

**RESOLUTION NO. 13-631**

**A RESOLUTION of the City Council of the City of Federal Way, Washington, to renew the Steel Lake Management District number 1, calling for a vote by affected property owners on the renewal of the proposed district.**

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WHEREAS, the City has completed the attached 2014-2023 Steel Lake Management District Plan (SLMDP) (Exhibit A) which includes the basis for the annual LMD work plan and LMD management goals; and

WHEREAS, the Plan was created because of citizen interest in the long term protection of Steel Lake; and

WHEREAS, Steel Lake contains significant natural resources including wetlands, and supports many beneficial public purposes including recreation, water quality, stormwater protection, aesthetics, and property value support; and

WHEREAS, pursuant to chapter 35.21 RCW and chapter 36.61 RCW a lake management district may be formed to provide funding to support the maintenance and improvement of lakes; and

WHEREAS, the Steel Lake community has demonstrated support for the Steel Lake Management District number 1 (District) through submittal of a petition calling for the renewal of the District (Exhibit B) pursuant to the requirements of chapter 36.61 RCW; and

WHEREAS, pursuant to a City resolution, a public meeting was conducted on February 19, 2013, on the renewal of the District after public notice of the hearing was provided to all affected property consistent with Chapter 36.61 RCW; and

WHEREAS, after considering the testimony received at the public hearing, the City of Federal Way City Council declares that submitting the question of renewal of a lake management district to a vote by the affected property owners is within the public's interest; and the proposed financing for a lake management district is considered feasible;

NOW THEREFORE, THE CITY COUNCIL OF THE CITY OF FEDERAL WAY,  
RESOLVES AS FOLLOWS:

Section 1. Findings. The City of Federal Way City Council finds that it is in the public interest to renew the District and the financing of the lake improvement and maintenance activities is feasible. Attached and hereby incorporated is the 2014-2023 SLMDP (Exhibit A). The plan describes (1) the proposed lake improvement and maintenance activities which avoid adverse impacts on fish and wildlife and provide for appropriate measures to protect and enhance fish and wildlife; (2) the number of years the lake or beach management district will exist; (3) the amount, method, description, and frequency of special assessments or rates and charges, and the possibility of revenue bonds that are payable from the rates and charges; and (4) the estimated special assessment or rate and charge proposed to be imposed on each parcel included in the proposed lake management district.

Section 2. Vote of Affected Property Owners. The renewal of the Steel Lake Management District Number One (the "District") shall be referred to a vote of the property owners within the proposed management district. The residents' Petition to the Federal Way City Council to renew a Lake Management District for Steel Lake is attached hereto as Exhibit B and incorporated herein by this reference. The City Clerk of Federal Way shall prepare the appropriate ballot, based upon criteria in Chapter 36.61.080 RCW, calling for a vote on the

renewal of the District. The ballots shall be submitted to the affected residents no later than February 25, 2013, and shall be returned to the City of Federal Way by no later than five o'clock p.m. (5:00 p.m.) on March 20, 2013. All ballots must be signed by the owner or reputed owner of property according to the assessor's tax rolls. Each property owner shall mark his or her ballot for or against the creation of the proposed lake management district, with the ballot weighted so that the property owner has one vote for each dollar of estimated special assessment or rate and charge proposed to be imposed on his or her property. The valid ballots shall be tabulated and a simple majority of the votes cast shall determine whether the proposed lake management district shall be approved or rejected. If approved by the voters within the proposed district, the implementation of the District will be effective January 1, 2014 and shall remain in effect for a term of ten (10) years, said term to expire on December 31, 2023.

Section 3. Severability. If any section, sentence, clause or phrase of this resolution should be held to be invalid or unconstitutional by a court of competent jurisdiction, such invalidity or unconstitutionality shall not affect the validity or constitutionality of any other section, sentence, clause or phrase of this resolution.

Section 4. Corrections. The City Clerk and the codifiers of this resolution are authorized to make necessary corrections to this resolution including, but not limited to, the correction of scrivener/clerical errors, references, resolution numbering, section/subsection numbers and any references thereto.

Section 5. Ratification. Any act consistent with the authority and prior to the effective date of this resolution is hereby ratified and affirmed.


Section 6. Effective Date. This resolution shall be effective immediately upon passage by the Federal Way City Council.

RESOLVED BY THE CITY COUNCIL OF THE CITY OF FEDERAL WAY,  
WASHINGTON this 19<sup>th</sup> day of February, 2013.

CITY OF FEDERAL WAY

  
\_\_\_\_\_  
MAYOR, SKIP PRIEST

ATTEST:

  
\_\_\_\_\_  
CITY CLERK, CAROL MCNEILLY, CMC

APPROVED AS TO FORM:

  
\_\_\_\_\_  
CITY ATTORNEY, PATRICIA A. RICHARDSON

FILED WITH THE CITY CLERK: 2-12-2013  
PASSED BY THE CITY COUNCIL: 2-19-2013  
RESOLUTION NO.: 13-631

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# **The 2014-2023 Steel Lake Management District Plan**

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February 8, 2013



Public Works Department  
Surface Water Management Division  
33325 8<sup>th</sup> Avenue South  
Federal Way, WA 98003

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**2014-2023 Steel Lake  
Management District Plan**

**Prepared by:**


Dan Smith  
Surface Water Quality Program Coordinator  
City of Federal Way, Washington  
Public Works Department  
Division of Surface Water Management


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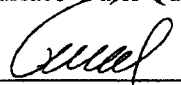
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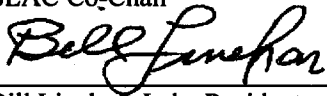
  
William G. Smith, City of Federal Way  
Surface Water Manager

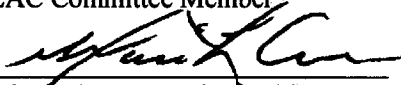
  
Dan Smith, City of Federal Way  
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Surface Water Quality Coordinator

  
Tom Dezutter, Lake Resident  
SLAC Chair

  
Margaret Reyhner, Lake Resident  
SLAC Co-Chair

  
Bill Linehan, Lake Resident  
SLAC Committee Member

  
Melarje Cannon, Lake Resident  
SLAC Committee Member

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## DISTRIBUTION LIST

The following lists City staff involved with the implementation of this project:

- Will Appleton, P.E., Surface Water Manager, City of Federal Way
  - Dan Smith, Surface Water Quality Program Coordinator, City of Federal Way
  - Hollie Shilley, Water Quality Specialist, City of Federal Way
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## INTRODUCTION

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In 2003, the City of Federal Way City Council, by Ordinance 03-452, created the inaugural ten-year Steel Lake Management District (LMD) Number 1 sun-setting on December 31, 2013. In 2012, the appointed members of the Steel Lake Advisory Committee (SLAC), representing the property owners of the LMD and acting per Resolution 03-397, began preparing the work scope to renew Steel Lake Management District Number 1 for a second multi-year period. This document, the *2014-2023 Steel Lake Management District Plan (SLMDP)*, outlines management goals established by the SLAC to provide the basis for the creation of a renewed Steel Lake Management District, set to become effective the beginning of 2014.

Per the Revised Code of Washington (RCW) 35.21.403, any city or town may establish lake management districts (LMD) within its boundaries as provided in chapter 36.61 RCW. The Washington State legislature finds that the environmental, recreational, and aesthetic values of many of the state's lakes are threatened by eutrophication and other deterioration and that existing governmental authorities are unable to adequately improve and maintain the quality of the state's lakes. It is through RCW 36.61 that a governmental mechanism may be established by which property owners can embark on a program of lake improvement and maintenance for their and the general public's benefit, health, and welfare.

RCW 36.61.020 outlines the requirements for the creation of a lake management district, including the protocols for financing the LMD improvements and maintenance of a lake. RCW 36.61 also describes the set of activities permitted to be undertaken by an LMD: (1) The control or removal of aquatic plants and vegetation; (2) water quality; (3) the control of water levels; (4) storm water diversion and treatment; (5) agricultural waste control; (6) studying lake water quality problems and solutions; (7) cleaning and maintaining ditches and streams entering or leaving the lake; and (8) the related administrative, engineering, legal, and operational costs, including the costs of creating the lake management district.

## 1.0 LAKE MANAGEMENT DISTRICT GOALS

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Depending upon year-to-year fund balances, the renewed Steel Lake Management District Number 1 will allow for the implementation of all activities granted by RCW 36.61.020. However, a more reasonable set of management goals have been established for the *2014-2023 Steel Lake Management District Plan (SLMDP)*. These management goals are based upon lake improvement and maintenance activities that may be expected to be implemented over the LMD's ten-year period (2014-2023) per approval by the Steel Lake Advisory Committee (SLAC):

1. Management of non-native aquatic plants and vegetation
2. Preservation of native vegetation and aquatic habitat
3. Management of hazardous algae blooms
4. Water quality monitoring
5. Maintenance of lake outlet channel
6. Management of Canada geese
7. Community Education and Public Involvement

## **2.0 BACKGROUND AND PAST LAKE MANAGEMENT EFFORTS**

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Past lake management work for Steel Lake has primarily been limited to aquatic plant management and public education and involvement. The following outlines these efforts.

### **2.1 Early efforts**

Until the incorporation of the City of Federal Way in 1990, the Steel Lake community was under the jurisdiction of King County. Early aquatic plant management efforts were spear-headed by the Steel Lake Residents Association to improve Steel Lake and the region around the lake. In the late 1980s, Steel Lake was reported to be infested by the non-native aquatic plant, Eurasian watermilfoil (see Section 5.2.3 for a description). The Eurasian watermilfoil (milfoil) infestation covered large littoral areas of Steel Lake up to the 15-foot depth interval, and was severe enough to result in the formation of dense beds that affected shallower near shore areas. The conditions caused restrictions to fishing, swimming, sailing, and other types of boating.

In 1990, Federal Way was incorporated as a city and the Surface Water Management (SWM) division began actively engaging in the lake water quality issues. By 1994 the City of Federal Way and the Steel Lake Residents' Association agreed to equally fund a multi-year aquatic plant management program for Steel Lake to combat recurring milfoil infestations. In addition, the City was able to obtain a Department of Ecology Grant to augment costs. During a successive four-year period, a number of efforts were undertaken by the Residents' Association-City alliance including: a whole-lake Sonar® treatment in 1994 (Resource Management, Inc.); annual diver surveys (Herrera Environmental); and the preparation of a 1994 Lake Management Plan (Envirovision, 1994).

### **2.2 2001- 2002**

A lull followed the mid-to-late 1990's aquatic vegetation work, then Steel Lake became reinfested with milfoil in the summer of 2001. The City of Federal Way provided notification of the issue to all Steel Lake residents and immediately began to develop a strategy for future aquatic weed management. In early 2002, although the Steel Lake Residents' Association had dissolved, SWM began gathering support of lakefront residents to re-form the aquatic plant management program. SWM obtained a two-year Early Infestation Grant from the Washington Department of Ecology (Ecology) that funded a series of underwater surveys and provided permit-authorized and contractor-implemented 2,4-D herbicide treatments that were successful in eradicating a five-acre milfoil infestation. Concurrently, efforts also began that year to form a Steering Committee to initiate the process to create a Lake Management District (LMD) for Steel Lake.

### **2.3 2003**

In 2003, SWM staff completed an updated Integrated Aquatic Vegetation Management Plan (IAVMP) required by the Ecology-issued Aquatic Noxious Weed Control National Pollutant Discharge Elimination System Waste Discharge General Permit. The IAVMP was approved by Ecology and provided the basis for LMD development. That year, SWM coordinated a number of Steel Lake Steering Committee meetings that resulted in the formation of a long-term aquatic vegetation management work plan. Cost

estimates from both the IAVMP and the work plan were used to calculate the necessary property assessment rates (based on parcel types) that would be required to fund a ten-year LMD.

AquaTechnex continued to work under contract for the City in 2003. Two systematic aquatic plant diver surveys were performed that established populations of all submerged, floating and emergent aquatic plants (both native and non-native). Following the successful efforts taken under the Ecology Grant in 2002, milfoil populations were limited and scuba-diver hand-pulling was sufficient to control the infestation.

After a public vote and action by Federal Way City Council, the process to form Steel Lake Management District Number One was completed toward the end of 2003. The ten-year LMD began in 2004.

## **2.4 2004-2013**

Surface Water Management (SWM) has managed all aquatic plant management activities on Steel Lake per the ten-year (2004-2013) Steel Lake Management District (LMD). In summary, the annual LMD programs have been administered through the implementation of work plans that included: quarterly Advisory Committee meetings, annual aquatic plant surveys, treatment and control methods as warranted, and effective public education. Steel Lake LMD Final reports describing annual aquatic plant management efforts during this period may be found at <http://www.cityoffederalway.com/index.aspx?nid=189>

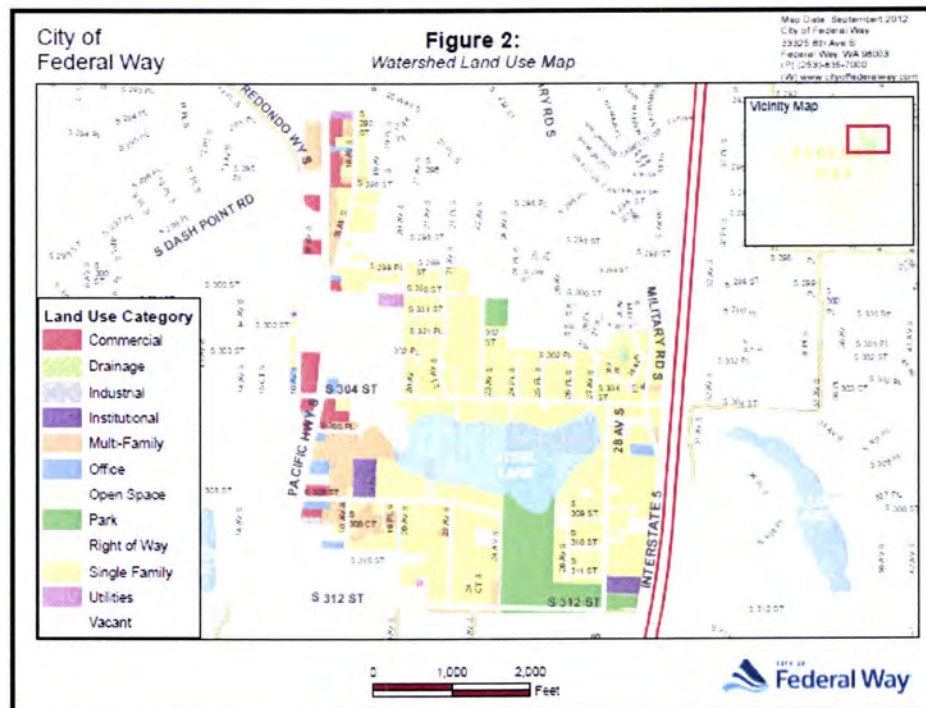
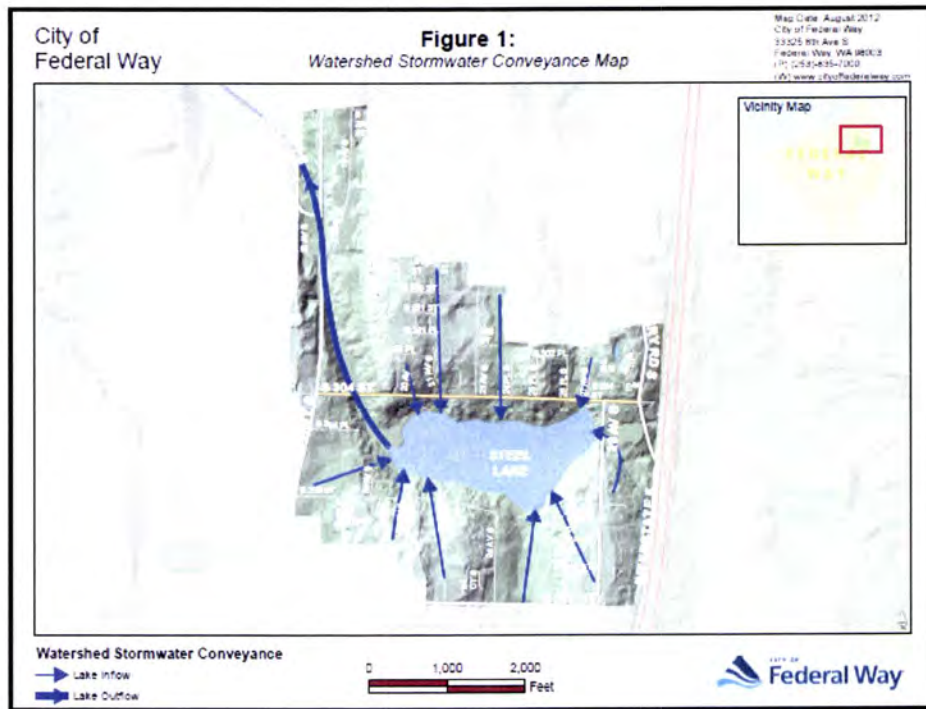
## **3.0 LAKE AND WATERSHED CHARACTERISTICS**

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The Steel Lake watershed is located approximately twenty miles south of Seattle, in the City of Federal Way, King County, Washington. The watershed is 429 acres in size and drains a gently sloping topographic area with elevations ranging from 440 feet to 500 feet (Figure 1). The entire watershed of Steel Lake lies within the City of Federal Way.

### **3.1 Land Use**

Land use in the watershed is primarily comprised of single-family residences (Figure 2 and Table 1). Steel Lake Park, multi-family residences, and vacant land comprise most of the remaining land in the watershed. It should be noted that the sub-basin boundary in Figure 1 and land use estimates in Table 1 are for Redondo Creek sub-basin CPR3, which includes an additional acreage to the north and west of the lake outlet.



**Table 1. Land Use Estimates for the Steel Lake Watershed (Subbasin CPR3)**

Land Use Classification	Area (Acres)	Percent (%)
Commercial	12.34	2.88
Drainage	0.74	0.17
Industrial	0.6	0.14
Institutional	5.81	1.36
Multi-family	27.26	6.36
Office	5.84	1.36
Open Space	2.65	0.62
Park	28.70	6.70
Right of Way	65.23	15.22
Single family	172.27	40.19
Steel Lake	47.37	11.05
Utilities	2.29	0.54
Vacant	57.52	13.42
<b>Watershed (Total)</b>	<b>428.63</b>	<b>100.00</b>

Data Source: King County Parcel Assessor Information and City of Federal Way GIS, 2012

### 3.2 Shoreline Use

Steel Lake includes 7,129 feet of shoreline (Table 2). The majority of the shoreline includes lake frontage adjacent to single-family property (5,179 feet). Public access to the lake is from Steel Lake Park (parcel 092104 9026), owned and managed by the City of Federal Way. The Park is located on the south shore of the lake and includes a public beach area. A public boat launch (parcel 798440 0210), also located on the south shore near the park, is owned by the Washington Department of Fish and Wildlife (WDFW). The largest undeveloped parcel (092104 9012) is located at the northwest corner, and has a shoreline measuring 542 feet, with a portion classified as a Category I Wetland (see Section 3.3).

