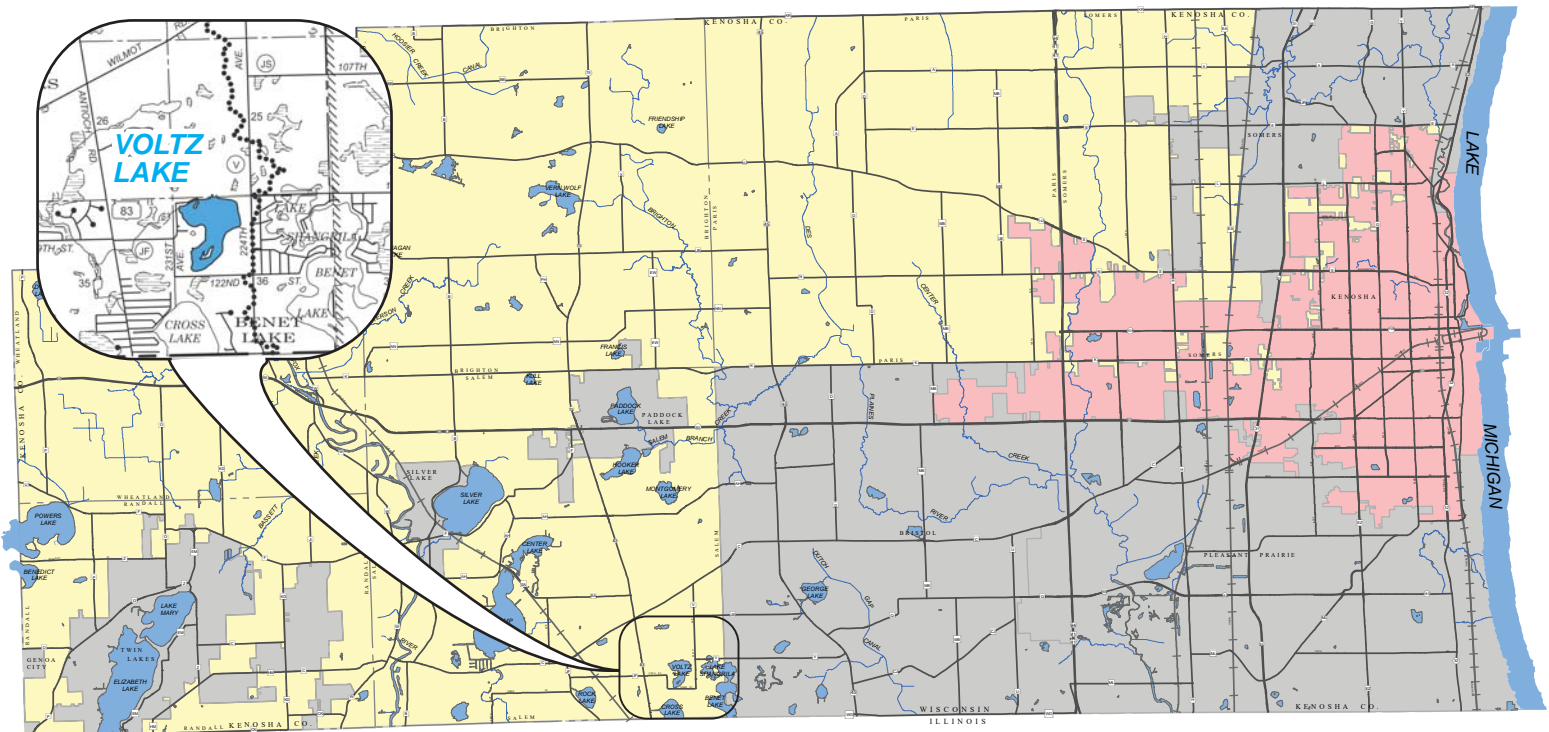


VOLTZ LAKE USE REPORT UPDATE LR-12

Prepared by the
Southeastern Wisconsin Regional Planning Commission
for
Kenosha County, Wisconsin
October 2017



This Lake Use Report Update is a product of the Lake and Stream Resources Classification Project for Kenosha County Wisconsin: 2017. This report is available online at co.kenosha.wi.us.

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BACKGROUND

Kenosha County's lakes are vital natural resource assets adding significant value to the aesthetic and ecological value of the County and Region. The Lakes are enjoyed by large numbers of lakeshore residents and local citizens as well as those seeking water-based recreation living in nearby urban areas such as Milwaukee, Racine, Kenosha, and Chicago. Kenosha County has 34 named Lakes ranging in size from about two to about 640 acres.¹ Of the 20 that are considered "major lakes" (i.e., lakes with a surface area of 50 acres or more), 12 lie in unincorporated or recently incorporated portions of the County. Between 1968 and 1970, the Wisconsin Department of Natural Resources (WDNR) produced a series of individual Lake Use Reports for each of the 12 named major lakes within Kenosha County. Voltz Lake was the subject of one such report.² This report updates the earlier Lake Use Report.

In addition to the earlier WDNR Lake Use Report, Voltz Lake was the subject of a Lake and Watershed Assessment and Management Recommendations Report prepared by Applied Ecological Services, Inc. in 1992 for the Voltz Lake Management District (VLMD).³ An aquatic plant management plan also was developed by the Southeastern Wisconsin Regional Planning Commission (SEWRPC) in 2005 for the VLMD.⁴ The VLMD is a Chapter 33, *Wisconsin Statutes*, public inland lake protection and rehabilitation district that oversees management of Voltz Lake. The VLMD does not maintain its own website, but can be accessed through the Village of Salem Lakes website (www.villageofsalemlakes.org/index.asp?SEC=C4740D80-A8C7-4A85-8A64-E46AC3C64EA7&DE=0C60F6F0-8DA0-421A-A194-668EF20D220C). The website is used to post a wide variety of information Lake users may find interesting. In addition to the above reports, Voltz Lake was also part of a 2017 lake and stream classification project developed for Kenosha County by Southeastern Regional Planning Commission (SEWRPC).⁵

INTRODUCTION

Voltz Lake is located in the Village of Salem Lakes, Kenosha County, Wisconsin. Despite its relatively shallow depth and small size, the Lake's fishery, natural beauty, and location give it significant local economic and recreational value. In addition, its healthy and relatively diverse aquatic plant community and large contiguous marshlands provide noteworthy fish and wildlife habitat. The Lake provides significant value to local ecology.

PHYSICAL DESCRIPTION

Lake Characteristics

Based upon recent orthophotography, Voltz Lake has a surface area of 64 acres.⁶ As shown on Map 1, Voltz Lake has an elongated basin with a north-south orientation and a maximum depth of 24 feet. According to 1960 (revised in 1967) depth soundings published by the WDNR, Voltz Lake contains 362 acre-feet of water. Twenty percent of Voltz Lake is three feet deep or less, yielding an average depth of only seven feet.⁷

¹ *Wisconsin Department of Natural Resources Publication No. PUB-FH-800 2005, Wisconsin Lakes, 2005.*

² *Wisconsin Department of Natural Resources (WDNR), Voltz Lake, Kenosha County, An Inventory with Planning Recommendations, Lake Use Report No. FX-45, Prepared by the WDNR for SEWRPC, 1970.*

³ *Applied Ecological Services, Inc., Lake and Watershed Assessment and Management Recommendations Report, Voltz Lake, Near Trevor, Wisconsin, May 1992.*

