Existing Conditions Report

ENVIRONMENTALLY CRITICAL AREAS

CITY OF SAMMAMISH

October 2023

Prepared for:

City of Sammamish
Community Development
801 228th Avenue SE
Sammamish, WA 98075

DCG WATERSHED

Title-page image: Photograph from City of Sammamish Community Development Department. Trail at Beaver Lake Preserve.

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CITY OF SAMMAMISH

1 INTRODUCTION

The purpose of this Existing Conditions Report – Environmentally Critical Areas is to summarize critical areas in the City of Sammamish to support the current Critical Areas Ordinance (CAO) update. The CAO update is mandated by the Growth Management Act (GMA). This Existing Conditions Report documents publicly available inventory information that will be referenced as CAO updates are made for the City.

Critical areas defined in the GMA are wetlands, critical aquifer recharge areas, fish and wildlife habitat conservation areas, frequently flooded areas, and geologically hazardous areas. All five critical area types are present in the City of Sammamish and are summarized in this report. Habitat corridors are discussed under fish and wildlife habitat conservation areas. Additionally, this report includes a summary of urban forests in Sammamish.

1.1 Study Area

The CAO update is focused on the City of Sammamish. The area reviewed is within city limits (Figure 1). Mapped environmentally critical areas within the city are shown in Figure 2 below.

1.2 Environmental Setting

The City of Sammamish is situated on a plateau and extends down to the Lake Sammamish shoreline. The plateau is approximately 500 feet above Lake Sammamish.

The City spans portions of two Water Resource Inventory Areas (WRIA), the Cedar-Sammamish WRIA 8 and the Snohomish WRIA 7. The City is predominantly located within the Cedar River Basin of WRIA 8 with some area within the Snoqualmie River Basin of WRIA 7. The City contains 16 sub-basins (Figure 3).

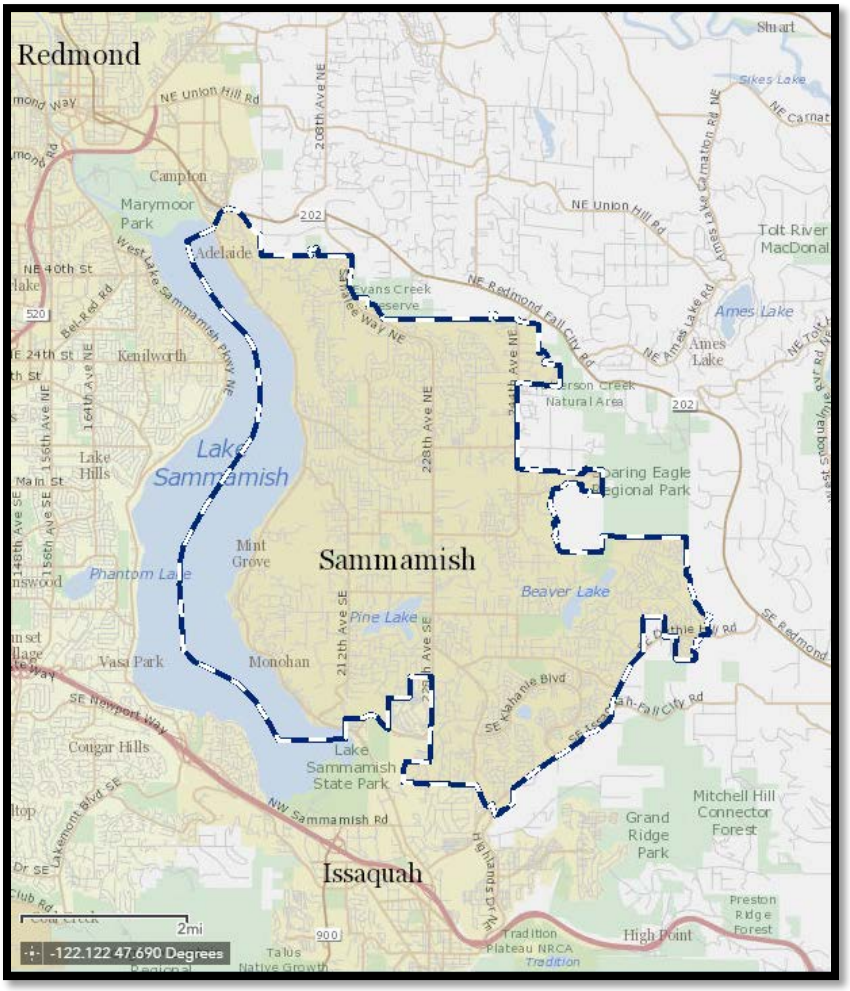


Figure 1. City of Sammamish, city limits outlined in black- and white-dashed line. (Source: Sammamish Property Tool, GIS)

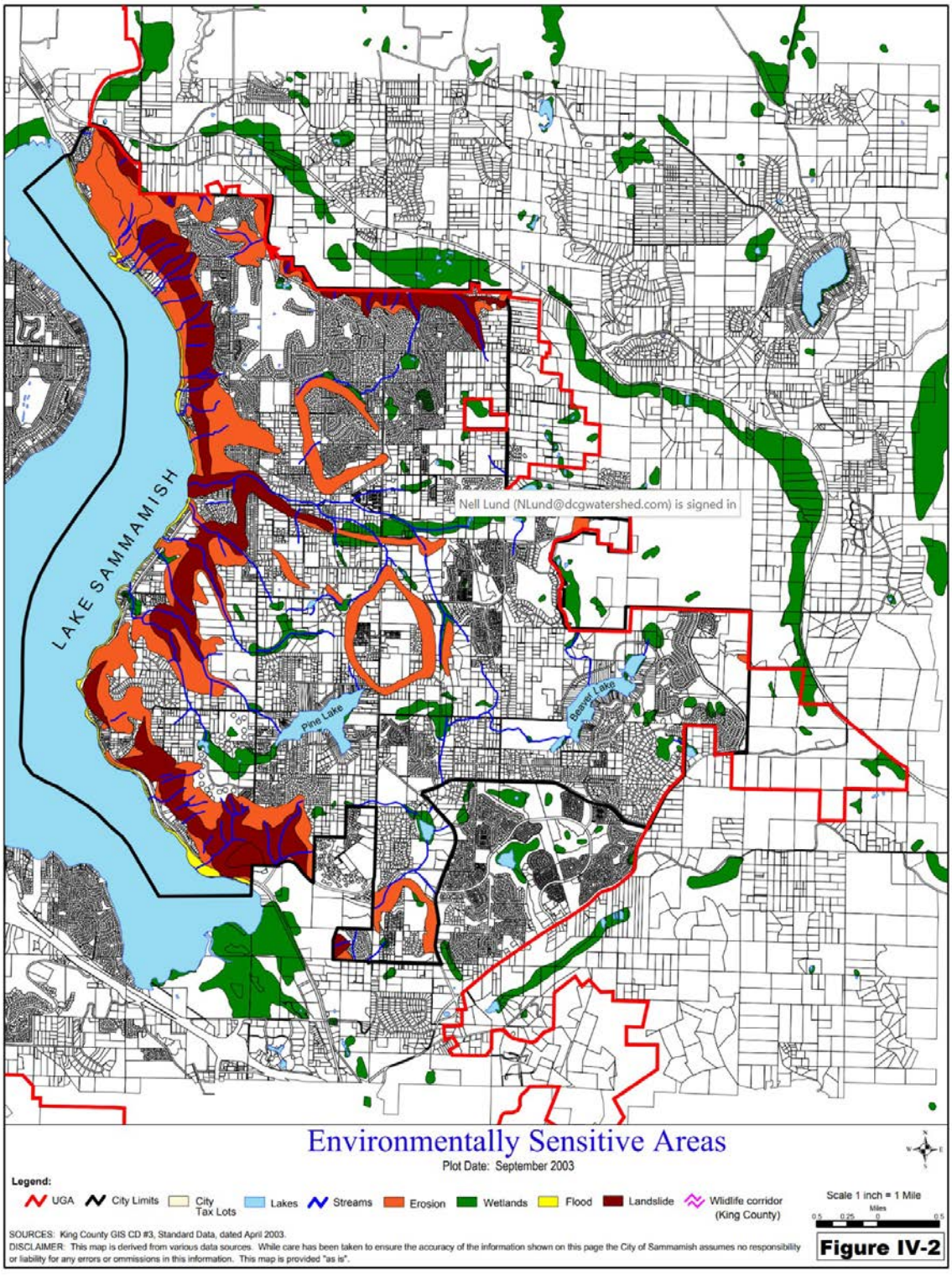


Figure 2. Mapped Environmentally Sensitive Areas in Sammamish and the surrounding UGA. [source: 2003 Comprehensive Plan, 2020 Amendment]

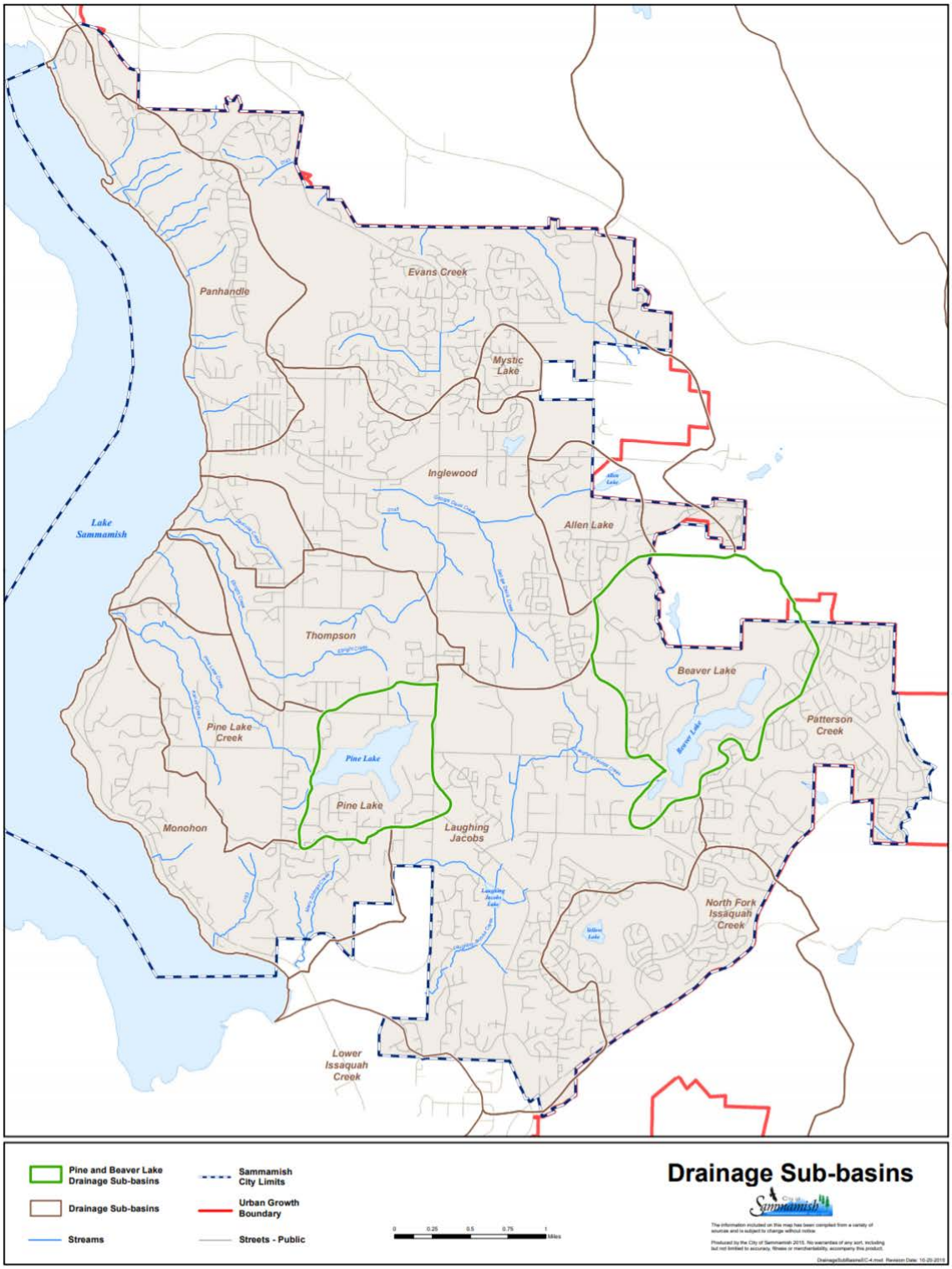


Figure 3. Drainage Sub-basins in Sammamish. [source: Sammamish Comprehensive Plan Background Information, Amended 2020]

2 CRITICAL AREAS

2.1 Wetlands

There are approximately 837.9 acres of wetlands mapped in the City of Sammamish (Table 1). These include over 160 mapped wetlands (Figure 4). Wetland acreage is highest in the Pine Lake, Inglewood, Beaver Lake and Laughing Jacobs basins. Additionally, there are unmapped wetland areas; the publicly available wetland maps are not comprehensive. Site-specific studies are necessary to determine the presence or absence of wetlands for individual projects.

Table 1. Wetland acreage by basin [Source: Sammamish Comprehensive Plan Background Information, Amended 2020]

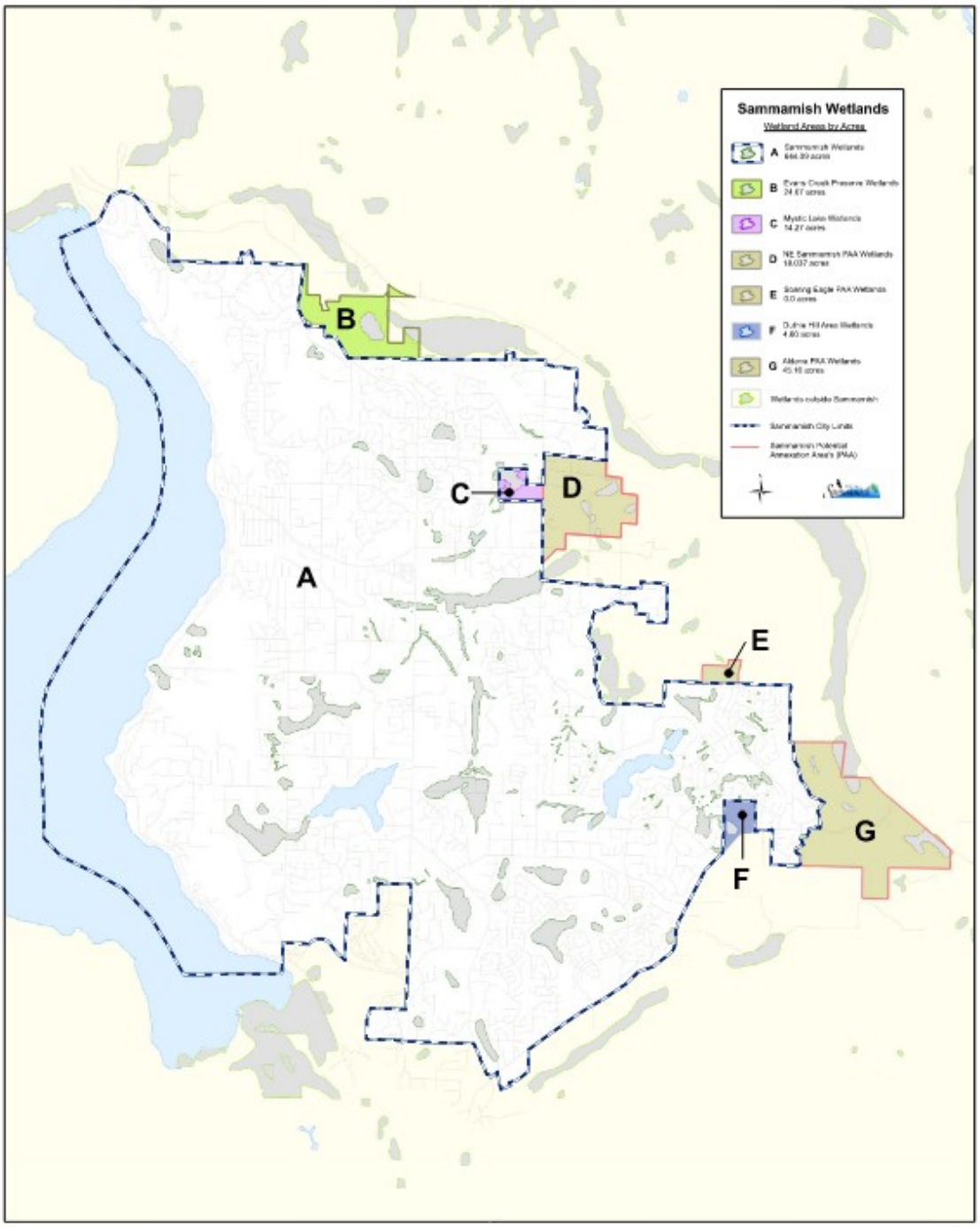
Basin	**Total Wetland Acreage**
Pine Lake	155.4
Inglewood (George Davis)	136.5
Beaver Lake	132.7
Laughing Jacobs	126.2
Evans Creek	68.2
Thompson (Ebright)	49.8
Allen Lake	47.6
North Fork Issaquah Creek	45.9
Patterson Creek	40.2
Mystic Lake	12.5
Panhandle	8.6
Monohon-North	8.4
Monohon-South	5.9
Total	*837.9*

