***Note: Methodology, explanation of analysis and biological background on Sturgeon Lake studies are contained within the Manitowish Waters Chain of Lakes-wide Management Plan document.***

## 8.12 Sturgeon Lake

### *An Introduction to Sturgeon Lake*

Sturgeon Lake, Vilas County, is a deep lowland drainage lake with a maximum depth of 18 feet, a mean depth of 5 feet, and a surface area of approximately 32 acres. Sturgeon Lake is considered to be mesotrophic and its watershed encompasses approximately 147,704 acres. In 2017, 41 native aquatic plant species were found in the lake, of which slender naiad (*Najas flexilis*) is the most common. No non-native plants were found during surveys.

**Field Survey Notes**

*Abundant natural shoreline primarily sandy and rocky substrate observed during the 2017 surveys. Vasey's pondweed was located on a few point-intercept locations.*

**Photo 8.12. Sturgeon Lake, Vilas County**

**Lake at a Glance* – Sturgeon Lake**

| | |
|---|---|
| **Morphology** | |
| Acreage | 32 |
| Maximum Depth (ft) | 18 |
| Mean Depth (ft) | 5 |
| Volume (acre-feet) | 151 |
| Shoreline Complexity | 2.8 |
| **Vegetation** | |
| Curly-leaf Survey Date | June 28, 2017 |
| Comprehensive Survey Date | August 1, 2017 |
| Number of Native Species | 41 |
| Threatened/Special Concern Species | Vasey's pondweed |
| Exotic Plant Species | - |
| Simpson's Diversity | 0.89 |
| Average Conservatism | 6.4 |
| **Water Quality** | |
| Wisconsin Lake Classification | Deep, Lowland Drainage |
| Trophic State | Mesotrophic |
| Limiting Nutrient | Phosphorus |
| Watershed to Lake Area Ratio | 4,631:1 |

**These parameters/surveys are discussed within the Chain-wide portion of the management plan.*

## 8.12.1 Sturgeon Lake Water Quality

Water quality data was collected from Sturgeon Lake on three occasions in 2017. Onterra staff sampled the lake for a variety of water quality parameters including total phosphorus, chlorophyll-*a*, Secchi disk clarity, temperature, and dissolved oxygen. Please note that the data in these graphs represent concentrations and depths taken during the growing season (April-October), summer months (June-August) or winter (February-March) as indicated with each dataset. Furthermore, unless otherwise noted the phosphorus and chlorophyll-*a* data represent only surface samples. No historical data exists for total phosphorus, chlorophyll-*a*, or water clarity.

Sturgeon Lake is located on the Manitowish River downstream of the Rest Lake Dam. As such, it is more like a river than a natural lake. Because of the very short hydrologic residence time, water quality likely reflects concentrations in the river.

In 2017, average summer phosphorus concentrations (19.0 µg/L) were lower than the median value (23.0 µg/L) for other deep lowland drainage lakes in the state and the median value (21.0 µg/L) for other lakes within the Northern Lakes and Forests ecoregion (Figure 8.12.1-1). The 2017 average summer phosphorus concentration falls in the *excellent* category for shallow lowland drainage lakes in the state.

In 2017, the average summer chlorophyll-*a* concentration (5.1 µg/L) was lower than the median value (7.0 µg/L) for other lakes of this type (Figure 8.12.1-2). This value is relatively similar to the median value (5.6 µg/L) for other lakes within the Northern Lakes and Forests ecoregion. The 2017 average summer chlorophyll-*a* concentration falls in the *excellent* category for shallow lowland drainage lakes in the state.

Both of these parameters, total phosphorus and chlorophyll-*a*, rank within a TSI category of *excellent*, indicating the lake has enough nutrients for production of aquatic plants, algae, and other organisms but not so much that a water quality issue is present.

The clarity of Sturgeon Lake's water can be described as *good* during the summer months in which data has been collected (Figure 8.12.1-3). The 2017 average summer Secchi disk depth (7.8 feet) is slightly lower than the median value for other deep lowland drainage lakes in the state (8.5 feet) and the regional median (8.9 feet). Secchi disk clarity is influenced by many factors, including plankton production and suspended sediments, which themselves vary due to several environmental conditions such as precipitation, sunlight, and nutrient availability. In many lakes in the Manitowish Waters Chain of Lakes, a natural staining of the water plays a role in light penetration, and thus water clarity, as well. The waters of Sturgeon Lake may contain naturally occurring organic acids that are washed into the lake from nearby wetlands. The acids are not harmful to humans or aquatic species; they are by-products of decomposing terrestrial and wetland plant species. This natural staining may reduce light penetration into the water column, which reduces visibility and also reduces the growing depth of aquatic vegetation within the lake. *True color* measures the dissolved organic materials in water; however, true color was not measured in Sturgeon Lake and it is unknown if the lake's water clarity is primarily influenced by staining from organic acids.

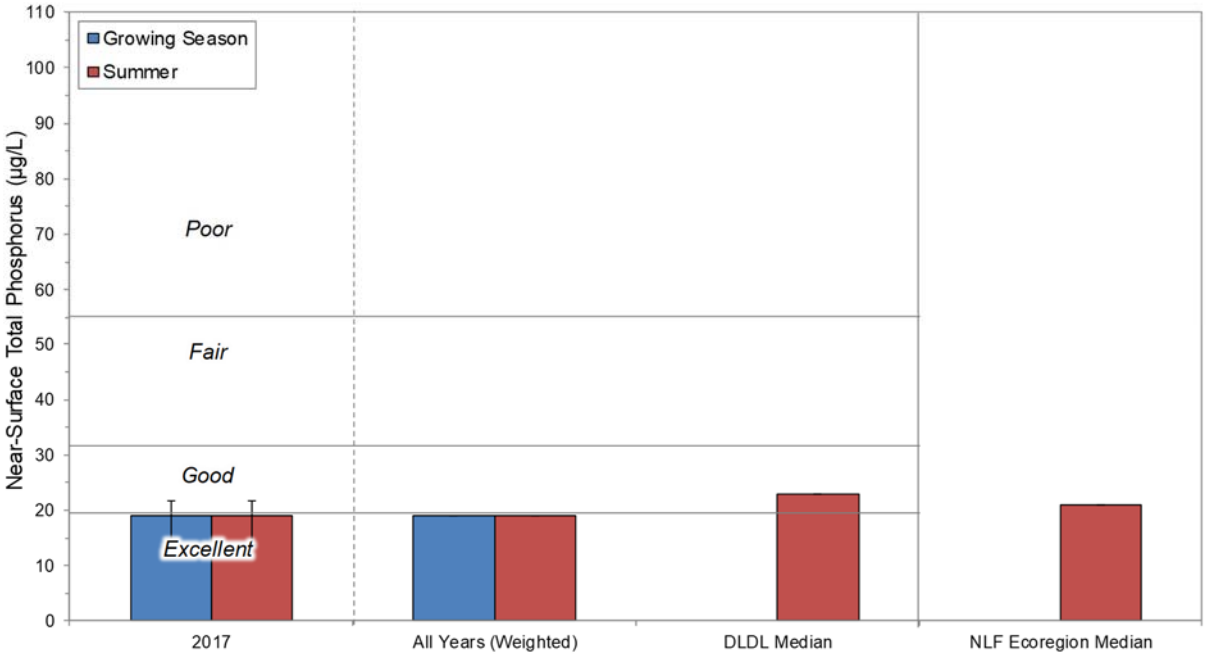


**Figure 8.12.1-1. Sturgeon Lake, state-wide deep lowland drainage lakes, and regional total phosphorus concentrations.** Mean values calculated with summer month surface sample data. Water Quality Index values adapted from WDNR PUB WT-913.