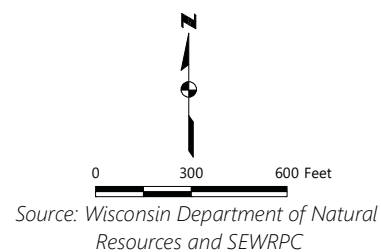
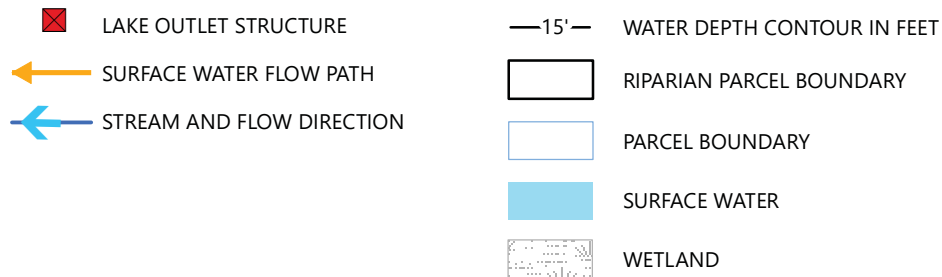
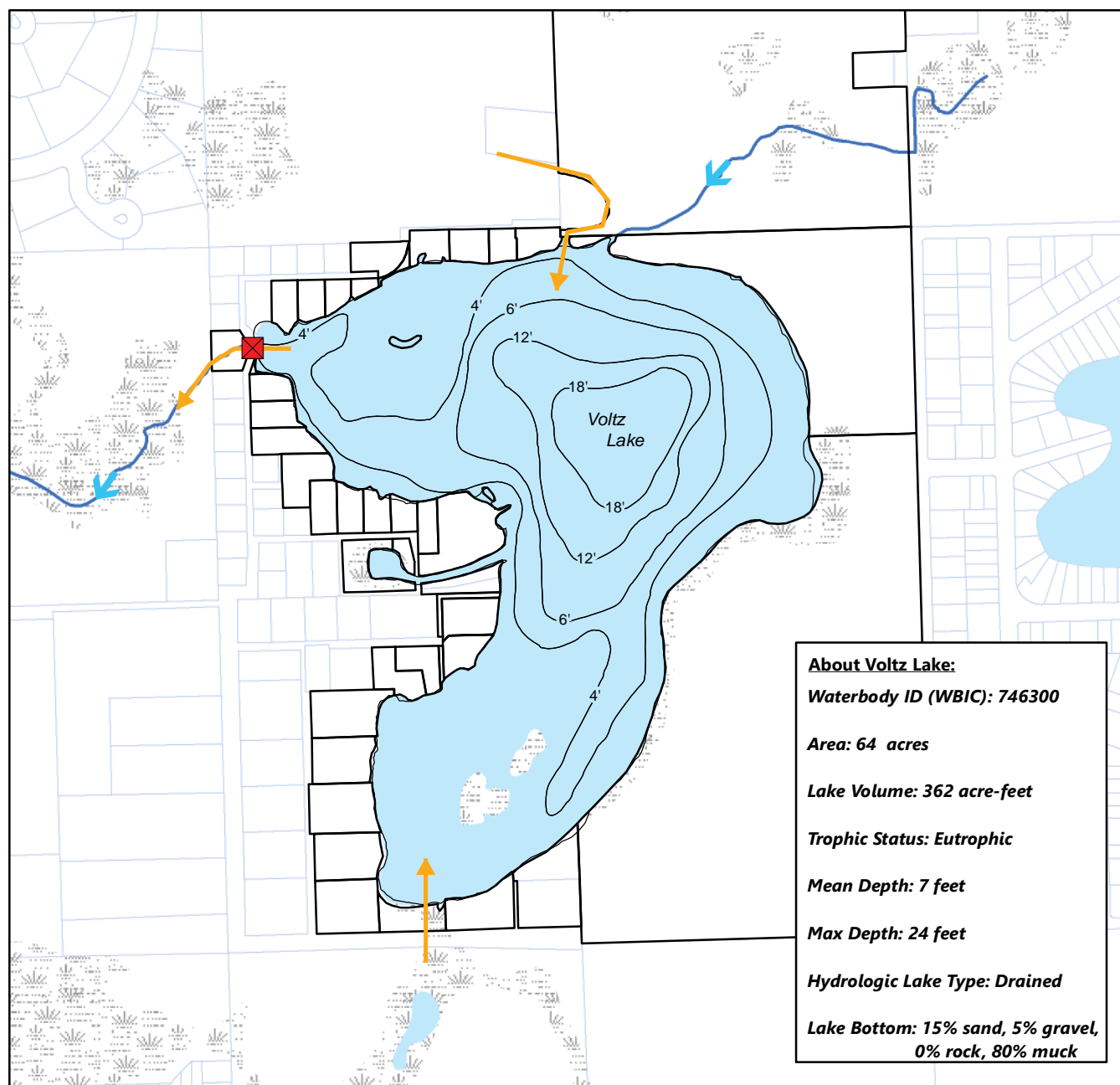
⁴ *SEWRPC Memorandum Report No. 159, An Aquatic Plant Management Plan for Voltz Lake, Kenosha County, Wisconsin, January 2005.*

⁵ *SEWRPC Memorandum Report No. 222, Lake and Stream Resources Classification Project for Kenosha County, Wisconsin: 2017.*

⁶ *Reported lake areas commonly fluctuate over time and between documents. The apparent size of a lake depends upon the lake's water level at time of measurement, the type and condition of shoreline vegetation, and the accuracy of available tools and techniques. For example, nearly all lakes are larger when water levels are higher. Conversely, lakes can appear smaller on aerial photographs when shorelines are covered by dense tree canopy. See Table 1 for more detail.*

⁷ *Wisconsin Department of Natural Resources, Lake Use Report No. FX-45, op cit.*

Map 1 Voltz Lake



The Lake has normal water surface elevation of approximately 812 feet above National Geodetic Vertical Datum, 1929 adjustment.⁸ Additional information regarding Voltz Lake's hydrology and morphometry is summarized in Table 1.

According to WDNR records, Voltz Lake's bottom sediments are composed 15 percent of sand, 5 percent of gravel, and 80 percent of muck.

Hydrology

Based upon its depth and the topography of surrounding lands, WDNR classifies Voltz Lake as a deep headwater lake. Deep headwater lakes are relatively deep and are therefore likely to stratify during summer. Furthermore, deep headwater lakes receive most of their water supply from surface runoff and discharge most of their water via an outlet stream, a situation also classifying the Lake as a drained lake. The WDNR uses these parameters to set water quality goals for the Lake.

There is no defined, permanently flowing inflow channel into Voltz Lake. The Lake likely receives some groundwater, but not in sufficient quantities to produce sustained discharge. Inflow and outflow to Voltz Lake are shown in Map 1. There is an inflow channel on the north shore that seasonally (primarily in spring) carries water into the lake from woodlands and agricultural lands. At the south end of the Lake, there is a stream bed that intermittently carries water into the Lake from nearby Cross Lake. There are no permanently inflowing streams to Voltz Lake.

Outflow from the Lake is regulated through means of a culvert located at the northwestern corner of the Lake. Water flowing through the culvert enters an unnamed stream that flows to Trevor Creek, a tributary of the Illinois-Fox River in northern Illinois.

Watershed Characteristics and Land Use

Voltz Lake's 317 acre watershed lies primarily to the north and south of the Lake. A lake's watershed is the physical area from which surface-water runoff can drain to a lake. Voltz Lake has a modest-sized watershed for its size, with a watershed to lake area ratio of 5.0:1 small for a drainage lake. Lakes with ratios above 10:1 tend to develop water-quality problems.⁹ Lakes with large watersheds are comparatively more vulnerable to human disturbance.

Table 1
Hydrology and Morphometry of Voltz Lake

Parameter	Measurement
Size	
Surface Area of Lake ^a	64 acres
Watershed Area ^b	317 acres
Lake Volume	362 acre-feet
Residence Time ^c	2.2 years
Shape	
Length	2.1 miles
Width	0.4 mile
Shoreline Length	2.3 miles
Shoreline Development Factor ^d	2.1
General Lake Orientation	North-south
Depth	
Maximum Depth	24 feet
Mean Depth	7 feet
Area under 3 feet	20 percent
Area over 15 Feet	17 percent

^aSurface lake surface area used in this study was believed by SEWRPC to best represent the present ordinary high water mark open water area of the Lake. It generally includes connected channels and sparsely vegetated marsh, and therefore tends toward the larger side of published values. Various sources have reported Voltz Lake's surface area to be as low as 55 acres and as high as 64 acres. Reported lake surface area varies widely by source and over time. Some of the reasons why this may happen include water elevation changes, differences in vegetation over the years, inclusion or exclusion of fringing marsh, and inclusion or exclusion of channels leading off the main body of the lake or actual changes in the lake shoreline over the 60-year period of record.

^bExcludes Voltz Lake.

^cResidence time is the estimated time period required for a volume of water equivalent to the volume of the lake to enter and be discharged from the lake during years of normal precipitation. The above data is based on a more accurate delineation of the watershed boundary than that used for the 1970 Lake Use Report.

^dShoreline development factor is the ratio of the shoreline length to the circumference of a circular lake of the same area. The closer to a value of 1.0, the more nearly circular a lake is.

Source: Wisconsin Department of Natural Resources, U.S. Geological Survey, and SEWRPC

⁸ Ibid.

⁹ Uttormark, Paul D. and Mark L. Hutchins, 1978, Input Output Models as Decision Criteria for Lake Restoration, University of Wisconsin-Madison, Wisconsin Water Resources Center, Technical Report No. 78-03, pg. 61.

Significant land development has occurred around Voltz since the writing of the previous lake use report (see Figures 1 and 2). Map 2 and Table 2 show the 2010 land uses in the Voltz Lake watershed. In 2010, rural uses accounted for approximately 78 percent of total land uses and urban uses accounted for about 22 percent. The largest rural land use was agriculture (46 percent), with woodlands and wetlands accounting for 21 and 9 percent of total land use, respectively. The largest urban land use was low-density, single-family residential areas at almost 10 percent.

