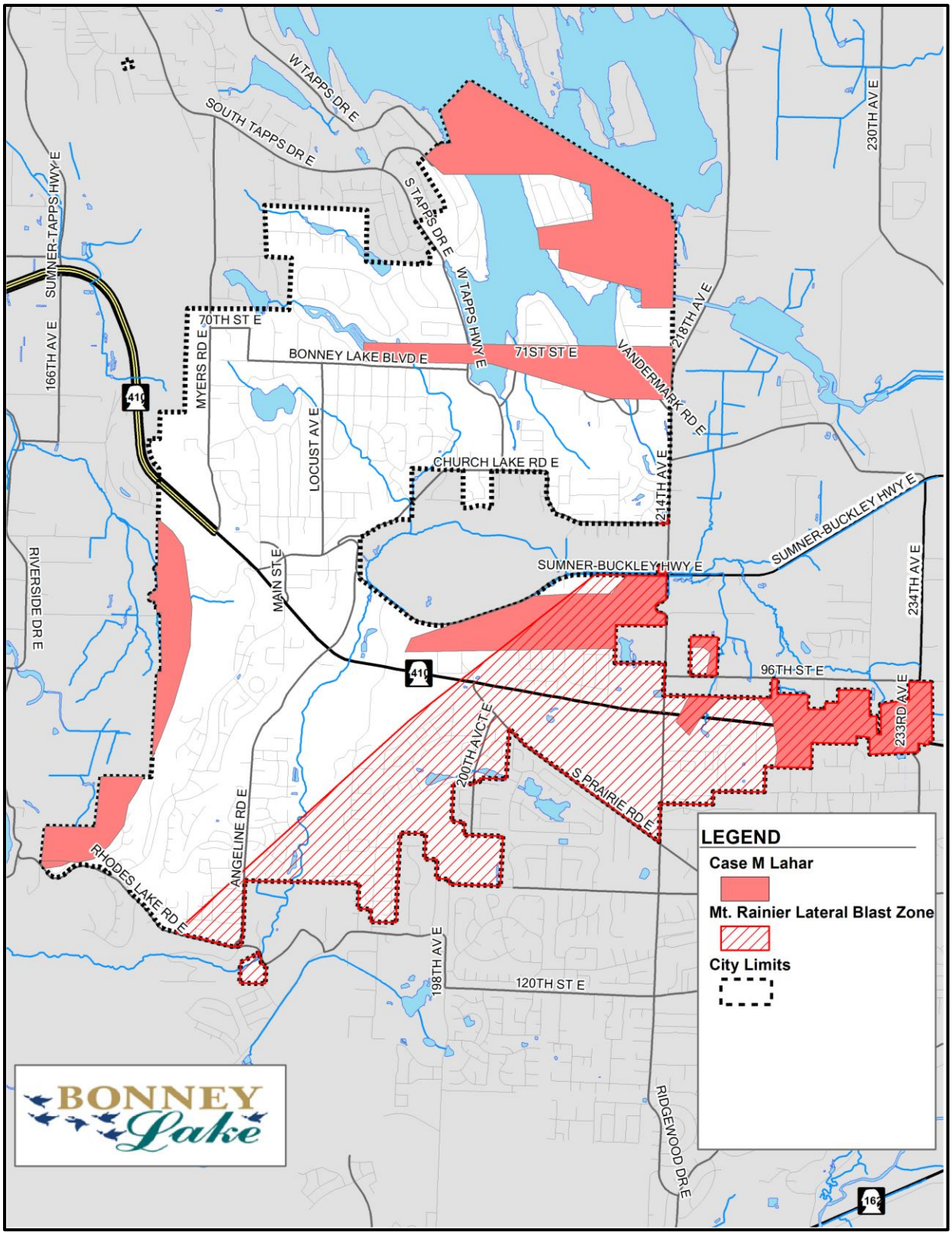

Figure 7-6: Case M Lahar Impact Areas

Goal ES-1: Development accounts for soil conditions and avoids land surface modifications that would induce erosion, create landslides, or unnecessarily scar the land in order to protect the environment, public health, and property.

Policy ES-1.1: Discourage development and disturbance of native vegetation on steep slopes.

Policy ES-1.2: Require buildings to be set back from the toe and top of steep slopes.

Policy ES-1.3: Require geotechnical or engineering studies to demonstrate that any proposed development in areas that have a high or moderate landslide hazard risk has been designed to withstand the hazard and not aggravate the hazard for other properties.

Policy ES-1.4: Designate areas with a moderate or high risk of slope instability either as Open Space – Conservancy, Open Space – Private, or Open Space – Public to limit the development intensity, site coverage, and vegetation removal within these hazardous areas.

Policy ES-1.5: Ensure that soils are suitable for the development proposed. Where soil suitability is questionable, require review by a geotechnical engineer.

Policy ES-1.6: Maintain existing vegetation to the greatest extent possible in order to prevent erosion. In cases where development necessitates removal of vegetation, a reasonable amount of landscaping should be required to replace trees, shrubs, and ground cover removed during construction.

Policy ES-1.7: When erosion hazard areas are disturbed, require erosion control measures and limit the duration of site exposure.

Policy ES-1.8: Enforce building codes designed to prevent earthquake damage.

3.2 AQUIFER AND WELLHEAD PROTECTION

Potable water is an essential life sustaining element for people and once contaminated it is difficult, costly, and sometimes impossible to clean up; therefore, preventing contamination is necessary to avoid exorbitant costs, hardships, and potential physical harm to people and ecosystems.[20] A primary source of potable water in the City is aquifers, which are geologic formations that readily transmits water to wells or springs.

The City of Bonney Lake has a robust Water System Plan and Wellhead Protection Program. Grainger Springs has a 100 foot sanitary control area and is at moderate risk of contamination from the source area. Victor Falls Springs is at high risk for contamination from septic systems in the source area.

The importance of protecting aquifers and the associated recharge areas for public water supplies is evident by the fact that the GMA address this issue in two different sections:

- **RCW 36.70A.070:** land use elements are required to provide for protection of the quality and quantity of groundwater used for public water supplies.
- **WAC 365-190-100:** aquifer recharge areas are designated as environmental critical areas.

Critical Aquifer Recharge Areas (CARAs) are established to protect sources of drinking water that are vulnerable to contamination that would affect the potability of the water or are susceptible to reduced recharging. Therefore, cities classify recharge areas for aquifers according to aquifer vulnerability, see Figure 7-7, as defined in WAC 365-190-100(3):

> Vulnerability is the combined effect of hydrogeological susceptibility to contamination and the contamination loading potential. High vulnerability is indicated by land uses that contribute directly or indirectly to contamination that may degrade groundwater, and hydrogeological conditions that facilitate degradation. Low vulnerability is indicated by land uses that do not contribute contaminants that will degrade groundwater, and by hydrogeological conditions that do not facilitate degradation. Hydrological conditions may include those induced by limited recharge of an aquifer. Reduced aquifer recharge from effective impervious surfaces may result in higher concentrations of contaminants than would otherwise occur.

In order to protect Bonney Lake's groundwater the City has designated the one year, five year, and ten year time-of-travel (TOT) zones identified in the *City of Bonney Lake Wellhead Protection and Monitoring Program Phase II* (November 2000) as CARAs. Additionally, the City has designed the one-year TOT zone as having very high contamination susceptibility, the five year TOT zone as having high contamination susceptibility, and the 10 year TOT zone as having moderate to low contamination susceptibility. These designations promote protection of wellheads which are sites most at risk for spreading contamination into the aquifer. The 2019 update to the Critical Areas Ordinance defined wellhead protection areas and integrated protections for wellheads into the existing CARA protections.

Goal ES-2: Protect the quality of groundwater used for public water supplies to ensure adequate sources of potable water for Bonney Lake and the region.

Policy ES-2.1: Evaluate the potential impacts of land development on critical aquifer recharge areas to ensure that the level of protection provided corresponds with the potential for contaminating the water supply aquifer.

Policy ES-2.2: Work with Pierce County, the Washington State Department of Ecology, and other agencies to protect Bonney Lake's water supply from contaminants originating outside the city limits.

Policy ES-2.3: Periodically review and update land use policies, regulations, development, or operating standards to ensure appropriate levels of groundwater recharge while preventing degradation of groundwater quality.

Policy ES-2.4: Manage surface water to maintain and improve water quality and maximize groundwater recharge.

Policy ES-2.5: Require new subdivisions and commercial development to connect to public sewers.

Policy ES-2.6: Encourage homes and businesses with septic systems to connect to public sewers.

