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5.12.1 General Information

Eagle Point Lake is located in the south-central area of the City of Lake Elmo. The lake is shallow with a maximum depth of about six feet and an average depth of three feet. The local watershed of Eagle Point Lake includes Farney Creek, an intermittent stream that enters the lake’s west side, and several small, isolated wetlands. The local watershed is within the Cities of Oakdale and Lake Elmo, and is shown on Figure 5.12-1.

The overall watershed of Eagle Point Lake is much larger than its local watershed. Because Raleigh Creek enters the lake from the northwest side, the total watershed to Eagle Point Lake includes portions of eight communities.

All of Eagle Point Lake, and a large portion of its local watershed, are located within the Lake Elmo Park Reserve. Since 1995, residential housing has been developed in the western portions of the lake’s local watershed, although some agricultural and undeveloped land use remains. Future (2030) estimated land use includes residential development in all portions of the local watershed not within Lake Elmo Park Reserve. Figure 5.12-2 shows the current (2010) and estimated future (2030) land use of the Eagle Point Lake watershed.

### Eagle Point Lake Local Watershed Information

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tributary Area (acres)</td>
<td>2,180 (local; 11,502 total)</td>
</tr>
<tr>
<td>MDNR-Designated Basins within Watershed</td>
<td>82-0410W, 82-0411W (Brown’s Pond, 82-0419W, 82-0413W, 82-0416W, 82-0412W, 82-0109P (Eagle Point Lake)</td>
</tr>
<tr>
<td>Downstream Watershed&lt;sup&gt;1&lt;/sup&gt;</td>
<td>Horseshoe Lake / Lake Elmo</td>
</tr>
</tbody>
</table>

### Eagle Point Lake Information

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>MDNR Designation</td>
<td>82-0109P</td>
</tr>
<tr>
<td>Surface Area (acres)</td>
<td>119.6 at El. 893.5</td>
</tr>
<tr>
<td>Mean Depth (feet)</td>
<td>3</td>
</tr>
<tr>
<td>Maximum Depth (feet)</td>
<td>6</td>
</tr>
<tr>
<td>Volume Below Discharge Elevation (acre-feet)</td>
<td>Not determined</td>
</tr>
<tr>
<td>Discharge Elevation</td>
<td>894.0</td>
</tr>
<tr>
<td>Outlet Type&lt;sup&gt;1&lt;/sup&gt;</td>
<td>Primary: Stoplog Weir Overflow: Concrete Weir</td>
</tr>
<tr>
<td>MDNR Ordinary High Water Level (OHW)&lt;sup&gt;2&lt;/sup&gt;</td>
<td>896.5</td>
</tr>
<tr>
<td>100-Year Flood Level&lt;sup&gt;2&lt;/sup&gt;</td>
<td>901.0</td>
</tr>
<tr>
<td>VBWD “Allowable Fill” (cubic yards/lineal foot of shoreline - See Section 4.7.)</td>
<td>1.2</td>
</tr>
<tr>
<td>VBWD Water Quality Priority Category</td>
<td>Medium</td>
</tr>
</tbody>
</table>

<sup>1</sup> Primary outlet is tributary to Horseshoe Lake, overflow to Lake Elmo
<sup>2</sup> Elevation in NGVD29 vertical datum
Because the lake is located within the Lake Elmo Park Reserve, it is accessible to the public. The primary use of Eagle Point Lake is aesthetic viewing. There is a canoe launch in the park and the lake is also used for canoeing. The lake provides habitat for waterfowl and wildlife.

5.12.2 Water Quality Management Plan

The VBWD classified and will manage Eagle Point Lake as a Medium Priority waterbody, due in part to its classification as a wetland by the Minnesota Pollution Control Agency (MPCA) and its location within public land (Lake Elmo Park Reserve). Eagle Point Lake was initially included in the draft 2014 impaired waters 303(d) list as not meeting shallow lake eutrophication standards for aquatic recreations, but was removed after the MPCA revised its classification from shallow lake to wetland. The VBWD classification as a low priority waterbody is below the medium priority assigned to Eagle Point Lake in the 2005 Plan, and similar to the Category V wetland classification assigned in the 1995 Plan.

The VBWD has a non-degradation water quality policy which sets “action triggers” for all of its major waterbodies. Section 4.1 – Water Quality discusses the action triggers in more detail. Action triggers for VBWD lakes consider the following water quality parameters (summer average) relative to MPCA water quality standards and prior water quality data (i.e., trend analysis):

- Secchi disc depth
- Total phosphorus
- Chlorophyll a

Eagle Point Lake is included among the waterbodies assessed in the VBWD Watershed Restoration and Protection Strategies (WRAPS) study performed from 2012 to 2015. The WRAPS study identified the primary source of phosphorus loading to Eagle Point Lake as internal loading, which accounted for about 60 percent of the total load during the growing season. The WRAPS study also identified possible implementation strategies applicable to Eagle Point Lake. The results of the WRAPS study are described in greater detail in Appendix A-5.12.

5.12.2.1 Water Quality Implementation Plan

Specific water quality implementation tasks for Eagle Point Lake are based on the WRAPS study and include the following:

1. The VBWD will monitor the water quality of Eagle Point Lake and perform the actions discussed in Section 4.1 – Water Quality for Medium Priority water bodies.

   The VBWD will evaluate the average summertime water quality (total phosphorus, chlorophyll a, and Secchi disc transparency) and compare it to applicable action triggers
(described in Section 4.1.7.5 – note that MPCA water quality standards presented in Table 4.1-1 are not applicable to waterbodies classified as wetlands by the MPCA).

2. The VBWD will cooperate with the City of Lake Elmo, the City of Oakdale, MDNR, or other entities to manage macrophytes (aquatic plants) in Eagle Point Lake. Treatment of areas containing dense, monospecific growths of Eurasian watermilfoil with an aquatic herbicide (2,4-D, Triclopyr, or low concentrations of Aquathol® K) is recommended to protect Eagle Point Lake’s native plant community. VBWD efforts may include

- point-intercept surveys of aquatic vegetation
- preparation of lake vegetation management plans (LVMP)
- completion of Invasive Aquatic Plant Management (IAPM) Permit applications
- design of herbicide treatment programs
- participation in meetings with MDNR staff
- other technical analysis

3. The VBWD will evaluate the feasibility of small scale stormwater BMPs and buffers within the watershed tributary to Eagle Point Lake. The VBWD’s BMP cost-share program may provide opportunities for private landowners to implement water quality improvements. Collectively, many small residential BMPs may have a significant impact on the cumulative phosphorus loading to Eagle Point Lake.

4. The VBWD will work with the City of Lake Elmo and/or Washington County Parks to evaluate opportunities for enhanced filtration (e.g., iron-enhanced sand filtration or spent lime filtration) at locations within the Raleigh Creek watershed in subwatersheds RLE-3, RLE-1-1, and/or RLE-1-2 (see Figure 5.12-1).

5. If necessary, the VBWD will cooperate with the MDNR to evaluate the feasibility of, and consider implementing, projects to reduce internal loading in Eagle Point through an in-lake aluminum sulfate (alum) treatment, dredging, drawdowns to freeze macrophytes, or other methods.