Projected 2035 land use (Table 2) indicates significant changes within the Voltz Lake watershed. Currently, projections indicate that all of the agricultural lands within the watershed will be converted to mostly low-density residential uses along with some recreational uses.

WATER QUALITY

The WDNR re-evaluated Voltz Lake's water quality as part of the recent impairment listing cycle and found that the Lake's water quality clearly meets State thresholds for fish and aquatic life uses.¹⁰

Historical water quality gives insight into changes that may be occurring within the Lake and its watershed. By comparing data and evaluating trends, causes for change may be identified and management actions can be taken to help protect the Lake. Historically, there is little water quality data available for Voltz Lake. The WDNR conducted water sampling and analysis in 1966, the findings of which were published in the original Lake Use Report. SEWRPC acquired water quality data during 1977 as part of the preparation of the adopted regional water quality management plan.¹¹ Since that time, there were several samplings conducted during 1989 and 1990 as part of the WDNR Self-Help Monitoring Program in which citizen volunteers assist in monitoring lake water quality. This program is currently known as the Citizen Lake Monitoring Network, or CLMN, and is supervised by the University of Wisconsin — Extension. The United States Geological Survey (USGS) conducted one sampling of water quality in 2007. From 2001 through 2011, water clarity of Voltz Lake was measured remotely by Landsat satellites as part of the Environmental Remote Sensing Center (ERSC).¹²

Currently, Voltz Lake residents participate in the CLMN. This is considered an extremely useful program in providing long-term water quality data and, as such, would be a worthwhile endeavor for the VLMD to pursue considering the scarcity of water quality data that exists for this lake. Available water quality data is compiled and is viewable on the WDNR Lakes page.¹³ Water quality data is compiled and is available on the WDNR Lakes page.¹⁴

Water clarity is a commonly used and easily understood surrogate for perceived water quality. Many people equate "clear" water with "clean" water. While this is not always true, methods have been developed to allow lake water clarity to be compared and contrasted. Water clarity is measured with a Secchi disk (Figure 3). "Secchi depth" is the distance below the water surface that a Secchi disk can be seen under carefully prescribed conditions. Secchi depth has been only occasionally measured in the Lake and the results are summarized graphically in Figure 4. On average, water clarity has been rather poor, with Secchi depth readings during summer 1989 averaging 4.1 feet, indicative of poor water quality.¹⁵ At the time of the original Lake Use Report, the clarity of Voltz Lake was not measured. Secchi depth values reported in 1977

¹⁰ Wisconsin Department of Natural Resources, Voltz Lake, Kenosha County website, "conditions" dnr.wi.gov/water/waterDetail.aspx?wbic=746300.

¹¹ SEWRPC Planning Report No. 30, A Regional Water Quality Management Plan for Southeastern Wisconsin-2000, Volume Two, Alternative Plans, February 1979.

¹² Established in 1970 at the University of Wisconsin-Madison campus, the ERSC is one of the first remote sensing facilities in the United States.

¹³ Water quality data and other information about Voltz Lake can be found at the WDNR Lakes page: dnr.wi.gov/lakes/lakepages/LakeDetail.aspx?wbic=746300.

¹⁴ Water quality data and other information about Voltz Lake can be found at the WDNR Lakes page: dnr.wi.gov/lakes/LakePages/LakeDetail.aspx?wbic=746300.

¹⁵ Data reported in 1990 on the WDNR Lakes page were questionable and not included in this report.

Figure 1
1970 Aerial Photograph of Voltz Lake



Date of Photography: 1970

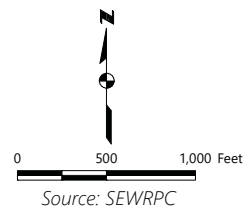
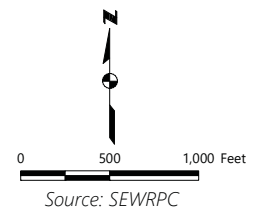


Figure 2
2015 Orthophotograph of Voltz Lake



Date of Photography: 2015



Map 2
2010 Land Use Within the Voltz Lake Watershed

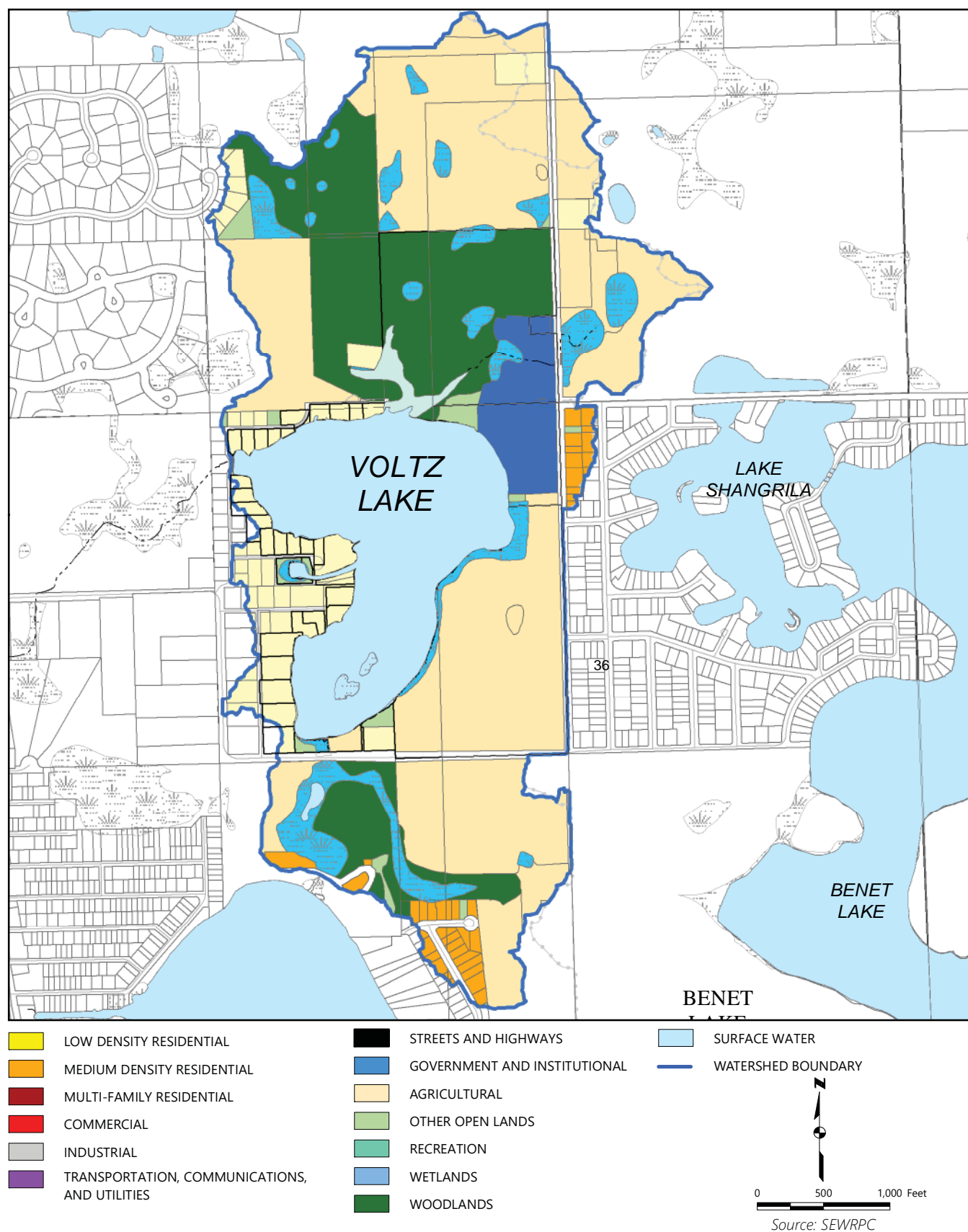


Table 2
Existing and Planned Land Use Within the Voltz Lake Watershed: 2010 and 2035

Land Use Categories ^a	2010		2035		Change: 2010-2035	
	Acres	Percent of Total	Acres	Percent of Total	Acres	Percent
Urban						
Residential						
Single-Family, Suburban Density	--	--	--	--	--	--
Single-Family, Low Density	31	9.8	138	43.5	107	345.2
Single-Family, Medium Density	9	2.8	9	2.8	0	0.0
Single-Family, High Density	--	--	--	--	--	--
Multi-Family	--	--	--	--	--	--
Commercial	--	--	--	--	--	--
Industrial	--	--	--	--	--	--
Governmental and Institutional	14	4.4	14	4.4	0	0.0
Transportation, Communication, and Utilities	15	4.8	15	4.8	0	0.0
Recreational	--	--	40	12.6	--	0.0
Subtotal	69	21.8	216	68.1	147	213.0
Rural						
Agricultural	147	46.3	--	--	-147	-100.0
Other Open Lands	5	1.6	5	1.6	0	0.0
Wetlands	30	9.5	30	9.5	0	0.0
Woodlands	66	20.8	66	20.8	0	0.0
Water ^b	--	--	--	--	--	--
Extractive	--	--	--	--	--	--
Landfill	--	--	--	--	--	--
Subtotal	248	78.2	101	31.9	-147	-59.3
Total	317	100.0	317	100.0	0	--

Note: This land use summary table includes internally drained areas. Internally drained areas do not contribute surface-water runoff to the Lake and are therefore not included in the Lake's watershed area listed in Table 1.

