Appendix A

Lake Water Quality Graphs
2018 Water Quality Sampling Results
Nine Mile Creek
Bush Lake

Total Phosphorus Concentrations
- Hypereutrophic: Summer Average = 10 µg/L
- Eutrophic
- Mesotrophic
- Oligotrophic

Chlorophyll a Concentrations
- Hypereutrophic: Summer Average = 2.4 µg/L
- Eutrophic
- Mesotrophic
- Oligotrophic

Secchi Disc Transparencies
- Hypereutrophic
- Eutrophic: Summer Average = 3.9 m
- Mesotrophic
- Oligotrophic
2018 Water Quality Sampling Results
Nine Mile Creek
Normandale Lake (East Basin)
2018 Water Quality Sampling Results
Nine Mile Creek
Northwest Anderson Lake

**Total Phosphorus Concentrations**
- Hypereutrophic: Summer Average = 26 µg/L
- Eutrophic
- Mesotrophic
- Oligotrophic

**Chlorophyll a Concentrations**
- Hypereutrophic: Summer Average = 9.6 µg/L
- Eutrophic
- Mesotrophic

**Secchi Disc Transparencies**
- Hypereutrophic: Summer Average = 1.8 m
- Eutrophic
- Mesotrophic

Secchi disc in aquatic plant growth on 8/20 and 9/5

Appendix A-3
2018 Water Quality Sampling Results
Nine Mile Creek
Smetana Lake
2018 Water Quality Sampling Results
Nine Mile Creek
Southeast Anderson Lake
2018 Water Quality Sampling Results
Nine Mile Creek
Southwest Anderson Lake

Total Phosphorus Concentrations

- Hypereutrophic: Summer Average = 24 µg/L
- Eutrophic
- Mesotrophic: Summer Average = 24 µg/L
- Oligotrophic

Chlorophyll a Concentrations

- Hypereutrophic
- Eutrophic: Summer Average = 5.8 µg/L
- Mesotrophic

Secchi Disc Transparencies

- Hypereutrophic
- Eutrophic
- Mesotrophic: Summer Average = 1.4 m
- Secchi disc on bottom or in aquatic plant growth on 6/12, 8/20 and 9/5

Appendix A-6
Appendix B

Aquatic Plant Survey Maps
(all monitored lakes, except Normandale Lake)
**FIELD NOTES:**

- Macrophytes observed throughout the entire waterbody.
- Macrophyte densities estimated as follows: 1=light; 2=moderate; 3=heavy
- *Nymphaea odorata* is sporadic around entire lake perimeter.
- *Lemna trisulca* is present throughout entire lake (dense in areas)
- One *Potamogeton crispus* fragment was observed on west side of lake. No rooted plants were observed or sampled.

**NORTHWEST ANDERSON LAKE MACROPHYTE SURVEY**

June 20, 2018
Nine Mile Creek Watershed District
**Emergent Plants**

- Canada waterweed (Elodea canadensis)
- Cattail (Typha sp.)
- Northern blueflag (Iris versicolor)
- Common bur-reed (Sparganium eurycarpum)
- Arrowhead (Sagittaria sp.)

**Floating Leaf Plants**

- Water smartweed (Polygonum sp.)
- Bulrush (Schoenoplectus sp.)
- Purple loosestrife (Lythrum salicaria)

**Submerged Aquatic Plants**

- American lotus (Nelumbo lutea)
- Yellow waterlily (Nuphar variegata)
- Forked duckweed (Lemna trisulca)
- White waterlily (Nymphaea odorata)

**No Aquatic Vegetation**

**Water Quality Monitoring Station**

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

---

**FIELD NOTES:**

- Macrophytes observed throughout the entire waterbody.
- Macrophyte densities estimated as follows: 1=light; 2=moderate; 3=heavy
- *Nymphaea odorata* is sporadic around entire lake perimeter.
- *Lemna trisulca* is present throughout entire lake (dense in areas)
**FIELD NOTES:**
- Macrophytes observed throughout the entire waterbody.
- Macrophyte densities estimated as follows:
  1=light; 2=moderate; 3=heavy
- Algal mats present.
- *Nymphaea odorata* (White waterlily) is sporadic (light) around lake. Areas are marked where more dense.
- *Riccia fluitans*, *Lemna trisulca* and *Lemna minor* present throughout the lake.

