

Project Name | Bass Lakes Management Plan**Date** | 5/5/2020**To / Contact info** | BCWD Board of Managers**Cc / Contact info** | Karen Kill**From / Contact info** | Pat Conrad, Joe Pallardy, Jimmy Marty**Regarding** | Phase 1 Data Collection Summary

Background

In the 2017-2026 Watershed Management Plan, the District adopted a strategy to develop management plans for large ponds and wetlands that residents' value and, in some cases, utilize as lakes. Given the size of the resources, public access and the number of landowners using these resources, these management plans are a scaled-down version of a typical lake management plan and focus on reducing watershed nutrient loading and internal phosphorous loading. The large pond/wetland that is locally known as Bass Lake West falls into this category. Due to its proximity to Bass Lake East, it was proposed that a combined management plan be developed for the two resources.

In April of 2019, the BCWD Board of Managers approved a scope of services to conduct a point-intercept plant survey for both Bass Lake East and Bass Lake West. A point-intercept survey is a standard method for sampling macrophytes (aquatic plants) and measuring the diversity and health of the aquatic plant community. The results of the Bass Lakes Point-Intercept survey, which was conducted in August of 2019, is summarized in this Technical Memorandum. A complete report detailing the point-intercept plant survey is attached to this document.

In July of 2019 the BCWD Board of Managers approved Phase I of the Bass Lake East & West Management Plan scope of services. Phase I of the management plan included a watershed model and assessment. This assessment includes a summary of the hydrology, watershed nutrient loading and past monitoring data on Bass Lake East and West. It also includes an evaluation of potential nutrient loading in the watershed. Phase II of the Management Plan will build upon the work completed for Phase I and include a fisheries survey and sediment core. This information will be used to determine how much of the existing nutrient load is coming from in-lake sources versus the contributing drainage area. By sharing this information with residents and other stakeholders, the District can identify implementation strategies that will address nutrient loads in these pond/wetland systems so they can support a healthy fishery and provide recreational and wildlife value for the watershed.

This memorandum summarizes the results of Phase I of the Bass Lake East & West Management Plan.

Background Lake Data

Bass Lake East and Bass Lake West are located in the western edge of the watershed in the City of Grant, south of 107th Street North and east and west of Joliet Avenue North. Lake management classification information from the BCWD Watershed Management Plan for the resources is summarized in Table 1. Lake location and subwatersheds are shown in Figure 1, while existing land use is shown in Figure 2.

Table 1. Lake Management Classification Data: BCWD Watershed Management Plan

Waterbody	Bass Lake East	Bass Lake West
BCWD Classification	Lake	Ponds & Open Water Wetlands
Public Waters Inventory (PWI) #	82-0124-00	82-0123-00
MN Public Waters Inventory Classification	Wetland	Wetland
DNR Lake Shoreland Mgmt. Classification	NA	NA
BCWD Lake Mgmt. Plan	N	N
MN PCA Assessed	Y	Y
Applicable WQ Standard	Shallow	Shallow
Aquatic Recreation Use Support	Fully Supported	Fully Supported
BCWD Monitored	Y	Y
Meets Standard (District WQ Data)	Meets	Meets
Recreational Use	M	L*
Adjoining Residents	H	L

* While recreational use was assessed as Low in the Watershed Management Plan, a public access is located on Bass Lake West in the City of Grant's Bass Lake Park (May Ave N and 150th St N)

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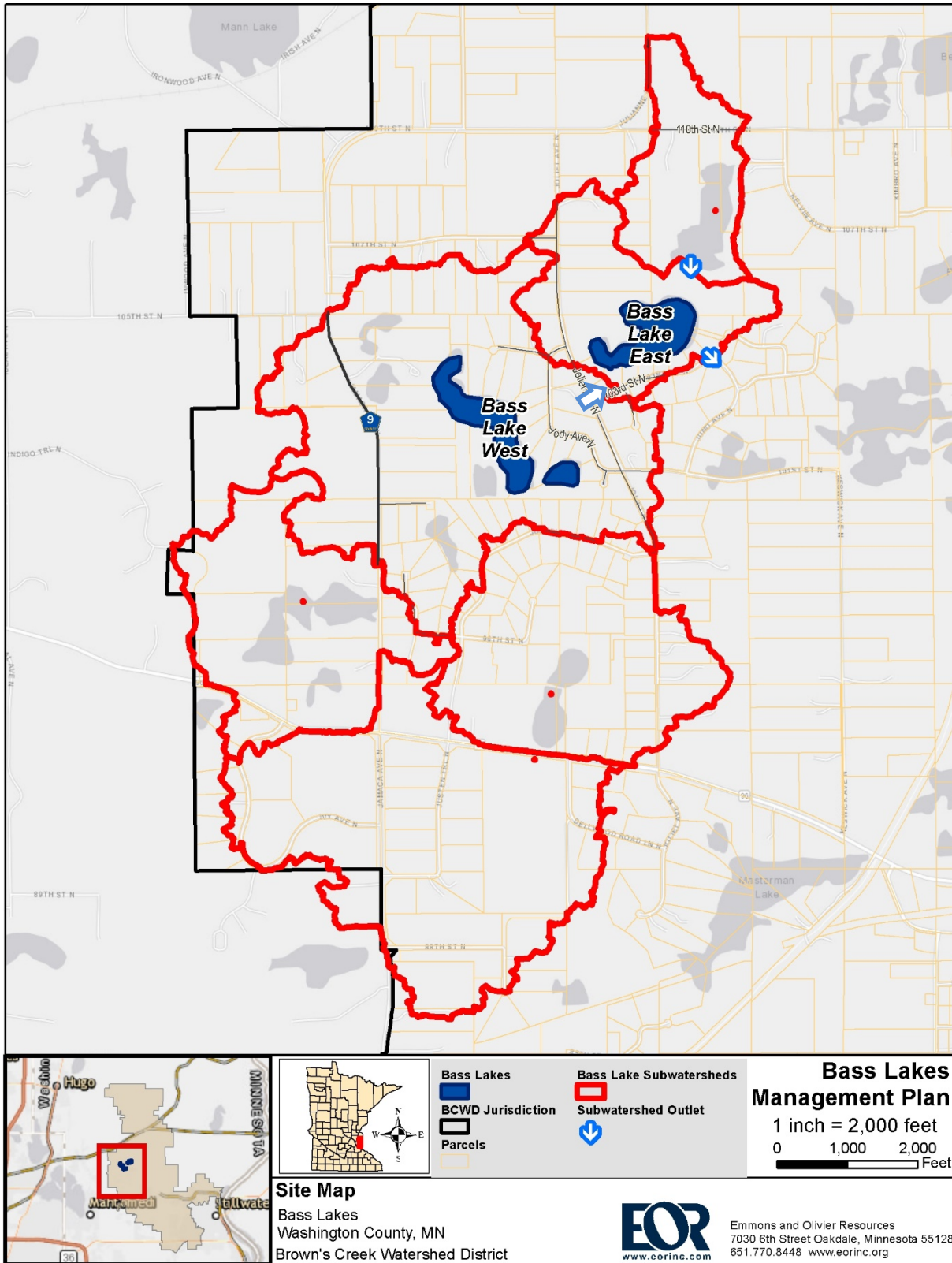


