2ND ANNUAL MONITORING REPORT

FOR THE

LAKE BELLE VIEW RESTORATION PROJECT

BELLEVILLE, WISCONSIN

FEBRUARY 2013

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1 GENERAL

The first complete growing season of the post-construction restoration and mitigation activities of the Lake Belle View Restoration Project is complete. In December of 2011 the Lake Belle View water levels were raised to its final elevation of about 858 and wetland/floodplain forest restoration and mitigation areas were dormant seeded, completing the construction phase of the project. In May of 2012, the dredging activities on the Sugar River side of the new separation berm were completed, the gates of the Belleville Dam were closed and water levels on the Sugar River impoundment rose to its normal elevation of about 858. A covenant for conservation easement was granted in May 2012 to the US Army Corps of Engineer for 7.85-acres of enhanced wetland forest, upland buffer and restored wetlands to meet USACE requirements for compensatory mitigation for unavoidable wetland loss (See *Appendix E*). Vegetation maintenance activities conducted by a restoration contractor hired by the Village of Belleville (NES Ecological Services) started right away in January and continued throughout the year. A team of consultants hired by the Village (Montgomery Associates, Agrecol Environmental Consulting and Eco-Resource Consulting) also continued to monitor the progress of the restoration efforts, going above and beyond the requirements of the USACE permit special conditions with funding assistance from the Wisconsin DNR Lake Planning Grant. This summary report documents the various restoration and monitoring activities associated with the Lake Belle View Restoration Project.

2 VEGETATION MANAGEMENT

The following vegetation management activities took place in 2012:

- January 8 days Woody Species Control (Buckthorn & Honeysuckle)
- January 2 days Cattail Control
- February 4 days Cattail Control
- May 3 days Mowed Berm & Spot Treated Invasive Species in New Habitat Area (Primarily Cattails & Reed Canary Grass)
- June 7 days Mowed Berm & Spot Treated Invasive Species in New Habitat Area
- July 3 days Cattail Control
- August 6 days Cattail Control, Mowed Berm & Spot Treated Invasive Species in New Habitat Area

Activities planned for 2013:

<u>Existing Woods</u>

- Additional buckthorn & honeysuckle control along with Japanese Barberry in winter or early spring
- Spot-treat reed canary grass & moneywort in spring/early summer with follow-up in late summer or early fall

Emergent Zone

- Continued cattail control with focus on narrow-leaf and hybrid if easily distinguished from broad-leaf.
- This work will be conducted in spring or early summer with some follow-up in early fall. Some cattail will remain for muskrat habitat.

New Habitat Area

- Accessible areas will be mowed in early spring (May) and then again in mid to late June to help suppress weeds.
- Spot herbicide treatments in mid to late May, July and early September.

3 WETLAND/FLOODPLAIN FOREST RESTORATION

The wetland/floodplain forest restoration areas were evaluated for diversity, extent and dominance of native and invasive species, and the floristic quality of the species present in the restoration areas. This was done by Eco-Resource Consulting, LLC using transects and meander surveys in summer and fall of 2012. Even though 2012 was the second year of the project, because of delays in grading and seeding in 2011 due to wet conditions, 2012 is in fact the first full growing season. Additionally, the project experienced significant droughts which may have affected the success of the establishment of the seeding that took place in December 2011. Nevertheless, the conclusions from the ERC analysis are encouraging.

The ERC report found that the restoration area has at least 70% cover plant cover with no bare areas larger than 10 square feet. This meets the performance requirement after the first growing season as outlined in the Restoration and Mitigation plan for the Lake Belle View Restoration project by Montgomery Associates, 2010. Native species are present (40% - 90% of the taxa number) and are in most cases the dominant species (such as rice cut grass and Pennsylvania smartweed) although they are mostly weedy with low floristic quality. This is expected during the first year of the restoration as the early invaders occupy the area and can to a certain extent act as a “nurse” crop for more desirable native species; species such as big bluestem, black-eyed susan, purple coneflower, and New England aster that are already present in restoration area. The conclusions of the ERC report do indicate that continued weed control is necessary and possibly interseeding of desirable native plants will likely be needed to attain the desired performance standards for growing seasons 2 and 3.

Based on the conclusions of the first growing season, the team will continue to control invasive species in the second growing season and evaluate the success of the establishment of more desirable native species. The current plan is to implement a prescribed burn in the spring of 2014 with interseeding of climax species and planting of tree seedlings. The dominance of native species and the establishment of the more desirable non-weedy native species will be evaluated during growing season 2 and next steps will discussed in the fall of 2013. As discussed in the restoration and mitigation plan, adaptive management is necessary on a project such as this one where weather and ground conditions can impact the course of action and modifications to the current plan will be proposed if deemed necessary in the fall of 2013.

4 LAKE LEVEL MONITORING

Continuous water level monitoring was continued in 2012. Water level loggers were installed in two location: by the control structure to Lake Belle View and immediately west of the separation berm as it connects to Community Park on the Sugar River impoundment upstream of the old Belleville Dam. The loggers were launched on March 21st, as soon as ice had broken and continued throughout the year until December 12th. As noted earlier, due to the implementation of the West Lake Dredging project, the water levels on the Sugar River side were drawn down until about mid May.

The results of the monitoring can be seen in *Appendix C*. The graph shows daily mean water levels for the Lake and the River as well as the accumulative precipitation at the Dane County Regional Airport in Madison. The graph shows that the fluctuations on both the river and the lake were within 0.5' from the highest to the lowest water levels in the year. The median water levels were 857.85 and 857.87 for the Lake and the River respectively. The Lake levels are within the +/- 0.5' range from the normal water level of 858 and within +/- 0.5' of the annual median stage of the Sugar River.

5 IN LAKE WATER QUALITY MONITORING

Agrecol Environmental Consulting conducted in-lake water quality monitoring program supported by the Village of Belleville and a Wisconsin DNR Lake Planning grant and facilitated the training and coordination of various volunteer monitoring activities. Vertical lake profiles of dissolved oxygen, temperature, specific conductivity, and pH were recorded on five occasions throughout the year and a comparison of turbidity and transparency was performed between the Lake and the Sugar River on same occasions. Total nitrogen and total phosphorus, chlorophyll samples and secchi disk depths were collected for a Trophic State Index (TSI) determination and fish surveys were designed to sample populations of non-game species and juvenile stage sportfish. Attached in *Appendix B* is a short water quality monitoring summary for 2012 that serves as an interim progress report for a multi-year lake and watershed monitoring project sponsored by the Wisconsin DNR Planning Grant.

In summary, during the growing season of 2012, lake turbidity was relatively high but overall conditions were considered favorable by the Lake users. The high turbidity likely suppressed rooted plants but encouraged beds of white water lilies, longleaf pondweed, soft stem bulrush and arrowhead. Sugar River transparencies were generally better than the lake and likely reflected the severe drought in 2012. However, water quality in general was favorable for fish populations and abundant numbers of panfish were collected. Lake users had reported harvests of common carp around 10-14" and we confirmed the presence of the non-native fish during the fish sampling surveys. The carp are about two years old and suggest that small young of year carp over-wintered in an unidentified low area during the lake drawdown and dredging project. We are hopeful that the abundant numbers of green sunfish and bluegills collected during the shocking surveys can suppress carp reproduction.

6 ADDITIONAL RESTORATION AND MONITORING ACTIVITIES

In addition to the restoration and monitoring activities discussed above, the Village of Belleville has also shown initiatives in implementing additional monitoring and restoration activities to increase the amenities of the newly restored lake. Below is some of the additional work being implemented:

- The Village is in cooperation with the DNR working on vegetation maintenance activities on the Sugar River side of the berm to improve navigation, and control invasive species.
- UW-Madison took 7th graders from Belleville on a wildlife observation field visit and recorded numerous birds, mammals, reptiles and amphibians (see *Appendix D*)
- As part of the Wisconsin DNR Lake Planning Grant, the Village is monitoring stormsewer outlets and doing water quality testing to see if there any pollution concerns from the adjacent watershed. The results of this sampling (see *Appendix D*) suggest that the runoff pollution occurring from the remaining watershed area to the new lake are typical, or on the low side, of those experienced from low density residential development. Future management practice recommendations would be to minimize future storm water inputs and to maintain best management practices on lands currently draining to the lake.
- The Village has done numerous improvements to Community Park to improve access and the amenity of the newly restored project. Construction of a new pedestrian bridge across the river connects the park to downtown Bellville and creates a wonderful pedestrian corridor all the way from downtown to the Village north of Lake Belle View instead of having to travel along HWY 69.
- The Village celebrated the successful completion of the construction of the project and the improvements to Community Park by putting together LAKEFEST 2012. These festivities were a huge success with activities such as a triathalon in the Lake, canoe and kayak trips around the "canoe loop", and pontoon rides up and down the river. Hopefully this will become an annual event. Please see more information at http://bellevillelakefest.com/

APPENDIX A

SUMMER 2012 MONITORING REPORT FOR LAKE BELLE VIEW RESTORATION PROJECT
2012 ANNUAL MONITORING REPORT FOR LAKE BELLE VIEW RESTORATION PROJECT

ECO-RESOURCE CONSULTING, LLC

SUMMER 2012

MONITORING REPORT

FOR

LAKE BELLE VIEW RESTORATION PROJECT

Prepared for:

The Village of Belleville
Belleville, Wisconsin

Prepared by:

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Introduction

Eco-Resource Consulting, LLC, conducted a field investigation of the native plant community restoration around Lake Belle View on July 25, 2012. The areas surveyed included the emergent aquatic bed, an area from two feet below water level to the shoreline (-2 to 0 feet elevation), the wet meadow, an area from the shoreline to two feet of elevation above the shoreline (0 to + 2 feet elevation), the wet mesic prairie, an area from two feet to five feet elevation above the shoreline (+2 to + 5 feet elevation) and the mesic prairie area greater than five feet of elevation above the shoreline (> 5 feet elevation). The emergent aquatic bed occupies 9.4 acres of shallow water, the wet meadow, 11.1 acres of wetland; the wet prairie, 4.1 acres, and the mesic prairie 3.9 acres of upland (Figure 1).

The restoration area is composed of dredge spoils from the construction of Lake Belle View. The area was dredged during September 2010 and March 2011, grading activities were completed in November, 2011. The emergent area was seeded in June, 2011 and a dormant seeding using native plant seed appropriate to the community type was conducted in December, 2011.

Eco-Resources Consulting (ERC) was assigned the task of evaluating the success of the restoration during the growing season from 2012 -2015. In addition, ERC did a comparison analysis of one of the undisturbed lowland forest areas that was originally sampled in 2009 (Area 2, Montgomery and Associates, 2009)

The 2009 survey focused on the existing plant communities before the reconstruction of Lake Belle View. This survey focuses on the new plant communities as part of the Lake Belle View restoration efforts.

Field Methods

To assess the vegetation, a meander survey of the entire restoration area was conducted. In addition, three straight-line transects were completed starting at the emergent zone, traveling through the wet meadow, the wet-mesic prairie, and into the mesic prairie at various locations. Two field personnel traveled along the meander survey path (Figure 2) and recorded all species encountered. The three straight-line transects across the four habitat zones were conducted to verify and confirm that each habitat zone segment accurately assigned species dominance in that zone. Table 1 provides the GPS starting and ending points for each transect.

Table 1. Starting and Ending GPS Points for Lake Belle View Sampling Transects

	Starting point	Ending point
Transect 1	N42^{o}51.902, W-89°32.216	N42^{o}51.907, W-89°32.224
Transect 2	N42^{o}51.952, W-89°32.174	N42^{o}51.960, W-89°32.173
Transect 3	N42^{o}51.942, W-89°32.094	N42^{o}51.949, W-89°32.092

Analysis

A species list was compiled within each habitat community type to measure plant species diversity and floristic quality. The species lists are a compilation of species from the meander survey and the additional three transects for that community type. The 2009 survey (Montgomery and Associated, 2009) defined vegetative cover class as an estimated percent cover of a species in a habitat zone based on visual observation over the entire habitat zone. The table below provides the ranges of percent cover and the cover class value or ranking.

Vegetative Cover Classes

Cover Class	% Cover
1	1-10%
2	11-25%
3	26-50%
4	51-75%
5	76-90%
6	91-100%

The percent cover assigns every species observed a cover class rating of 1 to 6. A cover class rating of 6 indicates a species was found and was dominant or co-dominant in all three transects, and in the habitat zone as a whole. A cover rating of 1 indicates the species was found in low density throughout the habitat zone. Our estimates of cover class are also included in Tables 3-6 describing the plant communities in the four habitat types.

The Floristic Quality Assessment (FQA) was used to assess the floristic quality, following methodology developed by Swink and Wilhelm (1994). An FQA analysis was performed for each community type. This method is based on calculating an average Coefficient of Conservatism (C) and a Floristic Quality Index (FQI) for each community. A predetermined C value is assigned to each identifiable native plant species using locally appropriate values assigned by a panel of botanical experts (Bernthal, 2003). Each native species is assigned a C value which ranges from 0 to 10 and represents an estimated probability that a plant is likely to occur in a landscape relatively unaltered from what is believed to be a pre-settlement condition. A value for C of 0 is applied to a species that demonstrates little fidelity to any remnant natural community and to non-native species; whereas C of 10 is applied to plants that are almost always restricted to pre-settlement remnants. Values lower than 4 generally represent weedy species and values closer to 10 represent more “conservative”, rare or disturbance intolerant species (Swink and Wilhelm 1994). C values for each species that were assigned C values are included in Tables 2-6.

FQI values are calculated using the following formula:

FQI = Mean C(√N)

C= Coefficient of Conservatism

N= species richness (Identifiable Native & Non-native)

FQI has traditionally been calculated using C values and species richness of only native species. However, more recently, scientists are including the non-native species in the calculations, giving all non-native species a C value of "0". This is done because disregarding the non-native species can often give sites falsely elevated mean C and FQI values that do not reflect the presence or abundance of less desirable species, which influences the overall floristic quality of an area. This methodology better reflects the actual integrity of a site, rather than simply using native species for the FQI analysis, particularly in highly disturbed conditions dominated by non-native taxa.

FQI and mean C values were calculated using both natives only and all species, including non-natives. While FQI results must be carefully interpreted, especially in small sites or stands such as those surveyed which usually result in lower FQI values regardless of species composition. It is generally accepted that an FQI value of 35 and/or a mean C value of 4.0 indicates a site with very high floristic quality and integrity, while an FQI value of less than 20 and a mean C value of less than 2.5 indicates that the site is degraded (Swink and Wilhelm 1994) or in the case of a restoration a newly restored area or a restored area that has not reached its habitat potential.

In the 2009 survey a quantitative FQI (qFQI) was also calculated for each area using each species' estimated abundance in that stand as a weighting factor. For this calculation, the sum of the product of species abundances and Mean C values is divided by the sum of the species abundances. The result is a weighted C value (qC) that is multiplied by the square root of species richness for the stand to give the qFQI This calculation can result in an FQI value that more accurately takes into account species dominance, and thus floristic composition and quality, within the vegetation survey areas. The qC and qFQI results are also provided in Tables 3-6.

To determine the degree to which the species found in a restoration area are appropriate to the habitat type, an analysis of the species present was done using the wetland indicator status of assigned species. For this calculation each species is assigned a regional wetland indicator status (from Bernthal, 2003). These indicator statuses are defined as follows: Obligate Wetland (OBL) species almost always occur under natural conditions in wetlands in the region specified (estimated probability 99%), Facultative Wetland (FACW) species typically occur in wetlands (estimated probability 67%-99%) but are occasionally found in non-wetlands, Facultative (FAC) species are equally likely to occur in wetlands or non-wetlands (estimated probability 34%-66%), Facultative Upland (FACU) species typically occur in non-wetlands (estimated probability 67%-99%) but are occasionally found in wetlands, Upland (UPL) species almost always occur under natural conditions in non-wetlands (estimated probability 99%). Positive (+) or negative (-) signs are also used with the indicator statuses to further categorize the regional frequency of each species. A positive sign indicates a tendency toward the wetter end of the category, and a negative sign indicates a tendency toward the drier end. Tables 2-6 give the wetland status of species with assigned values and positive (+) or negative (-) signs. However for the trends displayed in Table 7 the signs were not considered.

Results

The flora of the whole restoration area consisted of 75 species (Table 2). Forty percent of these species were non-native and only 12% had a C value greater than 4. This indicates that at this point in the restoration the flora consists of mainly weedy or non-native species.

The emergent zone had the fewest species but the highest percentage of native species (Table 7). It also was most "true" to its habitat type with all but one species being obligate wetland species. Small duckweed and broad- and narrow-leaved cattails are the most common species (Table 3). Although small duckweed is a small (a little bigger than pinhead size), and free floating so it moves about the water, it can have a dominant impact in the plant community when layers become thick enough to shade out plants beneath it. The paucity of plants in this zone is not surprising. Emergent plant communities generally have fewer species than many upland communities. Also any residual seed bank found in bottom sediments may have been removed by dredging. The Mean C and qC values for this area are 2.93 and 2.6. The FQI and qFQI are 11 and 9.7 (Table 7).

The wet meadow had the highest number of species with 41, and 66% of them are native (Table 7). The two dominant species, rice cut grass and Pennsylvania smartweed are native species but with rather low C values which indicates they are "weedy" so it is not surprising that they are early invaders on the site (Table 4). The wet meadow probably has the highest species number because it spans the largest hydric gradient from wet shoreline to almost dry upland. The species present span an expected wetness gradient from obligate wetland species to facultative upland species with the highest percentage of species still in the obligate category (Table 7). The Mean C and qC values for this area are 2.05 and 1.9. The FQI and qFQI values are 13 and 12.2 (Table 7).

The species number and percentage of native species drops in the wet-mesic prairie zone (Table 7). Only 39% of the 36 species present are native. This zone also has the lowest Mean C value and FQI values for both total and native species. The wetness gradient is as expected with the majority of the species in the FACW, FAC, and FACU categories. Pennsylvania smartweed is the most dominant species in this area, but the next two most dominant species, lamb's quarters and carpetweed are non-native species (Table 5). The qC and qFQI values for this area are 1.2 and 7.2 respectively.

Species number in the mesic prairie drops further than those found in the wet-mesic prairie but the percentage of native species is higher (Table 7). Mean C and FQI values are only slightly higher than those of the wet-mesic prairie. The habitat fidelity of species in this area is confusing and the reason is not clear. The highest percentage of species is in the obligate category. A possibility is a seed bank from the original emergent zone was spread in this area and sediments didn't dry out very rapidly, allowing more wet "loving" species to grow and survive. Pennsylvania smartweed is again the most dominant species and lamb's quarters is the

second most dominant (Table 6). Species number for this area is 29 and Mean C and qC values are 1.17 and 1.1. FQI and qFQI values are 6 and 5.9 (Table 7).

The highest Mean C and FQI values, considering both native and total species, for all areas were 3.42 and 16 in the wet meadow area (Table 7). Many were considerably lower than these numbers and don't approach the Mean C and FQI values of 4 and 35 considered by Swink and Wilhelm (1994) as areas with high floristic quality and integrity. Some areas, however, surpass the 2.5 Mean C but fall below the FQI value of 20 which Swink and Wilhelm consider the area to be degraded or in this case needs considerably more time and work for the restoration to be successful.

Wildlife Observations

A variety of wildlife was observed on the July 25, 2012 survey including mallard and blue-winged teal ducks, Canada geese, sea gulls, cormorants, hummingbirds, snakes, bullfrogs, mink, bluegills, damselflies, dragonflies, and a variety of songbirds. Although the present vegetation in the restored area doesn't approach that of high quality plant communities, with the high dominance of smartweeds, it is good feeding habitat for waterfowl, especially in the fall when seeds mature.

Wisconsin Rapid Assessment Methodology (WRAM)

ERC completed the WRAM assessment concurrent with the semi-annual monitoring of the restoration on July 23 and 25, 2012. The results are similar but improved over the WRAM completed in 2009 by NRC. Annual WRAM assessments will be conducted in 2013 and 2014 and comparisons will be evaluated on an annual basis. As the restoration matures, the wetland functionality should improve and provide greater benefit to wildlife and the general public.

The 2012 WRAM is attached in Appendix B.

Summary and Discussion

The performance standard for the Lake Belle View restoration states that after one growing season, areas seeded with the native cover crop shall have 70% total plant cover with no bare areas larger than 10 square feet. After two full growing seasons, seeded areas shall have 80% total plant cover and 20% cover by native species. After three full growing seasons, seeded areas shall have 40% total cover by native species, at least 30% of the installed species shall be present (Montgomery and Associates, 2010). This requirement is not applicable if the prescribed burn is conducted after the second growing season.

The Year 1 performance standard of 70% plant cover with no bare areas larger than 10 square feet has been met. No bare areas greater than a few square feet were observed in the restoration area.

Although the restoration area is not very high quality, botanically speaking, at this time, the results should not be discouraging. The restoration is new and has not gone through one complete growing season. Restored vegetation takes time and considerable effort to attain performance standard results. This restoration needs additional weed control and interseeding of desirable native plants to attain the desired performance standard results.

The restoration limits are generally speaking from the separation berm to the east and do not include the Sugar River corridor and its associated wetlands. Invasive species removal actions have been successful in the restoration area but have not been conducted west of the separation berm. The wetlands west of the separation berm contain a manageable population of purple loosestrife, which if addressed in 2012, can yield positive results for the Lake Belle View restoration moving forward by removing an immediately adjacent population that is young and just beginning to become established. If left unchecked, the purple loosestrife will expand in size and become more difficult to eradicate in the future. The Village of Belleville is encouraged to contract NES or others to eradicate this small population for future benefit of the restoration and the long-term health of Lake Belle View.

References

Bernthal, Thomas W. 2003. Development of a Floristic Quality Assessment Methodology for Wisconsin, Final Report to USEPA – Region V. Wisconsin Department of Natural Resources. 22 pg.

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Swink, F. and G. Wilhelm. 1994. *Plants of the Chicago Region*, 4th edition. The Indiana Academy of Science. 921 pg.