^aParking included in associated use

^bExcludes Voltz Lake

Source: SEWRPC

averaged only two feet.¹⁶ Satellite estimates made remotely between 2001 and 2011 (Figure 4) ranged from 2.9 feet to 12.5 feet, with an average of about 6.6 feet, indicative of generally poor to fair water quality. Based upon the available information, Voltz Lake's water clarity is rather poor and has not changed significantly since monitoring began.

Lake trophic state index (TSI) is calculated using physical and chemical indicators of lake nutrient enrichment. Lakes with low numeric scores (i.e., less than 40) generally have clear water of excellent quality and are termed oligotrophic. Lakes with TSI values between 50 and 60 are termed eutrophic and have limited water clarity, fewer algal species, overly-abundant aquatic plant growth, and deep areas that are commonly devoid of oxygen during summer. Mesotrophic lakes (TSI values between 40 and 50) have conditions intermediate between oligotrophic and eutrophic lakes, while hypereutrophic lakes (TSI values above 70) commonly can experience algal blooms, poor water

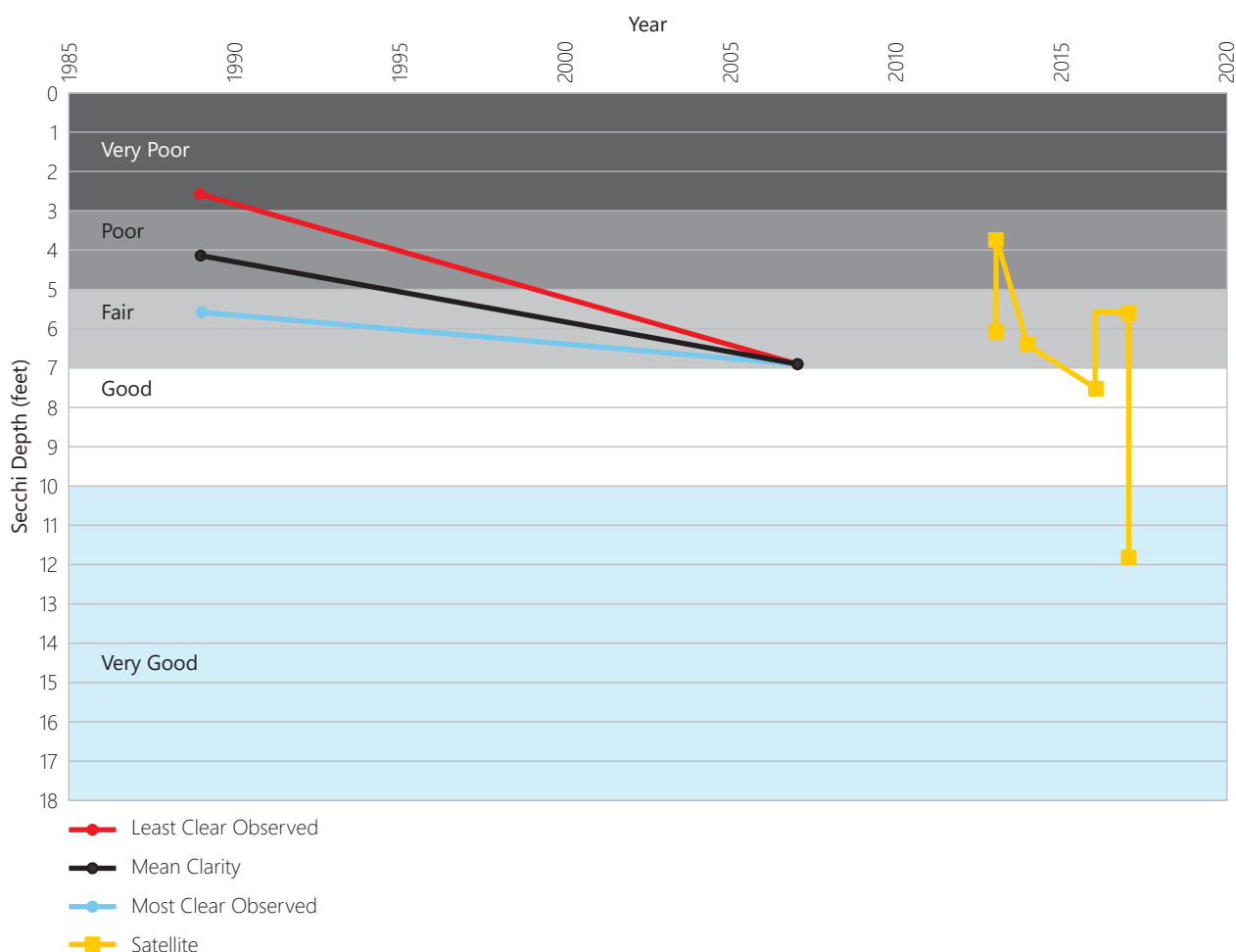
Figure 3
Measuring Water Clarity with a Secchi Disk



Source: www.burnsville.org and SEWRPC

¹⁶ SEWRPC Planning Report No. 30, op cit.

Figure 4
Summer (June Through August) Secchi Depth and Satellite Ranges for Voltz Lake



Source: Wisconsin Department of Natural Resources and SEWRPC

clarity, and, in extreme cases, summer fish kills. Hypereutrophic conditions rarely occur in nature and are generally associated with human activity.

Voltz Lake's TSI values are plotted over time in Figure 5. As can be seen from this graphic, TSI values from 1989 to 2007, based mostly upon Secchi depth (there was only a single chlorophyll-*a* concentration measurement), have changed very little since 1989, and indicate mesotrophic bordering on eutrophic conditions. Satellite measurements taken in the last five years indicate eutrophic conditions. Such lakes support an abundance of aquatic plant growth, sometimes to nuisance levels, and may support productive fisheries. This trophic state is supported by USGS data collected in 2007 that reported a total phosphorus concentration (0.038 mg/L) above the guideline recommended by SEWRPC (0.020 mg/L) as the value above which water quality problems are likely to occur.

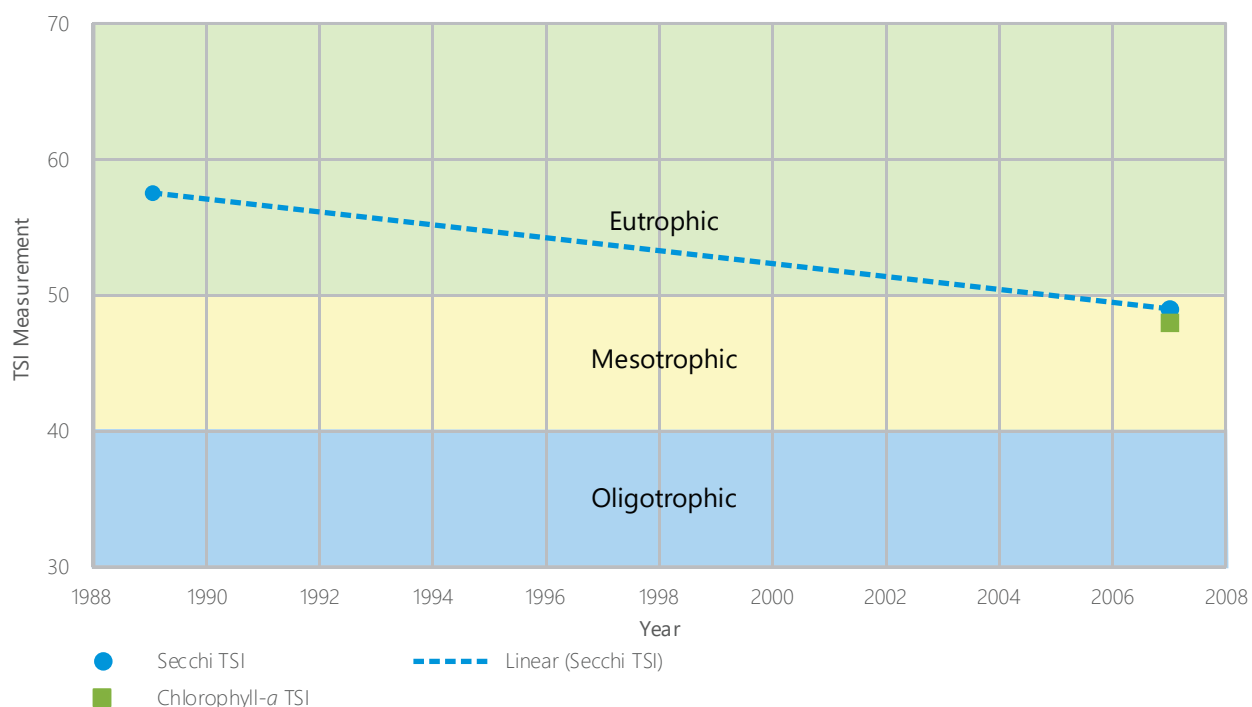
NATURAL RESOURCES

Aquatic Plants

Aquatic plant growth in Voltz Lake was observed by WDNR staff in 1967 and surveyed by SEWRPC staff in 2001 (Table 3). The 1967 survey results were expressed anecdotally while the 2001 results were expressed quantitatively for all submerged plant species observed.