Figure 1. Bass Lake East and Bass Lake West Watersheds

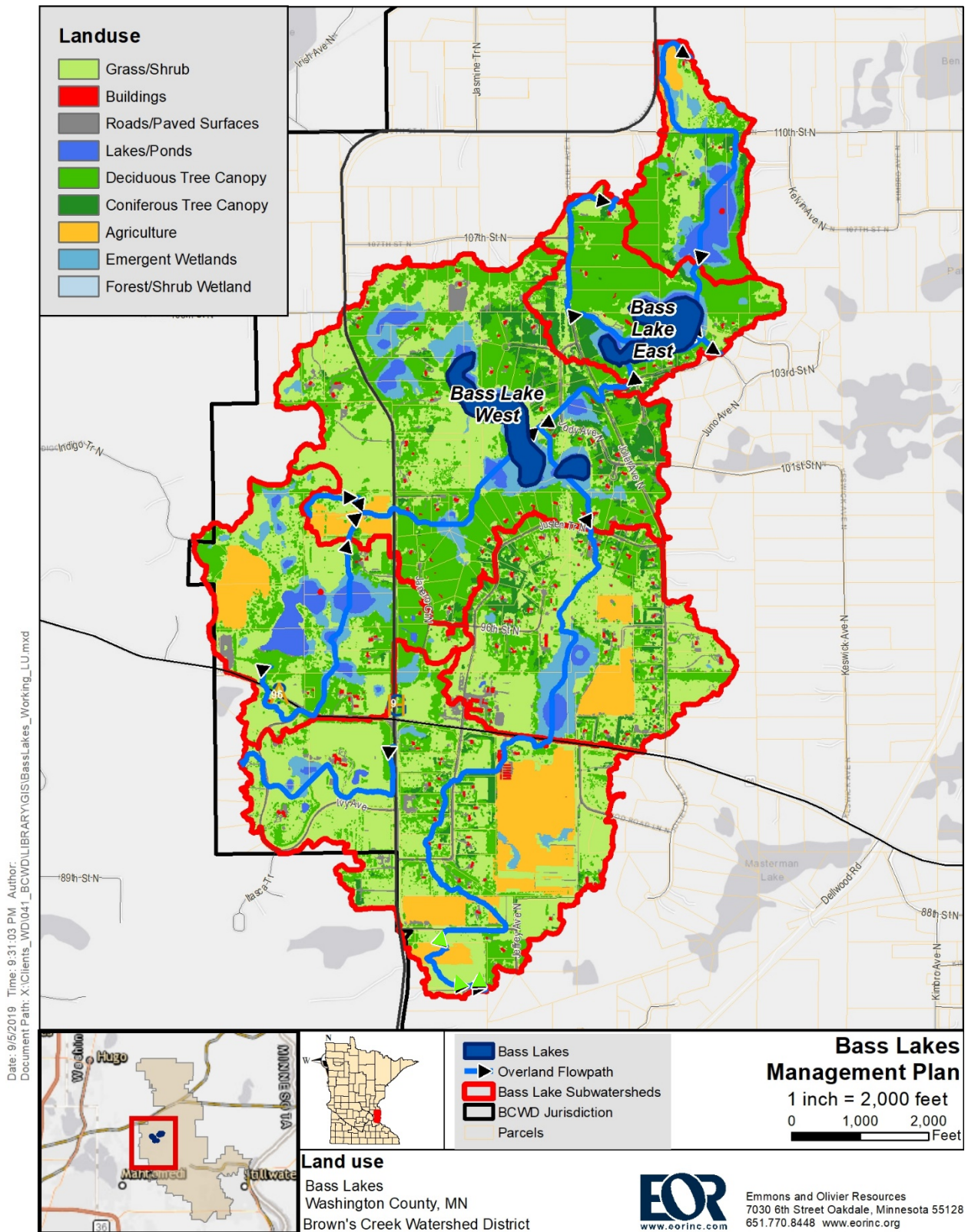


Figure 2. Bass Lake East and Bass Lake West Watershed Land Use

Water Quality

A summary of water quality monitoring data collected from 2006-2018 for Phosphorus, Chlorophyll A, and Secchi Depth is shown in Figure 3 for Bass Lake West and in Figure 4 for Bass Lake East. Further summaries of lake water quality grades for the lakes are found in Table 2 and Table 3 as well as Figure 5 and Figure 6. Both lakes have relatively good water quality compared to other lakes in the region. The District's annual monitoring program typically rates the lakes in the B+ to A- range.