Wetter, M.A., T.S. Cochrane, M.R. Black, H.H. Iltis, and P.E. Berry. 2001. Checklist of the Vascular Plants of Wisconsin. Technical Bulletin No. 192. Wisconsin Department of Natural Resources, Madison, Wisconsin. 258 pg.

Appendix A

Floral Comparison of Lake Belle View, Area 2

Area 2 of the lowland forest surrounding Lake Belle View was sampled in May 2009 before renewal of Lake Belle View commenced (Montgomery and Associated, 2009). For comparison purposes the same area was sampled on July 25, 2012. A random traverse was taken through the area and all plant species encountered were noted. The species found in 2012 are compared to those found in 2009 (Table A.1).

A total of 74 species were recorded during the two surveys. Thirty-nine species were found in the 2009 survey, an additional 35 species were found in the 2012 survey. Twenty-one species from the original survey were found in the 2012 survey, eighteen species were not found. There were 12 non-native species. Sixteen percent of the floras found in the combined two surveys were non-native species.

Some of the difference can be explained by the timing of the surveys. The 2009 survey found more of the spring flora that senesced by the time of the 2012 survey. Likewise the 2012 survey found more of the later growing and flowering plants. The three year difference in the surveys probably also accounted for some of the differences. Some new species entered the flora and some found in 2009 may have exited the flora.

Appendix B

Wisconsin Rapid Assessment Methodology

January, 2001

_____

File or Docket Number

Wisconsin Department of Natural Resources

RAPID ASSESSMENT METHODOLOGY FOR EVALUATING WETLAND FUNCTIONAL VALUES

GENERAL INFORMATION

Name of Wetland/Owner:
Location: County _____; ¼, ¼, Section , Township , Range
Project Name:
Evaluator(s):
Date(s) of Site Visit(s):

Description of seasonality limitations of this inspection due to time of year of the evaluation and/or current hydrologic and climatologic conditions (e.g. after heavy rains, snow or ice cover, during drought year, during spring flood, during bird migration):

WETLAND DESCRIPTION

Wisconsin Wetlands Inventory classification:
Wetland Type: shallow open water deep marsh shallow marsh seasonally flooded basin bog floodplain forest alder thicket sedge meadow coniferous swamp fen wet meadow shrub-carr low prairie hardwood swamp
Estimated size of wetland in acres:

SUMMARY OF FUNCTIONAL VALUES

Based on the results of the attached functional assessment, rate the significance of each of the functional values for the subject wetland and check the appropriate box. Complete the table as a summary.

FUNCTION	SIGNIFICANCE				
	Low	Medium	High	Exceptional	N/A
Floral Diversity					
Wildlife Habitat					
Fishery Habitat					
Flood/Stormwater Attenuation					
Water Quality Protection					
Shoreline Protection					
Groundwater					
Aesthetics/Recreation/Education					

List any Special Features/"Red Flags":

SITE DESCRIPTION

I. HYDROLOGIC SETTING

A. Describe the geomorphology of the wetland:

- ❑ Depressional (includes slopes, potholes, small lakes, kettles, etc.)
- ❑ Riverine
- ❑ Lake Fringe
- ❑ Extensive Peatland

B. **Y N** Has the wetland hydrology been altered by ditching, tiles, dams, culverts, well pumping, diversion of surface flow, or changes to runoff within the watershed (circle those that apply)?

C. **Y N** Does the wetland have an inlet, outlet, or both (circle those that apply)?

D. **Y N** Is there any field evidence of wetland hydrology such as buttressed tree trunks, adventitious roots, drift lines, water marks, water stained leaves, soil mottling/gleying, organic soils layer, or oxidized rhizospheres (circle those that apply)?

E. **Y N** Does the wetland have standing water, and if so what is the average depth in inches? _____"
Approximately how much of the wetland is inundated? _____%

F. How is the hydroperiod (seasonal water level pattern) of the wetland classified?

- ❑ Permanently Flooded
- ❑ Seasonally Flooded (water absent at end of growing season)
- ❑ Saturated (surface water seldom present)
- ❑ Artificially Flooded
- ❑ Artificially Drained

G. **Y N** Is the wetland a navigable body of water or is a portion of the wetland below the ordinary high-water mark of a navigable water body? List any surface waters associated with the wetland or in proximity to the wetland (note approximate distance from the wetland and navigability determination). Note if there is a surface water connection to other wetlands.

II. VEGETATION

A. Identify the vegetation communities present and the dominant species.

	floating leaved community dominated by:
	submerged aquatic community dominated by:
	emergent community dominated by:
	shrub community dominated by:
	deciduous broad-leaved tree community dominated by:
	coniferous tree community dominated by:
	open sphagnum mat or bog
	sedge meadow/wet prairie community dominated by:
	other (explain)

B. Other plant species identified during site visit:

III. SOILS

A. NRCS Soil Map Classification: _____

B. Field description:

❑ Organic (histosol)? If so, is it a muck or a peat?

❑ Mineral soil?

- Mottling, gleying, sulfidic materials, iron or manganese concretions, organic streaking (circle those that apply)
- Soil Description: _____
- Depth of mottling/gleying: _____
- Depth of A Horizon: _____
- Munsell Color of matrix and mottles
  - -Matrix below the A horizon (10"depth): _____
  - -Mottles: _____

V. SURROUNDING LAND USES

A. What is the estimated area of the wetland watershed in acres? _____

B. What are the surrounding land uses?

LAND-USE	ESTIMATED % OF WETLAND WATERSHED
Developed (Industrial/Commercial/Residential)	
Agricultural/cropland	
Agricultural/grazing	
Forested	
Grassed recreation areas/parks	
Old field	
Highways or roads	
Other (specify)	

VI. SITE SKETCH

FUNCTIONAL ASSESSMENT

The following assessment requires the evaluator to examine site conditions that provide evidence that a given functional value is present and to assess the significance of the wetland to perform those functions. Positive answers to questions indicate the presence of factors important for the function. The questions are not definitive and are only provided to guide the evaluation. After completing each section, the evaluator should consider the factors observed and use best professional judgement to rate the significance. The ratings should be recorded on page 1 of the assessment.

SPECIAL FEATURES/"RED FLAGS"

1. **Y N** Is the wetland in or adjacent to an area of special natural resource interest (NR 103.04, Wis. Adm. Code)? If so, check those that apply:

- ❑ Cold water community as defined in s. NR 102.04(3)(b), Wis. Adm. Code, including trout streams, their tributaries, and trout lakes
- ❑ Lakes Michigan and Superior and the Mississippi River
- ❑ State or federal designated wild and scenic river
- ❑ Designated state riverway
- ❑ Designated state scenic urban waterway
- ❑ Environmentally sensitive area or environmental corridor identified in an area-wide water quality management plan, special area management plan, special wetland inventory study, or an advanced delineation and identification study
- ❑ Calcareous fen
- ❑ State park, forest, trail or recreation area
- ❑ State and federal fish and wildlife refuges and fish and wildlife management areas
- ❑ State or federal designated wilderness area
- ❑ Designated or dedicated state natural area
- ❑ Wild rice water listed in ch. NR 19.09, Wis. Adm. Code
- ❑ Surface water identified as an outstanding or exceptional resource water in ch. NR 102, Wis. Adm. Code

2. **Y N** According to the Natural Heritage Inventory (Bureau of Endangered Resources) or direct observations, are there any rare, endangered, or threatened plant or animal species in, near, or using the wetland or adjacent lands? If so, list the species of concern:

3. **Y N** Is the project located in an area that requires a State Coastal Zone Management Plan consistency determination?

Floral Diversity

1. **Y N** Does the wetland support a variety of native plant species (i.e. not a monotypic stand of cattail or giant reed grass and/or not dominated by exotic species such as reed canary grass, brome grass, buckthorn, purple loosestrife, etc.)?

2. **Y N** Is the wetland plant community regionally scarce or rare?

Wildlife and Fishery Habitat

1. List any species observed, evidenced (e.g. tracks, scat, nest/burrow, calls), or expected to utilize the wetland:

2. **Y N** Does the wetland contain a number of diverse vegetative cover types and a high degree of interspersion of those vegetation types?

3. **Y N** Is the estimated ratio of open water to cover between 30 and 70 percent? What is the estimated ratio? _____%

4. **Y N** Does the surrounding upland habitat likely support a variety of animal species?

5. **Y N** Is the wetland part of or associated with a wildlife corridor or designated environmental corridor?

6. **Y N** Is the surrounding habitat and/or the wetland itself a large tract of undeveloped land important for wildlife that requires large home ranges (e.g. bear, woodland passerines)?

7. **Y N** Is the surrounding habitat and/or the wetland itself a relatively large tract of undeveloped land within an urbanized environment that is important for wildlife?

8. **Y N** Are there other wetland areas near the subject wetland that may be important to wildlife?

9. **Y N** Is the wetland contiguous with a permanent waterbody or periodically inundated for sufficient periods of time to provide spawning/nursery habitat for fish?

10. **Y N** Can the wetland provide significant food base for fish and wildlife (e.g. insects, crustaceans, voles, forage fish, amphibians, reptiles, shrews, wild rice, wild celery, duckweed, pondweeds, watermeal, bulrushes, bur reeds, arrowhead, smartweeds, millets...)?

11. **Y N** Is the wetland located in a priority watershed/township as identified in the Upper Mississippi and Great Lakes Joint Venture of the North American Waterfowl Management Plan?

12. **Y N** Is the wetland providing habitat that is scarce to the region?

Flood and Stormwater Storage/Attenuation

1. **Y N** Are there steep slopes, large impervious areas, moderate slopes with row cropping, or areas with severe overgrazing within the watershed (circle those that apply)?

2. **Y N** Does the wetland significantly reduce run-off velocity due to its size, configuration, braided flow patterns, or vegetation type and density?

3. **Y N** Does the wetland show evidence of flashy water level responses to storm events (debris marks, erosion lines, stormwater inputs, channelized inflow)?

4. **Y N** Is there a natural feature or human-made structure impeding drainage from the wetland that causes backwater conditions?

5. **Y N** Considering the size of the wetland area in relation to the size of its watershed, at any time during the year is water likely to reach the wetland's storage capacity (i.e. the level of easily observable wetland vegetation)? [For some cases where greater documentation is required, one should determine if the wetland has capacity to hold 25% of the run-off from a 2 year-24 hour storm event.]

6. **Y N** Considering the location of the wetland in relation to the associated surface water watershed, is the wetland important for attenuating or storing flood or stormwater peaks (i.e. is the wetland located in the mid or lower reaches of the watershed)?

Water Quality Protection

1. **Y N** Does the wetland receive overland flow or direct discharge of stormwater as a primary source of water (circle that which applies)?

2. **Y N** Do the surrounding land uses have the potential to deliver significant nutrient and/or sediment loads to the wetland?

3. **Y N** Based on your answers to the flood/stormwater section above, does the wetland perform significant flood/stormwater attenuation (residence time to allow settling)?

4. **Y N** Does the wetland have significant vegetative density to decrease water energy and allow settling of suspended materials?

5. **Y N** Is the position of the wetland in the landscape such that run-off is held or filtered before entering a surface water?

6. **Y N** Are algal blooms, heavy macrophyte growth, or other signs of excess nutrient loading to the wetland apparent (or historically reported)?

Shoreline Protection

1. **Y N** Is the wetland in a lake fringe or riverine setting? If NO, STOP and enter "not applicable" for this function. If YES, then answer the applicable questions.

2. **Y N** Is the shoreline exposed to constant wave action caused by long wind fetch or boat traffic?

3. **Y N** Is the shoreline and shallow littoral zone vegetated with submerged or emergent vegetation in the swash zone that decrease wave energy or perennial wetland species that form dense root mats and/or species that have strong stems that are resistant to erosive forces?

4. **Y N** Is the stream bank prone to erosion due to unstable soils, land uses, or ice floes?

5. **Y N** Is the stream bank vegetated with densely rooted shrubs that provide upper bank stability?

Groundwater Recharge and Discharge

1. **Y N** Related to discharge, are there observable (or reported) springs located in the wetland, physical indicators of springs such as marl soil, or vegetation indicators such as watercress or marsh marigold present that tend to indicate the presence of groundwater springs?

2. **Y N** Related to discharge, may the wetland contribute to the maintenance of base flow in a stream?

3. **Y N** Related to recharge, is the wetland located on or near a groundwater divide (e.g. a topographic high)?

Aesthetics/Recreation/Education and Science

1. **Y N** Is the wetland visible from any of the following kinds of vantage points: roads, public lands, houses, and/or businesses? (Circle all that apply.)

2. **Y N** Is the wetland in or near any population centers?

3. **Y N** Is any part of the wetland is in public or conservation ownership?

4. **Y N** Does the public have direct access to the wetland from public roads or waterways? (Circle those that apply.)

5. Is the wetland itself relatively free of obvious human influences, such as:

   a. **Y N** Buildings?
   b. **Y N** Roads?
   c. **Y N** Other structures?
   d. **Y N** Trash?
   e. **Y N** Pollution?
   f. **Y N** Filling?
   g. **Y N** Dredging/draining?
   h. **Y N** Domination by non-native vegetation?

6. Is the surrounding viewshed relatively free of obvious human influences, such as:
   a. **Y N** Buildings?
   b. **Y N** Roads?
   c. **Y N** Other structures?

7. **Y N** Is the wetland organized into a variety of visibly separate areas of similar vegetation, color, and/or texture (including areas of open water)?

8. **Y N** Does the wetland add to the variety of visibly separate areas of similar vegetation, color, and/or texture (including areas of open water) within the landscape as a whole?

9. Does the wetland encourage exploration because any of the following factors are present:
   a. **Y N** Long views within the wetland?
   b. **Y N** Long views in the viewshed adjacent to the wetland?
   c. **Y N** Convoluted edges within and/or around the wetland border?
   d. **Y N** The wetland provides a different (and perhaps more natural/complex) kind of environment from the surrounding land covers?

10. **Y N** Is the wetland currently being used for (or does it have the potential to be used for) the following recreational activities? (Check all that apply.)

ACTIVITY	CURRENT USE	POTENTIAL USE
Nature study/photography		
Hiking/biking/skiing		
Hunting/fishing/trapping		
Boating/canoeing		
Food harvesting		
Others (list)		

11. **Y N** Is the wetland currently being used, and/or does it have the potential for use for educational or scientific study purposes (circle that which applies)?

Table 2. Lake BelleView - Semi-annual Monitoring conducted on July 25, 2012

Restoration Species List		Regional wetland Indicator[3]	C of C[3]
Abutilon theophrasti	velvet-leaf		
Ajuga genevensis	blue bugle		0
Alisma subcordatum	water-plantain	OBL	3
Alopecurus carolinianus	foxtail	FACW	0
Amaranthus retroflexus	pigweed	FACU+	0
Ambrosia artemisiifolia	common ragweed	FACU	0
Ambrosia trifida	giant ragweed	FAC+	0
Arctium minus	burdock	FACU	0
Asclepias incarnata	swamp milkweed	OBL	5
Asparagus officinalis	asparagus	FACU	0
Aster sp.	aster		
Barbarea vulgaris	yellow rocket	FAC	0
Bidens frondosa	beggars tick	FACW	1
Bromus inermis	smooth brome grass	FACU	0
Carex lacustris	lake sedge	OBL	6
Carex sp.	sedge		
Ceratophyllum demersum	coontail	OBL	3
Chenopodium album	lamb's-quarters	FACU-	0
Cirsium vulgare	bull thistle	FACU-	0
Convolvulus arvensis	bindweed		0
Cuscuta gronovii	dodder		4
Cyperus esculentus	yellow nut sedge	FACW	0
Daucus carota	Queen Anne's-lace		0
Decodon vericillatus	swamp loosestrife	OBL	7
Echinacea pallida	purple coneflower		7
Echinochloa crusgalli	barnyard grass	FACW	0
Eleocharis obtusa	blunt spike-rush	OBL	3
Elodea canadensis	common waterweed	OBL	3
Elymus canadensis	Canadian wild rye	FACU-	4
Erigeron annuus	daisy fleabane	FAC-	0
Eupatorium maculatum	joe-pye weed	OBL	4
Eupatorium perfoliatum	boneset	FACW+	6
Festuca pratensis	rye grass	FACU-	0
Glyceria borealis	mana grass	OBL	8
Conyza canadensis	horseweed	FAC-	0
Impatiens capensis	jewel weed	FACW	2
Iris virginica	blue flag	OBL	5
Laportea canadensis	Canadian wood-nettle	FACW	4
Leersia oryzoides	rice cut grass	OBL	3
Lemna minor	small duckweed	OBL	4
Lythrum salicaria	purple loosestrife	OBL	0
Mentha arvensis	field mint	FACW	3
Mollugo verticillata	carpetweed	FAC	0
Nymphaea odorata	white water lily	OBL	6
Oenothera biennis	evening-primrose	FACU	1
Phalaris arundinacea	reed canary grass	FACW+	0
Poa pratensis	Kentucky bluegrass	FAC	0
Polygonum hydropiper	water-pepper	OBL	0
Polygonum pensylvanicum	Pennsylvania smartweed	FACW+	1
Polygonum persicaria	lady's thumb	FACW	0

Populus deltoides	cottonwood	FAC+	2
Potamogeton natans	floating-leaved pondweed	OBL	5
Potentilla simplex	common cinquefoil	FACU-	2
Rudbeckia hirta	black-eyed susan	FACU	4
Rumex crispus	curly dock	FAC+	0
Sagitarria latifolia	common arrowhead	OBL	3
Salix nigra	willow	OBL	4
Schoenoplectus tabernaemontani	soft-stem bulrush	OBL	4
Scirpus atrovirens	dark-green bulrush	OBL	3
Scirpus cyperinus	wool grass	OBL	4
Scirpus fluviatilis	river bulrush	OBL	6
Silene latifolia	white campion		0
Solanum dulcamara	deadly nightshade	FAC	0
Sonchus arvensis	sow-thistle	FAC-	0
Stuckenia pectinata	sago pondweed	OBL	3
Taraxacum officinale	dandelion	FACU	0
Thlaspi arvense	penny cress	FACU	0
Trifolium pratense	red clover	FAC+	0
Trifolium repens	white clover	FAC+	0
Typha angustifolia	narrow-leaved cattail	OBL	0
Typha latifolia	broad-leaved cattail	OBL	1
Urtica dioica	stinging nettle	FAC+	1
Verbascum thapsus	mullein		
Verbena hastata	blue vervain	FACW+	3
Vitis riparia	river bank grape	FACW-	2

Total species	75
Non-native species	30
Percent non-native	40%
Species C > 4	9
Percentage Species C > 4	12%

1. Naming follows Wetter et al. 2001
2. Species in bold are non-native
3. After Bernthal, 2003

Table 3. Lake BelleView - Semi-annual Monitoring conducted on July 25, 2012

Emergent Zone Vegetation

Scientific Name [1,2]	Common Name	Cover Class	Regional wetland Indicator[3]	C of C[3]	Cover X C
Lemna minor	small duckweed	5	OBL	4	20
Typha angustifolia	narrow-leaved cattail	5	OBL	0	0
Typha latifolia	broad-leaved cattail	5	OBL	1	5
Alisma subcordatum	water-plantain	3	OBL	3	9
Ceratophyllum demersum	coontail	3	OBL	3	9
Sagitarria latifolia	common arrowhead	3	OBL	3	9
Elodea canadensis	common waterweed	2	OBL	3	6
Leersia oryzoides	rice cut grass	2	OBL	3	6
Potamogeton natans	floatingleaf pondweed	2	OBL	5	10
Eleocharis obtusa	blunt spike-rush	1	OBL	3	3
Nymphaea odorata	white water lily	1	OBL	6	6
Phalaris arundinacea	reed canary grass	1	FACW+	0	0
Schoenoplectus tabernaemontani	soft-stem bulrush	1	OBL	4	4
Stuckenia pectinata	sago pondweed	1	OBL	3	3
	Total cover	35	Total C	41	90
Total species	14		Mean C	2.93	
Native species	12		Mean C	3.42	
% Native	86.00%				

		FQI		
1. Naming follows Wetter et al., 2001	**Native**	12	**qC**	2.6
2. Species in bold are non-native	**Total**	11	**qFQI**	9.7
3. After Bernthal,2003				

Table 4. Lake BelleView - Semi-annual Monitoring conducted on July 25, 2012

Wet Meadow Zone Vegetation

Scientific Name [1,2]	Common Name	Cover Class	Regional wetland Indicator[3]	C of C[3]	Cover X C
Leersia oryzoides	rice cut grass	5	OBL	3	15
Polygonum pensylvanicum	Pennsylvania smartweed	5	FACW+	1	5
Conyza canadensis	horseweed	3	FAC-	0	0
Polygonum persicaria	lady's thumb	3	FACW	0	0
Rudbeckia hirta	black-eyed susan	3	FACU	4	12
Ajuga genevensis	blue bugle	2			0
Chenopodium album	lamb's-quarters	2	FAC-	0	0
Poa pratensis	Kentucky bluegrass	2	FAC	0	0
Verbena hastata	blue vervain	2	FACW+	3	6
Amaranthus retroflexus	pigweed	1	FACU+	0	0
Ambrosia trifida	giant ragweed	1	FAC+	0	0
Asclepias incarnata	swamp milkweed	1	OBL	5	5
Aster sp.	aster	1			0
Bidens frondosa	beggars tick	1	FACW	1	1
Carex lacustris	lake sedge	1	OBL	6	6
Carex sp.	sedge	1			0
Convolvulus arvensis	bindweed	1		0	0
Cyperus esculentus	yellow nut sedge	1	FACW	0	0
Decodon vericillatus	swamp loosestrife	1	OBL	7	7
Echinacea pallida	purple coneflower	1		7	7
Echinochloa crusgalli	barnyard grass	1	FACW	0	0
Eleocharis obtusa	blunt spikerush	1	OBL	3	3
Erigeron annuus	daisy fleabane	1	FAC-	0	0
Eupatorium perfoliatum	boneset	1	OBL	6	6
Eupatorium maculatum	joe-pye weed	1		4	4
Glyceria borealis	mana grass	1	OBL	8	8
Impatiens capensis	jewel weed	1	FACW	2	2
Iris virginica	blue flag	1	OBL	5	5
Laportea canadensis	Canadian wood-nettle	1	FACW	4	4
Lythrum salicaria	purple loosestrife	1	OBL	0	0
Mollugo verticillata	carpetweed	1	FAC	0	0
Phalaris arundinacea	Reed canary grass	1	FACW+	0	0
Polygonum hydropiper	water-pepper	1	OBL	0	0
Populus deltoides	cottonwood	1	FAC+	2	2
Schoenoplectus tabernaemo	soft-stem bulrush	1	OBL	4	4
Scirpus atrovirens	dark-green bulrush	1	OBL	3	3
Scirpus cyperinus	wool grass	1	OBL	4	4
Solanum dulcamara	deadly nightshade	1	FAC	0	0
Thlaspi arvense	penny cress	1	FACU	0	0
Trifolium pratense	red clover	1	FAC+	0	0
Vitis riparia	river bank grape	1	FACW-	2	2
	Total Cover	59	Total C	84	111
Total species	41		Mean C	2.05	
Native species	27		Mean C	3.11	
% Native	66%				
			FQI		
		Native	16	**qC**	1.9
		Total	13	**qFQI**	12.2

