City of Kenmore

City of Kenmore - 18120 68th Avenue NE Kenmore, WA 98028 Phone: 425-398-8900
Agendas also available at www.kenmorewa.gov E-mail: cityhall@kenmorewa.gov

City Council Regular Meeting Agenda

7 PM , November 9, 2020, via Zoom

Link: https://us02web.zoom.us/j/89152105626

Or iPhone one-tap :

US: +12532158782,,89152105626# or +13462487799,,89152105626#

Or Telephone: Dial US: US: +1 253 215 8782 Webinar ID: **891 5210 5626**

I. CALL MEETING TO ORDER

II. ROLL CALL

III. FLAG SALUTE

IV. AGENDA APPROVAL

V. PROCLAMATION

A. Honoring Veterans
Honoring Veterans Proclamation

VI. RECOGNITION

A. Councilmember Corina Pfeil receives Advanced Certificate of Municipal Leadership through the Association of Washington Cities (AWC), presented by Peter King, CEO, AWC

VII. PUBLIC COMMENTS

A. This is an opportunity to express your views on issues that are important to you and the community. Please state your name, city of residence, and limit your comments to three (3) minutes.

VIII. CONSENT AGENDA

A. Minutes:
October 26, 2020 Regular Meeting Minutes
October 27, 2020 Special Meeting Minutes

IX. PUBLIC HEARING

A. 2021 - 2022 Preliminary Biennial Budget
Agenda Bill - Public Hearing Preliminary 2021-2022 Budget
City Manager Budget Message
Summary of All Funds Budgets 2021-2022

X. BUSINESS AGENDA

A. 2019 -2020 Budget Amendments, presented by Finance & Administration Director Joanne Gregory, *for Review and Discussion*
Agenda Bill - 2019-2020 Amendment #2 November, 2020
Exhibit 1- Year End Budget Amendment Worksheet

B. Diversity, Equity, and Inclusion (DEI) Program Proposal, presented by City Manager Rob Karlinsey, *for Discussion*
Agenda Bill- Diversity, Equity, and Inclusion
Diversity, Equity, and Inclusion Memorandum and Timeline

C. Update to the 2017 Integrated Aquatic Vegetation Management Plan (IAVMP) and renewal of the City's Aquatic Plant and Algae Management General Permit with Washington State Department of Ecology, presented by the Environmental Services Director Richard Sawyer, *for Discussion*
Agenda Bill - IAVMP Update
IAVMP Update Presentation (Uploaded 11/09)
2017 IAVMP
Draft 2020 IAVMP Update
Log Boom Park Treatment Detail
Lower Sammamish East Open Water Treatment Detail
Middle Sammamish River Treatment Detail

D. Financial Report for 3rd Quarter, presented by Finance Director Joanne Gregory, *for Review*
September Financial Report

XI. STAFF REPORT

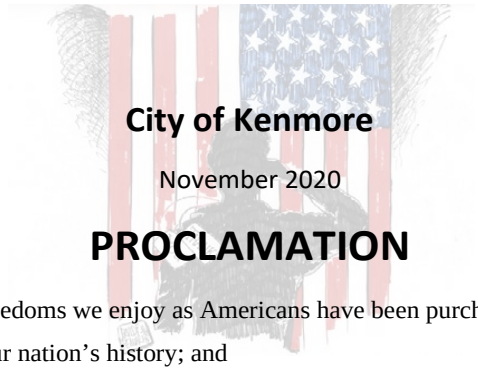
A. Finance Director Recruitment Update

XII. COUNCILMEMBER COMMENTS

XIII. ADJOURNMENT

UPCOMING MEETINGS:

- November 16, 2020 - 7 PM Regular Meeting
- November 23, 2020 - 7 PM Regular Meeting
- December 7, 2020 - 7 PM Special Meeting



City of Kenmore

November 2020

PROCLAMATION

WHEREAS, the freedoms we enjoy as Americans have been purchased and maintained at a high price throughout our nation's history; and

WHEREAS, since the establishment of the United States of America, Americans have fought and died to preserve our individual rights as guaranteed in the United States Constitution and the Bill of Rights; and

WHEREAS, we owe a great debt to those who have served in defense of this nation; and

WHEREAS, throughout the generations, their sacrifices have preserved our unique form of government dedicated to human rights and respect for the individual; and

WHEREAS, for many, that sacrifice ended in permanent injury or death, yet their spirit remains in the continued preservation of our freedoms and the promise of liberty established as an example for all oppressed persons of the world; and

WHEREAS, in honor of these fine dedicated individuals, we pledge continued defense of our nation, so that their sacrifice will stand before the entire world as a tribute to the spirit and determination of people dedicated to the principles of freedom and democracy.

NOW THEREFORE, do hereby call upon the citizenry of Kenmore to join in the celebration by giving honor and recognition to all those who have served, by observing November 11th as **Veterans Day** with expressions of gratitude to veterans; and to further extend this gratitude to the families of deceased veterans. For we solemnly remember the sacrifices of all those who fought so valiantly, on the seas, in the air, and away on foreign shores to preserve our nations heritage and freedom. Let us re-consecrate ourselves to the task of promoting an enduring peace so that their efforts shall not have been in vain; and

NOW, THEREFORE BE IT RESOLVED, I, David Baker, Mayor of the City of Kenmore, Washington, together and on behalf of the City Council, do hereby proclaim the week of November 9th through November 13th as **Veterans in Focus Appreciation Week**, in our fine City of Kenmore.

PROCLAIMED on this the 9th day of November 2020.

_____

David Baker, Mayor

Attested: _____

Anastasiya Warhol, City Clerk

City of Kenmore
City Council Regular Meeting
Minutes
October 26, 2020

CALL SPECIAL MEETING TO ORDER:

Mayor Baker called the meeting to order at 7:00 p.m. via Zoom.

PRESENT:

Councilmembers:
Mayor David Baker
Deputy Mayor Nigel Herbig
Councilmember Joe Marshall
Councilmember Milton Curtis
Councilmember Debra Srebnik
Councilmember Corina Pfeil
Councilmember Melanie O'Cain

Staff:
City Manager Rob Karlinsey
Assistant City Manager Nancy Ousley
Finance & Administration Director Joanne Gregory
Community Development Director Debbie Bent
Public Works Operations Manager Jennifer Gordon
City Engineer John Vicente
Environmental Services Manager Richard Sawyer
City Clerk Anastasiya Warhol
City Attorney Dawn Reitan
Steve Tolar, Management Partners

Speaking Guests:
Stacey Valenzuela, Kenmore Resident
John Peeples, Kenmore Resident
David Morton, Redmond Resident
Patrick O'Brien, Kenmore Resident
Emilie Burnham, Kenmore Resident
Sofia Leotta, Kenmore Resident
Rachel Regelein, Kenmore Resident
Victoria Grayland, Kenmore Resident
Rose Hendrix, Kenmore Resident
Elizabeth Mooney, Kenmore Resident
John Hendrickson, Kenmore Resident
Carl Michelman, Kenmore Resident
Nadia Silver, Kenmore Resident
Jim Meyers, Kenmore Resident
Janet Hays, Kenmore Resident

FLAG SALUTE

Mayor Baker led the flag salute.

AGENDA APPROVAL

The agenda was approved as presented.

PUBLIC COMMENT

- Stacey Valenzuela, a Kenmore Resident, spoke in support of Veterans Day proclamation. She also requested advance notice to residents for Simonds road maintenance. She affirmed conservative budgeting.
- John Peeples, a Kenmore Resident, spoke I support of budget cuts in place of taxes. He also expressed general support for constitutional freedom of speech.
- David Morton, a Redmond Resident, expressed concern over the Cadman Asphalt plant using non-permitted WMA from cutback asphalt, which contains jet fuel and other pollutants.
- Patrick O'Brien, a Kenmore Resident, expressed concern that no one from the Council was invited to participate in the staff meeting with Cadman Asphalt Plant.
- Emilie Burnham,a Kenmore Resident, spoke in support of safeguarding the urban tree canopy by imposing tree mitigation measures.
- Sofia Leotta, a Kenmore Resident and the Earth Corp Club president at Inglemoor High School, spoke in opposition to the Cadman Asphalt Plant emissions citing health and environmental concerns.
- Rachel Regelein, a Kenmore Resident, expressed overwhelming support of the financial sustainability plan, especially the RADAR and equity training components.
- Victoria Grayland, a Kenmore Resident, affirmed the comments regarding the tree canopy and the concerns surrounding the asphalt plant.
- Rose Hendrix, a Kenmore Resident, expressed an interest in understanding the public safety budget and whether or not the contracts in place address current Kenmore resident needs.
- Elizabeth Mooney, a Kenmore Resident, invited the Council and attendees to attend Stream Fest 2020, hosted by People for an Environmentally Responsible Kenmore (PERK).
- John Hendrickson, a Kenmore Resident, spoke in opposition of the Financial Sustainability Plan. He also expressed concern over the City's reliance on consulting services.
- Carl Michelman, a Kenmore Resident, expressed disappointment over the lack of communication from individual Councilmembers.
- Nadia Silver, a Kenmore Resident, invited the Council and attendees to an "Ofrenda" that she is organizing. She also encouraged continued support of Kenmore Veterans.
- Jim Meyers, a Kenmore Resident, affirmed Elizabeth Mooney's Stream Fest announcement, highlighting salmon recovery goals.
- Janet Hays, a Kenmore Resident, expressed disappointment over not being invited to the City Staff meeting with Cadman Asphalt plant representatives.

DRAFT

CONSENT AGENDA

MOTION: Councilmember Pfeil moved to approve the consent agenda as presented. Councilmember Srebnik seconded the motion.
VOTE: Motion passed unanimously.

The consent agenda included the following items:

A. Resolution No. 20-356, Setting the 2021 Development Services Fee Schedule
Agenda Bill - 2021 Fee Schedule
Exhibit A Resolution No. 20-0356 2021 Fee Schedule
Exhibit A 2021 Fee Schedule
Exhibit B Section 7 of NSD CFP
Exhibit C Resolution No. 18-315
- Exhibit D 2020 Fee Schedule

B. Contract No. 20-2222, Consultant Services Agreement with Gordon Thomson, Honeywell for Legislative Advocacy
Agenda Bill
Consultant Services Agreement with Gordon Thomas Honeywell

BUSINESS AGENDA

A. 2021-2022 Preliminary Biennium Budget: Proposed Biennial Budget: Community Development, Public Works Engineering, Maintenance, Street Fund, Parks Capital Fund, Transportation Capital Fund, and 2021 Salary Plan, presented by City Manager Rob Karlinsey and Finance & Administration Director Joanne Gregory, *for Discussion*

MOTION: Councilmember Srebnik moved to change the climate action plan administrative position as presented in the budget from a regular FTE to a temporary*, 18-month position*. Councilmember Curtis seconded the motion.

AMENDMENT: Deputy Mayor Herbig moves to amend the original motion to make the temporary position for 24 months instead of 18 months. Councilmember Srebnik seconded the motion.
VOTE: 7 yes. 0 No, 0 Abstain. MOTION PASSES.

The Council deliberated and opposing views were expressed.

AMENDED MOTION: To set a climate action plan administrative position as a temporary, 0.5 FTE, 24-month position as opposed to a regular, 0.5 FTE, position outlined in the budget presentation.
VOTE: 5 yes. 2 No, 0 Abstain. MOTION PASSES.

B. Kenmore Financial Sustainability Plan and related Resolution No. 20-357, presented by City Manager Rob Karlinsey, Finance & Administration

Director Joanne Gregory & Steve Toler of Management Partners, for Approval

City Manager Rob Karlinsey walked the Council through the much-anticipated Financial Sustainability Plan, now available to the public.

MOTION: Councilmember O'Cain moved to approve Resolution No. 20-357, approving the city of Kenmore Financial Sustainability Plan through 2027. Deputy Mayor Herbig seconded the motion.
VOTE: 5 yes, 2 No, 0 Abstain. Motion PASSES.

STAFF REPORTS

Development Services Director Bryan Hampson offered a brief update on the recent meeting with Cadman Asphalt plant representatives; discussions are productive and promising.

ADJOURNMENT

Mayor Baker adjourned the special meeting at 10:50 p.m.

_____
David Baker, Mayor

ATTEST:

_____
Anastasiya Warhol, City Clerk

DRAFT

City of Kenmore
City Council Special Meeting
Minutes
October 27, 2020

CALL SPECIAL MEETING TO ORDER:

Mayor Baker called the meeting to order at 7:00 p.m. via Zoom.

PRESENT:

Councilmembers: Mayor David Baker
Deputy Mayor Nigel Herbig
Councilmember Joe Marshall
Councilmember Milton Curtis
Councilmember Debra Srebnik
Councilmember Corina Pfeil
Councilmember Melanie O'Cain

EXECUTIVE SESSION:

Pursuant to RCW 42.30.110(1)(g), The Council will now recess to a closed executive session for the purpose of evaluating a public employee. The closed session will last approximately two hours.

Announcement: At 9 PM, Mayor Baker announced that the executive session is to be extended by 30 minutes.

Announcement: At 9:30, Mayor Baker announced that the executive session is set to conclude around 9:45 PM.

ADJOURNMENT:

Mayor Baker adjourned the special meeting at 9:45 p.m.

_____
David Baker, Mayor

ATTEST:

_____
Anastasiya Warhol, City Clerk

City Council Business Agenda Item
City of Kenmore, WA

Subject/Topic: Public Hearing on the 2021-2022 Proposed Preliminary Biennial Budget	**For Council Meeting Agenda of: November 9, 2020** **Department:** Finance and Administration **Prepared by:** Joanne Gregory, Director of Finance and Administration **Initial & Date** **Approved by Department Head:** JMG 10/30/20 **Approved by City Attorney:** **Approved by Finance Director:** JMG 10/30/20 **Approved by City Manager:** RDK
Proposed Council Action/Motion: Public Hearing on the 2021-2022 Proposed Preliminary Biennial Budget	**Exhibits/Attachments:** Exhibit 1: City Manager Budget Message Exhibit 2: Summary of All Revenues and Expenditures By Fund 2019-2020 to 2021/2022

INFORMATION/BACKGROUND:

Passage of a biennial budget by year-end is required by State law. A public hearing will be held November 9, 2020 regarding the 2021-2022 proposed preliminary budget. A public hearing on the 2021 tax levy was held on October 19, 2020.

The proposed budget document was distributed to the City Council on October 12, 2020 and is also available at City Hall and at www.kenmorewa.gov/finance.

City Council reviews of department and fund budgets were held throughout October and into November and the adoption of the 2021-2022 Biennial Budget is scheduled for November 23. The public is invited and encouraged to attend public sessions and offer public comment.

FISCAL CONSIDERATION:

The City wide 2021-2022 Proposed Budget expenditures are $132,209,358 and budgeted revenues are $122,210,624. The General Fund is balanced in that budgeted expenditures do not exceed budgeted revenues and the projected ending fund balance at 12/31/2022 is $5,177,624.

The total Proposed Budget expenditures are 19% more than the 2019-2020 budget primarily due to increased capital project expenditures and use of capital project funding sources such as bond funds, grants, real estate excise taxes and impact fees. Most significantly this includes the West Sammamish River Bridge project and the Walkways and Waterways park and transportation projects.

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COUNCIL GOAL/BUDGET OBJECTIVE BEING ADDRESSED:
RCW 35A.33.055 The legislative body must schedule hearings on the budget or parts of the budget prior to the final approval.

City of Kenmore, Washington

Summary of All Revenues and Expenditures By Fund
2019-2022

FUND	2019-2020 Adopted Revenue Budget	2019 Actual	2020 Projected	2019-2020 Biennial Total	2021 Proposed	2022 Proposed	2021-2022 Proposed Revenue Budget
General Fund	$ 26,477,871	$ 13,326,439	$ 14,866,070	$ 28,192,509	$ 13,237,826	$ 13,829,944	$ 27,067,770
Strategic Reserve Fund	25,900	24,187	6,607	30,794	12,000	10,000	22,000
Strategic Opportunities Fund	1,031,000	866,707	175,035	1,041,742	289,418	187,300	476,718
Street Fund	4,634,779	3,036,463	1,553,320	4,589,783	1,470,928	1,594,598	3,065,526
Public Art Fund	136,535	1,284	135,073	136,357	200	200	400
Transportation Benefit District	718,000	357,828	355,623	713,451	0	0	0
UTGO 2016 Bond Fund	1,752,800	1,219,667	533,133	1,752,800	530,000	1,050,000	1,580,000
Transportation Capital Fund	23,467,481	1,377,042	8,095,408	9,472,450	20,318,038	5,660,421	25,978,459
Real Estate Excise Tax Fund	2,665,916	1,561,906	3,547,089	5,108,995	1,047,567	1,026,892	2,074,459
Walkways & Waterways Bonds	10,045,000	188,407	63,816	252,223	10,037,000	10,000	10,047,000
Park Capital Fund	5,839,847	1,998,470	1,553,610	3,552,080	4,960,590	3,640,958	8,601,548
Park Impact Fee Fund	491,864	104,684	95,065	199,749	94,847	90,416	185,263
Transportation Impact Fee Fund	1,981,991	485,780	363,693	849,473	360,987	326,721	687,708
Sammamish River Bridge Fund	22,088,296	1,002,016	9,753,720	10,755,736	18,024,711	8,643,947	26,668,658
Public Works Shop Fund	6,500,000	0	0	0	0	6,500,000	6,500,000
Surface Water Management Fund	4,127,000	2,361,662	2,614,919	4,976,581	2,493,189	2,592,758	5,085,947
Surface Water Capital Fund	2,702,450	133,644	1,011,727	1,145,371	1,472,237	2,446,230	3,918,467
Swamp Creek Basin Fund	40,000	26,874	8,256	35,130	5,400	1,200	6,600
Equipment Replacement Fund	142,282	76,818	85,971	162,789	121,051	123,050	244,101
TOTAL	**$ 114,869,012**	**$ 28,149,878**	**$ 44,818,135**	**$ 72,968,013**	**$ 74,475,989**	**$ 47,734,635**	**$ 122,210,624**

FUND	2019-2020 Adopted Expenditure Budget	2019 Actual	2020 Projected	2019-2020 Biennial Total	2021 Proposed	2022 Proposed	2021-2022 Proposed Expenditure Budget
General Fund	$ 27,857,780	$ 14,728,294	$ 13,129,292	$ 27,857,586	$ 13,237,826	$ 13,829,944	$ 27,067,770
Strategic Reserve Fund	0	0	0	0	0	0	0
Strategic Opportunities Fund	0	0	660,000	660,000	430,000	1,633,503	2,063,503
Street Fund	4,204,749	2,067,053	2,137,695	4,204,748	1,641,631	1,686,536	3,328,167
Public Art Fund	21,000	0	11,950	11,950	143,973	500	144,473
Transportation Benefit District	716,000	358,000	358,000	716,000	0	0	0
UTGO 2016 Bonds	1,752,800	1,223,150	529,650	1,752,800	531,100	1,050,000	1,581,100
Transportation Capital Fund	23,880,759	2,629,512	2,403,835	5,033,347	19,668,451	4,618,508	24,286,959
Real Estate Excise Tax Fund	5,205,050	900,000	(346,568)	553,432	3,115,050	3,186,911	6,301,961
Walkways & Waterways Bonds	8,685,794	600,000	4,345,440	4,945,440	8,975,653	2,260,340	11,235,993
Park Capital Fund	4,221,119	2,061,296	1,620,063	3,681,359	4,914,790	3,635,158	8,549,948
Park Impact Fee Fund	467,000	496,719	(356,523)	140,196	449,495	379,917	829,412
Transportation Impact Fee Fund	1,216,663	35,654	302,210	337,864	3,458,848	358,699	3,817,547
Sammamish River Bridge Fund	22,088,296	496,131	11,661,100	12,157,231	18,024,711	8,643,947	26,668,658
Public Works Shop Fund	2,000,000	0	0	0	0	3,500,000	3,500,000
Surface Water Management Fund	4,414,469	1,444,166	2,614,292	4,058,458	3,302,945	4,518,453	7,821,398
Surface Water Capital Fund	3,169,340	304,008	841,363	1,145,371	822,650	3,095,817	3,918,467
Swamp Creek Basin Fund	400,000	400,000	0	400,000	325,984	319,562	645,546
Equipment Replacement Fund	149,000	19,606	97,028	116,634	264,000	184,456	448,456
TOTAL	**$ 110,449,819**	**$ 27,763,589**	**$ 40,008,827**	**$ 67,772,416**	**$ 79,307,107**	**$ 52,902,251**	**$ 132,209,358**

City of Kenmore, Washington

October 12, 2020

Honorable Members of the City Council
City of Kenmore
18120 68th Avenue NE
Kenmore, WA 98028

Honorable Mayor, Deputy Mayor, and City Council:

We are pleased to present the proposed biennial budget for the years 2021 and 2022. Once again, this budget is packed with incredible plans and resources to continue propelling Kenmore upward on the trajectory of becoming a thriving community where people love where they live.

My budget message of two years ago reflected on the first twenty years of cityhood, how much had been accomplished, and how we looked forward to Kenmore's next 20 years with great anticipation and excitement. We had (and still have) ambitious goals to look forward to, and I noted that we had our work cut out for us. Little did I know back then what 2020 would bring.

The year 2020 has unfolded like no other; the effects of the pandemic have changed us forever, and this year's public outcry against systemic racism has made a major impact across our nation and right here in Kenmore.

Despite the upheaval and surprises of 2020, the people of this organization still managed to accomplish a great deal. We began the year with excitement and optimism for providing important public services and implementing the priorities that you, the City Council, had set out for us. I'm pleased to say we made great progress toward advancing those priorities even as we shifted and responded to the events of 2020.

Responding to the Pandemic

Responding to the pandemic was a major workload item that fully consumed us for many weeks starting in late February. We had to quickly respond to the needs of the public while, on the fly, reinventing how we got work done as we protected our coworkers from the possibility of infection and did our part to help slow the spread. We ascended a steep learning curve, and our organization was nimble as we changed the way we worked and interacted.

As the pandemic was unfolding, we created a plan of action with a purpose statement and objectives:

> Lead and support employees and the community through the social, mental, health and economic impacts of the pandemic.

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Objectives in Responding to the Pandemic:

1. Help slow the spread of the virus in our community
2. Maintain essential city services
3. Keep city employees safe
4. Communicate like crazy
5. Respond to budget impacts
6. Look after each other
7. Develop a recovery plan

My coworkers have been amazing throughout this pandemic. As City Hall has been closed to the public under the Governor's directive, office employees have been working from home, and I am pleasantly surprised how productive everyone has been. I am grateful for the technology that allowed us to communicate and get work done. Online video meetings have been critical to our success. City Council meetings and many other meetings have been able to continue thanks to today's modern technology. Our employees performing maintenance and inspections on the front lines have been courageous and very adaptable as we installed new precautions and protocols to keep them safe in the field.

Managing the federal CARES Act funding has been a major effort. We are grateful for this funding—we are using it to offset our pandemic-related costs, and we have also been able to distribute much of it to the business community and residents in need. My coworkers have really stepped up to manage and distribute these funds, all while still performing their other daily tasks. Thank you for providing direction on how to distribute this much-needed funding to the community—it has already helped offset some losses for our local businesses, assisted those who are behind in their rent, provided school supplies and technology for students in need, and more.

As of the date of this writing, no city employees have tested positive for COVID-19. While I'm grateful for that, I'm sad for the families of the nine Kenmore residents who have died from the virus, and we're all hurting for those who have been suffering from the economic and other effects of the pandemic.

Our residents have nicely pulled together and have done their part. For example, Kenmore was early in adopting a face covering directive, and our residents quickly rallied around wearing masks and getting them distributed throughout the community.

Countless pandemic "love notes" have been created as the wonderful people of Kenmore have creatively and quietly served, contributed, and volunteered. For example, back when masks were harder to come by, many Kenmore residents donated their time and materials to sew masks and distribute them freely. As another example, local residents provided rock painting kits with masks that were distributed to the public at City Hall.

About two months into the pandemic, Op-Ed columnist David Brooks said, "The pandemic has reminded us of our interdependence and the need for a strong and effective government. It's also taken us to a deeper level. The polarization over the past decades has . . . required constant volleys of dehumanization. This dehumanization has always been a bit of a mirage. . . The

pandemic has been a massive humanizing force—allowing us to see each other on a level much deeper than politics—see the fragility, the fear, and the courage."[1]

I think we all have seen this "humanizing force" play out over the last nine months. Think of how families have suffered together as residents of assisted living facilities have had to live in physical isolation from their families and friends; or how many of our senior citizens have had to shelter in place in their homes, magnifying the loneliness that was already there; or how a family member was hospitalized by the virus and could have no visitors; or the despair that came with job loss and delinquent rent; and worst of all, loved ones who have fallen to the virus.

Yet despite this suffering, people have come together and united in countless and quiet ways. For example, some of my coworkers organized a note-writing effort to the residents of our assisted living facilities. I'm sure they made a few people smile that day.

I believe the pandemic will persist well into 2021, and the effect will be felt in 2022 and beyond. Only a small fraction of Kenmore's and the state's population has tested positive for COVID-19. In addition, a vaccine will not be available for a while. From what I'm reading, a reliable vaccine may not be available until spring or summer of 2021, and then there will be time needed for the vaccine to be distributed into the population.

The low number of confirmed cases combined with a vaccine not being available soon cause me to conclude that we're going be in this state of teleworking, various stages of closures, physical distancing, and other precautions for a long time.[2] Nevertheless, if the past nine months is any indication of the future, the "humanizing force" of the pandemic will continue as we pull together and help those in need. If that happens, we will come out better and stronger on the other end.

Systemic Racism. Racial Equity. Diversity, Equity, and Inclusion

Not only did the pandemic rock our world in 2020, but so did the murder of Georg Floyd and the public outcry against systemic and institutional racism that has been mounting for years. But hopefully this call for action and the resulting steps we take will not just rock our world, but change our world, our systems, and us, for the better.

Kenmore is not immune to racial inequity and disparity. Our Hispanic residents are twice as likely to live below the poverty level as our white residents, and Black Kenmore residents are five times more likely.[3] Educational attainment[4] and other demographic measures for Kenmore tell a similar story.

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[1] *New York Times*, April 30, 2020

[2] Aren't you glad we all stocked up on toilet paper?

[3] Kenmore percent of race living below poverty level: white—5.9%, Hispanic—12.4%, and Black—30.3%. Source: United States Census Bureau American Community Survey, Poverty Status in the Last 12 Months, Table S1701.

[4] United States Census Bureau American Community Survey, Educational Attainment, Table S1501.

For King County, income for Black households is 52% of white households, and Hispanic households bring in about a third less than white households.[5]

Trends show that the number of children below the poverty line is growing dramatically in King County, with children of color bearing the disproportionate brunt of that trend. About 46% of Black children in King County are below the poverty level—seven times the rate for white children.[6] Health, education, and other indicators point to similar demographic trends in King County.[7]

But this is more than about statistics and numbers. Qualitatively, we know there is much hurt, anger, frustration, and despair among too many of our sisters and brothers who are Black, Indigenous, and People of Color (BIPOC). These feelings are justified and are not new; the most recent social unrest and protests once again bring this issue to the forefront and hopefully motivate all of us to move, to act, to change.

Such action and change can take place right here in Kenmore. We do not need to wait for a national or regional conversation or strategy—we can start right here at home. But any conversations we have and actions we take must not be superficial. It's not just about changing our attitudes—it's about dismantling systemic racism throughout the complex and entrenched social, political, and economic systems that bias in favor of white people.

To go below the surface and change the machine, we need to take intentional ownership of what's happened. We should historicize Kenmore, and we must be willing to dig deep, to be vulnerable, to be humble, and to own up to our own history. We have to honestly ask and answer tough questions that will make us uncomfortable and make us more aware, and we have to create a safe, inclusive space for people of color and other marginalized groups to ask the tough questions and tell us what they've gone through—and to be able to do so and truly feel heard and understood—not interrupted, not ignored.

In her book *So You Want to Talk About Race,* Ijeoma Oluo said, "We have a real problem of racial inequity and injustice in our society, and we cannot wish it away. We have to tackle this problem with real action, and we will not know what needs to be done if we are not willing to talk about it."[8]

Oluo goes on to say that "These conversations will always be hard because they will always be about the hurt and pain of real people. . . And if you are white, and you don't want to feel any of that pain by having these conversations, then you are asking people of color to continue to bear the entire burden of racism alone."[9]

Under your leadership and direction, we as a community can go on this journey of uncomfortable conversations and meaningful action. Hopefully along the way, we'll learn a lot—such as ways

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[5] King County Office of the Executive, Performance Strategy and Budget. *King County's Changing Demographics*, Chandler Felt, Demographer. 2016.
[6] See footnote 3
[7] Communitiescount.org
[8] 2019, pages 44-45
[9] Page 51

we unknowingly make race an issue; deep down, what our implicit biases might be; an awaking to microaggressions and the damage they do; what is intersectionality and how this more inclusive view casts a wider umbrella; and what specifically can we do to truly move the needle in Kenmore—to truly alter the machinery of societal systems laced with policies and practices that maintain barriers for people of color and keeps in place a racial caste system that too few want to acknowledge or talk about but is alive and well.[10]

But what can little old Kenmore do to make real progress on this societal issue? Isn't it national or even global in scope, and therefore shouldn't we leave it to larger institutions such as Congress or the U.S. Supreme Court to solve? Actually, there are things we can do at the local level. We can start with examining our own systems and processes.

Further, real change happens one heart at a time—you can't get any more local than that. And we might be surprised how our actions can ripple over into other communities. The more cities, big and small, that take on this issue, the more momentum will build and the more it will roll up to the state and national levels.

Kenmore can make a difference. When approved for funding and resources as proposed in this preliminary budget, in early 2021 we will begin the process of developing a racial equity and inclusion policy that honors diversity in our programs and community. As you directed in Resolution 20-348 last month, a proposed plan for this process will be presented to you in early November. The proposed process will include engaging our community and creating a brave space and an atmosphere of trust for people of color and people who have been "othered" and marginalized to open up to share their lived experiences and struggles.

An atmosphere of trust can be created through the process of learning our individual and community identities, how we are interconnected with each other, and who we really are. Fernell Miller, founder and CEO of The Root of Us says, "When we fail to see and understand ourselves, we fail to see and understand each other," and that "having accurate knowledge of our roots allows us to use that knowledge to build strong, equitable, inclusive, and diverse communities of practice."[11] The process will tell us how we can own up and be transparent about what's going on now and what truly needs to change.

And again, we need to go beyond proclamations, public statements, and words on paper. What actionable steps can we as a community take that will produce real deliverables that will help change the system, including Kenmore's systems and institutions? To me, this question is at the heart of the matter and will make the process worth the time and resources *if* we can answer it. I'm looking forward to this process—I know it's going to be hard and at times painful, but I believe that it will result in positive and long overdue changes that we all deserve, but especially for those in our community who have been "othered," discriminated against, and marginalized for far too long.

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[10] *The New Jim Crow: Mass Incarceration in the Age of Colorblindness,* by Michelle Alexander. 2020. Page 26
[11] Correspondence with Fernell Miller, October 7, 2020. www.therootofus.com

Later in this letter, there will be more details on what staffing and resources will be allocated to Diversity, Equity, and Inclusion in the 2021-2022 budget, but let me end this section of the budget message by quoting late Congressman John Lewis:

> I think there's something brewing in America that's going to bring people closer and closer together. Adversity can breed unity; hatred can give way to love. We need a leadership of love now, a strong leadership to lift us, to transport us, to remind us that God's truth is marching on. We can do it. We must do it. We have to go forward as one people, one family, one house. I believe in it. I believe we can do it. (*His Truth is Marching On: John Lewis and the Power of Hope,* by John Meacham. 2020. Page 249)

2021-2022 Budget Highlights

For the City of Kenmore, the first year of the next biennium will begin in better financial shape than we forecasted last spring. As major sectors of the economy were closing and as the general population was sheltering in place, we expected significant drops in certain revenues, including permitting fees, sales tax, and fuel tax. I am pleased to report that these drops as predicted did not materialize. Sales tax is down only about four percent compared to last year, and permit fees are on par with last year. Fuel tax is down about fifteen percent, which is significant, but not the fifty percent that we braced for.

To prepare for the drops in revenue, we cut many discretionary expenditures where we could. See the expenditure reductions table under Financial Sustainability Plan later in this letter. The expenditure cuts we made combined with the better-than-anticipated revenues have positioned us well for the next biennium and will allow us to maintain key services and jump start some important City Council initiatives.

However, we must continue to approach the budget and our spending with caution. We do not know the full extent of the financial effects of this pandemic recession. Further, we project that 2021 will see less revenues than originally budgeted for 2020. At the time of this writing, it appears that Initiative 976 which eliminates vehicle license fee revenue will be upheld, cutting more than $350,000 per year from our Street Fund. In addition, for the next biennium we are predicting notably lower sales tax, fuel tax, and development services fees than a pre-pandemic scenario would have anticipated.

In light of all of this, we believe the City's 2021-2022 biennium budget will have the resources to maintain current services and advance your top priorities. These priorities are as follows:

2020-2021 City Council Priorities

October 2020 Update: Given unprecedented circumstances in 2020, we must acknowledge the impacts of the pandemic and the public outcry against system racism by adding the following priorities:

- Respond to the pandemic

- Begin the process to develop and implement a diversity, equity, and inclusion policy and program.

1. Focus on and emphasize multimodal transportation safety in the City of Kenmore with a specific focus on pedestrian, bicycle, and other means of travel.
   - Implement the Sidewalk Plan
   - Target Zero
2. Increase and preserve the options for affordable housing stock.
3. Develop a Kenmore Climate and Environment Action Plan including water, air, forest, and habitat restoration.
4. Implement the Walkways and Waterways projects.
5. Create and implement a Financial Stability Plan.
6. Support Bus Rapid Transit on 522.
7. Implement the Economic Development Plan, with an emphasis on the following key points:
   - Advance Public's Access to Water
   - Create a vibrant walkable downtown
   - Attract new businesses and support existing businesses
   - Promote the Image of Kenmore
8. Foster and create a welcoming, diverse, affirming community celebrating culture and fun.
9. Engage and educate the community on growth and development in Kenmore.
10. Continue to implement a Parks Capital Improvement Plan.
11. Continue to seek opportunities to complete a successful Lakepointe Project.

The above priorities are an important policy guide as we develop the budget. Other lenses with which to view and develop the budget include our Priority-Based Budgeting results and Council-adopted policies such as the City's 20-Year Vision Statement and Comprehensive Plan, as well as more specific policies such as the Target Zero Resolution for pedestrian and bicycle safety.

1. Target Zero – Pedestrian and Bicycle Safety

Pedestrian and bicycle safety has been in the number one spot on the City Council's list of priorities since 2014. We continue to keep our eye on the Target Zero goal of no pedestrian or bicycle serious injuries or deaths by the year 2025. While pedestrian and cyclist deaths and serious injuries were in the low single digits in prior years, the numbers have gone down to zero in 2018, 2019, and year-to-date 2020.[12]

While it can be next to impossible to prove prevention, I believe your vision combined with the City's efforts have made a difference in improving pedestrian and bicycle safety over the last six years. Who knows—maybe lives have been saved. What follows are descriptions of the City's current and ongoing efforts aimed at achieving the Target Zero goal.

Traffic Photo Enforcement. The financial sustainability plan task force recommended traffic photo enforcement as a way to improve traffic safety and fund traffic safety and pavement preservation. In Washington State, traffic photo enforcement can only be used for red light running and school zone speed enforcement. The task force assumed photo enforcement at three locations, yet to be determined. This proposed program is described in more detail later in this letter under *Traffic Safety and Pavement Preservation* in the "Other Highlights for the Proposed 2021-2022 Biennium Budget" section.

Local Road Safety Plan. We continue to implement the data-driven Local Road Safety Plan. We are in the process of designing two projects that received Highway Safety Improvement Program (HSIP) funding:

- New radar feedback signs along 73rd Ave NE, 80th Ave NE, NE 192nd St., and Simonds Road
- 25 New streetlights throughout the City

Sidewalks. We apply for sidewalk grants as they become available. This year, applications for the WSDOT Safe Routes to Schools and the Pedestrian/Bicycle grants were submitted for:

- Arrowhead Drive: New sidewalk from NE 151st St. to 64th Ave. NE
- 81st Ave NE: Closing the sidewalk gap south of Moorlands Elementary
- 61st Ave NE: Sidewalk replacement from NE 190th St. to 62nd Ave. NE
- NE 192nd St: New sidewalk from 75th Ave. NE to existing sidewalk west of 75th Ave.

Bike Lanes. We also applied for Pedestrian/Bicycle grants for bike lane striping along NE 175th St. from 68th Ave. NE to 65th Ave. NE to connect the future bike lanes on 68th Ave. NE to the Burke Gilman Trail.

Simonds Overlay/Restripe. When Simonds overlay was completed this summer, the design for the striping reclaimed some of the road's existing real estate for peds and bikes. In other words, Simonds Road experienced more road diet—the road was originally overbuilt for cars with more

[12] Note, however, that earlier this year, a cyclist crashed heading down the hill (northbound) on Juanita Drive. The crash was due to a mechanical failure of the bicycle. No motor vehicles, other cyclists, or pedestrians were involved. The cyclist was transported to the hospital and was expected to recover from his injuries.

lanes and right turn off ramps than were necessary. Simonds Road (at least the Kenmore portion) is now one lane in each direction, creating new room for buffered bike lanes.

West Sammamish River Bridge. Construction is underway, and we very much look forward to the two-way ped/bike promenade that will be part of the new bridge.

Traffic Data Collection: We are continuing with our Annual Counts Program. This program allows us to stay on top of the traffic conditions within the City, monitor trends, and alert us to potential concerns that we can address before they become a problem.

2. Affordable Housing

It is quite rewarding to look back at the affordable housing work our organization and the community have completed under your direction, and we look forward to advancing this cause even further in this next biennium. What follows are affordable housing actions recently completed or underway, several of which will continue into 2021 and 2022.

Mobile Home Park Preservation. The April 2019 ordinance (Ordinance 19-0481) preserved the six mobile home parks and existing affordable housing stock. Preserving existing affordable housing is a Tier 1 regulatory approach in the adopted 2016 Affordable Housing Strategy. Council direction for Phase 2 of the project was to establish regulations for the four parks north of SR522, limiting the preservation of those parks to 10 years and allowing redevelopment at higher densities but including an affordable housing component. Phase 2 is on hold pending outcome of an appeal being challenged in the courts. The City is defending this ordinance.

Accessory Dwelling Units. After much input from the community and much work by the Planning Commission and the City Council, last month you approved the ordinance allowing more flexibility and opportunities for residential accessory dwelling units. This ordinance creates another tool for affordable housing and for providing more housing choices in Kenmore. Strategies for Accessory Dwelling Units are also a Tier 1 regulatory approach for affordable housing in the adopted 2016 Affordable Housing Strategy.

Missing Middle. At the January 2019 Council retreat, Council expressed interest in learning more about smaller housing types such as cottage housing, duplexes or triplexes that support affordable housing goals and provide flexibility in single-family neighborhoods i.e. "missing middle" housing. The City hosted a developer panel October 2019 on the missing middle housing topic. The Planning Commission is expected to begin the process of considering potential changes in our zoning regulations that will allow for more housing stock in the "missing middle," providing more choice and potentially more affordable housing in single-family neighborhoods. Public outreach is an important component of this project. Encouraging infill, increased capacity and housing diversity is a Tier 2 regulatory strategy in the 2016 Affordable Housing Strategy.

Multi-Family Tax Exemption (MFTE). April 2019, Council adopted Ordinance 19-0479 designating the transit-oriented development (TOD) district overlay as a residential target area, eligible to apply for MFTE. MFTE is an incentive to encourage development of multi-family and

affordable housing, by providing an 8-year exemption or 12-year property tax exemption if affordable housing is included. Encouraging layering incentives to create greater affordability and density is a Tier 1 regulatory approach for affordable housing in the 2016 Affordable Housing Strategy.

Rent Notification Regulations. Council adopted Ordinance 19-0484 in May 2019 with an effective date of September 1, 2019. The ordinance requires landlords to give tenants a 90-day notice when their rent is being increased by more than 10% over the course of a year. State law calls for a 60 day notice regardless of the amount of rent increase. Rent notification regulations are not a specific strategy in the Affordable Housing Strategy. However, promoting and supporting regional and statewide initiatives is a broad category in the strategy.

Local Sales Tax for Affordable Housing. Council adopted Resolution 19-326 and Ordinance 19-0496 September 2019 in accordance with HB1406 allowing retention of 0.0073% of the state sales tax for affordable housing for a twenty-year period. The Department of Revenue noted an effective date of November 1, 2019 and calculated a maximum capacity of $22,466.15 per year. Receipts will be pooled to ARCH. Providing local funding assistance for affordable housing is a Tier 1 direct assistance strategy in the affordable housing strategy.

Re-Use of Tax-Exempt or Publicly-Owned Sites for Affordable Housing. Development Services staff have been working with a church property on options for provision of affordable housing on their property. Sound Transit is evaluating the King County Metro park & ride site on SR522 for locating a future parking garage to support the ST3 transit initiative and city staff are encouraging inclusion of housing as a project component. Allowing flexible re-use of tax-exempt or publicly-owned sites through a special process to increase housing supply and enable more diverse forms of housing, if linked to providing some affordable housing, is a Tier 1 regulatory approach in the Affordable Housing Strategy to support infill/increased capacity and housing diversity. This strategy also notes the possible opportunity at the park and ride property. The Planning Commission is currently working on this topic and will bring forward a recommendation for Council consideration in the near future.

Annual Dashboard on Housing. At the January 2019 Council retreat, the City Council requested an annual dashboard on housing. To avoid duplication Staff were anticipating being able to use the housing dashboard prepared by the King County Housing Interjurisdictional Team (HIJT), who were also coordinating with ARCH. The HIJT initial estimate for completing the dashboard was year-end 2019 but the project was delayed in 2019 and delayed further in 2020 due to the pandemic. HIJT have gathered data from jurisdictions and other housing partners. Collaborating with other local governments on regional housing strategies is a Tier 1 approach in the Affordable Housing Strategy.

Housing Interjurisdictional Team (HIJT). Lauri Anderson, Principal Planner is a staff member of the HIJT (Housing Interjurisdictional Team) supporting work of the Countywide Affordable Housing Committee. Collaborating with other local governments on regional housing strategies is a Tier 1 approach in the Affordable Housing Strategy.

ARCH Membership. Kenmore continues to be one of the eastside cities to participate as a member for A Regional Coalition for Housing (ARCH). Kenmore pays an annual membership due as well as a capital contribution toward helping build new affordable housing units in the region. ARCH incentivizes affordable housing through subsidies and other tools. From ARCH's website: "ARCH assists member governments in developing housing policies, strategies, programs, and development regulations; coordinates the cities' financial support to groups creating affordable housing for low– and moderate-income households; and assists people looking for affordable rental and ownership housing." Our Assistant City Manager serves on the governing board of ARCH, and ARCH staff frequently advise us on affordable housing policy development.

Affordable Housing Work for the Next Biennium. Several of the programs and projects listed above will continue into the next biennium, including the missing middle project. The missing middle discussion will continue into 2021 and will include the concept of allowing more flexibility in single-family neighborhoods. This discussion will need to be preceded with proactive public input on the matter, so we plan on asking the community for feedback about what they envision in single-family neighborhoods in the near future. Community input for single-family neighborhoods also provides important information for the next State mandated update of the Comprehensive Plan due June 2024. Any changes considered for the single-family neighborhoods would be incorporated into the Comprehensive Plan land use element. It is unlikely that an affordable housing project would be part of the Planning Commission's 2022 work program, as the Planning Commission focus will be on updating other elements of the Comprehensive Plan (as required by the state).

3. Climate Action Plan

Earlier this year we presented the City Council with a "plan for creating a Climate Action Plan." The "plan for the plan" included associated workload impacts if we were to move forward with developing and implementing a Climate Action Plan (CAP) for our organization and for the greater Kenmore community. You directed us to move forward with Phase I of a Climate Action Plan, which is to conduct an inventory of our greenhouse gas emissions. This inventory should be completed by the end of the year, and we should have a report for you soon thereafter.

As stated before, I believe that in order to do a good job with developing and implementing a CAP and to have it truly integrated into our organization and a part of everything we do, we will need a new half-time position—especially in the context of all of our other competing priorities. Therefore, this proposed budget includes such a position, and it includes funding for climate action plan consultant expertise as well.

We currently have a temporary position working in the Environmental Services Division. We are proposing that half of the position continue working as administrative support for our surface water utility, and the other half serve as a specialist in helping us develop and implement the climate action plan. A little over half the position would be charged to the surface water utility, and the remainder would be funded from the Strategic Opportunities Fund for the 2021-2022 biennium. When additional revenue sources become available in 2023 and beyond (according to

the plan recommended by the FSP task force), the climate action portion of the position would be charged to the General Fund.

If you allocate these additional resources as proposed in this 2021-2022 budget, we will be able to proceed with the next phases of the Climate Action Plan, including implementation.

4. Walkways & Waterways

I am pleased to report that all five of the Walkways & Waterways projects are on schedule, meaning the schedule we presented to our residents before they voted to approve the 2016 Walkways and Waterways Bond Measure. The bad news is that the projects are costing more than we estimated, but the corresponding good news is that my resourceful coworkers have found additional funds through grants and other resources without having to cut the projects or go back to our voters for more money. Squire's Landing Park is the only Walkways & Waterways project that is not yet fully funded, but we are optimistic that the remaining funding will materialize as we seek more resources from the state and other sources.

As you know, the Rhododendron boardwalk and float were completed ahead of schedule in 2018. The Log Boom Park improvement project has completed most of its permitting and will likely begin construction in 2021. The Squire's Landing Park project has also completed important permitting milestones and should be under construction in 2022.

We have awarded the construction contract for the new sidewalks and bike lanes on Juanita Drive, and the contractor is well under way and on schedule. This project should be completed by the end of 2021.

Later this month we will go out to bid for the 68th Avenue sidewalk and bike lane project, with construction expected to begin in 2021 and wrap up in 2022.

When the Juanita Drive and 68th Avenue projects are complete (in conjunction with the West Sammamish River Bridge Project), we will have continuous new sidewalks and bike lanes on Kenmore's main north-south arterial from city limit to city limit.

5. Financial Sustainability Plan (FSP)

The budget message of two years ago discussed the increasing difficulty of producing a balanced budget given that revenues were not keeping pace with the increasing cost of city services. That budget message described the need to have a "broader discussion with the community about the structural revenue problem." I'm pleased to report that we followed through and have been having that very discussion with the community about the City's budget and long-term financial sustainability.

In the fall of 2019, you approved a public process by which we engaged the community and created a plan that keeps revenues and expenditures in balance over the next six years. You approved a charter for a task force and directed me to appoint the task force members and give

them the information they needed to provide recommendations for a Six-Year Financial Sustainability Plan (FSP).

This task force began its work early this year and was making great progress until the pandemic struck. They paused their work last April and then resumed meeting in August. This amazing group of residents did an outstanding job and presented their plan to you at your budget retreat last month. The task force's recommendations are a culmination of many meetings and input from the public.

Public engagement during the FSP process included public comment during task force meetings, open houses, and an online, interactive tool called "Balancing Act" that gave the public a virtual way to balance the budget. Results of the public input were reported to the City Council at the September 10 budget retreat.

At the September budget retreat, you listened to additional public comment and you heard the task force recommendations. You provided feedback and general direction. Based on the feedback you gave, I will take the task force's recommendations, make some adjustments, and bring forward a final Six-Year Financial Sustainability Plan for you to approve on October 26, 2020.

The financial sustainability plan will be a measured and phased approach, with specific actions being implemented sequentially over several years. The plan will include both reductions in expenditures and increases in revenues. Expenditure reductions will be implemented first before revenue increases; many of these expenditure cuts went into effect in 2020 and others will be implemented in 2021.

Many of these reductions represent drops in service levels, such as economic development, federal and regional advocacy, landscape maintenance, and decorative banners and flower baskets along arterials. The Kenmore Business Incubator (KBI) is among the cuts in economic development and will close its doors at the end of this year. The KBI has helped many Kenmore businesses representing dozens of jobs during its eight-year run, and I want to thank Assistant City Manager Nancy Ousley for her outstanding work in creating and running the KBI.

The decreases in public safety expenditures (jail and court) reflect both a shift in how we approach policing as well as changes in misdemeanor crime laws and how they are prosecuted. The following table shows expenditure reductions that make up the bulk of the cuts in the General Fund and Street Fund that will continue into the next biennium:

Expenditure Reductions: 2019-2020 Compared to 2021-2022 Proposed

Program	2019-2020 Budget	2021-2022 Proposed Budget	Biennium (Two-Year) Savings	Savings Per Year
Economic Development, Communications, Federal/State/Regional Advocacy, etc.	807,000	286,776	520,224	260,112
Public Safety				
Court	260,000	155,100	104,900	52,450
School Resource Officer	100,000	-	100,000	50,000
Jail	850,000	550,000	300,000	150,000
Subtotal	1,210,000	705,100	504,900	252,450
Public Works				
Arterial Landscape Maintenance	363,400	245,500	117,900	58,950
Transportation Consulting (design, studies, etc.)	112,550	10,000	102,550	51,275
Street Banners	50,000	-	50,000	25,000
Materials (including flower baskets--about $2k/yr	60,000	36,000	24,000	12,000
Subotal	585,950	291,500	294,450	147,225
Total	**2,602,950**	**1,283,376**	**1,319,574**	**659,787**

The task force for the financial sustainability plan (FSP) recommends that proposed increases in program revenues and taxes will be phased in over the next six years, none of which will begin prior to mid-2022. For this biennium, the task force recommends a new cable TV utility tax of six percent (current Cable TV utility tax rate is 0%) starting in mid-2022, which is projected to raise approximately $190,000 for the last six months of 2022 and $380,000 per year in 2023 and beyond.

Per state law, Real Estate Excise Tax (REET) is used for capital project expenditures. However, recent state legislation allows for up to approximately $100,000 per year of REET to be used for maintenance; as a result, I am proposing that starting in 2021, $100,000 per year of REET be allocated to the Street Fund for road and sidewalk maintenance purposes.

Diversity, Equity, and Inclusion and Human Resources

You have directed us move forward with a Diversity, Equity, and Inclusion (DEI) policy and program in 2021. We look forward to this important initiative and recognize that in order to do it right, the appropriate amount of resources will need to be allocated to this endeavor. Responsibility for DEI will not be concentrated in one person or department—it will be everyone's job to advance equity and justice. That said, we will need some outside expertise to help guide us through the conversation and implementation, and I will need a point person on staff to run and coordinate DEI. This budget allocates funding for a consultant to provide us with the expertise and guidance we need for DEI program development and implementation.

We'll also need internal staff resources to drive this initiative, and I propose that we create a human resources manager position to manage the DEI process and take on the ever-growing workload of human resource management for our city organization. As you know, we all wear various hats in our small organization. Our Finance and Administration Director not only manages all aspects of our city finances, but she also manages our human resources, information technology, and risk management functions. The human resources responsibility in particular has ballooned over the years; this phenomenon has less to do with our number of employees and more to do with the ever-changing rules and regulations pertaining to personnel.

Neither finance nor human resources can be neglected. All sorts of bad things happen when one or both don't get their due, and we can no longer stretch one person's time to manage these functions. With the added workload of the important DEI initiative, it is time to create a position with the time and expertise to handle these functions of both DEI and human resources.

Below are some key functions of the proposed human resources manager position:

1. Recruitments
2. New employee orientation program
3. Personnel matters (discipline, complaints, etc.)
4. Performance evaluation system
5. Employee recognition
6. Compliance with frequently changing personnel and labor laws
7. Compensation and benefits
8. Job function evaluation, including job descriptions
9. Personnel Policy Manual and other administrative policies and procedures
10. Employee wellness program
11. Title VI of the Civil Rights Act reporting requirements
12. Employee engagement and organizational health and culture
13. Employee training and development (including training on anti-harassment, diversity, equity, safety, etc.)
14. Employee and workplace safety (OSHA/WISHA compliance, L&I/workers comp, updating standards and rules, ergonomics, etc.)
15. Drug & alcohol testing program for CDL drivers, including random testing, pre-employment testing, etc.
16. Diversity, Equity, and Inclusion Program (developing and implementing, possibly staffing a commission, re-vamping our policies, procedures, training, etc.)

As you can see, managing human resources is no small chore, and we need to give this function the necessary resources for the benefit of our organization. Doing so can yield significant benefits—a more engaged workforce, reduction of risk, and improved processes, to name a few.

Funding for the DEI consultant services is proposed to be allocated from the Strategic Opportunities Fund, and the General Fund will cover the cost of the human resources position.

Other Highlights for the Proposed 2021-2022 Biennium Budget

Industrial Emissions and Air Quality

Many of our residents have concerns about industrial emissions from the asphalt plant in Kenmore. The plant currently is under a 40+ year-old EPA permit that does not require emissions standards or testing. Puget Sound Clean Air Agency (PSCAA) has jurisdiction over emissions regulations and enforcement, and a current enforcement action by PSCAA may result in requiring the plant to comply with emissions standards and testing. The City needs to play an active role in tracking the situation, asking the right questions, and looking out for the public's

interests. This proposed budget includes funding from the Strategic Opportunities Fund to pay for the engineering and legal expertise necessary for the City to stay on top of the situation.

Public Works Facility

Kenmore's public works department maintains the City's essential infrastructure, and it is imperative that the City find an adequate, long-term site for a Public Works facility and yard. Our Public Works Operations team is currently located at a temporary site on SR522 that allows them to limp along but is woefully inadequate. Public Works does not have a special interest group to stand up and fight for it. That's where the Kenmore City Council and staff come in—it is up to us to be that voice for the greater good of the people of Kenmore, and we should persist in searching for and acquiring the right property for public works.

In 2021 we will continue our search for an appropriate site for the public works facility, and this proposed budget includes resources to do so. An informal City Council subcommittee of three of you is helping us review and revise the site selection criteria, and I expect we will have updated criteria for you to review in the first quarter of 2021.

Policing

Immediately following the murder of George Floyd, you directed us to employ the process recommended by the Obama Foundation Mayors' Pledge, as a commitment to action regarding police use of force policies. As part of this pledge, the Mayor and Council pledged to:

1. REVIEW your police use of force policies.
2. ENGAGE your communities by including a diverse range of input, experiences, and stories in your review.
3. REPORT the findings of your review to your community and seek feedback.
4. REFORM your community's police use of force policies.

Without delay, we held two listening sessions with the public and invited King County Sheriff Johanknecht and Chief Moen to a City Council meeting to discuss use of force policies and hear additional feedback from the public. Based on these listening sessions and meetings, Chief Moen produced a report, including recommended changes for the local, county, and state levels. He presented this report to you at the September 14, 2020 City Council meeting.

This process is not over. We need to move forward with and advocate for the recommendations in the report. We especially need to continue to engage the public and build trust and relationships with our BIPOC communities so that they will feel safe enough to open up and help us understand what they are going through and what needs to change. This work will be part of and coordinate with our community-wide Diversity, Equity, and Inclusion work that I outlined earlier.

In keeping with the FSP task force recommendation, this budget discontinues funding for a school resource officer ($50,000 per year) and replaces it with funding to supplement the RADAR program which provides mental health professionals to respond to calls with police officers and provide the necessary follow up ($50,000).

Traffic Safety and Pavement Preservation

Maintenance and preservation of our roads is one of our core municipal functions. While our most recent pavement rating of 78 is good compared to other cities in the area, the consultant who completed the study concluded that if we want to maintain our pavement rating and avoid the slippery slope of deferred maintenance,[13] we need to invest more funding into asphalt preservation than we have been.

In addition to pavement preservation, traffic safety is also a core function. Since the Target Zero resolution in 2014, the City has invested aggressively in traffic safety programs, including the addition of a traffic engineer position. This fulltime position has allowed us to be much more proactive and responsive in solving traffic safety issues. All of our traffic safety efforts have seen results, and they have been appreciated and noticed by our residents.

Funding for these efforts needs to continue. This proposed budget, based on the recommendation of the FSP task force, adds a proposed new funding source to address both traffic safety and pavement preservation: traffic photo enforcement. State law allow cities to use traffic photo enforcement in only two applications: school zone speeding and red light running.

The FSP task force recognized the safety benefits of photo enforcement, but they also recognized photo enforcement as a mechanism not only to fund traffic safety and pavement preservation, but also as a way for road users who don't live in Kenmore to help pay for the costs of maintaining our transportation systems. Because Kenmore is a residential bedroom community, a portion of the taxes we pay goes to other communities when we travel elsewhere to shop and do business. This phenomenon is known as tax leakage, and while photo enforcement it is not a tax, it is a way to help address the imbalance.

If you, the City Council, give us the green light[14] to move forward with photo enforcement, we expect that the equipment will be installed and operational by mid-2022. Assuming three photo enforcement locations, half of a year of operations would conservatively yield a net of about $500,000 in 2022 (after costs to operate, court costs, etc.). This additional funding for 2022 and beyond would provide additional resources needed to help keep up with the maintenance of our asphalt and maintain our traffic safety efforts.

Administrative Support in Development Services and Community Development

Currently, the Development Services Department (DS) and the Community Development Department (CD) share one full-time administrative assistant position to provide the clerical and other administrative support they need for the departments. This one position has not been able to meet the workload demands of both departments.

The consistent flow of mailings, notices, public records request, records management and filing, and service requests in DS are requiring the resources of a full-time administrative assistant. At

[13] See postscript at the end of this budget letter
[14] Sorry, I couldn't help myself.

half time, there is not enough time for all of the administrative support work to be completed in DS. For example, records management, including state-required archiving activities, are not up to date. Meanwhile CD has plenty of work for a half time administrative assistant. As a result, we are recommending the addition of a half time administrative assistant to address this issue. If approved, the current half-time Recreation Coordinator would be brought to fulltime—0.5 FTE Recreation Coordinator in the City Manager's Office, and 0.5 FTE Administrative /assistant in CD. The existing full-time Administrative Assistant would be fully allocated to Development Services. The following tables list the administrative support needs of Development Services and Community Development:

Development Services, Administrative Assistant Responsibilities

Function	Description
General Admin	Registering staff for training, filing project file, filing inspection reports, coding A/R, becoming familiar with financial software to verify if payments have been issued, updating forms, updating website, scanning plans & permits, assisting staff with projector & laptop for presentations, covering front desk breaks
Records Management	Records retention/archiving/destruction of all department documents
Land use notifications	Notifying applicants, uploading docs to MyBuildingPermit.com, mailing, publications, notifying Person of Interest, updating Trakit, updating website
Bonds and agreements	Receiving & verifying agreements, informing staff, working with the Development Review Engineer to verify release, updating R Drive, updating iCompass, updating Trakit, creating release letters, notifying applicant & bonding agent
Public Records Request	Researching & pulling all documents related to requests or generate requested report, notifying staff when ready
Clerk to Hearing Examiner	Coordinating with Hearing Examiner, appellant and staff for appeal dates, creating exhibit binders, creating cd's with staff report & exhibits, setting up chambers, sitting in & recording the appeal, being the liaison for notifications/emails to appellant, staff & Hearing Examiner
Service Requests	Receiving & distributing service requests to the appropriate department staff, entering service requests as received, monitoring that they are completed
Rental & Room Requests	Receiving all inquiries from both staff & public related to City Hall rental, meeting with public to review the rental. tracking and confirming payments have been received, refunding deposits after completion, making sure room is set up, scheduling on calendar
Permit Backup	Learning & backing up permit desk, issuing permits
Addressing	Filing in address files-electronic & paper, putting on map
Familiar with the following software platforms:	
ESS (time sheet)	Entering time
Trakit	Permit tracking software
iCompass	Bonds and public records request software

City Works	Service requests and Public Works asset software
Tyler	Financial software
MBP	Permit portal

Community Development Administrative Assistant Responsibilities

Planning Commission:
Assist in preparing /editing information for planning commission packets and meetings. This could include basic research, data collection, map preparation, formatting and editing of documents, or creating display boards or materials
Posting meeting or project info to website and listserve or at the library or other sites and keeping it current
Reviewing planning commission mail and email and distribute to staff or folders, as appropriate
Keeping list serve and other mailing lists updated
Keeping commission contact info updated
For public hearings/open house/meetings: prepare meeting notices, mailings, legal notice, postings. There are likely to be two or three public hearings between July and December
Scheduling meeting rooms and meeting room set up including setting up recording equipment for meetings and making sure presentation materials are on the laptop
Preparing advertisement for new commission positions, providing public notice (newspaper, website etc.), setting up interviews, setting up orientation for new commissioners
Attend planning commission meetings to take and prepare minutes, operate recording equipment. Meetings are typically held the first and third Tuesdays of the month, although special meetings regularly occur.
"Publish" video after meeting
Comprehensive Plan:
Formatting/editing comp plan update materials. Amendments are typically adopted once per year—scheduled for November 2019
Preparing maps, figures, tables, or other materials
Research and data collection
Legal and Notice requirements: Prepare required materials and notice for the annual docket, public hearings, and Department of Commerce
Updating all hard copies of comp plan (library, staff, counter)
Updating and maintaining the website
Maintaining an ordinance list related to comp plan amendments
Planning Projects (annual work program)
Set up and maintain project files (paper and electronic)
Assist in preparing /editing and assembling information for council packets and other meetings
Preparing presentation materials including maps and display boards
Conducting research and data collection
Formatting and editing memos or other information
Legal and Notice Requirements: Prepare required materials for meetings, public hearings, open houses, Commerce
Maintaining an ordinance list for planning projects
Coordinate/cross reference filing system for related grants and contracts

Recreation Coordination

For the 2019-2020 biennium, the City Council approved a half-time recreation coordinator position with a two-year term. I am recommending that this position continue through the next biennium and become a regular position.

When it comes to recreation services, Kenmore has generally followed the model of allowing the private and non-profit sectors to provide the programming while the City provides the facilities. Examples include:

- Skyhawks summer camps at Rhododendron Park
- Skate Like a Girl at Jack Crawford Skate Court
- Kenmore Senior Center at Rhododendron Park
- Youth sports leagues at Bastyr University and Moorlands Park athletic fields
- Paddling and rowing programs at Squire's Landing, Rhododendron, and Log Boom Park

Prior to the creation of the recreation coordinator position, responsibilities for managing and coordinating with the various service providers were spread throughout the organization. There was no main point of contact for recreation, and at times there was confusion about which department to talk to and keeping the left hand informed about what the right hand was doing.

To address this issue and to better coordinate and grow recreation opportunities, the City established a part-time Recreation Coordinator position with the training and experience that goes with the position. As a result, we can now provide a less piecemeal and more holistic approach to recreation coordination and bring it to a more professional level, including improved public information on the website and printed materials. Expectations have been exceeded with this position—not only have existing programs been coordinated more effectively, but the position has been able to expand opportunities for recreation in Kenmore. As mentioned in the previous section about administrative support, we propose that the 0.5 FTE Recreation Coordinator be combined with the 0.5 FTE Administrative Assistant in Community Development, bringing it to a fulltime position.

Unfunded Mandate – Residential Streetlights

A State Supreme Court ruling of quite some time ago ruled that residents can't be billed directly for streetlights, and that streetlights should be paid directly by cities from tax revenue.[15] Starting in 2021, we are going to take over these utility bills from many neighborhoods throughout the City. Per the ruling, the City can't bill residents for the streetlights as a fee, so the City will need to absorb this unfunded mandate into the budget. The hit to the Street Fund will be just over $200,000 per year. Combining this new burden with the losses from I-976 sends the budget more than $550,000 per year in the wrong direction.

Lakepointe

[15] *Okeson v. City of Seattle*, 150 Wn.2d 540 (2003)

While would-be developers continue to come and go, we should consider re-thinking Lakepointe. After several decades of hoping for a developer to swoop in and save the day, maybe we should look at Lakepointe through a new lens. What if this lakefront property was redeveloped with more of a balance of public and private spaces and infrastructure?

Given that Lakepointe is 11th on your list of eleven priorities (13th if you put responding to the pandemic, and diversity, equity, and inclusion ahead of it), we will work on it as time allows. We need to put first things first before we turn too much of our attention back to Lakepointe. Getting our financial house in order in the context of the pandemic, addressing our part in climate change, confronting systemic racism, and your other higher priorities come first.

That said, this proposed budget does include some funding to begin the process to re-vision Lakepointe and amend the Comprehensive Plan accordingly, including an environmental impact study and a high-level, planned land use action to go with it. The proposed funding source for this effort over the biennium would come from the Strategic Opportunities Fund.

Strategic Opportunities Fund

Speaking of the Strategic Opportunities Fund (SOF), this budget proposes one-time strategic expenditures in the 2021-2022 biennium to be paid for from the SOF. The SOF was created in 2013 with one-time funding from the General Fund of $2.5 million. Over the years, the City has drawn from the SOF for various capital projects and other strategic opportunities. The City has also kept SOF replenished with year-end budget savings in the General Fund from prior years, and at the end of 2020, the fund balance of the SOF will be just over $2.6 million.

The proposed list of SOF uses for the 2021-2022 biennium is as follows:

- Engineering consulting expertise and specialized legal counsel for air quality and emissions from industrial plants in the City.
- Climate Action Plan consultant expertise to fully develop the plan.
- Lakepointe re-visioning, including a potential new subarea plan, EIS, possibly a planned land use action.
- Diversity, Equity, and Inclusion consultant expertise.
- Transfer to the Surface Water Management Fund for Climate Action Plan Staffing (1/2 FTE).
- Transfer to the Transportation Capital Fund for 68th Avenue Walkways & Waterways bicycle and pedestrian improvements.

Amounts for each of the above items is found in the Strategic Opportunities section of the budget. The above list does draw down the SOF balance from about $2.6 million at the beginning of 2021 down to just under $1.0 million by the end of 2022. However, we have a track record of replenishing the SOF with end-of-year savings and other sources. For example, we propose paying back SOF for the 68th Avenue project by transferring $200,000 per year in traffic impact fees back to the SOF, starting in 2024.

The Budget Picture

The recession aside for a moment, we'll be going into 2021 with two new negative hits to our budget, both of which are courtesy of the state—loss of vehicle fee revenues thanks to Initiative 976 (assuming it is upheld by the state Supreme Court) and absorbing the costs of neighborhood street lights. The negative impact to our budget from these two changes will be more than $550,000 per year.

Bringing the recession back into the picture, several of Kenmore's revenues will see drops compared to the pre-pandemic levels:

		Forecasted		
	2019 Actual	2020	2021	2022
Sales Tax	2,774,091	2,633,784	2,628,000	2,654,280
Permitting Revenue	994,772	901,128	856,071	813,268
Fuel Tax in the Street Fund	483,214	402,603	435,000	503,058

Even with these negative impacts, we are proposing a budget that is in keeping with the FSP task force recommendation for a budget that is *mostly* balanced for the next biennium. What do I mean by "mostly balanced?" Thanks to the service level cuts we made earlier this year in response to the pandemic, and given that many of these reductions will continue into the next biennium, we will be able to balance out <u>most</u> of the negative impacts from the recession and the state-imposed hits to the budget.

However, the FSP task force recognized the ongoing recession and the desire to not impose new revenues during these difficult times. In keeping with this direction, this budget does not add new revenues until mid-2022, resulting in a Street Fund deficit of $170,703 in 2021 and $91,938 in 2022. The task force was willing to accept a 2021-2022 budget that was not completely balanced, knowing that 1) we have very healthy fund balances to draw from, and 2) in future years their plan would phase in other budget balancing measures and thereby restore any draws on fund balances taken during the recession. This proposed budget follows the task force's direction. Also note that were it not for the unfunded state mandate to take on residential streetlight utility bills starting in 2021, both the General Fund and the Street Fund would be full balanced.

Even though the Street Fund expenditures are forecasted to exceed revenues in the next biennium, the City has strong fund balances in its operating funds. The General Fund and Street Fund will have a combined beginning fund balance in 2021 of $6,489,620 and an ending balance of $6,226,979 at the end of 2022.

We anticipate that collectively, operating revenues will remain flat in the next biennium compared to 2020. This forecast is what I call a middle-of-the-road approach, meaning that we're not expecting the economy to bounce back quickly, nor are we expecting it to decline significantly below what we are seeing now during the height of the pandemic.

While I have been reading compelling cases for both sides of the argument, I believe our revenue projections are prudent. On the one-hand, we are seeing troubling economic indicators on the

macro level, such as drops in gross domestic product, unemployment, consumer confidence, and small business closures. On the other hand, we are experiencing encouraging indicators at the local level, including consumer spending, real estate price stability, and new construction activity. Our own revenues on whole are also remaining steady, including property tax, sales tax, and permitting revenues.

We will continue to monitor economic indicators and City revenue collections closely and frequently, and we can respond and make adjustments as necessary. Overall, Kenmore is in a good financial position to weather this storm because a) the City has strong fund balances in its operating funds, b) our major revenues sources are relatively inelastic, and c) the reductions we made earlier this year are significant, and many of those reductions will continue into 2021 and 2022.

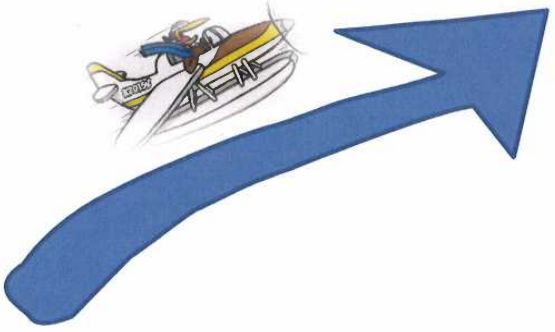
Conclusion

I believe we are at another hinge point in our nation's history. The civil rights area of the 1960s, including the Civil Rights Act of 1964 and the Voting Rights Act of 1965, was one of those hinge points.

Multiple forces are converging together to create this hinge point, give us great pause, inject a dose of humility, and cause us to assess who we are and where we need to go. Such forces include the pandemic, the public outcry against systemic racism, and the effects of climate change.

How will Kenmore play a contributing role in this hinge point? As small as we are, we *can* make a difference, even if it's only for our 24,000 residents. For years we have talked about how Kenmore is on an "upward trajectory of becoming." I think my view of that upward trajectory and how it's going to happen has evolved. Kenmore can go to a new level on this trajectory—perhaps even to a level that is an order of magnitude higher.

Kenmore is on an Upward Trajectory of Becoming



So far, ascending this upward trajectory has been propelled by our many amazing programs and projects, such as creating a new downtown, beautification, building new sidewalks, habitat

restoration and water quality programs, and improving traffic safety. We are also focusing on climate change, affordable housing, and partnering with our community cocreators who produce what we call "love notes" that bring people together and create art, beauty, and fun.

All of these efforts are very important and meaningful, and we should continue with them because they will propel us on that upward trajectory. I also believe there's a next level in our progression, and I think this level will take us beyond the purely financial or things we can objectively put a finger on; a level that helps us acquire or improve upon higher attributes such as sympathy, empathy, love, and compassion.

Earlier in this letter I quoted David Brooks and his idea of "see[ing] each other on a level much deeper than politics." He expounded on this idea at a university forum in 2019:

> Many of our society's great problems flow from people not feeling seen and known. . . To me, the core democratic trait that we all need to get a little better at is the trait of seeing each other deeply and being deeply seen. It's a question of . . . understanding each other.[16]

I believe the Diversity, Equity, and Inclusion (DEI) work and funding included in this budget must include this idea of "seeing each other deeply and being deeply seen." This concept, if we can practice it, will prove extremely helpful as we combat racial inequity and the machine that supports it.

As we see each other more deeply, we will drive out fear, and in particular, fear of losing power or position. Instead, we'll learn that power, like love, is not a zero-sum game; power gained by one group or person does not mean a corresponding amount of power lost by another group or individual. I have seen this concept of empowering and lifting all successfully play out in organizations, and I know it can happen in communities.

Despite the pandemic and the recession, this proposed budget and the resources and initiatives contained within it will allow us to continue to propel Kenmore and our organization to new heights. And this budget, along with our community and organization, will position us well to be on the right side of this special hinge point in history.

Like Congressman Lewis, I believe "there's something brewing in America [and Kenmore] that's going to bring people closer and closer together." Our best days are still ahead of us, and I am thrilled to be on this team and part of this community. In closing, may I suggest adding a new word to our organization's service vision:

Propelling Kenmore Upward:
We create a thriving community where *ALL* people love where they live

Thank you for your vision and direction that guided the development of this biennial budget. We look forward to the budget discussions in the weeks ahead.

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[16] *Finding the Road to Character*, by David Brooks. University forum, Brigham Young University. October 22, 2019.

Sincerely,

Rob Karlinsey
City Manager
City of Kenmore

Acknowledgements

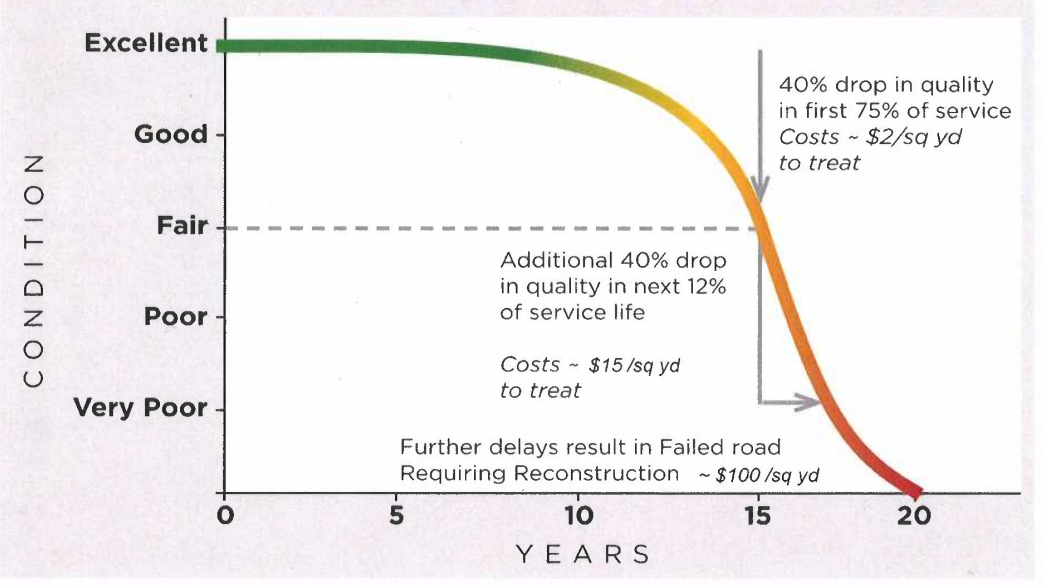
I cannot overstate how crucial my coworkers have been in the production of this preliminary budget. Our Finance and Administration Director Joanne Gregory and her team have worked long hours to bring this document together (all while juggling their other daily responsibilities). The policy guidance of our department heads was essential as we figured how best to meet the Council's vision and effectively allocate the City's financial resources. The passion and commitment of the entire organization came through as they produced the budget narratives and detail pages. Again, a big thank you to the City Council for putting your trust in us and providing the vision and policy direction we need, and many thanks to all members of the Kenmore community—for providing the resources to accomplish all that is set forth in this budget and for providing input and staying engaged. Thank you!

Postscript

The Importance of Staying on top of Pavement Preservation

Does it really matter how much we invest in our roads, and what does it hurt to delay or postpone asphalt preservation measures? The following graph shows what happens to a road's condition over time. After about 10 years of life, a road's condition drops off sharply with each passing year.

Pavement Deterioration Curve
(Provided by Capital Asset and Pavement Services, 2018)



The more time goes by without applying a preservation treatment to the road, the cost to restore the road rises exponentially—it boils down to "pay me now or pay me a lot more later." Taking good care of our roads is analogous to maintaining wood siding on a house. It's a lot easier and less expensive to keep the siding painted as opposed to not painting it and letting the siding rot and require replacement.

City of Kenmore, Washington

Summary of All Revenues and Expenditures By Fund
2019-2022

FUND	2019-2020 Adopted Revenue Budget	2019 Actual	2020 Projected	2019-2020 Biennial Total	2021 Proposed	2022 Proposed	2021-2022 Proposed Revenue Budget
General Fund	$ 26,477,871	$ 13,326,439	$ 14,866,070	$ 28,192,509	$ 13,237,826	$ 13,829,944	$ 27,067,770
Strategic Reserve Fund	25,900	24,187	6,607	30,794	12,000	10,000	22,000
Strategic Opportunities Fund	1,031,000	866,707	175,035	1,041,742	289,418	187,300	476,718
Street Fund	4,634,779	3,036,463	1,553,320	4,589,783	1,470,928	1,594,598	3,065,526
Public Art Fund	136,535	1,284	135,073	136,357	200	200	400
Transportation Benefit District	718,000	357,828	355,623	713,451	0	0	0
UTGO 2016 Bond Fund	1,752,800	1,219,667	533,133	1,752,800	530,000	1,050,000	1,580,000
Transportation Capital Fund	23,467,481	1,377,042	8,095,408	9,472,450	20,318,038	5,660,421	25,978,459
Real Estate Excise Tax Fund	2,665,916	1,561,906	3,547,089	5,108,995	1,047,567	1,026,892	2,074,459
Walkways & Waterways Bonds	10,045,000	188,407	63,816	252,223	10,037,000	10,000	10,047,000
Park Capital Fund	5,839,847	1,998,470	1,553,610	3,552,080	4,960,590	3,640,958	8,601,548
Park Impact Fee Fund	491,864	104,684	95,065	199,749	94,847	90,416	185,263
Transportation Impact Fee Fund	1,981,991	485,780	363,693	849,473	360,987	326,721	687,708
Sammamish River Bridge Fund	22,088,296	1,002,016	9,753,720	10,755,736	18,024,711	8,643,947	26,668,658
Public Works Shop Fund	6,500,000	0	0	0	0	6,500,000	6,500,000
Surface Water Management Fund	4,127,000	2,361,662	2,614,919	4,976,581	2,493,189	2,592,758	5,085,947
Surface Water Capital Fund	2,702,450	133,644	1,011,727	1,145,371	1,472,237	2,446,230	3,918,467
Swamp Creek Basin Fund	40,000	26,874	8,256	35,130	5,400	1,200	6,600
Equipment Replacement Fund	142,282	76,818	85,971	162,789	121,051	123,050	244,101
TOTAL	**$ 114,869,012**	**$ 28,149,878**	**$ 44,818,135**	**$ 72,968,013**	**$ 74,475,989**	**$ 47,734,635**	**$ 122,210,624**

FUND	2019-2020 Adopted Expenditure Budget	2019 Actual	2020 Projected	2019-2020 Biennial Total	2021 Proposed	2022 Proposed	2021-2022 Proposed Expenditure Budget
General Fund	$ 27,857,780	$ 14,728,294	$ 13,129,292	$ 27,857,586	$ 13,237,826	$ 13,829,944	$ 27,067,770
Strategic Reserve Fund	0	0	0	0	0	0	0
Strategic Opportunities Fund	0	0	660,000	660,000	430,000	1,633,503	2,063,503
Street Fund	4,204,749	2,067,053	2,137,695	4,204,748	1,641,631	1,686,536	3,328,167
Public Art Fund	21,000	0	11,950	11,950	143,973	500	144,473
Transportation Benefit District	716,000	358,000	358,000	716,000	0	0	0
UTGO 2016 Bonds	1,752,800	1,223,150	529,650	1,752,800	531,100	1,050,000	1,581,100
Transportation Capital Fund	23,880,759	2,629,512	2,403,835	5,033,347	19,668,451	4,618,508	24,286,959
Real Estate Excise Tax Fund	5,205,050	900,000	(346,568)	553,432	3,115,050	3,186,911	6,301,961
Walkways & Waterways Bonds	8,685,794	600,000	4,345,440	4,945,440	8,975,653	2,260,340	11,235,993
Park Capital Fund	4,221,119	2,061,296	1,620,063	3,681,359	4,914,790	3,635,158	8,549,948
Park Impact Fee Fund	467,000	496,719	(356,523)	140,196	449,495	379,917	829,412
Transportation Impact Fee Fund	1,216,663	35,654	302,210	337,864	3,458,848	358,699	3,817,547
Sammamish River Bridge Fund	22,088,296	496,131	11,661,100	12,157,231	18,024,711	8,643,947	26,668,658
Public Works Shop Fund	2,000,000	0	0	0	0	3,500,000	3,500,000
Surface Water Management Fund	4,414,469	1,444,166	2,614,292	4,058,458	3,302,945	4,518,453	7,821,398
Surface Water Capital Fund	3,169,340	304,008	841,363	1,145,371	822,650	3,095,817	3,918,467
Swamp Creek Basin Fund	400,000	400,000	0	400,000	325,984	319,562	645,546
Equipment Replacement Fund	149,000	19,606	97,028	116,634	264,000	184,456	448,456
TOTAL	**$ 110,449,819**	**$ 27,763,589**	**$ 40,008,827**	**$ 67,772,416**	**$ 79,307,107**	**$ 52,902,251**	**$ 132,209,358**

City Council Business Agenda Item
City of Kenmore, WA

Subject/Topic: Amendments to the 2019-2020 Biennial Budget	**For Council Meeting Agenda of: November 9, 2020** **Department: Finance and Administration** **Prepared by: Joanne M. Gregory, Finance and Administration Director** **Initial & Date** **Approved by Department Head:** Jmg 10-30-20 **Approved by City Attorney:** _____ **Approved by Finance Director:** Jmg 10-30-20 **Approved by City Manager:** RJK
Proposed Council Action/Motion: Review Amendments to the 2019-2020 Biennial Budget	**Exhibits/Attachments:** Attachment to be provided the week of November 2, 2020

INFORMATION/BACKGROUND:

On November 19, 2018, the City of Kenmore City Council adopted the 2019-2020 biennial budget. The city-wide budget was amended on November 25, 2019 during the Mid Biennium Review. The amended budget includes revenue ($114,710,315) and expenditure ($111,548,939) projections for both years which support the City Council priorities, departmental work programs, various municipal obligations, as well as Federal and State mandates.

Prior to the close of 2020, which will conclude the 2019-2020 biennial budget period, it is important to review all funds' budgets, consider actions taken by the City Council since the last budget amendment, consider any significant unappropriated expenditures, and adjust fund budgets accordingly so as not to exceed approved legal appropriations.

Amendments to the General Fund, Public Art Fund, Park Capital Fund, Transportation Capital Fund, and the Strategic Opportunities Fund will be recommended and details will be provided prior to and at the Council meeting.

In the General Fund, the most significant adjustments are due to the pandemic and the award of Coronavirus Relief Funds (CRF) to be applied as reimbursement of significant pandemic related costs.

Following Council's direction on the proposed budget amendments, an Ordinance to formally amend the budget will be presented for approval on November 23, 2020.

FISCAL CONSIDERATION: Details of proposed revenue and expenditure adjustments will be uploaded prior to November 9, 2020.
COUNCIL GOAL/BUDGET OBJECTIVE BEING ADDRESSED: Per RCW 35A the budget is the legal authority to expend public funds and controls those expenditures by setting the amount of the appropriation at the fund level by ordinance.

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EXHIBIT 1

2019-2020 Schedule of 2020 Year End Recommended Budget Adjustments		Current 2019-2020 Amended Budget	Recommended Budget Amendments	2019-2020 Amended Budget
Fund: 001 - General Fund				
Revenue			**increase (decrease)**	
001.000.36700004	Lakepointe Reimbursements	500,000	(399,238)	100,762
	Reduce anticipated reimbursements to actual			
001.000.33321010	Corona Virus Relief Fund Grant - King Co	0	35,615	35,615
	Recognize King Co distribution of CARES CRF Funds			
001.000.33321011	Corona Virus Relief Fund Grant - Commerce Dept	0	1,049,000	1,049,000
	Recognize State Commerce Dept allotment of CARES CRF Funds to Kenmore			
Expenditures			**increase (decrease)**	
001.xxx various	Various Pandemic Expenditures, Grants, Business Assistance	0	1,084,615	1,084,615
	Technology, Personal Protective Supplies, Small Business and Human Services Grants, Payroll Costs and various unbudgeted expenditures related to the Pandemic			
Fund: 001 - General Fund	**NET INCREASE/(DECREASE)**		**(399,238)**	
Fund: 110 - Public Art Fund				
Revenues			**increase (decrease)**	
110.000.39700303	Transfer from Park Capital Fund	0	69,473	69,473
	1% for Art for Rhododendron Park, Squires Landing and Log Boom Park; approved by City Council 6/22/20			
110.000.39700300	Transfer from Transportation Capital Fund	0	65,000	65,000
	1% for Art for 68th Ave Ped & Bicycle Safety Project approved by City Council 6/22/20			
Fund 110 - Public Art Fund	**NET INCREASE/(DECREASE)**		**134,473**	
Fund: 303 - Park Capital Fund				
Revenue			**increase (decrease)**	
303.000.39700046	Transfer from Strategic Opp Fund	0	660,000	660,000
	Advance to provide interim project funding for the Rhododendron Park Boathouse project until Northshore School District contribution ($250K) and private foundation fundraising ($400K)can be obtained			
Expenditures				
303.000.59700110	Transfer to Public Art Fund	0	69,473	69,473
	1% for Art for Rhododendron Park, Squires Landing and Log Boom Park; approved by City Council 6/22/20			
Fund: 303 - Park Capital Fund	**NET INCREASE/(DECREASE)**		**590,527**	

EXHIBIT 1

2019-2020 Schedule of 2020 Year End Recommended Budget Adjustments		Current 2019-2020 Amended Budget	Recommended Budget Amendments	2019-2020 Amended Budget
Fund: 300 - Transportation Capital Fund				
Revenue			**increase (decrease)**	
300.000.33320010	Highway Safety Improvement Program Grant Grant funding secured for projects T48 and T49 (Local Road Safety - Signing and Lighting)	0	380,000	360,000
Expenditures				
300.000.59569.6722	T48 2018 Local Road Safety-Signing To establish 2020 budget for new Transportation Project expected expenditures Project primarily funded by WSDOT Highway Safety Improvement Program	0	67,000	67,000
300.000.59569.6723	T49 2018 Local Road Safety -Lighting To establish 2020 budget for new Transportation Project expected expenditures Project primarily funded by WSDOT Highway Safety Improvement Program	0	2,500	2,500
300.000.59700.0110	Transfer to Public Art Fund 1% for Art for 68th Ave Ped & Bicycle Safety Project approved by City Council	0	65,000	65,000
Fund: 300 - Transportation Capital Fund	**NET INCREASE/(DECREASE)**		**245,500**	

Fund: 046 - Strategic Opportunity Fund				
Expenditures			**increase (decrease)**	
046.000.59700.0303	Transfer to Park Capital Fund. Advance to provide interim project funding for the Rhododendron Park Boathouse project until Northshore School District contribution ($250K) and private foundation fundraising ($400k) can be obtained	0	660,000	660,000
Fund: 046 - Strategic Opportunity Fund	**NET INCREASE/(DECREASE)**		**(660,000)**	

City Council Business Agenda Item
City of Kenmore, WA

Subject/Topic: Establishing a Diversity, Equity and Inclusion (DEI) policy, and program timeline	**For Council Meeting Agenda of:** November 9, 2020 **Department:** City Manager Department **Prepared by:** Adam Nebenzahl, City Management Intern **Initial & Date** **Approved by Department Head:** _JMG_____ **Approved by City Attorney:** _____ **Approved by Finance Director:** __JMG_____ **Approved by City Manager:** ___RGK___
Proposed Council Action/Motion: Motion to approve the timeline and actions proposed in the DEI Policy and Program Timeline Memo.	**Exhibits/Attachments:** 1. DEI Policy and Program Timeline Memo

INFORMATION/BACKGROUND: On September 14, 2020, Council adopted Resolution 20-348 approving a framework to develop and implement policies that foster and create a safe, inclusive and welcoming community through continued actions that improve diversity, equity and inclusion. Section 6 of Resolution 20-348 directs the City Manager to return to the Council on November 9th with a draft DEI policy development timeline, including a plan for community engagement and funding recommendations for Council authorization to implement the elements of the framework resolution.

At the November 9th Council meeting staff will present a draft DEI policy development timeline and proposed actions leading to DEI policy development by year-end 2021 (see attachment #1). The memo outlines a two-track process for developing a DEI Policy and Program. Track 1 includes recruitment of a Human Resources Manager whose responsibilities include: managing the DEI policy development process; conducting a request for proposals for and managing a consultant hired to lead the DEI development process; staff support to the DEI Task Force, and managing a DEI training schedule. A consultant will be hired to lead a community engagement process and work with a Council-appointed DEI Task Force to develop DEI policy recommendations for Council consideration. Appendix A to Attachment 1 describes a proposed timeline.

Track 2 includes a training schedule for the City organization starting in November of 2020. The Roots of Us, LLC will provide DEI training to Council and staff in November/December 2020. A staff DEI committee will be formed in 2021 led by the Human Resource Manager. The Human Resource Manager will manage DEI training including hiring a consultant if needed. Appendix B to Attachment 1 describes a draft training schedule.

FISCAL CONSIDERATION: The draft 2021-2022 Budget includes $150,000 (Strategic Opportunity Funds) for consultant assistance to develop the DEI policy and training in 2021 ($120,000) plus implementation steps/training in 2022 ($30,000). A new Human Resources Manager position is also proposed to manage human resources for the City organization and manage the DEI policy development and plan implementation.
COUNCIL GOAL/BUDGET OBJECTIVE BEING ADDRESSED: Council priority adopted October 12, 2020 which states that Kenmore must "begin the process to develop and implement a diversity, equity, and inclusion policy and program."

City of Kenmore, Washington

Date: October 22, 2020

To: Rob Karlinsey, City Manager
From: Adam Nebenzahl, City Management Intern

Re: DEI Policy and Program Timeline

Introduction
The City Council and staff have a strong commitment to making Kenmore an open, inclusive and welcoming place for all. On 9/14/20, Council adopted Resolution 20-348 directing the City Manager to bring back a plan in early November outlining funding and resources for the process of developing a racial, equity inclusion policy that honors diversity in the city programs and community. The purpose of this memo is to outline a timeline and the steps, actions, and resources needed to develop a Diversity, Equity and Inclusion (DEI) Policy (Track 1, November 2020 through December 2021). A schedule for training (Track 2, Training) to begin the DEI conversation and education for the City organization (November-December 2021) and a schedule for additional organization training in 2021 is attached at the end of the document.

Kenmore's DEI Context: The City Manager's budget message presented in the 10/12/20 Draft 2021-2022 Budget (pages 5-8 attached) provides a description and reasons why Kenmore needs to acknowledge and own the community's long history and ongoing evidence of systemic and institutional racism. The City Manager calls for community engagement and an atmosphere of trust to honestly ask and answer tough questions in a brave and inclusive space for people of color and other marginalized groups to feel visible, validated and valued in their community. The goal for the DEI policy is to identify actionable steps that will help change Kenmore's policies and practices that perpetuate racism.

DEI Actions and Resources 2020:

- 4/28/20 - 12/31/20 Intern funded 20 hours/week. Work on DEI began 6/22/20.
- 9/14/20 Council meeting, staff presented a background memo reviewing DEI policy and implementation measures in other jurisdictions and memo providing suggestions for a Kenmore DEI policy framework.
- 9/14/20 Council Resolution 20-348 directing the City Manager to bring back a plan in early November outlining funding and resources for the process of developing a racial, equity inclusion policy that honors diversity in the city programs and community.

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- 8/25/20 staff submitted an application to join the Government Alliance for Racial Equity (GARE). $1,000/year membership fee.
- 10/14/20- 12/31/20 Consultant contract 20-C2223 October through November 2020 with The Root of Us, LLC for $12,000. Scope of work includes assisting with the DEI process design (i.e., this memo), providing DEI training for Council and staff, and providing other DEI related consultation as needed.

DEI Resources 2021-2022: The draft 2021-2022 Budget includes $150,000 (Strategic Opportunity Funds) for consultant assistance to develop the DEI policy and training in 2021 ($120,000) plus implementation steps/training in 2022 ($30,00). A new Human Resources Manager position is also proposed to manage human resource management for the City organization and manage the DEI policy development and plan implementation.

Track 1: Developing a DEI Policy and Program
Appendix A provides a timeline for the following three actions:

- Recruitment process and hiring a Human Resource Manager (December 2020-April 2021): The HR Manager will be responsible for managing DEI policy development including managing the consultant contract, plan implementation, training, and staff support to an appointed DEI Task Force.
- Request for Proposal (RFP) process and hiring a consultant (December 2020-April 2021): The consultant scope of work would include leading a community engagement process, working with the Task Force, and developing recommendations for DEI policies and programs.
- Application process and appointment of a DEI Task Force (February 2021-April 2021): A seven-member Task Force will be appointed by the Council. The Task Force, with the help of the consultant and staff, engages the community in developing recommendations to Council for a DEI policy.
- DEI Policy Development (April 2021-December 2021): This phase includes the consultant, staff, and the Task Force working together on community engagement, holding Task Force meetings, and developing recommendations for Council consideration.
- 2022 taking action steps for implementation following adoption of the DEI policy.

Track 2: Training

- Staff and Council Training (November 2020-December 2020): The Root of Us provides online racial equity training exploring Kenmore's history and identity.
- Formation of Staff DEI Committee (January 2021-March 2021): Representatives from each department to form a committee, led by the Human Resource Manager. The Committee will be responsible for developing a training schedule for staff for 2021. There are many online free training resources available.
- Self-Directed Training (January 2021 – March 2021): During the period in between training received from The Root of Us, LLC and the hiring of an HR

manager and trainer, Staff would be requested to participate in a self-directed training such as the 21 Day Challenge[1] to prevent a gap in anti-racist education.

- Staff/Council Training (April 2021-December 2021): The Human Resource Manager will develop and manage a training schedule and consultant contract for training as needed. Appendix B provides a draft schedule for anti-bias and racial equity training.
- DEI Lunch Socials: an elective once-a-month dialogue about the issues of DEI locally, regionally, and nationally. These DEI Lunch Socials will be facilitated by interested staff members and can discuss a variety of topics ranging from equity-related articles/books, to educational exercises and discussions, to watching The Institute for Democratic Education and Culture's 'Speak Out' video series.[2]

Attachments:

1. Excerpt from the City Manager's 10/12/20 budget message

[1] https://www.eddiemoorejr.com/21daychallenge
[2] https://www.speakoutnow.org/

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Appendix A – Track 1: Developing a DEI Policy and Program Timeline

	Leader(s)	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	+++
Allocation of Funds for DEI into 2021-2022 Biennial Budget	City Council, City Manager															
Hiring HR Manager	City Manager															
RFP/Q Process/Consultant Hiring	City Manager, HR Manager															
Task Force Formation	City Manager, HR Manager															
Community Enagagement	HR Manager, Consultant															
Task Force Meetings	HR Manager, Consultant															
Consultant proposes recommendations	City Manager, HR Manager															
Task Force Release Recommendations	City Manager, HR Manager															
Presentation to City Council Findings and Recommendations	City Council, City Manager															
City Manager's Office Analyzes Recommendations and Proposes Next Steps	City Manager															

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Appendix B – Track 2: City Staff Training Timeline (Draft)

	Leader(s)	Who Participates?	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	+++
Allocation of Funds for Staff DEI training in 2021-2022 Biennial Budget	City Council, City Manager																
The Root of Us, LLC Training	The Root of Us, LLC Trainers	Staff, Management Team, City Council															
Hiring of Trainer(s)	HR Manager, City Manager																
Creation of Staff DEI Sub-Committee	City Manager, HR Manager	Voluntary/Selected Staff															
Anti-Racist Continuing Education	Self-Directed	Staff, Management Team															
Anti-Bias Training	Trainer, HR Manager	City Council, Management Team, Staff															
Racial Equity Training	HR Manager	City Council, Management Team															
DEI Lunch Socials	Voluntary Staff Members	Staff															

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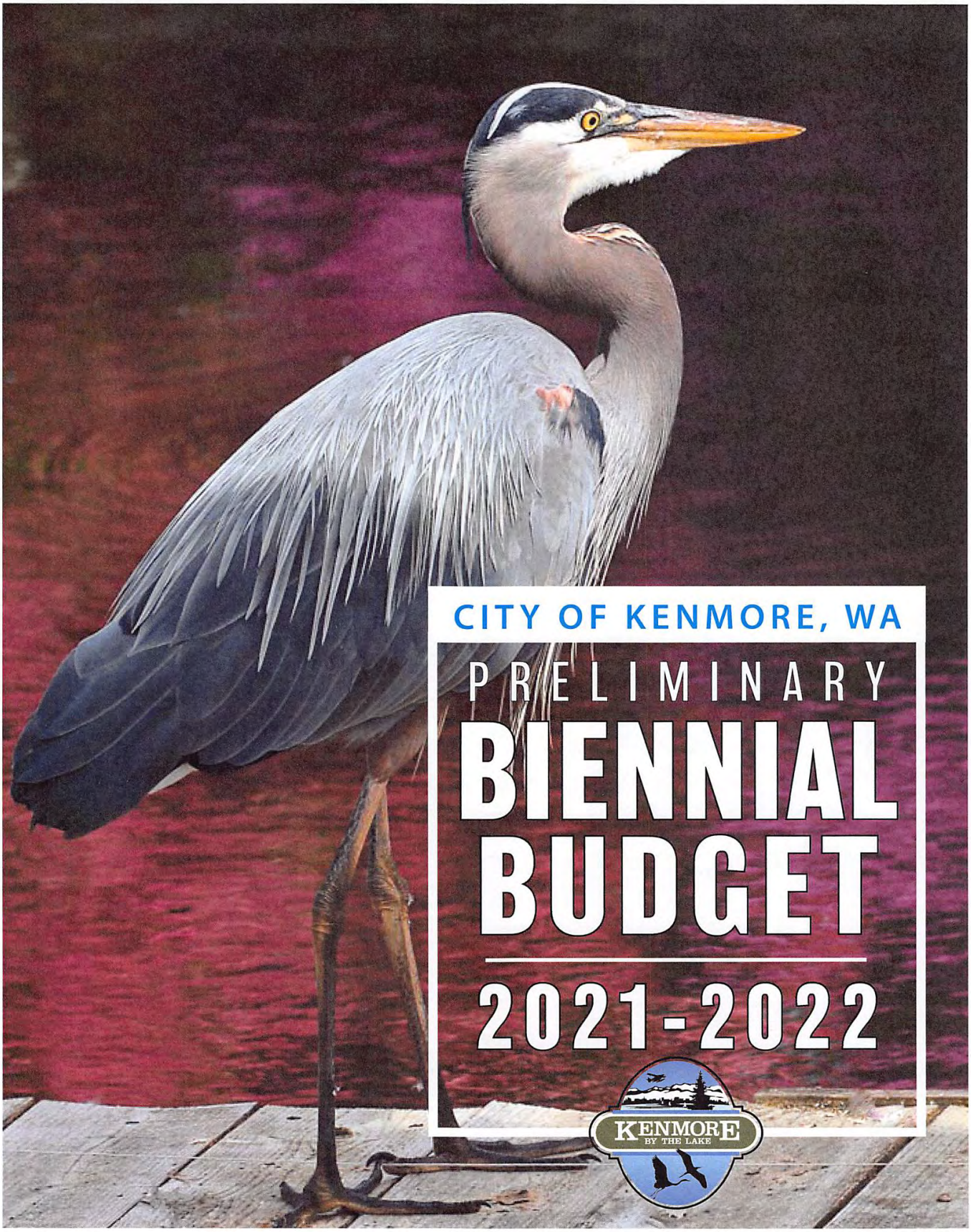
CITY OF KENMORE, WA
PRELIMINARY
BIENNIAL
BUDGET
2021-2022
KENMORE
BY THE LAKE

pandemic has been a massive humanizing force—allowing us to see each other on a level much deeper than politics—see the fragility, the fear, and the courage."[1]

I think we all have seen this "humanizing force" play out over the last nine months. Think of how families have suffered together as residents of assisted living facilities have had to live in physical isolation from their families and friends; or how many of our senior citizens have had to shelter in place in their homes, magnifying the loneliness that was already there; or how a family member was hospitalized by the virus and could have no visitors; or the despair that came with job loss and delinquent rent; and worst of all, loved ones who have fallen to the virus.

Yet despite this suffering, people have come together and united in countless and quiet ways. For example, some of my coworkers organized a note-writing effort to the residents of our assisted living facilities. I'm sure they made a few people smile that day.

I believe the pandemic will persist well into 2021, and the effect will be felt in 2022 and beyond. Only a small fraction of Kenmore's and the state's population has tested positive for COVID-19. In addition, a vaccine will not be available for a while. From what I'm reading, a reliable vaccine may not be available until spring or summer of 2021, and then there will be time needed for the vaccine to be distributed into the population.

The low number of confirmed cases combined with a vaccine not being available soon cause me to conclude that we're going be in this state of teleworking, various stages of closures, physical distancing, and other precautions for a long time.[2] Nevertheless, if the past nine months is any indication of the future, the "humanizing force" of the pandemic will continue as we pull together and help those in need. If that happens, we will come out better and stronger on the other end.

Systemic Racism. Racial Equity. Diversity, Equity, and Inclusion

Not only did the pandemic rock our world in 2020, but so did the murder of Georg Floyd and the public outcry against systemic and institutional racism that has been mounting for years. But hopefully this call for action and the resulting steps we take will not just rock our world, but change our world, our systems, and us, for the better.

Kenmore is not immune to racial inequity and disparity. Our Hispanic residents are twice as likely to live below the poverty level as our white residents, and Black Kenmore residents are five times more likely.[3] Educational attainment[4] and other demographic measures for Kenmore tell a similar story.

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[1] *New York Times*, April 30, 2020
[2] Aren't you glad we all stocked up on toilet paper?
[3] Kenmore percent of race living below poverty level: white—5.9%, Hispanic—12.4%, and Black—30.3%. Source: United States Census Bureau American Community Survey, Poverty Status in the Last 12 Months, Table S1701.
[4] United States Census Bureau American Community Survey, Educational Attainment, Table S1501.

For King County, income for Black households is 52% of white households, and Hispanic households bring in about a third less than white households.[5]

Trends show that the number of children below the poverty line is growing dramatically in King County, with children of color bearing the disproportionate brunt of that trend. About 46% of Black children in King County are below the poverty level—seven times the rate for white children.[6] Health, education, and other indicators point to similar demographic trends in King County.[7]

But this is more than about statistics and numbers. Qualitatively, we know there is much hurt, anger, frustration, and despair among too many of our sisters and brothers who are Black, Indigenous, and People of Color (BIPOC). These feelings are justified and are not new; the most recent social unrest and protests once again bring this issue to the forefront and hopefully motivate all of us to move, to act, to change.

Such action and change can take place right here in Kenmore. We do not need to wait for a national or regional conversation or strategy—we can start right here at home. But any conversations we have and actions we take must not be superficial. It's not just about changing our attitudes—it's about dismantling systemic racism throughout the complex and entrenched social, political, and economic systems that bias in favor of white people.

To go below the surface and change the machine, we need to take intentional ownership of what's happened. We should historicize Kenmore, and we must be willing to dig deep, to be vulnerable, to be humble, and to own up to our own history. We have to honestly ask and answer tough questions that will make us uncomfortable and make us more aware, and we have to create a safe, inclusive space for people of color and other marginalized groups to ask the tough questions and tell us what they've gone through—and to be able to do so and truly feel heard and understood—not interrupted, not ignored.

In her book *So You Want to Talk About Race,* Ijeoma Oluo said, "We have a real problem of racial inequity and injustice in our society, and we cannot wish it away. We have to tackle this problem with real action, and we will not know what needs to be done if we are not willing to talk about it."[8]

Oluo goes on to say that "These conversations will always be hard because they will always be about the hurt and pain of real people. . . And if you are white, and you don't want to feel any of that pain by having these conversations, then you are asking people of color to continue to bear the entire burden of racism alone."[9]

Under your leadership and direction, we as a community can go on this journey of uncomfortable conversations and meaningful action. Hopefully along the way, we'll learn a lot—such as ways

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[5] King County Office of the Executive, Performance Strategy and Budget. *King County's Changing Demographics*, Chandler Felt, Demographer. 2016.
[6] See footnote 3
[7] Communitiescount.org
[8] 2019, pages 44-45
[9] Page 51

we unknowingly make race an issue; deep down, what our implicit biases might be; an awaking to microaggressions and the damage they do; what is intersectionality and how this more inclusive view casts a wider umbrella; and what specifically can we do to truly move the needle in Kenmore—to truly alter the machinery of societal systems laced with policies and practices that maintain barriers for people of color and keeps in place a racial caste system that too few want to acknowledge or talk about but is alive and well.[10]

But what can little old Kenmore do to make real progress on this societal issue? Isn't it national or even global in scope, and therefore shouldn't we leave it to larger institutions such as Congress or the U.S. Supreme Court to solve? Actually, there are things we can do at the local level. We can start with examining our own systems and processes.

Further, real change happens one heart at a time—you can't get any more local than that. And we might be surprised how our actions can ripple over into other communities. The more cities, big and small, that take on this issue, the more momentum will build and the more it will roll up to the state and national levels.

Kenmore can make a difference. When approved for funding and resources as proposed in this preliminary budget, in early 2021 we will begin the process of developing a racial equity and inclusion policy that honors diversity in our programs and community. As you directed in Resolution 20-348 last month, a proposed plan for this process will be presented to you in early November. The proposed process will include engaging our community and creating a brave space and an atmosphere of trust for people of color and people who have been "othered" and marginalized to open up to share their lived experiences and struggles.

An atmosphere of trust can be created through the process of learning our individual and community identities, how we are interconnected with each other, and who we really are. Fernell Miller, founder and CEO of The Root of Us says, "When we fail to see and understand ourselves, we fail to see and understand each other," and that "having accurate knowledge of our roots allows us to use that knowledge to build strong, equitable, inclusive, and diverse communities of practice."[11] The process will tell us how we can own up and be transparent about what's going on now and what truly needs to change.

And again, we need to go beyond proclamations, public statements, and words on paper. What actionable steps can we as a community take that will produce real deliverables that will help change the system, including Kenmore's systems and institutions? To me, this question is at the heart of the matter and will make the process worth the time and resources *if* we can answer it. I'm looking forward to this process—I know it's going to be hard and at times painful, but I believe that it will result in positive and long overdue changes that we all deserve, but especially for those in our community who have been "othered," discriminated against, and marginalized for far too long.

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[10] *The New Jim Crow: Mass Incarceration in the Age of Colorblindness,* by Michelle Alexander. 2020. Page 26
[11] Correspondence with Fernell Miller, October 7, 2020. www.therootofus.com

Later in this letter, there will be more details on what staffing and resources will be allocated to Diversity, Equity, and Inclusion in the 2021-2022 budget, but let me end this section of the budget message by quoting late Congressman John Lewis:

> I think there's something brewing in America that's going to bring people closer and closer together. Adversity can breed unity; hatred can give way to love. We need a leadership of love now, a strong leadership to lift us, to transport us, to remind us that God's truth is marching on. We can do it. We must do it. We have to go forward as one people, one family, one house. I believe in it. I believe we can do it. (*His Truth is Marching On: John Lewis and the Power of Hope,* by John Meacham. 2020. Page 249)

2021-2022 Budget Highlights

For the City of Kenmore, the first year of the next biennium will begin in better financial shape than we forecasted last spring. As major sectors of the economy were closing and as the general population was sheltering in place, we expected significant drops in certain revenues, including permitting fees, sales tax, and fuel tax. I am pleased to report that these drops as predicted did not materialize. Sales tax is down only about four percent compared to last year, and permit fees are on par with last year. Fuel tax is down about fifteen percent, which is significant, but not the fifty percent that we braced for.