**Table 2. Shoreline Use Estimates for Steel Lake**

Shoreline Use	Total frontage (ft)	Percent %
Single family	5,178.63	72.64
Steel Lake Park	872.67	12.24
Vacant	699.1	9.81
Multi family	314.13	4.41
Public boat launch	64.49	0.90
<b>Total</b>	<b>7,129.03</b>	<b>100.00</b>

Data Source: King County Parcel Assessor Information and City of Federal Way GIS, 2012



### 3.3 Outlet, Stream and Wetland Locations

Steel Lake forms the headwaters of Redondo Creek. Outflow from the lake generally occurs only during the wet season (November through April). The lake outlet drains in a northwest direction from the west end of the lake, passing through wetlands to a culvert crossing at South 304th Street. The outlet continues to flow underneath Pacific Highway South to eventually discharge into Puget Sound at Redondo Beach in the City of Des Moines (approximately 1.5 miles downstream of the lake).

The Steel Lake outlet channel has a history of flow congestion due to an accumulation of sediment, fallen trees, woody debris, invasive blackberry vegetation, and trash. In addition, there is a lack of a defined channel immediately downstream of the lake. SWM will continue to maintain the culvert crossing at S. 304<sup>th</sup> Street. In addition, it is envisioned that the Steel Lake LMD will maintain the wetland area upstream of the culvert crossing to minimize impacts to lake levels caused by identified causes and natural wetland processes.

Steel Lake wetland areas were surveyed by Sheldon & Associates for the City of Federal Way in 1998, and this information is included in the July 1999 Final Wetland Inventory Report. The purpose of the wetlands inventory report was to identify and map the general location of the wetlands within the city limits of Federal Way. General wetland and buffer conditions and characteristics, wetland sizes, and wetland ratings based on the City's proposed rating system are provided in the report. Although all wetlands inventoried were mapped, the inventory process did not include delineation of wetland edges (only approximate boundaries and locations of wetlands were determined).

The 1999 Sheldon & Associates Final Wetland Inventory Report lists two separate categories of wetlands associated with Steel Lake:

1. Category I wetland at the west end of Steel Lake (04-21-04-39) on parcels 092104 9196 and 092104 9124. Category I wetlands are defined as those greater than 2,500 square feet in area and those that meet one of the following criteria:
  1. Contain the presence of species or documented habitat recognized by state or federal agencies as endangered, threatened or potentially extirpated plant, fish or animal species; or
  2. Contain the presence of plant associations of infrequent occurrence, irreplaceable ecological functions, or exceptional local significance including but not limited to estuarine systems, peat bogs and fens, mature forested wetlands, groundwater exchange areas, significant habitat or unique educational sites; or
  3. Have three or more wetland classes one of which is open water.
2. Category III wetlands at the north shore (09-21-04-38) from approximately 2111 South 304<sup>th</sup> Street east to 2231 South 304<sup>th</sup> Street. These Category III wetlands are described as having an approximate cumulative size between 500 to 2,500 square feet. Category III wetlands do not exhibit characteristics of Category I or II wetlands.

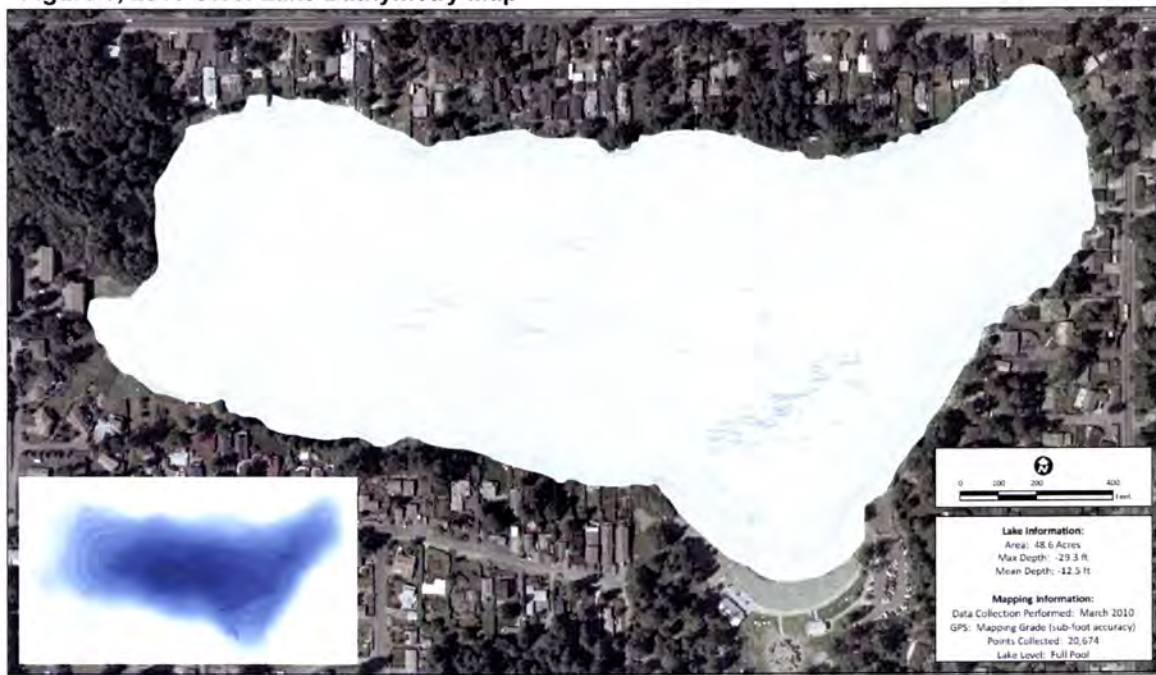
### 3.4 Non-point Nutrient Source Locations

The majority of surface water is conveyed to the lake through the City’s stormwater system from the 429-acre watershed. (Figure 1). The largely urbanized nature of the watershed contributes typical urban area nutrient-related pollutants to the lake, in particular nitrogen and phosphorous. Pollutant sources in the watershed—including landscaping, gardening, domestic pets, flocks of resident and migratory Canada geese, and vehicle washing in upland areas of the watershed—all have the potential to contribute a loading of nutrients into the lake. Large concentrations of these non-point nutrients can increase the biological productivity of the lake and stimulate plant growth. It is worthy to note that all lakefront residences and most of the development in the watershed are connected to the Lakehaven Utility District sanitary sewer system.

### 3.5 Lake Bathymetry

On March 11, 2010, AquaTechnex completed a bathymetry mapping effort for Steel Lake (Figure 3). A sonar unit accurate to a tenth of a foot was paired with a Trimble GPS data logger with sub-foot accuracy to record depth readings at two second intervals along pre-determined transects. There were a total of 20,674 points generated in the production of the mapping effort.

Figure 3, 2010 Steel Lake Bathymetry Map



Physical characteristics of Steel Lake are summarized in Table 3.

**Table 3. Physical Characteristics of Steel Lake Watershed**

Characteristic	Unit
Surface area	48.6 acres
Lake volume	607 acre-feet
Maximum depth	29 feet
Average depth	12.5 feet
Lake altitude	440 feet
Shoreline length	7,129 feet

Data Source: AquaTechnex Bathymetry Mapping, 2010. Note that the lake surface area calculated by AquaTechnex reflects full lake pool conditions, and differs from the figure provided in Table 1.

### 3.6 Water Source

The majority of surface water enters the lake via stormwater outfalls located around the perimeter of the lake (Figure 1). No streams flow into the lake.

### 3.7 Water Quality

Population growth, and specifically residential development, is associated with many environmental impacts, including nutrient pollution and subsequent eutrophication of lakes. Eutrophication of lakes refers to a group of symptoms that lakes generally display when they have been overloaded by nutrients, namely nitrogen and phosphorus. These symptoms include a disruption of the natural ecological state of the lake, including higher primary production, higher algae biomass, and a shifting of the algal community to a larger proportion of large blue-green algae that can be toxic to humans and pets. Thus, eutrophication often leads to lakes that are less economically beneficial and less aesthetically desirable to humans (2003, Moore, Schindler, Scheuerell, Smith and Frodge). Although the developed region surrounding Steel Lake has seen a reduction in point source nutrient pollution (i.e. hook up to public sanitary systems), there continues to be sources of nonpoint pollution in the watershed.

#### 3.7.1 Historic Water Quality Data

A King County Lake Stewardship Program Volunteer Monitoring Program for Steel Lake began in the 1980s and continued for several decades until budget cuts ended the program in 2004. The most recent data generated by this program indicates that Steel Lake is relatively low in primary productivity (borderline oligotrophic to mesotrophic) with very good water quality.

The assessment of biological activity (or trophic state) can be classified into three general categories of lake water quality: oligotrophic, mesotrophic, and eutrophic. A common measurement used to calculate a lake's water quality classification is the numerical trophic state index (illustrated in Table 4). Lakes with low concentrations of nutrients, low concentrations of algae, and high

transparency (or clarity) are considered oligotrophic. A lake with high concentrations of nutrients and algae and low transparency is considered eutrophic. Lakes whose quality ranges between eutrophic and oligotrophic are considered mesotrophic.

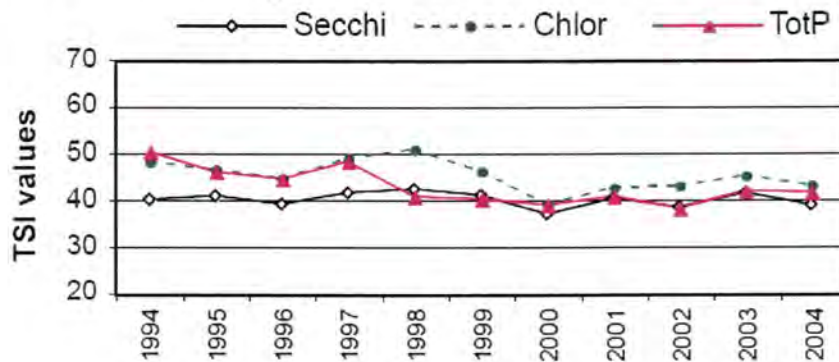
**Table 4. Trophic State Index (TSI) Water Quality Parameters**

Trophic State/Biological Activity	TSI
Oligotrophic/Low	<40
Mesotrophic/Moderate	40-50
Eutrophic/High	>50

Data Source: Carlson, 1977

Historical water quality data for Steel Lake are represented graphically in Figure 4. The data indicate Steel Lake has been consistently trending toward lower primary productivity (borderline oligotrophic to mesotrophic) with very good water quality.

**Figure 4, Steel Lake TSI 1994-2004**



Data Source: King County Lake Stewardship Program

### 3.7.2 Water Quality Assessments

The federal Clean Water Act, adopted in 1972, requires that all states restore their waters to be “fishable and swimmable.” Washington’s Water Quality Assessment—developed by the Department of Ecology—lists the water quality status for all water bodies in the state. This assessment meets the federal requirements for an integrated report under Sections 303(d) and 305(b) of the Clean Water Act.

The most up-to-date information, *The 2008 Water Quality Assessment and 303(d) List*, was reviewed for the *2014-2023 Steel Lake Management District Plan* (Ecology, 2012). The following two assessment listings for Steel Lake were found to be present:

1. **Fecal Coliform, Category 2, Waters of Concern:** *Waters where the data are not sufficient for listing a waterbody segment as impaired but may still raise a concern about water quality.*
  - Department of Ecology lakes monitoring data shows 0 of 3 daily maximum samples exceeded the percentile criterion in 2003. Samples were collected near Steel Lake Park recreation area to reflect water quality conditions in this area only.
  - King County unpublished data from station A730 show a geometric mean of 134 cfu/100mL with 50% exceeding the percentile criterion during 1998.
  - King County unpublished data from station A730 show a geometric mean of 260 cfu/100mL with 100% exceeding the percentile criterion during 1999.
  - *Remarks:* Based on comments produced by the City of Federal Way, the assessment for this listing was changed from Category 5 (Polluted Waters that Require a TMDL) to Category 2 (Waters of Concern) on January 5, 2006.
  
1. **Invasive Exotic Species, Category 2, Waters of Concern:** *Waters where the data are not sufficient for listing a waterbody segment as impaired but may still raise a concern about water quality.*
  - Ecology survey (Parsons and O'Neal, 2000) found Eurasian water-milfoil (*Myriophyllum spicatum*).
  - *Remarks:* Based on comments produced by the City of Federal Way, the assessment for this listing was changed from Category 4C (Waters Impaired by a Non-Pollutant) to Category 2 (Waters of Concern) on January 31, 2005. Information cited for the new listing included the implementation of an active aquatic weed management program in 2002, including an annual milfoil eradication program; the approval by Ecology of the Steel Lake Integrated Aquatic Vegetative Management Plan in 2003; and the formation of Lake Management District Number One for Steel Lake in 2004.

### 3.8 Water Rights

In June 2012, the Department of Ecology Water Resources Program was accessed electronically to determine current water right certificates, water use permits, applications for water use, and claims of water use on Steel Lake (Ecology, 2012). Using Geographic Information System (GIS) mapping, it was determined that only one Certificate of Water Right currently exists on Steel Lake:

- 2605 South 304<sup>th</sup> Street (parcel 092104 9078).

### 3.9 Beneficial and Recreational Uses

Table 5 contains a list of beneficial uses that Steel Lake provides to area residents, visitors, and wildlife. In particular, the lake supports a large public park, excellent wetland habitat, and a trout-stocking program. It is also important to note that motorized boats are prohibited on Steel Lake per City of Federal Way Ordinance Number 12-715.

### 3.10 Wildlife

Steel Lake is managed by the Washington Department of Fish and Wildlife (WDFW) as a trout and warm-water fishery. Between 1947 and 1969, the lake was rehabilitated on five occasions by treating with rotenone to reduce populations of spiny-ray fish and was stocked each of those years with approximately 7,000 rainbow trout fry (*Salmo gairdneri*). Due to the mixed species character of the fish community and the poor survival of trout fry, the fish management program changed in the 1970s by eliminating rotenone treatments and by stocking with rainbow trout of catchable size ( between 8 and 12 inches long) in the spring of each year (City of Federal Way, 2003). Since 1991 an average of 6,000 trout have been released into the lake each year.

Due to program cutbacks, WDFW has not conducted fish population surveys in Steel Lake since 2002. The results of that survey (utilizing electro-fishing and gull and fyke nets), may be found in Table 6.

**Table 5. List of Beneficial Uses for Steel Lake**

Beneficial Use	Location
Swimming	Public and private shorelines and docks
Fishing	Whole lake
Sailing	Whole lake
Waterfowl habitat	Concentrated along western shore
Aesthetic enjoyment	In lake and surrounding shoreline
Bird watching	Throughout the lake
Wetland habitat	Near the lake outlet (western end of the lake)
Wildlife habitat	Crayfish, turtles, and frogs primarily near shore
Trout stocking	Deep water habitat. No trout spawn in the lake
City park	Approximately 873 feet of shoreline
Fish habitat	Spawning (warmwater fish) occurs near docks and lilies in the west end. No salmon spawn in the lake

**Table 6. 2002 WDFW Total Fish Counts**

Species	Yellow Perch	Largemouth Bass	Pumpkinseed	Rainbow Trout	Brown Bullhead
Total Sampled	621	148	79	16	37
Percent	68.9%	16.4%	8%	4.1%	1.8%
Size, 1-4 inch	4	88	8	0	0
Size, 4-7 inch	46	49	51	0	2
Size, 7-11 inch	22	7	28	37	12
Size, 11-14 inch	0	1	0	0	2
Size, 14-17 inch	0	1	0	0	0
Size, 17-19 inch	0	2	0	0	0

The Kent/Auburn chapter of the Rainier Audubon Society 2010 Christmas Bird Count may be used as a gauge of bird species that may visit Steel Lake (Table 7). Birds, mammals and small amphibians are also known to use Steel Lake. Residents report seeing muskrats, bald eagles, skunks, raccoons, opossums, squirrels, turtles and frogs. There are no known threatened or endangered fish species using Steel Lake.

**Table 7. Kent/Auburn Rainier Audubon 2010 Christmas Bird Count**

Cackling Goose	399	Spotted Sandpiper	1	American Robin	821
Canada Goose	1029	Black Turnstone	20	Varied Thrush	38
Trumpeter Swan	34	Wilson's Snipe	10	European Starling	2407
Wood Duck	2	Mew Gull	77	American Pipit	1
Gadwall	134	Ring-billed Gull	2	Yellow-rumped Warbler	64
Eurasian Wigeon	7	California Gull	15	Townsend's Warbler	7
American Widgeon	1883	Herring Gull	3	Common Yellowthroat	0
Mallard	1674	Thayer's Gull	1	Spotted Towhee	128
Green-winged Teal	1276	Western Gull	2	Savannah Sparrow	8
Eurasian GW Teal	1	Glaucous-winged Gull	645	Fox Sparrow	96
Northern Shoveler	285	Gull sp.	230	Song Sparrow	513
Northern Pintail	1955	Pigeon Guillemot	6	Lincoln's Sparrow	28
Canvasback	11	Rhinoceros Auklet	2	White-throated Sparrow	1
Redhead	21	Rock Pigeon	1159	White-crowned Sparrow	64
Ring-neck duck	604	Band-tailed Pigeon	13	Dark-eyed Junco	616
Greater Scaup	1	Mourning Dove	7	State-colored Junco	2
Harlequin Duck	79	Barn Owl	3	Red-winged Blackbird	628
Surf Scoter	4	Western Screech Owl	1	Brewer's Blackbird	500
White-winged Scoter	576	Great Horned Owl	4	Brown-headed Cowbird	21
Black Scoter	17	Barred Owl	1	Purple Finch	15
Bufflehead	7	Short-eared Owl	0	House Finch	202
Common Goldeneye	478	Northern Saw-whet Owl	1	Pine Siskin	434
Barrow's Goldeneye	92	Anna's Hummingbird	30	American Goldfinch	47
Hooded Merganser	71	Belted Kingfisher	16	Evening Grosbeak	125
Common Merganser	102	Downey Woodpecker	18	House Sparrow	108
Red-breasted Merganser	164	Hairy Woodpecker	10	Cooper's Hawk	9
Ruddy Duck	29	Northern Flicker	141	Red-tailed Hawk	89
California Quail	182	Pileated Woodpecker	14	Merlin	6
Red-throated Loon	10	Northern Shrike	1	Peregrine falcon	2
Pied-billed Grebe	46	Hutton's Vireo	5	Virginia Rail	12
Horned Grebe	73	Steller's Jay	91	American Coot	454
Red-necked Grebe	24	Western scrub Jay	10	Killdeer	6
Dble-crested Cormorant	105	American Crow	4749	Bewick's Wren	73
Pelagic Cormorant	1	Common Raven	8	Pacific Wren	104
American Bittern	2	Black-capped Chickadee	482	Marsh Wren	60
Great Blue Heron	33	Chestnut Chickadee	224	American Dipper	1
Green Heron	1	Bushtit	265	Golden Kinglet	388
Bald Eagle	36	Red-breasted Nuthatch	30	Ruby Kinglet	136
Sharp-shinned Hawk	10	Brown Creeper	16	Hermit Thrush	4

All available information on sensitive, threatened, or endangered aquatic animals (excluding fish) using the water body is on a county-specific basis, and little or no information is available on Steel Lake proper.