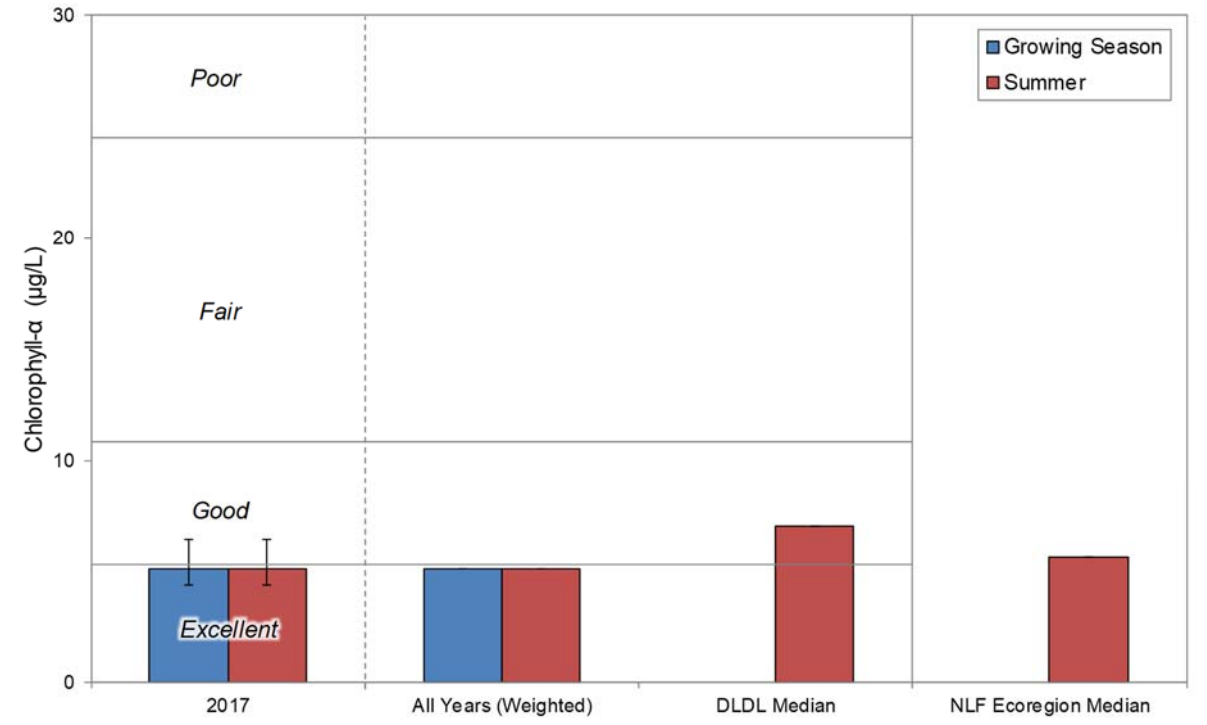


**Figure 8.12.1-2. Sturgeon Lake, state-wide deep lowland drainage lakes, and regional chlorophyll-*a* concentrations.** Mean values calculated with summer month surface sample data. Water Quality Index values adapted from WDNR PUB WT-913.

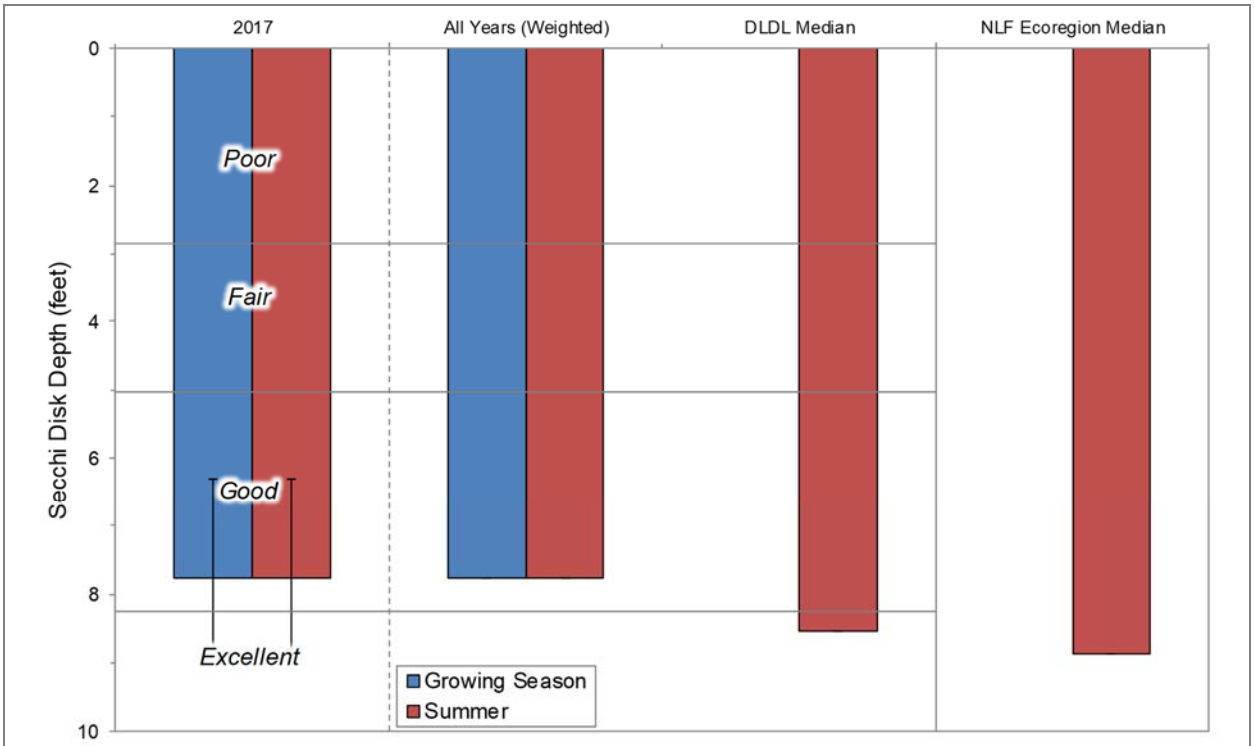


**Figure. 8.12.1-3. Sturgeon Lake, state-wide deep lowland drainage lakes, and regional Secchi disk clarity values.** Mean values calculated with summer month surface sample data. Water Quality Index values adapted from WDNR PUB WT-913.

## Sturgeon Lake Trophic State

The TSI values calculated with Secchi disk, chlorophyll-*a*, and total phosphorus values are displayed in Figure 8.12.1-4. In general, the best values to use in judging a lake's trophic state are the biological parameters; therefore, relying primarily on total phosphorus and chlorophyll-*a* TSI values, it can be concluded that Sturgeon Lake is in a mesotrophic state.

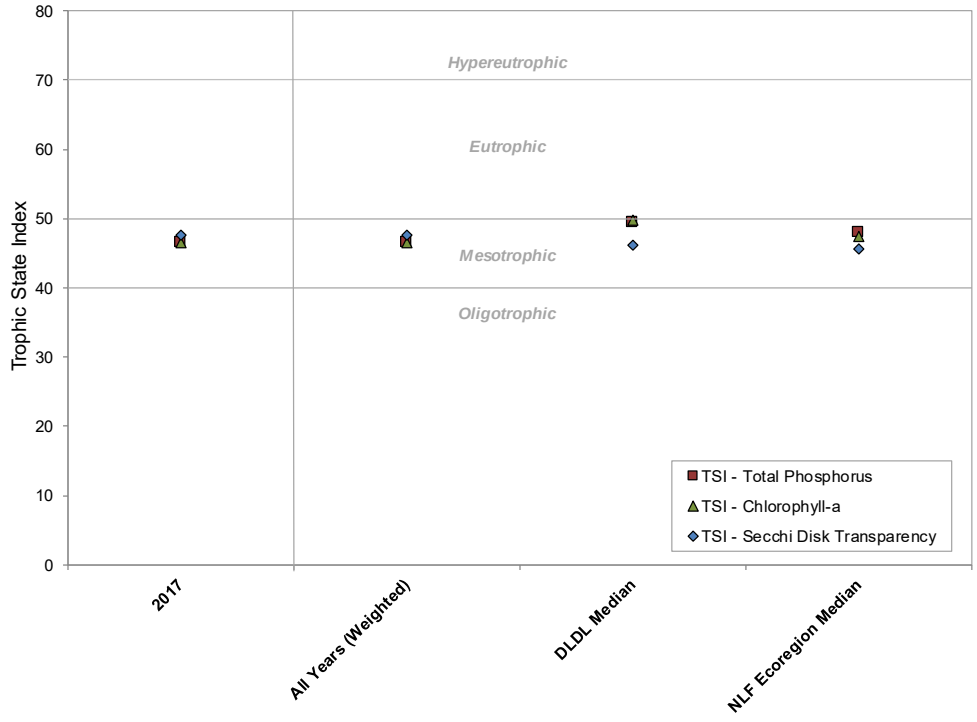


**Figure 8.12.1-4. Sturgeon Lake, state-wide deep lowland drainage lakes, and regional Trophic State Index values.** Values calculated with summer month surface sample data using WDNR PUB-WT-193.