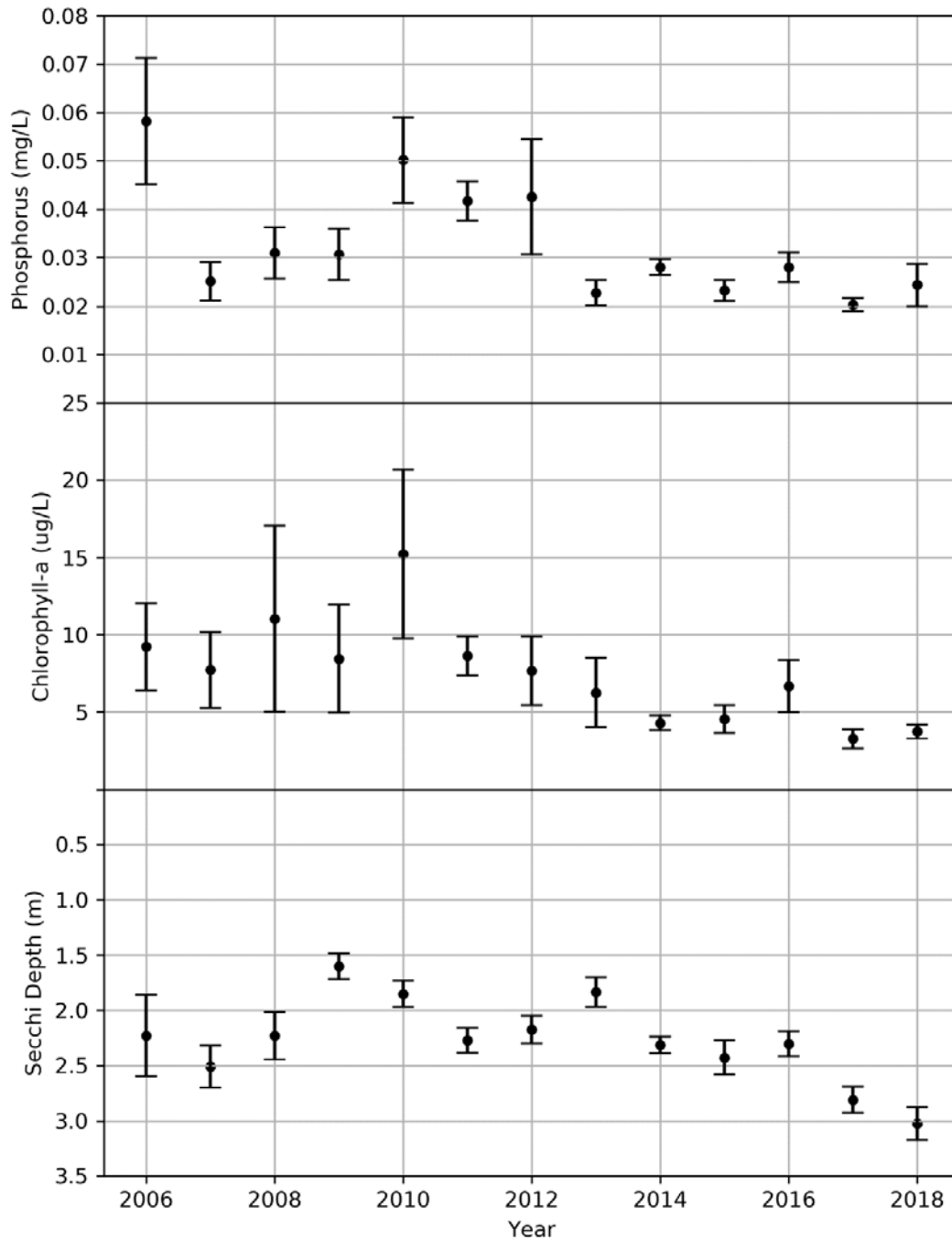


Figure 3. Bass Lake West Summary of Water Quality Monitoring Data 2006-2018; Phosphorus, Chlorophyll A, and Secchi Depth

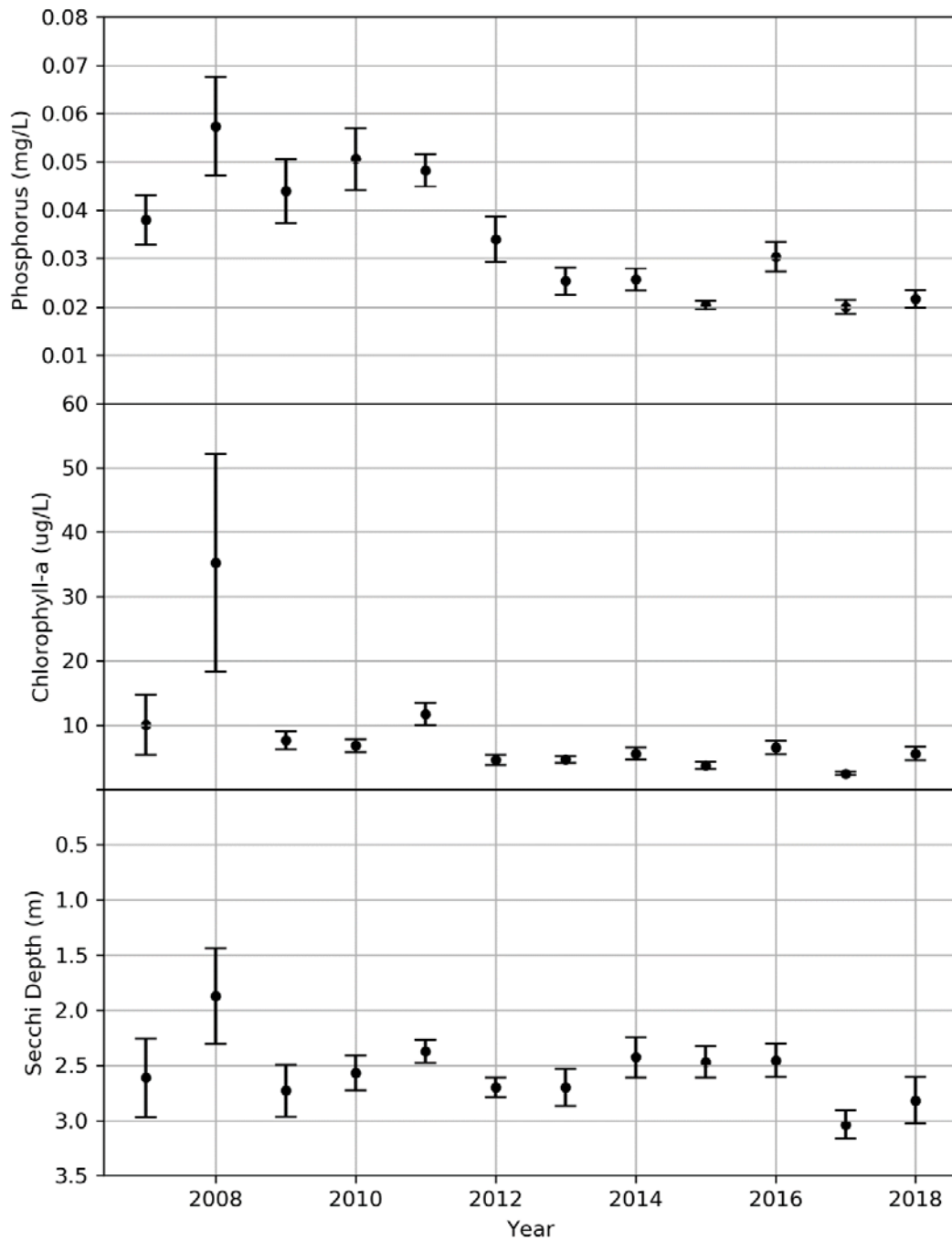


Figure 4. Bass Lake East Summary of Water Quality Monitoring Data 2006-2018; Phosphorus, Chlorophyll A, and Secchi Depth