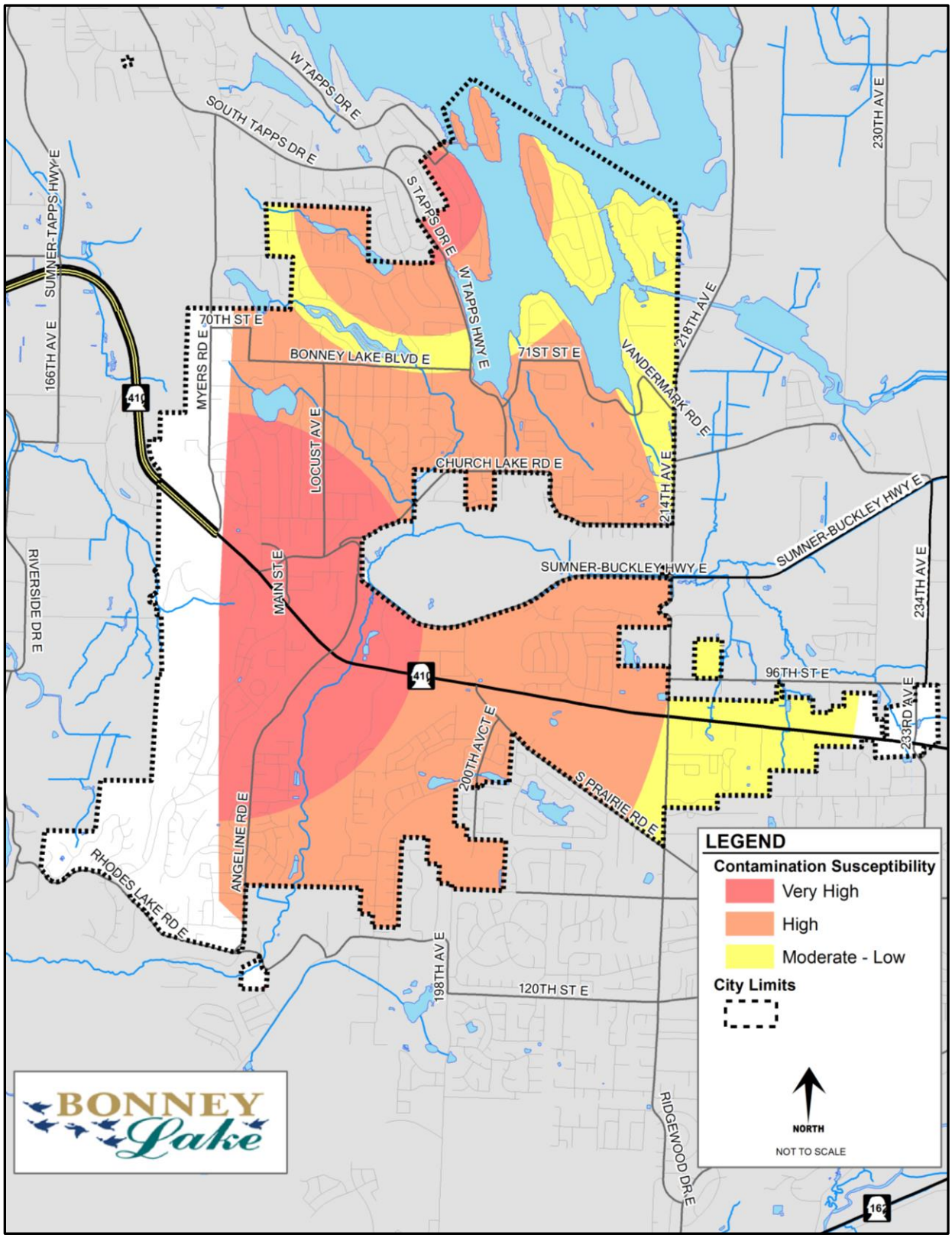

Figure 7-7: Well-head Contamination Susceptibility

3.3 SURFACE WATER

> **"Maintain and enhance the quality of streams, wetlands, and lakes by retaining their natural characteristics."**
>
> ***City of Bonney Lake Comprehensive Plan***
> **August 1985**

The water quality of Bonney Lake's surface waters is closely tied to the amount of development that occurs nearby, as development has the potential to cause impacts from contaminated runoff and siltation. Poor water quality can adversely affect natural resources, including streams, aquatic, and terrestrial ecosystems, and the plants and animals that depend on them. Poor water quality also has a negative impact on public health.

The Federal Clean Water Act's regulates stormwater discharge from municipal storm drain systems under a nationwide permit to prevent impacts to surface waters as the result of development, which is referred to as the National Pollutant Discharge Elimination System (NPDES). The City's Public Works Department is responsible for managing the City's compliance with the NPDES permit under the guidance of the Washington State Department of Ecology.

The Washington Department of Fish and Wildlife has provided new guidance in *Riparian Ecosystems – Volume 2: Management Recommendations* (Riparian Guidance) dated May 2018. Using this new guidance the City established riparian management zones around streams based on the site potential tree height (SPTH), which is the average maximum height of the tallest dominant trees (200 years or more) for a given site class. Along the City's streams the SPTH is between 191 feet and 204 feet based on the draft WDFW Priority Habitats & Species (PHS) Riparian Ecosystems: Site Potential Tree Height online mapping tool accessed on March 14, 2019. The RMZ for fish bearing streams was established as 200 feet or at one SPTH as recommended in the Riparian Guidance. This will also help protect the water quality of Fennel Creek, a priority documented in the City's Watershed Protection Plan. The RMZ for non-fish bearing perennial streams was established at 120 feet, which is sixty percent of one SPTH as recommended in the Riparian Guidance. The RMZ for non-fish bearing perennial streams was maintained at thirty five (35) feet based on existing site conditions and consultation with WDFW as recommended in the Riparian Guidance.

Lake Tapps

Pacific Coast Power Company constructed Lake Tapps between 1909 and 1911 by diverting water from the White River into a diked area of the plateau. The 2,500-acre lake, now owned by the Cascade Water Alliance, is considered a shoreline of statewide significance and as such is discussed in the Shoreline Element of *Bonney Lake 2035* (Chapter 8).

Lake Bonney

Lake Bonney is a seventeen-acre lake that has a mean water depth of 11 feet with a maximum depth of 21 feet located in a depression fed by surface and ground water. Lake Bonney is used for swimming, fishing, and non-power boating. Almost the entire shoreline has been developed for homes. Waterfowl

frequent the lake. Between 2004 and 2007 the lake was experiencing a mesotrophic to early eutrophic state of enrichment due to non-point pollution associated with residential development and lawn maintenance that over time will result in lake eutrophication with decreasing water quality and aesthetic values, odor problems, and algae blooms during the summer due to the presence of sunlight and nutrients.[21] Since 2014, Lake Bonney has shown generally increasing TSI (Trophic State Index) scores indicating improving lake health. 2018 data classifies Lake Bonney as mesotrophic. [22] Lake Bonney did exceed the State's standards for fecal coliform bacteria in 2012 and 2013, but met the State's standards in 2014.[23] In efforts to improve the health of the lake, the City included a required vegetative conservation area within 20 feet of the lake to be installed when property owners make waterward improvements on their lots.

Lake Debra Jane

Lake Debra Jane is about 15 acres in size and ranges from seven to fifteen feet in depth. The lake is used for fishing, swimming, and non-power boating. Waterfowl frequent the lake. Lake Debra Jane is fed by local springs that are augmented in late summer by nearby wells. The lake has little inflow/outflow for two to three months during the year. Algae grows in the weeds along the shoreline, especially in the summer. Lake Debra Jane is a mesotrophic lake.[24] The lake has a history of total coliform counts that have been in gross excess of the Department of Ecology's standards and occasionally exceeds the standards of the Pierce County Health Department.[25] In efforts to improve the health of the lake, the City included a required vegetative conservation area within 20 feet of the lake to be installed when property owners make waterward improvements on their lots.

Fennel Creek

Fennel Creek begins at a spring near the intersection of SR-410 and 234th Ave. E. flowing west then south through a flat, shallow valley to Victor Falls, then west through a deep canyon to the Puyallup River. The creek collects surface and spring runoff all along the corridor, including excess flows from the municipal water supply springs near Victor Falls. The Fennel Creek drainage basin covers about 11 square miles, of which 3 square miles are located within the City of Bonney Lake.

The reach of Fennel Creek below Victor Falls is within the highest-class range (Class AA) established for Washington state surface waters. This reach is an Urban Natural Open Space consisting of a high value riparian corridor with multiple vegetation layers and a predominance of native plant species providing high quality habitat for wildlife species including Coho salmon, cutthroat trout, and winter steelhead, listed as threatened or endangered under the Endangered Species Act (ESA).[26] This portion of Fennel Creek is a Shoreline of the State, discussed in more detail in the Shoreline Element (Chapter 8).