Wetlands within the City are most commonly characterized by depressional or riverine hydrologic conditions. The largest wetland areas within the City include Evans Creek Preserve wetlands, Mystic Lake wetlands, NE Sammamish Potential Annexation Area (PAA) wetlands, Soaring Eagle PAA wetlands, Duthie Hill Area wetlands, and Aldarra PAA wetlands. The remainder of the Sammamish city limits include approximately 644 acres of delineated wetlands, some of which are connected via corridors while others are isolated (Sammamish Comprehensive Plan Background Information Amended 2020). Figure 4 below shows currently documented wetlands within City limits.

2.1.1 Bog Wetlands

The City of Sammamish contains several bog wetlands, a rare wetland type that develops over thousands of years. Bogs support a rare vegetation community, including Labrador tea, bog laurel, and bog cranberry. Bog wetlands are acidic ecosystems that are highly sensitive to hydrologic and chemical changes. These fragile ecosystems cannot withstand common urban inputs of pollution and runoff.

Twelve of these unique and fragile bog wetlands are mapped within the City including Queen's Bog in the Laughing Jacobs sub-basin (Figure 5).



Wetland boundaries shown on this map are approximate, and an individual wetland delineation study, followed by a survey and a city review for accuracy would be needed to determine where exact wetland boundaries are on any individual property. In addition, it should be noted that there are more known wetlands in the City than shown on this map.

Figure 4. Wetland areas in Sammamish [Source: Sammamish Comprehensive Plan Background Information, Amended 2020]

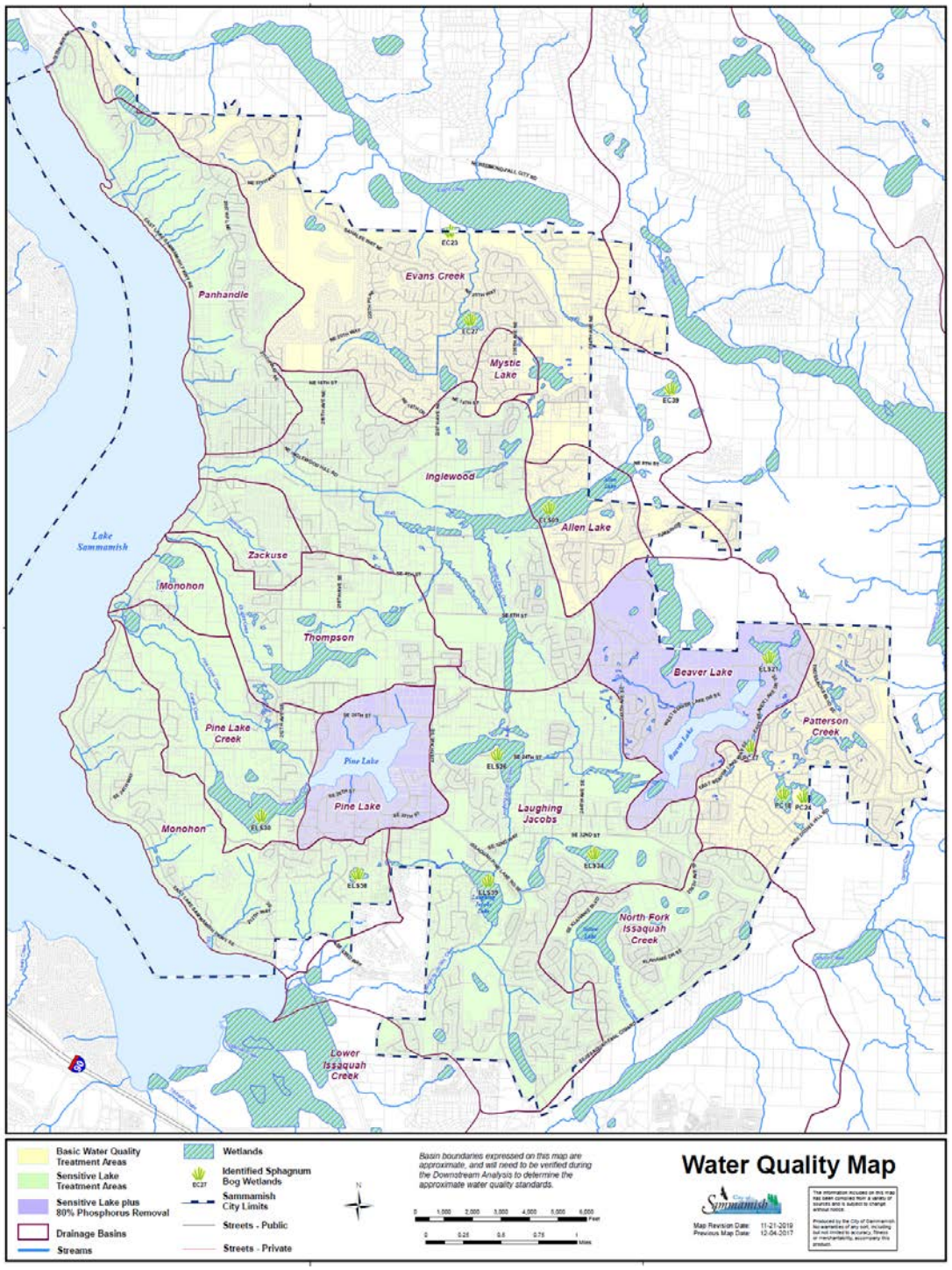


Figure 5. Water Quality Map for Sammamish, includes bog wetlands [source: Sammamish Balanced Land Use and Mobility Analysis EIS project 2022]

2.1.2 Wetland Functions and Values

Wetlands in the City provide a wide range of habitat, water quality and hydrologic functions. Commonly recognized wetland functions include surface flow desynchronization, water quality improvement, base stream flow support, shoreline protection, and natural biological support.

Wetland functions are affected by physical, chemical, and biological processes that occur within a wetland and the surrounding landscape. Many wetland areas in the City have been degraded to some extent through deforestation, filling, drainage, agriculture, and the alteration of surrounding buffer areas.

Wetland functions for flood control, erosion protection, and water quality improvement are particularly valuable to protect infrastructure and limit the effects of development on water quality in the area's streams and rivers.

2.1.3 Wetland Buffers

The City regulates wetlands as critical areas under the Environmentally Critical Areas Regulations that are described in the Sammamish Municipal Code (SMC), Chapter 21.03 - Environment and Sustainability. Wetlands continuous with and within 200 feet of a Shoreline of the State are managed under the City's Shoreline Master Program (SMP).

Vegetated buffer areas and stormwater management are an important factor in protecting wetland functions from effects of surrounding land uses. The factors that influence the performance of a buffer include vegetative structure, percent slope, soils and buffer width and length. Wetland buffer conditions in the City of Sammamish are frequently interrupted by roads and adjacent residential development. Standard wetland buffer widths per City of Sammamish code are listed in Table 2 below.

Table 2. Wetland category and buffer widths under current city code

Wetland Category	Standard Wetland Buffer Width (feet)
Category I – Natural heritage or bog	215’
Category I – Habitat score 8-9	200’
Category I – Habitat score 5-7	150’
Category I - standard	125’
Category II – Habitat score 8-9	150’
Category II – Habitat score 6-7	100’
Category II – standard	75’
Category III – Habitat score 8-9	75’
Category III – Standard	50’
Category IV - Standard	50’

Invasive species, such as Himalayan blackberry, commonly occur in wetland buffers. Increasing the density and diversity of native vegetation in wetland buffers may provide an opportunity to improve wetland conditions within the city. Buffer averaging is an approved method to conserve wetland buffers while allowing for approved development, as described in SMC 21.03.020.Y.1.g.

Current buffer width requirements and recommended updates are summarized in the *Sammamish Gap Analysis Draft* (2023).

2.2 Fish and Wildlife Habitat Conservation Areas

Fish and Wildlife Habitat Conservation Areas (FWHCA) are defined as critical habitat and species federally and/or state listed as endangered, threatened or sensitive. FWHCA also includes wetlands, streams and lakes, state natural area preserves, natural areas managed by the state Department of Natural Resources, and fish and wildlife habitat corridors (SMC 21.04.040.B.134).

FWHCA are managed to maintain populations of species in suitable habitats within their natural geographic distribution so that the habitat available is sufficient to support viable populations over the long term and isolated subpopulations are not created.

Known FWHCA in the city limits include Lake Sammamish, include Pine Lake, Beaver Lake George Davis Creek, Ebright Creek, Pine Lake Creek, Laughing Jacobs Creek, and Evans Creek among others. Each type of FWHCA and potential occurrences in the Sammamish planning area are described below.

2.2.1 Streams

Sammamish is within WRIA 8 – Cedar / Sammamish and WRIA 7 - Snohomish. Sub-basins within the city are mapped in Figure 3 above. These sub-basins include numerous streams, which provide habitat for species of regional, State, and Federal significance. In some cases, non-fish bearing watercourses and water bodies are critical to supporting productive downstream habitat conditions. Table 3 below identifies the priority fish species occurring within the City of Sammamish's waterbodies as reported for WRIA 8 and in Washington Department of Fish and Wildlife (WDFW) Priority Habitat Species (PHS) data. A description of the existing conditions of the City's watercourses and water bodies follows. City stream maps are provided in Figures 6 and 7 below.

Table 3. Priority fish species and state- and federally-listed fish species by waterbody.

Common Name	**Scientific Name**	**State Status**	**Federal Status**	**Water Bodies with Documented Occurrence in Sammamish**
Bull trout/Dolly Varden	*Salvelinus confluentus*	Candidate	Threatened	Lake Sammamish, Patterson Creek
Chinook salmon	*Oncorhynchus tshawytscha*		Threatened (Upper Columbia - Endangered)	Lake Sammamish, Pine Lake Creek
Chum salmon	*Oncorhynchus keta*			
Resident Coastal cutthroat trout	*Oncorhynchus clarki clarki*			Lake Sammamish, Ebright Creek, Kanim Creek, Patterson Creek[1], Pine Lake Creek, Zackuse Creek, George Davis Creek
Coho salmon	*Oncorhynchus kisutch*		Threatened – Lower Columbia	Lake Sammamish, George Davis Creek, Pine Lake Creek, Kanim Creek, Evans Creek, Patterson Creek, Zackuse Creek
Kokanee	*Oncorhynchus nerka*			Lake Sammamish, Pine Lake Creek, Ebright Creek, Zackuse Creek
Pink salmon	*Oncorhynchus gorbuscha*			
Pygmy whitefish	*Prospium coulterii*	Sensitive		
Ranbow trout/Steelhead/Inland Redband trout	*Oncorhynchus mykiss*	Candidate	Threatened	Lake Sammamish, Evans Creek, George Davis Creek, Ebright Creek, Patterson Creek, Kanim Creek
Sockeye salmon	*Oncorhynchus nerka*			Lake Sammamish, Ebright Creek

1 Patterson Creek is southeast of city limits. However, the associated drainage basin is partially within the City of Sammamish as shown in Figure 3 above.

Ebright Creek

Ebright Creek is located in the Monohan subbasin on the northeast end of Lake Sammamish. It originates east of Lake Sammamish, near the Sammamish Commons, and travels west to Lake Sammamish. It has approximately 2.3 miles of open channel length. More than half of the total

land use in the basin is developed, followed by forest. Forest is a combination of mixed, evergreen, and deciduous forest with the best riparian cover (>80%) in the middle reaches. Ebright Creek is categorized as "Core Summer Salmonid Habitat" for aquatic life use and is on the Washington State Department of Ecology's 303(d) list for bioassessment scores that indicate biological integrity is degraded (Category 5).

Ebright Creek is a primary Kokanee spawning stream habitat that (together with Laughing Jacobs Creek) provides most of the species' current spawning habitat. It also supports coastal cutthroat trout spawning. There is a total fish passage barrier northwest of Ebright Creek Park as well as a partial fish passage barrier where the creek crosses under E Lake Sammamish-Pkwy SE.

Evans Creek

Evans Creek and its tributaries support Chinook, Coho and Sockeye spawn. The Evans Creek basin has approximately 68.2 acres of wetlands as of 2016 (Sammamish 2016, Amended 2020). Ecology's Water Quality Atlas documents temperature and dissolved oxygen in Evans Creek below water quality thresholds (https://apps.ecology.wa.gov/waterqualityatlas/wqa/map).

George Davis Creek

George Davis Creek is in the Inglewood subbasin on the northeast side of Lake Sammamish within the City of Sammamish. The George Davis Creek/Allen Lake wetland complex forms the headwaters of streams feeding George Davis Creek (see Figure 6) The total land use in this subbasin is dominated by developed land, mostly low intensity and open space, along with some forest.

George Davis Creek has approximately 3 miles of open channel length, but only about 100 feet was accessible to kokanee and other migratory fish species. However, culverts on George Davis Creek were replaced in 2020 (County, City of Sammamish Water Quality and Aquatic Habitat Monitoring Plan, 2018) and provides potential spawning habitat as the connection between George Davis Creek and Lake Sammamish is highly altered. George Davis Creek is categorized as "Core Summer Salmonid Habitat" for aquatic life use, and portions of the creek have been assigned an additional "Supplemental Spawning and Incubation Protection" temperature criteria.

Kanim Creek

Kanim Creek is located in the Pine Lake subbasin where it flows across an upland plateau from wetland headwaters into Lake Sammamish east of the community of Lake Hills. A large portion of the subbasin is forested, with remaining areas being primarily rural and urban-density residential uses. Kanim Creek has a drainage area of approximately 185 acres, 22 of which are classified as impervious areas. The creek has approximately 1.31 miles of open channel, and has anadromous fish use up to river mile 1.80 (County, 1994).

Kanim Creek has historically suffered from landslide and sedimentation issues, which resulted in a hillslope failure causing a fish passage blockage.

