HERRERA

TECHNICAL MEMORANDUM

Date: July 16, 2021

To: Richard Sawyer, City of Kenmore

From: Rob Zisette and Eliza Spear, Herrera Environmental Consultants, Inc.

Subject: Kenmore 2021 Aquatic Plant Survey

KENMORE 2021 AQUATIC PLANT SURVEY

Background

The City of Kenmore issued the 2017 Integrated Aquatic Vegetation Management Plan (IAVMP) and the 2020 Update to manage aquatic noxious weeds within the city and to maintain public access to three shoreline parks: Log Boom Park, Rhododendron Park, and Squires Landing (Herrera 2017, 2021). Invasive aquatic vegetation negatively impacts ecological processes, and recreation and business activities. Dense native vegetation also may negatively impact recreation and business activities while providing important habitat and water quality benefits for the environment.

The IAVMP presents a monitoring and evaluation plan to be conducted by the City which includes regular aquatic plant surveys and mapping. Herrera Environmental Consultants, Inc. (Herrera) conducted a survey in 2016 that included plant distribution and density mapping throughout the shorelines within the Kenmore city limits (Herrera 2017). Herrera also conducted a brief survey of plant distribution in 2020 to inform the IAVMP update (Herrera 2021).

The survey described in this memorandum was conducted by Herrera biologists Rob Zisette and Eliza Spear on July 1 and 2, 2021, to continue the implementation of the City of Kenmore's monitoring plan to document existing conditions, inform aquatic plant control practices, and identify any new infestations of invasive plants on Lake Washington and the Sammamish River within the Kenmore, Washington, city limits. The purpose of this survey was to map the density of all aquatic plants and to identify the presence and locations of any nonnative, invasive, submerged aquatic plant species. In addition, the survey produced a plant density map to document current conditions for comparison to past and future conditions.

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Methods

Herrera conducted the survey by boat and did not conduct diver surveys or mapping of emergent plants. Herrera conducted the survey along transects perpendicular to shore and spaced no more than 150 feet apart. An aquatic plant sampling rake was used to sample and identify the relative abundance or submersed aquatic plant species along the transects, and sample locations were recorded by GPS (Figure 1). Herrera used underwater sonar equipment with GPS to gather plant height and density data processed by BioBase EcoSound for preparing a map of water depth and submersed aquatic plant biovolume within the survey area. Plant biovolume represents the fraction (0 to 1) of the water column occupied by plant matter at each measurement location.

Results

Figure 1 shows the plant biovolume and dominant species distribution collected during the 2021 aquatic vegetation survey. All species identified during the survey are listed in Table 1, which includes the plant type and noxious weed class (King County 2021). The species composition and percent cover observed at sampling locations during the survey are included in Table 2. Survey results within the City's priority management areas (Log Boom Park, Squires Landing, and the Lower Sammamish River) are described in further detail in this section.

Table 1. Aquatic Vegetation Species Identified at Lake Washington and the Sammamish River, 2021.

Scientific Name	Common Name	Type
Ceratophyllum demersum	Hornwort	Native Plant
Egeria densa	Brazilian elodea	Class B Noxious Weed
Elodea canadensis	Common waterweed	Native Plant
Lemna minor	Duckweed	Native Plant
Myriophyllum spicatum	Eurasian watermilfoil	Class B Noxious Weed
Najas guadalupensis	Common water-nymph	Native Plant
Nymphaea odorata	Fragrant waterlily	Class C Noxious Weed
Potamogeton crispus	Curly-leaf pondweed	Class C Noxious Weed
Potamogeton epihydrus	Ribbon-leaf pondweed	Native Plant
Potamogeton praelongus	White-stem pondweed	Native Plant
Potamogeton richardsonii	Richardson's pondweed	Native Plant
Potamogeton zosteriformis	Flat-stem pondweed	Native Plant
Sparganium angustifolium	Narrow leaf bur-reed	Native Plant
Vallisineria americana	Tapegrass	Native Plant

Table 2. Aquatic Vegetation Species Identified at Sampling Locations in Lake Washington and the Sammamish River, 2021.