6. The VBWD will consider working with Washington County Parks to install enhanced stormwater treatment or promote infiltration in subwatershed EPL-9 (see Figure 5.12-1).

7. The VBWD will assist Washington County Parks in implementing a project to redesign and reconstruct the Farney Creek Berm.

8. The VBWD will cooperate with Washington County Parks in their efforts to protect oak forest and upland buffers within the Eagle Point Lake watershed.
9. The VBWD will promote Washington County financial assistance programs for non-compliant or non-functioning subsurface sewage containment systems (SSTS).

10. The VBWD will continue to implement its Rules and Regulations (2013, as amended) in the Eagle Point Lake watershed. The VBWD Rules address water quality performance standards for development and redevelopment projects, as well as required vegetated buffers around VBWD lakes, streams, and wetlands. The VBWD Rules and Regulations are included in this Plan as Appendix A-4.5.

5.12.2.2 Water Quality Issues

Historically, water quality in Eagle Point Lake has been poor. In 1999, the VBWD completed the report, *Hydrologic and Phosphorus Budgets for Eagle Point Lake, Lake Elmo, Minnesota* (Barr, December 1999). The report estimated that the water quality of Eagle Point Lake will likely degrade as a result of continued development in the watershed. Generally, phosphorus loading to a lake increases as a result of increased development (and imperviousness) in the watershed which causes the in-lake phosphorus concentrations to increase and the potential for internal loading to increase. Water quality has remained poor since the 1999 study, but no statistically significant trends (improving or degrading) are evident in the data (see Figure 5.12-3).

Additional water quality data was collected in 2007 and 2008 as part of the *Water Quality Assessment for DeMontreville, Eagle Point, and Horseshoe Lakes* (Barr, 2009). That effort included and assessment of loading sources and recommended actions to maintain nutrient concentrations below the impaired waters listing criteria. At that time, Eagle Point Lake was classified as a shallow lake by the MPCA, versus its current wetland designation.

The VBWD performed additional analysis of nutrient loading to Eagle Point Lake as part of the WRAPS study completed from 2012 to 2015. The results of the 2009 Water Quality Assessment and the WRAPS study are summarized in Appendix A-5.12.

5.12.2.3 Water Chemistry Data

Water quality sampling has been conducted on Eagle Point Lake sporadically since 1972, and approximately every other year since 2003. Water quality samples are typically analyzed for total phosphorus and chlorophyll $a$, while Secchi disc transparency is measured in the field at the time of sampling (see Appendix A-4.1 – Water Quality Background Information).

The most recent 10-year average summer water quality data is presented relative to applicable MPCA and VBWD water quality standards in Table 5.12-1 and illustrated in Figure 5.12-3. Detailed water quality data are shown in Appendix A-5.1. The most recent 10-years of data identify no statistically significant trends in total phosphorus, chlorophyll $a$, or Secchi disc transparency.
Table 5.12-1 Summary of Eagle Point Lake summer average water quality

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Units</th>
<th>10-year Average (2004-2013)</th>
<th>Trend in Average</th>
<th>MPCA Standard¹</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Phosphorus</td>
<td>ug/L</td>
<td>309</td>
<td>None</td>
<td>NA</td>
</tr>
<tr>
<td>Chlorophyll a</td>
<td>ug/L</td>
<td>70.6</td>
<td>None</td>
<td>NA</td>
</tr>
<tr>
<td>Secchi Disc Depth</td>
<td>m</td>
<td>0.58</td>
<td>None</td>
<td>NA</td>
</tr>
</tbody>
</table>

¹ MPCA eutrophication water quality standards are not applicable to wetlands

5.12.2.4 Habitat Assessment

In 2003, the VBWD conducted a wetland habitat assessment and management project on Eagle Point Lake and several wetlands within the Lake Elmo Regional Park. The assessment evaluated the current wetland and riparian plant communities, water quality and hydrology issues as they relate to wildlife habitat in Eagle Point Lake and other wetlands in Lake Elmo Park Reserve, and developed a work plan for habitat improvement projects. The VBWD completed a Minnesota Routine Assessment Method for Evaluating Wetland Functions (MnRAM) evaluation of the presence and abundance of hydrophytic and invasive vegetation to identify and appraise the plant community and habitat quality as part of this assessment. Eagle Point Lake was rated as predominantly low-moderate quality for wildlife habitat and aesthetics/recreation, and has been utilized for flood control and stormwater management. The MnRAM management classification is Manage 1, meaning that impacts to this wetland should be avoided and preservation should be the top priority when prudent and feasible.

The surrounding upland areas are predominantly oak forest and grasslands, including some areas of restored prairie grasses. Restoration of a native plant ecosystem is recommended for those areas that are currently dominated by non-natives, including grasslands (now dominated by smooth brome), wetland areas dominated by reed canary grass, and non-native deciduous forest (buckthorn). When ecosystem restoration is implemented, it should address the complete basin, both wetland and surrounding upland, preserving the desirable elements.

The 2005 Plan recommended vegetation management for the Eagle Point Lake Dam in order to improve the quality of the plant community, improve habitat, and prevent erosion. The recommended management strategies included mowing the dam, treating it with herbicides, and replanting with native plants. The first phase of re-vegetating the earthen dam began in the fall of 2008 with a mowing of the site, spraying with herbicide to kill weeds, and installation of temporary erosion control blanket to prevent erosion through the winter. VBWD reapplied herbicide in May 2009, seeded the site in June 2009 with a native prairie seed mix, and installed erosion control blanket following seeding. The site was monitored through the summer and vegetation growth was slowed due to lower-than-normal rainfall throughout the summer months. Maintenance mowing in 2010, 2011, 2012, and 2013 proceeded as planned.
5.12.2.5 Biological Data

Several types of biological data have been compiled and evaluated for Eagle Point Lake, in addition to physical and chemical parameters. Macrophyte (large aquatic plant), phytoplankton (non-rooted floating plants – algae), zooplankton (microscopic aquatic animals), and fisheries data provide insight into the ecological quality of Eagle Point Lake. Section 4.2 (Water Quality Background Information) provides more information about the importance of fisheries and other biological data.

5.12.2.5.1 Fisheries

Eagle Point Lake is not currently managed by the MDNR for fishing; there have been no fisheries surveys on the lake in the past decade and no fish consumption advisories exist for fish caught in Eagle Point Lake. Eagle Point Lake does not currently have a fisheries-use classification.

Large numbers of carp and bullheads are the predominant fish species in the lake. Prior to the VBWD construction of the bypass pipe as part of Project 1007, the carp migrated from Lake Elmo and spawned in Eagle Point Lake. The MDNR applied rotenone to Eagle Point Lake in November 1988 to kill the large carp population. This was done in conjunction with a temporary lowering of the lake. The MDNR then stocked the lake with tiger muskie in an attempt to use the lake for rearing fish hatchery stock. The presence of rough fish in the lake (despite the rotenone treatment) caused the attempt to be unsuccessful. The MDNR has no plans to use the lake for rearing fish hatchery stock in the future.