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

**Emergent Plants**
- *Coontail*
- *Elodea*
- *Northern milfoil*
- *Stonewort*
- *Sago pondweed*
- *Narrowleaf pondweed*
- *Flatstem pondweed*
- *Bladderwort*
- *Water starwort*

**Submerged Aquatic Plants**
- *Utricularia sp.*
- *Ceratophyllum demersum*
- *Potamogeton sp.*
- *Stuckenia pectinata*

**Floating Leaf Plants**
- *Nymphaea odorata* (White waterlily)
- *Riccia fluitans*
- *Lemna trisulca*
- *Lemna minor*

**Narrowleaf pondweed**
- *Potamogeton sp.* (narrowleaf) - 1-2
- *Stuckenia pectinata* - 1
- *Heteranthera dubia* - 1-2
- *Elodea canadensis* - 1

**Bladderwort**
- *Utricularia sp.* - 1-2
- *Nitella sp.* - 1-2+
- *Ceratophyllum demersum* - 2-3+
- *Potamogeton sp.* (narrowleaf) - 1
- *Stuckenia pectinata* - 1
- *Heteranthera dubia* - 1-2
- *Elodea canadensis* - 1

**Heteranthera dubia**
- *Ceratophyllum demersum* - 2-3+
- *Potamogeton sp.* (narrowleaf) - 1-3
- *Stuckenia pectinata* - 1
- *Heteranthera dubia* - 1
- *Elodea canadensis* - 1

**Nymphaea odorata**
- *Elodea canadensis* - 1
- *Ceratophyllum demersum* - 2-3s
- *Stuckenia pectinata* - 1
- *Heteranthera dubia* - 1

**Slender riccia**
- *Riccia fluitans*

**Notes:**
- *Nymphaea odorata* (White waterlily) is sporadic (light) around lake. Areas are marked where more dense.
- *Riccia fluitans*, *Lemna trisulca* and *Lemna minor* present throughout the lake.

**Macrophyte Survey**
- **Field Notes:**
  - Macrophytes observed throughout the entire waterbody.
  - Macrophyte densities estimated as follows:
    1=light; 2=moderate; 3=heavy
  - Algal mats present.
  - *Nymphaea odorata* (White waterlily) is sporadic (light) around lake. Areas are marked where more dense.
  - *Riccia fluitans*, *Lemna trisulca* and *Lemna minor* present throughout the lake.

**Survey Details:**
- **Map Source:** Twin Cities 2016 (MnGeo WMS)
- **Barr Footer:** ArcGIS 10.6, 2018-10-02 18:59 File: I:\Client\Nine_Mile_Creek_WD\Work_Orders\Macrophyte_Maps\2018\Southwest Anderson Lake Macrophyte Map_20180618.mxd User: kac2

**SOUTHWEST ANDERSON LAKE**
**MACROPHYTE SURVEY**

**June 18, 2018**
Nine Mile Creek Watershed District
**Common Name** | **Scientific Name**
--- | ---
Coontail | Ceratophyllum demersum
Elodea | Elodea canadensis
Water stargrass | Heteranthera dubia
Northern milfoil | Myriophyllum sibiricum
Bushy pondweed and naiads | Utricularia sp
Stonewort | Nitella sp.
Narrowleaf pondweed | Potamogeton sp. (narrowleaf)
Flatstem pondweed | Potamogeton zosteriformis
Sago pondweed | Stuckenia pectinata
Bladderwort | Utricularia sp

**Common Name** | **Scientific Name**
--- | ---
Small duckweed | Lemna minor
Forked duckweed | Lemna trisulca
Yellow waterlily | Nuphar variegata
White waterlily | Nymphaea odorata
Slender riccia | Riccia fluitans

**FIELD NOTES:**
- Macrophytes observed throughout the entire waterbody.
- Macrophyte densities estimated as follows:
  1=light, 2=moderate, 3=heavy
- Algal mats present.
- *Nymphaea odorata* (White waterlily) is sporadic (light) around lake. Areas are marked where more dense.
- *Riccia fluitans*, *Lemna trisulca* and *Lemna minor* present throughout the lake.

*Note: Bold red name indicates extremely aggressive/invasive introduced species.*
**FIELD NOTES:**
- Macrophytes observed throughout the entire waterbody.
- Macrophyte densities estimated as follows:
  1=light; 2=moderate; 3=heavy

**Common Name** | **Scientific Name**
--- | ---
Bladderwort | Utricularia sp.
Bog pondweed and naiads | Najas sp.
Canada waterweed | Elodea canadensis
Coontail | Ceratophyllum demersum
Curly-leaf pondweed | Potamogeton crispus
Burhead Watermilfoil | Myriophyllum spicatum
Flat-stem pondweed | Potamogeton zosteriformis
Large-leaf pondweed | Potamogeton amplifolius
Maidgrass | Chara sp.
Narrow-leaf pondweed | Potamogeton sp. (narrowleaf)
Northern milfoil | Potamogeton striatus
Sago pondweed | Stuckenia pectinata
Stonewort | Nitella sp.
Water celery | Vallisneria americana
Water stargrass | Heteranthera dubia