Sample Location[a]	Dominant Plant Species (percent composition)
74	Flat-stem pondweed (80), curly leaf pondweed (15), duckweed (5)
75	Flat-stem pondweed (85), Eurasian watermilfoil (10), duckweed (5)
76	Hornwort (90), Eurasian watermilfoil (10)
77	Hornwort (30), curly-leaf pondweed (50), Eurasian watermilfoil (20)
78	Common waterweed (40), flat-stem pondweed (45), curly-leaf pondweed (5), Eurasian watermilfoil (10)
79	No cover by vegetation
80	Common waterweed (40), hornwort (50), Eurasian watermilfoil (10)
81	Common waterweed (80), flat-stem pondweed (5), hornwort (5), Eurasian watermilfoil (10)
82	Common waterweed (30), flat-stem pondweed (30), Eurasian watermilfoil (40)
83	Flat-stem pondweed (95), hornwort (5)
84	Hornwort (35), common waterweed (35), flat-stem pondweed (30)
85	Common water-nymph (90), common waterweed (10)
86	Hornwort (100)
87	Common waterweed (50), hornwort (25), common water-nymph (10), Eurasian watermilfoil (15)
88	Common waterweed (90), hornwort (10)
89	Hornwort (75), common waterweed (20), flat-stem pondweed (5)
90	Hornwort (50), common waterweed (50)
91	Hornwort (70), common waterweed (15), Eurasian watermilfoil (15)
92	Hornwort (60), common waterweed (20), curly-leaf pondweed (15), Eurasian watermilfoil (3), duckweed (2)
93	No cover by vegetation
94	Common waterweed (50), ribbon-leaf pondweed (20), curly-leaf pondweed (30)
95	Hornwort (30), common waterweed (20), thin-leaf pondweed (40), Eurasian watermilfoil (5), curly-leaf pondweed (5)
96	Eurasian watermilfoil (90), curly-leaf pondweed (2), ribbon-leaf pondweed (2), duckweed (2), common waterweed (4)
97	Flat-stem pondweed (80), Richardson's pondweed (10), common waterweed (2), Eurasian watermilfoil (8)
98	White-stem pondweed (90), hornwort (6), flat-stem pondweed (4)
99	Brazilian elodea (100)
100	Flat-stem pondweed (50), Eurasian watermilfoil (50)
101	White-stem pondweed (33), common waterweed (33), Richardson's pondweed (34)
103	Common waterweed (100)
104	Hornwort (33), common waterweed (33), white-stem pondweed (34)
105	Common waterweed (100)
106	Brazilian elodea (50), common waterweed (50)
108	White-stem pondweed (100)
109	Eurasian watermilfoil (90), Brazilian elodea (10)

Table 2 (continued). Aquatic Vegetation Species Identified at Sampling Locations in Lake Washington and the Sammamish River, 2021.

Sample Location[a]	Dominant Plant Species (percent composition)
110	Eurasian watermilfoil (20), curly-leaf pondweed (80)
111	Thin-leaf pondweed (60), curly-leaf pondweed (40)
112	Common waterweed (90), curly-leaf pondweed (10)
114	Hornwort (50), curly-leaf pondweed (50)
115	Eurasian watermilfoil (90), white-stem pondweed (10)
116	Flat-stem pondweed (60), whit-stem pondweed (20), hornwort (19), common waterweed (1)
117	White-stem pondweed (100)
118	Eurasian watermilfoil (80), white-stem pondweed (10), flat-stem pondweed (5), common waterweed (5)
119	Eurasian watermilfoil (80), common waterweed (10), white-stem pondweed (10)
120	Eurasian watermilfoil (100)
121	White-stem pondweed (80), hornwort (5), flat-stem pondweed (5)
122	White-stem pondweed (80), hornwort (10), flat-stem pondweed (10)
123	Hornwort (33), flat-stem pondweed (33), common waterweed (33), curly-leaf pondweed (1)
124	Hornwort (70), common waterweed (29), Eurasian watermilfoil (1)
125	White-stem pondweed (80), Eurasian watermilfoil (20)
126	White-stem pondweed (33), hornwort (33), common waterweed (34)
127	Eurasian watermilfoil (60), hornwort (20), common waterweed (20)
128	Flat-stem pondweed (50), common waterweed (45), hornwort (5)
129	Eurasian watermilfoil (50), common waterweed (25), hornwort (25)
130	Flat-stem pondweed (90), hornwort (5), curly-leaf pondweed (5)

[a] Sample location numbers begin at 74 and continue sequentially due to previous samples locations stored in the sonar equipment.