The reach of Fennel Creek above Victor Falls that gently meanders through the plateau has high water quality values (Class A) and moderate habitat values containing a mosaic of vegetation classes including forested uplands, forested wetlands, palustrine emergent wetlands, scrub-shrub wetlands, riverine wetlands, and pastures.[27] Bonney Lake's greatest concentration of wetlands is along the Fennel Creek

corridor. The corridor's riparian (streamside) vegetation, its linear nature, and its close association with wetlands make it Bonney Lake's most valuable asset in terms of wildlife habitat and biological potential.

In 1999, the Foster Wheeler Environmental Corporation prepared for the City an Environmental Analysis of the Fennel Creek Corridor. It thoroughly studied the corridor's environmental quality, providing a baseline for future comparison. The Foster Wheeler Analysis recommended improvements designed to remedy its environmental problems. For example, where the creek has been straightened it recommends that it be restored to its original sinuosity by installing diversion berms and large woody debris. Where riparian vegetation has been destroyed, it recommends plantings. Where it floods a road the study recommends culverts. Where wetlands have been damaged, it recommends that they be enhanced by hydrological connections and plantings. Because its wetland functions and values can be greatly enhanced at reasonable cost, the corridor has great potential for wetland mitigation. That is, if a wetland outside the corridor is in the path of development and not worth saving, the developer could pay to enhance wetlands inside the corridor, thus preventing a net loss of wetland functions and values.

Bonney Lake Outfall

The Lake Bonney Outlet starts on the eastern shoreline of Lake Bonney and flows for approximately one (1) mile through a series of pipes, culverts, swales, ditches, and open channels in mostly residential areas prior to joining Debra Jane Creek at the southwest of the corner of Church Lake Rd East and Evergreen Drive. Lake Bonney Outlet, upstream of 192nd Avenue Place East is an intermittent watercourse that occasionally flows when Lake Bonney fills past its capacity does not support fish due to the lack of stream channels and significant sections of pipes and culverts. Downstream of 192nd Avenue Place East, the Bonney Lake Outlet is a perennial fish bearing stream with hydrology supported by springs and precipitation.

Debra Jane Creek

Debra Jane Creek starts at the outlet in the southeast corner of Debra Jane Lake. Maps show that Debra Jane Creek then flows south through residential and forested areas for approximately 1 mile until it reaches the confluence with Bonney Lake Outlet. Debra Jane Creek, from the outlet at Debra Jane Lake to Allan York Park, is an intermittent stream that occasionally flows when the lake fills past its capacity and does not support fish due to the lack of significant stretches of defined stream channel. Once Debra Jane Creek enters Allan York Park, the stream becomes perennial stream supported by wetland seeps, springs, and precipitation without physical fish barriers (other than passable culverts) downstream from Allan York Park, to the confluence of Bonney Lake Outlet, and eventual connection to Fennel Creek. Habitat is suitable for fish use throughout this section, with clear bed/bank, sorted substrate, and complex habitats and is considered a perennial stream with fish use.

Other Streams

During 2018, the City undertook a stream assessment project. Prior to this assessment that City had mapped and classified most but not all stream located within the City. This assessment confirmed the presence or absence of the streams and assigned a classification per City code, if appropriate. More details regarding the project are available in a Final Stream Assessment Technical Memorandum which was completed by The Watershed Company for the City of Bonney Lake.

Streams evaluated as a portion of this assessment were assigned types consistent with the Bonney Lake Municipal Code and Washington Administrative Code 222-16-030 and 222-16-031. Figure 7-8 illustrates other small-unnamed streams located in the City.

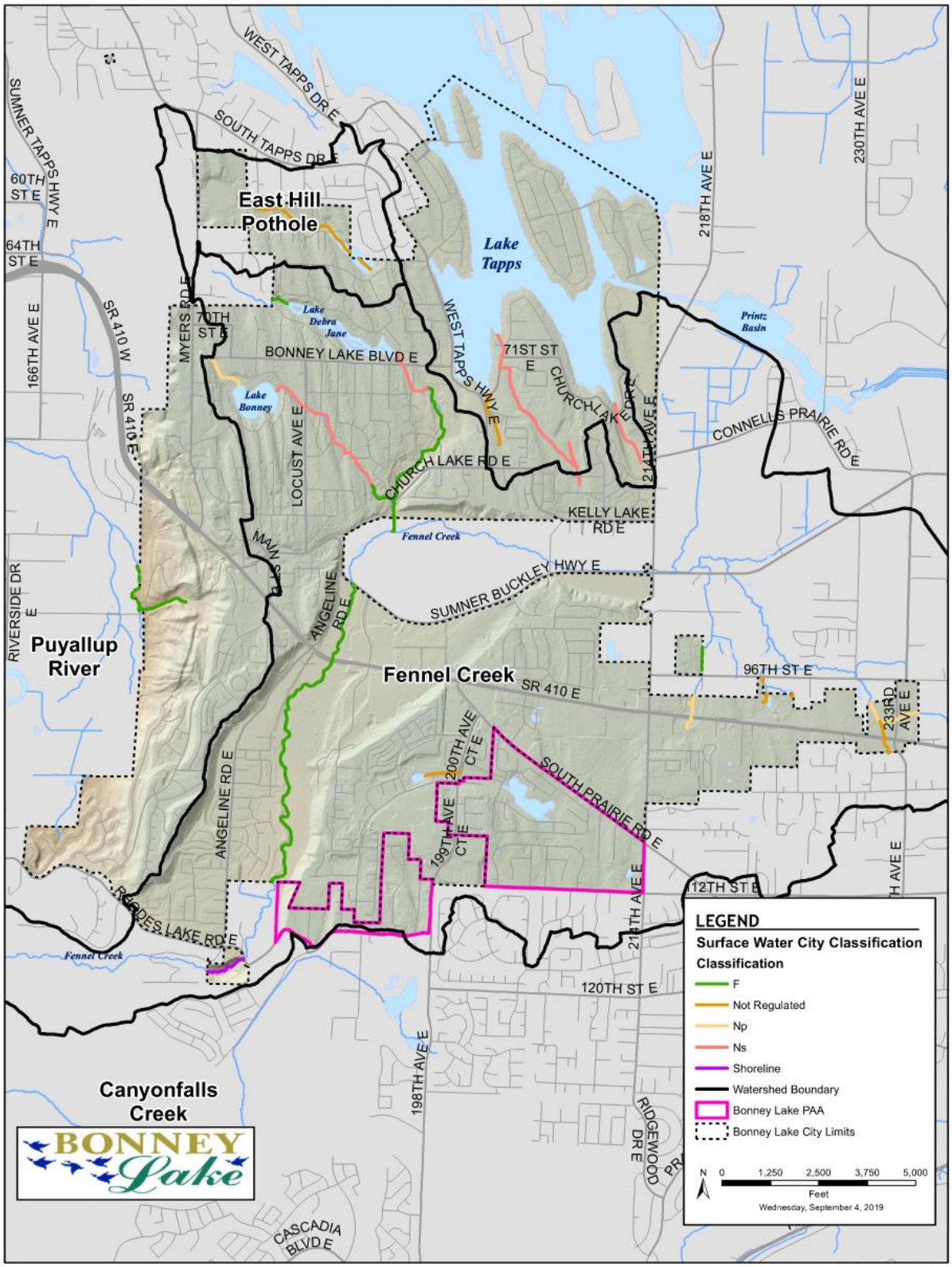

Figure 7-8: Surface Waters and Stream Typing

The Federal Clean Water Act requires that all states restore their waters to be "fishable and swimmable." Washington's Water Quality Assessment, which meets the federal requirements for an integrated report under Sections 303(d) and 305(b) of the Clean Water Act, does not identify any impaired water bodies within Bonney Lake.

Goal ES-3: Preserve and restore the quality of surface waters to provide high quality natural habitats protected from point and non-point pollution sources.

Policy ES-3.1: Protect water bodies from point and non-point sources of contamination and nitrification.

Policy ES-3.2: Promote the enhancement or restoration of surface waters as adjacent development activities occur.

Policy ES-3.3: Protect against erosion of drainage channels.

Policy ES-3.4: Encourage land developments to maximize stormwater infiltration.

Policy ES-3.5: Promote Low Impact Development techniques as an alternative to standard development practices such as, using natural systems to maintain and enhance environmental quality by having them perform such functions as cleaning air and water, and controlling storm water runoff.

Policy ES-3.6: Preserve vegetative buffers along streams and drainage ways to enhance water quality, protect habitat, and prevent erosion.

Policy ES-3.7: Mitigate stormwater related impacts through best management practices.