The 1967 survey was general in nature and not intended to yield a comprehensive list of all species present in the Lake; therefore, only dominant species were reported. The three most abundance species of submerged

Figure 5
Summer (June Through August) Annual Average Trophic State Indices (TSI) for Voltz Lake



Note: Comparatively little data was available for Voltz Lake. June-August data of each year was averaged to produce the resultant values.

Source: Wisconsin Department of Natural Resources and SEWRPC

plants were waterweed (*Elodea canadensis*), curly-leaf pondweed (*Potamogeton crispus*), and coontail (*Ceratophyllum demersum*). White water lilies (*Nymphaea odorata*) were abundant in shallow areas and cattails (*Typha latifolia*) were common along the shoreline. At that time, it was noted that the bays adjacent to the main basin of the Lake were generally heavily vegetated to the extent of impeding recreational activities in midsummer, although not to an extent that required chemical treatment.

The 2001 survey resulted in a comprehensive list of submerged plant species (Table 3). At that time, the three most dominant species in the Lake, in decreasing order, were: coontail, Eurasian water milfoil (*Myriophyllum spicatum*), and waterweed. Curly-leaf pondweed was still found in Voltz Lake, but was the fifth most dominant species. A total of nine native submerged aquatic plant species were observed and documented within Voltz Lake in 2001. Although the number of species is low, these native species provide a variety of benefits, including food for wildfowl and fish, and shelter for fingerling fish such as trout, bluegill, and bass. All of the plants found were species commonly observed in lakes within the Region.

A diverse array of native aquatic plant species is generally indicative of a healthy aquatic plant community. Twelve high-value species are identified under Chapter NR 107, "Aquatic Plant Management," of the *Wisconsin Administrative Code* as plants that contribute important ecosystem services to lakes. Only one has recently been found in Voltz Lake (Sago pondweed).

Aquatic plants have been noted to grow to depths ranging between 0.5 and 15 feet below the Lake surface. Since most of Voltz Lake is relatively shallow, and since water depths exceeding the Lake's maximum plant rooting depth are very limited in extent, most of the Lake supports aquatic plants. Only small areas of the Lake have water depths exceeding the maximum observed aquatic plant rooting depth and are, therefore, free of aquatic plant growth.

Aquatic Invasive Species

The terms "nonnative" and "invasive" are often confused and incorrectly assumed to be synonymous. Nonnative (sometimes also referred to as "exotic") is an overarching term describing living organisms

Table 3
Voltz Lake Aquatic Plant Surveys: 1967 and 2001

Aquatic Plant Species	1967 ^a	2001 (July) ^b
Floating Plants		
<i>Lemna minor</i> (lesser duckweed)	--	-- ^c
<i>Lemna trisulca</i> (forked duckweed)	--	-- ^c
<i>Nymphaea odorata</i> (white water lily)	Abundant in shallows	-- ^c
<i>Wolffia columbiana</i> (watermeal)	--	-- ^c
Emergent Plants		
<i>Typha latifolia</i> (common cattail)	Common along wet shores	-- ^c
Submerged Plants		
<i>Ceratophyllum demersum</i> (coontail)	Dense mats	380.0
<i>Chara</i> spp. (muskgrass)	Dense mats	27.5
<i>Elodea canadensis</i> (waterweed)	--	180.0
<i>Heteranthera dubia</i> (water stargrass)	--	15.0
<i>Myriophyllum spicatum</i> (Eurasian water milfoil)	--	297.5
<i>Najas flexilis</i> (bushy pondweed)	--	82.5
<i>Potamogeton crispus</i> (curly-leaf pondweed)	Abundant in shallows	35.0
<i>Potamogeton zosteriformis</i> (flat-stem pondweed)	--	17.5
<i>Ranunculus longirostris</i> (white water crowfoot)	--	20.0
<i>Stuckenia pectinata</i> (Sago pondweed)	--	12.5
<i>Utricularia vulgaris</i> (bladderwort)	--	22.5

Notes: Nonnative species above are listed in red print; all other species are native.

NR107 Wisconsin Administrative Code high-value species are printed in green print.

^aOnly dominant species were reported in 1967.

^bThe Dominance Factor is the product of the Relative Frequency of Occurrence of a plant species in the lake (the number of sampling sites where the plant was found compared to the total number of sites where vegetation occurred) and the Relative Density (the average abundance of the plant at each site where the plant occurred), expressed as a percentage. It provides a method for determining the dominance of a species within a community; the higher the value, the more dominant the species.

^cEmergent and floating aquatic plants were documented as present during the 2001 survey but were not quantified.

Source: Wisconsin Department of Natural Resources and SEWRPC

introduced to new areas beyond their native range with intentional or unintentional human help. Nonnative species may not necessarily harm ecological function or human use values in their new environments. Invasive species are the subset of nonnative species that damage the ecological health of their new environments and/or are commonly considered nuisances to human use values. In summary, invasive species are non-native but not all non-native species are invasive.

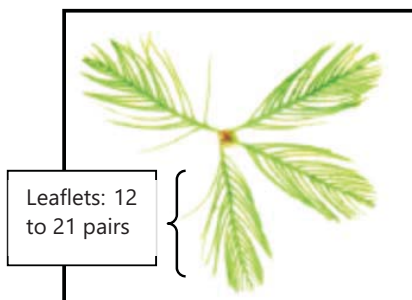
Eurasian Water Milfoil (*Myriophyllum spicatum*) and Eurasian/Northern Water Milfoil Hybrids

EWM, one of eight milfoil species found in Wisconsin, is the only milfoil species known to be exotic/nonnative (see Figure 6). This plant can grow profusely in nutrient-rich lakes impeding boating and recreational use. Because of this management concern, EWM is actively managed by mechanical and chemical means in many Southeastern Wisconsin lakes. In recent years, EWM/native northern milfoil hybrids have been observed in some Wisconsin lakes. These hybrids pose a difficult management problem: not only do hybrids grow quickly like EWM, but hybrids appear to be more tolerant to aquatic herbicides such as 2, 4-D and Endothall that are commonly used to manage EWM.¹⁷ EWM/native milfoil hybrids have not yet been identified in Voltz Lake. EWM was positively identified as part of the 2001 survey and was the second most dominant plant in the Lake at that time. The presence of invasive milfoil species is a management concern. The VLMD manages nuisance aquatic vegetation using herbicides. Increasing vigilance has been devoted to protecting native aquatic plants to promote their spread into areas infested with EWM.

¹⁷ T. Groves, P. Hausler, and P. Tynning, Water Resources Group, Progressive AE, Hybrid Milfoil: Management Implications and Challenges, *The Michigan Riparian*, Winter 2015.