1. Naming follows Wetter et al. 2001
2. Species in bold are non-native
3. After Bernthal,2003

Table 5. Lake BelleView - Semi-annual Monitoring conducted on July 25, 2012

Wet-Mesic Prairie Vegetation

Scientific Name [1,2]	Common Name	Cover Class	Regional wetland Indicator[3]	C of C[3]	Cover X C
Polygonum pensylvanicum	Pennsylvania smartweed	5	FACW+	1	5
Chenopodium album	lamb's-quarters	4	FAC-	0	0
Mollugo verticillata	carpetweed	4	FAC	0	0
Rudbeckia hirta	black-eyed susan	3	FACU	4	12
Thlaspi arvense	penny cress	3	FACU	0	0
Verbena hastata	blue vervain	3	FACW+	3	9
Cirsium vulgare	bull thistle	2	FACU-	0	0
Poa pratensis	Kentucky bluegrass	2	FAC	0	0
Rumex crispus	curly dock	2	FAC+	0	0
Salix nigra	willow	2	OBL	4	8
Abutilon theophrasti	velvet-leaf	1	FACU-	0	0
Alopecurus carolinianus	foxtail	1	FACW	0	0
Arctium minus	burdock	1	FACU	0	0
Barbarea vulgaris	yellow rocket	1	FAC	0	0
Bidens frondosa	beggars tick	1	FACW	1	1
Carex sp.	sedge	1			0
Convolvulus arvensis	bindweed	1		0	0
Conyza canadensis	horseweed	1	FAC-	0	0
Daucus carota	Queen Anne's-lace	1		0	0
Echinacea pallida	purple coneflower	1		7	7
Echinochloa crusgalli	barnyard grass	1	FACW	0	0
Elymus canadensis	Canadian wild rye	1	FACU-	4	4
Eupatorium perfoliatum	boneset	1	OBL	6	6
Festuca pratensis	rye grass	1	FACU-	0	0
Iris virginica	blue flag	1	OBL	5	5
Leersia oryzoides	rice cut grass	1	OBL	3	3
Mentha arvensis	field mint	1	FACW	3	3
Phalaris arundinacea	Reed canary grass	1	FACW+	0	0
Polygonum hydropiper	water-pepper	1	OBL	0	0
Polygonum persicaria	ladys thumb	1	FACW	0	0
Potentilla simplex	common cinquefoil	1	FACU-	2	2
Sonchus arvensis	sow-thistle	1	FAC-	0	0
Taraxacum officinale	dandelion	1	FACU	0	0
Trifolium pratense	red clover	1	FAC+	0	0
Trifolium repens	white clover	1	FAC+	0	0
Verbascum thapsus	mullein	1		0	0
	Total Cover	56	Total C	30	65
Total species	36		Ave. C	0.83	
Native species	14		Ave. C	2.14	
% Native	39%				
			FQI		
		Native	8	**qC**	1.2
		Total	5	**qFQI**	7.2

1. Naming follows Wetter et al., 2001
2. Species in bold are non-native
3. After Bernthal,2003

Table 6. Lake BelleView - Semi-annual Monitoring conducted on July 25, 2012

Mesic Prairie Vegetation

Scientific Name [1,2]	Common Name	Cover Class	Regional wetland Indicator[3]	C of C[3]	Cover X C
Polygonum pensylvanicum	Pennsylvania smartweed	5	FACW+	1	5
Chenopodium album	lamb's-quarters	4	FAC-	0	0
Conyza canadensis	horseweed	3	FAC-	0	0
Leersia oryzoides	rice cut grass	3	OBL	3	9
Poa pratensis	Kentucky bluegrass	3	FAC	0	0
Rudbeckia hirta	black-eyed susan	3	FACU	4	12
Thlaspi arvense	penny cress	3	FACU	0	0
Verbena hastata	blue vervain	3	FACW+	3	9
Mollugo verticillata	carpetweed	2	FAC	0	0
Polygonum hydropiper	water-pepper	2	OBL	0	0
Rumex crispus	curly dock	2	FAC+	0	0
Amaranthus retroflexus	pigweed	1	FACU+	0	0
Ambrosia artemisiifolia	common ragweed	1	FACU	0	0
Asparagus officinalis	asparagus	1	FACU	0	0
Bromus inermis	smooth brome grass	1	FACU	0	0
Cuscuta gronovii	dodder	1		4	4
Echinacea pallida	purple coneflower	1		7	7
Eupatorium perfoliatum	boneset	1	OBL	6	6
Lythrum salicaria	purple loosestrife	1	OBL	0	0
Oenothera biennis	evening-primrose	1	FACU	1	1
Phalaris arundinacea	Reed canary grass	1	FACW+	0	0
Polygonum persicaria	lady's thumb	1	FACW	0	0
Salix nigra	willow	1	OBL	4	4
Scirpus fluviatilis	river bulrush	1			0
Silene latifolia	white campion	1		0	0
Sonchus arvensis	sow-thistle	1	FAC-	0	0
Typha angustifolia	narrow-leaved cattail	1	OBL	0	0
Urtica dioica	Stinging nettle	1	FAC+	1	1
Verbascum thapsus	mullein	1		0	0
	Total Cover	51	Total C	34	58
Total species	29		Mean C	1.17	
Native species	14		Mean C	2.43	
% Native	48%				
			FQI		
1. Naming follows Wetter et al., 2001		**Native**	9	**qC**	1.1
2. Species in bold are non-native		**Total**	6	**qFQI**	5.9
3. After Bernthal,2003					

Table 7. Lake BelleView - Semi-annual Monitoring conducted on July 25, 2012. Summary of Species Richness and Floral Quality

Zone	Species Richness				Mean C Value		Percentage C value	Regional Wetland Idicator Status Percentage[1]					FQI	FQI	qC	qFQI
	Native	Non-native	Total	Percentage native	all	native	4 or less	UPL	FACU	FAC	FACW	OBL	native	total		
Emergent	12	2	14	86%	2.93	3.42	86%	0%	0%	0%	7%	93%	12	11	2.6	9.7
Wet Meadow	27	14	41	66%	2.05	3.11	83%	0%	7%	20%	24%	32%	16	13	1.9	12.2
Wet-Mesic Prairie	14	22	36	39%	0.83	2.14	92%	0%	25%	25%	22%	14%	8	5	1.2	7.2
Mesic Prairie	14	15	29	48%	1.17	2.43	93%	0%	14%	14%	14%	21%	9	6	1.1	5.9

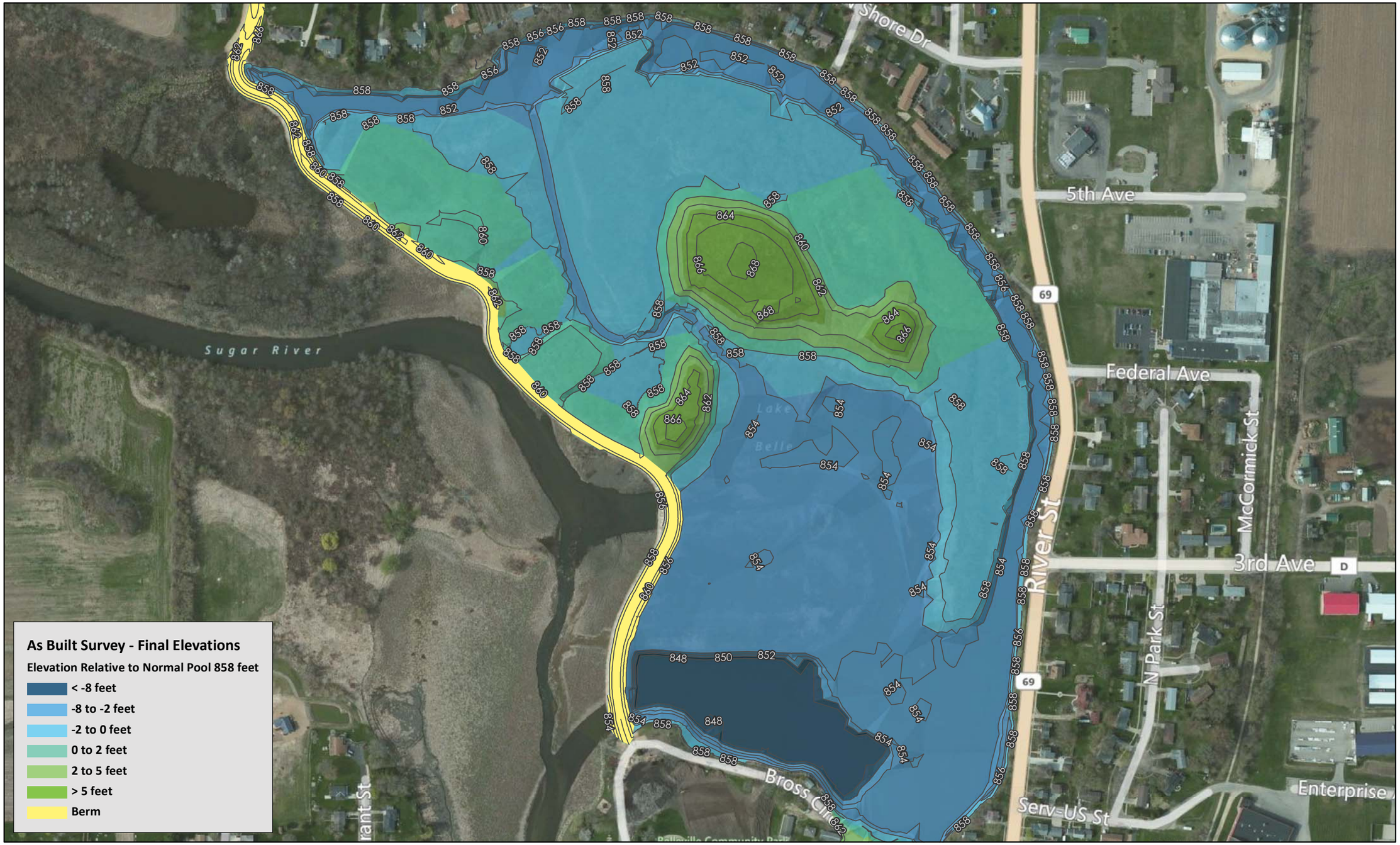
1. Percentage may not add up to 100% because all species in a zone were not given a wetland status.

Table A.1 Floral Comparison of Lake Belle View, Area 2

Scientific Name[1]	Common Name	Found[2] May, 2009	Found[3] July, 2012
Acer negundo	box elder		x
Acer saccharinum	silver maple	x	x
Alliaria petiolata	garlic mustard		x
Allium canadense	wild onion	x	
Alnus incana	swamp alder	x	x
Amelanchier laevis	smooth seviceberry		x
Anemone quinquefolia	wood anemone		x
Arctium minus	burdock	x	x
Arisaema triphyllum	jack-in-pulpit	x	
Asarum canadense	wild ginger	x	x
Aster lateriflorus	calico aster		x
Aster macrophyllus	large-leaf aster		x
Bidens frondosa	beggar-ticks		x
Brassica rapa	field mustard	x	
Cardamine concatenata	toothwort		x
Carex blanda	wood sedge		x
Carex spp.	various sedges	x	
Carya ovata	shagbark hickory		x
Celtis occidentalis	hackberry	x	x
Cirsium arvense	Canada thistle		x
Claytonia virginica	spring beauty	x	
Clintonia borealis	blue-bead lily	x	
Convolvulus arvensis	bindweed		x
Cornus racemosa	gray dogwood		x
Cornus stolinifera	red osier dogwood	x	x
Corylus americana	hazelnut		x
Daucus carota	Queen Anne's-lace		x
Dicentra cucullaria	Dutchman's-breeches	x	
Eupatorium perfoliatum	boneset		x
Fraxinus pennsylvanica	green ash	x	x
Galinsoga quadriradiata	quick-weed		x
Galium aparine	bedstraw		x
Geranium maculatum	wild geranium	x	x
Geum canadense	white avens		x
Geum laciniatum	rough avens	x	x
Hackelia virginiana	stickseed		x
Helianthus annuus	commun sunflower		x
Impatiens capensis	orange jewelweed	x	x
Iris virginica	Vrginia iris	x	
Laportea canadensis	wood nettle		x
Lonicera X Bella	Bell's honeysuckle	x	x
Lysimachia nummularia	creeping-jennie	x	
Mentha arvensis	field mint		x
Napaea dioica	glade mallow	x	
Onoclea sensibilis	sensitive fern	x	x
Oxalis stricta	wood-sorrel		x

Parthenocissus quinquefolia	woodbine		x
Phalaris anundinacea	reed canary grass	x	
Podophyllum peltatum	may-apple	x	
Polygonum persicaria	spotted lady's-thumb	x	
Potentilla simplex	cinquefoil		x
Prenanthes alba	lions-foot		x
Prunus pennsylvanica	pin cherry	x	
Prunus serotina	black cherry		x
Rhamnus cathartica	common buckthorn	x	x
Ribes americanum	wild black currant	x	x
Rosa multiflora	multiflower rose		x
Rubus idaeus	red raspberry		x
Salix nigra	black willow	x	
Silphium perfoliatum	cup plant		x
Sium suave	water-parsnip	x	
Smilacina racemosa	false solomon seal	x	x
Smilax herbacea	smooth carrion-flower		x
Solidago gigantea	giant goldenrod	x	x
Thalictrum dioicum	quicksilver-weed	x	
Tilia americana	American basswood	x	x
Toxicodendron radicans	poison-ivy		x
Ulmus americana	American elm	x	x
Urtica dioica	Stinging nettle	x	x
Viburnum acerifolium	maple-leaed viburnum		x
Viola cucullata	blue marsh violet	x	
Viola pubescens	yellow violet	x	x
Vitis riparia	river bank grape		x
Zanthoxylum americanum	common prickly ash	x	x

1. Bold type indicates non-native species
2. From Montgomery and Associates, 2009
3. Naming follows Wetter et al., 2001



Main Map Projection: Dane County Coordinate System | Locator Map Not to Scale

DRAWN BY	CHECKED BY
DYL	SJH

MONTGOMERY ASSOCIATES:
RESOURCE SOLUTIONS, LLC
119 South Main Street | Cottage Grove, WI 53527
(608) 839-4422 | www.ma-rs.org

AS BUILT ELEVATIONS
HABITAT ZONES

Lake Belle View Lake Restoration
Village of Belleville
Dane County, WI

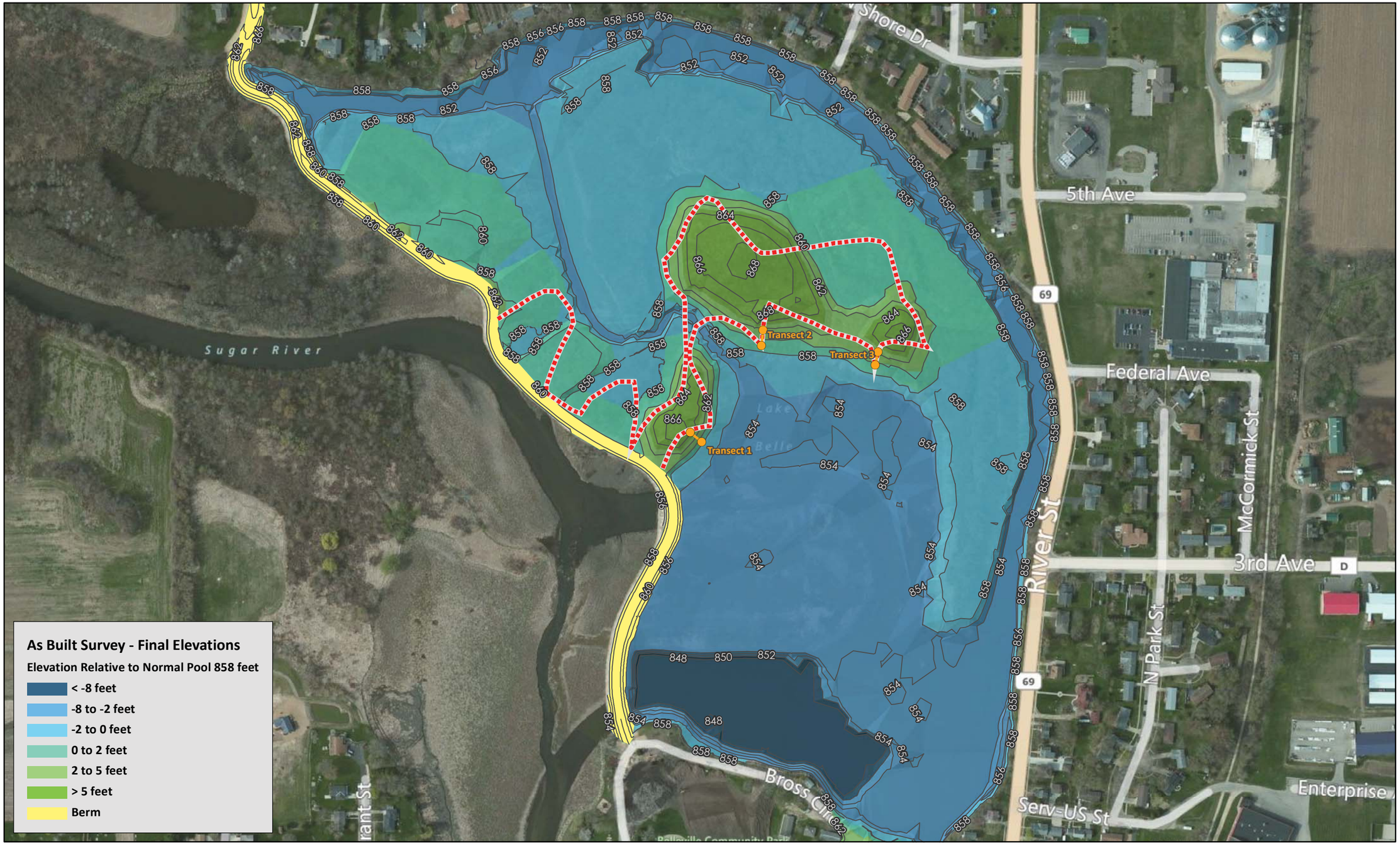
N
W E
S

0 150 300 Feet

SCALE
1 inch = 300 feet

PROJECT NO.	DATE
1428-011	Sept 4, 2012

SHEET NO.
Figure 1



Meander Survey Path

Transect Points

Transect Lines

Main Map Projection: Dane County Coordinate System | Locator Map Not to Scale

DRAWN BY	CHECKED BY
DYL	SJH

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JULY 25, 2012
MEANDER SURVEY PATH
Lake Belle View Lake Restoration
Village of Belleville
Dane County, WI

N
W E
S

0 150 300 Feet

SCALE
1 inch = 300 feet

PROJECT NO.	DATE
1428-011	Sept 4, 2012

SHEET NO.
Figure 2

2012 ANNUAL MONITORING REPORT

FOR

LAKE BELLE VIEW RESTORATION PROJECT

Prepared for:

The Village of Belleville
Belleville, Wisconsin

Prepared by:

Eco-Resource Consulting, LLC
409 Concord Drive
Oregon, WI 53575

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Introduction

Eco-Resource Consulting, LLC, conducted a fall field investigation of the native plant community restoration around Lake Belle View on September 10 and 20, 2012. The September 10, 2012 survey was comparable to the survey done in July with a different meander path covering the restoration area. The areas surveyed were in the main restoration area and included the emergent aquatic bed, an area from two feet below water level to the shoreline (-2 to 0 feet elevation), the wet meadow, an area from the shoreline to two feet of elevation above the shoreline (0 to + 2 feet elevation), the wet mesic prairie, an area from two feet to five feet elevation above the shoreline (+2 to + 5 feet elevation) and the mesic prairie area greater than five feet of elevation above the shoreline (> 5 feet elevation). The emergent aquatic bed occupies 9.4 acres of shallow water, the wet meadow, 11.1 acres of wetland; the wet prairie, 4.1 acres, and the mesic prairie 3.9 acres of upland (Figure 1). In addition two loops (Loops 1 and 2 on Figure 2) areas were surveyed north of the main restoration area.

On September 20, 2012 a random meander survey was conducted to record species found in the original 2009 meander survey conducted by Natural Resource Consulting (NRC) for comparison purposes (Areas 3 and 5 on Figure 2). These two areas did not receive active restoration activities other than woody invasive species removal.

The main restoration area is composed of dredge spoils from the construction of Lake Belle View. The area was dredged during September 2010 and March 2011; grading activities were completed in November 2011. The emergent area was seeded in June 2011 and a dormant seeding using native plant seed appropriate to the community type was conducted in December 2011. Eco-Resource Consulting (ERC) was assigned the task of evaluating the success of the restoration during the growing seasons from 2012 -2015.