The MDNR’s Lakefinder website includes the most current data on Eagle Point Lake and is available at: http://www.dnr.state.mn.us/lakefind/lake.html?id=82010900

The MDNR classified Eagle Point Lake as a waterfowl lake in 1951 and will continue to manage Eagle Point Lake as a wildlife wetland.

5.12.2.5.2 Macrophytes (Large Aquatic Plants)

Macrophyte surveys were conducted in 1998, 2003, 2007, 2010, 2011, and 2012 at Eagle Point Lake. The VBWD performed point intercept surveys of macrophytes in Eagle Point Lake in 2013 and 2014. The VBWD collects macrophyte data to identify the conditions of plant growth throughout the lake. Macrophytes are the primary producers in the aquatic food chain, converting the basic chemical nutrients in water and soil into plant matter through photosynthesis, which becomes food for all other aquatic life. While macrophytes can negatively impact the recreational use of a water body, they are critical to the ecosystem as fish and wildlife habitat.

Macrophytes were found throughout the entire water body in most surveys. The 13 to 20 individual species observed during each plant survey are common to Minnesota lakes.

The growth of the exotic (non-native) species, curleaved pondweed (CLP), in Eagle Point Lake is of concern. Although densities of this plant were light to moderate during 1998, density has increased over time. Problematic CLP growth was observed in 2012, 2013, and 2014 (Barr, 2014). Once a lake becomes infested with CLP, this plant typically replaces native vegetation, thereby increasing its coverage and density. CLP begins growing in late August, grows throughout the winter at a slow rate, grows rapidly in the spring, and dies in early summer. Native plants that grow from seed in the spring are unable to grow in areas already occupied by CLP, and are displaced by this plant. The proliferation of CLP may also be the reason for no aquatic vegetation being observed in large sections of the lake in the August 2010 and 2011 surveys. CLP die-off in early summer releases phosphorus to the lake, causing increased algal growth for the remainder of the summer.

In 2014, the overall density of CLP was significantly reduced, but the distribution was not. The reduction in density is presumably due to the thick snow cover and late ice-out during 2014. Continued management of CLP may be necessary to protect the lake’s water quality and native plant community. This plant’s turions (like seeds) can flow downstream and infest downstream lakes. Thus, management should begin in the most upstream lake and continue to the most downstream lake.

The 2014 survey of the lake revealed that reed canary grass, which is an invasive species, was abundant along the lakeshore and in surrounding wetland areas.

The VBWD will continue to provide technical assistance to entities seeking to manage aquatic invasive species.

### 5.12.2.5.3 Phytoplankton (Non-Rooted, Floating Plants - Algae) and Zooplankton (Microscopic Aquatic Animals)

The VBWD collected phytoplankton and zooplankton samples from Eagle Point Lake in 1998 and 2003. Appendix C-5.12 and Appendix D-5.12 show the information from the 1998 samples (June 16, July 14, August 11, August 25, and September 9) and 2003 samples (June 9, July 19, August 5, August 18, and September 8).

Phytoplankton derive energy from sunlight and use nutrients dissolved in lake water. They provide food for several types of animals, including zooplankton, which in turn are eaten by fish. A phytoplankton population in balance with the lake’s zooplankton population is ideal for fish production. An inadequate phytoplankton population reduces the lake’s zooplankton population and adversely impacts the growth of the lake’s fishery. However, excess phytoplankton, especially blue-green algae, can interfere with recreational use of a lake and is considered problematic.

Although diverse, Eagle Point Lake’s phytoplankton community is dominated by blue-green algae during much of the summer. In 1998, blue-green algae comprised 87 to 97 percent of the algal
community during July and August and 38 percent during September. In 2003, blue-green algae comprised 32 to 51 percent of the algal community during the July through September period. Dominance by blue-green algae is undesirable because they are often inedible to zooplankton due to their large size. Furthermore, blue-green algae generally float on the waters’ surface where they are particularly objectionable to lake users. Blue-green algae are best managed by reducing the lake’s phosphorus concentration. Increases in the lake’s phosphorus concentration could likely cause increased growth of blue-green algae. However, blue-green algae limit their own growth by shading when their growth levels are very high. High growth levels may adversely impact the lake’s plant community by limiting growth through shading. Judicious management of the lake’s phosphorus concentration is recommended to reduce objectionable algal blooms and to prevent adverse impacts to the lake’s plant community.

Although nutrient levels in Eagle Point Lake were similar during 1998 and 2003, reduced algal growth was observed during 2003. The maximum number of algae observed in 1998 and 2003 were 77,611 units per milliliter and 34,312 units per milliliter, respectively. The decrease in algal numbers corresponds to the reduction in average summer chlorophyll concentration observed during 2003. The average summer chlorophyll concentrations during 1998 and 2003 were 90 µg/L and 38 µg/L, respectively. Nonetheless, the algal numbers and chlorophyll concentrations confirm that nuisance algal blooms occurred during both years.

The lake’s zooplankton community is dominated by small-bodied forms. While these animals provide food for the lake’s panfish community, they are unable to control the lake’s phytoplankton community due to their small size. Because fish predation generally determines the numbers of large- and small-bodied zooplankters in a lake, increasing the numbers of large-bodied zooplankters is unrealistic. Because zooplankton grazing will not control the lake’s phytoplankton community, phosphorus loading to the lake solely determines Eagle Point Lake’s algae community. Hence, phosphorus management will provide the best management measures for the lake’s phytoplankton community.

### 5.12.3 Water Quantity Management Plan

The VBWD will perform the following management actions related to water quantity:

1. The VBWD will continue to inspect and maintain the Eagle Point Lake outlet structures. According to the VBWD’s MDNR-approved operation, inspection and maintenance plan for the Eagle Point Lake dam and control structures, no operation of the dam or control structures is anticipated under normal conditions. Only the bypass control structure can be operated to alter water levels. The stop logs in the bypass control structure can be removed to temporarily raise and lower the water level of Eagle Point Lake. The water level may be raised to Elevation 896.0 (NGVD29) and lowered to Elevation 893.0 (NGVD29). At the time of construction of the Eagle Point Lake Dam and control structures, the MDNR planned to use Eagle Point Lake for fish rearing. VBWD installed the stop logs to allow MDNR staff to operate the bypass control structure to aid in fish rearing efforts. However, the MDNR no
longer plans to use Eagle Point Lake for fish rearing purposes. According to VBWD’s operation plan (see Appendix E-5.12), the MDNR must notify VBWD five days in advance of any proposed water level alteration.

2. The VBWD will continue to conduct annual inspections of the Eagle Point Lake dam, in accordance with the operation, inspection and maintenance plan. The VBWD also inspects the Eagle Point Lake control structures as part of the Project 1007 annual inspection. The VBWD inspects more frequently during times of extended high water levels.

3. The VBWD will continue to measure Eagle Point Lake water levels on an approximately monthly basis and supply the information to the MDNR for their records. The VBWD will include the water level measurements in its annual report, which is posted to the VBWD website.

5.12.3.1 Water Levels, Drainage Patterns, and Outlet Information

The VBWD currently monitors Eagle Point Lake water levels on an approximately monthly basis. VBWD’s lake monitoring began in 1969. Figure 5.12-4 shows the historical water levels, beginning in 1969.