To prepare for the drops in revenue, we cut many discretionary expenditures where we could. See the expenditure reductions table under Financial Sustainability Plan later in this letter. The expenditure cuts we made combined with the better-than-anticipated revenues have positioned us well for the next biennium and will allow us to maintain key services and jump start some important City Council initiatives.

However, we must continue to approach the budget and our spending with caution. We do not know the full extent of the financial effects of this pandemic recession. Further, we project that 2021 will see less revenues than originally budgeted for 2020. At the time of this writing, it appears that Initiative 976 which eliminates vehicle license fee revenue will be upheld, cutting more than $350,000 per year from our Street Fund. In addition, for the next biennium we are predicting notably lower sales tax, fuel tax, and development services fees than a pre-pandemic scenario would have anticipated.

In light of all of this, we believe the City's 2021-2022 biennium budget will have the resources to maintain current services and advance your top priorities. These priorities are as follows:

2020-2021 City Council Priorities

October 2020 Update: Given unprecedented circumstances in 2020, we must acknowledge the impacts of the pandemic and the public outcry against system racism by adding the following priorities:

- Respond to the pandemic

City Council Business Agenda Item
City of Kenmore, WA

Subject/Topic: Update to the 2017 Integrated Aquatic Vegetation Management Plan (IAVMP), 2021-2022 Aquatic Plant Management Strategy in City Treatment Areas and renewal of the City's Aquatic Plant and Algae Management General Permit with the Washington State Department of Ecology.	**For Council Meeting Agenda of:** November 9, 2020 **Department:**_Public Works, Env Services Division **Prepared by:** Richard Sawyer, Env Services Manager **Initial & Date** **Approved by Department Head:** RS **Approved by City Attorney:** _____ **Approved by Finance Director:** _____ **Approved by City Manager:** RK
Proposed Council Action/Motion: Direction to Staff on Council's Preferred 2021-2022 Aquatic Plant Management Strategy in Public Treatment Areas.	**Exhibits/Attachments:** 2017 IAVMP Draft 2020 IAVMP Update Log Boom Park Treatment Detail Lower Sammamish River/East Open Water Treatment Detail Middle Sammamish River Treatment Detail

Introduction

The City, with financial support from the Washington State Department of Ecology (Ecology), began preparation of the original Integrated Aquatic Vegetation Management Plan (IAVMP) in 2016 and published the final plan in June 2017. The IAVMP was developed to manage the dense growth of aquatic plants during summer that interferes with recreational and commercial use of the Sammamish River and Lake Washington. The dense aquatic plant communities, particularly the invasive species, also create negative impacts on riparian habitat. The IAVMP provided management strategies for both private and public stakeholders, which are meant to maintain recreation and commercial usability and habitat integrity of the lake and river. This report focuses on strategies previously identified in the IAVMP for the City to implement and those being recommended in the update.

2016-2019 Treatment Summary

In 2016, the City's consultant mapped a total of 24 species of aquatic plants throughout the lake and river, which included 10 noxious weed species identified as Class B and C (conditional or no control required). Of these, four noxious weed species, including Brazilian Egeria, Eurasian watermilfoil, fragrant waterlily and garden loosestrife were targeted for control. After consideration of several control methods, a combination of herbicides, mechanical harvesting and manual removal were determined to be the best course of action. For the City's role in weed control, four distinct treatment areas were identified, including Log Boom Park, the Sammamish River (from Rhododendron Park to the lake), Inglewood Wetlands and the Squire's Landing boat launch area.

These areas received herbicide treatments in 2016, 2018 and 2019 using a variety of Ecology-approved chemicals specific to the target weeds being controlled. In addition, weeds along the shoreline of Log Boom Park are raked up and removed from the shoreline. Reductions in target weed populations were observed in 2018, but by the conclusion of treatment in 2019, the City's applicator noted that Eurasian watermilfoil and Brazilian elodea were sparsely populated throughout the treatment areas and native plants were the primary source of recreational impairment. Fragrant waterlily still dominated at the mouth of the river and did not respond strongly to treatment in 2019, however, the City's contractor noted that where removal of Fragrant waterlily is successful it is replaced by other, potentially less desirable, plants.

2020 IAVMP Update

In 2020, the City hired Herrera Environmental Consultants (Herrera) to assist staff with updating the 2017 IAVMP. Rob Zisette, Principal Aquatic Scientist with Herrera, was also the lead consultant who assisted the City on the development of the 2017 IAVMP. Herrera reviewed information from the 2018 and 2019 herbicide treatments, spoke with stakeholders, including local property and business owners, and conducted a plant survey during summer 2020.

The IAVMP was designed to be updated as new technologies, advancements in treatment options and lessons learned from completed treatments guide the City and other stakeholders towards more efficient and productive weed management. Additionally, several notable changes and updates have occurred since the 2017 IAVMP was published, including:

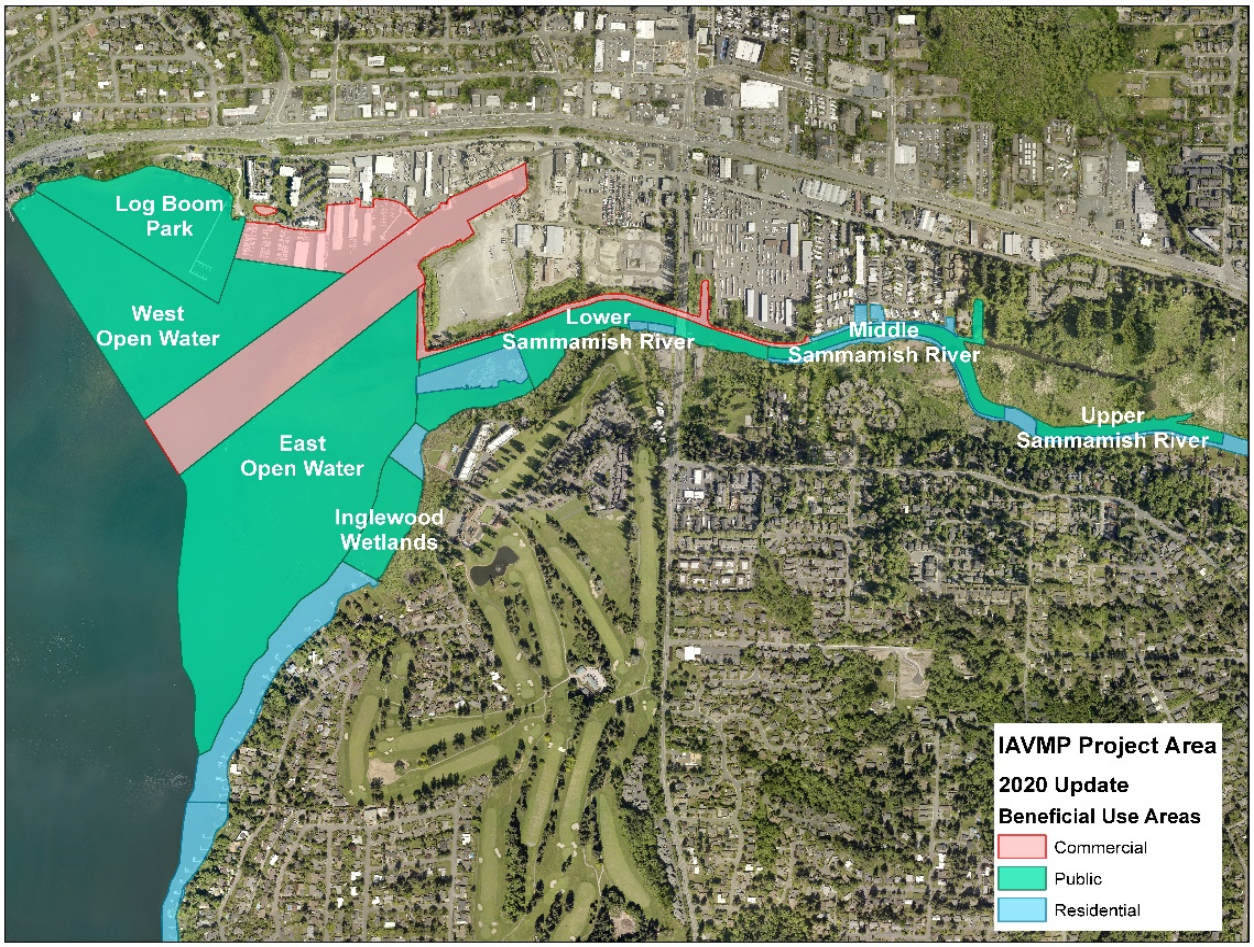
- Improved access to waterfront from Rhododendron Park
- Construction of Rhododendron Park boathouse (2020)
- Design well underway for improvements to Log Boom Park and Squire's Landing
- PW Operations removal of underwater debris and obstacles at Log Boom Park pier (2020)
- US Army Corps of Engineers (USACE) dredging of navigation channel in fall/winter 2020/2021
- ProcellaCOR™ added by Ecology as an approved herbicide option
- New Council priority focused on climate and environment

The IAVMP provides strategies for both public and private stakeholders in managing aquatic plants in Kenmore and this report focuses primarily on those recommendations targeted for public use areas and discusses City management activities proposed in 2021-2022 in these areas for Council's consideration. However, Council feedback on any portion of the IAVMP update is welcome.

2021-2022 Proposed City Aquatic Plant Management Strategies

The following section discusses proposed treatment strategies, if any, for each public beneficial use area. The beneficial use areas designated as 'public use' are grouped into seven sections, including; Upper Sammamish River, Middle Sammamish River (including Squire's Landing Park), Lower Sammamish River (including Rhododendron Park and WDFW boat launch), Inglewood Wetlands, East Open Water, West Open Water and Log Boom Park. These public use areas are adjacent to public owned/operated land or connect public lands on the river to the lake. The following figure and table summarize the location of public use areas and treatment recommendations.

Public Use Areas Overview Map



Public Beneficial Use Area	Summary
Upper Sammamish River	The aquatic plant community is not obstructing boat access along the central channel of the river and treatment is not currently recommended in 2021-2022.
Middle Sammamish River	Treatment is proposed in this area – see attached report for details.
Lower Sammamish River	Treatment is proposed in this area if spring plant survey reveals that plant growth is impeding access to public areas – see attached report for details.
East Open Water	Treatment is proposed in this area if spring plant survey reveals that plant growth is impeding access to public areas – see attached report for details.
Inglewood Wetlands	This area is designated as a conservation area and treatment is not being recommended in 2021-2022 unless weed growth impedes boat navigation.
West Open Water	The aquatic plant community is not obstructing boat access in this open area of the lake and treatment is not currently recommended in 2021-2022.
Log Boom Park	Treatment is proposed in this area – see attached report for details.

Based on details provided in the attached Treatment Detail Sheets, two recommendations for Council to consider include an herbicide treatment option and a non-herbicide treatment option. Herbicide treatment, when done properly, has been approved by Washington State Department of Ecology and is recommended by the City's consulting Aquatic Scientists as a safe and viable option for aquatic plant management within the identified treatment areas. Additionally, Council and members of the public wanted non-herbicide options to consider, therefore, staff and the City's consultant have identified a viable herbicide alternative option for Council to consider. The following table summarizes costs associated with the different treatment strategies that were reviewed.

Estimated Biennium Budget Cost (2-Year Implementation)							
	Herbicide Treatment[A]	Suction Dredging (Diver)[B]	Shore Raking	Hand Removal (Diver)	Bottom Barrier	Mechanical Harvesting	Nanobubble Technology
LOG BOOM PARK							
PIER TREATMENT AREA	$1,802 - $2,711	$5,960 - $12,402	Not Applicable	$12,914 - $25347	$66,558 - $133,309	$27,218	Not Applicable
OUTER TREATMENT AREA	$3,373 - $5,072	$11,152 - $23,206	Not Applicable	$24,165 - $47,429	$124,543 - $249,448	$50,932	Not Applicable
SHORELINE			$20,800				
LOWER SAMMAMISH RIVER							
TREATMENT AREA	$5,692 - $8,561	$18,822 - $39,166	Not Applicable	$40,783 - $80,048	Not Applicable	$85,960	Not Applicable
EAST OPEN WATER							
TREATMENT AREA	$6,869 - $10,330	$22,711 - $47,259	Not Applicable	$49,211 - $96,589	Not Applicable	$103,724	Not Applicable
MIDDLE SAMMAMISH RIVER							
RIVERFRONT AREA	$202 - $305	$670 - $1,393	Not Applicable	$1,450 - $2,847	Not Applicable	$3,058	Not Applicable
LAGOON AREA	$495 - $745	$1,637 - $3,407	Not Applicable	$3,547 - $6,963	$18,283 - $36,619	$7,476	$31,368
TOTAL (ALL)	**$18,434 - $27,724**	**$60,952 - $126,832**	**$20,800**	**$132,071 - $259,223**	**$209,384 - $838,751**	**$139,185**	**$31,368**

[A] *Recommended if budget is primary factor*

[B] *Recommended if use of non-herbicide option is primary factor*

Staff recommend that Council consider the following two options and provide direction on which strategy is preferred. Once direction is provided, staff will update the IAVMP accordingly and begin preparation for 2021 treatment. Selecting a preferred option doesn't mean that the City is limited to that option – for instance, staff will still obtain permits needed for multiple options in case unforeseen conditions come up that make the preferred option infeasible or new options become available that are preferred.

Herbicide Option – Staff will conduct a spring assessment of the aquatic plant communities present in each of the public use areas identified in the updated IAVMP. Appropriate herbicides will be selected to target aquatic plants that are interfering with recreational or commercial use of these areas or impairing riparian habitat. ProcellaCOR™ will be the preferred herbicide, but others may be required depending on the plant communities present at the time of treatment because some herbicides are only effective on specific plants. There may be timing restrictions depending on the herbicide used, but application can be completed in 1 to 2 days total.

Non-Herbicide Option – Staff will conduct a spring assessment of the aquatic plant communities present in each of the public use areas identified in the updated IAVMP. Based on effectiveness and cost considerations, manual removal by suction dredging conducted by divers is the recommended strategy for managing aquatic plants in the areas requiring treatment. This strategy is more costly and will take days to weeks to complete (depending on the treatment area), but it does not have the risks associated with herbicide use and allows for more selective plant removal.

Ecology Permit Renewal (2021-2026)

The city is required to obtain an Aquatic Plant and Algae Management General Permit from Ecology in order to apply herbicides in the lake or river. Application of herbicides under this permit can only be conducted by a

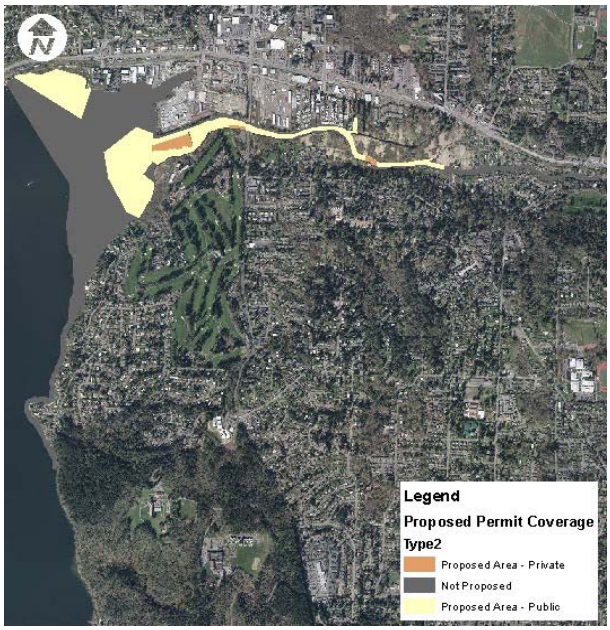
Washington State licensed pesticide applicator approved by the Washington State Department of Agriculture. Additionally, only herbicides approved by Ecology may be used under this permit.

Ecology is in the process of renewing their Aquatic Plant and Algae Management General Permit, and the City's current permit expires on March 31, 2021. City staff are in the process of renewing the permit with Ecology.

As part of the permit renewal, the City is modifying its current coverage area to include the potential treatment areas identified in the IAVMP update. Currently, the Squire's Landing lagoon and stretches of Sammamish River connecting the City's parks to Lake Washington are not included in the coverage area. City staff recommend removing existing coverage from private residential and commercial areas that do not provide a direct connection from City parks or City owned waterfront property to Lake Washington or Sammamish River. This modification of permit coverage will require the City to conduct public notification and provide public comment opportunities. Obtaining coverage under the permit does not mean that the City is required to conduct treatment within that area, but it leaves the option open.

The current and proposed permit coverage areas are shown in the following figure (Figure 9):

Current Permit Coverage (Expires March 2021)



Proposed Permit Coverage

FISCAL CONSIDERATION:

The current 2021-2022 budget request for aquatic weed management is $120,000 ($60,000 annually).

COUNCIL GOAL/BUDGET OBJECTIVE BEING ADDRESSED:

Council's 2020-2021 Priority #3 "Develop a Kenmore Climate and Environment Action Plan including water, air, forest, and habitat restoration

LAKE WASHINGTON AND THE SAMMAMISH RIVER

WITHIN THE CITY OF KENMORE, WASHINGTON

INTEGRATED AQUATIC VEGETATION MANAGEMENT PLAN
2020 UPDATE

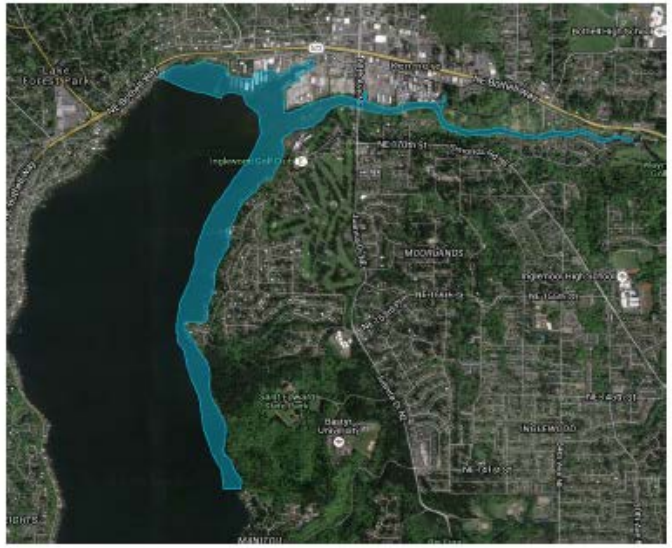


Image from Google Maps

Prepared by Herrera Environmental Consultants, Inc.

In Conjunction with the City of Kenmore

18120 68th Avenue Northeast, Kenmore, Washington 98028

October 22, 2020

City of Kenmore Council Meeting
November 9, 2020

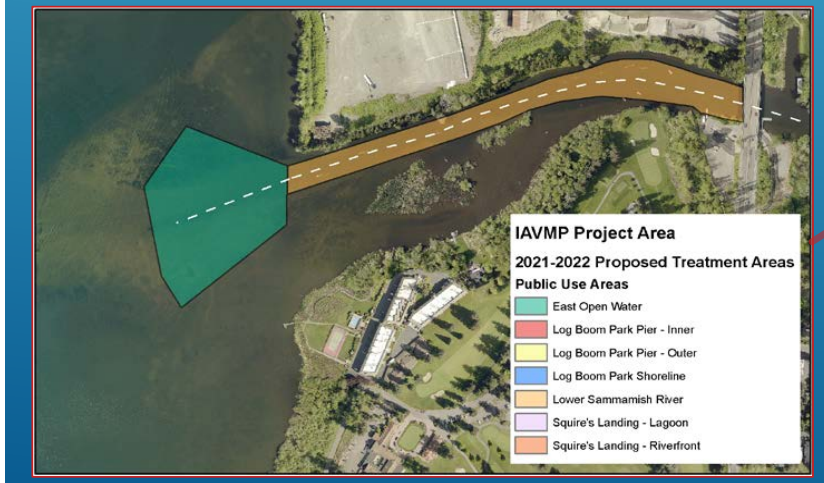
Update to the 2017 Integrated Aquatic Vegetation Management Plan

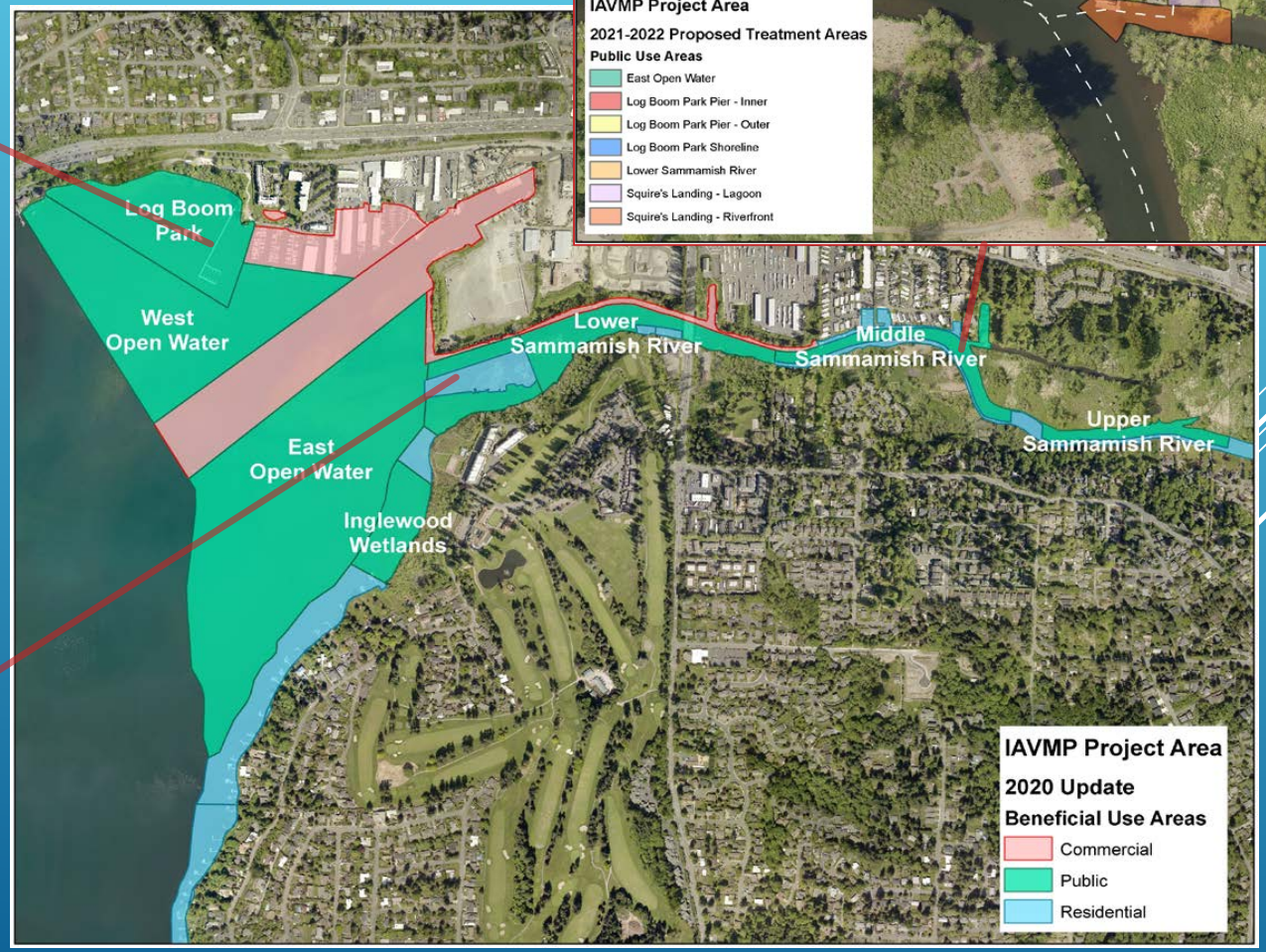
Management Strategies for Public, Residential and Commercial areas of Lake Washington and Sammamish River.

Updates:

- Control of nuisance native vegetation is now included in management goals for beneficial use areas as needed to allow for recreational and commercial use
- Newly approved herbicide, ProcelleCOR®, added to recommended list
- Summary of City treatments since 2017 IAVMP
- **Detailed City treatment and monitoring options for public beneficial use areas**
- **Dept. of Ecology Aquatic Plant and Algae Management General Permit Renewal**

Public Beneficial Use Areas: 2021-2022 Treatment





Treatment Strategies: Public Beneficial Use Areas

Estimated Biennium Budget Cost (2-Year Implementation)							
	Herbicide Treatment[A]	Suction Dredging (Diver)[B]	Shore Raking	Hand Removal (Diver)	Bottom Barrier	Mechanical Harvesting	Nanobubble Technology
LOG BOOM PARK							
PIER TREATMENT AREA	$1,802 - $2,711	$5,960 - $12,402	Not Applicable	$12,914 - $25347	$66,558 - $133,309	$27,218	Not Applicable
OUTER TREATMENT AREA	$3,373 - $5,072	$11,152 - $23,206	Not Applicable	$24,165 - $47,429	$124,543 - $249,448	$50,932	Not Applicable
SHORELINE			$20,800				
LOWER SAMMAMISH RIVER							
TREATMENT AREA	$5,692 - $8,561	$18,822 - $39,166	Not Applicable	$40,783 - $80,048	Not Applicable	$85,960	Not Applicable
EAST OPEN WATER							
TREATMENT AREA	$6,869 - $10,330	$22,711 - $47,259	Not Applicable	$49,211 - $96,589	Not Applicable	$103,724	Not Applicable
MIDDLE SAMMAMISH RIVER							
RIVERFRONT AREA	$202 - $305	$670 - $1,393	Not Applicable	$1,450 - $2,847	Not Applicable	$3,058	Not Applicable
LAGOON AREA	$495 - $745	$1,637 - $3,407	Not Applicable	$3,547 - $6,963	$18,283 - $36,619	$7,476	$31,368
TOTAL (ALL)	**$18,434 - $27,724**	**$60,952 - $126,832**	**$20,800**	**$132,071 - $259,223**	**$209,384 - $838,751**	**$139,185**	**$31,368**

[A] *Recommended if budget is primary factor*

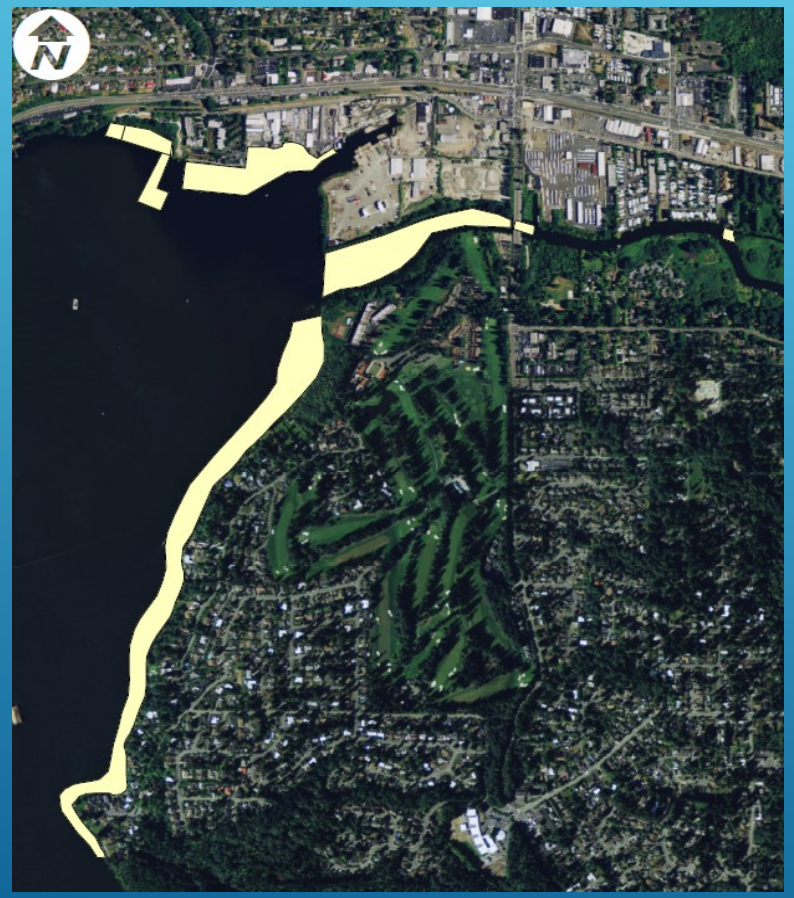
[B] *Recommended if use of non-herbicide option is primary factor*

2021-2022 Proposed Biennium Budget: $120,000 ($60,000 annually)

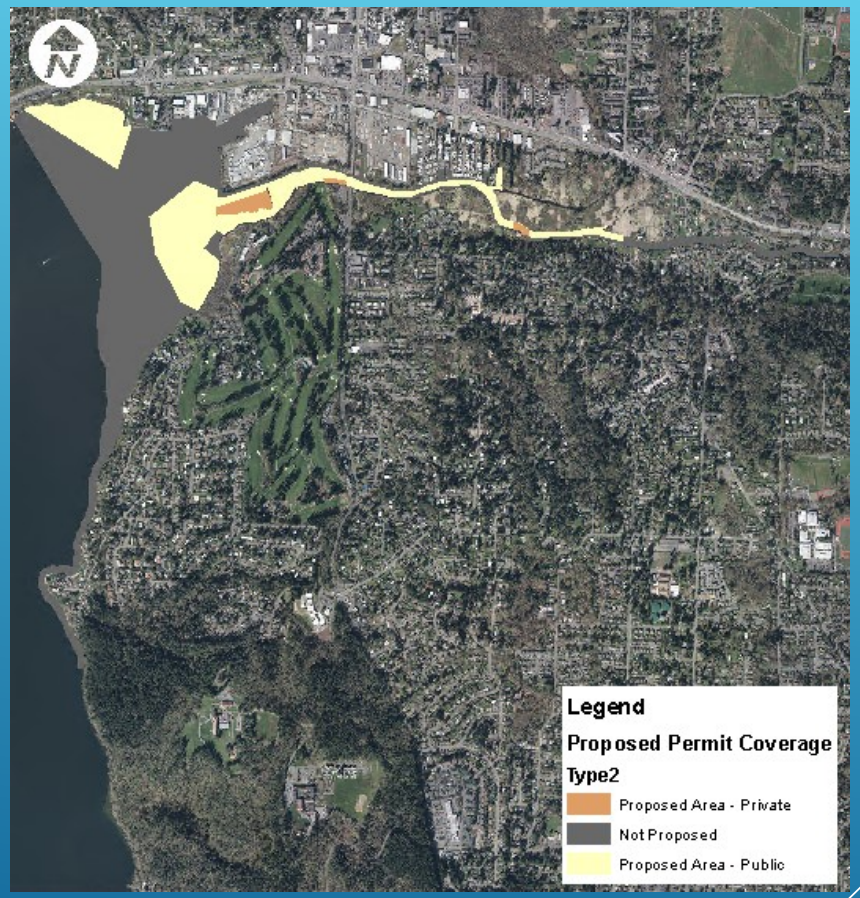
Considerations

- Most cost-effective option (overall) – Herbicide
- Most cost-effective option (non-herbicide) – Suction Dredging (removal by divers)

Department of Ecology
Aquatic Plant and Algae Management General Permit



Current Permit Coverage (Expires March 2021)

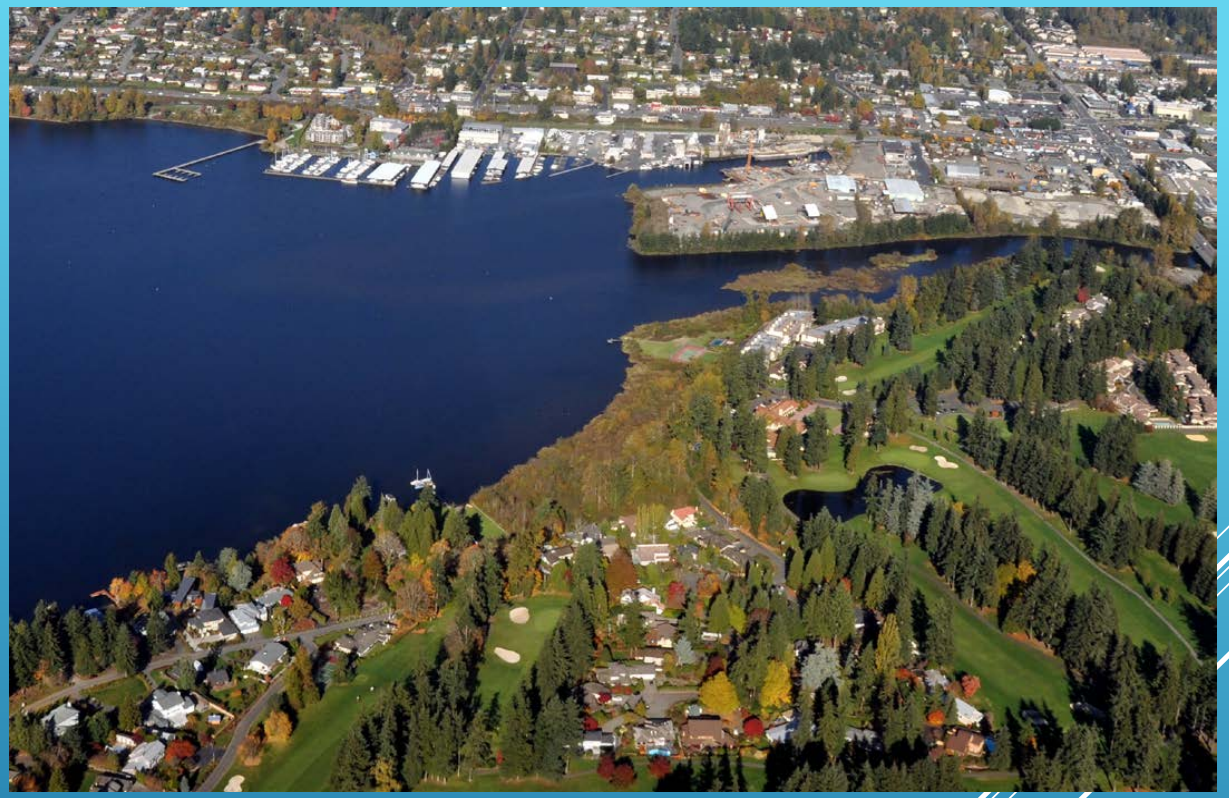


Proposed Permit Coverage

A virtual meeting will be held for the public on November 19, 2020, 5PM – 7PM. The Zoom link will be posted on the City's website. This is an opportunity for the public to provide comments or ask questions to City staff or the City's Consultant regarding the IAVMP update.

If you can't make the meeting, but would like to submit a comment, please email Richard Sawyer at rsawyer@kenmorewa.gov.

Thank you!



City of Kenmore
Richard Sawyer, Environmental Services Manager
Janet Quinn, Administrative Specialist

Herrera Environmental Consultants
Rob Zisette, Principal Aquatic Scientist
Eliza Spear, Ecologist

LAKE WASHINGTON AND THE SAMMAMISH RIVER

WITHIN THE CITY OF KENMORE, WASHINGTON

INTEGRATED AQUATIC VEGETATION MANAGEMENT PLAN

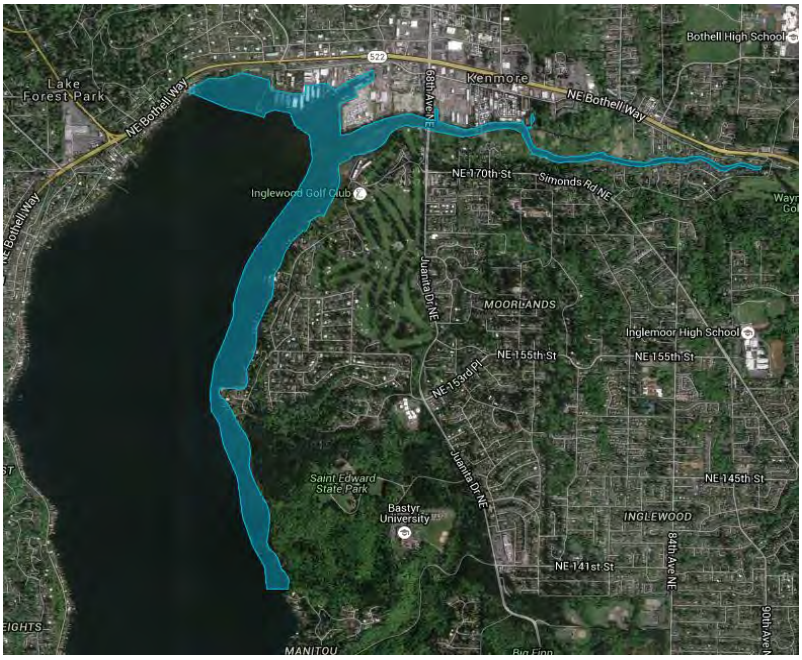


Image from Google Maps

Prepared by Herrera Environmental Consultants, Inc.

In Conjunction with the City of Kenmore

18120 – 68th Avenue Northeast, Kenmore, Washington 98028

With Grant Funding from the Washington State Department of Ecology

June 30, 2017

Note:
Some pages in this document have been purposely skipped or blank pages inserted so that this document will copy correctly when duplexed.

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ACKNOWLEDGEMENTS

The City of Kenmore is grateful to the Washington State Department of Ecology for providing funding, without which we might not have been able to create this Integrated Aquatic Vegetation Management Plan. In particular, the Department of Ecology's Lizbeth Seebacher has been instrumental in this process, providing guidance, answering questions, and serving on the - steering committee for the project. We are also appreciative of Ben Peterson, King County Aquatic Noxious Weed Specialist, for being willing to provide information and insights as we worked through the process, and who also served on the steering committee. Casey Costello, Washington State Department of Fish and Wildlife, also lent his expertise to the committee, as did Douglas Poppe, Puget Sound Anglers Association, providing a fisherman's perspective. In addition, Kenmore business owner/agents Todd Banks, President of Kenmore Air; Jim Davidson, Owner of North Lake Marina; Greg Matz, Superintendent of Inglewood Golf Club; and Doug Ritchie, former Vice President of Kenmore Waterfront Activities Center, offered their perspectives as representatives of waterfront commercial enterprises. We would also like to thank Kenmore residents John Adamski and Matt Muller for providing both historical and current perspectives on the presence of aquatic weeds and water quality issues.
Samantha Loyuk, City of Kenmore Associate Planner, provided input on City of Kenmore permit requirements. Rounding out the steering committee were Jennifer Gordon, City of Kenmore Public Works Operations Manager; and Quinn Proffitt, City of Kenmore Maintenance; both of whom offered input from the perspective of frequent observers of our parks and waters. Our thanks to Nancy Rapin and Karen Walter of the Muckleshoot Tribe for their review of the plan, as well as the many citizens who provided input during this project. Lastly, we would like to thank Herrera Environmental Consultants—in particular Rob Zisette and Julia Munger—for surveying and mapping and for providing scientific knowledge and expertise throughout the process.

EXECUTIVE SUMMARY

The City of Kenmore lies on the northern edge of Lake Washington, and also encompasses the mouth of the Sammamish River, giving the City 7.8 miles of shoreline. Among City of Kenmore goals is a commitment to advance the public's access and connection to the waterfront. In the fall of 2016, Kenmore residents approved the City's first bond measure, which will, in part, increase public access to and make improvements in three of Kenmore's waterfront parks: Log Boom Park on the northern shore of Lake Washington, and Rhododendron Park and Squire's Landing on the Sammamish River.

Dense growth of aquatic plants during the summer interferes with recreational and commercial use of the Sammamish River and Lake Washington in the City of Kenmore, creating obstructions for multiple users and inhibiting use for swimmers, kayakers, boaters and others. Negative impacts on riparian habitat are also of concern.

Residents and business owners within the City of Kenmore, as well as aquatic plant biologists and plant management experts, came together to develop goals and a proposal for the City's Integrated Aquatic Vegetation Management Plan (IAVMP), which is funded by a Washington Department of Ecology grant.

The management goals are to maintain recreational and commercial usability and habitat integrity of the lake and river by managing nuisance plants in identified beneficial use areas, and to keep swimming areas clear of weeds. Management activities will primarily target noxious weeds focusing on three aquatic noxious weeds (Eurasian watermilfoil, Brazilian egeria, and fragrant waterlily) that are abundant in the project area, and two emergent weed species (garden and purple loosestrife) that are not abundant but are required for control in this part of King County.

The aquatic plants will be controlled by a combination of hired contractors to do work in public areas, as well as manual removal and management by residents in private areas. Four state-approved aquatic herbicides were selected for use in this plan: glyphosate, triclopyr, imazapyr, and diquat. Non-chemical management methods may include inexpensive hand-held rakes for residents to use on their own waterfront properties, and the installation of bottom barriers around docks and swim areas. To preserve wildlife habitat, aquatic plants in conservation areas near the Inglewood wetlands will not be managed unless they further encroach upon the navigation channels.

Successful implementation of this plan revolves around a collective sharing of information. The City of Kenmore will work to solicit public input, and keep residents and businesses informed of current and future plant management strategies.

INTRODUCTION

In his Budget Cover Letter of October 24, 2016, Kenmore City Manager, Rob Karlinsey, said, "Cities like Kenmore can go beyond being just functional and providing basic public safety. Cities can play a key role in prosperity and human flourishing. In other words, it's not just about preventing suffering and undue hardship, which is important; our job is also about creating opportunities and clearing the path for our residents, businesses, and visitors to play, find fulfillment, and connect with each other as a community … Especially for Kenmore, the way to make progress on that upward trajectory [of becoming] is through continuous improvement or "relentless incrementalism." The overwhelming majority of our progress will be through the seemingly small, one-step-at-a-time improvements we make to our City. All of these incremental improvements add up over time to make a big difference." The creation and implementation of this Integrated Aquatic Vegetation Management Plan (IAVMP) is one of those incremental improvements that over time can make a big difference.

Rob Karlinsey continued, "As affirmed in Council Goal #2 [… advance the public's access and connection to the waterfront], a key component of a prosperous Kenmore is how we turn toward the lake and leverage this powerful asset. Our waterfront on beautiful Lake Washington is a precious resource that few cities have … We [have] heard clearly from the public that public access to the water is one of their highest priorities … Kenmore can bring the vision of its citizens to fruition and become a waterfront destination in its own right; not just a place to launch or store your boat—a place where boaters and visitors intentionally go to tour and have fun. In other words, Kenmore can become known for its beautiful waterfront and the public access it provides."

In the fall of 2016, Kenmore residents generously approved Kenmore's first bond measure, which will, in part, increase public access to and make improvements in three of Kenmore's waterfront parks: Log Boom Park on the northern shore of Lake Washington, and Rhododendron Park and Squire's Landing on the Sammamish River.

Aquatic noxious weeds are non-native plants that are particularly invasive in shoreline areas or open water. These plants negatively impact ecological processes, recreation, and business activities. With 7.8 miles of shoreline and multiple opportunities to enjoy the water, management of these weeds in the lake and river areas of Kenmore is critically important as more and more people gain access to the water. However, because Kenmore is on the receiving end of invasive weeds and other debris from the Sammamish River, this issue cannot be addressed in isolation from upstream communities. Therefore, we've also included the component of upstream outreach as a part of our plan.

The development of this IAVMP has been an interesting and valuable process that has given us the opportunity to focus our attention on the problem of aquatic noxious weeds and to gain citizen input on ways to address the problem. This document offers a menu of options available for the City and residents alike to utilize as we work to manage aquatic weeds.

PROBLEM STATEMENT

Dense growth of aquatic plants during the summer interferes with recreational and commercial use of the Sammamish River and Lake Washington in the city of Kenmore, creating obstructions for multiple users and inhibiting use for swimmers, kayakers, boaters and others. Negative impacts on riparian habitat are also of concern, as non-native invasive species crowd out native growth, alter water temperatures, and negatively impact the environment for fish and other aquatic animals.

Survey and mapping by Herrera Environmental Consultants, Inc. (Herrera) in early September 2016, which forms the basis for this IAVMP, was performed 6 to 10 weeks after herbicide treatments targeting Eurasian watermilfoil (milfoil) and Brazilian egeria (egeria) were conducted in five portions of the survey area. Pretreatment mapping in May and June 2016 showed a high density of Eurasian watermilfoil in portions of the following three treatment locations: deeper portions of Log Boom Park, small isolated portions from the mouth of the Sammamish River to just east of the 68th Avenue Northeast Bridge, and deeper portions of Lake Washington offshore of waterlilies adjacent to Inglewood Wetlands. Pretreatment mapping of plant density was not conducted at the remaining two treatment locations: Squire's Landing Park on the Sammamish River at the confluence with Swamp Creek and in Lake Washington at the Arrowhead Point neighborhood. It should be noted that the pretreatment surveys focused on high-use, public areas representing a small portion of the total project area. Therefore, plant location and density reported in the September survey do not represent typical conditions for the treated areas.

In addition to milfoil and egeria, the lowermost reach of the Sammamish River and most of Lake Washington north of Arrowhead Point was dominated by native plants of varied density. Another noxious weed, fragrant waterlily, covered the south shoreline of the lower 0.3 miles of the Sammamish River and extended 0.3 miles south along the eastern shore of Lake Washington. Green filamentous algae has formed in large floating mats along the Sammamish River banks and at the river mouth, and blue-green algae has periodically been found at toxic levels. These algae mats often wash up on public and private shorelines, creating problems ranging from a nuisance and malodorous deposit to high toxicity and unsafe water conditions. While not specifically addressed in this IAVMP, algae and aquatic vegetation ecosystems are interconnected.

Aquatic plants (macrophytes) may have an impact on the amount of floating and attached algae in a lake. They can provide a growing surface for an enormous amount of attached algae. These attached algae use up a portion of the nutrients dissolved in the water that might otherwise fertilize the floating algae and increase their growth. On the other hand, the macrophytes themselves, as they die back and decay, contribute nutrients to the water and thus can promote algal growth. So in many cases we cannot be sure (without very specific and detailed analyses) whether removing rooted plants would bring about more algae growth, or less, or no change. Source: Ecology 2017a.

Problems created by the presence of non-native, invasive plants fall into three categories—environmental, recreational, and economic—and there is significant overlap between categories.

Environmental problems created by dense aquatic weeds include:

- Negative impact on fish habitat
- Impact on native biodiversity by displacing native aquatic plants and reducing plant diversity
- Non-native aquatic weeds promote habitat for non-native fish species that prey on salmon and other indigenous species
- Increased levels of algae from nutrients released by plant decay
- Water quality concerns:
    - Low dissolved oxygen under plant canopies
    - High temperature from reduced water circulation

Recreational problems include:

- Dense weeds inhibit swimming and paddle sports and discourage water users
- Weeds get wound around boat motors and rudders
- Fishing lines get tangled with weeds
- Health risks of toxic blue-green algae scum that accumulates on dense and decaying plants
- Impacts on aesthetics:
    - Plant accumulation and decay
    - Foul aroma
    - Water clarity issues
- Reduced shoreline access

Economic impacts include:

- Reduction of navigable waterways by forcing lake traffic into narrower channels, which increases potential for conflict between boats and planes

- Decomposition of plants causes debris accumulation on the river and lake bottoms, which in turn results in reduction of water depth impacting navigable channels and access to moorage slips, especially for larger boats
- Costly repairs to damaged boat propellers and plane rudders
- Costly repairs to irrigation systems from clogged intake lines and damaged pumps
- Reduction of recreational uses and associated reduction in perceived quality of life
- Lower waterfront property values (Olden and Tamayo 2014)
- Cost of treatment to manage/control/eradicate

As the recipient of invasive aquatic weeds from upstream on the Sammamish River, the City of Kenmore has a challenging task in determining what will be possible to manage, control, and/or eradicate within its waters. A total of 10 of the observed species are on the Washington state noxious weed list, and garden and purple loosestrife are required to be controlled. In addition, control is recommended for Japanese knotweed, Eurasian watermilfoil, and fragrant waterlily. While control is not required by the King County Noxious Weed Control Board, management of Brazilian egeria is necessary for maintaining a healthy native plant population and addressing water body usability issues. Public education and engagement, management of all of these species, and early detection of any new or emerging invasive species will be the focus of this IAVMP.

PUBLIC INVOLVEMENT

Kenmore has a large waterfront community, both residential and commercial, and the City wanted to include representatives on the IAVMP steering committee with a broad spectrum of perspectives and geographic locations. The City reached out to community leaders from the residential community—residents who had been vocal in their desire to address the problem of aquatic weeds—and to all of the businesses with waterfront property locations.

As a result, the City was fortunate to gain the participation of Todd Banks, President of Kenmore Air, the largest seaplane operator in the United States; Jim Davidson, Owner of North Lake Marina, a family owned and operated marina on Kenmore's waterfront; Greg Matz, Superintendent of Inglewood Golf Club, located along both the Sammamish River and Lake Washington and irrigated by water from these sources; and Doug Ritchie, then Vice President of the Kenmore Waterfront Activities Center located adjacent to Squire's Landing Park along the Sammamish River.

John Adamski, waterfront homeowner in the Arrowhead Point community of Lake Washington for multiple decades and avid stand-up paddle boarder; and Matt Muller, waterfront property owner in the Inglewood residential area and frequent user of Lake Washington and the Sammamish River, both provided important perspective, including historical insights from John.

The City felt it would be valuable to have the perspective of a fisherman as well, so they posted notices at Log Boom Park and the public boat launch managed by the Department of Fish and Wildlife. When the notices didn't provide any additional steering committee members the City took a more active approach, went to the boat launch, and found Douglas Poppe, an officer in the Puget Sound Anglers Association.

With good community representation the City also reached out to agencies associated with the management of aquatic weeds, and was fortunate to gain the following additional members of the steering committee: Lizbeth Seebacher, Wetland and Aquatic Biologist for the Washington State Department of Ecology; Ben Peterson, Aquatic Noxious Weeds Specialist with King County; and Casey Costello, Habitat Biologist with the Washington State Department of Fish and Wildlife.

The steering committee was rounded out by two City staff members: Jennifer Gordon, Public Works Operations Manager; and Quinn Proffitt, Maintenance Worker and observer of City parks on a daily basis; and Janet Quinn, Project Coordinator for the City of Kenmore. Rob Zisette, Senior Aquatic Scientist and Project Manager with Herrera, was also included on the committee. Janet and Rob acted as co-facilitators for all meetings. Meeting presentations and minutes are presented in Appendix A.

In addition to the steering committee meetings, the City invited residential and commercial waterfront property owners and other residents to a community meeting held in January 2017 at Kenmore City Hall (see Appendix A). In response to extensive social media invitations to all Kenmore residents and written, mailed invitations to all waterfront property owners, 30 largely waterfront property owners met to hear about the development of the IAVMP, to learn about management options, and to express their thoughts on the work done to date. Participation was enthusiastic and there was clearly a desire to learn more and do more, both individually and collectively, to address aquatic weeds problems. As staffing and funding allows, the City of Kenmore plans to continue to reach out to the community to provide education and solicit input into chosen management strategies.

In addition, a meeting was held in May 2017 to respond to citizen questions and gauge interest in the formation by residents of a Plant Management Association that would allow them to work together to manage invasive plants. There was insufficient interest at the present time in forming an Association, but this remains a possibility as a future strategy.

Outreach to upstream jurisdictions has been an on-going process although no Coalition has been formed to date. Conversations with the cities of Bothell, Redmond, Woodinville and other upstream jurisdictions will continue as the City develops more specific ways of working together to address the Sammamish River system more holistically than could be achieved by one downstream City. Formation of a multi-jurisdictional coalition involving municipalities and non-profits and other interested organizations continues to be a City of Kenmore long-term vision.

The Muckleshoot Tribe provided comments on the draft IAVMP that are addressed in this final IAVMP.

In response to citizen requests, the City of Kenmore published a webpage that provides access to detailed information on permits and best management practices, as well as links to other aquatic weed-related topics. This page can be found at: <http://www.kenmorewa.gov/IAVMP>.

PLANT MANAGEMENT GOALS

The aquatic plant management goals are to maintain recreation and commercial usability and habitat integrity of the lake and river by managing nuisance plants in identified beneficial use areas, and to keep swimming areas clear of weeds for optimal usability.

Management priorities include:

- Control of regulated noxious weeds
- Control of dominant noxious weed species
- Early detection of emerging noxious weed species

Priority management areas include:

- Public parks, main channels, other high public use areas
- Private waterfront residences and businesses

Management goals include:

- Reduce impact on boating (hand-powered watercraft and motor boats):
  - Provide clear, clean water
  - Reduce weeds catching on paddles, rudders, propellers
- Provide clear, clean water for swimmers:
  - Reduce weeds near beach areas
  - Reduce noxious weeds or decomposed weeds on beaches
- Maintain healthy environment for fish:
  - Provide appropriate water temperatures
  - Provide appropriate dissolved oxygen levels

WATERBODY CHARACTERISTICS

LAKE WASHINGTON

Watershed and Physical Characteristics

The city of Kenmore lies along the northern end of Lake Washington near the outlet of the Sammamish River (Figure 1). Lake Washington is the largest lake in King County, and the second largest natural lake in the state of Washington. The lake's western shore is bounded by urban Seattle, and the eastern shore is bounded by the cities of Bellevue, Medina, Renton, and Kirkland. The lake is 22 miles long and has a surface area of 21,500 acres square miles and a mean depth of 108 feet (Table 1, King County 2017a). The basin area for the lake is 472 square miles, with the Cedar and Sammamish rivers as the largest freshwater inputs contributing an average of 57 percent and 27 percent of the total inflow volume, respectively.

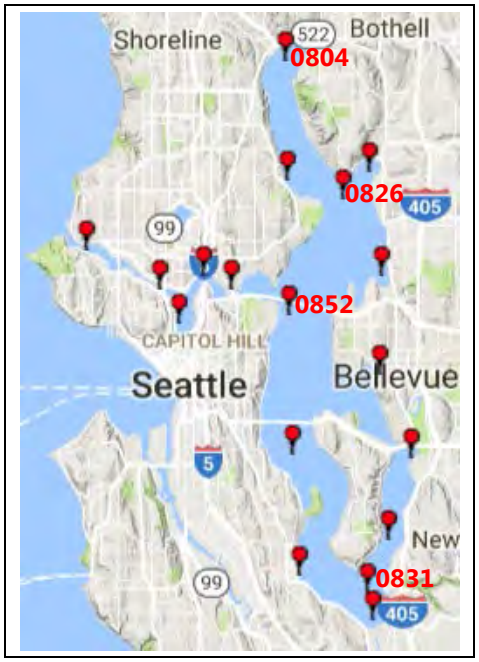
Table 1. Physical Characteristics of Lake Washington.

Basin Area	300,000 acres (472 square miles)
Lake Area	21,500 acres
Lake Volume	2,350,000 acre-feet
Maximum Depth	214 feet
Average Depth	108 feet
Flushing Rate	0.43 per year
Length of Lake	22 miles
Main Inflows	Cedar River (57 percent) and Sammamish River (27 percent)
Main Outlet	Ship Canal to Puget Sound
Typical Period of Stratification	Late March to early November
Trophic State	Mesotrophic

Water is discharged from the lake via Union Bay and the Lake Washington Ship canal into Portage Bay in Lake Union, and ultimately to Puget Sound. The hydrology of Lake Washington has been significantly altered by human intervention. Construction of the Lake Washington Ship Canal in 1916 lowered the mean lake level by 9 feet and decreased the lake's surface area by 7 percent, eliminating the original shoreline and wetland habitats and transforming most shallow water habitat into upland areas. Deeper water areas were transformed to emergent and scrub-shrub wetlands. The US Army Corps of Engineers (USACE) maintains the level of Lake Washington between 20 and 22 feet as measured above the Puget Sound mean low tide through the operation of the Ballard Locks (King County 2010).

Figure 1.
Aquatic Vegetation Survey Area Within the City of Kenmore, Washington.

Water Quality

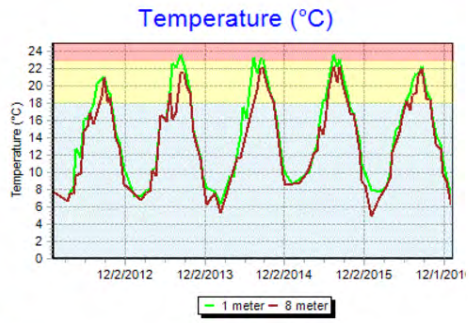


Lake Washington is the largest of the three major lakes in King County, and the second largest natural lake in the state of Washington. King County currently has four sampling stations located in Lake Washington: Station 0804 in the north near the mouth of the Sammamish River, Station 0826 near Juanita Bay, Station 0852 in the deep basin near I-520, and Station 0831 in the south end near the mouth of the Cedar River. Station 0852 is the legacy station that the University of Washington began monitoring in 1993. The other stations have been monitored since the early 1980s. In addition, sampling stations located around the shoreline of the lake, mostly near influent streams, were sampled from the mid-1980s until the program reduction in 2009.

Samples are collected twice monthly from March through November, and once monthly from December through February. There is also a monitoring buoy located in the central basin of the lake that collects continuous temperature, pH, oxygen, conductivity, chlorophyll-a, and turbidity readings throughout the water column, as well as weather information (King County 2017a).

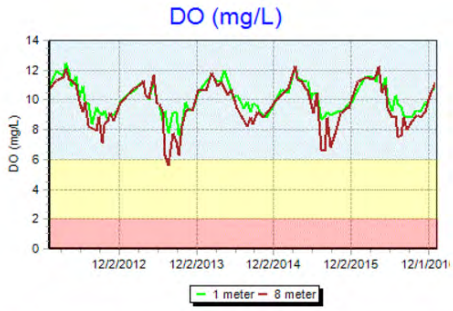
Temperature, Dissolved Oxygen, and pH

At Station 0804, temperatures in Lake Washington get down to between 5 and 7 degrees Celsius in the winter months, and can reach up to 24 degrees Celsius in the summer. Temperatures above 23 degrees Celsius can be fatal to salmonids (King County 2017a). Dissolved oxygen (DO) ranges from around 6 milligrams per liter (mg/L) in the winter to over 12 mg/L in the summer. The pH in Lake Washington typically reaches its highest in the middle of the summer, at around a pH of 8 or 9. The lake is more acidic in the winter, when the pH is typically around 7 to 7.5. Recent temperature, DO, and pH data for Station 0804 are presented in Figure 2.



= Temperatures > 23 °C are lethal to salmonids.

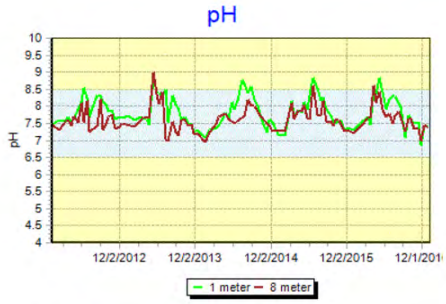
= Temperatures between 18 °C to 23 °C may be too warm for salmonid survival.



Note: Dissolved oxygen thresholds for salmonid survival are indicated by color changes.

= Concentrations < 2 mg/L are lethal to salmonids.

= Concentrations < 4.25 mg/L may threaten salmonid survival.



Note: State water quality standards for pH thresholds are indicated by color changes.

6.5 = the lower threshold, and 8.5 = the upper threshold of the Washington Aquatic Life Criteria.

Figure 2. Temperature, Dissolved Oxygen, and pH at Station 0804 in Lake Washington.

Trophic State

One way to characterize the health of lakes is by using total phosphorus, chlorophyll-a, and Secchi depth (water transparency) data to calculate the Trophic State Index (TSI, Carlson 1977). This index provides a way to rate and compare lakes according to their level of biological activity on a scale from 0 to 100. As the TSI values increase by 10 (10, 20, 30, etc.) they represent a doubling of algal biovolume that can be related to easily measured parameters through linear regression and re-scaling. The TSI scale provides thresholds for three ranges of lake primary productivity (oligotrophic, mesotrophic, and eutrophic representing low, moderate, and high amounts of algae growth). The indices are based on summer mean values (June through September) of three commonly measured lake parameters: water transparency measured by Secchi depth, and concentrations of total phosphorus (TP) and chlorophyll-a (Chla) in the epilimnion (upper 10-meter surface layer). TSI values for Lake Washington (Station 0852) are presented in Figure 3.

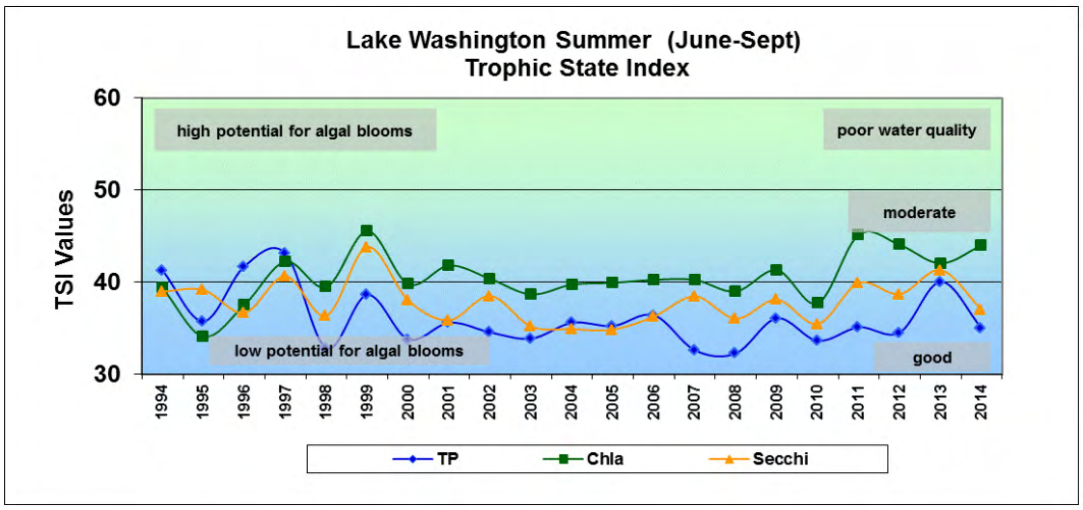


Figure 3. Trophic State Index Values for Lake Washington.

Secchi depth transparency is a measurement of water clarity produced by lowering a Secchi disk (an 8-inch disk with alternating black and white quadrants) into the water until the observer can no longer see it. This depth of disappearance, called the Secchi depth, is a relative measure of the water's transparency that can be used to look at events in a lake, trends over time, or make comparisons between lakes. Algae, soil particles, and other materials suspended in the water all affect transparency. The Secchi depth will decrease as these factors increase. In King County, clarity tends to be lower during periods of high algal growth (spring and summer) and during periods of high stormwater flows (winter).

Nutrients such as nitrogen, phosphorus, and silica are necessary for plant and animal growth. However, increasing nutrients availability can increase the growth of aquatic plants, which can cause nuisance blooms that subsequently decay. Decomposition can deplete oxygen to levels

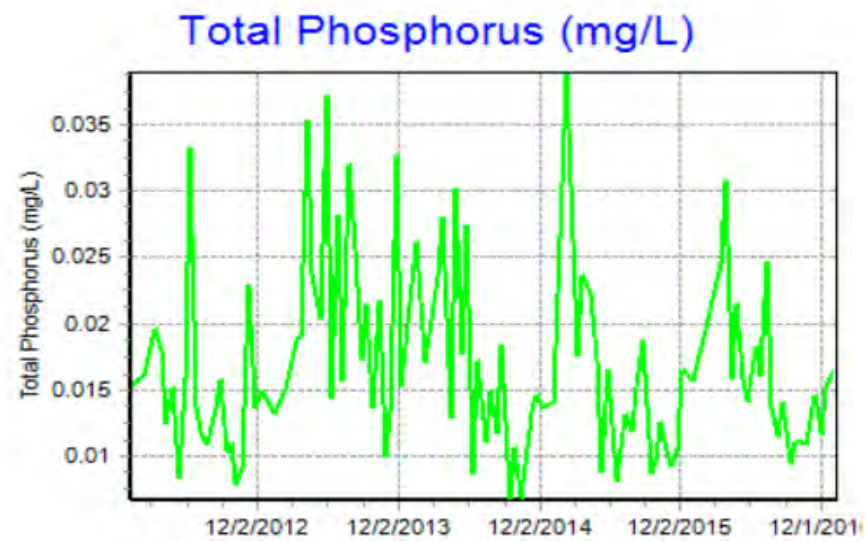
incapable of sustaining many aquatic organisms, thus leading to more problems. In the temperate latitudes, **phosphorus** is most often the primary nutrient of concern in freshwater systems because it is usually the nutrient that is in shortest supply, thus limiting algae growth. If excess phosphorus gets into lake water, it can cause nuisance algal blooms or even algal blooms that produce toxins. Additional phosphorus from human activities enters water bodies via pathways such as discharge of detergents, runoff containing fertilizers, pet waste, car washing and seepage from failing septic systems. Sediment can also be a source of phosphorus, as phosphorus readily binds to soil particles and is washed into the lakes. Through chemical reactions, phosphorus may be later released into the water column from the lake sediments when DO concentrations fall below 0.2 mg/L.

In general the TSI-TP values for Lake Washington fluctuate below the low (good) to moderate threshold indicating fairly consistent low phosphorus with low potential for nuisance algal blooms (see Figure 3). Recent seasonal patterns in total phosphorus and chlorophyll near the water surface at the north station (Station 0804) are presented in Figure 4. Total phosphorus concentrations tend to peak in the spring and decline to minimum values in the late fall, but patterns are highly variable between years.

Chlorophyll is the green pigment in plants that allows them to create energy from light (photosynthesis). Measuring chlorophyll provides an indirect estimate of the amount of algae in the water column. Chlorophyll-a is a measure of the portion of the pigment that is still actively photosynthesizing at the time of sampling. There are several other forms of chlorophyll present in different groups of algae, as well as other assisting pigments and degradation byproducts that may be found in the water, but chlorophyll-a is the most common form present and is used as an indicator of the volume of algae present.

In general, the TSI chlorophyll-a values for Lake Washington are much higher than the TSI total phosphorus values (see Figure 3). TSI chlorophyll-a values have fluctuated at and above the low to moderate threshold, indicating low to moderate potential for nuisance algal blooms. Recent seasonal patterns in total phosphorus and chlorophyll near the water surface at Station 0804 are presented in Figure 4. Chlorophyll concentrations typically follow total phosphorus concentrations, but are less variable and show a more distinctive peak in the spring followed by decline to minimum values in winter.

The more phosphorus that can be prevented from entering lakes, the less chance that a potentially toxic cyanobacteria bloom will occur. The cyanobacteria generally responsible for making toxins are known to be poor competitors for phosphorus, so the available levels must be high before they will do well in a body of water. Phosphorus inputs can be minimized through well-designed storm water drainage systems, maintenance of sewer infrastructure, changing homeowner and business behaviors (such as using no phosphorus-rich fertilizers on lawns), education and incentives, and replacing watershed septic systems with sewers (King County 2017a).



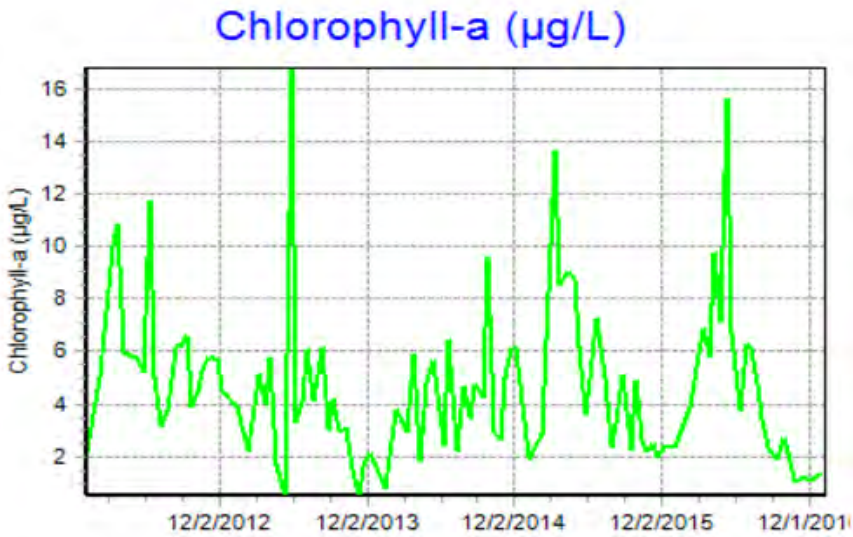


Figure 4. Total Phosphorus and Chlorophyll-a at Station 0804 in Lake Washington.

SAMMAMISH RIVER

Watershed

The Sammamish River basin drains a watershed composed of approximately 153,600 acres that includes 62,080 acres in the Lake Sammamish basin, 32,000 acres in the Bear Creek basin, and 42,880 acres that are the combined Little Bear, Swamp, and North Creek basins. The remaining 16,640 acres comprise the Sammamish River sub-basin (King County 2017b).

Historically, the Sammamish River was somewhat longer than it is today with abundant "swampy" areas that were filled with peat and diatomaceous earth. In 1891, the US Army Corps of Engineers reported that the river was 17 miles long. The river corridor was heavily logged from the 1870s through the early 20th century. Throughout the 20th century, the river went through dramatic changes that reduced the complexity of the floodplain including the lowering of the water level in Lake Washington, the channelization of the river, and the construction of drainage ditches in the river valley. The elevation of Lake Washington was lowered about 9 feet with the opening of the Chittenden Locks in 1916, and this elevation change drained much of the swampy Sammamish River corridor. Around the same time period, farmers in the Sammamish River Valley formed a drainage district that began to straighten the upper reach of the river dramatically. In 1962, The Corps of Engineers began to systematically dredge the river, primarily as a flood control project, thus deepening the river 5 feet throughout most its length, hardening the river's banks, and dramatically decreasing its remaining connection with the floodplain and cutting off most of the smaller tributaries to the river. The Corps' project also included the construction of a weir at the Lake Sammamish outlet. Overall, this project practically eliminated flooding in the Sammamish River valley and reduced the maximum flood elevations and seasonal water surface elevations in Lake Sammamish.

The Sammamish River is now about 13.5 miles long. The upper river corridor extends from the Lake Sammamish weir in Marymoor Park to the City of Woodinville through a floodplain valley that is more than a mile wide in places. Land use in this upper reach includes open space and recreational areas at Marymoor Park, urban commercial and residential development in the City of Redmond, the Willows Run Golf Course, the Sammamish Valley Agricultural Production District, and urban development again in the City of Woodinville. The lower reach extends from Woodinville to the mouth of the river at Lake Washington. This reach has a much narrower drainage area, which includes the downtown cores of Bothell and Kenmore but also some open space areas, including the Wayne and Inglemoor Country Club golf courses, Bothell parkland along the Sammamish River Trail, and Kenmore parks at the mouth of Swamp Creek and the mouth of the river. A major King County sewer line runs underneath the Sammamish River Trail, which is adjacent to most of the river.

Fisheries

Chinook, coho, sockeye, kokanee, steelhead, and coastal cutthroat are known salmonid species to currently inhabit the Sammamish River system (Kerwin 2001). The United States Fish and Wildlife Service has identified the river and its tributaries as potential foraging habitat for bull trout on the assumption that they are found in the watershed. Volunteers with the Salmon Watchers Program have been making observations at various locations within the Sammamish River basin since 1997.

Two salmon-bearing tributary systems are located in the upper reach: Bear Creek and Little Bear Creek. The lower reach includes two large salmon-bearing tributaries: Swamp Creek and North Creek (Kerwin 2001).

Water Quality

King County monitors the ecological health of the Sammamish River by collecting and analyzing surface water samples. Station 0486 is located at the Marymoor Park Bridge where Lake Sammamish drains into the Sammamish River. Sampling at this station began in 1971 and continues today. Station 0450 is located at the bridge on 68th Avenue Northeast in Kenmore where the river drains into Lake Washington. Sampling at this station began in 1971 but was discontinued in 2008 due to monitoring program budget cuts. Station 450CC, located where Northeast 145 crosses the Sammamish River, was added in 2009. The County also has stations at multiple locations along the major tributaries to the Sammamish River – Swamp Creek, North Creek, Bear Creek, and Little Bear Creek (King County 2017b).

Water quality samples are analyzed monthly for temperature, dissolved oxygen, pH, conductivity, turbidity, total suspended solids, orthophosphate, total phosphorus, ammonia, nitrate-nitrogen, total nitrogen, and fecal coliform bacteria. Results are compared to State water quality standards. Water quality standards are designed to protect public health and aquatic life. Comparing monitoring results to water quality standards allows an understanding of how safe the creek is for recreational contact as well as for aquatic life.

State water quality standards were revised in 2003. The Sammamish River is now categorized as "Core Summer Salmonid Habitat" for aquatic life use and "Extraordinary Primary Contact Recreation" for recreational use (swimming and water skiing). The river is on the 2012 Washington Department of Ecology's (Ecology) 303(d) list for violation of dissolved oxygen, fecal coliform, and water temperature standards (Category 5). Dissolved oxygen levels decrease when the temperatures increase. In addition, high nutrient (phosphorus and nitrogen) concentrations can exacerbate low oxygen conditions by increasing vegetative growth. Decaying algae and aquatic plants consume oxygen in the water. See Figure 5 for a summary of water quality index scores for Station 450CC in water year 2016 (King County 2017b).

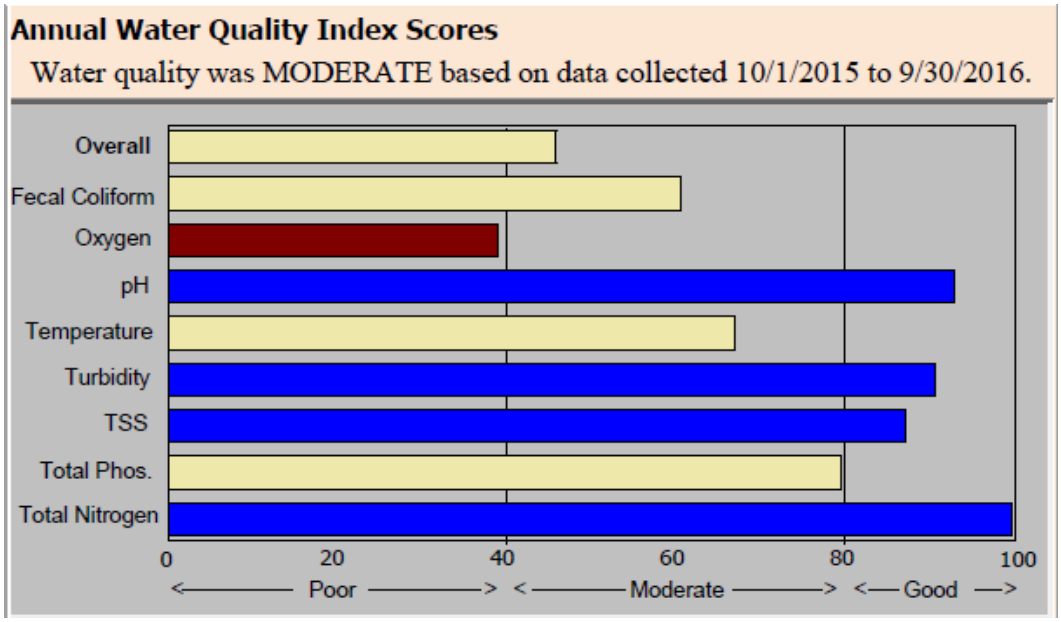


Figure 5. Annual Water Quality Index Scores for the Sammamish River Station 450CC.

Diazinon and other chemicals have been found in one irrigation and drainage ditch feeding the river at levels that are of concern. King County has done additional toxicity studies of the river (see King County 2017b).

A 28-year (1979–2007) trend analysis was conducted with water quality data from both Sammamish River stations. Results indicated that water quality might have declined over this 28-year period with significant increases in water temperatures and conductivity, and decreasing dissolved oxygen concentrations. High conductivity can suggest the presence of unidentified dissolved charged substances in the water. Water at the mouth of the river is becoming less acidic as indicated by the significant increase in pH. (The pH remains within acceptable range relative to the state standards.) Decreased total suspended solids (TSS), turbidity, nutrients (orthophosphate and total phosphorus, ammonia and total nitrogen), and bacteria levels indicate some improvements in water quality in the same 28-year period.

BENEFICIAL USES AND IDENTIFIED PROBLEMS

The project area provides numerous beneficial uses to humans and wildlife, including the following three types identified by the Steering Committee (Figure 6):

- Recreational Use: Boating, fishing, swimming, aesthetic and wildlife observation.
- Commercial Use: Marinas, Kenmore Air, water supply
- Wildlife Use: Waterfowl, aquatic mammals, fish, and other aquatic organisms.

Beneficial uses are impacted by excessive aquatic plant growth, including the following three types of problems identified by the Steering Committee:

- Environmental:
  - Negative impact of dense plants on fish habitat
  - Impact of invasive noxious weeds on native biodiversity
  - Excessive levels of algae from scum accumulation on dense plants and nutrient release by decaying plants that impair aquatic habitat
  - Water quality degradation (low dissolved oxygen and high temperature) in dense plant growth
- Recreational:
  - Inhibit swimming and paddle sports
  - Weeds wound around boat motors
  - Weeds tangled in fishing lines
  - Non-native weeds promote habitat for non-native fish species
  - Health risks of toxic blue-green algae and nuisance of excess filamentous green algae
  - Aesthetical impacts from plant accumulation and decay, foul aroma, and water clarity
  - Restricted shoreline access

- Economic:
  - Reduction of navigable waterways by forcing lake traffic into narrow lanes, and increased potential for conflict between boats and planes
  - Reduction of water depth that impacts access to moorage slips
  - Costly repairs to damaged boat propellers and plane rudders
  - Irrigation impacts from clogged intake lines and damaged pumps
  - Perceived quality of life
  - Lower waterfront property values (Olden and Tamayo 2014)
  - Cost to manage/control/eradicate

To protect beneficial uses and address the identified problems, the project area was segregated into the following three types of areas by the Steering Committee:

- Public Use Areas:
  - Saint Edward
  - Inglewood Wetlands
  - East Open Water
  - West Open Water
  - Log Boom Park
  - Lower Sammamish River
  - Rhododendron Park
  - Squire's Landing Park
- Commercial/Industrial Use Areas:
  - Kenmore Air
  - Marina
  - Warehouse/Industrial

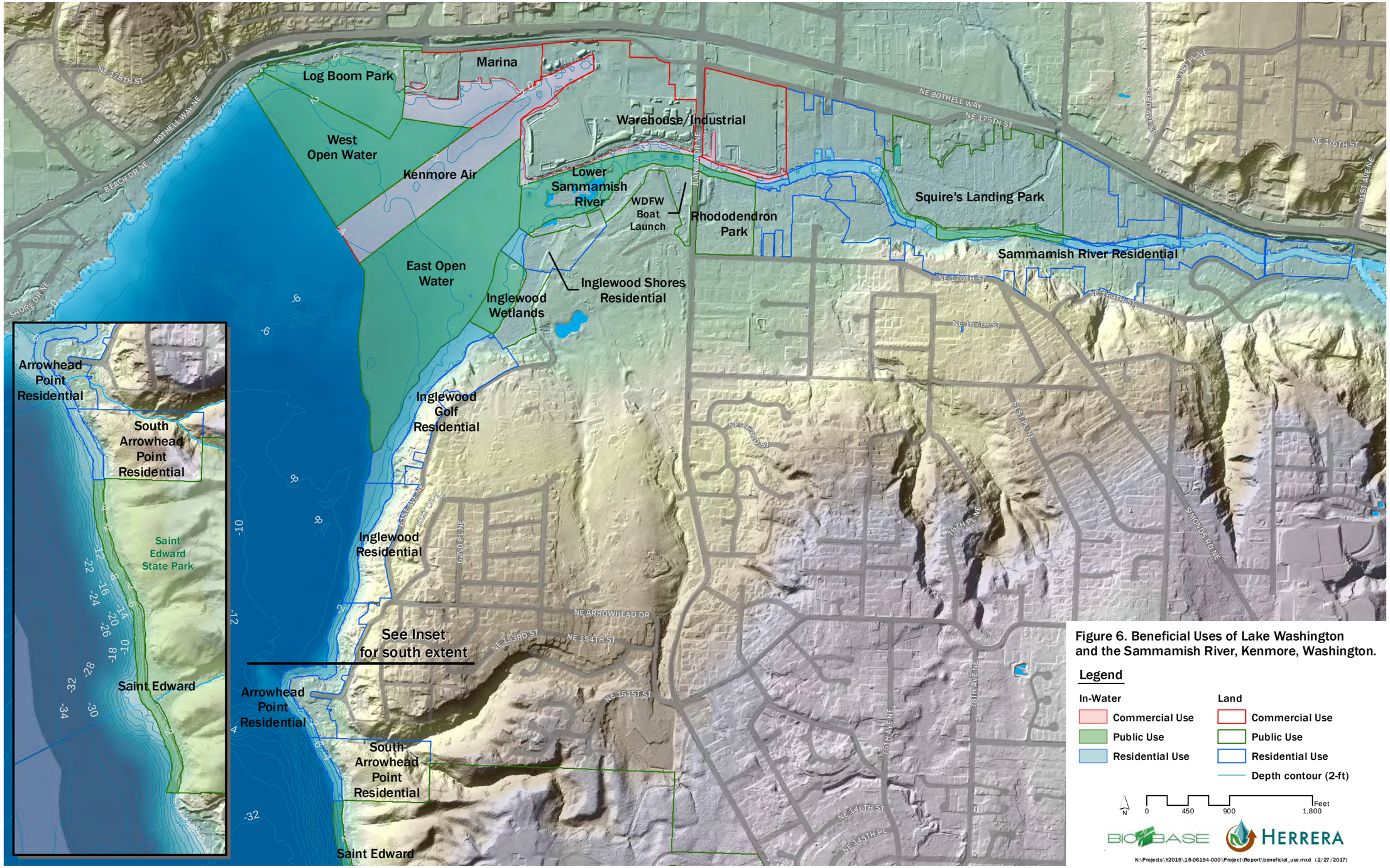


Figure 6. Beneficial Uses of Lake Washington and the Sammamish River, Kenmore, Washington.

Legend

In-Water	Land
Commercial Use	Commercial Use
Public Use	Public Use
Residential Use	Residential Use
	Depth contour (2-ft)

- Residential Use Areas:
  - South Arrowhead Point Residential
  - Arrowhead Point Residential
  - Inglewood Residential
  - Inglewood Golf Residential
  - Inglewood Shores Residential
  - Sammamish River Residential

AQUATIC PLANT COMMUNITY

The Washington State Department of Ecology (Ecology) has records of plant surveys on Lake Washington dating back to 1993 (Ecology 2015). Earlier aquatic plant surveys of Lake Washington were completed in 1979 and 1981 (Municipality of Metropolitan Seattle). A plant survey was conducted in October 2014 by the City of Kenmore and King County. Aquatic plant surveys of specific areas selected for herbicide treatment were performed in May and June 2016 by a contractor (Aquatechnex). Available historical survey maps are presented in Appendix B.

The most recent plant survey was conducted by Herrera on September 7 and 8, 2016, for this IAVMP. The plant distribution and density observed during this survey is described below, followed by a description of each target aquatic plant species.

2016 Plant Distribution and Density

Herrera conducted an aquatic vegetation survey of Lake Washington and the Sammamish River within the City of Kenmore on September 7 and 8, 2016 (Figure 1). The survey was conducted by two aquatic botanists (Rob Zisette and Julia Munger) using an inflatable boat and motor along transects spaced up to 120 feet apart. The river area was surveyed first, following one transect upriver along the south bank and then another transect downriver along the north bank, with occasional cross-river transects. The lake area south of the river was surveyed by following transects perpendicular to shore, and the remaining lake area was surveyed following parallel transects oriented in a northeast/southwest direction with additional transects located between docks.

Vegetation density and water depth data were collected along each transect using a Lowrance® HDS-7 underwater sonar and global positioning system (GPS), and data processing was provided by BioBase®. Vegetation density was calculated and interpolated between transects based on the relative proportion of plant biovolume in the water column. If there was little or no vegetation in a given location within the water column, the biovolume was recorded as a low density. If plants took up a large portion of the water column or came to the surface of the water, the biovolume was recorded as a high density.

An aquatic plant sampling rake was used to collect a total of 68 grab samples for identifying submersed plant species and estimating the percent abundance of each species in the samples. Dominant plant areas were delineated based on the sample results and visual observations where one or two species were present in higher densities than all other species, and thus determined to be dominant or co-dominant. In addition, the presence of emergent plant species was also noted with an emphasis on noxious weed species. Locations of plant species observations were recorded using separate GPS equipment.

Kenmore has a thriving community of native and non-native aquatic and shoreline plants. These plants can be divided into three general categories:

- Native – Beneficial
- Native – Nuisance
- Non-native – Noxious Weeds

The term "noxious weed" refers to those non-native plants that are legally defined by Washington's Noxious Weed Control Law (RCW 17.10) as highly destructive, competitive, or difficult to control once established. Noxious weeds have usually been introduced accidentally as a contaminant, or as ornamentals. Non-native plants often do not have natural controls (i.e., herbivores, pathogens) or strong competitors to control their numbers as they may have had in their home range. WAC 16.750 sets out three classes (A, B, and C) of noxious weeds based on their distribution in the state, each class having different control requirements. Class A weeds are required to be controlled. County Weed Boards are given some discretion as to setting control priorities for Class B and C weeds. The state also maintains a monitor list for certain plant species, which are weeds that are under consideration for noxious status.

The categorization of native plants is more subjective. Generally, native plants are considered beneficial because they often provide habitat and forage for animals, compete with non-native plants, and perform other ecological functions. Native plants become a nuisance when their growth is excessive and out of balance to the point of impacting the beneficial uses of the lake.

A total of 24 aquatic and emergent plant species were identified within the survey area (Table 2). Out of those species, 10 were classified as noxious weed species in Washington State. The remaining 14 plant species were common native species. No rare native species or non-native, non-invasive species were observed. The number and type of species observed represent a reasonably diverse aquatic plant community that is impacted by a relatively high number of invasive species.

Aquatic vegetation was the densest closest to the shoreline of the Sammamish River and Lake Washington (Figure 7). Vegetation density was low in the deep portions of the Sammamish River and eastern shoreline of the lake. There was also a large low density area near the center of the survey area, extending from the mouth of the Sammamish River toward the center of the lake. This low density area also extended to the northern-most tip of the lake, where Kenmore Air operates.

Table 2. Aquatic Plant List for the Kenmore Survey on September 7 and 8, 2016.

Plant Type	Common Name	Scientific Name	Status
Emergent Plants	Common cattail	*Typha latifolia*	Native
	Garden loosestrife	*Lysimachia vulgaris*	Noxious Weed – Class B
	Japanese knotweed	*Fallopia japonica*	Noxious Weed – Class B
	Narrow-leaf bur-reed	*Sparganium angustifolium*	Native
	Purple loosestrife	*Lythrum salicaria*	Noxious Weed – Class B
	Reed canarygrass	*Phalaris arundinacea*	Noxious Weed – Class C
	Spotted jewelweed	*Impatiens capensis*	Noxious Weed – Monitor List
	Yellow-flag iris	*Iris pseudacorus*	Noxious Weed – Class C
Floating Leaved Rooted Plants	Fragrant waterlily	*Nymphaea odorata*	Noxious Weed – Class C
	Grass-leaved pondweed	*Potamogeton gramineus*	Native
Free Floating Plants	Lesser duckweed	*Lemna minor*	Native
	Mexican water-fern	*Azolla mexicana*	Native
Submersed Plants	Brazilian egeria	*Egeria densa*	Noxious Weed – Class B
	Common waternymph	*Najas guadalupensis*	Native
	Common waterweed	*Elodea canadensis*	Native
	Coontail	*Ceratophyllum demersum*	Native
	Curly-leaf pondweed	*Potamogeton crispus*	Noxious Weed – Class C
	Eurasian watermilfoil	*Myriophyllum spicatum*	Noxious Weed – Class B
	Flat-stemmed pondweed	*Potamogeton zosteriformis*	Native
	Richardson's pondweed	*Potamogeton richardsonii*	Native
	Sago pondweed	*Potamogeton pectinatus*	Native
	Tapegrass	*Vallisneria americana*	Non-native
	White-stemmed pondweed	*Potamogeton praelongus*	Native
Plant-Like Algae	Nitella	*Nitella* sp.	Native

Dominant Plant Distribution

A total of 13 distinct dominant plant areas were mapped within the survey area, as shown in Figure 8. Dominant aquatic vegetation species include: Coontail (*Ceratophyllum demersum*), Eurasian watermilfoil (milfoil) (*Myriophyllum spicatum*), tapegrass (*Vallisneria americana*), white-stemmed pondweed (*Potamogeton praelongus*), Brazilian egeria (*Egeria densa*), flat-stemmed pondweed (*Potamogeton zosteriformis*), and common waterweed (*Elodea canadensis*).

Figure 8 also displays pie charts at the 68 sample locations exhibiting the relative percentages of three submersed vegetation categories: Eurasian watermilfoil, Brazilian egeria, and other species. Other submersed species include all native species and two non-native species, which includes tapegrass (*Vallisneria americana*) and one observation of curly-leaf pondweed (*Potamogeton crispus*). Because Eurasian watermilfoil, Brazilian egeria were found throughout the entire survey area, this figure conveys the areas in which these submersed noxious weeds are most prevalent.

The Sammamish River was dominated by the noxious weed Eurasian watermilfoil and the native plant coontail. Lake Washington was typically dominated by the non-native tapegrass in shallow areas and the native white-stemmed pondweed in deeper areas. Exceptions include co-dominance by Eurasian watermilfoil and tapegrass along the southernmost shoreline adjacent to Saint Edward State Park, co-dominance by Brazilian egeria and white-stemmed pondweed in the westernmost deep area of the lake, and co-dominance by flat-stemmed pondweed and common waterweed in the easternmost deep area of the lake.

Noxious Weed Species

A total of 10 of the observed species are on the Washington state noxious weed list (NWCB 2016) (see Table 2). In Washington State, weeds are designated as Class A, B, or C by the state's Noxious Weed Control Board (NWCB):

- Class A weeds are weeds that are not yet present in the state, or occur in only a few populations. These weeds usually occur in bordering states and present a risk for widespread infestation if they are not controlled. Class A weeds are required for control throughout the entire state.
- Class B weeds are widespread in some areas of the state but not others. The NWCB requires the control of Class B weeds in counties where a particular weed is not yet widespread.
- Class C weeds are widespread throughout the state. The NWCB does not require control for Class C weeds in any county.

Each county can choose to enforce the control of Class B or C weeds throughout the county or in particular locations if the NWCB has not already done so. In King County, Japanese knotweed and Brazilian egeria (both Class B) have been designated for required removal by the King County Noxious Weed Control Board in some areas of the county. However, these species are not required for control in Lake Washington or the Sammamish River. The state NWCB also has a state monitor list, which are not designated as Class A, B, or C. They are species that may be designated as A, B, or C weeds in the future.

There are no Class A noxious weeds on the site, but there are five Class B weeds, four Class C weeds, and one weed on the state monitor list. Two of the species, garden loosestrife (*Lysimachia vulgaris*) and purple loosestrife (*Lythrum salicaria*), are required for removal in King County (King County 2016).

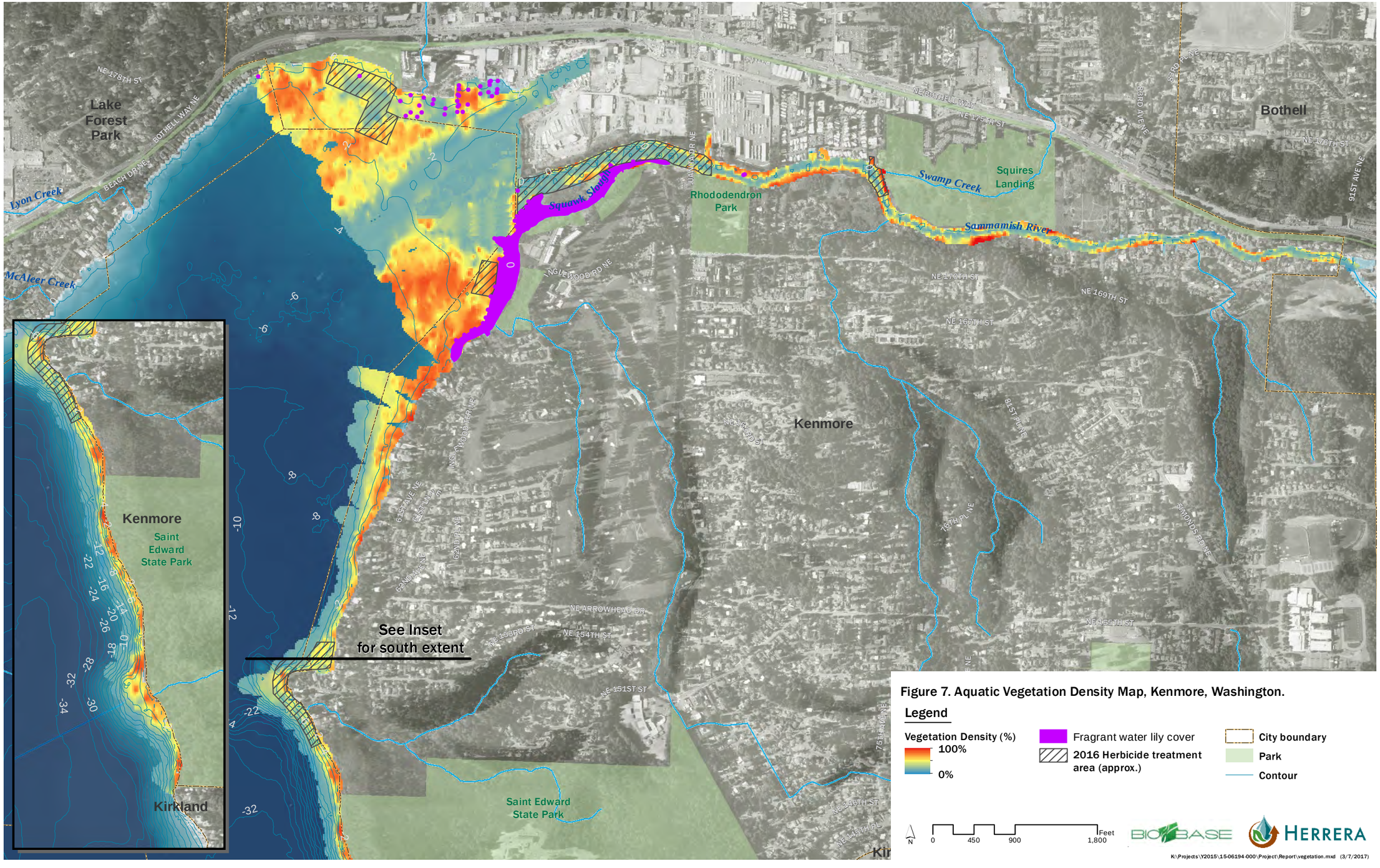


Figure 7. Aquatic Vegetation Density Map, Kenmore, Washington.

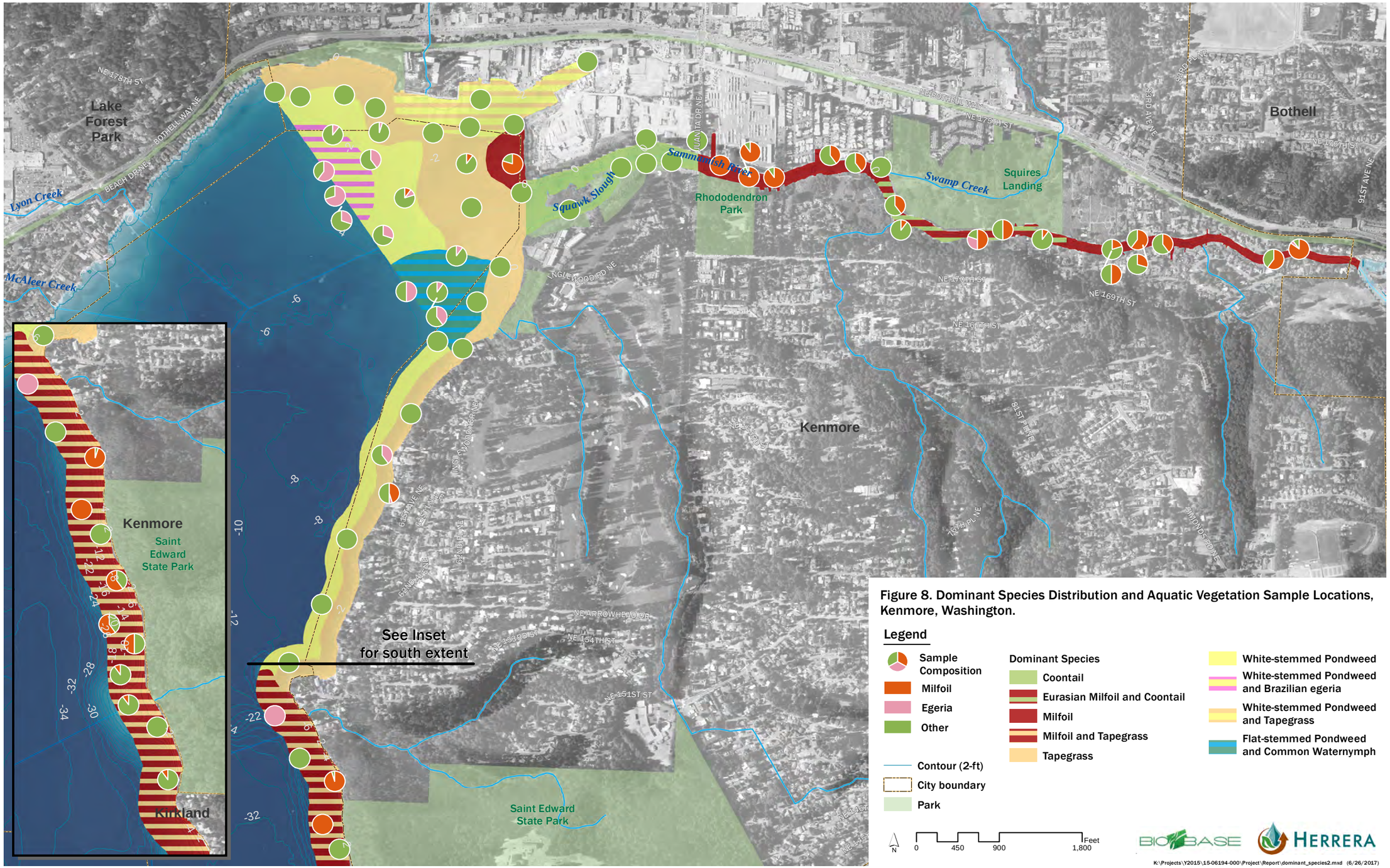


Figure 8. Dominant Species Distribution and Aquatic Vegetation Sample Locations, Kenmore, Washington.

Legend

- Sample Composition
  - Milfoil
  - Egeria
  - Other
- Contour (2-ft)
- City boundary
- Park

Dominant Species

- Coontail
- Eurasian Milfoil and Coontail
- Milfoil
- Milfoil and Tapegrass
- Tapegrass
- White-stemmed Pondweed
- White-stemmed Pondweed and Brazilian egeria
- White-stemmed Pondweed and Tapegrass
- Flat-stemmed Pondweed and Common Waternymph

N 0 450 900 1,800 Feet

BIOBASE HERRERA

K:\Projects\Y2015\15-06194-000\Project\Report\dominant_species2.mxd (6/26/2017)

Emergent Noxious Weeds

Six emergent noxious weed species were observed during the vegetation survey with locations shown in Figure 9. These species include garden loosestrife, purple loosestrife, Japanese knotweed (*Fallopia japonica*), yellow-flag iris (*Iris pseudacorus*), reed canarygrass (*Phalaris arundinacea*), and spotted jewelweed (*Impatiens capensis*). Only garden loosestrife and purple loosestrife are required for control in this part of King County. Although not mapped during the September 2016 survey, there exists a known infestation of the non-native genotype of common reed (*Phragmites australis)* along the south shore of the Sammamish River (B. Peterson, personal communication). This plant is a regulated (required for control) Class B noxious weed and is annually surveyed and controlled by the King County Noxious Weed Control Program.

Emergent noxious weed species were primarily found along the banks of the Sammamish River. The noxious weed cover was nearly 100 percent in undeveloped areas along the Sammamish River, especially upstream of the 68th Avenue Northeast Bridge. These noxious weeds occurred in front of developed properties as well, although with less abundance. Reed canarygrass was the dominant noxious weed species along the Sammamish River, although all of the species were observed in abundance.

All of the emergent noxious weed species (with the exception of Japanese knotweed) were also seen along the banks of Lake Washington, but with much less frequency. There was one observation each of yellow-flag iris and garden loosestrife, and two sightings of purple loosestrife. There were numerous small, infrequent patches of both spotted jewelweed and reed canarygrass on the lake shore.

Aquatic Noxious Weeds

Four aquatic noxious weeds were observed within the survey area: fragrant waterlily (*Nymphaea odorata*), which is a rooted floating-leaved plant; and Brazilian egeria (*Egeria densa*), curly-leaf pondweed (*Potamogeton crispus*), and Eurasian watermilfoil (*Myriophyllum spicatum*), all of which are submersed aquatic plants (see Figure 9). None of these species are required for control in this part of King County.

Eurasian watermilfoil was growing densely in the Sammamish River upstream of 68th Avenue Northeast. Eurasian water milfoil was the dominant or co-dominant species upstream of 68th Avenue Northeast, while Brazilian egeria was subdominant at one location upstream of Squire's Landing Park. There was no fragrant waterlily found upstream of the 68th Avenue Northeast Bridge, but it covered the entire shallow waters on the south bank of the river downstream of the 68th Avenue Northeast Bridge, completely overtaking a side channel at the outlet of the Sammamish River. No curly-leaf pondweed was found in the Sammamish River.

Within Lake Washington, most of the fragrant waterlily was confined to the northeastern shore, adjacent to the Sammamish River. There were other small patches throughout the lake, particularly near the marina docks at the north end of the lake. Curly-leaf pondweed was only found in one location near the northwestern portion of the lake survey area. Eurasian watermilfoil and Brazilian egeria were found throughout the lake survey area, although in varying densities. Eurasian watermilfoil was most dense in shallow areas and near the shore, while Brazilian egeria was most dense in deep areas and toward the middle of the survey area.

Between 6 and 10 weeks before the plant survey, aquatic noxious weeds were treated with herbicides at four locations within Lake Washington and the Sammamish River. Under contract with the City of Kenmore, a licensed aquatic herbicide applicator (Aquatechnex) surveyed the areas in May and early June 2016 to determine the appropriate treatment methods. The areas were treated with the systemic herbicide triclopyr on June 27, 2016, to control Eurasian watermilfoil, and then treated with the contact herbicide diquat on July 29, 2016, to control Brazilian egeria. Approximate locations of the treatment areas are shown in Figure 7. There was noticeably less Eurasian watermilfoil and Brazilian egeria in the two larger treatment areas located near Log Boom Park in Lake Washington and in the Sammamish River downstream of 68th Avenue. The two smaller treatment areas, located near Squire's Landing Park in the Sammamish River and the Inglewood Country Club in Lake Washington, did not appear to have less aquatic noxious weeds than adjacent areas. Pretreatment (May/June 2017) and post-treatment (September 2016) plant density maps are compared in Appendix B.

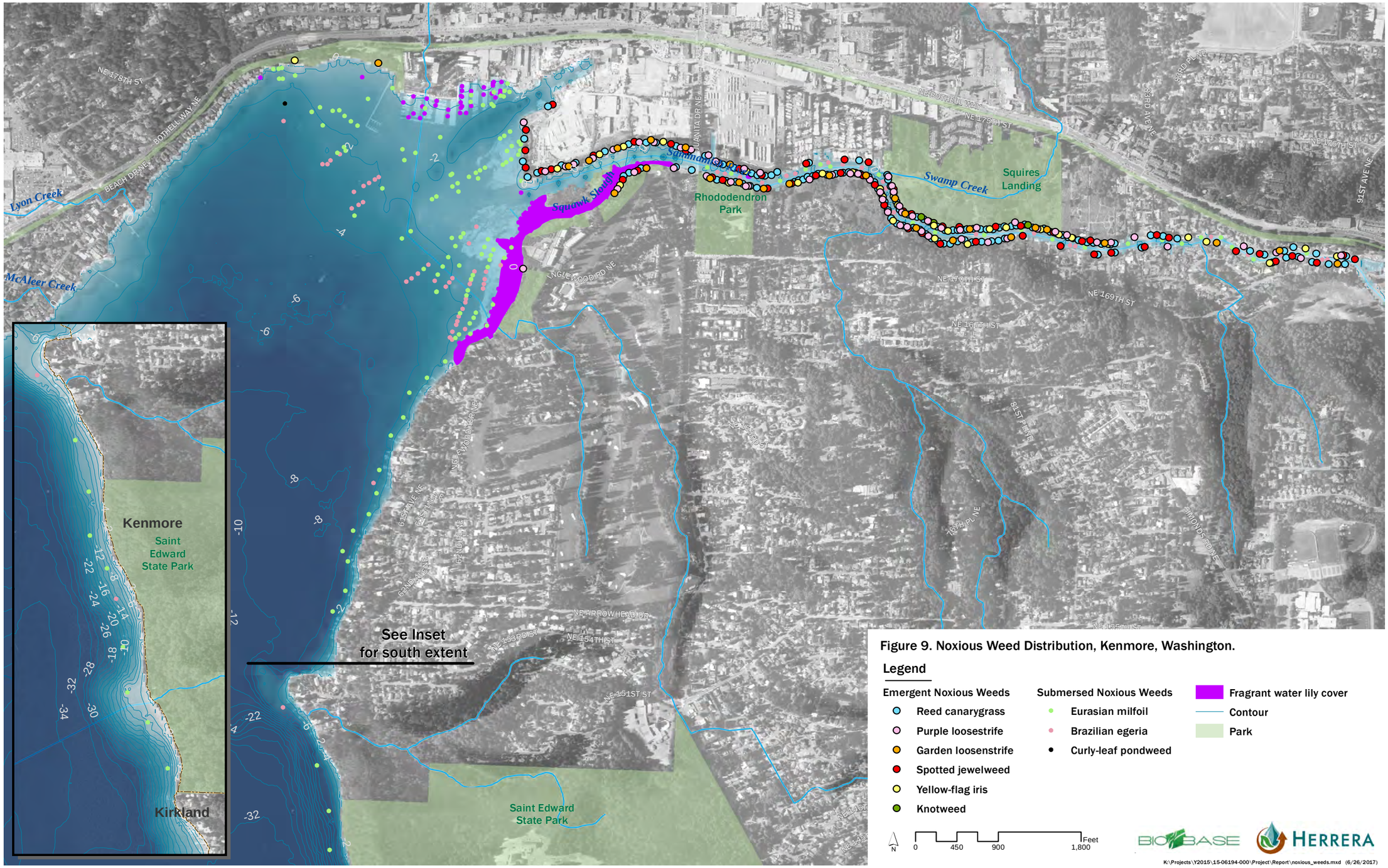


Figure 9. Noxious Weed Distribution, Kenmore, Washington.