**Common Name** | **Scientific Name**
--- | ---
White waterlily | Nymphaea odorata
Yellow waterlily | Nuphar variegata

**Common Name** | **Scientific Name**
--- | ---
Water smartweed | Polygonum sp.
Bulrush | Schoenoplectus sp.
Cattail | Typha sp.
Blue flag iris | Iris versicolor

*Note: Bold red name indicates extremely aggressive/invasive introduced species.*
**FIELD NOTES:**
- Macrophytes observed throughout the entire waterbody.
- Macrophyte densities estimated as follows:
  1=light; 2=moderate; 3=heavy
- Abundant *Potamogeton crispus* turions observed throughout lake.
- Algal mats present.

**Note:** Bold red name indicates extremely aggressive/invasive introduced species.
<table>
<thead>
<tr>
<th>Common Name</th>
<th>Scientific Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Buttercup</td>
<td>Ranunculus sp.</td>
</tr>
<tr>
<td>Canada waterweed</td>
<td>Elodea canadensis</td>
</tr>
<tr>
<td>Clasping leaf pondweed</td>
<td>Potamogeton richardsonii</td>
</tr>
<tr>
<td>Common Bladderwort</td>
<td>Utricularia macrorhiza</td>
</tr>
<tr>
<td>Coontail</td>
<td>Ceratophyllum demersum</td>
</tr>
<tr>
<td>Curlyleaf pondweed</td>
<td>Potamogeton crispus</td>
</tr>
<tr>
<td>Eurasian watermilfoil</td>
<td>Myriophyllum spicatum</td>
</tr>
<tr>
<td>Flat-stem pondweed</td>
<td>Potamogeton zosteriformis</td>
</tr>
<tr>
<td>Floating-leaf pondweed</td>
<td>Potamogeton natans</td>
</tr>
<tr>
<td>Illinois pondweed</td>
<td>Potamogeton illinoensis</td>
</tr>
<tr>
<td>Large-leaf pondweed</td>
<td>Potamogeton amplifolius</td>
</tr>
<tr>
<td>Long-leaf pondweed</td>
<td>Potamogeton nodosus</td>
</tr>
<tr>
<td>Muskgrass</td>
<td>Chara sp.</td>
</tr>
<tr>
<td>Narrow-leaf pondweed</td>
<td>Potamogeton sp. (narrowleaf)</td>
</tr>
<tr>
<td>Northern watermilfoil</td>
<td>Myriophyllum sibiricum</td>
</tr>
<tr>
<td>Robin's pondweed</td>
<td>Potamogeton robinsonii</td>
</tr>
<tr>
<td>Sago pondweed</td>
<td>Stuckenia pectinata</td>
</tr>
<tr>
<td>Water celery</td>
<td>Vallisneria americana</td>
</tr>
<tr>
<td>Water stargrass</td>
<td>Heteranthera dubia</td>
</tr>
<tr>
<td>Water crowfoot</td>
<td>Ranunculus sp.</td>
</tr>
<tr>
<td>White water crowfoot</td>
<td>Ranunculus longirostris</td>
</tr>
</tbody>
</table>

**FIELD NOTES:**
- Macrophyte densities estimated as follows:
  - 1-high, 2-moderate, 3-heavy
  - No rooted macrophytes found in water >12-14’
  - Ceratophyllum demersum at 15-16’
  - Sagittaria sp. sporadic along shoreline
  - High water level
  - Iris versicolor sporadic along entire perimeter