The highest water level in the lake was reported on June 30, 1976, when a major storm caused the lake to rise to Elevation 901. In May of 1986, the water level reached Elevation 899.4. Since the shoreline of the lake is undeveloped, the lake has historically been used as a water storage area. In 1980, an earthen dam was placed across the outlet stream, which raised the lake as high as Elevation 898 on a temporary basis. As part of VBWD’s Project 1007, a dam was constructed in 1986 across the outlet stream from Eagle Point Lake, just upstream from Lake Elmo. The temporary dam was subsequently removed. Two control structures and outlet pipes were installed as part of the Project 1007 dam construction.

- Primary Outlet Structure – the primary outlet structure contains a stop-log weir which controls the Eagle Point Lake water level at Elevation 894.0 (NGVD29 datum); above this elevation, water flows over the weir and into a 22-inch diameter pipe which carries water from Eagle Point Lake along the bottom of Lake Elmo (bypass pipe). This structure is show in Figure 5.12-5.

- Overflow Structure – the secondary outlet structure is an overflow structure with a 20-foot long weir at Elevation 896.5 (NGVD29 datum). When the water level in Eagle Point Lake rises above Elevation 896.5, water flows into the overflow structure and into a 42-inch diameter pipe, which discharges directly to Lake Elmo. Figure 5.12-6 shows this overflow structure. Approximately 90 percent of the water from Eagle Point Lake is designed to be diverted through the bypass pipe (i.e., the primary outlet).
Since completion of Project 1007, water flowed into the overflow structure seven times:

1. July 1987, following a large rainfall event
2. August until October of 1993, following a period of above-average precipitation
3. Spring of 2001, following a spring melt and rainstorms
4. Early September 2002 after a period of above-average precipitation
5. August 2011, following a period of above-average precipitation
6. July 2013, following a period of above-average precipitation
7. June to July 2014, following a period of above-average precipitation

As a result of the Project 1007 construction, the 100-year flood elevation of Eagle Point Lake was raised 0.5 foot, to Elevation 901.0 (NGVD29 datum). In 2004, the VBWD re-analyzed the 100-year flood elevation of Eagle Point Lake as part of re-mapping the Raleigh Creek floodplain on Federal Emergency Management Agency (FEMA) floodplain maps. The 2004 FEMA study used existing land use conditions, instead of ultimate development conditions, and determined a 100-year flood level of Eagle Point Lake of Elevation 899.2 (NAVD88 datum). The VBWD will continue to manage Eagle Point Lake’s 100-year flood level at Elevation 901.0.

In 2013, the National Oceanographic and Atmospheric Administration (NOAA) published Atlas 14, Volume 8 (see Section 4.7.6). Atlas 14 contains updated precipitation data for Minnesota and supersedes data sources used in the modeling and flood level determination of Eagle Point Lake. Over the next several years, the VBWD will update its hydrologic-hydraulic modeling of major subwatersheds, including Eagle Point Lake. Updated modeling will incorporate the most recent precipitation data (see Section 4.7.7) which may increase 100-year flood levels relative to the existing flood insurance rate maps (FIRMs).

During low-water conditions, a ditch upstream of a culvert under Kelvin Avenue (the park entrance road) controls the water levels of Eagle Point Lake. The invert of the ditch is Elevation 893.0 and the invert of the Kelvin Avenue culvert is Elevation 892.0. If the MDNR were to allow, the stop-log weir structure, located downstream of this culvert, could be lowered to a minimum level of Elevation 890.0 (NGVD29 datum).

5.12.4 Groundwater

The Eagle Point Lake local watershed lies within the Lake Elmo/Oakdale Special Well and Boring Construction Area (SWBCA). The Lake Elmo/Oakdale SWBCA was established due to volatile organic compound (VOC) and perfluorochemical (PFC) contamination at the Washington County Landfill and a disposal site in Oakdale. Established by the Minnesota Department of Health (MDH), the SWBCA (formerly known as a well advisory) puts limits on the construction of new wells, and
requires additional water testing of new wells. The SWBCA remains in effect as of the writing of this Plan.

More information regarding the Lake Elmo/Oakdale SWBCA is within Section 4.2.6.3 of this Plan. Current information about this site may be obtained from the MDH and the MPCA.

5.12.5 References


Figure 5.12-2
EAGLE POINT LAKE WATERSHED
CURRENT (2010) AND FUTURE (2030) LANDUSE

2015-2025 Watershed Management Plan
Valley Branch Watershed District

Current (2010) Land Use

Future (2030) Land Use

Source: Metropolitan Council 2010

1 inch = 2,500 feet
Figure 5.12-4

EAGLE POINT LAKE WATER LEVELS
2015 - 2025 Watershed Management Plan
Valley Branch Watershed District

Elevations in NGVD29 datum
Discharge elevations prior to 1987 are approximate
SECTION: STRUCTURE 6 (EAGLE POINT LAKE OUTLET)

SCALE: 1/4"=1'-0"

Figure 5.12-5

EAGLE POINT LAKE OUTLET
Valley Branch Watershed District
Appendix A-5.12 Additional Water Quality Information
Appendix A-5.12 Additional Water Quality Information

MINLEAP Modeling

The Minnesota Lake Eutrophication Analysis Procedure (MINLEAP) is intended to be used as a screening tool for estimating lake conditions and for identifying “problem” lakes. MINLEAP is particularly useful for identifying lakes requiring “protection” versus those requiring “restoration” (Heiskary and Wilson, 1990). In addition, MINLEAP modeling by has been done in the past to identify Minnesota lakes which may be in better or worse condition than they “should be” based on their location, watershed area and lake basin morphometry (Heiskary and Wilson, 1990).

Results of MINLEAP modeling done by the VBWD in 2014 for the direct, contributing watershed to Eagle Point Lake suggests that the lake should experience “better” water quality than is currently observed. For Eagle Point Lake MINLEAP predicts a growing season mean total phosphorus concentration of 104 µg/L versus 309 µg/L (observed from 2004 to 2013); a chlorophyll a concentration of 58 µg/L versus 70 µg/L (observed from 2004 to 2013); and summer average transparency of 0.7 meters versus 0.6 meters (observed from 2004 to 2013). The predicted phosphorus concentration has a standard error of 24 µg/L. The results of this analysis suggest that the water quality of Eagle Point Lake can be significantly improved.

Vighi and Chiaudani Method

Vighi and Chiaudani (1985) developed another method to determine the phosphorus concentration in lakes that are not affected by anthropogenic (human) inputs. As a result the phosphorus concentration in a lake resulting from natural, background phosphorus loadings can be calculated from information about the lake’s mean depth and alkalinity or conductivity. Alkalinity is considered more useful for this analysis because it is less influenced by the modifying effect of anthropogenic inputs.

Based on the Vighi and Chiaudani method, the predicted phosphorus concentration from natural, background loadings should be about 36 µg/L. This predicted phosphorus concentration is much lower than to the average observed phosphorus concentration from 2004 through 2013 and suggest that better water quality can be attained in Eagle Point Lake.