Field Methods

In the main survey area three straight-line perpendicular transects were completed starting at the emergent zone, traveling through the wet meadow, the wet-mesic prairie, and into the mesic prairie at various locations. Two ERC field personnel traveled along the three transects that crossed the four habitat zones and recorded each species found and assigned species dominance to each in that zone. In addition, each species encountered while meandering through the zone was assigned a species dominance. Table 1 provides the GPS starting and ending points for each transect. A meander survey recording dominance was conducted on Loops 1 and 2 but without regard to habitat type. The September 20, 2012 survey recorded the species present without regard to dominance or habitat type in Areas 3 and 5.

Table 1. Starting and Ending GPS Points for September Sampling Transects

	Starting point	Ending point
Transect 1	N42.51.973 W-89.32.237	N52.51.991 W-89.32.221
Transect 2	N42.52.042 W-89.32.234	N42.52.008 W-89.32.202
Transect 3	N42.51.077 W-89.32.110	N42.51.964 W-89.32.110

Analysis

A species list was compiled within each habitat community type to measure plant species diversity and floristic quality. The species lists are a compilation of species from the meander survey and the three transects and for that community type.

In a 2009 survey (NRC, 2009) defined vegetative cover class as an estimated percent cover of a species in a habitat zone based on visual observation over the entire habitat zone. The table below provides the ranges of percent cover and the cover class value or ranking.

Vegetative Cover Classes

Cover Class	% Cover
1	1-10%
2	11-25%
3	26-50%
4	51-75%
5	76-90%
6	91-100%

The percent cover assigns every species observed a cover class rating of 1 to 6. A cover class rating of 6 indicates a species was found and was dominant or co-dominant in all three transects, and in the habitat zone as a whole. A cover rating of 1 indicates the species was found in low density throughout the habitat zone. Our estimates of cover class are included in Tables 3-6 describing the plant communities in the four habitat types and in Table 7 for Loops 1 and 2.

The Floristic Quality Assessment (FQA) was used to assess the floristic quality, following methodology developed by Swink and Wilhelm (1994). An FQA analysis was performed for each community type. This method is based on calculating an average Coefficient of Conservatism (C) and a Floristic Quality Index (FQI) for each community. A predetermined C value is assigned to each identifiable native plant species using locally appropriate values assigned by a panel of botanical experts (Bernthal, 2003). Each native species is assigned a C value which ranges from 0 to 10 and represents an estimated probability that a plant is likely to occur in a landscape relatively unaltered from what is believed to be a pre-settlement condition. A value for C of 0 is applied to a species that demonstrates little fidelity to any remnant natural community and to non-native species, whereas C of 10 is applied to plants that are almost always restricted to pre-settlement remnants. Values lower than 4 generally represent weedy species and values closer

to 10 represent more "conservative", rare or disturbance intolerant species (Swink and Wilhelm 1994). C values for each species that were assigned C values are included in Tables 2-6.

FQI values are calculated using the following formula:
FQI = Mean C (√N)
C= Coefficient of Conservatism
N= species richness (Identifiable Native & Non-native)

FQI has traditionally been calculated using C values and species richness of only native species. However, more recently, scientists are including the non-native species in the calculations, giving all non-native species a C value of "0". This is done because disregarding the non-native species can often give sites falsely elevated mean C and FQI values that do not reflect the presence or abundance of less desirable species, which influences the overall floristic quality of an area. This methodology better reflects the actual integrity of a site, rather than simply using native species for the FQI analysis, particularly in highly disturbed conditions dominated by non-native taxa.

FQI and mean C values were calculated using both natives only and all species, including non-natives. While FQI results must be carefully interpreted, especially in small sites or stands such as those surveyed which usually result in lower FQI values regardless of species composition. It is generally accepted that an FQI value of 35 or above and/or a mean C value of 4.0 indicates a site with very high floristic quality and integrity, while an FQI value of less than 20 and a mean C value of less than 2.5 indicates that the site is degraded (Swink and Wilhelm 1994) or in the case of a restoration a newly restored area or a restored area that has not reached its habitat potential.

We also calculated a quantitative FQI (qFQI) for each area using each species estimated abundance in that stand as a weighting factor. For this calculation, the sum of the product of species abundances and mean C values is divided by the sum of the species abundances. The result is a weighted C value (qC) that is multiplied by the square root of species richness for the stand that results in the qFQI. This calculation can result in an FQI value that more accurately takes into account species dominance, and thus floristic composition and quality, within the vegetation survey areas. The qC and qFQI results are also provided in Tables 3-6 and are summarized in Table 8.

To determine the degree to which the species found in a restoration area are appropriate to the habitat type, an analysis of the species present was done using the wetland indicator status of assigned species. For this calculation each species is assigned a regional wetland indicator status (from Bernthal, 2003). These indicator statuses are defined as follows: Obligate Wetland (OBL) species almost always occur under natural conditions in wetlands in the region specified (estimated probability 99%), Facultative Wetland (FACW) species typically occur in wetlands (estimated probability 67%-99%) but are occasionally found in non-wetlands, Facultative (FAC) species are equally likely to occur in wetlands or non-wetlands (estimated probability 34%-66%), Facultative Upland (FACU) species typically occur in non-wetlands (estimated probability 67%-99%) but are occasionally found in wetlands, Upland (UPL) species almost always occur under natural conditions in non-wetlands (estimated probability 99%). Positive (+) or negative (-) signs are used with the indicator statuses to further categorize the regional frequency of each species. A positive sign indicates a tendency toward the wetter end of the category, and a negative sign

indicates a tendency toward the drier end. Tables 2-6 give the wetland status of species with assigned values and positive (+) or negative (-) signs. However for the trends displayed in Table 8 the signs were not considered.

Results

The taxa found in the July, and the September surveys were combined to describe the flora for the whole restoration area (this does not include taxa from Appendix A1 of the July survey that is not a restoration area). The flora consisted of 125 taxa (Table 2). Thirty-four percent of these species were non-native and 19% had a C value greater than 4. This indicates that at this point in the restoration the flora consists of mainly weedy or non-native species. Twenty-two percent were OBL species, 22% FACW species, 17% FAC species, 22% FACU species, and one UPL species. The remainder of the species was not rated.

The emergent zone had the fewest species but the highest percentage of native species (Table 8). It also was most "true" to its habitat type with all but one species being obligate wetland species. Small duckweed and broad- and narrow-leaved cattails are the most common species (Table 3). Although duckweed is a small plant species (a little bigger than pinhead size), and free floating so it moves about the water, it can have a dominant impact in the plant community when layers become thick enough to shade out plants beneath it. The paucity of plants in this zone is not surprising. Emergent plant communities generally have fewer species than many upland communities. Also any residual seed bank found in bottom sediments may have been removed by dredging. The Mean C total and Mean C native are 2.9 and 3.6 respectively. The FQI total and FQI native are 9.6 and 10.8 respectively. The qC value is 2.5 and the qFQI is 8.3 (Table 8). It should be noted that Tables 3-6 are organized in descending order of cover for the September survey. The most important species in the area were virtually unchanged between the July and September sampling (Table 3). The FQI and qFQI were slightly lower in September than in July. This may be the result of finding fewer species in September.

The wet meadow had the highest number of species with 40 and 75% of them were native (Table 8). Twenty-one species that were found in the July sampling were not found in September but 20 new species were found. This caused a drop in total species count by one. The dominant species is rice cut grass with a cover rating of 5. There are four species with cover ratings of 3. All these species have C value of 4 or less and one is non-native. This indicates they are "weedy" so it is not surprising that they are early invaders on the site (Table 4). The wet meadow probably has the highest species number because it spans the largest hydric gradient from wet shoreline to almost dry upland. The species present span an expected wetness gradient from obligate wetland species to facultative upland species with the highest percentage of species in the FACW category (Table 8). This is a change from the July sampling when most species were in the OBL category. The Mean C native and total values are 3.4 and 2.5. The FQI native and FQI total values are 18.5 and 16, up slightly from July values (Table 8). The qC and qFQI values of 2.3 and 14.6 are also up slightly from July values (Table 8). This area had the highest FQI and qFQI values of the four habitat types. This may be the result of higher species number than the other areas and more native species present.

Species number in the wet-mesic prairie zone was the same as in the emergent zone but only 43% were native (Table 8). Five species found in the July survey were not found but nine new species were found in September. The Mean C total was low (1.5) but not as low as the mesic

prairie. The Mean C native (2.5) was slightly lower than the Mean C native for the mesic prairie (Table 8). The wetness gradient is as expected with most species somewhat evenly distributed between the FACW, FAC, and FACU categories. Pennsylvania smartweed and lamb's quarters, the two dominant species in July were still dominant in September (Table 5), Carpetweed, a dominant species in July was not found in September. The FQI native and FQI total are 10.6 and 7.2. The qC and qFQI values for this area are 1.1 and 6.9 respectively.

Species number in the mesic prairie drops further than those found in the wet-mesic prairie but the percentage of native species is higher and increased to 57% (Table 8). Species number for this area is 30 with 12 species found in July not found in September but with 13 new species found. The habitat fidelity of species in this area was confusing in July with many OBL species found. This was not the case in September when no OBL species were found, one UPL species was found, and the majority of the species were in the FAC or FACU categories (Table 8). Pennsylvania smartweed is again the most dominant species and lamb's quarters and black-eyed susans the second most common species (Table 6). Mean C native and Mean C total were 2.1 and 1.2 respectively. The FQI native and total were 8.7 and 6.6. The qC and qFQI values were 1.2 and 6.6.

The species found in Areas 3 and 5 are listed in Table 7. Most species are what might be expected in these areas. Of particular interest is white turtlehead, knotweed dodder, early meadow rue, tussock sedge, and frost aster. All these species have a C value of 7 or greater (Table 2) so they may be remnants from wetlands before reconstruction of Lake Belle View.

The highest Mean C native and Mean C total was 3.6 and 2.9 in the emergent community. The highest FQI native and FQI total values were 18.5 and 16 in the wet meadow community (Table 8). Many were considerably lower than these numbers. The emergent native Mean C value approaches the Mean C of 4 considered by Swink and Wilhelm (1994) as an area with high floristic quality but its FQI value does not approach 35. Some areas surpass the Mean C value of 2.5 but fall below the FQI value of 20 which Swink and Wilhelm consider to be degraded or in this case needs considerably more time and work for the restoration to be successful. Most Mean C and FQI values were similar between the July and September sampling; some being slightly higher and some being slightly lower.

Wildlife

A variety of wildlife was observed on the July 25, 2012 survey including mallard and blue-winged teal ducks, Canada geese, sea gulls, cormorants, hummingbirds, snakes, bullfrogs, mink, bluegills, damselflies, dragonflies, and a variety of songbirds. Additional species seen in September were great blue herons and little green herons. Although the present vegetation in the restored area doesn't approach that of high quality plant communities, with the high dominance of smartweeds, it is good feeding habitat for waterfowl, especially in the fall when seeds mature.

Discussion and Summary

The Performance Standards for the Lake Belle View restoration states that after one growing season, areas seeded with the native cover crop shall have 70% total plant cover with no bare areas larger than 10 square feet. After two full growing seasons, seeded areas shall have 80% total plant cover and 20% cover by native species. After three full growing seasons, seeded areas shall have 40% total cover by native species, at least 30% of the installed species shall be present (Montgomery and Associates, 2010). This requirement is not applicable if the prescribed burn is conducted after the second growing season. One full growing season after the prescribed burn and seeding of the native forbs mix, seeded areas shall have 70% total plant cover, seedlings of five installed native species shall be present and widely distributed, and seeded areas shall have no bare areas larger than 10 square feet. Two full growing seasons after the prescribed burn and seeding of the native forbs mix, seeded areas shall have 80% total plant cover and 20% cover by native species, and at least 20% of the installed species shall be present. Three full growing seasons after the prescribed burn and seeding of the native forbs mix, seeded areas shall have 40% total cover by native species, and at least 30% of the installed species shall be present.

The Year 1 performance standard of 70% plant cover with no bare areas larger than 10 square feet was met. No bare areas greater than a few square feet were observed in the restoration area. The total taxa from both the July and September sampling periods were comprised of 66% native species. All four of the habitat areas sampled had a greater than 40% native plant species by the September sampling. However, this is just based on taxa number, not on plant coverage. Most species found were low C value natives (i.e. weeds) or non-native species. This is expected in an "open" habitat such as a restoration. To a certain extent these species can act as a "nurse" crop for more desirable native species. Weedy species such as carpetweed has already been "out-competed" by other species during the 2012 growing season. Some of the weedy species can be long lasting and have undesirable impacts on native species planted for the restoration. Therefore, there needs to be continued management efforts to control these species.

Although the restoration area is not very high quality, botanically speaking, at this time, the results should not be discouraging. Some species like big bluestem, black-eyed susan, purple coneflower, and New England aster are present. The restoration is new and is in its first complete growing season. Restored vegetation takes time and considerable effort to attain performance standard results. This restoration needs additional weed control and interseeding of desirable native plants to attain the desired performance standard.

The restoration limits are generally speaking from the separation berm to the east and do not include the Sugar River corridor and its associated wetlands. Invasive species removal actions have been successful in the restoration area but have not been conducted west of the separation berm. The area west of the berm contains non-native species that can invade into the restoration area. Chief among these is purple loosestrife. Presently the wetlands west of the separation berm contain a manageable population of purple loosestrife, which if addressed immediately, can yield positive results for the Lake Belle View restoration. Removing this young, adjacent loosestrife population that is just beginning to become established will have long-term benefit to the restoration. If left unchecked, the purple loosestrife will expand in size and become more difficult to eradicate in the future. The Village of Belleville is encouraged to

contract NES or others to eradicate this small population for future benefit of the restoration and the long-term health of Lake Belle View.

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Table 2. Belle View-2012 Species list[1,2]

		Regional wetland Indicator[3]	C of C[3]
Abutilon theophrasti	velvet-leaf	FACU-	0
Ajuga genevensis	blue bugle	NI	0
Alisma subcordatum	water-plantain	OBL	3
Alnus incana	swamp alder	OBL	4
Alopecurus carolinianus	foxtail	FACW	0
Amaranthus retroflexus	pigweed	FACU+	0
Ambrosia artemisiifolia	common ragweed	FACU	0
Ambrosia trifida	giant ragweed	FAC+	0
Andropogon gerardii	big bluestem	FAC-	4
Arctium minus	burdock	FACU	0
Artemisia ludoviciana	white sage	UPL	3
Asclepias incarnata	swamp milkweed	OBL	5
Asparagus officinalis	asparagus	FACU	0
Aster novae-angliae	New England Aster	FACW	3
Aster pilosus	frost aster	FACU+	7
Aster sp.	aster		
Barbarea vulgaris	yellow rocket	FAC	0
Bidens connatus	purple-stem beggars-ticks	OBL	6
Bidens frondosa	beggars tick	FACW	1
Bromus inermis	smooth brome grass	FACU	0
Carduus nutans	musk thistle	NI	0
Carex blanda	common woodland sedge	FAC	3
Carex lacustris	lake sedge	OBL	6
Carex sp.	various sedge species		
Carex stricta	tussock sedge	OBL	7
Celtis occidentalis	northern hackberry	FAC-	4
Ceratophyllum demersum	coontail	OBL	3
Chelone glabra	white turtlehead	OBL	7
Chenopodium album	lamb's-quarters	FACU-	0
Cirsium arvense	Canada thistle	FACU	0
Cirsium vulgare	bull thistle	FACU-	0
Convolvulus arvensis	bindweed	NI	0
Conyza canadensis	horseweed	FAC-	0
Cornus stolonifera	red osier dogwood	FACW	3
Cuscuta gronovii	dodder	NI	4
Cuscuta polygonorum	knotweed dodder	NI	8
Cyperus esculentus	yellow nut sedge	FACW	0
Dactylis glomerata	orachard grass	FACU	0
Daucus carota	Queen Anne's-lace	NI	0
Decodon vericillatus	swamp loosestrife	OBL	7
Digitaria sanguinalis	hairy crabgrass	FACU	0
Echinacea pallida	purple coneflower	NI	7
Echinochloa crusgalli	barnyard grass	FACW	0
Eleocharis obtusa	blunt spike-rush	OBL	3
Elodea canadensis	common waterweed	OBL	3
Elymus canadensis	Canadian wild rye	FACU-	4
Elymus virginianus	virginia wild rye	FACW	6
Erigeron annuus	daisy fleabane	FAC-	0
Eupatorium maculatum	joe-pye weed	OBL	4
Eupatorium perfoliatum	boneset	FACW+	6
Festuca pratensis	rye grass	FACU-	0
Fraxinus pennsylvanicus	green ash	FACW	2
Galinsoga quadriradiata	common quickweed	NI	0
Gallium obtusum	blunt-leaf bedstraw	FACW+	6
Geranium maculatum	wild geranium	FACU	4
Glechoma hederacea	ground ivy	FACU	0

Glyceria borealis	mana grass	OBL	8
Helenium autumnale	sneeze weed	FACW+	4
Helianthus giganteus	swamp sunflower	FACW	4
Impatiens capensis	jewel weed	FACW	2
Iris virginica	blue flag	OBL	5
Laportea canadensis	Canadian wood-nettle	FACW	4
Leersia oryzoides	rice cut grass	OBL	3
Lemna minor	small duckweed	OBL	4
Lonicera x bella	Bell's Honeysuckle	NI	0
Lysimachia nummularia	creeping-jennie (moneywort)	FACW+	0
Lythrum salicaria	purple loosestrife	OBL	0
Mentha arvensis	field mint	FACW	3
Mollugo verticillata	carpetweed	FAC	0
Nymphaea odorata	white water lily	OBL	6
Oenothera biennis	evening-primrose	FACU	1
Oxalis stricta	wood sorrel	FACU	0
Panicum miliaceum	millet	NI	0
Parthenocissus vitacea	woodbine	FAC-	5
Phalaris arundinacea	Reed canary grass	FACW+	0
Plantago major	common plantain	FAC+	0
Poa pratensis	Kentucky bluegrass	FAC	0
Polygonum amphibium	water smartweed	OBL	6
Polygonum lapathifolium*	curly-top knotweed	FACW+	2
Polygonum pensylvanicum	Pennsylvania smartweed	FACW+	1
Polygonum persicaria	lady's thumb	FACW	0
Polygonum sagittatum	arrow-leaved tear-thumb	OBL	6
Populus deltoides	cottonwood	FAC+	2
Potamogeton natans	floatingleaf pondweed	OBL	5
Potentilla simplex	common cinquefoil	FACU-	2
Quercus macrocarpa	bur oak	FAC-	5
Rhamnus cathartica	common buckthorn	FACU	0
Ribes americanum	wild black currant	FACW	4
Rosa multiflora	mulitiflora rose	FACU	0
Rubus allegheniensis	blackberry	FACU+	2
Rudbeckia hirta	black-eyed susan	FACU	4
Rudbeckia laciniata	wild goldenglow (cutleaf coneflower)	FACW+	6
Rumex crispus	curly dock	FAC+	0
Rumex salicifolius	willow dock	FACW	1
Rumex vetricillatus	swamp dock	FACW	3
Sagitarria latifolia	common arrowhead	OBL	3
Salix nigra	willow	OBL	4
Schoenoplectus tabernaemontani	soft-stem bulrush	OBL	4
Scirpus atrovirens	dark-green bulrush	OBL	3
Scirpus cyperinus	wool grass	OBL	4
Schoenoplectus fluviatilis	river bulrush	OBL	0
Scutellaria galericulata	marsh skullcap	OBL	5
Setaria faberi	giant foxtail	FACU+	0
Silene latifolia	bladder campion	NI	0
Silphium perfoliatum	cupplant	FACW-	4
Solanum dulcamara	deadly nightshade	FAC	0
Solidago gigantea	giant goldenrod	FACW	3
Sonchus arvensis	sow-thistle	FAC-	0
Sonchus oleraceus	sow-thistle	FACU	0
Stuckenia pectinata	sago pondweed	OBL	3
Taraxacum officinale	dandelion	FACU	0
Thalictrum dioicum	early meadow rue	FACU+	7
Thlaspi arvense	penny cress	FACU	0
Tilia americana	American basswood	FACU	5
Trifolium pratense	red clover	FAC+	0
Trifolium repens	white clover	FAC+	0
Typha angustifolia	narrow-leaved cattail	OBL	0

Typha latifolia	broad-leaved cattail	OBL	1
Ulmus rubra	slippery elm	FAC	4
Urtica dioica	stinging nettle	FAC+	1
Verbascum thapsus	mullein	NI	0
Verbena hastata	blue vervain	FACW+	3
Viburnum lentago	nannyberry	FAC+	4
Vitis riparia	river bank grape	FACW-	2
Zanthoxylum americanum	common prickly-ash		3

			Taxa number	Percent
Total taxa	125	OBL	28	22%
Non-native species	43	FACW	28	22%
Percent non-native	34%	FAC	21	17%
Species C > 4	24	FACU	28	22%
Percentage Species C > 4	19%	UPL	1	1%
		Not rated	18	14%

1. Naming follows Wetter et al. 2001
2. Species in bold are non-native
3. After Bernthal, 2003

* in July this species was thought to be Polygonum hydropiper, with more maturity it was identified as P. latpathifolium

Table 3. Lake Belleview- 2012

Emergent Zone Vegetation

Scientific Name [1,2]	Common Name	Cover Class '7/12	Cover Class '9/12	Regional wetland Indicator[3]	7/12 C of C[3]	9/12 C of C[3]	Cover X C '7/12	Cover X C '9/12
Lemna minor	small duckweed	5	5	OBL	4	4	20	20
Typha latifolia	broad-leaved cattail	5	5	OBL	1	1	5	5
Typha angustifolia	narrow-leaved cattail	5	5	OBL	0	0	0	0
Ceratophyllum demersum	coontail	3	3	OBL	3	3	9	9
Leersia oryzoides	rice cut grass	2	3	OBL	3	3	6	9
Potamogeton natans	floatingleaf pondweed	2	2	OBL	5	5	10	10
Nymphaea odorata	white water lily	1	1	OBL	6	6	6	6
Schoenoplectus tabernaemontani	soft-stem bulrush	1	1	OBL	4	4	4	4
Sagitarria latifolia	common arrowhead	3	1	OBL	3	3	9	3
Stuckenia pectinata	sago pondweed	1	1	OBL	3	3	3	3
Phalaris arundinacea	Reed canary grass	1	1	FACW+	0	0	0	0
Alisma subcordatum	water-plantain	3		OBL	3		9	0
Elodea canadensis	common waterweed	2		OBL	3		6	0
Eleocharis obtusa	blunt spike-rush	1		OBL	3		3	0

