



There was concern about the condition of our lake and talk of Blue-green algae. We paid for another set of testing to be conducted at 4 locations around our lake. I have attached a picture of these locations which are numbered 1 through 4, as 4 samples were taken and the results are attached. There were blue-green algae cells present on the west side of the lake but please be aware the numbers of cells are not at a level of harm. The number that would require immediate action is around 100,000 and the highest number we received back was 6,000. This number is in sample #1. Also notable in this sample was a very low PH number of 5.5 which is acidic where all the other numbers are more natural at 8, 8.2 and 8.3 and lead us to believe the test was inaccurate at that location, since the body of waters PH level will most likely remain the same throughout the lake. We tested the PH level at the same point as soon as we received this report and found the PH at the same location to be 8.4 which is right in line with the rest of the body of water.

Note: even though the cell counts are too low to be harmful, we are treating the area to kill the blue-green algae. The other item to notice is DO level which is Dissolved Oxygen for fish anything over 5 is suitable for fish and our DO looks good as usual. Page 9 of the report show the explanation of the items measured.



Spring Valley
Lake Country Club

REPUBLIC

ASSOCIATION
OFFICE

3

1

2

4

Google

Country Club Dr

Country Club Dr

Country Club Dr

Duffwood Dr

Yates Rd

SeSCRIPT Analysis Report: *Spring Valley Lake*

Company: Aquatechnex

Address: P.O. Box 30824, Bellingham, WA 98228

Contact Person: Cody Appling

Phone: 760-636-8267

Email: cody@aquatechnex.com

Project Name: Spring Valley Lake

Surface Area:

Average depth: 12 feet

Date Sample Received: 8/9/17

SeSCRIPT Analysis Performed: Algae and Water
Quality Baseline Plus Bundle

Algae ID Results Spring Valley Lake

| Identification | Classification | Description | Density/ Biomass |
|--|---------------------------------|---|------------------|
| Finger 1 | | | |
| <i>Aphanocapsa</i> sp. (much present) | Cyanophyta- Blue-green algae | Colonial, planktonic, scum forming, potential toxin producer | 6,000 |
| <i>Pediastrum</i> sp. (much present) | Chlorophyta- Green algae | Colonial, planktonic | 1,600 |
| <i>Synedra</i> sp. (some present) | Bacillariophyta- Diatoms | Single-celled, planktonic | 800 |

Other algae in the sample, at densities below 40 cells/mL, include: *Euglena* (Euglenophyta); *Oocystis*, *Crucigenia*, *Scenedesmus*, *Tetraedon* (Chlorophyta); *Chaetoceros*, *Fragilaria* (Bacillariophyta)

Algae ID Results Spring Valley Lake

| Identification | Classification | Description | Density/ Biomass |
|--|---------------------------------|---|------------------|
| Finger 2 | | | |
| <i>Microcystis</i> sp. (much present) | Cyanophyta- Blue-green algae | Colonial, scum former, potential toxin producer | 1,800 |
| <i>Aphanocapsa</i> sp. (much present) | Cyanophyta- Blue-green algae | Colonial, planktonic, scum forming, potential toxin producer | 1,440 |
| <i>Synedra</i> sp. (some present) | Bacillariophyta- Diatoms | Single-celled, planktonic | 600 |

Other algae in the sample, at densities below 40 cells/mL, include: *Cosmarium* (Streptophyta); *Trachelomonas* (Euglenophyta); *Pediastrum*, *Tetraedon*, *Closteriopsis*, *Tetraselmis*, *Oocystis*, *Ankistrodesmus* (Chlorophyta); *Planktothrix* (Cyanophyta); *Chaetoceros*, *Asterionella* (Bacillariophyta); *Gymnodinium* (Dinophyta)

Algae ID Results Spring Valley Lake

| Identification | Classification | Description | Density/ Biomass |
|---|-----------------------------|------------------------------|------------------|
| Finger 3 | | | |
| <i>Pediastrum</i> sp. (much present) | Chlorophyta- Green algae | Colonial, planktonic | 1,760 |
| <i>Synedra</i> sp. (much present) | Bacillariophyta- Diatoms | Single-celled, planktonic | 1,120 |