Several non-native animal species are known to inhabit Steel Lake, including red swamp crayfish (*Procambarus clarkii*), Chinese mystery snails (*Bellamya chinensis*) and the red-eared slider turtle (*Trachemys scripta elegans*). These species were likely introduced to Steel Lake, and although the impact of these non-native species is unknown, most invasive aquatic animal species compete against native species for food sources, thereby presenting implications for the lake ecosystem if they multiply dramatically.

In 2012, AquaTechnex completed a Steel Lake Discharge Management Plan (DMP) and State Environmental Policy Act (SEPA) Addendum per the requirements of the State of Washington, Department of Ecology, Aquatic Plant and Algae General Permit, National Pollutant Discharge Elimination System (NPDES) and State Waste Discharge General Permit (Appendix G), section S2.B.4. This requirement must be satisfied when the total proposed treated area in the water body is expected to be five or more acres. The SEPA Addendum includes an "environmental checklist" that examines the potential impacts of the project on the environment and answers questions regarding the current status of Steel Lake including but not limited to: presence of sensitive, threatened, or endangered aquatic plant species; sensitive habitats or wetlands; threatened or endangered fish species; aquatic animals using the water body; sensitive, threatened or endangered aquatic animals; and waterfowl and other types of birds.

Historical observations of sensitive, threatened, or endangered aquatic plant species have been documented, but only reported for King County as a whole in the years prior to 1977. None listed have been reported or identified within Steel Lake (AquaTechnex, 2012). According to the Washington Department of Natural Resources database of high quality/rare ecological communities, there are no sensitive, threatened, or endangered aquatic plant species located in Steel Lake (2012 DMS, AquaTechnex).

## 4.0 THE AQUATIC WEED PROBLEM

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Noxious freshwater aquatic weeds are plants that are not native to Washington. They are generally of limited distribution, invasive, and pose a serious threat to our State's water bodies if left unchecked. Because nonnative plants have few natural controls in their new habitat, they spread rapidly, out-competing and effectively destroying native plant and animal habitats. In addition, the presence of noxious freshwater weeds may lower values of lakefront properties. The historical presence of aquatic plants in Steel Lake, (including non-native and noxious species), have been shown to impair the use and aesthetic value of the lake. Because of the lake's shallow characteristics, aquatic plants have the potential to restrict the available area for recreation activities such as fishing, swimming and boating. In addition, other regional lakes are in danger of becoming infested with noxious or invasive aquatic plants originating in Steel Lake. The *2014-2023 Steel Lake Management District Plan* provides a long-term strategy for the control of aquatic plants in Steel Lake.

Under the authority of Chapter 17.10 RCW, the King County Noxious Weed Control Board classifies noxious weeds based on each species' stage of invasion. This classification system is designed to: (1) prevent small infestations from becoming large infestations; (2) contain already established infestations to regions of the state where they occur, and, (3) prevent their movement to un-infested areas of Washington. The following three major classes (A, B and C) are listed according to the seriousness of the threat they pose to the state, or a region of the state:

**Class A Weeds:** Non-native species with a limited distribution in Washington. Preventing new infestations and eradicating existing infestations is the highest priority. Eradication is required by law.

**Class B Weeds:** Non-native species presently limited to portions of the state. Species are designated for control in regions where they are not yet wide-spread. Preventing new infestations in these areas is a high



priority. In regions where a Class B species is already abundant, control is decided at the local level, with containment as the primary goal.

**Class C Weeds:** Non-native weeds found in Washington. Many of these species are widespread in the state. Long-term programs of suppression and control are a County option, depending upon local threats and the feasibility of control in local areas.

Between 2000 and 2012, the following five noxious weed species have been detected in Steel Lake:

<b>Common Name</b>	<b>Scientific Name</b>	<b>Weed Class</b>
Eurasian watermilfoil	<i>Myriophyllum spicatum</i>	B
Fragrant water lily	<i>Nymphaea odorata</i>	C
Yellow flag iris	<i>Iris pseudacorus</i>	C
Japanese knotweed	<i>Polygonum cuspidatum</i>	B

## 5.0 AQUATIC PLANT CHARACTERISTICS

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Steel Lake is a typical urban Western Washington naturally-formed glacial lake, and the aquatic plants (both native and non-native) that inhabit it are also typical. Surface Water Management (SWM), through a ten-year Steel Lake Management District (LMD) that began in 2004, has coordinated all aquatic plant management activities on Steel Lake.

### 5.1 Native Aquatic Plants in Steel Lake

Through the LMD, annual systematic surveys have been performed on Steel Lake to identify and quantify the presence of native and non-native aquatic vegetation. This information has provided a continued baseline of lake plant communities. Plant location maps may be found in all Steel Lake Annual reports generated from 2004 to 2011.

Overall, the Steel Lake native aquatic plant community has been rated as healthy through this period. Native vegetation has covered most littoral areas and did not interfere with the water use designations for the lake community during the period (swimming, boating, and fishing). Based upon the information provided in the annual surveys, Steel Lake has been within the parameters calculated from WDFW and Ecology criteria and adopted by the *SLMDP* for native vegetation littoral zone coverage (See section 8.0).

The following includes a summary of the types and characteristics of the dominant aquatic plant species found during Steel Lake Aquatic Plant Surveys that have been conducted during the last eight years. A portion of this information has been obtained from the Department of Ecology website (Ecology, 2012).

### **5.1.1 Native Emergent Plants**

There have been no dominant native emergent plant types noted in Steel Lake. Scattered along the shoreline in moderate to dense patches have been a number of emergent species, *Typha spp.* (Cattail), *Eleocharis sp.* (Spike Rush), and *Scirpus spp.* (Bull Rush), that grow in shallow lake margins. The seeds of the rushes are an important food for waterfowl and mammals. Cattail rhizomes and their basal portions are a food source for geese. All Steel Lake's native emergent vegetation provides habitat for amphibians and fish and helps to stabilize shorelines.

### **5.1.2 Native Rooted Floating-Leaved Plants**

The most dominant native rooted floating-leaved plant type that has been noted in Steel Lake is *Nuphar spp.* (Yellow pond lily). This plant is a perennial water lily plant that has established a moderate-sized stand in the shallow waters of the lake near the public beach and swimming area. It is a food source for mammals and waterfowl and provides spawning habitat for fish.

### **5.1.3 Native Submerged Macrophytes**

The most dominant native submerged macrophyte communities noted in Steel Lake are as follows:

#### **Small-leaved pondweed (*Potamogeton pusillus*)**

These pondweeds have long, narrow leaves, and except for an occasional flower spike that briefly rises above the water, they remain underwater for their entire lives. Their stems are slender and profusely branched, and often have small, paired yellowish glands at the leaf base. The flower appears in 1-4 whorls on spikes measuring 3-15 mm long, not always above the water. The root is fibrous to form the base of the plant. The plant's seeds and winter buds form at the lateral branch tips and near the leaf bases. Its seeds and vegetation provide cover and food for aquatic animals.

#### **Naiads (*Naja flexilis*)**

Naiads (or slender water-nymph and common water-nymph) are completely submerged annual plants, although they are often found as floating fragments. They have opposite leaves that are often clustered near the tips of the stems. The leaf base is much wider than the rest of the leaf blade, which helps to distinguish the naiads from other underwater plants. These plants have inconspicuous flowers and fruits that are almost completely hidden by the leaf bases. Naiad pollination takes place underwater. The plants have glossy, green, and finely toothed leaves that are oppositely arranged, but appear to be whorled near ends of the stems. The leaves are long and narrow with broad bases that clasp the stem, and taper to a long point 1-3 cm long and 1-2 mm wide. The entire plant is eaten by waterfowl. Naiads are considered to be one of their most important food sources. They also provide shelter for small fish and insects.

### **5.1.4 Native Submerged Macroalgae**

The most dominant native submerged macroalgae communities noted in Steel Lake are as follows (information obtained in part from the Department of Ecology website):

### **Plant-like algae (*Chara, spp*)**

Although these common lake inhabitants look similar to many underwater plants, they are actually algae. *Chara* are green or gray-green colored algae that grow completely submersed in shallow (4 cm) to deep (20 m) water. Individuals can vary greatly in size, ranging from 5 cm to 1 m in length. These algae are identifiable by their strong skunk-like or garlic odor, especially evident when crushed.

*Chara*, like other algae, do not produce flowers. Instead, microscopic, one-celled sex organs called oogonia are formed. These tiny organs and patterns in the cases that surround them are used to distinguish between species. Tiny spores are produced in fruiting bodies. In some species the fruiting bodies are orange and very conspicuous. In addition, *Chara* may be attached to the bottom by root-like structures called holdfasts.

### **Plant-like algae (*Nitella, sp.*)**

*Nitellas* are bright green algae that often are mistaken for higher plants because they appear to have leaves and stems. These long, slender, delicate, smooth-textured algae lie on the bottom of a lake or pond and are seldom found in the water column. They often grow in deeper water than flowering plants and frequently form a thick carpet or grow in clumps along the bottom. Whorls of forked branches are attached at regularly spaced intervals along the "stems". *Nitellas* sometime grow together with muskgrasses (*Chara spp.*), another plant-like algae, to form underwater meadows.

The plant has no true leaves. Six-eight evenly forked branchlets grow in whorls at regularly spaced intervals along the "stem". Unlike the rough branchlets of most muskgrasses (*Chara spp.*), *Nitella* branchlets have a smooth texture. *Nitellas* have no true stems, but have hollow, stem-like structures that have whorls of forked branches along their entire length. The largest *Nitella* species have "stems" up to 2 m long. The plant does not bear flowers; instead they have microscopic spore-producing organs. The plants may be attached to the bottom by root-like structures called holdfasts or be floating free above the sediment. *Nitellas* provide cover for fish, food for fish and waterfowl, and stabilize the sediment. Because they have no roots, they remove nutrients directly from the water. *Nitellas* are considered desirable species in Washington.

## **5.2 Non-Native Aquatic Plants in Steel Lake**

As with native aquatic plants, annual systematic surveys performed on Steel Lake have identified and located non-native aquatic vegetation. From this information, control strategies have been developed. Plant location maps may be found in all Steel Lake Annual reports, 2004-2011.

During this period, the Steel Lake non-native aquatic plant community has been limited to four noxious species: Eurasian watermilfoil (*Myriophyllum spicatum*) Class B; Fragrant water lily (*Nymphaea odorata*) Class C; Yellow flag iris (*Iris pseudacorus*) Class C; and Japanese knotweed (*Polygonum spidatum*) Class B. The following sections describe these non-native plant species in greater detail.

### **5.2.1 Non-Native Emergent Plants**

The non-native emergent plants noted in Steel Lake are as follows:

#### **Yellow flag iris (*Iris pseudacorus*)**

Yellow flag iris is a Class C Noxious Weed. Yellow flag iris is native to mainland Europe, the British Isles, and the Mediterranean region of North Africa and was introduced widely in western Washington as a garden ornamental, the earliest from Lake McMurray in Skagit County in 1948. The yellow flowers are a distinguishing characteristic, and when not in flower, it may be confused with cattail (*Typha sp.*) or broad-fruited bur-reed (*Sparganium eurycarpum*). Yellow flag iris is considered an obligate wetland species, with a >99% probability of occurring in wetlands as opposed to upland areas. The plants produce large fruit capsules and corky seeds in the late summer. Yellow flag iris can spread by both seeds and by rhizome growth, where it can form dense stands that can exclude even the toughest native wetland species, such as *Typha latifolia* (cattail). In addition to threatening plant diversity, this noxious weed can also alter hydrologic dynamics through sediment accretion along the shoreline. This species produces prolific seeds that may easily transport downstream to invade other valuable resource areas.

Yellow flag iris continues to populate shoreline areas of Steel Lake, but its numbers are decreasing as it has been effectively targeted for treatment through the LMD aquatic plant management program.

#### **Japanese knotweed (*Polygonum cuspidatum*)**

Japanese knotweed (*Polygonum cuspidatum*) is a Class B Noxious Weed. It is an escaped ornamental that is becoming increasingly common along stream corridors and rights-of-way in Washington. The plant has spreading rhizomes and numerous reddish-brown, freely branched stems. It can reach four to eight feet in height and is often shrubby.

Although not formally listed as an aquatic plant by the Department of Ecology, Japanese knotweed can form dense stands that crowd out all other vegetation, degrading native plant and animal habitat. It is difficult to control because it has an extremely vigorous deep and dense rhizomes mat system. In addition, the plant can re-sprout from fragments to create new shoreline infestations.

Japanese knotweed (JK) was documented to be colonizing a very small area on one single property shoreline along South 308<sup>th</sup> Street. After two successive glyphosate treatments ending in 2009, it has been successfully eradicated.

### **5.2.2 Non-Native Rooted Floating-Leaved Plants**

The only non-native rooted floating-leaved plant noted in Steel Lake is:

#### **Fragrant water lily/ White water lily (*Nymphaea odorata*)**

Fragrant water lily is a Class C Noxious Weed. Fragrant waterlilies are water plants with floating leaves and large, many-petaled fragrant blossoms. Requests for waterlily control represent a high percentage of the herbicide permit requests received by the Department of Ecology.

The hardy white and (sometimes) pink lilies have become naturalized in Washington lakes and rivers. These plants are native to the eastern United States and it is believed that the waterlily was introduced to Washington in the late 1800s. Water lilies have been intentionally planted in many Washington lakes, especially those lakes in western Washington. Lake residents are strongly discouraged from planting fragrant waterlilies in lakes or natural waterbodies because they are aggressive plants. Oftentimes "hitchhiker" plants such as hydrilla can also be introduced to our lakes when water lilies are planted. Shallow lakes like Steel Lake are particularly vulnerable to becoming completely covered by fragrant waterlilies.

Left unmanaged, waterlilies will restrict lake-front access and eliminate swimming opportunities. Waterlilies grow in dense patches, excluding native species and even creating stagnant areas with low oxygen levels underneath the floating mats. These mats make it difficult to fish, water ski, swim, or even paddle a canoe through. Although relatively slow-spreading, waterlilies will eventually colonize shallow water depths to six feet deep and can dominate the shorelines of shallow lakes.

Waterlilies reproduce by seed and also by new plants sprouting from the large spreading roots (underground stems called rhizomes). A planted rhizome will cover about a 15-foot diameter in about five years. Each spring (April) new shoots appear from the rhizomes and grow up through the water until they reach the surface. The flowers appear from June to September. Root systems are tenacious, and if pieces of the rhizome are broken off during control efforts, they will drift to other locations and establish a new patch of lilies. Fragrant waterlily continues to populate sporadic areas of Steel Lake, but their numbers are decreasing as they have been effectively targeted for treatment through the LMD aquatic plant management program.

### **5.2.3 Non-Native Submerged Macrophytes**

The only non-native submerged macrophyte noted in Steel Lake is as follows:

#### **Eurasian watermilfoil (*Myriophyllum spicatum*)**

Eurasian watermilfoil (milfoil) is a Class B Noxious Weed. Because it is widely distributed and difficult to control, milfoil is considered to be the most problematic aquatic plant in Washington. The introduction of milfoil can drastically alter a waterbody's ecology. Milfoil forms very dense mats of vegetation on the surface of the water. These mats interfere with recreational activities such as swimming, fishing, water skiing, and boating.

Milfoil is an attractive plant with feathery underwater foliage. Once commonly sold as an aquarium plant, milfoil originated from Europe and Asia. It was introduced to North America fifty to one-hundred years ago. The first known specimen of milfoil in Washington was collected from Lake Meridian near Seattle in 1965. By the mid-1970s it was also found in Lake Washington. Now milfoil is found throughout the Northwest; and in western Washington, has spread up and down the Interstate 5 corridor.

Some tips to identify milfoil:

- Count the pairs of leaflets. Milfoil usually has twelve or more pairs on each leaf.

- Milfoil leaves tend to collapse around the stem when removed from the water. Other milfoil species have thicker stems and are usually more robust.
- The mature leaves are typically arranged in whorls of four around the stem.

Milfoil is an extremely adaptable plant, able to tolerate and even thrive in a variety of environmental conditions. It grows in still to flowing waters, roots in water depths from one to ten meters (regularly reaching the surface while growing in water three to five meters deep), and can survive under ice. Relative to other submersed plants, milfoil requires high light, has a high photosynthetic rate, and can grow over a broad temperature range. Milfoil grows best on fine-textured, inorganic sediments and relatively poorly on highly organic sediments.

The sheer mass of milfoil plants can interfere with water flow to cause flooding. Stagnant mats can create good habitat for mosquitoes. Milfoil mats can rob oxygen from the water by preventing the wind from mixing the oxygenated surface waters to deeper water. The dense mats of vegetation can also increase the sedimentation rate by trapping sediments. Milfoil also starts spring growth sooner than native aquatic plants and can shade out these beneficial plants. When milfoil invades new territory, the species diversity of nearby aquatic plants typically declines. While some species of waterfowl will eat milfoil, it is not considered to be a good food source.

Mono-specific stands of milfoil provide poor habitat for waterfowl, fish, and other wildlife. Significant rates of plant sloughing and leaf turnover, as well as the decomposition of high biomass at the end of the growing season, increase the internal loading of phosphorus and nitrogen to the water column. Dense milfoil mats alter water quality by raising pH, decreasing oxygen under the mats, and increasing temperature.