**Dissolved Oxygen and Temperature in Sturgeon Lake**

Dissolved oxygen and temperature profiles were created during each water quality sampling trip made to Sturgeon Lake by Onterra staff. Graphs of those data are displayed in Figure 8.12.1-5 for all sampling events.

The temperature and dissolved oxygen data collected in 2017 show that Sturgeon Lake's temperature and dissolved oxygen were fairly uniform throughout the water column during every sampling event, an indication that the lake was not thermally stratified (Figure 8.12.1-5). However, it should be noted that Sturgeon Lake was not sampled in the deepest part of the lake, and it is uncertain if the lake stratified during the summer in 2017. Sturgeon Lake is deep with a small surface area, and thus is classified as an intermediate lake based on the Osgood Index. The Osgood Index predicts the probability that a lake will remain stratified during the summer, and uses an equation that relates the lake's mean depth to its surface area (equation below). Lakes with an Osgood Index of less than 4.0 are deemed polymictic, and given Sturgeon Lake's surface area relative to its depth, it has an Osgood Index of 4.4. This Osgood Index value indicates that while Sturgeon Lake may thermally stratify during the summer, it may also mix during the summer.

$$Sturgeon\ Lake\ Osgood\ Index\ (4.4) = \frac{Sturgeon\ Lake\ Mean\ Depth\ (1.5\ m)}{\sqrt{Sturgeon\ Lake\ Area\ (0.12\ km^2)}}$$

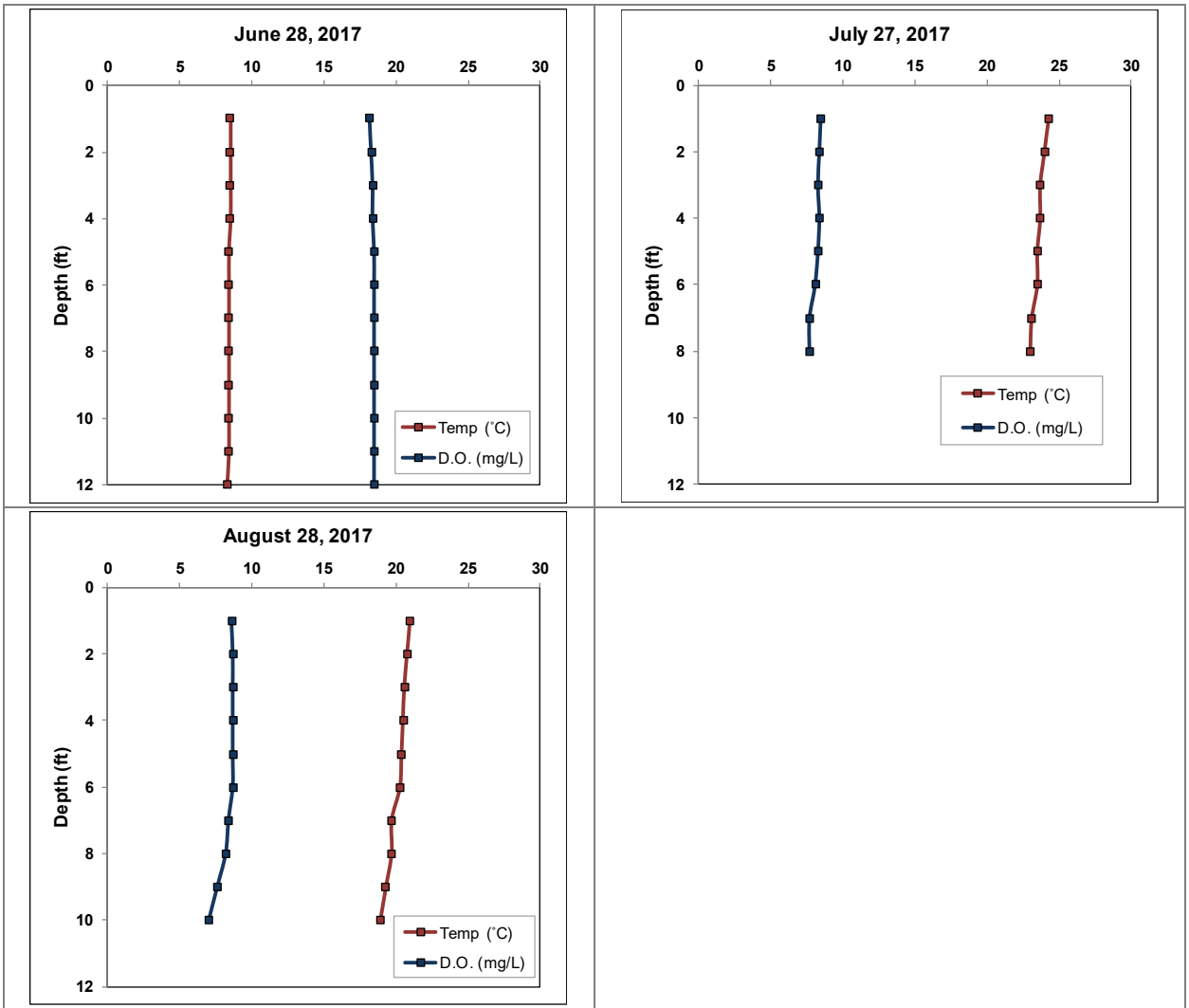


**Figure 8.12.1-5. Sturgeon Lake dissolved oxygen and temperature profiles.**

## Additional Water Quality Data Collected at Sturgeon Lake

The water quality section is centered on lake eutrophication. However, parameters other than water clarity, nutrients, and chlorophyll-*a* were collected as part of the project. These other parameters were collected to increase the understanding of Sturgeon Lake's water quality and are recommended as a part of the WDNR long-term lake trends monitoring protocol. These parameters include; pH, alkalinity, and calcium.

As the Chain-wide Water Quality Section explains, the pH scale ranges from 0 to 14 and indicates the concentration of hydrogen ions ($H^+$) within the lake's water and is thus an index of the lake's acidity. Sturgeon Lake's surface water pH was measured at roughly 7.8 July of 2017. This value is slightly above neutral and falls within the normal range for Wisconsin lakes. Fluctuations in pH with respect to seasonality is common; in-lake processes such as photosynthesis by plants act to reduce acidity by carbon dioxide removal while decomposition of organic matter adds carbon dioxide to water, thereby increasing acidity.

A lake's pH is primarily determined by the amount of alkalinity that is held within the water. Alkalinity is a lake's capacity to resist fluctuations in pH by neutralizing or buffering against inputs such as acid rain. Lakes with low alkalinity have higher amounts of the bicarbonate compound ($HCO_3^-$) while lakes with a higher alkalinity have more of the carbonate compound of alkalinity ($CO_3^=$). The carbonate form is better at buffering acidity, so lakes with higher alkalinity are less sensitive to acid rain than those with lower alkalinity. The alkalinity in Sturgeon Lake was measured at 38.8 in July of 2017 and indicates that the lake has a substantial capacity to resist fluctuations in pH and has a low sensitivity to acid rain.