Policy ES-3.8: Protect Fennel Creek's natural functions by being especially diligent in applying to the Fennel Creek corridor those policies relating to wetlands and fish and wildlife habitat as stated elsewhere in this Element.

Policy ES-3.9: Construct the Fennel Creek corridor environmental improvements identified in the 1999 Environmental Analysis of the Fennel Creek Corridor.

*Policy ES-3.10: Continue to purchase property along the Fennel Creek Corridor to preserve the corridor and consider using property around the creek as wetland mitigation site*s.

3.4 FREQUENTLY FLOODED AREAS

Flooding is defined as a general and temporary condition or partial or complete inundation of normally dry land areas from the overflow of inland water, the unusual and rapid accumulation of runoff of surface waters from any source, and mudslides which are proximately cause by flooding and are similar to a river of liquid and flowing mud. Flooding can also include the collapse or subsidence of land along the shore of a lake or other body of water a result of erosion or undermining cause by waves or currents or water exceeding average or anticipated levels.

Floodplains are regulated to protect the natural functions and habitat value of these areas and to manage potential risks to public safety. Bonney Lake regulates floodplains as special flood hazard areas, (see Figure 7-10), which is defined as land within the community subject to a one percent or greater chance of flooding in any given year.[28] To minimize flood damage, and maintain FEMA flood insurance eligibility, the City has administered floodplain regulations since 1982.

Of growing concerns in urban areas are urban stream/groundwater flood hazards. As weather averages change urban stormwater systems have trouble coping with increased rates of development paired with larger than average storm events, see Figure 7-9. Urban stream flooding is exacerbated by rain-on-snow events. Sometimes debris can accumulate in stormwater collection systems and reduce the capacity of the system to convey flow.[29]

Figure7-9: Image of 2016 Flooding at 188th Ave E and 62nd St E Photo Credit KOMO News

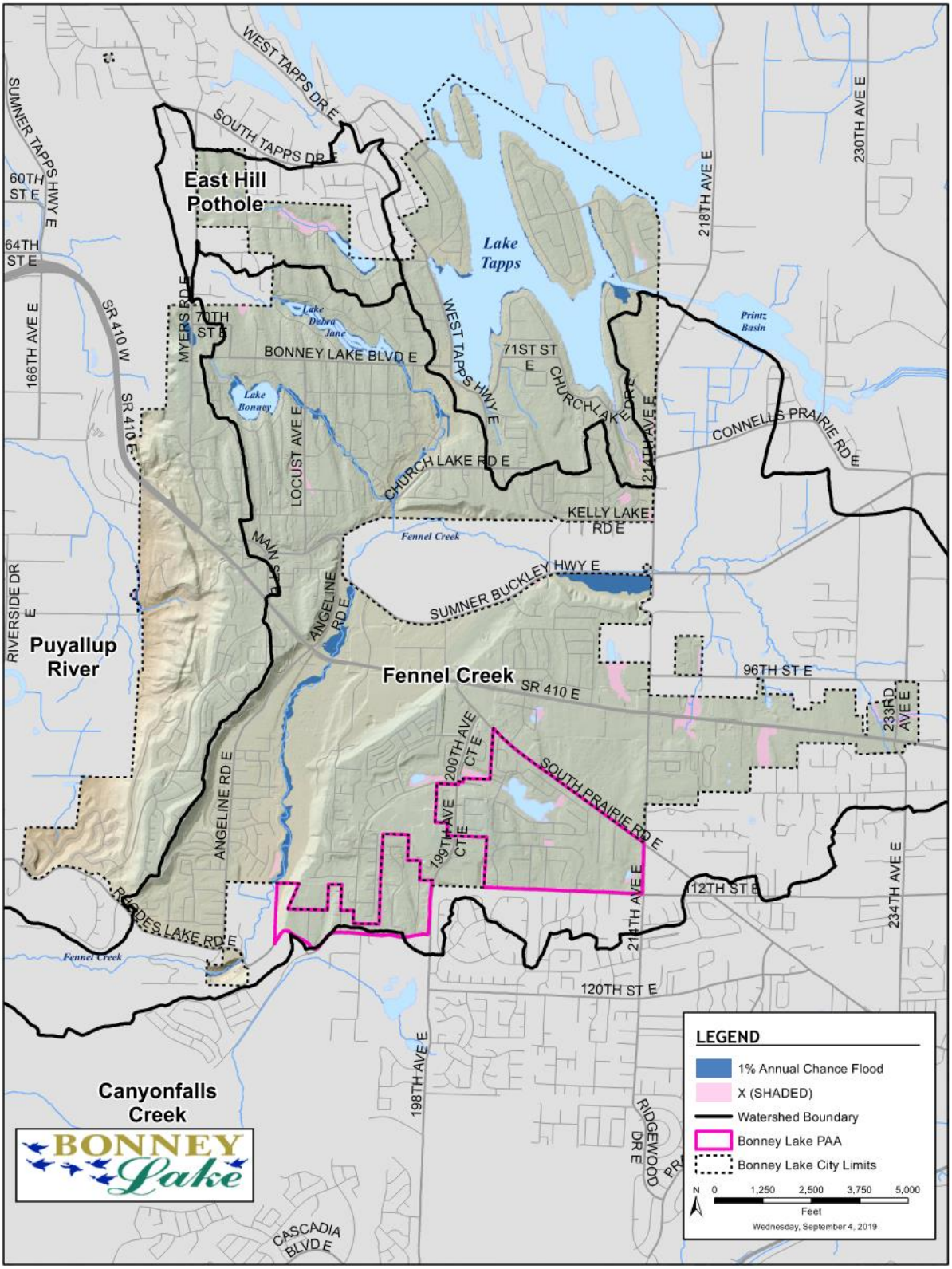

Figure 7-10: Special Flood Hazard Areas

Goal ES-4: Minimize risks to life and property resulting from flooding and preserve habitat associated with floodplains.

Policy ES-4.1: Prohibit new buildings in the 100-year flood zone as determined by the Federal Emergency Management Agency (FEMA) and as shown on the FEMA Flood Insurance Rate Maps (FIRM) unless the base elevation is above the floodplain elevation, the structure has been flood proofed, or the area is removed from the floodplain.

Policy ES-4.2: Protect floodplains from filling, excavating, and other activities that would interfere with natural drainage patterns and negatively affect the habitat functions.

Policy ES-4.3: Preserve floodplains to provide for natural flood storage protection and habitat functions.

Policy ES-4.4: Design new development and redevelopment projects to minimize hazards associated with flooding and limit the amount of runoff that contributes to flooding.

3.5 WETLANDS

The commonly used wetland definition as issued by the U.S. Environmental Protection Agency (EPA), the U.S. Army Corps of Engineers (Corps), Shoreline Management Act (SMA), Growth Management Act (GMA), and recorded in the Washington Administrative Code (WAC 173-22-030(10)) is:

> Those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas. Wetlands do not include artificial wetlands intentionally created from non-wetland sites, including, but not limited to, irrigation and drainage ditches, grass-lined swales, canals, detention facilities, wastewater treatment facilities, farm ponds, and landscape amenities, or those wetlands created after July 1, 1990, that were unintentionally created as a result of the construction of a road, street, or highway. Wetlands may include those artificial wetlands intentionally created from non-wetland areas to mitigate the conversion of wetlands.

Wetland scientists generally acknowledge that wetlands perform the following eight functions: (1) flood/storm water control, (2) base stream flow/groundwater support, (3) erosion/shoreline protection, (4) water quality improvement, (5) natural biological support, (6) general habitat functions, (7) specific habitat functions, and (8) cultural and socioeconomic values.[30] In the past, these functions were not understood. Many wetlands were senselessly destroyed by clearing, dredging, draining, and filling. Federal, state, and local government regulations now protect wetlands and an undisturbed buffer around the wetland.

The Bonney Lake area contains bogs, forested wetlands, scrub/shrub wetlands, wet meadows, shallow marsh wetlands, and deep marsh. The greatest concentration of wetlands is in the Fennel Creek corridor.

Wetlands also exist along swales draining Lake Bonney and Lake Debra Jane and in a few other isolated spots.

Goal ES-5: Protect natural habitat, groundwater recharge, and floor attenuation functions performed by wetlands.

Policy ES-5.1: Ensure that wetland buffers are adequately sized to protect functions and values of wetlands.

Policy ES-5.2: Ensure a no net loss of wetland functions and values.

Policy ES-5.3: Avoid denying all reasonable use on any parcel.

Policy ES-5.4: Protect wetlands from water quantity or quality impacts stemming from improper stormwater management.

Policy ES-5.5: Encourage environmental stewardship programs aimed at wetland preservation.

Policy ES-5.6: Pursue implementation of a wetland mitigation-banking program.