	7/12	9/12		7/12	9/12
			Total C	41	32
Total species	14	11	**Mean C**	2.9	2.9
Native species	12	9	**Mean C**	3.4	3.6
% Native	86%	82%			

New species found in '9/12	Species not found 9/12
0	3

	FQI '7/12	FQI '9/12		7/12	9/12
Native	11.8	10.8	**qC**	2.6	2.5
Total	10.8	9.6	**qFQI**	9.7	8.3

1. Naming follows Wetter et al., 2001
2. Species in bold are non-native
3. After Bernthal,2003

Table 4. Lake Belleview- 2012

Wet Meadow Zone Vegetation

Scientific Name [1,2]	Common Name	Cover Class '7/12	Cover Class '9/12	Regional wetland Indicator[3]	7/12 C of C[3]	9/12 C of C[3]	Cover X C '7/12	Cover X C '9/12
Leersia oryzoides	rice cut grass	5	5	OBL	3	3	15	15
Bidens connatus	purple-stem beggars-ticks		3	OBL		6		18
Rudbeckia hirta	black-eyed susan	3	3	FACU	4	4	12	12
Polygonum pensylvanicum	Pennsylvania smartweed	5	3	FACW+	1	1	5	3
Phalaris arundinacea	Reed canary grass	1	3	FACW+	0	0	0	0
Polygonum sagittatum	arrow-leaved tear-thumb		2	OBL		6		12
Polygonum amphibium	water smartweed		2	OBL		6		12
Helenium autumnale	sneezeweed		2	FACW		4		8
Verbena hastata	blue vervain	2	2	FACW+	3	3	6	6
Aster novae-angliae	New England aster		2	FACW		3		6
Impatiens capensis	jewel weed	1	2	FACW	2	2	2	4
Polygonum lapathifolium*	curly-top knotweed	1	2	FACW	2	2	2	4
Bidens frondosa	beggars tick	1	2	FACW	1	1	1	2
Cyperus esculentus	yellow nut sedge	1	2	FACW	0	0	0	0
Echinochloa crusgalli	barnyard grass	1	2	FACW	0	0	0	0
Setaria faberi	giant foxtail		2	FACU+		0		0
Conyza canadensis	horseweed	3	2	FAC-	0	0	0	0
Chenopodium album	lamb's-quarters	2	2	FAC-	0	0	0	0
Schoenoplectus fluviatilis	river bulrush		2	OBL		0		0
Decodon vericillatus	swamp loosestrife	1	1	OBL	7	7	7	7
Carex stricta	tussock sedge		1	OBL		7		7
Echinacea pallida	purple coneflower	1	1	NI	7	7	7	7
Eupatorium perfoliatum	boneset	1	1	OBL	6	6	6	6
Asclepias incarnata	marsh milkweed		1	OBL		5		5
Scutellaria galericulata	marsh skullcap		1	OBL		5		5
Schoenoplectus tabernaemontani	soft-stem bulrush	1	1	OBL	4	4	4	4
Sagittaria latifolia	common arrowhead		1	OBL		3		3
Rumex vetricillatus	swamp dock		1	FACW		3		3
Urtica dioica	stinging nettle		1	FACW		1		1
Rumex salicifolius	willow dock		1	FACW		1		1
Typha angustifolia	narrow-leaved cattail		1	OBL		0		0
Arctium minus	burdock		1	FACU		0		0
Ambrosia artemisiifolia	common ragweed		1	FACU		0		0
Digitaria sanguinalis	hairy crabgrass		1	FACU		0		0
Erigeron annuus	daisy fleabane	1	1	FAC-	0	0	0	0
Sonchus arvensis	sow thistle		1	FAC-		0		0
Convolvulus arvensis	bindweed	1	1	NI	0	0	0	0
Galinsoga quadriradiata	common quickweed		1	FACU		0		0

Aster sp.	aster	1	1				0	0
Carex sp.	sedge	1	1				0	0
Glyceria borealis	mana grass	1		OBL	8	8	8	0
Eleocharis obtusa	blunt spikerush	1		OBL	3		3	0
Asclepias incarnata	swamp milkweed	1		OBL	5		5	0
Carex lacustris	lake sedge	1		OBL	6		6	0
Iris virginica	blue flag	1		OBL	5		5	0
Lythrum salicaria	purple loosestrife	1		OBL	0		0	0
Scirpus atrovirens	dark-green bulrush	1		OBL	3		3	0
Scirpus cyperinus	wool grass	1		OBL	4		4	0
Vitis riparia	river bank grape	1		FACW-	2		2	0
Polygonum persicaria	lady's thumb	3		FACW	0		0	0
Laportea canadensis	Canadian wood-nettle	1		FACW	4		4	0
Amaranthus retroflexus	pigweed	1		FACU+	0		0	0
Thlaspi arvense	penny cress	1		FACU	0		0	0
Ambrosia trifida	giant ragweed	1		FAC+	0		0	0
Populus deltoides	cottonwood	1		FAC+	2		2	0
Trifolium pratense	red clover	1		FAC+	0		0	0
Poa pratensis	Kentucky bluegrass	2		FAC	0		0	0
Mollugo verticillata	carpetweed	1		FAC	0		0	0
Solanum dulcamara	deadly nightshade	1		FAC	0		0	0
Ajuga genevensis	blue bugle	2		NI		98	0	0
Eupatorium maculatum	joe-pye weed	1		OBL	4		4	0

	7/12	**9/12**
Total species	41	40
Native species	27	30
% Native	66%	75%

	7/12	**9/12**
Total C	51	98
Mean C	1.24	2.45
Mean C	1.89	3.27

New species found in '9/12	**Species not found in '9/12**
20	21

	FQI '7/12	**FQI '9/12**
Native	16.5	18.5
Total	13.4	16.0

	7/12	**9/12**
qC	1.9	2.3
qFQI	12.2	14.6

1. Naming follows Wetter et al. 2001
2. Species in bold are non-native
3. After Bernthal,2003

Table 5. Lake Belleview-2012

Wet-Mesic Prairie Vegetation

Scientific Name [1,2]	Common Name	Cover Class '7/12	Cover Class '9/12	Regional wetland Indicator[3]	7/12 C of C[3]	9/12 C of C[3]	Cover X C '7/12	Cover X C '9/12
Polygonum pensylvanicum	Pennsylvania smartweed	5	5	FACW+	1	1	5	5
Chenopodium album	lamb's-quarters	4	4	FAC-	0	0	0	0
Rudbeckia hirta	black-eyed susan	3	3	FACU	4	4	12	12
Verbena hastata	blue vervain	3	2	FACW+	3	3	9	6
Polygonum lapathifolium*	curly-top knotweed	1	2	FACW	2	2	2	4
Alopecurus carolinianus	foxtail	1	2	FACW	0	0	0	0
Echinochloa crusgalli	barnyard grass	1	2	FACW	0	0	0	0
Festuca pratensis	rye grass	1	2	FACU-	0	0	0	0
Conyza canadensis	horseweed	1	2	FAC-	0	0	0	0
Echinacea pallida	purple coneflower	1	1	NI	7	7	7	7
Eupatorium perfoliatum	boneset	1	1	OBL	6	6	6	6
Helenium autumnale	sneezeweed		1	FACW+		4		4
Elymus canadensis	Canadian wild rye	1	1	FACU-	4	4	4	4
Leersia oryzoides	rice cut grass	1	1	OBL	3	3	3	3
Mentha arvensis	field mint	1	1	FACW	3	3	3	3
Solidago gigantea	giant goldenrod		1	FACW	33	3		3
Aster novae-angliae	New England aster		1	FACW		3		3
Bidens frondosa	beggars tick	1	1	FACW	1	1	1	1
Urtica dioica	stinging nettle		1	FAC+		1		1
Phalaris arundinacea	Reed canary grass	1	1	FACW+	0	0	0	0
Cirsium vulgare	bull thistle	2	1	FACU-	0	0	0	0
Abutilon theophrasti	velvet-leaf	1	1	FACU-	0	0	0	0
Thlaspi arvense	penny cress	3	1	FACU	0	0	0	0
Arctium minus	burdock	1	1	FACU	0	0	0	0
Taraxacum officinale	dandelion	1	1	FACU	0	0	0	0
Cirsium arvense	Canada thistle		1	FACU		0		0
Ambrosia artemisiifolia	common ragweed		1	FACU		0		0
Rumex crispus	curly dock	2	1	FAC+	0	0	0	0
Trifolium pratense	red clover	1	1	FAC+	0	0	0	0
Trifolium repens	white clover	1	1	FAC+	0	0	0	0
Plantago major	common plantain		1	FAC+		0		0
Sonchus arvensis	sow-thistle	1	1	FAC-	0	0	0	0

Erigeron annuus	daisy fleabane		1	FAC-		0		0
Poa pratensis	Kentucky bluegrass	2	1	FAC	0	0	0	0
Barbarea vulgaris	yellow rocket	1	1	FAC	0	0	0	0
Convolvulus arvensis	bindweed	1	1	NI	0	0	0	0
Daucus carota	Queen Anne's-lace	1	1	NI	0	0	0	0
Verbascum thapsus	mullein	1	1	NI	0	0	0	0
Silene latifolia	bladder campion		1	NI		0		0
Salix nigra	willow	2		OBL	4		8	0
Iris virginica	blue flag	1		OBL	5		5	0
Polygonum persicaria	ladys thumb	1		FACW	0	0	0	0
Potentilla simplex	common cinquefoil	1		FACU-	2		2	0
Mollugo verticillata	carpetweed	4		FAC	0		0	0
Carex sp.	sedge	1					0	0

	7/12	**9/12**
Total species	36	40
Native species	14	17
% Native	39%	43%

	7/12	**9/12**
Total C	45	45
Ave. C	1.25	1.13
Ave. C	3.21	2.65

New species found in '9/12	**Species not found in '9/12**
9	5

	FQI '7/12	**FQI '9/12**		**7/12**	**9/12**
Native	12	10.6	**qC**	1.2	1.1
Total	7.5	7.2	**qFQI**	7.2	6.9

1. Naming follows Wetter et al., 2001
2. Species in bold are non-native
3. After Bernthal,2003

Table 6. Lake Belleview- 2012

Mesic Prairie Vegetation

Scientific Name [1,2]	Common Name	Cover Class '7/12	Cover Class '9/12	Indicator[3]	7/12 C of C[3]	9/12 C of C[3]	Cover X C '7/12	Cover X C '9/12
Polygonum pensylvanicum	Pennsylvania smartweed	5	5	FACW+	1	1	5	5
Rudbeckia hirta	black-eyed susan	3	3	FACU	4	4	12	12
Chenopodium album	lamb's-quarters	4	3	FAC-	0	0	0	0
Verbena hastata	blue vervain	3	2	FACW+	3	3	9	6
Phalaris arundinacea	Reed canary grass	1	2	FACW+	0	0	0	0
Conyza canadensis	horseweed	3	2	FAC-	0	0	0	0
Poa pratensis	Kentucky bluegrass	3	2	FAC	0	0	0	0
Artemisia ludoviciana	white sage		1	UPL		3		3
Helenium autumnale	sneeze weed		1	FACW+		4		4
Polygonum lapathifolium*	curly-top knotweed	2	1	FACW+	2	2	4	2
Solidago gigantea	giant goldenrod		1	FACW		3		3
Aster novae-angliae	New England Aster		1	FACW		3		3
Echginochloa crusgalli	barnyard grass		1	FACW		0		0
Setaria faberi	giant foxtail		1	FACU+		0		0
Elymus canadensis	Canada wild rye		1	FACU-		4		4
Cirsium vulgare	bull thistle		1	FACU-		0		0
Oenothera biennis	evening-primrose	1	1	FACU	1	1	1	1
Thlaspi arvense	penny cress	3	1	FACU	0	0	0	0
Ambrosia artemisiifolia	common ragweed	1	1	FACU	0	0	0	0
Bromus inermis	smooth brome grass	1	1	FACU	0	0	0	0
Dactylis glomerata	orachard grass		1	FACU		0		0
Urtica dioica	Stinging nettle	1	1	FAC+	1	1	1	1
Rumex crispus	curly dock	2	1	FAC+	0	0	0	0
Plantago major	common plantain		1	FAC+		0		0
Andropogon gerardii	big bluestem		1	FAC+		0		0
Sonchus arvensis	sow-thistle	1	1	FAC-	0	0	0	0
Erigeron annuus	daisy fleabane		1	FAC-		0		0
Echinacea pallida	purple coneflower	1	1	NI	7	7	7	7
Verbascum thapsus	mullein	1	1	NI	0	0	0	0
Carduus nutans	musk thistle		1	NI		0		0
Leersia oryzoides	rice cut grass	3		OBL	3		9	0
Eupatorium perfoliatum	boneset	1		OBL	6		6	0
Lythrum salicaria	purple loosestrife	1		OBL	0		0	0
Salix nigra	willow	1		OBL	4		4	0
Typha angustifolia	narrow-leaved cattail	1		OBL	0		0	0
Polygonum persicaria	lady's thumb	1		FACW	0		0	0

Amaranthus retroflexus	pigweed	1	FACU+	0	0	0
Asparagus officinalis	asparagus	1	FACU	0	0	0
Mollugo verticillata	carpetweed	2	FAC	0	0	0
Cuscuta gronovii	dodder	1	NI	4	4	0
Schoenoplectus fluviatilis	river bulrush	1	OBL		0	0
Silene latifolia	white campion	1	NI	0	0	0

	7/12	**9/12**
Total species	29	30
Native species	14	17
% Native	48%	57%

	7/12	**9/12**
Total C	36	36
Mean C	1.24	1.20
Mean C	2.57	2.12

New species found in '9/12	**Species not found in '9/12**
13	12

	FQI '7/12	**FQI '9/12**		**7/12**	**9/12**
Native	9.7	8.7	**qC**	1.1	1.2
Total	6.7	6.6	**qFQI**	5.9	6.6

1. Naming follows Wetter et al., 2001
2. Species in bold are non-native
3. After Bernthal,2003

Table 7. Lake Belleview- 2012

Species list for September Meander Loops

Scientific Name [1,2]	Common Name	Loop 1[a] 9/10/12	Loop 2[a] 9/10/12	Area 3&5[b] 9/20/12
Abutilon theophrasti	velvetleaf			1
Alnus incana	swamp alder			1
Ambrosia artemisiifolia	common ragweed			1
Aster pilosus	frost aster			1
Bidens connata	purplestem beggar-ticks			1
Bidens frondosa	devil's beggar-ticks		1	1
Carex blanda	common woodland sedge			1
Carex lacustris	common lake sedge			1
Carex sp.	various sedge species			1
Carex stricta	tussock sedge			1
Celtis occidentalis	northern hackberry			1
Chelone glabra	white turtlehead			1
Cirsium arvense	canada thistle			1
Cornus sericea	red osier dogwood			1
Cuscuta polygonorum	knotweed dodder			1
Echinochloa crusgalli	barnyard grass		2	1 1
Elymus virginianus	virginia wild rye			1
Fraxinus pennsylvanicus	green ash			1
Gallium obtusum	blunt-leaf bedstraw			1
Geranium maculatum	wild geranium			1
Glechoma hederacea	ground ivy			1
Helenium autumnale	sneezeweed			1
Helianthus giganteus	swamp sunflower			1
Impatiens capensis	orange touch-me-not (jewel weed)			1 1
Laportea canadensis	wood nettle			1
Lonicera x bella	Bell's Honeysuckle			1
Lysimachia nummularia	creeping-jennie (moneywort)			1
Oxalis stricta	wood sorrel			1
Parthenocissus vitacea	woodbine			1
Phalaris arundinacea	reed canary grass		4	2 1
Quercus macrocarpa	bur oak			1
Rhamnus cathartica	common buckthorn			1
Ribes americanum	wild black currant			1
Rosa multiflora	mulitiflora rose			1
Rubus allegheniensis	blackberry			1
Rudbeckia laciniata	wild goldenglow (cutleaf coneflower)		3	2 1
Rumex crispus	curly dock		2	1 1
Sagittaria latifolia	common arrowhead		1	1
Silphium perfoliatum	cupplant			1
Solidago gigantea	giant goldenrod		1	1 1
Sonchus oleraceus	sow thistle		1	1
Taraxacum officinale	common dandelion			1
Thalictrum dioicum	early meadow rue			1
Tilia americana	American basswood			1
Typha angustifolia	narrow-leaf cattail		1	1 1
Ulmus rubra	slippery elm			1
Urtica dioica	stinging nettle		2	2 1
Verbena hastata	blue vervain		1	1 1

Viburnum lentago	nannyberry			1
Vitis riparia	riverbank grape			1
Zanthoxylum americanum	common prickly-ash			1
Setaria faberi	giant foxtail	2	1	
Chenopodium album	lamb's-quarters	3	2	
Plantago major	common plantain	2		
Polygonum pensylvanicum	Pennsylvania smartweed	5	4	
Rumex vetricillatus	swamp dock	1		
Conyza canadensis	horseweed	1	1	
Polygonum lapathifolium*	curly-top knotweed	2	2	
Convolvulus arvensis	bindweed	1	1	
Leersia oryzoides	rice cut grass	4	2	
Erigeron annuus	daisy fleabane	1		
Schoenoplectus tabernaemonta	soft-stem bulrush	2		
Aster novae-angliae	New England Aster	1	1	
Lemna minor	small duckweed	2		
Polygonum persicaria	lady's thumb	1		
Salix nigra	willow	1		
Solanum dulcamara	deadly nightshade	1		
Festuca pratensis	rye grass		2	
Elymus canadensis	Canadian wild rye		1	
Verbascum thapsus	mullein		1	
Poa pratensis	Kentucky bluegrass		1	
Arctium minus	burdock		1	
Oenothera biennis	evening-primrose		1	
Digitaria sanguinalis	hairy crabgrass		1	
Thlaspi arvense	penny cress		1	
Eupatorium maculatum	joe-pye weed		1	
Panicum miliaceum	millet		1	

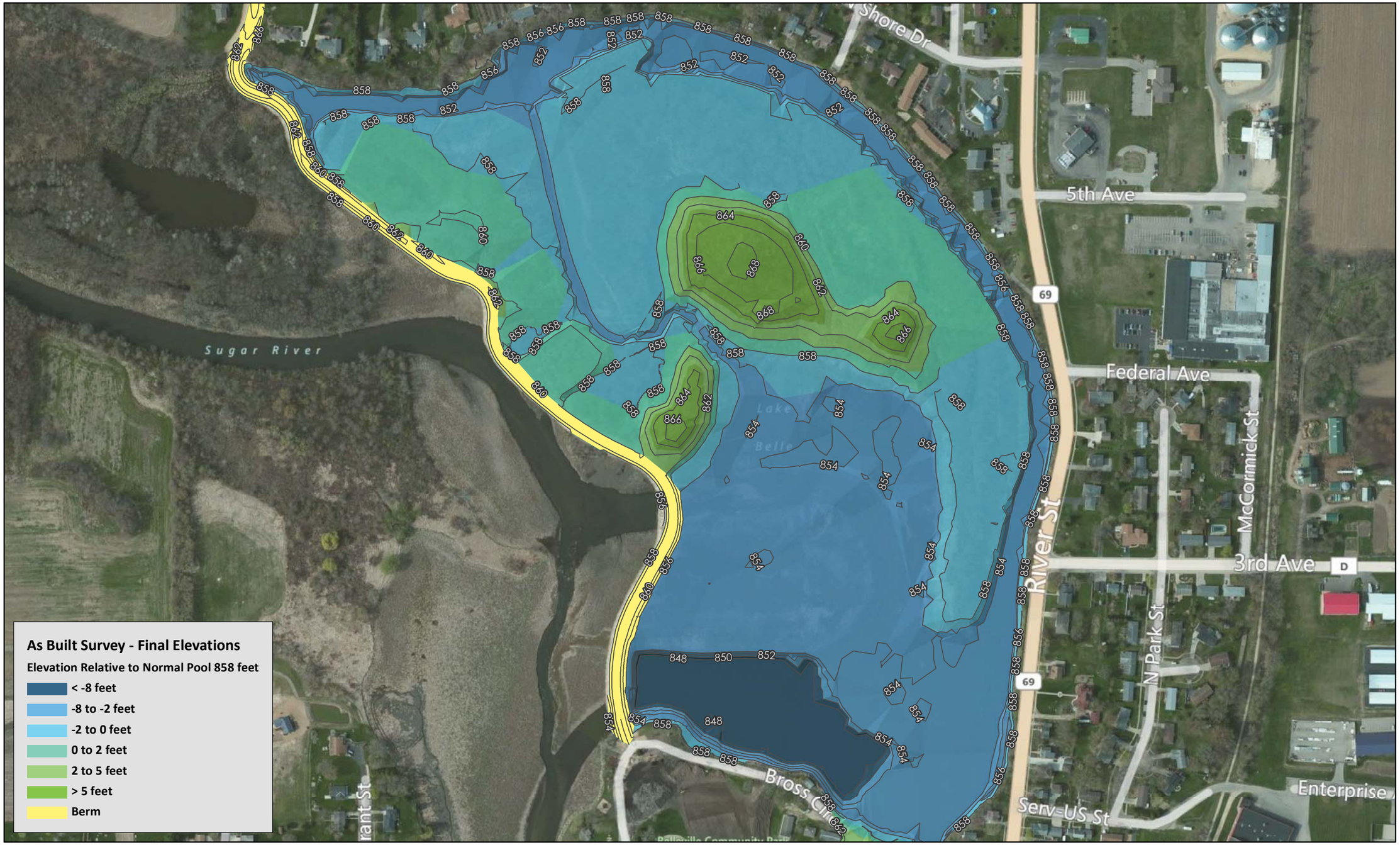
a. Indicates cover class
b.Indicates presents