**BUSH LAKE MACROPHYTE SURVEY RESULTS**

June 20, 2018
Nine Mile Creek Watershed District
### Submerged Aquatic Plants

<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>Buttercup</td>
<td>Ranunculus sp.</td>
</tr>
<tr>
<td>Canada waterweed</td>
<td>Elodea canadensis</td>
</tr>
<tr>
<td>Clasping-leaf pondweed</td>
<td>Potamogeton richardsonii</td>
</tr>
<tr>
<td>Common Bladderwort</td>
<td>Utricularia macrorhiza</td>
</tr>
<tr>
<td>Coontail</td>
<td>Ceratophyllum demersum</td>
</tr>
<tr>
<td>Eurasian watermilfoil</td>
<td>Myriophyllum spicatum</td>
</tr>
<tr>
<td>Flat-stem pondweed</td>
<td>Potamogeton zostereniforms</td>
</tr>
<tr>
<td>Floating-leaf pondweed</td>
<td>Potamogeton natans</td>
</tr>
<tr>
<td>Illinois pondweed</td>
<td>Potamogeton illinoensis</td>
</tr>
<tr>
<td>Large-leaf pondweed</td>
<td>Potamogeton amplifolius</td>
</tr>
<tr>
<td>Long-leaved pondweed</td>
<td>Potamogeton nodosus</td>
</tr>
<tr>
<td>Muskrass</td>
<td>Chara sp.</td>
</tr>
<tr>
<td>Narrowleaf pondweed</td>
<td>Potamogeton sp. (narrowleaf)</td>
</tr>
<tr>
<td>Northern watermilfoil</td>
<td>Myriophyllum sibiricum</td>
</tr>
<tr>
<td>Robin’s pondweed</td>
<td>Potamogeton robustiss</td>
</tr>
<tr>
<td>Sago pondweed</td>
<td>Stuckenia pectinata</td>
</tr>
<tr>
<td>Water celery</td>
<td>Vallisneria americana</td>
</tr>
<tr>
<td>Water stargrass</td>
<td>Heteranthera dubia</td>
</tr>
<tr>
<td>White water crowfoot</td>
<td>Ranunculus longirostris</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Emergent Plants</strong></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Floating Leaf Plants</strong></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Submerged Aquatic Plants</strong></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>No Aquatic Vegetation</strong></td>
</tr>
</tbody>
</table>

#### GPS Survey Location Path

- **Imagery Source:** Twin Cities 2016 (MnGeo WMS)
- **August 22, 2018**

**BUSH LAKE MACROPHYTE SURVEY RESULTS**

### FIELD NOTES:
- **Macrophyte densities estimated as follows:**
  - 1=tight; 2=moderate; 3=heavy
  - No rooted macrophytes found in water >12-14”, Ceratophyllum demersum at 15-16”
  - Sagittaria sp. sporadic along shoreline
  - Iris versicolor sporadic along entire perimeter
  - *Lythrum Salicaria* (Purple loosestrife) sporadic along lake perimeter

*Note: Bold red name indicates extremely aggressive/invasive introduced species.*
FIELD NOTES:
- *Lythrum salicaria* observed around entire lake perimeter (sporadically).
- Entire water body has macrophyte coverage.
- Macrophyte densities estimated as follows:
  1=light; 2=moderate; 3=heavy
- Algal mats, *Lemna trisulca* and *Wolffia columbiana* present.

*Note: Bold red name indicates extremely aggressive/invasive introduced species.
Lythrum salicaria
Nymphaea odorata
Iris versicolor
Nymphaea odorata
Potamogeton crispus - 1-2+
Ceratophyllum demersum - 3+
Ranunculus linguastris - 1-2
Elodea canadenesis - 1
Stackenia pectinata - 3
Nelumbo lutea
Typha sp.
Nymphaea odorata
Ceratophyllum demersum - 2-3
Potamogeton crispus - 2
Lythrum salicaria
Nymphaea odorata
Ceratophyllum demersum - 2-3
Potamogeton sp. (narrowleaf) - 1-2
Nymphaea odorata
Stackenia pectinata - 1
Nitella sp. - 1
Heteranthera dubia - 1

**Emergent Plants**

**Floating Leaf Plants**

**Submerged Aquatic Plants**

**No Aquatic Vegetation**

**GPS Survey Location Path**

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

**EMERGENT PLANTS**

- **Lythrum salicaria** observed around entire lake perimeter (sporadically).
- Entire water body has macrophyte coverage.
- Macrophyte densities estimated as follows:
  - 1=light; 2=moderate; 3=heavy
- Algal mats, *Leuca trisulca* and *Wolffia columbiana* dense around lake perimeter.

**FIELD NOTES:**

- *Nelumbo lutea*
- *Ceratophyllum demersum*
- *Ranunculus linguastris*
- *Elodea canadenesis*
- *Stackenia pectinata*
- *Nitella sp.*
- *Heteranthera dubia*
- *Potamogeton crispus*
- *Ceratophyllum demersum*
- *Lythrum salicaria*
- *Iris versicolor*
- *Nymphaea odorata*
- *Typha sp.*
- *Nelumbo lutea*
- *Potamogeton sp. (narrowleaf)*
- *Nitella sp.*
- *Stackenia pectinata*
Appendix C

Normandale Lake Aquatic Plant Survey Maps
Appendix C-5

Survey Sample Points
Macrophyte Point Intercept Survey
Normandale Lake
Nine Mile Creek Watershed District
Hennepin County, MN
June 19, 2018

Sample Point
Appendix C-9

Rake Fullness Rating

- Visual
- 1
- 2
- 3
- 4
- None Found

Common waterweed
(Elodea canadensis)