3.6 FISH AND WILDLIFE HABITAT

Urbanization and agriculture have reduced Bonney Lake's wildlife habitat, but the area's lakes, stream corridors, wetlands, floodplains, and forests support many plants and animals. Urban development and habitat conservation are compatible.

According to State rules (WAC 365-190), fish and wildlife conservation areas (FWHCAs) are "…areas that serve a critical role in sustaining needed habitats and species for the functional integrity of the ecosystem, and which, if altered, may reduce the likelihood that the species will persist over the long term. These areas may include, but are not limited to, rare or vulnerable ecological systems, communities, and habitat or habitat elements including seasonal ranges, breeding habitat, winter range, and movement corridors; and areas with high relative population density or species richness." Areas that are considered FWHCA, as determined by the Department of Natural Resources, are illustrated in Figure 7-11.

Goal ES-6: Preserve and restore fish and wildlife habitat conservation areas.

Policy ES-6.1: Preserve habitats for species, which the federal or state government have identified, as endangered, threatened, or sensitive.

Policy ES-6.2: Encourage conservation of sites that protect fish and wildlife habitat conservation areas through incentives or acquisition.

Policy ES-6.3: Encourage the restoration of ecological functions and the natural environment in environmentally damaged areas through incentives.

Policy ES-6.4: Protect water quality in lakes and streams.

Policy ES-6.5: Promote clustered developments, common areas, buffers, conservation easements, and retention of native vegetation as a means of conserving critical habitat.

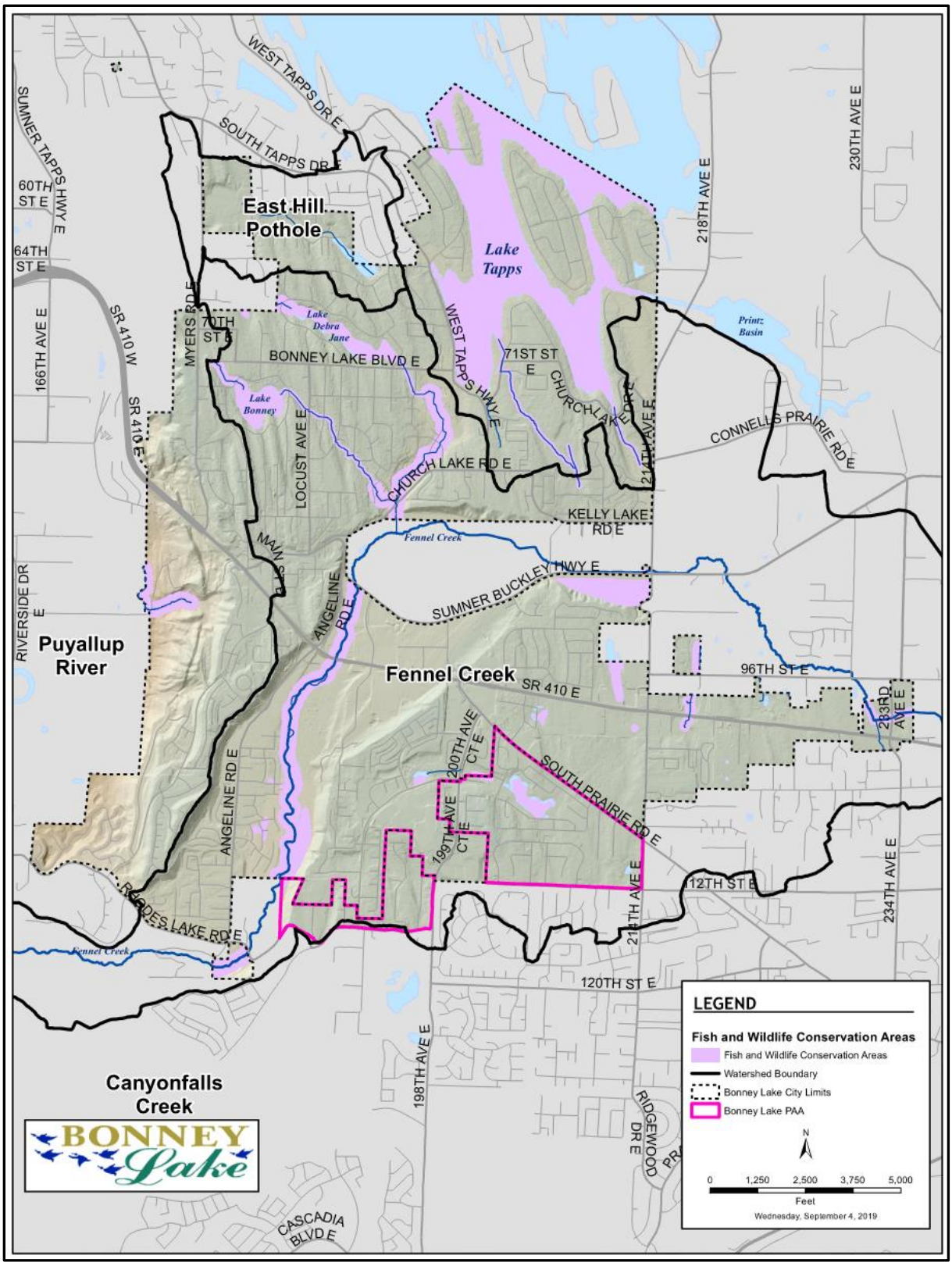

Figure 7-11: Fish and Wildlife Conservation Areas

4. URBAN FORESTRY

A healthy urban forest contributes to a sustainable City in a number of ways. Trees consume carbon dioxide (CO2), absorb air, and water pollutants. They also provide shade (which reduces energy consumption), absorb runoff, reduce soil erosion, provide habitat for plants and animals, and make walking more pleasant. The Center for Urban Forest Research estimates that over a forty-year period one hundred urban trees in the Pacific Northwest provide $202,000 in benefits.[31]

> **"Preserve Bonney Lake's character by maintaining significant trees, tree lines, and wooded lots to the maximum extent possible through the regulation of clearing prior to development."**
>
> ***City of Bonney Lake Comprehensive Plan***
> **August 1985**

As a Tree City, USA, with an active Community Forest Program, Bonney Lake has made a commitment to protect and manage the community's tree resources. As part of this ongoing commitment, the City contracted with the Watershed Company to prepare an analysis of the City's tree canopy. This analysis included a review of the effectiveness of existing codes, trends from recent development, and yield priority recommendations. This analysis was completed in 2019 and utilized high-resolution multispectral aerial imagery to complete a map-based canopy analysis which compared 2008 and 2017/2018 canopy coverage, see Figure 7-12. The analysis revealed a reduction in total coverage percentage from 43% to 34%; or 1,872 acres reduced to 1,638 acres of tree canopy.

Previous best practice established a 40% canopy coverage as an average for urban areas. However, as of 2017, this is no longer the best practice.[32] Based on existing impervious surface, future population projections, and a land use analysis the City has established a new canopy goal of 38%. The urban canopy is concentrated in existing residential and open space areas. Revisions to the clearing and landscaping codes which support the protection of this existing canopy and encourages tree replacement will be required in order to meet the 38% goal.

Trees make an important contribution to the aesthetics of the City, as well as the natural environment. Documentation and monitoring of the tree canopy will play an important role in preserving the visual identity and health of the Bonney Lake community. We all live under one canopy and must work together to protect it.