Table 2 Bass Lake West Water Quality Summary (WCD)

Lake Water Quality Summary										
	Lake Grades									
	2018	2017	2016	2015	2014	2013	2012	2011	2010	2009
Total Phosphorus (mg/l)	B	A	B	B	B	B	C	C	C	C
Chlorophyll-a (ug/l)	A	A	A	A	A	A	B	A	B	B
Secchi depth (ft)	B	B	B	C	B	B	C	B	C	C
Overall	B+	A-	B+	B	B+	B+	C+	B	C+	C+

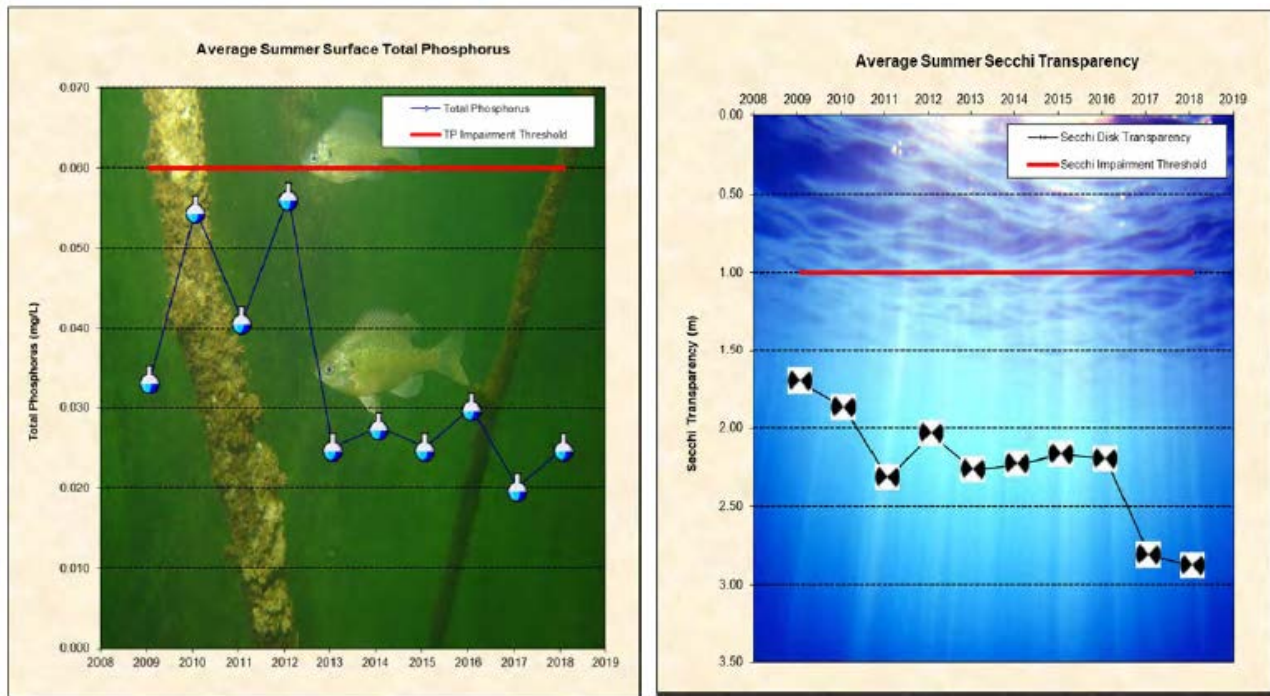


Figure 5. Bass Lake West Water Quality Monitoring Summary

Table 3. Bass Lake East Water Quality Summary (WCD)

Lake Water Quality Summary										
	Lake Grades									
	2018	2017	2016	2015	2014	2013	2012	2011	2010	2009
Total Phosphorus (mg/l)	A	A	C	A	B	B	C	C	C	C
Chlorophyll-a (ug/l)	A	A	A	A	A	A	A	B	A	B
Secchi depth (ft)	B	B	B	C	B	B	B	B	B	B
Overall	A-	A-	B	B+	B+	B+	B	B-	B	B-