While samples of calcium were not collected from Sturgeon Lake in 2017, calcium is commonly examined because invasive and native mussels use the element for shell building and in reproduction. Invasive mussels typically require higher calcium concentrations than native mussels. The commonly accepted pH range for zebra mussels is 7.0 to 9.0, so Sturgeon Lake's pH of 7.8 falls within this range. Lakes with calcium concentrations of less than 12 mg/L are considered to have very low susceptibility to zebra mussel establishment. Plankton tows were completed by Onterra staff during the summer of 2017 and these samples were processed by the WDNR for larval zebra mussels. No veligers (larval zebra mussels) were found within these samples.

## 8.12.2 Sturgeon Lake Watershed Assessment

Sturgeon Lake's watershed is 147,704 acres in size. Compared to Sturgeon Lake's size of 32 acres, this makes for an incredibly large watershed to lake area ratio of 4631:1. Similar to most lakes that are downstream of other lakes, the large majority of the lake's watershed consists of the lake immediately upstream. For Sturgeon Lake this means that 146,640 acres (98%) of Sturgeon Lake's watershed is the Vance Lake subwatershed. The direct watershed of Sturgeon Lake is a very small part of the lake's total watershed (Figure 8.12.2-1). Wisconsin Lakes Modeling Suite (WiLMS) modeling indicates that Sturgeon Lake's residence time is approximately one third of a day, or that the water within the lake is completely replaced 1050 times per year.

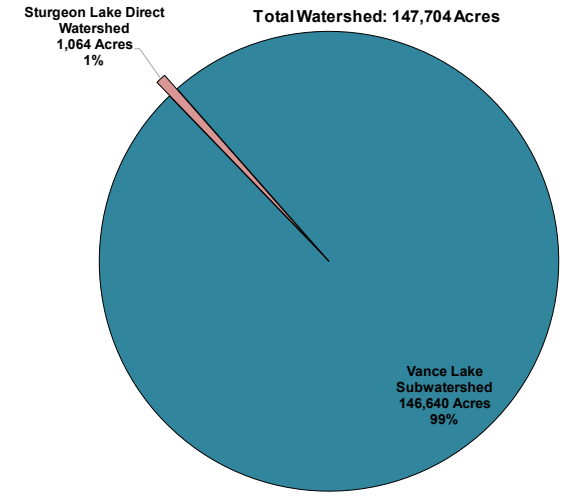


**Figure 8.12.2-1. Sturgeon Lake watershed proportion of land cover types.** Based upon National Land Cover Database (NLCD – Fry et. al 2011).

Of the estimated 7,201 pounds of phosphorus being delivered to Sturgeon Lake on an annual basis, nearly all of it originates from Sturgeon Lake which is the lake immediately upstream of Sturgeon Lake (Figure 8.12.2-2). Using the estimated annual potential phosphorus load, WiLMS predicted an in-lake growing season average total phosphorus concentration of 16 µg/L, which is similar to the measured growing season average total phosphorus concentration of 19 µg/L. This means the model works reasonably well for Sturgeon Lake and that there are no significant, unaccounted sources of phosphorus entering the lake.

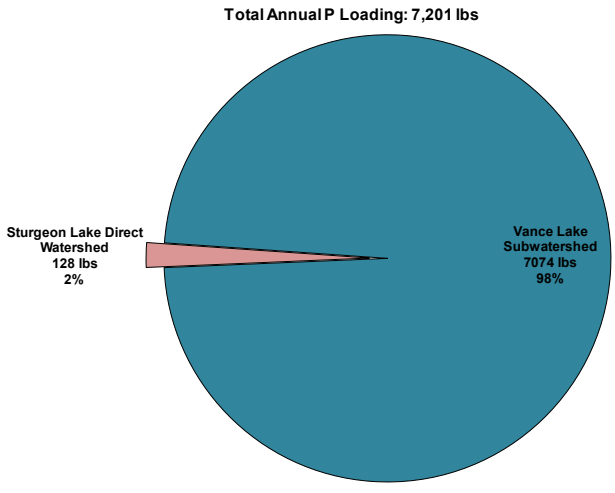


**Figure 8.12.2-2. Sturgeon Lake estimated potential annual phosphorus loading.** Based upon Wisconsin Lake Modeling Suite (WiLMS) estimates.

Because the nearly all of the phosphorus that enters Sturgeon Lake comes from the upstream Vance Lake, efforts to reduce phosphorus levels in Sturgeon Lake should concentrate on reducing phosphorus inputs to Vance Lake.

## 8.12.3 Sturgeon Lake Shoreland Condition

### Shoreland Development

As mentioned previously in the Chain-wide Shoreland Condition Section, one of the most sensitive areas of the watershed is the immediate shoreland area. This area of land is the last source of protection for a lake against surface water runoff, and is also a critical area for wildlife habitat. In fall of 2017, Sturgeon Lake's immediate shoreline was assessed in terms of its development. Sturgeon Lake has stretches of shoreland that fit four of the five shoreland assessment categories. In all, 1.2 miles of natural/undeveloped and developed-natural shoreline were observed during the survey (Figure 8.12.3-1). This constitutes about 97.9% of Sturgeon Lake's shoreline. These shoreland types provide the most benefit to the lake and should be left in their natural state if at all possible. During the survey, less than one tenth of a mile of developed–unnatural shoreline (0.3%) was observed. If restoration of the Sturgeon Lake shoreline is to occur, primary focus should be placed on these shoreland areas as they currently provide little benefit to, and actually may harm, the lake ecosystem. Sturgeon Lake Map 1 displays the location of these shoreline lengths around the entire lake.

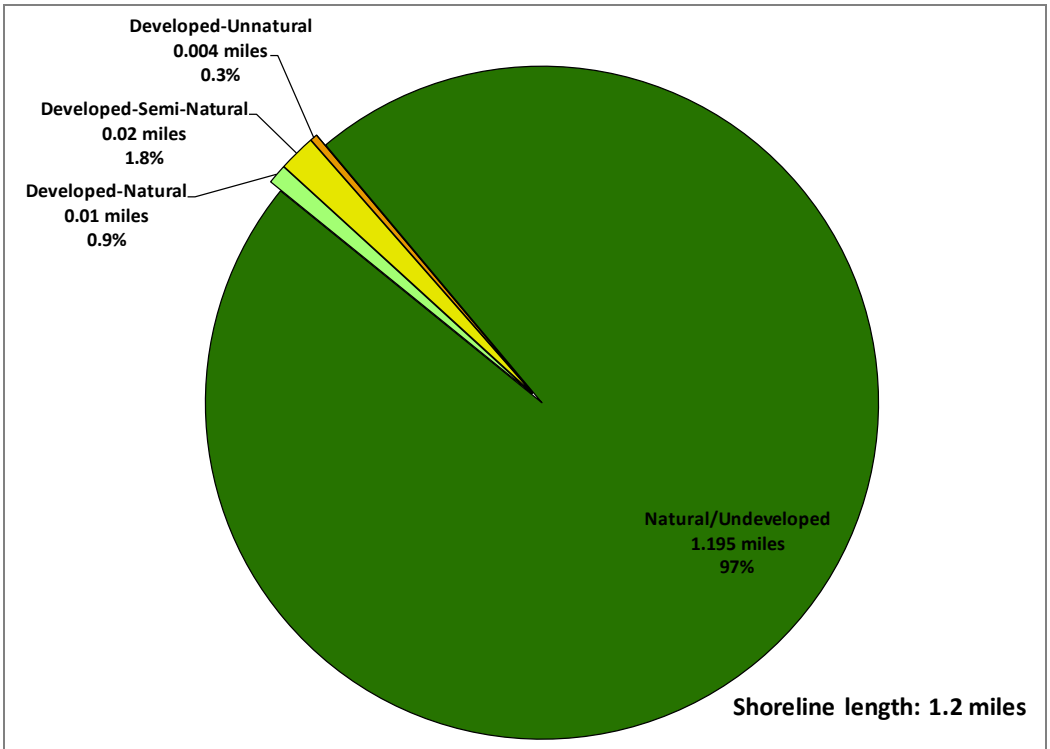


**Figure 8.12.3-1. Sturgeon Lake shoreland categories and total lengths.** Based upon a fall 2017 survey. Locations of these categorized shorelands can be found on Sturgeon Lake Map 1.