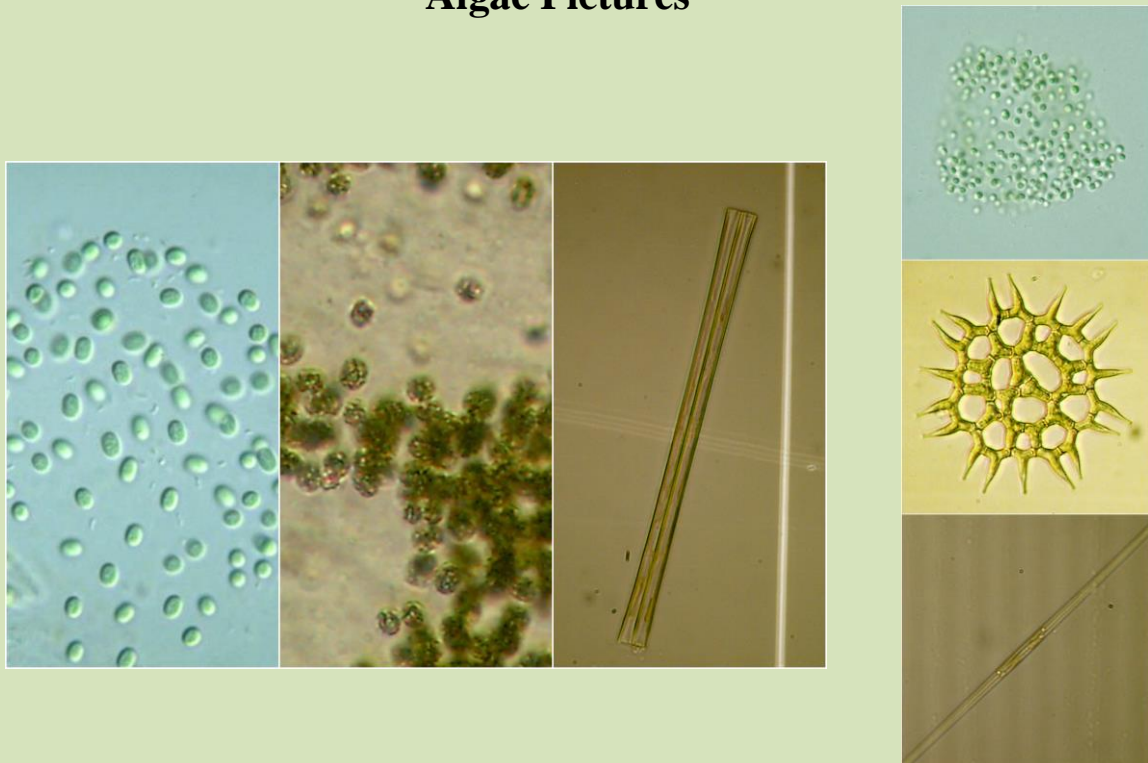
Other algae in the sample, at densities below 40 cells/mL, include: *Cosmarium* (Streptophyta); *Coelastrum*, *Scenedesmus*, *Oocystis*, *Tetraedon*, *Tetraselmis* (Chlorophyta); *Aphanocapsa* (Cyanophyta); *Aulacoseira*, *Navicula* (Bacillariophyta)

Algae ID Results Spring Valley Lake

| Identification | Classification | Description | Density/ Biomass |
|---|-----------------------------|------------------------------|------------------|
| Finger 4 | | | |
| <i>Pediastrum</i> sp. (much present) | Chlorophyta- Green algae | Colonial, planktonic | 1,000 |
| <i>Synedra</i> sp. (some present) | Bacillariophyta- Diatoms | Single-celled, planktonic | 364 |

Other algae in the sample, at densities below 40 cells/mL, include: *Cosmarium* (Streptophyta); *Coelastrum*, *Tetraedon*, *Tetraselmis*, *Closteriopsis*, *Monoraphidium* (Chlorophyta); *Aphanocapsa*, *Microcystis*, *Oscillatoria* (Cyanophyta); *Aulacoseira*, *Cyclotella*, *Chaetoceros* (Bacillariophyta)

Algae Pictures



Water Quality Results Spring Valley Lake

| Analysis | Measurement | Description |
|--|-------------|----------------------------|
| Finger 1 | | |
| pH (SU) | 5.5 | Notably acidic |
| Dissolved Oxygen (mg/L) | 8.5 | Acceptable for fish |
| Conductivity ($\mu\text{S}/\text{cm}$) | 388 | Acceptable for freshwaters |
| Alkalinity (mg/L as CaCO_3) | < 10 | Low buffered |
| Hardness (mg/L as CaCO_3) | 82.6 | Moderately hard |
| Turbidity (NTU) | 19.5 | Moderate |