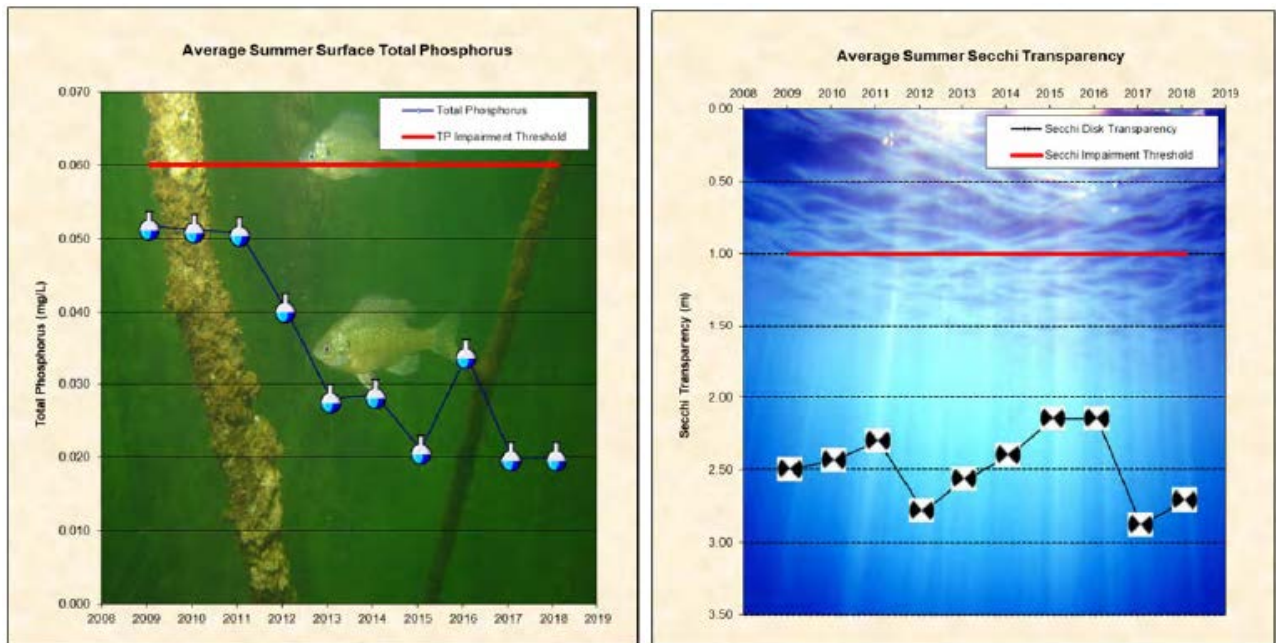


Figure 6. Bass Lake East Water Quality Monitoring Summary

Watershed Loading

A water quality model (EPA Simple-method) was used to determine loading rates for the Bass Lake subwatersheds as shown in Figure 7. In addition, the District's PTMApp model was used to identify areas of higher relative phosphorus and sediment loading (hot spots) for the watershed as shown in Figure 8. This information was further refined to identify priority areas, within in the direct drainage areas of the two lakes, for phosphorus and sediment loading as shown in Figure 9.

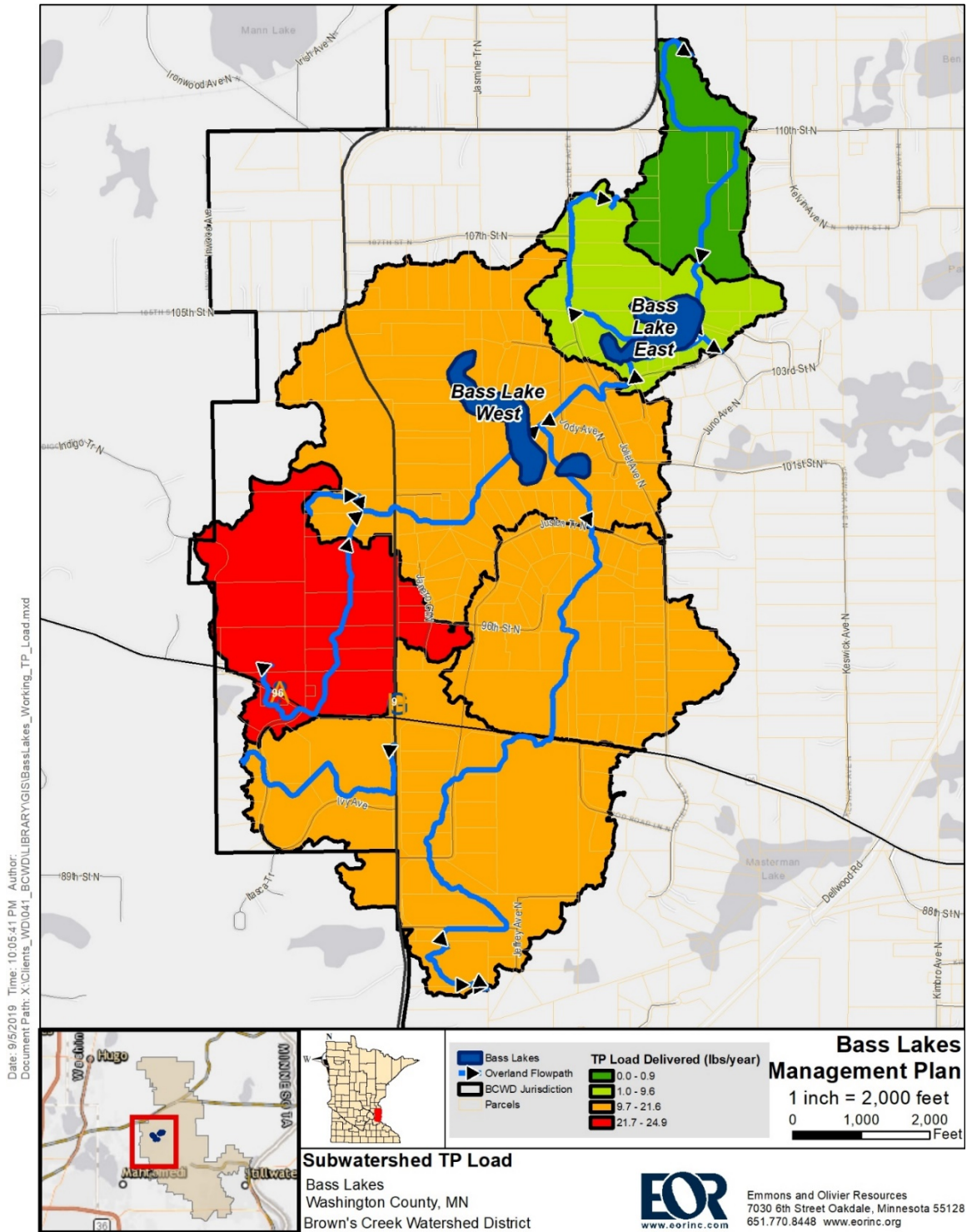


Figure 7. Subwatershed TP Loading (Source: EPA Simple-Method)