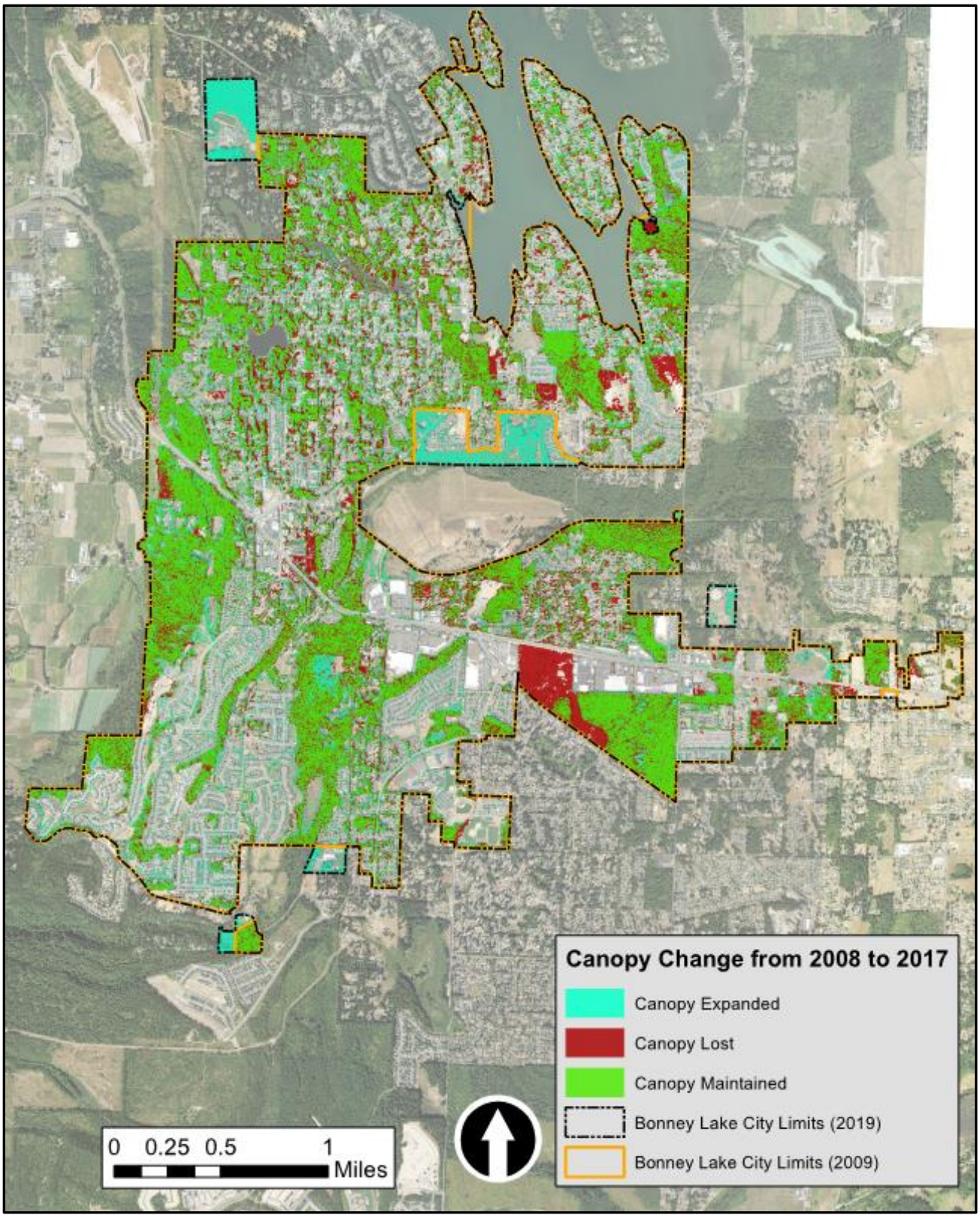

Figure 7-12: Tree Canopy Change 2008 to 2017

Goal ES-7: Promote, preserve, and emphasize a healthy urban forest with an overall tree canopy goal of 38%.

Policy ES-7.1: Protect and conserve open space and transition buffers between urban and rural areas.

Policy ES-7.2: Preserve and protect public views of the mountains and valley corridors.

Policy ES-7.3: Practice land cover management, which includes forest and topsoil preservation, native growth protection easements, dense vegetative zones, and preservation of the tree canopy.

Policy ES-7.4: Protect significant trees, promote tree replanting, and encourage the use of native plants in residential and commercial development.

Policy ES-7.6: Promote the preservation of native vegetation and mature trees, revegetation, and appropriate landscaping to improve air and water quality and fish and wildlife habitat.

Policy ES-7.7: Promote the use of native plants in residential and commercial landscapes

Policy ES-7.7: Develop an in-lieu fee program to assist the City in establishing or preserving urban tree canopy.

Policy ES-7-8 Provide opportunities to engage the Tree Board as advisors and stakeholders committed to the preservation of our tree canopy.

5. AGRICULTURAL LANDS

The GMA requires jurisdictions to prevent conversion of agricultural lands of long-term commercial significance. There are no such lands in the BLUGA. However, as a suburban community located on the edge of the Pierce County's urban growth area boundaries, pockets of agricultural lands of long-term commercial significance surround Bonney Lake. Therefore, the City should work cooperatively with the County to preserve and protect these areas. Additionally, one of the City's proposed additions to the BLUGA, the Fennel Creek Corridor Area, contain lands designated as agricultural resource lands (ARL). Areas designated as ARL are agricultural lands of long-term commercial significance, which should be preserved and protected, from urban development. The City proposes to preserve these resource lands by designating the areas as Open Space – Conservancy and zoning the areas Residential/Conservancy District that is comparable to the County's zoning in both the terms of allowed uses and density.

In addition to preserving agricultural lands of long-term commercial significance, Bonney Lake should also take steps to promote and preserve urban agricultural lands. Urban agriculture is an umbrella term encompassing backyard gardens, community gardens, urban farms, and framer's markets involved in a wide range of activities including raising, cultivation, processing, marketing, and distribution of food in urban areas.[33] Preserving and promoting urban agriculture would have a number of positive impacts on Bonney Lake, which include:

- Promoting community health by expanding access to fresh foods;

- Reducing green-house gas emissions caused by transporting food over long distances;
- Increasing social-capital by facilitating community engagement (See Community Development Element for a discussion of the health impacts of social capital); and
- Activating underutilized community spaces.[34]

Goal ES-8: Preserve and protect agricultural resource lands and urban agriculture sites to improve access to healthy foods, build social connections, and provide local sources of food.

Policy ES-8.1: Preserve Pierce County's designation of "urban agricultural land of long-term commercial significance" for properties so designated in the proposed Fennel Creek Corridor UGA.

Policy ES-8.2: Allow continued agricultural production in areas which currently produce such products but which have not been designated agricultural resource lands if such production is appropriate in an urban context.

Policy ES-8.3: Maintain agricultural production as the principal use on agricultural lands by limiting residential development, preventing conversion to non-agricultural uses, and prohibiting uses that are incompatible with long-term agricultural production.

Policy ES-8.4: Protect property owner's rights to cultivate gardens to produce fresh fruits and vegetables and to keep a limited number of farm animals through the City's development regulations.

Policy ES-8.5: Expand access to community gardens through Bonney Lake to increase access to fresh produce.

Policy ES-8.6: Remain open to further designations of agricultural resource lands on land shown to merit that designation.

Policy ES-8.7: Ensure that land uses proposed adjacent to lands designated, as agricultural resource lands are compatible with agricultural activities.

6. AIR QUALITY

"The emission of noise, smoke, dust, other obnoxious matter are to be limited and controlled by specific performance standards."

Plan for Bonney Lake,
Washington May 2, 1964

While air quality is not specifically identified as a critical area, protecting air quality is listed as a goal of the GMA and both the MPPs and CPPs include specific provisions that require the City to establish policies related to air quality. In the Puget Sound Region the primary concern is ground-level ozone, carbon monoxide, and fugitive dust which can damage lung tissue leading to respiratory disease, contribute to cancer and cardiovascular disease, and obscure many of our most scenic vistas, such as views of the Olympic and Cascade mountain ranges, including Mount Rainier.[35]

Air quality in Bonney Lake is monitored and regulated by the Puget Sound Clean Air Agency (PSCAA). The PSCAA is a special purpose, regional government agency covering King, Kitsap, Pierce and Snohomish Counties chartered by state law in 1967 under the Washington State Clear Air Act. The agency monitors air quality in the basin through a regional network of air pollution monitoring stations to determine if the national and State standards for criteria air pollutants and emission limits of toxic air contaminants are being achieved.

Criteria Air Pollutants

The Federal and Washington State Clean Air Acts have established ambient air quality standards for different air pollutants. The Federal Clean Air Act of 1970 (amended in 1977 and 1990) established the national ambient air quality standards (NAAQS) for six "criteria" pollutants: carbon monoxide (CO), ozone (O3), nitrogen dioxide (NO2), particulate matter (PM10 and PM2.5), sulfur dioxide (SO2), and lead (Pb), which are known to be hazardous to human health. Over the years PSCAA, has made great strides toward reducing levels of carbon monoxide, sulfur dioxide, nitrogen dioxide and lead, which are now well below federal air quality standards. However, two air pollutants remain a concern in the Puget Sound region: particle pollution and ozone (smog) which can cause heart attacks, strokes, asthma attacks and even premature death.[36]

Toxic Air Contaminants

In addition to the six criteria air pollutants, the PSCAA increasingly is focusing efforts on reducing air toxics, which is group of over 400 pollutants known or suspected to cause a number of health problems, including cancer and birth defects, as well as damage to lungs, and immune and nervous systems. In our region, health risk from air toxics comes primarily from fine particles in diesel exhaust.[37]

> **"Residential areas should be protected from the dangers of fire, explosions, toxic, noxious matter, and other similar objectionable influences."**
>
> *City of Bonney Lake Comprehensive Plan August 1985*

Greenhouse Gas Emissions

In addition to the air quality, cities in the central Puget Sound Region are required to address climate change. While addressing climate change is not specifically addressed in the GMA goals established by RCW 36.70A.020 nor the mandatory elements established by RCW 36.70A.070, the City is required to be consistent with adopted MPPs and CPPs pursuant to RCW 36.70A.100 and RCW 36.70A.210. Both the MPPs and CPPs include specific provisions that require the City to establish goals, policies, strategies, and performance measures related to the reduction of greenhouse gas emissions and to address adaptation to the effects of climate change.