Patterson Creek

Patterson Creek, 12.1 miles long, is the largest left bank tributary to the Snoqualmie River downstream of Fall City. Patterson Creek is part of the Patterson Creek subbasin, which covers

12,711 acres (19.86 square miles) along the slope of the Sammamish plateau and encompasses Patterson Creek and all of its tributaries. The elevation of the Patterson Creek Basin varies from about 70 feet at the confluence with the Snoqualmie River to 1,400 feet in the southwest corner. Surface geology types in the basin are 79 percent till and 13 percent outwash. Located along the western edge of the watershed, Patterson Creek flows in a southeasterly direction for most of its length before turning north and traversing the Snoqualmie River's floodplain through farmland.

Patterson Creek, as well as the tributaries contained within Patterson Creek Basin, support Chinook salmon, Coho salmon, steelhead/rainbow trout, and coastal cutthroat trout. Patterson Creek is a low-gradient floodplain channel that has been highly impacted by historic land use practices. The once Sitka spruce, western red cedar, and hemlock dominated floodplain has been largely converted to agricultural land, leaving the riparian habitat in poor conditions. Habitat connectivity in the main stem of Patterson Creek is limited by the lack of large woody debris (LWD). The stream banks of Patterson Creek from its confluence with Canyon Creek to the Snoqualmie River are dominated by agriculture and pastureland, with little to no riparian vegetation.

Pine Lake Creek

Pine Lake Creek basin drains approximately 1,200 acres near the south end of the Sammamish Plateau. Pine Lake Creek starts at its headwaters in Pine Lake, where it flows generally to the northwest where it converges with Kanim Creek and drains into Lake Sammamish. The Pine Lake Creek sub-basin has a drainage area of 341 acres and is one of three sub-basins within the Pine Lake basin.

Zackuse Creek

Zackuse Creek is in the Zackuse Basin, which is located on the western edge of Sammamish, draining approximately 245 acres from the Sammamish Plateau to Lake Sammamish near Louis Thompson Road. The basin is mostly residential and consists of established neighborhoods with private and public roads, and formal and informal stormwater infrastructure, varying by neighborhood. The Zackuse Basin drops in elevation from 500 feet at its high point in the northeast corner in the Tamarack neighborhood to 40 feet on the shore of Lake Sammamish.

Zackuse Creek is a small stream that originates from a series of wetlands in the City of Sammamish and flows down to the eastern shore of Lake Sammamish. In the lower reaches, the creek passes through several culverts, including those under the East Lake Sammamish (ELS) Parkway, ELS Trail, ELS Shore Lane, and a residential parcel before emptying into the lake.

Zackuse Creek is one of several streams on the east side of Lake Sammamish that has historically supported kokanee spawning. Additionally, cutthroat trout are known to be in the basin, and coho salmon are thought to be in the basin. It is identified as a Class 3 kokanee stream in the Blueprint for the Restoration and Enhancement of Lake Sammamish Kokanee Tributaries (Lake Sammamish Kokanee Work Group 2014).

Several stream restoration projects have been completed on Zackuse Creek over the last 15 years. Projects to-date have restored fish passage in the lower reaches of this stream through

daylighting, culvert replacements, and in-stream enhancements with the goal of reestablishing it as kokanee spawning habitat.

2.2.2 Stream Buffer Widths

The City of Sammamish's stream classifications and associated buffer widths under the current code are reported in Table 4 below. Current buffer width requirements and recommended updates are summarized in the *Sammamish Gap Analysis Draft* (2023).

Table 4. Required stream buffer widths in Sammamish (SMC 21.03.020.AA)

Stream Type	Standard Required Buffer (Sammamish)
Type S	150 feet
Type F	150 feet
Type Np	75 feet
Type Ns	50 feet

2.2.3 Lakes

Lake Sammamish

Lake Sammamish is the sixth-largest lake in Washington, with a surface area of 7.7 square miles and a watershed area of 98 square miles. It has an average depth of 58 feet, with its deepest point of 105 feet. Lake Sammamish is predominantly fed by Issaquah Creek, which contributes over 70% of the lake's inflow, plus numerous small streams. Its outflow is the Sammamish River, which enters Lake Washington. Lake Sammamish is a popular recreation spot with frequent boat/vehicular traffic.

The City of Sammamish has four significant small lakes: Beaver Lake, Pine Lake, Laughing Jacobs Lake, and Yellow Lake (outlined in Table 5 below). Lake with less than 20-acres of open water, such as Laughing Jacobs Lake and Yellow Lake, are not regulated as Shorelines of the State.

Table 5. Characteristics of small lakes in Sammamish

Lake	Area (acres)	Special Considerations
Beaver Lake	71.2	Phosphorous sensitive
Pine Lake	85.7	Phosphorous sensitive, high fecal-coliform bacteria
Laughing Jacobs Lake	7.7	Phosphorous sensitive
Yellow Lake	8.8	

Beaver Lake

Beaver Lake is a chain of three lakes, totaling 71 acres, with a watershed area of 1,100 acres. The largest, central basin is 62 acres, with an average depth of 21 feet and deepest point of 54

feet. Beaver Lake is fed primarily by small un-named tributaries from the East Lake Sammamish Wetland and the Hazel Wolf Wetlands (both contain sphagnum bogs). Beaver Lake's outflow is Laughing Jacob's Creek.

Beaver Lake is popular for swimming, fishing, and boating. It has public access via a Washington Department of Fish and Wildlife (WDFW) boat ramp near the southeast corner of the central basin, and Beaver Lake Park on the southwest side of the lake.

The watershed surrounding Beaver Lake is a mix of residential properties and parks/preserves. The watershed is essentially developed to its current zoned capacity.

Pine Lake

Pine Lake is 86 acres, with a 469-acre watershed. Its average depth is 20 feet, with its deepest point of 39 feet. Pine Lake is fed by several small un-named tributaries, and its outflow is Pine Lake Creek. Pine Lake is a popular fishing spot and is seasonally stocked with rainbow trout.

The watershed surrounding Pine Pake is primarily residential properties, plus Pine Lake Park. Population density in the watershed is increasing, primarily to the north of Pine Lake where sewer access was added in 2010 (along SE 20th St) and increased the allowable density. When future sewer access is added south of Pine Lake, further density increases may occur there as well. However, city sewer connections instead of private septic systems would presumably reduce nutrient loading from these residential properties.

Laughing Jacobs Lake

Laughing Jacobs Lake is 8 acres, with a sphagnum bog on the north end. Its shoreline is entirely private property with no public access. Docks and small unmotorized watercraft indicate that lakeside property owners use the late for boating.

Prior to 2017, Laughing Jacobs Lake was sparsely developed, and had several houses along the shoreline. In 2017 and 2018, a large new single-family residential development was constructed along the east side of Laughing Jacobs Lake.

Yellow Lake

Yellow Lake is a shallow 9-acre lake surrounded by a forested buffer strip and has no lakeside residences. The lake is private property of the Klahanie Homeowners Association, but has pubic access to a 1.25-mile trail around the lake and a short dock. It is most popular for trail uses and wildlife viewing. There is no boat access to the lake.

The watershed surrounding Yellow Lake is primarily residential properties and is essentially developed to its current zoned capacity.

2.2.4 Water Quality

The lakes in Sammamish provide habitat for fish species of regional, State, and federal significance. In 1986, in an effort to reduce phosphorus inputs into Lake Sammamish, sewage was diverted out of the lake resulting in a 35% reduction in overall phosphorus concentrations. This reduction in phosphorus visibly increased water quality and clarity however, as the urban areas around the lake developed the lake was threatened by non-point source phosphorus

runoff (King County, 2018). A non-point source pollutant is one that does not have any "discernible, confined and discrete conveyance, including but not limited to any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, concentrated animal feeding operation, or vessel or other floating craft, from which pollutants are or may be discharged(U.S. EPA, 2022). The new developments and changes in land use altered the watersheds' water quality, quantity, and runoff. The cumulative impacts of these changes were seen in Lake Sammamish as water quality diminished (King County, 2018).

King's County completed the East Lake Sammamish Basin and Nonpoint Action Plan in 1994. After the City of Sammamish was incorporated in 1999, the City adopted the already completed plan into City regulatory structure and utilized it for lake, stream and wetland management. This management program was referenced to help reduce negative impacts to surface water systems within the basin as the area developed. Additionally, it evaluated the water quality, aquatic resources, and surface-water problems of the East Lake Sammamish basin under past, current, and future land-use conditions. This plan consisted of three primary goals which included:

1. To reduce surface water-problems that threaten public health and safety;
2. To protect the value of waterbodies for recreation, fish and wildlife habitat, and aesthetic enjoyment; and
3. To reduce the contribution of nonpoint source pollution to these surface-water problems. (King County, 1994)

Before the City incorporated and under the guidance of King County in 1996 an adaptive management plan known as The Lake Sammamish Water Quality Management Plan was implemented by the interjurisdictional Lake Sammamish Initiative. This plan worked to identify sources of phosphorus pollution and develop strategies to reduce them by setting annual goals for three water quality indicators;

1. Annual volume weighted total phosphorus concertation of 22 µg/liter;
2. June September mean of 2.8 µg/liter chlorophyll a (a measure of algal density);
3. June September mean water transparency of 4 meters.

Adaptive management alternative that are being used today include;

1. Forest conservation in the Issaquah Creek basin;
2. Practices to reduce the use and loss of phosphorus from homes, gardens, farms, forests, and businesses;
3. Water quality facilities for new urban development;
4. Better maintenance of storm water facilities in the basin;
5. Better enforcement of erosion controls;
6. And capital projects for specific sources throughout the basin.

Today, the City of Sammamish, which was incorporated in August 1999, continues to monitor the water quality of Lake Sammamish to understand the lakes response to the management actions (King County, 2018).

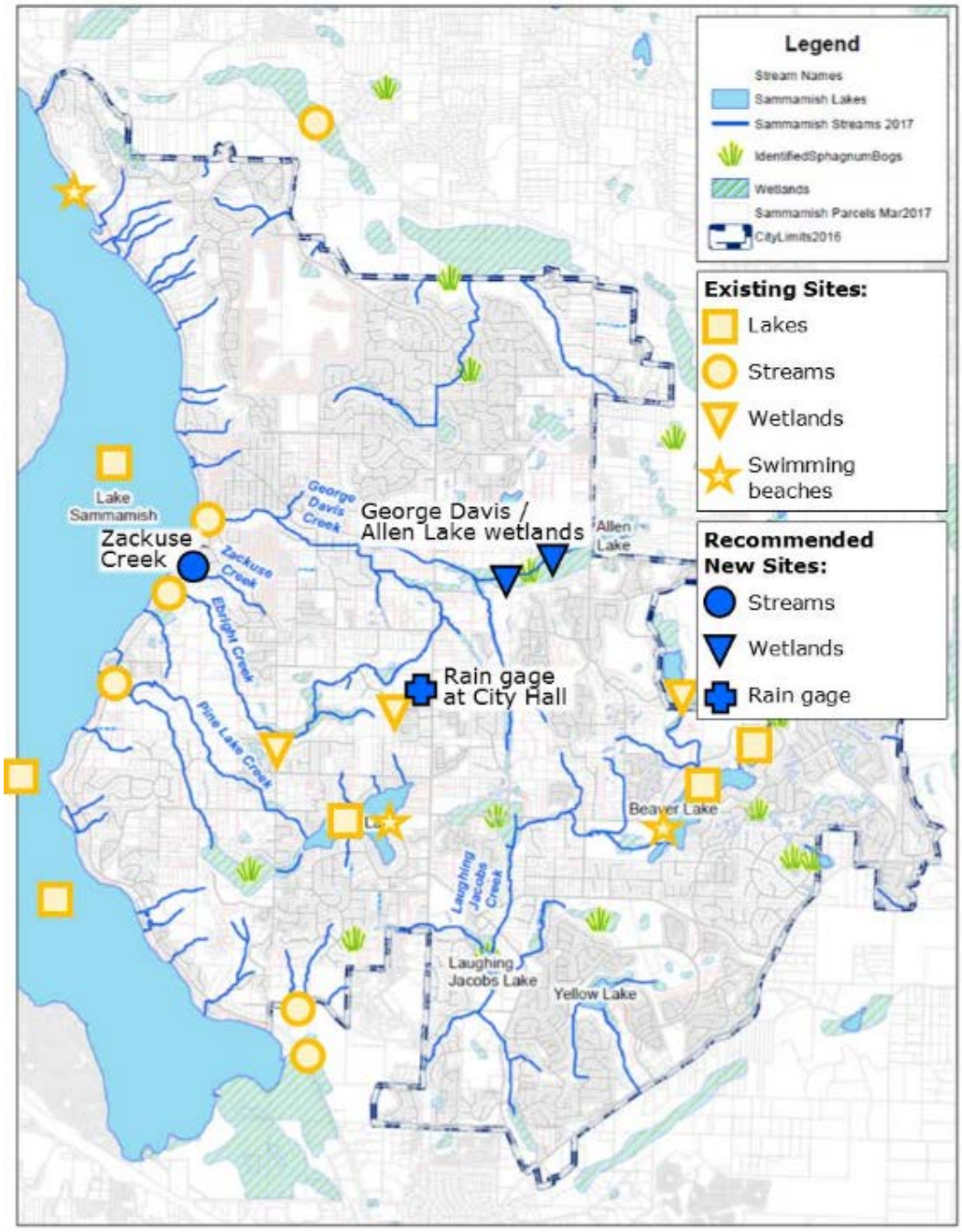
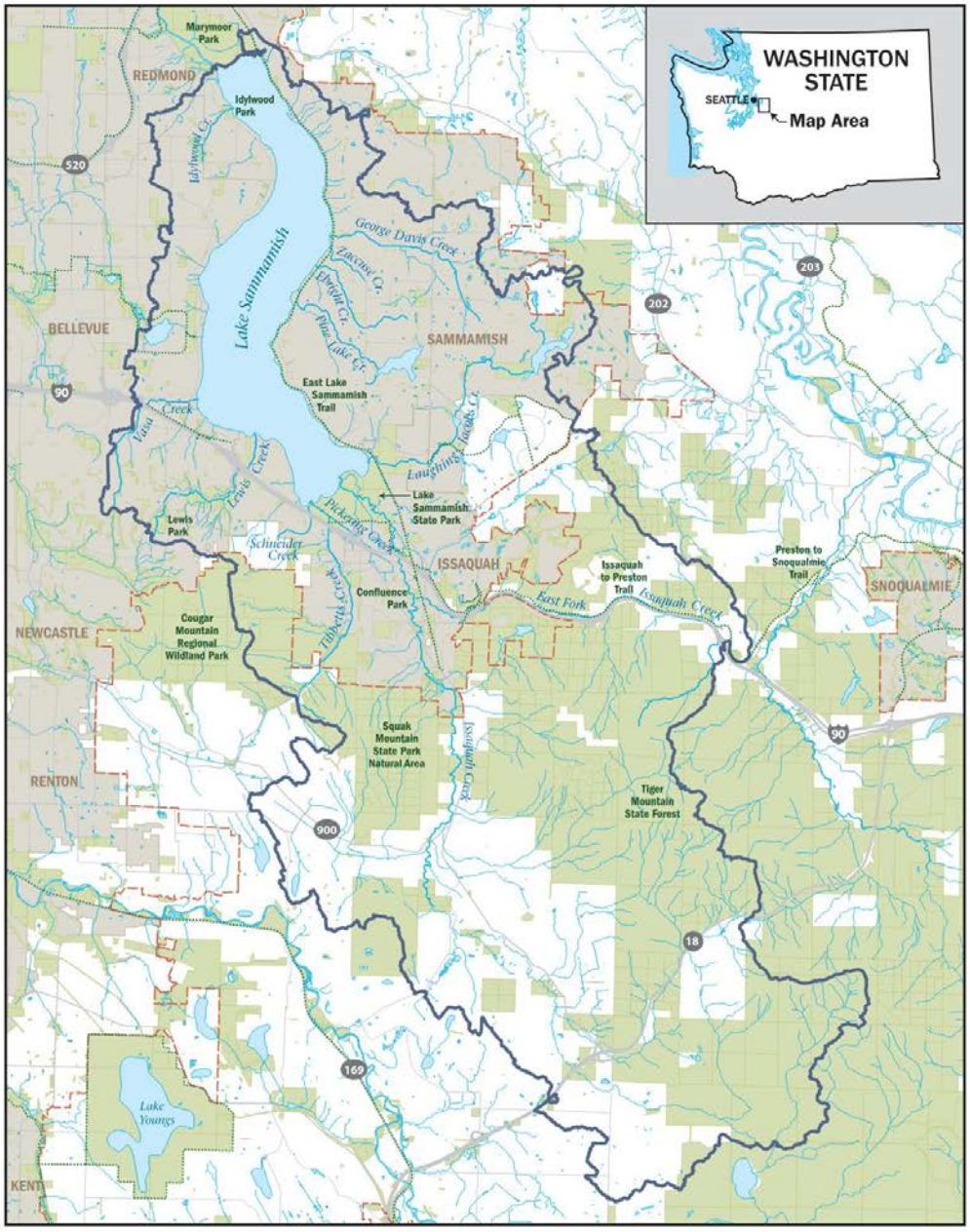


Figure 6. Proposed monitoring stations in Sammamish, per the 2018 Water Quality and Aquatic Habitat Monitoring Plan



Lake Sammamish Drainage Area

Lake Sammamish Drainage Area Boundary
Public Land
City Area
Stream/Lake
King County Regional Trail
Urban Growth Area Boundary
Major Road

N
0 1 2 Miles
May 2014

King County
Department of Natural Resources and Parks

File Name: 1405_w_lakeSAMMdrainageMAP.ai
Data Sources: KC GIS Data Library

Figure 7. Lake Sammamish Drainage Area.