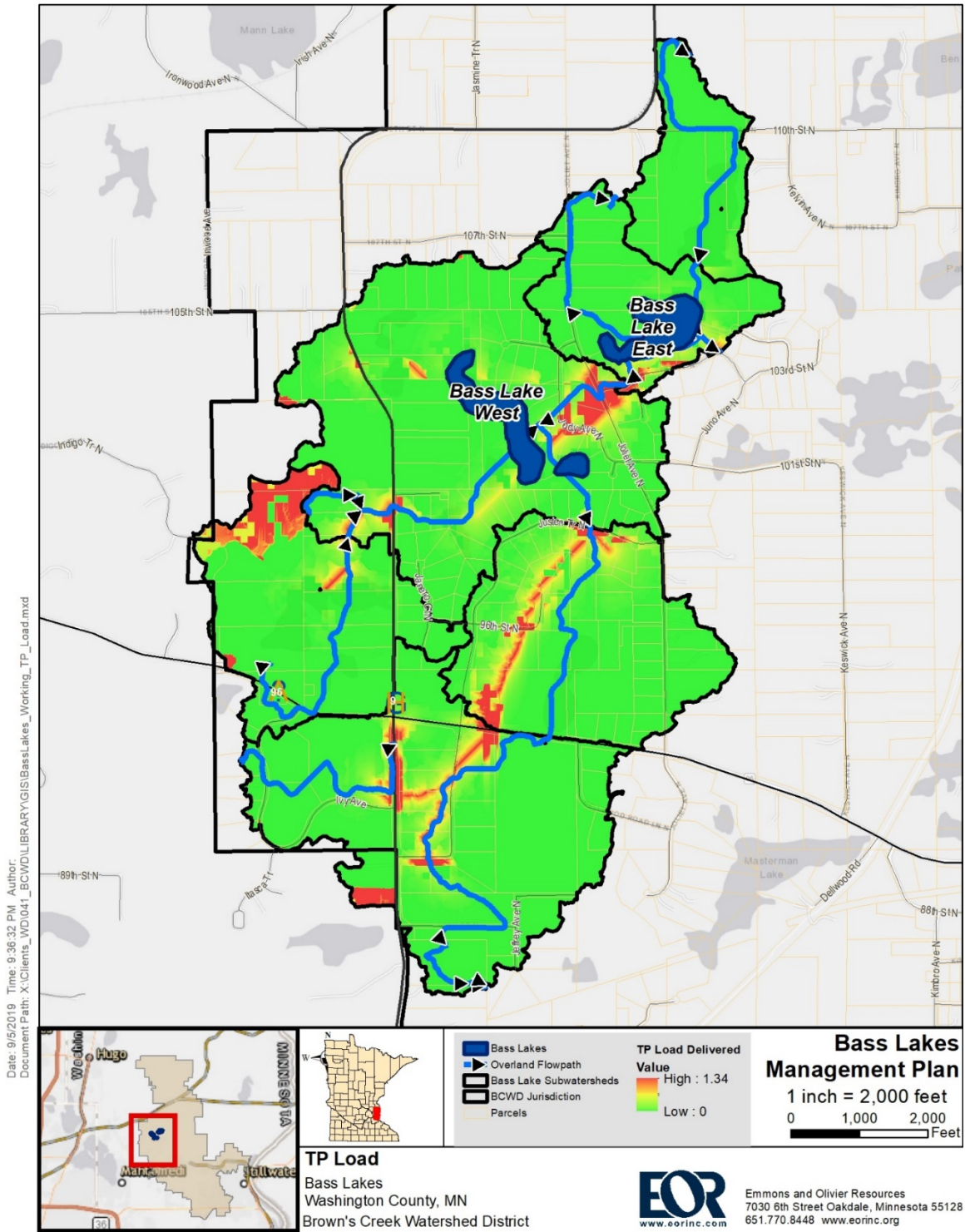


Figure 8. Watershed Phosphorus Loading Hot Spots (Source: PTMApp)