Unlike emissions of criteria pollutants and toxic air pollutants, which have local or regional impacts, emissions of greenhouse gasses (GHGs) have a broader, global impact. The principal GHGs are carbon dioxide (CO2), methane (CH4), nitrous oxide (N2O), and fluorinated compounds. These gases allow visible

and ultraviolet light from the sun to pass through the atmosphere, but prevent heat from escaping back out into space, a process known as the "greenhouse effect". Human-caused emissions of these GHGs in excess of natural ambient concentrations are responsible for intensifying the greenhouse effect.

The City's efforts to reduce GHGs began in 2010 with the passage of Resolution 2049, which adopted policies to reduce emissions of GHGs. As part of Resolution 2049, the City stated that local governments throughout the nation, both large and small, 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, economic development, and job creation through energy conservation and new energy. The City of Bonney Lake adopted the following policies, as part of Resolution 2049, to reduce GHGs:

- The City will strive to assure that all new municipal buildings are models of cost effective energy-efficient design.
- The City will encourage energy conservation practices in City buildings by raising the awareness of employee energy use.
- The City will use the recently approved shared resource conservation manager position to conduct energy audits of publicly owned buildings, evaluate potential conservation measures, and then carry out those measures that are appropriate.
- The City will monitor the efficiency of the pumps in water and sewer systems, and operate and maintain them at peak efficiency whenever practically feasible. When evaluating new systems, the most cost effective option using the least amount of energy will be preferred.
- The City will participate in the County-wide solid waste management plan which reduces the solid waste stream by recycling and other means, investigates ways to convert non-recyclable solid waste to energy, and promotes the purchase of recycled and recyclable goods.
- Where and when permitted under the building code, the City will encourage the use of building construction materials made from recycled and recyclable materials.
- The City will publicize energy conservation actions to raise public awareness of the value of wise energy use.
- The City will promote internal recycling programs, purchasing policies, and employee education to reduce the amount of waste produced.
- The City will implement its non-motorized transportation plan, on a funding available basis, to provide safe and convenient access for pedestrians and bicyclists to, across, and along major transit priority streets.
- The City will continue to support water conservation using conservation based rates and a tiered rate structures for water use.

In Puget Sound region, nearly 50% of the GHGs pollution comes from transportation. The goals and policies in the Community Development Element and Community Mobility Elements attempt to address the GHGs. These goals and policies encourage a local balance of jobs and housing, proximity of shopping,

recreational, childcare and other uses to residential areas, higher intensity land uses near transit, and encourage the use of alternative transportation modes such as transit, walking and bicycling.

In addition to transportation, GHGs are released during energy production and consumption, such as electricity used to power homes and businesses, and fuel used to power cars and trucks. Reducing the carbon content of the fuel source (e.g. solar or wind power versus fossil fuels) or reducing energy consumption (e.g. using energy efficient appliances or designing buildings for solar access) will help to further reduce overall GHGs emissions.

Goal ES-9: Meet the Washington State goal to reduce greenhouse emissions to 25% below 1990 levels by 2035 established by RCW 70.235.020(1)(a)(ii) and ensuring that overall air quality meets or exceeds State and Federal standards.

Policy ES-9.1: Support efforts of other local, regional and State agencies to improve regional air quality.

Policy ES-9.2: Coordinate land use planning and local transportation planning to reduce the potential for long-term exposure to criteria air pollutants and toxic air contaminants.

Policy ES-9.3: Reduce the air quality impacts created by truck traffic, hazardous materials, and development.

Policy ES-9.4: Continue to implement the policies adopted by Resolution 2049

Policy ES-9.5: Encourage energy efficiency in site design, building orientation, landscaping, and utilities/infrastructure for all development and redevelopment projects.

Policy ES-9.6: Encourage renewable energy sources for new and existing buildings and infrastructure.

7. RESILIENCY

As the instances of natural disaster increase throughout the world, communities must begin planning for how these disasters may affect them. In Pierce County the most frequently occurring natural disaster is flooding. Historically, disaster planning has focused on avoid or minimizing damage from these event. Policies developed today have started focusing on building community resilience and preparing for inevitable disasters and the post-disaster to recovery. In this instance resiliency is the defined as the ability of a community or ecosystem to return to a functioning state and enter into recovery as quickly and healthfully as possible. Resiliency can be thought of as a cycle as depicted in Figure 7-13. This adaptive cycle can be seen in ecological and social systems throughout our world.

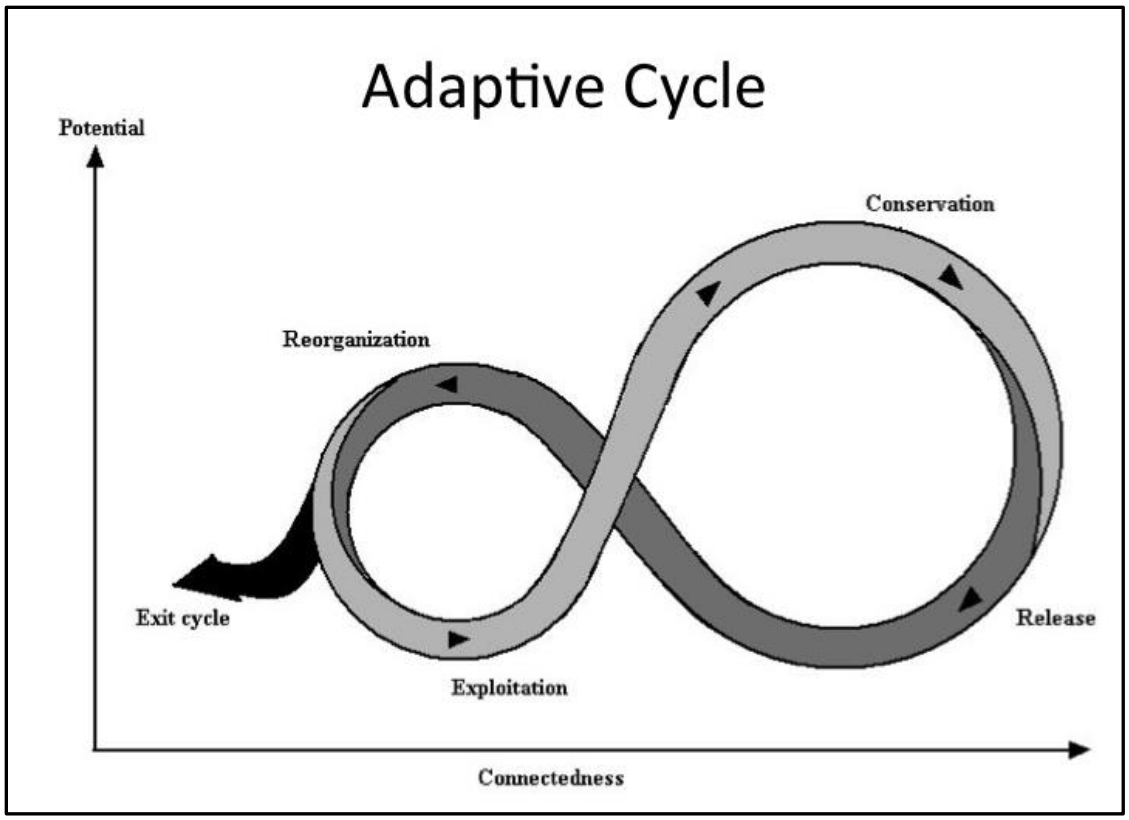

Figure 7-13: The Adaptive Cycle[38]

The rapid growth and conservation phases are referred to as the fore loop and characterized by an accumulation of capital and stability. The release and reorganization phases are referred to as the back loop and are characterized by uncertainty and loss of capital, but also novelty and experimentation. In terms of community preparedness the change from fore loop to back loop is the disruptive event (i.e. natural disaster).

This resiliency approach encourages communities to plan for safety, continuity of operations and delivery of services, and appropriate levels of infrastructure and support during events and for post-disaster recovery. The most likely instances for the City of Bonney Lake to face are flooding and being an area of reception for persons evacuated from surrounding areas during natural disasters. Hazard identification and risk management for the area are managed by Pierce County and more information about these topics can be found in the Pierce County Hazard Identification and Risk Assessment.