2009 Water Quality Assessment

The VBWD performed a detailed water quality assessment of Eagle Point Lake from 2007 to 2008 (Barr, 2007). The study found that the internal loading rate in Eagle Point Lake is high, and there is a gradient of phosphorus in the sediment, with the highest concentrations near the inflows from Raleigh Creek and Farney Creek. Despite frequent mixing (due to the lake’s shallow depth) dissolved oxygen levels and pH near the sediment both contribute to high internal loading rates. High concentrations of curlyleaf pondweed (CLP) in Eagle Point Lake further contribute to internal phosphorus loading.

As part of the study, a water quality model was developed for Eagle Point Lake to evaluate the effect of various best management practices on water quality. The model determined that management
actions to reduce internal loading would have more impact than those addressing external loads. Due to the expected cost and complexity involved with reducing phosphorus in Eagle Point Lake, the 2009 study recommended a phased approach. The recommended options below are listed in order, with an approximate implementation timeline (as proposed in the 2009 study) included as well.

- Conduct a comprehensive study of watershed infiltration opportunities and implement an infiltration program (e.g., rainwater gardens) to reduce phosphorus input to the lake over the long term (2009-2020)
- Manage the invasive macrophyte Curlyleaf pondweed by drawing down the lake water to improve the aquatic plant community and reduce mid-summer increases in phosphorus (2010). Additional spot treatment may be necessary in the following years if seeds remain active.
- Reduce internal phosphorus loading from the sediment by adding PAC to bind available phosphorus and inactivate it (2010, 2013)
- Reduce external loading coming from Raleigh Creek by installing a sedimentation basin and Enhanced Sand Filter (2015)
- Continue in-lake monitoring to assess the implementation of the recommended options on water quality and the macrophyte community in the lake (ongoing)

It is expected that the implementation of these management measures will significantly lower phosphorus levels and increase the health of the macrophyte community, helping to improve water quality in Eagle Point Lake and protect downstream Lake Elmo and Horseshoe Lake.

Watershed Restoration and Protection Strategy (WRAPS)
Eagle Point Lake is included in the VBWD WRAPS study, which addressed several VBWD waterbodies. One of the key components of the WRAPS study is to understand the sources of phosphorus contributing to the existing nutrient loading. Sources evaluated for Eagle Point Lake in the WRAPS study (and the associated percentage of phosphorus loading during the growing season) include:

- internal loading from sediment due to anoxic release, wind, fish, or boat activity (59 percent)
- direct watershed runoff (24 percent)
- aquatic vegetation (14 percent)
- subsurface sewage treatment systems (SSTS) (2 percent)
- atmospheric deposition (1 percent)
- inflow from Lake Jane and Lake Olson (0 percent)
**Modeling Methods**

The P8 (Program for Predicting Polluting Particle Passage through Pits, Puddles and Ponds) Urban Catchment (computer) Model (Version 3.4) was used to estimate watershed runoff and total phosphorus loads from the Eagle Point Lake watershed. Noncontributing areas of the watershed, as identified by the VBWD, were not included in the P8 model. In-lake modeling for Eagle Point Lake was accomplished through the creation of a mass balance model that tracks the flow of both water and phosphorus through the lake for the critical water quality growing season as well as the year prior (to establish a steady-state initial condition).

The key input parameters for the in-lake mass balance model included direct precipitation data, evaporation data, runoff loads from the lake’s watershed (as predicted by the P8 model), the lake storage and outlet rating curve, estimated groundwater exchange, and in-lake water quality monitoring data. Additional data, including sediment core data and macrophyte survey information, were used to verify that model estimates of internal phosphorus loading were reasonable.

**Implementation Plan**

Although the majority of nutrient loading to Eagle Point Lake comes from internal sources, direct watershed runoff is not inconsequential. This is reflected in the management strategies recommended in the WRAPS study, which include:

- Evaluate opportunities for enhanced treatment and/or infiltration in subwatersheds tributary to Raleigh Creek watershed
- Continue to target small scale BMPs throughout the tributary watershed through the VBWD’s cost-share program
- Promote Washington County’s financial assistance programs for non-complaint/non-functioning SSTS
- Continue routine monitoring of water quality and macrophytes

Strategies implemented in the Eagle Point Lake will affect downstream waterbodies, including Horseshoe Lake.
Appendix B-5.12 Additional Macrophyte Information
### Submerged Aquatic Plants:
- Curlyleaf pondweed
- Flatstem pondweed
- Sago Pondweed
- Leafy/Narrowleaf pondweed
- Coontail
- Bushy pondweed and naiad
- Yellow water buttercup
- Bladderwort
- Elodea

### Floating Leaf:
- Duckweed
  - (may include Lemna major, Lemna minor, Greater duckweed and Watermeal)

### Emergent:
- Cattail
- Sedge
- Bulrush

### No Aquatic Vegetation Found:

### Common Name
- Potamogeton crispus
- Potamogeton zosteriformis
- Potamogeton pectinatus
- Potamogeton spp.
- Ceratophyllum demersum
- Najas spp.
- Ranunculus spp.
- Utricularia spp.
- Algal mats
- Elodea canadensis

### Scientific Name

<table>
<thead>
<tr>
<th>Common Name</th>
<th>Scientific Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Curlyleaf pondweed</td>
<td>Potamogeton crispus</td>
</tr>
<tr>
<td>Flatstem pondweed</td>
<td>Potamogeton zosteriformis</td>
</tr>
<tr>
<td>Sago Pondweed</td>
<td>Potamogeton pectinatus</td>
</tr>
<tr>
<td>Leafy/Narrowleaf pondweed</td>
<td>Potamogeton spp.</td>
</tr>
<tr>
<td>Coontail</td>
<td>Ceratophyllum demersum</td>
</tr>
<tr>
<td>Bushy pondweed and naiad</td>
<td>Najas spp.</td>
</tr>
<tr>
<td>Yellow water buttercup</td>
<td>Ranunculus spp.</td>
</tr>
<tr>
<td>Bladderwort</td>
<td>Utricularia spp.</td>
</tr>
<tr>
<td>Elodea</td>
<td></td>
</tr>
<tr>
<td>Duckweed</td>
<td>Lemna spp.</td>
</tr>
<tr>
<td>Cattail</td>
<td>Typha spp.</td>
</tr>
<tr>
<td>Sedge</td>
<td>Carex spp.</td>
</tr>
<tr>
<td>Bulrush</td>
<td>Scirpus spp.</td>
</tr>
<tr>
<td>No Aquatic Vegetation Found</td>
<td></td>
</tr>
</tbody>
</table>

- No macrophytes found in water > 5-6.5 feet
- Macrophyte growth is heaviest along shoreline
- Macrophyte densities estimated as follows: 1 = light; 2 = moderate; 3 = heavy
- No macrophytes found in water > 3-4 feet
- Macrophyte growth is heaviest along shoreline
- Macrophyte densities estimated as follows: 1 = light; 2 = moderate; 3 = heavy

### Submerged Aquatic Plants:
- Curlyleaf pondweed
- Flatstem pondweed
- Sago Pondweed
- Leafy/Narrowleaf pondweed
- Coontail
- Bulbous pondweed and naiad
- Yellow water buttercup
- Bladderwort
- Elodea

### Floating Leaf:
- Duckweed
  (may include Lemna major, Lemna minor, Greater duckweed, and Watermeal)

### Emergent:
- Cattail
- Sedge
- Bulrush

### No Aquatic Vegetation Found:

### Water Quality Monitoring Location

#### Submerged Aquatic Plants:
- Common Name
  - Curlyleaf pondweed
  - Flatstem pondweed
  - Sago Pondweed
  - Leafy/Narrowleaf pondweed
  - Coontail
  - Bulbous pondweed and naiad
  - Yellow water buttercup
  - Bladderwort
  - Elodea

- Scientific Name
  - Potamogeton crispus
  - Potamogeton zosteriformis
  - Potamogeton pectinatus
  - Potamogeton spp.
  - Ceratophyllum demersum
  - Najas spp.
  - Ranunculus spp.
  - Utricularia spp.
  - Elodea canadensis

#### Floating Leaf:
- Common Name
  - Duckweed
- Scientific Name
  - Lemna spp.

#### Emergent:
- Common Name
  - Cattail
  - Sedge
  - Bulrush
- Scientific Name
  - Typha spp.
  - Carex spp.
  - Scirpus spp.