Legend

Emergent Noxious Weeds
- Reed canarygrass
- Purple loosestrife
- Garden loosenstrife
- Spotted jewelweed
- Yellow-flag iris
- Knotweed

Submersed Noxious Weeds
- Eurasian milfoil
- Brazilian egeria
- Curly-leaf pondweed

- Fragrant water lily cover
- Contour
- Park

TARGETED PLANT DESCRIPTIONS

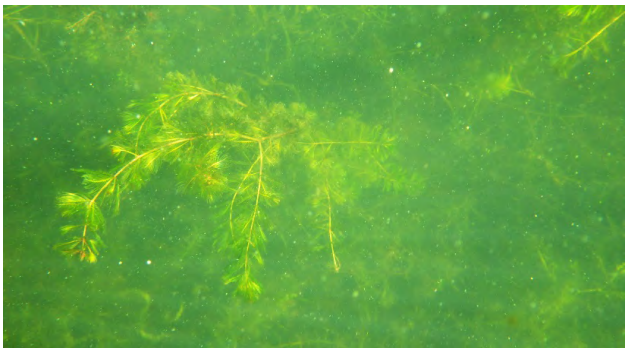
Several plants, including fragrant waterlily, Eurasian watermilfoil, Brazilian egeria, and purple and garden loosestrife, are targeted for control in the 2017 IAVMP. These plants are described below based on *An Aquatic Plant Identification Manual for Washington's Freshwater Plants* (Ecology 2001), where descriptions of other plants in Lake Washington and the Sammamish River may be found.

Fragrant waterlily is native to the eastern half of North America. It is a Class C noxious weed and it is not required for control in King County. It was most likely introduced into Washington during the Alaska Pacific Yukon Exposition in Seattle in the late 1800s. It has often been introduced to ponds and lakes because of its beautiful, large white or pink (occasionally light yellow), many-petaled flowers that float on the water's surface, surrounded by large, round green leaves. The leaves are attached to flexible underwater stalks rising from thick fleshy rhizomes. Adventitious roots attach the horizontal creeping and branching rhizomes.

Fragrant waterlily (*Nymphaea odorata*)

This aquatic perennial herb spreads aggressively, rooting in murky or silty sediments in water up to 10 feet deep. It prefers quiet waters such as ponds, lake margins and slow streams and will grow in a wide range of pH. Shallow lakes are particularly vulnerable to being totally covered by fragrant waterlilies. Fragrant waterlily spreads by seeds and by rhizome fragments. A planted rhizome will cover about a 15-foot-diameter circle in 5 years.

Eurasian watermilfoil is native to Eurasia and northern Africa, but it is a widespread invasive plant in North America. It is a Class B noxious weed, but it is not required for control in King County. This plant spreads rapidly and outcompetes many other native aquatic plant species. It can also be easily confused with native milfoils, and sometimes genetic testing is needed to identify milfoils to species. Eurasian watermilfoil is a submersed aquatic plant that spreads from plant fragments and rhizomes. The leaves are long and feather-like, and arranged in whorls of four around the stems, which are often reddish in



Eurasian watermilfoil (*Myriophyllum spicatum*)

color. Eurasian watermilfoil is found in rivers, lakes, and ponds, and tolerates a wide variety of water quality conditions.

Brazilian egeria (*Egeria densa*)

Brazilian egeria is a submersed aquatic plant. It is native to South America, but it is a widespread invasive plant in North America. It is a Class B noxious weed, but it is not required for control in Lake Washington or the Sammamish River in King County. It is commonly sold as an aquarium plant in other parts of the US, but it is illegal to sell in the state of Washington. This plant spreads rapidly and outcompetes many other native aquatic plant species. The leaves are clumped densely in whorls of four to six in the upper part of the plant, and more spread apart in whorls of three near the base of the plant. The plant primarily reproduces from stem fragments.

Purple loosestrife (*Lythrum salicaria L.*) is a Class B noxious weed that is on the quarantine list and is required to be controlled by Washington State.

Purple loosestrife (*Lythrum salicaria*)

Purple loosestrife is an emergent aquatic plant that usually grows on moist or saturated soils. A mature, well-established plant often grows up to 10 feet tall and 5 feet wide. Each plant can contain 30 to 50 herbaceous stems that rise from a common rootstock. The purple-magenta colored, five- to six-petaled flowers grow on long spikes. Purple loosestrife seed production depends on plant age, size, and vigor. A 4-to 5-year-old plant with 30 stems reportedly produces an estimated 2,700,000 seeds. Seed maintains viability of over 80 percent for at least 3 years.

Purple loosestrife is native to Eurasia and was first discovered in the Puget Sound region in 1929. Impacts on native vegetation have been dramatic. It is a vigorous competitor and can crowd other vegetation including native species. In a short period of time it will completely dominate a site. Impacts on wildlife have not been well studied; however, purple loosestrife appears to reduce waterfowl and aquatic mammal activity.

Garden loosestrife (*Lysimachia vulgaris*)

Garden loosestrife is an emergent aquatic plant that usually grows on moist or saturated soils. It is classified as a Class B noxious weed, and it is required for control in King County. The plant may grow up to over 4 feet tall. The leaves are arranged irregularly, in whorls, alternately, or oppositely on the stem. The five-petaled flowers grow on long spikes, and are bright yellow with orange centers. The plant propagates with seeds as while as rhizomes.

Garden loosestrife is native to Eurasia, and has been introduced to North America. It is found in marshes, and along the shorelines of lakes, ponds, and occasionally streams.

PAST MANAGEMENT EFFORTS

Aquatic herbicide treatments in Lake Washington have been permitted through the Washington State Department of Ecology's permit program since 2008 (Ecology 2017b). Only five documented treatments of aquatic plants in the lake are listed (Table 3). Additional permitted treatments have been performed, including those in the project area in 2016.

Table 3. Summary of Permitted Aquatic Herbicide Use for Lake Washington.

Year	Target Plant	Chemical Used	Amount[a]	Permit Number
2008	Eurasian watermilfoil, Brazilian egeria	Diquat dibromide	20 gal.	WAG994118
2010	Eurasian watermilfoil, Brazilian egeria	Diquat dibromide	6 gal.	WAG994118
2011	Eurasian watermilfoil	Diquat dibromide	18.65 lbs.	WAG994118
2013	Fragrant waterlily	Glyphosate	1.35 lbs.	WAG994118
2013	Eurasian watermilfoil, pondweeds	Diquat dibromide	22.38 lbs.	WAG994118

[a] Application area is not recorded (Ecology 2015).

Between 6 and 10 weeks before the 2016 plant survey, aquatic noxious weeds were treated with herbicides at five locations within Lake Washington and the Sammamish River (see Section 7.1.2.2). Under contract with the City of Kenmore, a licensed aquatic herbicide applicator (Aquatechnex) surveyed four of the areas in May and June 2016 to determine the appropriate treatment methods. The areas were treated with the systemic herbicide triclopyr on June 27, 2016, to control Eurasian watermilfoil, and then treated with the contact herbicide diquat on July 29, 2016, to control Brazilian egeria. Approximate locations of the treatment areas are shown in Figure 9. There was noticeably less Eurasian watermilfoil and Brazilian egeria in the two larger treatment areas located near Log Boom Park in Lake Washington and in the Sammamish River downstream of 68th Avenue compared to surrounding areas. The two smaller treatment areas, located near Squire's Landing Park in the Sammamish River and the Inglewood Country Club in Lake Washington, did not appear to have less aquatic noxious weeds than adjacent areas. Pretreatment (May/June 2017) and post-treatment (September 2016) plant density maps are compared in Appendix B.

Under separate contract with lake residents, the licensed aquatic herbicide applicator (Aquatechnex) also treated a fifth area located offshore of Arrowhead Point (see Figure 9). Pretreatment survey data were not provided for comparison to post-treatment survey data.

AQUATIC PLANT CONTROL ALTERNATIVES

There are many methods used to control aquatic weeds. The methods chosen for aquatic plant control vary depending upon several factors, including: the species of aquatic plants targeted; whether the control goal is management or eradication; the cost of a method and availability of funds; the impacts to water quality and habitat; the safety and feasibility of a method; and support from lake residents. Control methods considered for Kenmore included:

- Chemical treatments
- Manual control methods
- Mechanical control methods
- Diver dredging
- Bottom screening
- No action

Table 4 provides a summary of each method considered, its advantages and disadvantages, and suitability for Kenmore. Full descriptions of each method, as well as advantages and disadvantages, permits, costs, and suitability for Kenmore, are summarized in Appendix C. Much of the information in Appendix C is taken directly from Ecology (1994), or from Ecology's Aquatic Plant Management website (Ecology 2016). Some of the information obtained from Ecology (1994, 2016) for Appendix C is outdated, and Ecology is in the process of updating website information. In addition, Appendix D provides information prepared by King County on best management practices for each target species.

It should also be noted that in the future there may be additional herbicides approved for use in Washington State, and other management strategies and tools may become available. The City of Kenmore intends to leave open the possibility of examining and utilizing these in the future.

Table 4. Aquatic Plant Control Options Considered for Kenmore.

Category	Method	Description	Advantages	Disadvantages	Target Plants
None	No Action	Nothing is done to control plant growth.	• No costs incurred	• No control achieved	
Chemical Methods	Aquatic herbicide	Chemicals are applied directly to plants or the lake to inhibit or restrict plant growth.	• Cost effective • High level of control	• Ecological impact concerns • Off target damage to native plants	• All plants
Manual Methods	Hand-pulling	Plants are removed by pulling out by hand.	• No equipment cost	• Small infestation eradications only	• Emergent
	Raking	Plants are raked from the shore or dock using a rake attached to a rope.	• Low equipment cost	• Small control areas only • High root regrowth	• Submersed
	Cutting	Plants are cut from the shore or dock using a specialized tool.	• Low equipment cost	• Small control areas only • Regrowth and drift • Safety issues	• All plants
Mechanical Methods	Mechanical harvesters	Plants are cut and collected using a large barge-mounted machine with conveyor.	• Collects fragments	• Fragment drift • Depth limitations • Dock obstructions	• Submersed, floating
	Mechanical weed cutters	Plants are cut several feet beneath the water surface using a hand-held machine or boat without collection conveyor.	• Low cost	• Plant collection/drift • Depth limitations • Dock obstructions	• submersed
	Rotovators	Plants are uprooted using a rototiller-like machine.	• Affects roots	• Plant collection/drift • Depth limitations • Dock obstructions • Water quality impacts	• All plants
Dredging Methods	Mechanical dredging	Sediment and plant material from the lake bottom is removed using barge-mounted suction equipment.	• Deepens lake • Removed nutrients and seeds	• Very high cost • Sediment disposal • Permitting	• All plants
	Diver dredging	SCUBA divers use a hose attached to a dredge to suck plants from the sediment underwater.	• Removes roots • Moderate infestation eradication	• High cost • Water quality impacts	• Submersed
Biological Methods	Milfoil weevil	Milfoil weevils are introduced to milfoil.	• Low cost	• Low control • Lack of availability in WA State • Milfoil only	• Milfoil
Other Methods	Bottom screening	A gas-permeable barrier is installed on the lake bottom that compresses existing aquatic plants while blocking light to prevent further plant growth.	• Effective for rooted plants in small areas around docks	• Moderate cost • Remove in 2 years unless 100 percent biodegradable, including weights to keep in place	• All plants

INTEGRATED AQUATIC PLANT CONTROL SCENARIOS

The aquatic plant management goal for our project area in Lake Washington and the Sammamish River is to use an integrated approach to control nuisance aquatic vegetation to a low enough level to not impact recreation or wildlife. While it is often the goal of IAVMPs to eradicate invasive species and cease herbicide treatments--allowing the native plant community to self-manage--that is not the intent of this plan. Widespread eradication of these plant species are especially difficult due to inputs from upstream, and eradication could detrimentally affect water quality, destabilize river banks, and create space for infiltration by more invasive species. Further, eradication of these species requires a high level of effort and expense to achieve and maintain because they are such widespread and prolific plants.

After consideration of many aquatic plant control methods, the City of Kenmore, with input from the steering committee, determined that a combination of herbicides, mechanical harvesting, and manual removal were best suited for the project area. A maximum control area for each beneficial use area was considered (Table 5; Figure 10). A high level of control would target nearly 100 percent of those areas using herbicides and mechanical methods.

To assess the potential costs of controlling all of these areas with herbicide and mechanical harvesters, the total area was multiplied by unit costs of the two different treatments (Table 6). This comparison shows that control of all areas would be expensive at approximately $150,000/year for herbicide treatment and $300,000/year for mechanical harvesting, and submersed plants would be the most expensive type of plant to control.

Table 5. Maximum Plant Management Areas.

Area	Total Area (acres)	Submersed Cover (acres)	Floating Cover (acres)	Emergent Cover (miles)
Public				
Saint Edward	6.6	8.8	0.0	0.0
Inglewood Wetlands	5.9	2.3	3.6	0.1
East Open Water	65.2	40.6	0.2	0.0
West Open Water	36.5	31.0	0.0	0.0
Log Boom Park	16.4	16.6	0.0	0.1
Lower Sammamish River	1.4	2.4	5.6	0.1
Rhododendron Park	1.0	0.7	0.0	0.1
Squire's Landing Park	4.6	3.0	0.0	0.5
Commercial				
Kenmore Air	28.3	2.0	0.0	0.0
Marina	9.8	6.4	0.3	0.0
Warehouse/Industrial	6.0	3.9	0.0	0.5
Residential				
South Arrowhead Point Residential	1.9	2.5	0.0	0.0
Arrowhead point Residential	5.4	7.0	0.0	0.0
Inglewood Residential	5.3	0.0	1.2	0.0
Inglewood Golf Residential	10.2	8.9	1.2	0.0
Inglewood Shores Residential	1.4	0.0	1.2	0.0
Sammamish River Residential	14.2	10.5	0.0	1.1

Table 6. Maximum Plant Control Cover and Control Cost.

	Submersed Plants	Floating-Leaved Plants	Emergent Plants
Public Area (acres/miles)	105.3	9.5	0.9
Commercial Area (acres/miles)	30.7	3.9	0.5
Residential Area (acres/miles)	28.9	3.6	1.1
Total Area (acres/miles)	164.9	17.0	2.4
Annual Herbicide Treatment Cost[a]	$148,397	$5,111	$730
Annual Mechanical Harvesting Cost[b]	$263,817	$27,258	$0

[a] Herbicide treatment cost based on $900/acre for one diquat and one triclopyr treatment of submersed plants, $300/acre for one glyphosate treatment of floating-leaved plants, and $300/mile for one glyphosate treatment of emergent plants.

[b] Mechanical harvesting costs are based on $1,600 for two harvests of submersed or floating leaved plants, and do not include disposal costs. Emergent plants would be removed by hand by volunteers at no cost.

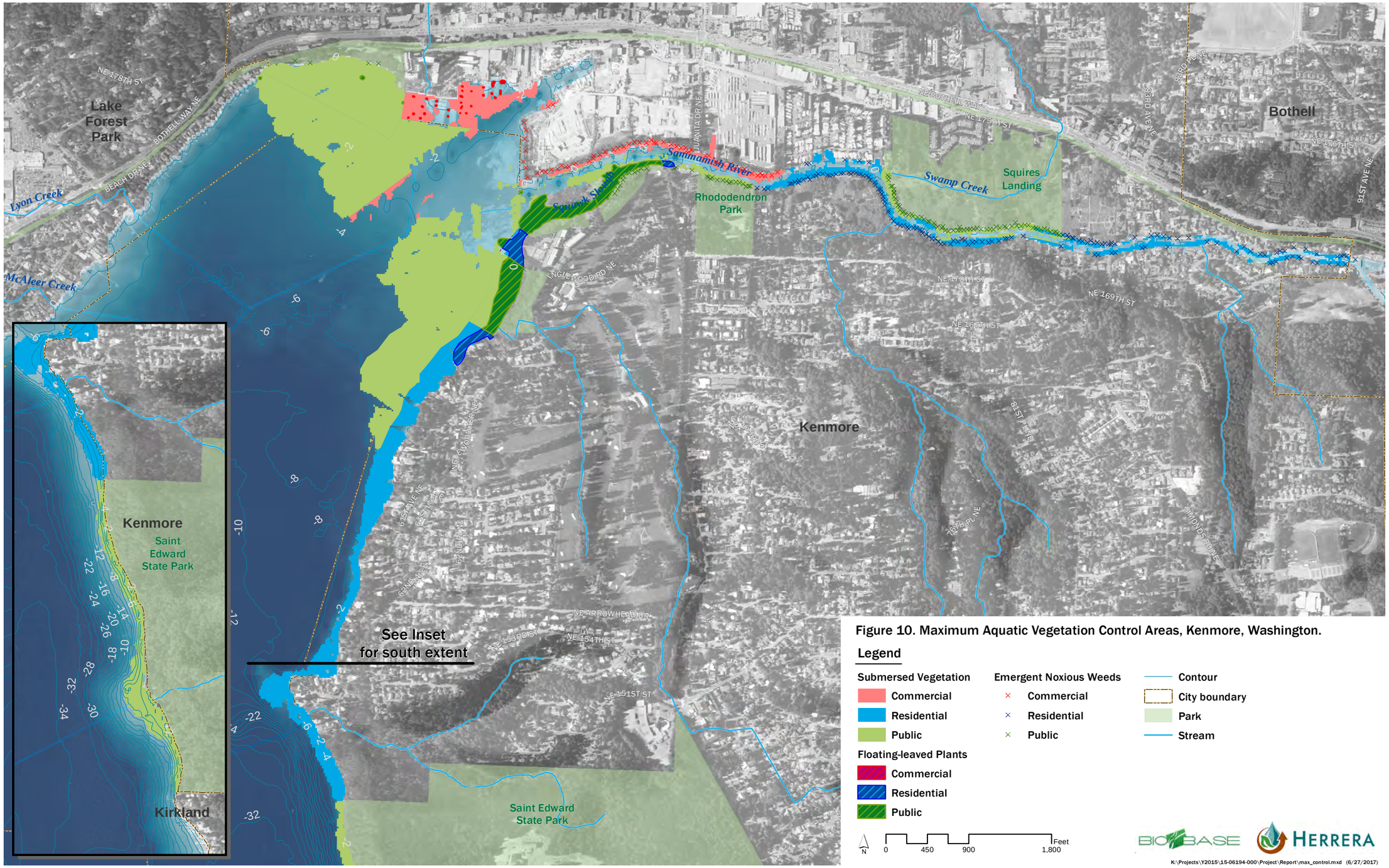


Figure 10. Maximum Aquatic Vegetation Control Areas, Kenmore, Washington.

Legend

Submersed Vegetation
- Commercial
- Residential
- Public

Floating-leaved Plants
- Commercial
- Residential
- Public

Emergent Noxious Weeds
- Commercial
- Residential
- Public

- Contour
- City boundary
- Park
- Stream

HERBICIDE

Four primary herbicides were considered for use in this plan: glyphosate, triclopyr, imazapyr, and diquat (described below). Glyphosate can be used to treat fragrant waterlily, as well as emergent species, including purple and garden loosestrife (Table 7). Triclopyr can be used for submersed Eurasian watermilfoil and emergent species. King County has found that imazapyr works better than glyphosate or triclopyr for controlling garden loosestrife (B. Peterson, personal communication). Diquat will be used for control of submersed plants such as Brazilian egeria (recognizing that treatment of nuisance native plants is not eligible for funding under Ecology guidelines). Glyphosate was selected for control of fragrant waterlily because it has been effectively used in Lake Washington and many other lakes in the region. Triclopyr and diquat were selected because they can effectively control submersed aquatic plants. The dead plants are left to decay and are not removed for any type of treatment.

Table 7. Herbicide Targets, Restrictions, and Cost.

Herbicide	Target Plants	Use Restrictions	Approximate Cost/Acre
Glyphosate	Fragrant waterlily Emergent noxious weeds	None	$350
Triclopyr	Eurasian watermilfoil Emergent noxious weeds	12-hour swimming advisory (water application only)	$700
Imazapyr	Emergent noxious weeds	None	$700
Diquat	Brazilian egeria and most other submersed aquatic plants	24-hour swimming advisory	$500

All four herbicides are approved for aquatic use in Washington State based on environmental impact studies. As a result of these studies, there are many other herbicides allowed by the US Environmental Protection Agency (US EPA), but prohibited for use in Washington State. Full precautions will be taken during applications in Kenmore to ensure that herbicide levels do not exceed the amounts at which these hazards arise by not exceeding amounts specified by US EPA on the product label. Permit applicants should take care to observe all fish timing windows and permit conditions, including notifications and public notices.

Both glyphosate and diquat are relatively inexpensive with application costs around $350 and $500 per acre, respectively. (Terry McNabb, Aquatechnex, personal communication, October 2016). Triclopyr and imazapyr are slightly more expensive, at application around $700 per acre. These estimated per acre costs include two treatments performed a few weeks apart.

Glyphosate – (trade names for aquatic products with glyphosate as the active ingredient include Rodeo®, AquaMaster®, and AquaPro®). This systemic broad-spectrum herbicide is used to control floating-leaved plants like waterlilies and shoreline plants like purple loosestrife. It is generally applied as a liquid to the leaves. Glyphosate does not work on submersed plants. Although glyphosate is a broad spectrum, non-selective herbicide, a good applicator can somewhat selectively remove targeted plants by focusing the spray only on the plants to be

removed. Plants can take several weeks to die and a repeat application is often necessary to remove plants that were missed during the first application. The slow decay of waterlily roots (rhizomes) in large treated areas may result in floating root mats that impact recreation or require costly mechanical removal to prevent recreational impacts. Floating root mat control is not addressed in this IAVMP because large waterlily treatment areas are not anticipated for the project site.

Triclopyr – (trade name Renovate3®). There are two formulations of triclopyr. It is the triethylamine salt (TEA) formation of triclopyr that is registered for use in aquatic or riparian environments. Triclopyr, applied as a liquid or in granular form, is a relatively fast-acting, systemic, selective herbicide. In Washington, it is most commonly used for used for the control of Eurasian watermilfoil. Triclopyr is very useful for purple loosestrife control since native grasses and sedges are unaffected by this herbicide. When applied directly to water, Ecology has imposed a 12 hour swimming advisory to minimize eye irritation. Triclopyr received its aquatic registration from EPA in 2003 and was allowed for use in Washington in 2004.

Imazapyr – (Trade name Habitat®). This systemic broad spectrum, slow-acting herbicide, applied as a liquid, is used to control emergent plants like spartina, reed canarygrass, and phragmites and floating-leaved plants like water lilies. Imazapyr does not work on underwater plants such as Eurasian watermilfoil. Although imazapyr is a broad spectrum, non-selective herbicide, a good applicator can somewhat selectively remove targeted plants by focusing the spray only on the plants to be removed. Imazapyr was allowed for use in Washington in 2004.

Diquat – (trade names for aquatic products with diquat as the active ingredient include Reward®). Diquat is a fast-acting non-selective contact herbicide that destroys the vegetative part (e.g., leaves) of the plant but does not kill the roots. It is applied as a liquid. Typically, diquat is used primarily for short term (one season) control of a variety of submersed aquatic plants. It is very fast-acting and is suitable for spot treatment. However, turbid water or dense algal blooms can interfere with its effectiveness. Ecology has imposed a 24 hour swimming advisory for the treated area.

Mechanical Harvesting

Mechanical harvesting was identified as a suitable control method for Kenmore because it is relatively cost effective, chemical-free, and can treat large public areas while collecting plant fragments.

Mechanical harvesters are large machines, which both cut and collect aquatic plants. Cut plants are removed from the water by a conveyor belt system and stored on the harvester until disposal. A barge may be stationed near the harvesting site for temporary plant storage or the harvester carries the cut weeds to shore. The shore station equipment is usually a shore conveyor that mates to the harvester and lifts the cut plants into a dump truck. Harvested weeds are disposed of in landfills, used as compost, or in reclaiming spent gravel pits or similar sites. Ecology does not recommend harvesting milfoil or egeria because it can create plant fragments

that help spread these invasive plants. However, fragment spread is less of a concern for this project area because these invasive plants are well established and widespread. Also, milfoil naturally produces large numbers of autofragments throughout the summer that have a higher carbohydrate content and are therefore much more viable than fragments cut by a harvester (Cooke et al 2005). Thus, milfoil fragments generated by harvesting may be less problematic than naturally produced autofragments and harvesting may reduce the parent stock producing autofragments.

Mechanical harvesting is ideally suited for large areas that are free from most obstacles such as docks. The harvesters are also difficult to maneuver in shallow water. The cost of using a mechanical harvester is about $1,600 per acre for two harvests/year (not including disposal).

Manual Raking

A third consideration for plant control in Kenmore is the use of publicly-available and inexpensive tools, such as hand-held rakes, for residents to use on their own waterfront properties. This is a preferred method for Kenmore. With this chemical-free method, small infestations of noxious weeds or nuisance native plants near docks can be controlled as needed.

Raking requires a sturdy rake for removing aquatic plants. Attaching a rope to the rake allows removal of a greater area of weeds. Raking literally tears plants from the sediment, breaking some plants off and removing some roots as well. Specially designed aquatic plant rakes are available. Rakes can be equipped with floats to allow easier plant and fragment collection. The operator should pull towards the shore because a substantial amount of plant material can be collected in a short distance. Ecology does not recommend manual raking of milfoil or Egeria because it can create plant fragments that help spread these invasive plants. As noted for mechanical harvesting, fragment spread is less of a concern for this project area because these invasive plants are well established and widespread, and raking of milfoil may reduce the parent stock producing autofragments.

Bottom Barriers

A final method of preferred plant control for Kenmore is the use of bottom barriers around docks and swim areas. Bottom screens can be installed by the homeowner or by a commercial plant control specialist. Installation is easier in winter or early spring when plants have died back. In summer, cutting or hand pulling the plants first will facilitate bottom screen installation. Bottom barriers are an excellent choice for small areas of control. The Washington Department of Fish and Wildlife requires barriers to be removed after a 2-year period unless the bottom barrier, including the weights to hold it in place, is made entirely of biodegradable material.

Plant Conservation

Kenmore desires to preserve some of the existing nuisance vegetation. This is in part to reduce costs, but more importantly to preserve fish habitat, protect water quality, prevent river bank erosion, and meet Ecology's permit standards. The steering committee identified conservation areas near the Inglewood wetlands where recreational activities are not impacted and no nuisance submersed or floating-leaved plants will be removed unless they further encroach upon the navigation channels. Emergent noxious weeds requiring control (garden and purple loosetrife) will continue to be controlled in conservation areas. Conservation areas are essential to the preservation of wildlife habitat, natural vegetation, and should be maintained as such to meet compliance with applicable federal, state, and local regulations.

Future Considerations

As noted in Aquatic Plant Control Alternatives, the City of Kenmore recognizes that best practices in the management of aquatic weeds are continually evolving. There may be additional herbicides approved for use in Washington State in the future, and other management strategies and tools may become available. The City of Kenmore intends to leave open the possibility of examining and utilizing any or all of these in the future.

SELECTED ACTION STRATEGY AND IMPLEMENTATION

ACTION STRATEGY

After assessing the control scenarios, the Steering Committee prioritized a maintenance level of control for the target plants that meets IAVMP goals using an integrated approach. To achieve these goals, the following priority areas were determined:

Lake Washington

- Log Boom Park Swimming and Boating
- Residential Area Swimming and Boating
- Marina Boating
- Kenmore Air Docking

Sammamish River

- Public and Residential Area Boating (including the WDFW boat launch and the river channel from the boat launch to the lake)
- Rhododendron Park
- Squire's Landing Park
- Class B Weed Control

The following plant management strategies were assessed to determine if they could meet the goals of the IAVMP:

- Herbicide treatment of invasive non-native submersed plants, nuisance native submersed plants, fragrant waterlily, and emergent loosestrife species in some or all areas.
- Harvesting submersed plants in some or all areas.
- Bottom barriers in dock and swim areas.
- Hand-pulling and raking by residents.
- No control of submersed plants or fragrant waterlily in Inglewood wetlands and other conservation areas unless there is further encroachment into navigation channels.

IMPLEMENTATION

The Development Services Department at the City of Kenmore is responsible for oversight of proposed development and permitting throughout the City of Kenmore. This includes regulating activities along the shoreline to ensure implementation of the Shoreline Management Act of 1971 (Washington State Legislature 2017), which recognizes that "the shorelines of the state are among the most valuable and fragile of its natural resources" and provides guidelines for permitted uses "designed and conducted in a manner to minimize, insofar as practical, any resultant damage to the ecology and environment of the shoreline area and any interference with the public's use of the water" (RCW 90.58.020). In addition, unless eligible for a Shoreline Substantial Development Permit (SSDP) exemption, permit requesters must complete a SEPA Environmental Checklist to determine whether the environmental impacts of any management efforts are significant. If a Shoreline Exemption is sought in lieu of a Shoreline Substantial Development Permit, applicants are responsible for demonstrating compliance with exemption criteria. Development Services will review all permits submitted to the City of Kenmore for compliance with the Shoreline Management Act of 1971 and the State Environmental Policy Act (SEPA). Fees for permits or exemptions issued by the City of Kenmore are based on the Fee Resolution in effect at the time of application. In general, work performed within the scope of this IAVMP will qualify for a Shoreline Exemption rather than a Shoreline Substantial Development Permit.

Because there are multiple jurisdictions and agencies concerned with Lake Washington and the Sammamish River, additional permits may be required by others. To determine what specific permits are required, anyone desiring to implement any of the strategies contained in this Plan should complete a Project Questionnaire at the Governor's Office for Regulatory Innovation and Assistance website (<www.oria.wa.gov>). The completed questionnaire generates a list of permits required for the project under consideration. Required permits are summarized in Table 8 for each plant management strategy. See Appendix C for additional permit information.

Table 8. Required Permits.

Method	Shoreline Permit Exemption from City of Kenmore	Aquatic Plant and Algae Management Permits from Ecology	Hydraulic Project Approval (HPA) Permit from WDFW
Herbicide	Exemption required	General permit required for all plants (Ecology 2017b), and noxious weed permit required for emergent noxious weeds (Ecology 2017c)	HPA not required
Mechanical Harvesting	Exemption required	Not required	HPA required for native plants, see pamphlet for noxious weeds (WDFW 2015)
Manual Raking/Pulling	Exemption required	Not required	See pamphlet for noxious weeds or native plants (WDFW 2015)
Bottom Barrier	Exemption required	Not required	See pamphlet for noxious weeds or native plants (WDFW 2015)

For projects implemented by the City of Kenmore, the City regularly will evaluate the management of aquatic weeds and the effectiveness of plant management strategies employed to date. The City will hire contractors to do work in public areas, such as large herbicide treatments and/or harvesting. The City will provide education and training to encourage residents to combine efforts in residential and commercial areas to manually remove aquatic plants or contract for herbicide treatment of noxious weeds.

The City also recommends that waterfront residents consider the formation of a Plant Management Association. This type of volunteer organization, formed by, run by, and for the benefit of, waterfront residents could provide an opportunity for residents to pool their resources and/or work in tandem with one another to employ approved management strategies such as jointly contracting with an herbicide application company or harvester, manual removal of plants, installation of bottom barriers, and other management strategies outlined in this plan.

Successful implementation of this plan revolves around a collective sharing of information. The City of Kenmore will work to solicit public input, and keep residents and businesses informed of current and future plant management strategies. As noted earlier, the City of Kenmore has published a webpage with useful links for permit and other information (<http://www.kenmorewa.gov/IAVMP>).

In addition, the City of Kenmore will continue to reach out to upstream jurisdictions to orchestrate joint plant management strategies. Conversations with upstream jurisdictions to date have garnered interest in continuing to stay in communication about the management of aquatic weeds in north Lake Washington and the Sammamish River as a whole.

MONITORING AND EVALUATION PLAN

Several different plant control-related monitoring and evaluation needs are identified for the City of Kenmore, including: aquatic plant surveys and evaluation of aquatic plant management activities. These evaluation activities are described below.

AQUATIC PLANT SURVEYS

Ongoing surveys and mapping will be necessary to evaluate the effectiveness of treatment strategies, to inform future treatments, and to detect new infestations of invasive plants. In response to the planned treatments, the aquatic plant community in the City of Kenmore may be in flux. It is critical that frequent and thorough surveys be conducted to document these changes and to detect new problems.

Subject to funding availability, a GPS/GIS survey and mapping effort may be performed by a contractor as a regular component of the long-term surveillance and management program. This survey effort will identify all plant species present in the lake and river and their relative abundance at each location. The survey map will include past management areas for comparison to plant densities observed in previous surveys and assessment of management effectiveness. These plant surveys will also help provide guidance for aquatic plant management in future years.

EVALUATION

Also subject to funding and staffing resources, a complete evaluation including a plant management report may be completed as needed. This report would describe which elements of the management plan have been implemented, relate the existing plant community to established goals, and make recommendations for the next year's activities.

This evaluation should begin with a description of which elements of the plan have been fully implemented, those that have not, and why. It should also include a summary of the plant survey results, both those obtained by volunteers and those by professionals. The evaluations should also provide a map of all management areas for each year. The survey results should be used to determine whether goals have been met. The community should also be asked for input on their satisfaction with aquatic plant and water body conditions. It is possible that the IAVMP goals will be met but that some people will remain dissatisfied.

Although it is unlikely that the needs of all stakeholders will be met (and it is possible that the IAVMP goals will be met but that some people will remain dissatisfied), an effort should be made to track concerns, especially if they are widespread. This information should be used to decide on the following:

- Has there been a quantifiable increase or decrease in the amount of nuisance plants in the lake?
- Have any other noxious aquatic plants been identified?
- Has there been a change in the occurrence and frequency of algae?
- What control methods work best and should other control methods (newly approved herbicides, for example) be considered?
- Is it necessary to revise the plan?
- Is funding adequate for the control measures in place?

Over the long term, adequate evaluations can make the difference between project success and failure, and the City of Kenmore will regularly monitor and evaluate the effectiveness of the various management strategies that have been employed. In addition, as noted earlier, potential new herbicides, management strategies, and tools will be considered as they become available.

REFERENCES

Carlson, R.E. 1977 A Trophic State Index for Lakes. Limnology and Oceanography, 3. 22, 361.

Cooke, G.D., E.B. Welch, S.A. Peterson, and S.A. Nichols. 2005. Restoration and Management of Lakes and Reservoirs. 3rd ed. Taylor and Francis Group, Boca Raton, Florida.

Ecology. 1994. A Citizen's Manual for Developing Integrated Aquatic Vegetation Management Plans. First edition. Washington State Department of Ecology, Water Quality Financial Assistance Program, Olympia, Washington. January. <https://fortress.wa.gov/ecy/publications/publications/93093.pdf>.

Ecology. 2001. An Aquatic Plant Identification Manual for Washington's Freshwater Plants. Publication Number 01-10-032. Washington State Department of Ecology, Olympia, Washington. June.

Ecology. 2015. Washington State Lakes Environmental Data. Washington State Department of Ecology, Olympia, Washington. <https://fortress.wa.gov/ecy/coastalatlas/tools/LakeDetail.aspx>.

Ecology. 2016. Aquatic Plant Management. Washington State Department of Ecology, Olympia, Washington. <http://www.ecy.wa.gov/programs/wq/plants/management/index.html>

Ecology. 2017a. Native Freshwater Plants, Aquatic Plants and Lakes. Washington State Department of Ecology, Olympia, Washington. <http://www.ecy.wa.gov/programs/wq/plants/native/lakes.html>.

Ecology. 2017b. Aquatic Plant and Algae Management General Permit. Washington State Department of Ecology, Olympia, Washington. <http://www.ecy.wa.gov/programs/wq/pesticides/final_pesticide_permits/aquatic_plants/aquatic_plant_permit_index.html>.

Ecology. 2017c. Aquatic Noxious Weed Control NPDES General Permit. Washington State Department of Ecology, Olympia, Washington. <http://www.ecy.wa.gov/programs/wq/pesticides/final_pesticide_permits/noxious/noxious_index.html>.

Goodpasture, et al. 1979. Municipality of Metropolitan Seattle – Water Quality Division. Aquatic Plants in Selected Waters of King County. Distribution and Community Composition of Macrophytes.

Kerwin, John. 2001. Salmon and Steelhead Habitat Limiting Factors Report for the Cedar-Sammamish Basin. Washington Conservation Commission. September.

King County. 2010. Lake Washington History and Data. King County Lake Stewardship. <http://www.kingcounty.gov/environment/waterandland/lakes/lakes-of-king-county/lake-washington.aspx>.

King County. 2016. King County Noxious Weed List. Updated October 3. <http://www.kingcounty.gov/environment/animalsAndPlants/noxious-weeds/laws/list.aspx>.

King County. 2017a. Lake Washington Monitoring Overview. King County Water and Land Services. <http://green2.kingcounty.gov/lakes/LakeWashington.aspx>.

King County. 2017b. King County Water Quality Monitoring. <http://green2.kingcounty.gov/streamsdata/watershedinfo.aspx?Locator=0450>.

NWCB. 2016. 2016 Washington State Noxious Weed List. Washington State Noxious Weed Control Board. <http://www.nwcb.wa.gov/>.

Olden and Tomayo. 2014. Incentivizing the Public to Support Invasive Species Management: Eurasian Milfoil Reduces Lakefront Property Values. PLoS ONE 9(10): e110458. doi:10.1371/journal.pone.0110458. <http://journals.plos.org/plosone/article?id=10.1371/journal.pone.0110458>.

Patmont, et al. 1981. Municipality of Metropolitan Seattle- Water Quality Division. Aquatic Plants in Selected Waters of King County. Distribution and Community Composition of Macrophytes.

Washington State Legislature. 2017. Chapter 90.58 RCW, Shoreline Management Act of 1971. Washington State Legislature, Olympia, Washington. <http://app.leg.wa.gov/RCW/default.aspx?cite=90.58>.

WDFW. 2015. Aquatic Plants and Fish, Rules for Aquatic Plant Removal and Control. Washington State Department of Fish and Wildlife, Olympia, Washington. Second Edition, July.

APPENDIX A

Kenmore Steering Committee and Public Meeting Presentations and Minutes

Kenmore IAVMP Steering Committee:

Jennifer Gordon, Public Works Operations Manager, City of Kenmore
Quinn Proffitt, Maintenance Work, City of Kenmore
Lizbeth Seebacher, Wetland and Aquatic Biologist, Washington State Dept. of Ecology
Ben Peterson, Noxious Weed Specialist II, King County
Casey Costello, Habitat Biologist, Dept. of Fish and Wildlife
Todd Banks, President, Kenmore Air
Jim Davidson, Owner, North Lake Marina in Kenmore
Doug Ritchie, Vice President, Kenmore Waterfront Activities Center
Douglas Poppe, Officer, Puget Sound Anglers Association
Greg Matz, Superintendent, Inglewood Golf Course and County Club
John Adamski, President, Arrowhead Point Community Waterfront Corporation
Matt Muller, Waterfront Property Owner

Facilitators:

Janet Quinn, Project Coordinator, City of Kenmore
Rob Zisette, Herrera Environmental Consultants

City of Kenmore

City of Kenmore Integrated Aquatic Vegetation Management Plan (IAVMP)

Steering Committee Meeting #1

Facilitated by:

Janet Quinn, Project Coordinator, City of Kenmore

Rob Zisette, Aquatic Scientist, Herrera Environmental Consultants, Inc.

October 28, 2016

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Agenda

- Introductions (10 min.)
- IAVMP Document Overview (5 min.)
- Plant survey maps and interpretation (25 min.)
- Discuss plant problems (35 min.)
- Break (10 min.)
- Develop problem statement (15 min.)
- Identify interested groups and compile a list of contacts for the public meeting (10 min.)
- Project schedule and set dates for Public Meeting and 3rd Steering Committee Meeting (10 min.)
- Identify beneficial use areas (if time permits)
- Develop plant management goals (if time permits)

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Steering Committee

- Jennifer Gordon, Public Works Operations Manager, City of Kenmore
- Quinn Proffitt, Maintenance Work, City of Kenmore
- Lizbeth Seebacher, Wetland and Aquatic Biologist, Washington State Dept. of Ecology
- Ben Peterson, Noxious Weed Specialist II, King County
- Casey Costello, Habitat Biologist, Dept. of Fish and Wildlife
- Todd Banks, President, Kenmore Air
- Jim Davidson, Owner, North Lake Marina in Kenmore
- Doug Ritchie, Vice President, Kenmore Waterfront Activities Center
- Douglas Poppe, Officer, Puget Sound Anglers Association
- Greg Matz, Superintendent, Inglewood Golf Course and County Club
- John Adamski, President, Arrowhead Point Community Waterfront Corporation
- Matt Muller, Waterfront Property Owner

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IAVMP Citizen's Manual*

- Living Document: Be flexible and allow for changes in:
  - Aquatic plant problems
  - Water use priorities
  - Land uses
  - Plant control technologies
  - Government policies and regulations
- Long term venture
- There is no "magic bullet"
- Desired outcome/costs/environmental concerns

*From "A Citizen's Manual for Developing Integrated Aquatic Vegetation Management Plans"

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IAVMP Chapters*

- **Problem Statement**
- Past Management Efforts
- **Management Goals**
- Lake and Watershed Characteristics
- **Beneficial Use Areas**
- **Aquatic Plant Characteristics**
- Aquatic Plant Control Alternatives & Level of Intensity
- Integrated Aquatic Plant Control Scenarios
- Selected Action Strategy
- Public Involvement
- Monitoring and Evaluation Plan
- References

* Based on minimum standards specified in Aquatic Weeds Management Fund Guidelines

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Historical Plant Surveys

King County - 1979 and 1981

City of Kenmore

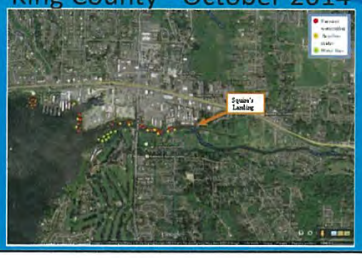
Historical Plant Surveys

BioSonics - 2001

City of Kenmore

Historical Plant Surveys

King County - October 2014



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Historical Plant Surveys

AquaTechnex - May 2016

City of Kenmore

- IAVMP Survey September 7-8, 2016
- Sonar transects ≤ 120 ft spacing
- Species composition samples at 68 locations

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Plant List

Table 3. Aquatic Plant List for the Kenmore Survey on September 7 and 8, 2016.

Plant Type	Common Name	Scientific Name	Status
Emergent Plants	Common cattail	Typha latifolia	Native
	Garden loosestrife	Lysimachia vulgaris	Noxious Weed- Class B
	Japanese knotweed	Fallopia japonica	Noxious Weed- Class B
	Narrow-leaf bur-reed	Sparganium angustifolium	Native
	Purple loosestrife	Lythrum salicaria	Noxious Weed- Class B
	Reed canarygrass	Phalaris arundinacea	Noxious Weed- Class C
	Spotted jewelweed	Impatiens capensis	Noxious Weed- Monitor List
	Yellow-flag iris	Iris pseudacorus	Noxious Weed- Class C
Floating Leaved Rooted Plants	Fragrant waterlily	Nymphaea odorata	Noxious Weed- Class C
	Grass-leaved pondweed	Potamogeton gramineus	Native
Free Floating Plants	Lesser duckweed	Lemna minor	Native
	Mexican water-fern	Azolla mexicana	Native
	Brazilian elodea	Egeria densa	Noxious Weed- Class B
Submersed Plants	Common waterweed	Najas guadalupensis	Native
	Common waterweed	Elodea canadensis	Native
	Coontail	Ceratophyllum demersum	Native
	Curly-leaf pondweed	Potamogeton crispus	Noxious Weed- Class C
	Eurasian watermilfoil	Myriophyllum spicatum	Noxious Weed- Class B
	Flat-stemmed pondweed	Potamogeton zosteriformis	Native
	Richardson's pondweed	Potamogeton richardsonii	Native
	Sago pondweed	Potamogeton pectinatus	Native
	Tapegrass	Vallisneria americana	Native
	White-stemmed pondweed	Potamogeton praelongus	Native
Plant-like algae	Nitella	Nitella sp.	Native

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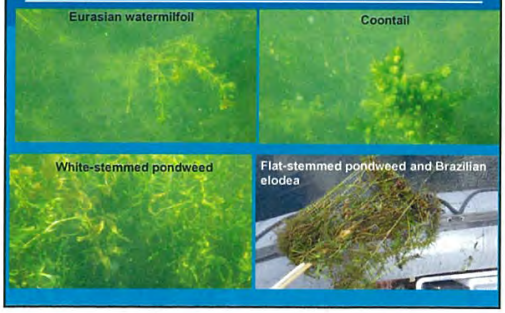
Example Plant Photographs



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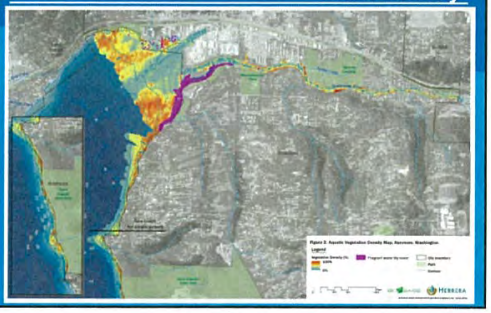
Plant Density



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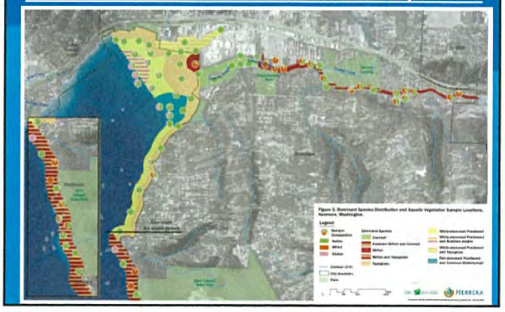
Dominant Species



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Noxious Weeds

City of Kenmore

Defining the Problem(s)

Questions to consider:

- Who uses the water and how and where is it used?
- Who is missing from this discussion and how do they use the water?
- What important water body uses are being limited because of aquatic plants?
- Native vs. non-native species: Do differences matter?

Steps:

- List problems
- Group problems into categories
- Condense main categories into problem statement

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Example Problem Statement

- Dense growth of aquatic plants interferes with recreational and business uses in some areas of the Sammamish River and Lake Washington in the City of Kenmore during the summer. Although some areas are impacted by native plants, recreational uses are primarily impacted by the invasive, non-native noxious weeds Eurasian watermilfoil and Brazilian elodea. Primary impacts of concern include ....

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Public Meeting Contacts

- Federal agencies
- State agencies
- King County
- Cities of Bothell, Woodinville, Redmond, other
- Native American Tribes
- Environmental groups
- Fishing and special user groups
- Water-related businesses
- Landowner
- Other interested parties

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Project Schedule

Activity	Date
Steering committee meeting #1 on plant survey, inter-pretive report and problem(s)	October 28, 2016
Steering committee meeting #2 on management goals, beneficial use areas, control methods, integrated control scenarios, and action strategy	December 16, 2016
Public meeting #1 all elements of draft IAVMP	**January 2017**
Draft IAVMP to Ecology	February 28, 2017
Steering committee meeting #3 on draft IAVMP comments	**April 2017**
Final IAVMP	June 30, 2017

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Beneficial Use Areas

- Recreational Use
  - Boating
  - Fishing
  - Swimming
  - Aesthetic and wildlife observation
- Commercial Use
  - Marinas
  - Kenmore Air
  - Water supply
- Wildlife Use
  - Waterfowl
  - Aquatic mammals
  - Fish and other aquatic organisms

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Plant Management Goals

- Control versus Eradication
  - Eurasian watermilfoil
  - Brazilian elodea
  - Fragrant waterlily
  - Other noxious weeds
  - Native plants
- Control areas
- Control period and frequency
- Conservation areas
- Use of chemicals
- Cost and funding

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Aquatic Weeds Steering Committee Meeting

10-28-16

Attendees: Rob Zisette, Herrera Environmental Consultants; Doug Ritchie, Kenmore Waterfront Activities Center; Matt Muller, Waterfront Property Owner; Casey Costello, Dept. of Fish and Wildlife; Greg Matz, Inglewood Golf Club; Liz Seebacher, Dept. of Ecology; Jim Davidson, North Lake Marina; Quinn Proffitt, City of Kenmore; Todd Banks, Kenmore Air; Ben Peterson, King County; John Adamski, Waterfront Property Owner, Doug Poppe, Puget Sound Anglers Association; Rob Karlinsey, City of Kenmore; Janet Quinn, City of Kenmore. Unable to attend: Jennifer Gordon, City of Kenmore

Mission of the committee is to share observations/knowledge of aquatic weeds in the project area, develop the problem statement, and provide guiding input into the Integrated Aquatic Vegetation Management Plan.

Rob Zisette of Herrera presented survey results and maps of aquatic plants in the Sammamish River and Lake Washington within Kenmore city limits. Milfoil invaded the lake in the 1960's. John Adamski has seen an acceleration of milfoil over the past several decades and he observed that the survey of weeds prior to AquaTechnex's herbicide application in June and July 2016 showed a higher density of invasive plants. John recommended that the density and location of plants from this earlier survey should also be included as an addition to the Herrera report. The navigation channel is relatively free of noxious weeds, as are the areas that are in the path of barges. The U.S. Army Corps of Engineers last dredged the navigation channel in 1997. Plant growth has accelerated since then, from Todd's observations. Barges disturb the plants and create unsuitable habitat for them, although milfoil can endure more disturbance than other species because of its extensive root system and sturdy stems.

As of this date, elodea is completely gone where it was treated, and milfoil died back but is beginning to reappear. Curly-leaf pondweed was present in Arrowhead Cove before the 2016 treatment. Filamentous algae smells bad and is a significant problem. The abundance of filamentous algae and toxic blue-green algae has increased in recent years, and was worse in 2014 and 2015 than in 2016.

Rob Z. of Herrera has a lot of experience with aquatic weed management and IAVMPs, and he'll be assisting Kenmore with the development of our Plan. We'll want to reach out to Tribes to gain their perspective on a Management Plan as well.

Problems created by the presence of aquatic weeds and identified by the group:

- Inhibits swimming and other recreational use
- Inhibits commercial use by breaking cables on planes, making it difficult to steer
- Transference to other waters when plants adhere to planes or boats that then go to another water body
- Weed debris fouls beaches – negatively impacting property values
- Reduces navigable areas and condenses water traffic into smaller areas
- Native plants are choked out by noxious weeds
- Impacts aesthetics – turns water brown and murky
- Impacts fish habitat and fish physical and chemical environment – creates migration barrier, dissolved oxygen goes down, water temperature rises
- Weeds promote habitat for non-native fish species that prey on salmon and other natural species
- Toxic algae – be sure we don't create an environment for it through the treatment we choose
- Potential impact to public and private property through flooding and erosion

We grouped the problems into three categories: Environmental, Recreational, and Economic.

Environmental problems:

- Fish Habitat
- Algae
- Native Biodiversity
- Potential flooding/erosion
- Water Quality

Recreational problems:

- Inhibits swimming and watercraft
- Fishing
- Toxic Algae
- Aesthetics
    - Plant accumulation and decay
    - Aroma
    - Water clarity
- Shoreline access
- Irrigation considerations

Economic problems:

- Impact on planes, boats and other watercraft
- Property value impact
- Cost to control/remove
    - Define time frame of problem—when are aquatic weeds a problem (i.e., what seasons)
- Perceived quality of life
- Reduction of navigable waterways

Rob Z. and Janet will work together to write a problem statement to send out to the group for thoughts.

Send Janet contact info for people/groups you think should be invited to the public meeting. She will send out an electronic meeting request for the January public meeting – first choice Tuesday, second choice Wednesday (not great but workable), Thursday out for at least one party.

Next steering committee meeting is Friday, December 16th.

Thanks for participating!

City of Kenmore, Washington — Aquatic Weeds Steering

Kenmore City Hall — Friday, Octob 28th 2016 — 11:30 a.m. - 1:30pm

	NAME	NAME OF BUSINESS OR COMPANY	ADDRESS
1	JOHN ADAMSKI	RETIRED	5906 NE ARROWHEAD DR KENMORE, WA
2.	Casey Costello	WDFW	1775 12th Ave Issaquah, WA
3.	Todd Banks	Kenmore Air	6321 NE 175th Kenmore, WA
4.	Greg Matz	Inglewood Golf Club	6505 Inglewood Rd NE Kenmore, WA 98028
5.	Ben Peterson	King County Noxious Weed Control Program	201 S. Jackson St. #60 Seattle, WA 98104
6.	Jim DAVIDSON	North Lake MARINA	6201 NE 175th ST Kenmore 98028
7.	Doug Poppe	EAST SIDE PSA	13448 NE 83rd Redmond WA
8.	DOUG RITCHIE	KENMORE CANOE + KAYAK TEAM	1037 NE 65th #352 SEATTLE WA 98115
9.	Quinn Proffitt	City of Kenmore	18120 68th Ave NE Kenmore WA 98028

10/28/16

City of Kenmore, Washington — Aquatic Weeds Steering

Kenmore City Hall — Friday, Octob
11:30 a.m. -

	NAME	NAME OF BUSINESS OR COMPANY	ADDRESS
10.	Rob Zisette	Herrera	rzisette@herrerainc.com
11.	Janet Quinn	City of Kenmore	
12.	MATT MULLER	REDBACK CONSULTING	
13.	Lizbeth Seebach	DOE	
14.	RY Karlinsey	City of Kenmore	

City of Kenmore

City of Kenmore Integrated Aquatic Vegetation Management Plan (IAVMP)

Steering Committee Meeting #2

Facilitated by:

Janet Quinn, Project Coordinator, City of Kenmore

Rob Zisette, Aquatic Scientist, Herrera Environmental Consultants, Inc.

December 16, 2016

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Agenda

- Review IAVMP Chapters (1 min.)
- Review Identified Problems (5 min.)
- Updates on park improvements (5 min.)
- Review plant maps (5 min.)
- Discuss plant management goals (15 min.)
  - City Manager identified priorities
- Overview of plant management methods (How) (20 min.)
- Identify beneficial use areas (Where) (20 min.)
- Discuss management strategies (Prioritize) (30 min.)
- Discuss level of intensity – balancing desired outcomes, costs, environmental concerns (15 min.)

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IAVMP Chapters*

- Problem Statement
- Past Management Efforts
- **Management Goals**
- Lake and Watershed Characteristics
- **Beneficial Use Areas**
- Aquatic Plant Characteristics
- **Aquatic Plant Control Alternatives & Level of Intensity**
- Integrated Aquatic Plant Control Scenarios
- Selected Action Strategy
- Public Involvement
- Monitoring and Evaluation Plan
- References

* Based on minimum standards specified in Aquatic Weeds Management Fund Guidelines

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Identified Problems

Environmental:
- Negative impact on fish habitat
- Impact on native biodiversity
- Increased levels of algae
- Water quality concerns:
  - Low dissolved oxygen
  - High temperatures

Recreational:
- Inhibit swimming & paddle sports
- Weeds wound around boat motors
- Weeds tangled in fishing lines
- Non-native weeds promote habitat for non-native fish species
- Health risks of toxic blue-green algae
- Aesthetical impact
  - Plant accumulation and decay
  - Foul aroma
  - Water clarity issues
- Shoreline access
- Irrigation challenges
  - Reduction of water circulation
  - Clogged intake lines
  - Damaged pumps
  - Contaminated water

Economic:
- Reduction of navigable waterways
  - Forces lake traffic into narrow lanes
  - Increases potential for conflict between boats and swimmers
- Reduction of water depth
  - Impacts access to moorage sites
- Costly repairs to damaged boat propellers and plane rudders
- Perceived quality of life
- Lower waterfront property values*
- Cost to manage/control/eradicate

*http://www.ecy.wa.gov/programs/wq/plants/management/aquaticinfo/eichhornia.html

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Log Boom Park Improvements

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Rhododendron Park Improvements

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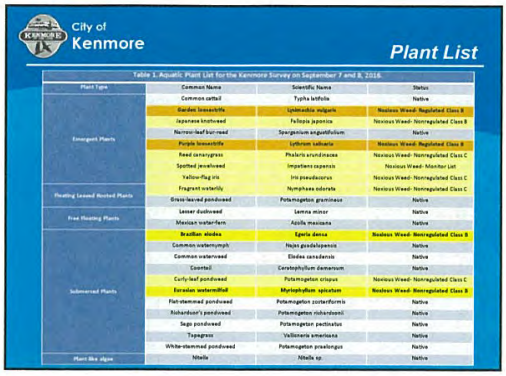
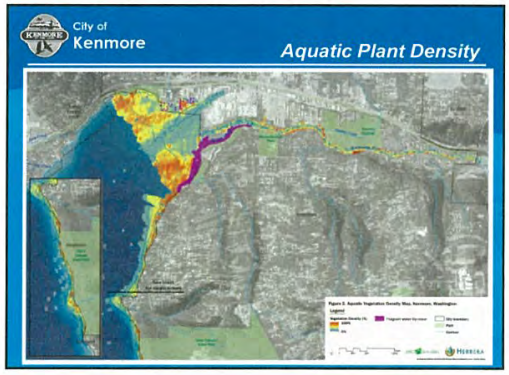
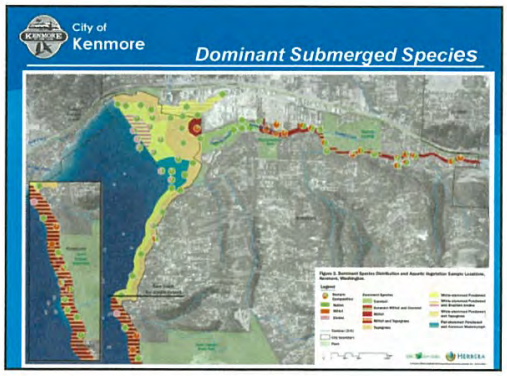
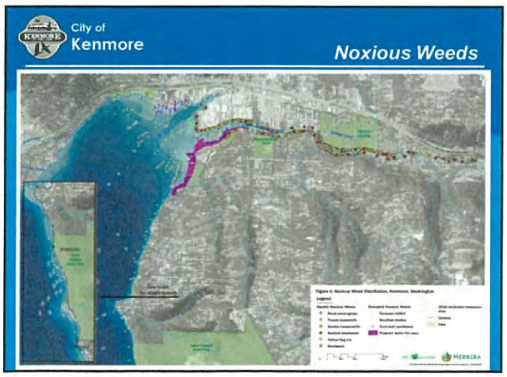


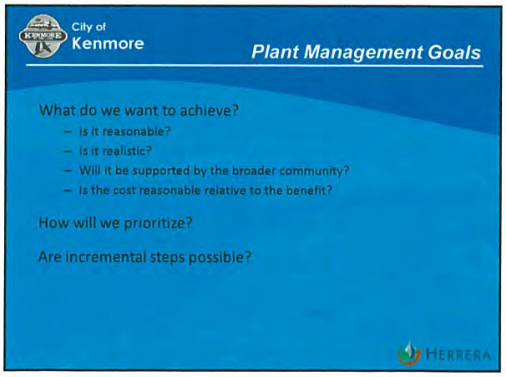
Table 1. Aquatic Plant List for the Kenmore Survey on September 7 and 8, 2016.

Plant Type	Common Name	Scientific Name	Status
Emergent Plants	Common cattail	Typha latifolia	Native
	Garden loosestrife	Lysimachia vulgaris	Noxious Weed- Regulated Class B
	Japanese knotweed	Fallopia japonica	Noxious Weed- Nonregulated Class B
	Narrow-leaf bur-reed	Sparganium angustifolium	Native
	Purple loosestrife	Lythrum salicaria	Noxious Weed- Regulated Class B
	Reed canarygrass	Phalaris arundinacea	Noxious Weed- Nonregulated Class C
	Spotted jewelweed	Impatiens capensis	Noxious Weed- Monitor List
	Yellow-flag iris	Iris pseudacorus	Noxious Weed- Nonregulated Class C
	Fragrant waterlily	Nymphaea odorata	Noxious Weed- Nonregulated Class C
Floating Leaved Rooted Plants	Grass-leaved pondweed	Potamogeton gramineus	Native
Free Floating Plants	Lesser duckweed	Lemna minor	Native
	Mexican waterfern	Azolla mexicana	Native
Submerged Plants	Brazilian elodea	Egeria densa	Noxious Weed- Nonregulated Class B
	Common waterwyrmyh	Hippi pseudolepanis	Native
	Common waterweed	Elodea canadensis	Native
	Coontail	Ceratophyllum demersum	Native
	Curly-leaf pondweed	Potamogeton crispus	Noxious Weed- Nonregulated Class C
	Eurasian watermilfoil	Myriophyllum spicatum	Noxious Weed- Nonregulated Class B
	Flat-stemmed pondweed	Potamogeton zosterformis	Native
	Robbinsion's pondweed	Potamogeton robbinsonii	Native
	Sago pondweed	Potamogeton pectinatus	Native
	Tapegrass	Vallisneria americana	Native
	White-stemmed pondweed	Potamogeton praelongus	Native
Plant like algae	Nitella	Nitella sp.	Native









City of Kenmore

City Priorities

- Reduce impact on boating (hand-powered watercraft and motor boats)
  - Clear, clean water
  - No weeds catching on paddles, rudders, propellers
- Provide clear, clean water for swimmers
  - No weeds in beach areas
  - No decomposed weeds on beaches
- Maintain healthy environment for fish
  - Maintain appropriate water temperature

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Plant Management Strategies - Parameters

- Species control or eradication
  - Eurasian watermilfoil
  - Brazilian elodea
  - Fragrant waterlily
  - Emergent noxious weeds
  - Native plants
- Control area priorities
  - Submersed/floating/emergent
  - Public/residential/commercial
- Control intensity
- Conservation areas
- Use of chemicals
- Cost and funding

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Plant Management Methods

- Chemical herbicides
- Manual methods
- Mechanical methods
- Dredging methods
- Biological methods
- Other methods

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Chemical Methods

Method	Advantages	Disadvantages	Kenmore Potential
Aquatic Herbicides	• Cost effective • High level of control	• Ecological impact concerns	Yes-all plants

Method	Type (~Cost/Acre)	Target Plants	Kenmore Applicable
Fluridone	• Systemic, selective, liquid or granular ($1,000)	• Submerged (milfoil and elodea)	Yes-Milfoil and Elodea
2,4-D	• Systemic, selective, liquid only ($500)	• Submerged (milfoil)	No-Milfoil
Triclopyr-TEA	• Systemic, selective, liquid or granular ($700)	• Submerged (milfoil) • Emergent (loosestrife)	Yes-Milfoil Yes-Loosestrife
Diquat	• Contact, nonselective, liquid only ($350)	• Submerged (all plants)	Yes-Elodea and natives
Endothall	• Contact, nonselective, liquid only ($700)	• Submerged (all plants)	No-all plants
Imazapyr	• Systemic, nonselective, liquid only ($700)	• Floating-leaved (lily/others) • Emergent (loosestrife/others)	Possible Possible
Glyphosate	• Systemic, nonselective, liquid only ($350)	• Floating-leaved (lily) • Emergent (loosestrife/others)	Yes-Lily Yes-Loosestrife

City of Kenmore

Manual Methods

Method	Advantages	Disadvantages	Kenmore Potential
Hand-pulling	• Small infestation eradication	• Small control areas • Root removal difficult	Yes-emergent
Raking	• Low equipment cost • Easy of use	• Small control areas • High root regrowth	Yes-submersed
Cutting	• Low equipment cost	• Small control areas • Regrowth and drift • Safety issues	No

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Mechanical Methods

Method	Advantages	Disadvantages	Kenmore Potential
Harvester	• Collects fragments	• Fragment drift • Depth limitations • Dock obstructions	Yes-submersed/floating
Weed Cutter	• Low cost	• Plant collection/drift • Depth limitations • Dock obstructions	No
Rotovator	• Effects roots	• Plant collection/drift • Depth limitations • Dock obstructions • Water quality impacts	No

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Dredging Methods

Method	Advantages	Disadvantages	Kenmore Potential
Barge dredging	• Deepens lake • Removes nutrients and seeds	• Very high cost • Sediment disposal • Permitting	No
Diver dredging	• Removes roots • Moderate infestation eradication	• High cost • Water quality impacts	Yes-submersed

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Biological Methods

Method	Advantages	Disadvantages	Kenmore Potential
Grass carp	• Low cost	• Unpredictable control • Outlet screen • Target native submersed plants	No
Insects	• Low cost	• Low control • Milfoil only	Yes-milfoil

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Other Methods

Method	Advantages	Disadvantages	Kenmore Potential
Bottom screening	• Effective for rooted plants in small areas around docks	• Moderate cost • Remove in 2 years	Yes-all
Water level drawdown	• Low cost if existing inflow control	• Low control in PNW • Water quality/aesthetic impacts • Depth limitations • Permitting	No

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Kenmore Potential Methods

Method	Advantages	Disadvantages	Kenmore Potential
Aquatic Herbicides: Triclopyr-Milfoil Diquat-Elodea Glyphosate-Lily/loosestrife	• Cost effective • High level of control	• Ecological impact concerns	Yes-all plants
Hand-pulling	• Small infestation eradication	• High cost	Yes-emergent
Raking	• Low equipment cost • Easy of use	• Small control areas • High root regrowth	Yes-submersed
Harvester	• Collects fragments	• Fragment drift • Depth limitations • Dock obstructions	Yes-submersed/ floating
Diver dredging	• Removes roots • Moderate infestation eradication	• High cost • Water quality impacts	Yes-submersed
Insects	• Low cost	• Low control • Milfoil only	Yes-milfoil
Bottom screening	• Effective for rooted plants in small areas around docks	• Moderate cost • Remove in 2 years	Yes-all plants

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Beneficial Uses

- Recreational Use
  - Boating
  - Fishing
  - Swimming
  - Aesthetic and wildlife observation
- Commercial Use
  - Marinas
  - Kenmore Air
  - Water supply
- Wildlife Use
  - Waterfowl
  - Aquatic mammals
  - Fish and other aquatic organisms

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Beneficial Use Areas

Public
- Log Boom Park
- West Open Water
- East Open Water
- Inglewood Wetlands
- North Arrowhead Point
- Rhododendron Park
- Saint Edward
- Squire's Landing Park
- WDFW Boat Launch

Commercial
- Kenmore Air
- Marina
- Warehouse

Residential
- Arrowhead Point Residential
- Saint Edward/South Arrowhead Point
- Inglewood Residential
- North Arrowhead Point Residential
- Sammamish River Residential

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Beneficial Use Map

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Plant Management Map

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Maximum Plant Management Areas

Area	Total Area (Acres)	Submersed Cover (Acres)	Floating Cover (Acres)	Emergent Cover (Miles)
Public Total				
Saint Edward	8.1	8.8	0.0	0.0
Arrowhead Point	4.9	0.0	0.0	0.0
North Arrowhead Point	20.4	13.1	0.0	0.0
Inglewood Wetlands	13.7	3.4	5.6	0.1
East Open Water	52.4	30.7	3.7	0.0
West Open Water	38.5	32.9	0.0	0.0
Log Boom Park	14.4	14.6	0.0	0.1
Rhododendron Park	1.0	1.0	0.0	0.1
Squire's Landing Park	4.6	3.0	0.0	0.5
WDFW Boat Launch	0.3	0.0	0.0	0.0

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Maximum Plant Management Areas

Area	Total Area (Acres)	Submersed Cover (Acres)	Floating Cover (Acres)	Emergent Cover (Miles)
Commercial				
Kenmore Air	28.3	2.0	0.0	0.0
Marina	9.8	6.4	0.3	0.0
Warehouse	6.0	3.9	0.0	0.5
Residential				
Arrowhead Point Residential	4.2	0.7	0.0	0.0
North Arrowhead Point Residential	12.0	11.1	2.6	0.0
Inglewood Residential	1.4	0.2	0.0	0.0
Sammamish River Residential	14.4	10.5	0.0	1.1

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Maximum Plant Control Cost

	Submersed Plants	Floating-Leaved Plants	Emergent Plants
Public Area (acres/miles)	285.0	24.4	4.7
Commercial Area (acres/miles)	12.4	0.3	0.5
Residential Area (acres/miles)	142.5	12.2	2.3
Total Area (acres/miles)	142.5	12.2	2.3
Annual Herbicide Treatment Cost[a]	$128,253	$3,663	$700
Annual Harvesting Cost[b]	$228,005	$19,535	$0

[a] Herbicide treatment cost based on $900/acre for one diquat and one triclopyr treatment of submersed plants, $300/acre for one glyphosate treatment of floating-leaved plants, and $300/mile for one glyphosate treatment of emergent plants.
[b] Harvesting costs based on $1,600 for two harvests of submersed or floating leaved plants. Emergent plants would be removed by hand by volunteers.

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Beneficial Use Area Impacts

Area	Environmental			Recreational				Economic			Count
	Habitat Diversity	Habitat Stability	Fish Use Anadromous	Swimming / Wading	Boating / Fishing	Fishing / Hunting	Boating	Property Value	Property Value	Property Value	All
Public											
East Open Water					X	X					2
Inglewood Wetlands			X		X	X					3
Log Boom Park				X	X	X	X				4
North Arrowhead Point					X	X	X				3
Rhododendron Park	X				X	X					3
Arrowhead Point					X	X	X				3
Saint Edward	X				X	X					3
Squire's Landing Park	X		X		X	X	X				5
WDFW Boat Launch					X	X	X				3
West Open Water		X			X	X					3
Commercial											
Kenmore Air					X	X	X	X			4
Marina					X	X	X	X	X		5
Warehouse	X				X	X					3
Residential											
Arrowhead Point Residential	X			X	X	X	X		X	X	7
Inglewood Residential			X	X	X	X	X		X	X	7
North Arrowhead Point Residential			X	X	X	X	X		X	X	7
Sammamish River Residential	X		X	X	X	X	X		X	X	8

City of Kenmore

Plant Management Priorities

Lake Washington
- Log Boom Park Swimming and Boating
- Residential Area Swimming and Boating
- Marina Boating
- Kenmore Air Docking

Sammamish River
- Public and Residential Area Boating
- Class B Weed Control

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Plant Management Strategies

- Herbicide treatment of invasive submersed plants, nuisance native submersed plants, fragrant waterlily, and emergent loosestrife species in some or all areas.
- Harvesting submersed plants in some or all areas.
- Bottom barriers in dock and swim areas.
- Hand-pulling and raking by residents.
- Milfoil weevil in river areas and St. Edwards Park.
- No control in Inglewood wetlands and other conservation areas.

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Public Meeting Contacts

Wednesday, January 18, 2017; 6:30 – 8:00p.m.

- Legislators (Senator Frockt, Representatives Farrell and Pollet from 46th Dist.)
- Federal agencies (Army Corp. of Engineers)
- State agencies (King Co. Noxious Weeds, Dept. of Ecology, WRIA 8)
- Cities of Bothell, Woodinville, Redmond (Council & Staff for each)
- Native American Tribes (Muckleshoot, ?)
- Environmental groups (Adopt-A-Stream Fdtn, WALPA, Save Lake Sammamish, PERK, Friends of Marymoor Park, Friends of Issaquah Hatchery)
- Fishing and special user groups (Puget Sound Anglers, ?)
- Waterfront businesses (SUP, Corpore Sano PT, Harbor Village Marina, North Lake Marina, Kenmore Air, CalPortland, Kenmore Asphalt Materials, Alaska General Seafoods, Evergreen Topsoil, Lakeside School, Plywood Supply)
- Waterfront property owners
- Other interested parties

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Kenmore IAVMP Steering Committee Meeting

December 16, 2016, 11:30 – 1:40, Kenmore City Hall, 18120 68th Ave NE, Kenmore, WA 98028

Meeting Notes by Ben Peterson (King County Noxious Weeds, ben.peterson@kingcounty.gov)

In attendance: John Adamski (Arrowhead Community), Todd Banks (Kenmore Air), Casey Costello (WA Dept. of Fish and Wildlife), Jim Davidson (North Lake Marina), Leslie Harris (City of Kenmore), Greg Matz (Inglewood Golf Course), Matt Muller (Inglewood Waterfront), Ben Peterson(King County Noxious Weed Control Program), Quinn Proffitt (City of Kenmore), Janet Quinn (City of Kenmore), Doug Ritchie (Kenmore Waterfront Activities Center), Lizbeth Seebacher (WA Dept. of Ecology), Rob Zisette (Herrera)

Management Goals- Identifying what conditions we want to have.

Janet- read an example of "management goals" from the IAVMP Development Manual

Jim- Stressed Milfoil and other identified weeds, recreation and commercial uses

John- Recreation and commercial uses, swimming, boating, viewing water. He is very concerned about filamentous algae in addition to listed weeds. He listed many impacts of filamentous algae.

Janet- Said we could talk about filamentous algae more later when specific plants are discussed

Todd- Wondered how sedimentation plays into the issue (of problems with plants in the water)

Rob- Added "this is our Plan" and said if these issues of filamentous algae and sediment are important we can include them.

John- said it seems the plan should include things that are important and these issues should be listed in the Plan

Jim- wondered if deeper water would make it so fewer weeds would grow

Rob – says dredging would be cost prohibitive

Janet- says she checked with the Army Corps of Engineers and they said that they would have to put any dredged material in a landfill because the sediment is contaminated (with metals and PCBs – according to Rob).

Plant Management Strategies slide presentation and discussion - Rob

(Refer to presentation slides)

Slide 8 – Plant List

Rob- the main plants of concern are milfoil, elodea, water lily, and emergent weeds. There are native plants everywhere

Rob- The goal of eradicating any weeds is not realistic because of new weed reintroduction from upstream on the Sammamish River or elsewhere in Lake Washington. Control Area priorities are: Submersed, floating leaf, and emergent weeds

Slide 16 – Chemical Methods

Rob explained the difference between systemic and contact herbicides; explained the difference how fluridone works

Janet – said Aquatechnex applied triclopyr in 2016

Rob –Di quat has been used to limited effectiveness

Rob discussed imazapyr and glyphosate use on emergent weeds

John- mentioned that diquat can't be used until mid-July because of the Fish Window

Quinn- had a question about glyphosate affecting other (submersed) plants when use for treating fragrant water lily plants

Rob – said that herbicide used to spray on water lily plants would not affect any submerged aquatic plants but would affect native floating leaf plants if it was sprayed on them.

Slide 17 – Manual Methods

-Hand pulling and raking useful on a small scale (individual home owner basis)

-Cutting doesn't work well

Slide 18- Mechanical Methods

Harvester- cuts up to 8' deep, removes cut plant material

King County used a harvester in the 1980s, a harvester machine and operator can be hired for use

A harvester will remove weeds and algae (as opposed to aquatic herbicide applications use on submersed which may lead to an increase in algae when the plants die.

John- Filamentous algae appears in the spring along with the weeds

Rotovation- an underwater rototiller- sort of rips up the plants by the roots, results in sedimentation and plant fragments

Slide 19- Dredging Methods

Barge Dredging- Removing sediments and plants.

Usually nutrient-rich sediment remains (which will still promote the growth of aquatic plants).

Usually done to deepen a shipping lane/for boat navigation.

Barge dredging costs at least 10 times more than any other weed control method. (in the millions of dollars).

Todd- Says the channel is filling in with sediment. He wondered if there is any money available to pay for dredging

Janet- said the Army Corps of Engineers is not interested in this because of high cost of disposal due to contamination.

Rob – Says it is very unlikely that the Army Corps of Engineers could do it.

Diver Dredging- Diver with 4" diameter suction hose removes submersed plants.

Diver dredging removed submersed plants; can be very selective (i.e. the diver can just remove the weed plants and keep the native plants).

Diver dredging is akin to large-scale, precise hand pulling. It is expensive and there can be sedimentation issues.

Slide 20- Biological Methods

-no grass carp

-Milfoil weevils- not commonly used in Washington State. Rob suggested that it might be suitable to consider releasing milfoil weevils offshore of St. Edward Sate Park

Slide 21- Other Methods

Jim- wondered how well a harvester would work in the river channel due to the variable bottom depth.

Rob- a harvester operator could make it work in the Sammamish River channel

Casey- says bottom screens can be kept in place longer than two years if they are made from completely biodegradable component (or Sand/gravel)

Slide 25- Beneficial Use Map

There was a lot of discussion about dividing up the Inglewood and Arrowhead Pt residential use areas. There was also a discussion about how far out from the shore should be considered the "residential use" area as opposed to the "public use" area.

Slide 27- Maximum Plant Management Areas

Jim- St. Edward State Park row in the table- Total area (acres) is less than Submersed Cover area (acres).

Rob- said it is due to overlapping GIS layers, he will fix the table

Slide 28- Maximum Plant Management Areas

Rob- Kenmore Air "submersed cover (area)" is only a small area compared to the total area

Slide 29- Maximum Plant Control Costs

The table in the slide has some errors. Rob will update the table

Janet- for comparison, Aquatechnex herbicide application in 2016 cost $30,000.**

**correction from JQ – I misspoke: treatment for 2016 was closer to $38,000.00

Slide 30- Beneficial Use Area Impacts

Ben- add "swimming" to St. Edwards state park

Doug- asked Janet if the City bond money could pay for the weed control work

Janet- said the city bond money would not be available to pay for this work

Management Goals Discussion – Janet

A dry erase board was used by Janet to write out, and edit the groups "Management Goals" statement. The statement was changed several times through the meeting. The final form of the statement read as follows:

"The Management goals are to maintain recreational, commercial, and habitat use of the lake by managing nuisance plants in identified beneficial use areas and to keep swimming areas clear of weeds for safety reasons"

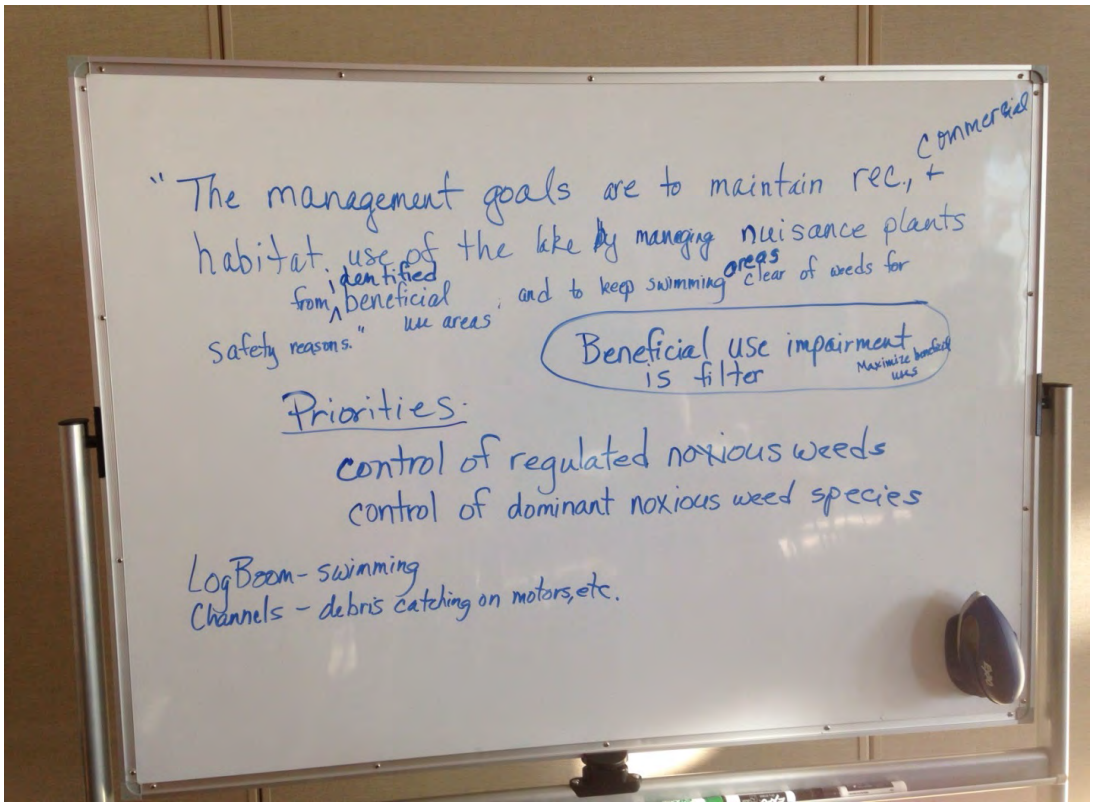
Beneficial use impairment is filter – maximize beneficial use

Priorities-

- *control of regulated noxious weeds*
- *control of dominant noxious weed species*

Log Boom Park – Swimming

Channels – debris catching on motors, etc.



John- asked Lizbeth if filamentous algae could be included in the Management Goals- he says algae should be recognized as part of the problem

Janet- Why are (filamentous) algae and weeds separate programs?

Lizbeth- The two are separated because they come from two separate Ecology funding sources. Those that are interested in the subject make a separate Algae Management plan. Says that filamentous algae can be mentioned in the Kenmore IAVMP. Suggested John work with Deb Bouchard at King County on the long-term algae management issue.

John- Are measurements and observations (presumably about parameters such as dissolve oxygen, temperature, nutrients in the water), pertinent to the IAVMP? He suggested these parameters are monitored as changes are made to the weeds. Does weed removal affect those parameters and algae?

Lizbeth- suggests working with the King County Lake program (Chris Knutson, Rachael Gravon)

Jim- Do we want to include the terminology “nuisance plants” rather than “noxious weeds”?

John- We ought to be able to relate the links of actions we recommend to the specific uses at different locations.

Rob- Beneficial use impairment becomes the priority. “Minimize impacts to beneficial uses.”

Slide 31 – Plant Management Priorities

Rob- tentative list of priorities for each waterbody. Rob says generally the Sammamish River channel is navigable as it is (without submersed weeds being controlled) because the weeds are generally only on the side of the channel and the main center part of the channel is relatively deep and mostly free of plants.

Slide 32- Plant Management Strategies – a list of suggested weed control strategies that vary by location

Meeting Sign-In Sheet
Aquatic Weeds Steering Committee Mtg. #2
December 16, 2016, 11:30am - 1:30pm
Kenmore City Hall
18120 68th Avenue NE, Kenmore WA 98028

	Name	Company Representing	Initials
1	John Adamski	Arrowhead Community	
2	Todd Banks	Kenmore Air	TB
3	Casey Costello	WA Dept. of Fish and Wildlife	
4	Jim Davidson	North Lake Marina	
5	Jennifer Gordon	City of Kenmore	
6	Greg Matz	Inglewood Golf Club	
7	Matt Muller	INGLEWOOD WATERFRONT	
8	Ben Peterson	King County	BP
9	Douglas Poppe	Puget Sound Anglers	
10	Quinn Proffitt	City of Kenmore	QRP
11	Janet Quinn	City of Kenmore	
12	Doug Ritchie	Kenmore Waterfront Activities Ctr.	D.R
13	Lizbeth Seebacher	WA Dept. of Ecology	
14	Rob Zisette	Herrera	RZ
15	Leslie Harris	Kenmore	
16			
17			
18			
19			
20			

City of Kenmore

City of Kenmore Integrated Aquatic Vegetation Management Plan (IAVMP)

Public Meeting #1

Facilitated by:

Janet Quinn, Project Coordinator, City of Kenmore

Rob Zisette, Aquatic Scientist, Herrera Environmental Consultants, Inc.

January 18, 2017

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City of Kenmore

Agenda

- Why we're engaged in this process
- What we hope to accomplish through an Integrated Aquatic Vegetation Management Plan (IAVMP)
- Why we invited you
- Work on an IAVMP that's been done so far
- Q & A
- What do <u>you</u> think? (Written input from you)

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City of Kenmore

Why Are We Here?

- Kenmore residents appreciate the water
- Components of Council's 20-Year Vision statement are 1) connection to waterfront; 2) protection of natural areas
- One of Kenmore City Council Goals is "to address watershed and water quality issues affecting the City"
- Noxious weeds have been observed in water and riparian areas
- City of Kenmore applied for and received Department of Ecology Grant to develop an Integrated Aquatic Vegetation Management Plan (IAVMP)
- Passage of Kenmore's Proposition 1 will allow the City to make improvements to water access and waterfront parks and increases the importance of managing aquatic weeds.

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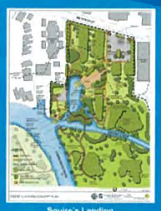
Park Improvements

Log Boom Park

Rhododendron Park



Squire's Landing

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How An IAVMP Can Help Us

- Department of Ecology (DOE) and other Agency support as we work to address the presence of aquatic weeds*

  *Water Quality vs. Aquatic Weeds; Interconnected, but DOE separates Water Quality from Invasive Plants for funding purposes. Our IAVMP will acknowledge water quality concerns such as algae, but will not specifically focus on them. Primary focus will be on aquatic weeds.

- Coalesce our thoughts and strategize long term management of aquatic weeds.
- Form a Coalition with upstream jurisdictions to address aquatic weeds from the perspective of a water body system, rather than just Kenmore.

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IAVMP Chapters*

*From DOE's Citizen's Manual for Developing Integrated Aquatic Vegetation Mgmt. Plans

- **Problem Statement**
- Past Management Efforts
- **Management Goals**
- Lake and Watershed Characteristics
- **Beneficial Use Areas**
- Aquatic Plant Characteristics
- **Aquatic Plant Control Alternatives & Level of Intensity**
- Integrated Aquatic Plant Control Scenarios
- Selected Action Strategy
- Public Involvement
- Monitoring and Evaluation Plan
- References

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Why We Invited You

- We want to provide information on this project.
- We want to answer any questions you might have.
- We want your input:
  - What are you seeing on/in the water?
  - Are we on the right track in the work done so far?
  - Any considerations we missed?

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Steering Committee Work

Steering Committee met twice to:

- Develop a Problem Statement for the IAVMP
- Identify Draft Management Goals
- Identify Beneficial Use Areas (i.e., target areas to focus City work on)
- Discuss and Identify Potential Management Strategies
- Discuss the level of Management Intensity

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Steering Committee Members

- John Adamski, Kenmore Waterfront Resident
- Todd Banks, President, Kenmore Air
- Casey Costello, Habitat Biologist, WA State Dept. of Fish & Wildlife
- Jim Davidson, Owner, North Lake Marina
- Jennifer Gordon, Public Works Operations Manager, City of Kenmore
- Greg Matz, Superintendent, Inglewood Golf Club
- Matt Muller, Kenmore Waterfront Resident
- Ben Peterson, Noxious Weed Specialist, King County
- Douglas Poppe, Officer, Puget Sound Anglers Association
- Quinn Proffitt, Parks Maintenance, City of Kenmore
- Doug Ritchie, Executive Vice President, Kenmore Waterfront Activities Center
- Lizbeth Seebacher, Wetland and Aquatic Biologist, WA State Dept. of Ecology
- Rob Zisette, Aquatic Scientist, Herrera Environmental Consultants

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Plant List

Table 1. Aquatic Plant List for the Kenmore Survey on September 7 and 8, 2016.

Plant Type	Common Name	Scientific Name	Status
Emergent Plants	Common cattail	Typha latifolia	Native
	Garden loosestrife	Lythrum salicaria	Noxious Weed- Regulated Class B
	Japanese knotweed	Fallopia japonica	Noxious Weed- Nonregulated Class B
	Narrow-leaf bur-reed	Sparganium angustifolium	Native
	Purple loosestrife	Lythrum salicaria	Noxious Weed- Regulated Class B
	Reed canarygrass	Phalaris arundinacea	Noxious Weed- Nonregulated Class C
	Spotted jewelweed	Impatiens capensis	Noxious Weed- Monitor List
	Yellow-flag iris	Iris pseudacorus	Noxious Weed- Nonregulated Class C
Floating Leaved Rooted Plants	Fragrant waterlily	Nymphaea odorata	Noxious Weed- Nonregulated Class C
	Grass-leaved pondweed	Potamogeton gramineus	Native
Free Floating Plants	Lesser duckweed	Lemna minor	Native
	Mexican water-fern	Azolla mexicana	Native
Submersed Plants	Brazilian elodea	Egeria densa	Noxious Weed- Nonregulated Class B
	Common waterweed	Najas guadalupensis	Native
	Common waterweed	Elodea canadensis	Native
	Coontail	Ceratophyllum demersum	Native
	Curly-leaf pondweed	Potamogeton crispus	Noxious Weed- Nonregulated Class C
	Eurasian watermilfoil	Myriophyllum spicatum	Noxious Weed- Nonregulated Class B
	Flat-stemmed pondweed	Potamogeton zosteriformis	Native
	Richardson's pondweed	Potamogeton richardsonii	Native
	Sago pondweed	Potamogeton pectinatus	Native
	Tapegrass	Vallisneria americana	Native
	White-stemmed pondweed	Potamogeton praelongus	Native
Plant-like algae	Nitella	Nitella sp.	Native

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Noxious Aquatic Weeds in Kenmore

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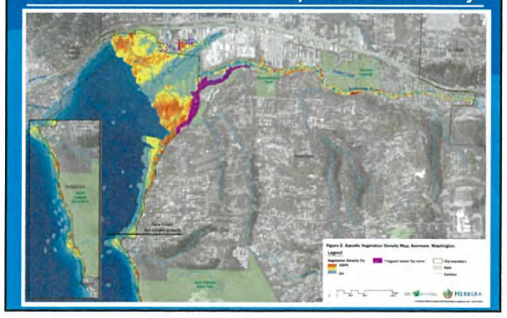
Aquatic Plant Density



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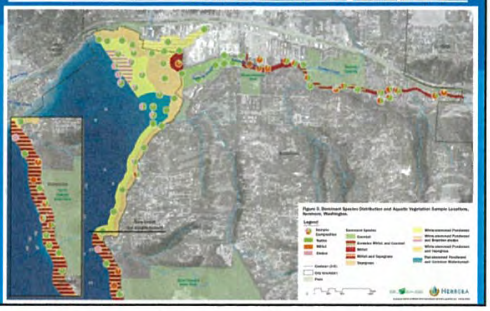
Dominant Submerged Species



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Noxious Weeds

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Beneficial Uses

- Recreational Use
  - Boating
  - Fishing
  - Swimming
  - Aesthetic and wildlife observation
- Commercial
  - Marinas
  - Kenmore Air
  - Water supply
- Wildlife Use
  - Waterfowl
  - Aquatic mammals
  - Fish and other aquatic organisms

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Identified Problems

Environmental:
- Negative impact on fish habitat
- Impact on native biodiversity
- Increased levels of algae
- Water quality concerns
  - Low dissolved oxygen
  - High temperature

Recreational:
- Inhibit swimming & paddle sports
- Weeds wound around boat motors
- Weeds tangled in fishing lines
- Non-native weeds promote habitat for non-native fish species
- Health risks of toxic blue-green algae
- Aesthetical impact
  - Plant accumulation and decay
  - Foul aroma
  - Water clarity issues
- Shoreline access
- Irrigation challenges
  - Reduction of water consumption
  - Clogged intake lines
  - Damaged pumps
  - Contaminated water

Economic:
- Reduction of navigable waterways
  - Forces lake traffic into narrow lanes or creates potential for conflict between boats and planes
- Reduction of water depth
  - Impacts access for boat ramps docks
- Costly repairs to damaged boat propellers and plane rudders
- Perceived quality of life
- Lower waterfront property values*
- Cost to manage/control/eradicate

*http://www.ecy.wa.gov/programs/wq/swqs/ranking/303d/2012/overview/pdfs/303d-2012-overview.pdf#page=22

Read the draft IAVMP problem statement at www.kenmorewa.gov/IAVMP

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Plant Management Goals
Guiding Questions

Thought Filter:
- Minimize beneficial use impairment
- Maximize beneficial uses

What do we want to achieve?
- Is it reasonable?
- Is it realistic?
- Will it be supported by the broader community?
- Is the cost reasonable relative to the benefit?

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Plant Management Goals

The Management Goals are to maintain recreational and commercial usability and habitat integrity of the lake and river by managing nuisance plants in identified beneficial use areas; and to keep swimming areas clear of weeds for safety reasons.

Priorities:

Control of regulated noxious weeds (loosestrife)

Control of dominant noxious weed species (milfoil, elodea, water lily)

Early detection of new noxious weed species

Priority Areas:

Public: Parks, main channels, public use areas

Private: Waterfront residences & businesses

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City Priorities

- Reduce impact on boating (hand-powered watercraft and motor boats)
  - Clear, clean water
  - No weeds catching on paddles, rudders, propellers
- Provide clear, clean water for swimmers
  - No weeds in beach areas
  - No noxious weeds or decomposed weeds on beaches
- Maintain healthy environment for fish
  - Appropriate water temperature
  - Appropriate dissolved oxygen levels

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Plant Management Strategies - Parameters

- Species control or eradication
  - Eurasian watermilfoil
  - Brazilian elodea
  - Fragrant waterlily
  - Emergent noxious weeds
  - Native plants
- Control priorities
  - Submersed/floating/emergent
  - Public/residential/commercial areas
- Control intensity
- Conservation areas
- Use of chemicals
- Cost and funding

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Plant Management Methods

- Chemical Methods
- Non-chemical Methods
  - Manual
  - Mechanical
  - Dredging
  - Biological
  - Other

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Applicable Methods

Type	Method	Advantages	Disadvantages	Target Plants
Chemical	Aquatic Herbicides	• Cost effective • High level of control	• Ecological impact concerns	All plants
Manual	Hand-pulling	• Small infestation eradication	• Small control areas • Root removal difficult	Emergent
Manual	Raking	• Low equipment cost • Easy of use	• Small control areas • High root regrowth	Submersed
Other	Bottom Screening	• Effective for rooted plants in small areas around docks	• Moderate cost • Remove in 2 years	All plants
Mechanical	Harvester	• Collects fragments	• Fragment drift • Depth limitations • Dock obstructions	Submersed, Floating
Dredging	Diver Dredging	• Removes roots • Moderate infestation eradication	• High cost • Water quality impacts	Submersed

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Applicable Methods

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Chemical Methods

Applicable Herbicide	Type (Cost/Acre)	Target Plants
Fluridone	Systemic, selective, liquid or granular ($1,000)	• Submersed (milfoil and elodea)
Triclopyr-TEA	Systemic, selective, liquid or granular ($700)	• Submersed (milfoil) • Emergent (loosestrife/others)
Diquat	Contact, nonselective, liquid only ($350)	• Submersed (elodea and natives)
Glyphosate	Systemic, nonselective, liquid only ($350)	• Floating-leaved (lily) • Emergent (loosestrife/others)
Imazapyr	Systemic, nonselective, liquid only ($700)	• Floating-leaved (lily/others) • Emergent (loosestrife/others)

Other Herbicide	Type (Cost/Acre)	Target Plants
2,4-D	Systemic, selective, liquid only ($500)	• Submersed (milfoil)
Endothall	Contact, nonselective, liquid only ($700)	• Submersed (all plants)

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Other Non-chemical Methods

Type	Method	Advantages	Disadvantages	Target Plants
Manual	Cutting	• Low equipment cost	• Small control areas • Regrowth and drift • Safety issues	All plants
Manual	Weed Cutter	• Low cost	• Plant collection/drift • Depth limitations • Dock obstructions	Submersed
Mechanical	Rotovator	• Effects roots	• Plant collection/drift • Depth limitations • Dock obstructions • Water quality impacts	All plants
Dredging	Barge dredging	• Deepens lake • Removes nutrients and seeds	• Very high cost • Sediment disposal • Permitting	All plants
Biological	Grass carp	• Low cost	• Unpredictable control • Outlet screen • Target native plants	Submersed
Biological	Milfoils weevil	• Low cost	• Low control • Milfoil only	Milfoil
Other	Water level drawdown	• Low cost if existing inflow control	• Low control/high impacts • Permitting • Depth limitations	All plants

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Beneficial Use Areas

Public
- Saint Edward
- Inglewood Wetlands
- East Open Water
- West Open Water
- Log Boom Park
- Lower Sammamish River
- Rhododendron Park
- Squire's Landing Park

Commercial/Industrial
- Kenmore Air
- Marina
- Warehouse/Industrial

Residential
- South Arrowhead Point Residential
- Arrowhead Point Residential
- Inglewood Residential
- Inglewood Golf Residential
- Inglewood Shores Residential
- Sammamish River Residential

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Beneficial Use Map

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Plant Management Map

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Maximum Plant Management Areas

Area	Total Area (Acres)	Submersed Cover (Acres)	Floating Cover (Acres)	Emergent Cover (Miles)
Public Total				
Saint Edward	6.6	8.8	0.0	0.0
Inglewood Wetlands	5.9	2.3	3.6	0.1
East Open Water	65.2	40.6	0.2	0.0
West Open Water	36.5	31.0	0.0	0.0
Log Boom Park	16.4	16.6	0.0	0.1
Lower Sammamish River	12.4	2.4	5.6	0.1
Rhododendron Park	1.0	0.7	0.0	0.1
Squire's Landing Park	4.6	3.0	0.0	0.5

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Maximum Plant Management Areas

Area	Total Area (Acres)	Submersed Cover (Acres)	Floating Cover (Acres)	Emergent Cover (Miles)
Commercial				
Kenmore Air	28.3	2.0	0.0	0.0
Marina	9.8	6.4	0.3	0.0
Warehouse/Industrial	6.0	3.9	0.0	0.5
Residential				
South Arrowhead Point Residential	1.9	2.5	0.0	0.0
Arrowhead Point Residential	5.4	7.0	0.0	0.0
Inglewood Residential	5.3	0.0	1.2	0.0
Inglewood Golf Residential	10.2	8.9	1.2	0.0
Inglewood ShoreS Residential	1.4	0.0	1.2	0.0
Sammamish River Residential	14.2	10.5	0.0	1.1

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Maximum Plant Control Cover/Cost

	Submersed Plants	Floating-Leaved Plants	Emergent Plants
Public Area (acres/miles)	105.3	9.5	0.9
Commercial Area (acres/miles)	30.7	3.9	0.5
Residential Area (acres/miles)	28.9	3.6	1.1
Total Area (acres/miles)	164.9	17.0	2.4
Annual Herbicide Treatment Cost[a]	$148,397	$5,111	$730
Annual Harvesting Cost[b]	$263,817	$27,258	$0

[a] Herbicide treatment cost based on $900/acre for one diquat and one triclopyr treatment of submersed plants; $300/acre for one glyphosate treatment of floating-leaved plants; and $300/mile for one glyphosate treatment of emergent plants.

[b] Harvesting costs based on $1,600 for two harvests of submersed or floating leaved plants. Emergent plants would be removed by hand by volunteers.

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Beneficial Use Area Impacts

Area	Environmental			Recreational				Economic			Count
	Wildlife Habitat	Unique Habitat	Critical Habitat	Swimming	Boating/Paddling	Fishing	Aesthetics	Land Value	Property Value	Irrigation	All
Public											
Saint Edward	X			X	X	X					4
Inglewood Wetlands			X		X	X					3
East Open Water					X	X					2
West Open Water		X			X	X					3
Log Boom Park				X	X	X	X				4
Lower Sammamish River			X		X	X	X				4
Rhododendron Park	X				X	X					3
Squire's Landing Park	X		X		X	X	X				5
Commercial											
Kenmore Air					X	X	X	X			4
Marina					X	X	X	X	X		5
Warehouse/Industrial	X				X	X					3
Residential											
S. Arrowhead Point Residential	X			X	X	X			X		5
Arrowhead Point Residential	X			X	X	X	X		X	X	7
Inglewood Residential				X	X	X	X		X	X	6
Inglewood Golf Residential			X	X	X	X	X		X	X	7
Inglewood Shore Residential			X	X	X	X	X		X	X	7
Sammamish River Residential	X		X	X	X	X	X		X	X	8

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Plant Management Priorities

Lake Washington
- Log Boom Park Swimming and Boating
- Residential Area Swimming and Boating
- Marina Boating
- Kenmore Air Docking

Sammamish River
- Public and Residential Area Boating
- Rhododendron Park
- Squire's Landing Park
- Class B Weed Control

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Plant Management Strategies

- Herbicide treatment of invasive non-native submersed plants, nuisance native submersed plants, fragrant waterlily, and emergent loosestrife species in some or all areas.
- Harvesting submersed plants in some or all areas.
- Bottom barriers in dock and swim areas.
- Hand-pulling and raking by residents.
- No control in Inglewood wetlands and other conservation areas.

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Q & A

Questions?

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Written Input

Input on:
- Problem Statement
- Management Goals
- Beneficial Use Areas
- Management Strategies
- Suggestions/Ideas on any aspect of the IAVMP

Please write your information on a sticky note and attach it to any of the boards set up around the room, or you can write directly on the General Ideas/Suggestions board. Thanks!

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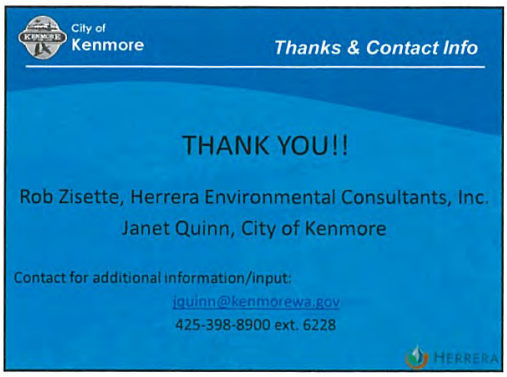
City of
Kenmore
Thanks & Contact Info
THANK YOU!!
Rob Zisette, Herrera Environmental Consultants, Inc.
Janet Quinn, City of Kenmore
Contact for additional information/input:
jquinn@kenmorewa.gov
425-398-8900 ext. 6228
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Public Meeting – Feedback/Suggestions

Management Goals/Strategies:

Let property owners know how to get rid of weeds—a phone number to call.

If you could send out community education on what each property owner could do to help, that would be great.

If the City has a contract with AquaTechnex, let homeowners know who to call and can homeowners get a contract rate.

General Comments (on information, process, project):

Need focus on prevention of water weeds—make sure homeowners, golf course and lawn maintenance companies control fertilizer runoff in rainwater. No phos. fertilizers.

Sedimentation in front of my home on S. Arrowhead Drive has decreased the depth off the bank by 2' to 3' and made a garden for purple loosestrife, reed canary grass and irises.

Please publicize info on AquaTechnex permit so we can contract for treatment this summer.

Please give property owners the chance to work with a weed control contractor this summer. Last year's treatment was very successful.

People for an Environmentally Responsible Kenmore (PERK) would like to offer their interactive map as a potential community education tool for the location of toxic algae (and other community education?).

Kenmore Government needs to inform us more fully of options to treat and/or the City's program to control weeds (e.g., 2016 herbicide treatment work by AquaTechnex).

From 30+ year waterfront resident: Thank you! 1. Noted increase of "froth" each summer (builds over summer). 2. Harvesting then thinking milfoil will float away? Does this just spread milfoil? Also floating "glumps" difficult for swimmers and property owners.

Safety data sheet warnings to public [when toxicity is high?]. Work with PERK to educate about possible O_2 increase possible due to herbicide.

Coordinate (City) efforts with private efforts to make a larger impact.

Try to limit spray/treatment (chemical) times to those of low human activity (spring/fall).

Residential Sammamish Slough includes children and dogs swimming—that should be added to info—near our house (close to eastern city limits)

Dioxins in Kenmore Navigation Channel – could we please get City to add some info to our grant-funded Interactive Map

Is scuba dredging done with underwater suction pump? [And if so] can you make one available to residents along the water?

And from Bothell Surface Water Manager:

It was difficult to understand what is ultimate goal? (Vision?) For ex.: open water and few to no aquatic plants? Suggestion was to be more specific, such as reduce [milfoil, elodea, etc.] abundance by 25% by _____.

Suggest that you use different treatments based on beneficial use, i.e., mechanical in swimming/primary contact areas and chemical in commercial zones.

Seemed hard to conceptualize that native plants are equally negative as non-native invasive ones. Preserve native vegetation.

Costs-out should span 10 or greater years due to the existing presence upstream of non-native species to re-seed the treated areas.

Please assess the loss of aquatic plants to shoreline erosion. A beneficial benefit of aquatic vegetation is reduced shoreline erosion; especially lake shore. (Beneficial use of lakeshore is to allow plants to grow.

Ask for the research papers on impact on phytoplankton.

Ask for the research papers on blue/green algae. Mere presence of blue/green algae doesn't mean toxins—some of it is not toxic. What triggers toxicity?

Suggest clarifying management options. (He left the meeting thinking that herbicide treatment was the only option being considered.)

Meeting Sign-In Sheet
Aquatic Weeds Public Meeting #1
January 18, 2017, 6:30pm - 8:00pm
Kenmore City Hall
18120 68th Avenue NE, Kenmore WA 98028

	Name	E-Mail Address	City
1	SCOTT PARROTT	SCOTTP@HEATHNorthwest.com	KENMORE
2	Charlie Garneski	charlie65@Gmail.com	Kenmore
3	Jack Smith	rjcjsmith@aol.com	Kenmore
4	John Adamski	john_adamski2@yahoo	KENMORE
5	John Byrne	jahbyrne@msn.com	Kenmore
6	Lynda O'Brien	lyndaobrien@comcast.net	Kenmore
7	(HARBOUR VILLAGE MARINA) ROLAND STROLIS	VIDOR@NWLINK.COM	KENMORE
8	Andy Loch	andy.loch@bothellwa.gov	Bothell
9	Casey Costello	Casey.Costello@dfw.wa.gov	Issaquah
10	Gary Ullrich	pbergLund@eltopia	Kenmore
11	Pat Park	patcpark@hotmail.com	KENMORE
12	Quinn Proffitt	QPROFFITT@KenmoreWA.gov	Kenmore
13	Jack Perry	playdough@msn.com	Kenmore
14	Nancy Bowen-Page	inglgdn99@hotmail.com	Kenmore

Meeting Sign-In Sheet
Aquatic Weeds Public Meeting #1
January 18, 2017, 6:30pm - 8:00pm
Kenmore City Hall
18120 68th Avenue NE, Kenmore WA 98028

	Name	E-Mail Address	City
1	Don Swanson	dons@plywoodsupply.com	Kenmore
2	Bob Spiger	spiger@comcast.net	"
3	Theresa Marshall	theresa_marshall@hotmail.com	Kenmore
4	Ben Peterson	ben.peterson@kingcounty.gov	Seattle
5	CARL PEDERSEN	CCPEDERSEN@COMCAST.NET	KENMORE
6	Elizabeth Mooney	elizabeth.mooney@comcast.net	Kenmore
7	Jim MYERS	oda1959@comcast.net	Kenm
8	Jennifer Gordon	jgordon@kenmorewa.gov	
9	Heather Byrne	jahbyrne@msn.com	Kenmore
10	Michele Gamin	michellegamin@metropolitanpark.info	Kenmore
11	Brent Cochran	brent_cochran@hotmail.com	Kenmore
12			
13			
14			

Meeting Sign-In Sheet
Aquatic Weeds Public Meeting #1
January 18, 2017, 6:30pm - 8:00pm
Kenmore City Hall
18120 68th Avenue NE, Kenmore WA 98028

	Name	E-Mail Address	City
1	Todd Banks	Todd b@Kenmoreair.com	Kenmore
2	Steve + Eliza Capps	whidbeybeachgirl@gmail.com	Kenmore
3	F. KLINE	fjksvd@comcast.net	KENMORE
4			
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Aquatic Weeds Steering Committee Meeting #3

May 5, 2017

Meeting Minutes

The Steering Committee held its final meeting to discuss the draft IAVMP. There was no PowerPoint presentation at this meeting; but the committee reviewed the draft, reviewed feedback from the Department of Ecology and input received from others, discussed revisions made to date, and possible new revisions.

The Steering Committee was supportive of the draft IAVMP and recommended putting a clause in the document that allows for consideration of future technologies and new herbicides approved at a future date.

Janet Quinn thanked Rob Zisette of Herrera Environmental Consultants, and members of the steering committee on behalf of the City of Kenmore and invited them to attend the meeting with waterfront property owners scheduled on May 11, 2017.