Milfoil exhibits an annual pattern of growth. In the spring, shoots begin to grow rapidly as water temperatures approach 15 degrees centigrade. When they near the surface, shoots branch profusely, forming a dense canopy. The leaves below one-meter senesce in response to self-shading. Typically, plants flower upon reaching the surface (usually in mid- to late-July). After flowering, plant biomass declines as the result of the fragmentation of stems. Where flowering occurs early, plant biomass may increase again later in the growing season and a second flowering may occur. During fall, plants die back to the root crowns, which sprout again in the spring. Milfoil frequently over-winters in an evergreen form and may maintain considerable winter biomass.

Although Milfoil can potentially spread by both sexual and vegetative means, vegetative spread is considered the major method of reproduction. During the growing season, the plant undergoes auto-fragmentation. The abscising fragments often develop roots at the nodes before separation from the parent plants. Fragments are also produced by wind and wave action and boating activities, with each fragment having the potential to develop into a new plant. Milfoil can easily be transported from lake to lake on boat trailers or fishing gear.

Milfoil continues to re-infest areas of Steel Lake as it is transported into the waterbody via boats, trailers or waterfowl. But its densities have been held mostly in-check as it has been effectively targeted for early identification and treatment through the LMD aquatic plant management program.

## 6.0 AQUATIC PLANT CONTROL ALTERNATIVES

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The aquatic plant management control goals outlined in the *2014-2023 Steel Lake Management District Plan* (SLMDP) are based on, at a minimum, controlling three identified non-native plant communities: milfoil, fragrant water lily, and yellow flag iris. To some extent, native submerged plants may be also controlled if they are determined to impact the beneficial uses of the lake. The feasibility of the different plant control techniques will depend on the specific aquatic plant and the degree of control desired. This section outlines common methods used to control aquatic vegetation including their advantages and disadvantages, and their suitability for Steel Lake.

### 6.1 Aquatic Herbicides

Aquatic herbicides are often required to manage freshwater noxious vegetation as the effects of the weeds may be significant and pervasive, having a serious potential to profoundly impact species diversity, habitat, water quality, recreation, water supply, drinking water, flood control, safety, and health. Aquatic herbicides are often the most effective tools to remove these invasive plants and restore the ecosystem (Ecology, 2012).

Aquatic herbicides are chemicals specifically formulated for use in water to kill or control aquatic plants. Herbicides approved for aquatic use by the United States Environmental Protection Agency (EPA) have been thoroughly reviewed and are considered compatible with the aquatic environment when used according to label directions. Note that the state of Washington imposes additional constraints on their use above and beyond federal guidelines.

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 are capable of killing the entire plant. Contact herbicides cause the parts of the plant in contact with the herbicide to die back, leaving the roots alive and able to regrow. Non-selective, broad spectrum herbicides will generally affect all plants that they come in contact with. Selective herbicides will affect only some plants. Dicots, broad leafed plants such as Eurasian watermilfoil (*Myriophyllum spicatum*), will be affected by selective herbicides whereas monocots like Brazilian elodea (*Egeria densa*) may not be affected.

The Integrated Aquatic Plant Management and Treatment Plan (Section 7) contains detailed information concerning the selected herbicide control measures used to prevent and/or halt the spread of aquatic plant species infestations to prevent potential lake degradation and to provide the opportunity for the reintroduction of native aquatic plants to Steel Lake.

Because of environmental risks due to improper application practices, aquatic herbicide treatment in Washington state waters is regulated by the following restrictions:

- Applicators must be licensed by the Washington State Department of Agriculture.
- A 2001 9th Circuit District Court decision requires that applicants obtain coverage under a National Pollutant Elimination System Discharge (NPDES) permit before they can legally apply aquatic herbicides to the waters of the state.
- The Washington Department of Ecology requires notification and posting before treatment. Mitigation to protect rare plants or threatened and endangered species is also required.

### **6.1.1 Aquatic Plant and Algae Management General Permit**

Aquatic herbicide applications on Steel Lake are covered under a State of Washington, Department of Ecology, Aquatic Plant and Algae General Permit, National Pollutant Discharge Elimination System (NPDES) and State Waste Discharge General Permit (permit). The current permit regulates the use of pesticides and other products applied to manage aquatic nuisance plants, noxious weeds, quarantine listed weeds, algae, and nutrients in fresh surface waters of the state of Washington. Permit requirements differ depending on plant growth forms and the legal status of the plant species. Impact to non-target plants is acceptable only to the extent needed to control the target plants. Ecology limits direct herbicide application to a percentage of the littoral zone for most control treatments to preserve native plant habitat. As such, one of the goals of the SLMDP will be to maintain native aquatic vegetation for habitat while allowing partial plant removal to maintain recreation and other beneficial uses (see Section 8).

Compliance with the permit ensures the following:

1. That the application of pesticides will not cause or contribute to a violation of the Water Quality Standards for Surface Waters of the State of Washington (chapter 173-201A WAC), Ground Water Quality Standards (chapter 173-200 WAC), Sediment Management Standards (chapter 173-204 WAC), and human health-based criteria in the National Toxics Rule (40 CRF 131.36).
2. That all known, available, and reasonable methods of pollution control, prevention, and treatment (AKART) will be used when applying pesticides. Compliance with this permit, the Washington Pesticide Control Act and the requirements of the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) label constitute AKART.

Additionally, Federal and state regulations require that effluent limits in an NPDES permit must be either technology or water quality-based:

- Technology-based limitations are based upon the methods available to treat specific pollutants. Technology-based limits are set by EPA and published as a regulation or Ecology develops the limit on a case-by-case basis (40 CFR 125.3, and chapter 173-220 WAC).
- Water quality-based limits are calculated so that the effluent will comply with the Surface Water Quality Standards (chapter 173-201A WAC), Ground Water Standards (chapter 173-200 WAC), Sediment Quality Standards (chapter 173-204 WAC) or the National Toxics Rule (40 CFR 131.36).
- Ecology must apply the more stringent of these limits to each parameter of concern.

Eradication projects target only state-listed noxious weeds or quarantine-list weeds. The goal is the complete and permanent removal of these species from the entire waterbody. Therefore, littoral zone limitations do not apply to eradication of noxious weeds or weeds on the quarantine list. Impacts to non-target plants are acceptable to the extent needed to eradicate the target plants. Eradication is allowed only for all noxious weeds as identified in chapter 16-750 of the Washington Administrative Code (WAC) including those targeted under the SLMDP: Eurasian water milfoil, fragrant water lily, yellow flag iris, and Japanese knotweed.



The permit has vetted all permit-covered herbicide applications through the *Herbicide Risk Assessment for the Aquatic Plant Management Final Supplemental Environmental Impact Statement* (Ecology, 2000).

### **6.1.2 Discharge Management Plan**

In compliance with section a S.3.D of the permit, a detailed, site-specific Discharge Management Plan (DMP) and State Environmental Policy Act (SEPA) addendum has been prepared and approved for Steel Lake. This particular requirement is for projects where herbicide treatment areas are expected to be five or more acres. The DMP and SEPA Checklist provides a way to identify possible environmental impacts that may result from aquatic herbicide applications, and helps agency decision-makers, applicants, and the public to understand how the plan will affect the environment. The final 2010 DMP-SEPA Checklist for Steel Lake is found in Appendix F.

### **6.1.3 Aquatic Herbicide Control of Milfoil**

Within the past eleven seasons (2002-2012), Steel Lake has experienced localized Eurasian watermilfoil (milfoil) infestations that have been controlled manually through diver hand-pulling six different years. During this period, the size and scope of the infestation required permit-covered herbicide treatments on four different occasions. Each time, the infestations have reacted well to partial lake herbicide spot applications using 2,4-D AquaKleen® (2002), 2,4-D DMA\*IVM (2005), and Triclopyr Renovate OTF (2009 and 2010).

The Washington State Noxious Weed Control Board (WAC Chapter 16-750) lists milfoil as a Class B Weed: a non-native species that is designated for control in regions where it is not yet widespread, and where preventing new infestations is a high priority (as is the case with Steel Lake). Milfoil, when detected in Steel Lake, shall be treated with aquatic herbicide only under State of Washington, Department of Ecology, Aquatic Plant and Algae General Permit, National Pollutant Discharge Elimination System (NPDES) and State Waste Discharge General Permit coverage.

When the aquatic plant surveys have detected milfoil in densities that require herbicide treatment, the contracted aquatic biologist will consult with SWM staff in the selection of the most appropriate product to be used (based on location of plants, product effectiveness, swimming restrictions, and cost). The current permit authorizes the Permittee to discharge the following herbicide products designated for milfoil control into freshwaters of the state:

- 2,4-D: 2,4-Dichlorophenoxyacetic acid, butoxyethyl ester
- 2,4-D: 2,4-Dichlorophenoxyacetic acid, dimethylamine salt (DMA\*IVM)
- Triclopyr TEA: Triethylamine salt of 3,5,6-trichloro-2-pyridyloxyacetic acid

### **6.1.4 Aquatic Herbicide Control of Fragrant Waterlily**

Fragrant waterlily has historically infested Steel Lake, inhabiting near shore areas around the lake. Per the Washington State Noxious Weed Control Board (WAC Chapter 16-750), fragrant water lily is a Class C Weed: a non-native weed that requires a long-term program of suppression and control. Under permit coverage, Steel Lake has seen progressive eradication of fragrant waterlily during the first ten-year LMD (2003-2013) through implementation of selective herbicide treatments.

The current permit authorizes the Permittee to discharge the following herbicide into freshwaters of the state:

- Glyphosate: N-(phosphonomethyl)glycine, isopropylamine salt

Glyphosate (trade names include Rodeo, AquaMaster, and AquaPro) is a systemic, broad spectrum herbicide registered by the United States Environmental Protection Agency (USEPA) for aquatic applications to floating-leaved plants and shoreline plants; it has no water use restrictions. It is generally applied as a liquid to the leaves. Plants treated with glyphosate can take several weeks to die and a repeat application is often necessary to remove plants that were missed during the first application. The active ingredient in glyphosate moves through the plant from the point of foliage contact into the root system. Visible effects on most annual weeds occur within two to four days, seven days or more on most perennial weeds, and thirty days or more on most woody plants. It is known that extremely cool or cloudy weather following treatment may slow the activity of this product and can delay visual effects of control. Visible effects include gradual wilting and yellowing of the plant, which will advance to complete browning of above-ground growth and deterioration of underground plant parts.

Glyphosate has been very effective for treatment of fragrant waterlily colonies on Steel Lake because it can be applied directly to the floating leaves) making it easier to kill the targeted vegetation (unlike fluridone or endothall which must be applied to the water). Generally two applications of glyphosate have been required (second applications are made later in the summer to control plants missed during the first herbicide application). The control effectiveness of fragrant waterlily is easy to measure through visual surveys of the impact to floating leaves.

One drawback of using herbicides has been the “uplifting” of mats of decomposing waterlily roots that form large floating islands in the waterbody after treatments killed the plants. Floating mats were problematic at the implementation of the LMD in 2003, but have since become non-existent as the densities of the lily colonies have been severely diminished over time.

### **6.1.5 Aquatic Herbicide Control of Emergent Vegetation: Yellow Flag Iris and Japanese Knotweed**

Yellow flag iris and Japanese knotweed have historically infested Steel Lake. Under permit coverage, Steel Lake has seen the gradual eradication of yellow flag iris and the complete eradication of Japanese knotweed during the first ten-year LMD (2003-2013) through the application of selective herbicides. Per the Washington State Noxious Weed Control Board (WAC Chapter 16-750), Yellow flag iris is a Class C Weed (a non-native weed that requires a long-term program of suppression and control); and Japanese knotweed is a Class B Weed (a non-native species that is designated for control in regions where it is not yet wide-spread and where preventing new infestations is a high priority, as is the case with Steel Lake).

The current permit authorizes the Permittee to discharge the following herbicide into freshwaters of the state:

- Glyphosate: N-(phosphonomethyl)glycine, isopropylamine salt

These emergent species have abundant leaf surface areas that absorb the chemical for translocation. As Japanese knotweed is resistant to foliar application, stem injection of glyphosate has been accomplished. The use of glyphosate herbicide has enabled the elimination of mature plants without the destructive disturbance of the shoreline by excavation. Future applications will ensure that experienced herbicide applicators will selectively target individual weed species to limit collateral damage to other native plant species. The application of glyphosate to emergent plants (Yellow flag iris, and Japanese knotweed) has also allowed specific areas to be targeted for removal by manual spot applications on private property, which requires Temporary Rights of Entry granting the city and its agents (AquaTechnex) access to complete treatments of the emergent weeds.

### **6.1.6 Aquatic Herbicide Control of Native Aquatic Plants**

The permit covers aquatic plant management activities including partial plant removal for recreation and other beneficial uses. Permit requirements differ depending on plant growth and the legal status of the plant species.

Following aquatic plant surveys, or when lake residents report native plant growth in densities that may be impacting the beneficial uses of the lake (i.e. swimming, boating, fishing), the contracted aquatic biologist will be asked to provide their professional judgment regarding the need for control of native aquatic plants via herbicide treatment. The Steel Lake Advisory Committee (SLAC) will have the authority to approve or disapprove of contractor recommendations for native plant control.

When required, the contracted aquatic biologist will consult with both SWM staff and the SLAC in the selection of the most appropriate herbicide product to be used (based on targeted plant species, location of plants, product effectiveness, swimming restrictions, and cost). The permit has vetted all permit-covered herbicide applications through the *Herbicide Risk Assessment for the Aquatic Plant Management Final Supplemental Environmental Impact Statement*. The current permit authorizes the Permittee to discharge the following herbicides (expected products for native submerged vegetation control, i.e. *Chara*, spp. and *Nitella*, sp.) into freshwaters of the state:

- Diquat: Dibromide salt of 6,7-dihydrodipyrido (1,2-a:2',1'-c) pyrazinedium
- Endothall: Dipotassium salt of 7-oxabicyclo[2.2.1]heptane-2,3dicarboxylic acid
- Endothall: mono(N,N-dimethylalkylamine) salt of 7-oxabicyclo[2.2.1]heptane-2,3-dicarboxylic acid
- Imazamox:2-[4,5-dihydro-4-methyl-(1-methylethyl)-5-oxo-1H-imidazol-2yl]-5-(methoxymethyl)-3-pyridinecarboxylic acid

### **Aquatic Herbicide Control Advantages**

Aquatic herbicides are easily applied around docks and underwater obstructions. Aquatic herbicide application can be less expensive than other aquatic plant control methods, especially when used in controlling wide-spread infestations of state-listed noxious aquatic weeds.

### **Aquatic Herbicide Control Disadvantages**

- Some herbicides have swimming, drinking, fishing, irrigation, and water use restrictions.
- 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 targeted plants.
- Rapid-acting herbicides may cause low oxygen conditions to develop as plants decompose. Low oxygen may cause fish kills.
- To be most effective, herbicides must be applied to rapidly-growing plants during the growing season only.
- Some expertise in using herbicides is necessary in order to be successful and to avoid unwanted impacts.
- Public perception to the application of chemicals to water can be unfavorable.

### **Aquatic Herbicide Control Suitability for Steel Lake**

The application of aquatic herbicides, in combination with other aquatic plant control methods, substantially increases the likelihood of eradicating all targeted noxious aquatic plants (and native aquatic plants when warranted) from Steel Lake. In situations where eradication is the goal, the application of aquatic herbicides is the most aggressive and prudent method to rapidly reduce vegetation coverage and readily allows for other methods such as bottom barrier installations and diver hand pulling.

## **6.2 Manual Methods**

A number of manual methods for both non-native and native vegetation control in Steel Lake have been implemented from 2004 to 2011 during the duration of the Lake Management District (LMD). The following describes commonly used manual methods:

### **6.2.1 Hand-Pulling**

Diver hand-pulling of aquatic plants in Steel Lake (specifically Eurasian watermilfoil) has been successfully implemented when the number of plants has been small (2003, 2005, 2006, 2008, and 2011). The process 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 three 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 in Steel Lake may not be suitable for hand pulling such as areas where there are deep flocculent sediments.

### **6.2.2 Cutting or Raking**

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 (weed rake) out into the water. Weed rakes may only be used on Steel Lake to the minimum extent necessary to maintain beneficial use of the shoreline (not to exceed the maximum length of ten linear feet), as specified in the WDFW Aquatic Plants and Fish pamphlet (Appendix H).

The Steel Lake LMD has implemented a weed rake loan program that provides Steel Lake residents an opportunity to borrow rakes that are designed especially for the control of native aquatic

vegetation. Rakes may be checked out once the Lake Management District determines that the targeted area does not contain milfoil or other submerged non-native vegetation. Each year on September 15, the program is shut down pursuant to WDFW pamphlet requirements.

Weed rakes have been used as necessary by lake residents from 2004 to 2011 to maintain the beneficial uses of the shoreline for fishing, boating and swimming. In addition, the City of Federal Way Parks and Recreation staff has also utilized aquatic weed rakes to remove unwanted native plants from the public swimming area prior to the opening of swimming season. Lake residents and City staff have been able to control native aquatic plants using two different styles of rakes depending on the type of plant targeted: a rake with a sharp cutting blade for submerged vegetation, and a rake with large tines for control of floating or slightly submerged plants.

### **6.2.3 Weed Rolling**

Several automatic plant control products are commercially available that mechanically disturb the lake bottom to remove aquatic plants and prevent their re-growth within a well-defined area. They sweep, roll, or drag repetitively over the plants and sediments to keep the area free of aquatic plant growth. These devices must be attached to a dock or post to work properly and each product requires electricity to operate. Depending on the equipment used, up to a 42-foot radius around the dock or post can be controlled.

#### **Manual Method Advantages**

- Manual methods are easy to use around docks and swimming areas.
- The equipment is inexpensive.
- Hand-pulling allows the flexibility to remove undesirable aquatic plants while leaving desirable plants.
- These methods are environmentally safe and will not harm aquatic wildlife.
- Manual methods do not require expensive permits, and can be performed on aquatic noxious weeds with Hydraulic Project Approval obtained by reading and following the WDFW Aquatic Plants and Fish pamphlet.

#### **Manual Method Disadvantages**

- As plants re-grow or fragments re-colonize the cleared area, the treatment may need to be repeated several times each summer.
- Because these methods are labor intensive, they may not be practical for large areas or for thick weed beds.
- Even with the best containment efforts, it is difficult to collect all plant fragments.
- Some plants, like waterlilies which have massive rhizomes, are difficult to remove by hand pulling.
- Pulling weeds and raking stirs up the sediment and may make it difficult to see remaining plants.