#### No Aquatic Vegetation Found:
- Macrophytes found in throughout entire water body
- Macrophyte growth is heaviest along shoreline
- Macrophyte densities estimated as follows: 1 = light; 2 = moderate; 3 = heavy

### Submerged Aquatic Plants:

- **Curlyleaf pondweed**
- **Flatstem pondweed**
- **Sago pondweed**
- **Cootail**
- **Bushy pondweed and naiad**
- **Elodea**
- **Northern milfoil**

### Floating Leaf:

- **Water meal**
- **Lesser duckweed**
- **Greater duckweed**

- **Found Throughout Lake**

### Emergent:

- **Cattail**
- **River bulrush**
- **Bulrush**
- **Giant reed grass**

### No Aquatic Vegetation Found:
Macrophytes found in throughout entire water body, P. crispus bloom which was dense throughout entire lake has dissipated
Macrophyte growth is heaviest along shoreline
Macrophyte densities estimated as follows: 1 = light; 2 = moderate; 3 = heavy
Filamentous algal mats growing on Ceratophyllum demersum

### Submerged Aquatic Plants:

- Flatstem pondweed
- Sago Pondweed
- Leafy/Narrowleaf pondweed
- Coontail
- Bushy pondweed and naiad
- Elodea
- Northern milfoil

### Floating Leaf:

- Watermeal
- Lesser duckweed
- Greater duckweed
- Duckweed (May include Lemna major, Lemna minor, Greater duckweed and Watermeal)

### Emergent:

- Cattail
- River bulrush
- Bulrush
- Giant reed grass

### No Aquatic Vegetation Found:

- Filamentous algal mats growing on Ceratophyllum demersum

### Comments:

Area inside dashed line macrophyte growth is less dense beneath surface
1. Ceratophyllum demersum
2. Elodea canadenesis
EAGLE POINT LAKE MACROPHYTE SURVEY RESULTS
May 25, 2007
Valley Branch Watershed District

FIELD NOTES:
- Macrophyte densities estimated as follows:
  1=light; 2=moderate; 3=heavy
- Densities generally not noted for emergent and floating leaf plants
- Wolffia columbiana, Lemna sp. and Spirodela polyrhiza found throughout entire waterbody
- Macrophyte growth is heaviest along the shoreline

Legend
Emergent Plants
Floating Leaf Plants
Submerged Aquatic Plants
No Aquatic Vegetation

Common Name
Scientific Name
bushy pondweed and naiads
Najas sp.
coontail
Ceratophyllum demersum
curlyleaf pondweed
Potamogeton crispus
flatstem pondweed
Potamogeton zosteriformis
muskgrass
Chara sp.
pondweed
Potamogeton sp.
sago pondweed
Potamogeton pectinatus
stonewort
Nitella sp.
Canada waterweed
Elodea canadensis

Common Name
Scientific Name
water meal
Wolffia columbiana
duckweed
Lemna sp.
greater duckweed
Spirodela polyrhiza

Common Name
Scientific Name
bulrush
Scirpus sp.
cattail
Typha sp.
common bur-reed
Spartanum eurycarpum
giant reed grass
Phragmites australis
hardstem bulrush
Scirpus acutus
river bulrush
Scirpus fluitatis

sedge
Carex sp.

Barr Footer: Date: 11/13/2007 9:11:44 AM   File:  I:\Client\Vbwd\District\Maps\MacrophyteMaps\2007\EagleptLk_Macrophytes_052507.mxd User:  mbs2
Imagery Source: 2006 AE
EAGLE POINT LAKE MACROPHYTE SURVEY RESULTS
August 17, 2007
Valley Branch Watershed District

FIELD NOTES:
- Macrophyte densities estimated as follows:
  1=light; 2=moderate; 3=heavy
- Densities generally not noted for emergent and floating leaf plants
- Wolffia columbiana, Lemna sp. and Spirodela polyrhiza found throughout entire waterbody
- Macrophyte growth is heaviest along the shoreline
- Algal mats present

Legend
- Emergent Plants
- Floating Leaf Plants
- Submerged Aquatic Plants
- No Aquatic Vegetation

Common Name | Scientific Name
--- | ---
Canada waterweed | Elodea canadensis
bushy pondweed and naiads | Najas sp.
coontail | Ceratophyllum demersum
curlyleaf pondweed | Potamogeton crispus
flatstem pondweed | Potamogeton zosteriformis
muskgrass | Chara sp.
pondweed | Potamogeton sp.
sago pondweed | Potamogeton pectinatus
stonewort | Nitella sp.

Common Name | Scientific Name
--- | ---
water meal | Wolffia columbiana
duckweed | Lemna sp.
greater duckweed | Spirodela polyrhiza

Common Name | Scientific Name
--- | ---
bulrush | Scirpus sp.
cattail | Typha sp.
common bur-reed | Sparganium eurycarpum
giant reed grass | Phragmites australis
hardstem bulrush | Scirpus acutus
river bulrush | Scirpus fluviatilis
edge | Carex sp.

Valley Branch Watershed District
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Imagery Source: 2006 AE
EAGLE POINT LAKE MACROPHYTE SURVEY RESULTS
June 4, 2010
Valley Branch Watershed District

**FIELD NOTES:**
- Macrophyte densities estimated as follows:
  - 1=light; 2=moderate; 3=heavy
- Densities generally not noted for emergent and floating leaf plants
- Wolffia columbiana, Lemna sp. and Spirodela polyrhiza found throughout entire waterbody
- Macrophyte growth is heaviest along the shoreline
- Low water level
- Algal mats present
- Wet shoreline is sporadic with: Schoenoplectus acutus, Typha sp.
  - Potamogeton crispus is less dense than 2009 and those present are not healthy in appearance.
  - Potamogeton sp. and Potamogeton pusillus is dense in areas close to shore
**EAGLE POINT LAKE MACROPHYTE SURVEY RESULTS**
August 17, 2010
Valley Branch Watershed District