Meeting Sign-In Sheet
Aquatic Weeds Steering Committee Mtg. #3
May 5, 2017, 11:30am - 1:30pm
Kenmore City Hall
18120 68th Avenue NE, Kenmore WA 98028

	Name	Company Representing	Initials
1	John Adamski		
2	Todd Banks	Kenmore Air	
3	Casey Costello	WA Dept. of Fish and Wildlife	
4	Jim Davidson	North Lake Marina	
5	Jennifer Gordon	City of Kenmore	
6	Greg Matz	Inglewood Golf Club	
7	Matt Muller		
8	Ben Peterson	King County	
9	Douglas Poppe	Puget Sound Anglers	
10	Quinn Proffitt	City of Kenmore	
11	Janet Quinn	City of Kenmore	
12	Doug Ritchie	Kenmore Waterfront Activities Ctr.	
13	Lizbeth Seebacher	WA Dept. of Ecology	
14	Rob Zisette	Herrera	RZ
15			
16			

City of Kenmore

Waterfront Property Owner Aquatic Weeds Meeting

May 11, 2017

Janet Quinn, City of Kenmore Project Coordinator
Tela Whiteman, City of Kenmore Permit Specialist
Rob Zisette, Herrera Environmental Consultants
Senior Aquatic Scientist

City of Kenmore

Agenda

- Status of Integrated Aquatic Vegetation Management Plan (IAVMP)
- What weed management is planned for public spaces?
- Permits: Why & How?
- Plant Management Association(s)?
  - Why & How?
- Discussion on Communication from/to City
- Q & A

City of Kenmore

IAVMP Status Update

- Draft submitted to Ecology in March 2017
  - Permit requirements for Kenmore were added (per Shoreline Management Act of 1971; RCW 90.58)
  - Small changes requested by Ecology, primarily to use a table for plant control alternatives rather than narrative
  - Trend in literature is to change Brazilian elodea to Brazilian egeria; corrected throughout document
  - Resident question on how to address dead plant removal; answer will be added in body of document

City of Kenmore

Aquatic Weed Management in Public Spaces

- City hired AquaTechnex to apply herbicide in public locations in 2016.
- IAVMP approval by Dept. of Ecology gives us potential grant funding opportunities.
- No plans to spray or treat this year (target as of now is every other year as funding allows).
- City focus is on public spaces: Log Boom Park, Rhododendron Park, Squire's Landing Park, mouth of Sammamish River to 68th Ave. bridge

City of Kenmore

Permit Requirements

- Shoreline Substantial Development Permit (SSDX)
  - What is an SSDX?
  - How do I apply?
  - What is the cost and expiration?
  - Q&A with Permit Specialist

Development Services Department

City of Kenmore

Plant Management Association

Lake/River Associations (Plant Mgmt. Assoc.?)

- Volunteer organizations
- Often non-profits (funded by membership dues if desired)
  - Advantages: Flexible and works well for carrying out low-cost activities; jointly contract with providers; monitor weeds/algae/water quality; work together on education and/or projects; apply for grant funding
  - Disadvantages: Dependent on dedicated volunteers
- Desire to proceed?
  - If yes, next steps (form steering committee?)
    - Secretary of State application for non-profit, then application to IRS for tax-exempt status if a 501(c)3

City of Kenmore

Communication from City

Kenmore's IAVMP found here:
http://www.kenmorewa.gov/IAVMP

- Short description of IAVMP
- Link to IAVMP
- Link to permit applications (samples?)
- PMA(s) contact information
- City plans for aquatic weed management
- Link to King County Best Management Practices for pertinent aquatic noxious weeds

City of Kenmore

Useful Websites

- Secretary of State: https://www.sos.wa.gov/corps/NonprofitCorporationsONLINEandpaperregistration.aspx
  - Resources, application, link to IRS, etc.
- Department of Ecology: http://www.ecy.wa.gov/
  - Search "Aquatic Weeds" for info on identification, management, permits, grant funding opportunities, etc.
- King County Noxious Weeds: http://www.kingcounty.gov/services/environment/animals-and-plants/noxious-weeds.aspx
  - Information on identification, Best Management Practices for individual weeds, brochures and other publications, etc.
- King County Lake Stewardship Program: http://www.kingcounty.gov/depts/dnrp/wlr/sections-programs/science-section/lake-stewardship-program.aspx
  - Reports, presentations and resources

City of Kenmore

Questions?

Q & A

City of Kenmore

Networking and Thanks

Thanks for attending!

Janet Quinn, City of Kenmore Project Coordinator, 425-984-6191
Tela Whiteman, City of Kenmore Permit Specialist, 425-984-6164
Rob Zisette, Sr. Aquatic Scientist, Herrera Environmental Consultants, 206-787-8262

APPENDIX B

Aquatic Plant Survey Maps

AQUATIC PLANTS IN SELECTED WATERS OF KING COUNTY

Distribution and Community Composition of Macrophytes

by

J. M. Goodpasture

J. I. Davis

R. I. Matsuda

Municipality of Metropolitan Seattle

Water Quality Division

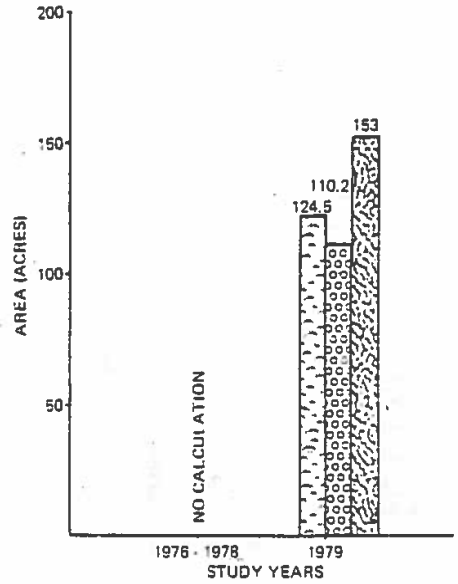
1979

LAKE WASHINGTON - KENMORE AREA

Survey date:
August 30, 1979

SPECIES LIST
- Ceratophyllum demersum (coontail)
- Elodea canadensis (water weed)
- Myriophyllum spicatum (Eurasian water milfoil)
- Nymphaea odorata (fragrant white waterlily)
- Potamogeton berchtoldii (Berchtold's pondweed)
- Potamogeton crispus (curly-leaved pondweed)
- Potamogeton richardsonii (Richardson's pondweed)
- Zannichellia palustris (horned pondweed)

DENSITY: Light; some moderate to dense. Unchanged.



TOTAL BAY AREA 298 ACRES

MAXIMUM POTENTIAL MACROPHYTE COVERAGE 194 ACRES

Fig. 49. Histogram of areal coverages of macrophytes in Kenmore area, 1976-1979.

The overall density of plants in this part of Lake Washington is light. The dominant species are Potamogeton berchtoldii, Ceratophyllum demersum, and Myriophyllum spicatum. P. richardsonii, P. crispus, Zannichellia palustris, and Elodea canadensis are less abundant but still important. In the northern end of this region the plants form an interlocking network of plant beds, each bed being comprised of 2 to 4 species. The map depicts in general what actually appears as a mosaic pattern. The maximal extension of C. demersum toward the deep water shown on the map is approximate. Plant densities were light and distances to shore points great, making accurate determinations difficult.

No significant changes in plant distribution and density appeared to have occurred since 1978.

KENMORE AREA

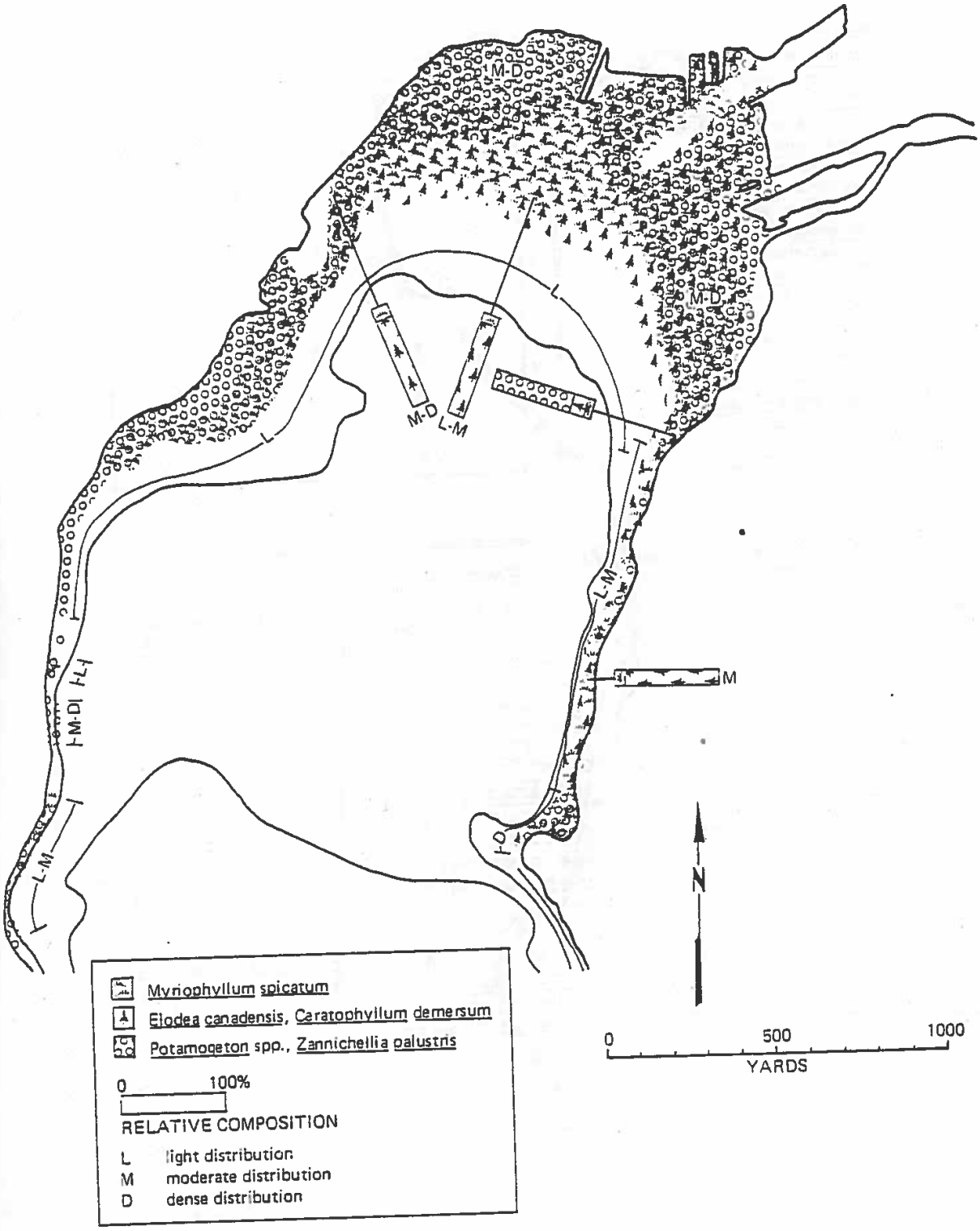


Fig. 50. Contour map showing areal distributions and densities of macrophytes as shown by 1979 survey.

AQUATIC PLANTS IN SELECTED WATERS OF KING COUNTY

Distribution and Community Composition of Macrophytes

by

Clayton R. Patmont, Harper-Owes

J. I. Davis

R. G. Swartz

Municipality of Metropolitan Seattle

Water Quality Division

1981

KENMORE AREA

Survey date:
August 3, 1981
August 4, 1981
August 5, 1981

SPECIES LIST
- Ceratophyllum demersum (coontail)
- Charales (macroalgae)
- Elodea canadensis (water weed)
- Juncus sp. (reed)
- Myriophyllum spicatum (Eurasian water milfoil)
- Najas flexilis (water nymph)
- Nuphar variegatum (yellow water lily)
- Potamogeton berchtoldii (Berchtold's pondweed)
- Potamogeton crispus (curly-leaved pondweed)
- Potamogeton natans (floating-leaf pondweed)
- Potamogeton pectinatus (thin-leaved pondweed)
- Potamogeton richardsonii (Richardson's pondweed)
- Vallisneria americana (tape grass)
- Zannichellia palustris (horned pondweed)

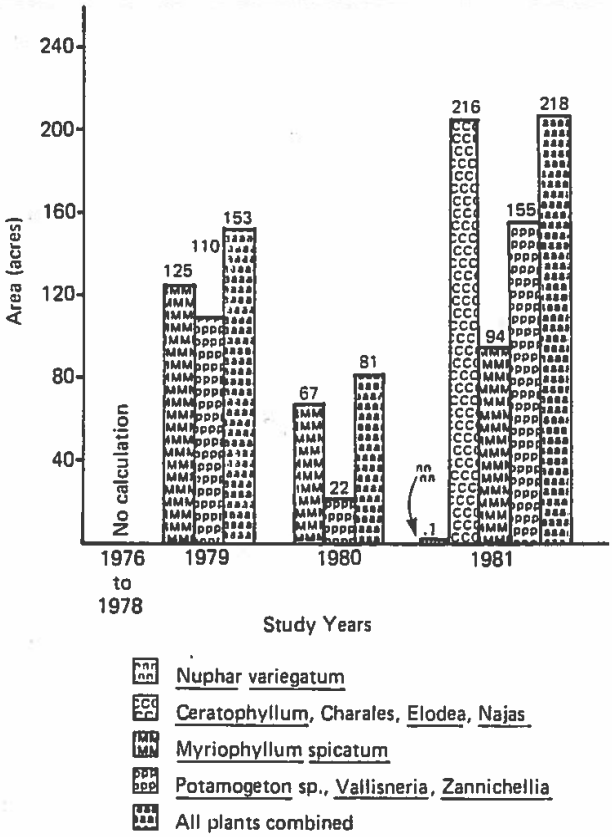


Fig.4-9 Histogram of areal coverages of macrophytes, 1976-1981.

Macrophyte areal coverage in the Kenmore area was substantially greater than in previous survey years, especially relative to 1980 levels. Much of this increase is attributable to extension of the Ceratophyllum population to an average depth of 5.5m. The plant community was dominated by Ceratophyllum; subdominants included Myriophyllum and Potamogeton berchtoldii. Myriophyllum areal coverage in 1981 was less than 1979, but more than 1980 levels. Potamogeton spp. areal coverage expanded well beyond 1979 levels. Plant densities were not markedly different between 1980 and 1981.

The increase in areal coverage above 1980 levels would probably have been more dramatic if the Kenmore navigational channel had not been dredged between the two study periods. The channel extends to a depth of approximately 8m and is devoid of plants.

KENMORE AREA

Just west of the navigation channel a new marina was constructed by soil excavation. No plants were observed in this 4m deep area. The 1981 survey was conducted before Metro's harvesting operations. The possible effect of previous harvests was not assessed.

A large area near the mouth of the Sammamish River was colonized by the benthic (attached to substrate) green alga Hydrodictyon. This alga typically coexisted with macrophytes in sparse and patchy plant communities. Following substantial wind events, large mats of the alga were observed suspended in the water column and often accumulated on leeward shores. Hydrodictyon beds were also reported in the 1980 survey.

KENMORE AREA

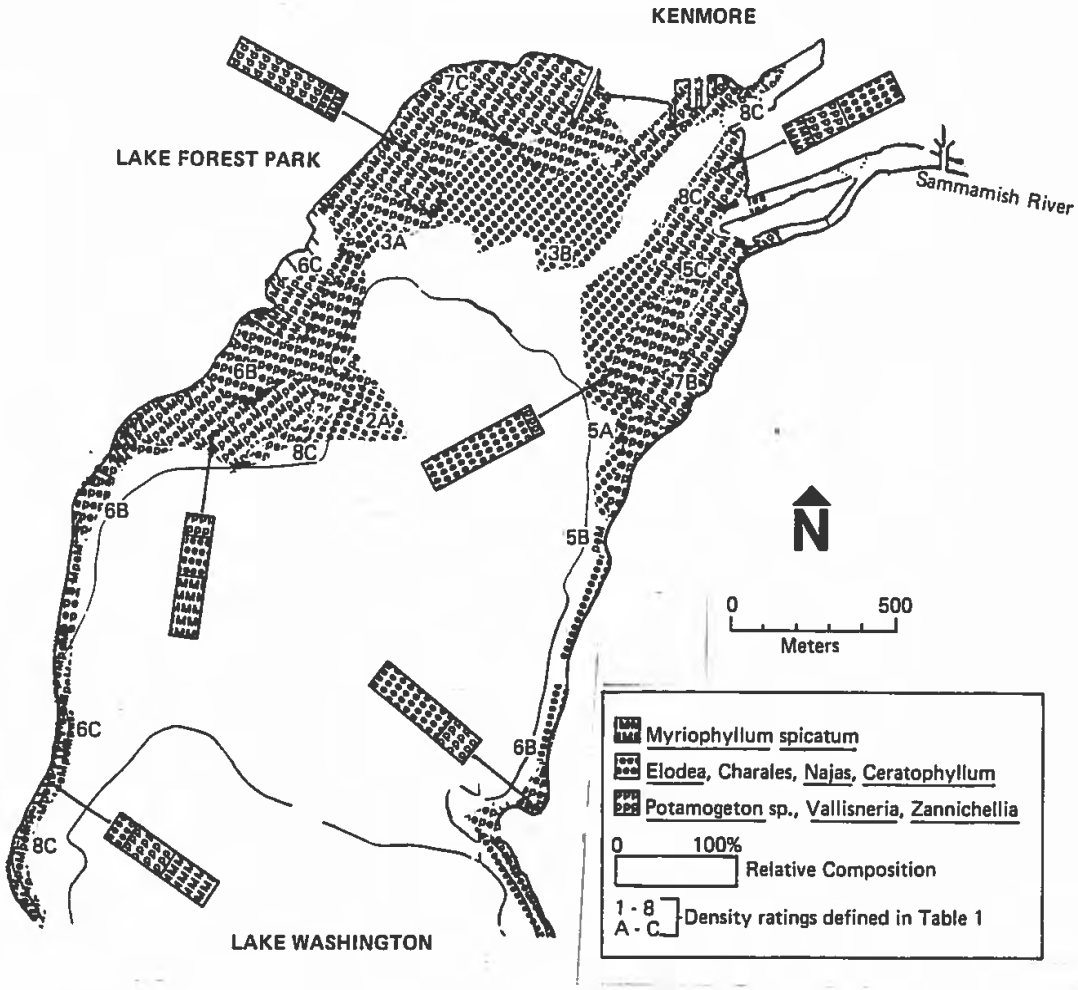
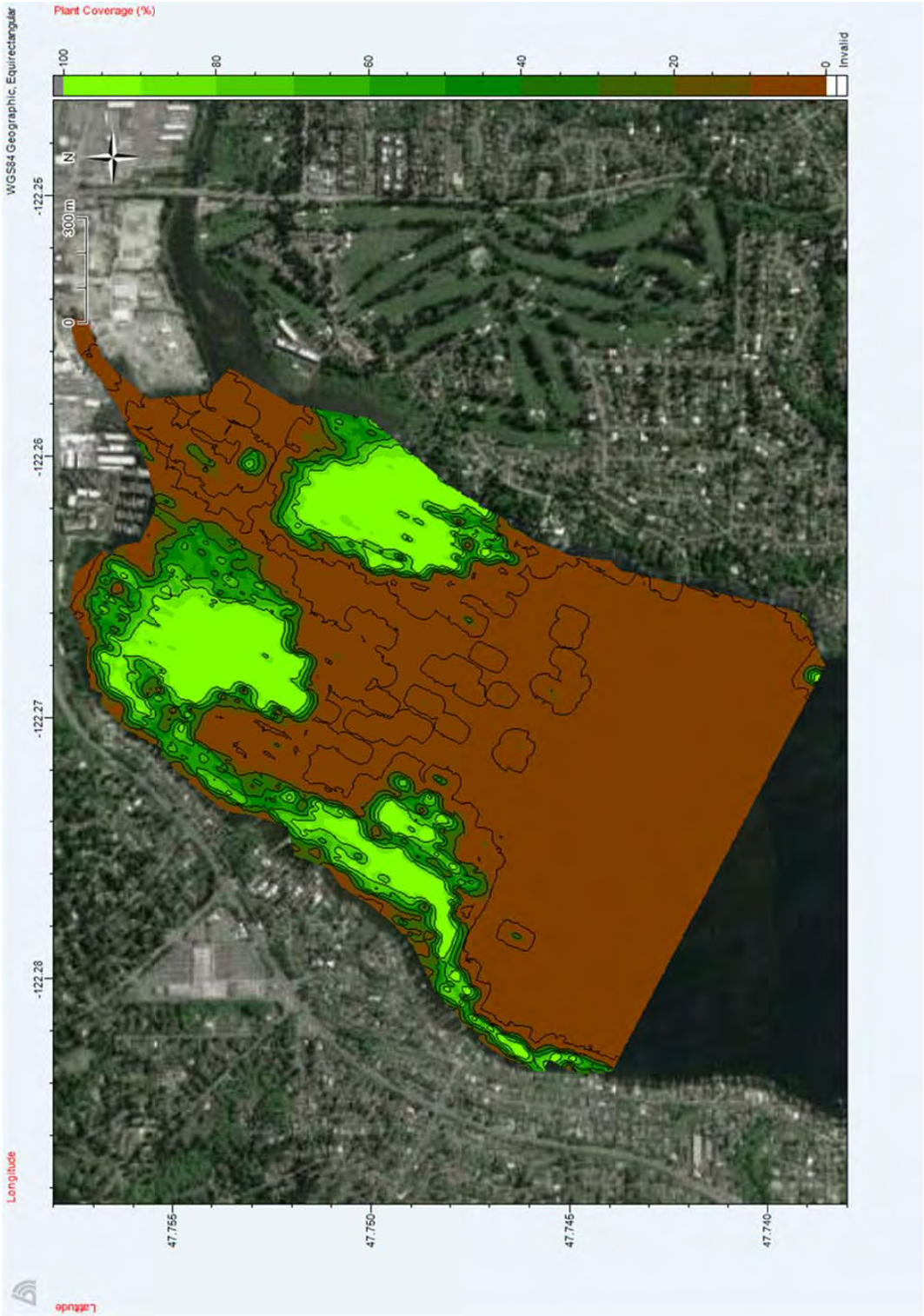
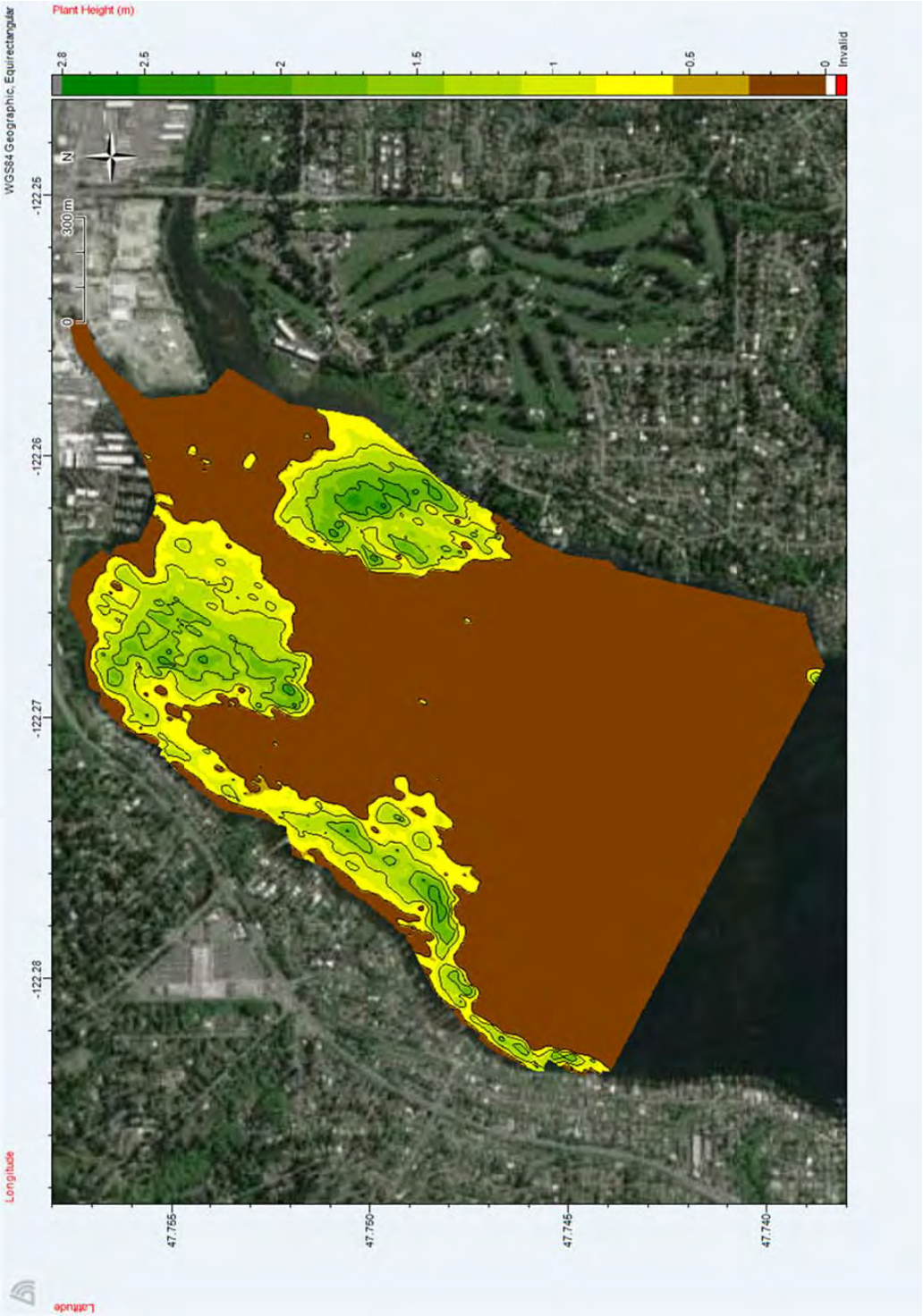


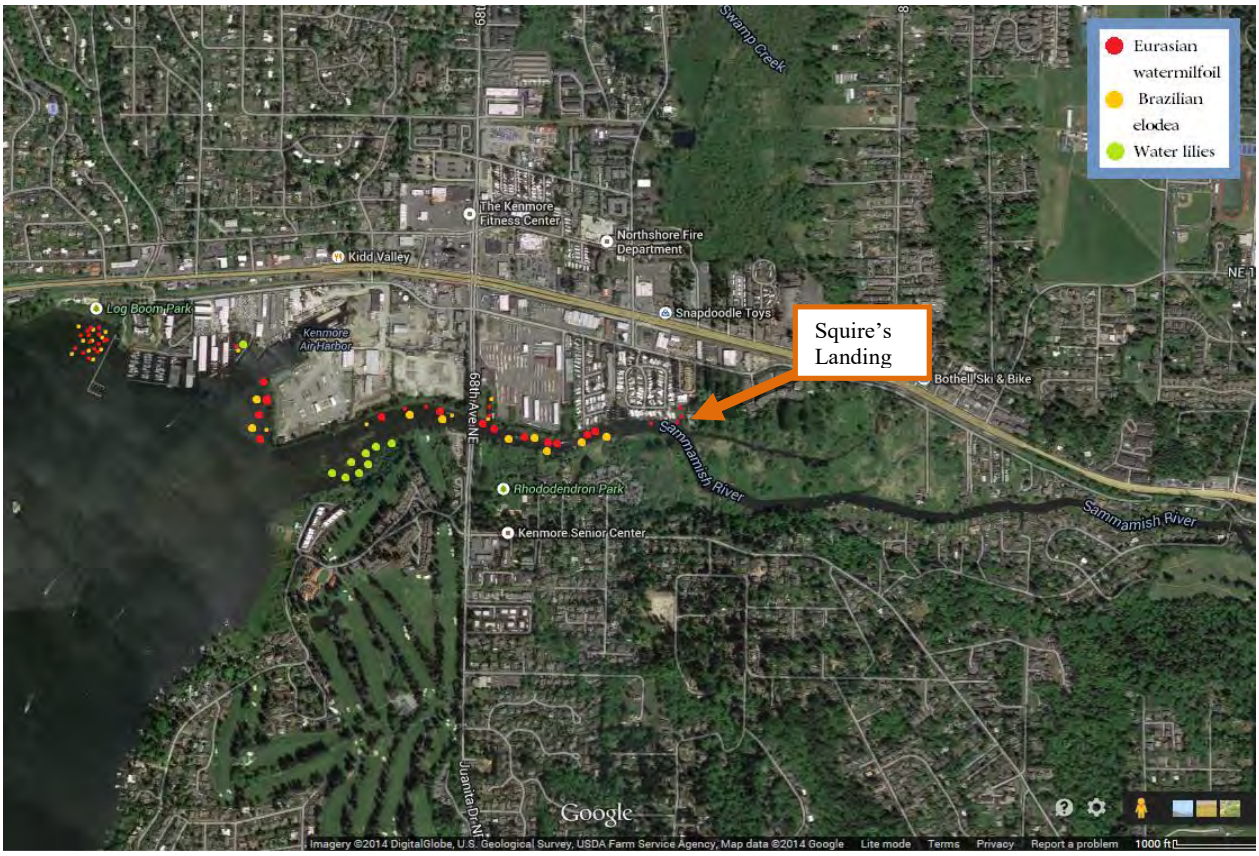
Fig. 4-10 Contour map showing areal distributions and densities of macrophytes as shown by 1981 survey.



North Lake Washington Aquatic Plant Cover on June 19, 2001 (BioSonics 2016).



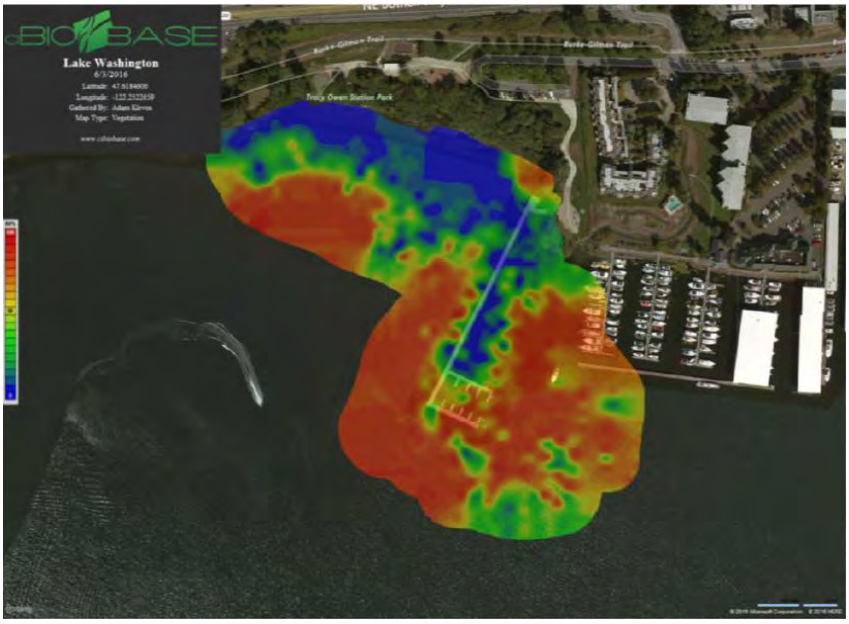
North Lake Washington Aquatic Plant Height on June 19, 2001 (BioSonics 2016).



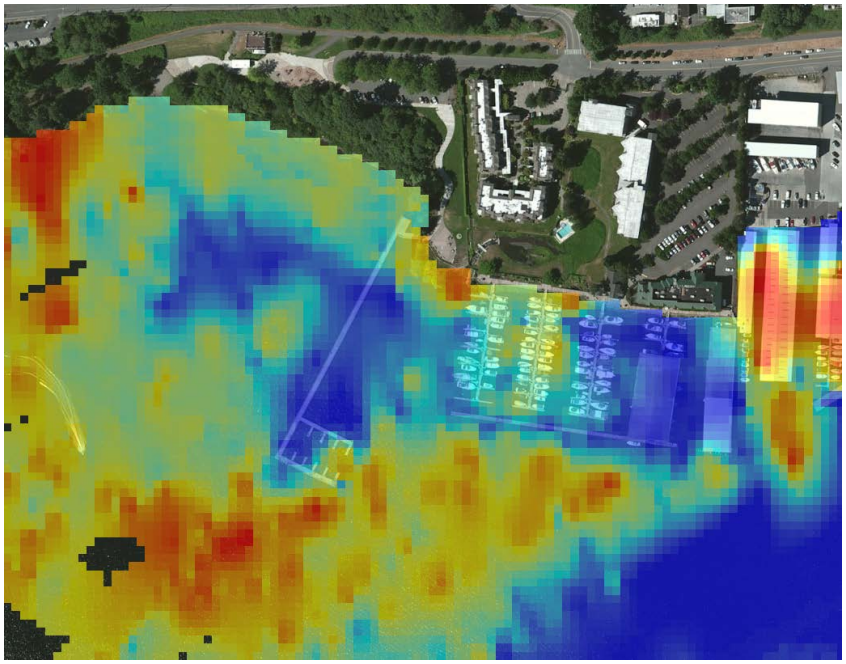
The image above shows the locations of three prominent invasive aquatic weed species, based upon an exploratory survey performed last year (October 2014) by City staff in conjunction with Ben Peterson, Noxious Weed Specialist from the King County Noxious Weed Control Program. We are seeking grant funding to do a more thorough survey, which will also look at weed infestation along Kenmore's portion of the eastern shore of Lake Washington.

Eurasian watermilfoil, Brazilian elodea, and water lilies appeared to be rooted in marked locations, while floating fragments were present almost the entire route between the mouth of the river and Squire's Landing. The total area these plants covered is around 30 acres, from Log Boom Park on the western side of Kenmore to Squire's Landing. This level of infestation would be classified as "Class 2 – Moderate" (locally abundant in patches along the shoreline, total acreage greater than 3 acres). **Note that this survey was done in October, when invasive plants are not as abundant.**

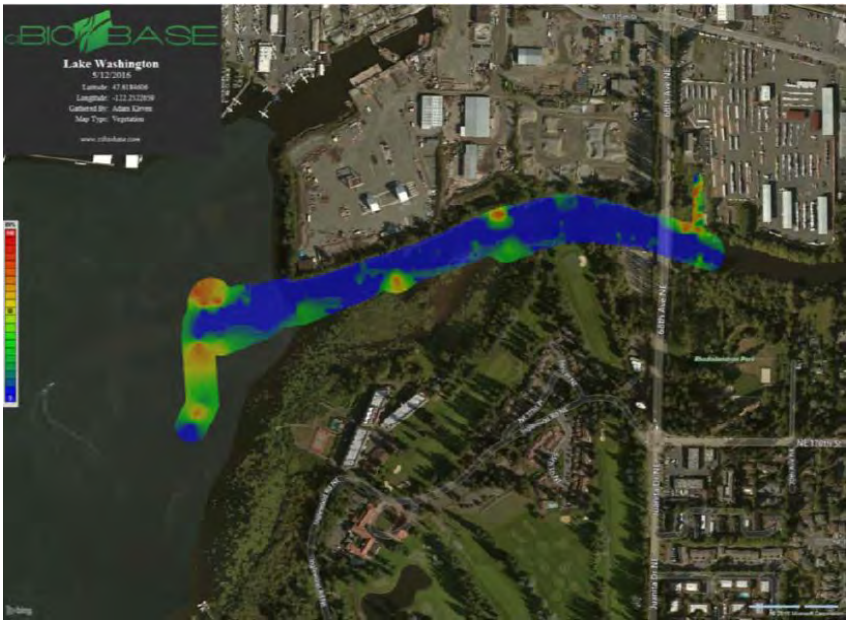
July 2016 Pretreatment Areas: Log Boom Park



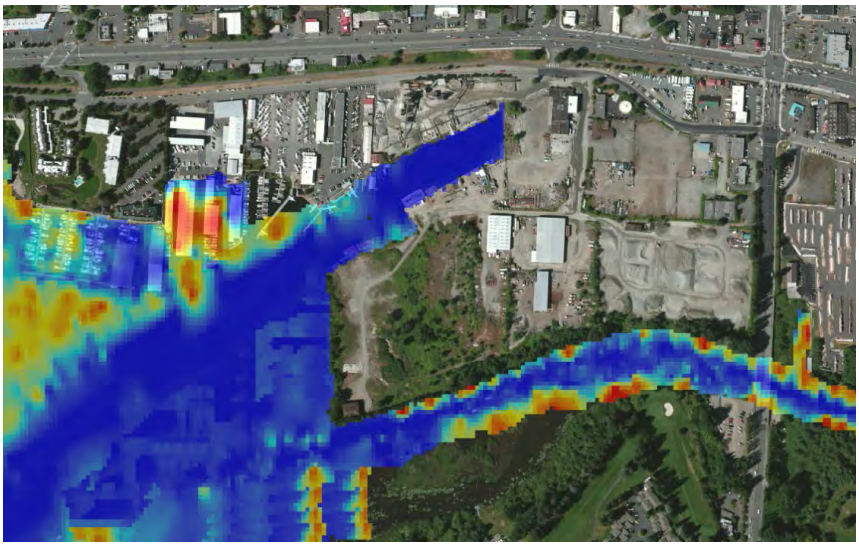
September 2016 Post-Treatment Areas: Log Boom Park



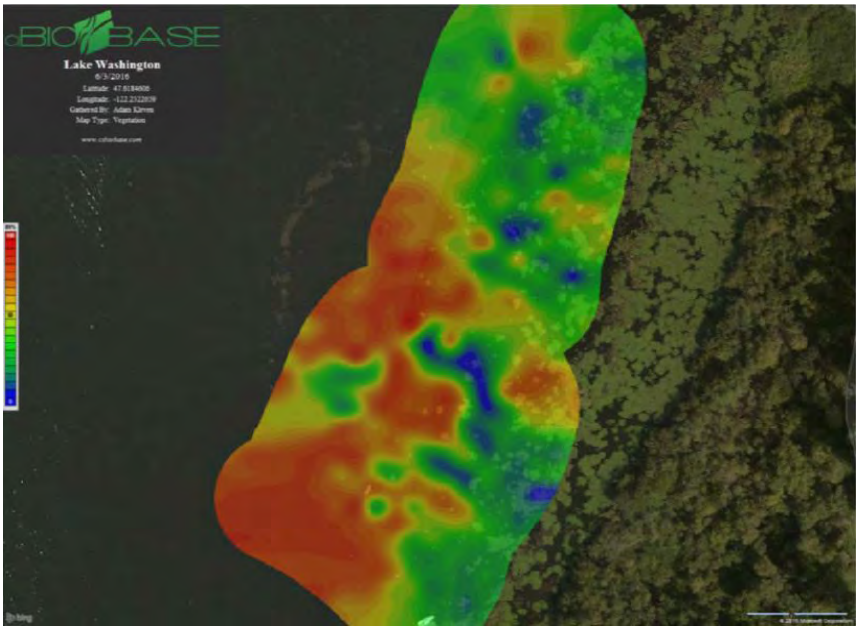
July 2016 Pretreatment Areas: Sammamish River Mouth



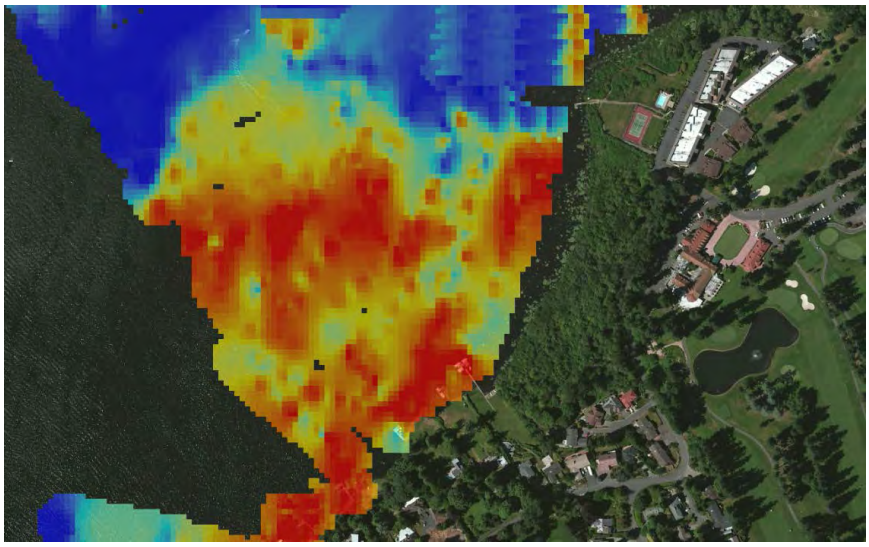
September 2016 Post-Treatment Areas: Sammamish River Mouth



July 2016 Pretreatment Areas: Inglewood Zone



September 2016 Post-Treatment Areas: Inglewood Zone



APPENDIX C

Aquatic Plant Control Alternatives

PLANT CONTROL ALTERNATIVES

CONTENTS

No Action....2
Chemical Herbicides....4
Manual Methods....8
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Diver Dredging....11
Mechanical Dredging....13
Biological Methods....15
Bottom Screening....17
Water Level Drawdown....19
Waterlily Root Mat Removal....20
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This appendix presents information about common methods used to control aquatic weeds. Much of the information in this section was obtained from the Citizen's Manual for Developing IAVMPs (Ecology 1994) and Washington State Department of Ecology (Ecology) Aquatic Plant Management website (Ecology 2017). It is important to note that some of the information obtained from Ecology 2017 is out of date, and this website is being updated by Ecology.

Control and eradication methods discussed below include: chemical treatments; manual methods such as mechanical hand-pulling, raking, and cutting; mechanical methods such as mechanical harvester, mechanical weed cutters, and Rotovators; diver dredging and mechanical dredging; biological control methods such as the introduction of grass carp; and other methods including bottom screening, water level drawdown, Aquamog dredging, and DinoSix dredging. Table B-1 designates plant control activities that need an Aquatic Plant and Algae Management General Permit from Ecology or a Hydraulic Project Approval (HPA) permit/authorization from the Washington Department of Fish and Wildlife (WDFW).

Table B-1. Permit Requirements for Aquatic Noxious Weed and Beneficial Plant Control.

	Aquatic Noxious Weeds			Aquatic Beneficial Plants		
Control Method	**Pamphlet HPA**	**Pamphlet HPA and WDFW Authorization**	**Individual HPA**	**Pamphlet HPA**	**Pamphlet HPA and WDFW Authorization**	**Individual HPA[a]**
Chemical Herbicides	Requires Aquatic Plant and Algae Management General Permit from Ecology					
Hand Pulling or Other Hand Tools	X			X	X[b]	
Mechanical Cutting and Harvesters	X				X	
Rotovators			X			X
Diver Dredges	X	X[b]			X	
Mechanical Dredges			X			X
Grass Carp	Requires Grass Carp Stocking Permit and Individual HPA (for outlet structure) from WDFW					
Bottom Barriers	X	X[b]		X	X[b]	
Water Level Drawdown			X			X

[a] Applicants may apply for Individual HPAs for projects that exceed pamphlet limitations.

[b] Prior authorization is needed from WDFW for projects that exceed specified thresholds.

HPA =- Hydraulic Project Approval

WDFW = Washington State Department of Wildlife

Source: WDFW 2015.

No Action

The first alternative considered was the "No Action" alternative to let aquatic weeds continue to grow and do nothing to control them. This "no action" alternative would acknowledge the presence of the aquatic weeds but would not outline any management plan or enact any

planned control efforts. Effectively, a “no action” alternative would preclude any integrated treatment and/or control effort, placing the choice and responsibility of aquatic weed control with lakefront property owners.

This management plan is primarily focused on the eradication of noxious weeds and the control of nonnative and native nuisance aquatic plants. Both noxious and nuisance plants have reduced the beneficial uses of the lake. Several different alternatives to control (or eradicate) these plants are presented in this plan. However, the “no action” alternative was examined as a reference for all other proposed control techniques.

It is very likely that all beneficial uses of the lake will continue to be further degraded if no aquatic plant control methods are implemented. Because the lake is eutrophic, a shallow lake with high nutrient conditions, the aquatic plants are able to absorb nutrients from sediments and the water column, making the likelihood of further plant growth certain. Therefore, the "no-action" alternative is not acceptable due to the further reduction of beneficial uses of the lake (boating, fishing, and swimming). Other negative environmental impacts include a definite degradation of the overall aesthetics. The fish communities may be impacted directly (e.g., lack of dissolved oxygen) or indirectly (i.e., changes in food web dynamics) with an overabundance of aquatic plants. Loss of open water may also restrict waterfowl use and habitat. Excessive aquatic plants also influence water quality by causing more pronounced temperature stratification and potentially a reduction in water circulation.

Chemical parameters such as pH, alkalinity, and dissolved oxygen may also be impacted through alteration of biological processes such as photosynthesis, respiration, and decomposition.

Advantages and Disadvantages

Advantages of the No Action alternative include:

- No treatment cost.
- No herbicide concerns.
- No need for permits.

Disadvantages of the No Action Alternative include:

- Quality of the lake will continue to decline.
- Recreational opportunities will decline.
- Fish and wildlife habitat will be reduced or impaired.
- Property values will decline.

Suitability for Kenmore

Unless control measures are enacted, the coverage of nuisance aquatic plants is likely to increase. This could degrade water quality and reducing the diversity of native aquatic plants. The "no action" alternative is not acceptable by members of the Kenmore steering committee.

CHEMICAL HERBICIDES

Aquatic herbicides are chemicals specifically formulated for use in water to eradicate or control aquatic plants. Aquatic herbicides are sprayed directly onto floating or emergent aquatic plants, or are applied to the water in either a liquid or pellet form. Systemic herbicides can kill the entire plant by translocating from foliage or stems and killing the root. Contact herbicides cause the parts of the plant in contact with the herbicide to die back, leaving the roots alive and capable of regrowth (chemical mowing). Non-selective herbicides will generally affect all plants that they contact. Selective herbicides will affect only some plants.

To be approved for use in aquatic environments, an herbicide must pass stringent toxicity testing by the federal government. These tests are designed to assess impacts to the target population (plants) as well as non-target populations such as fish, aquatic insects, and other organisms. The tests also examine what happens to the chemical over the long term to ensure the chemical quickly breaks down into a nontoxic form or becomes unavailable for uptake by aquatic organisms. Washington State has set more stringent standards. Therefore, some of the aquatic herbicides approved for use in the United States are not approved for use in Washington.

Because of environmental risks from improper application, aquatic herbicide use in Washington State waters is regulated and has certain restrictions. The Washington State Department of Agriculture must license aquatic applicators. In addition, an Aquatic Plant and Algae Management General Permit is required from Ecology for herbicide applications. This permit is a combined National Pollutant Discharge Elimination System (NPDES) and State Waste Discharge General Permit. It covers the in-water and shoreline (including roadsides and ditch banks) treatment of native and noxious plants and algae. It also covers nutrient inactivation treatments. The permit allows the discharge of a specific list of aquatic labeled herbicides, algaecides, biological water clarifiers, adjuvants, marker dyes, and nutrient inactivation products into the freshwaters of Washington (Ecology 2016).

Although there are a number of herbicides registered for aquatic use by the US Environmental Protection Agency (US EPA), Ecology currently issues permits for 17 aquatic herbicides.

Only herbicides known to be effective on the target species and approved for use in Washington State were considered for this plan. A brief discussion of these herbicides from Ecology (follows below:

- **Glyphosate** – (trade names for aquatic products with glyphosate as the active ingredient include Rodeo®, AquaMaster®, and AquaPro®). This systemic broad-spectrum herbicide is used to control floating-leaved plants like waterlilies and shoreline plants like purple loosestrife. It is generally applied as a liquid to the leaves. Glyphosate does not work on underwater plants such floating bladderwort. Although glyphosate is a broad spectrum, non-selective herbicide, a good applicator can somewhat selectively remove targeted plants by focusing the spray only on the plants to be removed. Plants can take several weeks to die and a repeat application is often necessary to remove plants that were missed during the first application.

- **Diquat** – (trade names for aquatic products with diquat as the active ingredient include Reward®). Diquat is a fast-acting non-selective contact herbicide which destroys the vegetative part (e.g., leaves) of the plant but does not kill the roots. It is applied as a liquid. Typically, diquat is used primarily for short term (one season) control of a variety of submersed aquatic plants. It is very fast-acting and is suitable for spot treatment. However, turbid water or dense algal blooms can interfere with its effectiveness.

- **Triclopyr** – (trade name Renovate3®). There are two formulations of triclopyr. It is the triethylamine salt (TEA) formation of triclopyr that is registered for use in aquatic or riparian environments. Triclopyr, applied as a liquid or in granular form, is a relatively fast-acting, systemic, selective herbicide. In Washington, it is most commonly used for used for the control of Eurasian watermilfoil. Triclopyr is very useful for purple loosestrife control since native grasses and sedges are unaffected by this herbicide. When applied directly to water, Ecology has imposed a 12-hour swimming restriction to minimize eye irritation. Triclopyr received its aquatic registration from the US EPA in 2003 and was allowed for use in Washington in 2004.

- **Imazapyr** – (trade name Habitat®). This systemic broad spectrum, slow-acting herbicide, applied as a liquid, is used to control emergent plants like spartina, reed canarygrass, and phragmites and floating-leaved plants like water lilies. Imazapyr does not work on underwater plants such as Eurasian watermilfoil. Although imazapyr is a broad spectrum, non-selective herbicide, a good applicator can somewhat selectively remove targeted plants by focusing the spray only on the plants to be removed. Imazapyr was allowed for use in Washington in 2004.

Advantages and Disadvantages

Advantages of herbicides include:

- Aquatic herbicide application can be less expensive than other aquatic plant control methods.

- Aquatic herbicides generally provide a high level of control.

- Aquatic herbicides are easily applied around docks and underwater obstructions.
- Many herbicides are fast acting.

Disadvantages of herbicides include:

- Some herbicides have swimming, drinking, fishing, irrigation, and water use restrictions.
- Herbicide use may have unwanted impacts to people who use the water and to the environment.
- Non-targeted plants as well as nuisance plants may be controlled or killed by some herbicides.
- Depending on the herbicide used, it may take several days to weeks or several treatments during a growing season before the herbicide controls or kills treated plants.
- To be most effective, generally herbicides must be applied to rapidly growing plants.
- Some expertise in using herbicides is necessary to be successful and to avoid unwanted impacts.
- Many people have strong feelings against using chemicals in water.
- Some cities or counties may have policies forbidding or discouraging the use of aquatic herbicides.

Permits and Costs

An Aquatic Plant and Algae Management General Permit is needed for any herbicide application. The City of Kenmore may be required to monitor herbicide levels in the lake as part of the permit process. The requirement of monitoring of herbicide levels started in 2003, whether the chemical has been applied directly to the water or along the shoreline where it may have gotten into the adjacent surface water. The applicator must apply to Ecology for coverage under their permit every 5 years. The permit is approximately $500 and will be billed once the permit is approved. Ecology requires that a Discharge Management Plan and State Environmental Protection Act checklist be submitted with the permit application. An IAVMP may be submitted in lieu of a Discharge Management Plan. There are no additional permit requirements from the City of Kenmore.

Approximate costs for 1 acre of herbicide treatment (costs will vary from site to site) are:

- Glyphosate: $350
- Diquat: $500

- Triclopyr: $700
- Imazapyr: $700

Other Considerations

The US EPA conducts very thorough risk assessments of all pesticides approved for use in the United States. These tests evaluate human exposure risks as well as risks posed to the environment resulting from persistence, accumulation, and mobility in the environment. Complete assessments are available from US EPA or the pesticide manufacturers. The state of Washington sets more stringent standards than the US EPA when considering which pesticides to allow.

Suitability for Kenmore

Aquatic herbicides can provide an effective method for control and eventual eradication of noxious weeds. Four primary herbicides were considered for use in this plan: glyphosate, triclopyr, imazapyr, and diquat (described below). Glyphosate can be used to treat fragrant waterlily, as well as emergent species, including purple and garden loosestrife. Triclopyr can be used for submersed Eurasian watermilfoil and emergent species. King County has found that imazapyr works better than glyphosate or triclopyr for controlling garden loosestrife (B. Peterson, personal communication). Diquat will be used for control of submersed plants including Brazilian elodea and nuisance native aquatic plants. Glyphosate was selected for control of fragrant waterlily because it has been effectively used in Lake Washington and many other lakes in the region. Triclopyr and diquat were selected because they can effectively control submersed aquatic plants.

All four herbicides are approved for aquatic use in Washington State based on environmental impact studies. As a result of these studies, there are many other herbicides allowed by the US Environmental Protection Agency (US EPA), but prohibited for use in Washington State. Full precautions will be taken during applications in Kenmore to ensure that herbicide levels do not exceed the amounts at which these hazards arise by not exceeding amounts specified by US EPA on the product label.

Follow-up control methods (hand pulling and/or cutting) will focus specifically on the target species and should also leave beneficial plants intact. An experienced herbicide applicator can selectively target individual weed species and limit collateral damage to other species to a minimum. This is especially true when infestations are small so that large areas with a diverse plant distribution don't have to be treated.

Manual Methods

Manual methods include hand-pulling, raking, and cutting, described as follows.

- **Hand-pulling** aquatic plants is similar to pulling weeds out of a garden. It involves removing entire plants (leaves, stems, and roots) from the area of concern and disposing of them in an area away from the shoreline. In water less than 3 feet deep, no specialized equipment is required, although a spade, trowel, or long knife may be needed if the sediment is packed or heavy. In deeper water, hand pulling is best accomplished by divers with SCUBA equipment and mesh bags for the collection of plant fragments. Some sites may not be suitable for hand pulling such as areas where deep flocculent sediments may cause a person hand pulling to sink deeply into the sediment.

- **Raking** requires a sturdy rake for removing aquatic plants. Attaching a rope to the rake allows removal of a greater area of weeds. Raking literally tears plants from the sediment, breaking some plants off and removing some roots as well. Specially designed aquatic plant rakes are available. Rakes can be equipped with floats to allow easier plant and fragment collection. The operator should pull towards the shore because a substantial amount of plant material can be collected in a short distance.

- **Cutting** differs from hand pulling in that plants are cut and the roots are not removed. Cutting is performed by standing on a dock or on shore and throwing a cutting tool out into the water. A non-mechanical aquatic weed cutter is commercially available. Two single-sided, razor-sharp stainless steel blades forming a "V" shape are connected to a handle, which is tied to a long rope. The cutter can be thrown about 20 to 30 feet into the water. As the cutter is pulled through the water, it cuts a 48-inch-wide swath. Cut plants rise to the surface where they can be removed. Washington State requires that cut plants be removed from the water. The stainless steel blades that form the "V" are extremely sharp, and great care must be taken with this implement. It should be stored in a secure area where children do not have access.

Advantages and Disadvantages

Advantages of manual methods include:

- Small infestations can be eradicated.
- The equipment is inexpensive.
- Easy to use around docks and swimming areas.
- Many manual methods can be carried out by trained volunteers and shoreline residents.

- Hand-pulling allows the flexibility to remove undesirable aquatic plants while leaving desirable plants.
- These methods are environmentally safe.

Disadvantages of manual methods include:

- Hand-pulling is a high-cost method.
- Because these methods are labor intensive, they may not be practical for large areas or for thick weed beds.
- As plants regrow or fragments recolonize the cleared area, the treatment may need to be repeated several times each summer.
- Even with the best containment efforts, it is difficult to collect all plant fragments, leading to recolonization for some plants.
- Some plants, like waterlilies, which have massive rhizomes, are difficult to remove by hand pulling.
- Pulling weeds and raking stirs up the sediment making it difficult to see remaining plants. Sediment re-suspension can also increase nutrient levels in lake water.
- Hand pulling and raking impacts bottom-dwelling animals.
- The V-shaped cutting tool is extremely sharp and can be dangerous to use.

Permits and Costs

Manual removal of aquatic plants in Washington requires compliance with the Aquatic Plants and Fish pamphlet (WDFW 2015) for control of noxious weeds, or an individual HPA permit for control of native plants in a large area. Hand-pulling, raking, and mechanical cutting are two methods commonly used by residents that do not require an authorization or an individual HPA permit for control of aquatic noxious weeds.

Hand-pulling costs up to $130 for the average waterfront lot for a hired commercial puller. A commercial grade weed cutter costs about $130 with accessories. A commercial rake costs about $95 to $125. A homemade weed rake costs about $85 (asphalt rake is about $75 and the rope costs 35 to 75 cents per foot).

Other Considerations

The community may need to invest money into buying the equipment and operation. Manual methods must include regular scheduled surveys to determine the extent of the remaining

weeds and/or the appearance of new plants after eradication has been attained. This is a large time investment by lakeside residents.

Suitability for Kenmore

Diver hand-pulling is not recommended for floating leaved plants due to difficulties with root (rhizome) removal, and is not cost-effective for control of large areas of nuisance submersed plants due to diver expense and fragment release.

Raking can be used to control nuisance submersed plants, especially in early summer when it begins to reach the water. Nuisance submersed plants are easily removed by rakes, but raking will generate fragments that may spread to other areas if they are not properly contained. However, most nuisance plants are already widespread throughout the lake, so fragmentation is not a huge issue. Prior authorization is needed from WDFW for projects that exceed specified thresholds, which is 50 percent of the littoral zone.

Mechanical Methods

Mechanical methods include mechanical harvesters, mechanical weed cutters, rotovators, and mechanical dredging.

- **Mechanical harvesters** are large machines, which both cut and collect aquatic plants. Cut plants are removed from the water by a conveyor belt system and stored on the harvester until disposal. A barge may be stationed near the harvesting site for temporary plant storage or the harvester carries the cut weeds to shore. The shore station equipment is usually a shore conveyor that mates to the harvester and lifts the cut plants into a dump truck. Harvested weeds are disposed of in landfills, used as compost, or in reclaiming spent gravel pits or similar sites.

- Mechanical weed cutters cut aquatic plants several feet below the water's surface. Unlike harvesting, cut plants are not collected while the machinery operates.

- Rotovators use underwater rototiller-like blades to uproot fragrant waterlily plants. The rotating blades churn 7 to 9 inches deep into the lake or river bottom to dislodge plant root crowns that are generally buoyant. The plants and roots may then be removed from the water using a weed rake attachment to the rototiller head or by harvester or manual collection.

Advantages and Disadvantages

Advantages of mechanical methods include:

- Large areas can be treated.
- No chemical residue.
- Harvesters will collect plant fragments.
- Rotovators will negatively impact plant roots.
- Weed cutters have a low operation cost.

Disadvantages of mechanical methods include:

- Increased fragment drift and difficulty in plant collection, which can create new plant populations elsewhere in the lake.
- These machines are difficult to navigate around docks and other obstacles.
- Difficult to maneuver in shallow water.
- Rotovators can stir up sediments and negatively impact water quality.

Permits and Costs

Mechanical methods may require an individual HPA permit from WDFW.

Other Considerations

None.

Suitability for Kenmore

Mechanical harvesting was identified as a suitable control method for Kenmore because it is relatively cost effective, chemical-free, and can treat large public areas while collecting plant fragments.

Diver Dredging

Diver dredging (suction dredging) is a method whereby SCUBA divers use hoses attached to small dredges (often dredges used by miners for mining gold from streams) to suck plant material from the sediment. The purpose of diver dredging is to remove all parts of the plant including the roots. A good operator can accurately remove target plants, like fragrant waterlily, while leaving native species untouched. The suction hose pumps the plant material and the sediments to the surface where they are deposited into a screened basket. The water and sediment are returned to the water column (if the permit allows this), and the plant material is retained. The turbid water is generally discharged to an area curtained off from the rest of the lake by a silt curtain. The plants are disposed of on shore.

Removal rates vary from approximately 0.25 acre to 1 acre per day, depending on plant density, sediment type, size of team, and diver efficiency. Diver dredging is more effective in areas where softer sediment allows easy removal of the entire plants, although water turbidity is increased with softer sediments. Harder sediment may require the use of a knife or tool to help loosen sediment from around the roots. In very hard sediments, some plants tend to break off leaving the roots behind and defeating the purpose of diver dredging.

Advantages and Disadvantages

Advantages of diver dredging include:

- Diver dredging can be a very selective technique for removing pioneer colonies of submersed noxious weeds.
- Divers can remove plants around docks and in other difficult to reach areas.
- Diver dredging can be used in situations where herbicide is not an option for aquatic plant management.

Disadvantages of diver dredging include:

- Diver dredging is very expensive.
- Dredging stirs up large amounts of sediment. This may lead to the release of nutrients and buried toxic materials into the water column.
- Only the tops of plants growing in rocks or hard sediments may be removed, leaving a viable root crown behind to initiate growth.
- In some states, acquisition of permits can take years.

Permits and Costs

Permits are required for many types of projects in lakes and streams. Diver dredging requires an HPA permit WDFW. Diver dredging may also require a Section 404 permit from the US Army Corps of Engineers. Depending on the density of the plants, specific equipment used, number of divers and disposal requirements, costs can range from a minimum of $1,500 to $2,000 per day.

Other Considerations

Diver dredging could be useful for spot control in subsequent years (coordinated with diver survey).

Suitability for Kenmore

Diver dredging removes the plant in its entirety. It removes the biomass above the sediment as well as roots and tubers in the sediment. This alternative is best used for a pioneering infestation of invasive submersed plants in soft sediments. Because diver dredging causes excessive stirring up of sediments, this method is not recommended.

Mechanical Dredging

Mechanical dredging uses large, barge-mounted excavation or suction equipment to remove sediment and associated plant material from the lake bottom. Mechanical dredging may be a suitable waterlily control strategy and a method for preventing problems with waterlily rhizome mats.

Advantages and Disadvantages

Advantages of mechanical dredging:

- Increases lake depth.
- No chemical residue.
- Large areas can be treated.
- Eliminates problems with floating rhizome mats.

Disadvantages of mechanical dredging:

- High cost: depending on the depth of material removed and area dredged, cost estimates range from about $30,000 to $200,000 per treatment.

- Material disposal: the material that is dredged needs to be disposed somewhere. Trucking and disposal at landfills or off-site facilities can potentially equal the cost of treatment as more heavy equipment is involved and time is consumed.
- Permits may be difficult to obtain.
- This method is slow (only about 100 cubic yards, or about 1/6 of an acre removing 1 foot of sediment, per day).
- Dredging can release nutrients from the sediment.

Permits and Costs

Mechanical dredging requires an individual HPA permit from WDFW. Dredging represents a significant disturbance to the lake substrate requiring a detailed environmental evaluation to obtain permits.

Other Considerations

Dredged material would need to be loaded onto trucks and taken off site for disposal. This would represent a significant cost. It also may be logistically difficult to maneuver heavy equipment to and from the lakeshore due to access restrictions. A rough cost estimate was obtained from Aquamog, a regional operator of sediment excavation equipment. While there are many cost considerations, removal of approximately 2 feet of sediment would cost about $45,000 per acre.

Aquamog Dredging

The Aquamog is owned and operated by Aquatic Environments, Inc. of California. The Aquamog has many configurations, but the one most suitable for removing sediment and rhizome mats is essentially a toothed clamshell bucket on a dredge-mounted excavator arm. Material removed by the Aquamog may be loaded onto a small barge or directly deposited on shore, and then offloaded into a truck where it would be hauled off site.

Dredging using the Aquamog machine is expensive. An estimate obtained for Aquamog indicated that dredging 2 feet of material from the lake bottom would cost approximately $45,000 per acre not including hauling and disposal cost, which often doubles the project cost, according to the Aquatic Environments representative. The amount of material removed from a depth of 2 feet in 1 acre is equivalent to 3,227 cubic yards. The Aquamog machine works at a rate of about 1 acre every 2 weeks. The cost of planning and obtaining permits needed to perform this type of work is estimated to be about $10,000. Thus, the total cost for dredging and disposal of 3,227 cubic yards from 1 acre is estimated to be approximately $100,000.

DinoSix Dredging

The DinoSix is a hydraulic dredge with a rotating cutterhead. The DinoSix pumps the dredged material directly into a 105-foot by 25-foot geotextile bag located on shore. The bag needs to be placed on a flat surface and would fill to a height of approximately 3 feet, containing approximately 3,000 cubic yards of material and representing approximately 2 feet of material from 1 acre. The bag needs to be drained for a period of 3 to 4 months before the dry material can be removed from the bags and hauled off site.

It was estimated by Sediment Removal Solutions that the geotextile bag would be filled in 5 days at a cost of approximately $30,000. Assuming an equivalent cost for disposal and $10,000 for planning and permitting, the total cost for dredging and disposal of approximately 3,000 cubic yards from 1 acre with the DinoSix is estimated to be approximately $70,000.

The DinoSix is recommended over the Aquamog for dredging due to the lower cost. In addition, the DinoSix is expected to have fewer water quality impacts during hydraulic dredging than mechanical removal by the Aquamog.

Biological Methods

Milfoil weevils are a possible treatment option for Eurasian watermilfoil. The milfoil weevil, *Euhrychiopsis lecontei*, has been associated with declines of Eurasian watermilfoil (*Myriophyllum spicatum*) in the United States (e.g., Illinois, Minnesota, Vermont, and Wisconsin). Researchers in Vermont found that the milfoil weevil can negatively impact Eurasian watermilfoil by suppressing the plants growth and reducing its buoyancy (Creed and Sheldon 1995). In 1989, state biologists reported that Eurasian watermilfoil in Brownington Pond, Vermont had declined from approximately 10 hectares (in 1986) to fewer than 0.5 hectares. Researchers from Middlebury College, Vermont hypothesized that the milfoil weevil, which was present in Brownington Pond, played a role in reducing Eurasian watermilfoil (Creed and Sheldon 1995). During 1990 through 1992, researchers monitored the populations of Eurasian watermilfoil and the milfoil weevil in Brownington Pond. They found that by 1991 Eurasian watermilfoil cover had increased to approximately 2.5 hectares (approximately 55 to 65 g/m^2) and then decreased to about 1 hectare (<15 g/m^2) in 1992. Weevil abundance began increasing in 1990 and peaked in June of 1992, where 3 to 4 weevils (adults and larvae) per stem were detected (Creed and Sheldon 1995). These results supported the hypothesis that the milfoil weevil played a role in reducing Eurasian watermilfoil in Brownington Pond.

Another documented example where a crash of Eurasian watermilfoil has been attributed to the milfoil weevil is in Cenaiko Lake, Minnesota. Researchers from the University of Minnesota reported a decline in the density of Eurasian watermilfoil from 123 g/m^2 in July of 1996 to 14 g/m^2 in September of 1996. Eurasian watermilfoil remained below 5 g/m^2 in 1997, then increased to 44 g/m^2 in June and July of 1998 and declined again to 12 g/m^2 in September of 1998 (Newman and Biesboer 2000). In contrast, researchers found that weevil abundance in Cenaiko Lake was 1.6 weevils (adults and larvae) per stem in July of 1996. Weevil abundance,

however, decreased with declining densities of Eurasian watermilfoil in 1996 and by September 1997 weevils were undetectable. In September of 1998 weevil abundance had increased to >2 weevils per stem (Newman and Biesboer 2000).

Based on observations made by researchers in Vermont, Ohio and Wisconsin it seems that having 2 weevils (or more) per stem is adequate to control Eurasian watermilfoil. However, as indicated by the study conducted in Cenaiko Lake, Minnesota, an abundance of 1.5 weevils per stem may be sufficient in some cases (Newman and Biesboer 2000).

In Washington State, the milfoil weevil is present primarily in eastern Washington and occurs on both Eurasian and northern watermilfoil (*M. sibiricum*), the latter plant being native to the state (Tamayo et. al. 1999). During the summer of 1999, researchers from the University of Washington determined the abundance of the milfoil weevil in 11 lakes in Washington. They found that weevil abundance ranged from undetectable levels to 0.3 weevils (adults and larvae) per stem. Fan Lake, Pend Oreille County, had the greatest density per stem or 0.6 weevils (adults, larvae, and eggs per stem). The weevils were present on northern watermilfoil. These abundance results are well below the recommendations made by other researchers in Minnesota, Ohio, Vermont, and Wisconsin of having at least 1.5 to 2.0 weevils per stem in order to control Eurasian watermilfoil.

To date, there have not been any documented declines of Eurasian watermilfoil in Washington State that can be attributed to the milfoil weevil, although Creed speculated that declines of Eurasian watermilfoil in Lake Osoyoos and the Okanogan River may have been caused by the milfoil weevil. In Minnesota, Cenaiko Lake is the only lake in that state that has had a Eurasian watermilfoil crash due to the weevil; other weevil lakes are yet to show declines in Eurasian watermilfoil. Researchers in Minnesota have suggested that sunfish predation may be limiting weevil densities in some lakes (Sutter and Newman 1997). The latter may be true for Washington State as sunfish populations are present in many lakes in the state, including those with weevils. In addition, other environmental factors that may be keeping weevil populations in check in Washington, but have yet to be studied, include over-wintering survival and habitat quality and quantity (Jester et. al. 1997; Tamayo et. al., in press). Although the milfoil weevil shows potential as a biological control for Eurasian watermilfoil, more work is needed to determine which factors limit weevil densities and what lakes are suitable candidates for weevil treatments in order to implement a cost- and control-effective program.

Advantages and Disadvantages

Advantages of milfoil weevil include:

- Milfoil weevil introductions have correlated with decreases in milfoil abundance in some lakes that have been studied.
- Milfoil weevil offer a biological alternative to chemical plant control.

Disadvantages of milfoil include:

- Milfoil weevil also feed on native milfoil species.
- There is still more research needed to determine the level of effectiveness of milfoil weevils.

Permits and Costs

More research is needed to determine the costs of maintaining a milfoil weevil population.

Other Considerations

Other factors about milfoil weevil to consider include:

- Would not achieve immediate results—milfoil weevils take time to establish and the method is not guaranteed to work.
- Community may have concerns about introduced species.

Suitability for Kenmore

Milfoil weevils are not suitable for Kenmore, because more research is needed to determine if they would be an effective control method. Although the milfoil weevil shows potential as a biological control for Eurasian watermilfoil more work is needed to determine which factors limit weevil densities and what lakes are suitable candidates for weevil treatments in order to implement a cost- and control-effective program.

Bottom Screening

A bottom screen or benthic barrier covers the sediment like a blanket, compressing aquatic plants while reducing or blocking light. Materials such as burlap, plastics, perforated black Mylar, AquaScreen, and woven synthetics can all be used as bottom screens. An ideal bottom screen should be durable, heavier than water, reduce or block light, prevent plants from growing into and under the fabric, be easy to install and maintain, and should readily allow gases produced by rotting weeds to escape without “ballooning” the fabric upwards.

Even the most porous materials, such as AquaScreen (plastic-coated glass fiber), will billow due to gas buildup. Therefore, it is very important to anchor the bottom barrier securely to the bottom. Unsecured screens can create navigation hazards and are dangerous to swimmers. Anchors must be effective in keeping the material down and must be regularly checked. Natural materials such as rocks or sandbags are preferred as anchors.

The duration of weed control depends on the rate that weeds can grow through or on top of the bottom screen, the rate that new sediment is deposited on the barrier, and the durability and longevity of the material. For example, burlap may rot within 2 years, plants can grow on top of screen and fabric materials. Regular maintenance is essential and can extend the life of most bottom barriers. Bottom screens will control most aquatic plants; however, non-rooted species such as the bladderworts or coontail will not be controlled by bottom screens.

In addition to controlling nuisance weeds around docks and in swimming beaches, bottom screening has become an important tool to help eradicate and contain early infestations of noxious weeds such as Eurasian watermilfoil and Brazilian elodea. Pioneering colonies that are too extensive to be hand pulled can sometimes be covered with bottom screening material.

Bottom screens can be installed by the homeowner or by a commercial plant control specialist. Installation is easier in winter or early spring when plants have died back. In summer, cutting or hand pulling the plants first will facilitate bottom screen installation. Research has shown that much more gas is produced under bottom screens that are installed over the top of aquatic plants. The less plant material that is present before installing the screen, the more successful the screen will be in staying in place. Bottom screens may also be attached to frames rather than placed directly onto the sediment. The frames may then be moved for control of a larger area.

Advantages and Disadvantages

Advantages of bottom barriers include:

- Installation of a bottom screen creates an immediate open area of water.
- Bottom screens are easily installed around docks and in swimming areas.
- Properly installed bottom screens can control up to 100 percent of aquatic plants.
- Screen materials are readily available and can be installed by homeowners or by divers.

Disadvantages of bottom barriers include:

- Because bottom barrier screens reduce habitat by covering the sediment, they are suitable only for localized control.
- For safety and performance reasons, bottom screens must be regularly inspected and maintained.
- Harvesters, Rotovators, fishing gear, propeller backwash, or boat anchors may damage or dislodge bottom screens.
- Improperly anchored bottom screen may create safety hazards for boaters and swimmers.

- Swimmers may be injured by poorly maintained anchors used to pin bottom screens to the sediment.
- Some bottom screens are difficult to anchor on deep muck sediments.
- Bottom screens interfere with fish spawning and bottom-dwelling animals.
- Without regular maintenance, aquatic plants may quickly colonize the bottom screen.

Permits and Costs

Bottom screening in Washington requires an HPA in accordance with restrictions specified in the Aquatic Plants and Fish pamphlet (WDFW 2015) for control of noxious weeds, or an individual HPA permit for control of native plants in a large area. Local jurisdictions may require shoreline permits. Barrier materials cost $0.22 to $1.25 per square foot. The cost of some commercial barriers includes an installation fee. Commercial installation costs vary depending on sediment characteristics and type of bottom screen selected. It costs up to about $750 to have 1,000 square feet of bottom screen installed. Maintenance costs for a waterfront lot are about $120 each year.

Other Considerations

None.

Suitability for Kenmore

Bottom barriers have been used in other lakes to control aquatic plants. Without constant upkeep and maintenance, the long-term benefits of bottom barriers are minimal. Currently, infested areas are too spread out to use a bottom barrier without becoming cost prohibitive. Most of the lakeshore residences have only small infestations and the bottom barrier would just reduce habitat by covering the sediment.

Barriers could be effective in localized areas, such as in swimming areas and around docks, to prevent re-infestation after initial control. Installing a bottom barrier at a dock can provide these benefits.

Water Level Drawdown

Lowering the water level of a lake or reservoir can have a dramatic impact on some aquatic weed problems. Water level drawdown can be used where there is a water control structure that allows the managers of lakes or reservoirs to drop the water level in the water body for extended periods of time.

Water level drawdown often occurs regularly in reservoirs for power generation, flood control, or irrigation, with a side benefit being the control of some aquatic plant species. However, regular drawdowns can also make it difficult to establish native aquatic plants for fish, wildlife, and waterfowl habitat in some reservoirs.

Drawdown is not a viable control strategy for Lake Washington. Water level drawdown would cause significant damage to the ecosystem, and effect areas far outside of Kenmore. The amount of drawdown required to impact nuisance aquatic plants would dry out the entire littoral zone of the lake. This would damage native plants and animals in the lake and have many negative consequences for residents and businesses around the lake.

Without a surface inflow to the system, returning the water level to a previous state would be both cost-and time-prohibitive.

Waterlily Root Mat Removal

Waterlily root mats often float to the surface in the years after waterlilies have been treated with herbicide. Waterlily root mats can impede water navigation and detract from the aesthetics of the lake. Waterlily root mat removal methods include moving them to a location where water navigation will not be impacted, and completely removing the root mats from the lake using heavy equipment.

- **Moving waterlily root mats** involves hauling the root mats into an area where water navigation will not be hindered, such as a conservation area. Boats or other vessels are used to haul the root mats into place. The root mats are then anchored to prevent them from floating into navigation areas.
- **Removal of waterlily root mats** requires heavy equipment. A boat or other vessel is used to haul the root mats to shore. Large root mats may need to be broken up using a high-pressured water jet for easier transport. Once the root mats are hauled to shore, an excavator is used to bring them to land and into a dump truck. The root mats are allowed to dewater in the dump truck before being taken to a landfill for disposal.

Advantages and Disadvantages

Advantages of waterlily root mat removal include:

- Improved navigation.
- Increased safety for boating and swimming.
- Improved aesthetics.

Disadvantages of waterlily root mat removal include:

- The methods for complete waterlily root mat removal are very expensive.
- Permits are required for complete waterlily root mat removal.

Permits and Costs

Moving Waterlily Root Mats

No permit is needed if root mats are not removed from the lake. Hauling and anchoring costs are estimated to be approximately $1,000 per day.

Complete Removal of Waterlily Root Mats

An HPA is needed from WDFW to remove root mats from a lake. It is estimated that each 1-acre waterlily root mat will be about 2 feet thick and have volume of 3,227 cubic yards. At a boat launch, the waterlily root mats would be brought on shore using an excavator and allowed to dewater to remove excess weight. The cost is estimated to be approximately $5,000 per day for boat and excavator equipment operators and machinery. It would require approximately 10 days to remove 1 acre of root mats. Disposal as yard waste at a landfill is estimated to cost $45 per ton disposal rate; 1 acre of root mats, at 0.4 ton per cubic yard, would cost approximately $60,000 for disposal. Initial planning and permitting is estimated to cost an additional $10,000.

Other Considerations

None.

Suitability for Kenmore

The cost of completely removing waterlily root mats from Kenmore may be prohibitively expensive.

REFERENCES

Bonar, S.A., B. Bolding, and M. Divens. 2002. Effects of Triploid Grass Carp on Aquatic Plants, Water Quality, and Public Satisfaction in Washington State. North American Journal of Fisheries Management 22:98–105.

Creed, R. P., and S. P. Sheldon. 1995. Weevils and watermilfoil: did a North American herbivore cause the decline of an exotic plant? Ecol. Applic. 5:1113–1121.

Ecology. 1994. A Citizen's Manual for Developing Integrated Aquatic Vegetation Management Plans. First edition. Washington State Department of Ecology, Water Quality Financial Assistance Program, Olympia, Washington. January. <https://fortress.wa.gov/ecy/publications/publications/93093.pdf>.

Ecology. 2016. Aquatic Plant and Algae Management General Permit. National Pollutant Discharge and Elimination System and State Waste Discharge General Permit. Washington State Department of Ecology, Olympia, Washington. April.

Ecology. 2017. Aquatic Plant Management website. Washington State Department of Ecology, Olympia, Washington. <http://www.ecy.wa.gov/programs/wq/plants/management/index.html>

Jester, L. L., M. A. Bozek, S. P. Sheldon, and D. R. Helsel. 1997. New records for *Euhrychiopsis lecontei* (*Coleoptera*: *Curculionidae*) and their densities in Wisconsin lakes. Great Lakes Entomology. 30:169–176.

Newman, R. M., and D. D. Biesboer. 2000. A decline of Eurasian watermilfoil in Minnesota associated with the milfoil weevil, *Euhrychiopsis lecontei*. Journal. Aquatic Plant Management. 38 (2):105–111.

Sutter, T. J., and R. M. Newman. 1997. Is predation by sunfish (*Lepomis* spp.) an important source of mortality for the Eurasian watermilfoil biocontrol agent *Euhrychiopsis lecontei*? Journal Freshwater Ecology. 12:225–234.

Tamayo, M., C. W. O'Brien, R. P. Creed, C. E. Grue, and K. Hamel. 1999. Distribution and classification of aquatic weevils (Coleoptera: Curculionidae) in the genus *Euhrychiopsis* in Washington State. Entomology. News 110:103–112.

Tamayo, M., C. E. Grue, and K. Hamel. 2000. The relationship between water quality, watermilfoil frequency, and weevil distribution in the State of Washington. J. Aquatic Plant Management 38:112–116.

WDFW. 2015. Plants and Fish, Rules for Aquatic Plant Removal and Control. Washington Department of Fish and Wildlife, Olympia, Washington. Second Edition. July.

APPENDIX D

Target Species Best Management Practices

King County Noxious Weed Control Program
BEST MANAGEMENT PRACTICES

King County

Eurasian Watermilfoil

Myriophyllum spicatum **Class B Non-Regulated Noxious Weed Control Recommended**

Variable-leaf Milfoil

Myriophyllum heterophyllum **Class A Noxious Weed Control Required**

Haloragaceae

Legal Status in King County: Variable-leaf milfoil is a Class A Noxious Weed according to Washington State Noxious Weed Law, RCW 17.10 (non-native species that is harmful to environmental and economic resources and that landowners are required to eradicate). In accordance with state law, the King County Noxious Weed Control Board requires property owners to eradicate variable-leaf milfoil from private and public lands throughout the county (eradicate means to eliminate a noxious weed within an area of infestation). Eurasian watermilfoil is a Class B Non-Regulated Noxious Weed (non-native species that can be designated for control based on local priorities). The State Weed Board has not designated this species for control in King County. The King County Weed Control Board recommends control of Eurasian watermilfoil where feasible, but does not require it. State quarantine laws prohibit transporting, buying, selling, or distributing plants, plant parts or seeds of these milfoils.

BACKGROUND INFORMATION

Impacts and History

- Eurasian watermilfoil is native to Eurasia but is widespread in the United States, including Washington. In King County it is present in numerous lakes and slow moving streams and rivers.
- Variable-leaf milfoil is native to the eastern United States. It was introduced to southwestern British Columbia several decades ago and was confirmed in Thurston and Pierce Counties in 2007.
- Both of these plants are very aggressive and can outcompete native aquatic plants, forming dense

monotypic stands. They can reduce biodiversity, change the predator/prey relationships in a lake and adversely impact the food web.

- These milfoil species impact recreation by eliminating swimming opportunities, fouling boat motors and snagging fishing lines.
- When allowed to grow in dense stands and "top out", the floating mats or emergent flower stems prevent wind mixing, and extensive areas of low oxygen can develop during the summer.
- Stagnant mats create mosquito breeding areas and increase the water temperature underneath by absorbing sunlight.
- These plants die back in the fall, and the resulting decay uses up dissolved oxygen and adds nutrients to the water, potentially increasing algae growth and related water quality problems.

Description, Reproduction and Spread

Milfoil species (*Myriophyllum* spp.) can be very difficult to tell apart, particularly when not in flower. Not only can the vegetative structures look very similar, but Eurasian watermilfoil (*M. spicatum*) is known to cross with the native northern milfoil (*M. sibiricum*), creating an invasive hybrid. Anyone who finds a new, aggressive population of milfoil should consult an expert to get a positive identification before taking action to control it.

Eurasian watermilfoil (*Myriophyllum spicatum*)

- Perennial, rhizomatous plant grows in water to 20 feet (possibly up to 30 feet) deep.
- Forms tangled underwater stands and dense floating mats.
- Leaves are in whorls of four, and are feathery, with generally more than 14 leaflet pairs per leaf. Leaves often appear squared-off at the tip. Leaves usually collapse against the stem when the plant is pulled from the water.
- Stems are long, branched near the surface, and usually reddish.
- Flowers are tiny and borne on reddish spikes above the water surface.
- Spread is generally by plant fragments or rhizomes.

- Can be confused with the native northern milfoil (*Myriophyllum sibiricum*), which generally has fewer than 14 leaflet pairs per leaf. The native milfoils also tend to retain their shape when pulled from the water rather than collapsing against the stem.

Variable-leaf milfoil (*Myriophyllum heterophyllum*)

- Perennial, rhizomatous plant grows in water to 15 feet deep.
- Forms tangled underwater stands and dense floating mats.
- Submersed leaves are in whorls of four to six, and are feathery, with six to 14 leaflet pairs per leaf.
- Flowering spikes emerge up to six inches above the water and have bright green, leaf-like bracts that are in whorls of 4 to 6 with toothed to entire margins.
- Flowers are tiny and borne in the axils of the leaf-like bracts.
- Submersed stems are stout (up to 8 mm in diameter), reddish, often with numerous branches. A cross-section of the stem will reveal "pie-shaped" air chambers.
- Spread is by plant fragments, rhizomes and seed.
- Has the ability to produce terrestrial plants with leaves resistant to drying. These apparently do not colonize new areas, but aid in the survival of the species in years when the water level is unusually low.
- Can be confused with the native western milfoil (*M. hippuroides*), which also has emergent flower stems with leaf-like bracts, and vegetative plants can be confused with the native northern milfoil (*Myriophyllum sibiricum*), which also has fewer than 14 leaflet pairs per leaf.

Habitat

- Milfoils grow in still and slow moving water, generally up to about 20 feet deep for Eurasian watermilfoil, and six to 15 for variable-leaf milfoil, depending on water clarity.
- They tend to cluster at downwind ends of smaller water bodies or in quiet coves where fragments can settle out of the water column and take root.
- Both tolerate a wide range of pH.
- Eurasian watermilfoil can tolerate brackish water.

Local Distribution

- Eurasian watermilfoil is widespread in western Washington and in King County, with established populations in the large lakes (Lakes Washington, Sammamish and Union), the Sammamish River, and a number of smaller lakes (notably Green Lake in Seattle).
- Variable-leaf milfoil was discovered in a lake in Thurston County in 2007, the first confirmed record in Washington State. It has since been found in another lake in Thurston County, as well as in two lakes in Pierce County (Blue and Clear Lakes), all four of which are privately owned. Since it is particularly difficult to distinguish from the native western milfoil (*M. hippuroides*), it may be established in other areas as well. The Washington State Department of Ecology is investigating other potential populations. At this writing, there are no confirmed populations of variable-leaf milfoil in King County.

CONTROL INFORMATION

Integrated Pest Management

- The preferred approach for weed control is Integrated Pest Management (IPM). IPM involves selecting from a range of possible control methods to match the management requirements of each specific site. The goal is to maximize effective control and to minimize negative environmental, economic and social impacts.
- Use a multifaceted and adaptive approach. Select control methods which reflect the available time, funding, and labor of the participants, the land use goals, and the values of the community and landowners. Management will require dedication over a number of years, and should allow for flexibility in method as appropriate.

Planning Considerations

- Survey area for weeds, set priorities and select best control method(s) for the site conditions and regulatory compliance issues (refer to the King County Noxious Weed Regulatory Guidelines).
- Small infestations may be effectively removed using manual methods or hand tools.
- Milfoil spreads by fragmentation, so care must be taken to contain and remove all plant fragments when using manual or mechanical control methods. Otherwise, the infestation will spread.
- Any control actions taken will necessarily affect all landowners adjacent to the water body and will require their approval and participation in order to succeed. In addition, many control options will be expensive and it will be more cost-effective to pool resources.
- Commit to monitoring. Once initial control has been achieved, be sure to conduct follow up monitoring and control in subsequent years in order to catch any overlooked patches or returning infestations before they can spread. Without this, control efforts can be wiped out within a few years. Monitor the site each year for at least three years after last observing any milfoil, and then again after three years.
- Any water body with a public boat launch should be monitored regularly since milfoils can be re-introduced easily from plant fragments on a boat or trailer.

Permitting and Regulatory Requirements

- Permits are required for all weed control work in natural water bodies.
- At minimum, the pamphlet **Aquatic Plants and Fish** is required. This pamphlet is published by the Washington State Department of Fish and Wildlife and acts as a Hydraulic Project Approval (HPA) permit. It is available free of charge online at http://wdfw.wa.gov/hab/aquaplnt/aquaplnt.htm or by calling (360) 902-2534. This "pamphlet HPA" is all you will need for most manual or light mechanical control methods.
- More extensive control, including some bottom barrier placement and all herbicide use, will require additional permits from Washington State. See the sections below for details.
- Permits and licenses are required for all herbicide use in aquatic systems. Minimum requirements include a pesticide applicator's license with an aquatic endorsement from the Washington Department of Agriculture and a permit from the Washington Department of Ecology.
- Some incorporated cities also regulate any work conducted in natural waterbodies. Contact your local jurisdiction for details.
- **Permit requirements can change from year to year. Contact the King County Noxious Weed Control Program for more information on current permitting requirements.**

Early Detection and Prevention

- Look for new plants. Get a positive plant identification from an authority such as King County Noxious Weed Control Program staff.
- Look for plants along lake shorelines and in stagnant or slow-moving water in wetlands and streams. Since these plants are often spread as fragments attached to boat motors and trailers, check especially around boat launches. Also check at the downwind end of the waterbody, and anywhere else where fragments could congregate or settle out of the water column.
- The best time to begin surveys is late spring when plants are visible, and surveys can continue into early fall when the plants senesce (die back).
- Clean all plant material off of boats, motors and trailers, and check bilgewater for plant fragments any time you have been in an infested water body (or a potentially infested water body).
- **Never dispose of unwanted aquarium or water garden plants or animals in a natural water body.** Variable-leaf milfoil in particular is still sold in some areas as an aquarium plant, and may have been introduced to Washington waters by careless dumping of aquariums.

Manual Control

- At minimum, an HPA pamphlet permit is required for all manual control activities in natural waterbodies. In incorporated areas, check with your local jurisdiction for other possible permit requirements.

- Hand pulling and the use of hand mechanical tools is allowable in all critical areas in unincorporated King County.
- Hand pulling can be successful for a very small area but is impractical for large infestations. Be sure to contain and remove all plants and plant fragments from the water.
- Weed rakes and weed cutters can assist in maintaining open water in a discrete area, such as around a dock, but will not eliminate the plants. Be sure to contain and remove all plants and plant fragments from the water.
- All manual control sites should be monitored for several years for signs of plants growing from roots or fragments.
- **DISPOSAL**: Milfoils can be composted on land away from water or placed in yard waste bins. Do not leave any plant parts or fragments in the water or near the water's edge. Variable-leaf milfoil can grow on exposed soil during periods of low water, so extra care should be taken to dispose of it away from the water.

Mechanical Control

- At minimum, an HPA pamphlet permit is required for all mechanical control activities in natural waterbodies. In incorporated areas, check with your local jurisdiction for other possible permit requirements.
- Cutting and harvesting using boat-mounted cutters or in-lake harvesting barges is effective at maintaining open water in water bodies with 100% of the available habitat infested. It must be done on a regular basis to maintain control. However, these methods will quickly spread these plants by creating numerous fragments, so cutting and harvesting are not recommended for small or partial infestations. Neither method will eradicate an infestation. In unincorporated King County, only an HPA pamphlet permit is required for cutting and harvesting noxious weeds.
- Diver dredging using boat or barge mounted suction dredges can be effective for small infestations or as a follow-up to herbicide treatment. Special care must be taken to remove all fragments. This method causes a temporary increase in turbidity and requires specific authorization from the Washington Department of Fish and Wildlife (WDFW).
- Rotovation (underwater rototilling) is not recommended since it causes severe fragmentation of the plants. Rotovation also results in significant short term turbidity and loss of water clarity and quality, as well as destruction of benthic habitat. Rotovation requires an individual HPA permit.

Cultural Methods

- An opaque bottom barrier can be used to suppress growth in small, discrete areas like at a boat launch or around a swimming area. Barriers need to be regularly cleaned because plants will root in the sediment that accumulates on top of them. This is not practical for large-scale infestations. Bottom barriers in Lake Washington and Lake Sammamish are not allowed without prior authorization by the Washington Department of Fish and Wildlife (WDFW) due to potential impact on sockeye salmon

spawning areas. A pamphlet HPA at minimum is required for bottom barrier installation. Other permits may also be required.

- Waterbodies with control structures can sometimes use water level drawdown to control submerged weeds. Generally the bottom must be exposed to heat or cold long enough to dry out completely, something that can be difficult to achieve in rainy western Washington. Occasionally drawdowns can backfire and increase subsequent germination of weed seeds, especially with variable-leaf milfoil. Drawdowns can have major impacts on native plants and other aquatic organisms. Carefully weigh the pros and cons before deciding on this option. A drawdown is not covered by the pamphlet HPA. Consult your local WDFW office for permit information.

Chemical Control

- Permits and licenses are required for all chemical control in water.
- Herbicides may be the most reasonable option for eradication of large submerged noxious weed infestations. Professional licensed contractors are available for hire to perform this task.
- Herbicides can only be applied to aquatic systems in Washington State by a licensed pesticide applicator. Aquatic formulations of herbicides are not available for sale over the counter to anyone without an aquatic pesticide license. **NEVER apply non-aquatic herbicide formulations to water since most of them include ingredients that are toxic to aquatic organisms.**
- Multiple years of treatment may be required to eradicate a milfoil infestation. For several years following treatment, monitor areas for new plants germinating from the seed bank. Remove any new growth using one of the manual control methods above.

Specific Herbicide Information

Milfoil species are dicots, and therefore selective herbicides can be used to control them with minimal collateral damage to the primarily monocot native plant communities. 2,4-D, a selective herbicide, and fluridone, a non-selective herbicide, have both been used to control Eurasian watermilfoil to good effect in western Washington lakes. However, 2,4-D cannot be used in waterbodies that support salmonids (salmon and trout species). Triclopyr, another selective herbicide, has been approved for control of submerged plants as of 2008 and shows promise as an alternative herbicide for milfoil control. Endothall and diquat, which are both contact herbicides, will control existing vegetation, but will not kill the roots, so the control is temporary.

The mention of a specific product brand name in this document is not, and should not be construed as an endorsement or as a recommendation for the use of that product. Chemical control options may differ for private, commercial and government agency users. **For questions about herbicide use, contact the King County Noxious Weed Control Program at 206-296-0290.**

Biological

- Triploid grass carp have been tried as a control for milfoil species, but milfoil is not palatable to them, and they will generally eat everything else in the waterbody first. Grass carp are not allowed in water bodies where the inlet and outlet cannot be screened to prevent fish from leaving the waterbody. Grass carp are not allowed anywhere in the Lake Washington and Lake Sammamish system. They are not recommended as a control for milfoil, although they can be used if these species predominate. Care should be taken to evaluate potential impacts on the native plant community before choosing grass carp as a control method.
- In some situations, the native milfoil weevil (*Euhrychiopsis lecontei*) seems to control Eurasian watermilfoil. The weevil appears to prefer Eurasian watermilfoil over its native host, northern watermilfoil (*Myriophyllum sibiricum*), and in lakes where the weevil occurs naturally, Eurasian milfoil has been shown to be less of a problem. Ongoing research is exploring lake conditions in which the weevil may thrive, including water pH and the abundance of insect-eating fish. Although no permits are needed to use native insects as biocontrol, currently the weevils are difficult to obtain in quantities high enough to have an effect on milfoil populations. Even when they have been specially reared and introduced, it can take several years for populations in a waterbody to reach sufficient levels to control milfoil populations. Biocontrols of any type will not eradicate milfoil, but if effective should reduce a milfoil population to below the threshold of significant impact.

SUMMARY OF BEST MANAGEMENT PRACTICES

- At all times at minimum a pamphlet HPA permit is required to do any activity that disturbs a lake bottom or wetland or streambed. For more extensive work, more specific permits will be required.
- Hand pulling or digging is recommended for small populations, with extreme care taken not to let fragments spread.
- Where a population has filled every possible inch of habitat in a waterbody and its connected waterways, cutting or harvesting when done consistently can maintain open water and diminish the adverse affects of these species.
- Bottom barriers can maintain small areas of open water around boat launches, swimming areas or docks, as long as care is taken to keep them free of debris and fragments.
- Diver dredging can be effective for small infestations or as a follow-up to herbicide treatment.
- To eradicate large areas of milfoil, herbicides are probably the best option.
- **Do not apply any herbicide to water without the proper licenses.** Hire a contractor to do the work.

Control in small isolated or man-made ponds

- Permits may be required (see "Permitting and Regulatory Requirements" section above).
- Drawdown can be very effective. Remove all plants and plant fragments. Let the bed dry out completely before refilling. Thoroughly clean pond liners. Examine or discard ornamental plants that may harbor plant fragments before re-introducing them to the pond.
- Manual control will work if the infestation is caught early and all fragments are removed.
- Bottom barriers may be effective over natural pond beds.
- Follow recommendations above for chemical control.

Control in small lakes

- Permits will be required for all control work (see "Permitting and Regulatory Requirements" section above).
- Community involvement will be essential for successful control efforts.
- For small pioneering infestations, manual control or bottom barriers may be effective. Monitor the lake for fragments and additional infestation sites. Maintain bottom barriers to prevent sediment buildup.
- For large or whole-lake infestations, chemical control will be the most effective (see above for chemical recommendations). Mechanical control may be used to manage infestations, but will not eradicate the weeds. Bottom barriers, if properly maintained, will create open water in small areas.

Control in flowing water (rivers, streams, ditches)

- Permits will be required for all control work (see "Permitting and Regulatory Requirements" section above).
- The most effective control will start with the furthest upstream infestation and move downward. If there are any weeds left upstream, any cleared site will likely be re-infested.
- If possible, contain the area being controlled with a boom to catch fragments before they float downstream.
- Manual control may be the most practical. Bottom barriers need to be securely anchored.
- Chemical control in flowing water is difficult. Consult an expert before considering this option.

Control along shores of Lakes Washington and Sammamish

- Permits will be required for all control work (see "Permitting and Regulatory Requirements" section above).
- Eradication of submerged aquatic weeds from these waterbodies is not practical.
- Bottom barriers, if properly maintained, can provide open water around docks, marinas, swimming beaches, and similar areas. Prior authorization by the Washington

Department of Fish and Wildlife (WDFW) is required due to potential impact on sockeye salmon spawning areas.

- Manual control of small patches may be sufficient.
- Mechanical control can be effective for lakeside communities or large marinas. Be sure to remove all fragments from the water.
- Spot control using chemicals can be effective in the right conditions. It is possible that more than one species of submerged noxious weeds may be present (particularly Brazilian elodea, which is increasing in these lakes). If this is the case, be sure to select an herbicide that will control all targeted weeds (consult BMPs for each weed or ask an expert for assistance in selecting herbicides). If there is any significant wave action or current, the chemicals will drift off target or quickly become diluted. Consult with a professional contractor before choosing this option. Neighboring property owners should be advised prior to spot chemical applications.
- Grass carp are not allowed in the Lake Washington and Lake Sammamish system.

Disposal Methods

- Eurasian watermilfoil can be left on land to dry out and/or decompose where it will not move into a waterway.
- Variable-leaf milfoil should not be left on the bank since it may root in damp soil.
- Both milfoils can be composted or placed in yard waste bins.

References

Aiken, S. G. 1981. A conspectus of *Myriophyllum* (Haloragaceae) in North America. Brittonia 33: 57-89.

Bates, L.A., E. R. Burns and D.H. Webb. Eurasian Watermilfoil (*Myriophyllum spicatum* L.) in the Tennessee-Valley: An update on the biology and control. Tennessee Valley Authority, Muscle Shoals, Alabama 35660. 104-115.

Crow, G. E. and C. B. Hellquist. 1983. Aquatic vascular plants of New England: Part 6. Trapaceae, Haloragaceae, Hippuridaceae. Station Bulletin 524. New Hampshire Agricultural Experiment Station, University of New Hampshire, Durham, New Hampshire.

Goldsby, T.L. and D.R. Sanders. 1977. Effects of consecutive water fluctuations on the submersed vegetation of Black Lake, Louisiana. Journal of Aquatic Plant Management. 15:23-8.

Hogan, W.D. and S.B. Hopkins. 1978. Improved efficacy in aquatic vegetation control. Proceedings of the Southern Weed Science Society 31: 237.

Hotchkiss, N. 1972. Common marsh, underwater and floating-leaved plants of the United States and Canada. Dover Publications, Inc., New York.

Madsen, J.D., J.W. Sutherland, J.A. Bloomfield, L.W. Eichler and C.W. Boylen. 1991. The decline of native vegetation under dense Eurasian watermilfoil canopies. J. Aquatic Plant Management 29: 94-99.

Manning, J.H. and D.R. Sanders. 1975. Effects of water fluctuation on vegetation in Black Lake, Louisiana. Hyacinth Control Journal 13: 17-24.

Netherland, M.D. and K.D. Getsinger. Efficacy of triclopyr on Eurasian watermilfoil: Concentration and exposure time effects. 1992. US Army Corps of Engineers Waterways Experiment Station. Miscellaneous Paper A-92-1.

New Hampshire Department of Environmental Services, 2008. Environmental Fact Sheet: Variable Milfoil. http://www.des.state.nh.us/factsheets/bb/bb-23.htm

Ohio Department of Natural Resources, Division of Natural Areas and Parks. 2008. www.dnr.state.oh.us/dnap.

Pieterse, A.H. and K.J. Murphy. eds. 1993. Aquatic Weeds The Ecology and Management of Nuisance Aquatic Vegetation. Oxford University Press.

Radford, A.E., H.E. Ahles, and C.R. Bell. 1968. Vascular Flora of the Carolinas. The University of North Carolina Press, Chapel Hill.

Tarver, D. P., J. A. Rogers, M. J. Mahler, and R. L. Lazor. 1986. Aquatic and wetland plants of Florida. Third Edition. Florida Department of Natural Resources, Tallahassee, Florida.

United States Army Corps of Engineers. Noxious and Nuisance Plant Management Information System. 2008. http://el.erdc.usace.army.mil/pmis.

University of Minnesota, 2006. Biological Control of Eurasian Watermilfoil webpage: http://fwcb.cfans.umn.edu/research/milfoil/milfoilbc.html

Washington Department of Ecology, 2003. Non-native freshwater plants, webpage: http://www.ecy.wa.gov/programs/wq/plants/weeds/

Westerdahl, H.E. and K.D. Getsinger, eds. 1988. Aquatic plant identification and herbicide use guide, volume II: Aquatic plants and susceptibility to herbicides. Technical report A-88-9. Department of the Army, Waterways Experiment Station, Corps of Engineers, Vicksburg, MS.

King County Noxious Weed Control Program
BEST MANAGEMENT PRACTICES

Brazilian Elodea

Egeria densa **Class B Noxious Weed**
Hydrocharitaceae **Control Required except in Selected Areas**

Legal Status in King County: Brazilian elodea is a class B noxious weed according to Washington State Noxious Weed Law, RCW 17.10 (non-native species that is harmful to environmental and economic resources and that landowners may be required to control based on distribution in the county and local priorities). The King County Noxious Weed Control Board requires property owners to control Brazilian elodea on private and public lands in the county except in Lakes Washington, Sammamish, Union and Fenwick (control, as defined by state law, means to prevent all seed production and to prevent the dispersal of all propagative parts capable of forming new plants). State quarantine laws prohibit transporting, buying, selling, or distributing plants, plant parts or seeds of Brazilian elodea.

BACKGROUND INFORMATION

Impacts and History

- Native to South America and introduced to the United States through the aquarium trade, it is found scattered throughout western Washington. In King County it is established in Lakes Washington, Sammamish, Union, Fenwick and Dolloff. It is also prolific in the Sammamish River and around Fisherman's Terminal on the Lake Washington Ship Canal.
- Very aggressive and can outcompete native aquatic plants, forming dense monotypic stands. Can reduce biodiversity, change the predator/prey relationships in the lake and adversely impact the food web.
- Impacts recreation by eliminating swimming opportunities, fouling boat motors and snagging fishing lines.
- When allowed to grow in dense stands and "top out", the floating mats prevent wind mixing and extensive areas of low oxygen can develop during the summer.
- Stagnant mats create mosquito breeding areas and increase the water temperature underneath by absorbing sunlight.
- These plants may die back in the fall, and

the resulting decay uses up dissolved oxygen and adds nutrients to the water, potentially increasing algae growth and related water quality problems.

Description, Reproduction and Spread

- Perennial, grows in up to 20 feet of water.
- Generally submergent but can form floating mats.
- Leaves are visibly smooth-edged (teeth are visible with magnification) and densely packed in whorls of four (or up to six).
- Relatively showy white flower has three petals and a yellow center. It is fragrant and floats on the water surface. Flowers are attached on slender stalks to the base of leaf whorls, and there are up to three flowers per whorl. Only male plants are known from the United States.
- Can thrive in relatively low light. High temperatures and high light conditions can cause senescence (die back).
- Often has two major growth periods, one in spring and one in fall. Some plants often persist through the winter.
- Is not known to seed in North America. Spreads by fragmentation.
- Can be confused with the native American waterweed (*Elodea canadensis*), which has a less robust appearance and smooth-edged leaves generally in whorls of three.
- In the nursery trade, also known as Brazilian waterweed, South American waterweed, Common waterweed, Egeria, and Anacharis.

Native *Elodea canadensis* (left) and *Brazilian elodea* (right)

Habitat

- Occurs in still and slow moving water up to about 20 feet deep, depending on water clarity.
- Tend to cluster at downwind ends of smaller water bodies or in quiet coves where fragments can settle out of the water column and take root.
- Tolerates a wide range of pH.

CONTROL INFORMATION

Integrated Pest Management

- The preferred approach for weed control is Integrated Pest Management (IPM). IPM involves selecting from a range of possible control methods to match the management requirements of each specific site. The goal is to maximize effective control and to minimize negative environmental, economic and social impacts.
- Use a multifaceted and adaptive approach. Select control methods that reflect the available time, funding, and labor of the participants, the land use goals, and the values of the community and landowners. Management will require dedication over a number of years, and should allow for flexibility in method as appropriate.

Planning Considerations

- Survey area for weeds, set priorities and select best control method(s) for the site conditions and regulatory compliance issues (refer to the King County Noxious Weed Regulatory Guidelines).
- Small infestations may be effectively removed using manual methods or hand tools.
- Brazilian elodea spreads by fragmentation, so extreme care must be taken to contain and remove all plant fragments when using manual or mechanical control methods. Otherwise, the infestation will spread.
- Any control actions taken will necessarily affect all landowners adjacent to the water body and will require their approval and participation in order to succeed. In addition, many control options will be expensive and it will be more cost-effective to pool resources.
- Commit to monitoring. Once initial control has been achieved, be sure to conduct follow up monitoring and control in subsequent years in order to catch any overlooked patches or returning infestations before they can spread. Without this, your control efforts can be wiped out within a few years. Monitor the site each year for at least three years after last observing any Brazilian elodea, and then again after three years.

Permitting and Regulatory Requirements

- Permits are required for all weed control work in natural waterbodies.
- At minimum, the pamphlet Aquatic Plants and Fish is required. This pamphlet is published by the Washington State Department of Fish and Wildlife (available free of charge online at http://wdfw.wa.gov/licensing/aquatic_plant_removal or by calling (360) 902-2534) and acts as a Hydraulic Project Approval (HPA) permit. This "pamphlet HPA" is all you will need for most manual or light mechanical control methods.
- More extensive control, including some bottom barrier placement and all herbicide use, will require additional permits from Washington State. See the sections below for details.
- Permits and licenses are required for all herbicide use in aquatic systems. Minimum requirements include a pesticide applicator's license with an aquatic endorsement from

the Washington Department of Agriculture and a permit from the Washington Department of Ecology.
- Some incorporated cities also regulate any work conducted in natural waterbodies. Contact your local jurisdiction for details.
- **Permit requirements can change from year to year. Contact the King County Noxious Weed Control Program for more information on current permitting requirements.**

Early Detection and Prevention

- Look for new plants. Get a positive plant identification from an authority such as King County Noxious Weed Control Program staff.
- Look for plants along lake shorelines and in stagnant or slow-moving water in wetlands and streams. Since these plants are often spread as fragments attached to boat motors and trailers, check especially around boat launches. Also check at the downwind end of the waterbody, and anywhere else where fragments could congregate or settle out of the water column.
- The best time to begin surveys is late spring when plants are visible, and surveys can continue into fall when the plants begin to senesce (die back).
- Clean all plant material off of boats, motors and trailers, and check bilgewater for plant fragments any time you have been in an infested waterbody (or a potentially infested waterbody).
- **Never dump unwanted aquarium or water garden plants or animals into a natural waterbody.** Brazilian elodea is still sold in some areas as an aquarium plant, and it was probably introduced to Washington waters by careless dumping of aquariums. It has several other common names, including Brazilian waterweed, South American waterweed, and Anacharis.

Manual Control

- At minimum, an HPA pamphlet permit is required for all manual control activities in natural waterbodies. In incorporated areas, check with your local jurisdiction for other possible permit requirements.
- Hand pulling and the use of hand mechanical tools is allowable in all critical areas in unincorporated King County.
- Hand-pulling can be successful for a very small area but is impractical for large infestations. Be sure to contain and remove all plants and plant fragments from the water.
- Weed rakes and weed cutters can assist in maintaining open water in a discrete area, such as around a dock, but will not eliminate the plants. Be sure to contain and remove all plants and plant fragments from the water.
- All manual control sites should be monitored for several years for signs of plants growing from roots or fragments.
- **DISPOSAL**: Brazilian elodea can be composted on land away from water or placed in yard waste bins. Do not leave any plant parts or fragments in the water or near the water's edge.