Flood

Flooding is the most common hazard in Pierce County. Of particular risk are areas of the City within special flood hazard areas. However, other low lying areas of the City and isolated "potholes" or closed depressions can be at risk of flooding, and once these areas flood the water can remain for the rest of the wet season. Flooding impacts about 50% of the population of Pierce County each year.[39] Mapping these

low-lying and closed depressions could alert residents that might not otherwise prepare for flood events. This was demonstrated during the flooding of a portion of the City during February of 2016.

Climate Change

Resilience thinking acknowledges that social-ecological systems are always changing and many changes reflect a progression through linked adaptive cycles. Climate change includes changes in average weather conditions or in the distribution of weather around the average conditions. Climate change encompasses the major influx in temperature, precipitation, or wind patterns.

Likely impacts of climate change on the City are changes in rain and snowfall patterns, residents moving to the area because of sea-level rise impacting other parts of the region, increased investment in infrastructure to create resilient systems that can cope with changes, and economic changes.

Fire

During 2020 an unprecedented fire season impacted the City of Bonney Lake. While wildfires can be a natural part of the adaptive cycle in healthy forests, the densely knit rural-urban divide brings these fires too close to our homes, our neighbors, and our livelihoods. All communities face some risk for fire, but 2020 demonstrated that this risk is closer and more real than we would have thought given the extended wet season experienced in the South Sound Region.

Likely impacts from fire include temporary loss of air quality, sudden need for shelter/evacuation planning, temporary loss of ingress and egress from the City, loss of telecommunication systems, loss of tree canopy, increase risk of landslide, and a need for long-term recovery management that focuses on soil health and stability. A focus on resiliency acknowledges that fires will happen, but community education, emergency preparedness, and established plans for recovery can save our homes and our lives.

Figure 7- 14: Sumner Grade Fire 2020, Image credit WSDOT

Drought

Bonney Lake's beauty and quality of life are likely to change if a long lasting drought impacts the area. These impacts can include habitat reduction for birds, insects, and amphibians, impacts on water distribution, impacts on tourism, and higher risk of wildfire. A resilient community prepares for these changes and develops interdisciplinary networks of professionals before disaster strikes to ensure resources are in place to address these changes before they impact day to day living.

Earthquake

As evaluated in section 3.1 of this chapter, areas with steep slopes may be at higher risk of liquefaction and landslide. Many of the homes in the southern portion of the City could be impacted by an earthquake event. The City has taken steps to strictly regulate development in this higher risk areas. Additionally, close geographic proximity to volcanos has increased the general population's awareness of the risk of earthquake and the potential effects of an event. In addition to preparing residents for an earthquake event, the City is likely to be impacted by transportation disruption, energy disruption, and an influx of evacuees from other areas during an event.

Transportation Accident Hazard

Of unique risk to the City of Bonney Lake is the impact of a transportation accident hazard. The road system in Bonney Lake has been defined, extensively, by housing development. A resilient streets system has built-in redundancies that ensure that emergency personal and citizens have multiple travel routes regardless of transportation mode or temporary obstructions.

Sustainable transportation systems are best achieved by planning transportation around pedestrians. Pedestrian focused transportation promotes interconnected grids of closely spaced streets, readily available parking, and increased density.[40] In addition to cul-de-sac development, the dependence on State Route 410 to provide routes throughout the City puts the transportation at risk of being devastated during a medium to large vehicle accident or road system failure. These issues are addressed more fully in the Mobility Element of this plan.

Volcanic

While flood may be the most common event in Pierce County, a volcano event would impact the largest segment of the population. The immediate and secondary impacts of the event will be far-reaching and long-lasting. Resilient communities prepare for these events, understanding they are inevitable even if they never happen in our life time. Investment in early alert systems and communication systems that will function and be accessible during an event are important aspects of preparedness, volcanoes give warning signs before they erupt. Additionally, education and outreach can help citizens understand risks. Bonney Lake is an evacuation site for residents in other areas of Pierce County.

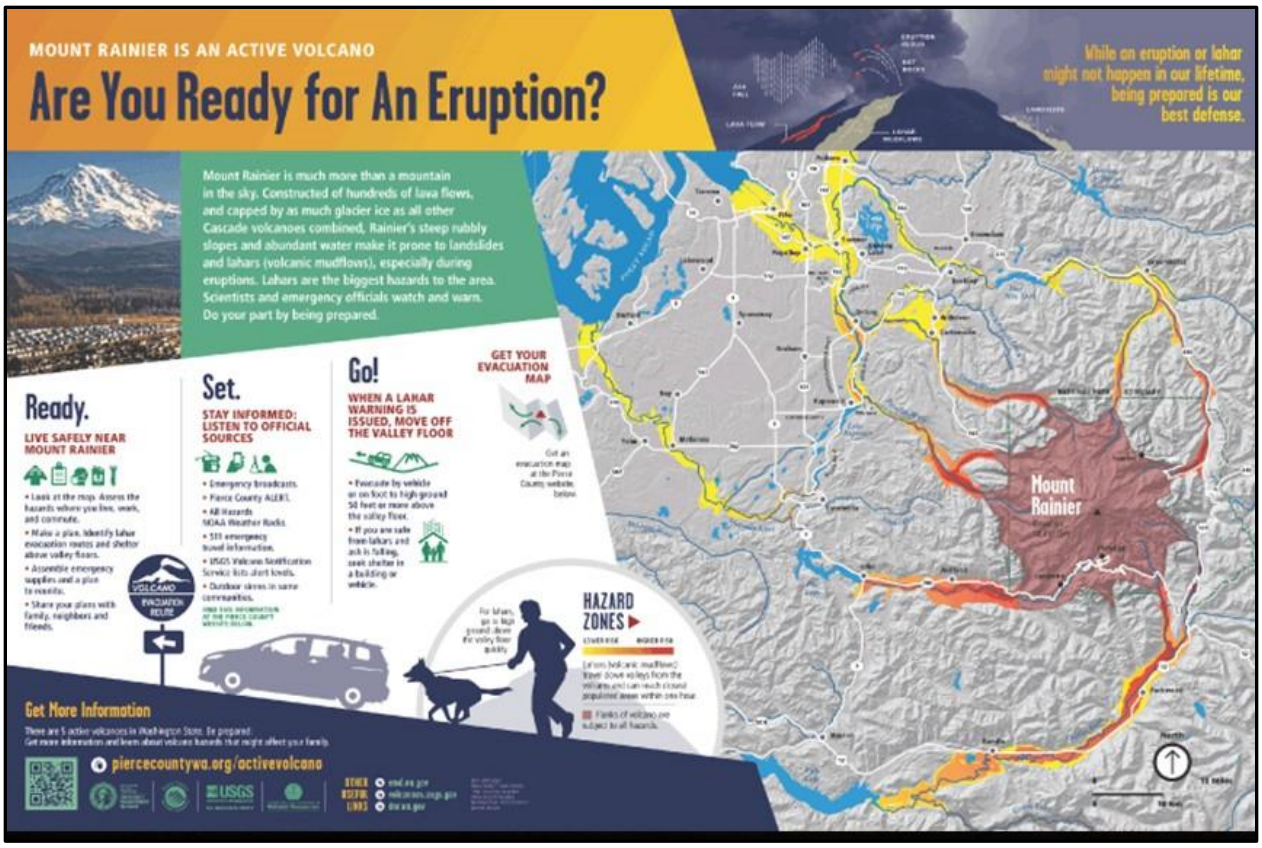

Figure 7-15: Are You Ready for An Eruption?[41]

Goal ES-10: Develop disaster preparedness management systems with a focus on resilience that prepares our residents, community, and systems to recover from disaster quickly and healthfully.

Policy ES-10.1: Improve existing infrastructure and develop future infrastructure to withstand greater than average weather events including storms and drought.

Policy ES-10.2 Cooperate with other agencies in preparing emergency management plans to respond to a lahar originating on Mount Rainier, an eruption of Mount Rainier, or an earthquake along the Cascadia Subduction Zone or the Nisqually Fault Line.

Policy ES-10.3: Develop maps that identify areas of the City most at risk of hazards and develop resiliency resources and education programs for citizens likely to be impacted.

Policy ES-10.4: Develops plans for managing event evacuees and, when appropriate, enter into inter-local and mutual aid agreements to help manage temporary population influx from disasters.

Policy ES-10.5: Develop a continuity plan that identifies the City's essential functions and provides procedures for notifications, orders of succession, delegation of authority, alternate locations, essential records, and reconstitution.

Policy ES-10.6: Evaluate urban forestry program and codes for incorporation of fire prevention and preparedness best practices.

Policy ES-10.7: Complete a Risk and Resilience Analysis and develop an Emergency Response Plan for drinking water infrastructure.

Endnotes:

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