### Coarse Woody Habitat

As part of the shoreland condition assessment, Sturgeon Lake was also surveyed to determine the extent of its coarse woody habitat. Coarse woody habitat was identified, and classified in three size categories (2-8 inches in diameter, 8+ inches in diameter, or clusters of pieces) as well as four branching categories: no branches, minimal branches, moderate branches, and full canopy. As discussed earlier, research indicates that fish species prefer some branching as opposed to no

branching on coarse woody habitat, and increasing complexity is positively correlated with higher fish species richness, diversity and abundance (Newbrey et al. 2005).

During this survey, 34 total pieces of coarse woody habitat were observed along 1.2 miles of shoreline (Sturgeon Lake Map 2), which gives Sturgeon Lake a coarse woody habitat to shoreline mile ratio of 28:1 (Figure 3.3-3). Only instances where emergent coarse woody habitat extended from shore into the water were recorded during the survey. Thirty pieces of 2-8 inches in diameter pieces of coarse woody habitat were found, four pieces of 8+ inches in diameter pieces of coarse woody habitat were found, and no instances of clusters of coarse woody habitat were found.

To put this into perspective, Wisconsin researchers have found that in completely undeveloped lakes, an average of 345 coarse woody habitat structures may be found per mile (Christensen et al. 1996). Please note the methodologies between the surveys done on Sturgeon Lake and those cited in this literature comparison are much different, but still provide a valuable insight into what undisturbed shorelines may have in terms of coarse woody habitat.

Onterra has completed coarse woody habitat surveys on 98 lakes throughout Wisconsin since 2012, with the majority occurring in the NLF ecoregion on lakes with public access. The number of coarse woody habitat pieces per shoreline mile in Sturgeon Lake falls just above above the median of these 98 lakes (Figure 3.3-3).

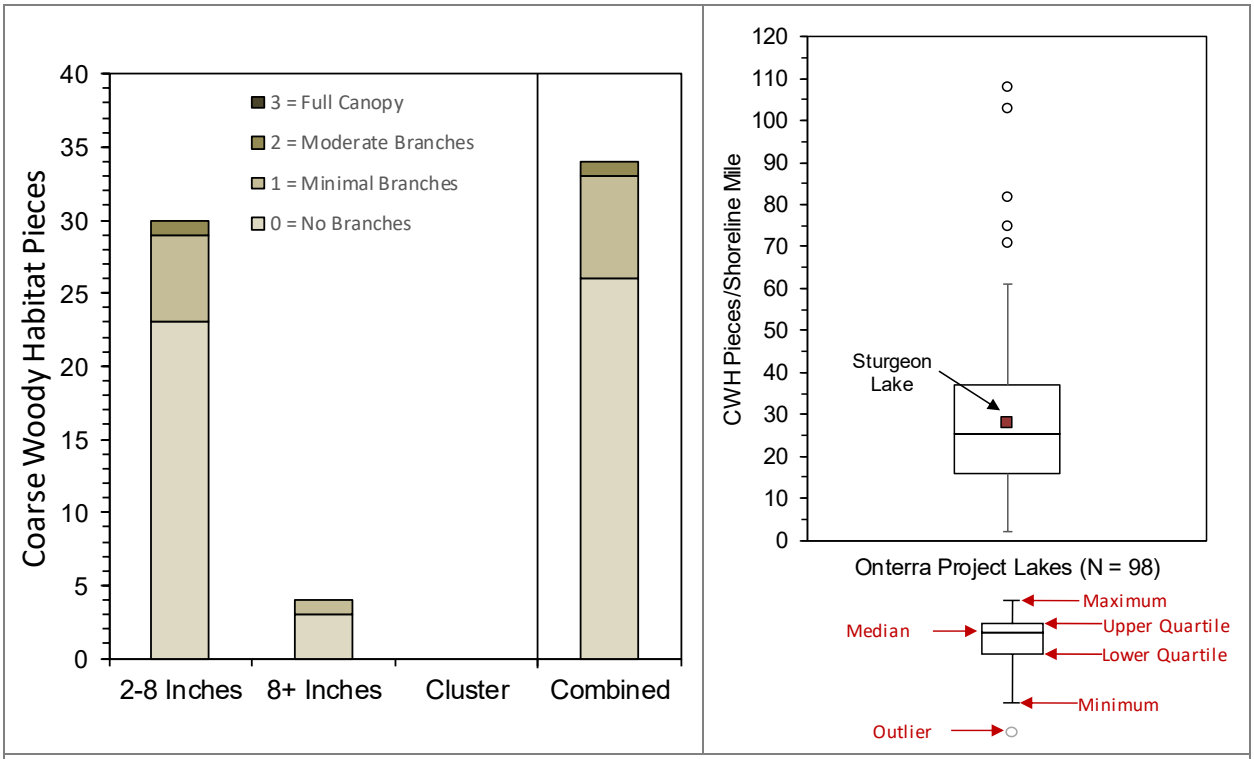


**Figure 8.12.3-2. Sturgeon Lake coarse woody habitat survey results.** Based upon a fall 2017 survey. Locations of the Sturgeon Lake coarse woody habitat can be found on Sturgeon Lake Map 2.

## 8.12.4 Sturgeon Lake Aquatic Vegetation

An early season aquatic invasive species survey was conducted on Sturgeon Lake on June 28, 2017. While the intent of this survey is to locate any potential non-native species within the lake, the primary focus is to locate occurrences of curly-leaf pondweed which should be at or near its peak growth at this time. During this meander-based survey of the littoral zone, Onterra ecologists did not locate any occurrences of curly-leaf pondweed or any other submersed non-native aquatic plant species in Sturgeon Lake.

The aquatic plant point-intercept survey and floating-leaf and emergent plant community mapping survey were conducted on Sturgeon Lake on August 1, 2017 by Onterra. During all surveys, 41 species of aquatic plants were located in Sturgeon Lake (Table 8.12.4-1). Twenty-five of these species were sampled directly during the point-intercept survey and are used in the analysis that follows, while 16 species were observed incidentally during visits to Sturgeon Lake.

Aquatic plants were found growing to a depth of 10 feet. As discussed later on within this section, many of the plants found in this survey indicate that the overall community is healthy and diverse. Of the 99 point-intercept locations sampled within the littoral zone, roughly 83% contained aquatic vegetation. Sturgeon Lake Map 3 indicates that most of the point-intercept locations that contained aquatic vegetation are located lake-wide. Approximately 69% of the point-intercept sampling locations where sediment data was collected at were sand, 28% consisted of a fine, organic substrate (muck) and 3% were determined to be rocky (Chain-wide Fisheries Section, Table 3.5-5).