Nutrient Results Spring Valley Lake

| Analysis | Measurement | Description |
|---|-------------|------------------------|
| Finger 1 | | |
| Total Phosphorus ($\mu\text{g}/\text{L}$) | 38.8 | High amount: eutrophic |
| Free Reactive Phosphorus ($\mu\text{g}/\text{L}$) | 28 | High amount |
| Nitrates & Nitrites (mg/L) | < 0.02 | Relatively low |
| Chlorophyll <i>a</i> ($\mu\text{g}/\text{L}$) | < 10 | Relatively low |

Water Quality Results Spring Valley Lake

| Analysis | Measurement | Description |
|--|-------------|----------------------------|
| Finger 2 | | |
| pH (SU) | 8 | Near neutral |
| Dissolved Oxygen (mg/L) | 8 | Acceptable for fish |
| Conductivity ($\mu\text{S}/\text{cm}$) | 340 | Acceptable for freshwaters |
| Alkalinity (mg/L as CaCO_3) | 96.5 | Moderately buffered |
| Hardness (mg/L as CaCO_3) | 82.1 | Moderately hard |
| Turbidity (NTU) | 22.6 | Moderate |

Nutrient Results Spring Valley Lake

| Analysis | Measurement | Description |
|---|-------------|------------------------|
| Finger 2 | | |
| Total Phosphorus ($\mu\text{g}/\text{L}$) | 56.4 | High amount: eutrophic |
| Free Reactive Phosphorus ($\mu\text{g}/\text{L}$) | 38 | High amount |
| Nitrates & Nitrites (mg/L) | < 0.02 | Relatively low |
| Chlorophyll <i>a</i> ($\mu\text{g}/\text{L}$) | < 10 | Relatively low |

Water Quality Results Spring Valley Lake

| Analysis | Measurement | Description |
|--|-------------|----------------------------|
| Finger 3 | | |
| pH (SU) | 8.2 | Near neutral |
| Dissolved Oxygen (mg/L) | 8 | Acceptable for fish |
| Conductivity ($\mu\text{S}/\text{cm}$) | 368 | Acceptable for freshwaters |
| Alkalinity (mg/L as CaCO_3) | 96.9 | Moderately buffered |
| Hardness (mg/L as CaCO_3) | 80.8 | Moderately hard |
| Turbidity (NTU) | 17.2 | Moderate |

Nutrient Results Spring Valley Lake

| Analysis | Measurement | Description |
|---|-------------|------------------------|
| Finger 3 | | |
| Total Phosphorus ($\mu\text{g}/\text{L}$) | 63.7 | High amount: eutrophic |
| Free Reactive Phosphorus ($\mu\text{g}/\text{L}$) | 30 | High amount |
| Nitrates & Nitrites (mg/L) | < 0.02 | Relatively low |
| Chlorophyll <i>a</i> ($\mu\text{g}/\text{L}$) | < 10 | Relatively low |

Water Quality Results Spring Valley Lake

| Analysis | Measurement | Description |
|--|-------------|----------------------------|
| Finger 4 | | |
| pH (SU) | 8.3 | Near neutral |
| Dissolved Oxygen (mg/L) | 7.6 | Acceptable for fish |
| Conductivity ($\mu\text{S}/\text{cm}$) | 336 | Acceptable for freshwaters |
| Alkalinity (mg/L as CaCO_3) | 96 | Moderately buffered |
| Hardness (mg/L as CaCO_3) | 81.9 | Moderately hard |
| Turbidity (NTU) | 19.5 | Moderate |

Nutrient Results Spring Valley Lake

| Analysis | Measurement | Description |
|---|-------------|------------------------|
| Finger 4 | | |
| Total Phosphorus ($\mu\text{g}/\text{L}$) | 45.8 | High amount: eutrophic |
| Free Reactive Phosphorus ($\mu\text{g}/\text{L}$) | 34 | High amount |
| Nitrates & Nitrites (mg/L) | 0.1 | Moderate |
| Chlorophyll <i>a</i> ($\mu\text{g}/\text{L}$) | < 10 | Relatively low |

SeSCRIPT Discussion

The algae and water samples collected from **Spring Valley Lake** were received on 8/9/17. Based on results from the water quality and algae analyses, proposed treatment recommendations for control of the problematic algae and nutrient management in **Spring Valley Lake** were determined (see below).

Follow all product label instructions. Check with the appropriate local and state agencies for product restrictions and permit regulations prior to use.

SeSCRIPT Treatment Guidance

Spring Valley Lake

ALGAE MANAGEMENT

In order to control the targeted algae at this site, apply:

Captain algaecide at a rate range of 0.6 to 1.2 gallons/acre foot (0.2 to 0.4 mg Cu/L).

Contact your SePRO Aquatic Specialist for further guidance on final application rate selection, technique and frequency based on project objectives, site conditions, algae location and density at treatment time.