Figure 6
Eurasian Water Milfoil (*Myriophyllum spicatum*)

Identifying Features	Ecology
<ul style="list-style-type: none"> • Stems spaghetti-like, often pinkish, growing long with many branches near the water surface • Leaves with 12 to 21 pairs of leaflets • Produces no winter buds (turions) <p>Eurasian water milfoil is similar to northern water milfoil (<i>M. sibiricum</i>). However, northern water milfoil has five to 12 pairs of leaflets per leaf and stouter white or pale brown stems</p>	<ul style="list-style-type: none"> • Hybridizes with native northern water milfoil, resulting in plants with intermediate characteristics • Invasive, growing quickly, forming canopies, and getting a head-start in spring due to an ability to grow in cool water • Grows from root stalks and stem fragments in both lakes and streams, shallow and deep; tolerates disturbed conditions • Provides some forage to waterfowl, but supports fewer aquatic invertebrates than mixed stands of aquatic vegetation



Source: Wisconsin Department of Natural Resources and Skawinski, P. M. (2014). *Aquatic Plants of the Upper Midwest: A Photographic Field Guide to Our Underwater Forests*, 2nd Edition, Wausau, Wisconsin, USA: Self-Published

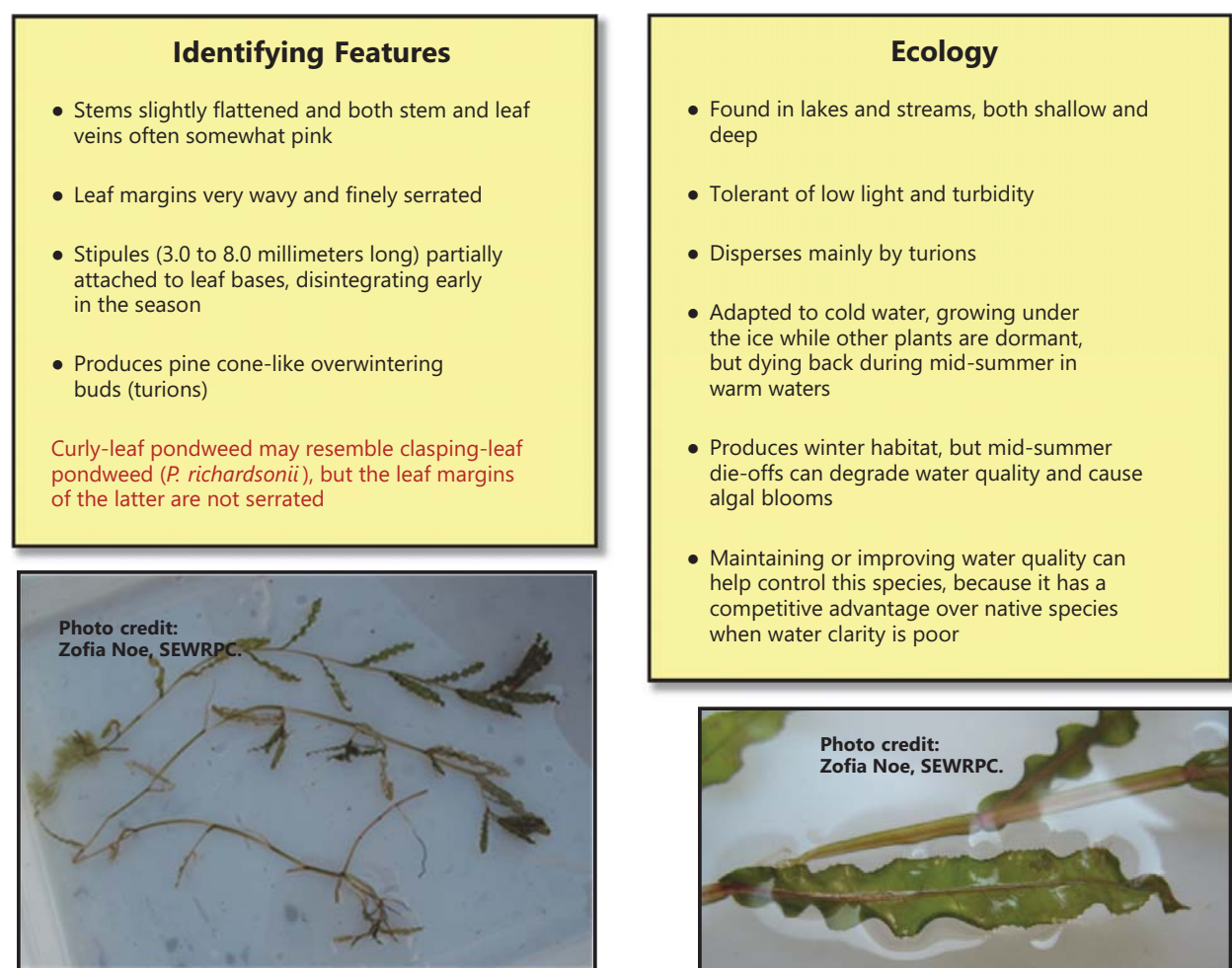
Curly-leaf pondweed (*Potamogeton crispus*)

Curly-leaf pondweed (see Figure 7) is a plant that thrives in cool water and exhibits an early-season growth cycle that helps give it a competitive advantage over native plants. However, curly-leaf pondweed begins to die off during the summer when lake water temperatures start to peak. Therefore, it is not normally considered a nuisance during summer months. Curly-leaf pondweed was found in Voltz Lake in 2001, but was not as abundant as Eurasian water milfoil.

Purple loosestrife (*Lythrum salicaria*)

Purple loosestrife (see Figure 8) spreads profusely, outcompeting native plant species and reducing the quality of fish and wildlife habitat while adding little ecological benefit. This species is a declared noxious weed in the State of Wisconsin and is subject to an ongoing control program. Purple loosestrife is present in wetlands fringing Voltz Lake. Voltz Lake's extensive marshlands make large areas particularly susceptible to purple loosestrife infestation.

Figure 7
Curly Leaf Pondweed (*Potamogeton crispus*)



Source: Wisconsin Department of Natural Resources, SEWRPC, and Skawinski, P. M. (2014). *Aquatic Plants of the Upper Midwest: A Photographic Field Guide to Our Underwater Forests*, 2nd Edition, Wausau, Wisconsin, USA: Self-Published.

Fisheries and Wildlife

At the time of the 1970 report, Voltz Lake was considered a warmwater sport fishing lake, with a fishery including northern pike (*Esox lucius*), largemouth bass (*Micropterus salmoides*), panfish, walleye (*Sander vitreus*), and channel catfish (*Ictalurus punctatus*). Carp were present but not at population levels that could be considered a problem. The panfish population was, at that time, composed of bluegill (*Lepomis macrochirus*), black crappie (*Pomoxis nigromaculatus*), brown bullhead (*Ameiurus nebulosus*), pumpkinseed (*Lepomis gibbosus*), and yellow bullhead (*Ameiurus natalis*).

The current fish population is unknown because there have been no recent WDNR fish surveys on Voltz Lake. Stocking had not, at the time of that original Lake Use Report, been conducted for over 15 years and the WDNR has no record of stocking since then.

Currently, the WDNR lists northern pike, largemouth bass, and panfish as common and catfish as present in Voltz Lake.¹⁸ The Lake also contains a Special Concern fish species, the lake chubsucker, *Erimyzon sucetta* (see Figure 9).

The wetlands and aquatic plant beds of Voltz Lake provide excellent habitat for waterfowl, muskrats, pheasants, and various marsh and migratory birds. The Lake's shallow depth and dense aquatic plant

¹⁸ dnr.wi.gov/lakes/lakepages/LakeDetail.aspx?wbic=746300.

Figure 8
Purple Loosestrife (*Lythrum salicaria*)

Identifying Features

- Terrestrial or semi-aquatic, emergent forb
- Stems often angled with four, five, or more sides, and growing one to two m tall
- Flowers deep pink or purple, six-parted, 12 to 25 mm wide, and in groups
- Leaves lance-like, four to 11 cm long and either opposite or in whorls of three

Purple loosestrife, if small, is similar to winged loosestrife (*Lythrum alatum*), but winged loosestrife differs in having leaves generally smaller (<5.0 cm long), leaves mostly alternate (only lower leaves opposite), and flowers mostly held singly in the leaf axils rather than in pairs or groups

Ecology/Control

- Found in shallows, along shores, and in wet to moist meadows and prairies
- Invasive and continues to escape from ornamental plantings
- Galerucella beetles have been successfully used to control purple loosestrife. Plants may also be dug or pulled when small, but they subsequently should be placed in a landfill or burned. Several herbicides are effective, but application near water may require permits and aquatic-use formulas



Source: The Nature Conservancy and SEWRPC

Figure 9
Lake Chubsucker (*Erimyzon sucetta*)



Source: Wisconsin Department of Natural Resources and SEWRPC

growth make it ideal for waterfowl. Herons, sandhill cranes, blue-winged teal, mallards, and bitterns have been reported as commonly present. Large flocks of waterfowl are known to congregate on the Lake during migrations. Non-migratory Canada geese that are so prevalent throughout southeastern Wisconsin are abundant.