**Table 8.12.4-1. Aquatic plant species located in Sturgeon Lake during 2017 plant surveys.**

| Growth Form | Scientific Name | Common Name | Coefficient of Conservatism (C) | 2017 (Onterra) |
|---|---|---|---|---|
| Emergent | *Carex comosa* | Bristly sedge | 5 | I |
| | *Carex utriculata* | Common yellow lake sedge | 7 | I |
| | *Dulichium arundinaceum* | Three-way sedge | 9 | I |
| | *Eleocharis palustris* | Creeping spikerush | 6 | I |
| | *Equisetum fluviatile* | Water horsetail | 7 | I |
| | *Pontederia cordata* | Pickerelweed | 9 | X |
| | *Sagittaria latifolia* | Common arrowhead | 3 | I |
| | *Schoenoplectus acutus* | Hardstem bulrush | 5 | X |
| | *Schoenoplectus tabernaemontani* | Softstem bulrush | 4 | I |
| | *Sparganium eurycarpum* | Common bur-reed | 5 | I |
| | *Typha* spp. | Cattail spp. | 1 | I |
| FL | *Brasenia schreberi* | Watershield | 7 | X |
| | *Nuphar variegata* | Spatterdock | 6 | X |
| | *Nymphaea odorata* | White water lily | 6 | X |
| Submergent | *Bidens beckii* | Water marigold | 8 | X |
| | *Ceratophyllum demersum* | Coontail | 3 | X |
| | *Chara* spp. | Muskgrasses | 7 | X |
| | *Elodea canadensis* | Common waterweed | 3 | X |
| | *Heteranthera dubia* | Water stargrass | 6 | X |
| | *Myriophyllum sibiricum* | Northern watermilfoil | 7 | I |
| | *Najas flexilis* | Slender naiad | 6 | X |
| | *Nitella* spp. | Stoneworts | 7 | X |
| | *Potamogeton epihydrus* | Ribbon-leaf pondweed | 8 | X |
| | *Potamogeton friesii* | Fries' pondweed | 8 | X |
| | *Potamogeton gramineus* | Variable-leaf pondweed | 7 | X |
| | *Potamogeton illinoensis* | Illinois pondweed | 6 | X |
| | *Potamogeton praelongus* | White-stem pondweed | 8 | X |
| | *Potamogeton pusillus* | Small pondweed | 7 | X |
| | *Potamogeton richardsonii* | Clasping-leaf pondweed | 5 | X |
| | *Potamogeton robbinsii* | Fern-leaf pondweed | 8 | I |
| | *Potamogeton spirillus* | Spiral-fruited pondweed | 8 | X |
| | *Potamogeton vaseyi** | Vasey's pondweed | 10 | I |
| | *Potamogeton zosteriformis* | Flat-stem pondweed | 6 | X |
| | *Ranunculus aquatilis* | White water crowfoot | 8 | X |
| | *Stuckenia pectinata* | Sago pondweed | 3 | X |
| | *Utricularia geminiscapa* | Twin-stemmed bladderwort | 9 | I |
| | *Utricularia intermedia* | Flat-leaf bladderwort | 9 | I |
| | *Utricularia vulgaris* | Common bladderwort | 7 | X |
| | *Vallisneria americana* | Wild celery | 6 | X |
| S/E | *Eleocharis acicularis* | Needle spikerush | 5 | I |
| | *Sagittaria cristata* | Crested arrowhead | 9 | I |

*FL = Floating Leaf; FL/E = Floating Leaf and Emergent; S/E = Submergent and Emergent; FF = Free Floating*
*X = Located on rake during point-intercept survey; I = Incidental Species*
** = Species listed as special concern by WI Natural Heritage Inventory*

Figure 8.12.4-1 shows that slender naiad, wild celery, and stoneworts were the most frequently encountered plants within Sturgeon Lake. Slender naiad, a common annual species in Wisconsin, is considered to be one of the most important food sources for a number of migratory waterfowl species (Borman et al. 1997). Their numerous seeds, leaves, and stems all provide sources of food. The small, condensed network of leaves provide excellent habitat for aquatic invertebrates. Wild celery is a long, limp, ribbon-leaved turbidity-tolerant species that is a premiere food source for ducks, marsh birds, shore birds and muskrats. Animals may eat the entire plant, including the

tubers that reside within the sediment. Stoneworts are a species of macro-algae rather than a vascular plant. Whorls of forked branches are attached to the "stems" of the plant, which are long, slender, smooth-textured algae. Because they lack roots, stoneworts remove nutrients directly from the water.

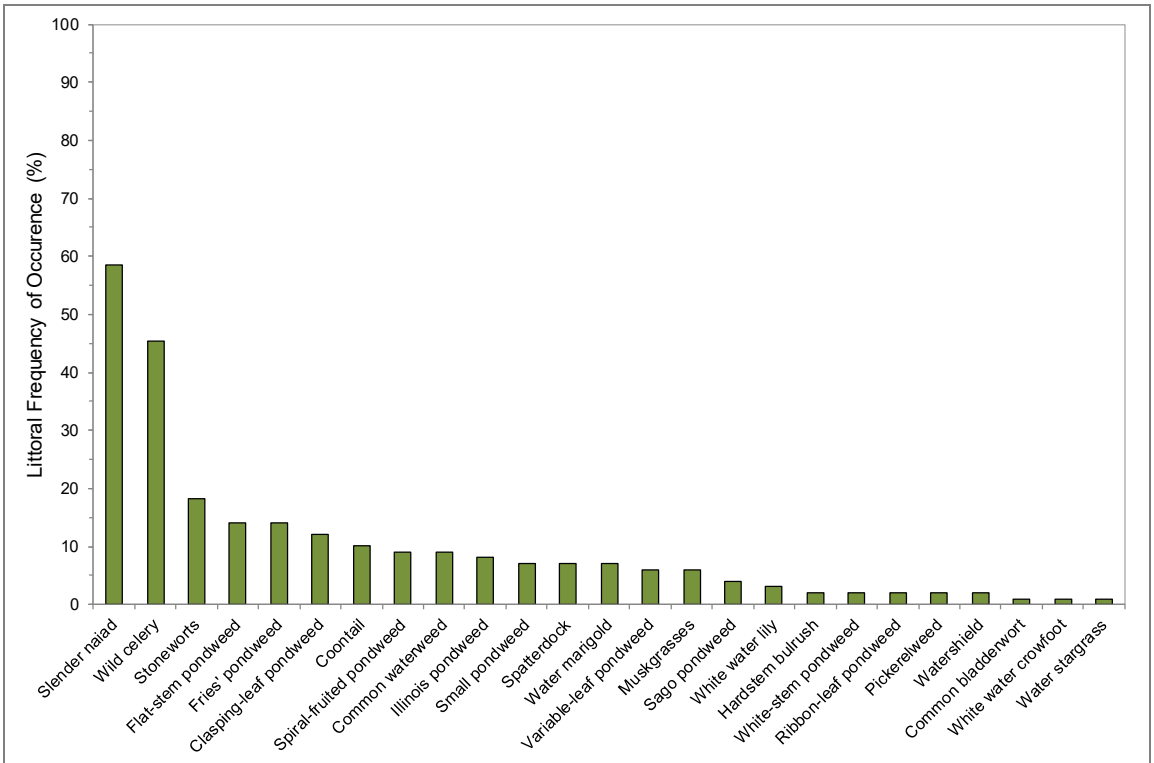


**Figure 8.12.4-1. Sturgeon Lake aquatic plant littoral frequency of occurrence analysis.** Created using data from a 2017 point-intercept survey. .

During aquatic plant inventories, 41 species of native aquatic plants (including incidentals) were found in Sturgeon Lake. Because of this, one may assume that the system would also have a high diversity. As discussed earlier, how evenly the species are distributed throughout the system also influence the diversity. The diversity index for Sturgeon Lake's plant community (0.89) lies above the Northern Lakes and Forest Lakes median ecoregion value (0.88), indicating the lake holds a high diversity.

As explained earlier in the Manitowish Waters Chain of Lakes-wide document, the littoral frequency of occurrence analysis allows for an understanding of how often each of the plants is located during the point-intercept survey. Because each sampling location may contain numerous plant species, relative frequency of occurrence is one tool to evaluate how often each plant species is found in relation to all other species found (composition of population). For instance, while slender naiad was found at 59% of the sampling locations, its relative frequency of occurrence is 23%. Explained another way, if 100 plants were randomly sampled from Sturgeon Lake, 23 of them would be wild celery. This distribution can be observed in Figure 8.12.4-2, where together four native species account for 54% of the aquatic plant population within Sturgeon Lake, while the other 21 species account for the remaining 46%. Sixteen additional native species were found incidentally from the lake but not from of the point-intercept survey, and are indicated in Table 8.12.4-1 as incidentals.