- Sediment re-suspension can also increase nutrient levels in lake water. Hand pulling and raking may impact bottom-dwelling animals.
- The V-shaped cutting tool is extremely sharp and can be dangerous to use.

### **Manual Method Suitability for Steel Lake**

- Annual diver hand-pulling (when appropriate), should be sufficient to remove small quantities of re-emerging milfoil plants. In combination with herbicide treatments (when warranted), manual methods used to contain and control can effectively combat milfoil re-infestations in subsequent years.
- Due to the success of herbicide (glyphosate) treatments, manual efforts for the control of fragrant water lily and yellow flag iris is not necessary.
- The weed rake load program for Steel Lake has proven to be successful. The LMD ensures that the rakes should only be used to the minimum extent necessary to maintain beneficial use of the shoreline (not to exceed the maximum length of ten linear feet), as specified in the WDFW Aquatic Plants and Fish pamphlet.

## **6.3 Diver Dredging**

Diver dredging (suction dredging) is a method whereby SCUBA divers use hoses attached to small dredges to suck plant material from the sediment. The purpose of diver dredging is to remove all parts of the plant including the roots.

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, milfoil plants tend to break off leaving the roots behind and defeating the purpose of diver dredging. Diver dredging is less effective on plants where seeds, turions, or tubers remain in the sediments to sprout the next growing season. For that reason, Eurasian watermilfoil is generally the target plant for removal during diver dredging operations.

### **Diver Dredging Advantages**

- Diver dredging can be a very selective technique for removing pioneer colonies of Eurasian watermilfoil.
- Divers can remove plants around docks and in other difficult to reach areas.
- Diver dredging can be used in situations where herbicide use is not an option for aquatic plant management.

### **Diver Dredging Disadvantages**

- Diver dredging is very expensive.

- Dredging stirs up large amounts of sediment. This may lead to the release of nutrients or long-buried toxic materials into the water column.
- Only the tops of plants growing in rocky or hard sediments may be removed, leaving a viable root crown behind to initiate growth.
- Acquisition of permits may take more than a year.

### **Diver Dredging Permit Requirements**

Diver dredging requires Hydraulic Approval from the Department of Fish and Wildlife and a Temporary Modification of Water Quality Standards from Ecology. Also diver dredging may require a Section 404 permit from the U.S. Army Corps of Engineers.

### **Diver Dredging Suitability for Steel Lake**

Although diver dredging could be used after the initial herbicide applications to remove plants that were missed or unaffected by the herbicide, the method greatly disturbs sediments and can affect nutrient concentrations and algal production in the lake. Therefore, because other removal and control techniques have proven to be successful, diver dredging is not considered suitable for Steel Lake.

## **6.4 Bottom Barriers**

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, and woven synthetics can all be used as bottom screens.

Bottom barriers will control most aquatic plants however freely-floating species will not be controlled by bottom screens. In addition to controlling nuisance weeds around docks and in swimming beaches, bottom barriers have 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 the bottom barrier material. When using this technique for Eurasian watermilfoil eradication projects, divers should recheck the barrier within a few weeks to make sure that all milfoil plants remain covered and that no new fragments have taken root nearby. The less plant material that is present before installation, the more successful the barrier will be in staying in place.

### **Bottom Barrier Advantages**

- Installation of a bottom barrier creates an immediate open area of water.
- Bottom barriers are easily installed around docks and in swimming areas.
- Properly installed bottom barriers can control up to 100 percent of aquatic plants.
- Barrier materials are readily available.

## Bottom Barrier Disadvantages

- Bottom barriers are only suitable for localized control.
- For safety and performance reasons, bottom barriers must be regularly inspected and maintained.
- Harvesters, rotovators, fishing gear, propeller backwash, or boat anchors may damage or dislodge bottom barriers.
- Improperly anchored bottom barriers may create safety hazards for boaters and swimmers.
- Swimmers may be injured by poorly maintained anchors used to pin bottom barriers to the sediment.
- Some bottom barriers are difficult to anchor on deep muck sediments.
- Bottom barriers interfere with fish spawning and bottom-dwelling animals.
- Without regular maintenance aquatic plants may quickly colonize the bottom barrier.

## Bottom Barrier Permit Requirements

Bottom barrier installation in Washington requires an hydraulic approval obtained from the Department of Fish and Wildlife. In addition, the City of Federal Way Community Development must review each installation to determine whether a shoreline permit is required.

## Bottom Barrier Suitability for Steel Lake

Several bottom barriers have been installed by individual lakefront homeowners prior to 2001, and they appear to have held up quite well. LMD-funded and/or contractor-installed bottom barriers have not been required. They will only be used to eradicate localized infestations, or when dense milfoil areas show resistance to herbicide applications.

## 6.5 Biological Control

Many problematic aquatic plants in the western United States that are non-indigenous species (i.e. Eurasian watermilfoil) may be controlled biologically by organisms from their native ranges. Classic biological control agents are host-specific and attack the growth or reproduction of only the species that are targeted for control. Theoretically, by stocking an infested waterbody or wetland with these organisms, the target plant can be controlled, allowing native plants to recover. The following list outlines a number of approved biological control agents that are available for release in the United States:

### 6.5.1 Grass Carp

The grass carp (*Cteno pharynogodon*), also known as the white amur, is a vegetarian fish native to the Amur River in Asia. Because this fish feeds on aquatic plants, it can be used as a biological tool to control nuisance aquatic plant growth. In some situations, sterile (triploid) grass carp may be permitted for introduction into Washington waters.



The Washington Department of Fish and Wildlife determines the appropriate stocking rate for each waterbody when issuing a grass carp-stocking permit. Success with grass carp in Washington has been varied (sometimes the same stocking rate results in no control, control, or even complete elimination of all underwater plants). Grass carp should be stocked only in waterbodies where complete elimination of all submersed plant species can be tolerated.

### **Grass Carp Advantages**

- Grass carp are inexpensive compared to some other control methods and offer long-term control.
- Grass carp offer a biological alternative to aquatic plant control.

### **Grass Carp Disadvantages**

- Depending on plant densities and types, it may take several years to achieve plant control using grass carp and in many cases control may not occur.
- If the waterbody is overstocked, all submersed aquatic plants may be eliminated. Removing excess fish is difficult and expensive.
- The type of plants grass carp prefer may also be those most important for habitat and for waterfowl food.
- Fish may need to be restocked at intervals
- If not enough fish are stocked, less-favored plants, such as Eurasian watermilfoil, may take over the lake.
- Stocking grass carp may lead to algae blooms due to a sudden loading of fecal-related nutrients.
- All inlets and outlets to the lake or pond must be screened to prevent grass carp from escaping into streams, rivers, or other lakes.

### **Grass Carp Permit Requirements**

Stocking grass carp requires a fish-stocking permit from the Washington Department of Fish and Wildlife. Also, if inlets or outlets need to be screened, a Hydraulic Project Approval application must be completed for the screening project.

### **Grass Carp Suitability for Steel Lake**

Grass carp are not suitable for aquatic plant control in Steel Lake. Infestations of milfoil have not reached levels where a bio-control such as grass carp would be necessary. The lake also has an outlet stream that eventually flows into Puget Sound, making it much more difficult to obtain the permits necessary to stock grass carp.

### **6.5.2 Watermilfoil Weevil**

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). 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. 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.

#### **Watermilfoil Weevil Advantages**

- Milfoil weevils offer a biological alternative to aquatic plant control.
- They may be cheaper than other control strategies.
- Biocontrols enable weed control in hard-to-access areas and can become self-supporting in some systems.
- If they are capable of reaching a critical mass, biocontrols can decimate a weed population.

#### **Watermilfoil Weevil Disadvantages**

- There are many uncertainties as to the effectiveness of this biocontrol in western Washington waters.
- There have not been any documented declines of Eurasian watermilfoil in Washington State that can be attributed to the milfoil weevil.
- Bio-controls often do not eradicate the target plant species.,

#### **Watermilfoil Weevil Permit Requirements**

The milfoil weevil is native to Washington and is present in a number of lakes and rivers. It is found associated with both native northern milfoil and Eurasian watermilfoil. However, importing out-of-state weevils into Washington requires a permit from the Washington Department of Agriculture.

#### **Watermilfoil Weevil Suitability for Steel Lake**

Since the milfoil weevil is a new bio-control agent, it has not been released yet intentionally in western Washington to control Eurasian watermilfoil, therefore it is uncertain how effective the weevil will be and whether populations per stem can be maintained at levels high enough to eradicate Eurasian watermilfoil. Milfoil infestations in Steel Lake have not been severe enough to warrant bio-control introduction of watermilfoil weevil as other methods are readily available and more suitable.

## **6.6 Rotovation**

Rotovators are underwater rototiller-like blades that are used to uproot submerged aquatic plants. The rotating blades churn seven to nine inches deep into the lake 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.

## **6.7 Harvesting**

Mechanical harvesters are large machines which both cuts and collects 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.

## **6.8 Mechanical Cutting**

Mechanical weed cutters cut aquatic plants several feet below the water's surface. Unlike harvesting, cut plants are not collected while the machinery operates.

### **Rotovation, Harvesting or Mechanical Cutting Suitability for Steel Lake**

None of these options (rotovation, harvesting or mechanical cutting) are suitable for the level of non-native aquatic plant infestations expected in Steel Lake. These are not considered eradication tools but rather are used to manage and control heavy, widespread infestations of aquatic weeds. Because the process creates plant fragments, these methods may serve to spread and expand any existing infestations. According to Ecology, "There is little or no reduction in plant density with mechanical harvesting." Since the aim of the SLMDP is to eliminate non-native aquatic plants milfoil from Steel Lake, rotovation, harvesting or mechanical cutting are not compatible control strategies (harvesting and cutting do not remove root systems; and rotovation would cause damage to the lake sediments and associated animals in a system that does not already receive dredging for navigability).

## **6.9 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 waterbody for extended periods of time to control 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 Suitability for Steel Lake**

Drawdown is not a viable control strategy for Steel Lake. The outlet from Steel Lake flows through a wetland to a natural stream system, and does not have a control structure installed. Not only would drawdown be difficult to achieve, it would also cause significant damage to the ecosystem. The amount

of drawdown required to impact milfoil would dry out the littoral zone of the lake. This would damage native plants and animals in both the lake and the adjacent wetland and have many negative consequences for residents living 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.

## **6.10 No Action Alternative**

The no action alternative acknowledges the presence of invasive aquatic plants in Steel Lake but does not call for any control or planning activities.

### **No Action Advantages**

There are few advantages to “doing nothing” to control or prevent the further spread of invasive aquatic plants; however, there may be a perception of saving money by not investing in activities such as herbicide application or mechanical control methods.

### **No Action Disadvantages**

The no action alternative may result in long-term deleterious effects on the ecology, recreational uses and aesthetics of Steel Lake. Invasive aquatic plants disrupt dissolved oxygen patterns, displace native plant species, and impair navigation. While changes to water quality may be less obvious, their seasonal and long-term impacts can seriously threaten features that attract homeowners, outdoor enthusiasts, anglers, and boaters to Steel Lake.

### **No Action Suitability for Steel Lake**

Based upon the recurrent milfoil infestations of Steel Lake, the “no action” alternative is not appropriate for Steel Lake.

## **7.0 INTEGRATED AQUATIC PLANT MANAGEMENT AND TREATMENT PLAN**

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The following Integrated Aquatic Plant Management and Treatment Plan for Steel Lake provides information regarding the selected aquatic plant management control measures designed to halt the spread of aquatic plant species infestations, to prevent potential lake degradation, and to provide the best opportunity for the reintroduction of native aquatic plants:

- Annual diver surveys will be performed by a contracted aquatic plant management firm to monitor changes in the aquatic plant community.
- An aquatic biologist will develop a management plan for all identified non-native aquatic plants to target them for control at as low a density as environmentally and economically feasible and at levels that do not impact public safety or the beneficial uses of the lake.
- All aquatic herbicides will be applied per a State of Washington, Department of Ecology, Aquatic Plant and Algae General Permit, National Pollutant Discharge Elimination System (NPDES) and State Waste Discharge General Permit (permit).

- All identified species of noxious weeds as listed in WAC 16-750 shall be reduced to levels that do not impact public safety or the beneficial uses of the lake.
- All appropriate aquatic plant control and treatment methods shall be used as needed for all other problematic aquatic weeds and native aquatic plants, using the best available science to identify and understand their effects on human, aquatic and terrestrial ecosystems prior to their implementation.

Each year, the SLAC will review the findings of the annual diver survey, and in consultation with the contracted aquatic biologist, will determine the direction of the annual plant management and treatment plan. The aquatic plant species in Steel Lake targeted for eradication are expected to be: Eurasian watermilfoil (*Myriophyllum spicatum*), fragrant water lily (*Nymphaea odorata*), and yellow flag iris (*Iris pseudacorus*).

In addition, native aquatic weeds (i.e., thin-leafed pondweed and submerged macro algae) may also be controlled when warranted. Manual methods will be implemented by lake residents per stipulations outlined in Section 6.2.2. Aquatic herbicides may also be used to control native vegetation to levels that do not impact fish and wildlife habitat when the contracted aquatic biologist has documented that their densities are impairing public safety or the beneficial uses of the lake (Section 6.1.6), and when the SLAC concurs with this determination.

## 8.0 PRESERVATION OF NATIVE VEGETATION AND AQUATIC HABITAT

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Noxious freshwater aquatic weeds, if left unchecked, pose a serious threat to our State's water bodies. The historical presence of non-native aquatic plants in Steel Lake has been shown to impair the use and aesthetic value of the lake. Because of Steel Lake's shallow characteristics, aquatic plants have the potential to restrict the available area for recreation activities such as fishing, swimming and boating. In addition, other regional lakes are in danger of becoming infested with noxious or invasive aquatic plants that are transported from Steel Lake via boat, boat trailer or waterfowl.

Since 2001, the year-by-year systematic eradication of noxious aquatic plant species in Steel Lake has allowed for the re-introduction of desirable native aquatic plants. In theory, the integrated approach implemented during the first Steel Lake LMD (2003-2013), has improved fish and wildlife habitat and the overall ecological health of Steel Lake by assuring that the native aquatic vegetation propagates and that habitat is preserved. The text below, adapted from the Department of Fish & Wildlife Aquatic Plants and Fish Publication, illustrates the importance of aquatic habitat preservation:

*Aquatic noxious weeds can adversely affect ecological functions by crowding out native vegetation and creating single species stands. While it is recognized that native aquatic plants can become a nuisance to swimmers and boaters due to excessive growth, it is important to recognize the value of native plant species for fish and wildlife. These native plants provide habitat for fish and wildlife, help stabilize shorelines, produce oxygen, trap beneficial nutrients, and keep sediment in place.*

*For example, pondweed is a critical food source for waterfowl and marsh birds. Pondweed also provides cover from predators for warmwater fish such as perch and bass. Aquatic beneficial plants are defined as native plants (such as pondweeds, bladderwort, or coontail) or non-native plants not included on the noxious weed list.*

*Warmwater gamefish often utilize vegetation in the shallow waters of lakes for spawning, early rearing, and feeding. Largemouth and smallmouth bass generally prefer ponds and reservoirs with abundant aquatic vegetation. Bluegill, sunfish and crappie also inhabit vegetated quiet or slow-moving waters for protection from predators. Too much vegetation can result in overpopulation if predators that access prey species, while too little vegetation can adversely affect the predator-prey balance and result in a decline in the fishery.*

*Aquatic plants provide important living space for insects, snails and crustaceans, which in turn become food for fish and waterfowl. Vegetated areas support many times more of these tiny creatures than to do non-vegetated areas. The plants make important nurseries for young fish, frogs, salamanders, and other amphibians. Several species of reptiles, including turtles, garter snakes and water snakes use these areas for cover and forage (WDFW, 1998).*

In 2003, AquaTechnex reported that submersed native aquatic plants were scattered in moderate to dense patches around the shoreline of the lake, and that floating leaf and submerged native aquatic plants covered approximately 55 percent of the lake littoral zone. In successive years, the native plant populations in the lake were reported to be healthy as mapped. In 2010 and 2011, it was noted that the native plant community had remained healthy and relatively unchanged (however plant densities were down from the same period of time in previous years due to a multi-year pattern of summertime cooler weather).

The removal of non-native plant species during the early years of the Steel Lake LMD program may have had a short-term negative impact on warmwater fish populations due to a loss of habitat cover, but as mentioned above, the removal of invasive vegetation has promoted growth of native plants and has allowed native plant species to re-seed over the long-term.

Although the need to re-vegetate is not likely at this time, the goal of the SLMDP will be to continue maintaining at least 35% native aquatic vegetative cover. This level is based upon the following targets:

- Washington Department of Fish & Wildlife recommended extent of native vegetative cover for fish habitat needs of 20% to 60% of the lake acreage (Jackson, 2003, WDFW, personal communication).
- The Department of Ecology recommended warmwater fishery needs for native vegetative cover of 25% to 40% of the lake acreage (Hamel, 2003, Ecology, personal communication).

Based on a lake surface area of 48.6 acres (AquaTechnex, 2010), the acreage needed for adequate native vegetation coverage will be calculated from the results of the annual plant survey. If there are less than 17 acres (35% coverage of the lake) of native aquatic vegetation cover, the Steel Lake Advisory Committee will determine whether mitigation measures are necessary to support wildlife species. If mitigation efforts are deemed necessary, native aquatic vegetation may be planted in the lake to supplement natural recovery efforts. Native vegetation may include floating leaved rooted plants such as *Brasenia schreberi* (water-shield); submerged plants such as *Ceratophyllum demersum* (coontail),

*Utricularia vulgaris* (common bladderwort), and *Potamogeton spp.* (pondweeds); and submerged macroalgae such as *Chara spp.* (muskgrass) and *Nitella sp.*

## 9.0 ALGAE MANAGEMENT PLAN

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In 2007, the Department of Ecology began implementing an Algae Control Program that provides funding of \$250,000 annually for local governments to help in the identification (freshwater lake toxicity testing) for potential hazardous algae blooms (HAB) that pose health risks to humans, pets, and livestock. The following year, The Washington Department of Health (DOH) developed statewide recreational guidelines for blue-green algae toxins (Washington State Recreational Guidance for Microcystin and Anatoxin-A) that SWM began using as a decision-making document concerning public notification and the posting of health advisories.