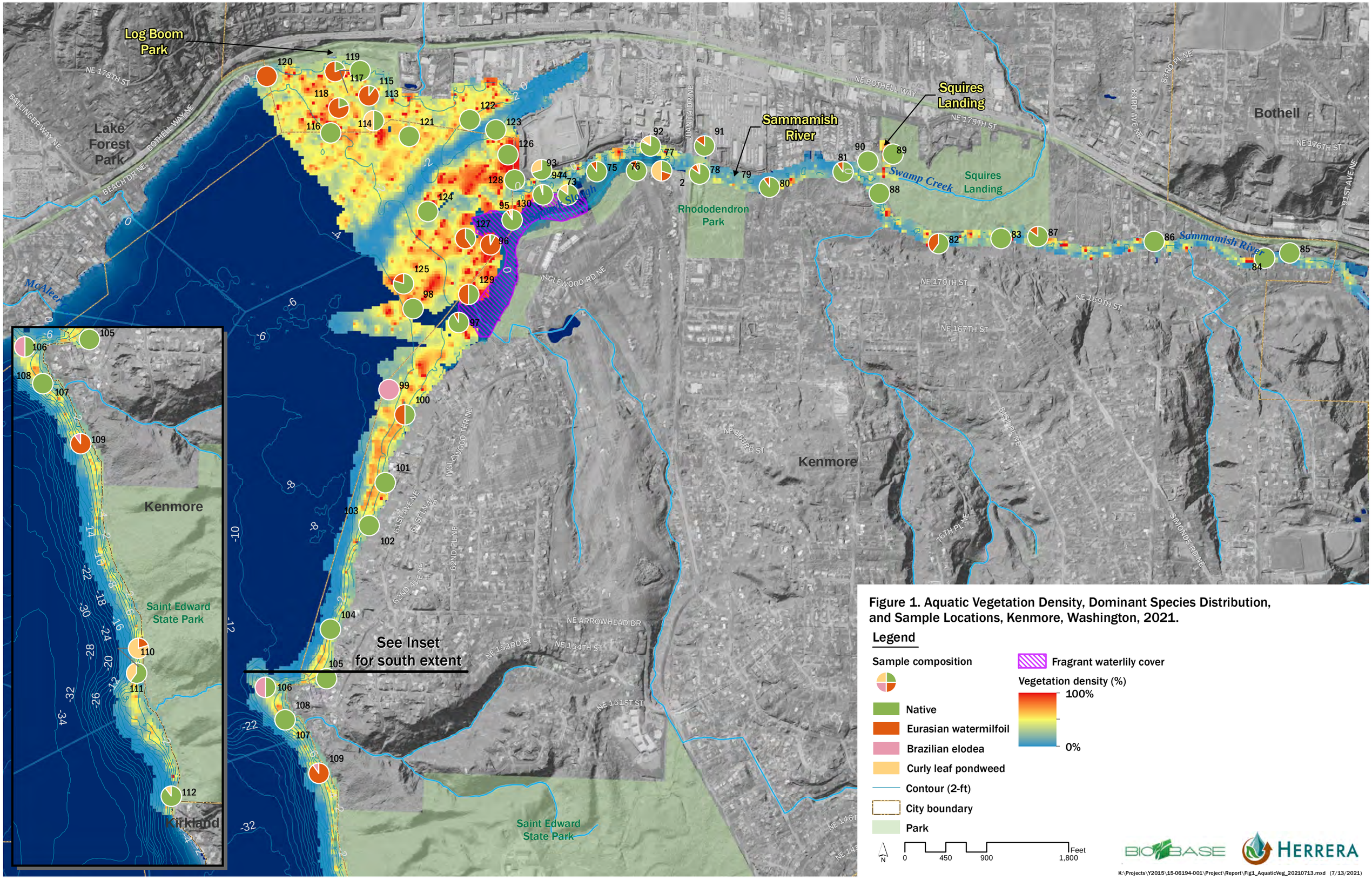

Figure 1. Aquatic Vegetation Density, Dominant Species Distribution, and Sample Locations, Kenmore, Washington, 2021.

Legend

Sample composition

- Native
- Eurasian watermilfoil
- Brazilian elodea
- Curly leaf pondweed

Fragrant waterlily cover

Vegetation density (%)

100%

0%

- Contour (2-ft)
- City boundary
- Park

N

0 450 900 1,800 Feet

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Log Boom Park

Herrera biologists observed a mix of native and invasive aquatic vegetation in the areas surrounding Log Boom Park. The areas immediately adjacent to the Log Boom Park dock were generally dominated by hornwort and white-stem pondweed. Patches of the invasives Eurasian watermilfoil and curly leaf pondweed were also observed. The plant biovolume in the areas immediately surrounding the Log Boom Park dock was moderate, with most vegetation patches ending 2 to 3 feet below the water surface. This vegetation may continue to grow towards the surface as the growing season continues.