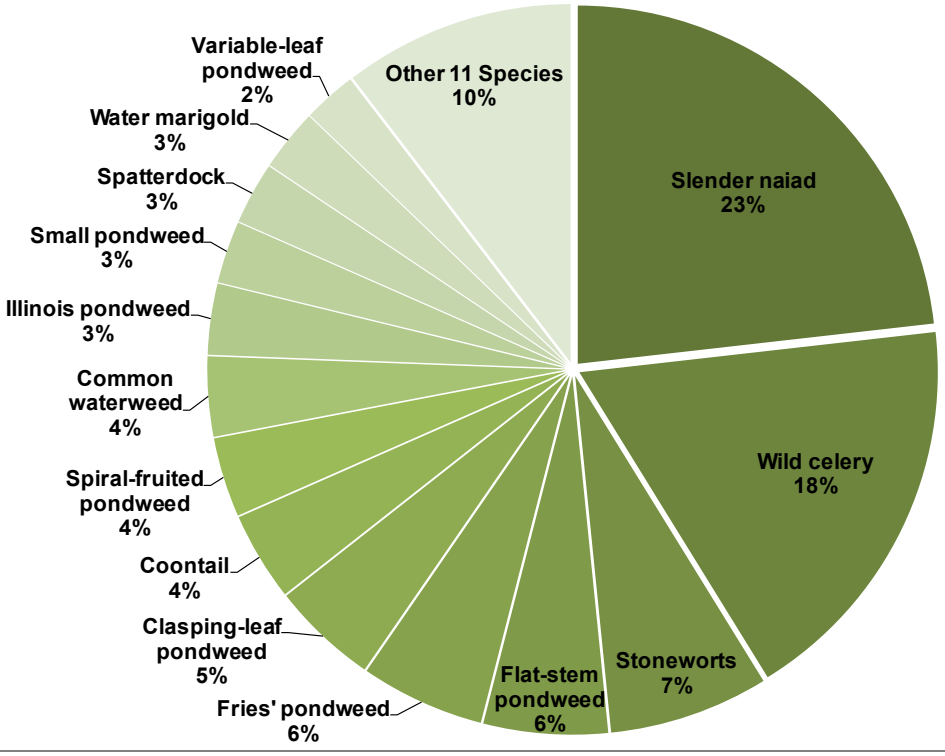


**Figure 8.12.4-2. Sturgeon Lake aquatic plant relative frequency of occurrence analysis.** Created using data from 2017 point-intercept survey.

Sturgeon Lake's average conservatism value (6.4) is higher than the state median (6.3) but slightly lower than the Northern Lakes and Forests ecoregion median (6.7). This indicates that the plant community of Sturgeon Lake is indicative of an average system within Wisconsin. Combining Sturgeon Lake's species richness and average conservatism values to produce its Floristic Quality Index (FQI) results in a value of 32.0 which is above the median values of the ecoregion and state.

The 2017 community map indicates that approximately 12.6 acres of the lake contains these types of plant communities (Sturgeon Lake Map 4, Table 8.12.4-2). Fourteen floating-leaf and emergent species were located on Sturgeon Lake (Table 8.12.4-1), all of which provide valuable wildlife habitat.

**Table 8.12.4-2. Sturgeon Lake acres of emergent and floating-leaf plant communities from the 2017 community mapping survey.**

| Plant Community | Acres |
|---|---|
| Emergent | 2.9 |
| Floating-leaf | 2.7 |
| Mixed Emergent & Floating-leaf | 7.0 |
| **Total** | **12.6** |

The community map represents a 'snapshot' of the emergent and floating-leaf plant communities, replications of this survey through time will provide a valuable understanding of the dynamics of these communities within Sturgeon Lake. This is important, because these communities are often negatively affected by recreational use and shoreland development. Radomski and Goeman (2001)

found a 66% reduction in vegetation coverage on developed shorelines when compared to undeveloped shorelines in Minnesota Lakes. Furthermore, they also found a significant reduction in abundance and size of northern pike (*Esox lucius*), bluegill (*Lepomis macrochirus*), and pumpkinseed (*Lepomis gibbosus*) associated with these developed shorelines.

## 8.12.5 Sturgeon Lake Fisheries Data Integration

Fishery management is an important aspect in the comprehensive management of a lake ecosystem; therefore, a brief summary of available data is included here and within the chain wide report section as a reference. The following section is not intended to be a comprehensive plan for the lake's fishery, as those aspects are currently being conducted by the fisheries biologists overseeing Sturgeon Lake. The goal of this section is to provide an overview of some of the data that exists. Although current fish data were not collected as a part of this project, the following information was compiled based upon data available from the Wisconsin Department of Natural Resources (WDNR) the Great Lakes Indian Fish and Wildlife Commission (GLIFWC) and personal communications with DNR Fisheries Biologist Hadley Boehm (WDNR 2018 & GLIFWC 2017).

### *Fish Stocking*

To assist in meeting fisheries management goals, the WDNR may stock fry, fingerling or adult fish in a waterbody that were raised in nearby permitted hatcheries. Stocking of a lake may be done to assist the population of a species due to a lack of natural reproduction in the system, or to otherwise enhance angling opportunities. Sturgeon Lake has no historical record of stocking.

### *Sturgeon Lake Spear Harvest Records*

Although Sturgeon Lake has been declared as a spear harvest lake, it has not historically seen a harvest. It is possible that spearing efforts have been concentrated on other larger lakes in the region, which would potentially have a higher estimated safe harvest for both walleye and muskellunge.


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S

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Feet

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920.338.8860
www.onterra-eco.com

**Sources:**
Hydro: WDNR
Orthophotography: NAIP, 2017
Shoreline Assessment: Onterra, 2017
**Map Date:** October 10, 2017
*Filename:Sturgeon_Map1_ShorelandCondition_2017.mxd*

Project Location in Wisconsin

## Legend

- Natural/Undeveloped
- Developed-Natural
- Developed-Semi-Natural
- Developed-Unnatural
- Urbanized

Seawall
Rip-Rap
Wood/Masonary/Metal

Map 1
Sturgeon Lake
Vilas County, Wisconsin

# 2017 Shoreland Condition


N
W E
S

300
Feet

Onterra LLC
Lake Management Planning
815 Prosper Road
De Pere, WI 54115
920.338.8860
www.onterra-eco.com

**Sources:**
Hydro: WDNR
Orthophotography: NAIP, 2017
Coarse Woody Habitat Survey: Onterra, 2017
**Map Date:** October 10, 2017
*Filename:Sturgeon_Map2_CWH_2017.mxd*