PHOSPHORUS MANAGEMENT

Analysis of the water quality parameters in this pond revealed this system is **hypereutrophic**.

Based on these site specific water parameters, consider implementing one of the following Phoslock phosphorus removal solutions to restore water quality in your water body.

Recovery Solution: Improve water quality by incorporating strategic applications of Phoslock to remove free reactive phosphorus from the water column. Integrate with SePRO algaecide applications as needed to control algae and achieve desired water quality objectives.

Reset Solution: A more comprehensive solution to water quality restoration. Reset the ecological clock and restore water quality in your pond by implementing a Reset application strategy customized by water body. This Phoslock solution targets and permanently removes free reactive phosphorus in the water column and accumulated in water body sediments over time.

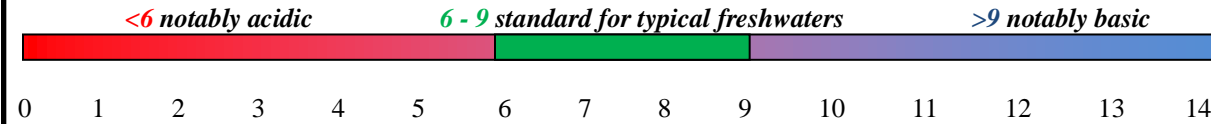
Contact your SePRO Aquatic Specialist for additional guidance on development of a custom Phoslock prescription based on site conditions and water quality management objectives.

Mike Pearce, SePRO Technical Sales Specialist, Pacific Northwest
Phone: 208-755-7930 Email: mpearce@sepro.com

Water Quality Analysis Explanation

These water quality parameters are essential to document the condition of a water body and design custom treatment prescriptions to achieve desired management objectives.

pH: Measure of how acidic or basic the water is (pH 7 is considered neutral).



Hardness: Measure of the concentration of divalent cations, primarily consisting of calcium and magnesium in typical freshwaters. *0-60 mg/L as CaCO₃ soft; 61-120 moderately hard; 121-180 hard; > 181 very hard*

Alkalinity- Measure of the buffering capacity of water, primarily consisting of carbonate, bicarbonate and hydroxide in typical freshwaters. Waters with lower levels are more susceptible to pH shifts.
≤ 50 mg/L as CaCO₃ low buffered; 51-100 moderately buffered; 101-200 buffered; > 200 high buffered

Conductivity- Measure of the waters ability to transfer an electrical current, increases with more dissolved ions.
< 50 uS/cm relatively low concentration may not provide sufficient dissolved ions for ecosystem health; 50-1500 typical freshwaters; > 1500 may be stressful to some freshwater organisms, though not uncommon in many areas

Dissolved Oxygen- amount of diatomic oxygen dissolved in the water.
< 2 mg/L likely toxicity with sufficient exposure duration; < 5 stressful to many aquatic organisms; ≥ 5 able to support most fish and invertebrates

Phosphorus: Essential nutrient often correlating to growth of algae in freshwaters.

Total Phosphorus (TP) is the measure of all phosphorus in a sample as measured by persulfate strong digestion and includes: inorganic, oxidizable organic and polyphosphates. This includes what is readily available, potential to become available and stable forms.
<12 µg/L oligotrophic; 12-24 µg/L mesotrophic; 25-96 µg/L eutrophic; > 96 µg/L hypereutrophic

Free Reactive Phosphorus (FRP) is the measure of inorganic dissolved reactive phosphorus (PO₄⁻³, HPO₄⁻², etc). This form is readily available in the water column for algae growth.

Nitrogen: Essential nutrient that can enhance growth of algae.

Total N is all nitrogen in the sample (organic N⁺ and Ammonia) determined by the sum of the measurements for Total Kjeldahl Nitrogen (TKN) and ionic forms.

Nitrites and Nitrates are the sum of total oxidized nitrogen, often readily free for algae uptake.
< 1 mg/L typical freshwater; 1-10 potentially harmful; >10 possible toxicity, above many regulated guidelines

Chlorophyll a: primary light-harvesting pigment found in algae and a measure of the algal productivity and water quality in a system.
0-2.6µg/L oligotrophic; 2.7-20 µg/L mesotrophic; 21-56 µg/L eutrophic; > 56 µg/L hypereutrophic

Turbidity- Measurement of water clarity. Suspended particulates (algae, clay, silt, dead organic matter) are the common constituents impacting turbidity.
< 10 NTU drinking water standards and typical trout waters; 10-50 NTU moderate; > 50 NTU potential impact to aquatic life.