**FIELD NOTES:**
- Macrophyte densities estimated as follows:
  1=light; 2=moderate; 3=heavy
- Densities generally not noted for emergent and floating leaf plants
- Wolffia columbiana, Lemna sp. and Spirodela polyrhiza found throughout entire waterbody
- Macrophyte growth is heaviest along the shoreline
- Low water level
- Wet shoreline is sporadic with: Schoenoplectus fluviatilis, Typha sp.
- Potamogeton crispus is less dense than 2009 and those present are not healthy in appearance.
- Areas of dense Elodea canadensis - dashed red lines

**Legend**
- Dry
- Emergent Plants
- Floating Leaf Plants
- Submerged Aquatic Plants
- No Aquatic Vegetation
- Extremely Dense Areas of Elodea canadensis

<table>
<thead>
<tr>
<th>Common Name</th>
<th>Scientific Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>bushy pondweed and naiads</td>
<td>Najas sp.</td>
</tr>
<tr>
<td>water crowfeet</td>
<td>Ranunculus sp.</td>
</tr>
<tr>
<td>coontail</td>
<td>Ceratophyllum demersum</td>
</tr>
<tr>
<td>small pondweed</td>
<td>Potamogeton pusillus</td>
</tr>
<tr>
<td>sago pondweed</td>
<td>Stuckenia peclinatus</td>
</tr>
<tr>
<td>water stargrass</td>
<td>Zostrella dubia</td>
</tr>
<tr>
<td>stoneworts</td>
<td>Nitella sp.</td>
</tr>
<tr>
<td>Canada waterweed</td>
<td>Elodea canadensis</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Common Name</th>
<th>Scientific Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>duckweed</td>
<td>Lemna sp.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Common Name</th>
<th>Scientific Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>bulrush</td>
<td>Scirpus sp.</td>
</tr>
<tr>
<td>cattail</td>
<td>Typha sp.</td>
</tr>
<tr>
<td>common bur-reed giant reed grass</td>
<td>Sparganium eurycarpum</td>
</tr>
<tr>
<td>hardstem bulrush</td>
<td>Phragmites australis</td>
</tr>
<tr>
<td>river bulrush</td>
<td>Schoenoplectus acutus</td>
</tr>
<tr>
<td>arrowhead</td>
<td>Schoenoplectus fluviatilis</td>
</tr>
<tr>
<td>water plantain</td>
<td>Sagittaria sp.</td>
</tr>
<tr>
<td>sedge</td>
<td>Alisma subcordata</td>
</tr>
<tr>
<td>sedge</td>
<td>Carex sp.</td>
</tr>
</tbody>
</table>

*Note: Bold red name indicates extremely aggressive/invasive introduced species.*

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Imagery Source: 2009 AE
**Submerged Aquatic Plants**

<table>
<thead>
<tr>
<th>Common Name</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Muskgrass</td>
<td>Chara sp.</td>
</tr>
<tr>
<td>Slender naiad</td>
<td>Najas sp.</td>
</tr>
<tr>
<td>Water crowfoot</td>
<td>Ranunculus sp.</td>
</tr>
<tr>
<td>Coontail</td>
<td>Ceratophyllum demersum</td>
</tr>
<tr>
<td>Curlyleaf pondweed</td>
<td>Potamogeton crispus</td>
</tr>
<tr>
<td>Small pondweed</td>
<td>Potamogeton pusillus</td>
</tr>
<tr>
<td>Sago pondweed</td>
<td>Stuckenia pectinata</td>
</tr>
<tr>
<td>Stoneworts</td>
<td>Nitella sp.</td>
</tr>
<tr>
<td>Canada waterweed</td>
<td>Elodea canadensis</td>
</tr>
</tbody>
</table>

**Emergent Plants**

<table>
<thead>
<tr>
<th>Common Name</th>
<th>Scientific Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water meal</td>
<td>Wolffia columbiana</td>
</tr>
<tr>
<td>Duckweed</td>
<td>Lemna sp.</td>
</tr>
<tr>
<td>Greater duckweed</td>
<td>Spirodea polyrhiza</td>
</tr>
<tr>
<td>Slender riccia</td>
<td>Riccia fluitans</td>
</tr>
</tbody>
</table>

**Legend**
- **Dry**
- **Emergent Plants**
- **Floating Leaf Plants**
- **Submerged Aquatic Plants**
- **No Aquatic Vegetation**
- **Extremely Dense Areas of Potamogeton Crispus Growing to Surface**

**Imagery Source: 2009 AE**

**FIELD NOTES:**
- Macrophyte densities estimated as follows:
  - 1-light; 2-moderate; 3-heavy
- Densities generally not noted for emergent and floating leaf plants
- Wolffia columbiana, Lemna sp. and Spirodea polyrhiza found throughout entire waterbody
- Algal mats present - north arm
- Wet shoreline is sporadic with: Schoenoplectus fluviatilis, Typha sp. Schoenoplectus acutus, Sagittaria sp.
- Potamogeton sp. and Potamogeton pusillus is dense in areas close to shore

**EAGLE POINT LAKE MACROPHYTE SURVEY RESULTS**
June 9, 2011
Valley Branch Watershed District
**Common Name** | **Scientific Name**
--- | ---
Muskgrass | Chara sp.
Flatstem pondweed | Potamogeton zosteriformis
Slender naiad | Najas sp.
Water crowfoot | Ranunculus sp.
Coontail | Ceratophyllum demersum
**Curly leaf pondweed** | **Potamogeton crispus**
Small pondweed | Potamogeton pusillus
Sago pondweed | Stuckenia pectinata
Stoneworts | Nitella sp.
Canada waterweed | Elodea canadensis

**Common Name** | **Scientific Name**
--- | ---
Water meal | Wolffia columbiana
Duckweed | Lemna sp.
Greater duckweed | Spirodela polyrhiza
Slender nicker | Riccia fluitans

**Common Name** | **Scientific Name**
--- | ---
Bulrush | Scirpus sp.
Cattail | Typha sp.
Common bur-reed | Sparganium eurycarpum
Giant reed grass | Phragmites australis
Hardstem bulrush | Schoenoplectus acutus
River bulrush | Schoenoplectus fluviatilis
Arrowhead | Sagittaria sp.
Water plantain | Alisma subcordata
Sedge | Carex sp.

**Legend**
- **Emergent Plants**
- **Floating Leaf Plants**
- **Submerged Aquatic Plants**
- **No Aquatic Vegetation**

**Note:** Bold red name indicates extremely aggressive/invasive introduced species.

**FIELD NOTES:**
- Macrophyte densities estimated as follows:
  - Light: 1-10 stems/m²
  - Moderate: 11-50 stems/m²
  - Heavy: >50 stems/m²
- Densities generally not noted for emergent and floating leaf plants
- Wolffia columbiana, Lemna sp., and Spriidea polyrhiza found throughout entire waterbody
- Wet shoreline is sporadic with: Schoenoplectus fluviatilis, Typha sp.
- Schoenoplectus acutus, Sagittaria sp.
- High water level, water flowing into lake on north end
- Lake appears to have been treated since June. Elodea is brown with green tips (growing)