Environmentally Significant Areas

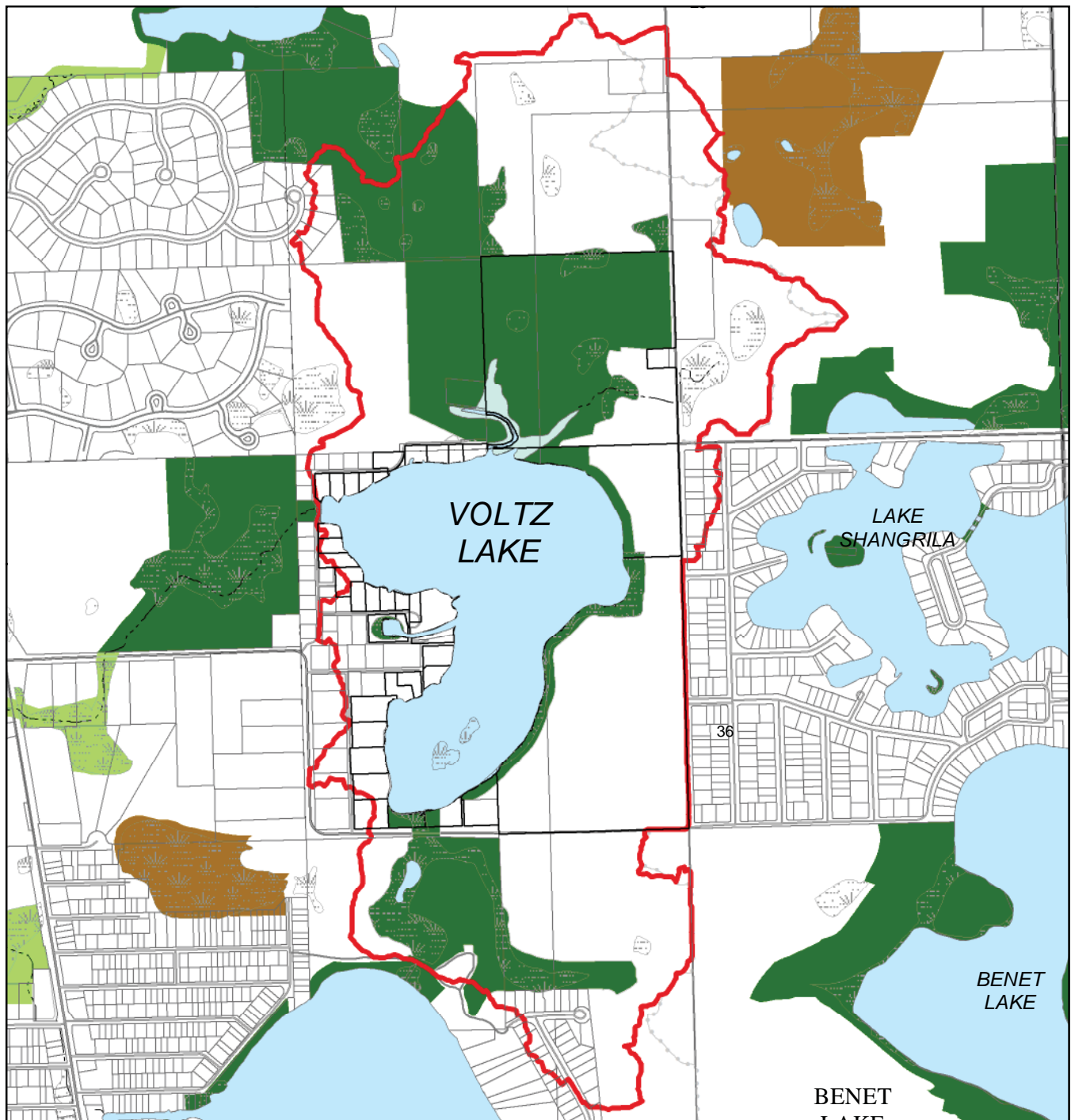
The Voltz Lake watershed contains numerous environmentally significant areas. These areas generally represent the best remaining natural resource areas in the Lake's watershed. Many important interdependent relationships occur between living organisms and their environment in such areas. Destruction or deterioration of any one element of a natural environment may unravel the value and stability of the overall resource. Therefore, it is important to protect such areas.







As shown on Map 3, primary environmental corridor areas occupy nearly 171 acres of land and water area (including the Lake itself) in the Lake's watershed, much of it in close proximity to the Lake. Preserving these areas is critically important to maintaining the ecological integrity of the Lake. As noted above, Voltz Lake itself is especially rich in aquatic plant growth. Voltz Lake Marsh is designated as a natural area of county-wide or regional significance.

Voltz Lake has been designated as a critical aquatic habitat area under the SEWRPC's Critical Habitat Designation program on the basis of its ability to provide ideal waterfowl, marsh wildlife, and critical fish species habitat.¹⁹ The Lake is considered an aquatic area of local significance, important to the overall health of aquatic plants and animals.

¹⁹SEWRPC Planning Report Number 42, A Regional Natural Areas and Critical Species Habitat Protection and Management Plan for Southeastern Wisconsin, September 1997.

Map 3
Environmentally Significant Areas Within the Voltz Lake Watershed: 2015



- | | |
|--|---|
|  SURFACE WATER |  PRIMARY ENVIRONMENTAL CORRIDORS |
|  WATERSHED BOUNDARY |  SECONDARY ENVIRONMENTAL CORRIDORS |
| |  ISOLATED NATURAL RESOURCE AREA |
| |  WETLANDS |

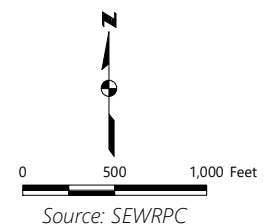


Figure 10
Typical Winter Activities on Voltz Lake



Source: SEWRPC

Aesthetic Features

The Lake, with its undeveloped eastern shoreline, vast expanses of marsh along the southern shore, and substantial mature oak trees populations along the western and northern shorelines, offers scenic viewing for lake residents. In addition, the relatively small number of year-round dwellings on the Lake, the larger-than-average lot size of lakeshore properties, the abundance and variety of wildlife, and an almost complete lack of motorized boating traffic all make for a quiet and peaceful setting.

LAKE USE

Recreational Use

The surveys showed that boat use of any kind on Voltz Lake is minimal and that power boating is practically nonexistent. Slow-cruising on pontoon boats, fishing, kayaking, and canoeing were the most popular summer activities on Voltz Lake. Ice fishing was the most popular winter activity observed (Figure 10).

The location of Voltz Lake within the greater Milwaukee and Chicago metropolitan areas would be expected to make this lake a popular weekend destination for boaters and fishermen, especially during the summer months. However, its relatively small size and the limitation of its navigable area due to an abundance of aquatic plant growth, together with its lack of adequate public boating access, result in this Lake's low level of recreational use. Those who live on Voltz Lake tend to look on it as more of a "quiet, nature lake".

Public Access

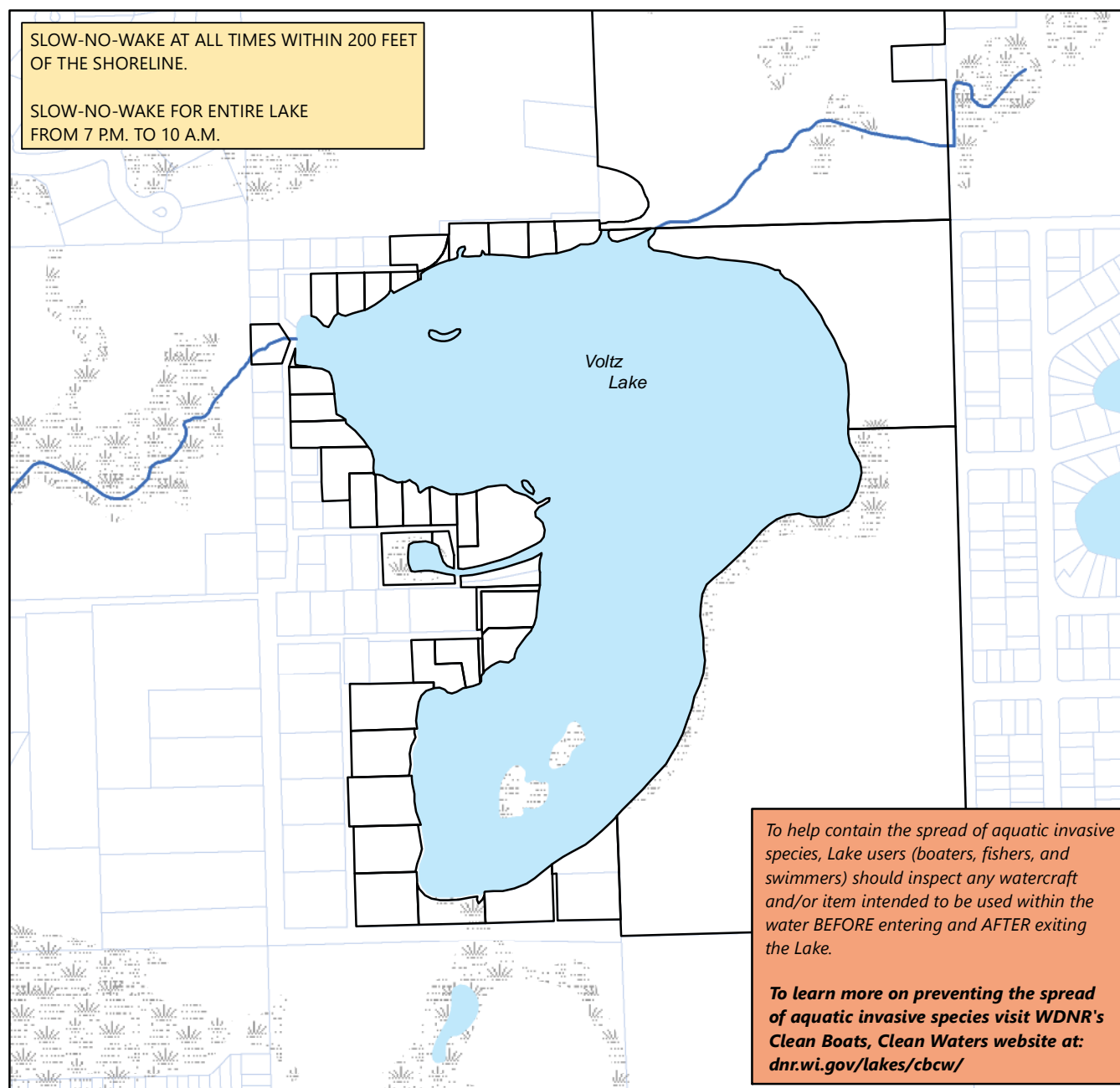
There are no public boat ramps on Voltz Lake (see Map 4). Therefore, the WDNR deems the Lake to have inadequate public recreational boating access pursuant to standards set forth in Chapter NR 1 of the *Wisconsin Administrative Code*.