1. Naming follows Wetter et al., 2001
2. Species in bold are non-native

Table 8 . Summary of Species Richness and Floral Quality

Zone	Species Richness				Mean C		Percentage	Regional Wetland Idicator Status								
	Native	Non-native	Total	Percentage	Value		C value	Percentage[1]					FQI	FQI	qC	qFQI
				native	all	native	4 or less	UPL	FACU	FAC	FACW	OBL	native	total		
Emergent '7/12	12	2	14	86%	2.9	3.4	86%	0%	0%	0%	7%	93%	11.8	10.8	2.6	9.7
Emergent '9/12	9	2	11	82%	2.9	3.6	72%	0%	0%	0%	9%	91%	10.8	9.6	2.5	8.3
Wet Meadow '7/12	27	14	41	66%	2.1	3.2	83%	0%	7%	20%	24%	32%	16.5	13.4	1.9	12.2
Wet Meadow '9/12	30	10	40	75%	2.5	3.4	73%	0%	13%	10%	33%	28%	18.5	16	2.3	14.6
Wet-Mesic Prairie '7/12	14	22	36	39%	1.2	3.2	92%	0%	25%	25%	22%	14%	12.0	7.5	1.2	7.2
Wet-Mesic Prairie '9/12	17	23	40	43%	1.5	2.5	95%	0%	25%	28%	28%	5%	10.6	7.2	1.1	6.9
Mesic Prairie '7/12	14	15	29	48%	1.2	2.6	93%	0%	14%	14%	14%	21%	9.7	6.7	1.1	5.9
Mesic Prairie '9/12	17	13	30	57%	1.2	2.1	97%	3%	30%	30%	27%	0%	8.7	6.6	1.2	6.6

1. Percentage will not add up to 100% because all species in a zone were not given a wetland status



Main Map Projection: Dane County Coordinate System | Locator Map Not to Scale

DRAWN BY	CHECKED BY
DYL	SJH

MONTGOMERY ASSOCIATES:
RESOURCE SOLUTIONS, LLC
119 South Main Street | Cottage Grove, WI 53527
(608) 839-4422 | www.ma-rs.org

AS BUILT ELEVATIONS
HABITAT ZONES

Lake Belle View Lake Restoration
Village of Belleville
Dane County, WI

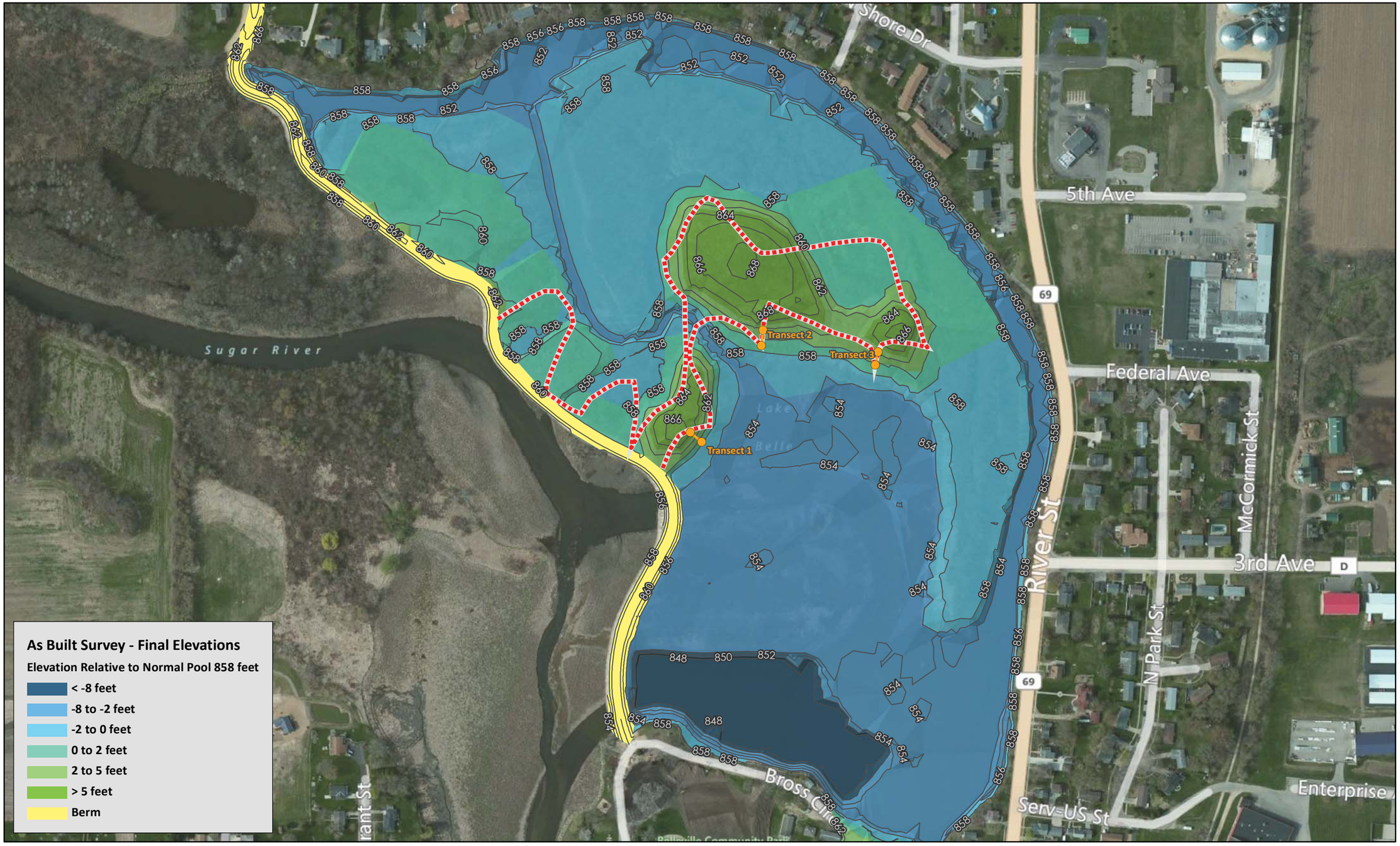
N
W E
S

0 150 300 Feet

SCALE
1 inch = 300 feet

PROJECT NO.	DATE
1428-011	Sept 4, 2012

SHEET NO.
Figure 1



Meander Survey Path

Transect Points

Transect Lines

Main Map Projection: Dane County Coordinate System | Locator Map Not to Scale

DRAWN BY	CHECKED BY
DYL	SJH

MONTGOMERY ASSOCIATES:
RESOURCE SOLUTIONS, LLC
119 South Main Street | Cottage Grove, WI 53527
(608) 839-4422 | www.ma-rs.org

JULY 25, 2012
MEANDER SURVEY PATH
Lake Belle View Lake Restoration
Village of Belleville
Dane County, WI

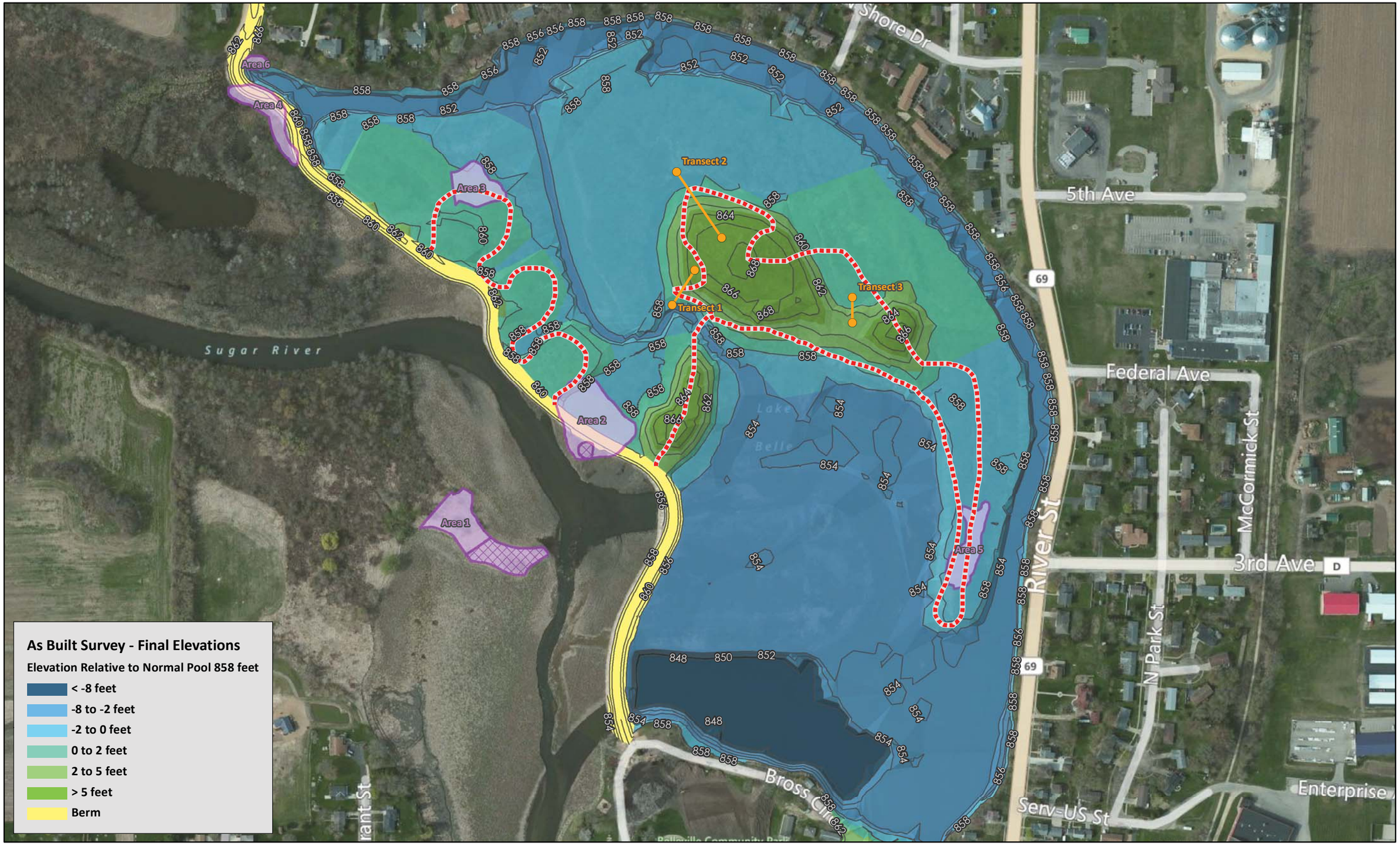
N
W E
S

0 150 300 Feet

SCALE
1 inch = 300 feet

PROJECT NO.	DATE
1428-011	Sept 4, 2012

SHEET NO.
Figure 2



Meander Survey Path

Transect Points

Transect Lines

Glade Mallow Population

Vegetation Survey Area

Main Map Projection: Dane County Coordinate System | Locator Map Not to Scale

DRAWN BY	CHECKED BY
DYL	CMF

MONTGOMERY ASSOCIATES:
RESOURCE SOLUTIONS, LLC
119 South Main Street | Cottage Grove, WI 53527
(608) 839-4422 | www.ma-rs.org

Fall 2012 Meander Survey Paths and Transects

Lake Belle View Lake Restoration
Village of Belleville
Dane County, WI

N W E S

0 150 300 Feet

SCALE
1 inch = 300 feet

PROJECT NO.	DATE
1428-011	11/13/2012

SHEET NO.
Figure 3

APPENDIX B

2012 LAKE BELLE VIEW MONITORING REPORT

2012 Lake Belle View Monitoring Report

Photo by Mike Kakuska

WDNR Lake Planning Grant Project: Sponsored by the Village of Belleville

Agrecol®
Native Seed, Plants & Restoration

Prepared by Dave Marshall and Richard Wedepohl

December 2012

Summary

During the growing season of 2012, lake turbidity was relatively high but overall conditions were considered favorable by the community as a whole. The high turbidity likely suppressed rooted plants but encouraging beds of white waterlilies, longleaf pondweed, softstem bulrush and arrowhead were noted. River transparencies were generally better than the lake and likely reflected the severe drought in 2012. However, water quality in general was favorable for fish populations and abundant numbers of panfish were collected. Citizens had reported harvests of common carp around 10-14" and we confirmed the presence of the non-native fish during the fish sampling surveys. The carp are about two years old and suggest that small young of year carp over-wintered in an unidentified low area during the lake drawdown and dredging project. We are hopeful that the abundant numbers of green sunfish and bluegills collected during the shocking surveys can suppress carp reproduction. This report serves as an interim progress report for a multi-year lake and watershed monitoring project.

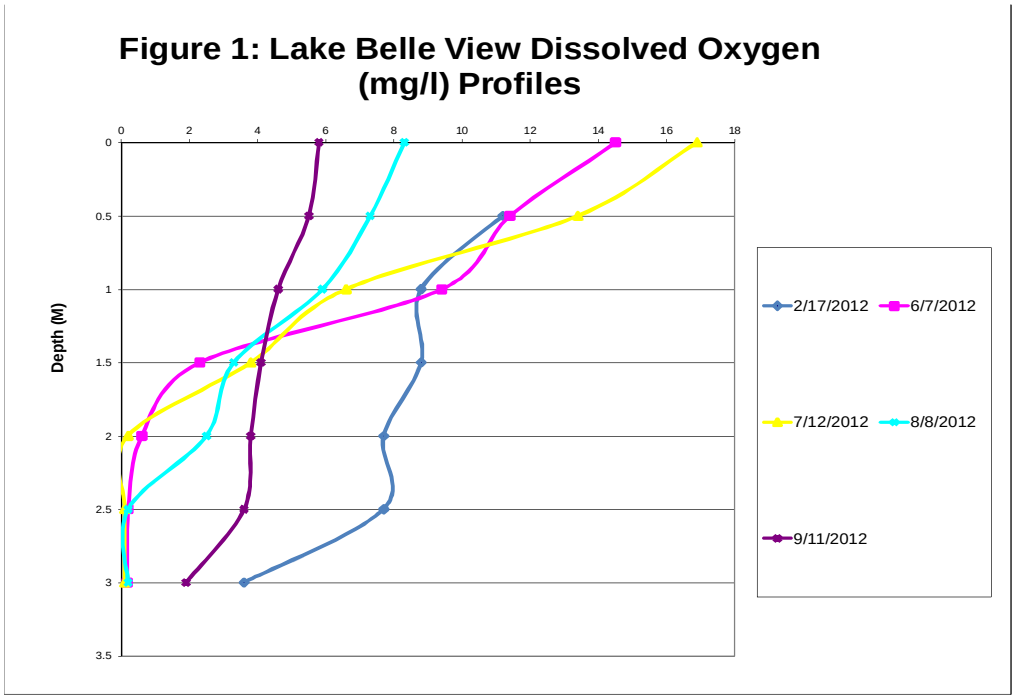
Methods

A YSI Model 52 meter was used to measure dissolved oxygen and temperature. A YSI Model 63 meter was used to measure pH and specific conductivity. Calibration of the instruments followed manufacturer recommendations including the 2 point calibration for pH. Back-up systems for pH included a LaMotte pH meter and ExStik conductivity probe. Secchi transparency measurements were collected in the lake. Paired testing of the Sugar River and Lake Belle View included a 120 cm transparency tube and turbidity using a Hach Model 2100P meter. Nutrient samples were collected and submitted to the State Lab of Hygiene Inorganic Chemistry Unit. The nutrient data was transformed to Trophic State Indices (TSI). Nearshore fish population sampling was conducted using a towed DC electroshocker barge. The fish surveys were designed to sample populations of nongame species and juvenile stages of sportfish. The survey results provide indicators of ecological diversity and distribution of fishes that inhabit nearshore areas within Lake Belle View. The surveys were also designed to detect potential common carp reproduction that could threaten the ecosystem.

Findings

Lake profile sampling was conducted in February, June, July, August and September of 2012. Profiles for dissolved oxygen (d. o.), temperature, pH and specific conductance appear in Figures 1-4. The profile data indicate no stratification as is expected in a shallow lake. Low d. o. levels were typically found near the bottom (max. depth ~10') and may indicate the low light conditions in the lake. The secchi water clarity data appears in Figure 5 and low light conditions reflected both a moderate Cyanobacteria bloom and inorganic turbidity. In Figure 6, all of the TSI parameters suggest that the lake is eutrophic and this is not surprising given the early state

transition conditions and shallow basin. However, the higher total phosphorus TSI and even higher secchi TSI appear to reflect the inorganic turbidity. The lake was actually more turbid than the Sugar River in 2012 and may have reflected a combination of factors including the drought, unstable conditions in a newly formed lake and potentially impacts of common carp (discussed below). Figures 7 and 8 display paired turbidity and transparency tube measurements respectively.



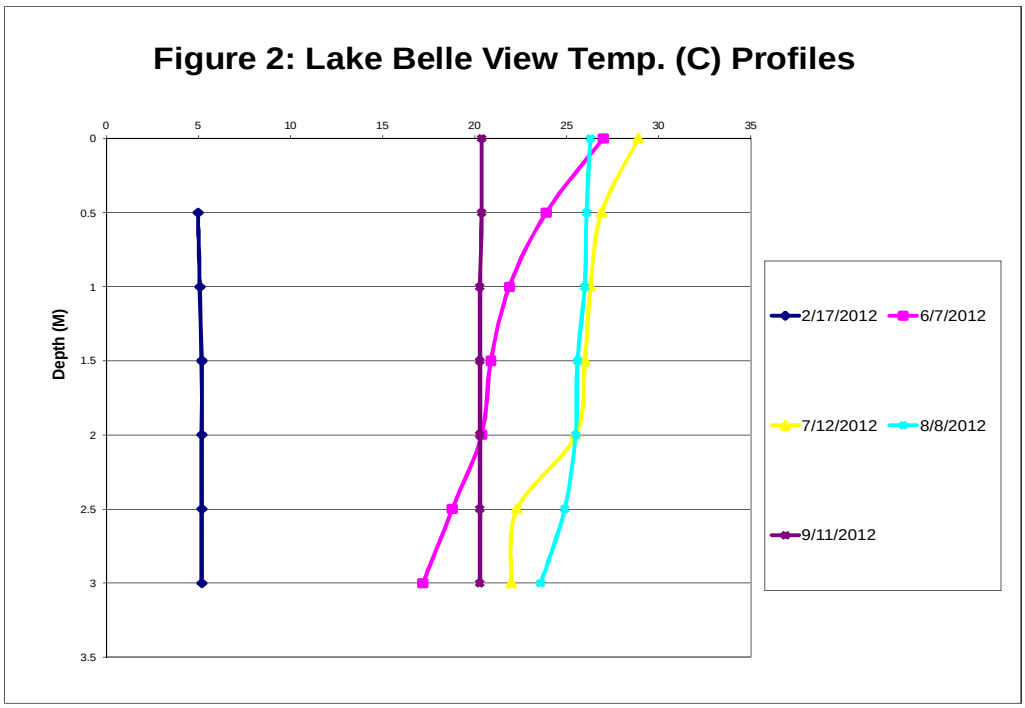


Figure 3:Lake Belle View pH Profiles

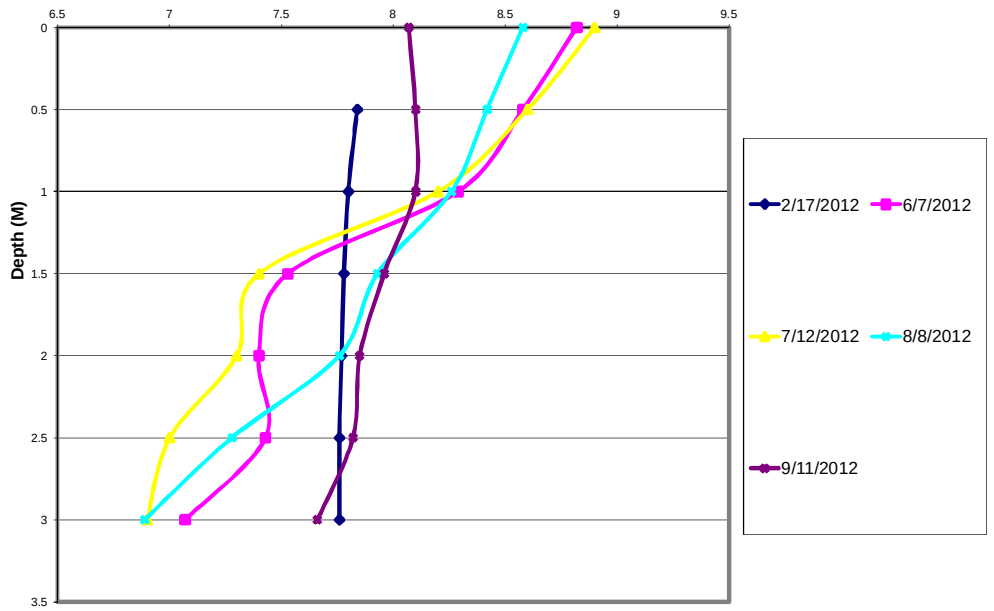
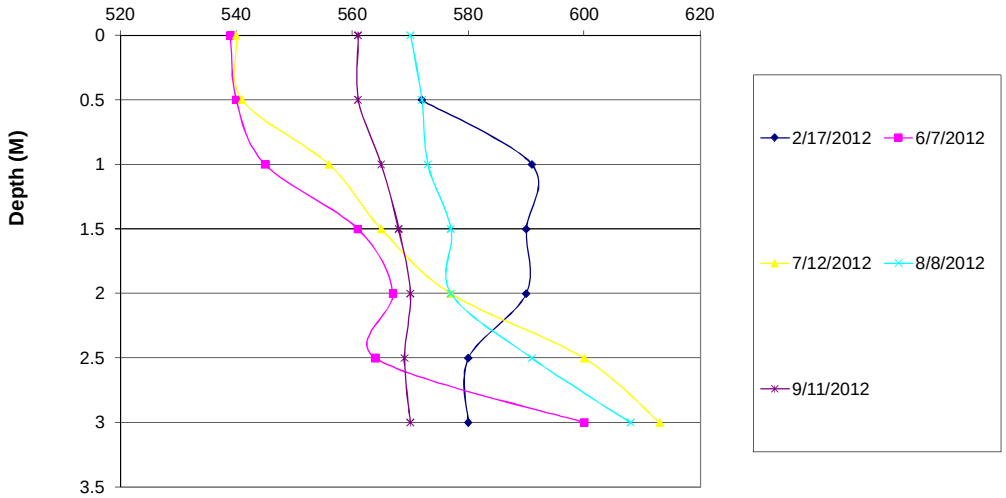