Mechanical Control

- At minimum, an HPA pamphlet permit is required for all mechanical control activities in natural waterbodies. In incorporated areas, check with your local jurisdiction for other possible permit requirements.
- Cutting and harvesting using boat-mounted cutters or in-lake harvesting barges is effective at maintaining open water in waterbodies with 100% of the available habitat infested. It must be done on a regular basis to maintain control. However, these methods will quickly spread these plants by creating numerous fragments, so cutting and harvesting are not recommended for small or partial infestations. Neither method will eradicate an infestation. In unincorporated King County, only an HPA pamphlet permit is required for cutting and harvesting noxious weeds.
- Diver dredging using boat or barge mounted suction dredges can be effective for small infestations or as a follow-up to herbicide treatment. Thurston County successfully controlled Brazilian elodea in the Chehalis River using this method. Special care must be taken to remove all fragments. This method causes a temporary increase in turbidity and requires specific authorization from the Washington Department of Fish and Wildlife (WDFW).
- Rotovation (underwater rototilling) is not recommended since it causes severe fragmentation of the plants. Rotovation also results in significant short term turbidity and loss of water clarity and quality. Rotovation requires an individual HPA permit.

Cultural Methods

- An opaque bottom barrier can be used to suppress growth in small, discrete areas like at a boat launch or around a swimming area. Barriers need to be regularly cleaned because plants, including Brazilian elodea fragments, will root in the sediment that accumulates on top of them. This is not practical for large-scale infestations. Bottom barriers in Lake Washington and Lake Sammamish are not allowed without prior authorization by the Washington Department of Fish and Wildlife (WDFW) due to potential impact on sockeye salmon spawning areas. A pamphlet HPA at minimum is required for bottom barrier installation. Other permits may also be required.
- Waterbodies with control structures can sometimes use water level drawdown to control submerged weeds. Generally the bottom must be exposed to heat or cold long enough to dry out completely, something that can be difficult to achieve in rainy western Washington. Consecutive drawdowns may be more effective than a single attempt. Drawdowns can have major impacts on native plants and other aquatic organisms. Carefully weigh the pros and cons before deciding on this option. A drawdown is not covered by the pamphlet HPA. Consult your local WDFW office for permit information.

Chemical Control

- Permits and licenses are required for all chemical control in water.
- Herbicides may be the most reasonable option for eradication of large submerged noxious weed infestations. Professional licensed contractors are available for hire to perform this task.

- Herbicides can only be applied to aquatic systems in Washington State by a licensed pesticide applicator. Aquatic formulations of herbicides are not available for sale over the counter to anyone without an aquatic pesticide license. **NEVER apply non-aquatic herbicide formulations to water since most of them include ingredients that are toxic to aquatic organisms**.
- Multiple years of treatment may be required to eradicate a Brazilian elodea infestation. For several years following treatment, monitor areas for new plants. Remove any new growth using one of the manual control methods above.

Specific Herbicide Information

The only herbicide allowed in Washington waters that has been shown to be successful against Brazilian elodea is fluridone (e.g., brand name Sonar®). Endothall and diquat have proven successful in combination with copper compounds, but the use of copper is illegal in most Washington State waters due to its demonstrated toxicity to juvenile salmonids.

The mention of a specific product brand name in this document is not, and should not be construed as an endorsement or as a recommendation for the use of that product. Chemical control options may differ for private, commercial and government agency users. **For questions about herbicide use, contact the King County Noxious Weed Control Program at 206-477-9333.**

Biological

- Triploid grass carp can be an option for controlling Brazilian elodea. Tests have shown that the carp prefer Brazilian elodea to native species. However, in practice, grass carp may remove the entire plant community. Grass carp are not allowed in water bodies where the inlet and outlet cannot be screened. Care should be taken to evaluate potential impacts on the native plant community before choosing grass carp to control Brazilian elodea.
- Although research is being done on a variety of invertebrates and pathogens, there are currently no accepted biocontrol agents for Brazilian elodea other than grass carp.

SUMMARY OF BEST MANAGEMENT PRACTICES

- At all times a minimum of a pamphlet HPA permit is required to do any activity that disturbs a lake bottom, wetland or streambed. For more extensive work, more specific permits will be required.
- Hand-pulling is recommended for small populations, with extreme care taken to remove all plants and fragments from the water.
- Where the plant has filled every possible inch of habitat in a water body and its connected waterways, cutting or harvesting can keep a large population under control when done consistently.

- Bottom barriers can maintain small areas of open water around boat launches, swimming areas or docks, as long as care is taken to keep them free of debris and fragments.
- Diver dredging has been effective in the Chehalis River and can be a good option in moving water.
- To eradicate large areas of Brazilian elodea, herbicides are probably the best option.
- **Do not apply any herbicide to water without the proper licenses.** Hire a contractor to do the work.

Control in small isolated or man-made ponds

- Permits may be required (see "Permitting and Regulatory Requirements" section above).
- Drawdowns can be very effective. Remove all plants and plant fragments. Let the bed dry out completely before refilling. Thoroughly clean pond liners. Examine or discard ornamental plants that may harbor plant fragments before re-introducing them to the pond.
- Manual control will work if the infestation is caught early and all fragments are removed.
- Bottom barriers may be effective over natural pond beds.
- Follow recommendations above for chemical control.
- Triploid grass carp may be an option if eradication is not desired.

Control in small lakes

- Permits will be required for all control work (see "Permitting and Regulatory Requirements" section above).
- Community involvement will be essential for successful control efforts.
- For small pioneering infestations, manual control or bottom barriers may be effective. Monitor the lake for fragments and additional infestation sites. Maintain bottom barriers to prevent sediment buildup.
- For large or whole-lake infestations, chemical control will be the most effective (see above for chemical recommendations). Mechanical control, or grass carp where allowed and appropriate, may be used to manage infestations, but will not eradicate the weeds. Bottom barriers, if properly maintained, will create open water in small areas.

Control in flowing water (rivers, streams, ditches)

- Permits will be required for all control work (see "Permitting and Regulatory Requirements" section above).
- The most effective control will start with the furthest upstream infestation and move downstream. If there are any weeds left upstream, any cleared site will likely be re-infested.
- If possible, contain the area being controlled with a boom to catch fragments before they float downstream.
- Diver dredging has proven effective in flowing water.

- Manual control may be the most practical for small infestations. Bottom barriers need to be securely anchored.
- Chemical control in flowing water is difficult. Consult an expert before considering this option.
- Grass carp will not be allowed in flowing water.

Control along shores of Lakes Washington and Sammamish

- Permits will be required for all control work (see "Permitting and Regulatory Requirements" section above).
- Eradication of submerged aquatic weeds from these water bodies is not practical.
- Bottom barriers, if properly maintained, can provide open water around docks, marinas, swimming beaches, and similar areas. Prior authorization by the Washington Department of Fish and Wildlife (WDFW) is required in these lakes due to potential impact on sockeye salmon spawning areas.
- Manual control of small patches may be sufficient.
- Mechanical control can be effective for lakeside communities or large marinas. Be sure to remove all fragments from the water.
- Spot control using chemicals can be effective in the right conditions. It is possible that more than one species of submerged noxious weeds may be present (particularly Eurasian watermilfoil, which is widespread in these lakes). If this is the case, be sure to select an herbicide that will control all targeted weeds (consult BMPs for each weed or ask an expert for assistance in selecting herbicides). If there is any significant wave action or current, the chemicals will drift off target or quickly become diluted. Consult with a professional contractor before choosing this option. Neighboring property owners should be advised prior to spot chemical applications.
- Grass carp are not allowed in the Lake Washington and Lake Sammamish system.

Disposal Methods

- Brazilian elodea can be left on land to dry out and/or decompose where it will not move into a waterway.
- Brazilian elodea can be composted away from water or placed in yard waste bins.
- Never dispose of Brazilian elodea into waterways, wetlands, or other wet sites where it might grow and spread.

References

Goldsby, T.L. and D.R. Sanders. 1977. Effects of consecutive water fluctuations on the submersed vegetation of Black Lake, Louisiana. Journal of Aquatic Plant Management. 15:23-8.

Hogan, W.D. and S.B. Hopkins. 1978. Improved efficacy in aquatic vegetation control. Proceedings of the Southern Weed Science Society 31: 237.

Hotchkiss, N. 1972. Common marsh, underwater and floating-leaved plants of the United States and Canada. Dover Publications, Inc., New York.

Manning, J.H. and D.R. Sanders. 1975. Effects of water fluctuation on vegetation in Black Lake, Louisiana. Hyacinth Control Journal 13: 17-24.

Pieterse, A.H. and K.J. Murphy. eds. 1993. Aquatic Weeds The Ecology and Management of Nuisance Aquatic Vegetation. Oxford University Press.

Radford, A.E., H.E. Ahles, and C.R. Bell. 1968. Vascular Flora of the Carolinas. The University of North Carolina Press, Chapel Hill.

Thurston County Noxious Weed Control Agency, 2009. Brazilian Elodea *(Egeria densa)* removal on the Chehalis River, webpage: http://www.co.thurston.wa.us/tcweeds/special-projects.htm

Washington Department of Ecology, 2003. Non-native freshwater plants, webpage: http://www.ecy.wa.gov/programs/wq/plants/weeds/

Westerdahl, H.E. and K.D. Getsinger, eds. 1988. Aquatic plant identification and herbicide use guide, volume II: Aquatic plants and susceptibility to herbicides. Technical report A-88-9. Department of the Army, Waterways Experiment Station, Corps of Engineers, Vicksburg, MS.

King County Noxious Weed Control Program
BEST MANAGEMENT PRACTICES

King County

Fragrant Water Lily

Nymphaea odorata
Nymphaeaceae

Class C Noxious Weed
Control Recommended

Legal Status in King County: Fragrant water lily is a Class C noxious weed (non-native species that can be designated for control based on local priorities) according to Washington State Noxious Weed Law, RCW 17.10. The State Weed Board has not designated this species for control in King County. The King County Weed Control Board recommends control of this species where feasible, but does not require it.

BACKGROUND INFORMATION

History and Impacts

- *Nymphaea odorata* is native to the eastern half of North America, including southern Canada. It has been introduced as an ornamental in many parts of the world and is now found throughout North America. Although found throughout Washington, fragrant water lily is especially prevalent in western Washington lakes where it has been intentionally planted by property owners who admired the showy flowers.
- It is believed that fragrant water lily was originally introduced into Washington during the Alaska Pacific Yukon Exposition held in Seattle in the late 1800s.
- Left unmanaged, water lilies can restrict lake-front access and hinder recreation.
- Drownings in King County have been attributed to swimmers getting tangled in dense water lily stems.
- Water lilies foul boat motors and restrict passage for non-motorized boats.
- When allowed to grow in dense stands, the floating leaves prevent wind mixing and extensive areas of low oxygen can develop under water lily beds during the summer.
- Aggressive water lily mats can outcompete native plants, reduce biodiversity, change the predator/prey relationships in the lake and adversely impact the food web.
- Stagnant mats create mosquito breeding areas and increase the water temperature underneath by absorbing sunlight.
- Water lilies die back in the fall, and the resulting decay uses up dissolved oxygen and adds nutrients to the water, potentially increasing algal growth and related water quality problems.

Description

- Perennial floating leaved rooted aquatic plant, growing in about three to six feet of water. Blooms June to October.
- **Round, green leathery leaves** up to 10 inches across have a basal slit. The flexible leaf stalk is attached at the base of the slit. The leaves float on the surface of the water, rarely sticking up above it as water level drops.
- **Many-petaled Flowers** are showy and range from white to pink (rarely yellow). They are borne on an individual stalk which curls like a corkscrew after the flower has been fertilized and pulls the flower under water. Seeds are leathery capsules with numerous small seeds.
- Both flower and leaf stalks arise from **thick fleshy rhizomes**.
- Adventitious roots attach the horizontal creeping and branching rhizomes.

Habitat

- Fragrant water lily occurs in shallow freshwater ponds and lake margins 3-6 feet deep.
- It will also grow in slow moving water.
- It can tolerate a wide range of pH, and it prefers substrates from mucky to silty.

Reproduction and Spread

- Spreads by floating seed and by rhizomes.
- Seeds disperse through the water by wind and wave action.
- Rhizome pieces can also break off and move through the water before establishing in a new location.
- A planted rhizome will spread to cover about a 15-foot diameter circle in five years.
- Primary source of distribution to new water bodies is deliberate planting. Many cultivars of *Nymphaea odorata* are available in the nursery trade. However, waterfowl can also spread the plant between water bodies.

Local Distribution

- While fragrant water lily is widely present in western Washington, it is less so in eastern Washington and uncommon to absent in western Oregon lakes.
- *Nymphaea odorata* was found in 27 of 36 surveyed lakes in the developed areas of King County in 1996. The number of ponds and smaller wetlands containing the plant is considerably larger.
- Requests for water lily control represent a high percentage of the herbicide permit requests received by the Washington State Department of Ecology.

CONTROL INFORMATION

Integrated Pest Management

- The preferred approach for weed control is Integrated Pest Management (IPM). IPM involves selecting from a range of possible control methods to match the management requirements of each specific site. The goal is to maximize effective control and to minimize negative environmental, economic and social impacts.
- Use a multifaceted and adaptive approach. Select control methods which reflect the available time, funding, and labor of the participants, the land use goals, and the values of the community and landowners. Management will require dedication over a number of years, and should allow for flexibility in method as appropriate.

Planning Considerations

- Survey area for weeds, set priorities and select best control method(s) for the site conditions and regulatory compliance issues **(refer to the King County Noxious Weed Regulatory Guidelines)**.
- Small infestations may be effectively removed using manual methods or hand tools.
- For many lake and wetland infestations, the whole community will need to be engaged. Any control actions taken will necessarily affect all landowners adjacent to the water body and will require their approval and participation in order to succeed. In addition, many control options will be expensive.
- Commit to monitoring. Once initial control has been achieved, be sure to conduct follow up monitoring in subsequent years in order to catch any overlooked patches or returning infestations before they can spread. Without this, your control efforts can be wiped out within a few years.

Early Detection and Prevention

- Look for new plants. Get a positive plant identification from an authority such as King County Noxious Weed Control Program staff.
- Look for plants along lake shorelines and in stagnant or slow-moving water in wetlands and streams.
- The best time to begin surveys is late spring when new leaves arise, and they can continue into early fall when the plants senesce.
- Dig up small isolated patches.
- Don't plant fragrant water lily in natural water bodies. It is legal to buy and plant water lilies, but their use as an ornamental should be restricted to small self-contained ponds and other man-made water features with no hydrologic connection to any natural body of water.

Manual

- Hand pulling or cutting can be successful for a small area if repeated on a regular basis. Impractical for large infestations. Must remove all pulled or cut plants and plant parts from the water. HPA pamphlet permit required.
- Carbohydrate depletion is a technique whereby during each growing season, all emerging leaves are consistently removed. Reports indicate that it takes about two to three seasons to kill the plants. This method is difficult to sustain and impractical for large infestations.
- To completely remove plants by hand you must dig up the entire rhizome. HPA pamphlet permit required.
- All manual control sites should be monitored for several years for signs of plants growing from root fragments and from the seed bank.
- Hand pulling and the use of hand mechanical tools is allowable in all critical areas.
- Fragrant water lily can be composted on land or placed in yard waste bins.

Mechanical

- Permits are required for all mechanical control methods.
- An opaque bottom barrier can be used to suppress growth in small, discrete areas like at a boat launch or around a swimming area. Barriers need to be regularly cleaned because plants will root in the sediment that accumulates on top of them. Not practical for large-scale infestations.
- Cutting and Harvesting using boat-mounted cutters or in-lake harvesting barges is a reasonable long-term control solution. These must be done on a regular basis to maintain control. Neither method will eradicate an infestation.
- Rotovation (underwater rototilling) dislodges the large, fleshy waterlily rhizomes which can then be removed from the water. This process results in the permanent removal of waterlily rhizomes. Rotovation results in significant short term turbidity and loss of water clarity and quality.
- Other mechanical solutions that have been tried include mounting a backhoe to a barge and digging the plants out.

Chemical

- Herbicides may be the most reasonable option for eradication of large fragrant water lily infestations. Professional licensed contractors are available for hire to perform this task.
- Herbicides can only be applied to aquatic systems in Washington State by a licensed pesticide applicator. Aquatic formulations of herbicides are not available for sale over the counter to anyone without an aquatic pesticide license. **NEVER apply non-aquatic herbicide formulations to water since most of them include ingredients that are toxic to aquatic organisms.**
- For several years following treatment, monitor areas for new plants germinating from the seed bank. Eradicate any new growth using one of the manual control methods above.

Specific Herbicide Information

Glyphosate (e.g. Rodeo™ or Aquamaster™) Apply to actively growing foliage. Avoid runoff. Caution: Glyphosate is non-selective: it will injure or kill other vegetation contacted by the spray. NEVER substitute Round-up™ or other landscape formulations of Glyphosate: these have additives that can devastate aquatic systems.

Imazapyr (Habitat®) Apply to actively growing foliage. Caution: Imazapyr is non-selective: it will injure or kill other vegetation contacted by the spray.

Triclopyr (Renovate†3). Apply to actively growing foliage. Triclopyr is selective: it will injure other broadleaved plants but not grasses or other monocots such as cattails, rushes, or most native aquatic plants.

All the above listed herbicides require the addition of an approved surfactant. Follow label directions for selecting the correct type of surfactant. Be sure that the selected surfactant is approved for aquatic use.

The mention of a specific product brand name in this document is not, and should not be construed as an endorsement or as a recommendation for the use of that product. Chemical control options may differ for private, commercial and government agency users. **For questions about herbicide use, contact the King County Noxious Weed Control Program at 206-296-0290.**

Biological

- There is currently no biological control approved for fragrant water lily.
- Although a number of organisms have been studied in the past, there is no current plan to pursue biological control for fragrant water lily due to the widespread use of the plant as an ornamental in private, isolated water features.

SUMMARY OF BEST MANAGEMENT PRACTICES

- At all times at minimum a pamphlet HPA permit is required to do any activity that disturbs a lake bottom or wetland or streambed. For more extensive work, more specific permits will be required.
- Hand pulling, cutting or digging is recommended for small populations.
- Where this is not practical, cutting or harvesting can keep a large population under control when done consistently.
- Bottom barriers can maintain small areas of open water around boat launches, swimming areas or docks.
- To remove large areas of water lilies, mechanical methods (such as rotovation) or herbicides can be used.
- **Do not apply any herbicide to water without the proper licenses.** Hire a contractor to complete the work.

Disposal Methods

- Fragrant water lily can be left on land to dry out and/or decompose in an area where it will not move into a waterway.
- Fragrant water lily can also be composted away from water or placed in yard waste bins.
- Never dispose of fragrant water lily into waterways, wetlands, or other wet sites where it might grow and spread.

References

Brayshaw, C.T. 1989. Buttercups, Waterlilies, and Their Relatives: (The Order Ranales) in British Columbia. Royal British Columbia Museum Memoir No.1. Royal British Columbia Museum

Hotchkiss, N. 1972. Common marsh, underwater and floating-leaved plants of the United States and Canada. Dover Publications, Inc., New York.

Washington Department of Ecology, 2003. Non-native freshwater plants, webpage: http://www.ecy.wa.gov/programs/wq/plants/weeds/

Westerdahl, H.E. and K.D. Getsinger, eds. 1988. Aquatic plant identification and herbicide use guide, volume II: Aquatic plants and susceptibility to herbicides. Technical report A-88-9. Department of the Army, Waterways Experiment Station, Corps of Engineers, Vicksburg, MS.

Whitley, J.E., B. Basset, J.G. Dillard, and R.A. Haefner. 1990. Water Plants for Missouri Ponds. Missouri Department of Conservation, P.O. Box 180, Jefferson City, MO 65102.

King County Noxious Weed Control Program
BEST MANAGEMENT PRACTICES

King County

Garden Loosestrife

Lysimachia vulgaris
Primulaceae

Class B Noxious Weed
Control Required

Legal Status in King County: Garden loosestrife is a Class B Noxious Weed (non-native species harmful to environmental and economic resources that landowners may be required to control based on distribution in the county and local priorities) according to Washington State Noxious Weed Law, RCW 17.10. In accordance with state law, the King County Noxious Weed Control Board requires property owners to control garden loosestrife on private and public lands throughout the county (control means to prevent all seed production and to prevent the dispersal of all propagative parts capable of forming new plants). In addition, state quarantine laws prohibit transporting, buying, selling, or distributing plants, plant parts or seeds of garden loosestrife.

BACKGROUND INFORMATION

Impacts and History

- Garden loosestrife displaces native vegetation along streambanks, wetlands and shorelines and reduces habitat needed by waterfowl and fish, including several important salmon species.
- Garden loosestrife can clog shallow waterways, increase sediment retention and interfere with water flow.
- Garden loosestrife is a native of Eurasia, where it occurs in fens, wet woods, lake shores, and river banks.
- In eastern North America, garden loosestrife is naturalized in parts of most states and provinces from Minnesota east to Newfoundland and Maryland and appears to be increasing in the Ohio River Valley (Cusick 1986). In the west, the species is present in Colorado, Montana, Oregon, Washington and British Columbia (NRCS Plants Database).
- Although the species is being monitored in most eastern states and provinces, it is currently considered a noxious weed only in Connecticut and Washington State. This may be due to colder winters providing a measure of control in some regions.
- First documented in Washington in 1978 in the NE corner of Lake Washington near Juanita Junction, garden loosestrife is probably an escaped garden plant.

- In Washington, infestations of garden loosestrife are currently known in King County, Whatcom County, Skagit County, Thurston County and Stevens County.

Description

- Perennial emergent plant that appears to remain in the vegetative stage for some time prior to blooming. The presence of a flowering specimen generally indicates it has been in an area for some years.
- Flowers are yellow, showy and primrose-like (5 petals), with the biggest cluster atop the stem and smaller clusters on stalks from the base of the upper leaves. Stamens are red-orange. Blooms from July to late August or September.
- Stems are round with soft hairs, occasionally broadly flattened.
- Leaves are 3-5 inches long, ovate, hairy beneath, and irregularly arranged (usually in whorls of 3-4, sometimes opposite) , with small orange or black glands on the underside visible with magnification.
- Seed pods are egg-shaped capsules with a few seeds each.
- Can be confused with the less aggressive *Lysimachia punctata* (spotted loosestrife, sometimes also called garden loosestrife), which bears single or small clusters of larger, more star-shaped flowers in leaf axils only, never in a terminal cluster like *Lysimachia vulgaris*.

Garden loosestrife (*Lysimachia vulgaris*) flowers are in clusters near the top of the stem; petals are somewhat rounded.

Spotted loosestrife (*Lysimachia punctata*) flowers are in leaf axils; petals are more pointed.

Habitat

- Occurs in freshwater wetlands, fens, wet woods, lakeshores, and river and stream banks.
- Grows on moist or saturated soils.
- Sometimes cultivated as a garden ornamental or used for landscaping purposes.

Reproduction and Spread

- Garden loosestrife spreads primarily vegetatively (by rhizomes) and also by seed.

- Produces extensive reddish-colored rhizomes that will reach out into the adjacent open water. Rhizomes have been recorded growing up to 15 feet long into the water.
- Seeds can disperse through water and are a secondary source of spread.

Local Distribution

- Found on lake shores and waterways in several areas of King County.
- Major infestations located on the shorelines of Lakes Washington and Sammamish, and along the Sammamish River.
- Smaller or pioneering infestations are present on Lake Burien, Rutherford Slough, the lower Snoqualmie River, the Raging River and a small number of other locations.

CONTROL INFORMATION

Integrated Pest Management

- The preferred approach for weed control is Integrated Pest Management (IPM). IPM involves selecting from a range of possible control methods to match the management requirements of each specific site. The goal is to maximize effective control and to minimize negative environmental, economic and social impacts.
- Use a multifaceted and adaptive approach. Select control methods which reflect the available time, funding, and labor of the participants, the land use goals, and the values of the community and landowners. Management will require dedication over a number of years, and should allow for flexibility in method as appropriate.

Planning Considerations

- Survey area for weeds, set priorities and select best control method(s) for the site conditions and regulatory compliance issues **(refer to the King County Noxious Weed Regulatory Guidelines or local jurisdictions)**.
- Areas vulnerable to erosion (steep slopes or shorelines within the zone of influence of wave action) should not be dug up without erosion-prevention measures in place. Large cleared areas need to be replanted with native or non-invasive vegetation and stabilized against erosion. Infestations in these situations may require more concentrated efforts to control.
- Control practices in critical areas should be selected to minimize soil disturbance or efforts should be taken to mitigate or reduce impacts of disturbance. Any disturbed areas need to be stabilized to control erosion and sediment deposition. Refer to the King County Surface Design Manual for further information about sediment and erosion control practices (call 206-296-6519 or go to http://kingcounty.gov/wlr/Dss/Manual.htm for more information).
- Generally work first in least infested areas, moving towards more heavily infested areas.
- Properly dispose of all parts of the plant (see Disposal Methods section below).
- Small areas of seedlings may be effectively dug up. Isolated plants should be removed, taking care to remove all of the rhizomes, in order to stop them from infesting a larger area.

- For larger infestations, the strategy will depend on the site. Generally work first in least infested areas, moving towards more heavily infested areas. On rivers and streams, begin at the infestation furthest upriver and work your way downstream.
- Minimize disturbance to avoid creating more opportunities for seed germination.

Early Detection and Prevention

- Look for new plants. Get a positive plant identification by contacting your local noxious weed control program or extension service.
- Look for plants along river and lake shorelines, wetlands, ditches and wet pastures.
- The best time to survey is in July and August when the plants are in flower, however seedlings may not flower in the first year.
- Look for seedlings starting in June.
- Dig up small isolated patches.
- Prevent plants spreading from existing infestations by cleaning off equipment, boots, clothing and animals that have been in infested areas.
- Don't buy or plant garden loosestrife. According to state quarantine laws it is illegal to buy, sell or offer garden loosestrife or any of its cultivars for sale.

Manual

- Hand pulling and the use of hand mechanical tools is allowable in unincorporated King County critical areas. Check with the local jurisdiction for regulations in other areas.
- Manual control is feasible for individual plants or small pioneering stands. Carefully dig out as much root and rhizome as possible; this plant doesn't pull well (breaks off from long rhizomes leaving root fragments behind).
- Hand digging is recommended for very young plants not yet established.
- Larger plants from isolated small populations can be dug out from moist upland areas. This may be impractical to impossible when trying to remove hardy, woody roots or extensive rhizome networks in compacted soils. Care should be taken to minimize erosion when digging in saturated soils on shorelines.
- If the plants are in seed, **cut off and bag all seed heads** before removing plants. Brush off boots, clothes and animals before leaving the infested area.
- All manual control sites should be monitored for several years for signs of plants growing from rhizomes and from the seed bank.
- **DISPOSAL:** Garden loosestrife seed heads, plant parts and roots must be bagged, removed from the site, and discarded in the trash or taken to a transfer station. **Do not compost or place in yard waste.**

Mechanical

- Removal of garden loosestrife with hand held mechanical tools is allowable in critical areas and their buffers within unincorporated King County. Check with the local jurisdiction for regulations in other areas.
- In unincorporated King County, riding mowers and light mechanical cultivating equipment may be used in critical areas if conducted in accordance with an approved

forest management plan, farm management plan, or rural management plan, or if prescribed by the King County Noxious Weed Control Program.

- Repeated mowing may keep garden loosestrife contained and slow dispersal by seed, but won't kill the plants or prevent spread by rhizomes. Plant fragments will root if left behind, so if care is not taken to remove all plant fragments, mowing may also facilitate spread rather than control.
- Cutting alone is not a control option for garden loosestrife. New plants will grow from the rhizomes.
- Sheet mulching or covering using black plastic, landscape fabric, or cardboard and six inches of mulch is an interim option for dense seedling infestations. It does not kill the roots of mature plants, but it does slow down growth and seed dispersal. The covering must extend several feet beyond the edges of the infestation and be weighted so the plants cannot push it up. The edges of the covered area must be monitored for plants coming up from rhizomes extending beyond the sheet. Covering materials should also be monitored for damage or gaps and repaired or re-installed as needed.

Chemical

- **Precautions:**
  - Herbicides should only be applied at the rates and for the site conditions and/or land usage specified on the label of the product being used. **Follow all label directions.**
  - For herbicide use in critical areas and their buffers, certain restrictions apply depending on the site and jurisdiction. In unincorporated King County, refer to the **King County Noxious Weed Regulatory Guidelines** for a summary of current restrictions and regulatory compliance issues. Elsewhere, check with the local jurisdiction.
  - For your personal safety, at a minimum wear gloves, long sleeves, long pants, closed toe shoes, and appropriate eye protection. Follow label directions for any additional personal protection equipment needed.
  - Aquatic formulations of herbicides are not available for sale over the counter to anyone without an aquatic pesticide license. **NEVER apply non-aquatic herbicide formulations to water since many include ingredients toxic to aquatic organisms.**
- For control of large infestations, herbicide use may be necessary. Infested areas should not be mowed until after the herbicide has had a chance to work, which may take several weeks.
- For several years following treatment, monitor areas for new plants germinating from the seed bank. In some cases several years of treatment may be necessary.
- When treating an area intermixed with native monocots (cattails, grasses, sedges, etc), we recommend using a selective herbicide. The monocots will not be harmed by the herbicide and will be able to help suppress new plants emerging from the seed bank.

Specific Herbicide Information

Glyphosate (e.g. Rodeo® or AquaMaster®): Apply to actively growing plants at full to late flowering stage. Application to pre-flowering plants or seedlings may also be effective, but unless the extent of the infestation is well known, plants can be difficult to locate when not

in flower. Apply to foliage but avoid runoff. Caution: Glyphosate is non-selective and it will injure or kill other vegetation contacted by the spray including grasses, cattails and other monocots.

Imazapyr (Habitat®): Apply to actively growing foliage. Caution: Imazapyr is non-selective: it will injure or kill other vegetation contacted by the spray including grasses, cattails and other monocots.

Triclopyr (Garlon 3A® and Renovate 3®). Apply when plants are in the mid to full-bloom stage. Application to pre-flowering plants or seedlings may also be effective, but unless the extent of the infestation is well known, plants can be difficult to locate when not in flower. Triclopyr is a selective herbicide and will kill only dicots. It will not harm monocots such as grasses, sedges, cattails and many native aquatic plants.

All the above listed herbicides require the addition of an approved surfactant. Follow label directions for selecting the correct type of surfactant. Be sure that the selected surfactant is approved for aquatic use in Washington State.
The mention of a specific product brand name in this document is not, and should not be construed as an endorsement or as a recommendation for the use of that product. Chemical control options may differ for private, commercial and government agency users. **For questions about herbicide use, contact the King County Noxious Weed Control Program at 206-296-0290.**

Biological

- No biological control agents are presently known. No research is currently being conducted.

SUMMARY OF BEST MANAGEMENT PRACTICES

Small Infestations in Native and/or Desirable Vegetation

- Hand digging is recommended for very young plants not yet established, when vegetative spread is less likely to occur.
- Larger plants from isolated small populations can be dug out from moist upland areas. This may be impractical to impossible when trying to remove hardy, woody roots in compacted soils. Care should be taken to minimize erosion when digging in saturated soils on shorelines.
- If the plants are in seed, **cut off and bag all seed heads.** It is very difficult to remove the plants without dispersing the seeds.
- Replace any divots created when removing the plants to lessen the amount of disturbed soil.
- If manual control is not possible due to site conditions or available labor, apply appropriate herbicide with wick wiper or spot spray to minimize off target injury.

- If using an herbicide in an area that has desirable monocots, use a selective herbicide to avoid injury to those plants.

Large Infestations in Areas with Monocots

- Cutting alone is not a control option for garden loosestrife. New plants will develop from rhizomes.
- Sheet mulching using black plastic, landscape fabric, or cardboard and six inches of mulch is an interim option for dense seedling infestations. It does not kill the roots of mature plants, but it does slow down growth and seed dispersal. This method is also non-selective.
- If an area has desirable monocots present, use a selective herbicide and encourage the growth of the monocots.

Control on Shorelines

- Additional permits may be required for control of infestations in riparian areas. See Noxious Weed Regulatory Guidelines for more information.
- When large areas of weeds are removed, the cleared area needs to be replanted with native or non-invasive vegetation and stabilized against erosion. Refer to the King County Surface Design Manual for further information about sediment and erosion control practices (call 206-296-6519 or go to http://kingcounty.gov/wlr/Dss/Manual.htm for more information).
- Survey area and document extent of infestation.
- Focus on manual removal for small infestations if possible.
- When removing vegetation on shorelines (by lakes, streams and wetlands) use barriers to prevent sediment and vegetative debris from entering the water system.
- Cutting or mowing will not control garden loosestrife but it can serve in the interim until more effective control measures can be utilized.
- For larger areas where herbicide use is warranted, spray using low pressure and large droplet size to reduce drift. If herbicide could potentially drift into the water or a wetland area, use only approved aquatic herbicides and surfactants after obtaining the necessary permits.
- When large areas of weeds are removed, the cleared area needs to be replanted with native or non-invasive vegetation to prevent re-invasion by weeds and stabilized against erosion.
- Infested areas will need to be monitored for several years to control plants growing from root fragments and germinating from the extensive seed bank.

Control along Road Rights-of-Way

- Hand dig small infestations if possible.
- Spot spray larger infestations. Use a selective broadleaf herbicide in areas with desirable monocots such as grasses, sedges or cattails; if controlled with a non-selective herbicide, re-seed after control is completed.

- If plants are about to flower, they can be cut until a more effective control strategy can be used.
- If plants are sprayed, wait until the herbicide has had a chance to work before mowing.

Disposal Methods

- All garden loosestrife flowers, seed heads, plant parts, and roots must be bagged and discarded in the trash or taken to a transfer station.
- **Do not compost or place in yard waste. Never dump plant material as weeds may spread from yard waste piles.**

References

Cusick, A.W. 1986. Distributional and taxonomic notes on the vascular flora of West Virginia. Castanea. 51: 56-65.

Washington State Noxious Weed Control Board. 1997. Written Findings. http://www.nwcb.wa.gov/weed_info/Lysimachia_vulgaris.html (Accessed 1/10/2008).

USDA NRCS Plants Profile database: http://plants.usda.gov/java/profile?symbol=LYVU. (Accessed 1/10/2008).

King County Noxious Weed Control Program
BEST MANAGEMENT PRACTICES

King County

Purple Loosestrife

Lythrum salicaria
Lythraceae

Class B Noxious Weed
Control Required

Legal Status in King County: Purple loosestrife is a Class B Noxious Weed (non-native species harmful to environmental and economic resources that landowners may be required to control based on distribution in the county and local priorities) according to Washington State Noxious Weed Law, RCW 17.10. In accordance with state law, the King County Noxious Weed Control Board requires property owners to control purple loosestrife on private and public lands throughout the county (control means to prevent all seed production and to prevent the dispersal of all propagative parts capable of forming new plants). In addition, state quarantine laws prohibit transporting, buying, selling, or distributing plants, plant parts or seeds of purple loosestrife.

BACKGROUND INFORMATION

Impacts and History

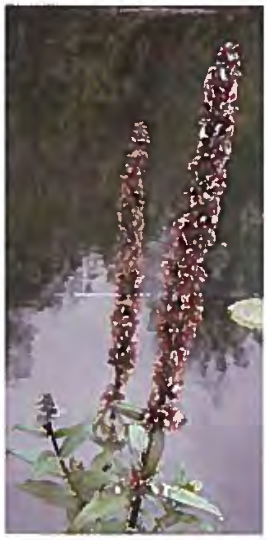
- Purple loosestrife is an invasive and competitive noxious weed that alters wetland ecosystems by replacing native and beneficial plants. Water-dependent mammals and waterfowl and other birds leave wetlands when their food source, nesting material and shelter are displaced by purple loosestrife.
- Dense infestations of purple loosestrife also alter the landscape by trapping sediments and thereby raising the water table.
- Although young shoots of purple loosestrife are palatable to cattle (and to white-tailed deer), larger plants are not, and so cattle graze preferentially on pasture grasses, giving purple loosestrife a distinct advantage in grazed areas. Over time, mature purple loosestrife plants will dominate, removing the use of the land as pasture. Similar processes can lead to destruction of hay meadows. Occasionally, deer browse the tops of mature plants in wetlands, but this doesn't appear to reduce the overall density of purple loosestrife.
- Purple loosestrife was introduced to the United States in the early 1800's at northeastern port cities, in ship ballast obtained from European tidal flats. Over the next 100 years it spread through canals and other waterways as far as the Midwest. It arrived in marine

estuaries in the Pacific Northwest in the early 1900s, suggesting that it was spread by maritime commerce.

- Purple loosestrife has also been commonly cultivated for the horticultural trade and became prized by bee-keepers in the mid 1900s. Deliberate planting and escapes from cultivation undoubtedly aided in the spread of infestations across the country.
- Purple loosestrife was first collected in Washington in 1929 from Lake Washington. The first eastern Washington collection was in the 1940s from the Spokane area, although there are reports that it escaped from a garden to the Spokane River ten years earlier.

Description

- Perennial emergent aquatic plant, reaching over 9 feet tall and 5 feet wide. As many as 30-50 herbaceous stems annually rise from a persistent perennial tap root and spreading rootstock.
- **Square stems** (usually 4-sided, sometimes 6-sided). Leaves are usually opposite. The leaves are linear in shape, 1.5 to 4 inches long, with smooth edges, and are sometimes covered with fine hairs.
- The showy **magenta or purple flowers appear from July to October** on flowering spikes. The flowers have 5 to 7 greenish sepals, 5 to 7 magenta petals and 12 stamens. Flowers will continue until frost.
- In winter months, dead, brown flower stalks remain with old seed capsules still visible.



Habitat

- Occurs in freshwater and brackish wetlands, lake and river shorelines, ponds, shallow streams and ditches, wet pastures and other wet places.
- Grows on moist or saturated soils or in shallow water. Can tolerate a range of soil pH and nutrients.
- Requires partial to full sunlight. Productivity is significantly reduced at 40% of full light.

Reproduction and Spread

- Spreads mainly by seed but also by stem and root fragmentation. A mature plant may have as many as thirty flowering stems capable of producing an estimated two to three million, pepper-sized seeds per year. Most seeds remain viable after two years in a natural water body, and stored in laboratory conditions they are viable for about three years.
- Dispersal is mainly by water, but seeds can also be transported on feathers and fur of waterfowl and other wetland animals as well as in mud on boots, tires, boats and pets. There is also some evidence of wind dispersal.
- Seedling densities sharply fall beyond 34 feet of the parent plant.
- Seed banks build for years, unnoticed until the right conditions of disturbance appear, resulting in a population explosion. Mature plants can live for 20 years.
- Vegetative spread is also possible. Buried stems harbor adventitious buds with the ability to produce shoots or roots. Breaking off stems or roots during incomplete plant removal initiates bud growth. Removed stems left on moist soil will also grow roots and sprout.

Local Distribution

- Found on lakes and waterways throughout King County, with 1,214 total sites reported in 2010.

CONTROL INFORMATION

Integrated Pest Management

- The preferred approach for weed control is Integrated Pest Management (IPM). IPM involves selecting from a range of possible control methods to match the management requirements of each specific site. The goal is to maximize effective control and to minimize negative environmental, economic and social impacts.
- Use a multifaceted and adaptive approach. Select control methods that reflect the available time, funding, and labor of the participants, the land use goals, and the values of the community and landowners. Management will require dedication over a number of years, and should allow for flexibility in method as appropriate.

Planning Considerations

- Survey area for weeds, set priorities and select best control method(s) for the site conditions and regulatory compliance issues **(refer to the King County Noxious Weed Regulatory Guidelines or local jurisdictions)**.
- Control practices in critical areas should be selected to minimize soil disturbance, or efforts should be taken to mitigate or reduce impacts of disturbance. Any disturbed areas need to be stabilized to control erosion and sediment deposition. Refer to the King County Surface Design Manual for further information about sediment and erosion

control practices (call 206-296-6519 or go to http://kingcounty.gov/wlr/Dss/Manual.htm for more information).

- Small infestations can be effectively hand-pulled or dug up if conditions allow (see section on Manual Control for more information). Isolated plants should be carefully removed in order to stop them from infesting a larger area.
- For larger infestations, the strategy will depend on the site. Generally work first in least infested areas, moving towards more heavily infested areas. On rivers, begin at the infestation furthest upriver and work your way downstream.
- Minimize disturbance to avoid creating more opportunities for seed germination.
- Properly dispose of all parts of the plant (see Disposal Methods section below).

Early Detection and Prevention

- Look for new plants. Get a positive plant identification by contacting your local noxious weed control program or extension service.
- Look for plants along river and lake shorelines, in ponds, wetlands, ditches and wet pastures.
- The best time to survey is in July and August when the plants are flowering; however, seedlings may not flower in the first year.
- Look for seedlings starting in June.
- Dig up or pull small isolated patches.
- Prevent plants spreading from existing infestations by cleaning off equipment, boots, clothing and animals that have been in infested areas.
- Don't buy or plant purple loosestrife. According to state quarantine laws it is illegal to buy, sell or offer purple loosestrife or any of its cultivars for sale.

Manual

- Hand pulling and the use of hand mechanical tools is allowable in unincorporated King County critical areas. Check with the local jurisdiction for regulations in other areas.
- If the plants are in flower or seed, **cut off and bag all flower stalks and seed heads.** It is very difficult to pull the plants without dispersing the small, lightweight seeds. Brush off boots, clothes and animals before leaving the infested area.
- Hand pulling is recommended when plants are rooted in mucky, sandy or other loose, wet soil. Grasp the base of the plant and pull slowly with steady pressure to release the roots from the soil. Pulling purple loosestrife by hand is easiest when plants are young. Older plants have larger roots that can be eased out with a garden fork. Remove as much of the root system as possible, because broken roots may sprout new plants.

- Cutting plants at the base when in flower may prevent seeding, but cut plants may continue to produce flowers. Sites should be consistently and regularly monitored until frost to cut and remove any subsequent flowers. Cutting will not kill the plants, and they will need to be controlled every year. Do not leave cut plant parts on site, because root and stem fragments can take root and form new plants.
- All manual control sites should be monitored for several years for plants growing from root fragments and from the seed bank.
- **DISPOSAL:** All purple loosestrife plant parts, including flowers, seed heads, stems, leaves and roots must be securely bagged, and discarded in the trash or taken to a transfer station. **Do not compost or place in yard waste. Plants may regenerate in compost. If you have the ability to burn plants, following all local regulations and restrictions, burning vegetative material is an acceptable disposal method. Do not burn flowering stems or seed heads.**
- **NOTE:** Under the Washington State Lythrum quarantine (WAC 16.752.400-415), it is illegal to transport, buy, sell, offer to sell, or to distribute plants, plant parts or seeds of purple loosestrife into or within the state of Washington. However, by following the recommendations in this Best Management Practices document you are covered under the King County Noxious Weed Control Program's permit to transport purple loosestrife for the purpose of taking it to a transfer station or landfill.

Mechanical

- Removal of purple loosestrife with hand held mechanical tools is allowable in critical areas and their buffers within unincorporated King County. Check with the local jurisdiction for regulations in other areas.
- Mowing is not recommended. Since plant fragments can produce new shoots, mowing may facilitate spread rather than control.
- Cutting alone is not a control option for purple loosestrife. New plants will grow from the roots. Cutting late in the season but before seed set reduces shoot production more than mid-summer cutting.
- Sheet mulching or covering using black plastic, landscape fabric, or cardboard and six inches of mulch is an interim option for dense seedling infestations. It does not kill the roots of mature plants, but it does slow down growth and seed dispersal. The covering must extend several feet beyond the edges of the infestation and be weighted so the plants cannot push it up. The edges of the covered area must be monitored for plants coming up from rhizomes extending beyond the sheet. Covering materials should also be monitored for damage or gaps and repaired or re-installed as needed.

Chemical

- **Precautions:**
  - Herbicides should only be applied at the rates and for the site conditions and/or land usage specified on the label of the product being used. **Follow all label directions.**
  - For herbicide use in critical areas and their buffers, certain restrictions apply depending on the site and jurisdiction. In unincorporated King County, refer to the **King County Noxious Weed Regulatory Guidelines** for a summary of current

restrictions and regulatory compliance issues. Elsewhere, check with the local jurisdiction.
  - For your personal safety, at a minimum wear gloves, long sleeves, long pants, closed toe shoes, and appropriate eye protection. Follow label directions for any additional personal protection equipment needed.
  - A Washington State pesticide license with an aquatic endorsement is required for the purchase of aquatic herbicides. **NEVER apply non-aquatic herbicide formulations to water since many include ingredients toxic to aquatic organisms.**
- For large infestations of purple loosestrife, herbicide use may be necessary for effective control.
- Cutting after spraying is not necessary. If cutting is desired, infested areas should not be cut until after the herbicide has had a chance to work, which may take several weeks.
- In sensitive areas or areas prone to erosion, careful spot-spraying will create less disturbance than manual or mechanical control.
- For several years following treatment, monitor areas for new plants germinating from the seed bank. In some cases several years of treatment may be necessary.
- When treating an area intermixed with native monocots (cattails, grasses, sedges, etc), using a selective broadleaf herbicide is recommended. The monocots will not be harmed by the herbicide and will be able to help suppress new plants emerging from the seed bank.

Specific Herbicide Information

Glyphosate (e.g. Rodeo®, AquaMaster® or Aqua Neat®): Apply to actively growing plants at early flowering stage. Application to pre-flowering plants or seedlings may also be effective, but unless the extent of the infestation is well known, plants can be difficult to locate when not in flower. Glyphosate works slowly, so plants may not appear to be affected for a couple of weeks. A second application a few weeks after the first may be helpful to control plants not in flower or otherwise skipped during the first application. Apply to foliage but avoid runoff. Caution: Glyphosate is non-selective and it will injure or kill other vegetation contacted by the spray including grasses, cattails and other monocots.

Imazapyr (Habitat®, Polaris®): Apply to foliage any time the plant is actively growing. Caution: Imazapyr is non-selective and highly effective even at low doses: it will injure or kill other vegetation contacted by the spray including trees, desirable vegetation, and grasses, cattails and other monocots. Also, imazapyr is soil-active and can harm trees and other plants rooted in the spray area or sometimes immediately downhill from the area being sprayed.

Triclopyr (Garlon 3A® and Renovate3®). Apply when plants are in the mid to full-bloom stage. Application to pre-flowering plants or seedlings may also be effective, but unless the extent of the infestation is well known, plants can be difficult to locate when not in flower. Triclopyr is a selective herbicide and will kill only dicots (broadleaf plants and trees). It will not harm monocots such as grasses, sedges, cattails and many native aquatic plants.

All the above listed herbicides require the addition of an approved surfactant. Follow label directions for selecting the correct type of surfactant. Be sure that the selected surfactant is approved for aquatic use in Washington State.

The mention of a specific product brand name in this document is not, and should not be construed as an endorsement or as a recommendation for the use of that product. Chemical control options may differ for private, commercial and government agency users. **For questions about herbicide use, contact the King County Noxious Weed Control Program at 206-296-0290.**

Biological

- Biological control can take up to six years to have a significant impact on the infestation. Purple loosestrife population density and the number of flowering plants can be reduced, but there will always be some plants remaining when using biological control agents. Releases should be made only at sites where loosestrife infestations are large and immediate eradication of the weed is not the primary objective.
- All biological control agents approved for use on purple loosestrife in Washington State will not feed on any plant species other than purple loosestrife in our area.
- Where feasible, biological control plans should incorporate another non-chemical control method to be able to prevent all seed production as required by state law. If the infestation is inaccessible, remove flowers at the edges of the infestation to the greatest extent possible. If *Galerucella* or *Hylobius* species are present, flower heads should be cut, bagged and properly disposed of by the time of flower drop in mid to late August. If *Nanophyes marmoratus* weevils are present, flower/seedheads should be cut very carefully in early September after emerging adult weevils have left the flowerheads for the season. If there is any chance of mature seeds being present in the seed heads, extreme care should be taken to avoid spread.
- Biological control is not recommended or prescribed for small infestations.
- Two species of *Galerucella* beetles were first released in Washington in 1992 and subsequently have been released in King County several times in many locations. These small golden-brown leaf-feeders defoliate plants and attack the terminal bud area, halting or drastically reducing seed production. The larvae feed constantly on the leaf underside. Loosestrife seedling mortality is high. These beetles are highly mobile and are often found in King County in locations far from release sites. *Galerucella* beetles do not do well near salt water.

Galerucella beetles feeding on purple loosestrife

Hylobius transversovittatus

- *Hylobius transversovittatus* is a root-mining weevil that also eats leaves. The adult beetle is reddish brown and ½ inch long. It eats from the leaf margins, working

inward. Eggs are laid in the lower 2-3 inches of the stem, or sometimes in the soil near the root. The larvae then work their way to the root, where they eat the carbohydrate reserves. Evidence of larvae in the root is a zig-zag pattern. *Hylobius* tolerates coastal areas and is a better choice for infestations near salt water.

- *Nanophyes marmoratus* is a tiny seed weevil. Larvae and adults impact purple loosestrife by feeding on unopened flower buds. Flower buds with larval feeding damage usually abort and fail to produce seeds. Adults also feed on developing leaves, further weakening plants. *Nanophyes* can also be successful when used in conjunction with *Hylobius*.

Nanophyes weevil on purple loosestrife

SUMMARY OF BEST MANAGEMENT PRACTICES

Small Infestations in Native and/or Desirable Vegetation

- Hand pulling is recommended for young plants or older plants in loose, wet soil.
- Larger plants from isolated small populations can be dug out from moist upland areas. This may be impractical to impossible when trying to remove hardy, woody roots in compacted soils. Care should be taken to minimize erosion when digging in saturated soils on shorelines.
- If the plants are in flower or in seed, **cut off and bag all flower heads.** Pulling plants in seed will disperse the small, lightweight seeds. Cut plants may continue to produce flowers, so these sites will have to be consistently and regularly monitored until frost to cut and remove any subsequent flowers.
- When digging or pulling on shorelines, take appropriate erosion control measures.
- If manual control is not possible due to site conditions or available labor, apply appropriate herbicide with wick wiper or spot spray to minimize off target injury.
- If using an herbicide in an area that has desirable grasses and other monocots, use a selective broadleaf herbicide to avoid injury to grasses and other monocots.

Large Infestations in Areas with Monocots

- Cutting alone is not a control option for purple loosestrife. Shoots and adventitious roots will develop. Cutting late in the season but before seed set reduces shoot production more than mid-summer cutting. Cut plants may continue to produce flowers, so these sites will have to be consistently and regularly monitored until frost to cut and remove any subsequent flowers.
- Sheet mulching using black plastic, landscape fabric, or cardboard and six inches of mulch is an interim option for dense seedling infestations. It does not kill the roots of mature plants, but it does slow down growth and seed dispersal. This method is also non-selective.
- If an area has desirable monocots present, use a selective herbicide and encourage the growth of the monocots.

- If the infestation is in a pasture, encourage healthy grassy areas by seeding and fertilizing. Use a mix of grass and clover species to improve resistance to purple loosestrife. Fertilize according to the soil needs.
- If using biological control, areas need to be monitored and any flowers removed and properly disposed of where feasible. If the infestation is inaccessible, remove flowers around the edges of the infestation to the greatest extent possible. If *Galerucella* or *Hylobius* insects are present, flower heads should be cut, bagged and properly disposed of by the time of flower drop in mid to late August. If *Nanophyes marmoratus* weevils are present, flower/seedheads should be cut very carefully in early September after emerging adult weevils have left the flowerheads for the season. If there is any chance of mature seeds being present in the seed heads, extreme care should be taken to avoid spread.

Control on Shorelines

- When large areas of weeds are removed, the cleared area needs to be replanted with native or non-invasive vegetation and stabilized against erosion. Refer to the King County Surface Design Manual for further information about sediment and erosion control practices (call 206-296-6519 or go to http://kingcounty.gov/wlr/Dss/Manual.htm for more information).
- Survey area and document extent of infestation.
- Focus on manual removal for small infestations if possible.
- When removing vegetation on shorelines (by lakes, streams and wetlands) use barriers to prevent sediment and vegetative debris from entering the water system.
- Cutting will not control purple loosestrife but it can serve in the interim until more effective control measures can be accomplished.
- For larger areas where herbicide use is warranted, spray using low pressure and large droplet size to reduce drift. If herbicide could potentially drift into the water or a wetland area, use only approved aquatic herbicides and surfactants after obtaining the necessary permits.
- Infested areas will need to be monitored for several years to control plants growing from root fragments and germinating from the extensive seed bank.

Control along Road Rights-of-Way

- Pull small infestations if possible.
- Spot spray larger infestations. Use a selective broadleaf herbicide in areas with desirable monocots such as grasses, sedges or cattails; if controlled with a non-selective herbicide, re-seed after control is completed.
- If plants are about to flower, they can be cut until a more effective control strategy can be used. Be sure to dispose of cut plant parts properly.
- If plants are sprayed, wait until the herbicide has had a chance to work before conducting any regular right-of-way mowing.

Disposal Methods

- All purple loosestrife plant parts, including flowers, seed heads, stems, leaves and roots must be securely bagged, and discarded in the trash or taken to a transfer station. **Do not compost or place in yard waste. Plants may regenerate in compost. If you have the ability to burn plants, following all local regulations and restrictions, burning vegetative material is an acceptable disposal method. Do not burn flowering stems or seed heads.**
- **NOTE:** Under the Washington State Lythrum quarantine (WAC 16.752.400-415), it is illegal to transport, buy, sell, offer to sell, or to distribute plants, plant parts or seeds of purple loosestrife into or within the state of Washington. However, by following the recommendations in this Best Management Practices document you are covered under the King County Noxious Weed Control Program's permit to transport purple loosestrife for the purpose of taking it to a transfer station or landfill.

References

Bender, J; update by Rendall, J 1987. Element stewardship abstract for *Lythrum salicaria* Nature Conservancy, Arlington, VA. http://wiki.bugwood.org/Lythrum_salicaria

Benefield, C, California Invasive Plant Council. *Lythrum salicaria*. Retrieved March 4, 2005 from UC Davis web page:
http://ucce.ucdavis.edu/datastore/detailreport.cfm?usernumber=61&surveynumber=182

William, R.D. and D. Ball, T. Miller, R. Parker, J. Yenish, T. Miller, D. Morishita and P. Hutchinson.
2002. Pacific Northwest Weed Management Book. Oregon State University, revised annually.

Written Findings. 1997. Washington State Noxious Weed Control Board.

Rawinski, Tom. 1982. The ecology and management of purple loosestrife (*Lythrum* salicaria *L.) in central New York. M. S. thesis, Cornell University.*

Thompson, Daniel Q., Ronald L. Stuckey, Edith B. Thompson. 1987. Spread, Impact, and Control of Purple Loosestrife (*Lythrum salicaria*) in North American Wetlands. U.S. Fish and Wildlife Service. 55 pages.

http://www.nps.gov/plants/alien/fact/lysa1.htm

King County Noxious Weed Control Program
BEST MANAGEMENT PRACTICES

King County

Invasive Knotweeds

Bohemian Knotweed
Polygonum x bohemicum (*Fallopia x bohemica*)
Japanese Knotweed
Polygonum cuspidatum (*Fallopia japonica*)
Giant Knotweed
Polygonum sachalinense (*Fallopia sachalinense*)
Himalayan Knotweed
Polygonum polystachyum (*Persicaria wallichii*)
Polygonaceae – Knotweed/Buckwheat Family

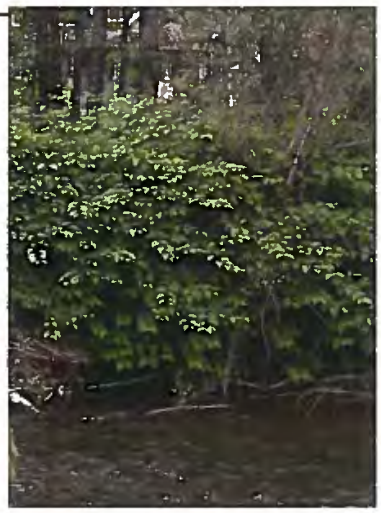
Class B Noxious Weeds
Control Recommended
(required in selected areas)

Legal Status in King County: The species of knotweed listed above are classified as Class B noxious weeds (non-native species that can be designated for control based on local priorities) according to Washington State Noxious Weed Law, RCW 17.10. The Washington State Noxious Weed Control Board has not designated these species for required control in King County. The King County Noxious Weed Control Board recommends control of these species wherever feasible, and requires control in selected areas (see current King County Noxious Weed List for details). State quarantine laws prohibit transporting, buying, selling or offering these species for sale or distributing plants, plant parts or seeds.

BACKGROUND INFORMATION

Impacts and History

- Displaces native vegetation due to its fast-growing, dense, aggressive growth.
- Creates bank erosion problems and is considered a potential flood hazard. Despite knotweed's large rhizome mass, it provides poor erosion control.
- Lowers quality of riparian habitat for fish and wildlife. Changes nutrient cycling of rivers and lowers water quality.
- Thickets can completely clog small waterways.
- Forms dense stands that crowd out all other vegetation, degrading native plant and animal



habitat.

- Damages pavement, limits sight visibility along roads, and obscures guard rails and road signs.
- Roots interfere with drainage and septic systems.
- Invades turf and landscaped areas.
- Difficult to control because of extremely vigorous rhizomes and roots that form a deep, dense mat.
- Plants can re-sprout from very small root and rhizome fragments.
- Plant stems and rhizomes that fall into the water can create new infestations downstream.
- Japanese and giant knotweed are native to northeastern Asia. They hybridize to produce Bohemian knotweed. Himalayan knotweed is native to south and central Asia, including the Himalayas.
- All species were introduced into the U.S. and Canada starting in the late 1800s as ornamental plants and for erosion control and have since spreadwidely.

Description

- Large, clump-forming, herbaceous perennial with 4 to 12 feet tall, round canes with thin, papery sheaths and creeping roots. The hollow stems are jointed and swollen at the nodes, giving a bamboo-like appearance.
- Japanese, giant, Bohemian and Himalayan knotweed are members of the buckwheat family (Polygonaceae).
- Rhizomes can spread at least 23 feet (7 meters) from the parent plant and can penetrate more than 7 feet (2 meters) into the soil.
- Forms large, dense clones of either male or female plants.
- Stems are thick and hollow, resembling bamboo, green to reddish in color, often red-speckled. Young shoots look similar to red asparagus.
- Leaves are alternate, bright green with smooth edges. Leaf shape varies. : Himalayan knotweed leaves are like an elongated triangle, Japanese knotweed leaves are rounded with a flat base and short pointed tip Bohemian knotweed leaves vary from a heart-shaped base to a flat base and variable leaf tip shape, and giant knotweed leaves are huge, "elephant ear" type leaves with a distinctly heart-shaped base and elongated pointed tip. Leaf size also varies, however Japanese knotweed leaves are generally 4 to 6 inches long by 3 to 4 inches wide, hybrid Bohemian knotweed leaves are 7 to 9 inches long, and giant knotweed leaves often exceed 12 inches across, twice the size of Japanese knotweed leaves.
- Flowers are small, white/green on Japanese, Bohemian and giant knotweed and light pinkish-white on Himalayan knotweed and grow in showy plume-like branched clusters. Flowers form in July and August and grow in dense clusters

from the leaf joints. Flowers are either all female (form seeds) or all male (don't form seeds) on each plant.
- Flowers in late July, typically start to form seeds by mid-August.

Habitat

- Can grow in partial shade or full sun.
- Knotweed thrives in any moist soil or river cobble, but can also grow in dry areas.
- Most commonly found in the flood zone along rivers and creeks, it also grows in roadside ditches, railroad rights-of-way, unmanaged lands, wetlands, neglected gardens, and other moist areas.

Reproduction and Spread

- Knotweed typically starts growth in April, but can begin as late as June in higher elevations.
- Reproduces by seed and vegetatively from rhizomes and roots. Knotweed can spread rapidly due to its ability to reproduce vegetatively.
- Invasive knotweeds spread mainly by rhizomes. Rhizome and root fragments are dispersed by natural causes (flood, erosion) or man-made dispersal (roadside clearing, fill dirt).
- Root fragments, as small as ½ in (1 cm) can form new plant colonies and can also be spread in contaminated fill material.
- Cut or broken stems will sprout if left on moist soil or put directly into water, or if moved by beavers or earth-moving equipment. Each node on the plant stock is able to produce roots and new plants.
- Seeds can be viable for as long as 15 years. Seeds in the upper 1 inch (2 cm) of soil generally are viable for 4 to 5 years. Below 1 inch (2 cm), the seeds remain dormant longer. However, knotweed seedlings are not often found in the wild and most dispersal is by root and stem fragments.
- Knotweed canes die back with the first hard frost (Pridham and Bing 1975) and go dormant during the winter. The dead, brown stems may remain standing through the winter with new canes developing in the spring from the same rootstock.

Local Distribution

Found throughout King County. The heaviest concentrations of invasive knotweeds are found along riparian corridors and road rights-of-way. Infestations can also be found in residential gardens, wetlands, and upland areas.

CONTROL INFORMATION

Integrated Pest Management

The preferred approach for weed control is Integrated Pest Management (IPM). IPM involves selecting from a range of possible control methods to match the management requirements of each specific site. The goal is to maximize effective control and to minimize negative environmental, economic and social impacts.

Use a multifaceted and adaptive approach. Select control methods that reflect the available time, funding, and labor of the participants, the land use goals, and the values of the community and landowners. Management will require dedication over a number of years, and should allow for flexibility in method as appropriate.

Planning Considerations

The key to controlling knotweed is controlling the rhizomes. What you see on the surface is only a fraction of the problem. "Control measures that fail to address the regenerative capacity of the rhizomes will not control this plant." (Gover et al 2005). Although there are potentially successful mechanical or manual control options for small patches, landscape level projects and large sites will likely require integrating herbicide into the control strategy.

Begin by surveying area for knotweed, setting priorities and selecting the best control method(s) for the site conditions and regulatory compliance issues **(refer to the King County Noxious Weed Regulatory Guidelines)**.

It is possible but not easy to control knotweed, and it is especially difficult on a landscape scale, such as along a river, or when spread over many properties. Because of knotweed's incredibly extensive root system and sprouting ability, landscape level control requires long-term planning and follow-up. Even on a patch-by-patch basis, successful eradication is likely to take several years and multiple treatments.

On rivers and streams, knotweed spreads easily downstream by water, so it is necessary to begin control from the furthest upstream infestation, including all tributaries and other upstream sources of possible re-infestation.

For large, landscape scale projects, outreach to all public and private landowners and the broader community, as well as volunteer recruitment and coordination, will improve the success of the project. Work with volunteers and other organizations in the community to expand the ability to physically get the work done. Landscape

level projects may have a greater chance of success under a coordinated effort such as a Cooperative Weed Management Area (CWMA). Grants are available for invasive vegetation removal, such as knotweed, that benefits public resources, especially for work done through non-profit organizations or government agencies.

Below, each method is first described individually, and then Best Management Method recommendations are provided for different types of infestations.

Early Detection and Prevention

- Monitor for new populations in May and June.
- Dig up isolated or small populations (50 stems or less). If there are more stems than you can remove manually, it may be necessary to treat the area with an appropriate herbicide in the late summer/early fall.
- Prevent plants from spreading away from existing populations by washing vehicles, machinery, and equipment that have been in infested areas.
- Prevent knotweed from entering waterways.
- Do not discard stems or root fragments in waterways or on moist soil.

Manual or Mechanical Control

- **When to use manual methods:** If there is easy access to the site and patches are reasonably small (50 stems or less), commit to following an intensive control regimen.
- **Variations:** Cutting, mowing, pulling, digging, covering.
- Cutting, mowing and pulling stimulates shoot growth and depletes the roots. The more shoots there are per linear foot of root, the more likely it will be to physically pull out the roots, exhaust them by depriving them of energy (i.e. by cutting the shoot off) or eradicating them with an herbicide treatment.
- When controlling knotweed manually, be sure to practice the four T's: timely, tenacious, tough and thorough (Soll 2004).
- Hand pulling and the use of hand mechanical tools to control noxious weeds are generally allowable in critical areas in unincorporated King County (refer to the **King County Noxious Weed Regulatory Guidelines** for details).
- Be aware that repeated cutting tends to produce numerous small stems that may make future treatment with stem injection more difficult.
- **CUT** stems close to the ground TWICE A MONTH OR MORE between at least April and August, and then once a month or more until the first frost, over 3 to 5 consecutive years (Soll 2004). This can vary depending on the growth of the plant. The important thing it to keep the plant from storing any new root energy.
    - Keep plants from growing taller than 6 inches.

- Using a machete, loppers or pruning shears, cut the stems to the ground surface. If using a mower/weed-eater is necessary, cut as low and as often as possible. Be sure not to scatter stems or root fragments.
- Rake and pile up the cut stems where they will dry out. Dried stems can be crushed and composted on site or discarded in yard waste.
- Stems or stem fragments left on moist soil or in water may sprout at the nodes, and the area (or adjacent areas) may become re-infested.
- Large piles of composting knotweed stems have been known to self-ignite, so take care not to create large piles and monitor regularly.
- Goats and chickens are reported to eat knotweed and in some circumstances, controlled grazing may be an option similar to intensive mowing. Be aware that goats will eat desirable vegetation as well as knotweed. Grazing should reduce the growth of knotweed, but is unlikely to completely kill the plants. For best results, maintain intense grazing pressure for at least 5 years over the entire knotweed patch or until plants stop growing back.
- Never allow cut, mowed or pulled knotweed vegetation to enter waterways.

- **DIG** up as much root as possible in August over at least three consecutive years; reported to work for small, isolated patches.
  - Roots of established plants may extend down 7 to 10 feet deep, and rhizomes are often very large and woody and difficult to dig up.
  - Be sure to carefully dispose of the roots in garbage. Do not put them in a compost pile because they remain viable for a very long time. Roots and rhizomes dry out very slowly, so burning isn't usually a feasible disposal option for rhizomes.
  - Each time you see new sprouts (start looking a week after you pull), uproot them as well, trying to pull out as much of the root as you can each time.
  - Be sure to search at least 20 feet away from the original patch center for new sprouts.
- **COVER** with heavy duty geo-textile fabric or black plastic.
  - Works better with isolated and smaller patches on open, undisturbed terrain.
  - Plan to leave the covering material in place throughout at least five growing seasons, longer if the soil is wet or the population large and well-established.
  - First, cut stems down to ground surface. Next, cover the area with geo-textile fabric or heavy duty black plastic extending beyond the plant base and stems at least 7 feet beyond the outside stems. Leave covering material loose and clean of debris, weighted down with heavy rocks or cement blocks. Watch for holes in the fabric and at the perimeters for any new growth. Every two to four weeks during the growing season, stomp down re-growth under covering material and clean debris.

- Install covering at the beginning of the year or after cutting the plant down several times during the growing season which will reduce some of the rapid plant growth.

Chemical Control

- Herbicides should only be applied at the rates and for the site conditions and/or land usage specified on the herbicide label. **Follow all label directions**.
- For your personal safety, at a minimum, wear gloves, long sleeves and pants, closed toe shoes, and appropriate eye protection. Follow label directions for any additional personal protection equipment needed.
- For herbicide use in critical areas and their buffers, certain restrictions apply depending on the site and jurisdiction. In unincorporated King County, refer to the **King County Noxious Weed Regulatory Guidelines** for a summary of current restrictions and regulatory compliance issues. Elsewhere, check with the local jurisdiction.
- Herbicides with the active ingredients glyphosate (e.g. Rodeo, Roundup, Aqua Neat among others), imazapyr (e.g. Habitat, Polaris, Arsenal), triclopyr (e.g. Garlon, Renovate, Element) and aminopyralid (e.g. Milestone) have shown to be variably effective in controlling or suppressing knotweed either separately or in combination. Results vary depending on the timing, rate and method of application. See below for detailed information.
- Aquatic herbicides are Restricted Use Pesticides in Washington and can only be purchased and used for aquatic applications by WSDA licensed pesticide applicators with an aquatic endorsement on their license. Also, state and sometimes local permits are generally required when applying pesticides in water or where herbicides are likely to drift into water.
- Aquatic herbicides that are also labeled for use in terrestrial areas, such as Roundup Custom, can be purchased and used by non-licensed individuals for treating knotweed, as long as the plants being treated are not growing in water and the herbicide is not likely to drift into water, such as with the stem injection method.

Types of Chemical Control Methods

Foliar Application

- Use a backpack sprayer or large volume sprayer.
- Easiest and fastest method, but potentially higher risk of drift onto desirable vegetation and into water and soil.
- Use a systemic herbicide that translocates from leaves to the roots.
- The most effective chemical on knotweed is imazapyr and the second most effective is glyphosate. These products can also be combined to produce

quicker visual signs of treatment, but does not increase the effectiveness of using imazapyr alone.

- The most effective time to spray knotweed with glyphosate or imazapyr is generally July to October, or between bud formation and when the plant dies back after the first frost, with later treatments in that time period generally being more effective than earlier. Early treatments may require a follow-up spray to control re-growth. This will vary with weather and water availability. Usually the most effective time for a single treatment is late August/early September.
- Non-selective herbicides such as glyphosate (e.g. Roundup) and imazapyr (e.g. Habitat, Polaris) kill both grass and broadleaf plants. Selective broadleaf herbicides will not harm most grasses if used according to label. However, there are currently no selective broadleaf herbicides that provide more than one season of knotweed control. Triclopyr and aminopyralid will provide short-term control of knotweed, but generally won't kill the plants. Metsulfuron and dicamba will also control top growth of knotweed although generally don't control the rhizomes. 2,4-D is not effective on knotweed.
- Where it is not possible to spray over the top of the plants due to height and access, spray the stems and the undersides of the leaves and get as much coverage of the plants as possible.
- Avoid spraying knotweed when bees and other pollinators are present on the flowers whenever feasible. When pollinators are present, consider spraying either before full-bloom or after petals begin to drop. You can also spray earlier or later in the day when bees are not as active. If necessary to spray when plants are in full flower, spray the stems and undersides of the leaves and avoid spraying the flowers as much as possible. You may also consider clipping and removing the flowers prior to foliar spray, or using a stem injection method. Alternately, beekeepers can be notified and asked to move bees away from areas being treated if there are concerns about exposure.
- If plants are cut back, allow them to re-grow for at least six weeks, or to about 3 to 6 feet tall, before spraying. If plants are bent over to make them shorter and easier to spray, allow them to recover for one to two weeks before spraying to make sure they are actively growing again. Typically, spraying re-growing or bent knotweed is not as effective as spraying full grown plants, but it is sometimes more efficient and necessary because of land use or visibility issues.
- If it is necessary to keep plants from growing tall for visibility or other reasons, a spring herbicide application or cutting will set back the plant so that it can be sprayed at an effective height and growth stage later in the year.
- Experience in Pennsylvania suggests June 1 as a good cutting date if follow up spraying is planned. They found that regrowth when cut June 1 is

vigorous, but limited in height (6 to 10 ft tall knotweed cut in June resulted in 2 to 4 foot tall re-growth). Cutting too early in the season can result in regrowth that reaches full height and waiting too late in the season can result in almost no regrowth and will limit the ability to spray and control next season's growth (Gover et al 2005).

- Continue to monitor and treat annually in the late summer as long as there is re-growth. Re-growth the following years will be much shorter and sparser, and can be sprayed with considerably less herbicide, although it will take more time to locate all the plants. Re-growing plants can also be dug up once they are very small, although it is still difficult to remove all the roots.
- Regardless of herbicide choice, rate or spray timing, large, established patches (hundreds or thousands of stems) will almost certainly require foliar treatments over at least three years, possibly many more. Similar to treating patches mechanically, be sure to search for new shoots up to 20 feet or more away from the central patch after herbicide treatment begins.

Specific Herbicide Information

Glyphosate: 2% to 5% solution plus surfactant (as recommended on label).

- Apply as coarse spray with complete, uniform coverage.
- Apply when knotweed is actively growing and most have reached the bud to early flowering stage until the first hard frost.
- Roundup Custom/AquaneatRodeo plus surfactant (e.g. Competitor, Agridex) are approved for aquatic sites.
- Roundup ProMax or other products containing glyphosate can be used on terrestrial sites. Add surfactant if advised on label. The concentration of active ingredients can vary by product so make sure to use the rate recommended on the label. The percent rate given here is based on a product such as Roundup ProMax that has 48% active ingredient.

Imazapyr : slow-acting and expensive but highly effective on knotweed.

- 1% solution with 0.25% to 1% surfactant or 0.5 to 1 lb per acre.
- Apply from midsummer after seed set until first killing frost.
- Habitat and Polaris are approved for aquatic sites.
- Arsenal and other imazapyr products are approved for various non-aquatic sites (see label for crop rotation and other restrictions).
- Imazapyr has some soil activity and may impact roots of other plants in the area being sprayed for several months after application. Follow label instructions before planting into treated area and use caution around tree roots and on permeable soils.

Wick Wipe

- Use an applicator wand with a sponge on the end of a reservoir for the herbicide. Wipe the sponge soaked with herbicide on the leaves and stem of the plants.
- Use glyphosate at 33 to 75 % concentration (or as directed on product label).
- Greatly reduces drift.
- Hard to get chemical on leaf surface and seems to increase personal contact with herbicide.
- May be appropriate for small re-growing plants growing near desirable vegetation.

Cut and Pour

- Not very effective and generally not recommended.
- Cut stems between lowest 2 nodes and put 3 ml undiluted (concentrated) glyphosate into stem cavity (can use a large needle with measured reservoir to be precise). Be very careful not to splash herbicide onto the ground.
- Timing best in late summer or early fall.
- Follow label directions on amount applied per acre (i.e. for the 7.5 quart per acre label rate, can only treat 2375 stems per acre at 3 ml per stem).
- Need to remove cut stems away from water where they can dry out and not spread off site.

Hollow Stem-Injection

- Timing is best from late July to end of September (or whenever the stems dry out and start splitting when injected).
- Use a stem injection gun or similar tool that can be calibrated to the required amount.
- Follow directions carefully especially on calibrating and cleaning the equipment.
- Highly effective; usually 95% or more controlled in first year.
- Greatly reduces drift, is highly selective and there are no cut stems to deal with.
- Need to inject every cane in the stand; very time and labor intensive compared with foliar spraying.
- Can only inject stems over ½ inch in diameter so there will always be small stems that can't be injected in a population, especially in the second year of treatment.
- Glyphosate is the only product labeled for hollow stem injection. Aquatic formulations of glyphosate such as Roundup Custom (formerly sold as Aquamaster), Rodeo, or Aqua Neat can be used on or near aquatic sites while Roundup ProMax and other non-aquatic formulations, can be used on non-aquatic sites.

- Inject the concentrated herbicide product into each stem between first and second nodes from the ground, or between second and third node if cane is too woody lower down.
- Most labels recommend 5 ml per cane for knotweed, but our experience and WSU Extension trials have shown that 3ml is just as effective as 5 ml, so we recommend using 3 ml.
- Mark stems immediately after injecting with spray paint or a grease pen to avoid missing stems or doubling up (once stems are injected they won't hold another dose and herbicide will spill out of the stem).
- Make sure to stay within the per acre label rate for the glyphosate product you are using. For example, with a label maximum of 7.5 quarts per acre, at 3ml per cane, you can only inject approximately 2,375 canes per acre.
- For two to three years following stem injection, plan on either spot-spraying or digging up any re-growing plants. Plants will be smaller and sparser, but follow up is essential to long term control.

Combination of Methods

- Using a combination of methods may work better for some site conditions, labor availability or land use needs. However, none of these methods are as effective as spraying full grown knotweed in late summer or using hollow stem injection.
- **Cut/Spray:** Cutting stems, followed by foliar spray 6 weeks later, instead of spraying twice, will reduce overall herbicide input into the watershed and is probably more labor efficient (can use volunteers or unlicensed crews to cut the infestation).
- **Bend/Spray:** Bend stems and then approximately 2 to 4 weeks later, spray plants. Volunteers or unlicensed crews can be used to bend the stems prior to foliar application.
- **Cut/Cover:** This method is moderately effective. Needs constant monitoring and controlling of plants around perimeter and scattered plants that grow through sheet mulch through holes/overlap areas. Every two to four weeks need to stomp down re-growth under covering material and clean off debris.
- **Spray/Spray:** Spring or summer spray followed by fall foliar spray; sets plants back so they can be sprayed at the appropriate growth stage and at the best (easiest) height. This method increases the amount of overall herbicide input into the watershed but takes the least time of the combination methods.

The mention of a specific product brand name in this document is not, and should not be construed as an endorsement or as a recommendation for the use of that product.
Chemical control options may differ for private, commercial and government

agency users. **For questions about herbicide use, contact the King County Noxious Weed Control Program or your local Weed Board or Extension Agent.**

Biological Control

- Biological control is the deliberate introduction of insects, mammals or other organisms which adversely affect the target weed species. Biological control is generally most effective when used in conjunction with other control techniques.
- There are currently no biological control agents approved for managing invasive knotweed in the United States, but it is likely that agents will be approved in the near future. In Washington, contact the WSU Integrated Weed Control Project at http://invasives.wsu.edu/aboutus.htm for current information.

SUMMARY OF BEST MANAGEMENT PRACTICES

Small Infestations in Native and/or Desirable Vegetation

- Dig up plants or apply appropriate herbicide with wick wiper or by spot spray to minimize off target injury (follow directions above for the method used).
- Monitor site throughout growing season and remove any new plants. Remember to search at least 20 feet from the original infestation.
- If using an herbicide in a grassy area, consider using a selective herbicide to avoid injury to the grass or a wick wiper or stem injector.
- Re-vegetate bare areas with appropriate vegetation or cover with mulch while desirable vegetation becomes established. Do not leave large areas of bare soil.

Large Infestations/Monocultures

- Mowing is not effective for controlling invasive knotweed infestations and can spread infestations further.
- Large infestations can be controlled with herbicides or a combination of methods (follow directions in the appropriate sections above).
- Eradication of knotweed with a single herbicide application is difficult. Typically it takes several treatments, over 4 to 6 years to get an infestation under control.
- If using the covering method, be sure to monitor for knotweed growth on the edges of sheet-mulched sites, at overlapped areas in the sheet-mulch, and where sheet-mulch has been staked. For sprayed sites, monitor annually around the edges of chemically treated areas.
- Use erosion control measures in areas subject to erosion, especially on steep slopes or riverbanks.
- Plan on re-vegetating with desirable vegetation after the initial 2-3 years of treatment, especially in areas likely to be re-infested with knotweed or other

invasive vegetation. Mulch bare areas until vegetation is re-established where feasible.

- Consider replanting with vegetation that is beneficial to bees and other pollinators when clearing large areas of knotweed. Use native or non-invasive plants only.

Control in Riparian Areas

- Additional permits may be required for control of infestations in riparian areas. See the **King County Noxious Weed Regulatory Guidelines** for more information or contact your local jurisdiction.
- Whenever large areas of vegetation are removed, the cleared area needs to be replanted with native or non-invasive vegetation and stabilized against erosion. Refer to the King County Surface Water Design Manual for further information about sediment and erosion control practices (call 206-477-4800 or go to http://www.kingcounty.gov/environment/waterandland/stormwater/documents/surface-water-design-manual.aspx for information).
- Survey area and document extent of infestation from the headwaters of waterways down.
- Consider manual removal or stem-injection for small (less than 50 stems) infestations if feasible.
- Target the knotweed, retaining and protecting native and beneficial plants.
- Use aquatic formulations where there is any risk of herbicide entering the water.
- Infested areas should incorporate a management plan lasting at least several years to control plants re-sprouting from the rhizome mass, skipped plants and any regrowth.

Control on Road Rights-of-Way

- Mowing is not an effective means of control and can spread knotweed infestations along road rights-of-way.
- Small plants should be dug up or spot sprayed with an appropriate herbicide. Large patches can be sprayed in late summer/early fall or controlled with a combination of cutting and spraying (see instructions above).
- Where necessary for visibility or other issues, plants can be cut down or sprayed in May or June and then sprayed again in late summer or early fall.

Knotweed Disposal Methods

- Knotweed crowns and rhizomes should be collected and discarded with the trash or taken to a transfer station for disposal. Composting crowns and rhizomes is not recommended.
- Knotweed stems can be composted, but they will root on moist soil so they need to be completely dried out and crushed before composting.

- Stems can be left on site to dry out and decompose if they are in a dry area where they will not move into waterways or onto moist soil. The area should be monitored for re-growth and stems should not be moved to an un-infested area.
- Large piles of composting knotweed stems have been known to self-ignite so monitor piles and avoid creating very large stacks. Knotweed stems burn when dry but the hollow compartments can burst and create small explosions when burned.
- Dried out stems may be broken up or chipped into pieces less than an inch long and then composted on site, disposed of in a city-provided yard waste container or in the green recycling at a transfer station.
- Stems of knotweed with seeds should be collected and put in the trash or taken to a transfer station. If removal is not feasible, these stems can be left on site. However, there is a risk of spread from the seeds, so the area should be monitored for several years for seedlings. Stems should be left well away from waterways, shorelines, roads and un-infested areas.
- Never dispose of knotweed plants or plant parts into waterways, wetlands, or other wet sites where they might take root or infest areas downstream.

References

Child, L.E. and P.M. Wade. 2000. The Japanese Knotweed Manual: The Management and Control of an Invasive Alien Weed. Packard Publishing Limited, West Sussex, UK.

Gerber, E., Kerbs, C., Murrell, C. Moretti, M., Rocklin, R., Schaffner, U., 2008. Exotic Invasive Knotweed (*Fallopia* spp.) Negatively Affects Native Plant and Invertebrate Assemblages in European Riparian Habitats. Biological Conservation 141, 646-654.

Gover, Art, Jon Johnson, and Larry Kuhns. 2005. Managing Japanese Knotweed and Giant Knotweed on Roadsides. Penn State Roadside Research Project, Department of Horticulture, College of Agricultural Sciences, Fact Sheet 5. Online: http://plantscience.psu.edu/research/projects/vegetative-management/publications/roadside-vegetative-mangement-factsheets/5managing-knotweed-on-roadsides. Accessed July 8, 2015.

Hood, W.G., Naimann, R.J., 2000. Vulnerability of riparian zones to invasion by exotic vascular plants. Plant Ecology 148, 105-114.

Peachey, E., editor. 2015. Pacific Northwest Weed Management Handbook [online]. Corvallis, OR: Oregon State University. Online http://pnwhandbooks.org/weed. Accessed July 8, 2015.

Silver, J., Hutten, M., 2004. Knotweed Control on the Hoh River Summary Report – 2002 to 2004. 10,000 Years Institute. Port Townsend, WA.

Soll, Jonathan. 'Controlling Knotweed (*Polygonum cuspidatum, P. sachalinense, P. polystachyum* and hybrids) in the Pacific Northwest". 2004. The Nature Conservancy. Online: http://www.invasive.org/gist/moredocs/polspp01.pdf. Accessed July 14, 2015.

Urgenson, L., 2006. The Ecological Consequences of Knotweed Invasion into Riparian Forests. University of Washington, College of Forest Resources. Seattle, WA.

Urgenson, L., Reichard, S., Halpern, B., 2009. Community and Ecosystem Consequences of Giant Knotweed (*Polygonum sachalinense*) Invasion into Riparian Forests of Western Washington, USA. Biological Conservation 142, 1536-1541.

Washington State Department of Agriculture (WSDA), 2005. 2005 Washington State Integrated Knotweed Management Plan. http://agr.wa.gov/plantsinsects/weeds/knotweed/docs/KnotweedIPMPlan.pdf (accessed February 21, 2014).

Washington State Noxious Weed Control Board. Written Findings. http://www.nwcb.wa.gov/siteFiles/Polygonum_cuspidatum.pdf, http://www.nwcb.wa.gov/siteFiles/Polygonum_polystachyum.pdf, http://www.nwcb.wa.gov/siteFiles/Polygonum_x_bohemicum.pdf, http://www.nwcb.wa.gov/siteFiles/Polygonum_sachalinense.pdf. Accessed July 14, 2015.

King County Noxious Weed Control Program
BEST MANAGEMENT PRACTICES

Reed Canarygrass

Phalaris arundinacea **Class C Noxious Weed**
Poaceae **Control Recommended**

Legal Status in King County: Reed canarygrass (RCG) is a Class C noxious weed (non-native species that can be designated for control based on local priorities) according to Washington State Noxious Weed Law, RCW 17.10. The State Weed Board has not designated this species for control in King County. The King County Weed Control Board recommends control of this species where feasible, but does not require it.

BACKGROUND INFORMATION

History and Impacts

- Native to Eurasia and possibly North America as well. No reliable way to tell the difference between native and introduced populations. Present on every continent except Antarctica.
- Widespread throughout most of North America including Washington State
- European cultivars widely introduced as hay and forage
- Agricultural use in the Pacific Northwest began at the turn of the 20th century as the first crop following logging for areas being converted to farming
- Used for soil stabilization, although waterways can undermine sod and increase erosion
- Can cause indigestion in livestock
- Forms monospecific stands over time and drastically reduces wetland species diversity
- Can form physical barriers to salmonid migration
- Flooded RCG fields have been known to confuse and strand migrating salmon
- Provides little food for native wildlife species
- Contributes to increased water temperatures
- Dense colonies decrease water flow, increase siltation, contribute to flooding
- Pollen and chaff can aggravate allergies in humans

Reed canarygrass leaf and ligule (*left*); reed canarygrass inflorescence w/seeds formed (*right*)

Description

- Cool-season sod-forming perennial grass 3-9 feet (1-3m) tall
- Rhizomes and dead stems can form sod over 1.5 feet (0.5m) thick that few other species can penetrate
- Stems hairless, hollow, to ½ inch (1.25 cm) in diameter, often reddish near top
- Leaves stick out at a 45 degree angle from the stem
- Leaf blades flat, hairless, ¼ to ¾ inch (0.6-1.9cm) wide, up to 1.5 feet (0.5m) long
- Ligule long and membranous
- Inflorescence is a compact panicle on tall stems high above leaves
- Flowers May to July
- Inflorescence turns from green to purplish in full bloom, then straw colored when seeds form
- Seeds are shiny brown
- Dead stems remain erect and persist throughout the winter, making identification in winter possible

Habitat

- Grows best in wet to damp soil
- Can tolerate prolonged drought in seasonally wet areas
- Can survive in deeper water if recently inundated
- Wet meadows, streambanks, lake margins, ditches, shallow wetlands
- Full sun, does not tolerate shade well

Reproduction and Spread

- Spreads by seed, rhizomes and vegetative fragments
- All plant parts float, facilitating spread in standing or moving water

- Rhizomes:
  - More common form of spread is by rhizomes
  - Rhizomes can extend over 10 feet per year and form a thick mat
- Seeding:
  - Each inflorescence can produce up to 600 seeds;
  - Seeds will not germinate in dense shade
  - Seed germination generally low, seeds viable for less than four years
  - Cold temperatures required for flowering and seed germination
  - Seeds spread on animals, humans (boots, clothing, tools) and cars/machinery
- Vegetative fragments:
  - Detached stems or rhizomes grow into new plants when in contact with bare soil
- Can become established in a disturbed wetland in less than 12 years

Reed canarygrass seeds on muddy boots

Local Distribution

Very widespread in King County in all available habitats

CONTROL INFORMATION

Many of the control techniques discussed below require permits to implement. Refer to the **King County Noxious Weed Control Regulatory Guidelines** for more information on permitting. This document outlines permits and regulations that pertain to physical, cultural, and chemical control methods. The document is available at: www.kingcounty.gov/weeds

Integrated Pest Management

- The preferred approach for weed control is Integrated Pest Management (IPM). IPM involves selecting from a range of possible control methods to match the management requirements of each specific site. The goal is to maximize effective control and to minimize negative environmental, economic and social impacts.
- Use a multifaceted and adaptive approach. Select control methods which reflect the available time, funding, and labor of the participants, the land use goals, and the values of the community and landowners. Management will require dedication over a number of years, and should allow for flexibility in method as appropriate.
- In most cases, a successful reed canarygrass control project will involve at least two different control methods

Early Detection and Prevention

- Reed canarygrass is identifiable year round. Search for it in winter when other grasses are dormant and RCG's persistent, straw-colored stalks are easily seen.
- RCG can be slow to invade intact wetland systems with healthy native plant communities. Any RCG plants found in this situation should be pulled or otherwise carefully controlled as soon as possible.
- Prevent plants from spreading away from existing populations by washing vehicles, boots and animals that have been in infested areas.
- Invasion of any disturbed wetland, including wetland restoration sites, is common since RCG is so widespread. Take measures to prevent establishment such as heavily mulching around new plantings and following a regular maintenance regime to remove new introductions.

Manual Control: using hand tools

- Hand pulling and the use of hand tools are allowable in unincorporated King County critical areas. Check with the local jurisdiction for regulations in other locations.
- Pulling is usually not a viable option because rhizomes will remain in the soil and resprout. It is possible to pull seedlings in wet/mucky soil.
- Dig with hand tools only small clumps in soft soil where you have a reasonable chance of removing all roots and rhizomes.
- Cut small patches with hand clippers or machetes as close to the ground as possible to prevent seeding or as part of an integrated approach. Cutting alone will not kill the plants.
- Clean tools after use to minimize risk of spread.
- Always dispose of removed material properly (see below).

Mechanical Control: using mechanical tools

- Mow or cut using an appropriate tool for the infestation location and size (mowers, brush cutters, line trimmers, tractor-drawn mowers, etc). Follow recommendations below under "Large Infestations/Monocultures" for frequency and timing of mowing.
- Cultivate using discing or tilling machinery as part of an IPM program. Cultivating alone will increase RCG by cutting up and spreading rhizomes unless done frequently through several seasons.
- Burn using a hand-held weed torch. Several varieties are available online. Follow all instructions and safety considerations for the model you use. Do not use a torch in dry or windy conditions. For best results heat small or cut plants slowly to kill all growth.
- Prescribed burning can stimulate growth if done at the wrong time. In the Pacific Northwest that means that burning alone is impractical since fall burns are usually the only timing possible, and fall is the wrong time of year to burn RCG. However, burning can be used as a pre-treatment with other methods such as tilling, shade cloth installation or herbicide application, since it will remove above-ground dead litter.

Burning may require special permits. Check with your local jurisdiction prior to attempting a prescribed burn. For unincorporated King County check with the Department of Permitting and Environmental Review (http://www.kingcounty.gov/property/FireMarshal/BurnBanInfo.aspx)

- Excavating (as with a backhoe) is generally not advised. If a wetland restoration design calls for excavating in reed canarygrass-dominated areas, dispose of all removed plant material properly (see below) and/or bury sod and soil under at least two feet of uncontaminated soil.
- Clean tools and machinery after use to minimize risk of spread.
- Always dispose of removed material properly (see below).

Cultural Control

1) Covering

a) Cover with commercially available shade cloth and secure tightly with stakes, rebar, large garden staples or other appropriate devices. Overlap sections of cloth by at least one foot, and extend the coverage at least two feet beyond the edge of the infestation. Monitor edges and seams for shoots from lateral growth of rhizomes. Shade cloth should be left in place for at least two growing seasons. Shade cloth does not biodegrade and must be removed after use.

b) Sheet mulch using several layers of thick, clean cardboard (no tape or staples). Overlap pieces by at least one foot and extend coverage at least two feet beyond edge of infestation. Cover cardboard with at least four inches of wood mulch or hog fuel.

c) Sheet mulching as described above plus planting densely (2-3 ft. (0.6-0.9 m) apart) with live willow stakes has proven successful in the Puget Sound area, but will not work in areas that get flooded.

2) Flooding

a) If it is possible to manipulate water levels, flood to at least 18 inches (if combined with intensive cultivation) or at least 32 inches if flooding is the only control method.

3) Planting shade

a) Establish desirable trees and shrubs to form shade canopy. Where possible, plan to establish a multi-layered dense canopy, preferably with conifers in the overstory. Dense planting of alders or cottonwoods has also been shown to reduce RCG once a canopy is formed.

b) Install live willow stakes planted at a density of 2-3 ft. (0.6-0.9 m) apart.

c) Any planting effort must include monitoring and spot control of reinvasion for several seasons until trees and shrubs are large enough to compete with RCG. Heavy mulching when plants are small will help.

d) Incomplete shade will allow RCG to recover and/or re-invade.

Chemical Control

Precautions

1) Herbicides should only be applied at the rates and for the site conditions and/or land usage specified on the label of the product being used. **Follow all label directions**.
2) For your personal safety, at a minimum wear gloves, long sleeves, long pants, closed toe shoes, and appropriate eye protection. Follow label directions for any additional personal protection equipment needed.
3) Permits and licenses are required for all chemical control in water and where herbicide is likely to drift into water.
4) Herbicides can only be applied to aquatic systems in Washington State by a licensed pesticide applicator with an aquatic endorsement on their license.
5) A Washington State pesticide license with an aquatic endorsement is also required for the purchase of aquatic herbicides. **NEVER apply non-aquatic herbicide formulations to water since many include ingredients toxic to aquatic organisms**.

Application Methods

1) Small areas can be successfully treated with one application, but larger areas may require several years of treatment to exhaust the seed bank.
2) Spot spray small infestations taking care to avoid damaging surrounding vegetation.
3) Herbicide application prior to covering or sheet mulching can increase efficacy of those methods. Allow for enough time for the herbicide application to take effect so the read canarygrass is dead prior to mulching.
4) Small patches (less than 2 feet in diameter) can be tied in a bunch just before flowering, cut above the tie and then treated with a 33% glyphosate solution applied directly to the stems.
5) Wick-wipe using a wick-wipe tool or hand swiping.
6) Wick-wipers attached to a tractor can treat tall stands without affecting shorter vegetation underneath.

Specific Herbicide Information

1) **Glyphosate** (aquatic labeled trade names include Rodeo ®, AquaMaster ®, Aquaneat ®, Glypro ®). Effective when applied in a 1.5 to 5 percent solution with a nonionic, surfactant (only use surfactants approved for use in aquatic areas by Washington Department of Ecology).

2) **Imazapyr** (aquatic formulations include Habitat ® and Polaris®). Effective when applied at a 1.5 percent solution with a nonionic surfactant (only use Ecology-approved aquatic surfactants). Imazapyr remains active in soil for some time and may cause collateral damage to nearby vegetation, including trees. Recommended only when applied to a RCG monoculture where the site will not be replanted until the following growing season or later. Conducting a soil bioassay prior to planting is recommended to avoid any residual effects from the herbicide in the soil.

The mention of a specific product brand name in this document is not, and should not be construed as an endorsement or as a recommendation for the use of that product.

Chemical control options may differ for private, commercial and government agency users. Additional information and recommendations can be found in the references listed at the end of this document. **For questions about herbicide use, contact the King County Noxious Weed Control Program, Washington State Department of Agriculture or Washington State Department of Ecology.**

Biological Control

- There is no known biocontrol at this time.

BEST MANAGEMENT PRACTICES

Reed canarygrass is widespread in King County, and eradication is unlikely in all but the most isolated locations. Reinfestation is likely unless control, monitoring and maintenance are carefully planned and implemented. Successful long term control will follow these steps:

1. **Prevention**: If you have a wetland dominated by native plants, monitor the edges and immediately remove any reed canarygrass you find. Avoid disturbing the wetland.
2. **Remove existing plants:** Follow the recommendations below that best suit your situation to remove or kill all existing reed canarygrass plants in the infestation. Generally work first in least infested areas, moving towards more heavily infested areas.
3. **Deplete seed bank:** In all but early pioneering infestations the seed bank should be depleted if at all possible before replanting the area (if necessary). Allow seeds to grow and then remove the plants several times over at least two seasons for best results. Seeds can remain viable for up to four years.
4. **Revegetate** with shade-producing or highly-competitive native or other desirable species. Choose plants that will thrive in your location. Best results are obtained with a planting plan that will ultimately establish a multi-layered shade canopy, preferably coniferous, but lighter shade or other plant communities can reduce the impact of reed canarygrass. Consult a restoration specialist for assistance with your area.
5. **Monitoring and maintenance** of any controlled site is imperative until desirable vegetation becomes well established. Any site left unmaintained will revert back to reed canarygrass within a few years.

Permits may be required for some control techniques and some situations. See Control Information section above for more information.

Small Infestations

- **Manual:** Not practical for any but the smallest patches. Hand dig when the ground is soft. Be sure to remove all roots and rhizomes. Any roots or rhizomes left in the soil will resprout. Monitor the site for regrowth. Properly dispose of all removed plant material.
- **Shade:** Cover with shade cloth or sheet mulch with several layers of cardboard and four to six inches of wood mulch. Leave in place for at least one growing season. Monitor the edges for shoots coming up from lateral growth of rhizomes. Efficacy can be increased by pre-treating with herbicide (allow enough time for the herbicide to kill the reed canarygrass before covering), flaming, or removing above ground plant material at or just after flowering, either with hand tools or a line trimmer. Properly dispose of all removed plant material.
- **Burn**: Flaming using hand-held weed torch (many varieties available online) may be possible in some situations. Remove dead stems and thatch as much as possible prior to flaming to reduce threat of smoke and fire. Flame emerging shoots frequently during at least one growing season to weaken and kill roots. Monitor site for regrowth.
- **Chemical:** Spot spray or wick wipe with approved aquatic herbicide just past flowering stage when maximum energy has been depleted from the root system.

Large Infestations/Monocultures

Multiple methods will be required in most situations for large infestations.

1. **Remove or kill established plants.** Depending on feasibility, site conditions and resources, use mowing, cultivation, flooding, burning or herbicide alone or in combination. Research has demonstrated that the following combinations work in many situations:
    - Mow at least 5 times per year for several years.
    - Mow in late spring and again in August, spray in October-November, repeat for at least three growing seasons.
    - Mow or burn in late spring, then cultivate repeatedly (every two weeks). Repeat at least two growing seasons.
    - Spray in late spring and late fall for at least two growing seasons.
    - Cultivate, then flood: Cultivate as soon as possible in spring; be sure to get entire sod layer. Allow sod to dry out, repeating cultivation throughout growing season to ensure thorough drying of the entire infestation. At the end of the growing season, flood to at least 18 inches through late spring the following year.
    - Where manipulation of water levels is possible, flood to at least 32 inches (0.85m) and maintain that depth for at least one growing season. Use other methods to control around the edges of the flooded zone. If using flooding only, additional seasons may be required, or other methods should be used to control regrowth after water levels drop.

- Note: mowing or burning alone fewer than 5 times per growing season has been shown to INCREASE reed canarygrass density.

2. **Eliminate seed bank.** This may not be necessary if long-term goal includes establishment of multi-layered canopy for shade, however it is critical if shade establishment is not planned. Seeds remain viable for up to four years. Allow seeds to germinate and then control the seedlings in one of the following ways:
    - Cultivate repeatedly over at least two growing seasons
    - Flame or apply herbicide to seedlings as they emerge
    - Flood the area where seedlings are present
3. **Establish desirable vegetation.** Shading is the best long-term control strategy. Where possible, establish a multi-layered dense canopy, preferably with conifers in the overstory.
4. **Live willow stakes** installed 2 to 3 feet (0.60-0.91 m) apart in areas of shallow inundation or high soil moisture content can diminish RCG within two growing seasons.
5. **Monitor for regrowth/reinvasion and maintain site.** Control regrowth and re-infestations using techniques for small patches.

Control in Irrigation Ditches

For control of reed canarygrass in the maintenance of agricultural ditches, follow the recommendations in the **Manual of Best Management Practices for Maintenance of Agricultural Waterways in King County**. http://www.kingcounty.gov/environment/waterandland/stormwater/agricultural-drainage-assistance/waterway-maintenance-bmp-manual.aspx .

Control Along Road Rights-of-Way

- Follow appropriate recommendations as described above for small or large infestations.
- Spot spray infestations in mixed vegetation, taking care not to spray beneficial plants.
- Do NOT mow plants in seed.

Disposal Methods

- Above-ground vegetative plant parts can be composted in a professional composting facility.
- Many plant parts will form roots if left in contact with moist soil. If composting on site, dry thoroughly on a tarp or black plastic before composting.
- Plant parts can be burned where conditions allow. Follow local burn regulations
- Rhizomes, plants in seed, and sod should be disposed of in a landfill.
- All plants parts, including seed, roots and sod, can be buried a minimum of two feet deep in weed-free soil. Buried RCG must remain undisturbed for at least four years.

REFERENCES

Antieau, Clayton J. 1998. Biology and Management of Reed Canarygrass, and Implications for Ecological Restoration. Society for Ecological Restoration. http://www.ser.org/sernw/pdf/RCG_BIO_MGT.pdf.

Apfelbaum, Stephen I. and Charles E. Sams. 1987. Ecology and control of reed canarygrass. Natural Areas Journal 7: 69-74.

Dobrowolski, J.P.` and T.W. Miller. 2004. Reed canarygrass – a formidable foe for Washington's riparian areas. Sustaining the Pacific Northwest: Food, Farm, and Natural Resource Systems 2(3):11-13.

Foster, R.D. and P.R. Wetzel. 2005. Invading monotypic stands of *Phalaris arundinacea*: a test of fire, herbicide, and woody and herbaceous native plant groups. Restoration Ecology 13:318-324.

Hook, P.B. and J.K. Klausmann. 2008. *Streamside Revegetation and Reed Canarygrass Suppression at Silver Creek Preserve*, Project Completion Report Prepared for The Nature Conservancy, Idaho Field Office by Intermountain Aquatics, Inc., Driggs, ID

Hook, Paul B., K.M Salsbury and J. M. Klausmann. 2009. Revegetation of reed canarygrass infested riparian areas: performance of pre-vegetated coir after 3 to 6 years. National Meeting of the American Society of Mining and Reclamation, Billings, MT, *Revitalizing the Environment: Proven Solutions and Innovative Approaches.* R.I. Barnhisel (Ed.) Published by ASMR, 3134 Montavesta Rd., Lexington, KY 40502. http://asmr.us/Publications/Conference%20Proceedings/2009/0597-Hook-ID.pdf.

Invasive Plants Association of Wisconsin Reed Canary Grass web page http://www.ipaw.org/invaders/reed_canary_grass/index.aspx

Jenkins, Noah J., J Alan Yeakley, Elaine M. Stewart. 2008. First-Year Responses To Managed Flooding Of Lower Columbia River Bottomland Vegetation Dominated By *Phalaris arundinacea.*Wetlands 28(4):1018-1027.

Kercher, S. M. and J. B. Zedler. 2004. Multiple disturbances accelerate invasion of reed canary grass (*Phalaris arundinacea* L.) in a mesocosm study. Oecologia 138:455–464

Kilbride, K.M. and F.L. Paveglio. 1999. Integrated pest management to control reed canarygrass in seasonal wetlands of southwestern Washington. Wildlife Society Bulletin 27:292-297.

Kim, K.D., K. Ewing and D. E. Giblin. 2006. Controlling *Phalaris arundinacea* (reed canarygrass) with live willow stakes: a density-dependent response. Ecological Engineering 27:219-227

Moore, S., D. Ward, and B. Aldrich. 2000. Transplanting large trees for reed canarygrass control. Reed Canarygrass Working Group Conference, Washington State Department of Transportation, USDA Natural Resources Conservation Service, and Society for Ecological Restoration – Northwest Chapter, March 15, 2000, Olympia, Washington.

Pennsylvania Department of Conservation and Natural Resources Exotic Plant Tutorial for Natural Land Managers web page
http://www.dcnr.state.pa.us/forestry/invasivetutorial/reed_canary_grass_M_C.htm

Reinhardt, C. and S.M. Galatowitsch. 2004. *Best Management Practices for the Invasive* Phalaris arundinacea L. *(Reed Canary Grass) in Wetland Restorations*. University of Minnesota Report, published by Minnesota Department of Transportation, Research Services Section.

Reinhardt Adams, C. and S. M. Galatowitsch. 2006. Increasing the effectiveness of *Phalaris arundinacea* L. (reed canarygrass) control in wet meadow restorations. Restoration Ecology 14(3):440-450.

Seebacher, Lizbeth A. 2008. *Phalaris arundinacea* Control and Riparian Restoration within Agricultural Watercourses in King County, Washington. Dissertation, University of Washington.
http://depts.washington.edu/uwbg/research/theses/Dissertation_Lisbeth_Seebacher_2008.pdf

Stannard, Mark and Wayne Crowder. 2002. USDA, NRCS Plant Guide: REED CANARYGRASS *Phalaris arundinacea L*. USDA NRCS Pullman Plant Material Center, Pullman, Washington.
http://plants.usda.gov/plantguide/pdf/pg_phar3.pdf (accessed 2/13/2015).

Tu, Mandy, 2004. Reed Canarygrass Control & Management in the Pacific Northwest. The Nature Conservancy's Wildlife Invasive Species Team.
http://www.invasive.org/gist/moredocs/phaaru01.pdf

Washington State Noxious Weed Control Board, 1995.Written findings.
http://www.nwcb.wa.gov/siteFiles/Phalaris_arundinacea.pdf.

Wisconsin Department of Natural Resources, 2009. Reed Canary Grass Fact Sheet.
http://dnr.wi.gov/invasives/fact/reed_canary.htm.

Wisconsin Reed Canary Grass Management Working Group. 2009. Reed Canary Grass (*Phalaris arundinaceae*) Management Guide: Recommendations for Landowners and Restoration Professionals. PUB-FR-428 2009.

King County
Department of
Natural Resources and Parks
Water and Land Resources Division

Noxious Weed Control Program

BEST MANAGEMENT PRACTICES

Yellow-flag iris
(*Iris pseudacorus*)
Iridaceae

Class C Noxious Weed; Not Designated for Control

Legal Status in King County: Class C Noxious Weed (non-native species that can be designated for control under State Law RCW 17.10 based on local priorities.) The King County Noxious Weed Control Board does not require property owners to control yellow-flag iris, but control is recommended.

BACKGROUND INFORMATION

Impacts and History

- Alternate common names include yellow flag, paleyellow iris and yellow iris.
- On state weed lists in Connecticut, Massachusetts, Montana and New Hampshire in addition to Washington. Also on the USDA Natural Resources Conservation Service invasive plants list and on the Exotic Plant Pest List of the California Exotic Pest Plant Council.
- Yellow-flag iris displaces native vegetation along streambanks, wetlands, ponds and shorelines and reduces habitat needed by waterfowl and fish, including several important salmon species.
- It clogs small streams and irrigation systems, and it dominates shallow wetlands, wet pastures and ditches. Its seeds clog up water control structures and pipes.
- Rhizome mats can prevent the germination and seedling growth of other plant species. These mats can also alter the habitat to favor yellow-flag iris by compacting the soil as well as increasing elevation by trapping sediments.
- Studies in Montana show that yellow-flag iris can reduce stream width by up to 10 inches per year by trapping sediment, creating a new bank and then dominating the new substrate with its seedlings, creating still more sediment retention (Tyron 2006).
- Even when dry, yellow-flag iris causes gastroenteritis in cattle (Sutherland 1990), although livestock tend to avoid it. All plant parts also cause gastric distress in humans when ingested, and the sap can cause skin irritation in susceptible individuals.
- Native to Europe and the Mediterranean region, including North Africa and Asia Minor. Found as far north as 68 degrees North in Scandinavia.

- The earliest North American record comes from Newfoundland in 1911, and it was established in British Columbia by 1931. By 1961 yellow-flag iris was reported to be naturalized in Canada (Cody 1961). It was established in California by 1957 and in Montana by 1958 (Tyron 2006). It is now naturalized in parts of most states and provinces throughout North America except in the Rocky Mountains. (NRCS Plants Database).