Cottages and Homesites

According to recent records, 37 lakefront lots abut Voltz Lake. Lot sizes average 3.0 acres and range from less than 0.14 acre to 41.6 acres.²⁰ Lake shore lots along the south end of the Lake are one-acre parcels; lots

²⁰ SEWRPC Memorandum Report No. 222, op.cit.

Map 4 Recreational Use on Voltz Lake: 2015



along the rest of the Lake are smaller in size, averaging about 100 feet in width. The population and number of households in the Voltz Lake watershed is projected to decrease slightly by 2035 (Table 4).

EXISTING PROTECTIVE MEASURES

Sewage Disposal

At present, the majority of riparian residential lands in the Voltz Lake watershed are served by unrefined public sanitary sewer systems. As such, a number of residential lands are still served by private onsite wastewater treatment systems. Such systems need to be conscientiously maintained and inspected to ensure operation compliant with county and or local ordinances.

Shoreline Protection and Erosion Control

The shoreline of Voltz Lake is comprised of stretches of protected shoreline (either man-made or natural), as well as some areas of unprotected shoreline, such as where riparian owners mow lawn to water's edge (see Map 5). No major areas of shoreline erosion were recorded during a survey conducted by SEWRPC in August 2014.²¹

Land Use Regulations

Comprehensive zoning ordinances are one of the most important tools available to local units of government for encouraging orderly development and land use that contributes to long-term human and environmental welfare. Voltz Lake and its watershed are subject to ordinances and regulations adopted by the Village of Salem Lakes. The Village of Salem Lakes was incorporated on February 14, 2017, and, as an interim measure, continues to follow the ordinances adopted by the Town of Salem and Kenosha County. Table 5 summarizes general and special-purpose zoning ordinances for the civil divisions within the Voltz Lake watershed.

Water Use Regulations

Voltz Lake is subject to Village of Salem Lakes boating ordinances, which as mentioned in the previous paragraph, were originally adopted by the Town of Salem. These ordinances apply to persons, boats, watercraft, and objects upon, in, and under the waters of Voltz Lake. This ordinance is consistent with Chapter 30 of the *Wisconsin Statutes* and applies to persons, boats, watercraft, and objects upon, in, and under the waters of Voltz Lake within the jurisdiction of the Village and limits the times during which boats may operate on Voltz Lake.

Table 4
Population and Households in the
Voltz Lake Watershed: 1960-2035

Year	Population	Households
1960	9	5
1970	115	36
1980	107	34
1990	104	39
2000	119	38
2010	157	57
Planned 2035	126	43

Source: U.S. Bureau of Census and SEWRPC.

²¹ Ibid..

Map 5 Shoreline Survey of Voltz Lake: 2014

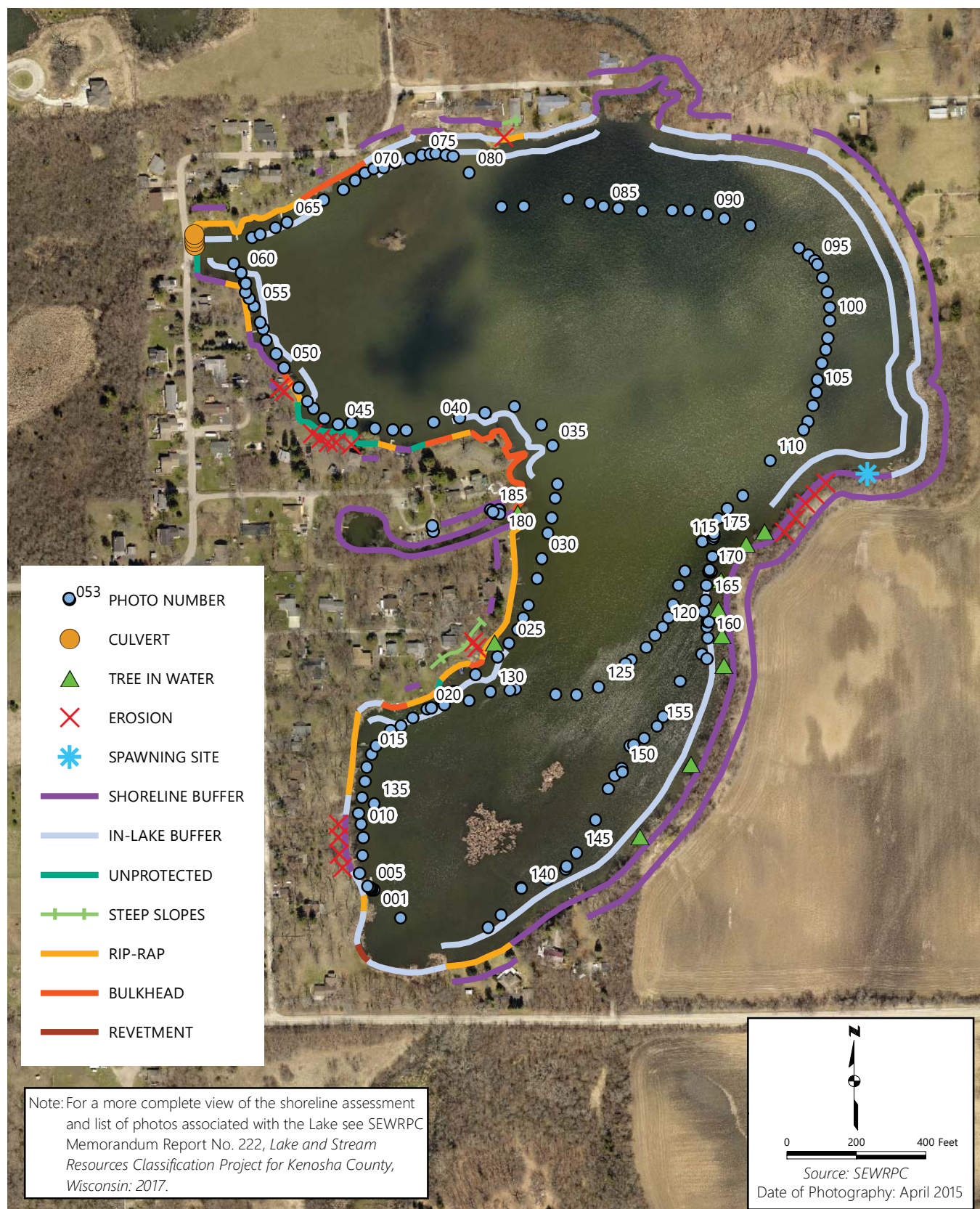


Table 5
Land Use Regulations Within the Voltz Lake Watershed in Kenosha County by Civil Division: 2016

Type of Ordinance	Community	
	Kenosha County	Village of Salem Lakes
General Zoning	Adopted	Regulated under County ordinance
Floodplain Zoning	Adopted	Regulated under County ordinance
Shoreland Zoning	Adopted	Regulated under County ordinance
Subdivision Control	Adopted ^a	Adopted ^a
Construction Site Erosion Control and Stormwater Management	Adopted ^a	Adopted ^a

^aBoth the Kenosha County and Village of Salem Lakes subdivision ordinances and erosion control and stormwater management ordinances apply within the Village of Salem Lakes. In the event of conflicting regulations, the more restrictive regulation applies

Source: SEWRPC