2.2.5 Endangered, Threatened or Sensitive Species – Birds and Mammals

The City of Sammamish and surrounding study area includes habitat types that are known to be used or could potentially be used by species of interest (excluding fish), including those species with State or federal states and WDFW priority species. These habitats include forested upland, wetlands, riparian areas, scrub-shrub, and open habitat such as agricultural fields.

Priority and Endangered Species Act (ESA) listed species of local interest likely to use habitat within the City are listed in Table 6. Suitability and availability of habitat in the City of Sammamish for species of interested known or likely to occur in the City are addressed in the following sections. Also, listed species with historical presence in the Puget Sound area or King County are addressed briefly. Documented occurrences of the species listed below were drawn primarily from WDFW and eBird.org databases.

Table 6. Priority and ESA-listed bird and mammal species in potentially present in the City of Sammamish [Source, WDFW PHS on the Web, eBirds]

Common Name	Scientific Name	State Status	Federal Status	PHS?
Birds				
Marbled Murrelet	*Brachyramphus marmoratus*	E	T	N
Yellow-billed cuckoo	*Coccyzus americanus*	E	T	N
Great blue heron	*Ardea herodias*	M		N
Green heron	*Butorides virescens*	M		N
Band-tailed pigeon	*Patagioenas fasciata*			Y
Pileated woodpecker	*Dryocopus pileatus*	S	Co	N
Peregrine falcon	*Falco peregrinus*	S	Co	N
Osprey	*Pandion haliaetus*	M		N
Bald eagle	*Haliaeetus leucocephalus*	S	Co	N
Purple martin	*Progne subis*	C		N
Vaux's swift	*Chaetura vauxi*			Y
Mammals				
Gray wolf	*Canis lupus*	E	E	Y
Big brown bat	*Eptesicus fuscus*	S		Y
Little brown bat	*Myotis lucifugus*	S		Y
Townsend's big-eared bat	*Corynorhinus townsendii*	S	Co	Y
Yuma myotis	*Myotis yumanensis*	S		Y

Legend: PHS = Priority Habitat and Species; E=Endangered; C = Candidate Species; Co = Species of Concern; M = Monitor species; S = Sensitive Species; T=Threatened; P = Proposed threatened

Marbled Murrelet

The Marbled murrelet is a small diving seabird that breeds along the Pacific Coast. In Washington, it forages almost exclusively in the nearshore marine environment, but flies inland to nest in mature conifers. Behavior of marbled murrelet nesting has been documented to occur

beyond 50 miles inland from the marine environment. Marbled murrelets are small and secretive with their nesting sites. The City of Sammamish is only approximately 10 miles to the east of Puget Sound, therefore it is possible that marbled murrelets could use some of the mature forest areas with an old-growth component within the City for nesting. Marbled murrelets nest in old-growth trees.

Yellow-billed cuckoo

Yellow-billed cuckoos are fairly large, long and slim birds that are stealthy and shy. They prefer dense forests and riparian areas, often sitting motionless for long periods of time. Their preferred habitats also include woodlands, thickets, orchards, and streamside groves. The species' major food resources vary in distribution – as a result the western yellow-billed cuckoo's use of an area is tied to the area's habitat condition and food resources, which can vary over time. Though there is not designated critical habitat within City limits, Sammamish has numerous wetland complexes and shaded riparian corridors that could attract yellow-billed cuckoos.

Great Blue Heron

Great blue herons are typically thought of as wading birds frequenting wetlands, rivers, ponds, and lakes. They are common in these habitats year-round in the Sammamish area. In winter, however, they also hunt on land, foraging on small mammals, primarily voles (Seattle Audubon Society 2005). The species usually nests in tall trees, but may also utilize artificial structures and even shrubs. The availability of suitable nesting sites in proximity to foraging areas may limit the occurrence of the species, and may be a limiting factor in the City. A number of studies also show that human disturbance can affect colony success, although some birds may climatize to disturbance (Quinn and Milner 2004). There are no known nesting colonies in the City at present, although future opportunities may exist near wetlands.

Green Heron

Green herons depend on wetlands, ponds, and streams for their prey, which is primarily small fish, but also includes crustaceans, insects, herptiles, and rodents. They typically nest in trees near water. There are no current breeding area records in Sammamish, but they are a secretive species and susceptible to disturbance, development, and habitat loss (Seattle Audubon Society 2005).

Band-tailed Pigeon

This species is commonly sighted year-round in western Washington. It utilizes natural areas, parks, and developed areas, usually when large conifers are available (Seattle Audubon Society 2005). There are several non-breeding records of the species in Woodinville, and they are likely to use the City's parks and open spaces and may be drawn to feeders in residential areas.

Pileated Woodpecker

Pileated woodpeckers are regularly observed in suburban environs, where they forage and drum on trees, snags, and telephones poles. Despite being commonly referred to as old-growth or mature forest nesters, they will nest in any forest type as long as suitably large trees for roosting and nesting are present (Seattle Audubon Society 2005). The species has been noted in the City of Sammamish and is likely to occur regularly in wooded areas.

Peregrine Falcon

Peregrine falcons are mainly cliff-nesters, preferring cliffs greater than 45 m in height (Hays and Milner 2004), although man-made structures and occasionally trees are also used, as are existing abandoned nests built by other species. Preferred nest sites are usually near open water (Seattle Audubon Society 2005). Most breeding pairs are near a coast, but the species' range is expanding to encompass cities (Seattle Audubon Society 2005). They occur throughout western Washington in winter, when they often utilize large trees and snags for foraging perches near feeding sites, which are often open wetlands and mudflats but also include developed areas. Bridges and commercial and treed lakeside properties in Sammamish provide potential nesting and foraging locations, but the species is not presently documented in the City.

Osprey

Ospreys typically breed near rivers and other large bodies of fresh or salt water and nest in large trees, snags, or man-made structures and platforms. They forage for fish in water that can support medium-sized fish. Osprey sightings are documented in the City of Sammamish, although no known nests are present.

Bald eagle

Bald eagles are common nesters in western Washington. Nesting birds tend to choose sites close to open water in dominant tall trees of any species, usually providing line-of-sight to nearby water (Watson and Rodrick 2004). The species often acclimatizes well to human development, although some individuals respond negatively to new disturbance and development (Stalmaster 1987). In winter, birds congregated at feeding grounds along large rivers and roost sites in dense conifer stands in western Washington. Potential breeding habitat exists in Sammamish, and suitable foraging perch trees are present throughout the City, particularly near open water, including streams and lakes. Individuals have been documented in the City on numerous occasions.

Purple Martin

Purple martins readily nest in man-made boxes and structures, in addition to natural cavities. A colony nested in pilings at the north end of Lake Sammamish until at least 2003, and birds are regularly sighted on and near the lake. Individuals can be observed foraging on flying insects over any open area, including lakes, wetlands, fields and developed areas. Potential for the establishment of breeding sites, either natural or human-created, exists in the City of Sammamish, particularly in large wetlands or along Pine Lake.

Vaux's Swift

Vaux's swift forages in open skies over forests, lakes and rivers, where insects are abundant. Nesting normally takes place in mature or old-growth forest where large snags, preferably at least 27 inches dbh (Lewis et al. 2002) with cavities of approximately 20 inches in length, are available. The species also nests in broken treetops and chimneys. Sightings of individuals are not uncommon in developed areas, and they have been observed foraging and flying in Sammamish. Remaining tracts of forest could potentially support breeding birds in the future.

Gray Wolf

According to WDFW, Gray wolves are forming resident breeding packs in the region, ranging from Montana to Idaho, Washington, Oregon, and British Columbia. Gray wolves are highly

social and typically live in packs; pack size varies. Gray wolves are opportunistic carnivores and scavengers. Gray wolves are habitat generalists and have been known to forage in rural and urban environments, although they primarily inhabit forests (Wiles et al. 2011).

Townsend's Big-eared Bat and Roosting Concentrations of Big Brown Bat (Eptesicus fuscus), Myotis bats (Myotis spp.), Pallid Bat (Antrozous pallidus)

Townsend's big-eared bat's range includes most of the lowland and high montane mixed and coniferous forests of Washington, but their occurrence is limited by the availability of required habitat features (Woodruff and Ferguson 2005). Suitable roosts for both daytime and nursery roosting are caves, mines, hollow trees, and man-made structures. Use of abandoned man-made structures features by the species within the City of Sammamish cannot be precluded.

2.2.6 Habitat Corridors

Terrestrial Corridors

Sammamish regulates wildlife corridors as FWHCA. The city defines Fish and wildlife habitat corridors as follows (SMC 21.04.040.B.135):

> *Those corridors set aside and protected for preserving connections between habitats on development proposal sites that contain Type F or Np streams and/or wetlands with a high habitat score greater than or equal to eight on the Washington State Wetland Rating System for Western Washington (Department of Ecology 2014 or as revised) that are located within 200 feet of an on-site or off-site Type F or Np stream and/or wetland with a high habitat score greater than or equal to eight on the Washington State Wetland Rating System for Western Washington. Fish and wildlife habitat corridors do not increase stream buffers, except as required to provide a connection between two features as described above.*

Wildlife corridors are not formally mapped by the City of Sammamish. However, King County iMap includes wildlife network mapping (Figure 8 below). The wildlife network mapped by King County is a single line, but in practice a set width is typically applied. The mapped corridors cross through developed areas, such as neighborhoods, which impede wildlife movement.

Maintaining fish and wildlife corridors throughout the city is critical to support viable populations of numerous fauna species, including priority species. Connected corridors support migration and provide access to both aquatic and terrestrial habitats. Many species require access to both aquatic and terrestrial areas at different seasons or life cycle stages. Habitat corridors also support microclimate conditions, and provide sources of food, shelter and shade.

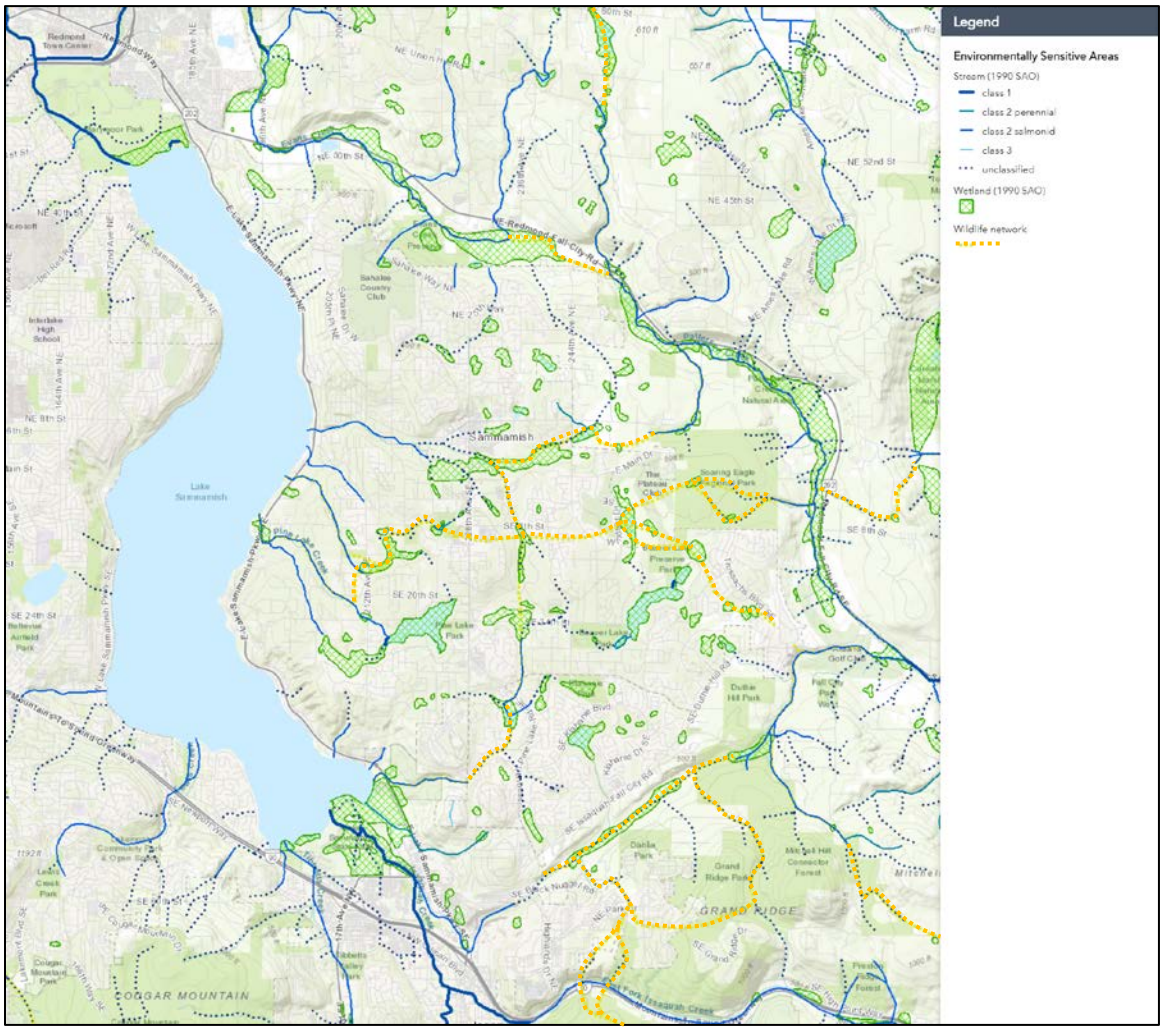


Figure 8. Wildlife network (orange dashed line) and habitats mapped in Sammamish [source: King County iMap]

2.3 Frequently Flooded Areas

Frequently flooded areas include floodplains and other areas subject to flooding. These areas provide important hydrologic functions and may present a risk to persons and property.