Figure 4: Lake Belle View Specific Conductance Profiles (uS/cm)



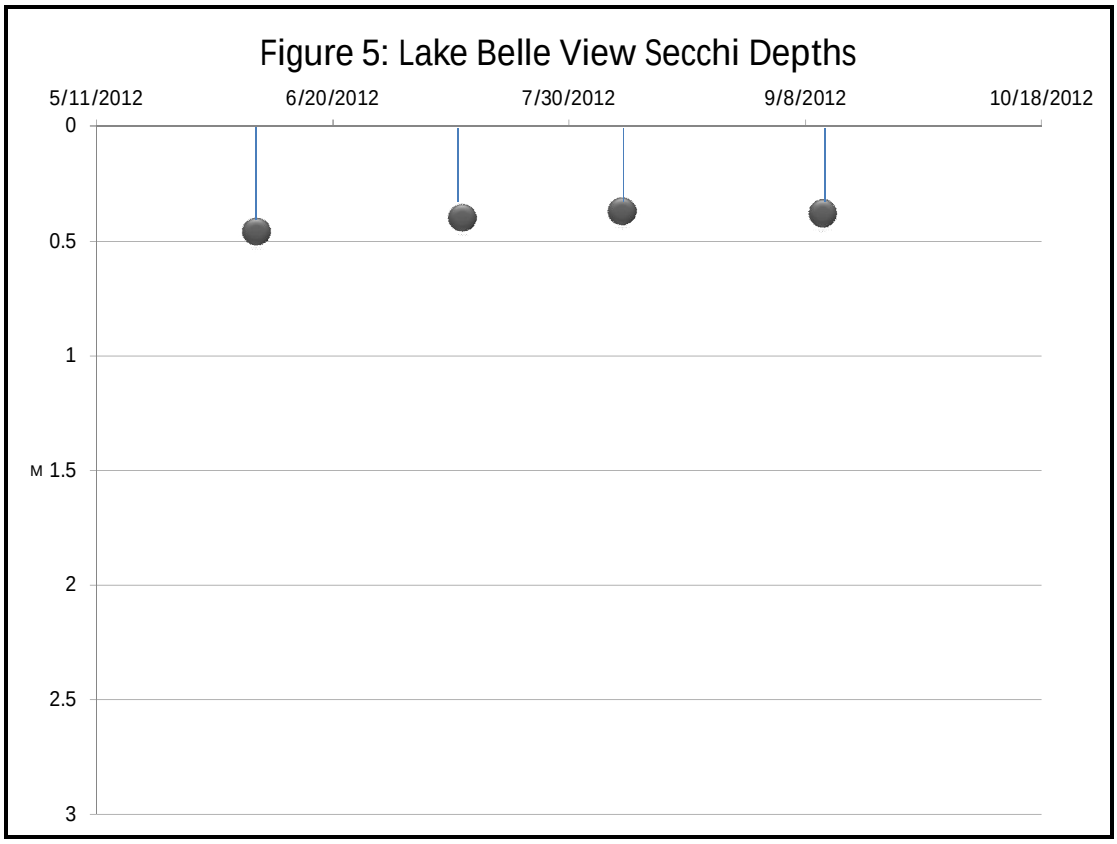


Figure 5: Lake Belle View Secchi Depths
5/11/2012
6/20/2012
7/30/2012
9/8/2012
10/18/2012
0
0.5
1
M 1.5
2
2.5
3

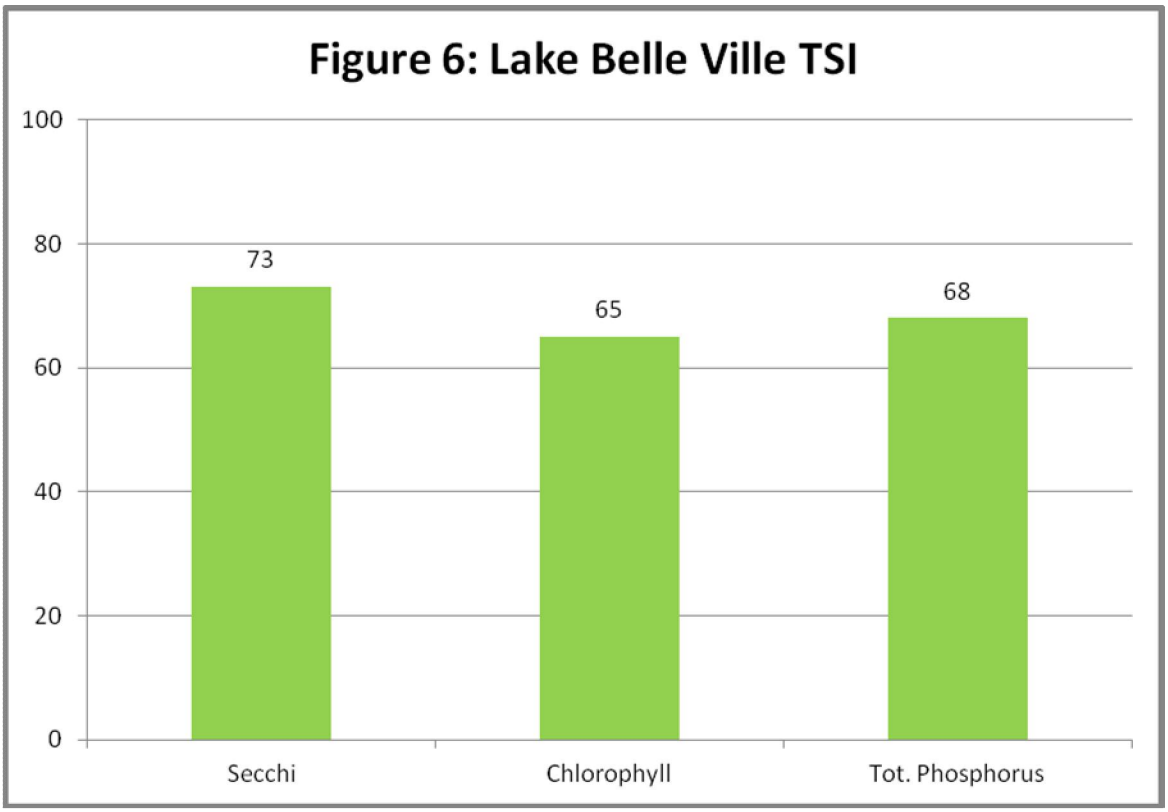


Figure 6: Lake Belle Ville TSI
100
80
60
40
20
0
73
65
68
Secchi
Chlorophyll
Tot. Phosphorus

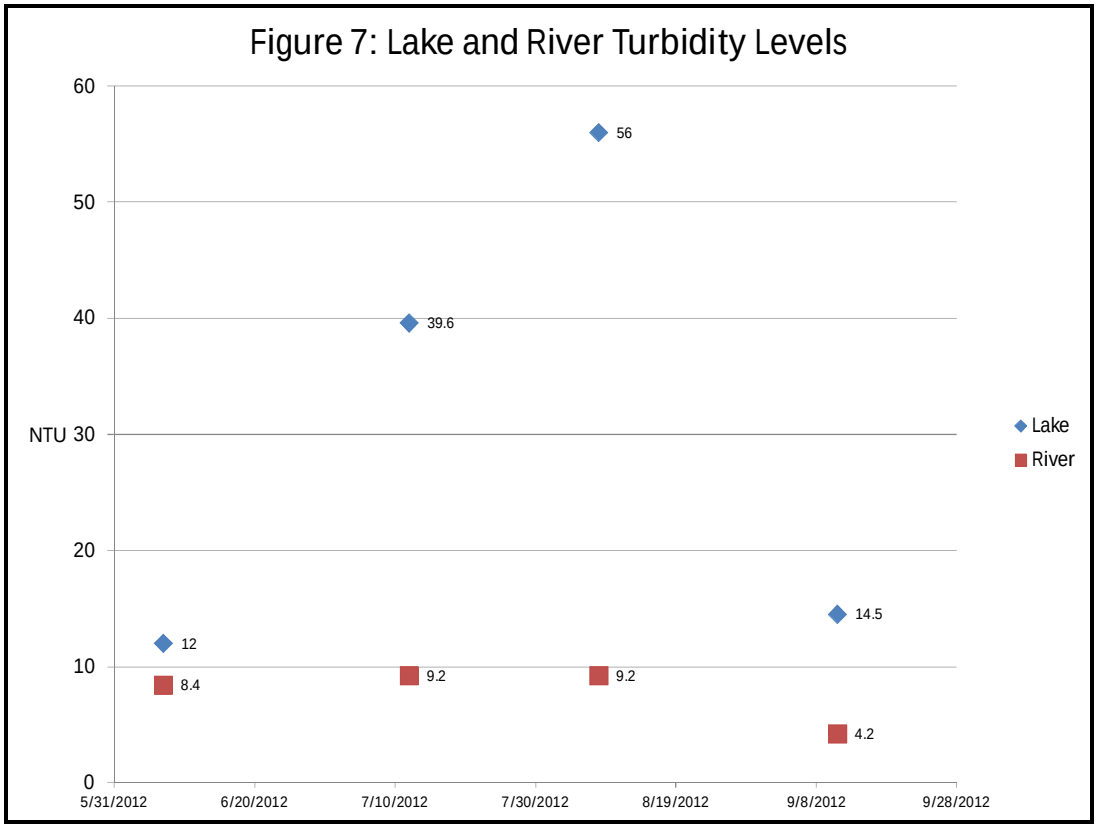


Figure 7: Lake and River Turbidity Levels
NTU
60
50
40
30
20
10
0
56
39.6
12
8.4
9.2
9.2
14.5
4.2
5/31/2012
6/20/2012
7/10/2012
7/30/2012
8/19/2012
9/8/2012
9/28/2012
Lake
River

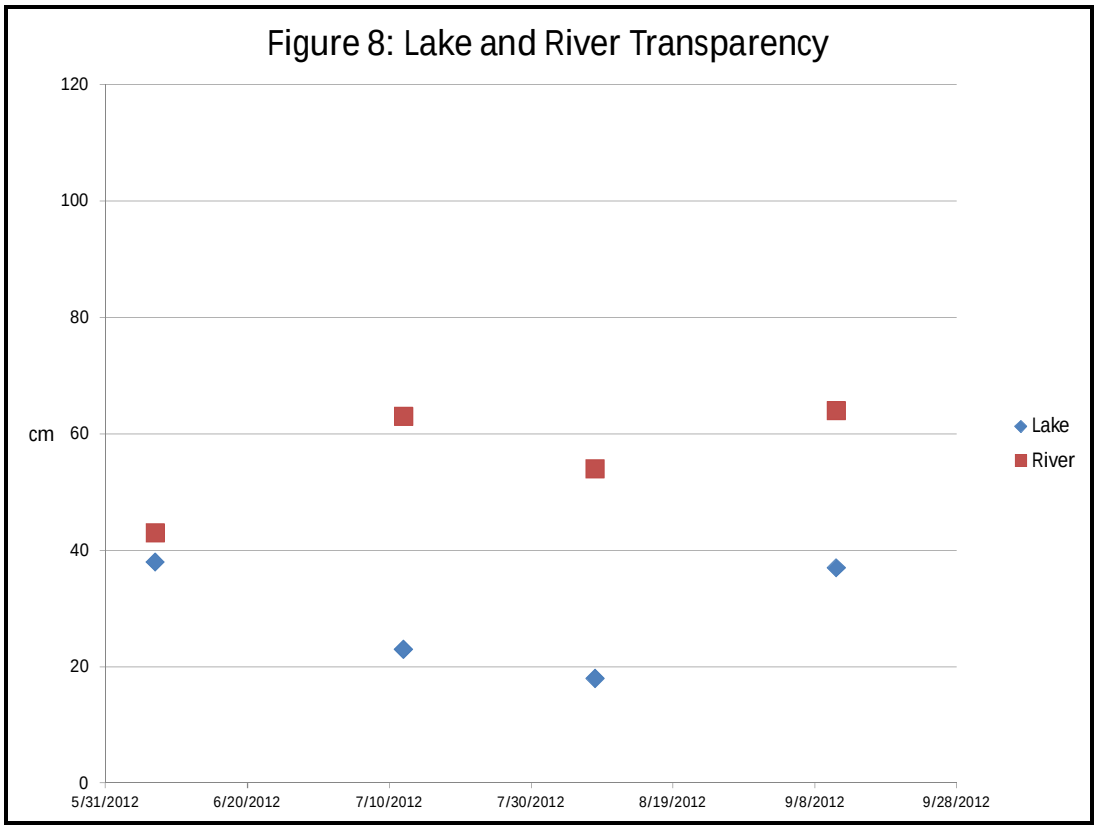
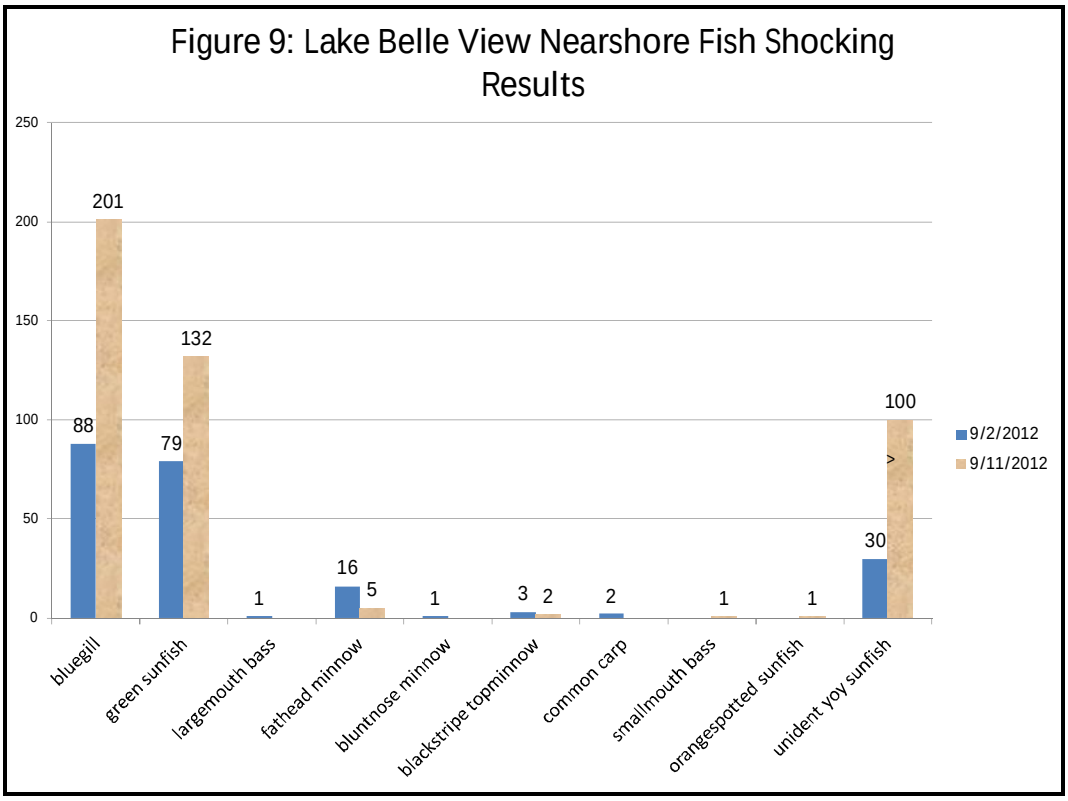


Figure 8: Lake and River Transparency
cm
120
100
80
60
40
20
0
5/31/2012
6/20/2012
7/10/2012
7/30/2012
8/19/2012
9/8/2012
9/28/2012
Lake
River

Thirty fish species were introduced into newly constructed Lake Belle View in 2011-13 including hatchery sportfish and Sugar River predator and nongame species. Nearshore fish shocking surveys were conducted on September 2 and September 11, 2012. The cover photograph indicates the areas that were sampled. Nine species of fish were sampled during the nearshore fish shocking surveys (Figure 9). Additionally, black bullhead was also caught with hook and line. The smaller diversity collected does not necessarily indicate lack of survey of some species but clearly green sunfish and bluegill are thriving in the lake. The presence of common carp is disconcerting but none of the individuals collected were mature enough to spawn. The size range between 10" and 14" suggest that they might be two years old and survived the drawdown and dredging operations in the lake. Fortunately, the abundance of green sunfish and bluegill (Figure 10), typical of natural oxbow lakes, could ultimately suppress common carp reproduction.



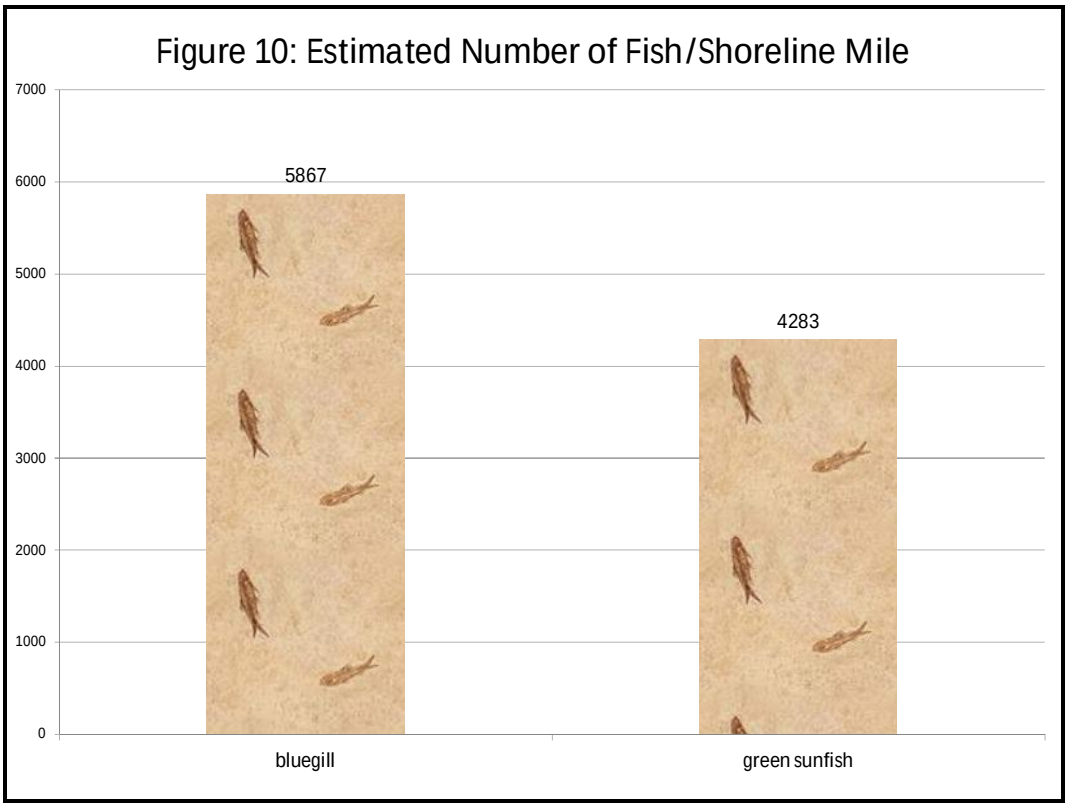
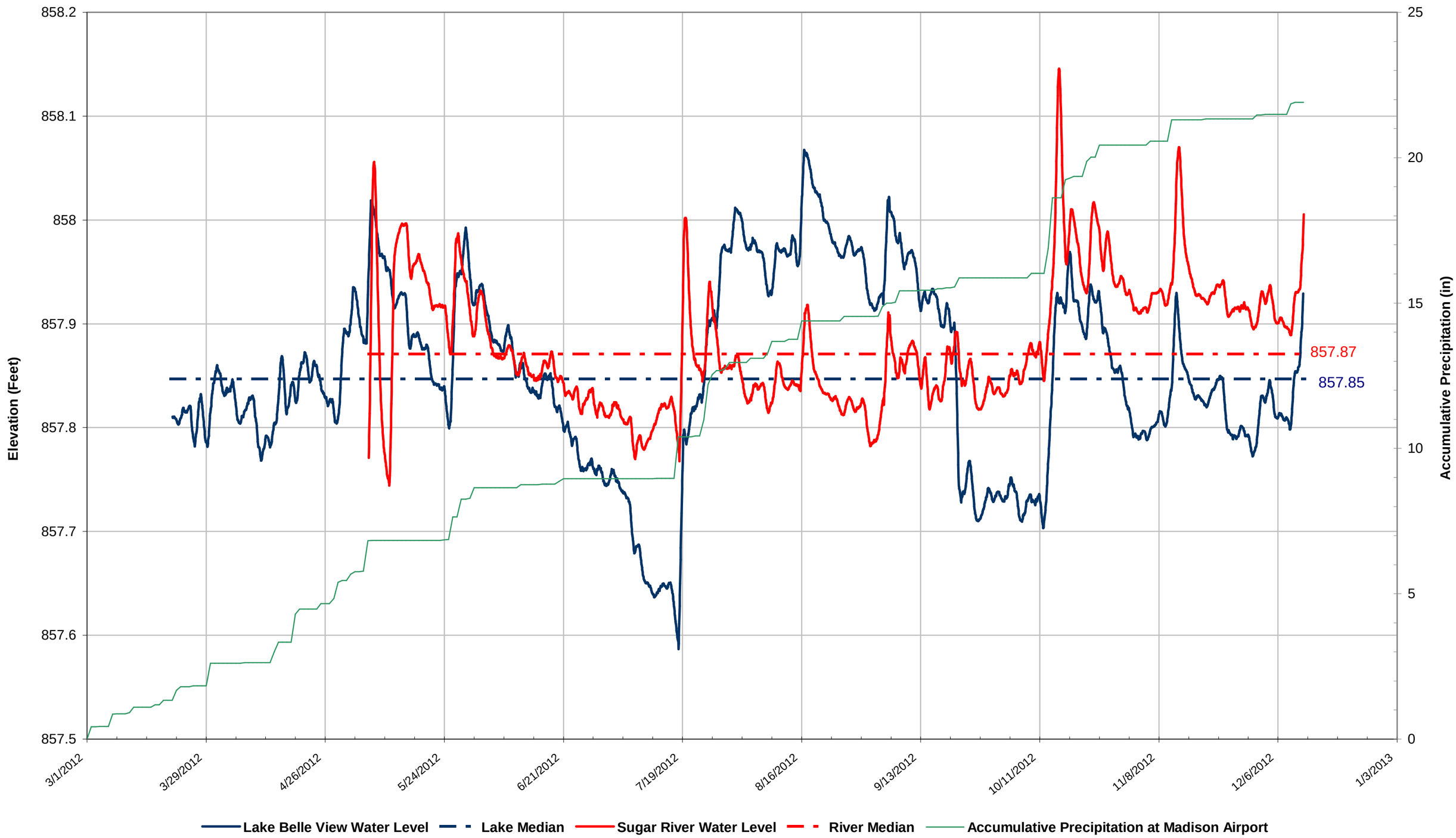