**EAGLE POINT LAKE MACROPHYTE SURVEY RESULTS**
August 17, 2011
Valley Branch Watershed District
Figure 22. Eagle Point Lake Curly-leaf Pondweed: June 19, 2012
Appendix C-5.12 Additional Phytoplankton Information
<table>
<thead>
<tr>
<th>DIVISION</th>
<th>TAXON</th>
<th>06/16/98 units/mL</th>
<th>07/14/98 units/mL</th>
<th>08/11/98 units/mL</th>
<th>08/25/98 units/mL</th>
<th>09/09/98 units/mL</th>
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<td>646</td>
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<td>Ankistrodesmus Brauni</td>
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<td>0</td>
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<td>Chlamydomonas globosa</td>
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<td>Dictyospheirum Ehrenbergianum</td>
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<td></td>
<td>Golenkinia radiata</td>
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<td>Lagerheimia sp.</td>
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<td>169</td>
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<td>Pediastrum Boryanum</td>
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<td>0</td>
<td>0</td>
<td>0</td>
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<td></td>
<td>Pediastrum duplex</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
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<tr>
<td></td>
<td>Pediastrum simplex</td>
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<td>0</td>
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<tr>
<td></td>
<td>Scenedesmus dimorphus</td>
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<tr>
<td></td>
<td>Scenedesmus sp.</td>
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## Standard Phytoplankton Clump Count

**Eagle Point Lake**

**Sample:** 0-2 Meters (Int. Tube)

**Date Range:**
- 6/9/2003
- 7/19/2003
- 8/5/2003
- 8/18/2003
- 9/8/2003

### Chlorophyta (Green Algae)

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**Chlorophyta Total:** 1,444, 12,415, 18,823, 5,153, 15,972

### Chrysophyta (Yellow-Brown Algae)

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**Chrysophyta Total:** 0, 1,015, 0, 0, 0

### Cyanophyta (Blue-Green Algae)

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**Cyanophyta Total:** 0, 1,054, 11,967, 2,479, 17,490

### Bacillariophyta (Diatoms)

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**Bacillariophyta Total:** 78, 312, 374, 0, 243

### Cryptophyta (Cryptomonads)

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**Cryptophyta Total:** 508, 1,015, 499, 117, 547

### Euglenophyta (Euglenoids)

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**Euglenophyta Total:** 0, 39, 0, 0, 0

### Pyrrophyta (Dinoflagellates)

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**Pyrrophyta Total:** 0, 0, 0, 0, 0

**Totals:** 2,030, 15,850, 31,662, 7,749, 34,312
Appendix D-5.12 Additional Zooplankton Information
# ZOOPLANKTON IDENTIFICATION SUMMARY (#/sq. m)

## VALLEY BRANCH WATERSHED DISTRICT

23/83 207 V98 030

### LAKE: Eagle Point

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<tr>
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<td>2,388</td>
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P:\23\82\207\EAGLEPT\V98-ZOOP.WB2
# Eagle Point Lake

## Sample: Bottom to Surface Tow

### Zooplankton Analysis

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<td>#/m²</td>
<td>#/m²</td>
<td>#/m²</td>
<td>#/m²</td>
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<td>0</td>
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<td>823,627</td>
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<td>9,903</td>
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<td>315,657</td>
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**TOTALS** | 1,171,027 | 5,928,080 | 1,287,387 | 1,967,597 | 1,610,648
Appendix E-5.12  Eagle Point Lake Operating Plan
INTRODUCTION

This plan is submitted by Valley Branch Watershed District (Watershed District) to fulfill Special Provision 8 of Protected Waters Permit 86-6264, issued July 7, 1986 by the Minnesota Department of Natural Resources (MnDNR). It describes the operation, inspection and maintenance plan for the Eagle Point Lake Dam.

PROCEDURE

This Operation, Inspection and Maintenance Plan will be adopted tentatively for a period of one year after which it will be reviewed before permanent adoption. It will be reviewed thereafter on a two-year basis.

OPERATION PLAN

1. Under normal conditions, no operation of the dam or control structures is anticipated.

2. The water level of Eagle Point Lake is controlled by a stoplog weir which is set at Elevation 894.0 feet. The stoplog design was chosen so that MnDNR staff could temporarily raise and lower the water level of Eagle Point Lake to aid in fish rearing. Additional stoplogs may be added to raise the water level to Elevation 896.0 feet and stoplogs may be removed to lower the water level to Elevation 893.0 feet. The MnDNR shall notify the Watershed District five working days in advance of any proposed water level changes. Otherwise, stoplogs are not to be added or removed.

INSPECTION PLAN

The dam and control structures shall be inspected annually by a registered engineer. A report of the inspection shall be submitted to the Dam Safety Unit of the Division of Waters of the MnDNR.
1. The outlet structures and outlet works shall be inspected annually for evidence of:
   - accumulated debris
   - cracking or spalling of concrete and opening of joints
   - deterioration of concrete
   - abnormal leakage through concrete surfaces or along pipe outlet
   - unusual or inadequate operational behavior

2. Upstream embankment slopes shall be inspected annually for evidence of:
   - wave erosion
   - cracks
   - slides
   - sloughs
   - subsidences
   - damages to slope protection
   - other signs of serious erosion
   - failure of vegetation
   - growth of trees, brush or other unsuitable vegetation
   - animal burrows

3. Downstream slopes shall be inspected annually for evidence of:
   - wave erosion
   - cracks
   - slides
   - sloughs
   - subsidences
   - damages to slope protection
   - other signs of serious erosion
   - springs
   - seeps
   - boggy areas
   - failure of vegetation cover
   - establishment of brush or trees
   - animal burrows

4. During periods of low reservoir levels, the exposed portions of the abutments and lake bottom shall be examined annually for sinks or seepage holes, and cracking.

5. During periods of sustained high water (above Elevation 898.0 feet), a weekly inspection shall be made of the embankment for evidence of abnormal development, with particular attention being given to:
o the crest of the dam
o the visible portions of the upstream slope protection
o downstream slope protection
o areas downstream from the dam

The Watershed District shall promptly notify the MnDNR of any abnormal developments.

MAINTENANCE PLAN

The Watershed District shall be responsible for and promptly perform all necessary dam maintenance. Possible maintenance activities include the following:

1. Vegetative cover shall be maintained on the dam.
   o Lost or destroyed vegetative cover shall be reseeded or resodded. The reshaping, fertilizing, reseeding and resodding shall follow the original construction specifications.
   o Vegetation shall be fertilized as necessary to maintain the desired vegetative stand.
   o Vegetation shall be mowed at regular intervals to a minimum height of 3 to 4 inches. Trees and deep rooting plants shall be removed.

2. The structural integrity and function of the earth dam and outlet structures shall be maintained.
   o Soil removed by burrowing animals shall be replaced.
   o The outlet piping system and the toe drains shall be cleaned or replaced as necessary.
   o Any slides on the embankment areas shall be stabilized as soon as practical.
   o Any settled portions of the dam shall be restored to their proper elevation.
   o Eroded material shall be replaced and the eroded areas revegetated.
   o Unusual seepages, boils, subsidences or settlements in fill areas shall be investigated and repaired.
- Eroded materials around pipe outlets and inlets shall be restored.

- Deteriorated or damaged concrete shall be restored.

- The outlet structures shall be maintained in proper working order. Ice and debris that may hamper its function shall be removed. Damaged protective coatings shall be restored.