The City of Sammamish has extensive floodplains, including numerous streams, lakes, stormwater outlets, and areas of flood problem flow controls, but only limited flood hazard areas (mapped by the FEMA NFIP). The flood hazard areas are located along the eastern shore of Lake Sammamish and near the northern city boundary along State Route 202 (Figure 9). Regulations for flood hazard protection are contained within SMC 15.10, Flood Damage Prevention.

The City of Sammamish defines flood hazards as those areas in the City of Sammamish subject to inundation by the base flood and those areas subject to risk from channel relocation or stream meander including, but not limited to, streams, lakes, wetlands, and closed depressions in SMC 24.04.040.139. The Sammamish Municipal Code (SMC) 15.10.040 defines “Floodplain” or

"flood-prone area" as "any land area susceptible to being inundated by water from any source." See "flood" or "flooding." This definition would include lake level flooding, groundwater flooding, stormwater flooding, seismic and tsunami flooding and seiches.

The King County Regional Hazard Mitigation Plan (RHMP) notes that approximately 254 buildings and 12 stormwater structures are within the FEMA 100-year floodplain, based on 2012 building roofline imagery. In the event of flooding caused by a water level rise of Lake Sammamish, homes and structures bordering the shoreline are likely to be affected. Flooding on Lake Sammamish may also affect the main transportation corridors, East Lake Sammamish Parkway and State Route 202.

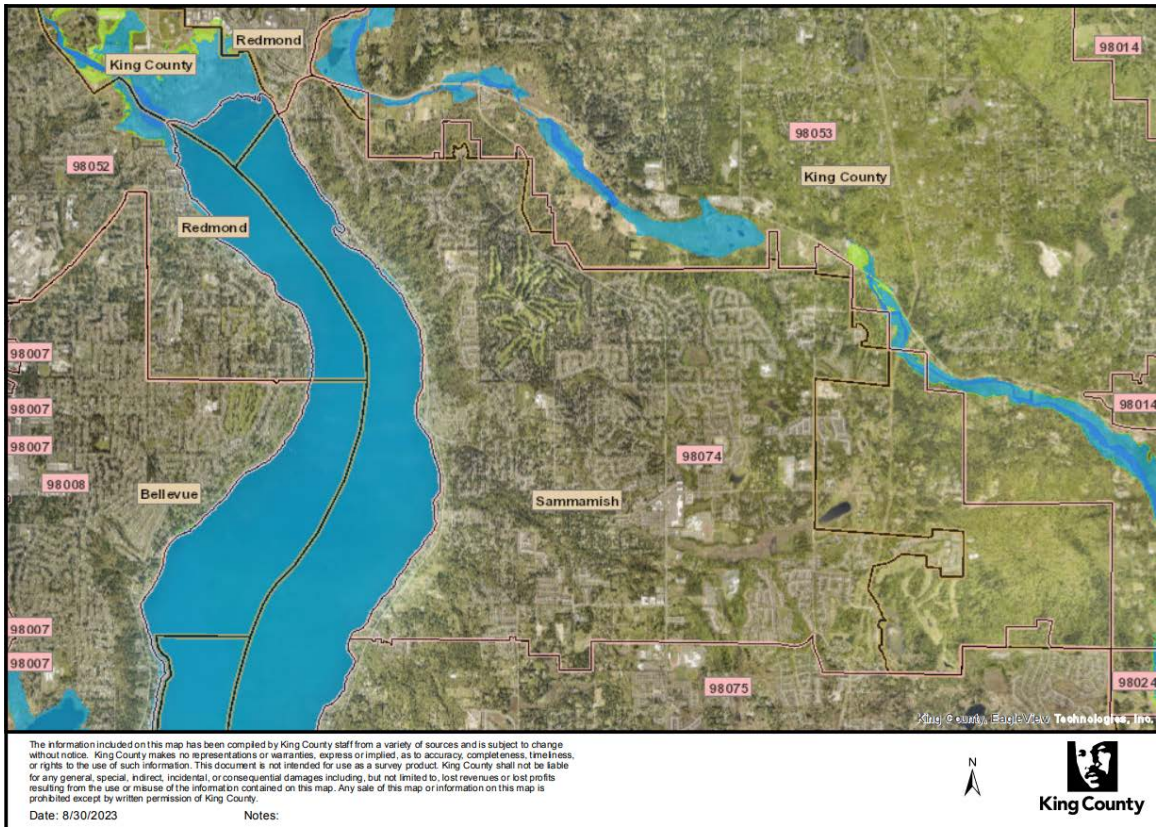


Figure 9. FEMA Floodplain (King County)

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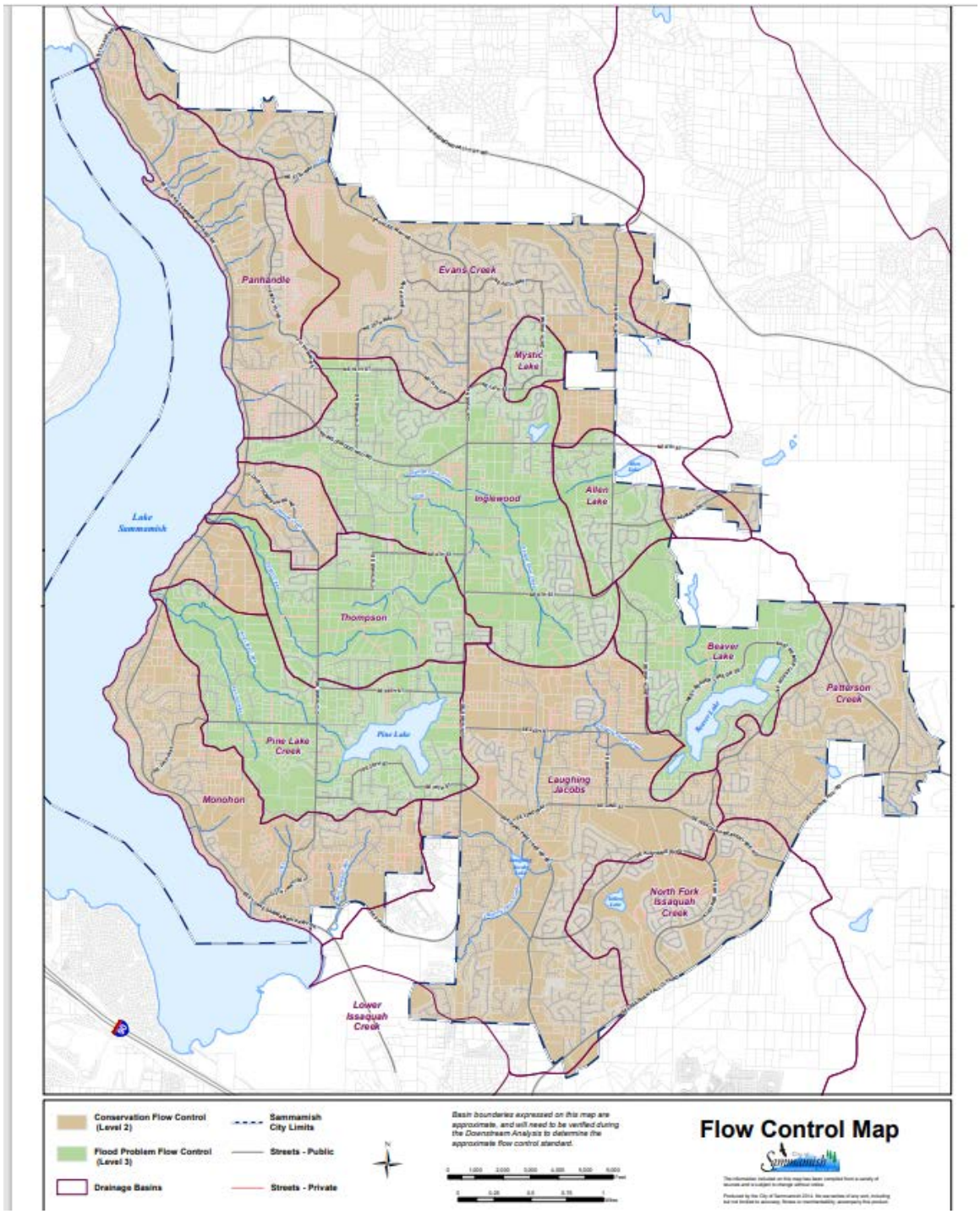

Figure 10. Flow Control Map (City of Sammamish)

2.4 CARAs

WAC 365-190-030 describes critical aquifer recharge areas (CARA) as,

"Critical aquifer recharge areas' are areas with a critical recharging effect on aquifers used for potable water, including areas where an aquifer that is a source of drinking water is vulnerable to contamination that would affect the potability of the water, or is susceptible to reduced recharge."

An aquifer is a geologic formation that readily transmits water to wells or springs. Where the surficial geology consists of shallow glacial deposits, aquifers are typically sand and gravel with sufficient infiltration for water to be stored and discharged. Deeper aquifers may be sedimentary or volcanic formations with sufficient permeability to store and transmit recharge.

There are mapped CARAs within Sammamish city limits, the King County designated Potential Annexation Area, and the City-King County Joint Study Area. The City of Sammamish Critical Aquifer Recharge Areas Map shows Class 1, Class 2, and Class 3 CARA locations within and around the City. The CARAs include wellhead protection areas drawn from time-of-travel calculations for Group A and Group B wells (Figure 11). This is an interactive map tool available to the public through the City's website.

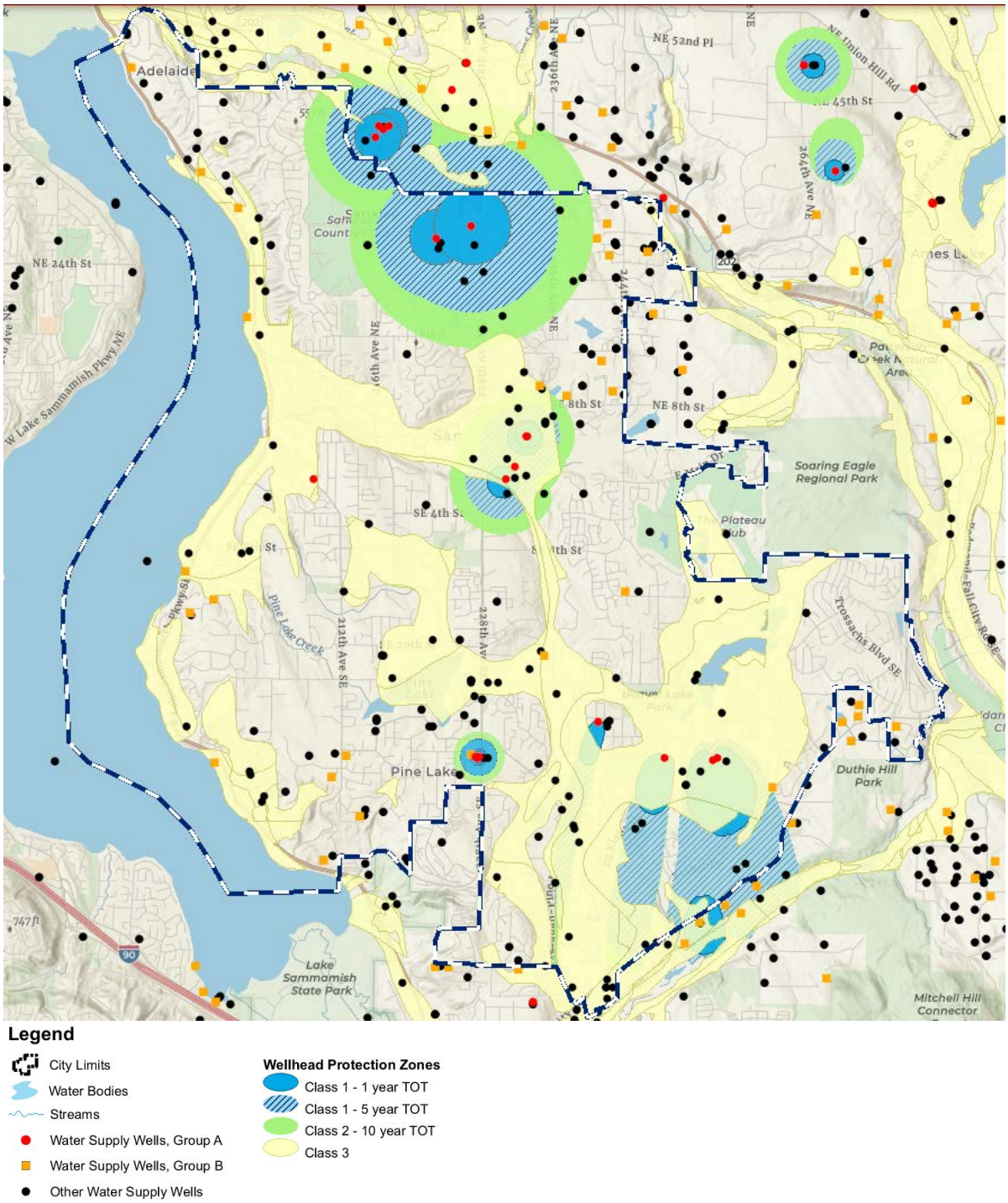

Figure 11. City of Sammamish Critical Aquifer Recharge Areas (Sammamish Property Tool).

As indicated in the map above, large areas of the city are covered by known Class 1 and Class 2 CARAs particularly on the northern boundary near the Evans Creek Preserve. This area is built out primarily with single family homes as well as the Sahalee Country Club and Golf Course.

There are also several small residential parks and small businesses within these CARAs. The primary zoning for this area of the City is Residential (R-4).

A relatively smaller CARA, located in the center of Sammamish, near the intersection of 228th Ave NE and NE 8th St, includes several larger commercial businesses, grocery stores, storage facilities, Eastlake High School and Central Washington University Sammamish, as well as a townhome residential neighborhood. This area has a mix of zoning districts, including Community Business (CB), Office (O), and Residential including R-18, R-8, R-6, and R-4.

The southeastern boundary of the city, near Yellow Lake, Klahanie Park, and SE Issaquah Beaver Lake Road, includes a relatively large Class 1 CARA. This area is also built out primarily with single-family and multi-family homes as well as a few small commercial businesses. The zoning in this area includes Residential R-6 and R-18, and Community Business (CB).

Class 3 CARAs cover much of the city but have fewer development regulations than Class 1 or Class 2 CARAs.

Current stormwater management and adherence to best management practices consistent with Washington State Department of Ecology (Ecology) requirements address the potential for groundwater contamination in these susceptible areas. Lower density zoning within the CARAs can reduce the risk of groundwater contamination. The majority of the City-King County Joint Study Area CARA is zoned A-10, Agricultural, which allows one residential unit per acre.

The City of Sammamish is largely located within the East Lake Sammamish Basin. This basin flows westward and into Lake Sammamish. Other significant basins within the City include the Evans Basin, which is located to the northeast, Patterson Creek Basin, located to the east, and Issaquah Creek Basin to the south.