The following summarizes significant blue-green algae blooms occurring on Steel Lake which have been investigated under the Algae Control Program:

- In 2009, SWM responded to two separate algae blooms: one on April 20 and one on June 3. Samples indicated the presence of blue-green algae. Microcystin toxins were detected above action levels during the April event which required the posting of Warning signs at the public swimming beach. SWM followed through with public notifications (sign postings and email notices) to both the LMD and the public until each bloom dissipated per DOH guidance.
- In 2010, SWM staff responded to a large bloom on September 14 that was reported by numerous residents and lake users. Although the presence of blue-green algae was documented, further follow-up laboratory analysis showed that toxin levels were below the DOH action level. Per DOH guidance, proper sign posting and notifications were provided until the bloom dissipated.
- In 2011, SWM was awarded a four-year Freshwater Algae Control Program Grant from the Department of Ecology for the management of algal blooms occurring in City of Federal Way freshwater lakes (including Steel Lake). The grant improved and enhanced the Lake Management District's algal bloom management efforts, and assisted in our response to HAB reports, early detection investigations, water quality sampling, sample delivery/analyses, public notification, data reporting, and community outreach. In 2011, there were two separate blue-green algae blooms: June 20 and September 14. Water samples for both blooms were not toxic per the DOH guidance, but caution signs were posted at the public swimming beach until the bloom dissipated.
- Since 2008, there have been five major HAB events resulting in a total of thirty nine (39) days of beach health advisories (both warning and caution) posted at the Steel Lake public swimming beach.

The SLMDP, depending on the annual budget and work plan developed by the Steel Lake Advisory Committee (SLAC), will ensure that blue-green algae blooms will be competently identified when they occur, and Washington Department of Health guidelines regarding public notifications, health advisories and recreational waters closure will continue to be implemented.

Through June 2014, algae management efforts will be partially funded by a Washington Department of Ecology (Ecology) Freshwater Algae Grant obtained by SWM. Additionally, Ecology has advised SWM that the blue-green algae toxicity testing component (a high priority program totally funded by

the department), will continue in perpetuity as the sunset date was removed from the legislative record (Hamel, 2012, personal communication).

## **10.0 WATER QUALITY MONITORING PROGRAM**

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The King County Lake Stewardship Program Volunteer Monitoring Program for Steel Lake began in the 1980s and continued for several decades until budget cuts ended the program in 2005. Although the most recent data generated by this program (six years prior to the date of this report) indicates that Steel Lake had been relatively low in primary productivity (borderline oligotrophic to mesotrophic) with very good water quality, a significant data gap exists.

The intent of a newly established water quality monitoring program will be to provide residents, scientists, lake managers, and interested individuals with current information on the water quality and physical conditions for Steel Lake. The SLAC recognizes that these data may represent the only reliable source of information for assessing current water quality, and can be used to address questions regarding the characteristics and ecology of Steel Lake.

The objective of the Steel Lake Management District Water Quality Monitoring Program includes: (1) continuation of the gathering of baseline data with the intent of assessing long-term trends; (2) defining seasonal and water column variability; (3) identifying potential problems, proposing possible management solutions when feasible, or pinpointing additional studies to be made; and (4) educating lake residents, lake users, and policy makers regarding lake water quality.

Water chemistry and physical characteristics in lakes vary seasonally as well as by depth over the course of a year. The most dynamic period for lakes is during the “growing season” of mid-spring through early autumn when lake dwelling organisms are most active. To maximize information obtained for this effort, the Steel Lake Water Quality Monitoring Program will involve the collection of data all year on precipitation, lake level, surface water temperature, and water clarity (with an emphasis on the hydrological balance between the lake and its watershed, as well as temperature ranges and the impacts of inputs on water clarity). Additionally, samples for water chemistry will be collected from May through October—the second emphasis being an effort on nutrient balances coinciding with much of the primary recreational period for lakes in the Pacific Northwest (which is the chief beneficial use of most of the regional lakes from the human standpoint).

If part of an annual work plan approved by the SLAC, Surface Water Management staff will collect, analyze and manage the data. During the summer, water chemistry and temperature vary with depth in Steel Lake. On each sampling trip, samples will be collected from a depth of one meter. In early summer and again in late summer, samples will be collected from the surface (1m), middle, and one meter above the bottom from the deepest part of the lake to define changes found in the vertical profiles of the parameters. Ideally, lake level and precipitation will be recorded daily by lake volunteers, however, the actual scope of the water quality monitoring program will be developed and authorized by the SLAC on an annual basis.



## 11.0 LAKE OUTLET MAINTENANCE PROGRAM

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If part of an annual work plan approved by the SLAC, the following action items will be implemented to prevent future lake outlet blockages:

- Perform periodic maintenance to relieve flow congestion due to fallen trees, woody debris, invasive vegetation, and trash (large appliances, shopping carts, plastic, etc.) between the lake outlet and the South 304<sup>th</sup> Street culvert crossing.
- Perform hand work to better define outlet channel at northwest corner of lake.

City staff has discussed establishing a long term maintenance agreement with various outlet channel property owners to ensure that this drainage system continues to be properly maintained in the future. Most of the outlet channel owners have indicated that they are willing to allow volunteers or city staff to access their property to perform channel maintenance activities as long as the work is sponsored and administered by either the City or Lake Management District and evidence of liability insurance is provided. All outlet maintenance activity will comply with all required and appropriate permitting requirements.

## 12.0 CANADA GEESE MANAGEMENT PROGRAM

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Canada geese (*Branta canadensis*) are among the most familiar birds in Washington. They are a source of recreation for bird watchers and hunters and symbolize nature for many people. But unfortunately, populations of resident Canada geese have dramatically increased over the past 25 years, particularly in urban areas in and around Steel Lake. These environments have few predators, no hunting prohibitions, and a dependable year-round supply of food and water.

Canada geese are extremely adaptable. They use food and other resources present in urban landscapes for nesting, raising young, molting, feeding, and resting. In parks and shorelines with short grass, large flocks of geese can denude areas of vegetation and litter them with their droppings and feathers. Although Canada geese are not normally considered to be a significant source of infectious diseases that are transmittable to humans or domestic animals, their droppings are increasingly cited as a cause for water quality concerns in municipal lakes and ponds.

Waterfowl feces contain large amounts of *E. coliform*, a bacterium that is strongly correlated with the presence of pathogens and a common cause of gastrointestinal illness contracted by swimmers who ingest lake water. Fecal matter produced by waterfowl has been demonstrated to elevate bacteria within lakes to levels which may be sufficient to cause water-quality standard violations. High bacteria levels have been known to result in swimming beach closures. "Swimmers Itch" (schistosome or cercarial dermatitis) is caused by a parasite that can be spread by goose droppings. Furthermore, waterfowl feces contain nutrients that can cause hazardous algae blooms (see Section 9.0). Elevated nutrients in a lake can also exacerbate non-native aquatic weed growth.

Public health concerns presented by populations of resident Canada geese have been demonstrated by a water-quality monitoring effort conducted at Collins Lake (a 60-acre urban lake in New York). In the late

1970s and throughout the 1990s, the New York State Department of Environmental Conservation documented a dramatic increase in nutrient and algae levels directly attributable to increases in waterfowl populations over the monitoring period (Tobissen and Wheat, 2000).

The Steel Lake LMD, through public education efforts, has attempted to reduce waterfowl populations through the implementation of a public education campaign. “*Stop Feeding the Geese*” signs have been posted at the public swimming beach. Lake residents have been informed regarding waterfowl control practices and physical installations that may be established on their property including, plant barriers and fences. Information regarding residential harassment and scare tactics (flags, streamers and scarecrows) has also been disseminated by the LMD. Although it is difficult to gauge whether public education efforts have been effective, there have been five major hazardous algae bloom events at the Steel Lake public swimming beach since 2008 (See Section 9.0) that have resulted in a total of 39 days of posted beach advisories.

In public areas with favorable habitat, it is rarely desirable (or possible), to eliminate geese entirely. Ideally, management programs should strive to reduce goose numbers and related problems to a level that a community can tolerate. No single, quick-fix solution is likely to solve conflicts with geese. An integrated approach using several techniques in combination will be required for Steel Lake.

Canada geese are protected under federal and state law. Therefore, if a Canada geese management program, a Cooperative Service Agreement will be established between the Waterfowl Management Committee and the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Wildlife Services (WS). The contract will set forth the objectives, activities and budget of the wildlife control activities for a specified period.

If part of an annual work plan approved by the SLAC, the Canada geese management program will be designed to reduce/alleviate property damage and human health and safety concerns, including reducing the contamination of Steel Lake’s recreational waters. A Canada geese management program will include technical assistance, population monitoring, and population control (reduction in the number of geese utilizing certain areas). The objectives of a Canada geese management program may include:

- Technical assistance upon request, including on-site evaluation of problem areas.
- Monthly surveys of Canada geese.
- A direct control program (egg addling and lethal control) if needed to reduce damage in designated areas as requested.

## **13.0 COMMUNITY EDUCATION AND INVOLVEMENT PROGRAM**

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Since 2004, SWM has implemented an effective public education and involvement program associated with the Steel Lake Management District. Using this model, the community education and involvement program designed per the *2014-2023 Steel Lake Management District Plan (SLMDP)* will include the following elements:

- Quarterly SLAC meetings (or as needed) to discuss annual work plan and budget.

- Production of SLAC written minutes.
- Quarterly *LakeView* publication.
- Annual Steel Lake LMD Report.
- Distribution of necessary email notifications to lake resident subscribers concerning lake management activities, events and public health notices.
- Production and distribution of necessary educational materials concerning the prevention/introduction of noxious weeds, nuisance plants and non-native animal species to the lake; nutrient reduction and impacts of toxic blue-green algae; lake watershed stewardship and stormwater pollution prevention; natural yard care; efforts to control non-native animal species and Canada geese

## **14.0 LMD ANNUAL COSTS AND COMMITTEE AUTHORIZATION**

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The following priorities have been established for the *2014-2023 Steel Lake Management District Plan* (SLMDP). These are based upon lake improvement and maintenance activities which may be implemented over the LMD's ten-year period:

1. Management of non-native aquatic plants and vegetation
2. Preservation of native vegetation and aquatic habitat
3. Management of hazardous algae blooms
4. Water quality monitoring
5. Maintenance of lake outlet channel
6. Management of Canada geese

### **14.1 Primary LMD Management Goal**

It is projected that each annual work plan will include the primary LMD goal of controlling or removing non-native aquatic plants and vegetation through contracted aquatic plant management activities. The scope, RCW reference, description and estimated annual cost for this effort is described below in Table 8:

**Table 8, Primary LMD Management Goal: Description and Costs for Management of Non-Native Aquatic Plants and Vegetation**

Scope Item	RCW Reference	Description	Estimated Annual Cost
Development of LMD	36.61.020 (8)	Estimate 30 SWM hours at \$50/hour. One time cost of \$1,500 spread out over ten-year LMD.	\$150.00
Contracted Aquatic Plant Management	36.61.020 (1)	Based upon AquaTechnex 2012-2015 contract and expected scope, including public education materials, annual permitting, and King County assessment collection fees (see Table 9 for detail).	\$9,790.00
SWM Implemented Aquatic Plant Management	36.61.020 (1)	Estimate 50 SWM man hours per year at \$50/hour. Includes: development of annual work plan, management and oversight of contractor(s), finance budgeting, public education, coordination of SLAC meetings, notifications, and final report.	\$2,500.00
<b>PRIMARY LMD MANAGEMENT GOAL-TOTAL ANNUAL COST</b>			<b>\$12,440.00</b>

The estimated annual cost for implementing a contracted aquatic plant management program was derived from a review of recent Steel Lake Work Plans, including the 2012 LMD budget. See Table 9 for a detailed itemization of the expected tasks and associated costs for this effort.

**Table 9, Estimated Annual Cost for Contracted Aquatic Plant Management Program**

TASK	ESTIMATED ANNUAL COST
Annual permit fee	\$500
Initial systematic survey	\$1,480
Treatment notifications	\$725
Glyphosate treatments	\$1,800
Milfoil treatments	\$1,700
Second systematic survey	\$1,480
Annual report	\$500
Public education	\$500
Native plant control (1 acre)	\$400
KC assessment fee	\$430
Contractor meetings	\$275
<b>TOTAL</b>	<b>\$9,790</b>

## 14.2 Optional LMD Management Goals

The balance of the lake improvement and maintenance activities that may also be performed over the LMD's ten-year period (2014-2023) are considered optional and will be implemented on an as-needed basis when funds are available based upon Steel Lake Advisory Committee (SLAC) review and approval. The SLAC must formally authorize the implementation of these optional activities (see section 14.3). The scope, RCW reference, description and estimated annual cost of these goals are described below in Table 10:

**Table 10. Optional LMD Management Goals**

Scope Item	RCW Reference	Description	Estimated Annual Cost
Preservation of Native Vegetation and Aquatic Habitat	36.61.020 (1)	Introduction of native plantings when warranted by SLAC. Cost is based upon pricing provided in AquaTechnex 2012 contract. Includes labor, mobilization, and materials. (One time cost of \$3,000.00).	\$300.00
Management of Hazardous Algae Blooms	36.61.020 (2), (6)	Hazardous Algae Bloom (HAB) inspections and investigations. Partially funded by a Department of Ecology grant through 2014. Estimates based on two (2) blooms per year sampling, delivery, notifications, and follow-up. Estimate ten (10) SWM man hours at \$50/hour annually. Estimate that lab costs are covered through Ecology Freshwater Algae Control Program.	\$500
SWM Implemented Water Quality Monitoring Program	36.61.020 (6)	Estimate based on existing North Lake LMD WQ volunteer program. Estimate six (6) annual on-lake monitoring events and travel time: 14 SWM man hours at \$50/hour. Estimate six (6) rounds of lab sample analysis per year. Estimate six (6) man hours of data management per year at \$50/hour. Purchase of one YSI ODO probe (\$1,200) and one lake water sampler (\$500).	\$3,540
Maintenance of Lake Outlet Channel	36.61.020 (7)	Annually remove sediment in channel. Annually perform periodic maintenance (remove vegetation and trash). Annual hand work to define channel. Estimate 16 SWM man hours per year at \$30/hour	\$480
Management of Canada Geese	36.61.020 (6)	Contract with USDA Wildlife Services to implement annual Canada geese control activities (technical assistance, population monitoring, and population control)	\$2,200

### **14.3 SLAC Responsibilities/Authority**

The Steel Lake Advisory Committee (SLAC) will be created to represent the property owners of Steel Lake and to advise City Council during the renewed Steel Lake LMD, set to become effective the beginning of 2014. Members of the SLAC shall be appointed by the City Council following an open recruitment process approved by the City Council. Members of the SLAC shall be selected from individuals who own property or represent government bodies that own property within the LMD. Intent of the selection process shall be to proportionally represent the various property types identified in the district assessment roll. A *Resolution of the City Council of the City of Federal Way Creating a Lake Management District Advisory Committee for Steel Lake* will clearly establish the duties and authority of the Committee

### **14.4 Petition to Create LMD**

Per RCW 36.61.030, a lake management district may be initiated upon either the adoption of a resolution of intention by a county legislative authority or the filing of a petition signed by ten landowners or the owners of at least fifteen percent of the acreage contained within the proposed lake management district, whichever is greater. A petition or resolution of intention shall set forth: (1) The nature of the lake improvement or maintenance activities proposed to be financed; (2) the amount of money proposed to be raised by special assessments or rates and charges; (3) if special assessments are to be imposed, whether the special assessments will be imposed annually for the duration of the lake management district, or the full special assessments will be imposed at one time, with the possibility of installments being made to finance the issuance of lake management district bonds, or both methods; (4) if rates and charges are to be imposed, the annual amount of revenue proposed to be collected and whether revenue bonds payable from the rates and charges are proposed to be issued; (5) the number of years proposed for the duration of the lake management district; and (6) the proposed boundaries of the lake management district.

On November 11, 2012, a public meeting was held to discuss and hear comments regarding the SLMP. Afterwards, the Steel Lake Advisory Committee submitted a signed petition (Appendix A) to the City Clerk which met the criteria set forth in RCW 36.61.030:

- The petition contained a total of thirty seven (37) signatures from landowners within the proposed district; and,
- The petition contained a total of twenty percent (20%) of the acreage contained within the proposed district.

The estimated assessment rates imposed on each parcel in the proposed Steel Lake LMD is included in Appendix B.

## 15.0 REFERENCES

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- AquaTechnex, LLC. 2010. *Steel Lake Bathymetry Mapping Report*.
- AquaTechnex, LLC. 2012. *Steel Lake Discharge Management Plan*.
- Carlson, Robert. E. 1977. *A Trophic State Index for Lakes*, Limnological Research Center, University of Minnesota, Minneapolis.
- City of Federal Way, Washington. 2003. An Ordinance (03-452) of the City Council of the City of Federal Way, Washington, creating Lake Management District Number 1 for Steel Lake and setting a public hearing on the assessment roll for the district.
- City of Federal Way, Washington. 2003. A Resolution (03-397) of the City Council of the City of Federal Way, Washington, creating a Lake Management District Advisory Committee for Steel Lake and establishing the duties thereof.
- City of Federal Way, Washington. 2003. *Steel Lake Integrated Aquatic Vegetation Management Plan*.
- City of Federal Way, Washington. 2012. An Ordinance (12-715) of the City Council of the City of Federal Way, Washington, relating to boats and watercraft; amending FWRC 7.03.010 and FWRC 7.03.040.
- Envirovision, Inc. 1994. *Steel Lake Integrated Aquatic Vegetation Management Plan*.
- Hamel, Kathy. 2012. Washington Department of Ecology, Aquatic Plants, Algae & Lakes Program. Personal communication.
- Moore, Schindler, Scheuerell, Smith and Frodge. 2003. *Lake Eutrophication at the Urban Fringe, Seattle Region*. Vol. 32 No. 1, Feb. 2003© Royal Swedish Academy of Sciences.
- Sheldon and Associates. 1999. *City of Federal Way Wetland Inventory Report*.
- Tobissen, P. and E. Wheat. 2000. *Long and Short-Term Effects on Waterfowl on Collins Lake, An Urban Lake in Upstate New York*.
- Washington State Department of Ecology. 2000. *Herbicide Risk Assessment for the Aquatic Plant Management Final Supplemental Environmental Impact Statement*.
- Washington State Department of Ecology. 2011. *Aquatic Plant and Algae General Permit, National Pollutant Discharge Elimination System (NPDES) and State Waste Discharge General Permit*.
- Washington State Department of Ecology. 2012. On-Line Aquatic Plant and Algae Identification. <http://www.ecy.wa.gov/programs/wq/plants/plantalgaeid.html>

Washington State Department of Ecology. 2012. *Fact Sheet for the State of Washington Aquatic Noxious Weed Management General Permit.*

Washington State Department of Ecology. 2012. On-Line Statewide water rights web map.  
<http://www.ecy.wa.gov/programs/wr/info/webmap.html>

Washington State Department of Fish and Wildlife. 1998. *Aquatic Plants and Fish.* Publication #APF-1-98.