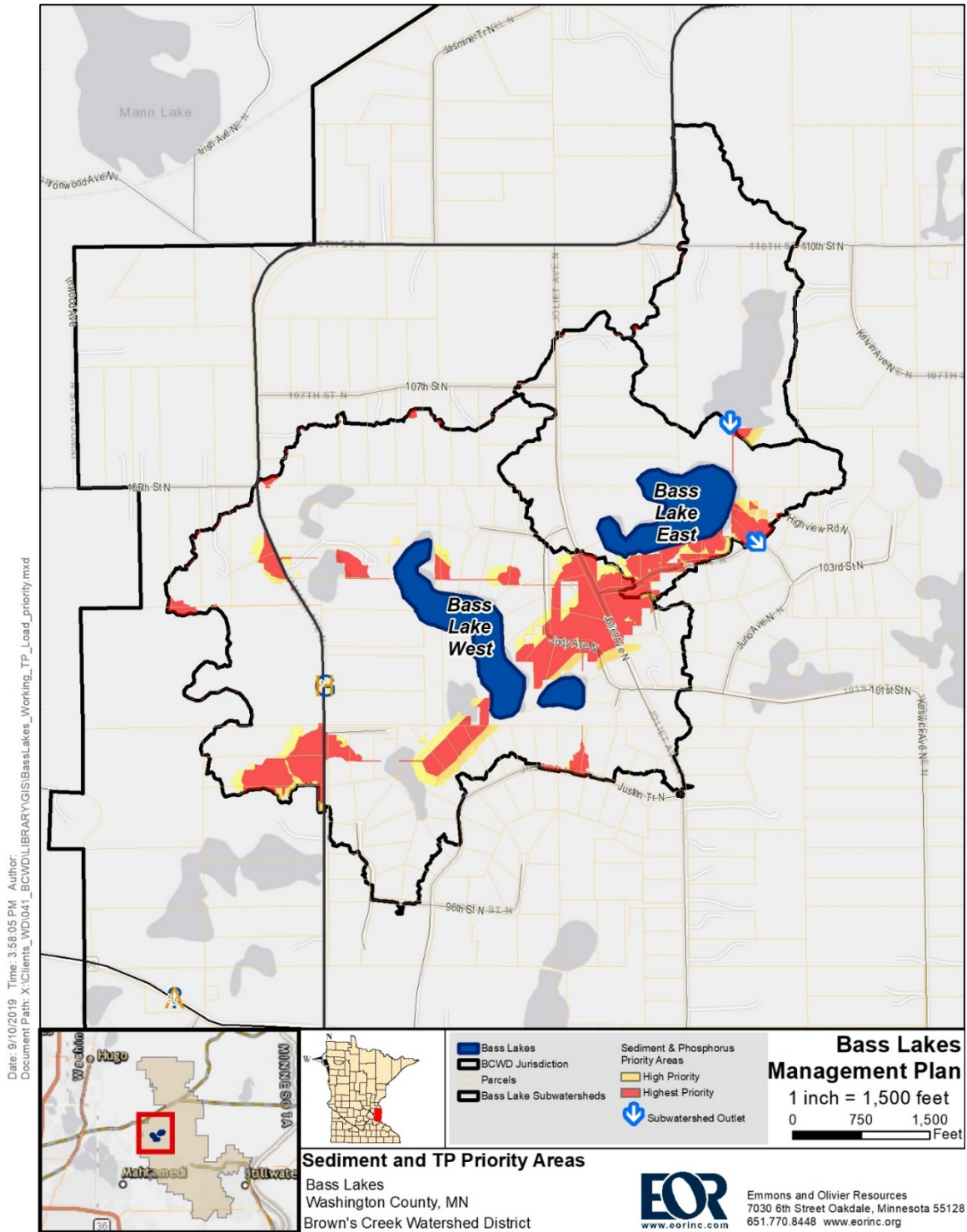


Figure 9. Sediment and Phosphorus Priority Loading Areas

Hydrology

Recorded water levels (2011-2019) for Bass Lake East (Figure 10) and Bass Lake West (Figure 11) have increased dramatically over the past ten years. The Ordinary High Water Level (OHWL), which is an elevation delineating the highest water level that has been maintained for a sufficient period of time to leave evidence on the landscape, is shown as a red line. Water level profiles through both lakes and surrounding areas is shown in Figure 12. The outlet of the Bass Lake West subwatershed is currently modeled as a 100 foot weir at 973.0 ft-msl and the outlet of Bass Lake East subwatershed is modeled as 1,600 foot weir at 974.0 ft-msl.

BCWD measures groundwater levels in residential wells and observation wells throughout the district. The closest wells are about one mile to the east and two miles to the south. Water levels in those wells (and most wells in the district) have risen over the last four years. Some wells are approaching the record highs recorded in the late 1990's.

Additional information is needed to fully understand the hydrology of this system, particularly the role of groundwater. Integrating Groundwater and Surface Water Management – Northern Washington County (EOR) identifies Bass Lake West as a groundwater dependent natural resource. The report also identifies the area surrounding Bass Lake West as an area of high infiltration potential.

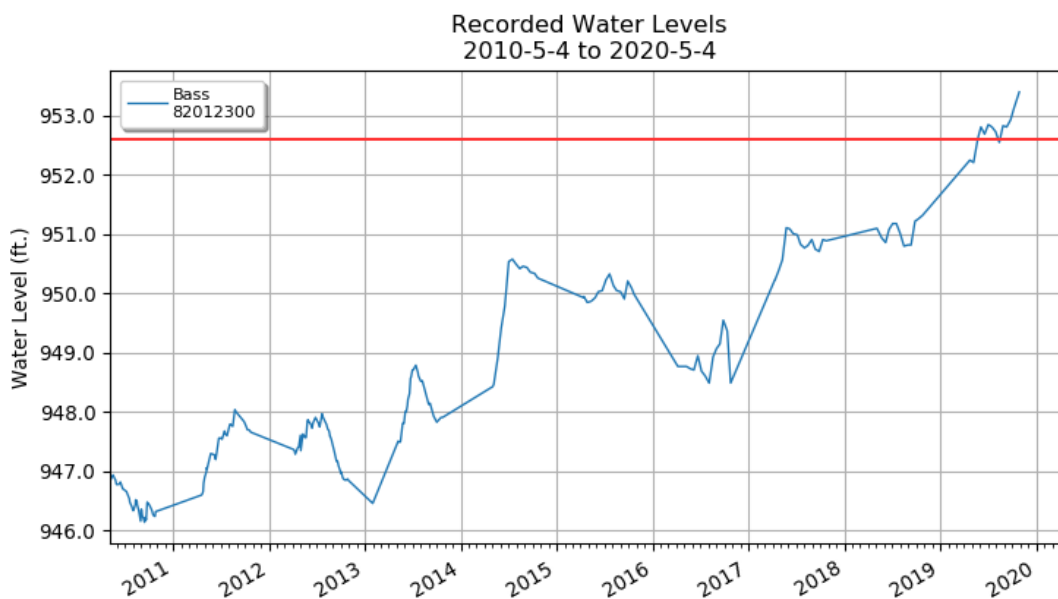


Figure 10. Bass Lake East Recorded Water Levels 2010-2020 (Source: MNDNR)

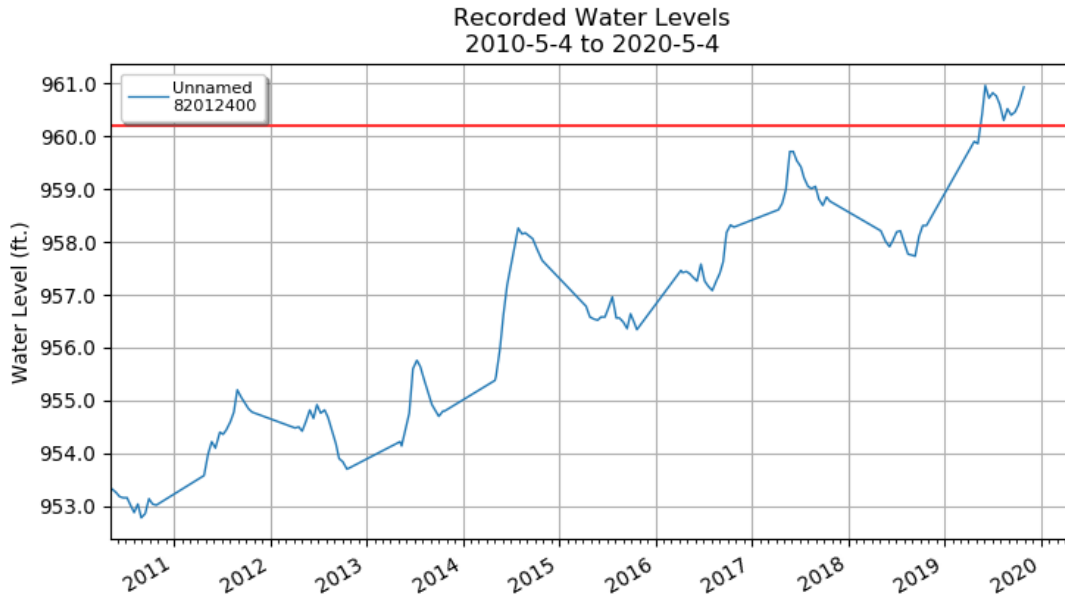


Figure 11. Bass Lake West Recorded Water Levels 2010-2020 (Source: MNDNR)