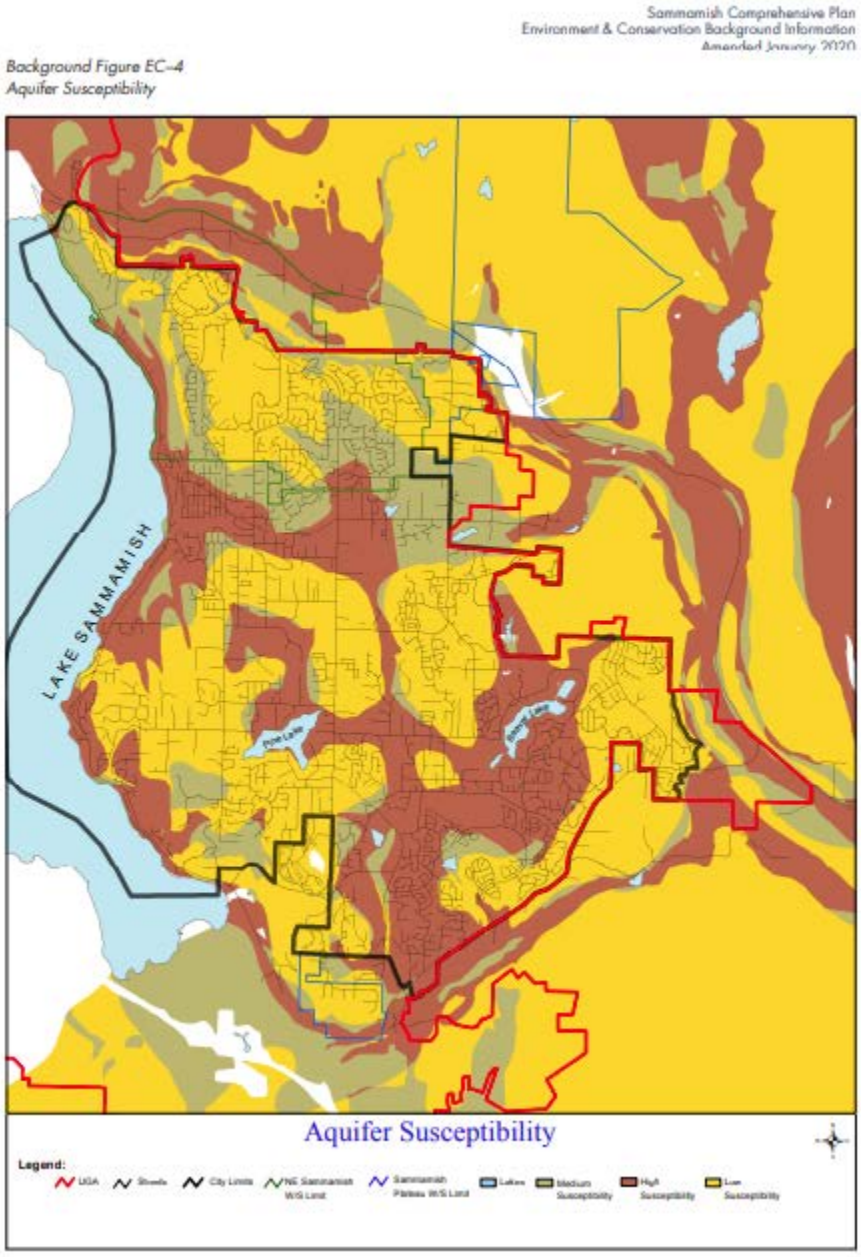

Figure 12. Aquifer susceptibility (City of Sammamish Comprehensive Plan).

Sammamish Comprehensive Plan
Environment & Conservation Background Information
Amended January 2020

Background Figure EC–5
Wellhead Protection Areas

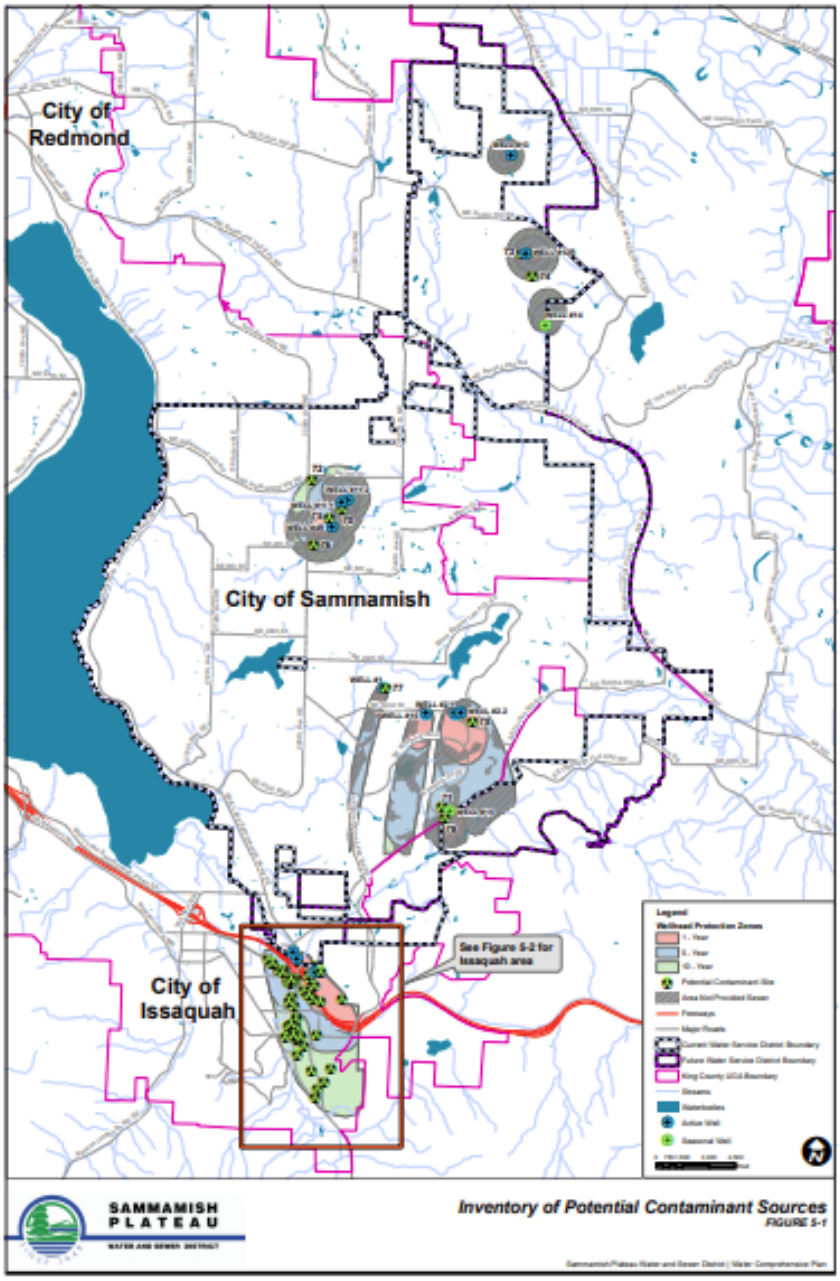

Figure 13. Inventory of potential contaminant sources.

The City of Sammamish gets much of its drinking water from the Sammamish Plateau Water and Sewer District, which serves the City of Sammamish, a northern portion of the City of Issaquah, as well as other urban and unincorporated portions of King County. The water district is

considered a Group A system (system ID No. 409009), operating as a municipal corporation under Title 57 of the RCW using both groundwater wells and surface water sources.

The Sammamish Plateau Water & Sewer District boundary is approximately 29.3 square miles and the system includes the Plateau Zone and the Cascade View Zone. The Plateau zone is located south of the City of Redmond and Cascade and the Cascade View Zone is located north of Redmond. These two zones are each served by their own wells, and storage and regional system connections. The Plateau zone currently has 10 operation wells and connection to the regional surface water source from the Cascade Water Alliance. The primary land use in this area is residential with a few commercial and office use areas. The Cascade View Zone currently has two operational wells as well as the regional surface water source from the Cascade Water Alliance. The primary land use in this area is residential and agricultural with approximately 18 percent of the land undeveloped (SPWSD, 2018).

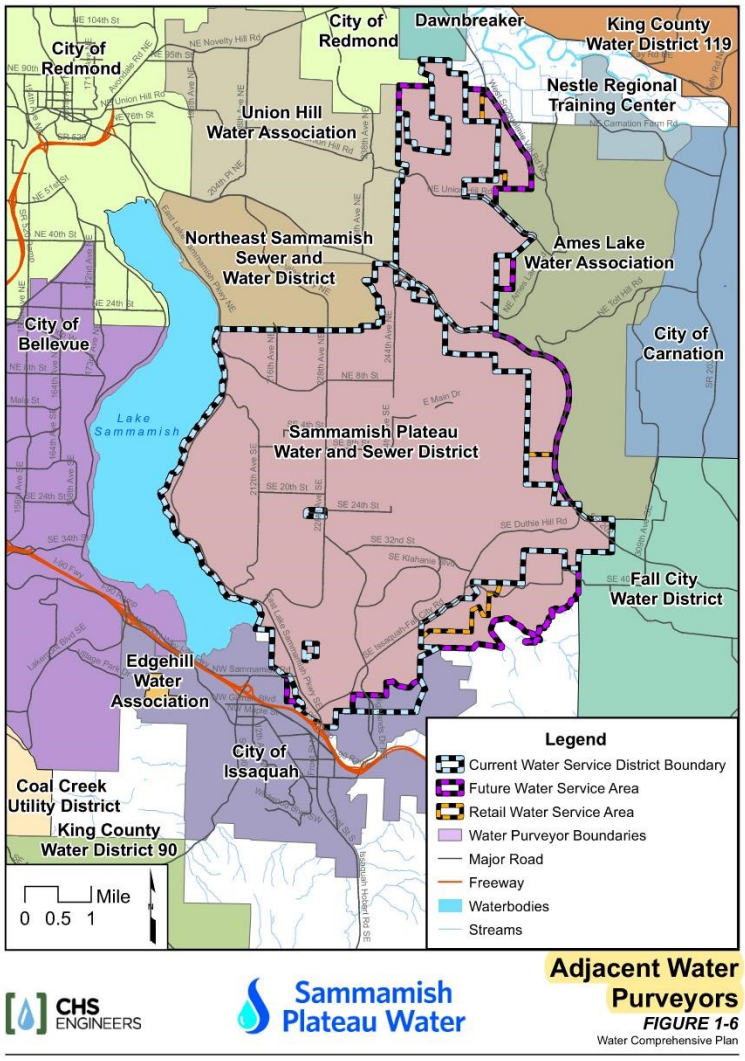

Figure 14. Sammamish Plateau Water District Adjacent Water Purveyors Boundaries.

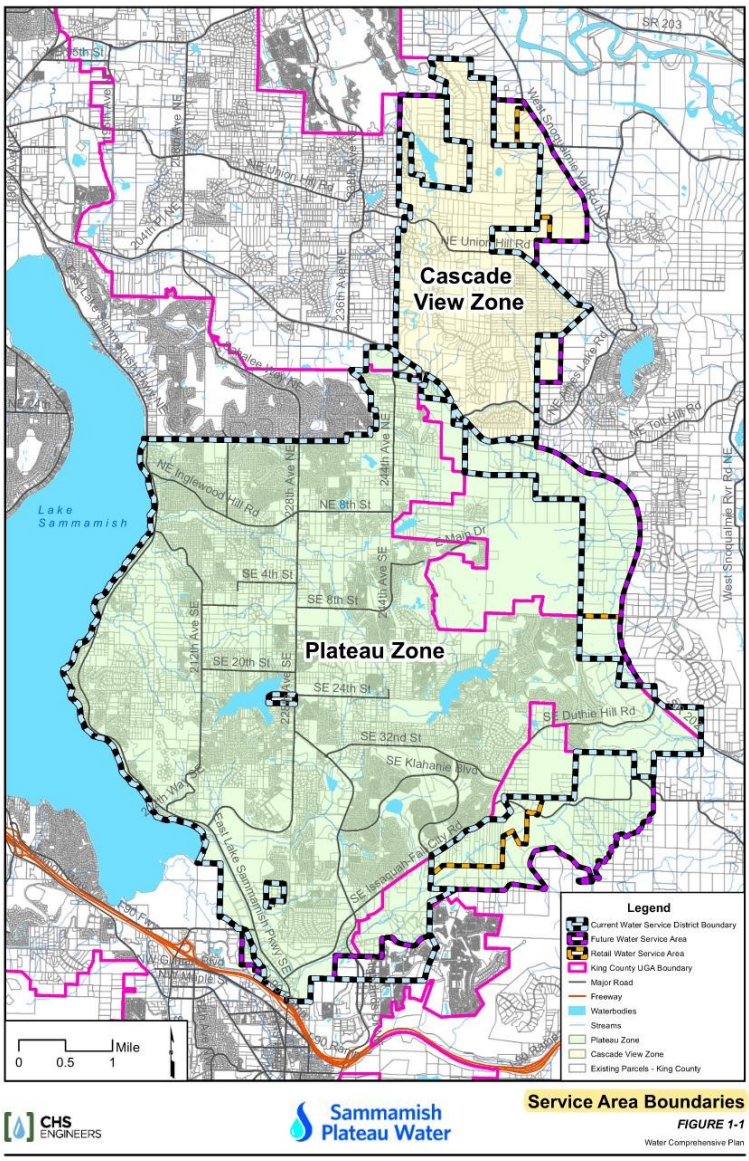

Figure 15. Sammamish Plateau Water District Service Area Boundaries.

2.5 Geologically Hazardous Areas

WAC 365-190-120 describes geologically hazardous areas as those areas susceptible to erosion, sliding, earthquake, or other geological events. These areas pose a threat to the health and safety of citizens when incompatible commercial, residential, or industrial development is sited

in areas of significant hazard. The types of geologically hazardous areas recognized in the Sammamish Municipal Code (SMC 21.03.020.W) include erosion, landslide, and seismic hazards.

2.5.1 Erosion Hazard

Erosion is a natural geologic process that involves the wearing away and removal of material, primarily soil and rock, from the Earth's surface through the action of natural agents such as water, wind, ice, and gravity. Erosion hazard areas are portions of the City that are likely to become unstable due to erosion. Areas that are likely to experience erosion are unconsolidated soils on moderate to steep slopes. Additionally, moderate to steep slopes underlain by glacially consolidated soils, such as glacial till, can be subject to erosion if disturbed or left exposed in wet weather. Activities that increase the potential for erosion include the removal of vegetation, concentration of stormwater to an area, particularly if on a slope, and disturbance of soils due to construction activity.

The City of Sammamish designates erosion hazard areas as areas in the City that are underlain by soils that are subject to severe erosion when disturbed. Such soils include, but are not limited to, those classified as having a severe or very severe erosion hazard according to the USDA Soil Conservation Service, the 1973 King County Soils Survey, or any subsequent revisions or addition by or to these sources. These soils include the following when they occur on slopes 15 percent or steeper.

a. Alderwood gravelly sandy loam (AgD);
b. Alderwood and Kitsap soils (AkF);
c. Beausite gravelly sandy loam (BeD and BeF);
d. Everett gravelly sandy loam (EvD);
e. Kitsap silt loam (KpD);
f. Ovall gravelly loam (OvD and OvF);
g. Ragnar fine sandy loam (RaD); and
h. Ragnar-Indianola Association (RdE).

However, any soil that is on a slope of 15 percent or more is likely to experience erosion if human activity results in disturbance of the soil and inadequate erosion control measures are put in place to mitigate the disturbance.