Macrophyte Point Intercept Survey
Normandale Lake
Nine Mile Creek Watershed District
Hennepin County, MN
June 19, 2018

Appendix C-9
Rake Fullness Rating

- Visual
- 1
- 2
- 3
- 4
- None Found

Filamentous algae

Macrophyte Point Intercept Survey
Normandale Lake
Nine Mile Creek Watershed District
Hennepin County, MN
June 19, 2018

Appendix C-10
Rake Fullness Rating

- Visual
- 1
- 2
- 3
- 4
- None Found

Water star-grass
(*Heteranthera dubia*)
Macrophyte Point Intercept Survey
Normandale Lake
Nine Mile Creek Watershed District
Hennepin County, MN
June 19, 2018

Appendix C-11
Aerial Imagery: Hennepin County (2015)

Rake Fullness Rating

- Visual
- 1
- 2
- 3
- 4
- None Found

Forked duckweed
(Lemna trisulca)

Macrophyte Point Intercept Survey
Normandale Lake
Nine Mile Creek Watershed District
Hennepin County, MN
June 19, 2018
Rake Fullness Rating

- Visual
- 1
- 2
- 3
- 4
- None Found

Long-leaf pondweed
(Potamogeton nodosus)

Macrophyte Point Intercept Survey
Normandale Lake
Nine Mile Creek Watershed District
Hennepin County, MN
June 19, 2018

Appendix C-18
Rake Fullness Rating

- Visual
- 1
- 2
- 3
- 4
- None Found

Large duckweed (Spirodea polyrhiza)
Macrophyte Point Intercept Survey
Normandale Lake
Nine Mile Creek Watershed District
Hennepin County, MN
June 19, 2018

Appendix C-21
Narrow-leaved cattail
(Typha angustifolia)
Macrophyte Point Intercept Survey
Normandale Lake
Nine Mile Creek Watershed District
Hennepin County, MN
June 19, 2018

Appendix C-23

Rake Fullness Rating

- Visual
- 1
- 2
- 3
- 4
- None Found
Rake Fullness Rating

- Visual
- 1
- 2
- 3
- 4
- None Found

Common watermeal (Wolffia columbiana)

Macrophyte Point Intercept Survey
Normandale Lake
Nine Mile Creek Watershed District
Hennepin County, MN
June 19, 2018

Appendix C-24
Lake Depth
Macrophyte Point Intercept Survey
Normandale Lake
Nine Mile Creek Watershed District
Hennepin County, MN
August 13, 2018

Depth in ft.
- 0.5 - 2.0
- 2.0 - 3.5
- 3.5 - 4.5
- 4.5 - 6.5
- 6.5 - 11.0
Common waterweed (Elodea canadensis)
Macrophyte Point Intercept Survey
Normandale Lake
Nine Mile Creek Watershed District
Hennepin County, MN
August 13, 2016

Rake Fullness Rating

- Visual
- 1
- 2
- 3
- 4
- None Found
Filamentous algae

Macrophyte Point Intercept Survey
Normandale Lake
Nine Mile Creek Watershed District
Hennepin County, MN
August 13, 2018
Small duckweed
(Lemma minor)
Macrophyte Point Intercept Survey
Normandale Lake
Nine Mile Creek Watershed District
Hennepin County, MN
August 13, 2018

Rake Fullness Rating
- Visual
- 1
- 2
- 3
- 4
- None Found
Forked duckweed
(Lemna trisulca)

Macrophyte Point Intercept Survey
Normandale Lake
Nine Mile Creek Watershed District
Hennepin County, MN
August 13, 2018

Rake Fullness Rating

- Visual
- 1
- 2
- 3
- 4
- None Found
Rake Fullness Rating

- Visual
- 1
- 2
- 3
- 4
- None Found

Small pondweed (Potamogeton pusillus)
Macrophyte Point Intercept Survey
Normandale Lake
Nine Mile Creek Watershed District
Hennepin County, MN
August 13, 2018
Rake Fullness Rating

- Visual
- 1
- 2
- 3
- 4
- None Found

Narrow-leaved cattail (Typha angustifolia)

Macrophyte Point Intercept Survey
Normandale Lake
Nine Mile Creek Watershed District
Hennepin County, MN
August 13, 2016
Common watermeal (Wolffia columbiana)
Macrophyte Point Intercept Survey
Normandale Lake
Nine Mile Creek Watershed District
Hennepin County, MN
August 13, 2018

Rake Fullness Rating

- Visual
- 1
- 2
- 3
- 4
- None Found

Feet
0 350 700