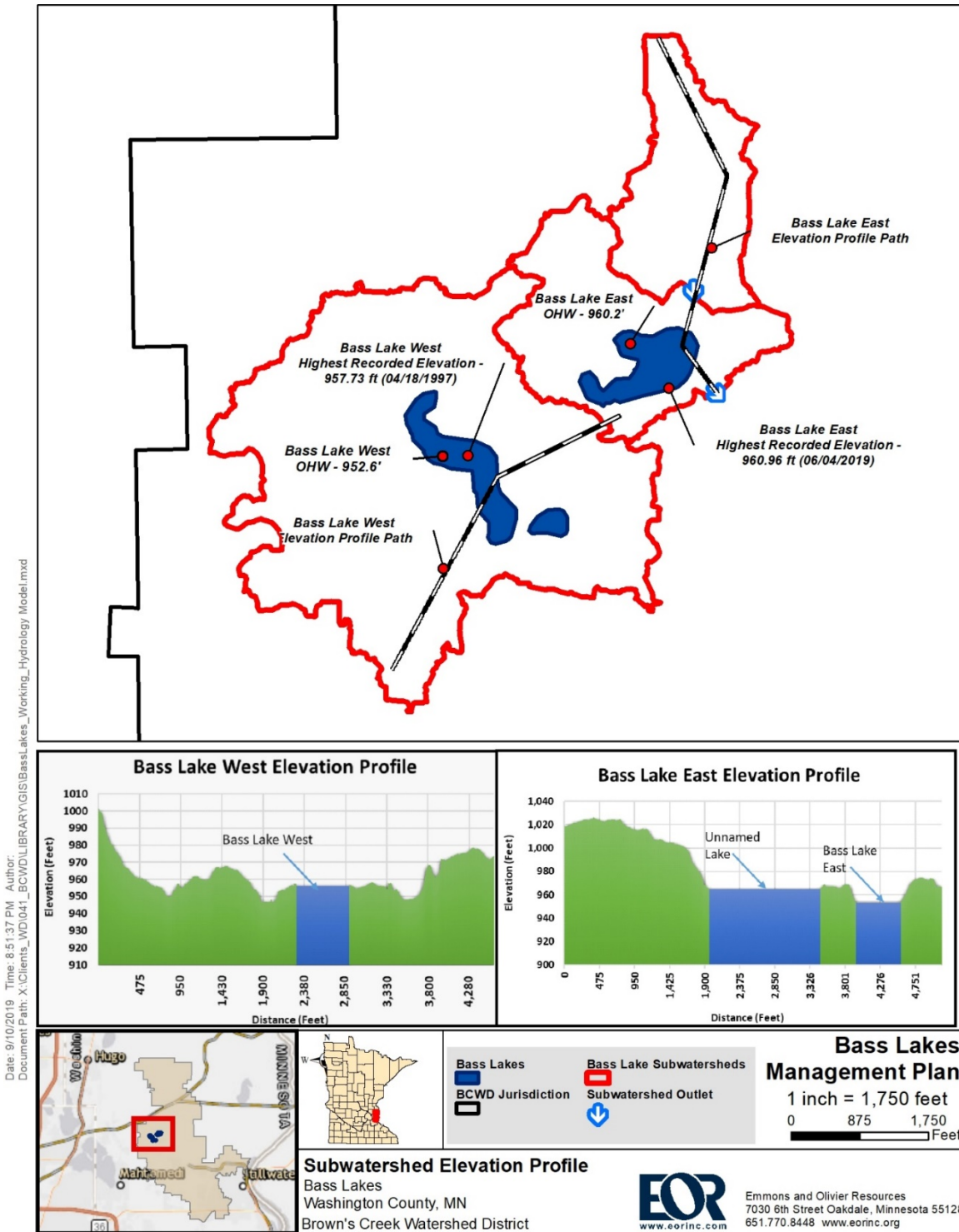


Figure 12. Bass Lake West and Bass Lake East Elevation Profiles

Aquatic Plant Community

A point-intercept aquatic plant survey was completed on August 9, 2019 on Bass Lake West and on August 19, 2019 on Bass Lake East. A detailed description of the survey is included as Appendix A. Key findings of the aquatic plant survey include:

- The most common aquatic plants in Bass Lake West were Canada waterweed (68.1% of sampling points), fern-leaf pondweed (53.6% of sampling points), and coontail (43.5% of sampling points).
- The most common aquatic plants in Bass Lake East were fern-leaf pondweed (100% of sampling points) and white-water-lily (30.2% of sampling points).
- Both lakes were characterized by dominance of fern-leaf pondweed which tends to grow in colonies with few other species, but has a high coefficient of conservatism (c-value = 8) and requires good water clarity because it is most common in deeper water.
- Uncommon plant or algae species typical of lakes with good water clarity were present in both lakes.
 - Bass Lake West: Spiny coontail was observed at 11.6% of sampling points. Spiny coontail is uncommon in Minnesota.
 - Bass Lake West: A species of *Nostoc* algae was also observed in abundance in Bass Lake West (36.2% of sampling points). *Nostoc* algae is a blue-green algae that forms globular colonies that appear as small floating balls, sometimes called “freshwater grapes”. Abundant *Nostoc* algae is somewhat uncommon and requires good water clarity because colonies typically form on the bottom of the lake and later float to the surface.
 - Bass Lake East: Spiny coontail was present in addition to spiral-fruited pondweed, another uncommon species.
- The invasive emergent plant purple loosestrife was observed along the shores of both lakes at low abundances. Small populations of purple loosestrife, like those observed at Bass Lake, can be reasonably managed and controlled.

Conclusions

Both lakes have relatively good water quality compared to other lakes in the region. The District’s annual monitoring program typically rates the lakes in the B+ to A- range. At this time, water quality management focus for the lakes should be on protection strategies. The rising water levels on these lakes, an issue common in the District, should be the focus of the Bass Lakes Management Plan. A scope of services for Phase II, the final phase of the Bass Lake East & West Management Plan will be presented to the BCWD Board of Managers at the May 2020 regularly scheduled meeting.