Washington State Department of Health (DOH). 2010. *Washington State Recreational Guidance for Microcystin and Anatoxin-A.*



**Appendix A**  
Signed Petition

**Petition to the Federal Way City Council to Renew the  
Lake Management District Number 1 for Steel Lake, 2014-2023**

We, the undersigned Steel Lake property owners, request that the Federal Way City Council renew the Lake Management District (LMD) Number 1 for Steel Lake pursuant to RCW 36.61 that will otherwise expire in 2013. The LMD funds will finance efforts to protect and enhance Steel Lake in terms of water quality, recreational and aesthetic value.

1. Purpose of the Lake Management District may include the following activities:

- a) Management of non-native aquatic plants and vegetation
- b) Preservation of native vegetation and aquatic habitat
- c) Management of hazardous algae blooms
- d) Water quality monitoring
- e) Maintenance of lake outlet channel
- f) Management of Canada geese
- g) Community Education and Public Involvement

It is expected that all management district lake improvement and maintenance activities described in RCW 36.61.020 may be considered as LMD funding allows. The attached 2014-2023 Steel Lake Management District Plan (SLMDP) provides additional detail regarding the basis for the annual LMD work plan, management goals and budget.

2. Boundary

The proposed boundary of the LMD would include all the property with lakefront on Steel Lake. See attached map of proposed properties within the district.

3. Duration

The proposed duration of the LMD renewal is 10 years.

4. Charges to property:

Annual rates and charges will be used to raise funds to support LMD activities. The following is the formula of rates and charges proposed for establishment of the assessment role for the LMD:

ASSESSMENT CATEGORY	RATE	REVENUE (\$)
<b>Single Family Residential Zone RS9.6, Lakefront</b>		
Developed property (89 units)	X \$95 per unit	\$8,455.00
Vacant property (9 units)	X \$33.00 per unit	\$279.00
City Park (1 unit)	X \$2,279.00	\$2,279.00
WDFW Public Boat Launch (1 unit)	X \$3,895.00	\$3,895.00
<b>Multi-Family Residential Zone (RM 1800), Lakefront</b>		
Village at the Lake Apartments (1 unit)	X \$306.00	\$306.00
<b>TOTAL ANNUAL ASSESSMENT</b>		<b>\$15,232.00</b>

It is proposed that unallocated funds in the current LMD (estimated at \$15,000) roll over into the Lake Management District (LMD) Number 1 for Steel Lake, 2014-2023.

The estimated amount that is proposed to be collected for the LMD per year is \$15,232. Issuance of revenue bonds is not proposed.

The LMD budget and rates will be approved through a public hearing and a public vote after the city council adopts a resolution to renew the LMD. Once approved by the public and city council, the annual rates and charges may not be altered without another public vote and city council approval.

5. Steel Lake Management District Advisory Committee

The volunteer Steel Lake Management District Advisory Committee (SLAC) is proposed to represent the interests of LMD property owners. City staff will work with the SLAC to develop the annual work plan. The annual LMD work plan and budget will be forwarded by the SLAC for implementation by the City's surface water utility. The SLAC will track and review activities and expenditures by the City as well as outside contractors. City staff will provide SLAC support including quarterly financial reports.

**Petition to the Federal Way City Council to Renew the  
Lake Management District Number 1 for Steel Lake, 2014-2023**

RCW 36.61.030 – A lake management district may be initiated upon either the adoption of a resolution of intention by a county legislative authority or the filing of a petition signed by ten landowners or the owners of at least fifteen percent of the acreage contained within the proposed lake management district, whichever is greater.

	Signature of Property Owner(s)	Printed Name	Full Address	Parcel Number (if known)
1		Mike Grovisky	2039 S. 304 <sup>th</sup> St.	053700-0055
2		Margaret Reyhner	2435 S 304 <sup>th</sup> St	0921049059
3		William & Margaret Linde	2417 S. 304 <sup>th</sup> St.	0921049002
4		Michael Brazel	2222 S. 308 <sup>th</sup> St	0537000210
5		(Jobson) Deanna K. Riddle	30643 28 <sup>th</sup> Ave Federal Way WA 98003	0921049229
6		Peggy Coltrio	2226 S 304 <sup>th</sup> St. Federal Way WA 98003	0537000205
7		ELAINE HAESEKER	2637 So. 304 <sup>th</sup> St	0921049081
8		EVELYN MADDOX	2605 S. 304 <sup>th</sup> St	0921049078
9		Leo Heider	2451 <del>2451</del> S 304 <sup>th</sup> St	0921049062
10		Karen Caisse	2423 S. 304 <sup>th</sup> St.	0921049066
11		TOM DELITTER	30716 19 <sup>th</sup> Ave S.	0921049283
12		Robert Cannon	30700 19 <sup>th</sup> Ave S.	0921049104
13		Mark M. Loscia	30720 19 <sup>th</sup> Ave S.	0921049144
14		Timothy A. JENKINS	30706 19 <sup>th</sup> Ave S.	0921049281
15		Deborah Stokes	2006 S. 308 <sup>th</sup> St	0537000335
16		MARTIN R. NEUBAUER	2010 S 308 <sup>th</sup> St	0537000325
17		GARY E. SMITH	30445 28 <sup>th</sup> Ave So	0921049184
18		Myrtle Thompson	30421 28 <sup>th</sup> Ave S.	0921049063
19		Glenn D. Spalding	2321 S 304 <sup>th</sup> St.	0537000160
20		Susan Pearson	2215 So. 304 <sup>th</sup> St.	0537000110

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**Petition to the Federal Way City Council to Renew the  
 Lake Management District Number 1 for Steel Lake, 2014-2023**

RCW 36.61.030 – A lake management district may be initiated upon either the adoption of a resolution of intention by a county legislative authority or the filing of a petition signed by ten landowners or the owners of at least fifteen percent of the acreage contained within the proposed lake management district, whichever is greater.

	Signature of Property Owner(s)	Printed Name	Full Address	Parcel Number (if known)
21		SOUTHALL NORTHROP	2111 S. 304TH ST	0537000089
22		Michael D. Kubicek	2107 S. 304 ST	0537000080
23		Richard BALLUND	2433 SO. 304 <sup>th</sup>	0921049108
24		BARBARA LOBDELL	2103 S. 304 <sup>th</sup> ST	0537000075
25		SUSAN E. SABOL	2219 S 304th ST.	0537000115
26		BOGDAN WOJNICZ	2309 S. 304th St	0537000145
27		DEBORAH SPURGEON	2301 S. 304th St.	0537000135
28		C.T. Furdom	2313 S. 304 <sup>th</sup> ST	0537000150
29		E.A. HARDING	2515 S 304 <sup>th</sup> ST	0921049301
30		MARK BARRETT	2529 S 304TH	0921049071
31		BRIAN OWEN	2427 S. 304 <sup>th</sup> ST	0921649069
32		Terri Johnson	30605 25 <sup>th</sup> Ave S	0921049202
33		Debbie Myers	30619 25 <sup>th</sup> Ave S.	0921049264
34		J. Bruce Myers	30623 28 <sup>th</sup> Ave S.	0921049195
35		ELEANOR BENNETT	2238 SO 308 F.W.	0537000195
36		John O'Neal	2050 S 308 <sup>th</sup>	0537000275
37		Margaret Fohn	2042 S 308	0537000285
38				
39				
40				

# City of Federal Way

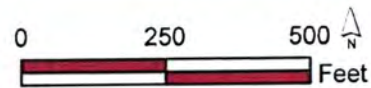
## Steel Lake Existing Land Use Map

Map Date: November 2012  
 City of Federal Way  
 33325 8th Ave S  
 Federal Way, WA 98003  
 (P) (253)-835-7000  
 (W) www.cityoffederalway.com



**Land Use Category**

Multi-Family	Park	Single Family	Vacant
	Open Space*		



This map is intended for use as a graphical representation only. The City of Federal Way makes no warranty to its accuracy.

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**Appendix B**  
Assessment Rates by Parcel

**Steel Lake LMD 2014-2023, Assessment Roll**

Single Family Residential Lakefront Properties, Developed							
TAXPAYER NAME	ADDRESS LINE #1	ADDRESS LINE #2	PARCEL NO.	RATE	LANDUSE	ZONINGCD	
1	JOHNSON VERNETTE E	2015 S. 304th St	Federal Way, WA 98003	053700 0020	\$95.00	RES,SINGLE FAMILY RESIDENCE	RS7.2
2	COOK ARLINE M	2017 S. 304th St.	Federal Way, WA 98003	053700 0030	\$95.00	RES,SINGLE FAMILY RESIDENCE	RS7.2
3	GALLIANO MARIO LUCIANO	2021 S. 304th St.	Federal Way, WA 98003	053700 0035	\$95.00	RES,SINGLE FAMILY RESIDENCE	RS7.2
4	HOLT GARY L	2027 S. 304th St.	Federal Way, WA 98003	053700 0040	\$95.00	RES,SINGLE FAMILY RESIDENCE	RS7.2
5	DELAPAZ JOE+ROCKAS KOSTANDENA D	2033 S. 304th St.	Federal Way, WA 98003	053700 0049	\$95.00	RES,SINGLE FAMILY RESIDENCE	RS7.2
6	GNOINSKY MICHAEL S	2039 S. 304th St.	Federal Way, WA 98003	053700 0055	\$95.00	RES,SINGLE FAMILY RESIDENCE	RS7.2
7	LEWIS JAYNE M	2047 S. 304th St.	Federal Way, WA 98003	053700 0065	\$95.00	RES,SINGLE FAMILY RESIDENCE	RS7.2
8	LOBDELL PAUL O+BARBARA L	2103 S. 304th St.	Federal Way, WA 98003	053700 0075	\$95.00	RES,SINGLE FAMILY RESIDENCE	RS7.2
9	KUBICEK MICHAEL D	2107 S. 304th St.	Federal Way, WA 98003	053700 0080	\$95.00	RES,SINGLE FAMILY RESIDENCE	RS7.2
10	SOUNTHALA NOPHADON+YOKO UCH	2111 S. 304th St.	Federal Way, WA 98003	053700 0085	\$95.00	RES,SINGLE FAMILY RESIDENCE	RS7.2
11	WILSON DAVID L+DORIS L	2115 S. 304th St.	Federal Way, WA 98003	053700 0090	\$95.00	RES,SINGLE FAMILY RESIDENCE	RS7.2
12	KOCH JEROME F+KATHLEEN A	2207 S. 304th St.	Federal Way, WA 98003	053700 0100	\$95.00	RES,SINGLE FAMILY RESIDENCE	RS7.2
13	PEARSON JOHN A & SUSAN	2215 S. 304th St.	Federal Way, WA 98003	053700 0110	\$95.00	RES,SINGLE FAMILY RESIDENCE	RS7.2
14	SABOL MARK A+SUSAN E	2219 S. 304th St.	Federal Way, WA 98003	053700 0115	\$95.00	RES,SINGLE FAMILY RESIDENCE	RS7.2
15	OSTERHOUT MARVIN J	2225 S. 304th St.	Federal Way, WA 98003	053700 0120	\$95.00	RES,SINGLE FAMILY RESIDENCE	RS7.2
16	GREEN JEFFREY J+TRISHA A	2231 S. 304th St.	Federal Way, WA 98003	053700 0130	\$95.00	RES,SINGLE FAMILY RESIDENCE	RS7.2
17	SPURGEON DEBORAH K	2301 S. 304th St.	Federal Way, WA 98003	053700 0135	\$95.00	RES,SINGLE FAMILY RESIDENCE	RS7.2
18	WOJNICZ BODGAN H+DEBORAH K	2309 S. 304th St.	Federal Way, WA 98003	053700 0145	\$95.00	RES,SINGLE FAMILY RESIDENCE	RS7.2
19	PURDOM CHARLES T+BARBARA J	2313 S. 304th St.	Federal Way, WA 98003	053700 0150	\$95.00	RES,SINGLE FAMILY RESIDENCE	RS7.2
20	TACKETT FAIRREL & PHYLLIS	2317 S. 304th St.	Federal Way, WA 98003	053700 0155	\$95.00	RES,SINGLE FAMILY RESIDENCE	RS7.2
21	SPALDING GLENN & LORRAINE	2321 S. 304th St.	Federal Way, WA 98003	053700 0160	\$95.00	RES,SINGLE FAMILY RESIDENCE	RS7.2
22	BENDER ARTHUR G+DALENE W -TRUST	2325 S. 304th St.	Federal Way, WA 98003	053700 0165	\$95.00	RES,SINGLE FAMILY RESIDENCE	RS7.2
23	VO TYSON	2329 S. 304th St.	Federal Way, WA 98003	053700 0170	\$95.00	RES,SINGLE FAMILY RESIDENCE	RS7.2
24	LAM CHI H+MATHIASON DONALD	2403 S. 304th St.	Federal Way, WA 98003	092104 9074	\$95.00	RES,SINGLE FAMILY RESIDENCE	RS7.2
25	LINEHAN WILLIAM	2417 S. 304th St.	Federal Way, WA 98003	092104 9002	\$95.00	RES,SINGLE FAMILY RESIDENCE	RS7.2
26	CAISSE PETER R	2423 S. 304th St.	Federal Way, WA 98003	092104 9066	\$95.00	RES,SINGLE FAMILY RESIDENCE	RS7.2
27	OWEN BRIAN W+PATRICIA J	2427 S. 304th St.	Federal Way, WA 98003	092104 9069	\$95.00	RES,SINGLE FAMILY RESIDENCE	RS7.2
28	BAKLUND RICHARD H+CORINNE A	2433 S. 304th St.	Federal Way, WA 98003	092104 9108	\$95.00	RES,SINGLE FAMILY RESIDENCE	RS7.2
29	REYHNER THEODORE A	2435 S. 304th St.	Federal Way, WA 98003	092104 9059	\$95.00	RES,SINGLE FAMILY RESIDENCE	RS7.2
30	HEIDER LEO M	2451 S. 304th St.	Federal Way, WA 98003	092104 9062	\$95.00	RES,SINGLE FAMILY RESIDENCE	RS7.2
31	LAZDINS ELIZABETH	2515 S. 304th St.	Federal Way, WA 98003	092104 9301	\$95.00	RES,SINGLE FAMILY RESIDENCE	RS7.2
32	BARRETT MARK STEVEN+KELLY R	2529 S. 304th St.	Federal Way, WA 98003	092104 9071	\$95.00	RES,SINGLE FAMILY RESIDENCE	RS7.2
33	MADDEN GLENN C+SANDRA L	2605 S. 304th St.	Federal Way, WA 98003	092104 9078	\$95.00	RES,SINGLE FAMILY RESIDENCE	RS7.2
34	THOMPSON MARC W+SANDY L	2609 S. 304th St.	Federal Way, WA 98003	092104 9077	\$95.00	RES,SINGLE FAMILY RESIDENCE	RS7.2
35	TISDEL GERALD C	2613 S. 304th St.	Federal Way, WA 98003	092104 9079	\$95.00	RES,SINGLE FAMILY RESIDENCE	RS7.2
36	MAIER TROY M	2619 S. 304th St.	Federal Way, WA 98003	092104 9076	\$95.00	RES,SINGLE FAMILY RESIDENCE	RS7.2
37	BEMILLER ELIZABETH R+STEPHEN G	2623 S. 304th St.	Federal Way, WA 98003	092104 9073	\$95.00	RES,SINGLE FAMILY RESIDENCE	RS7.2
38	DOMINGO PEDRO B+CHIN C	2629 S. 304th St.	Federal Way, WA 98003	092104 9061	\$95.00	RES,SINGLE FAMILY RESIDENCE	RS7.2
39	MAIER JACK G	2633 S. 304th St.	Federal Way, WA 98003	092104 9064	\$95.00	RES,SINGLE FAMILY RESIDENCE	RS7.2
40	HAESEKER EDWARD J+ELAINE	2637 S. 304th St.	Federal Way, WA 98003	092104 9081	\$95.00	RES,SINGLE FAMILY RESIDENCE	RS7.2
41	NGUYEN KATHY H	2649 S. 304th St	Federal Way, WA 98003	092104 9082	\$95.00	RES,SINGLE FAMILY RESIDENCE	RS7.2
42	NGUYEN KATHY H	2661 S. 304th St.	Federal Way, WA 98003	092104 9058	\$95.00	RES,SINGLE FAMILY RESIDENCE	RS7.2
43	HIXSON JOHN D+NANCY A	30415 28th Ave S.	Federal Way, WA 98003	092104 9070	\$95.00	RES,SINGLE FAMILY RESIDENCE	RS7.2
44	FULLER PEGGY Y	30419 28th Ave S.	Federal Way, WA 98003	092104 9237	\$95.00	RES,SINGLE FAMILY RESIDENCE	RS7.2
45	THOMPSON MYRTHALYNE C	30421 28th Ave S	Federal Way, WA 98003	092104 9063	\$95.00	RES,SINGLE FAMILY RESIDENCE	RS7.2
46	DECKER MONTE R	30511 28th Ave S	Federal Way, WA 98003	092104 9080	\$95.00	RES,SINGLE FAMILY RESIDENCE	RS7.2
47	SMITH GARY	30445 28th Ave S	Federal Way, WA 98003	092104 9184	\$95.00	RES,SINGLE FAMILY RESIDENCE	RS7.2
48	SCHAFFER SUZANNE R	30527 28th Ave S	Federal Way, WA 98003	092104 9072	\$95.00	RES,SINGLE FAMILY RESIDENCE	RS7.2
49	KACHMAN NORMAN R & MILDRED	30535 28th Ave S	Federal Way, WA 98003	092104 9275	\$95.00	RES,SINGLE FAMILY RESIDENCE	RS7.2
50	JOHNSON TERHI K	30605 28th Ave S	Federal Way, WA 98003	092104 9202	\$95.00	RES,SINGLE FAMILY RESIDENCE	RS7.2
51	AMERICAN ESCROW & CLOSING	30609 28th Ave S	Federal Way, WA 98003	092104 9244	\$95.00	RES,SINGLE FAMILY RESIDENCE	RS7.2
52	SHAWGO MICHAEL D+SUSAN M RICHTER	30617 28th Ave S	Federal Way, WA 98003	092104 9263	\$95.00	RES,SINGLE FAMILY RESIDENCE	RS7.2
53	MYERS BRUCE E+MYERS DEBBIE J	30619 28th Ave S	Federal Way, WA 98003	092104 9264	\$95.00	RES,SINGLE FAMILY RESIDENCE	RS7.2