Figure 10: Estimated Number of Fish/Shoreline Mile
7000
6000
5000
4000
3000
2000
1000
0
5867
4283
bluegill
green sunfish

APPENDIX C

2012 LAKE WATER LEVELS – CONTINUOUS MONITORING - MARS

Lake Belle View Restoration Project
2012 Lake Water Levels - Continuous Monitoring



APPENDIX D

WILDLIFE OBSERVATIONS – UW – MADISON/BELLEVILLE 7TH GRADERS

STORMWATER OBSERVATIONS – VILLAGE OF BELLEVILLE

Lake Belle View Wildlife Observations

Thursday, May 17, 2012

Observers: Jamie Nack, David Drake, and (80) 7th grade students

Identification methods: visual, auditory, and animal sign interpretation

Birds

1	Canada Goose
2	Mallard
3	Great Blue Heron
4	Green Heron
5	Bald Eagle
6	Red-tailed Hawk
7	Cooper's Hawk
8	American Coot
9	Wilson's Snipe
10	Black Tern
11	Mourning Dove
12	Barred Owl
13	Ruby-throated Hummingbird
14	Red-bellied Woodpecker
15	Northern Flicker
16	Eastern Wood-pewee
17	Great Crested Flycatcher
18	American Crow
19	Barn Swallow
20	Tree Swallow
21	Northern Rough-winged Swallow
22	Black-capped Chickadee
23	White-breasted Nuthatch
24	American Robin
25	Gray Catbird
26	Cedar Waxwing
27	Common Yellowthroat
28	Yellow Warbler
29	Song Sparrow
30	Chipping Sparrow
31	Northern Cardinal
32	Indigo Bunting
33	Red-winged Blackbird
34	Brown-headed Cowbird
35	Common Grackle
36	Baltimore Oriole
37	American Goldfinch
38	House Sparrow

Mammals

1	Meadow Vole
2	Muskrat

Reptiles

1	Common Watersnake
2	Gartersnake sp.
3	Eastern Spiny Softshell Turtle
4	Painted Turtle sp.

Amphibians

1	Green Frog

BELLEVILLE STORMWATER DATA

Grab samples of storm water runoff into Lake Belleville were collected during the summer of 2012. Very few rainfall events occurred given the extensive drought experienced during this time period. However the pollutant concentrations from the rain events collected in August and September of 2012 were on the low side of those that would typically be expected from urban runoff.

8/9/12 Total Rainfall = 0.6”

River St. Grab:	BOD = 14.9 mg/l	TSS = 74 mg/l
Kari St. Grab:	BOD = 15.9 mg/l	TSS = 50 mg/l

8/15/12 Total Rainfall = 1.2”

River St. Grab:	BOD = 9.6 mg/l	TSS = 14 mg/l	TP = 0.21 mg/l
Kari St. Grab:	BOD = 14.1 mg/l	TSS = 206 mg/l	TP = 0.25 mg/l

9/25/2012 Total Rainfall = 1.0”

River St. Grab:	BOD = 7.4 mg/l	TSS = 27 mg/l	TP = 0.23 mg/l
Kari St. Grab:	BOD = 5.2 mg/l	TSS = 7 mg/l	TP = 0.11 mg/l

APPENDIX E

COVENANT FOR CONSERVATION EASEMENT

8 3 8 7 7 2 1
Tx:8234198

KRISTI CHLEBOWSKI
DANE COUNTY
REGISTER OF DEEDS

COPY

DOCUMENT #
4870566
05/09/2012 3:38 PM
Trans. Fee:
Exempt #:
Rec. Fee: 30.00
Pages: 7

Document Number

COVENANT FOR CONSERVATION EASEMENT

Document Title

The Village of Belleville in Dane County, Wisconsin, hereby gives notice that the following Covenant for Conservancy Area and Conservation Easement was granted by the Village of Belleville to the St. Paul District of the United States Army Corps of Engineers at a legal meeting of the Village Board of Trustees on February 20, 2012. The land is described in page one of the Creation and Grant of Covenants document and shown and described on Exhibit A – Conservation Easement.

Recording Area

Name and Return Address

April Little
Village of Belleville
P.O. Box 79
Belleville, WI 53508

106/0508-342-9550-8

Parcel Identification Number (PIN)

Howard Ward — 05-09-2012

Howard Ward — Date

Howard Ward — Village President

Name printed — Title

NOTARY PUBLIC
APRIL LITTLE
STATE OF WISCONSIN

STATE OF WISCONSIN, County of Dane

Subscribed and sworn to before me on May 9, 2012 by the above named person.

April Little

April Little

Title: Notary Public — Date commission expires: November 24, 2014

RECEIVED
MAY 07 2012

CREATION AND GRANT OF COVENANTS

This GRANT OF THESE COVENANTS is made by Village of Belleville, a Wisconsin Municipal Corporation, with its principal office located at 24 W. Main Street, Belleville, WI 53508 (hereinafter referred to collectively as the "Covenantor") to the St. Paul District of the United States Army Corps of Engineers, (hereinafter referred to as "Government").

WITNESS THAT:

WHEREAS, the Covenantor is the owner in fee of certain real property located in the **Southeast quarter of the Northwest quarter of Section 34, Township 5 North, Range 8 East, Village of Belleville**, County of **DANE**, in the State of **Wisconsin**, described more particularly as follows, and referred to herein as the "Conservancy Area":

Commencing at the west quarter corner of said section 34;
Thence along the west line of said northwest quarter, N 00° 47' 43" E 1261.52 feet;
Thence East 1729.76 feet to the point of beginning;
Thence continuing East 415.41 feet;
Thence S 38° 16' 11" E 792.18 feet;
Thence South 323.10 feet;
Thence West 209.01 feet;
Thence North 93.54 feet;
Thence N 39° 18' 13" W 1100.43 feet to the point of beginning containing 341,718 square feet or 7.845 Acres;

WHEREAS, the Covenantor desires and intends that the natural elements and the ecological and aesthetic values of the Conservancy Area be maintained and improved in accordance with the terms and conditions of these Covenants; and

WHEREAS, the Covenantor and Government both desire, intend and have the common purpose of conserving and preserving in perpetuity the Conservancy Area in a relatively natural condition by placing restrictions on the use of the Conservancy Area and by assigning from the Covenantor to the Government, by the establishment of these Covenants, affirmative rights to ensure the preservation of the natural elements and values of the Conservancy Area; and

WHEREAS, the Covenantor has received Department of the Army permit number **2009-01035-ADJ** or other valuable consideration for the making of these Covenants.

NOW THEREFORE, the Covenantor, for valuable consideration received, does hereby establish, give and assign to the Government an assignable right to enforce the following restrictions against the Covenantor, its successors and assigns if any; any third party holding, or professing to hold, any legal or equitable title to the Conservancy Area; or any trespasser or interloper committing any act on or near the premises inconsistent with these covenants:

a. The right of the Government to enforce by proceedings at law or in equity the Covenants hereinafter set forth. The right shall include but not be limited to, the right to bring an action in any court of competent jurisdiction to enforce the terms of these Covenants, to require the restoration of this property to its natural condition or to enjoin non-compliance by appropriate injunctive relief. The Government does not waive or forfeit the right to take action as may be necessary to ensure compliance with terms of these Covenants by any prior failure to act. Nothing herein shall be construed to entitle the Government to institute any enforcement action against the Covenantor for any changes to the Conservancy Area due to causes beyond the Covenantor's control and without the Covenantor's fault or negligence (such as changes caused by fire, flood, storm, civil or military authorities undertaking emergency action or unauthorized wrongful acts of third parties).

b. The right of the Government, its contractors, agents and invitees, to enter the Conservancy Area, in a reasonable manner and at reasonable times, for the purpose of inspecting the Conservancy Area to determine compliance with these Covenants.

AND IN FURTHERANCE of the foregoing affirmative rights, the Covenantor makes the following covenants on behalf of itself and its heirs, successors and assigns, which covenants shall run with and bind the Conservancy Area in perpetuity:

COVENANTS

a. USES. There shall be no commercial, industrial or residential activity undertaken or allowed within the Conservancy Area.

b. BUILDINGS AND STRUCTURES. There shall be no buildings, dwellings, barns, roads, advertising signs, billboards or other structures built or placed in the Conservancy Area.

c. TOPOGRAPHY. There shall be no dredging, filling, excavating, mining, drilling or removal of any topsoil, sand, gravel, rock, minerals or other materials. There shall be no plowing or any other activity that would alter the topography of the Conservancy Area.

d. DUMPING/DISPOSAL. There shall be no dumping of any waste, trash, ashes, garbage or other material that is unsightly, offensive or incompatible with the natural character of the Conservancy Area.

e. WATER. The hydrology of the Conservancy Area will not be altered in any way or by any means including pumping, draining, diking, impounding or diverting surface or ground water into or out of the Conservancy Area.

f. AGRICULTURAL USES. No plowing, tilling, cultivating, planting, timbering, or other agricultural activities may take place within the Conservancy Area. The release or pasturing of livestock or other domestic or non-native animals shall not be allowed within the Conservancy Area.

g. The Covenantor is responsible for compliance with all federal, state and local laws governing the safety and maintenance of the property, including the control of noxious weeds within the Conservancy Area.

h. There shall be no operation of any motorized watercraft, vehicle, or equipment within the Conservancy Area.

i. VEGETATION. Except in conjunction with the authorized uses set forth in paragraph g. above, there shall be no removal, cutting, mowing or alteration of any vegetation or change in the natural habitat in any manner.

NOTWITHSTANDING the foregoing restrictions, the Covenantor may construct and maintain any project features or mitigation features expressly required or approved by the Government and the State of Wisconsin.

RESERVED RIGHTS

These covenants do not convey any ownership interest in the Conservancy Area to the Government nor require the Covenantor to allow the general public to enter upon or use the Conservancy Area.

The Covenantor and Covenantor's invitees may hunt and fish in the Conservancy Area so long as they comply with the terms and conditions of these Covenants and all federal, state and local game and fishery regulations.

Nothing herein shall be construed as limiting the right of the Covenantor to lease, sell, give or otherwise convey the Conservancy Area, or any portion or portions thereof, provided that the conveyance is subject to the terms of these Covenants.

GENERAL PROVISIONS

These Covenants shall run with and burden the Conservancy Area in perpetuity and shall bind the Covenantor and Covenantor's heirs, successors and assigns. These Covenants are fully valid and enforceable by any assignee of the Government, whether assigned in whole or in part. Said assignment may be by operation of law or by written notice of assignment to the Covenantor.

The Covenantor warrants that it owns the Conservancy Area in fee simple, and that Covenantor either owns all property interests in the Conservancy Area which may be impaired by the granting of these Covenants or that there are no outstanding mortgages, tax liens, encumbrances, or other interests in the Conservancy Area which have not been expressly subordinated to these Covenants by signing below. If it is determined at any time that there is any party who may have a property interest in the Conservancy Area that is superior to these Covenants, then the Covenantor shall immediately obtain and record a consent and subordination agreement signed by the other party. Acceptance of these Covenants does not release the Covenantor from the obligation to obtain and record a consent and subordination agreement signed by any party who may have a property interest in the Conservancy Area that is superior to these Covenants, even if such interest was of record at time of acceptance.

The Covenantor agrees to pay any and all real property taxes and assessments levied by competent authority on the Conservancy Area.

The Covenantor agrees that the terms, conditions, covenants and restrictions set forth in this instrument will be inserted in any subsequent conveyance of any interest in said property. The Covenantor agrees to notify the Government of any such conveyance in writing and by certified mail at least 60 days prior to the conveyance.

The Covenantor agrees to notify the Government at least 60 days prior to the establishment of any other legal claims over the Conservancy Area. The Government may prohibit the establishment of legal claims that are incompatible with the purposes and covenants stated herein.

As the Covenantor received a Department of the Army permit or other valuable consideration for the making of these Covenants, these Covenants may only be modified or amended by a properly recorded written instrument executed by the Covenantor, with the written consent of the St. Paul District, U.S. Army Corps of Engineers, or other Federal agency authorized by law to enforce Section 404 of the Clean Water Act.

The terms "Covenantor" and "Government" as used herein shall be deemed to include, respectively, the Covenantor and its heirs, successors, personal representatives, executors and assigns, and the United States Government, acting by and through the U.S. Army Corps of Engineers or other Federal agency authorized by law to enforce Section 404 of the Clean Water Act.

TO HAVE AND TO HOLD the above described together with all the appurtenances, rights and privileges belonging thereto, either in law or equity, for the proper use and benefit of the Government and its successors and assigns, forever.

EXECUTIONS AND ACKNOWLEDGMENTS

IN WITNESS THEREOF, the Covenantor has hereto set its hand and seal this 3RD day of May, 2012.

Howard Ward

Howard Ward, Village President, Village of Belleville, Wisconsin

County of Dane

State of Wisconsin

The foregoing instrument was acknowledged before me this 3RD day of May, 2012, by Howard Ward, Village President, Village of Belleville, Wisconsin, Covenantor.

NOTARY PUBLIC
APRIL LITTLE
STATE OF WISCONSIN

April Little

Notary Public
My Commission Expires: Nov. 24, 2014

This instrument was drafted by:

Sigurdur G Sigmarsson

using a form developed by the
St. Paul District, U. S. Army Corps
of Engineers

2012 © HOFMEISTER ENGINEERING & SURVEYING, INC.

CONSERVATION EASEMENT LEGAL DESCRIPTION:

A PARCEL OF LAND LOCATED IN THE SOUTHEAST QUARTER OF THE NORTHWEST QUARTER OF SECTION 34, TOWNSHIP 5 NORTH, RANGE 8 EAST, VILLAGE OF BELLEVILLE, DANE COUNTY, WISCONSIN, MORE PARTICULARLY DESCRIBED AS FOLLOWS:

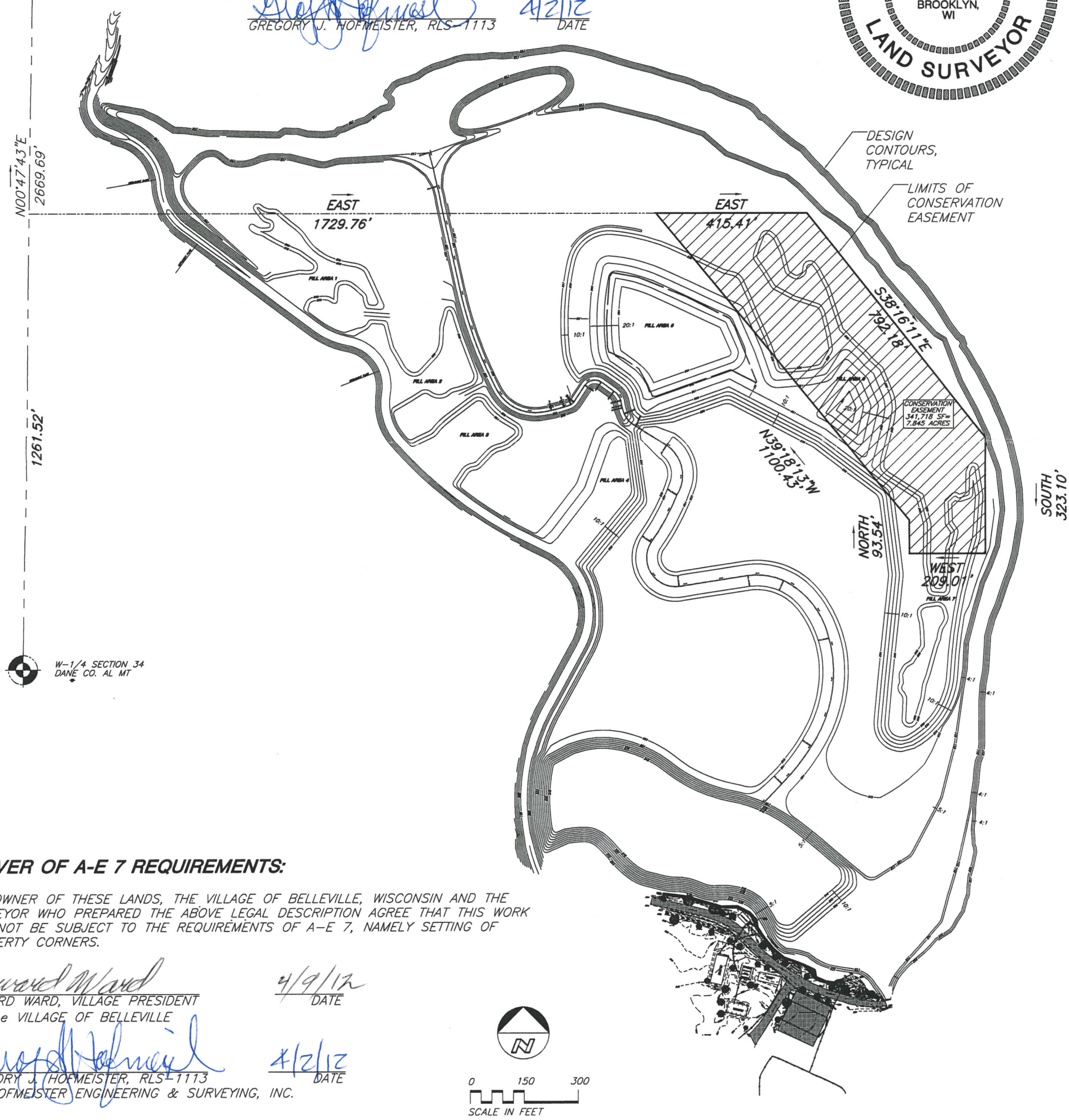
COMMENCING AT THE WEST QUARTER CORNER OF SAID SECTION 34;
THENCE ALONG THE WEST LINE OF SAID NORTHWEST QUARTER, N 00° 47' 43" E 1261.52 FEET;
THENCE EAST 1729.76 FEET TO THE POINT OF BEGINNING;
THENCE CONTINUING EAST 415.41 FEET'
THENCE S 38°16'11" E 792.18 FEET;
THENCE SOUTH 323.10 FEET;
THENCE WEST 209.01 FEET;
THENCE NORTH 93.54 FEET;
THENCE N 39°18'13" W 1100.43 FEET TO THE POINT OF BEGINNING CONTAINING 341,718 SQUARE FEET OR 7.845 ACRES.

SURVEYOR'S CERTIFICATE

I, GREGORY J. HOFMEISTER, REGISTERED LAND SURVEYOR, HEREBY CERTIFY THAT THE ATTACHED MAP AND ACCOMPANYING SURVEY ARE CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF.

GREGORY J. HOFMEISTER, RLS-1113 — DATE 4/2/12

WISCONSIN
GREGORY J. HOFMEISTER
S-1113
BROOKLYN, WI
LAND SURVEYOR



WAIVER OF A-E 7 REQUIREMENTS:

THE OWNER OF THESE LANDS, THE VILLAGE OF BELLEVILLE, WISCONSIN AND THE SURVEYOR WHO PREPARED THE ABOVE LEGAL DESCRIPTION AGREE THAT THIS WORK WILL NOT BE SUBJECT TO THE REQUIREMENTS OF A-E 7, NAMELY SETTING OF PROPERTY CORNERS.

HOWARD WARD, VILLAGE PRESIDENT — DATE 4/9/12
for the VILLAGE OF BELLEVILLE

GREGORY J. HOFMEISTER, RLS-1113 — DATE 4/2/12
for HOFMEISTER ENGINEERING & SURVEYING, INC.

BASIS FOR BEARINGS

BEARINGS FOR THIS SURVEY AND MAP ARE BASED ON GRID NORTH AS DEFINED BY THE DANE COUNTY COORDINATE SYSTEM,

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Project No. 1009-09
Sheet 1 of 1
Drawing No. C-35

LAKE BELLE VIEW RESTORATION

CONSERVATION EASEMENT
VILLAGE OF BELLEVILLE
DANE COUNTY, WISCONSIN

HOFMEISTER Engineering & Surveying, Inc.
Civil Engineers and Land Surveyors
15626 West Holt Road • Brooklyn, Wisconsin 53521-9319
Telephone 608.455.1044
Mobile 608.692.2282
Email hofmeist@chorus.net

Surveyed:	GJH/TMS	12.02.11
Drawn:	GJH	03.20.12
Checked:	000	03.26.12
Approved:	GJH	04.02.12
Plotted:		04.02.12
Printed:		

Revisions:

Number	Revision	Date
1	ADD CONS. EASEMENT	03.20.12