In the areas of Lake Washington farther west of the Log Boom Park dock, Eurasian watermilfoil, white-stem pondweed, flat-stem pondweed, and hornwort dominated the aquatic plant community. The presence of Eurasian watermilfoil in these areas increases significantly in comparison to the areas immediately adjacent to the dock. The biovolume in this area was generally moderate, with plant growth up to 2 to 3 feet below the surface. High biovolume patches of Eurasian watermilfoil formed canopies at the water surface that shade native plants and interfere with recreational use.

Squires Landing

The natives hornwort, common waterweed, and flat-stem pondweed dominate the aquatic vegetation community in the inlet at Squires Landing. The invasives Eurasian watermilfoil and curly-leaf pondweed were also observed in this area but were not dominant. The biovolume was moderate in the inlet, with vegetation typically growing to 1 to 3 feet below the water surface. This vegetation may continue to grow towards the surface as the growing season continues. Common water-nymph dominates the plant community in the narrow entrance to the inlet from Swamp Creek, where the biovolume is highest due to vegetation growth reaching the water surface.

Lower Sammamish River (including Rhododendron Park and WDFW Boat Launch)

Common waterweed, flat-stem pondweed, and hornwort dominated the aquatic vegetation community in the Lower Sammamish River. The invasives curly-leaf pondweed, Eurasian watermilfoil, and fragrant waterlily were also observed in the Lower Sammamish River but did not dominate the plant community upstream of Squawk Slough (see Figure 1). Biovolume was greatest within 10 to 20 feet of the shoreline in the Sammamish River. Herrera biologists observed a clear navigation channel in the center of the river that did not have sufficient biovolume to cause disturbance to recreational or commercial access along its entire length. At the mouth of the Sammamish River, curly-leaf pondweed, Eurasian watermilfoil, hornwort, and fragrant waterlily dominated the aquatic plant community. Plant biovolume was generally higher in this area when compared to upstream conditions, but a clear channel for navigation existed for undisturbed recreational and commercial boat traffic between Lake Washington and the Sammamish River.

A large area with high biovolume and dense Eurasian watermilfoil was present adjacent to the large patch of fragrant waterlily immediately south of the mouth of the Sammamish River. Eurasian watermilfoil grows to the surface and forms a canopy layer that impedes recreational and commercial access to this area and shades the native plant community. This area can be avoided by boats traveling between the river and the lake.

Conclusions and Recommendations

Conclusions from the 2021 aquatic plant survey of the shorelines of Lake Washington and the Sammamish River subject to City of Kenmore jurisdiction include:

- The aquatic vegetation community throughout the survey area was typically dominated by native plants. Native plant communities provide fish habitat and improve water quality and should only be controlled as necessary to allow for commercial and recreational access.

- Aquatic vegetation in the Sammamish River did not significantly inhibit boat access in the areas surveyed. Public education and signage indicating the channel location and optimal navigation route are recommended to reduce issues from boats travelling through more densely vegetated areas.

- In areas where Eurasian watermilfoil dominates the aquatic plant community, it tends to reach the water surface and form a canopy layer that impedes boat access and reduces the amount of available light for native plants. Even when not visible from the surface due to a milfoil canopy, native plants were identified growing beneath the surface in areas dominated by Eurasian watermilfoil using a sampling rake to sample the lakebed. Aquatic vegetation control is recommended to reduce the dominance of Eurasian watermilfoil in these areas.

- Diver suction dredging to remove the roots and shoots of invasive vegetation is the recommended method for invasive aquatic plant control. Mechanical harvesting may also be used to trim invasive vegetation but will not have as long-lasting results because it leaves roots intact. Intact root systems result in faster regrowth of invasive species.

- Diver suction dredging or mechanical harvesting to trim native vegetation while leaving roots intact are the recommended methods for native aquatic plant control.

- Aquatic plant control via diver suction dredging is recommended at Log Boom Park and Squires Landing to maintain recreational and commercial access to these areas. Aquatic plant control is not recommended on the Lower Sammamish River due to lack of obstructions caused by vegetation growth in current conditions.

References

Herrera. 2017. Lake Washington and the Sammamish River Within the City of Kenmore, Washington, Integrated Aquatic Vegetation Management Plan. Prepared for the City of Kenmore by Herrera Environmental Consultants, Inc., Seattle, Washington. June.

Herrera. 2021. Lake Washington and the Sammamish River Within the City of Kenmore, Washington, Integrated Aquatic Vegetation Management Plan 2020 Update. Prepared for the City of Kenmore by Herrera Environmental Consultants, Inc., Seattle, Washington. March.

King County. 2021. King County Noxious Weeds List. Updated February 26, 2021. https://kingcounty.gov/services/environment/animals-and-plants/noxious-weeds/laws/scientific-list.aspx.