Project Location in Wisconsin

## Legend

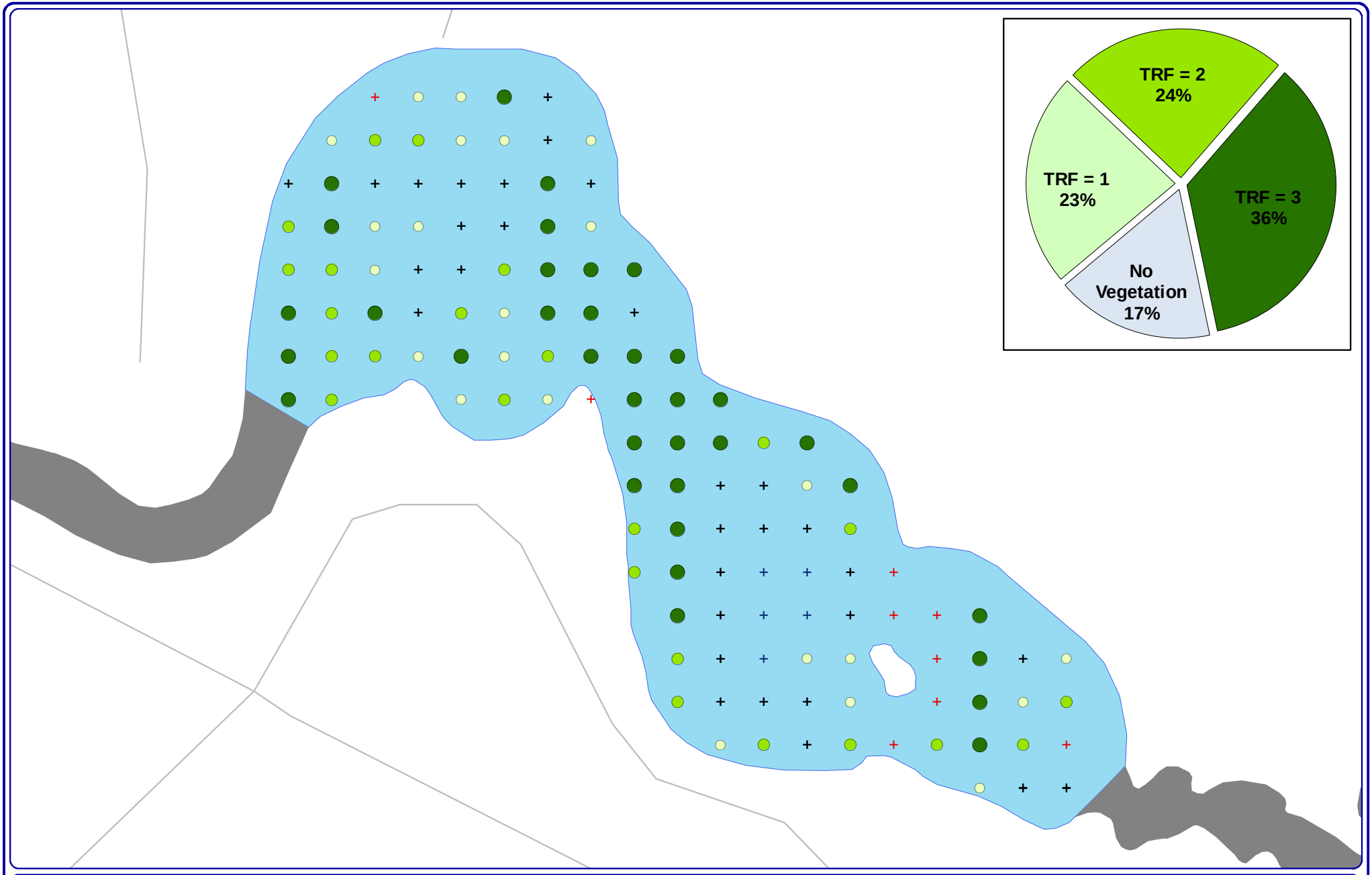
**2-8 Inch Pieces**
- No Branches
- Minimal Branches
- Moderate Branches
- Full Canopy (none)

**8+ Inch Pieces**
- No Branches
- Minimal Branches
- Moderate Branches (none)
- Full Canopy (none)

**Cluster of Pieces**
- No Branches (none)
- Minimal Branches (none)
- Moderate Branches (none)
- Full Canopy (none)

Map 2
Sturgeon Lake
Vilas County, Wisconsin

# Coarse Woody Habitat




N
W E
S

300
Feet

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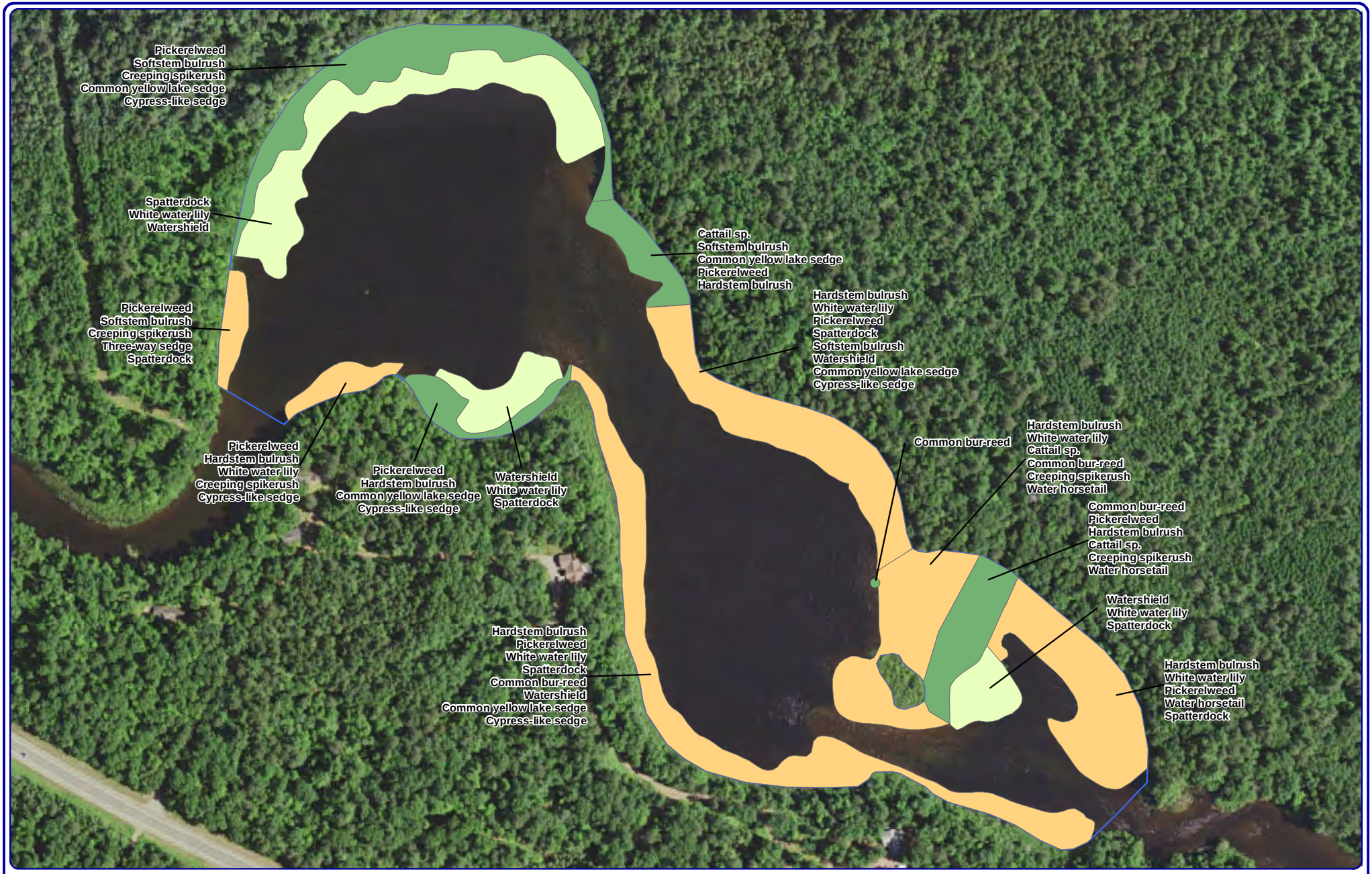
**Sources:**
Roads and Hydro: WDNR
Plant Survey: Onterra, 2017
**Map Date:** November 17, 2017
**Filename:** *MapX_Sturgeon_TRFPI_2017.mxd*


Project Location in Wisconsin

## Legend

- Total Rake Fullness = 1
- Total Rake Fullness = 2
- Total Rake Fullness = 3
- \+ No Vegetation
- \+ Non-Navigable

Map 3
Sturgeon Lake
Vilas County, Wisconsin
**2017 PI Survey:**
**Aquatic Vegetation Distribution**




N
W E
S

275
Feet

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**Sources:**
Aquatic Plants: Onterra, 2017
Orthophotography: NAIP, 2017
**Map date:** August 16, 2017
*Filename: Sturgeon_Comm_2017.mxd*

Project Location in Wisconsin

## Legend

**Small Plant Communities**
- Emergent
- Floating-leaf
- Mixed Floating-leaf & Emergent

**Large Plant Communities**
- Emergent
- Floating-leaf
- Mixed Floating-leaf & Emergent

Map 4

# Sturgeon Lake

Vilas County, Wisconsin

## Emergent & Floating-leaf Aquatic Plant Communities