**Steel Lake LMD 2014-2023, Assessment Roll**

54	SPANÉ FRANK A	30623 28th Ave S	Federal Way, WA 98003	092104 9195	\$95.00	RES, SINGLE FAMILY RESIDENCE	RS7.2	33,250
55	BARTENETTI FRANK P+MARY LOU	30637 28th Ave S	Federal Way, WA 98003	092104 9181	\$95.00	RES, SINGLE FAMILY RESIDENCE	RS7.2	37,897
56	DOBSON JOHN	30643 28th Ave S	Federal Way, WA 98003	092104 9229	\$95.00	RES, SINGLE FAMILY RESIDENCE	RS7.2	39,204
57	LASKE JEREMY+NACK JUNAE	30803 28th Ave S	Federal Way, WA 98003	092104 9188	\$95.00	RES, SINGLE FAMILY RESIDENCE	RS7.2	42,632
58	OTTO DWIGHT J+CAROL LAU	2256 S. 308th St	Federal Way, WA 98003	053700 0175	\$95.00	RES, SINGLE FAMILY RESIDENCE	RS7.2	10,488
59	SUN DANY	2250 S. 308th St	Federal Way, WA 98003	053700 0180	\$95.00	RES, SINGLE FAMILY RESIDENCE	RS7.2	10,578
60	TOWNSEND DAVID+KATHRYN	2246 S. 308th St	Federal Way, WA 98003	053700 0185	\$95.00	RES, SINGLE FAMILY RESIDENCE	RS7.2	9,471
61	ARMSTRONG ROBERT M	2240 S. 308th St	Federal Way, WA 98003	053700 0190	\$95.00	RES, SINGLE FAMILY RESIDENCE	RS7.2	8,651
62	BENNETT ELEANOR J	2238 S. 308th St	Federal Way, WA 98003	053700 0195	\$95.00	RES, SINGLE FAMILY RESIDENCE	RS7.2	8,692
63	BECHARD CYNTHIA L+BING THOM	2230 S. 308th St	Federal Way, WA 98003	053700 0200	\$95.00	RES, SINGLE FAMILY RESIDENCE	RS7.2	8,774
64	COLTRIN PEGGY J	2226 S. 308th St	Federal Way, WA 98003	053700 0205	\$95.00	RES, SINGLE FAMILY RESIDENCE	RS7.2	8,733
65	BRAZEL MICHAEL S+MONTOYA LO	2222 S. 308th St	Federal Way, WA 98003	053700 0210	\$95.00	RES, SINGLE FAMILY RESIDENCE	RS7.2	8,733
66	KIAZIMOV ALI+JOULIA BOGACHO	2218 S. 308th St	Federal Way, WA 98003	053700 0225	\$95.00	RES, SINGLE FAMILY RESIDENCE	RS7.2	15,200
67	IGIELSKI TIMOTHY J	2214 S. 308th St	Federal Way, WA 98003	053700 0230	\$95.00	RES, SINGLE FAMILY RESIDENCE	RS7.2	18,450
68	IGIELSKI TIMOTHY J	2210 S. 308th St	Federal Way, WA 98003	053700 0240	\$95.00	RES, SINGLE FAMILY RESIDENCE	RS7.2	9,020
69	MCDONNELL PATRICK D	2206 S. 308th St	Federal Way, WA 98003	053700 0245	\$95.00	RES, SINGLE FAMILY RESIDENCE	RS7.2	9,430
70	LONG JOHN C+DEBORAH L	2204 S. 308th St	Federal Way, WA 98003	053700 0250	\$95.00	RES, SINGLE FAMILY RESIDENCE	RS7.2	9,225
71	BAILEY BRIAN D	2200 S. 308th St	Federal Way, WA 98003	053700 0255	\$95.00	RES, SINGLE FAMILY RESIDENCE	RS7.2	8,200
72	RATCLIFF ROBERT E	2058 S. 308th St	Federal Way, WA 98003	053700 0260	\$95.00	RES, SINGLE FAMILY RESIDENCE	RS7.2	15,580
73	SHEPPARD JANET E	2054 S. 308th St	Federal Way, WA 98003	053700 0270	\$95.00	RES, SINGLE FAMILY RESIDENCE	RS7.2	7,626
74	O'NEAL JR JOHN K	2050 S. 308th St	Federal Way, WA 98003	053700 0275	\$95.00	RES, SINGLE FAMILY RESIDENCE	RS7.2	7,790
75	MASSEY PHYLLIS	2046 S. 308th St	Federal Way, WA 98003	053700 0280	\$95.00	RES, SINGLE FAMILY RESIDENCE	RS7.2	7,954
76	FOHN MARGARET U	2042 S. 308th St	Federal Way, WA 98003	053700 0285	\$95.00	RES, SINGLE FAMILY RESIDENCE	RS7.2	8,528
77	SCHUKAR CHARLES F+LORRAINE	2034 S. 308th St	Federal Way, WA 98003	053700 0295	\$95.00	RES, SINGLE FAMILY RESIDENCE	RS7.2	9,046
78	SANTO JOHN L+KERRI L	2026 S. 308th St	Federal Way, WA 98003	053700 0305	\$95.00	RES, SINGLE FAMILY RESIDENCE	RS7.2	12,371
79	ZAHIR ZALMAI	2022 S. 308th St	Federal Way, WA 98003	053700 0310	\$95.00	RES, SINGLE FAMILY RESIDENCE	RS7.2	11,728
80	ABY CATHY	2018 S. 308th St	Federal Way, WA 98003	053700 0315	\$95.00	RES, SINGLE FAMILY RESIDENCE	RS7.2	12,833
81	SCAGLIONE SALVATORE F+B PAT	2014 S. 308th St	Federal Way, WA 98003	053700 0320	\$95.00	RES, SINGLE FAMILY RESIDENCE	RS7.2	13,448
82	NEUBAUER MARTIN R+DARCY J	2010 S. 308th St	Federal Way, WA 98003	053700 0325	\$95.00	RES, SINGLE FAMILY RESIDENCE	RS7.2	36,862
83	STOKES DEBORAH L	2006 S. 308th St	Federal Way, WA 98003	053700 0335	\$95.00	RES, SINGLE FAMILY RESIDENCE	RS7.2	16,700
84	WILBURN ERIC D	2000 S. 308th St	Federal Way, WA 98003	053700 0340	\$95.00	RES, SINGLE FAMILY RESIDENCE	RS7.2	12,960
85	MILOSCIA MARK A+MESCHELL M	30720 19th Ave S	Federal Way, WA 98003	092104 9144	\$95.00	RES, SINGLE FAMILY RESIDENCE	RS7.2	16,552
86	DEZUTTER THOMAS W+ELAINE R	30716 19th Ave S	Federal Way, WA 98003	092104 9283	\$95.00	RES, SINGLE FAMILY RESIDENCE	RS7.2	18,730
87	BERNARD GARY D+PATRICIA A	30714 19th Ave S	Federal Way, WA 98003	092104 9282	\$95.00	RES, SINGLE FAMILY RESIDENCE	RS7.2	20,473
88	TIMOTHY A + DIANE L	30706 19th Ave S	Federal Way, WA 98003	092104 9281	\$95.00	RES, SINGLE FAMILY RESIDENCE	RS7.2	18,295
89	CANNON ROBERT L III+MELANIE	30700 19th Ave S	Federal Way, WA 98003	092104 9104	\$95.00	RES, SINGLE FAMILY RESIDENCE	RS7.2	19,602

**Lakefront Properties, Vacant**

	TAXPAYER NAME	ADDRESS LINE #1	ADDRESS LINE #2	PARCEL NO.	RATE	LANDUSE	ZONINGCD	
1	FAY WILLIAM A+NANCY L	1171 14TH AVE	FOX ISLAND, WA 98333	053700 0095	\$33.00	VACANT PROPERTY	RS7.2	14,430
2	SPURGEON DEBORAH K	2301 S 304TH ST	FEDERAL WAY WA 98003	053700 0141	\$33.00	VACANT PROPERTY	RS7.2	5,900
3	GAITHER DAVID N	PO BOX 94071	SEATTLE WA 98124	092104 9060	\$33.00	VACANT PROPERTY	RS7.2	13,503
4	WONG SUZANNE	PO BOX 28677	SEATTLE WA 98118	092104 9092	\$33.00	VACANT PROPERTY	RS7.2	4,358
5	SPANÉ FRANK A	30623 28TH S	FEDERAL WAY WA 98003	092104 9246	\$33.00	VACANT PROPERTY	RS7.2	5,475
6	FOHN MARGARET U	2042 S 308TH ST	FEDERAL WAY WA 98003	053700 0291	\$33.00	VACANT PROPERTY	RS7.2	4,160
7	SCHUKAR CHARLES F+LORRAINE	2034 S 308TH ST	FEDERAL WAY WA 98003	053700 0290	\$33.00	VACANT PROPERTY	RS7.2	4,360
8	SCHUKAR CHARLES F+LORRAINE	2034 S 308TH ST	FEDERAL WAY WA 98003	053700 0300	\$33.00	VACANT PROPERTY	RS7.2	8,387
9	HOTEL CONCEPTS 251552	211 DEXTER AVE N	SEATTLE WA 98109	092104 9012	\$33.00	VACANT PROPERTY	RS5.0	185,565

**Steel Lake LMD 2014-2023, Assessment Roll**

<b>Multifamily (Apartment Complex, 30602 Pacific Hwy S)</b>							
TAXPAYER NAME	ADDRESS LINE #1	ADDRESS LINE #2	PARCEL NO.	RATE	LANDUSE	ZONINGCD	
1 LMREC II REO III INC 938989	10880 WILSHIRE BLVD #1750	LOS ANGELES CA 90024	092104 9124	\$306.00	MULTI FAMILY	RM1800	246,938

<b>Park (Steel Lake Park)</b>							
TAXPAYER NAME	ADDRESS LINE #1	ADDRESS LINE #2	PARCEL NO.	RATE	LANDUSE	ZONINGCD	
1 CITY OF FEDERAL WAY			092104 9026	\$2,279.00	PARK	RS7.2	2,332,638

<b>Open Space (WDFW Public Boat Launch)</b>							
TAXPAYER NAME	ADDRESS LINE #1	ADDRESS LINE #2	PARCEL NO.	RATE	LANDUSE	ZONINGCD	
1 STATE OF WASHINGTON DOT	REAL ESTATE SERVICES, PO BOX 47338	OLYMPIA WA 98504	798440 0210	\$3,895.00	OPEN SPACE	RS9.8	52,272

# EXHIBIT B

## Petition to the Federal Way City Council to Renew the Lake Management District Number 1 for Steel Lake, 2014-2023

We, the undersigned Steel Lake property owners, request that the Federal Way City Council renew the Lake Management District (LMD) Number 1 for Steel Lake pursuant to RCW 36.61 that will otherwise expire in 2013. The LMD funds will finance efforts to protect and enhance Steel Lake in terms of water quality, recreational and aesthetic value.

1. Purpose of the Lake Management District may include the following activities:

- a) Management of non-native aquatic plants and vegetation
- b) Preservation of native vegetation and aquatic habitat
- c) Management of hazardous algae blooms
- d) Water quality monitoring
- e) Maintenance of lake outlet channel
- f) Management of Canada geese
- g) Community Education and Public Involvement

It is expected that all management district lake improvement and maintenance activities described in RCW 36.61.020 may be considered as LMD funding allows. The attached 2014-2023 Steel Lake Management District Plan (SLMDP) provides additional detail regarding the basis for the annual LMD work plan, management goals and budget.

2. Boundary

The proposed boundary of the LMD would include all the property with lakefront on Steel Lake. See attached map of proposed properties within the district.

3. Duration

The proposed duration of the LMD renewal is 10 years.

4. Charges to property:

Annual rates and charges will be used to raise funds to support LMD activities. The following is the formula of rates and charges proposed for establishment of the assessment role for the LMD:

ASSESSMENT CATEGORY	RATE	REVENUE (\$)
<b>Single Family Residential Zone RS9.6, Lakefront</b>		
Developed property (89 units)	X \$95 per unit	\$8,455.00
Vacant property (9 units)	X \$33.00 per unit	\$279.00
City Park (1 unit)	X \$2,279.00	\$2,279.00
WDFW Public Boat Launch (1 unit)	X \$3,895.00	\$3,895.00
<b>Multi-Family Residential Zone (RM 1800), Lakefront</b>		
Village at the Lake Apartments (1 unit)	X \$306.00	\$306.00
<b>TOTAL ANNUAL ASSESSMENT</b>		<b>\$15,232.00</b>

It is proposed that unallocated funds in the current LMD (estimated at \$15,000) roll over into the Lake Management District (LMD) Number 1 for Steel Lake, 2014-2023.

The estimated amount that is proposed to be collected for the LMD per year is \$15,232. Issuance of revenue bonds is not proposed.

The LMD budget and rates will be approved through a public hearing and a public vote after the city council adopts a resolution to renew the LMD. Once approved by the public and city council, the annual rates and charges may not be altered without another public vote and city council approval.

5. **Steel Lake Management District Advisory Committee**

The volunteer Steel Lake Management District Advisory Committee (SLAC) is proposed to represent the interests of LMD property owners. City staff will work with the SLAC to develop the annual work plan. The annual LMD work plan and budget will be forwarded by the SLAC for implementation by the City's surface water utility. The SLAC will track and review activities and expenditures by the City as well as outside contractors. City staff will provide SLAC support including quarterly financial reports.

**Petition to the Federal Way City Council to Renew the  
Lake Management District Number 1 for Steel Lake, 2014-2023**

RCW 36.01.030 - A lake management district may be initiated upon either the adoption of a resolution of intention by a county legislative authority or the filing of a petition signed by ten landowners or the owners of at least fifteen percent of the acreage contained within the proposed lake management district, whichever is greater.

	Signature of Property Owner(s)	(Printed Name)	(Full Address)	(Parcel Number (if known))
11		Mike Grovisky	2039 S. 304 <sup>th</sup> St	053700-0055
12		Margaret Reylmer	2435 S 304 <sup>th</sup> St	0921049059
13		W. K. Henselbueh	2417 S 304 <sup>th</sup> St	0921049002
14		Michael Bezel	2222 S. 308 <sup>th</sup> St	0537000210
15		Deanna K. Pistalle (Dobson)	30643 28 <sup>th</sup> Ave S Federal Way, WA 98003	0921049229
16		Peggy Collier	2224 S 304 <sup>th</sup> St Federal Way, WA 98003	0537000205
17		ELAINE HARSENIER	2637 So. 304 <sup>th</sup> St	0921049081
18		Leo Herbner	2405 S. 304 <sup>th</sup> St 24511	0921049078
19		Karen Cavisse	2423 S. 304 <sup>th</sup> St.	0921049066
110		TOM DELITTER	30716 19 <sup>th</sup> Ave S.	0921049283
112		Robert Cannon	30700 19 <sup>th</sup> Ave S.	0921049104
113		Mark M. Loscia	30720 19 <sup>th</sup> Ave S.	0921049144
114		Timothy A. Jenkin	30706 19 <sup>th</sup> Ave S.	0921049281
115		Deborah Stokes	2006 S. 308 <sup>th</sup> St	0537000325
116		MARTIN R. NEUBAUER	2010 S 308 <sup>th</sup> St	057000325
117		Gail Z. Summit	30445 28 <sup>th</sup> Ave S	0921049184
118		Myrtle Ann Thompson	30421 28 <sup>th</sup> Ave S.	0921049063
119		Catherine D. Sipal-Thompson	2321 S 304 <sup>th</sup> St.	0537000160
120		Susan Pearson	2315 So. 304 <sup>th</sup> St.	0537000110

**Petition to the Federal Way City Council to Renew the  
Lake Management District Number 1 for Steel Lake, 2014-2023**

RCW 36.61.030 – A lake management district may be initiated upon either the adoption of a resolution of intention by a county legislative authority or the filing of a petition signed by ten landowners or the owners of at least fifteen percent of the acreage contained within the proposed lake management district, whichever is greater.

	Signature of Property Owner(s)	Printed Name	Full Address	Parcel Number (if known)
21	<i>[Signature]</i>	SOUTHALL NORTHALL	2111 S 304TH ST	0537000089
22	<i>[Signature]</i>	Michael D. Kubicek	2107 S. 304 ST	0537000080
23	<i>[Signature]</i>	Richard Baklund	9433 SO. 304 <sup>th</sup>	0921049108
24	<i>[Signature]</i>	BARBARA LOBDOLL	2103 S. 304 <sup>th</sup> ST	0537000075
25	<i>[Signature]</i>	SUSAN E SABOL	2219 S 304TH ST.	0537000115
26	<i>[Signature]</i>	BODAN WJANICZ	2309 S 304th St	0537000145
27	<i>[Signature]</i>	DEBEAD SPUEBER	2301 S. 304th St.	0537000135
28	<i>[Signature]</i>	C.T. Purdom	2313 S. 304 <sup>th</sup> ST	0537000150
29	<i>[Signature]</i>	E.A. Lutzins.	2515 S 304 <sup>th</sup> ST	0921049301
30	<i>[Signature]</i>	MARK BARRETT	2529 S 304 <sup>th</sup>	0921049071
31	<i>[Signature]</i>	BRIAN J. DEN	2427 S. 304 <sup>th</sup> ST	0921649019
32	<i>[Signature]</i>	Terhe Johnson	30605 28 <sup>th</sup> Ave S	0921049207
33	<i>[Signature]</i>	Debbore Myers	30619 28 <sup>th</sup> Ave S.	0921049264
34	<i>[Signature]</i>	J. Sue Myers	30623 28 <sup>th</sup> Ave S.	0921049175
35	<i>[Signature]</i>	ELEANOR BENNETT	2238 SO 308 F.W.	0537000195
36	<i>[Signature]</i>	John O'Neal	2050 S 308 <sup>th</sup>	0537000275
37	<i>[Signature]</i>	Margaret Subject	2042 S 308	0537000285
38				
39				
40				

# City of Federal Way

## Steel Lake Existing Land Use Map

Map Date: November 2012  
 City of Federal Way  
 33326 8th Ave S  
 Federal Way, WA 98003  
 (P) (253)-836-7000  
 (W) www.cityoffederalway.com



### Land Use Category

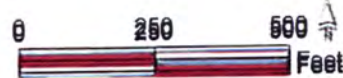
Multi-Family

### Open Space\*

Park

Single Family

Vacant



This map is intended for use as a general representation only. The City of Federal Way makes no warranty, to its accuracy.

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