Description

- A perennial, emergent iris that creates dense stands along freshwater margins. It is the only naturalized, emergent yellow iris in King County.
- Grows to 5 feet (1.5 m) tall.
- Has numerous thick, fleshy rhizomes.
- Flowers are yellow, showy, and sometimes have brown to purple veins at the base of the petals. Several flowers can occur on each stem.
- Can bloom from April to August; in western Washington usually blooms May into July. It will remain green all winter in mild years.
- Broad, flat, pointed leaves are folded and overlap one another at the base. They are generally longer in the center of the plant and fan out in a single plane toward the edges of the plant. The leaves are dark green to blue-green.
- Fruits are large capsules to 3 inches (8 cm) long. They are 3-angled, glossy green and contain rows of many flattened brown seeds.
- Seeds are corky, large - about ¼ inch (7 mm) across, and float. Seed pods grow in clusters that resemble little bunches of bananas. Seeds spread by water and usually germinate after the water recedes along the edges of the shore. They do not usually germinate under water.
- When not in flower or seed, can be confused with cattails (*Typha sp.*), which are round at the base and taller than yellow-flag iris, while iris are flattened along one plane and shorter. Can also be mistaken for native bur-reeds (*Sparganium sp.*), which have thick, spongy leaves that are somewhat narrower than iris leaves.

Habitat

- Occurs in freshwater wetlands, fens, ponds, lake shores, river and stream banks, wet pastures and ditches.
- Grows in standing water or next to it on saturated soils. Prefers silty, sandy or rocky soil.
- Generally grows in shallow water, but can create extensive mats over deeper water.
- Sometimes cultivated as a garden ornamental or used for landscaping purposes.

Reproduction and Spread

- Spreads by seed and vegetatively (rhizomes).
- Produces extensive thick, fleshy rhizomes, forming dense mats that exclude native wetland species. Up to several hundred flowering plants may be connected rhizomatously. Rhizome fragments can form new plants if they break off and drift to suitable habitat. Rhizomes that dry out remain viable and will re-infest an area if they are re-moistened.

- Flat spongy seeds disperse through water and germinate after the water recedes along shorelines. Submersed seeds will generally not germinate.
- Plants take three years to mature before flowering (Tyron 2006).
- The flowers are pollinated by bumble-bees and long-tongued flies.

Local Distribution

- Widespread throughout King County.
- Present along most lake shores and many stream banks in the developed areas of the county.
- A few shallow wetlands significantly impacted.

CONTROL INFORMATION

Integrated Pest Management

- The preferred approach for weed control is Integrated Pest Management (IPM). IPM involves selecting from a range of possible control methods to match the management requirements of each specific site. The goal is to maximize effective control and to minimize negative environmental, economic and social impacts.
- Use a multifaceted and adaptive approach. Select control methods that reflect the available time, funding, and labor of the participants, the land use goals, and the values of the community and landowners. Management may require dedication over a number of years, and should allow for flexibility in method as appropriate.

Planning Considerations

- Survey area for weeds, set priorities and select best control method(s) for the site conditions and regulatory compliance issues **(refer to the King County Noxious Weed Regulatory Guidelines or local jurisdictions)**.
- Isolated plants can be effectively dug up. Take care to remove all of the rhizomes, in order to stop them from infesting a larger area.
- For larger infestations, the strategy will depend on the site. Generally work first in least infested areas, moving towards more heavily infested areas. On rivers and streams, begin at the infestation furthest upstream and work your way downstream.
- If conducting manual control, be sure to collect any rhizome fragments that may float free.
- Minimize disturbance to avoid creating more opportunities for seed germination.

Early Detection and Prevention

- Look for new plants. Get a positive plant identification by contacting your local noxious weed control program or extension service.
- Look for plants along river and lake shorelines, wetlands, ditches and wet pastures.
- The best time to survey is in April to June when the plants are in flower.
- Look for seedlings starting in late winter.
- Dig up small isolated patches, being sure to remove all the rhizome.
- Don't buy, move or plant yellow-flag iris.

- Clean any tools and machinery that were used in an infested area before moving to another site.

Manual

- Hand removal with the use of hand tools is allowable in all critical areas in unincorporated King County. Check with the local jurisdiction for regulations in other areas.
- When removing manually, care should be taken to protect the skin, as resins in the leaves and rhizomes can cause irritation.
- Manual control is feasible for individual plants or small stands. You can easily pull seedlings in damp or wet soil.
- Dig out mature plants, taking care to remove all the rhizome. The rhizome is tough and may require heavier tools, such as pickaxes, pulaskis or saws. If you do not get all the rhizome, more plants will be produced. Keep watching the location after you have removed the plants, and new leaves will show you where you missed any sections of rhizome. Continue to remove the rhizome, and in this way you can eradicate a small patch.
- Simon (2008) found that for plants emergent in standing water for the entire growing season, cutting all leaves and stems off below the waterline can result in good control. This method is most effective if the plants are cut before flowering.
- Be sure to dispose of any removed pieces of rhizome away from wet sites. Composting is not recommended for these plants in any home compost system, because rhizomes can continue growing even after three months without water (Sutherland 1990).

Mechanical

- Removal of yellow-flag iris with hand held mechanical tools is allowable in critical areas and their buffers in unincorporated King County. Check with the local jurisdiction for regulations in other areas.
- In unincorporated King County, riding mowers and light mechanical cultivating equipment may be used in critical areas if conducted in accordance with an approved forest management plan, farm management plan, or rural management plan, or if prescribed by the King County Noxious Weed Control Program.
- Repeated mowing or cutting may keep yellow-flag iris contained and can potentially kill it by depleting the energy in the rhizomes after several years of intensive mowing (Tu 2003).

Cultural

- Small patches can be covered with a heavy tarp weighted at the edges for several years (Simon 2008). Be sure to extend the tarp well beyond the edges of the infestation and check periodically to ensure that plants are not growing up around the tarp. Other materials (heavy plastic, landscape cloth) are not as effective.
- Burning is not recommended. Seeds germinate and grow well after late summer burning (Sutherland 1990), and plants have a strong tendency to resprout from rhizomes after burning (Clark et al. 1998).

Biological

- Although a number of insects and pathogens are known to attack yellow-flag iris

(Tu 2003), no biological control agents are presently known, and no research is currently being conducted.

Chemical

- Herbicides should only be applied at the rates and for the site conditions and/or land usage specified on the label. **Follow all label directions**.
- Herbicides can only be purchased and applied to aquatic systems in Washington State by a licensed pesticide applicator (contact Washington State Department of Agriculture for more information on pesticide licenses).
- There are federal, state and local restrictions on herbicide use in critical areas and their buffers. Refer to the **King County Noxious Weed Regulatory Guidelines** for a summary of current restrictions and regulatory compliance issues.
- For control of large infestations, herbicide use may be necessary. Infested areas should not be mowed until after the herbicide has had a chance to work, which may take several weeks, depending on the herbicide used.
- Due to dense growth, re-application a few weeks after initial treatment will probably be needed to get complete coverage (Tyron 2006).
- For several years following treatment, monitor areas for new plants germinating from the seed bank or from rhizome fragments. In some cases several years of treatment may be necessary.

Specific Herbicide Information

Since yellow-flag iris is a monocot, only non-selective herbicides are effective. However, non-selective herbicides will injure or kill any plant they contact, so special care must be taken when using these chemicals. Both of the herbicides discussed below are non-selective.

Glyphosate (e.g. Rodeo™ or Aquamaster™). This is the most frequently used chemical for controlling yellow-flag iris. Apply to actively growing plants in late spring or early summer. Apply directly to foliage, or apply immediately to freshly cut leaf and stem surfaces. Avoid runoff. (Tu, 2003). Follow the label for recommended rates for yellow-flag iris since higher rates may provide better results. A study in Montana showed good results with 5% Rodeo plus Competitor (Tyron, 2006). Glyphosate at lower rates is not as effective as either imazapyr or imazapyr and glyphosate combined.

Imazapyr (e.g. Habitat®). Simon (2008) found that 1% imazapyr (with 1% non-ionic surfactant) sprayed in the fall resulted in good control. Imazapyr sprayed in the spring, or a combination of imazapyr (1%) and glyphosate (2.5%) sprayed in fall both result in good control, but slightly less effective than imazapyr alone. Note that imazapyr has been shown to have some residual soil activity, so care should be taken to avoid spraying in the root zone of desirable plants, and do not replant the treated area for several months after application.

The above listed herbicides require the addition of an approved surfactant. Follow label directions for selecting the correct type of surfactant. Be sure that the selected surfactant is approved for aquatic use.

The mention of a specific product brand name in this document is not, and should not be construed as an endorsement or as a recommendation for the use of that product.

Chemical control options may differ for private, commercial and government agency users. **For questions about herbicide use, contact the King County Noxious Weed Control Program at 206-296-0290.**

Experimental

Preliminary trials indicate that injecting herbicide into the cut flowering stems of yellow-flag iris may provide a successful alternative treatment method with little or no non-target damage. Check with your local weed control agency for progress.

SUMMARY OF BEST MANAGEMENT PRACTICES

Small Infestations in Native and/or Desirable Vegetation

- Hand digging is recommended for very young plants not yet established.
- Larger plants from isolated small populations can be dug out from moist upland areas. This is difficult but possible with persistence.
- Replace any divots created when removing the plants to lessen the amount of disturbed soil.
- Plants emergent in standing water can be cut below the waterline.
- If manual control is not possible due to site conditions or available labor, apply appropriate herbicide by spot spray, stem-injection or wick-wiper to minimize off target injury.

Large Infestations

- Persistent mowing or cutting over several years may be effective. Cutting flowering plants will stop seed dispersal.
- Herbicide use may be necessary.
- If the infestation is in a pasture, combine control methods with ongoing good pasture management. Encourage healthy grassy areas by seeding and fertilizing. Use a mix of grass and clover species to improve resistance to weeds. Fertilize according to the soil needs.

Control in Riparian Areas or Lake Shores

- Survey area and document extent of infestation. Start eradication efforts at the headwaters and progress downstream whenever possible.
- Focus on manual removal for small infestations if possible.

- When removing vegetation near streams and wetlands use barriers to prevent sediment and vegetative debris from entering the water system.
- For larger areas where herbicide use is warranted, use the method that will cause the least amount of damage to desirable vegetation, such as spot spraying or wick wiping.
- When large areas of weeds are removed, the cleared area needs to be replanted with native or non-invasive vegetation and stabilized against erosion.
- Control of larger areas will need to incorporate a management plan lasting for several years to remove plants germinating from the seed bank and rhizome fragments.

Control on Road Rights-of-Way

- Dig up small infestations if possible.
- Spot spray if digging is not practical due to soil, site conditions or size of infestation.
- If plants are in grassy areas, re-seed after control is completed.
- If plants are sprayed, wait until the herbicide has had a chance to work (up to several weeks) before mowing.

References

Center for Aquatic and Invasive Plants, University of Florida website: http://aquat1.ifas.ufl.edu/seagrant/iripse2.html

Clark, F.H, C. Mattrick and S. Shonbrun (eds.). 1998. **Rogues Gallery: New England's Notable Invasives.** New England Wild Flower. New England Wildflower Society. Vol. 2, No. 3. Pp. 19-26.

Cody WJ. 1961. ***Iris pseudacorus* L. escaped from cultivation in Canada**. Canadian Field Nat., 75: 139-142 Ecology 78: 833-848.

Exotic Plant Pest List (http://www.cal-ipc.org/1999_cal-ipc_list/, October 19, 1999). California Exotic Pest Plant Council. California.

Simon, Bridget. 2008. **Yellow-flag Iris Control and Education**. http://www.ecy.wa.gov/Programs/wq/plants/weeds/YFI%20Final%20Report%20to%20DOE%206-30-08.pdf

Sutherland WJ. 1990. **Biological flora of the British Isles.** ***Iris pseudacorus* L**. J. Ecology 78(3):833-848

Thomas, L.K., Jr. 1980. **The impact of three exotic plant species on a Potomac Island**. National Park Service Scientific Monograph Series, Number 13.

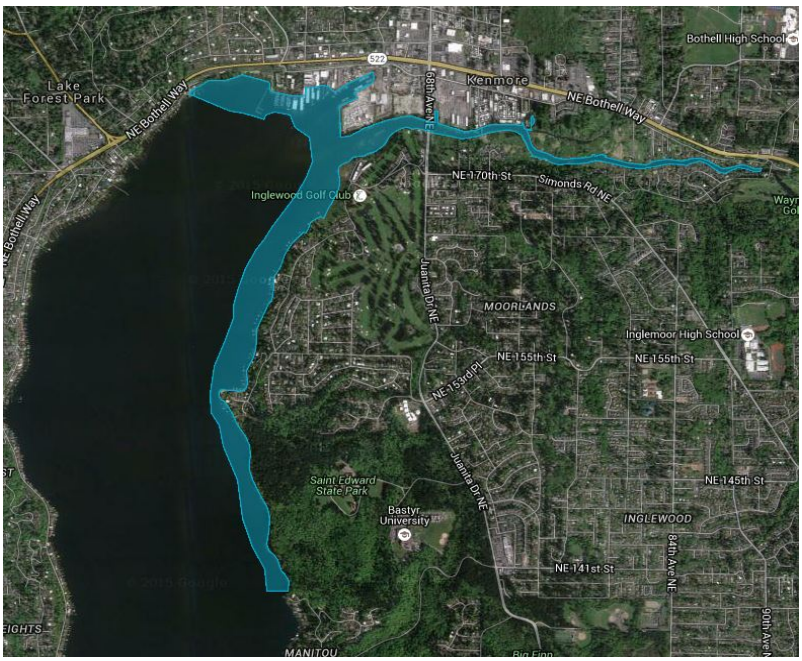
Tu, Mandy. 2003. **Element Stewardship Abstract for *Iris pseudacorus*.** The Nature Conservancy's Wildland Invasive Species Team. Website: http://www.invasive.org/gist/esadocs/documnts/irispse.pdf

Tyron, Paul. 2006. **Yellow Flag Iris Control, in the Mission Valley of Western Montana**. Presented at the 2006 Washington State Weed Conference, Yakima, WA. Lake County Weed Control, 36773 West Post Creek Road, St. Ignatius, MT 59865, 406-531-7426.

Lake Washington and the Sammamish River

Within the City of Kenmore, Washington

Integrated Aquatic Vegetation Management Plan 2020 Update



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Prepared by Herrera Environmental Consultants, Inc.

In Conjunction with the City of Kenmore

18120 68th Avenue Northeast, Kenmore, Washington 98028

October 22, 2020

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EXECUTIVE SUMMARY

The city of Kenmore lies on the northern edge of Lake Washington and encompasses the mouth of the Sammamish River, giving the city 7.8 miles of shoreline. Among City of Kenmore goals is a commitment to advance the public's access and connection to the waterfront. In the fall of 2016, Kenmore residents approved the City's first bond measure, which will, in part, increase public access to and make improvements in three of Kenmore's waterfront parks: Log Boom Park on the northern shore of Lake Washington, and Rhododendron Park and Squire's Landing Park on the Sammamish River.

Dense growth of aquatic plants during the summer interferes with recreational and commercial use of the Sammamish River and Lake Washington in the city of Kenmore, creating obstructions for multiple users and inhibiting use for swimmers, kayakers, boaters and others. Negative impacts on riparian habitat are also of concern.

Residents and business owners within the city of Kenmore, as well as aquatic plant biologists and plant management experts, came together to develop goals and a proposal for the City's Integrated Aquatic Vegetation Management Plan (IAVMP), which is funded by a Washington State Department of Ecology (Ecology) grant. In 2017, the City of Kenmore issued the *Lake Washington and the Sammamish River Within the City of Kenmore, Washington Integrated Aquatic Vegetation Management Plan* (2017 IAVMP) (Herrera 2017). This report serves as an update to the 2017 IAVMP and includes revisions to management goals and activities; summarizes maintenance efforts in 2018 and 2019; and updates the action strategy and implementation, and the monitoring and evaluation plans.

This 2020 update includes several updates to the 2017 IAVMP, which are summarized below:

- Control of nuisance native vegetation is now included in management goals for beneficial use areas as needed to allow for recreational and commercial uses.
- Information about a newly approved aquatic herbicide, ProcelleCOR™, which is a systemic, selective aquatic herbicide with low toxicity recommended for control of Eurasian watermilfoil.
- Further specified commitments by the City of Kenmore to communicate annual management efforts before and after treatments and require consistent reporting so that these efforts may be tracked reliably over time.

For more detailed documentation and analyses of invasive aquatic vegetation in Lake Washington and the Sammamish River in Kenmore, Washington, continue to refer to the 2017 IAVMP located on the IAVMP webpage: <http://www.kenmorewa.gov/IAVMP>.

INTRODUCTION

The City of Kenmore issued the 2017 Integrated Aquatic Vegetation Management Plant (IAVMP) to address aquatic noxious weeds, which are nonnative plants that are particularly invasive in shoreline areas or open water (Herrera 2017). The IAVMP was part of an effort to increase public access and make improvements throughout Kenmore shorelines and specifically in three of the City's waterfront parks: Log Boom Park on the northern shore of Lake Washington, and Rhododendron Park and Squire's Landing Park on the Sammamish River. This update is based on the experiences of stakeholders and results of aquatic weed control efforts since 2017, and includes the following summarized updates:

- Control of nuisance native vegetation is now included in management goals for beneficial use areas as needed to allow for recreational and commercial uses.
- Information about a newly approved aquatic herbicide, ProcelleCOR, which is a systemic, selective aquatic herbicide with low toxicity recommended for control of watermilfoil species.
- Further specified commitments by the City of Kenmore to communicate annual management efforts before and after treatments on a consistent basis that are tracked over time.
- For more detailed documentation and analyses of invasive aquatic vegetation in Lake Washington and the Sammamish River in Kenmore, Washington, continue to refer to the 2017 IAVMP.

Invasive aquatic vegetation negatively impacts ecological processes, recreation, and business activities. Dense native vegetation also negatively impacts recreation and business activities. With 7.8 miles of shoreline and multiple opportunities to enjoy the water, management of vegetation in the lake and river areas of Kenmore is critically important as more and more people gain access to the water. However, because Kenmore is on the receiving end of invasive weeds and other debris from downstream flow of the Sammamish River and downwind drift in Lake Washington, this issue cannot be addressed in isolation from upstream communities. Therefore, we have continued to include the component of upstream outreach as a part of our plan. Working with the City, Herrera Environmental Consultants, Inc. (Herrera) prepared this 2020 IAVMP update that provides additional information to the following sections in the 2017 IAVMP:

- Problem Statement

- Public Involvement
- Plant Management Goals
- Beneficial Uses and Identified Problems
- Past Management Efforts
- Selected Action Strategy and Implementation
- Monitoring and Evaluation Plan
- References

The following sections of the 2017 IAVMP have not been updated and should be referred to as needed:

- Waterbody Characteristics
- Aquatic Plant Community
- Aquatic Plant Control Alternatives
- Integrated Aquatic Plant Control Scenarios

PUBLIC INVOLVEMENT

Kenmore has a large waterfront community, both residential and commercial, and the City wanted to include representatives on the IAVMP steering committee with a broad spectrum of perspectives and geographic locations. Public involvement for the IAVMP update is described for interviews and meetings with community leaders, outreach to upstream jurisdictions, and the City's IAVMP webpage.

STAKEHOLDER INTERVIEWS

On behalf of the City for this update, Herrera reached out to stakeholders and aquatic plant management experts to solicit their input on conditions since publication of the IAVMP in 2017. Herrera prepared the following questions for each interview:

Briefly, what is your experience managing aquatic plants in Kenmore?

Where are aquatic plants primarily impacting which water uses?

Which exotic and native plant species are primarily impacting water uses at those locations?

Which aquatic plant management techniques used in 2018 and/or 2019 were most effective at reducing water use impacts, and why?

Which aquatic plant management techniques used in 2018 and/or 2019 were not effective at reducing water use impacts, and why?

How should aquatic plant management techniques be modified in the future to effectively reduce water use impacts, and why?

Do you have any other suggestions for improving the IAVMP?

These questions were sent by email to the following individuals:

- Todd Banks, President of Kenmore Air, the largest seaplane operator in the United States
- John Adamski, waterfront homeowner in the Arrowhead Point community of Lake Washington for multiple decades and avid stand-up paddle boarder
- Janet Ketcham, waterfront homeowner in the Inglewood Shores condominium complex and avid paddler
- Greg Matz, Superintendent of the Inglewood Golf Club

- Ben Peterson, Noxious Weed Specialist II with the King County Noxious Weed Program
- Dave Klutz, Managing Member of Lakeland Restoration Services, LLC
- Doug Dorling, President of Northwest Aquatic Eco-Systems
- Terry McNabb, President of AquaTechnex

Telephone interviews were successfully conducted with John Adamski, Janet Ketchum, and Ben Peterson. Todd Banks responded to interview questions by email. Several attempts to interview the remaining individuals failed. Information gathered from the interviews is incorporated into various sections of this IAVMP update.

Upstream Jurisdiction Outreach

Outreach to upstream jurisdictions has been an ongoing process although no Coalition has been formed to date. Conversations with the cities of Bothell, Redmond, Woodinville and other upstream jurisdictions will continue as the City develops more specific ways of working together to address the Sammamish River system more holistically than could be achieved by one downstream city. Formation of a multi-jurisdictional coalition involving municipalities and non-profits and other interested organizations continues to be a City of Kenmore long-term vision. The City of Kenmore also plans to coordinate with Forterra to eradicate emergent invasive species, including Japanese knotweed, along the shoreline of the Samammish River.

Webpage

In response to citizen requests, the City of Kenmore published a webpage that provides access to detailed information on permits and best management practices, as well as links to other aquatic weed-related topics. This page can be found at: <http://www.kenmorewa.gov/IAVMP>.

PLANT MANAGEMENT GOALS

The aquatic plant management goals are to maintain recreation and commercial usability and habitat integrity of the lake and river by managing nuisance plants in identified beneficial use areas.

Management priorities include:

- Control of regulated noxious weeds
- Control of dominant noxious weed species
- Control of native vegetation that inhibits recreational and business uses (New)
- Early detection of emerging noxious weed species

Priority management areas include:

- Public parks, main channels, other high public use areas
- Private waterfront residences and businesses

Management goals include:

- Reduce impact on boating (hand-powered watercraft and motorboats):
  - Provide clear, clean water
  - Reduce weeds and native vegetation catching on paddles, rudders, propellers
- Maintain healthy environment for fish:
  - Provide appropriate water temperatures
  - Provide appropriate dissolved oxygen levels

These priorities and goals are the same as those established by the 2017 IAVMP except that control of native vegetation was added to weed control based on input from select stakeholders. Private priority management areas are to be managed by their respective stakeholders.

BENEFICIAL USES AND IDENTIFIED PROBLEMS

The project area (identified on the cover page of this plan) provides numerous beneficial uses to humans and wildlife, including the following three types identified by the Steering Committee in 2017 and 2020 (Figure 1):

- Recreational Use: Boating, fishing, swimming, aesthetic and wildlife observation
- Commercial Use: Marinas, Kenmore Air, water supply
- Wildlife Use: Waterfowl, aquatic mammals, fish, and other aquatic organisms

Beneficial uses are impacted by excessive aquatic plant growth, including the following three types of problems identified by the Steering Committee:

- Environmental:
  - Negative impact of dense plants on fish habitat
  - Impact of invasive noxious weeds on native biodiversity
  - Excessive levels of algae from scum accumulation on dense plants and nutrient release by decaying plants that impair aquatic habitat
  - Water quality degradation (low dissolved oxygen and high temperature) in dense plant growth
- Recreational:
  - Inhibit swimming and paddle sports
  - Weeds and native vegetation wound around boat motors
  - Weeds and native vegetation tangled in fishing lines
  - Nonnative weeds promote habitat for nonnative fish species
  - Health risks of toxic blue-green algae and nuisance of excess filamentous green algae
  - Aesthetic impacts from plant accumulation and decay, foul aroma, and water clarity
  - Restricted shoreline access
- Economic:

- Reduction of navigable waterways by forcing lake traffic into narrow lanes in years with dense aquatic vegetation growth, and increased potential for conflict between boats and planes
- Reduction of water depth that impacts access to moorage slips
- Costly repairs to damaged boat propellers and plane rudders
- Irrigation impacts from clogged intake lines and damaged pumps
- Perceived quality of life
- Lower waterfront property values (Olden and Tamayo 2014)
- Cost to manage/control/eradicate

These beneficial uses and identified problems are the same as those established for the 2017 IAVMP except for the addition of native vegetation to recreational impacts of weeds on boat motors and fishing lines. It should also be noted that although some swimming occurs in Kenmore waters, there is no established swimming area with lifeguards.

To protect beneficial uses and address the identified problems, the project area was segregated into the following three types of areas by the Steering Committee:

- Public Use Areas:
  - Saint Edward
  - Inglewood Wetlands
  - East Open Water
  - West Open Water
  - Log Boom Park and Pier
  - WDFW Boat Launch
  - Lower Sammamish River
  - Rhododendron Park
  - Squire's Landing Park
- Commercial/Industrial Use Areas:
  - Kenmore Air
  - Marina

- Warehouse/Industrial

- Residential Use Areas:
  - South Arrowhead Point Residential
  - Arrowhead Point Residential
  - Inglewood Residential
  - Inglewood Golf Residential
  - Inglewood Shores Residential
  - Sammamish River Residential

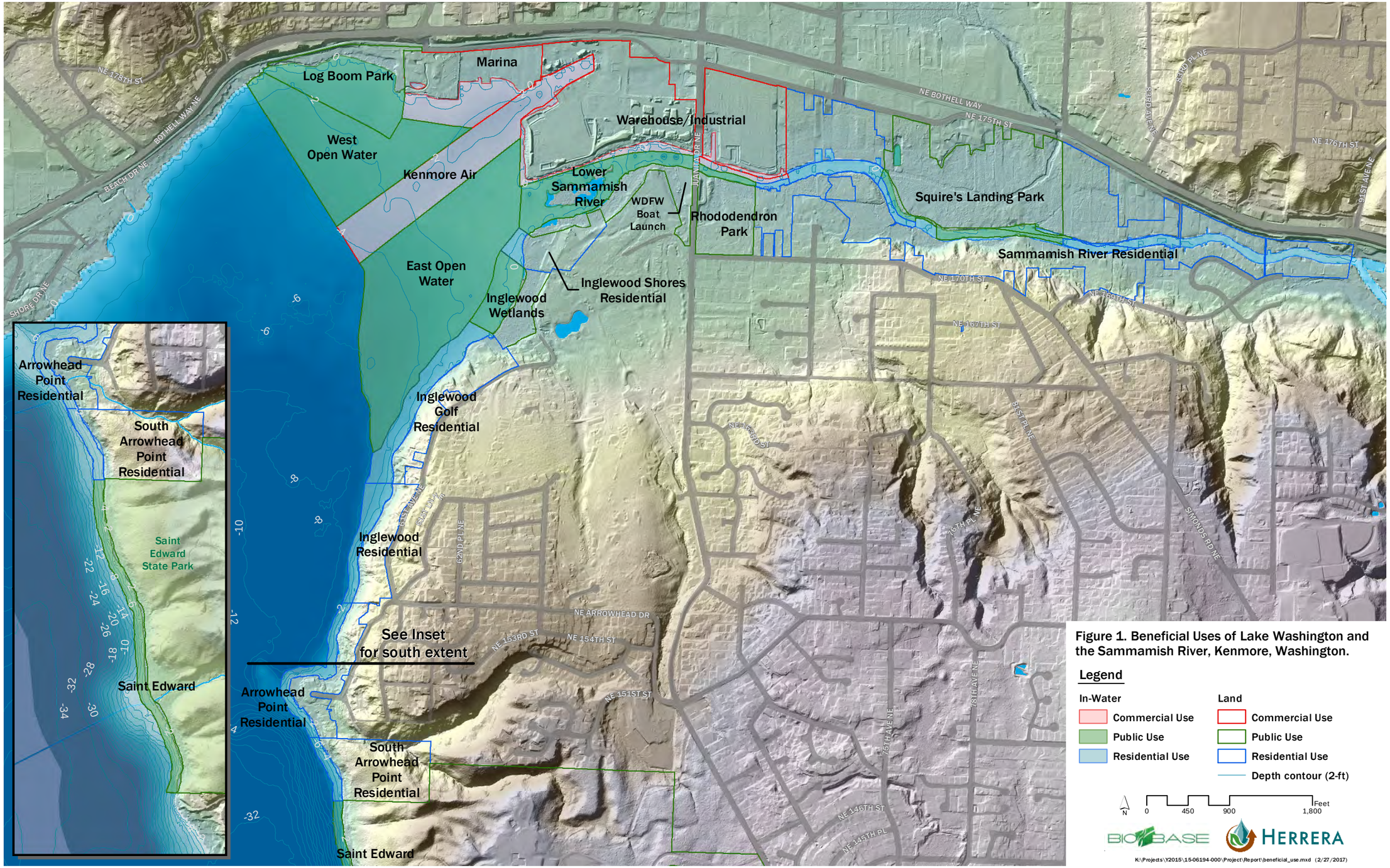

Figure 1. Beneficial Uses of Lake Washington and the Sammamish River, Kenmore, Washington.

2018–2020 MANAGEMENT EFFORTS

In 2018 and 2019, Kenmore contracted with Lakeland Restoration Services and Northwest Aquatic Eco-Systems, respectively, to manage aquatic plants. Both companies are licensed aquatic herbicide applicators. The contracts were aimed to control noxious invasive and nuisance native aquatic macrophytes in multiple treatment areas in the Sammamish River and on the northern shorelines of Lake Washington to meet the goals outlined by the IAVMP. In addition, Arrowhead Point contracted with AquaTechnex in 2017 through 2019 for treatment of Eurasian watermilfoil in this area on the northeast shore of Lake Washington north of St. Edwards. Kenmore Air also contracted with AquaTechnex in 2020 for treatment of Eurasian watermilfoil and other nuisance aquatic vegetation in the Kenmore Air commercial use area.

2018 City Treatments

Lakeland Restoration Services (LRS) applied herbicides to multiple treatment areas on two occasions in 2018 that included a Triclopyr treatment on June 4 and a Diquat/Hydrothol/Aquathol treatment on July 16. LRS provided a series of maps showing pretreatment and posttreatment survey results (LRS 2018), but did not provide a detailed, narrative report. Treatment areas are shown in Figure 2. Representative maps submitted by LRS are presented in Appendix A.

On June 4, LRS applied 180 gallons of Triclopyr to 30.8 acres for Eurasian watermilfoil and fragrant waterlily control, including:

- 13.3 acres at Log Boom Park in Lake Washington, targeting primarily Eurasian watermilfoil
- 7.7 acres at Inglewood Wetlands in Lake Washington, targeting fragrant waterlily near shore and Eurasian watermilfoil offshore
- 7.0 acres at the mouth of the Sammamish River downstream of the boat launch, targeting primarily fragrant waterlily

Comparison of submersed plant density maps for pretreatment (June 3) and 3-week post-treatment (June 25) shows that the June 4 treatment generally reduced plant density from high to low in most of the treatment areas. Also, the number of Eurasian watermilfoil and fragrant waterlily observations were substantially reduced at 3 weeks following the treatment (see Appendix A).

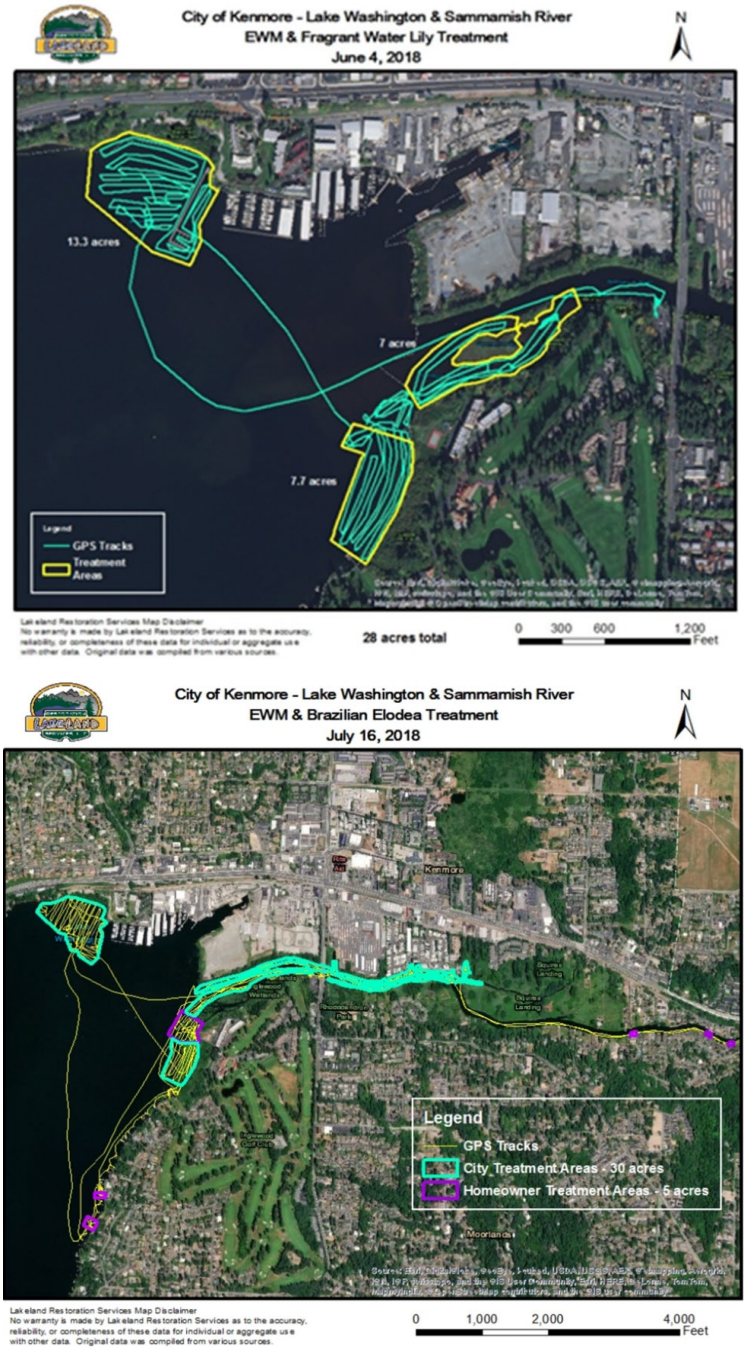

Figure 2. Kenmore 2018 Aquatic Plant Treatment Areas.

On July 16, LRS applied 35 gallons of Diquat, 35 gallons of Hydrothol, and 35 gallons of Aquathol to 40 acres for Eurasian watermilfoil and Brazilian Egeria control, including:

- 16.0 acres at Log Boom Park in Lake Washington
- 6.3 acres at Inglewood Wetlands in Lake Washington
- 5.0 acres at Inglewood Shores and Inglewood residential areas in Lake Washington
- 13.2 acres in the Sammamish River from Squires Landing Park downstream to the river mouth

Comparison of submersed plant density maps for pretreatment (July 15) and 2-week post-treatment (July 31) shows little reduction in plant density that generally ranged from a high density at Inglewood Wetlands in Lake Washington to a low density in the Sammamish River. Treatment effects on plant density could not be assessed in Log Boom Park because the post-treatment plant density map does not include that area. Plant species observations showed that Eurasian watermilfoil was not observed before or after treatment in any treatment area, and that Brazilian Egeria was not observed before treatment in any treatment area but was observed after treatment at one location in Log Boom Park and two locations in Inglewood Wetlands. Thus, the July 15 treatment did not appear to affect plant density or control target species at 2 weeks after treatment.

2019 City Treatments

Northwest Aquatic Eco-Systems (NAE) applied herbicides to multiple treatment areas on two occasions in 2019 that included a Triclopyr treatment on May 28 and a Diquat/Hydrothol treatment on July 17 and 18. NAE provided a treatment report describing treatment methods and results, series of maps showing pretreatment and posttreatment survey results, list of species observed by location, pesticide application records, and recommendations for future work (NAE 2019). The treatment areas are shown in Figure 3 and the treatment report is presented in Appendix A.

On June 4, NAE applied 101.5 gallons of Triclopyr to 27.9 acres for Eurasian watermilfoil and fragrant waterlily control, including:

- 10 gallons to 5.69 acres at Log Boom Park in Lake Washington (Treatment Area 4), targeting primarily Eurasian watermilfoil
- 8.5 gallons to 4.07 acres at Inglewood Wetlands in Lake Washington (Treatment Area 3), targeting fragrant waterlily near shore and Eurasian watermilfoil offshore
- 78 gallons to 16.28 acres at the mouth of the Sammamish River downstream of 68th Avenue South (Treatment Area 2), targeting primarily Eurasian watermilfoil in the

river channel and fragrant waterlily in shallow waters along the south bank downstream of the boat launch

- 5 gallons to 0.85 acre in Squires Landing Park in the Sammamish River (Treatment Area 1), targeting primarily Eurasian watermilfoil

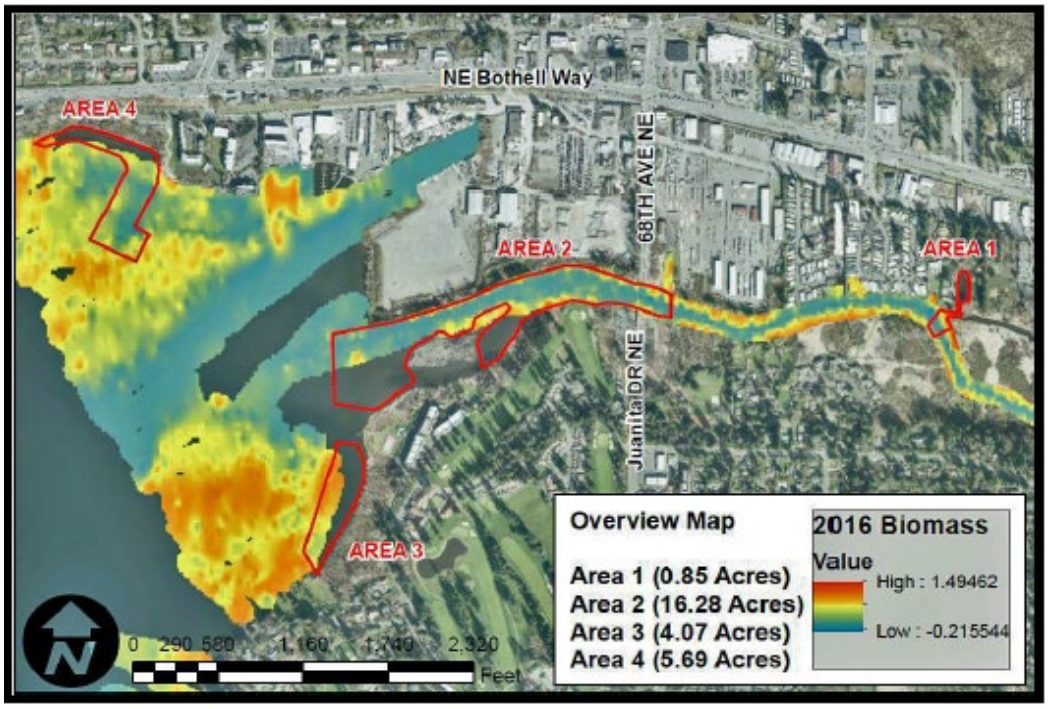

Figure 3. Kenmore 2019 Aquatic Plant Treatment Areas.

A post-treatment visual survey on June 15, 2019, indicated that Eurasian watermilfoil plants were responding to treatment, but fragrant waterlily plants were not. A post-treatment bathymetric survey was not performed in June 2019 (see Appendix A).

On July 17 and 18, NAE applied 43.5 gallons of Diquat, 1.5 gallons of Hydrothol, and 0.5 gallon of Triclopyr to 27.1 acres primarily targeting Brazilian Egeria and native plants (white stem pondweed [dominant], coontail, and common elodea), including:

- 10 gallons of Diquat to 5.69 acres at Log Boom Park in Lake Washington (Treatment Area 4), targeting primarily native plants

- 7 gallons of Diquat to 4.07 acres and 0.5 gallon of Triclopyr to 0.25 acre at Inglewood Wetlands in Lake Washington (Treatment Area 3), targeting primarily native plants and Brazilian Elodea with the Diquat and including a small test plot of Triclopyr on fragrant waterlily

- 25 gallons of Diquat to 16.28 acres at the mouth of the Sammamish River downstream of 68th Avenue South (Treatment Area 2), targeting primarily native plants and some Brazilian Elodea
- 1.5 gallons of Diquat and 1.5 gallons of Hydrothol to 0.85 acre in Squires Landing Park in the Sammamish River (Treatment Area 1), targeting primarily native plants with the Diquat and filamentous algae with the Hydrothol

A 4.5-week post-treatment survey of submersed plant biovolume on August 19, 2019, was negatively impacted by the 1-foot drop in water level interfering with sonar accuracy in shallow waters. In general, submersed plant density decreased in Squires Landing Park but did not change or slightly increased in the other treatment areas. NAE noted that no native plants or noxious weeds were inhibiting recreational use in treatment sites, aside from those vegetated by fragrant waterlily. Neither Eurasian watermilfoil nor Brazilian Egeria were present in any of the 20 rake samples collected. Little if any fragrant waterlily were controlled by the submerged applications of Triclopyr below the water surface.

NAE recommended taking a different approach than the area-wide treatment of Eurasian watermilfoil and Brazilian elodea because these noxious weeds are so sparsely populated. The early season (May through June) treatment with Triclopyr is very expensive and appears to be ineffective because it selectively targets Eurasian watermilfoil without impacting native plants and very few milfoil plants are present in most target areas, with the exception of Squires Landing Park and some other areas of the Sammamish River. It was suggested that isolated noxious weed populations be spot treated or that area-wide treatment be conducted less frequently. Because native plants are the primary source of recreational impairment, it was recommended to treat native plant species at the beginning of the 2-week treatment window followed by a post-treatment survey and second spot treatment where needed before the end of the window. NAE also recommended modifications to the request for proposals to improve the project (NAE 2019).

Residential Area Management

Under separate contracts with lake residents in 2017, 2018, and 2019, the licensed aquatic herbicide applicator AquaTechnex treated a fifth area located offshore of Arrowhead Point with Triclopyr and Diquat (J. Adamski, personal communication, May 5, 2020). In 2018 and 2019, the licensed aquatic herbicide applicator Lakeland Restoration Services treated areas offshore of the Inglewood Condominiums (J. Ketcham, personal communication, May 6, 2020). Pretreatment survey data were not provided for comparison to post-treatment survey data for these treatments. Residents noted the general success of treatments but were dissatisfied with inconsistency of treatments in adjacent areas from year to year and communications from City contracted companies prior to and after treatments.

Residents from Arrowhead Point have also used a weed razor to control aquatic plant growth near docks and have noted its success in slowing plant growth, but that it is a large level of effort to remove the debris after it is cut (J. Adamski, personal communication, May 5, 2020).

COMMERCIAL AREA MANAGEMENT

The North Bay Marina did not report any treatments since issuance of the 2017 IAVMP. Under separate contracts with Kenmore Air in 2017, 2018, and 2019, a licensed aquatic herbicide applicator treated the areas surrounding the seaplane docks and marina primarily for Eurasian watermilfoil (T. Banks, personal communication, June 3, 2020). Pretreatment survey data were not provided for comparison to post-treatment survey data for these treatments. Kenmore Air noted that while these treatments were successful in the areas treated, the drift of plant material into the Kenmore Air navigation areas causes navigation issues for sea planes. This plant material likely comes from a variety of sources including the Sammamish River and other areas within Lake Washington.

2020 AQUATIC PLANT SURVEY

Herrera biologists conducted a qualitative aquatic plant survey on July 28, 2020 in targeted areas of high concern for impacts to recreational uses within City treatment areas. The survey methods and observations are briefly described below. Descriptions of target aquatic plant species are included in the IAVMP (Herrera 2017).

SURVEY METHODS

Herrera conducted an aquatic plant survey on July 28, 2020 of Lake Washington and the Sammamish River within areas previously managed by the City of Kenmore (study area) (Figure 4). The survey was conducted by two Herrera biologists (Eliza Spear and Nick Bartish) using a rowboat, underwater viewer, and aquatic plant sampling rake, and did not include underwater sonar measurements of plant biovolume.

The aquatic plant sampling rake was used to collect grab samples throughout the study area to identify submersed plant species and estimate the relative abundance of each species in the sample. Dominant species were identified based on the sample results and visual observations where one or two species were present in higher densities than all other species, and thus determined to be dominant or co-dominant. Locations of plant species were recorded on a map in the field.

SURVEY RESULTS

A total of 16 aquatic species were identified within the survey area (Table 1). Among those species, 10 are classified as noxious weed species in Washington State. A total of five plant species are common native species, and one species (*Vallisneria americana*) is a common nonnative plant that has naturalized in this area and is not considered a noxious weed. No rare native species were observed. The number and type of species observed represent a reasonably diverse aquatic plant community that is impacted by a relatively high number of invasive noxious weeds.

A total of eight dominant plant species were identified within five plant communities, as shown in Figure 4. The eight dominant submersed and floating-leaved species include:

- Four noxious weeds: Brazilian egeria (*Egeria densa*), curly-leaf pondweed (*Potamogeton crispus*), Eurasian watermilfoil (milfoil) (*Myriophyllum spicatum*), and fragrant waterlily (*Nymphaea odorata*)
- Four native plants: common waterweed (*Elodea canadensis*), coontail (*Ceratophyllum demersum*), ribbon-leaf pondweed (*Potamogeton epihydrus*), and white-stemmed pondweed (*Potamogeton praelongus*)

Other submersed species observed include flat-stemmed pondweed (*Potamogeton fresii*) and tapegrass (*Vallisneria americana*).

Table 1. Aquatic Plant List for the Kenmore Survey on July 28, 2020.

Plant Type	Common Name	Scientific Name	Status
Emergent Plants	Nonnative cattail	*Typha* ssp.	Noxious Weed – Class C
	Bohemian knotweed	*Polygonum x bohemicum*	Noxious Weed – Class B
	Purple loosestrife	*Lythrum salicaria*	Noxious Weed – Class B
	Reed canarygrass	*Phalaris arundinacea*	Noxious Weed – Class C
	Spotted jewelweed	*Impatiens capensis*	Noxious Weed – Class C
	Yellow-flag iris	*Iris pseudacorus*	Noxious Weed – Class C
Floating Leaved Rooted Plants	Fragrant waterlily	*Nymphaea odorata*	Noxious Weed – Class C
	Ribbon-leaf pondweed	*Potamogeton epihydrus*	Native
Submersed Plants	Brazilian egeria	*Egeria densa*	Noxious Weed – Class B
	Common waterweed	*Elodea canadensis*	Native
	Coontail	*Ceratophyllum demersum*	Native
	Curly-leaf pondweed	*Potamogeton crispus*	Noxious Weed – Class C
	Eurasian watermilfoil	*Myriophyllum spicatum*	Noxious Weed – Class B
	Flat-stemmed pondweed	*Potamogeton zosteriformis*	Native
	Tapegrass	*Vallisneria americana*	Nonnative
	White-stemmed pondweed	*Potamogeton praelongus*	Native

The Sammamish River was dominated by the noxious weeds Eurasian watermilfoil and curly-leaf pondweed, and the native plant common waterweed dominated a small area. Lake Washington was typically dominated by coontail and Eurasian watermilfoil in shallow areas and the native white-stemmed pondweed in deeper areas. In general, aquatic plants were the densest closest to the shoreline of the Sammamish River and Lake Washington within the survey area.

Five separate aquatic plant communities were identified in the survey area, proceeding from the Plant Community 1 in the Sammamish River to Plant Community 5 in Log Boom Park. The plant community locations are depicted in Figure 4 and briefly described below.

Figure 4. Dominant Species Observed in 2020 Aquatic Plant Survey.

Legend

- Plant Community 1
- Plant Community 2
- Plant Community 3
- Plant Community 4
- Plant Community 5

Native Plant:

- Common waterweed
- Coontail
- Ribbon-leaf pondweed
- White-stemmed pondweed

Noxious Weed:

- Brazilian Elodea
- Curly-leaf pondweed
- Eurasian watermilfoil
- Fragrant waterlily

N

HERRERA

0 350 700 Feet

King County (2019)

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Plant Community 1–Lower Sammamish River

In the Sammamish River survey area from 68th Avenue NE to the mouth of the river (Plant Community 1 in Figure 4), the plant community was densest within 20 feet of the shore on both sides of the river, with aquatic plants in this area reaching the water surface and thus having the potential to interfere with recreational activities. There was a sufficient open channel to allow for boat passage in the middle of the river, with no aquatic plants within several feet of the water surface. The lower Sammamish River was dominated by the noxious weeds Eurasian watermilfoil in the upper portion and curly-leaf pondweed in the lower portion, and the native plant common waterweed in part of the lower portion.

Plant Community 2–Mouth of Sammamish River

At the mouth of the Sammamish River (Plant Community 2 in Figure 4), curly-leaf pondweed and fragrant waterlily were densely vegetated and had a significant potential to interfere with recreational or commercial activities in this area. Shallow water depths in this area further impact motorboat navigation. Fragrant waterlily dominated the south portion, curly-leaf pondweed dominated the central channel portion, and Brazilian egeria dominated the north portion.

Plant Community 3–Lake Washington Marina Area

Offshore of North Lake Marina in Lake Washington (Plant Community 3 in Figure 4), the plant community was dominated by milfoil in the eastern portion and coontail in the western portion. Plant density was low and unlikely to cause interference with recreation.

Plant Community 4–East of Log Boom Park Dock

On the east side of the dock in Log Boom Park, the plant community was dominated by the native plants coontail and ribbon-leaf pondweed. The overall plant density was low and unlikely to cause interference with recreation.

Plant Community 5–West of Log Boom Park Dock

On the west side of the dock in Log Boom Park, the plant community was dominated by the native plants ribbon-leaf pondweed in the nearshore area and white-stemmed pondweed in the offshore area. The plant community was denser on the west side than the east side of the boat dock. Dense growth of white-stemmed pondweed grew within 1 foot of the water surface had the potential to interfere with recreational activities in this area.

AQUATIC PLANT CONTROL ALTERNATIVES UPDATE

The 2017 IAVMP provides a complete description of all Aquatic Plant Control Alternatives except the recently approved aquatic herbicide: ProcellaCOR™ with the common name florpyrauxifenbenzyl. In February 2018, the US Environmental Protection Agency (US EPA) certified registration of ProcellaCOR™ as a selective herbicide that can be used to treat hydrilla, watermilfoil, and crested floating heart. ProcellaCOR™ is approved for aquatic use and has been given a Reduced Risk status from the US EPA because of the reduced risk to human health and native plants in comparison to alternative herbicides.

Ecology issued a supplemental environmental impact statement in August 2017 that includes ProcellaCOR™ (TRC 2017) and Ecology approved its use in the modified Aquatic Noxious Weed Management General Permit effective on July 5, 2019 (Ecology 2019). If used, full precautions will be taken during applications in Kenmore to ensure that ProcellaCOR™ concentrations do not exceed the amounts at which hazards can arise by not exceeding amounts specified by US EPA on the product label. Permit applicants should take care to observe all permit conditions, including notifications and public notice. There are no timing restrictions for fish or other priority species for using ProcellaCOR™ in Lake Washington or the Sammamish River (Ecology 2019).

ProcellaCOR™ is a systemic, selective herbicide that is applied as a liquid directly into the water or sprayed onto emergent foliage of aquatic plants (TRC 2017). ProcellaCOR™ is quickly absorbed by aquatic vascular plants through shoots and leaves and should be applied during active growth periods of targeted plant species to be most effective. It is particularly effective for spot treatments in flowing waters and large water bodies because it has a short contact exposure time, which typically ranges from 12 to 24 hours and up to a maximum of 72 hours depending on application rate and target weed. There are no human exposure restrictions for recreational purposes, including swimming and fishing. Due to its low aquatic toxicity, high effectiveness on Eurasian watermilfoil, and high species-selectivity preventing harm to native plants, ProcellaCOR™ is recommended for spot treatment of Eurasian watermilfoil in Lake Washington and the Sammamish River within the city of Kenmore. ProcellaCOR™ is licensed to a limited number of applicators in the United States who have been trained in its use, and at this time is only available through one local treatment company, AquaTechnex.

Additional information on costs for submersed aquatic plant management were obtained for this update and are summarized in Table 2.

Table 2. Submersed Aquatic Plant Management 2020 Cost Estimate Update.

Method	2016 IAVMP Unit Cost	2020 Areal Cost ($/acre)	2020 Areal Rate (acres/day)	2020 Daily Rate ($/day)	2020 Disposal Cost ($/ton)	2020 Mobilization Cost ($/day)
Manual Control						
Hand Harvesting[a]	NA	$13,800	0.2 acres	$2,760	$160	$75
Suction Dredging[a]	$1,500-$2,000/day	$5,000-$6,400	0.7 acres	$3,500-$4,500	$160	$350
Burlap Bottom Barrier[a]	$0.75/sq. ft.	$74,052 ($1.70/sq. ft.)	0.15 acres	$11,100	n/a	$75
Mechanical Harvesting[b]	NA	$3,780	1.0-1.5	$5,670	$160	$2,700 (included)
Herbicide Treatment						
Triclopyr[c]	$700/acre	$	<40	NA	$0	NA
Diquat[c]	$500/acre	$	<40	NA	$0	NA
ProcellaCOR[d]	-	$1,500	<40	NA	$0	NA

[a] 2020 costs based on estimates provided by Joe Markman, Lake Defense Force, personal communication , October 2020.

[b] 2020 costs based on estimates provided by Kyle Steelhammer of Northwest Aquatic Management, personal communication, October 2020.

[c] 2020 costs based on contractor bids to the City of Kenmore for 2018 and 2019 with 5 percent inflation rate.

[d] 2020 costs based on estimates provided by Terry McNabb, Aquatechnex, personal communication, October 2020.

NA = Not applicable or available.

SELECTED ACTION STRATEGY AND IMPLEMENTATION

ACTION STRATEGY

After assessing the control scenarios, the Steering Committee prioritized a maintenance level of control for the target plants that meets IAVMP goals using an integrated approach. To achieve these goals, the following priority areas were determined by the 2017 IAVMP:

Lake Washington

- Log Boom Park Swimming and Boating
- Residential Area Swimming and Boating
- Marina Boating
- Kenmore Air Docking

Sammamish River

- Public and Residential Area Boating (including the WDFW boat launch and the river channel from the boat launch to the lake)
- Rhododendron Park
- Squire's Landing Park
- Class B Weed Control

The following plant management strategies were recommended to meet the goals of the IAVMP:

- Herbicide treatment of invasive nonnative submersed plants, nuisance native submersed plants, fragrant waterlily, and emergent loosestrife species in some or all areas.
- Bottom barriers in dock areas and in strategic navigation channels to create pathways for recreational vehicles to travel from docks to open water areas. Channels may be marked with buoys to identify the easiest route for travel from shoreline to open water.

- Hand-pulling and raking by residents. All fragments created by these efforts must be removed from the water to prevent the spread of plant species.
- No control of submersed plants or fragrant waterlily in Inglewood wetlands and other conservation areas unless there is further encroachment into navigation channels.

These IAVMP strategies have not changed for this update, besides the elimination of using harvesting for aquatic plant control in large public areas as described above. In addition, the City of Kenmore has added the following aquatic plant management strategies for this update to be implemented in 2021:

- Reduce the amount of herbicide application by focusing treatment on smaller, high use areas where aquatic plants grow close to the water surface and significantly impact motorboating by entanglement in boat propellers.
- Adaptively manage aquatic plants by adjusting herbicide application areas based on pre-treatment surveys of plant density and, if necessary, adjusting chemical formulations based on the changes in plant species composition.
- Use non-chemical methods of control where feasible and cost-effective.

IMPLEMENTATION

Permitting

The Development Services Department at the City of Kenmore is responsible for oversight of proposed development and permitting throughout the city of Kenmore. This includes regulating activities along the shoreline to ensure implementation of the Shoreline Management Act of 1971 (Washington State Legislature 2017), which recognizes that "the shorelines of the state are among the most valuable and fragile of its natural resources" and provides guidelines for permitted uses "designed and conducted in a manner to minimize, insofar as practical, any resultant damage to the ecology and environment of the shoreline area and any interference with the public's use of the water" (RCW 90.58.020). See the 2017 IAVMP for a complete description of the permitting processes required for implementing aquatic plant control, with the following correction. Herbicide treatment does not fall under the Shoreline Management Act and a Shoreline Permit Exemption is not required. Herbicide treatment is covered by the Washington State Department of Ecology's Aquatic Plant and Algae Management General Permit for management of native plants (Ecology 2019) or the Aquatic Invasive Species Management General Permit for treatment of noxious weeds (Ecology 2016). These permits establish notification, timing, application and reporting requirements for shoreline and in-water herbicide treatment of noxious weeds, native nuisance plants, and algae. The herbicide applicator obtains the appropriate General Permit.

Permitting requirements for manual control methods are specified by the Washington Department of Fish and Wildlife (WDFW) in the Aquatic Plants and Fish Pamphlet (WDFW 2015). All manual control methods implemented by a contractor in Lake Washington or the Sammamish River require an individual Hydraulic Project Approval (HPA) from the WDFW (WDFW 2020a). A permit application is completed through the online Aquatic Protection Permitting System (WDFW 2020b) and the application is issued or denied within 45 days. Manual control methods in Lake Washington and the Sammamish River are recommended to be implemented in the month of August (WDFW 2015).

City Projects

As described above, the City implemented the 2017 IAVMP in 2018 and 2019 by herbicide treatment of invasive nonnative submersed plants, nuisance native submersed plants, and fragrant waterlily in the following four of the eight priority areas: Log Boom Park, Rhododendron Park, Squires Landing Park, and the public boating area from the boat launch to the mouth of the Sammamish River. The City also treated these same plants in the Inglewood Wetlands in Lake Washington, which was designated as a conservation area by 2017 IAVMP and not targeted for treatment, however the area was treated because of the high prevalence of invasive plants. The City did not implement any of the physical control methods of harvesting, bottom barriers, or hand removal.

For future projects implemented by the City of Kenmore, the City will continue to regularly evaluate the management of aquatic weeds and the effectiveness of plant management strategies employed to date. The City will continue to hire contractors to do work in public areas, such as large herbicide treatments and manual control areas. The City will provide education and training to encourage residents to combine efforts in residential and commercial areas to manually remove aquatic plants or contract for herbicide treatment of noxious weeds.

The City plans to continue focusing future aquatic plant management efforts in the areas surrounding public parks for recreational and commercial uses. The City will focus most management efforts in areas around Log Boom Park and Squire's Landing Park because of the high public use and dense vegetation commonly present in these areas. The proposed management strategies for these and other public use areas are outlined below in order from east to west (see Figure 1), based on existing plant communities, feasible management methods, and results of recent herbicide treatments. Management strategies should be adjusted each year as needed based on current plant survey information and past performance.

Squire's Landing Park

The aquatic plant community at Squire's Landing Park is dominated by Eurasian watermilfoil that forms a dense surface canopy impacting active boating in the adjacent river. Chemical treatments are recommended in this area due to the dominance of invasive vegetation and the reduced level of effort in comparison to manual removal. The planned treatment area is shown in Figure 5.

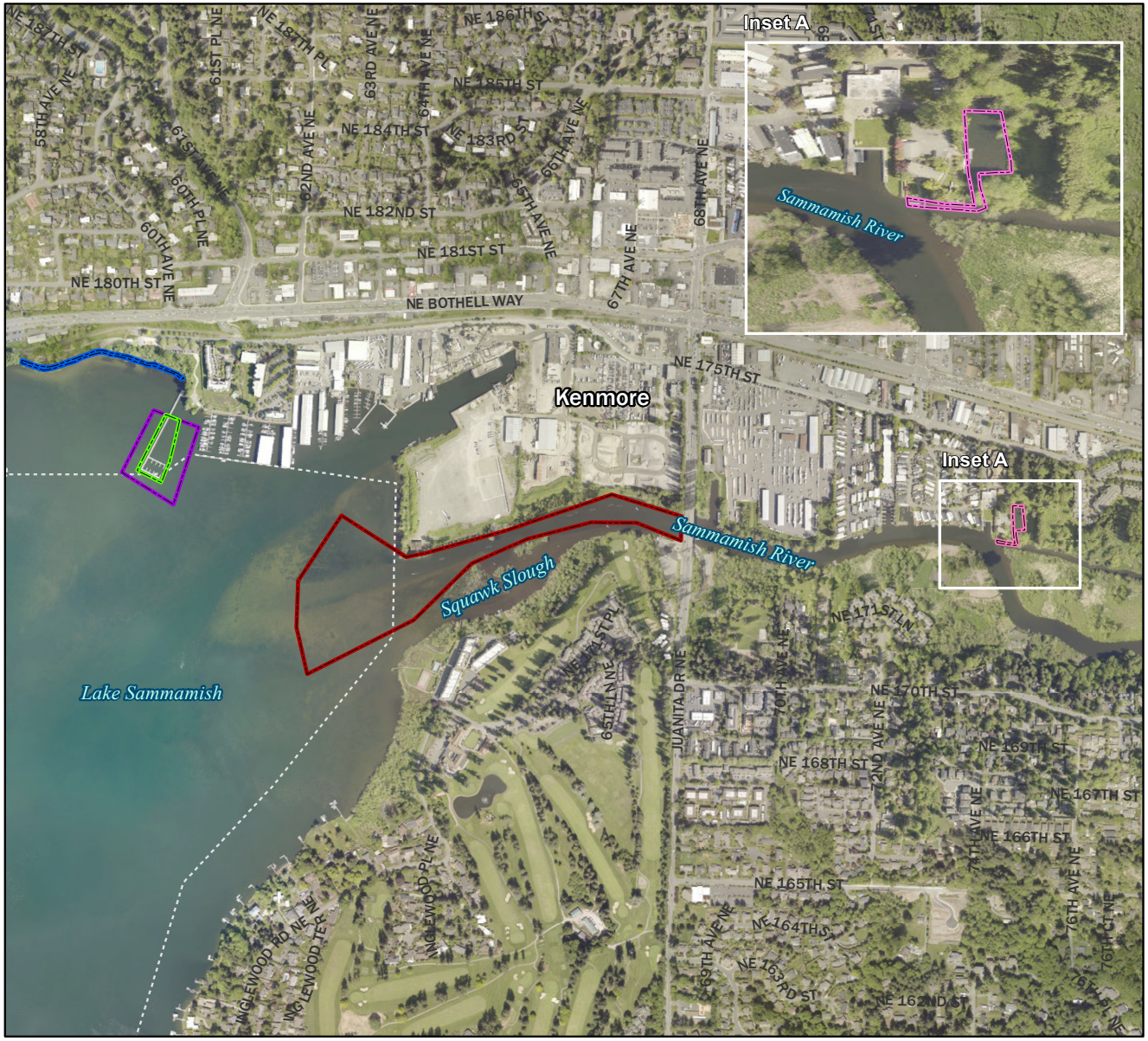

Figure 5. Future City of Kenmore Treatment Areas.

Legend

- City boundary
- Channel Survey Area

City Treatment Areas

- Beach Raking Area
- Log Boom Park Pier - Inner
- Log Boom Park Pier - Outer

Squire's Landing

- Chemical Treatment Area

HERRERA

0 475 950 Feet

King County 2019

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ProcellaCOR™ is recommended as the primary treatment method for this area due to its low aquatic toxicity, high effectiveness on Eurasian watermilfoil, rapid uptake by milfoil in flowing waters, and high species-selectivity preventing harm to native vegetation. ProcellaCOR™ does not require repeated applications, so one spring application per year in the chemical treatment area is anticipated to be sufficient for spot treatment of Eurasian watermilfoil (see Figure 5). Triclopyr may also be used in place of ProcellaCOR™ to control Eurasian watermilfoil in this area but is expected to be less effective. Figure 5 shows the planned treatment area, which will be adapted as needed each year based on the observed plant growth.

After the population of Eurasian watermilfoil is controlled in the chemical treatment area, the area will be monitored to determine whether follow up algae control is necessary. If excess algae growth develops (e.g., surface scum covering over 50 percent of the treatment area), short-term algae control may be achieved by applying a state-approved algicide. If algae control is needed beyond 2021, then long-term algae control techniques using non-chemical methods should be evaluated (e.g., mixing, shading, or nutrient inactivation).

Alternative manual management methods considered most feasible for this area include hand harvesting or suction dredging, which would be considerably more expensive than ProcellaCOR™ treatment.

Middle Sammamish River

This area of Sammamish River connects Squire's Landing Park with Lower Sammamish River (as shown in Figure 1) and provides the public access to and from these public areas. Treatment is not targeted for this area in 2021 and 2022 because the aquatic plant community, which is dominated by Eurasian watermilfoil, is dense along the river banks but not in the central portion of the river, providing unobstructed boat access to Lake Washington from Squire's Landing.

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

Aquatic plant management in the Sammamish River at Rhododendron Park and the public boat launch is not targeted for treatment in 2021 and 2022 because the aquatic plant community, which is dominated by Eurasian watermilfoil, is dense along the river banks but not in the central portion of the river, providing unobstructed boat access to Lake Washington from the WDFW boat launch. However, navigation past the mouth of the Sammamish River was identified as a potential concern due to dense growth of curly-leaf pondweed and shallower water depths. Therefore, it is recommended that the lower river and adjacent lake area depicted as the Channel Survey Area in Figure 5 be surveyed each year to assess the potential need for treatment within all or some of this area. Sonar equipment should be used to measure plant biovolume and delineate areas where plants grow within 1 foot of the water surface and impact motorboat navigation. Depending on the plant communities observed during each survey, appropriate herbicides should be used for treatment targeting those specific communities. Herbicides are recommended rather than manual control methods because of the size of the

potential treatment area, which would render bottom barriers or mechanical harvesting cost-prohibitive due to excessive level of effort associated with these methods.

Inglewood Wetlands

The recommendation remains the same as it was presented in the 2017 IAVMP and the Inglewood Wetlands, identified as a conservation area, will not be targeted for treatment unless the fragrant water lilies further encroach upon the navigation channel and obstruct boat access from the river to the lake.

East and West Open Water

Moderate to dense growth of both native and invasive aquatic plant species are typically present in the East and West Open Areas of Lake Washington (see Figure 1). Management is not targeted for this area in 2021 and 2022 due to the large size of these areas and associated high management cost. If boat navigation in these areas is severely obstructed in the future, then the City should consider providing boating access lanes through the East Open Water Area from the Sammamish River to the deep portion of the lake and through the West Open Water Area from the dock in Log Boom Park to the deep portion of the lake.

Log Boom Park

The strategy for Log Boom Park in 2021 is to focus management of aquatic plants in the vicinity of the dock where motorboating is most impacted and to improve access by hand carried boats launched from shore on the east side of the dock.

Aquatic plant growth in the shallow waters near shore does not require management at this time. The aquatic plant community surrounding the public dock at Log Boom Park is dominated by the native plants coontail, white-stemmed pondweed, and ribbon-leaf pondweed, and include an abundance of the nonnative plant tapegrass. Noxious weed abundance was low in 2020 in the immediate vicinity of the dock, but an abundance of Eurasian watermilfoil has been observed and treated in this area in previous years.

Large amounts of aquatic plant fragments accumulate on the lake shore in Log Boom Park. The source of these fragments extends very far from shore and aquatic plant management in the vicinity of the shore would not significantly affect fragment accumulation on shore. Management of fragment accumulation on shore is best performed by raking and disposal (in compost) of the plant fragments to reduce aesthetic and recreational impacts of large accumulations on shore. Regular shoreline cleanup of aquatic vegetation and detritus is recommended to maintain safe access to the lake in Log Boom Park.

Costs, advantages, and disadvantages of manual management methods were for Log Boom Park are compared in Table 3 for the inner and outer pier areas shown in Figure 5.

Table 3. Comparison of Aquatic Plant Strategies for 2021 in Log Boom Park.

Method	Description	Annual Cost	Advantages	Disadvantages	Recommendation
Herbicide	Herbicide may be used to control both the native and invasive vegetation around the pier but would be adjusted based on pre-treatment survey results. Based on the current plant communities observed in this area, Diquat is the recommended herbicide to be applied once each year. Diquat is a broad-spectrum, short-term contact herbicide that does not kill plant roots.	$900 for the 1.8-acre inner pier area $2,600 for the entire 5.3-acre area	Cost is considerably lower than non-herbicide options. Application can cover large area quickly and often be completed in less than one day with contact advisories lasting less than 24 hours.	Requires permit from Ecology. Diquat can only be applied during fish timing window of July 16 through July 31, general negative perception of pesticides/herbicides due to potential impacts if not applied properly.	Yes, if full control of target weeds is desired using one strategy and budget is of concern. If used in conjunction with other strategies, less herbicide treatment would be needed.
Bottom Barrier	A bottom barrier would provide control of all target weeds observed in this area for at least one year and is expected to last two years on average, so the annual cost is based on two years of effectiveness.	$67,000 for 1.8-acre the inner pier area Not applicable to entire 5.3-acre area	Effective for treatment of all aquatic weeds without use of herbicides or water quality impacts. Treatment can remain effective for more than one growing season. Biodegradable barriers do not require physical removal after use.	Requires individual HPA permit from WDFW. This strategy is a very expensive alternative compared to other treatment strategies and with a comparatively slow installation process that may potentially impact use of the pier.. Non-biodegradable barriers require removal after 2 years of use biodegradable barriers may lessen effectiveness over time. There is a risk of barriers becoming dislodged from anchors and impacting boating.	No, too expensive for large areas.
Shore Raking	Large amounts of aquatic plant fragments accumulate on the lake shore in Log Boom Park. Management of fragment accumulation on shore is best performed by raking and disposal (in compost) of the plant fragments to reduce aesthetic and recreational impacts of large accumulations on shore. Regular shoreline cleanup of aquatic vegetation and detritus (debris) is recommended to maintain safe access to the lake in Log Boom Park. This work would most likely be conducted by City staff.	$10,000	This strategy does not require use of herbicides or other intrusive weed control methods. Provides aesthetically pleasing shoreline in park area.	This is primarily a 'cosmetic' strategy and does not prevent or control the growth or spread of weeds.	Yes
Hand Removal by Divers	A team of divers, with 2-person surface support team, hand remove weeds from the target area. Weeds are collected and disposed of appropriately. Divers can cover approximately 0.2 acres per day. Expected to last two years with root removal.	$13,000 for 1.8-acre inner pier area $38,000 for the 5.3-acre entire area	This strategy does not require use of herbicides. All target weeds can be managed using this strategy. Can include removal of all invasive plant parts but selective removal of native plant shoots without roots to favor native plant growth.	Requires individual HPA permit from WDFW. This strategy is a very expensive alternative compared to other treatment strategies. This process is also much slower than other options and may take up to 25 working days to complete treatment of the complete area (9 days directly adjacent to pier), which may potentially impact use of the pier. In addition, some of the dominant species observed in this area have extensive root systems that would slow and limit long-term effectiveness of removal.	No, suction dredging is a less costly and more effective alternative strategy for this large area covered by native and invasive plants.
Suction Dredging by Divers	One diver, with 2-person surface support team, conduct suction dredging along the bottom of the target area. Weeds are collected and disposed of appropriately. Divers can cover approximately 0.7 acres per day. Expected to last two years with root removal.	$6,000 for 1.8-acre inner pier area $16,500 for the entire 5.3-acre area	This strategy does not require use of herbicides. All target weeds can be managed using this strategy. Expected to last two years with root removal.	Requires individual HPA permit from WDFW. This strategy is an expensive alternative compared to other treatment strategies. This process is slower than other options and may take up to 8 working days to complete treatment of the complete area (2.5 days directly adjacent to pier), which may potentially impact use of the pier.	Yes, this appears to be a financially viable non-chemical strategy if greater control than harvesting is desired. Implementation does take several days so consideration of pier use impacts, similar to hand harvesting and bottom barriers, should be considered.
Mechanical Harvesting	An aquatic plant harvester consists of a pontoon boat with paddle wheels and is equipped with a 5-feet deep (or 8-feet deep on some models) cutting head that conveys the cut plants onto the boat. The collected weeds are conveyed to a trailer for disposal, preferably at a compost facility. Harvesting rates range from 1 to 4 acres per day depending on transport distance, wind, underwater obstructions, and plant biomass. Expected to require two cuts per season (e.g., late June and early August) due to plant regrowth of about 0.5 feet per week.	$13,700 for 1.8-acre inner pier area $40,000 for the entire 5.3-acre area	This strategy does not require use of herbicides. All target weeds can be managed using this strategy. Faster rate than other non-chemical methods. Less fish habitat impact than other non-chemical strategies because not all plants are removed.	Requires individual HPA permit from WDFW. Strong onshore winds may delay or reduce effectiveness of weed removal due to navigation and visibility issues. May increase accumulation of plant fragments on shore.	No, suction dredging is a less costly and more effective alternative strategy for this large area covered by native and invasive plants.

Diver suction dredging is recommended for non-chemical, manual control of aquatic plants in Log Boom Park because it is the least expensive of the manual methods. Diver suction dredging is less expensive than hand removal and both of these methods have the advantage of allowing differential control of invasive and native species. Divers adjust the suction dredge to deter regrowth of invasive plants by removing all of their roots while encouraging regrowth of native plants by not removing their roots. Bottom barriers cover all plants and allow faster colonization by invasive plants on the barrier, and harvesting leaves lower portions of invasive plants to outgrow the native plants.

Suction dredging should be initiated in early summer before plant growth reaches the water surface. It is anticipated that suction dredging will provide adequate control of plant growth for two years because invasive plant roots will be removed. Suction dredging intensity and rate should vary depending on the plant species and observed density. Suction dredging requires an individual HPA permit and use of proper equipment to control fragment escapement and turbidity impacts.

Herbicide application would be less expensive and may be used as a contingency to suction dredging if greater coverage is needed or adequate funding is not available. Diquat may be used to control both the native and invasive vegetation around the dock as an alternative to bottom barriers. Diquat application would be a lower level of effort and cost for the City to control vegetation in this area. The actual treatment area may vary based on the pre-treatment survey results. Diquat can only be applied within the approved fish window for Lake Washington that extends from July 16 through July 31 for protection of sockeye salmon spawning (WDFW 2016). It is anticipated that only one treatment in the last two weeks of July would be needed each year.

Commercial and Residential Projects

No commercial management efforts were reported since the 2017 IAVMP at the North Lake Marina. Kenmore Air reported annual treatments that were successful; however, ongoing navigation issues were caused by plant drift resulting from inconsistent treatment in adjacent areas. The US Army Corps of Engineers will be conducting maintenance dredging of the Kenmore Federal Navigation Channel in the winter of 2020 to 2021 (Figure 5). This maintenance dredging is intended to enable continued access to the Kenmore Industrial Park but will also disturb the Eurasian watermilfoil and coontail in this area, inhibiting plant growth. Commercial treatment is determined by individual businesses independently from the City.

The only residential project using herbicides was for Arrowhead Point where Triclopyr was used for Eurasian watermilfoil control and Diquat was used for Brazilian Egeria and nuisance native submersed plant control. Treatment undertaken in residential areas is determined by individual sponsors (homeowners associations, etc.) independently from the City.

Residents have also used a weed razor to control aquatic plant growth near docks.

The City recommended in the 2017 IAVMP that waterfront residents consider the formation of a Plant Management Association. This type of volunteer organization, formed by, run by, and for the benefit of, waterfront residents could provide an opportunity for residents to pool their resources and/or work in tandem with one another to employ approved management strategies such as jointly contracting with an herbicide-application company or harvester, manual removal of plants, installation of bottom barriers, and other management strategies outlined in this plan. A residential community organization has not been formed and is not planned for the near future.

Communication

Successful implementation of this plan revolves around a collective sharing of information. The City of Kenmore will continue to work to solicit public input after publication of this IAVMP update, and keep residents and businesses informed of current and future plant management strategies planned for public areas. The City will make plans for aquatic plant management activities publicly available at the beginning of each treatment season so that residents may coordinate with City efforts to promote efficiency and thorough treatment of aquatic plants in targeted areas. The City will also publish survey results after the summer season so that stakeholders may be informed of completed maintenance activities.

The City will make reporting requirements consistent and clear in Requests for Proposals from year to year to create a usable record of past treatments. The requirements for monitoring and evaluation are further detailed in the Monitoring and Evaluation Plan section of this update. The treatment plans and reports will be made available on the City's IAVMP webpage <http://www.kenmorewa.gov/IAVMP>, which already has useful links for permits and other information.

The City will encourage residents to report their aquatic plant management activities and the relative effectiveness of those activities to the City. The City will share this information with other stakeholders to improve effectiveness of City, commercial, and residential aquatic plant management projects.

In addition, the City of Kenmore will continue to reach out to upstream jurisdictions to orchestrate joint plant management strategies. Conversations with upstream jurisdictions to date have garnered interest in continuing to stay in communication about the management of aquatic weeds in north Lake Washington and the Sammamish River as a whole.

MONITORING AND EVALUATION PLAN

Several different aquatic plant control-related monitoring and evaluation needs are identified for the City of Kenmore, including aquatic plant surveys and evaluation of aquatic plant management activities. These survey and evaluation activities are described below.

AQUATIC PLANT SURVEYS

Ongoing surveys and mapping will be necessary to evaluate the effectiveness of treatment strategies, to inform future treatments, and to detect new infestations of invasive plants. In response to the planned treatments, the aquatic plant community in the city of Kenmore may be in flux. It is critical that frequent and thorough surveys continue to document these changes and to detect new problems.

Subject to funding availability, a GPS/GIS survey and mapping effort is recommended to be performed by a contractor as a regular component of the long-term surveillance and management program. This survey effort will identify all plant species present in public areas of the lake and river and their relative abundance at each location. The survey map will include past management areas for comparison to plant densities observed in previous surveys and assessment of management effectiveness. These plant surveys will also help provide guidance for aquatic plant management in future years.

EVALUATION

Also subject to funding and staffing resources, a complete evaluation, including a plant management report, should be completed annually. This report would describe which elements of the management plan have been implemented and how (i.e., which mechanisms for control or removal and where), relate the existing plant community to established goals based on pre- and post-treatment surveys, and make recommendations for the next year's activities based on success or failure of management efforts and identified needs.

This evaluation should begin with a description of which elements of the plan have been fully implemented, those that have not, and why. It should also include a summary of the plant survey results, both those obtained by volunteers and those by professionals. The evaluations should also provide a map of all management areas for each year. The survey results should be used to determine whether goals have been met. The community should also be asked for input on their satisfaction with aquatic plant and water body conditions. It is possible that the IAVMP goals will be met but that some people will remain dissatisfied. The evaluation should be posted publicly after each maintenance season to provide a resource for the public to stay updated on City management efforts.

Although it is unlikely that the needs of all stakeholders will be met (and it is possible that the IAVMP goals will be met but that some people will remain dissatisfied), a continued effort should be made to track concerns, especially if they are widespread. This information should be used to decide on the following:

- Has there been a quantifiable increase or decrease in the amount of nuisance plants in the lake?
- Have any other noxious aquatic plants been identified?
- Has there been a change in the occurrence and frequency of algae?
- What control methods work best and should other control methods (newly approved herbicides, for example) be considered?
- Is it necessary to revise the plan?
- Is funding adequate for the control measures in place?

Over the long term, adequate evaluations can make the difference between project success and failure, and the City of Kenmore will continue to regularly monitor and evaluate the effectiveness of the various management strategies that have been employed. In addition, as noted earlier, potential new herbicides, management strategies, and tools will be considered as they become available.

REFERENCES

Ecology. 2016. Aquatic Invasive Species Management General Permit, National Pollutant Discharge Elimination System and State Waste Discharge General Permit. Washington Department of Ecology, Olympia, Washington. Effective September 16, 2016. Expires September 15, 2021. <https://ecology.wa.gov/Regulations-Permits/Permits-certifications/Aquatic-pesticide-permits/Aquatic-invasive-species-management>.

Ecology. 2019. Aquatic Plant and Algae Management General Permit, National Pollutant Discharge Elimination System and State Waste Discharge General Permit. Washington Department of Ecology, Olympia, Washington. Modified June 5, 2019. Effective July 5, 2019. Expires February 2, 2022. <https://ecology.wa.gov/Regulations-Permits/Permits-certifications/Aquatic-pesticide-permits/Aquatic-plant-algae-management>.

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.

Lakeland Restoration Services. 2018. EWM & Brazilian Elodea Treatment Map. City of Kenmore – Lake Washington and Sammamish River. Prepared for the City of Kenmore. July.

NAE. 2019. City of Kenmore 2019 Aquatic Macrophyte Control Program. Prepared for the City of Kenmore by Northwest Aquatic Ecosystems.

Olden and Tamayo. 2014. Incentivizing the Public to Support Invasive Species Management: Eurasian Milfoil Reduces Lakefront Property Values. PLoS ONE 9(10): e110458. doi:10.1371/journal.pone.0110458. <http://journals.plos.org/plosone/article?id=10.1371/journal.pone.0110458>.

TRC. 2017. FINAL Supplemental Environmental Impact Statement for State of Washington Aquatic Plant and Algae Management. Prepared for the Washington Department of Ecology by TRC Environmental, Seattle, Washington. Publication 17-10-020. SEPA No. 201704291. August 14. <https://fortress.wa.gov/ecy/publications/documents/1710020.pdf>.

Washington State Legislature. 2017. Chapter 90.58 RCW, Shoreline Management Act of 1971. Washington State Legislature, Olympia, Washington. <http://app.leg.wa.gov/RCW/default.aspx?cite=90.58>.

WDFW. 2015. Aquatic Plants and Fish: Rules for Aquatic Plant Removal and Control (2015). Washington State Department of Fish and Wildlife, Olympia, Washington. Second Edition. July 2015. <https://wdfw.wa.gov/sites/default/files/publications/01728/wdfw01728.pdf>.

WDFW. 2016. Recommended Fish and Wildlife Treatment Windows for Aquatic Plant and Algae Management. Washington State Department of Fish and Wildlife, Olympia, Washington. February. <https://ecology.wa.gov/DOE/files/fa/fa8057b6-6ffb-4191-9170-e5cb31f05331.pdf>.

WDFW. 2020b. Aquatic Protection Permitting System. Washington State Department of Fish and Wildlife, Olympia, Washington. Website accessed in October 2020. <https://www.govonlinesaas.com/WA/WDFW/Public/Client/WA_WDFW/Shared/Pages/Main/Login.aspx>.

APPENDIX A

2018 Treatment Report

Lakeland Restoration Services, LLC
78 E River Spur Rd, Priest River, ID 83856
Phone: (877) 273-6674
www.lakelandrs.com

City of Kenmore
Lake Washington & Sammamish River
Herbicide Treatment 2018

Lakeland Restoration Services, LLC (LRS) performed two aquatic herbicide treatments on Lake Washington and the Sammamish River Channel for the City of Kenmore in 2018. The first application was completed on June 4th to control Eurasian watermilfoil and fragrant water lily. The second treatment, targeting Eurasian watermilfoil and Brazilian Elodea, occurred on July 16th. Additionally, 2.8 acres were treated for Inglewood Condos on June 4th and a total 5 acres were treated for homeowners, including Inglewood Condos, on July 16th.

Pre-treatment and post-treatment surveys were completed for both applications. BioBase analysis was also conducted before and after each treatment. *(Survey and BioBase maps attached, please see Appendix A.)* Survey maps indicating individual plants were created and sent to Richard Sawyer and Janet Quinn.

One herbicide, Triclopyr, was used during the first treatment on June 4th. One-hundred and eighty (180) gallons of Triclopyr were applied to 30.8 acres of EWM and fragrant water lily. The second application incorporated a combination of three herbicides: Diquat, Hydrothol and Aquathol. Thirty-five (35) gallons of each herbicide was applied to 35 acres. *(Treatment maps attached, please see Appendix A.)*

Business and Residential Notices were provided to Richard Sawyer and Janet Quinn for approval and were mailed on May 21st, 2018 for the first treatment and July 3rd, 2018 for the second treatment. *(Attached please see Appendix B.)*

Shoreline notifications were provided to Richard Sawyer and Janet Quinn for approval and were posted in and near treatment areas. Notifications were left in place for 48 hours. *(Attached please see Appendix C.)*

Pre and post treatment notifications were sent to Washington State Department of Ecology. *(Attached please see Appendix D.)*

The following personnel were present for this project:
David L. Kluttz – License #66448 – Applicator/Airboat Pilot

Jim Pogue –License #90277 – Applicator
Roy Moore – Mixer/Loader Cert. – Mixer/Loader

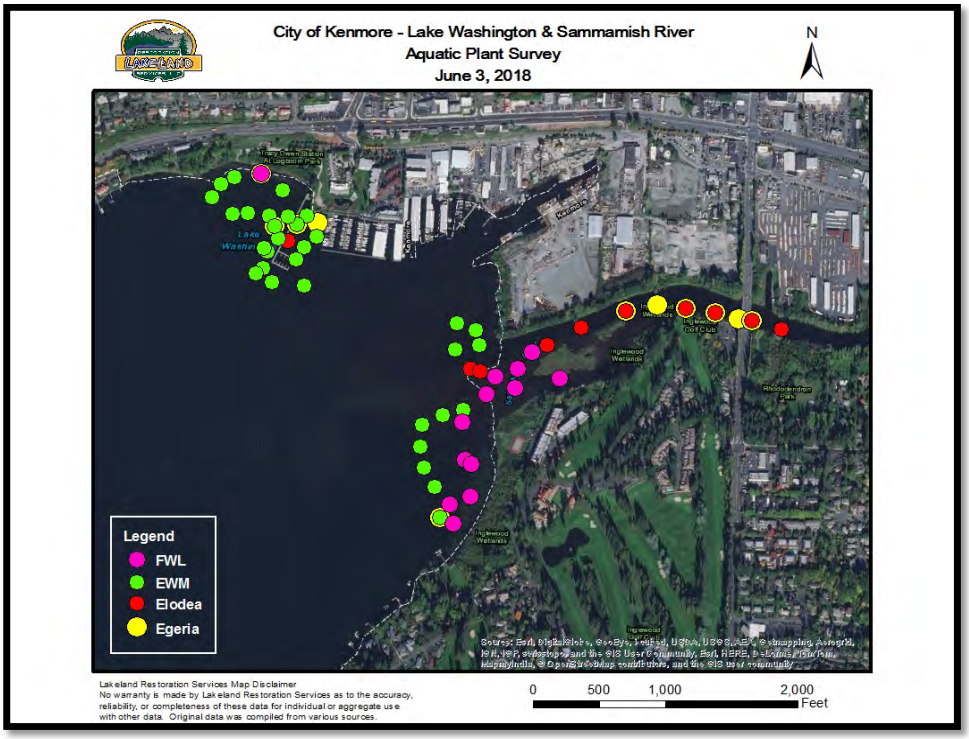
Site specific safety plans used during each treatment are included in Appendix E. A WSDA Pesticide Application Record was completed for each treatment and will be kept on file for seven years as required by the WSDA. *(Copies included please see Appendix F.)*

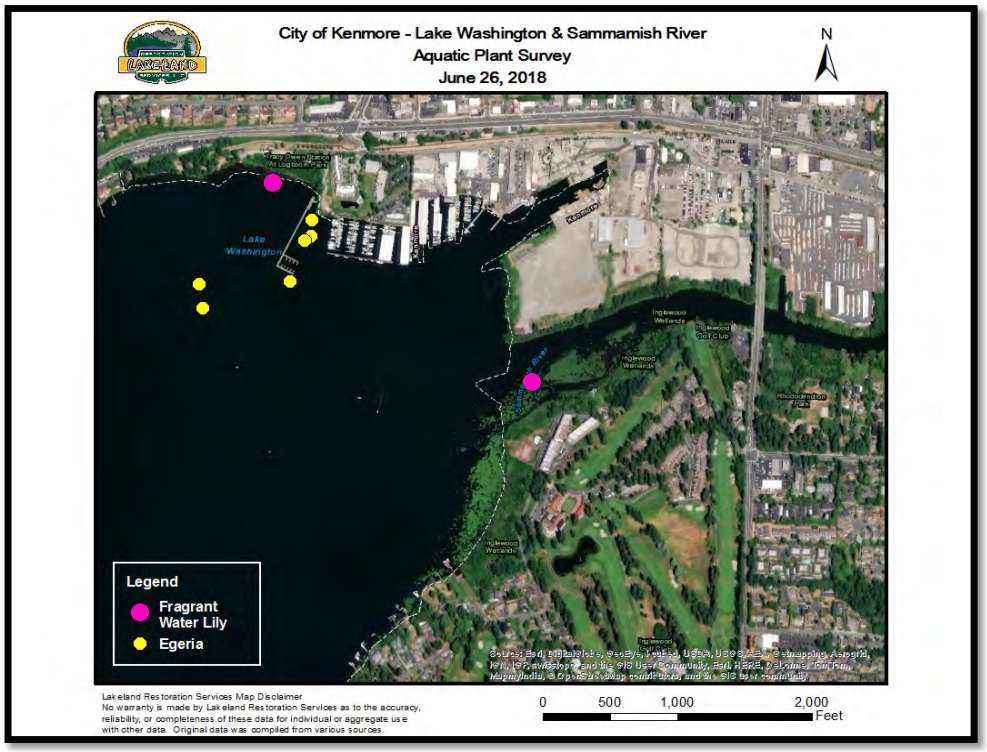
June 4, 2018

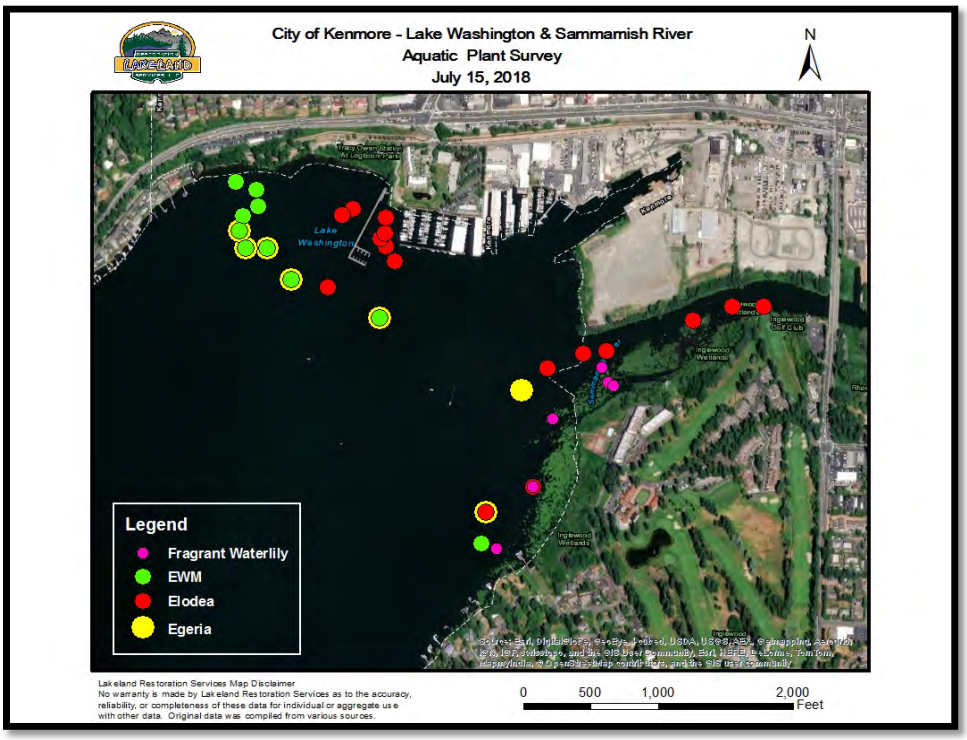
July 16, 2018

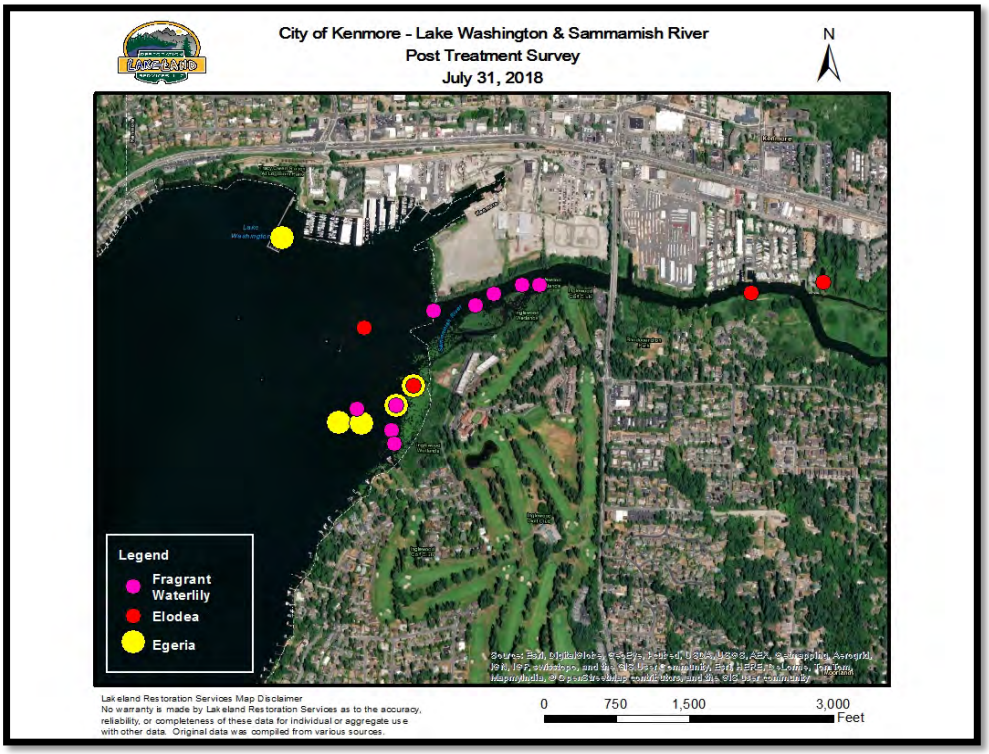
Appendix A

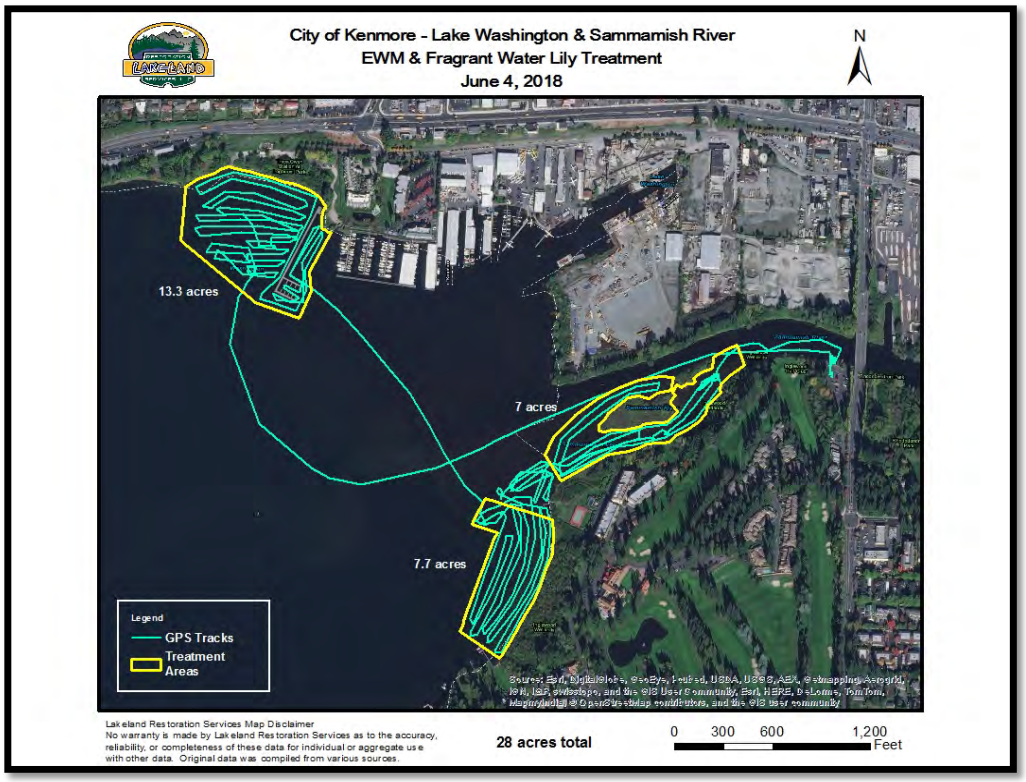
Maps


City of Kenmore - Lake Washington & Sammamish River
Aquatic Plant Survey
June 3, 2018
N
Legend
FWL
EWM
Elodea
Egeria
Lake Washington
Inglewood Wetlands
Inglewood Golf Club
Rhododendron Park
Lakeland Restoration Services Map Disclaimer
No warranty is made by Lakeland Restoration Services as to the accuracy, reliability, or completeness of these data for individual or aggregate use with other data. Original data was compiled from various sources.
0 500 1,000 2,000 Feet

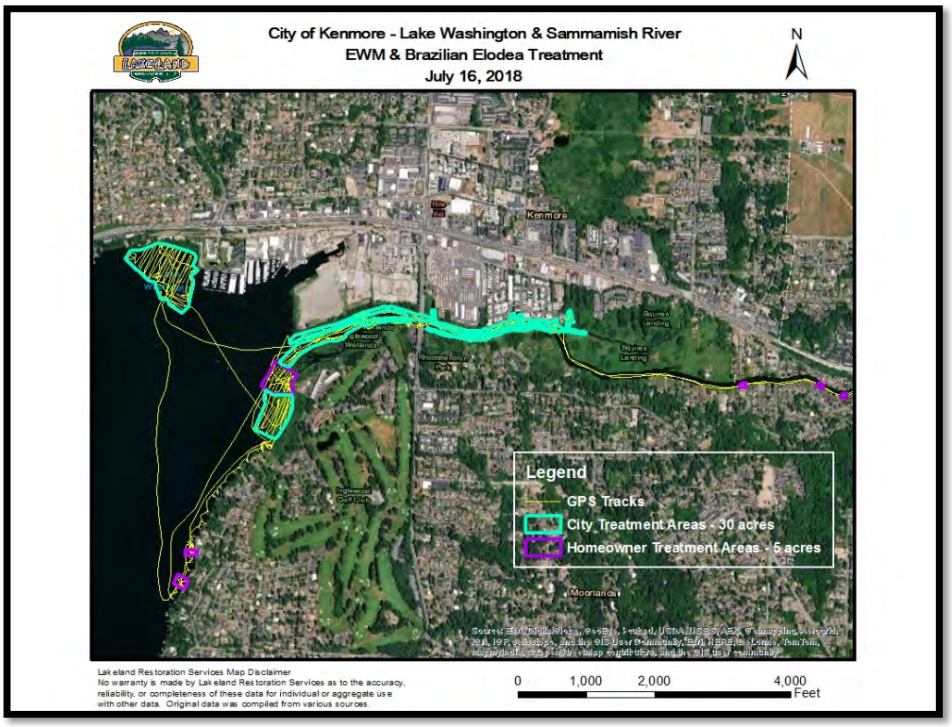

City of Kenmore - Lake Washington & Sammamish River
Aquatic Plant Survey
June 26, 2018
N
Legend
Fragrant Water Lily
Egeria
Lake Washington
Inglewood Wetlands
Inglewood Golf Club
Rhododendron Park
Lakeland Restoration Services Map Disclaimer
No warranty is made by Lakeland Restoration Services as to the accuracy, reliability, or completeness of these data for individual or aggregate use with other data. Original data was compiled from various sources.
0 500 1,000 2,000 Feet

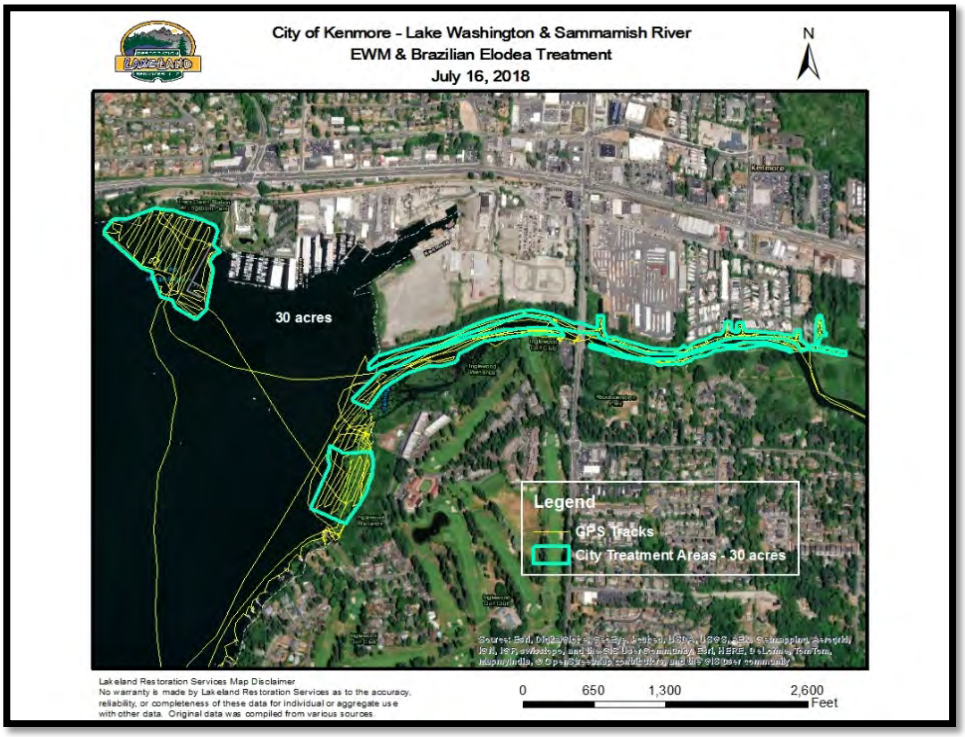

City of Kenmore - Lake Washington & Sammamish River
Aquatic Plant Survey
July 15, 2018
N
Lake Washington
Legend
Fragrant Waterlily
EWM
Elodea
Egeria
Lakeland Restoration Services Map Disclaimer
No warranty is made by Lakeland Restoration Services as to the accuracy, reliability, or completeness of these data for individual or aggregate use with other data. Original data was compiled from various sources.
0 500 1,000 2,000
Feet

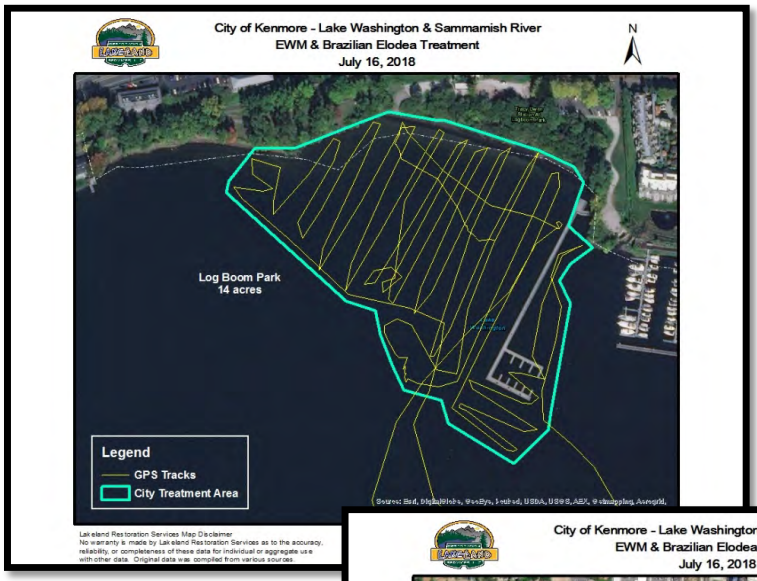

City of Kenmore - Lake Washington & Sammamish River
Post Treatment Survey
July 31, 2018
N
Legend
Fragrant Waterlily
Elodea
Egeria
Lakeland Restoration Services Map Disclaimer
No warranty is made by Lakeland Restoration Services as to the accuracy, reliability, or completeness of these data for individual or aggregate use with other data. Original data was compiled from various sources.
0 750 1,500 3,000
Feet

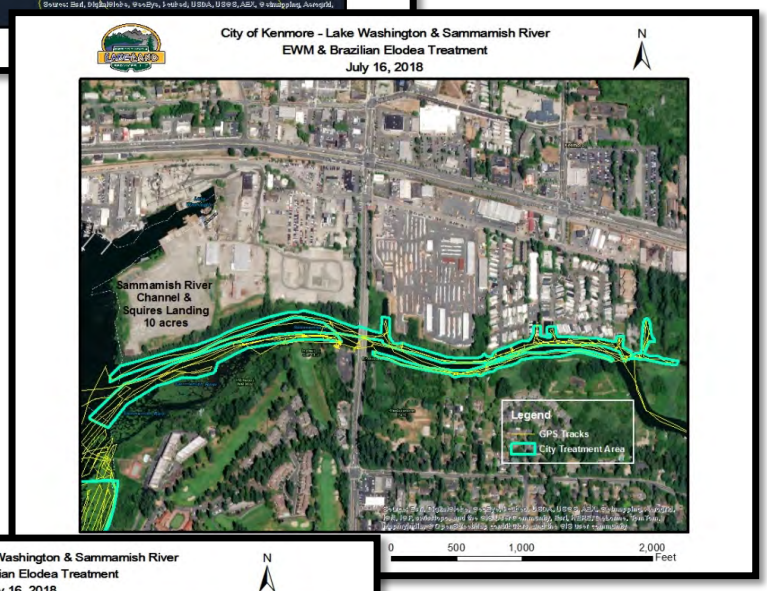

City of Kenmore - Lake Washington & Sammamish River
EWM & Fragrant Water Lily Treatment
June 4, 2018
N
13.3 acres
7 acres
7.7 acres
Legend
GPS Tracks
Treatment Areas
Lakeland Restoration Services Map Disclaimer
No warranty is made by Lakeland Restoration Services as to the accuracy, reliability, or completeness of these data for individual or aggregate use with other data. Original data was compiled from various sources.
28 acres total
0 300 600 1,200
Feet

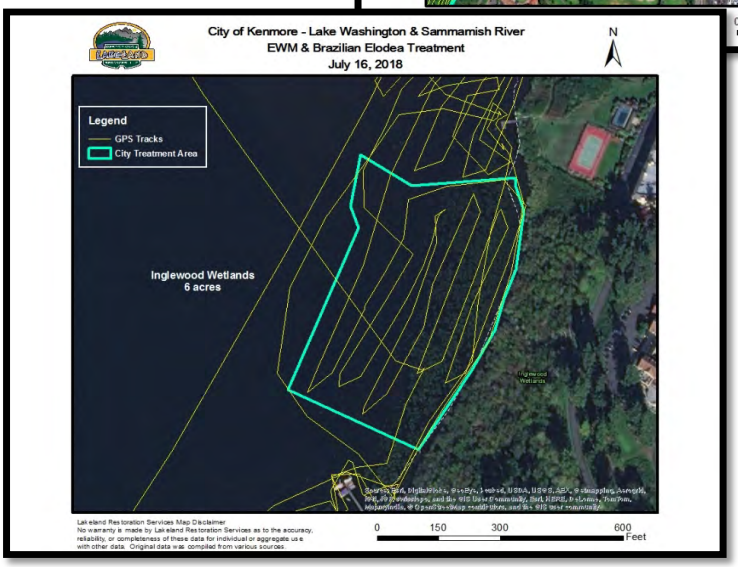
Inglewood Shores HOA
Lake Washington
June 4, 2018
Legend
GPS Tracks
Treatment Area
2.8 acres
Lakeland Restoration Services Map Disclaimer
No warranty is made by Lakeland Restoration Services as to the accuracy, reliability, or completeness of these data for individual or aggregate use with other data. Original data was compiled from various sources.
0 50 100 200
Feet

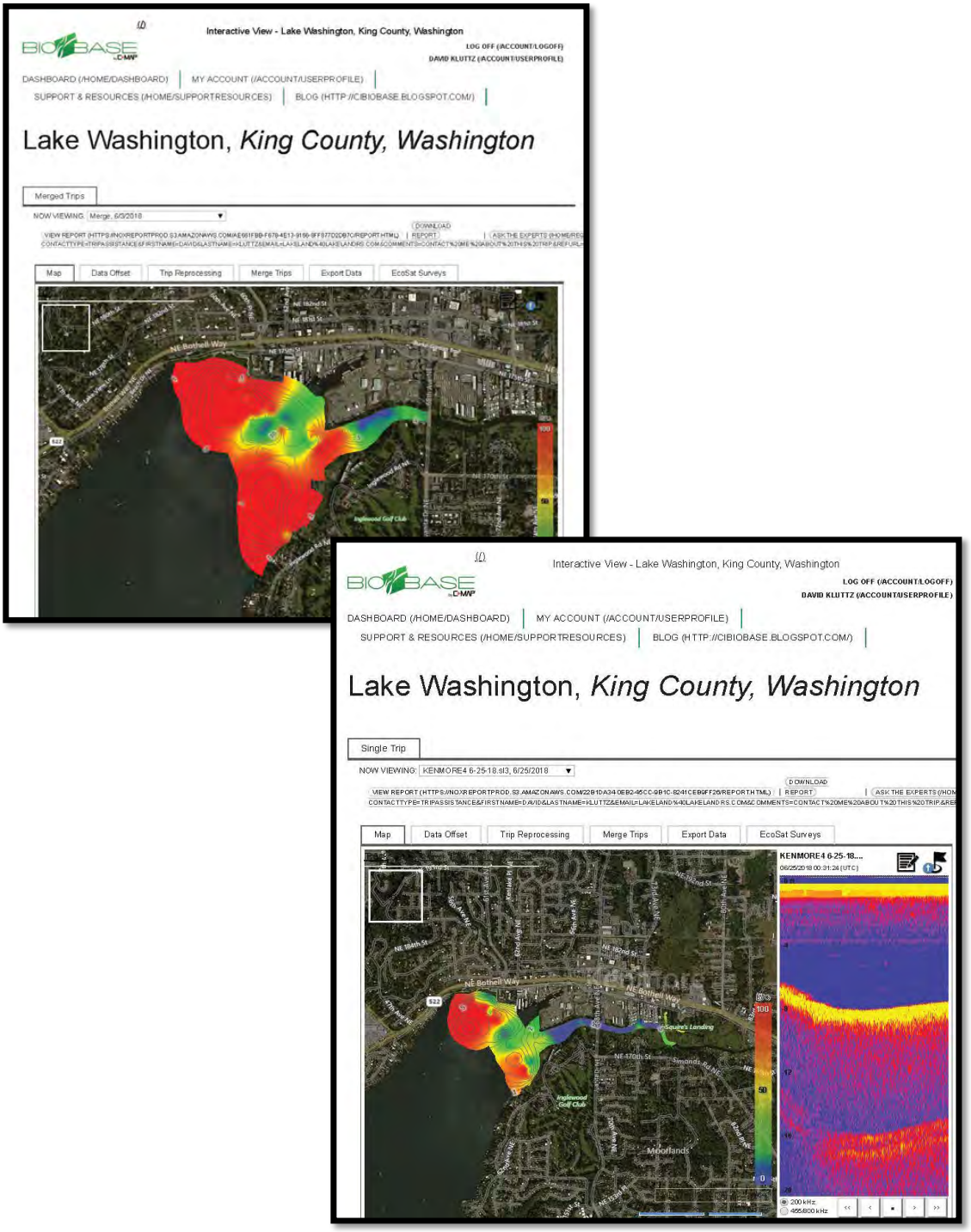

City of Kenmore - Lake Washington & Sammamish River
EWM & Brazilian Elodea Treatment
July 16, 2018
N
Kenmore
Legend
GPS Tracks
City Treatment Areas - 30 acres
Homeowner Treatment Areas - 5 acres
Moorlands
Lakeland Restoration Services Map Disclaimer
No warranty is made by Lakeland Restoration Services as to the accuracy, reliability, or completeness of these data for individual or aggregate use with other data. Original data was compiled from various sources.
0 1,000 2,000 4,000
Feet


City of Kenmore - Lake Washington & Sammamish River
EWM & Brazilian Elodea Treatment
July 16, 2018
N
30 acres
Legend
GPS Tracks
City Treatment Areas - 30 acres
Lakeland Restoration Services Map Disclaimer
No warranty is made by Lakeland Restoration Services as to the accuracy, reliability, or completeness of these data for individual or aggregate use with other data. Original data was compiled from various sources.
0 650 1,300 2,600
Feet


City of Kenmore - Lake Washington & Sammamish River
EWM & Brazilian Elodea Treatment
July 16, 2018
N
Log Boom Park
14 acres
Legend
GPS Tracks
City Treatment Area
Lakeland Restoration Services Map Disclaimer
No warranty is made by Lakeland Restoration Services as to the accuracy, reliability, or completeness of these data for individual or aggregate use with other data. Original data was compiled from various sources.