Further, the City also regulates Erosion Hazard Areas Near Sensitive Water Bodies. SMC 21.04.040.115 describes these areas as portions within the City where sloped areas posing erosion hazards, or contributing to erosion hazards, that drain directly to lakes or streams of high resource value that are particularly sensitive to the impacts of increased erosion and the resulting sediment loads from development.

Erosion Hazards Near Sensitive Water Bodies includes the designated No-Disturbance Area and properties that drain to the No-Disturbance Area. The No-Disturbance Area is established on the sloped portion of the special district overlay to prevent damage caused by erosion. The No-Disturbance Area's upslope boundary is located at the first break in slope from the upland plateau over onto the valley walls. The first obvious break in slope is generally located at the top of the erosion hazard area associated with the slope. The downslope boundary is the extent of those areas designated as erosion or landslide hazard areas. The Department maintains maps of

the approximate location of the No-Disturbance Areas for Erosion Hazard Areas Near Sensitive Water Bodies referenced as Figure 16 below.

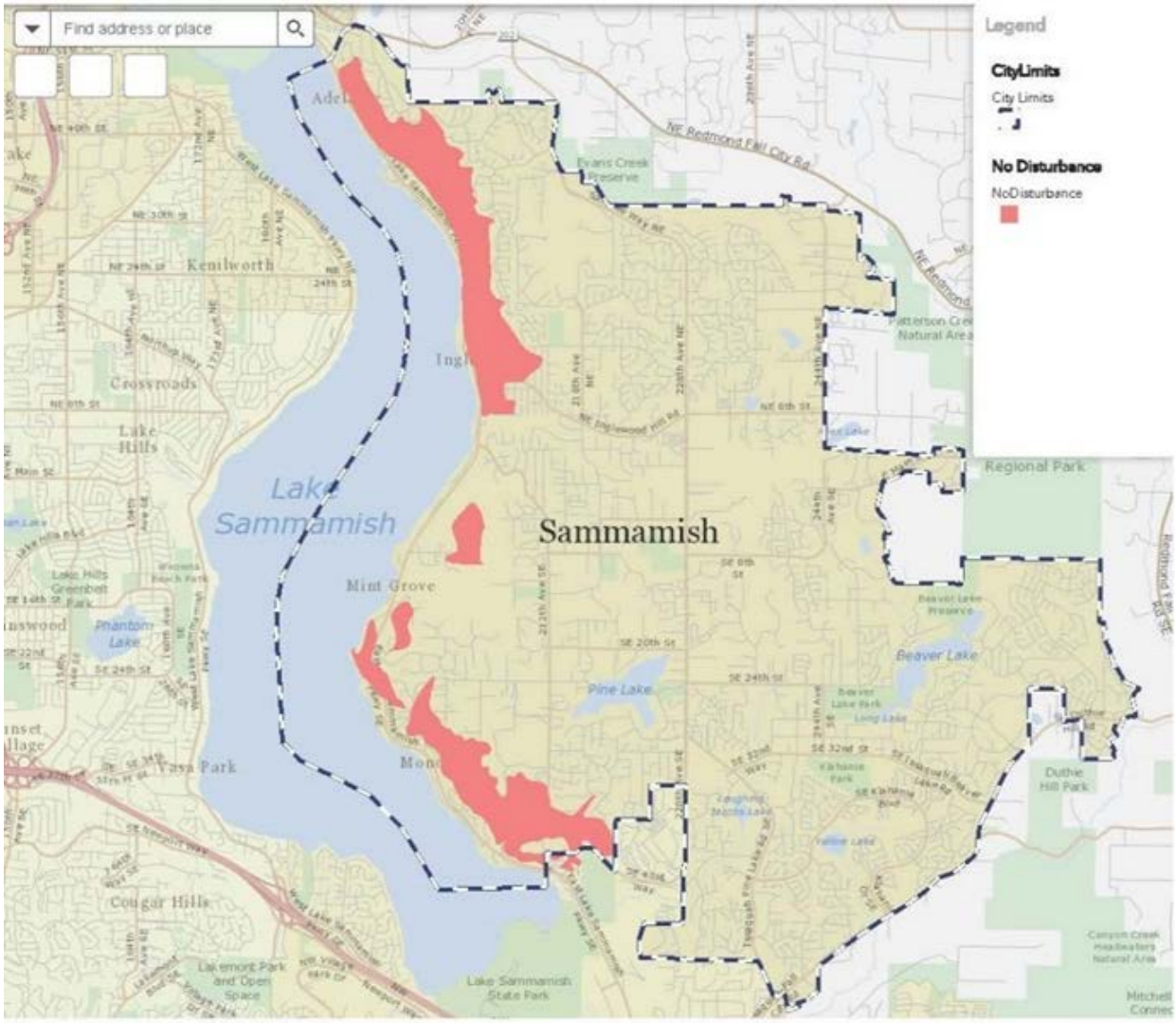

Figure 16. No Disturbance Areas (City of Sammamish)

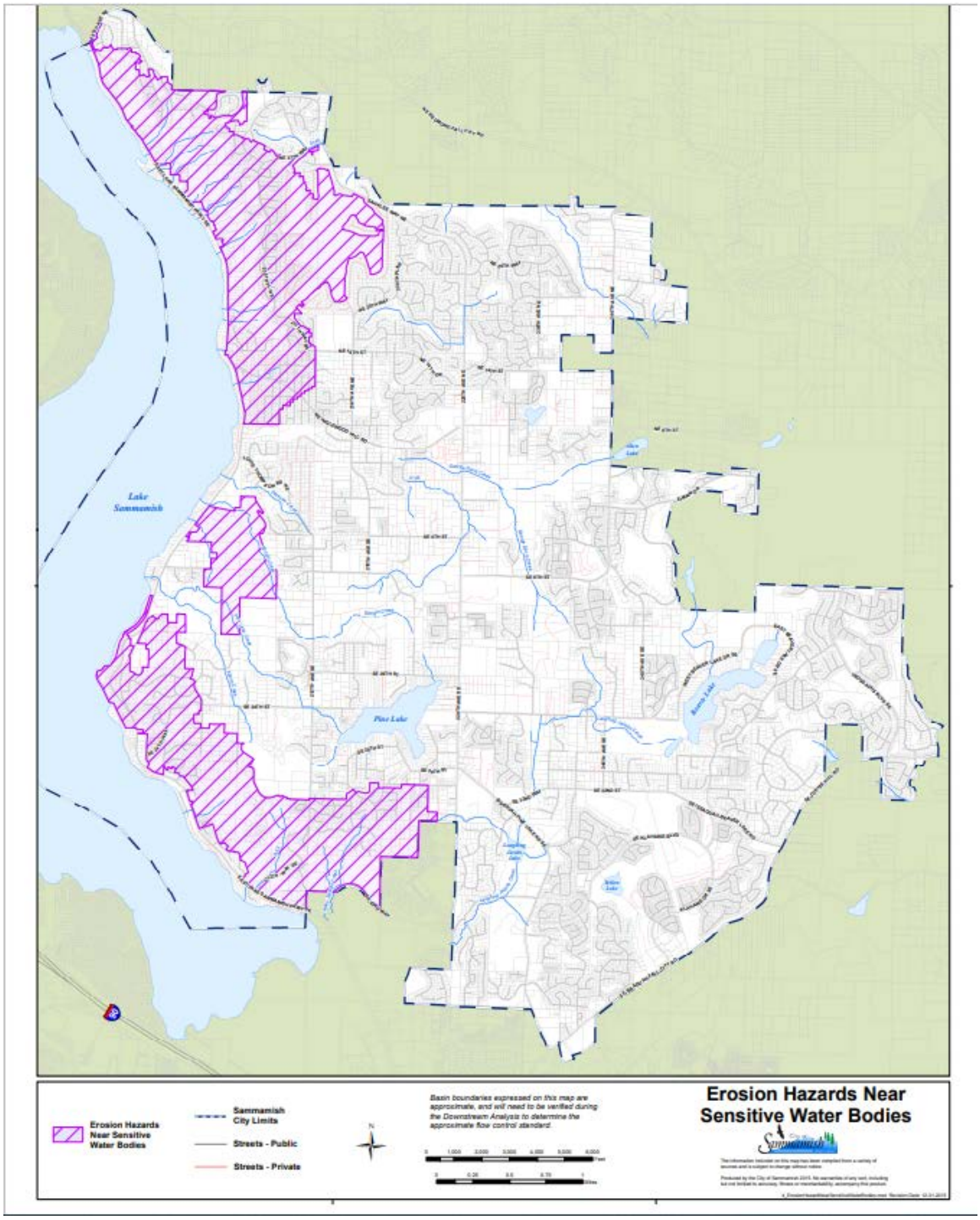

Figure 17. Erosion Hazards Near Sensitive Water Bodies (City of Sammamish)

2.5.2 Landslide Hazards

City of Sammamish defines landslide hazards as areas that are potentially subject to risk of mass movement due to a combination of geologic, topographic, and hydrologic factors. These areas are typically susceptible to landslides because of a combination of factors including bedrock, soil, slope gradient, slope aspect, geologic structure, groundwater, or other factors (SMC 21.04.040.195). The designated landslide hazard areas within the City are mapped in Figure 17.

A majority of Sammamish is located on a plateau of roughly 500 feet in elevation; however, the western and northern perimeters of Sammamish are located at a lower elevation of about 30 feet. As a result, nearly the entire northern and western perimeters of Sammamish are considered under threat of landslide activities (King County RHMP, 2020).

Main transportation corridors, including East Lake Sammamish Parkway and Sahalee Way, have been identified as vulnerable to landslides (King County RHMP, 2020). Significant impacts to these roadways would create logistical issues and subsequent failures for other critical services that are present in the right-of-way, including energy and telecommunication utilities. The regionally mapped landslide hazards in King County are referenced in Figure 18.

The City of Sammamish has also mapped the landslide hazard drainage areas as critical drainage areas (Figure 19) due to their proximity to landslide hazard areas. The regulation of these areas is found in the Surface Water Management section (SMC 21.03.050.B.38) and requires drainage review for projects that include more than 500 square feet of new impervious surface area.

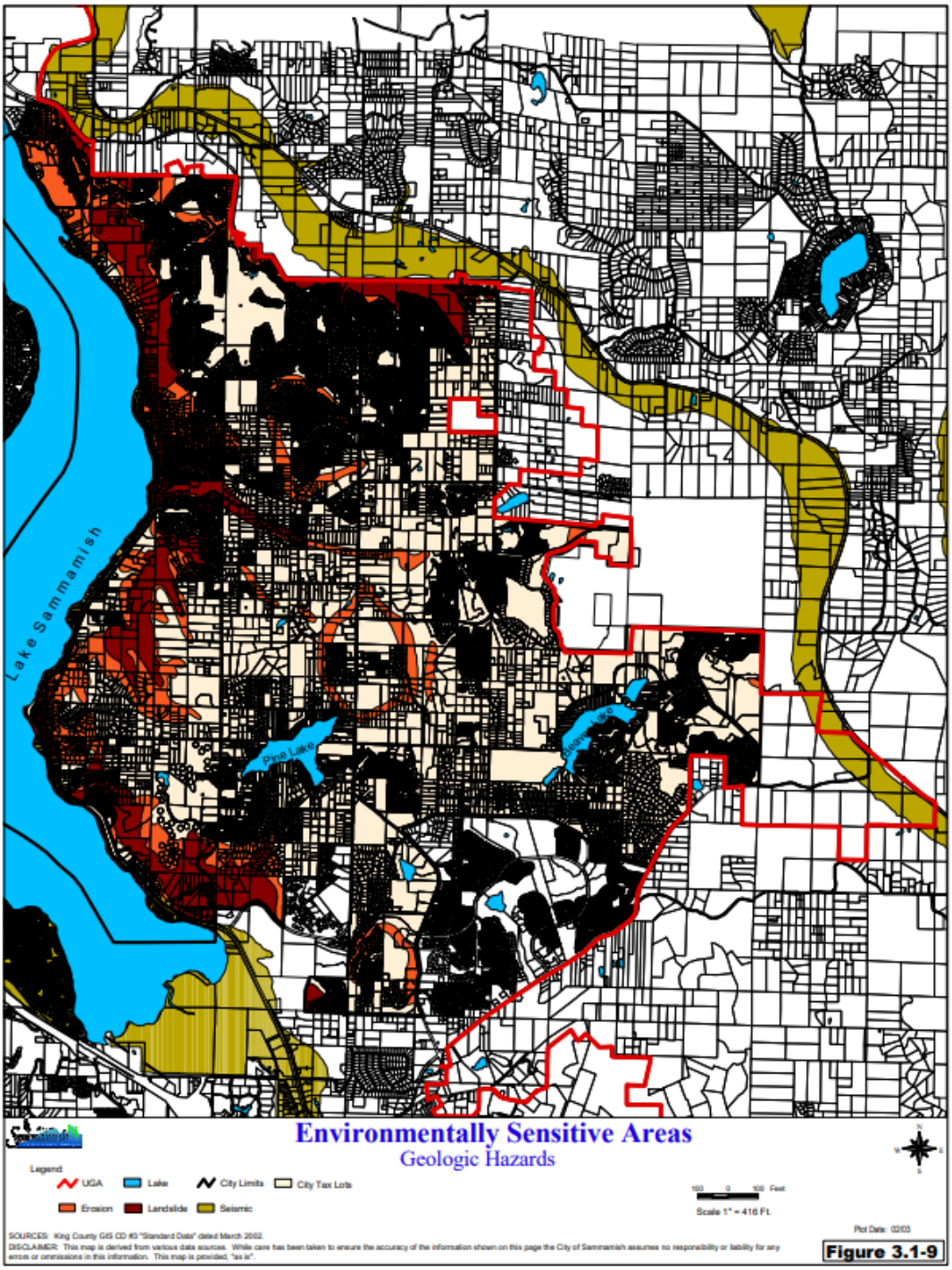

Figure 18: Geologic Hazard Areas (City of Sammamish)

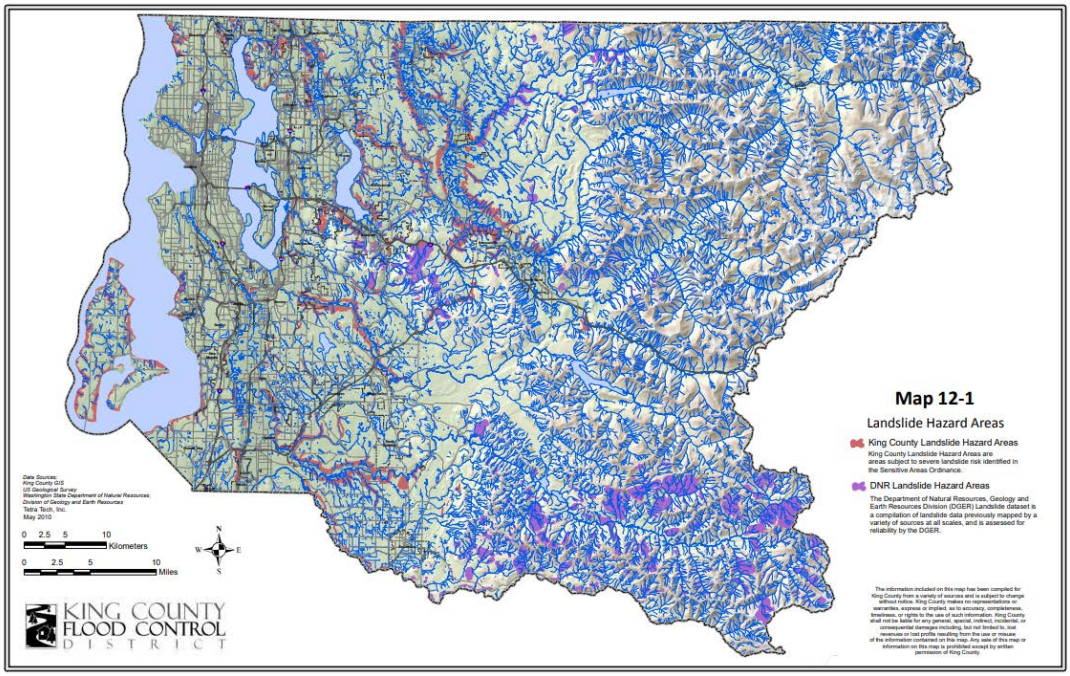

Figure 19. Landslide hazards in King County (King County Flood Control District).