City of Kenmore - Lake Washington & Sammamish River
EWM & Brazilian Elodea Treatment
July 16, 2018
N
Sammamish River
Channel &
Squires Landing
10 acres
Legend
GPS Tracks
City Treatment Area
0
500
1,000
2,000
Feet


City of Kenmore - Lake Washington & Sammamish River
EWM & Brazilian Elodea Treatment
July 16, 2018
N
Legend
GPS Tracks
City Treatment Area
Inglewood Wetlands
6 acres
Lakeland Restoration Services Map Disclaimer
No warranty is made by Lakeland Restoration Services as to the accuracy, reliability, or completeness of these data for individual or aggregate use with other data. Original data was compiled from various sources.
0
150
300
600
Feet


Interactive View - Lake Washington, King County, Washington
LOG OFF (/ACCOUNT/LOGOFF)
DAVID KLUTTZ (/ACCOUNT/USERPROFILE)
DASHBOARD (/HOME/DASHBOARD)
MY ACCOUNT (/ACCOUNT/USERPROFILE)
SUPPORT & RESOURCES (/HOME/SUPPORTRESOURCES)
BLOG (HTTP://CIBIOBASE.BLOGSPOT.COM/)
Lake Washington, King County, Washington
Merged Trips
Map
Data Offset
Trip Reprocessing
Merge Trips
Export Data
EcoSat Surveys
Interactive View - Lake Washington, King County, Washington
LOG OFF (/ACCOUNT/LOGOFF)
DAVID KLUTTZ (/ACCOUNT/USERPROFILE)
DASHBOARD (/HOME/DASHBOARD)
MY ACCOUNT (/ACCOUNT/USERPROFILE)
SUPPORT & RESOURCES (/HOME/SUPPORTRESOURCES)
BLOG (HTTP://CIBIOBASE.BLOGSPOT.COM/)
Lake Washington, King County, Washington
Single Trip
Map
Data Offset
Trip Reprocessing
Merge Trips
Export Data
EcoSat Surveys
KENMORE4 6-25-18...

Appendix B

Business and Residential Notifications

Like us on Facebook
www.facebook.com/lakelandrs

Lakeland Restoration Services, LLC
78 E River Spur Rd, Priest River, ID 83856
Phone: (877) 273-6674
www.lakelandrs.com

May 21, 2018

To: Property Owners/Residents/Business Owners

The City of Kenmore has contracted Lakeland Restoration Services to treat the north-shore of Lake Washington in Kenmore and certain parts of the Sammamish River with herbicides to control Eurasian watermilfoil, Brazilian Elodea and other aquatic nuisance plants. Treatment will occur on June 4th and 5th, 2018. Certain areas are being treated for the City of Kenmore. These areas include: Log Boom Park, Rhododendron Park, Squires Landing Park, Inglewood Wetlands, and the Sammamish River Channel. Lakeland is also offering aquatic plant treatment to homeowners who are in the permitted area. A sign up form will be enclosed with this application if you are in the permitted area. If you would like to sign up for treatment, please fill it out and mail it back to us with payment before May 28th. The permitting process and notification system of the State of Washington is being followed with the enclosed notification.

In order to help prevent fragmentation, please DO NOT cut, rake or hand-pull plants prior to treatment.

Products planned for aquatic use: Diquat, Hydrothol® 191, and Triclopyr

The following precautions are to be followed, especially for those that may be sensitive to herbicides: (if water restrictions apply to you, your dock/shoreline will be posted with a sign listing restrictions no more than 48 hours prior to treatment)

Swimming Restrictions: It has been advised that no swimming occur within the treated areas during or for 24 hours following treatment.

Drinking Water Restrictions: Do not use water from treatment area until Triclopyr is non detectable.

Irrigation Restrictions Turf and Landscape Ornamentals: Do not use water from treatment area for 3 days.

Irrigation Restrictions Food Crops and Production Ornamentals: Do not use water from treatment area until Triclopyr is non detectable.

Stock Water Restrictions: Do not use water from treatment area for 1 day.

There is NO restriction for fishing or other recreational activities.

Details of treatment time and the end of use restrictions will be announced at (877) 273-6674 or www.lakelandrs.com. To access information from the website on this project, go to the bulletin board, click projects, then click City of Kenmore. This application will involve the use of airboats. Please remove items from docks such as lawn chairs, flower pots, personal/recreational flotation devices, etc.

Herbicide Treatment
Business and Residential Notice

In Treatment Area ☐ In ¼ Mile Notification Area ☒

Distribution Date: May 21, 2018

Specific sites on Lake Washington and the Sammamish River will be treated with aquatic herbicides on **June 4th and 5th, 2018.**

Products planned for aquatic use: Diquat, Hydrothol, and Triclopyr

Active ingredient(s): (Diquat dibromide [6,7-dihydrodipyrido (1,2-a:2'1'-c) pyrazinediium dibromide]), (Hydrothol [Mono(N,N-dimethylalkylamine) salt of endothall]), (Triclopyr[3,5,6-trichloro-2-pyridinyloxyacetic acid, triethylamine salt])

Plants/Algae targeted: Eurasian watermilfoil, Brazilian Elodea and other aquatic nuisance plants to improve water quality in Lake Washington and the Sammamish River

Location of Treatments: Log Boom Park, Rhododendron Park, Squires Landing Park, Inglewood Wetlands, and the Sammamish River Channel

The applicator will post signs in the treated and potentially affected areas no more than 48 hours prior to treatment. The signs will describe any water use restrictions or advisories.

If you are withdrawing water for potable or domestic water use, livestock watering, or irrigation, and have no alternate water source, please contact Lakeland Restoration Services at **877-273-6674** or **lakeland@lakelandrs.com** to arrange an alternate water supply.

If you want additional notification prior to treatment, or have further questions, please contact me using the information above.

This herbicide treatment is regulated under a permit issued by the Washington State Department of Ecology; Permit No. WAG994293.

Scan with QR reader to go to permit web page

Like us on Facebook
www.facebook.com/lakelandrs

Lakeland Restoration Services, LLC
78 E River Spur, Priest River, ID 83856
Phone: (877) 273-6674
www.lakelandrs.com

July 3, 2018

To: Property Owners/Residents/Business Owners

The City of Kenmore has contracted Lakeland Restoration Services to treat the north-shore of Lake Washington in Kenmore and certain parts of the Sammamish River with herbicides to control Eurasian watermilfoil, Brazilian Elodea and other aquatic nuisance plants. Treatment will occur on July 16th, 2018. Certain areas are being treated for the City of Kenmore. Additionally, Lakeland is offering aquatic plant control to residents in the permitted area. The permitting process and notification system of the State of Washington is being followed with the enclosed notification.

In order to help prevent fragmentation, please DO NOT cut, rake or hand-pull plants prior to treatment.

Products planned for aquatic use: Diquat, Hydrothol® 191, Aquathol and Glyphosate

The following precautions are to be followed, especially for those that may be sensitive to herbicides: (if water restrictions apply to you, your dock/shoreline will be posted with a sign listing restrictions no more than 48 hours prior to treatment)

Swimming Restrictions: It has been advised that no swimming occur within the treated areas during or for 24 hours following treatment.

Drinking Water Restrictions: Do not use water from treatment area until an approved assay result is below 0.1ppm of Hydrothol and Aquathol.

Irrigation Restrictions Turf and Landscape Ornamentals: Do not use water from treatment area for 3 days.

Irrigation Restrictions Food Crops and Production Ornamentals: Do not use water from treatment area for 5 days.

Stock Water Restrictions: Do not use water from treatment area for 1 day.

There is NO restriction for fishing or other recreational activities.

Details of treatment time and the end of use restrictions will be announced at (877) 273-6674 or www.lakelandrs.com. To access information from the website on this project, go to the home page, hover over projects, 2018, then click City of Kenmore. This application will involve the use of airboats. Please remove items from docks such as lawn chairs, flower pots, personal/recreational flotation devices, etc.

Sincerely,

Dave Kluttz, Managing Member

Herbicide Treatment
Business and Residential Notice

In Treatment Area ☐ In ¼ Mile Notification Area ☒

Distribution Date: July 3, 2018

Specific sites on Lake Washington and the Sammamish River will be treated with aquatic herbicides on **July 16th, 2018.**

Products planned for aquatic use: Diquat, Hydrothol® 191, Aquathol and Glyphosate

Active ingredients: (Diquat dibromide [6,7-dihydrodipyrido (1,2-a:2'1'-c) pyrazinediium dibromide]), (Hydrothol [Mono(N,N-dimethylalkylamine) salt of endothall]), (Aquathol [Dipotassium salt of endothall]), (Glyphosate, N-(phosphonomothyl)glycine, in the form of its isopropylamine salt)

Plants/Algae targeted: Eurasian watermilfoil, Brazilian Elodea and other aquatic nuisance plants to improve water quality in Lake Washington and the Sammamish River

Location of Treatments: Specific sites on the north part of Lake Washington and the Sammamish River in Kenmore, WA

The applicator will post signs in the treated and potentially affected areas no more than 48 hours prior to treatment. The signs will describe any water use restrictions or advisories.

If you are withdrawing water for potable or domestic water use, livestock watering, or irrigation, and have no alternate water source, please contact Lakeland Restoration Services at **877-273-6674** or **lakeland@lakelandrs.com** to arrange an alternate water supply.

If you want additional notification prior to treatment, or have further questions, please contact me using the information above.

This herbicide treatment is regulated under a permit issued by the Washington State Department of Ecology; Permit No. WAG994293.

Scan with QR reader to go to permit web page

Appendix C

Shoreline Posting Notifications

CAUTION

Herbicide application to water will occur on June 4-5, 2018.

Triclopyr will be applied under permit to these waters to control ☒ aquatic or ☐ shoreline vegetation.

Ecology recommends no swimming in the sign-posted area for 24 hours following treatment due to possible eye irritation.

Drinking Water Restrictions: Do not use water from treatment area until the level of Triclopyr is determined to be less than or equal to 0.4 ppm.

Irrigation Restrictions Turf: No restrictions

Irrigation Restrictions Food Crops, Landscape Ornamentals and Production Ornamentals: Do not use water from treatment area until Triclopyr is non-detectable.

Stock Water Restrictions: No restrictions

Fishing Restrictions: No restrictions

For more information contact the applicator: Lakeland Restoration Services
Phone number: (877) 273-6674
Or the Department of Ecology at (360) 407-6600

THIS SIGN MUST REMAIN IN PLACE UNTIL 2 DAYS AFTER APPLICATION.

Scan with QR reader to go to permit web page

CAUTION

Herbicide application to water will occur on July 16 or 17, 2018.

Diquat, Aquathol, Hydrothol and Glyphosate will be applied under permit to these waters to control ☒ aquatic or ☐ shoreline vegetation.

Swimming Restrictions: It has been advised that no swimming occur within the treated area(s) during or for 24 hours following treatment.

Drinking Water Restrictions: Do not use water from treatment area until an approved assay result is below 0.1ppm of Hydrothol and Aquathol.

Irrigation Restrictions Turf and Landscape Ornamentals: Do not use water from treatment area for 3 days.

Irrigation Restrictions Food Crops and Production Ornamentals: Do not use water from treatment area for 5 days.

Livestock/Domestic Animal Consumption Restrictions: Do not use water from treatment area for 1 day.

There is NO restriction for fishing or other recreational activities.

For more information contact the applicator: Lakeland Restoration Services
Phone number: (877) 273-6674
This application is regulated by Department of Ecology: Phone (360) 407-6600

THIS SIGN MUST REMAIN IN PLACE UNTIL 2 DAYS AFTER APPLICATION.

This herbicide treatment is regulated under a permit issued by the Washington State Department of Ecology; Permit No WAG994293.

Appendix D

Pre/Post Treatment Notifications to Ecology

APPENDIX B – ECOLOGY NOTIFICATION TEMPLATE
See Special Condition S5.A for instructions on providing notification to Ecology.

Email Form

Email to: apampreposttreat@ecy.wa.gov

From: **Permittee or Applicator**: (name) Lakeland Restoration Services, LLC
Cell Phone No: (contact number for the applicator) 208-597-6601

Pre-Treatment Notification

Week of Treatment: June 4, 2018

Water body name & permit no.	County	Location where treatment will begin	Chemicals/products proposed for use	Targeted plants & algae	Proposed date & treatment start time
WAG994293	King	tbd	Triclopyr	ewm	8 am
				egeria densa	06/04/2018
				nuisance aquatic plants	

Additional Information: _____

Aquatic Plant and Algae Management General Permit
Page 53

Post-Treatment Notification

Week of Treatment: June 4, 2018

Water body name & permit no. WAG994293	County King	Chemicals or products used	Targeted plants/ algae	Acres treated	Amount of active ingredient applied (lbs.)	Treatment date
Lake Washington		Triclopyr	Eurasian	30.8 acres	180 gals	6/4/18
			Watermilfoil			
			Fragrant			
			Waterlily			

Additional Information: _____
Knowingly submitting false information will result in permit termination.

Permittee may add additional rows if needed

Aquatic Plant and Algae Management General Permit
Page 54

APPENDIX B – ECOLOGY NOTIFICATION TEMPLATE
See Special Condition S5.A for instructions on providing notification to Ecology.

Email Form

Email to: apamprepostreat@ecy.wa.gov

From: **Permittee or Applicator:** (name) Lakeland Restoration Services, LLC
Cell Phone No: (contact number for the applicator) 208-597-6601

Pre-Treatment Notification

Week of Treatment: 07/16/2018

Water body name & permit no.	County	Location where treatment will begin	Chemicals/products proposed for use	Targeted plants & algae	Proposed date & treatment start time
WAG994293	King	tbd	diquat	Eurasian watermilfoil	8 am
Lake Washington			hydrothol		07/16/2018
Sammamish River			aquathol	Brazilian Elodea	
			glyphosate	aquatic nuisance	
				plants	

Additional Information: _____

Aquatic Plant and Algae Management General Permit
Page 53

Post-Treatment Notification

Week of Treatment: **July 16, 2018**

Water body name & permit no. **WAG994293**	County **King**	Chemicals or products used	Targeted plants/ algae	Acres treated	Amount of active ingredient applied (lbs.)	Treatment date
Lake		**Diquat**	**Eurasian**	**35 acres**	**35 gals**	**7/16/18**
Washington		**Hydrothol**	**Watermilfoil**		**35 gals**	
		Aquathol	**Brazilian Elodea**		**35 gals**	
Sammamish						
River Channel						

Additional Information: _____
Knowingly submitting false information will result in permit termination.

Permittee may add additional rows if needed

Aquatic Plant and Algae Management General Permit
Page 54

Appendix E

Safety Plans

Lakeland Restoration Services, LLC
78 E River Spur Rd, Priest River, ID 83856
Phone: 877-273-6674
www.lakelandrs.com

CITY OF KENMORE, LAKE WASHINGTON/SAMMAMISH RIVER EURASIAN WATERMILFOIL, EGERIA & AQUATIC NUISANCE PLANT TREATMENT SITE SPECIFIC SAFETY PLAN JUNE 4 -5, 2018

Table of Contents

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Job Hazard Analysis 4 Pages
Triclopyr 3 MSDS 5 Pages

Chapter 3
Emergency Response Plan 3 Pages

Chapter 4
Training Program 1 Page

Chapter 5
Spill Containment Program 3 Pages

Chapter 6
Personal Protection Equipment 2 Pages

1.0 ORGANIZATIONAL STRUCTURE

(in compliance with 29 CFR 1910.120(b)(2))

This chapter of the Health and Safety Plan describes lines of authority, responsibility, and communication as they pertain to health and safety functions at this site. The purpose of this chapter is to identify the personnel who impact the development and implementation of the site health and safety plan and to describe their roles and responsibilities. This chapter also identifies other contractors and subcontractors involved in work operations, and establishes the lines of communication among them for safety and health matters.

The organizational structure of this site's safety and health program is consistent with OSHA requirements in 29 CFR 1910.120(b)(2) and provides the following site-specific information:

the general supervisor who has the responsibility and authority to direct all hazardous waste operations
the site safety and health officer who has the responsibility and authority to develop and implement this HASP and verify compliance

other personnel needed for hazardous waste operations and emergency response and their general functions and responsibilities

the lines of authority, responsibility, and communication for safety and health functions

This section is reviewed and updated as necessary to reflect the current organizational structure at this site.

1.1 Roles and Responsibilities

All personnel and visitors on this site must comply with the requirements of this HASP. The specific responsibilities and authority of management, safety and health, and other personnel on this site are detailed in the following paragraphs. A site organizational chart illustrating the hierarchy of personnel and lines of communication within this company and with additional contractors on site is found in Figure 1-1.

Project Manager (PM)

The Project Manager (PM) for this site is Dave Kluttz. The PM has responsibility and authority to direct all work operations. The PM coordinates safety and health functions with the Site Safety and Health Officer (SSHO), has the authority to oversee and monitor the performance of the SSHO, and bears ultimate responsibility for the proper implementation of this HASP. The specific duties of the PM are:

Preparing and coordinating the site work plan; providing site supervisor(s) with work assignments and overseeing their performance; coordinating safety and health efforts with the SSHO; ensuring effective emergency response through coordination with the Emergency Response Coordinator (ERC); serving as primary site liaison with public agencies and officials and site contractors.

The qualified alternate Project Manager (PM) for this site is Jim Pogue.

Site Safety and Health Officer (SSHO)

The Site Safety and Health Officer (SSHO) for this site is Dave Kluttz. The SSHO has full responsibility and authority to develop and implement this HASP and to verify compliance. The SSHO reports to the Project Manager. The SSHO is on site or readily accessible to the site during all work operations and has the authority to halt site work if unsafe conditions are detected. The specific responsibilities of the SSHO are:

Managing the safety and health functions on this site; serving as the site's point of contact for safety and health matters; ensuring site monitoring, worker training, and effective selection and use of PPE; assessing site conditions for unsafe acts and conditions and providing corrective action; assisting the preparation and review of this HASP; maintaining effective safety and health records as described in this HASP; coordinating with the Emergency Response Coordinator (ERC), Site Supervisor(s), and others as necessary for safety and health efforts.

The qualified alternate Site Safety and Health Officer (SSHO) for this site is Jim Pogue.

Emergency Response Coordinator (ERC)

The Emergency Response Coordinator (ERC) for this site is Dave Kluttz. The ERC is responsible for assessing site conditions and directing and controlling emergency response activities in accordance with the Site Emergency Response Plan. The ERC reports to the Project Manager (PM). The ERC will ensure the evacuation, emergency transport, and treatment of site personnel and will notify the appropriate emergency response units and management staff in accordance with the emergency response plan of this HASP. Specific duties of the ERC include:

Developing and reviewing the emergency response plan; conducting emergency response rehearsals; ensuring effective emergency response to and evacuation of the site; coordinating emergency response functions with the Site Safety and Health Officer (SSHO), and integrating site emergency response plans with the disaster, fire, and/or emergency response plans of local, state, and federal organizations and agencies.

The qualified alternate Emergency Response Coordinator (ERC) for this site is Jim Pogue.

The qualified second alternate Emergency Response Coordinator (ERC) for this site is Roy Moore.

Site Workers

Site workers are responsible for complying with this HASP, using the proper PPE, reporting unsafe acts and conditions, and following the work and safety and health instructions of the Project Manager (PM), Site Safety and Health Officer (SSHO), and Site Supervisor.

1.2 Identification of Other Site Contractors

There are no other contractors or subcontractors on this site.

2.0 JOB HAZARD ANALYSIS

(in compliance with 29 CFR 1910.120(b)(4)(ii)(A),and 1910.120(i))

This chapter of the HASP describes the safety and health hazards associated with site work and the control measures selected to protect workers. The purpose of a job hazard analysis (JHA) is to identify and quantify the health and safety hazards associated with each site task and operation, and to evaluate the risks to workers. Using this information, appropriate control methods are selected to eliminate the identified risks if possible, or to effectively control them. The control methods are documented in each task-specific JHA. The information contained in this chapter is essential to effective preparation of all other chapters of the HASP. This section of the HASP includes:

job hazard analysis
hazardous substance information
employee notification of hazards

The person responsible for ongoing job hazard analysis at this site Dave KLuttz.

2.1 Job Hazard Analysis

Each site-specific JHA appears on a separate copy of Table 2-1. Each JHA lists a task or operation required during site operations and the location(s) where that task or operation is performed. A single JHA may be used for a task/operation performed in multiple locations if the hazards, potential exposures, and controls are the same in each location.

Each JHA lists the chemical hazards associated with that task and their known or anticipated concentrations during performance of the task. Each JHA also identifies anticipated physical and biological hazards and potential exposure levels or the likelihood of exposure. The final section of each JHA lists the control measures implemented toprotect employees from exposure to the identified hazards. The information provided here is designed to satisfy the job hazard analysis requirements of 1910.120(b)(4)(ii)(A) and the workplace hazard assessment requirements of 1910.132(d). Health hazard information for all chemical substance identified in site JHAs appears in hazard data sheets attached to this chapter.

Dave Kluttz modifies site-specific JHAs and the accompanying data sheets when:

the scope of work is changed by adding, eliminating, or modifying tasks
new methods of performing site tasks are selected
observation of the performance of site tasks results in a revised characterization of the hazards
new chemical, biological, or physical hazards are identified
exposure data indicate changes in the concentration and/or likelihood of exposure
new/different control measures are selected

When JHAs are modified, related provisions in other chapters of this HASP are modified as needed.

Table 2-1: Site-Specific Job Hazard Analysis

Operational Phase	Phase No	Task/Operation	Location Where Task/Operation Performed
JH 01	1	On shore loading and handling	Lake Washington & Sammamish

Conducted	Print Name	Signature
June 2, 2018	Dave Kluttz	

Chemical Hazards

Chemical Name	Source	Concentration	Exposure Potential During Operations
Triclopyr	Containers	100	Unlikely

Physical Hazards

Name of Physical Hazard	Source	Exposure Potential During Operations
Falling Down Bank	Steep Banks	Unlikely

Biological Hazards

Name of Biological Hazard	Source	Exposure Potential During Operations
No Biological Hazards		

Control Measures Used

Engineering Controls: Locate pump, tank and hoses to reduce tripping hazards.
Work Practices: Exercise care when loading and handling, exercise care when moving and transporting equipment and use proper Personal Protection Equipment to reduce exposure hazard. Follow Aquatic Herbicide Label instructions.

Level of PPE: Long Sleeve Shirt or Coveralls
Shoes with socks Eye Protection Gloves

PPE Upgrade: No PPE

Downgrade: No

Table 2-1: Site-Specific Job Hazard Analysis

Operational Phase	Phase No	Task/Operation	Location Where Task/Operation Performed
JH 02	1	On boat application to targeted vegetation	Lake Washington Sammamish

Conducted	Print Name	Signature
06/02/2018	Dave KLuttz	

Chemical Hazards

Chemical Name	Source	Concentration	Exposure Potential During Operations
Triclopyr	Containers, Hoses, and Pumps	100	Unlikely

Physical Hazards

Name of Physical Hazard	Source	Exposure Potential During Operations
Tripping over hoses	Hoses	Unlikely
Falling Overboard	Water	Unlikely

Biological Hazards

Name of Biological Hazard	Source	Exposure Potential During Operations
No Biological Hazards		

Control Measures Used

Engineering Controls: Locate pump, tank and hoses to reduce tripping hazards.
Work Practices: Exercise care when loading and handling, exercise care when moving and transporting equipment and use proper Personal Protection Equipment to reduce exposure hazard. Follow Aquatic Herbicide Label instructions.

Level of PPE: Eye Protection
Long Sleeve Shirt or Coveralls Shoes with socks
Gloves

PPE Upgrade: No PPE

Downgrade: No

2.3 Employee Notification of Hazards and Overall Site Information Program

The information in the JHAs and the attached data sheets is made available to all employees who could be affected by it prior to the time they begin their work activities. Modifications to JHAs and the accompanying data sheets are communicated during routine briefings.

The person responsible for providing site information, this HASP, and any modifications to the HASP to other contractors and subcontractors working on this site is: Dave Kluttz.

3.0 EMERGENCY RESPONSE PLAN

(in compliance with 29 CFR 1910.120(l) and 1910.120(b)(4)(ii)(H)

This is the site-specific emergency response plan. This chapter of the Health and Safety Plan describes potential emergencies at this site, procedures for responding to those emergencies, roles and responsibilities during emergency response, and training that workers must receive in order to follow emergency procedures.

This emergency response plan is consistent with the requirements of 29 CFR 1910.120(l) and provides the following site-specific information:

pre-emergency planning
personnel roles, lines of authority, and communication
emergency recognition and prevention
emergency medical treatment and first aid
PPE and emergency equipment

3.1 Pre-emergency Planning

This site has been evaluated for potential emergency occurrences, based on site hazards, the tasks within the work plan.

Table 3-1 Potential Site Emergencies

Type of Emergency	Source of Emergency	Location of Source
Chemical Spill	Containers	All Loading and Handling Areas
Physical Injury	Lifting, Falling, Tripping, Drowning	All Loading, Handling and Application Sites

3.2 On-Site Emergency Response Equipment

Emergency procedures may require specialized equipment to facilitate worker rescue, contamination control and reduction, or post-emergency clean-up. Emergency response equipment stocked on this site is listed in Table 11-2. The equipment inventory and storage locations are based on the potential emergencies described in Table 11-1.
This equipment inventory is designed to meet on-site emergency response needs and any specialized equipment needs that off-site responders might require because of the hazards at this site but not ordinarily stocked.

Any additional PPE required and stocked for emergency response is also listed in Table 3-2 below. During an emergency, the Emergency Response Coordinator is responsible for specifying the level of PPE required for emergency response.

Emergency response equipment is inspected at regular intervals and maintained in good working order. The equipment inventory is replenished as necessary to maintain response capabilities.

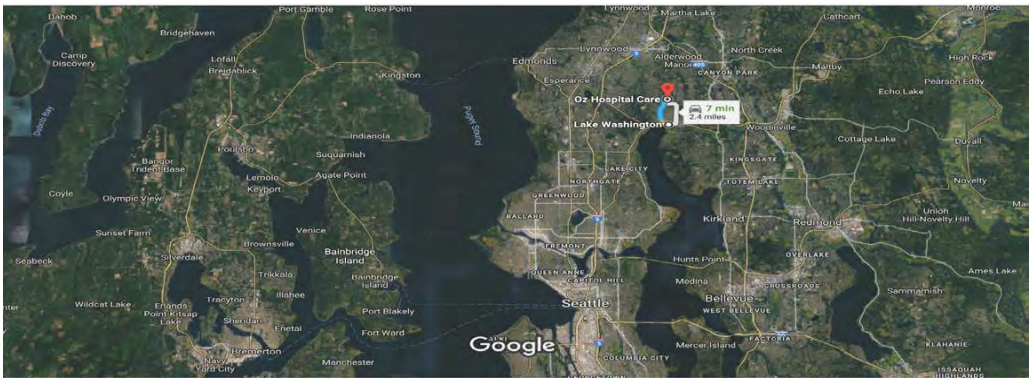
Table 3-2 Emergency Equipment and Emergency PPE

Emergency	Specific Type	Quantity Stocked	Location Stored
Fire extinguisher		5	Boats and Trucks
First Aid and Eye Wash Kits		2	Boats
Spill Kits		2	Loading Area
Emergency PPE	**Specific Type**	**Quantity Stocked**	**Location Stored**
Rubber gloves		24	Boats and Trucks
Eye protection		12	Boats and Trucks

Figure 3-3a provides a map to the nearest emergency medical assistance.

Figure 3-3 Map to Nearest Emergency Medical Assistance

Oz Hospital Care 425-286-6494
24230 18th PL W, Bothell, WA 98021



Lake Washington
Washington

1. Head west on NE 175th St toward 61st Ave NE — 0.2 mi
2. Turn right onto 61st Ave NE — 1.4 mi
3. Continue onto Locust Way — 0.2 mi
4. Turn right onto 18th Pl W — 469 ft
   Destination will be on the right

Oz Hospital Care
24230 18th Pl W, Bothell, WA 98021

3.3 Roles and Responsibilities for On-Site and Off-Site Personnel

Dave KLuttz is responsible for implementing the emergency response plan and coordinates emergency response activities on this site. He/she provides specific direction for emergency action based upon information available regarding the incident and response capabilities and initiates emergency procedures, including protection of the public and notification of appropriate authorities.

In the event of an emergency, site personnel are evacuated and do not participate in emergency response activities, except as indicated below.

Limited On-Site Emergency Response Activities

For spills

Turn off all pumps Close all valves
Surround spill with containment dike Use Absorbent mats to clean up spill Place in plastic containment bags

For Injuries

Assess extent of injury Administer First Aid if appropriate
Contact Emergency Medical Personnel
Transport to **Oz Hospital Care 24230 18th PL W, Bothell, WA 98021**

Emergency Medical Treatment and First Aid

Personnel who require medical care and/or who are transferred to a medical facility are accompanied by MSDSs and other applicable hazard data to apprise caregivers of the chemicals and hazards to which the victim has been potentially exposed. The emergency medical care facility for this site is **24230 18th PL W, Bothell, WA 98021**. The route to the facility is shown in Figure 3-3 a & b.

Table 3.6 Emergency Contact Information

The list of telephone numbers below are the emergency contact numbers for this site. These emergency numbers are verified to be accurate, working numbers. Site personnel are trained and rehearsed in site-specific emergency calling procedures. A copy of this contact information is posted at the following locations:

Trucks and Boats

SITE PERSONNEL

Title	Contact	Telephone
Project Manager (PM)	Dave Kluttz	208-597-6601
Site Safety and Health Officer (SSHO)	Dave Kluttz	20-8597-6601
Emergency Response Coordinator (ERC)	Dave Kluttz	208-597-6601
Emergency Response Coordinator 1st Alternate	Jim Pogue	208-290-4953
Emergency Response Coordinator 2nd Alternate	Roy Moore	509-671-7596

Agency	Contact	Address/Location	Telephone
Ambulance/EMS			911
Police			911
Fire			911
Primary Medical Facility	**Oz Hospital Care 24230 18th PL W, Bothell, WA**	**98021**	**425-286-6494**
State Police			911
Local Emergency Response			911
Emergency Medical Assistance			911
Poison Control Center			800-424-9300

4.0 TRAINING PROGRAM

(in compliance with 29 CFR 1910.120(e))

This training program is consistent with the requirements of 29 CFR 1910.120(e) and addresses the following site- specific information:

training for site workers
site briefings for visitors and workers
management and supervisor training

a Training Elements to be Covered for Site Workers:

names of personnel and alternates responsible for site safety and health
safety, health and other hazards present on the site
use of PPE
work practices by which the employee can minimize risks from hazards
safe use of engineering controls and equipment on the site
the emergency response plan detailed in Chapter 3 of this HASP
the spill containment program detailed in Chapter 5 of this HASP

4.1b Site-Specific Briefings for Visitors

A site-specific briefing is provided to all site visitors who enter this site. For visitors, the site-specific briefing provides information about site hazards, the site lay-out including work zones and places of refuge, the emergency alarm system and emergency evacuation procedures, and other pertinent safety and health requirements as appropriate.

c HASP Information and Site-Specific Briefings for Workers

Site personnel review this HASP and are provided a site-specific briefing prior to the commencement of work to ensure that employees are familiar with this HASP and the information and requirements it contains. Additional briefings are provided as necessary to notify employees of any changes to this HASP as a result of information gathered during ongoing site characterization and analysis. Conditions for which we schedule additional briefings include, but are not limited to: changes in site conditions, changes in the work schedule/plan, newly discovered hazards, and incidents occurring during site work.

Initial Training

Initial training requirements are based on a worker's potential for exposure.

Management and Supervisor Training

On-site managers and supervisors who are directly responsible for or who supervise workers engaged in hazardous operations are licensed herbicide applicators in the State of Washington. Mixer/Loaders who work with the applicators are trained and supervised by licensed applicators.

5.0 SPILL CONTAINMENT PROGRAM

(in compliance with 29 CFR 1910.120(b)(4)(ii)(J) and (j)(1)(viii))

This chapter of the Health and Safety Plan describes the potential for hazardous substance spills at this site and procedures for controlling and containing such spills. The purpose of this chapter of the Plan is to ensure that spill containment planning is conducted and appropriate control measures are established.

The spill containment program is consistent with OSHA requirements in 29 CFR 1910.120(b)(4)(ii)(J) and (j)(1)(viii) and addresses the following site-specific information:

potential hazardous substance spills and available controls
initial notification and response
spill evaluation and response
post-spill evaluation

Potential Spills and Available Controls

Table 5-1 below lists the location and type of potential hazardous substance spills at this site. This table also describes the activities or situations in which an accidental spill could occur and the type of release--either an incidental or an emergency release -- likely to result.

Wherever spills, leaks, or ruptures can occur, this site keeps suitable spill kits available. Their location is noted in Table 5-1. In addition, all areas subject to potential spills are diked or a means to adequately dike these areas in the event of a spill is available so that the entire volume of the hazardous substance being spilled can be contained and isolated. The type and location of spill containment equipment is also listed in Table 5-1.

Table 5-1 Potential Spills and Controls

Hazardous Substance	Location	Source of spill	Potential maximum qty of spill	Classification of spill	Available Spill Containment Equipment	Equipment Location
Herbicide	Lake shoreline loading herbicide into boats	Equipment failure	Unknown	Emergency	Spill Kit	Trucks & Boats
Herbicide	Lake shoreline loading herbicide into boats	Hose/line rupture	Unknown	Emergency	Spill Kit	Trucks & Boats
Herbicide	Spill in boat	Containers, Hoses, Hoppers, Tanks	Unknown	Emergency	Dispose of spillage in treatment zone not to exceed Aquatic Herbicide Label Concentrations	

5.2 Initial Spill Notification and Response

Any worker who discovers a hazardous substance spill will immediately notify Dave Kluttz, Project Manager. The worker will, to his/her best ability, report the hazardous substance involved, the location of the spill, the estimated quantity of material spilled, the direction/flow of the spill material, related fire/explosion incidents, and any associated injuries. The site Emergency Response Plan, found in Chapter 3 of this HASP, will immediately be implemented if an emergency release has occurred.

5.3 Spill Evaluation and Response

Dave Kluttz, Project Manager is responsible for evaluating spills and determining the appropriate response. When this evaluation is being made, the spill area will be isolated and demarcated.

The procedures of the Emergency Response Chapter of this HASP are implemented when the spill is determined to require emergency precautions and action. If necessary to protect nearby community members, notification of the appropriate authorities is made. Table 5-3 below lists the spill conditions that trigger notification of Federal, state, and local agencies.

Table 5-3 Off-site Notification Requirements

Spill Volume/ Hazardous Substance	Location	Conditions	Required Notification
Herbicide	Lake Shoreline, loading herbicide into boats	TBD By PM	Richard Sawyer 425-398-8900 x 6153

When an incidental release occurs, cleanup personnel receive instructions in a pre-cleanup meeting as to spill conditions, PPE, response activities, decontamination, and waste handling. The following are general measures that response/ cleanup personnel take when responding to a spill:

To minimize the potential for a hazardous spill, hazardous substance and contaminated soils, control/absorbent media, drums and containers, and other contaminated materials are properly stored and labeled.

When a spill occurs, only those persons involved in overseeing or performing spill containment operations will be allowed within the designated hazard areas. If necessary, the area will be roped, ribboned or otherwise blocked off. Unauthorized personnel are kept clear of the spill area.

Appropriate PPE, as specified during the pre-cleanup meeting, is donned before entering the spill area.

Appropriate spill control measures are specified in the pre-cleanup meeting and applied during spill response.

Whenever possible without endangerment of personnel, the spill is stopped at the source or as close to the source as possible.

Ignition points are removed if fire or explosion hazards exist.

Surrounding reactive materials are removed.

Drains or drainage in the spill area will be blocked or surrounded by berms to exclude the spilled waste and any materials applied to it.

Provisions are made to contain and recover a neutralizing solution, if used.

Small spills or leaks from a drum, tank, or pipe will require immediate cleanup to prevent or limit employee exposure. For small spills, sorbent materials such as sand, sawdust, or commercial sorbents from the spill kit are placed directly on the waste to prevent further spreading and aid in recovery.

If any spill is large and/or continuing, an initial isolation area is created. Large spills are diked at the leading edge of the spill. Berms of earthen or sorbent material are constructed downstream of the leading edge of the spill to contain it. Where feasible, pumps are utilized to transfer the liquid to appropriate containers.

Spill area is sprayed with appropriate foam where the possibility of volatile emissions exist.

If the spill results in the formation of a toxic vapor cloud, from vaporization, or reaction with surrounding materials or by the outbreak of fire, further evacuation may be required.

To dispose of spill waste, all contaminated sorbents, liquid waste, or earthen material will be cleaned up and placed in small quantities (50 pounds) in approved drums for proper storage or disposal as hazardous waste.

5.4 Post-Spill Evaluation

A written spill response report is prepared at the conclusion of clean-up operations. The report includes, at a minimum, the following information:

date of spill incident
cause of incident
spill response actions
any outside agencies involved, including their incident reports
lessons learned or suggested improvements

The spill area is inspected to ensure the area has been satisfactorily cleaned. The use of soil, water, and air sampling is utilized in this determination as necessary. The root cause of the spill is examined and corrective steps taken to ensure the engineering and control measures in place have performed as required. If alternative precautions or measures are needed, they are made available and implemented.

6.0 PERSONAL PROTECTIVE EQUIPMENT

(in compliance with 29 CFR 1910.120(b)(4)(ii)(C) and 29 CFR 1910.120(g))

This chapter of the HASP describes how personal protective equipment (PPE) is used to protect against employee exposures to hazardous substances and hazardous conditions on this site.

PPE selection criteria
Site-specific PPE ensembles
Criteria for PPE upgrades and downgrades
Procedures for determining work duration
Training in use of PPE
Respiratory protection
Hearing conservation
PPE maintenance && storage
Evaluation of this program

The person with the overall responsibility for the PPE program is Dave Kluttz.

PPE Selection Criteria

Site safety and health hazards are eliminated or reduced to the greatest extent possible through engineering controls and work practices. Where hazards are still present, a combination of engineering controls, work practices, and PPE are used to protect employees.

An initial level of PPE is assigned to each task to provide an adequate barrier to exposure hazards. Initial PPE ensembles are selected based on the anticipated route(s) of entry of the hazardous substances on site and their concentration. Ensemble materials are selected using permeation data supplied by individual manufacturers.
Materials providing the greatest duration of protection have been chosen. Tear and seam strength of the PPE are also considered to ensure ensemble durability while work is performed. When necessary, multiple layers of protection are used to accommodate the range of hazards that may be encountered. Where possible, employees are provided with a range of component sizes to ensure properly fitted PPE.

The following criteria are used in selecting PPE levels at this site. Use of

Level D Protection

Employees use Level D protection during tasks that have the following characteristics:

The atmosphere contains no known or suspected hazardous substances at concentrations that meet or exceed the published exposure limit.

Contact with hazardous levels of any chemicals through splashes, immersion, or by other means will not occur.

There is no potential for unexpected inhalation or contact with hazardous levels of any chemical.

Use of PPE

Site-specific PPE ensembles and materials are identified below in Table 6-2a. These ensembles are consistent with Appendix B of 29 CFR 1910.120. PPE is used in accordance with manufacturers' recommendations.

Table 6-2a Site-Specific PPE Ensembles

Equipment	Model Purchased	Material	Employee
Level D			
Coveralls/Standard Work Clothes	Coveralls or long sleeve shirts and long pants, hats	Cotton or poly cotton	No
Boots/shoes	Shoes with socks		Yes
Gloves	Chemical Resistant		No
Other: Eye protection	Glasses		No
Other: Ear Muffs	Ear Muffs on boats		No

Criteria for PPE Upgrades and Downgrades

Dave Kluttz has the authority to upgrade or downgrade PPE in a timely manner to respond to changing site conditions and to protect employee health and safety. Routine evaluation of the effectiveness of the PPE program is conducted as identified in Section 6.7 below.

Procedures for Determining Work Duration

Dave Kluttz identifies task-specific work duration based on the following:

Physiological requirements of the task

PPE level for the task

Ambient temperature and humidity

Acclimatization of the work force

Employees are informed about task-specific work duration by the SSHO, during initial training and whenever a change is necessary

Training

Employees receive general training regarding proper selection, use and inspection of PPE during initial training and subsequent refresher training. Site-specific PPE requirements, including task-specific PPE, ensemble components, and inspection and maintenance procedures are communicated as identified in Chapter 4, Training.

Respiratory Protection

Respiratory protection is not used on this site in accord with the label of the products being applied.

Hearing Conservation

Employees must use hearing protection when traveling on airboats at speeds which require engine revolutions above 2000 rpm.

PPE Maintenance & Storage

Table 6-6 describes the PPE maintenance schedule for this site. The person responsible for overseeing PPE maintenance & storage procedures and for maintaining the inspection record is Dave Kluttz.

Table 6-6 PPE Maintenance

Type of PPE	Model	Inspection Frequency	Done by	Cleaning Frequency	Done by
Level D					
Component	Coveralls or long sleeve	Daily	Applicators	NA	NA
Component	Shoes with socks	Daily	Applicators	NA	NA
Component	Ear Muffs	Daily	Applicators	NA	NA
Component	Glasses	Daily	Applicators	NA	NA
Component	Ear Muffs	Daily	Applicators	NA	NA

Defective or damaged equipment is not used and is reported to Dave Kluttz so that the equipment can be repaired or discarded.

Evaluation of PPE Program

Evaluation of the effectiveness of site PPE selections occurs throughout site activities in response employee

Lakeland Restoration Services, LLC

78 E River Spur Rd, Priest River, ID 83856

Phone/Fax: 877-273-6674

CITY OF KENMORE, LAKE WASHINGTON/SAMMAMISH RIVER

EURASIAN WATERMILFOIL, EGERIA, and AQUATIC NUISANCE PLANT TREATMENT SITE SPECIFIC SAFETY PLAN

July 16, 2018

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1.0 ORGANIZATIONAL STRUCTURE

(in compliance with 29 CFR 1910.120(b)(2))

This chapter of the Health and Safety Plan describes lines of authority, responsibility, and communication as they pertain to health and safety functions at this site. The purpose of this chapter is to identify the personnel who impact the development and implementation of the site health and safety plan and to describe their roles and responsibilities. This chapter also identifies other contractors and subcontractors involved in work operations, and establishes the lines of communication among them for safety and health matters.

The organizational structure of this site's safety and health program is consistent with OSHA requirements in 29 CFR 1910.120(b)(2) and provides the following site-specific information:

* the general supervisor who has the responsibility and authority to direct all hazardous waste operations
* the site safety and health officer who has the responsibility and authority to develop and implement this HASP and verify compliance
* other personnel needed for hazardous waste operations and emergency response and their general functions and responsibilities
* the lines of authority, responsibility, and communication for safety and health functions

This section is reviewed and updated as necessary to reflect the current organizational structure at this site.

1.1 Roles and Responsibilities

All personnel and visitors on this site must comply with the requirements of this HASP. The specific responsibilities and authority of management, safety and health, and other personnel on this site are detailed in the following paragraphs. A site organizational chart illustrating the hierarchy of personnel and lines of communication within this company and with additional contractors on site is found in Figure 1-1.

Project Manager (PM)

The Project Manager (PM) for this site is Dave Kluttz. The PM has responsibility and authority to direct all work operations. The PM coordinates safety and health functions with the Site Safety and Health Officer (SSHO), has the authority to oversee and monitor the performance of the SSHO, and bears ultimate responsibility for the proper implementation of this HASP. The specific duties of the PM are:

Preparing and coordinating the site work plan; providing site supervisor(s) with work assignments and overseeing their performance; coordinating safety and health efforts with the SSHO; ensuring effective emergency response through coordination with the Emergency Response Coordinator (ERC); serving as primary site liaison with public agencies and officials and site contractors.

The qualified alternate Project Manager (PM) for this site is Jim Pogue.

Site Safety and Health Officer (SSHO)

The Site Safety and Health Officer (SSHO) for this site is Dave Kluttz. The SSHO has full responsibility and authority to develop and implement this HASP and to verify compliance. The SSHO reports to the Project Manager. The SSHO is on site or readily accessible to the site during all work operations and has the authority to halt site work if unsafe conditions are detected. The specific responsibilities of the SSHO are:

Managing the safety and health functions on this site; serving as the site's point of contact for safety and health matters; ensuring site monitoring, worker training, and effective selection and use of PPE; assessing site conditions for unsafe acts and conditions and providing corrective action; assisting the preparation and review of this HASP; maintaining effective safety and health records as described in this HASP; coordinating with the Emergency Response Coordinator (ERC), Site Supervisor(s), and others as necessary for safety and health efforts.

The qualified alternate Site Safety and Health Officer (SSHO) for this site is Jim Pogue.

Emergency Response Coordinator (ERC)

The Emergency Response Coordinator (ERC) for this site is Dave Kluttz. The ERC is responsible for assessing site conditions and directing and controlling emergency response activities in accordance with the Site Emergency Response Plan. The ERC reports to the Project Manager (PM). The ERC will ensure the evacuation, emergency transport, and treatment of site personnel and will notify the appropriate emergency response units and management staff in accordance with the emergency response plan of this HASP. Specific duties of the ERC include:

Developing and reviewing the emergency response plan; conducting emergency response rehearsals; ensuring effective emergency response to and evacuation of the site; coordinating emergency response functions with the Site Safety and Health Officer (SSHO), and integrating site emergency response plans with the disaster, fire, and/or emergency response plans of local, state, and federal organizations and agencies.

The qualified alternate Emergency Response Coordinator (ERC) for this site is Jim Pogue.

The qualified second alternate Emergency Response Coordinator (ERC) for this site is Roy Moore.

Site Workers

Site workers are responsible for complying with this HASP, using the proper PPE, reporting unsafe acts and conditions, and following the work and safety and health instructions of the Project Manager (PM), Site Safety and Health Officer (SSHO), and Site Supervisor.

1.2 Identification of Other Site Contractors

There are no other contractors or subcontractors on this site.

2.0 JOB HAZARD ANALYSIS

(in compliance with 29 CFR 1910.120(b)(4)(ii)(A),and 1910.120(i))

This chapter of the HASP describes the safety and health hazards associated with site work and the control measures selected to protect workers. The purpose of a job hazard analysis (JHA) is to identify and quantify the health and safety hazards associated with each site task and operation, and to evaluate the risks to workers. Using this information, appropriate control methods are selected to eliminate the identified risks if possible, or to effectively control them. The control methods are documented in each task-specific JHA. The information contained in this chapter is essential to effective preparation of all other chapters of the HASP. This section of the HASP includes:

* job hazard analysis
* hazardous substance information
* employee notification of hazards

The person responsible for ongoing job hazard analysis at this site Dave KLuttz.

2.1 Job Hazard Analysis

Each site-specific JHA appears on a separate copy of Table 2-1. Each JHA lists a task or operation required during site operations and the location(s) where that task or operation is performed. A single JHA may be used for a task/operation performed in multiple locations if the hazards, potential exposures, and controls are the same in each location.

Each JHA lists the chemical hazards associated with that task and their known or anticipated concentrations during performance of the task. Each JHA also identifies anticipated physical and biological hazards and potential exposure levels or the likelihood of exposure. The final section of each JHA lists the control measures implemented toprotect employees from exposure to the identified hazards. The information provided here is designed to satisfy the job hazard analysis requirements of 1910.120(b)(4)(ii)(A) and the workplace hazard assessment requirements of 1910.132(d). Health hazard information for all chemical substance identified in site JHAs appears in hazard data sheets attached to this chapter.

Dave Kluttz modifies site-specific JHAs and the accompanying data sheets when:

* the scope of work is changed by adding, eliminating, or modifying tasks
* new methods of performing site tasks are selected
* observation of the performance of site tasks results in a revised characterization of the hazards
* new chemical, biological, or physical hazards are identified
* exposure data indicate changes in the concentration and/or likelihood of exposure
* new/different control measures are selected

When JHAs are modified, related provisions in other chapters of this HASP are modified as needed.

Table 2-1: Site-Specific Job Hazard Analysis

Operational Phase	Phase No	Task/Operation	Location Where Task/Operation Performed
JH 01	1	On shore loading and handling	Lake Washington & Sammamish

Conducted	Print Name	Signature
July 15, 2018	Dave Kluttz	

Chemical Hazards

Chemical Name	Source	Concentration	Exposure Potential During Operations
Diquat, Hydrothol, Aquathol & Glyphosate	Containers	100	Unlikely

Physical Hazards

Name of Physical Hazard	Source	Exposure Potential During Operations
Falling Down Bank	Steep Banks	Unlikely

Biological Hazards

Name of Biological Hazard	Source	Exposure Potential During Operations
No Biological Hazards		

Control Measures Used

Engineering Controls: Locate pump, tank and hoses to reduce tripping hazards.
Work Practices: Exercise care when loading and handling, exercise care when moving and transporting equipment and use proper Personal Protection Equipment to reduce exposure hazard. Follow Aquatic Herbicide Label instructions.

Level of PPE: Long Sleeve Shirt or Coveralls
Shoes with socks
Eye Protection
Gloves

PPE Upgrade: No

PPE Downgrade: No

Table 2-1: Site-Specific Job Hazard Analysis

Operational Phase	Phase No	Task/Operation	Location Where Task/Operation Performed
JH 02	1	On boat application to targeted vegetation	Lake Washington Sammamish

Conducted	Print Name	Signature
07/15/2018		

Chemical Hazards

Chemical Name	Source	Concentration	Exposure Potential During Operations
Diquat, Hydrothol, Aquathol & Glyphosate	Containers, Hoses & Pumps	100	Unlikely

Physical Hazards

Name of Physical Hazard	Source	Exposure Potential During Operations
Tripping over hoses	Hoses	Unlikely
Falling Overboard	Water	Unlikely

Biological Hazards

Name of Biological Hazard	Source	Exposure Potential During Operations
No Biological Hazards		

Control Measures Used

Engineering Controls: Locate pump, tank and hoses to reduce tripping hazards.
Work Practices: Exercise care when loading and handling, exercise care when moving and transporting equipment and use proper Personal Protection Equipment to reduce exposure hazard. Follow Aquatic Herbicide Label instructions.

Level of PPE: Eye Protection
Long Sleeve Shirt or Coveralls
Shoes with socks
Gloves

PPE Upgrade: No

PPE Downgrade: No

2.2 Employee Notification of Hazards and Overall Site Information Program

The information in the JHAs and the attached data sheets is made available to all employees who could be affected by it prior to the time they begin their work activities. Modifications to JHAs and the accompanying data sheets are communicated during routine briefings.

The person responsible for providing site information, this HASP, and any modifications to the HASP to other contractors and subcontractors working on this site is: Dave Kluttz.

3.0 EMERGENCY RESPONSE PLAN

(in compliance with 29 CFR 1910.120(l) and 1910.120(b)(4)(ii)(H)

This is the site-specific emergency response plan. This chapter of the Health and Safety Plan describes potential emergencies at this site, procedures for responding to those emergencies, roles and responsibilities during emergency response, and training that workers must receive in order to follow emergency procedures.

This emergency response plan is consistent with the requirements of 29 CFR 1910.120(l) and provides the following site-specific information:

* pre-emergency planning
* personnel roles, lines of authority, and communication
* emergency recognition and prevention
* emergency medical treatment and first aid
* PPE and emergency equipment

3.1 Pre-emergency Planning

This site has been evaluated for potential emergency occurrences, based on site hazards, the tasks within the work plan.

Table 3-1 Potential Site Emergencies

Type of Emergency	Source of Emergency	Location of Source
Chemical Spill	Containers	All Loading and Handling Areas
Physical Injury	Lifting, Falling, Tripping, Drowning	All Loading, Handling and Application Sites

3.2 On-Site Emergency Response Equipment

Emergency procedures may require specialized equipment to facilitate worker rescue, contamination control and reduction, or post-emergency clean-up. Emergency response equipment stocked on this site is listed in Table 11-2. The equipment inventory and storage locations are based on the potential emergencies described in Table 11-1. This equipment inventory is designed to meet on-site emergency response needs and any specialized equipment needs that off-site responders might require because of the hazards at this site but not ordinarily stocked.

Any additional PPE required and stocked for emergency response is also listed in Table 3-2 below. During an emergency, the Emergency Response Coordinator is responsible for specifying the level of PPE required for emergency response.

Emergency response equipment is inspected at regular intervals and maintained in good working order. The equipment inventory is replenished as necessary to maintain response capabilities.

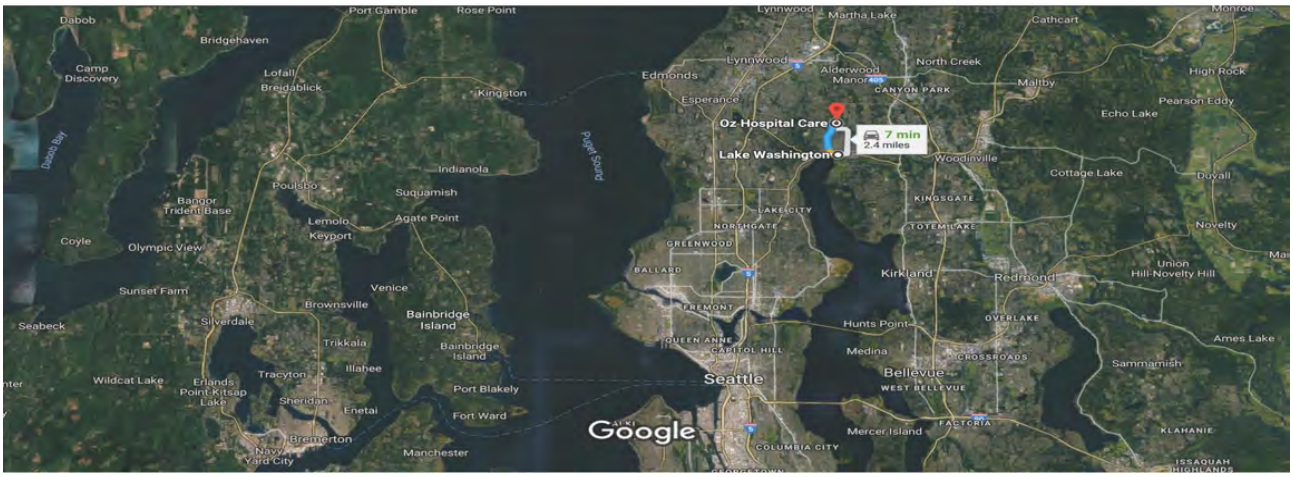
Table 3-2 Emergency Equipment and Emergency PPE

Emergency	Specific Type	Quantity Stocked	Location Stored
Fire extinguisher		5	Boats and Trucks
First Aid and Eye Wash Kits		2	Boats
Spill Kits		2	Loading Area
Emergency PPE	**Specific Type**	**Quantity Stocked**	**Location Stored**
Rubber gloves		24	Boats and Trucks
Eye protection		12	Boats and Trucks

Figure 3-3a provides a map to the nearest emergency medical assistance.

Figure 3-3 Map to Nearest Emergency Medical Assistance

Oz Hospital Care 425-286-6494
24230 18th PL W, Bothell, WA 98021



Lake Washington
Washington

1. Head west on NE 175th St toward 61st Ave NE — 0.2 mi
2. Turn right onto 61st Ave NE — 1.4 mi
3. Continue onto Locust Way — 0.2 mi
4. Turn right onto 18th Pl W — 469 ft
   Destination will be on the right

Oz Hospital Care
24230 18th Pl W, Bothell, WA 98021

3.4 Roles and Responsibilities for On-Site and Off-Site Personnel

Dave KLuttz is responsible for implementing the emergency response plan and coordinates emergency response activities on this site. He/she provides specific direction for emergency action based upon information available regarding the incident and response capabilities and initiates emergency procedures, including protection of the public and notification of appropriate authorities.

In the event of an emergency, site personnel are evacuated and do not participate in emergency response activities, except as indicated below.

Limited On-Site Emergency Response Activities

For spills

Turn off all pumps
Close all valves
Surround spill with containment dike
Use Absorbent mats to clean up spill
Place in plastic containment bags

For Injuries

Assess extent of injury
Administer First Aid if appropriate
Contact Emergency Medical Personnel
Transport to **Oz Hospital Care 24230 18th PL W, Bothell, WA 98021**

3.5 Emergency Medical Treatment and First Aid

Personnel who require medical care and/or who are transferred to a medical facility are accompanied by MSDSs and other applicable hazard data to apprise caregivers of the chemicals and hazards to which the victim has been potentially exposed. The emergency medical care facility for this site is **24230 18th PL W, Bothell, WA 98021**. The route to the facility is shown in Figure 3-3 a & b.

Table 3.6 Emergency Contact Information

The list of telephone numbers below are the emergency contact numbers for this site. These emergency numbers are verified to be accurate, working numbers. Site personnel are trained and rehearsed in site-specific emergency calling procedures. A copy of this contact information is posted at the following locations:

Trucks and Boats

SITE PERSONNEL

Title	Contact	Telephone
Project Manager (PM)	Dave Kluttz	208-597-6601
Site Safety and Health Officer (SSHO)	Dave Kluttz	20-8597-6601
Emergency Response Coordinator (ERC)	Dave Kluttz	208-597-6601
Emergency Response Coordinator 1st Alternate	Jim Pogue	208-290-4953
Emergency Response Coordinator 2nd Alternate	Roy Moore	509-671-7596

Agency	Contact	Address/Location	Telephone
Ambulance/EMS			911
Police			911
Fire			911
Primary Medical Facility	**Oz Hospital Care**	**24230 18th PL W, Bothell, WA 98021**	**425-286-6494**
State Police			911
Local Emergency Response			911
Emergency Medical Assistance			911
Poison Control Center			800-424-9300

4.0 TRAINING PROGRAM

(in compliance with 29 CFR 1910.120(e))

This training program is consistent with the requirements of 29 CFR 1910.120(e) and addresses the following site-specific information:

* training for site workers
* site briefings for visitors and workers
* management and supervisor training

4.1a Training Elements to be Covered for Site Workers:

- names of personnel and alternates responsible for site safety and health
- safety, health and other hazards present on the site
- use of PPE
- work practices by which the employee can minimize risks from hazards
- safe use of engineering controls and equipment on the site
- the emergency response plan detailed in Chapter 3 of this HASP
- the spill containment program detailed in Chapter 5 of this HASP

4.1b Site-Specific Briefings for Visitors

A site-specific briefing is provided to all site visitors who enter this site. For visitors, the site-specific briefing provides information about site hazards, the site lay-out including work zones and places of refuge, the emergency alarm system and emergency evacuation procedures, and other pertinent safety and health requirements as appropriate.

4.1c HASP Information and Site-Specific Briefings for Workers

Site personnel review this HASP and are provided a site-specific briefing prior to the commencement of work to ensure that employees are familiar with this HASP and the information and requirements it contains. Additional briefings are provided as necessary to notify employees of any changes to this HASP as a result of information gathered during ongoing site characterization and analysis. Conditions for which we schedule additional briefings include, but are not limited to: changes in site conditions, changes in the work schedule/plan, newly discovered hazards, and incidents occurring during site work.

4.2 Initial Training

Initial training requirements are based on a worker's potential for exposure.

4.3 Management and Supervisor Training

On-site managers and supervisors who are directly responsible for or who supervise workers engaged in hazardous operations are licensed herbicide applicators in the State of Washington. Mixer/Loaders who work with the applicators are trained and supervised by licensed applicators.

5.0 SPILL CONTAINMENT PROGRAM

(in compliance with 29 CFR 1910.120(b)(4)(ii)(J) and (j)(1)(viii))

This chapter of the Health and Safety Plan describes the potential for hazardous substance spills at this site and procedures for controlling and containing such spills. The purpose of this chapter of the Plan is to ensure that spill containment planning is conducted and appropriate control measures are established.

The spill containment program is consistent with OSHA requirements in 29 CFR 1910.120(b)(4)(ii)(J) and (j)(1)(viii) and addresses the following site-specific information:

* potential hazardous substance spills and available controls
* initial notification and response
* spill evaluation and response
* post-spill evaluation

5.1 Potential Spills and Available Controls

Table 5-1 below lists the location and type of potential hazardous substance spills at this site. This table also describes the activities or situations in which an accidental spill could occur and the type of release--either an incidental or an emergency release -- likely to result.

Wherever spills, leaks, or ruptures can occur, this site keeps suitable spill kits available. Their location is noted in Table 5-1. In addition, all areas subject to potential spills are diked or a means to adequately dike these areas in the event of a spill is available so that the entire volume of the hazardous substance being spilled can be contained and isolated. The type and location of spill containment equipment is also listed in Table 5-1.

Table 5-1 Potential Spills and Controls

Hazardous Substance	Location	Source of spill	Potential maximum qty of spill	Classification of spill	Available Spill Containment Equipment	Equipment Location
Herbicide	Lake shoreline loading herbicide into boats	Equipment failure	Unknown	Emergency	Spill Kit	Trucks & Boats
Herbicide	Lake shoreline loading herbicide into boats	Hose/line rupture	Unknown	Emergency	Spill Kit	Trucks & Boats
Herbicide	Spill in boat	Containers, Hoses, Hoppers, Tanks	Unknown	Emergency	Dispose of spillage in treatment zone not to exceed Aquatic Herbicide Label Concentrations	

5.2 Initial Spill Notification and Response

Any worker who discovers a hazardous substance spill will immediately notify Dave Kluttz, Project Manager. The worker will, to his/her best ability, report the hazardous substance involved, the location of the spill, the estimated quantity of material spilled, the direction/flow of the spill material, related fire/explosion incidents, and any associated injuries. The site Emergency Response Plan, found in Chapter 3 of this HASP, will immediately be implemented if an emergency release has occurred.

5.3 Spill Evaluation and Response

Dave Kluttz, Project Manager is responsible for evaluating spills and determining the appropriate response. When this evaluation is being made, the spill area will be isolated and demarcated.

The procedures of the Emergency Response Chapter of this HASP are implemented when the spill is determined to require emergency precautions and action. If necessary to protect nearby community members, notification of the appropriate authorities is made. Table 5-3 below lists the spill conditions that trigger notification of Federal, state, and local agencies.

Table 5-3 Off-site Notification Requirements

Hazardous Substance	Location	Spill Volume/ Conditions	Required Notification
Herbicide	Lake Shoreline, loading herbicide into boats	TBD By PM	Richard Sawyer 425-398-8900 x 6153

When an incidental release occurs, cleanup personnel receive instructions in a pre-cleanup meeting as to spill conditions, PPE, response activities, decontamination, and waste handling. The following are general measures that response/ cleanup personnel take when responding to a spill:

* To minimize the potential for a hazardous spill, hazardous substance and contaminated soils, control/absorbent media, drums and containers, and other contaminated materials are properly stored and labeled.

* When a spill occurs, only those persons involved in overseeing or performing spill containment operations will be allowed within the designated hazard areas. If necessary, the area will be roped, ribboned or otherwise blocked off. Unauthorized personnel are kept clear of the spill area.

* Appropriate PPE, as specified during the pre-cleanup meeting, is donned before entering the spill area.

* Appropriate spill control measures are specified in the pre-cleanup meeting and applied during spill response.

* Whenever possible without endangerment of personnel, the spill is stopped at the source or as close to the source as possible.

* Ignition points are removed if fire or explosion hazards exist.

* Surrounding reactive materials are removed.

* Drains or drainage in the spill area will be blocked or surrounded by berms to exclude the spilled waste and any materials applied to it.

* Provisions are made to contain and recover a neutralizing solution, if used.

* Small spills or leaks from a drum, tank, or pipe will require immediate cleanup to prevent or limit employee exposure. For small spills, sorbent materials such as sand, sawdust, or commercial sorbents from the spill kit are placed directly on the waste to prevent further spreading and aid in recovery.

* If any spill is large and/or continuing, an initial isolation area is created. Large spills are diked at the leading edge of the spill. Berms of earthen or sorbent material are constructed downstream of the leading edge of the spill to contain it. Where feasible, pumps are utilized to transfer the liquid to appropriate containers.

* Spill area is sprayed with appropriate foam where the possibility of volatile emissions exist.

* If the spill results in the formation of a toxic vapor cloud, from vaporization, or reaction with surrounding materials or by the outbreak of fire, further evacuation may be required.

* To dispose of spill waste, all contaminated sorbents, liquid waste, or earthen material will be cleaned up and placed in small quantities (50 pounds) in approved drums for proper storage or disposal as hazardous waste.

5.4 Post-Spill Evaluation

A written spill response report is prepared at the conclusion of clean-up operations. The report includes, at a minimum, the following information:

* date of spill incident
* cause of incident
* spill response actions
* any outside agencies involved, including their incident reports
* lessons learned or suggested improvements

The spill area is inspected to ensure the area has been satisfactorily cleaned. The use of soil, water, and air sampling is utilized in this determination as necessary. The root cause of the spill is examined and corrective steps taken to ensure the engineering and control measures in place have performed as required. If alternative precautions or measures are needed, they are made available and implemented.

6.0 PERSONAL PROTECTIVE EQUIPMENT

(in compliance with 29 CFR 1910.120(b)(4)(ii)(C) and 29 CFR 1910.120(g))

This chapter of the HASP describes how personal protective equipment (PPE) is used to protect against employee exposures to hazardous substances and hazardous conditions on this site.

* PPE selection criteria
* Site-specific PPE ensembles
* Criteria for PPE upgrades and downgrades
* Procedures for determining work duration
* Training in use of PPE
* Respiratory protection
* Hearing conservation
* PPE maintenance && storage
* Evaluation of this program

The person with the overall responsibility for the PPE program is Dave Kluttz.

6.1 PPE Selection Criteria

Site safety and health hazards are eliminated or reduced to the greatest extent possible through engineering controls and work practices. Where hazards are still present, a combination of engineering controls, work practices, and PPE are used to protect employees.

An initial level of PPE is assigned to each task to provide an adequate barrier to exposure hazards. Initial PPE ensembles are selected based on the anticipated route(s) of entry of the hazardous substances on site and their concentration. Ensemble materials are selected using permeation data supplied by individual manufacturers. Materials providing the greatest duration of protection have been chosen. Tear and seam strength of the PPE are also considered to ensure ensemble durability while work is performed. When necessary, multiple layers of protection are used to accommodate the range of hazards that may be encountered. Where possible, employees are provided with a range of component sizes to ensure properly fitted PPE.

The following criteria are used in selecting PPE levels at this site.

Use of Level D Protection

Employees use Level D protection during tasks that have the following characteristics:

* The atmosphere contains no known or suspected hazardous substances at concentrations that meet or exceed the published exposure limit.

* Contact with hazardous levels of any chemicals through splashes, immersion, or by other means will not occur.

* There is no potential for unexpected inhalation or contact with hazardous levels of any chemical.

6.2 Use of PPE

Site-specific PPE ensembles and materials are identified below in Table 6-2a. These ensembles are consistent with Appendix B of 29 CFR 1910.120. PPE is used in accordance with manufacturers' recommendations.

Table 6-2a Site-Specific PPE Ensembles

Equipment	Model Purchased	Material	Employee
Level D			
Coveralls/Standard Work Clothes	Coveralls or long sleeve shirts and long pants, hats	Cotton or poly cotton	No
Boots/shoes	Shoes with socks		Yes
Gloves	Chemical Resistant		No
Other: Eye protection	Glasses		No
Other: Ear Muffs	Ear Muffs on boats		No

Criteria for PPE Upgrades and Downgrades

Dave Kluttz has the authority to upgrade or downgrade PPE in a timely manner to respond to changing site conditions and to protect employee health and safety. Routine evaluation of the effectiveness of the PPE program is conducted as identified in Section 6.7 below.

Procedures for Determining Work Duration

Dave Kluttz identifies task-specific work duration based on the following:

* Physiological requirements of the task

* PPE level for the task

* Ambient temperature and humidity

* Acclimatization of the work force

Employees are informed about task-specific work duration by the SSHO, during initial training and whenever a change is necessary

6.3 Training

Employees receive general training regarding proper selection, use and inspection of PPE during initial training and subsequent refresher training. Site-specific PPE requirements, including task-specific PPE, ensemble components, and inspection and maintenance procedures are communicated as identified in Chapter 4, Training.

6.4 Respiratory Protection

Respiratory protection is not used on this site in accord with the label of the products being applied.

6.5 Hearing Conservation

Employees must use hearing protection when traveling on airboats at speeds which require engine revolutions above 2000 rpm.

6.6 PPE Maintenance & Storage

Table 6-6 describes the PPE maintenance schedule for this site. The person responsible for overseeing PPE maintenance & storage procedures and for maintaining the inspection record is Dave Kluttz.

Table 6-6 PPE Maintenance

Type of PPE	Model	Inspection Frequency	Done by	Cleaning Frequency	Done by
Level D					
Component	Coveralls or long sleeve	Daily	Applicators	NA	NA
Component	Shoes with socks	Daily	Applicators	NA	NA
Component	Ear Muffs	Daily	Applicators	NA	NA
Component	Glasses	Daily	Applicators	NA	NA
Component	Ear Muffs	Daily	Applicators	NA	NA

Defective or damaged equipment is not used and is reported to Dave Kluttz so that the equipment can be repaired or discarded.

6.7 Evaluation of PPE Program

Evaluation of the effectiveness of site PPE selections occurs throughout site activities in response employee feedback.

Appendix F

WSDA Pesticide Application Records

Washington State Department of Agriculture
Pesticide Management Division
PO Box 42560
Olympia WA 98504-2560
(877) 301-4555

PESTICIDE APPLICATION RECORD (Version 1)

NOTE: This form must be completed same day as the application and it must be retained for 7 years (Ref. chapter 17.21 RCW)

1. Date of Application - Year: 2018 Month: June Day: 4 Start Time: 8:00am
   Stop Time: 5:00pm
2. Name of person for whom the pesticide was applied: Richard Sawyer and Janet Quinn
   Firm Name (if applicable): City of Kenmore
   Street Address: 18120 68th Ave NE City: Kenmore State: WA Zip: 98028
3. Licensed Applicator's Name (if different from #2 above): David Kluttz License No.: 66448
   Firm Name (if applicable): Lakeland Restoration Services, LLC Tel No.: 877-273-6674
   Street Address: 78 E River Spur Rd City: Priest River State: ID Zip: 83856
4. Name of person(s) who applied the pesticide (if different from #3 above): Jim Pouge
   License No(s). If applicable: 90277
5. Application Crop or Site: Parts of Lake Washington and the Sammamish River Channel
6. Total Area Treated (acre, sq. ft., etc.): 30.8 acres
7. Was this application made as a result of a WSDA Permit? ☐ No ☒ Yes (If yes, give Permit No.) # WAG994293
8. Pesticide Information (please list all information for each pesticide, including adjuvants (buffer, surfactant, etc.), in the tank mix):

a) Full Product Name	b) EPA Reg. No.	c) Total Amount of Pesticide Applied in Area Treated	d) Pesticide Applied/Acre (or other measure)	e) Concentration Applied
Triclopyr	81927-13	180 gallons	5.8 gal / acre	
			/	
			/	
			/	
			/	

9. Address ***or exact location*** of application. NOTE: If the application is made to one acre or more of agricultural land, the field location must be shown on the map on page two of this form.

   See attached Maps

10. Wind direction and estimated velocity (mph) during the application: 8 mph S
11. Temperature during the application: Low 52 F High 66 F
12. Apparatus license plate number (if applicable): E818
13. ☐ Air ☒ Ground ☐ Chemigation
14. Miscellaneous Information: Airboat

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Washington State Department of Agriculture
Pesticide Management Division
PO Box 42560
Olympia WA 98504-2560
(877) 301-4555

PESTICIDE APPLICATION RECORD (Version 1)

NOTE: This form must be completed same day as the application and it must be retained for 7 years (Ref. chapter 17.21 RCW)

1. Date of Application - Year: 2018 Month: July Day: 16 Start Time: 8:00am
   Stop Time: 5:00pm
2. Name of person for whom the pesticide was applied: Richard Sawyer and Janet Quinn
   Firm Name (if applicable): City of Kenmore
   Street Address: 18120 68th Ave NE City: Kenmore State: WA Zip: 98028
3. Licensed Applicator's Name (if different from #2 above): David Kluttz License No.: 66448
   Firm Name (if applicable): Lakeland Restoration Services, LLC Tel No.: 877-273-6674
   Street Address: 78 E River Spur Rd City: Priest River State: ID Zip: 83856
4. Name of person(s) who applied the pesticide (if different from #3 above): Jim Pouge
   License No(s). If applicable: 90277
5. Application Crop or Site: Parts of Lake Washington and the Sammamish River Channel
6. Total Area Treated (acre, sq. ft., etc.): 35 acres
7. Was this application made as a result of a WSDA Permit? ☐ No ☒ Yes (If yes, give Permit No.) # WAG994293
8. Pesticide Information (please list all information for each pesticide, including adjuvants (buffer, surfactant, etc.), in the tank mix):

a) Full Product Name	b) EPA Reg. No.	c) Total Amount of Pesticide Applied in Area Treated	d) Pesticide Applied/Acre (or other measure)	e) Concentration Applied
Diquat	81927-35	35 gallons	1 gal / acre	
Hydrothol	70506-175	35 gallons	1 gal / acre	
Aquathol	70506-176	35 gallons	1 gal / acre	
			/	
			/	

9. Address ***or exact location*** of application. NOTE: If the application is made to one acre or more of agricultural land, the field location must be shown on the map on page two of this form.

   See attached Maps

10. Wind direction and estimated velocity (mph) during the application: 5 mph NW
11. Temperature during the application: Low 63 F High 90 F
12. Apparatus license plate number (if applicable): E818
13. ☐ Air ☒ Ground ☐ Chemigation
14. Miscellaneous Information: Airboat

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APPENDIX B

2019 Treatment Report

City of Kenmore

2019 Aquatic Macrophyte Control Program

Prepared By
Northwest Aquatic Eco-Systems
855 Trosper Road SW #108-313
Tumwater, WA 98512
360-357-3285
Pondweeds@comcast.net

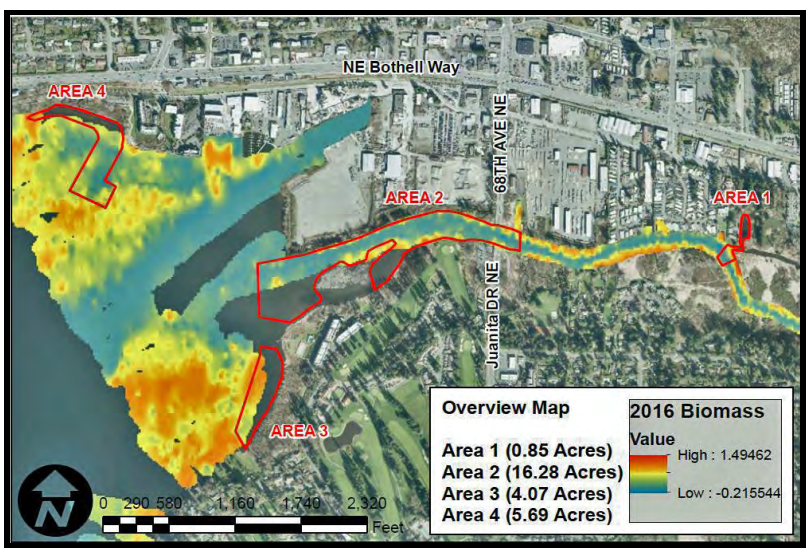
Project Overview

The City of Kenmore has been actively involved since 2017 in controlling noxious and noxious native aquatic macrophytes within approximately 27 acres encompassing 4 treatment sites. Targeted sites are located within the Sammamish River and north shores of Lake Washington. Excessive plant biomass presently interferes with the water-body's ability to function as a safe and aesthetically pleasing water resource. Specifically targeted are Eurasian watermilfoil, fragrant water lily and Brazilian Elodea. Sites were to receive one application prior to July 15 targeting the Eurasian watermilfoil and a second application following July 15. All four treatment sites have a fish timing window (noted above) that restricts general broad spectrum control during this limited two week timeframe. Treatments may occur prior to July 15 and after July 31 but such applications can only utilizes specific herbicides that typically target only Eurasian watermilfoil. The only timeline permitted to control Brazilian Elodea is July 15 through July 31.

Eurasian watermilfoil is classified as a non-regulated Class B noxious species while fragrant water lily is a non-regulated Class C species. Both classifications are not designated for control in King County, control is only recommended but not required.

Brazilian Elodea is a Class B noxious species. Typically this classification mandates control in areas where the plant is not wide spread. Brazilian elodea is designated for control throughout King County except in Lake Washington and the Sammamish River. Control at the four targeted sites for this species is under the discretion of the local jurisdiction.

Established Treatment Zones (Four targeted control sites)



Predominant lake use within the targeted sites consists of typical non wake recreational use activities, swimming, fishing, canoeing, kayaking and paddle boarding.

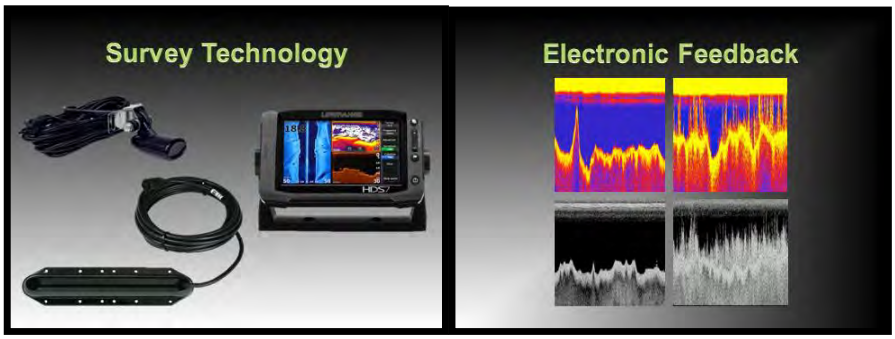
Survey Protocol

The NWAE mapping protocol utilizes state of the art Bio Base mapping technology. This system produces three map types consisting of a bathymetric contour, a sediment composition profile and a macrophyte density map. All maps are GIS friendly and can be exported into any GIS program. Maps are color coded so they can be easily evaluated by any viewer.

Mapping technology utilizes specialized transducers that electronically collect thousands of data points as the survey boat transects the lakes littoral zone. Data is recorded and viewed onboard. Each file contains one hour of survey data. A completed survey may be comprised of one or more files. Upon completion, all the program files are downloaded and processed. The survey and sonar log produces a stored electronic file of the lake bottom that can be viewed in house at any time and allows the ability to view plant growth along the boats survey track.

Our protocol encompasses a surface vehicle transecting the lake along the entire littoral zone. Boat tracks are designed to be approximately 150 feet apart. Sonar beam data collection extends approximately 150 feet from all directions surrounding the boat. To ensure the efficacy of the survey, a bottom sampling rake is thrown from the boat at various locations lake-wide. The rake is then drawn across the lake bottom, brought to the surface and into the boat. Plants attached to the rake are identified and confirmed as being the same species as noted through the structure scan or visually noted through the water column. This sampling point is then incorporated into the file data log as a single point reference noting the species captured during the rake tow. These points are then added to the final project map.

Noted below is the equipment utilized during a survey event. The survey technology picture below identifies the chart recorder, transducer and structure scan electronics. Electronic feedback picture displays real time data as being recorded and viewed on screen. Color and black/white photos on the left identify a lake bed bottom without weed growth, pictures on the right depict weed growth throughout the water column.



Our program provides for a straightforward format for the interpretation of pre and post treatment results.

One issue related to the use of sonar technology is the inability to accurately map weed beds in depths of less than 3 feet or in areas where weed densities interfere with the ability of the transducer to accurately receive the rebounding signals from the bottom sediments. The transducer must accurately define the lake bottom from which the signal rebounds while also receiving a signal that is not distorted due to the short distance the transducer is in conjunction with the bottom. As a result of these issues it is not advisable to rely on survey data in depths of less than 3 feet. Our late August survey of these sites brings into focus how these environmental conditions influence the survey results.

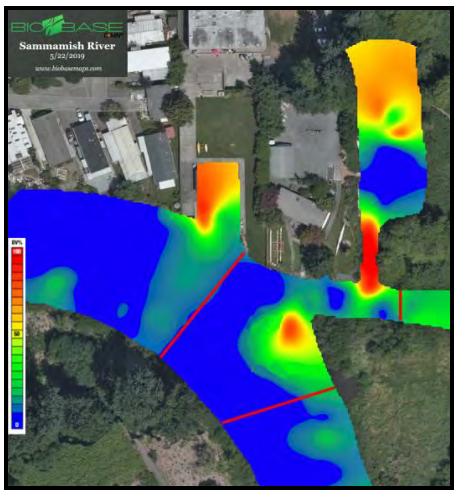
Pre Treatment Survey 5-22-19

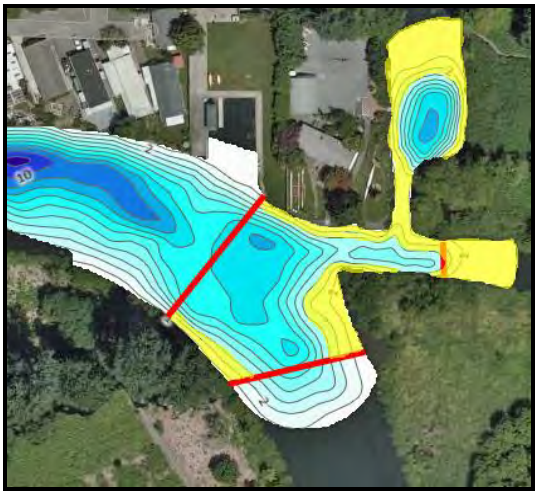
The 2019 pre-treatment assessment was conducted on May 22. Survey maps were broken down into three separate events Area #1, Areas #2 & #3 and Area #4. A bathymetric map of each site is included in the survey with water depths less than three feet identified in yellow.

Maps have been produced and processed utilizing the BioBase (www.biobasemaps.com) mapping software.

Blue areas indicate no plant biomass present, yellow 50% and red 100%. Bathymetric maps have been delineated at one foot contour intervals.

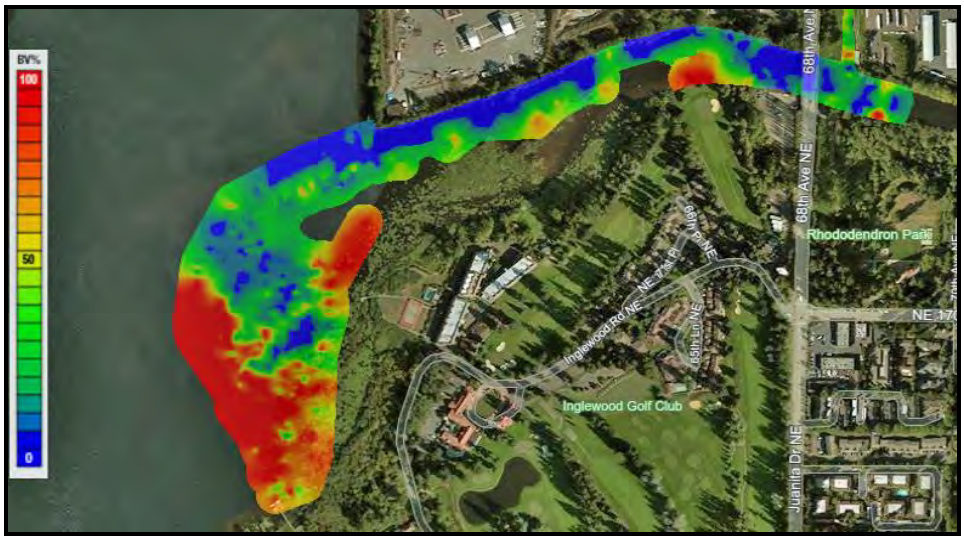
Area #1

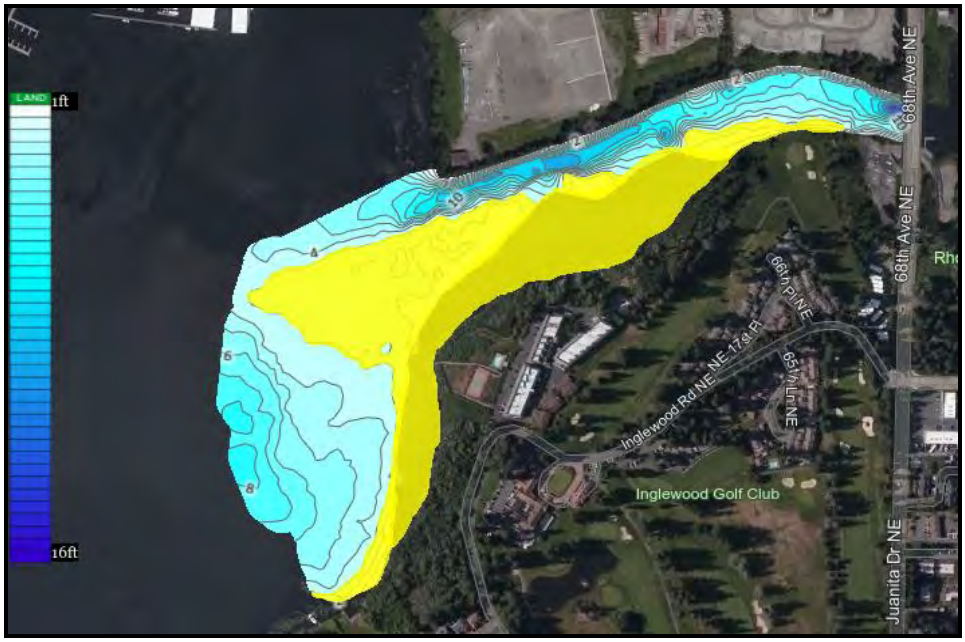




Three foot yellow contour

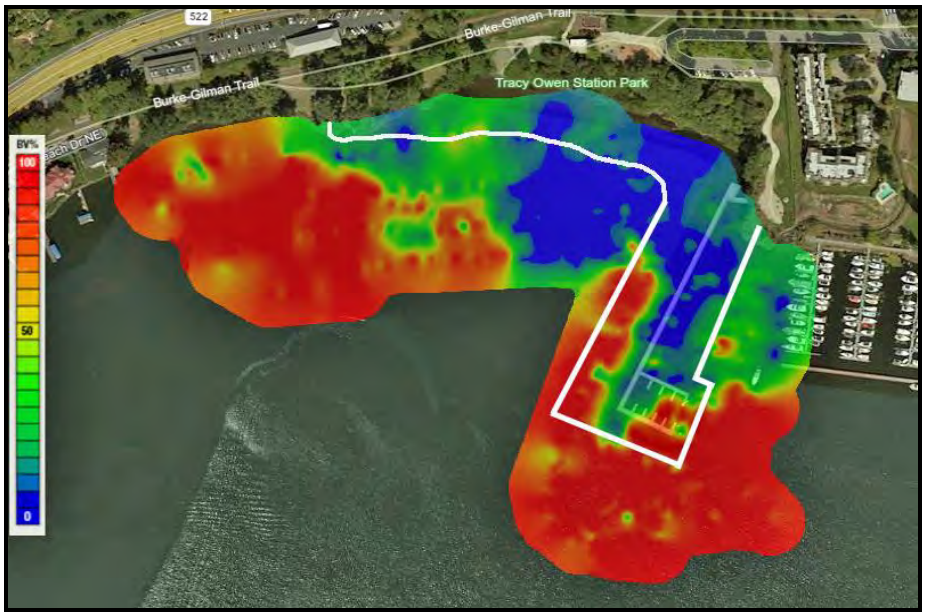
Area #2 & #3

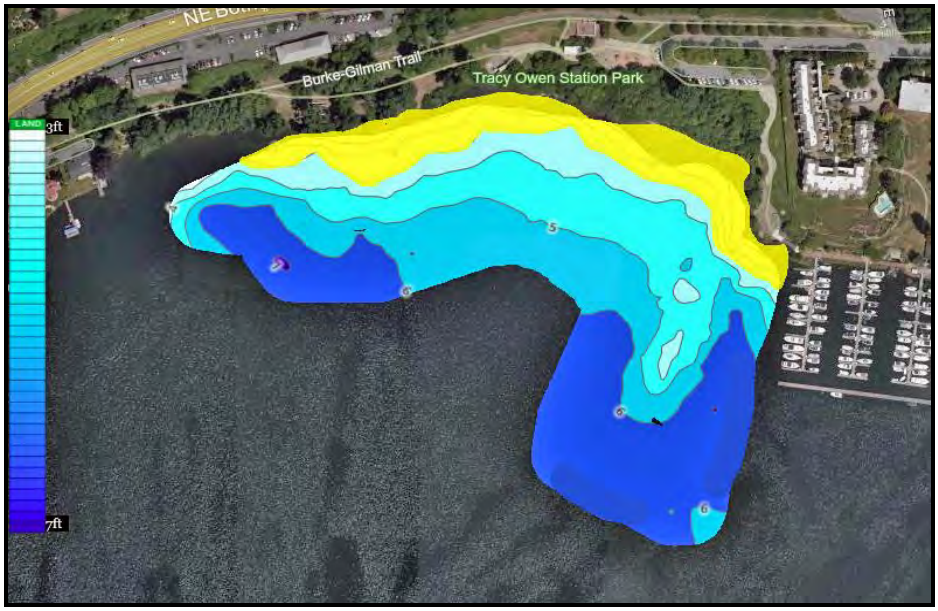




Three foot yellow contour

Area #4





Three foot yellow contour

Pre treatment rake bottom sampling data was mistakenly erased from the unit during a hard set reboot during the post treatment survey.

Triclopyr Treatment 5-28

All sites were treated with Triclopyr to control Eurasian watermilfoil and fragrant water lily. Prior to treatment all residents and business within ¼ mile of the targeted sites were sent a Business and Residential treatment notification in accordance with the permit guidelines. A mailing list provided by the city was utilized to complete this task. On the day of treatment docks and properties within 400 feet of the sites were posted with signage that also complied with the permit requirements.

A sixteen foot Airgator airboat with two 25 gallon holding tanks and weighted discharge hoses were incorporated into the project as the vessel responsible for applying the herbicide mixture. As each site was sprayed the correct prescribed dosage was added into the tanks. If the tanks were not full the remaining volume in each tank was than filled with clean lake water. Upon arrival at each designated site the onboard pumping system was then engaged. Water was drawn from the lake and mixed onboard with the herbicide through a metered injection system. Once mixed the resulting combination was then injected back into the water column within two feet of the bottom. The treatment boat transversed each targeted location until the mixture was evenly distributed.

All empty containers were triple rinsed at the staging area or treatment sites.

Treatment Area ID #1 5-28-2019
Chemical Used –Triclopyr
Active Ingredient 15 pounds, 5 gallons
Acreage Treated– .85

Treatment Area ID #2 5-28-2019
Chemical Used –Triclopyr
Active Ingredient 255 pounds, 78 gallons
Acreage Treated 16.28

Treatment Area ID #3 5-28-2019
Chemical Used –Triclopyr

Active Ingredient 25 pounds 25, 8.5 gallons
Acreage Treated– 4.07

Treatment Area ID #4 5-28-2019
Chemical Used –Triclopyr
Active Ingredient 30 pounds, 10 gallons
Acreage Treated– 5.69

Post Treatment Visual Survey 6-15-19

A brief visual inspection of the site was performed to assess the effectiveness of the Triclopyr treatment. Milfoil plants were exhibiting a typical and expected response of bent stems, discolored leafs and partial defoliation. Fragrant water lily plants were experiencing a very limited barely noticeable response. Characteristically these plants should have been exhibiting a much stronger response to the Triclopyr. It appeared that limited uptake of the herbicide occurred.

Diquat & Hydrothol Treatment 7-17 & 7-18

The same posting procedure noted during the earlier treatment was once again utilized during this event. Application equipment was the same with the one exception that the discharge hoses were now positioned one foot from the water's surface. Targeted species for all sites consisted of pondweeds (dominant species white stem), coontail, elodea, and Brazilian Elodea. Area #1 was experiencing a filamentous algae problem so Hydrothol 191 was applied to this small site at a rate of .2ppm. Areas #1 & #2 were treated first. Poor weather shortly surfaced as the treatment boat was forced to secure cover in the marina adjacent to site #4. Weather conditions continued to degrade as planes were no longer landing or taking off from Kenmore Air. Our crew remained hostage to the weather for approximately three hours. A short downturn in the weather occurred and the crew proceed back to the launch. NWAE returned back to the site the following day to complete the treatment of sites #3 & #4. Wind and rain likely created problems with the posting signage remaining in place.

Treatment Area ID #1 7-17-2019-
Chemical Used –Diquat, Hydrothol 191
Active Ingredient 5.6 pounds Diquat, 1.5 gallons , Hydrothol 3.0 pounds, 1.5 gallons
Acreage Treated– .85

Treatment Area ID #2 7-17-2019
Chemical Used –Diquat
Active Ingredient 93.25 pounds, 25 gallons
Acreage Treated 16.28

Treatment Area ID #3 7-18-2019
Chemical Used – Diquat, Triclopyr
Active Ingredient 26.1pounds Diquat, 7 gallons, Triclopyr 1.5 pounds, .5 gallons
Acreage Treated– Diquat 4.07, Triclopyr .25

Treatment Area ID #4 5-28-2019
Chemical Used –Diquat
Active Ingredient 37.3 pounds, 10 gallons
Acreage Treated– 5.69

Post Treatment Visual Survey 7-26-19

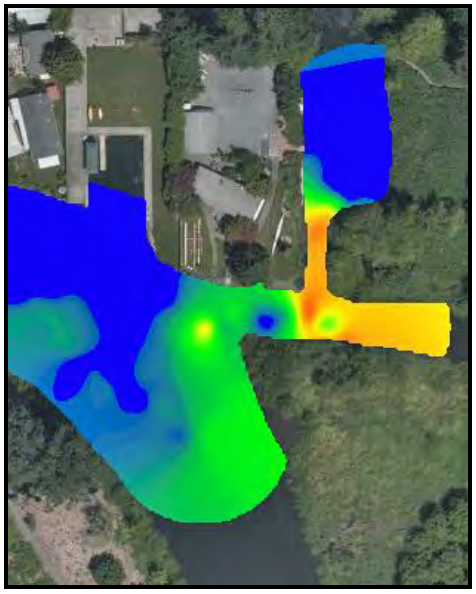
A visual inspection of all sites resulted in observing all targeted species responding to the application. The small test site within site #3 was exhibiting a favorable response to the surface spraying of the lily pads with triclopyr.

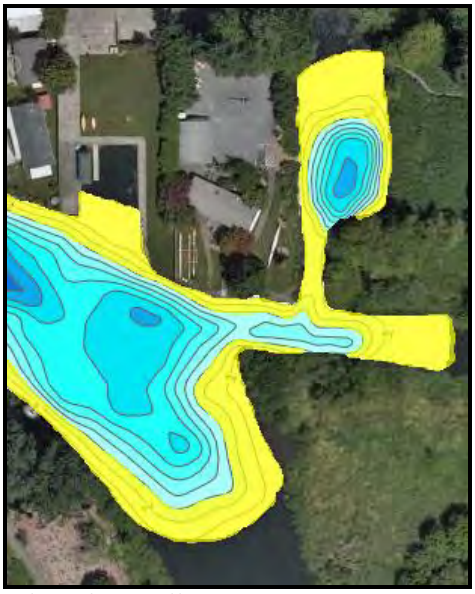
Post Treatment Survey 8-19

A post treatment survey was conducted on 8-19, 30 days following the 7-17 & 7-18 treatments. At the time of the survey water levels had declined. These lower water levels resulted in access related issues and survey complications. Lake level decline was approximately one foot. Three foot contour lines established during the 8-19 survey represented very closely the old 4 to 4.5 foot contour detected during the May survey. Much of the main basin and lower Sammamish River (areas #2 & #3) were now below the acceptable limit for a reliable electronic survey.

Lower water levels also resulted in the eel grass (vallisaneri) positioned horizontally in the water column instead of vertically. This horizontal positioning tends to skew the data as a result of more leaf area having greater exposure to the sonar.

Area #1





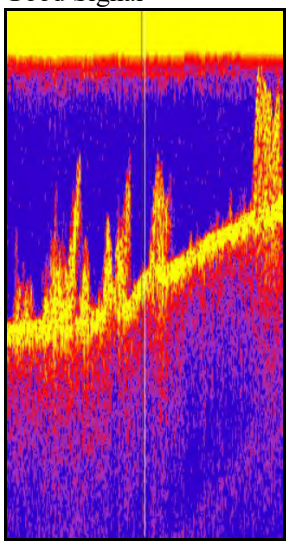
Three foot yellow contour

Nearly all of the areas representing weed densities greater than 50% are located in waters three feet or less in depth.

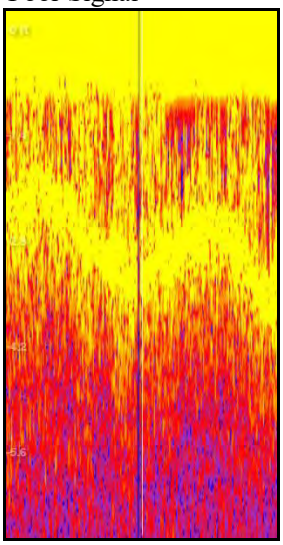
Areas #2 & #3

Areas #2 & #3 proved to be the most difficult to survey as a result of low water levels throughout most of the site. The boat had limited access to much of the lily pad infestation zones due to excessive lily growth and low water levels. As observed in the vegetation map below only a channel down the center of the waterway leading into Lake Washington produced any meaningful data. Sonar signals were weak off the bottom at times producing no viable on screen image. Typically the on board screen illustrates a strong bottom line identifying the bottom sediments accompanied with a clear water profile. These critical attributes were limited throughout the survey.

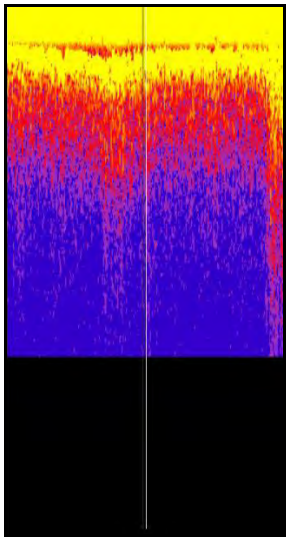
Good Signal

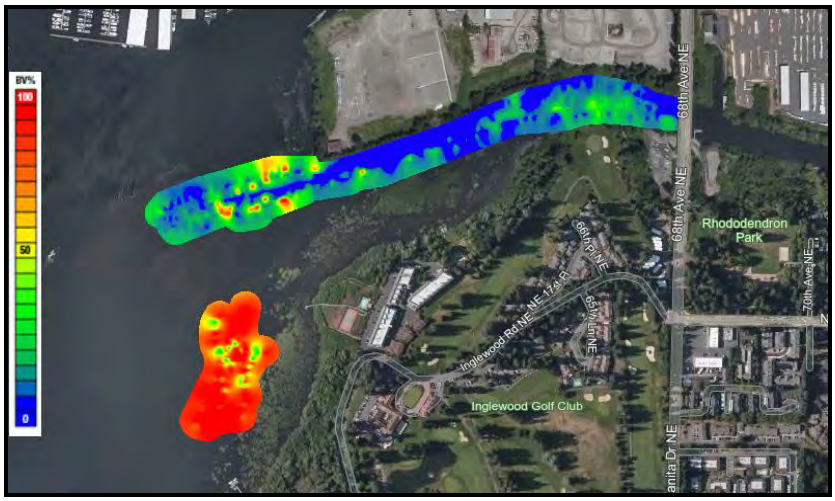


Poor Signal



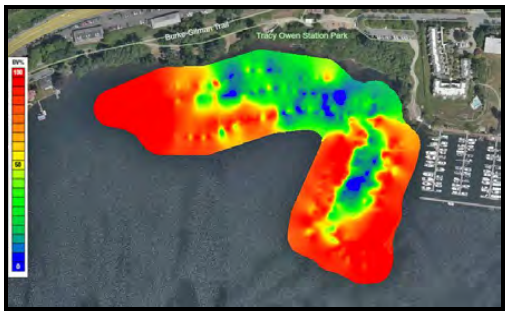
No Bottom Detected

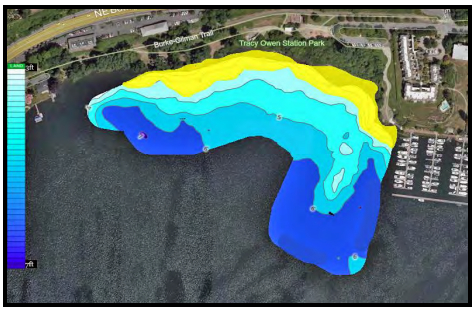




Three foot yellow contour

Area #4

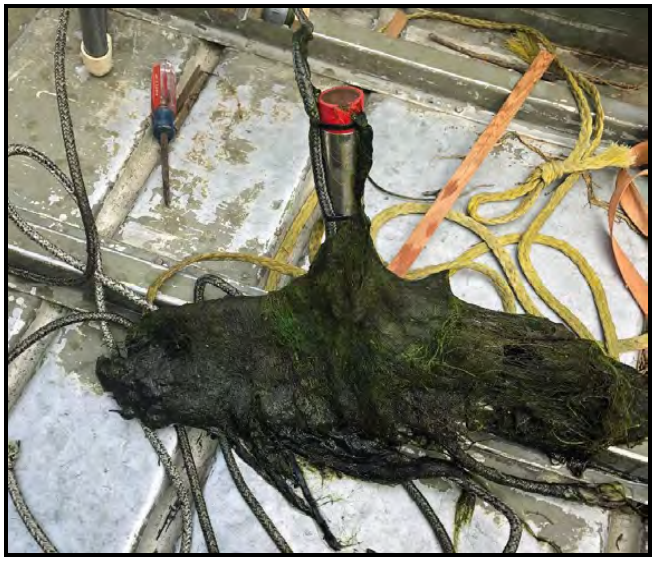




Yellow three foot contour

Bottom Sampling Tows

20 data points were collected throughout the sites identifying the macrophyte community within the immediate sampling area. Sampling points were than imported into the site project map.



Bottom sample from waypoint #014

Waypoint	Comment	Latitude	Longitude
001	E, A	N47.75471	W122.241
002	C, A	N47.75428	W122.241
003	C, A	N47.75418	W122.241
004	N	N47.75450	W122.242
005	A	N47.75450	W122.249
006	TP, A	N47.75478	W122.250
007	TP	N47.75470	W122.252
008	C	N47.75378	W122.256
009	A	N47.75354	W122.257
010	A, C	N47.75318	W122.258
011	A	N47.75350	W122.258
012	A, BE, DP	N47.75091	W122.258
013	A, DP	N4775030	W122.259
014	NI, A, WP	N47.75596	W122.263
015	C, V, A	N47.75516	W122.264
016	V, C	N47.75507	W122.264
017	dead plants	N47.75686	W122.264
018	V, E	N.47.75687	W122.263
019	WP	N47.75529	W122.264
020	BE	N47.75586	W122.264

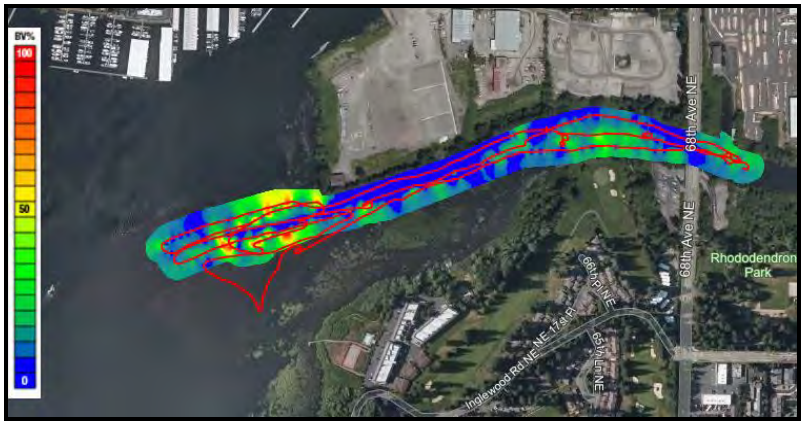
E- elodea, V- vallisaneri, C- coontail, WP- white stem pondweed
NI- niad, A- filamentous algae, N- nitella, TP- thin leaf pondweed
DP- dead plants

Treatment Evaluation

The shallow nature of three of the four sites in conjunction with the change in water level proved to be a difficult task when evaluating the success or failure of the 2019 control program. Our survey protocol and processing are capable of evaluating biomass in a number of formats.

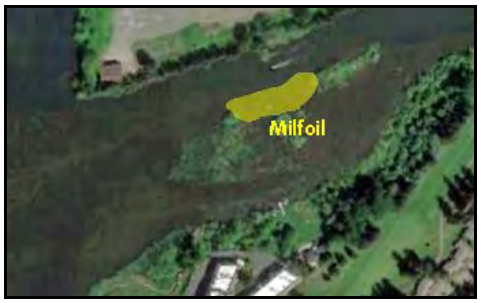
A polygon can be delineated around weed beds or specific areas. Weed densities can be evaluated between different contour lines or a shape file of the treatment site can be used as the reference with all calculations occurring within the file shape. The change in water depth, no referenced shape file and the difficulty of accurately representing the treatment site by creating a best guess estimate with a polygon proved to be unattainable. The degree of control requested by the City of Kenmore within their RFP appears to be a standard that may be unrealistic over the length of a growing season. Most all of the native plants residing throughout the sites reproduce from seed germination and this process occurs throughout the length of the season. Contact herbicides simply burn the green vegetative portion of the plants leaving viable roots to sprout new grow approximately 45 days post application. These products are only active to the plants present at the site during treatment. There are no residual related properties. Regrowth typically doesn't create a seasonal problem in deep water bodies but in shallow system's supporting good light penetration, once regrowth initiates the process proceeds quickly. This often results in seasonal weed growth patterns that afford low density biomass immediately succeeding application however as the season progresses these biomass densities increase in relation to the waters depth. A fifteen foot water depth supporting regrowth of two feet proves to be a non issue in this scenario. However a two foot regrowth in a three foot depth creates a water column that now consists of nearly a 66% biomass volume.

Associated problems noted throughout all of the sites consisted of the boat track (red line) not being able to successfully capture the sonar signal resulting in no data along that portion of the track.



What can be concluded from this year's final survey was that no native or noxious plants were creating any type of recreational hazard within areas that were not dominated by fragrant water lilies. Most all of the shallow areas did not support motor boat access as was noted by our survey boat constantly churning up the bottom, becoming stuck in soft muck and damaging the prop in an effort to access all the targeted sites.

Only one Brazilian Elodea plants were observed and only sparse single stemmed milfoil plants were identified. No milfoil was noted at the bottom sampling stations. The majority of the milfoil observed was within area #2 noted on the map below.

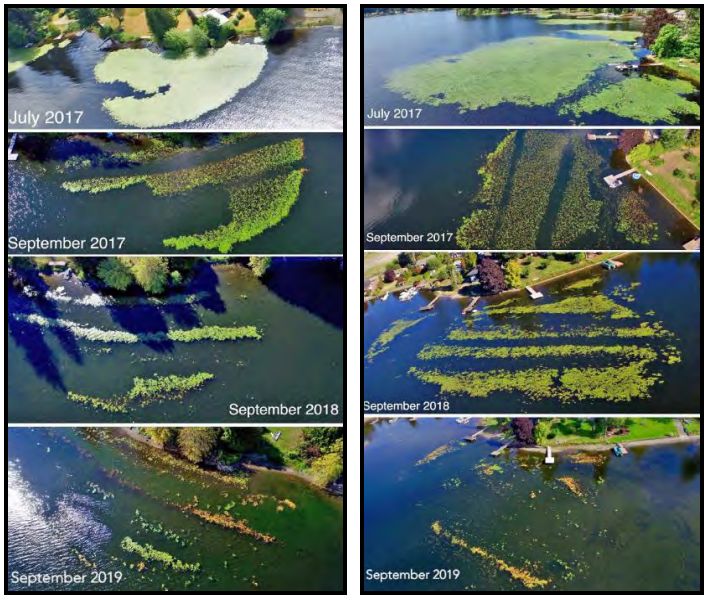


It was clear that milfoil was controlled as a result of the Triclopyr treatment. Milfoil plants outside of the treatment #3 site had been impacted from the resulting drift of material off site.

Little if any noticeable change in the fragrant water lily infestations was noted. This is the third year lily pads have been targeted and the accompanying results appear to fall far short of what should be expected.

Lily pads that have been sprayed for three years within site #3. Semi open channel represents a single surface spraying of the pads that occurred during 2019.

Below is a three year sequence of a lily pad eradication process actively in progress utilizing surface application.



Recommendations

1. City of Kenmore should disclose in the RFP the limited depths associated with each site and the potential for access related problems accompanying depth changes as the season progresses. The shallow nature of the sites disrupted our teams technical approach to the project. A bathymetric map of the area would also prove to be helpful.

2. A shape file of each treatment site should be provided in the RFP so that interested parties have a clear understanding as to the boundaries of each site. The file and site locations can then be utilized by the selected contractor in evaluating project components and results. Our team could only guess the boundaries of each site in accordance with the hard copy site plan provided.

3. The lack of milfoil and Brazilian elodea throughout the sites during the initial survey complements the fact that these areas are currently experiencing limited noxious weed issues and that the recreational related access issues is more related to native plant growth. Perhaps targeting the current sparse milfoil growth on a full scale basis with an expensive early seasonal treatment should be reconsidered. Perhaps a spot treatment approach or bi annual treatment would prove to be more cost effective.

4. The current approach of injecting herbicide into the lily pad infestations while also controlling the milfoil appears not to have resulted in favorable long term results. Typically lily pads are surface sprayed so that ample material is translocated down into the root system over an extended period of time. Injecting into the water column provides only a short window for this translocation to occur. Early seasonal spraying of lily pads is less effective than mid to late seasonal spraying. Two surface applications should be applied approximately 30 days apart. First application should occur late July. These infested areas currently provided limited recreational access. Perhaps submersed weed control activities should be curtailed until greater access is achieved and the funding currently allocated for submersed weed control within these areas be shifted to floating plant control.

5. The City of Kenmore should extend the contract terms to two years. There was considerable confusion amongst property owners as to who was providing the service. Over the past three years different contractors have been responsible for treatment. In addition to eliminating confusion the selected contractor would know that his effort or lack of effort would be realized the preceding year. It would also encourage the contractor to institute recognized changes the second year that were learned to be beneficial the initial year. At times a contractor during the contract year will uncover site specific issues that can improve the projects outcome but is unwilling to make those discoveries known knowing that they may not be involved with the project the following year.

6. The treatment window for native species is only approximately two weeks. The program should require a visual survey 7-10 days post application so that if an additional treatment is required it can be performed within the treatment window opening. Our crew

noted that the weather conditions can change quickly in the northern portion of Lake Washington. Wind will move the herbicide, create suspended sediment issues and if a rain event were to occur, possibly flush the herbicide from the sites prior to securing the proper exposure time. This visual survey should be performed with a City of Kenmore representative on the survey boat.

7. A more realistic method to evaluate plant density changes at these shallow targeted sites.

PESTICIDE APPLICATION RECORD (Version 3)

NOTE: This form must be completed same day as the application and it must be retained for 7 years. (Ref. RCW 17.21)

1. **Date of Application-Year:** 2019 **Month:** May 28 **Date:** 06 **Time:** 9:00

2. **Name of person for whom the pesticide was applied:** City of Kenmore
   Firm Name (if applicable): Richard Sawyer
   Street Address: 18120 68th Ave NE **City:** Kenmore, 98028

3. **Licensed Applicator's Name (if different from #2 above):** Douglas Dorling
   Firm Name): Northwest Aquatic Eco-Systems
   4426 Bush Mountain Drive SW.
   Olympia, WA. 98512
   360-357-3285
   License # 375

4. **Name of person who applied the pesticide (if different than #3 above):**

   License No(s). if applicable:

5. **Application Crop or Site:** Lake WA, Sammamish River

6. **Total Area Treated (acre, sq. ft., etc.):** 27 acres,

7. **Was this application made as a result of a WSDA Permit ?** No

8. **Pesticide information (please list all information for each pesticide in the tank mix):**

a) Product Name Pesticide Applied	b) EPA Reg. No.	c) Total Amount of Pesticide Applied in Area Treated	d) Pesticide Applied/Acre (or other measure)	e) Concentration Applied ppm
Triclopyr	819127-3	101.5 gallon	4-6 gals/acre	

9. **Address or exact location of application NOTE: If the application made to one acre or more of Agricultural land, the field location must also be shown on the map on page two of this form.** City of Kenmore north shore of Lake Washington and Sammamish River as it enters Lake WA.

10. Date: 5-28-19 **11. Name of person making application:** Douglas Dorling

12. License No: 375 **13. Apparatus License. Plate No.:** G-425

14. Start: 9:00 **Stop:** 5:00

15. Acres completed : 27
16. Wind Direction: SW **Wind Velocity:** 0-5

17. Temperature: 70

Location of Application (If the application covers more than one township or range, please indicate the township & range for the top left section of the map only):
Township: T26N
Range: E OR W (please indicate) 04E

Section(s): 11
County: King

PLEASE NOTE:
The map is divided into 4 sections with each section divided into quarter-quarter sections. Please complete it by marking the appropriate section number(s) on the map and indicate as accurately as possible the location of the area treated.

PESTICIDE APPLICATION RECORD (Version 3)

NOTE: This form must be completed same day as the application and it must be retained for 7 years. (Ref. RCW 17.21)

1. **Date of Application-Year:** 2019 **Month:** July **Date:** 17 **Time:** 9:00

2. **Name of person for whom the pesticide was applied:** City of Kenmore
   Firm Name (if applicable): Richard Sawyer
   Street Address: 18120 68th Ave NE **City:** Kenmore, 98028

3. **Licensed Applicator's Name (if different from #2 above):** Douglas Dorling
   Firm Name): Northwest Aquatic Eco-Systems
   4426 Bush Mountain Drive SW.
   Olympia, WA. 98512
   360-357-3285
   License # 375

4. **Name of person who applied the pesticide (if different than #3 above):**

   License No(s). if applicable:

5. **Application Crop or Site:** Lake WA, Sammamish River

6. **Total Area Treated (acre, sq. ft., etc.):** 17 acres,

7. **Was this application made as a result of a WSDA Permit ?** No

8. **Pesticide information (please list all information for each pesticide in the tank mix):**

a) Product Name Pesticide Applied	b) EPA Reg. No.	c) Total Amount of Pesticide Applied in Area Treated	d) Pesticide Applied/Acre (or other measure)	e) Concentration Applied ppm
Diquat	100-1390	26.5 gallons	1-2 gals/acre	
Hydrothol 191	70506-1753	1.5 gallons		.2 ppm

9. **Address or exact location of application NOTE: If the application made to one acre or more of Agricultural land, the field location must also be shown on the map on page two of this form.** City of Kenmore north shore of Lake Washington and Sammamish River as it enters Lake WA.

10. Date: 7-17-19 **11. Name of person making application:** Douglas Dorling

12. License No: 375 **13. Apparatus License. Plate No.:** G-425

14. Start: 9:00 **Stop:** 1:00

15. Acres completed : 17.3
16. Wind Direction: S **Wind Velocity:** 0-5 Treatment stopped due to wind

17. Temperature: 74

Location of Application (If the application covers more than one township or range, please indicate the township & range for the top left section of the map only):
Township: T26N
Range: E OR W (please indicate) 04E

Section(s): 11
County: King

PLEASE NOTE:
The map is divided into 4 sections with each section divided into quarter-quarter sections. Please complete it by marking the appropriate section number(s) on the map and indicate as accurately as possible the location of the area treated.

PESTICIDE APPLICATION RECORD (Version 3)
NOTE: This form must be completed same day as the application and it must be retained for 7 years. (Ref. RCW 17.21)

1. Date of Application-Year: 2019 Month: July Date: 18 Time: 9:30

2. Name of person for whom the pesticide was applied: City of Kenmore
Firm Name (if applicable): Richard Sawyer
Street Address: 18120 68th Ave NE City: Kenmore, 98028

3. Licensed Applicator's Name (if different from #2 above): Douglas Dorling
Firm Name): Northwest Aquatic Eco-Systems
4426 Bush Mountain Drive SW.
Olympia, WA. 98512
360-357-3285
License # 375

4. Name of person who applied the pesticide (if different than #3 above):

License No(s). if applicable:

5. Application Crop or Site: Lake WA, Sammamish River

6. Total Area Treated (acre, sq. ft., etc.): 9.76 acres,

7. Was this application made as a result of a WSDA Permit ? No

8. Pesticide information (please list all information for each pesticide in the tank mix):

a) Product Name Pesticide Applied	b) EPA Reg. No.	c) Total Amount of Pesticide Applied in Area Treated	d) Pesticide Applied/Acre (or other measure)	e) Concentration Applied ppm
Diquat	100-1390	17 gallons	1-2 gals/acre	
Triclopyr	81927-3	.5		1%

9. Address or exact location of application NOTE: If the application made to one acre or more of Agricultural land, the field location must also be shown on the map on page two of this form. City of Kenmore north shore of Lake Washington and Sammamish River as it enters Lake WA.

10. Date: 7-18-19 **11. Name of person making application: Douglas Dorling**

12. License No: 375 **13. Apparatus License. Plate No.: G-425**

14. Start: 9:30 Stop: 2:00

15. Acres completed : 9.76
16. Wind Direction: SW Wind Velocity: 0-5 continuation of 7-17 treatment

17. Temperature: 76

Location of Application (If the application covers more than one township or range, please indicate the township & range for the top left section of the map only):
Township: T26N
Range: E OR W (please indicate) 04E

Section(s): 11
County: King

PLEASE NOTE:
The map is divided into 4 sections with each section divided into quarter-quarter sections. Please complete it by marking the appropriate section number(s) on the map and indicate as accurately as possible the location of the area treated.

Public Use Area – Log Boom Park Treatment Detail

Summary

Inner Pier Area: 77,891 Square Feet (1.79 Acre)
Outer Pier Area: 145,750 Square Feet (3.35 Acre)
Shoreline Area: 1,100 Linear Feet

The strategy for Log Boom Park in 2021-2022 is to focus management of aquatic plants in the vicinity of the dock where motorboating is most impacted and to improve access by hand carried boats launched from shore on the east side of the dock.

Aquatic plant growth in the shallow waters near shore does not require management at this time. The aquatic plant community surrounding the public dock at Log Boom Park is dominated by the native plants coontail, white-stemmed pondweed, and ribbon-leaf pondweed, and include an abundance of the nonnative plant tapegrass. Noxious weed abundance was low in 2020 in the immediate vicinity of the dock, but an abundance of Eurasian watermilfoil has been observed and treated in this area in previous years.

Large amounts of aquatic plant fragments accumulate on the lake shore in Log Boom Park. The source of these fragments extends very far from shore and aquatic plant management in the vicinity of the shore would not significantly affect fragment accumulation on shore. Management of fragment accumulation on shore is best performed by raking and disposal (in compost) of the plant fragments to reduce aesthetic and recreational impacts of large accumulations on shore. Regular shoreline cleanup of aquatic vegetation and detritus is recommended to maintain safe access to the lake in Log Boom Park.

2021-2022 Treatment Strategy (Public Areas)
Log Boom Park

Treatment Strategy	Herbicide

Herbicide may be used to control both the native and invasive vegetation around the pier but would be adjusted based on pre-treatment survey results. Based on the current plant communities observed in this area, Diquat is the recommended herbicide to be applied once each year. Diquat is a broad-spectrum, short-term contact herbicide that does not kill plant roots.

2021-2022 Biennium Cost: $1,802 - $2,711 (Inner Pier area)
$3,373 - $5,072 (Outer Pier area)

Advantages: Cost is considerably lower than non-herbicide options. Application can cover large area quickly and often be completed in less than one day with contact advisories lasting less than 24 hours.

Disadvantages: Requires permit from Ecology, Diquat can only be applied during fish timing window of July 16 through July 31, general negative perception of pesticides/herbicides due to potential impacts if not applied properly.

Recommended: Yes, if full control of target weeds is desired using one strategy and budget is of concern. If used in junction with other strategies, less herbicide treatment would be needed.

Treatment Strategy	Bottom Barrier

A bottom barrier would provide control of all target weeds observed in this area for at least one year and is expected to last two years on average, so the annual cost is based on two years of effectiveness.

2021-2022 Biennium Cost: $66,558 - $133,309 (Inner Pier area)
$124,543 - $249,448 (Outer Pier area)

Advantages: Effective for treatment of all aquatic weeds without use of herbicides or water quality impacts. Treatment can remain effective for more than one growing season. Biodegradable barriers do not require physical removal after use.

Disadvantages: Requires individual HPA permit from WDFW. This strategy is a very expensive alternative compared to other treatment strategies and with a comparatively slow installation process that may potentially impact use of the pier for days or weeks. Non-biodegradable barriers require removal after 2 years of use and biodegradable barriers may lessen effectiveness over time. Fishing gear, propeller backwash, or boat anchors may damage or dislodge bottom barriers and they could become hazardous to swimmers if poorly maintained.

Recommended: No, this strategy is too expensive for large areas and other non-herbicide options are more viable.

2021-2022 Treatment Strategy (Public Areas)
Log Boom Park

Treatment Strategy	Shore Raking

Large amounts of aquatic plant fragments accumulate on the lake shore in Log Boom Park. Management of fragment accumulation on shore is best performed by raking and disposal (in compost) of the plant fragments to reduce aesthetic and recreational impacts of large accumulations on shore. Regular shoreline cleanup of aquatic vegetation and detritus (debris) is recommended to maintain safe access to the lake in Log Boom Park. This work would be conducted by City staff weekly.

2021-2022 Biennium Cost: $20,800 (plus $160/ton disposal)

Advantages: This strategy does not require use of herbicides or other intrusive weed control methods. Provides aesthetically pleasing shoreline in park area.

Disadvantages: This is primarily a 'cosmetic' strategy and does not prevent or control the growth or spread of weeds.

Recommended: Yes

Treatment Strategy	Hand Removal By Divers

A team of divers, with 2-person surface support team, hand remove weeds from the target area. Weeds are collected and disposed of appropriately. Divers can cover approximately 0.2 acres per day. Expected to last two years with root removal.

2021-2022 Biennium Cost: $12,914 - $25,347 (Inner Pier area)
$24,165 - $47,429 (Outer Pier area)

Advantages: This strategy does not require use of herbicides. All target weeds can be managed using this strategy. Can include removal of all invasive plant parts but selective removal of native plant shoots without roots to favor native plant growth.

Disadvantages: Requires individual HPA permit from WDFW. This strategy is a very expensive alternative compared to other treatment strategies. This process is also much slower than other options and may take up to 25 working days to complete treatment of the complete area (9 days directly adjacent to pier), which may potentially impact use of the pier. In addition, some of the dominant species observed in this area have extensive root systems that would slow and limit long-term effectiveness of removal.

Recommendation: No, suction dredging is a less costly and more effective alternative strategy for this large area covered by native and invasive plants.

Treatment Strategy	Suction Dredging

One diver, with 2-person surface support team, conduct suction dredging along the bottom of the target area. Weeds are collected and disposed of appropriately. Divers can cover approximately 0.7 acres per day. Expected to last two years with root removal.

2021-2022 Biennium Cost: $5,960 - $12,402 (Inner Pier area)
$11,152 - $23,206 (Outer Pier area)

Advantages: This strategy does not require use of herbicides. All target weeds can be managed using this strategy. Expected to last two years with root removal.

Disadvantages: Requires individual HPA permit from WDFW. This strategy is an expensive alternative compared to other treatment strategies. This process is slower than other options and may take up to 8 working days to complete treatment of the complete area (2.5 days directly adjacent to pier), which may potentially impact use of the pier.

Recommended: Yes, this appears to be a financially viable non-chemical strategy if greater control than mechanical harvesting is desired. Implementation does take several days so pier use impacts should be considered.

Treatment Strategy	Mechanical Harvesting

An aquatic plant harvester consists of a pontoon boat with paddle wheels and is equipped with a 5-feet deep (or 8-feet deep on some models) cutting head that conveys the cut plants onto the boat. The collected weeds are conveyed to a trailer for disposal, preferably at a compost facility. Harvesting rates range from 1 to 4 acres per day depending on transport distance, wind, underwater obstructions, and plant biomass. Expected to require two cuts per season (e.g., late June and early August) due to plant regrowth of about 0.5 feet per week.

2021-2022 Biennium Cost: $27,218 (Inner Pier area)
$50,932 (Outer Pier area)

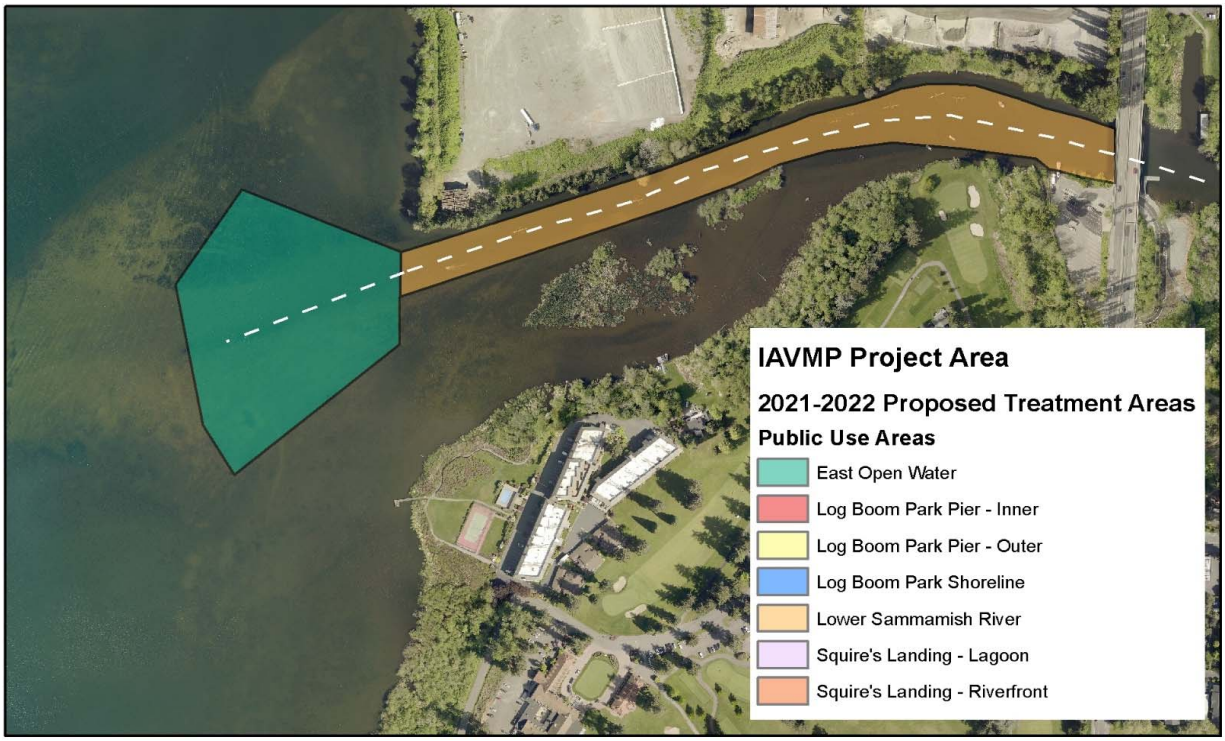
Advantages: This strategy does not require use of herbicides. All target weeds can be managed using this strategy. Faster rate than other non-chemical methods. Less fish habitat impact than other non-chemical strategies because not all plants are removed.

Disadvantages: Requires individual HPA permit from WDFW. Strong onshore winds may delay or reduce effectiveness of weed removal due to navigation and visibility issues. May increase accumulation of plant fragments on shore.

Recommended: No, suction dredging is a less costly and more effective alternative strategy for this large area covered by native and invasive plants.

2021-2022 Treatment Strategy (Public Areas)
Log Boom Park

Public Use Area – Lower Sammamish River & East Open Water Treatment Detail



Summary

Lower Sammamish River: 245,988 Square Feet (5.65 Acre)
East Open Water: 296,820 Square Feet (6.81 Acre)

Plant management in the lower Sammamish River is not targeted for treatment in 2021 and 2022 because the aquatic plant community is less dense and there are sufficient paths for recreational access to Lake Washington from public properties, including the WDFW boat launch and Rhododendron Park. However, navigation past the mouth of the Sammamish River was identified as a potential concern due to dense growth of curly-leaf pondweed and shallower water depths. Therefore, it is recommended that the lower river and adjacent lake area depicted above be surveyed each year to assess the potential need for treatment within all or some of this area. Sonar equipment should be used to measure plant biovolume and delineate areas where plants grow within 1 foot of the water surface and impact motorboat navigation.

Treatment Strategy	Herbicide

Aquatic plant management in the Sammamish River at Rhododendron Park and the public boat launch is not targeted for treatment in 2021 and 2022 because the aquatic plant community, which is dominated by Eurasian watermilfoil, is dense along the river banks but not in the central portion of the river, providing unobstructed boat access to Lake Washington from the WDFW boat launch. However, navigation past the mouth of the Sammamish River was identified as a potential concern due to dense growth of curly-leaf pondweed and shallower water depths. Therefore, it is recommended that the lower river and adjacent lake area be surveyed each year to assess the potential need for treatment within all or some of this area. Sonar equipment should be used to measure plant biovolume and delineate areas where plants grow within 1 foot of the water surface and impact motorboat navigation. Depending on the plant communities observed during each survey, appropriate herbicides should be used for treatment targeting those specific communities. Herbicides are recommended rather than other control methods because of the size of the potential treatment area, which would render other strategies cost-prohibitive due to excessive level of effort associated with these methods.

2021-2022 Biennium Cost: $5,692 – 8,561 (Lower Sammamish River area)
$6,869 - $10,330 (East Open Water area)

Advantages: Cost is considerably lower than non-herbicide options. Application can cover large area quickly and often be completed in less than one day with contact advisories lasting less than 24 hours.

Disadvantages: Requires permit from Ecology, if Diquat is required then it can only be applied during fish timing window of July 16 through July 31, general negative perception of pesticides/herbicides due to potential impacts if not applied properly.

Recommended: Yes, if budget is primary concern. Other non-herbicide options are available at higher cost.

2021-2022 Treatment Strategy (Public Areas)
Lower Sammamish River & East Open Water

Treatment Strategy	Bottom Barrier

A bottom barrier is not feasible in this treatment area due to size and waterbody velocity.

Installation Cost: NA

Annual Cost: NA

Advantages: NA

Disadvantages: NA

Recommended: No, this strategy is not feasible in this treatment area.

Treatment Strategy	Shore Raking

Shore raking is not applicable in this treatment area.

Installation Cost: NA

Annual Cost: NA

Advantages: NA

Disadvantages: NA

Recommended: No, this strategy is not applicable in this treatment area.

Treatment Strategy	Hand Removal By Divers

A team of divers, with 2-person surface support team, hand remove weeds from the target area. Weeds are collected and disposed of appropriately. Divers can cover approximately 0.2 acres per day. Expected to last two years with root removal.

2021-2022 Biennium Cost: $40,783 - $80,048 plus $160/ton disposal (Lower Sammamish River area)
$49,211 - $96,589 plus $160/ton disposal (East Open Water area)

Advantages: This strategy does not require use of herbicides. All target weeds can be managed using this strategy. Can include removal of all invasive plant parts but selective removal of native plant shoots without roots to favor native plant growth.

Disadvantages: Requires individual HPA permit from WDFW. This strategy is a very expensive alternative compared to other treatment strategies. This process is also much slower than other options and may take up to 60 working days to complete, which may impact use of the area.

Recommendation: No, suction dredging is a less costly and more effective alternative strategy for this large area covered by native and invasive plants.

Treatment Strategy	Suction Dredging

One diver, with 2-person surface support team, conduct suction dredging along the bottom of the target area. Weeds are collected and disposed of appropriately. Divers can cover approximately 0.7 acres per day. Expected to last two years with root removal.

2021-2022 Biennium Cost: $18,822 - $39,166 plus $160/ton disposal (Lower Sammamish River area)
$22,711 - $47,259 plus $160/ton disposal (East Open Water area)

Advantages: This strategy does not require use of herbicides. All target weeds can be managed using this strategy. Expected to last two years with root removal.

Disadvantages: Requires individual HPA permit from WDFW. This strategy is a very expensive alternative compared to other treatment strategies. This process is also much slower than other options and may take up to 18 working days to complete, which may impact use of the area.

Recommended: Yes, this appears to be a financially viable non-chemical strategy if greater control than mechanical harvesting is desired. Implementation does take several days so consideration of impacts should be considered.

Treatment Strategy	Mechanical Harvesting

An aquatic plant harvester consists of a pontoon boat with paddle wheels and is equipped with a 5-feet deep (or 8-feet deep on some models) cutting head that conveys the cut plants onto the boat. The collected weeds are conveyed to a trailer for disposal, preferably at a compost facility. Harvesting rates range from 1 to 4 acres per day depending on transport distance, wind, underwater obstructions, and plant biomass. Expected to require two cuts per season (e.g., late June and early August) due to plant regrowth of about 0.5 feet per week.

2021-2022 Biennium Cost: $85,960 plus $160/ton disposal (Lower Sammamish River area)
$103,724 plus $160/ton disposal (East Open Water area)

Advantages: This strategy does not require use of herbicides. All target weeds can be managed using this strategy. Faster rate than other non-chemical methods. Less fish habitat impact than other non-chemical strategies because not all plants are removed.

Disadvantages: Requires individual HPA permit from WDFW. Strong onshore winds may delay or reduce effectiveness of weed removal due to navigation and visibility issues. May increase accumulation of plant fragments on shore.

Recommended: No, suction dredging is a less costly and more effective alternative strategy for this large area covered by native and invasive plants.

Public Use Area – Middle Sammamish River (Squire's Landing Park) Treatment Detail

Summary

Lagoon: 21,396 Square Feet (0.49 Acre)
Riverfront: 8759 Square Feet (0.20 Acre)

The aquatic plant community at Squire's Landing Park is dominated by Eurasian watermilfoil that forms a dense surface canopy impacting active boating in the adjacent river. Chemical treatments are recommended in this area due to the dominance of invasive vegetation and the reduced level of effort in comparison to manual removal.

ProcellaCOR™ is recommended as the primary treatment method for this area due to its low aquatic toxicity, high effectiveness on Eurasian watermilfoil, rapid uptake by milfoil in flowing waters, and high species-selectivity preventing harm to native vegetation. ProcellaCOR™ does not require repeated applications, so one spring application per year in the chemical treatment area is anticipated to be sufficient for spot treatment of Eurasian watermilfoil.

After the population of Eurasian watermilfoil is controlled in the chemical treatment area, the area will be monitored to determine whether follow up algae control is necessary. If excess algae growth develops (e.g., surface scum covering over 50 percent of the treatment area), short-term algae control may be achieved by applying a state-approved algicide. If algae control is needed beyond 2021, then long-term algae control techniques using non-chemical methods should be evaluated (e.g., mixing, shading, or nutrient inactivation).

Alternative manual management methods considered most feasible for this area include hand harvesting or suction dredging, which would be considerably more expensive than ProcellaCOR™ treatment.

2021-2022 Treatment Strategy (Public Areas)
Middle Sammamish River (Including Squire's Landing Park)

Treatment Strategy	Herbicide

ProcellaCOR™ is recommended as the primary treatment method for this area due to its low aquatic toxicity, high effectiveness on Eurasian watermilfoil, rapid uptake by milfoil in flowing waters, and high species-selectivity preventing harm to native vegetation. ProcellaCOR™ does not require repeated applications, so one spring application per year in the chemical treatment area is anticipated to be sufficient for spot treatment of Eurasian watermilfoil.

2021-2022 Biennium Cost: $495 - $745 (Lagoon Area)
$202 - $305 (Riverfront area)

Advantages: Cost is considerably lower than non-herbicide options. Application can cover large area quickly and often be completed in less than one day with contact advisories lasting less than 24 hours.

Disadvantages: Requires permit from Ecology and general negative perception of pesticides/herbicides due to potential impacts if not applied properly.

Recommended: Yes, if budget is primary concern. Other non-herbicide options are available at higher cost.

Treatment Strategy	Bottom Barrier

A bottom barrier would provide control of all target weeds observed in this area for at least one year and is expected to last two years on average, so the annual cost is based on two years of effectiveness. Due to waterbody characteristics in the river, this is not a feasible option for the riverfront area.

2021-2022 Biennium Cost: $18,283 - $36,619 (Lagoon Area)
Not Applicable (Riverfront area)

Advantages: Effective for treatment of all aquatic weeds without use of herbicides or water quality impacts. Treatment can remain effective for more than one growing season. Biodegradable barriers do not require physical removal after use.

Disadvantages: Requires individual HPA permit from WDFW. This strategy is a very expensive alternative compared to other treatment strategies and with a comparatively slow installation process that may potentially impact use of the area for a couple days. Non-biodegradable barriers require removal after 2 years of use and biodegradable barriers may lessen effectiveness over time. Fishing gear, propeller backwash, or boat anchors may damage or dislodge bottom barriers and they could become hazardous to swimmers if poorly maintained.

Recommended: No, other non-herbicide options are more viable.

Treatment Strategy	Shore Raking

Shoreline management of aquatic plants is not being recommended in this area.

Annual Cost: NA

Advantages: NA

Disadvantages: NA

Recommended: No

Treatment Strategy	Hand Removal by Divers

A team of divers, with 2-person surface support team, hand remove weeds from the target area. Weeds are collected and disposed of appropriately. Divers can cover approximately 0.2 acres per day. Expected to last two years with root removal.

2021-2022 Biennium Cost: $3,547 - $6,963 (Lagoon Area)
$1,450 - $2,847 (Riverfront area)

Advantages: This strategy does not require use of herbicides. All target weeds can be managed using this strategy. Can include removal of all invasive plant parts but selective removal of native plant shoots without roots to favor native plant growth.

Disadvantages: Requires individual HPA permit from WDFW. This strategy is a very expensive alternative compared to other treatment strategies. This process is also much slower than other options and may take multiple working days to complete treatment of the complete area.

Recommendation: No, suction dredging is a less costly and more effective alternative strategy for this large area covered by native and invasive plants.

Treatment Strategy	Suction Dredging

One diver, with 2-person surface support team, conduct suction dredging along the bottom of the target area. Weeds are collected and disposed of appropriately. Divers can cover approximately 0.7 acres per day. Expected to last two years with root removal.

2021-2022 Biennium Cost: $1,637 - $3,407 (Lagoon Area)
$670 - $1,393 (Riverfront area)

Advantages: This strategy does not require use of herbicides. All target weeds can be managed using this strategy. Expected to last two years with root removal.

Disadvantages: Requires individual HPA permit from WDFW. This strategy is a very expensive alternative compared to other treatment strategies. This process is also much slower than other options and may take multiple working days to complete treatment of the complete area.

Recommended: Yes, this appears to be a financially viable non-chemical strategy if greater control than mechanical harvesting is desired. Implementation does take several days so consideration of impacts should be considered.

Treatment Strategy	Mechanical Harvesting

An aquatic plant harvester consists of a pontoon boat with paddle wheels and is equipped with a 5-feet deep (or 8-feet deep on some models) cutting head that conveys the cut plants onto the boat. The collected weeds are conveyed to a trailer for disposal, preferably at a compost facility. Harvesting rates range from 1 to 4 acres per day depending on transport distance, wind, underwater obstructions, and plant biomass. Expected to require two cuts per season (e.g., late June and early August) due to plant regrowth of about 0.5 feet per week.

2021-2022 Biennium Cost: $7,476 plus $160/ton disposal (Lagoon area)
$3,058 plus $160/ton disposal (Riverfront area)

Advantages: This strategy does not require use of herbicides. All target weeds can be managed using this strategy. Faster rate than other non-chemical methods. Less fish habitat impact than other non-chemical strategies because not all plants are removed.

Disadvantages: Requires individual HPA permit from WDFW. Strong onshore winds may delay or reduce effectiveness of weed removal due to navigation and visibility issues. May increase accumulation of plant fragments on shore.

Recommended: No, suction dredging is a less costly and more effective alternative strategy for this large area covered by native and invasive plants.

Treatment Strategy	Moleaer Nanobubble Generator

Moleaer nanobubble generators inject tiny bubbles into a waterbody to increase oxidation-reduction potential, which increases the ability of the waterbody to break down waste products resulting in less algae buildup and clearer water. This option is suggested as an alternative to algicide for algae control in the lagoon at Squire's Landing.

2021-2022 Biennium Cost: $31,368 (Lagoon area)
Not Applicable (Riverfront area)

Advantages: This strategy does not require use of chemicals to control algae growth in lagoon area.

Disadvantages: Technology has limited history and more analysis of lagoon flow characteristics after improvement of park will be needed before considering implementation of this technology.

Recommended: No, not until an analysis of the lagoon can be conducted after park improvements are complete.

City Council Business Agenda Item
City of Kenmore, WA

Subject/Topic September 2020 Financial Report Presentation	For Council Meeting Agenda: November 9, 2020 Department: Finance and Administration Prepared by: Joanne Gregory, Director of Finance and Administration Initial & Date Approved by Department Head: JMG 10-30-20 Approved by City Attorney: Approved by Finance Director: JMG 10-30-20 Approved by City Manager: RYK
Proposed Council Action/Motion: Receive and File September 2020 Financial Report for the City of Kenmore, Washington	Exhibits/Attachments: September 2020 Financial Report for the City of Kenmore, Washington.

INFORMATION/BACKGROUND:

The September 2020 monthly financial report is presented for Council review. This provides the opportunity for the City Council and the community to receive information on the City of Kenmore's biennium to date revenues and expenditures in comparison to the City's 2019-2020 adopted biennial budget. The budget was adopted on November 19, 2018 and a mid-biennium review was conducted in November 2019. Due to expected negative economic impacts of the COVID19 pandemic, the expenditure budgets for the General and Street Funds were reduced by $1.1M and the budget reductions are incorporated into this report.

FISCAL CONSIDERATION:

September is the 21st month of the 2019-2020, 24-month biennium. It is the sixth month fully affected by the Governor's Stay Home Stay Healthy order in March although restrictions have been modified since that time. As of September, expenditures exceeded revenues in the General Fund by $1,096,875. Earlier in the year $2,051,000 of planned one-time transfers from the General Fund to the Street Fund ($1,427,000) and Strategic Opportunities Fund ($624,000) were recorded. In October the 2nd half of 2020 real property taxes are due which will balance out the revenue/expenditure comparison. Also, COVID19 related expenditures for PPE, technology and human services grants are impacting the expenditure total; these are expected to be reimbursed by the State at a later date.

In September, General Fund revenues were $629,915 and expenditures were $8886,192. Sales tax has a two-month lag therefore revenues received in September were from sales in July which was 7.7% higher compared to July 2019. Real Estate Excise Tax year to date is lower than 2019 by 3% although the month of September is slightly higher than September of 2019. The Dow Jones index fell to 27,781 on September 30 from 28,430 at the end of August. Unemployment dropped to 7.9% from 8.4%.

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COUNCIL GOAL/BUDGET OBJECTIVE BEING ADDRESSED: Kenmore Budget Policy 9a: A revenue/expenditure report will be produced monthly so that it can be directly compared to the actual results of the fiscal year to date. Kenmore Budget Policy 9b: All budget amendments, both revenues and expenditures, will be noted in the monthly report. Priority Based Budgeting Result: Governance: Supports decision-making with timely and accurate short-term and long-range analysis that enhances vision and planning.

18120 68TH AVE. NE
KENMORE, WASHINGTON 98028

MEMORANDUM

TO: Rob Karlinsey, City Manager
FROM: Joanne Gregory, Finance Director
DATE: October 20, 2020
RE: September 2020 Financial Reports for the City of Kenmore, Washington

September 2020 financial information is presented for your review and delivery to the City Council. Attached you will find the following reports:

- General Fund Summary
- General Fund Revenue Graphs
- General Fund Expenditure Graphs
- Street Fund Summary
- Cash and Investment Report
- Investment Schedule and Portfolio Analysis
- Sales Tax Receipts by Business Type
- Retail Sales and Use Tax Distribution
- Real Estate Excise Tax Report
- Report for Transportation Benefit District

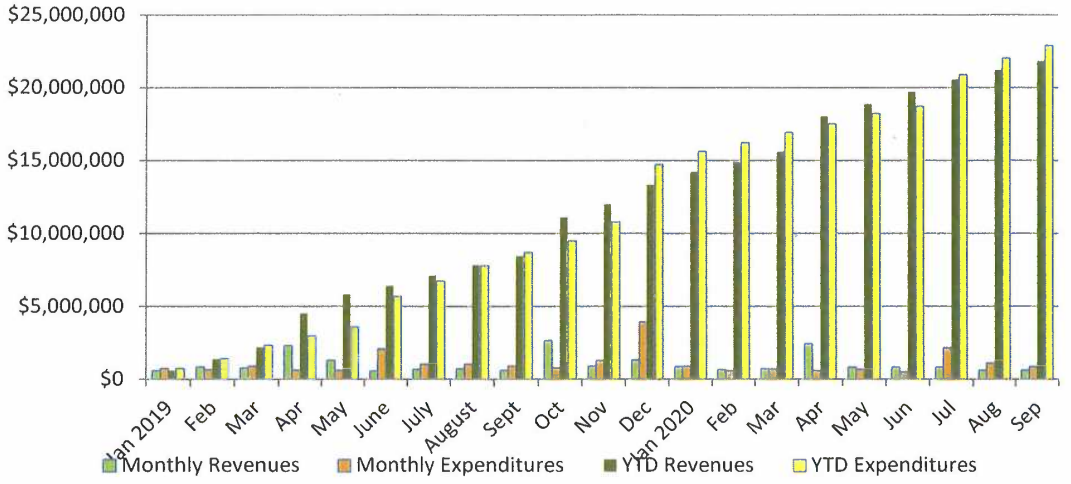
If you would like additional information or have any questions regarding the financial reports, please feel free to contact me.

GENERAL FUND

The first section of the monthly financial report is a review of the General Fund. This fund accounts for operational activities and includes all financial resources except those required or elected to be accounted for in another fund. Revenues include various taxes, per capita distributions from the State, fines and forfeitures, permits and licenses, and fees for service. In the context of the biennial budget, September is the twenty-first (88%) of the 2019-2020 biennial budget period. For the month of September, expenditures exceeded revenues in the General Fund by $256,277. Biennium to date, expenditures exceed revenues by $1,096,875.

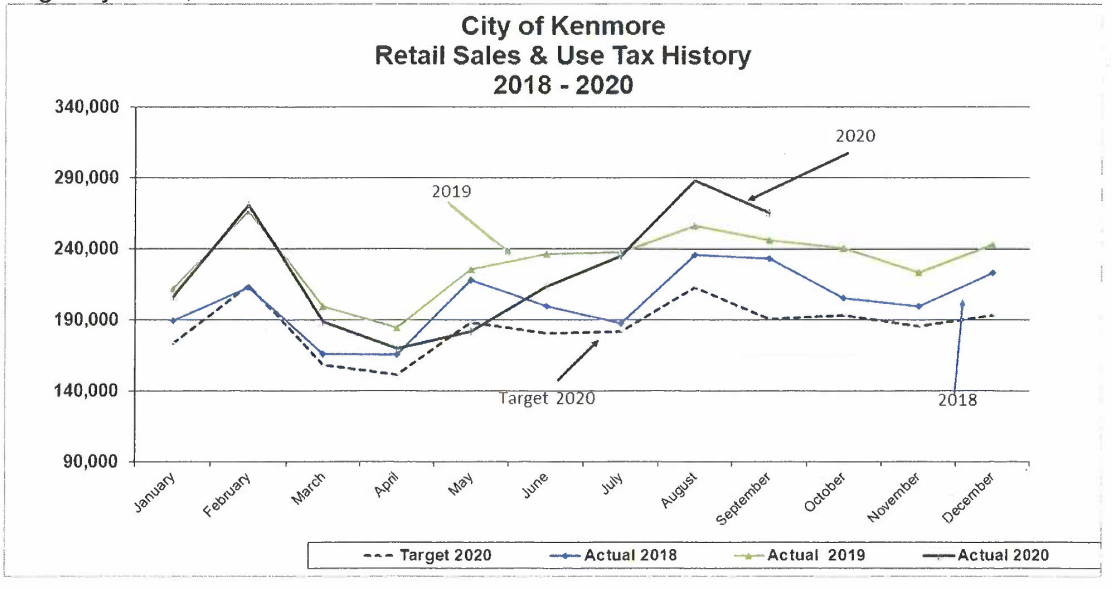
The following chart illustrates the monthly revenue and expenditure activity in the General Fund through September 2020.

City of Kenmore, Washington
Monthly Financial Report
September 2020

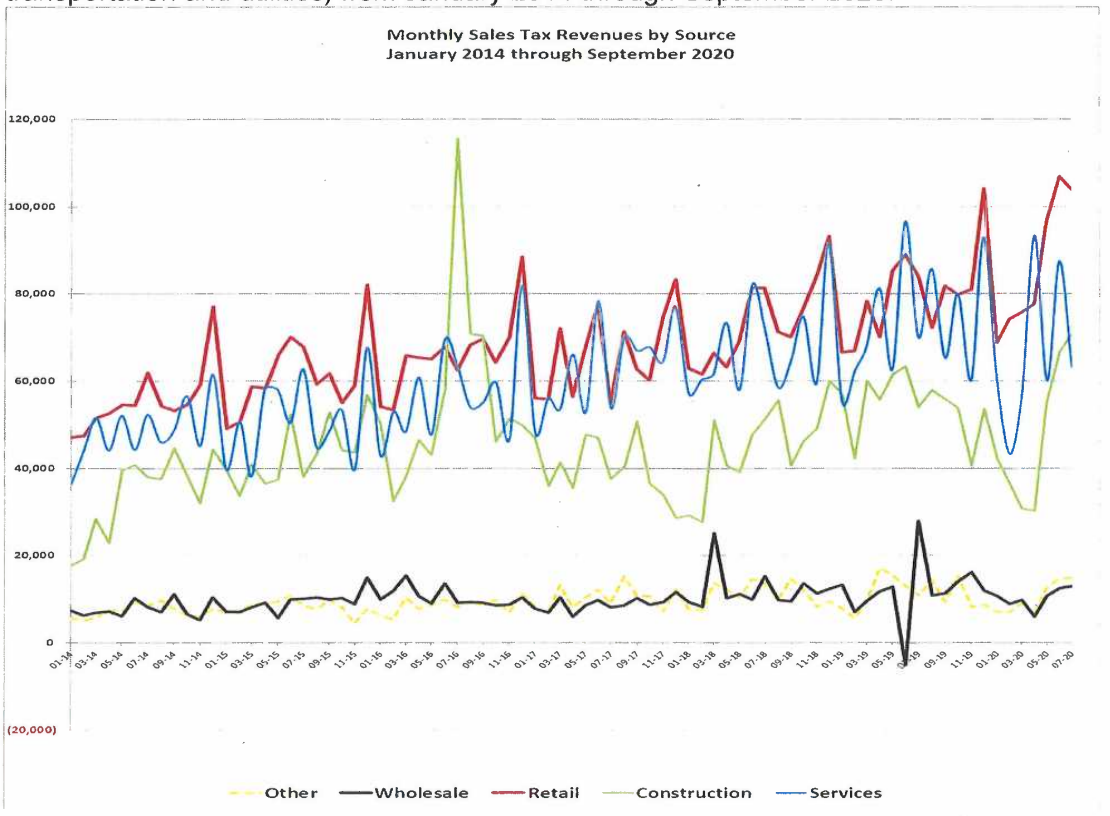


Total **revenues** for the month were **$629,915.** Biennium to date revenues are $21,823,177 which is 82% of the amended budgeted revenues of $26,477,872. Primary sources of revenue for the month included property taxes in the amount of $86,181, development fees & permits in the amount of $96,283, retail sales and use taxes in the amount of $265,718, and utility taxes in the amount of $61,697.

A summary of sales tax revenues received in **September** is attached. These receipts are based on **July** sales activity. The chart below gives a historical perspective of monthly sales tax receipts over the last several years. The black dotted Target 2020 line is a monthly average of actual receipts during 2017, 2018, and 2019. The purple line represents 2020 actual receipts, which are $44,855 below 2019 and ahead of the 2020 target by $367,862.



The following chart illustrates the historical trends of sales tax receipts from the major segments: construction, retail, wholesale, other (agriculture, services, manufacturing, transportation and utilities) from January 2014 through September 2020.



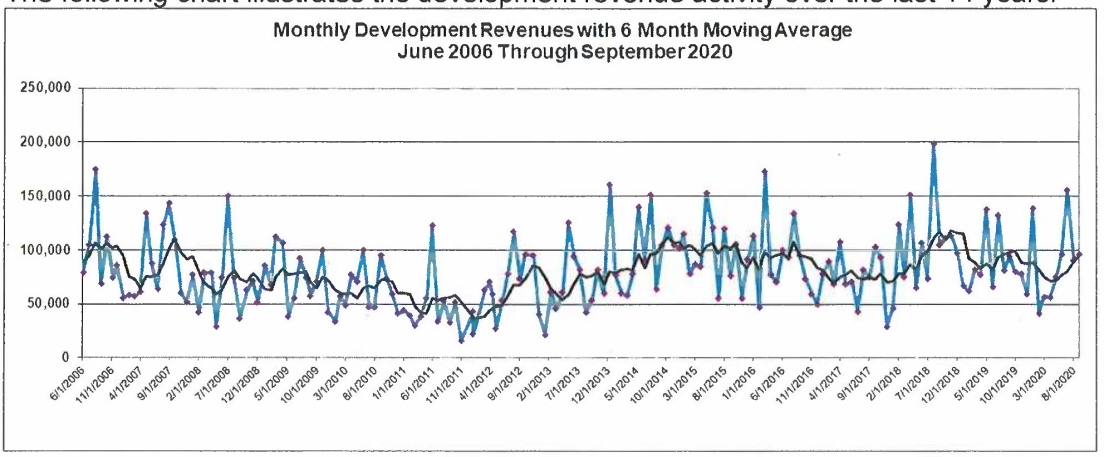
In September, the top 509 sales tax remitters, accounting for 89% or $237,555 of total remittances, were reviewed for internet sales activity.

Of the $237,555 of sales tax remitted by these companies in September, $56,011 (24% of the total) was generated from internet-based companies. Below is a chart that illustrates the amount of internet based sale tax in the major segments that include it:

	Total Sales Tax Remitted in September	Internet Based Companies	% of Total Internet Sales Tax Collected
Retail Trade	$76,854	$39,368	51%
Information	7,712	1,865	24%
Services	48,787	13,449	28%
Wholesale	9,944	1,329	13%
		$56,011	

City of Kenmore, Washington
Monthly Financial Report
September 2020

The following chart illustrates the development revenue activity over the last 14 years.



September 2020 expenditures were **$886,192.** Biennium to date expenditures are $22,920,052, which is 82% of the amended biennial budget expenditures of $27,857,781.

Total City cash ($17,579,878) and long-term investments ($5,510,927), at the end of September, totaled $23,090,805. Proposition 1 levy funds are included in this cash balance. The Other Funds Monthly Activity graphs compare biennium to date revenues and expenditures to the 2019-2020 biennial budget.

Total non-General Fund revenues were $751,236 and total non-General Fund expenditures were $1,140,600.

In the **Street Fund** revenue from gas tax distributions were $32,943. This revenue is from gas sales in August and is 1.6% lower than last month. $63,214 was expended for maintenance and operations during the month.

In the **Transportation Capital Fund,** there were expenditures in the amount of $291,348 on pedestrian safety projects & street maintenance. The fund received $186,928 in grant reimbursements during the month.

The **Sammamish Bridge Replacement Fund** had $1,308,441 in expenditures during the month. The fund received $1,035,395 in bridge grant reimbursements during the month

The **Park Impact Fee** fund received $11,655 in revenues during the month.

There were $30,344 in revenues for the **Transportation Impact Fee** fund during the month.

The **Real Estate Excise Tax** Fund received $158,479 of real estate excise taxes (REET) in September from sales activity that occurred in August. 44 transactions were reported during the month. The 2020 year to date revenue is lower than the 2019 revenue by $35,112 and $134,163 lower than the 2020 target.

The **Park Capital** fund had $84,928 in Park improvement expenditures during the current month.

The **Walkways & Waterways Debt Service** Fund collected $9,052 in property taxes related to the Prop 1 Bond for a biennium to date total revenue of $1,554,079.

The **Transportation Benefit District** Fund received $37,699 in vehicle license fees during the month.

SUMMARY

This concludes the financial report for the City of Kenmore as of **September 30, 2020.** I appreciate your feedback and encourage you to contact me if you have any questions prior to the City Council meeting.

City of Kenmore, Washington
General Fund Summary Report
September 30, 2020

	CURRENT PERIOD 2019-2020				PREVIOUS PERIOD 2017-2018			
	MONTH September 2020	BIENNIUM TO DATE 2019-2020	% of BUDGET	BIENNIUM BUDGET 2019-2020	MONTH September 2018	BIENNIUM TO DATE 2017-2018	% of BUDGET	BIENNIUM BUDGET 2017-2018
REVENUES								
Beginning Fund Balance		**4,934,368**		**4,934,368**		**3,138,914**		**3,131,687**
Property Taxes	86,181	7,966,745	77.9%	10,224,205	50,478	7,285,027	76.8%	9,491,704
Sales and Use Taxes	324,356	6,011,842	96.8%	6,212,000	291,965	5,211,563	88.2%	5,906,291
Utility Taxes	61,697	1,820,025	73.8%	2,466,355	77,972	2,137,876	78.7%	2,717,485
Other Taxes	2,292	204,839	112.6%	181,868	6,188	155,800	71.4%	218,113
Development Fees & Permits	96,283	1,822,217	98.3%	1,854,042	104,538	1,850,731	90.3%	2,050,518
Franchise Fees	0	1,525,829	83.3%	1,831,835	0	1,527,389	87.6%	1,743,476
Intergovernmental and Grants	55,873	1,036,893	98.0%	1,057,677	55,950	834,232	99.1%	841,615
Investment Interest	585	165,444	173.6%	95,300	4,067	185,610	356.9%	52,000
Fines and Forfeitures	0	4,173	n/a	0	-295	12,771	0.0%	0
Transfers and Other Revenues	2,647	1,265,171	49.5%	2,554,590	21,570	951,037	59.4%	1,600,972
Total Revenues	629,915	21,823,177	82.4%	26,477,872	612,433	20,152,036	81.8%	24,622,174
Total Revenues & Beginning Fund Balance		26,757,545		31,412,240		23,290,950		27,753,861

	CURRENT PERIOD 2019-2020				PREVIOUS PERIOD 2017-2018			
	MONTH September 2020	BIENNIUM TO DATE 2019-2020	% of BUDGET	BIENNIUM BUDGET 2019-2020	MONTH September	BIENNIUM TO DATE 2017-2018	% of BUDGET	BIENNIUM BUDGET 2017-2018
EXPENDITURES								
Cost Center								
City Council	6,197	297,557	88.5%	336,208	17,395	300,693	91.3%	329,426
City Manager	133,698	2,918,166	92.0%	3,170,520	121,235	2,850,641	85.6%	3,328,297
City Clerk	4,832	611,098	66.5%	919,466	13,023	423,960	99.7%	425,368
Finance	73,582	1,745,146	90.6%	1,925,756	61,573	1,602,132	95.8%	1,672,775
Legal	22,941	546,923	83.5%	654,782	13,961	430,280	86.1%	500,000
Interfund Transfers	0	2,606,529	80.8%	3,226,484	425,505	1,075,725	76.7%	1,403,228
Public Safety	322,138	6,926,337	77.2%	8,967,044	304,513	6,779,725	77.0%	8,806,304
Engineering & Environmental Services	48,216	1,119,723	72.0%	1,555,790	78,180	1,237,628	87.5%	1,415,011
Community Development	54,789	1,343,682	85.0%	1,580,826	71,309	1,183,411	69.0%	1,715,510
Developmental Services	90,093	2,142,007	94.2%	2,273,299	138,235	2,120,947	99.5%	2,131,288
Parks & Facility Maintenance	129,708	2,662,885	82.0%	3,247,606	92,564	1,764,340	61.8%	2,854,489
Total Expenditures	886,192	22,920,052	82.3%	27,857,781	1,337,492	19,769,483	80.4%	24,581,696
Ending Fund Balance	**-256,277**	**3,837,493**	**0**	**3,554,459**		**3,521,467**		**3,172,165**
Total Expenditures and Ending Fund Balance		26,757,545		31,412,240		23,290,950		27,753,861

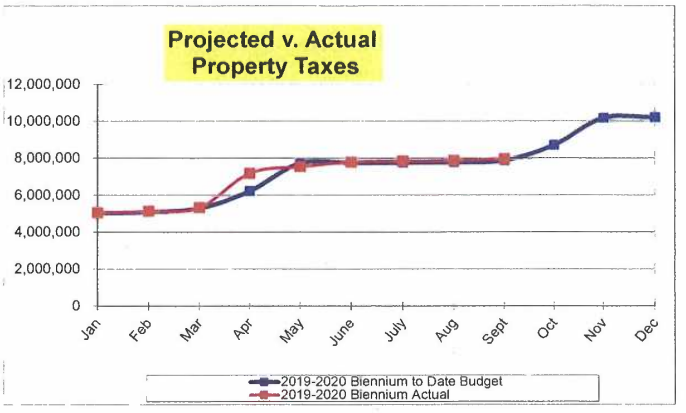
*Non-Departmental expenditures have been moved to other General Fund Cost Centers

I:\Admin & Finance\Monthly Reports\2020\Sept 2020General Fund

City of Kenmore, Washington
General Fund Revenue Graphs
September 30, 2020

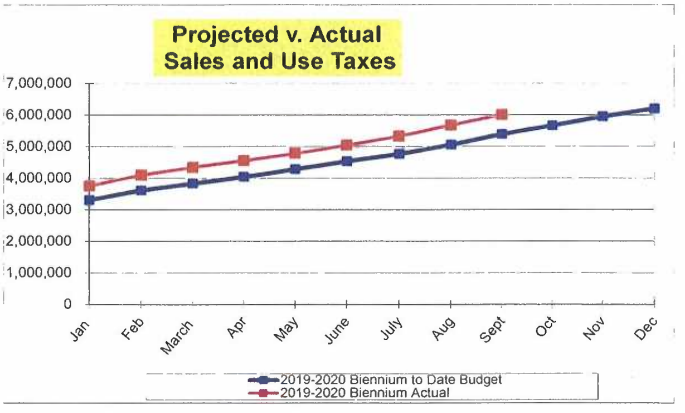
PROPERTY TAXES

	2019-2020 Biennium to Date Budget	2019-2020 Biennium Actual
2019	5,024,414	5,050,864
Jan	5,041,120	5,061,216
Feb	5,105,461	5,142,142
Mar	5,296,524	5,334,145
Apr	6,228,071	7,185,633
May	7,737,751	7,545,693
June	7,752,286	7,795,717
July	7,766,698	7,843,737
Aug	7,782,013	7,880,564
Sept	7,886,618	7,966,745
Oct	8,730,684	
Nov	10,194,653	
Dec	10,224,205	
2019-20	10,224,205	
Year To Date		
Actual v. Projected		101%



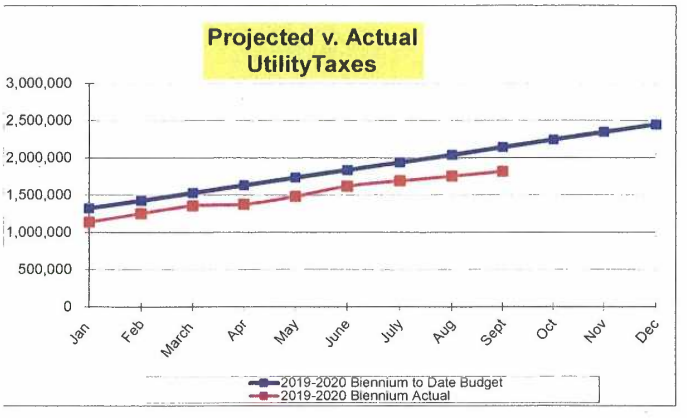
SALES, USE, CRIM JUSTICE TAXES

	2019-2020 Biennium to Date Budget	2019-2020 Biennium Actual
2019	3,102,000	3,493,551
Jan	3,314,653	3,759,238
Feb	3,620,942	4,101,432
March	3,838,937	4,346,349
Apr	4,049,383	4,562,020
May	4,291,368	4,789,674
June	4,543,454	5,049,140
July	4,778,211	5,340,419
Aug	5,068,877	5,687,486
Sept	5,397,027	6,011,842
Oct	5,677,075	
Nov	5,960,380	
Dec	6,212,000	
2019-20	6,212,000	
Year To Date		
Actual v. Projected		111%



UTILITY TAXES

	2019-2020 Biennium to Date Budget	2019-2020 Biennium Actual
2019	1,227,000	1,029,975
Jan	1,329,250	1,143,328
Feb	1,431,500	1,257,030
March	1,533,750	1,360,425
Apr	1,636,000	1,380,122
May	1,738,250	1,488,191
June	1,840,500	1,623,719
July	1,942,750	1,695,949
Aug	2,045,000	1,758,328
Sept	2,147,250	1,820,025
Oct	2,249,500	
Nov	2,351,750	
Dec	2,454,000	
2019-20	2,466,355	
Year To Date		
Actual v. Projected		85%



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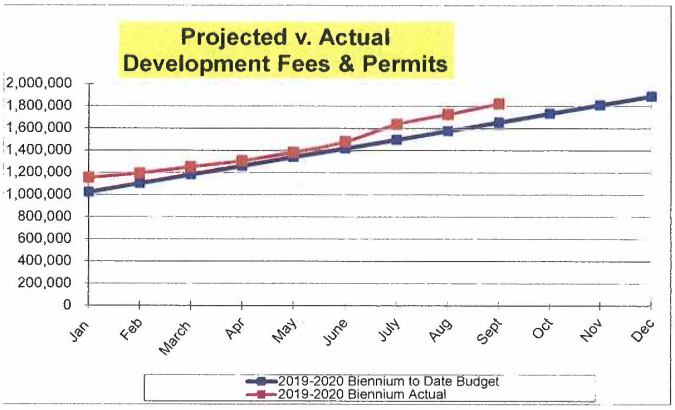
City of Kenmore, Washington
General Fund Revenue Graphs
September 30, 2020

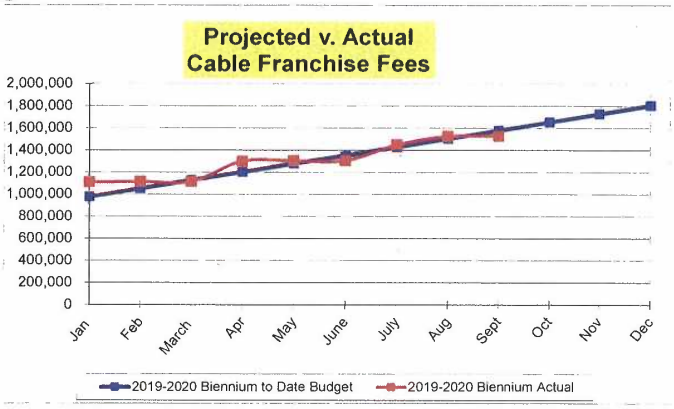
DEVELOPMENT FEES & PERMITS

	2019-2020 Biennium to Date Budget	2019-2020 Biennium Actual
2019	945,576	1,014,896
Jan	1,024,374	1,153,770
Feb	1,103,172	1,195,109
March	1,181,970	1,251,405
Apr	1,260,768	1,307,950
May	1,339,566	1,382,812
June	1,418,364	1,479,076
July	1,497,162	1,635,134
Aug	1,575,960	1,725,933
Sept	1,654,758	1,822,217
Oct	1,733,556	
Nov	1,812,354	
Dec	1,891,152	
'2019-20	1,854,042	
Year To Date		
Actual v. Projected		110%



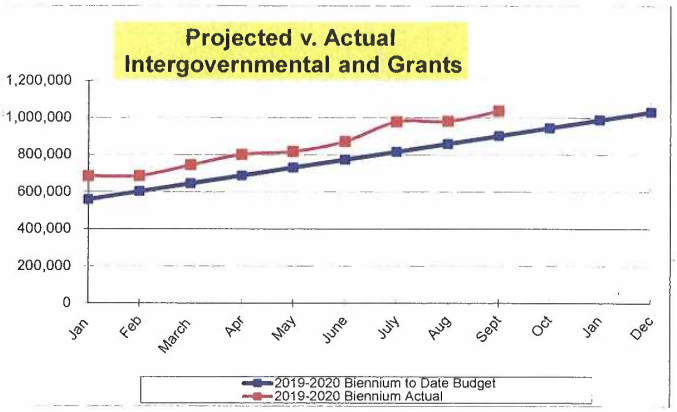
CABLE/WATER/SEWER FRANCHISE FEES

	2019-2020 Biennium to Date Budget	2019-2020 Biennium Actual
2019	902,382	874,872
Jan	977,581	1,110,153
Feb	1,052,779	1,114,341
March	1,127,978	1,114,341
Apr	1,203,176	1,300,350
May	1,278,375	1,304,237
June	1,353,573	1,304,237
July	1,428,772	1,449,163
Aug	1,503,970	1,525,829
Sept	1,579,169	1,525,829
Oct	1,654,367	
Nov	1,729,566	
Dec	1,804,764	
'2019-20	1,831,835	
Year To Date		
Actual v. Projected		97%



INTERGOVERNMENTAL & GRANTS

	2019-2020 Biennium to Date Budget	2019-2020 Biennium Actual
2019	515,651	627,769
Jan	558,622	684,503
Feb	601,593	686,213
March	644,564	744,611
Apr	687,535	801,143
May	730,506	817,203
June	773,477	872,583
July	816,447	978,007
Aug	859,418	981,020
Sept	902,389	1,036,893
Oct	945,360	
Jan	988,331	
Dec	1,031,302	
'2019-20	1,057,677	
Year To Date		
Actual v. Projected		115%



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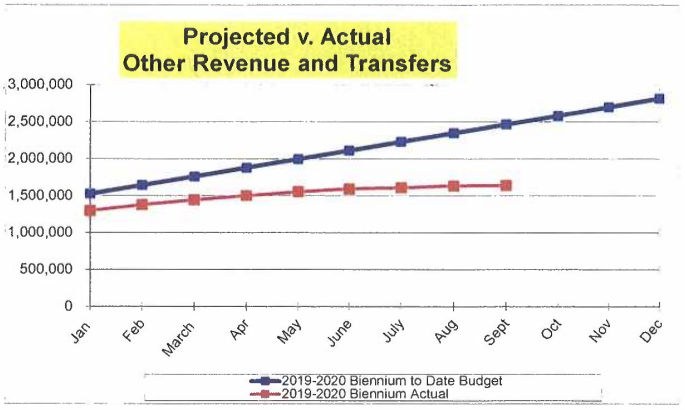
City of Kenmore, Washington
General Fund Revenue Graphs
September 30, 2020

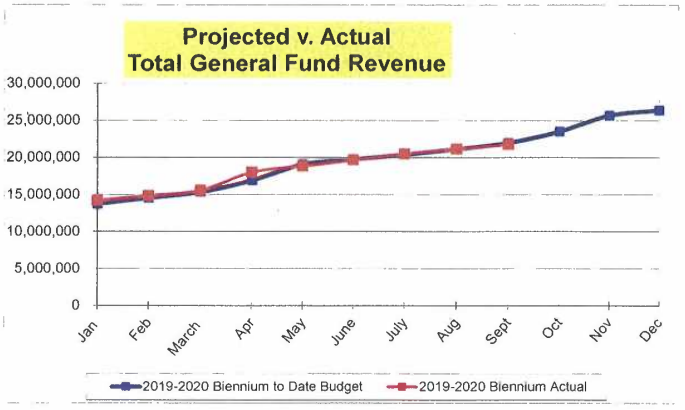
OTHER REVENUES AND TRANSFERS

	2019-2020 Biennium to Date Budget	2019-2020 Biennium Actual
2019	1,410,444	1,234,739
Jan	1,527,981	1,297,287
Feb	1,645,518	1,378,460
March	1,763,055	1,444,730
Apr	1,880,592	1,502,044
May	1,998,129	1,554,138
June	2,115,666	1,594,506
July	2,233,203	1,610,810
Aug	2,350,740	1,634,103
Sept	2,468,277	1,639,627
Oct	2,585,814	
Nov	2,703,351	
Dec	2,820,888	
'2019-20	2,831,758	
Year To Date Actual v. Projected		66%



TOTAL GENERAL FUND REVENUE

	2019-2020 Biennium to Date Budget	2019-2020 Biennium Actual
Jan	13,773,581	14,209,494
Feb	14,560,965	14,874,728
March	15,386,777	15,596,006
Apr	16,945,525	18,039,262
May	19,113,945	18,881,949
June	19,797,319	19,718,978
July	20,463,243	20,553,219
Aug	21,185,979	21,193,262
Sept	22,035,488	21,823,177
Oct	23,576,356	
Nov	25,740,386	
Dec	26,438,311	
'2019-20	26,477,872	
Year To Date Actual v. Projected		99%



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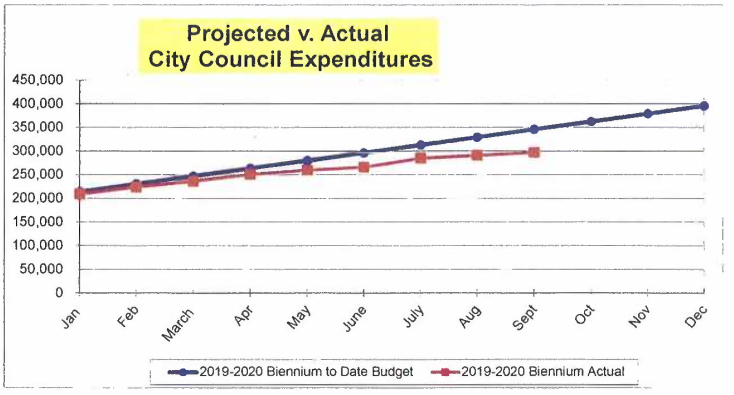
City of Kenmore, Washington
General Fund Expenditure Graphs*
September 30, 2020

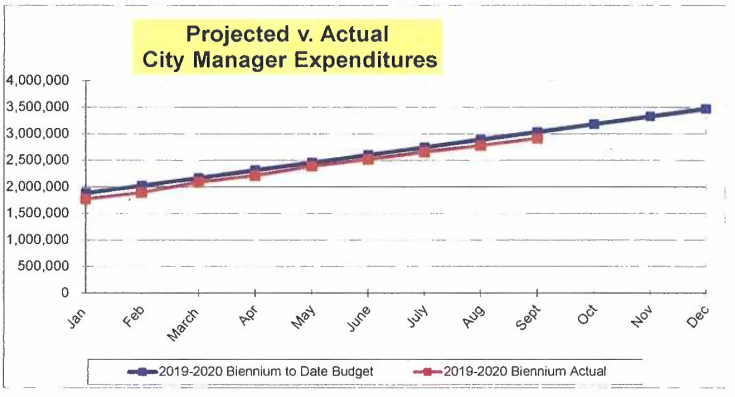
CITY COUNCIL

	2019-2020 Biennium to Date Budget	2019-2020 Biennium Actual
2019	197,953	166,557
Jan	214,449	209,570
Feb	230,945	224,551
March	247,441	236,851
Apr	263,937	250,761
May	280,433	259,920
June	296,930	266,298
July	313,426	285,096
Aug	329,922	291,361
Sept	346,418	297,557
Oct	362,914	
Nov	379,410	
Dec	395,906	
2019-20	400,337	
Year To Date		
Actual v. Projected		86%



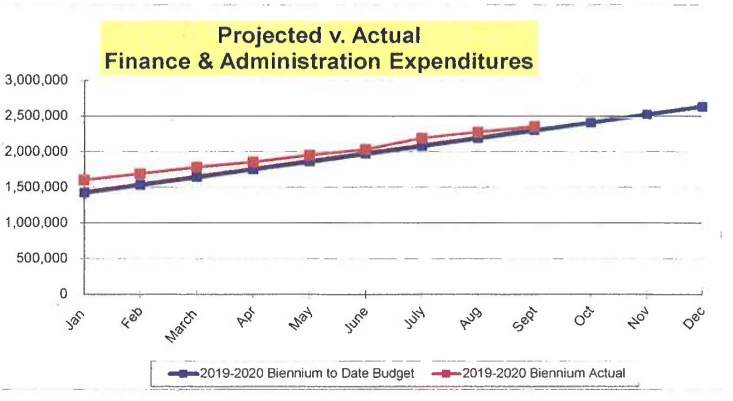
CITY MANAGER

	2019-2020 Biennium to Date Budget	2019-2020 Biennium Actual
2019	1,738,841	1,651,429
Jan	1,883,744	1,773,645
Feb	2,028,648	1,897,149
March	2,173,551	2,091,116
Apr	2,318,455	2,213,470
May	2,463,358	2,393,013
June	2,608,262	2,521,658
July	2,753,165	2,664,260
Aug	2,898,068	2,784,467
Sept	3,042,972	2,918,166
Oct	3,187,875	
Nov	3,332,779	
Dec	3,477,682	
2019-20	3,471,467	
Year To Date		
Actual v. Projected		96%



FINANCE & ADMINISTRATION

	2019-2020 Biennium to Date Budget	2019-2020 Biennium Actual
2019	1,316,827	1,248,548
Jan	1,426,563	1,603,856
Feb	1,536,298	1,691,479
March	1,646,034	1,785,191
Apr	1,755,769	1,859,291
May	1,865,505	1,953,314
June	1,975,241	2,036,998
July	2,084,976	2,194,391
Aug	2,194,712	2,277,831
Sept	2,304,447	2,356,245
Oct	2,414,183	
Nov	2,523,918	
Dec	2,633,654	
2019-20	2,708,853	
Year To Date		
Actual v. Projected		102%



*** The Blue Budget lines do not reflect the COVID19 reductions taken in April**

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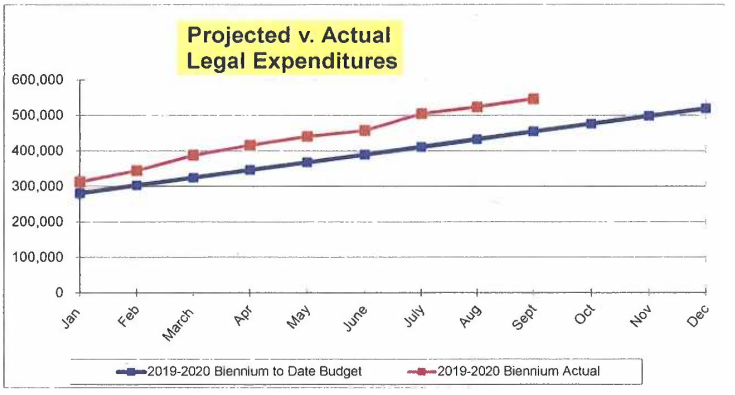
City of Kenmore, Washington
General Fund Expenditure Graphs*
September 30, 2020

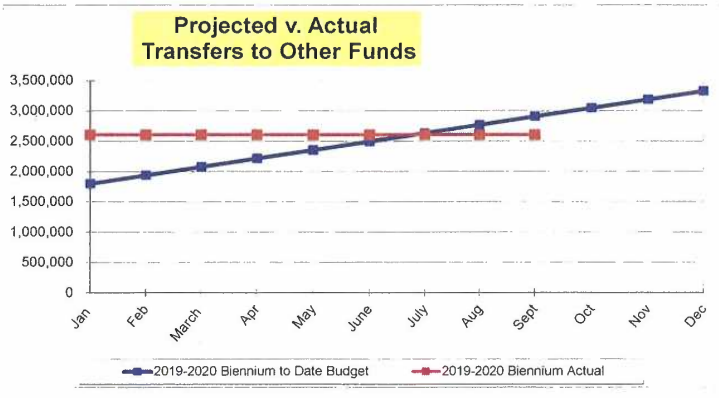
LEGAL

	2019-2020 Biennium to Date Budget	2019-2020 Biennium Actual
2019	260,000	312,722
Jan	281,667	313,184
Feb	303,333	344,327
March	325,000	387,838
Apr	346,667	415,988
May	368,333	440,916
June	390,000	457,584
July	411,667	505,287
Aug	433,333	523,982
Sept	455,000	546,923
Oct	476,667	
Nov	498,333	
Dec	520,000	
2019-20	530,000	
Year To Date		
Actual v. Projected		120%



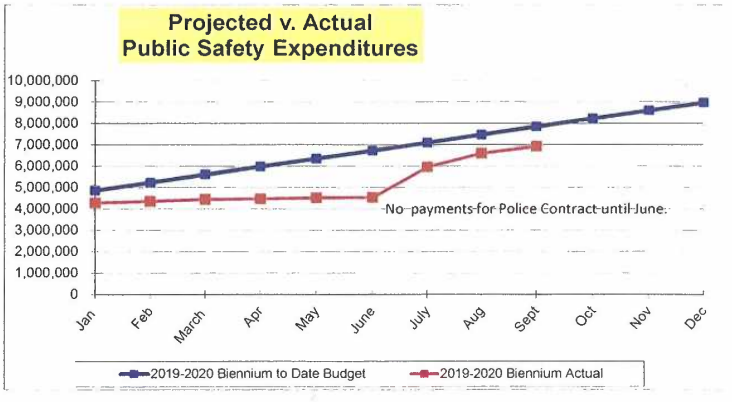
TRANSFERS TO OTHER FUNDS

	2019-2020 Biennium to Date Budget	2019-2020 Biennium Actual
2019	1,663,897	2,606,529
Jan	1,802,555	2,606,529
Feb	1,941,213	2,606,529
March	2,079,871	2,606,529
Apr	2,218,529	2,606,529
May	2,357,187	2,606,529
June	2,495,846	2,606,529
July	2,634,504	2,606,529
Aug	2,773,162	2,606,529
Sept	2,911,820	2,606,529
Oct	3,050,478	
Nov	3,189,136	
Dec	3,327,794	
2019-20	3,226,484	
Year To Date		
Actual v. Projected		90%



PUBLIC SAFETY

	2019-2020 Biennium to Date Budget	2019-2020 Biennium Actual
2019	4,492,575	4,282,065
Jan	4,866,956	4,291,016
Feb	5,241,338	4,362,349
March	5,615,719	4,448,594
Apr	5,990,100	4,485,997
May	6,364,481	4,531,349
June	6,738,863	4,544,392
July	7,113,244	5,968,981
Aug	7,487,625	6,604,199
Sept	7,862,006	6,926,337
Oct	8,236,388	
Nov	8,610,769	
Dec	8,985,150	
2019-20	9,133,991	
Year To Date		
Actual v. Projected		88%



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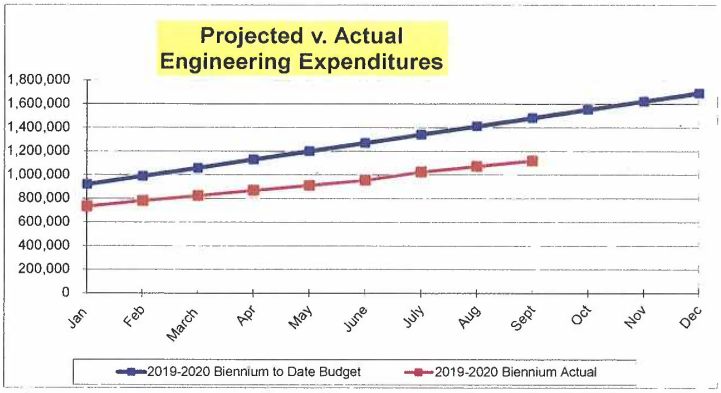
City of Kenmore, Washington
General Fund Expenditure Graphs*
September 30, 2020

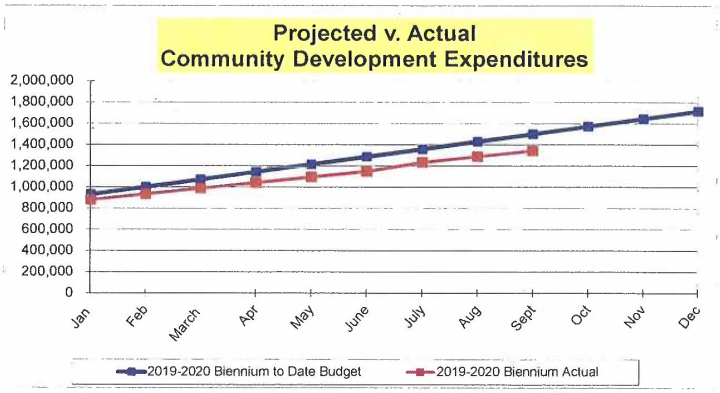
ENGINEERING

	2019-2020 Biennium to Date Budget	2019-2020 Biennium Actual
2019	847,685	674,259
Jan	918,325	731,841
Feb	988,966	780,295
March	1,059,606	823,596
Apr	1,130,247	867,066
May	1,200,887	910,748
June	1,271,528	954,142
July	1,342,168	1,025,202
Aug	1,412,808	1,071,507
Sept	1,483,449	1,119,723
Oct	1,554,089	
Nov	1,624,730	
Dec	1,695,370	
2019-20	1,658,620	
Year To Date Actual v. Projected		75%



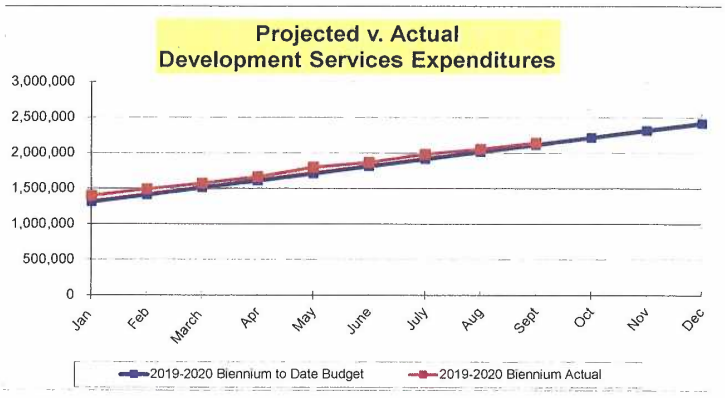
COMMUNITY DEVELOPMENT

	2019-2020 Biennium to Date Budget	2019-2020 Biennium Actual
2019	858,610	798,613
Jan	930,161	878,279
Feb	1,001,712	933,626
March	1,073,263	988,218
Apr	1,144,813	1,041,906
May	1,216,364	1,095,708
June	1,287,915	1,149,550
July	1,359,466	1,233,806
Aug	1,431,017	1,288,892
Sept	1,502,568	1,343,682
Oct	1,574,118	
Nov	1,645,669	
Dec	1,717,220	
2019-20	1,698,893	
Year To Date Actual v. Projected		89%



DEVELOPMENT SERVICES

	2019-2020 Biennium to Date Budget	2019-2020 Biennium Actual
2019	1,208,200	1,227,207
Jan	1,308,883	1,396,571
Feb	1,409,567	1,491,445
March	1,510,250	1,571,648
Apr	1,610,933	1,663,786
May	1,711,617	1,795,904
June	1,812,300	1,868,299
July	1,912,983	1,981,782
Aug	2,013,667	2,051,915
Sept	2,114,350	2,142,007
Oct	2,215,033	
Nov	2,315,717	
Dec	2,416,400	
2019-20	2,461,502	
Year To Date Actual v. Projected		101%



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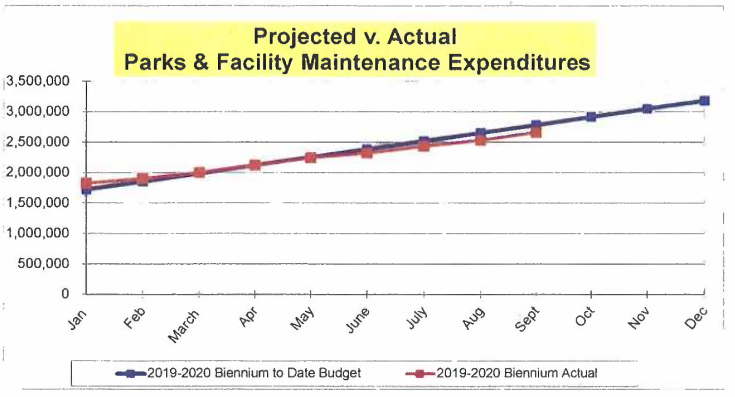
City of Kenmore, Washington
General Fund Expenditure Graphs*
September 30, 2020

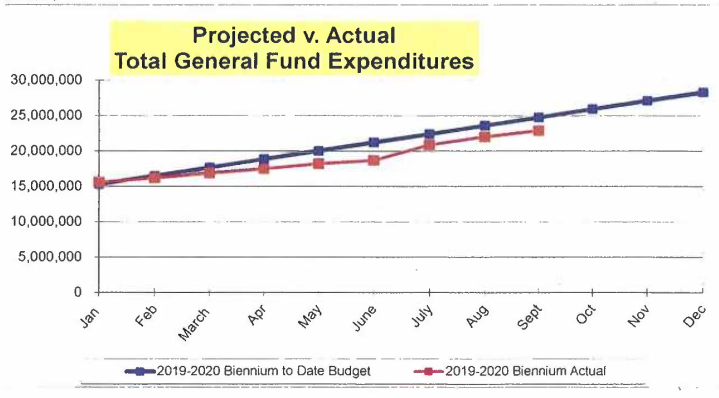
PARKS & FACILITY MAINTENANCE

	2019-2020 Biennium to Date Budget	2019-2020 Biennium Actual
2019	1,592,380	1,760,364
Jan	1,725,078	1,828,695
Feb	1,857,777	1,905,398
March	1,990,475	2,002,841
Apr	2,123,173	2,127,339
May	2,255,872	2,245,201
June	2,388,570	2,324,861
July	2,521,268	2,438,579
Aug	2,653,967	2,533,177
Sept	2,786,665	2,662,885
Oct	2,919,363	
Nov	3,052,062	
Dec	3,184,760	
2019-20	3,236,725	
Year To Date		
Actual v. Projected		96%



TOTAL GENERAL FUND EXPENDITURES

	2019-2020 Biennium to Date Budget	2019-2020 Biennium Actual
Jan	15,358,382	15,633,185
Feb	16,539,796	16,237,147
March	17,721,210	16,942,423
Apr	18,902,624	17,532,133
May	20,084,038	18,232,604
June	21,265,452	18,730,311
July	22,446,866	20,903,912
Aug	23,628,280	22,033,860
Sept	24,809,694	22,920,052
Oct	25,991,108	
Nov	27,172,522	
Dec	28,353,936	
2019-20	28,526,872	
Year To Date		
Actual v. Projected		92%



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City of Kenmore, Washington
Street Fund Summary Report
September 30, 2020

	MONTH September 2020	BIENNIUM TO DATE 2019-2020	% of BUDGET	BUDGET 2019-2020
REVENUES				
Beginning Fund Balance		**926,962**		**926,962**
Fuel Tax	32,943	784,560	78.0%	1,006,385
Investment Interest	96	21,675	433.5%	5,000
Miscellaneous	400	15,867	793.3%	2,000
ROW Permit Fees/Inspections	3,362	245,851	102.4%	240,000
Multimodal Transportation	7,947	55,572	88.3%	62,910
Transfer from General Fund	0	1,982,529	76.2%	2,602,484
Transfer from TBD	0	358,000	50.0%	716,000
Total Revenues	44,749	3,464,053	74.7%	4,634,779
Total Revenues & Beginning Fund Balance		4,391,015		5,561,741

		BIENNIUM TO DATE 2019-2020	% of BUDGET	BUDGET 2019-2020
EXPENDITURES				
Salary and Benefits	50,007	1,173,457	88.8%	1,320,880
Maintenance & Operations	63,214	1,724,524	60.8%	2,838,406
Capital	0	155,312	341.6%	45,463
Total Expenditures	113,221	3,053,292	72.6%	4,204,749
Ending Fund Balance		**1,337,723**		**1,356,992**
Total Expenditures and Ending Fund Balance		4,391,015		5,561,741

I:\Admin & Finance\Monthly Reports\2020\Sept 2020Street Fund

City of Kenmore, Washington
Cash and Investment Report
September 30, 2020

Fund	Beg. Cash & Inv. from Prev. Mo.	Monthly Revenues	Monthly Expenditures	End. Cash & Inv. Current Month
General	$4,093,770	$629,915	$886,192	3,837,493
Street	1,405,194	44,749	113,221	1,336,722
Transportation Capital	-1,398,227	186,928	291,348	(1,502,647)
Public Art	69,196	5	0	69,201
Park Impact Fee	369,140	11,711	-400,000	780,852
Transportation Impact Fee	3,461,926	30,596	0	3,492,522
Swamp Creek Basin	1,088,345	78	0	1,088,423
Transportation Benefit District	351,270	37,727	0	388,997
Sammamish Bridge Replacement	-2,256,863	1,035,395	1,308,441	(2,529,909)
Walkways & Waterways Debt Service	353,112	9,052	0	362,164
Real Estate Excise Tax	2,396,333	158,699	-500,000	3,055,032
Kenmore Village	3	0	0	3
Park Capital	-778,470	-900,000	84,929	(1,763,399)
Walkways & Waterways Bond	6,430,059	1,407	0	6,431,466
Surface Water Management	2,485,252	48,807	203,588	2,330,472
Surface Water Capital	-45,136	10,500	0	(34,636)
Public Works Shop Fund	0	0	0	0
Strategic Reserve	1,340,571	97	0	1,340,668
Strategic Opportunities	3,051,106	220	0	3,051,326
Equipment Replacement	500,142	36	0	500,178
Trust & Agency	819,348	75,230	39,074	855,504
Totals	$23,736,073	$1,381,151	$2,026,792	$23,090,432

Fund	Cash, Savings, Local Govt Investment Pool	(> One Year) Fixed Investments	Total
General	$3,461,941	$375,927	3,837,868
Street	486,723	850,000	1,336,723
Transportation Capital	-1,502,647	0	(1,502,647)
Public Art	54,201	15,000	69,201
Park Impact Fee	-149,146	930,000	780,854
Transportation Impact Fee	3,462,524	30,000	3,492,524
Swamp Creek Basin	-311,576	1,400,000	1,088,424
Transportation Benefit District	388,997	0	388,997
Sammamish Bridge Replacement	-2,529,909	0	(2,529,909)
Walkways & Waterways Debt Service	362,164	0	362,164
Real Estate Excise Tax	3,055,030	0	3,055,030
Kenmore Village	0	0	0
Park Capital	-1,763,399	0	(1,763,399)
Walkways & Waterways Bond	6,431,466	0	6,431,466
Surface Water Management	1,820,473	510,000	2,330,473
Surface Water Capital	-34,636	0	(34,636)
Public Works Shop Fund	0	0	0
Strategic Reserve	490,668	850,000	1,340,668
Strategic Opportunities	3,051,326	0	3,051,326
Equipment Replacement	50,178	450,000	500,178
Trust & Agency	755,499	100,000	855,499
Totals	$17,579,878	$5,510,927	$23,090,805

note: negative balances are due to pending transfers from other funds, not yet recorded.

I:\Admin & Finance\Monthly Reports\2020\Sept 2020CashInv

City of Kenmore, Washington
Investment Schedule
September 30, 2020

		Average Yield to Maturity-Securities					Overall Average Yield	0.63%
Report by Security	**Investment #**	**Type**	**Maturity Date**	**Purchase Date**	**Rate**	**Yield**	**Principal or Balance**	**Yield Equivalents**
Morgan Stanley								
	3130AHFA6	FHLB	11/4/2022	11/4/2019	1.80%	1.80%	1,000,000.00	18,000.00
Total Morgan Stanley Purchases							1,000,000.00	18,000.00
Time Value Investments								
	3130AHV83	FHLB	1/22/2024	1/22/2020	1.78%	1.78%	1,001,154.00	17,820.54
	3133ELAU8	FFCB	11/25/2022	3/25/2020	1.71%	1.71%	1,510,054.50	25,821.93
	76116FAG2	RFCSP	1/15/2021	5/31/2018	2.50%	2.50%	999,718.18	24,992.95
Total TVI Purchases							**3,510,926.68**	**68,635.43**
Opus Bank CD's								
	11495975	CD	8/10/2020	8/10/2019	2.50%	2.50%	1,000,000.00	24,970.00
Total Cascade Bank CD's							**1,000,000.00**	**24,970.00**
TOTAL ALL SECURITIES							**$ 5,510,926.68**	**$ 111,605.43**

Banner Checking and Savings	**0.03% Banner**	**2,664,511.94**	799.35
Pacific Premier Savings	**0.28% Pacific Premier**	**3,152,248.68**	8,826.30
LGIP - Primary Account	**0.21% LGIP**	**3,441,343.68**	7,082.29
LGIP - Bond Proceeds Account	**0.21% LGIP**	**8,321,773.84**	17,126.21
Total Accounts		**$ 23,090,804.82**	**145,439.57**

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City of Kenmore, Washington

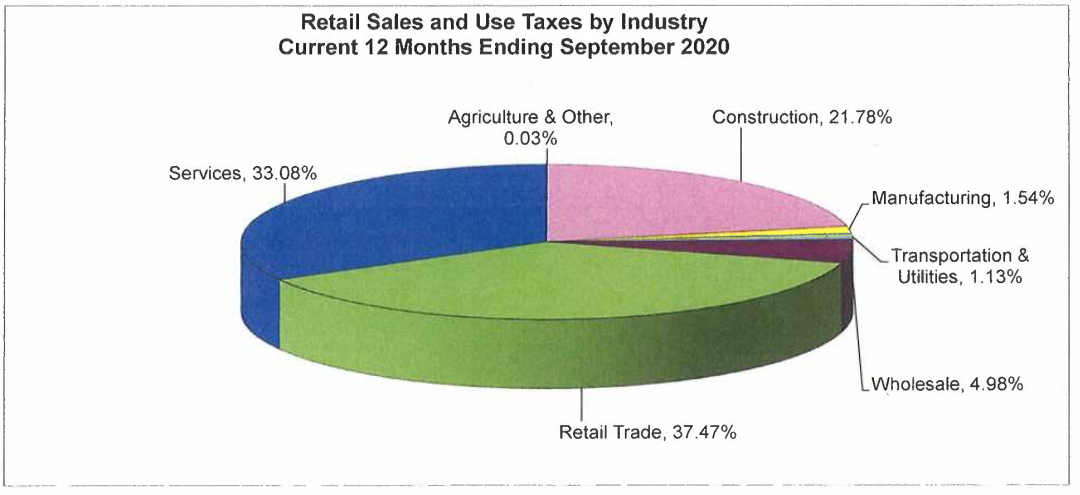
SALES TAX RECEIPTS BY BUSINESS TYPE

September 2020

	SALES TAX	USE TAX	TOTAL	PERCENT
AGRICULTURE & OTHER	39.04	0.00	39.04	0.0%
CONSTRUCTION	68,963.11	1,876.34	70,839.45	26.7%
MANUFACTURING	4,146.11	2.20	4,148.31	1.6%
TRANSPORTATION & UTILITIES	2,056.07	508.02	2,564.10	1.0%
WHOLESALE	12,900.41	31.00	12,931.40	4.9%
RETAIL TRADE	103,712.35	181.54	103,893.88	39.1%
SERVICES	54,455.47	274.58	54,730.05	20.6%
INFORMATION	8,267.44	197.73	8,465.16	3.2%
PUBLIC SERVICES	6.18	8,100.70	8,106.89	3.1%
	254,546.18	11,172.11	265,718.29	100.0%

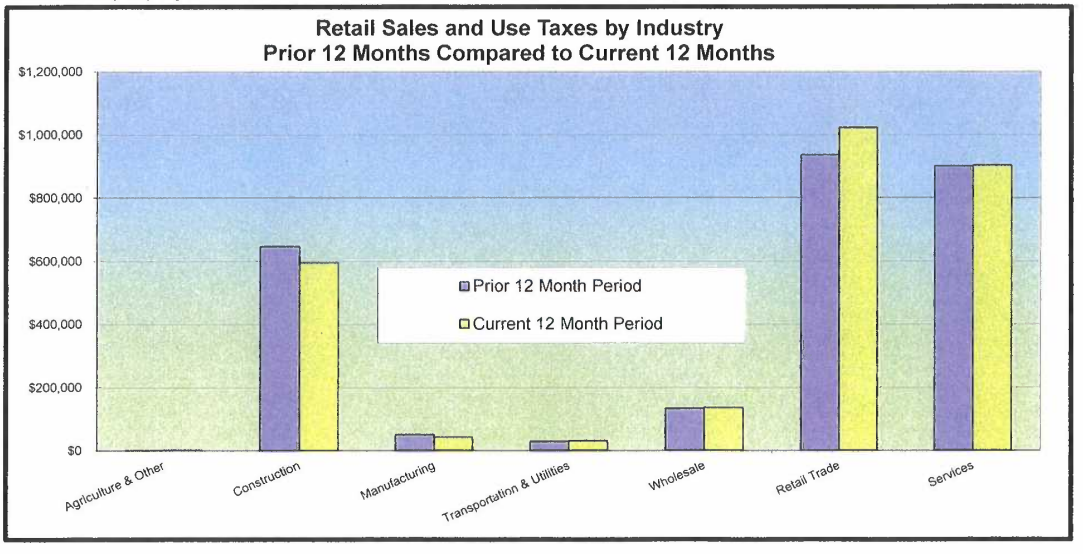
City of Kenmore, Washington
Retail Sales and Use Tax Distribution
September 30, 2020

Industry	Prior 12 Months ending September 2019	Current 12 Months ending September 2020	% Increase/ (Decrease)	% of Total
Agriculture & Other (Landscaping, Animal Hospitals)	$597	$729	22.18%	0.03%
Construction	645,548	594,553	-7.90%	21.78%
Manufacturing (Printing, Publishing, Other Manuf.)	50,353	42,095	-16.40%	1.54%
Transp/Comm/Utilities (Telecomm., Air Transport.)	28,530	30,713	7.65%	1.13%
Wholesale (Lumber, Other Wholesale)	133,835	135,849	1.50%	4.98%
Retail Trade (Eating, Merchandise, Food Stores)	935,472	1,022,587	9.31%	37.47%
Services (Auction, Recreation, Auto Repair, Financial)	900,107	902,712	0.29%	33.08%
Totals	$2,694,442	$2,729,238	1.29%	100%
Increase/(Decrease)		$34,796	1.29%	



NOTE: Due to the City's Confidentiality Agreement with the Department of Revenue, specific business information cannot be disclosed.

There is a sixty-day lag between sales taxes collected and when they are remitted to the City



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City of Kenmore, Washington
Real Estate Excise Tax Report
September 30, 2020

Real Estate Excise Taxes (REET)
2017 - 2020 Monthly Receipts

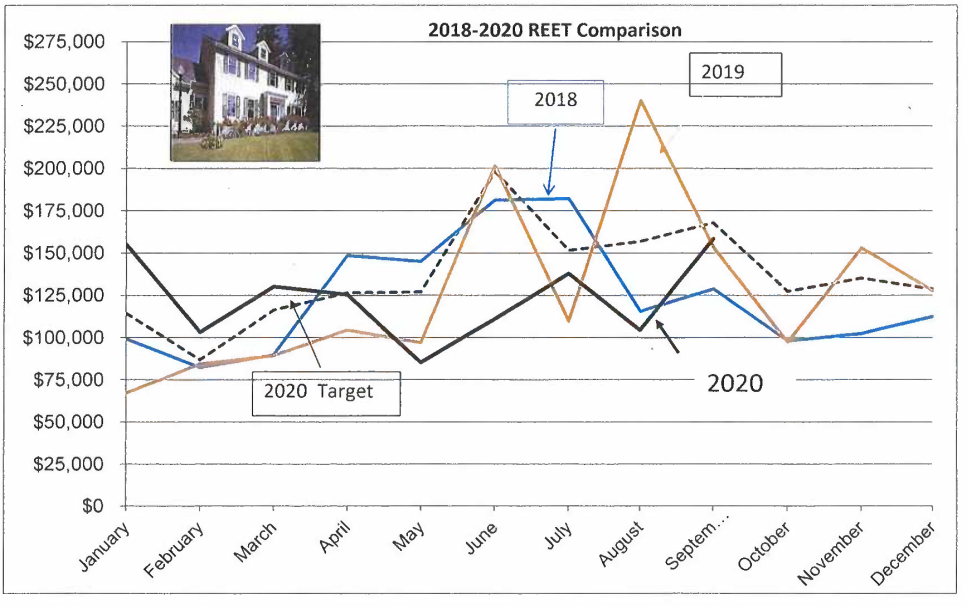
	Actual 2017	Actual 2018	Actual 2019	Actual 2020	Target 2020
January	176,657	99,205	67,141	155,141	114,335
February	94,134	82,263	84,215	103,270	86,871
March	170,086	89,698	89,106	130,207	116,297
April	126,245	148,514	104,430	125,508	126,396
May	139,422	144,906	96,756	85,257	127,028
June	211,430	181,182	201,666	110,913	198,093
July	163,138	181,974	109,538	137,879	151,550
August	114,754	115,421	240,124	104,386	156,766
September	221,719	128,704	153,174	158,479	167,866
October	186,805	97,998	97,291		127,365
November	150,187	102,373	152,965		135,175
December	146,159	112,490	127,473		128,707
	$1,900,736	$1,484,728	$1,523,880	$1,111,039	$1,636,448

For 2020, REET is $35,112 less than the same period last year and less than the 2020 target by $134,163

* NOTE THE 2020 target is computed on a 3 year average (2017-2019) of actual receipts

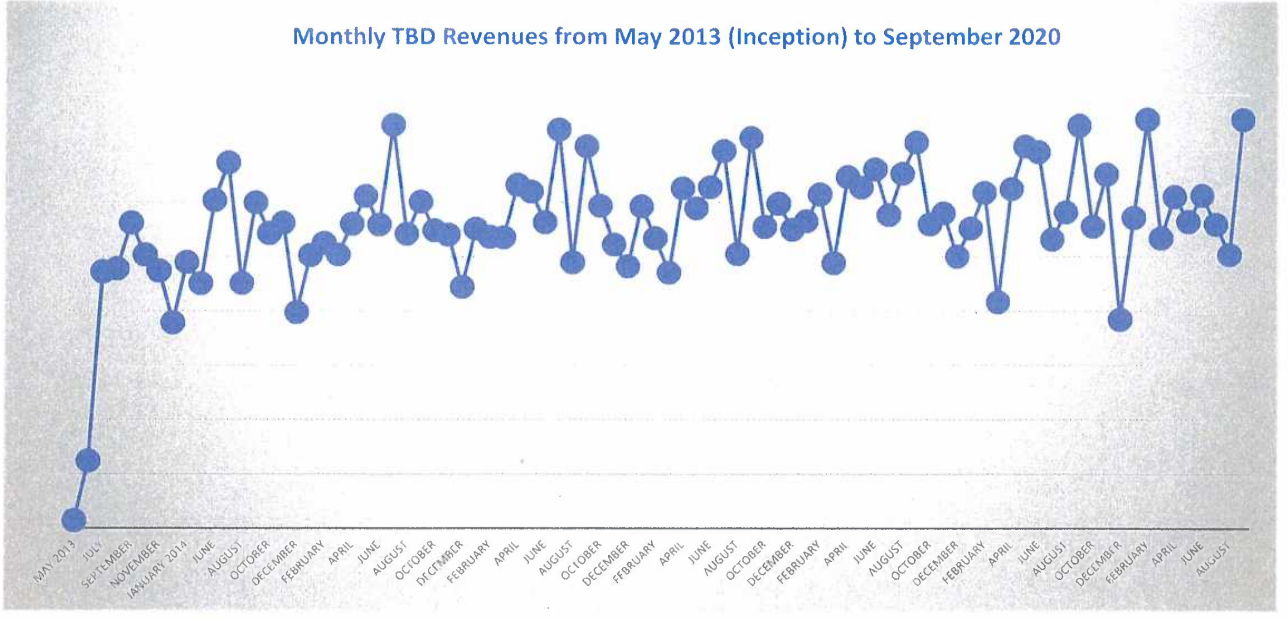
Real Estate Excise Taxes (REET)
2017 - 2019 Property Sales > $500,000
(30 Day Lag)

	2017	2018	2019	2020	2017	2018	2019
January	27,548,430	17,379,581	12,424,500	26,365,900	136,365	86,029	61,501
February	19,017,050	15,277,640	14,286,900	17,193,650	94,134	75,624	70,720
March	29,692,641	13,818,387	15,106,888	23,534,795	146,979	68,401	74,779
April	19,953,544	23,896,450	19,671,000	24,286,927	98,770	118,287	97,371
May	24,277,456	25,710,632	16,722,738	15,764,089	120,173	127,268	82,778
June	36,414,050	31,816,871	36,281,428	20,531,013	180,250	157,494	179,593
July	28,779,145	32,800,185	20,426,900	25,632,898	142,457	162,361	101,113
August	18,859,991	19,693,600	44,530,295	17,483,023	93,357	97,483	220,425
September	38,431,272	22,172,221	23,545,383	29,252,400	190,235	109,752	116,550
October	31,278,148	14,697,849	15,876,738		154,827	72,754	78,590
November		16,347,581	28,040,050		0	80,921	138,798
December	25,603,889	19,908,284	20,693,490		126,739	98,546	102,433
	$299,855,616	$253,519,281	$267,606,310	$200,044,695	$1,484,286	$1,254,920	$1,324,651



Kenmore Transportation Benefit District
Monthly Report
September 30, 2020

Revenues	September 2020	Biennium-to-Date	Percent of Budget	Biennium Budget
Vehicle Fees	37,699	627,110	88.33%	710,000
Investment Interest	28	5,527	69.09%	8,000
Total Revenues	$37,727	$632,637	88.11%	$718,000
Expenditures				
Reimbursement to Street Fund	0	358,000	50.00%	716,000
Total Expenditures	0	358,000	50.00%	716,000
Net Income (Loss)	$37,727	$274,637		$2,000



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