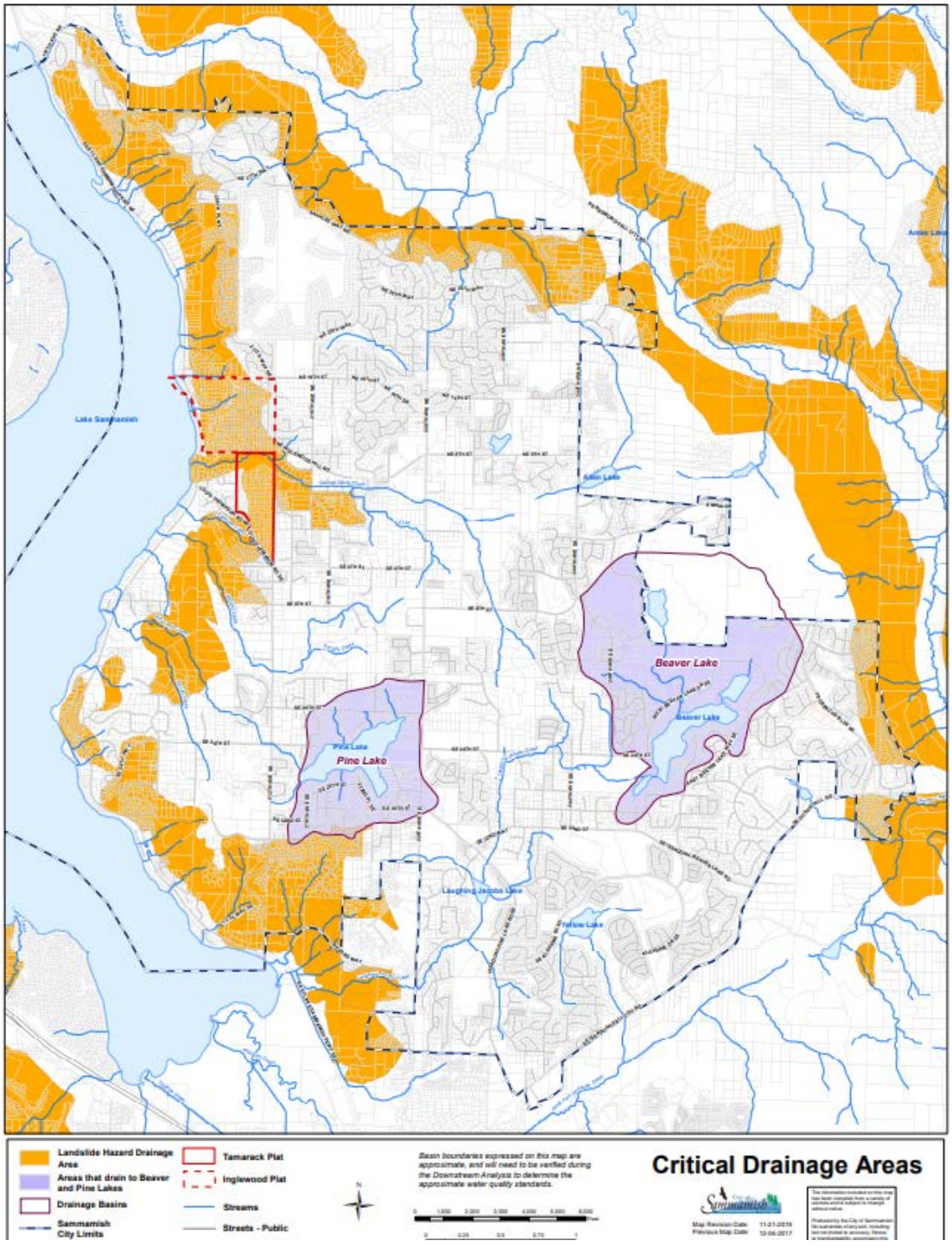

Figure 20: Critical Drainage Areas. Landslide Hazard Drainage Areas are outlined in orange. (City of Sammamish)

2.5.3 Seismic Hazards

The Puget Sound area is known to be seismically active, as evidenced by recent significant seismic events including the 1949 Olympia (magnitude 7.2), the 1965 Seattle (magnitude 6.5), and the 2001 Nisqually (magnitude 6.8) Earthquakes. The seismic hazard in the area comes from three main sources: (1) Cascadia Subduction Zone (interplate), (2) Benioff Zone (intraslab), and (3) shallow crustal earthquakes.

Cascadia Subduction Zone earthquakes occur locally when the interface bond between the North American Tectonic Plate and the subducting Juan de Fuca Plate ruptures. In contrast to similar geologic regimes having subducting plates, such as Alaska or Chile, no earthquakes have been recorded in the Pacific Northwest from thrust fault deformation between plates. However, seismologists believe that the Cascadia Subduction Zone has created great interplate earthquakes (Magnitude > 8) in the past and is likely to produce earthquakes with magnitudes up to 9. Significant ground accelerations would occur in the City of Sammamish in the event of a large subduction zone earthquake; however, the long distance to the rupture area would reduce the intensity of shaking. Notwithstanding, the duration of the shaking could last several minutes.

Benioff Zone, or intraslab events, occur due to tensional rupture within the subducting Juan de Fuca Plate at depths of approximately 28 to 38 miles. This is the source of the largest historical local earthquakes - 1949 Olympia, 1965 Seattle, and 2001 Nisqually. This source has the potential for events with magnitudes of approximately 7.5. Shaking from a Benioff Zone event could be significant within the City.

Shallow crustal earthquakes occur on shallow faults due to tectonic stresses. The Puget Sound area is underlain by several shallow faults. The notable faults include the Seattle Fault Zone, which is an east-west trending zone of thrust or reverse faults that strikes roughly through downtown Seattle and is mapped within the southern section of the City. The Whidbey Island Fault Zone extends approximately several kilometers from north of Whidbey Island southward through Woodinville to North Bend and contributes a significant level of risk. Recent research indicates that these fault zones are capable of producing events with magnitudes of 6.5 to 7.5, which could cause severe damage in the Seattle area. As shown on Figure 20, a significant portion of the southern part of the City is within the Seattle Fault Zone and there is risk for surface rupture to occur within this area.

The King County RHMP looked at several seismic scenarios that would be threats to the City of Sammamish including the Cascadia Subduction Zone earthquake (magnitude 9.0), a Seattle Fault earthquake (magnitude 7.2), and a Southern Whidbey Island earthquake (magnitude 7.4). The average age of building stock was determined to be the primary factor that has the capability to reduce the City of Sammamish's vulnerability to seismic threats. Since most structures in the region have been built to more recent structural code standards, the community has a reduced risk of collapse during seismic events compared to older portions of the region. While the building standards for most structures strengthen the City's overall resiliency from seismic hazards, there are several factors that are likely to increase vulnerabilities.

Seismic risks besides strong ground shaking include the potential for soil liquefaction, lateral spreading of slopes where liquefaction occurs, seismic induced landslides due to weak slope

soils, surface rupture of the Seattle Fault Zone, and flooding due to seiches of land around Lake Sammamish.

Soi liquefaction typically occurs at sites that are underlain by loose sand and non-plastic silt. The areas most susceptible to liquefaction are where alluvium has been deposited by streams and rivers in alluvial plains. Liquefaction can cause damage to development as a result of large differential settlement. However, the more damaging impact of liquefaction is lateral spreading. Lateral spreading occurs where non-liquefied blocks of soil are displaced laterally on top of liquefied soil below. This can occur on gently sloping ground or adjacent to a free slope face, such as along the eastern shore of Lake Sammamish. Lateral spreading can result in a few inches of movement, but can also result in many feet of lateral movement. Where larger magnitudes of displacement are observed, significant damage is likely to the existing development.

The seismic hazard for the area also includes the potential for slope instability initiated by seismic shaking. Areas prone to landslides are likely to be exacerbated by ground movement.

A seismic hazard for some parts of the city is the presence of the Seattle Fault. Several mapped lineaments of the fault are shown on Figure 21. As outlined in a magnitude 6.7 earthquake of the Seattle Fault developed by the Earthquake Engineering Research Institute (EERI) and the Washington Military Department Emergency Management Division, jurisdictions, which the fault line passes through, could expect the rupture to raise the ground surface of the southern side of the fault by 6.5 feet (EERI, 2005).

Inundation of areas adjacent to Lake Sammamish could occur as a result of a seiche, which is similar to a tsunami, but is located with a closed body of water. Reporting by the EERI states that the Seattle 6.7 scenario earthquake most certainly would generate damaging seiches in bodies of water throughout the Seattle area. Historical ruptures of the Seattle Faultline have resulted in tsunamis/seiches of up to ten feet or more (EERI, 2005).

Similar to landslide hazards, the main transportation corridors are at risk of significant impacts or failures in the event of seismic activity. The primary transportation arterials that allow for access to and from the Sammamish plateau terminate in areas that are susceptible to liquefaction and/or seismic induced landslides. In the event of roadway failure or blockage due to landslides, this could potentially isolate the population from critical services following a catastrophic event.

Figure 2: Hazard Map – Seismic Hazards

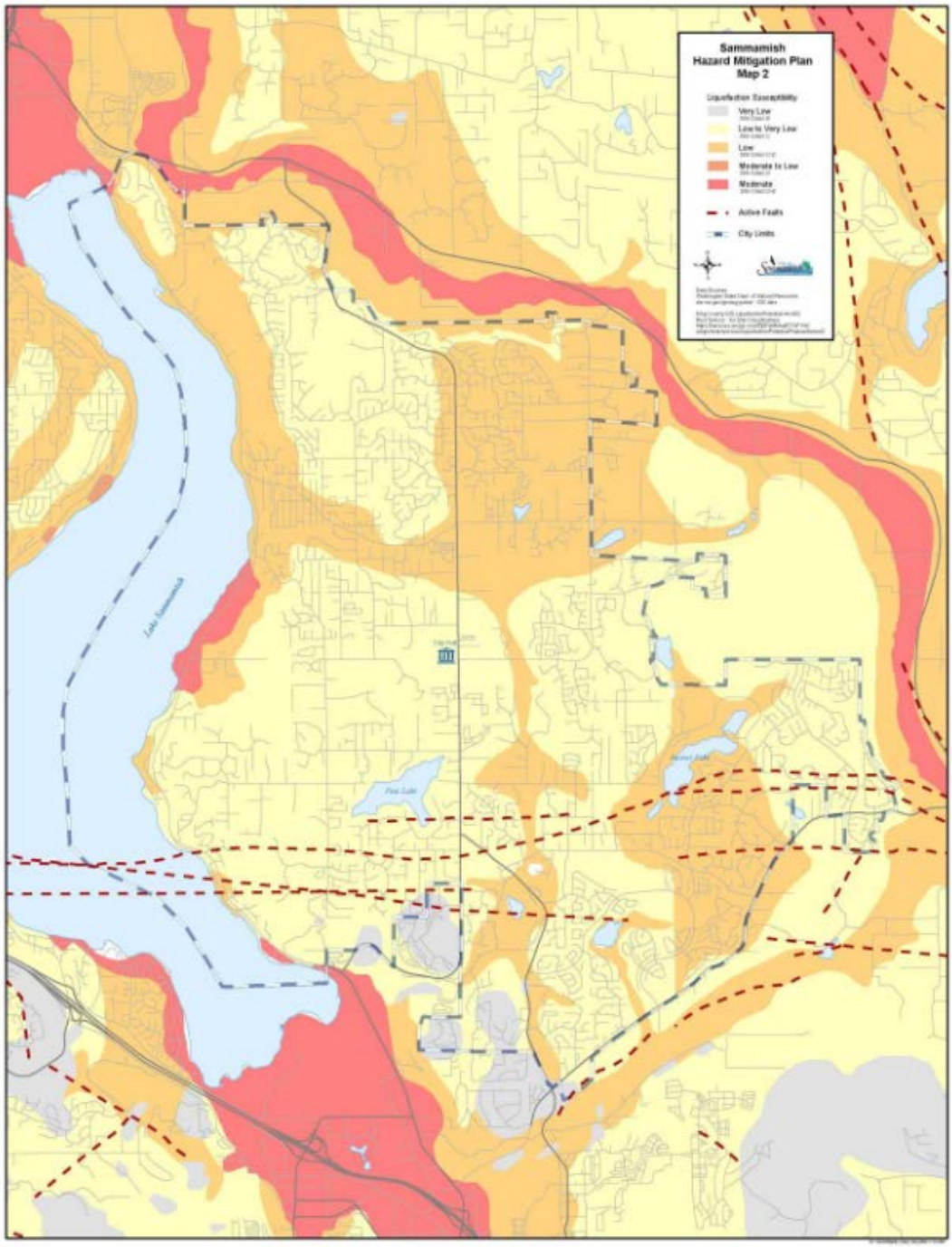

Figure 21. Seismic Hazards (King County Regional Hazard Mitigation Plan).

3 Relationship To Urban Forestry

Trees amplify human experience and wellbeing on a daily basis, where we live, work and play. The human health, social, economic, and ecosystem benefits extend beyond trees typically considered part of our urban forest, like street and park trees, and into protected landscapes like wetlands, streams, and steep slopes. The City of Sammamish's critical areas and urban forest broadly overlap – both in function and values. Evaluating the relationship between the two collaborative resources is complex and it is important to consider many of the important functions provided by critical areas are facilitated through trees and their associated vegetation.

Current tree canopy coverage within Sammamish is 48% (Dyson 2018), while an estimated 40-60% of that canopy is protected by critical area policies. The trees and their associated vegetation increase water quality and quantity, provide essential habitat and increase soil security within Sammamish's wetlands, riparian corridors, steep slopes, and other critical areas. While protection and management of critical areas is the focus of this plan update, it is crucial that urban forest policies are succinct with those policies managing protected areas, resulting in improved ecosystem services, community benefits and climate adaption.

Sammamish's entire urban forest, including protected critical areas, publicly owned trees, street trees, and trees on private property, provides $3.1 million in the following benefits to the community. This corresponds annually to 87.8 million gallons of attenuated or captured stormwater runoff, filtering 180 tons of pollutants, and sequestering 26,859 tons of carbon (Davey 2019). Provided much of City of Sammamish's urban forest resides in protected critical areas, these values can be projected to remain consistent through long-range projections. Unquantified social benefits are being provided to community members who live or work adjacent to, have views of, or walk by critical areas (Dobbs 2018).

Urban forests' provision of valuable economic and environmental benefits as natural resources is well documented (Novak 2018). Even so, urban and community tree canopy over is decreasing across the nation. Urban tree cover in the U.S. dropped by 0.2 percent between 2000 and 2018 while impervious cover increased 2.8 percent (Novak 2017). This reduction of community tree canopy cover occurred concurrently while many tree protection ordinances, canopy cover goals and land conversion policies across the country attempted to arrest or reduce canopy decline.

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