

2021 Kasota Ponds Biological Monitoring

In 2011, monitoring at the Kasota Ponds (KP) wetlands was expanded beyond water quality to include assessment of the biological health of the wetlands. Results from the previous biological surveys can be found in the [2011](#) and [2016 MWMO Annual Monitoring Report](#) (MWMO, 2011; MWMO, 2016). With the goal of maintaining a five-year schedule for biological assessment, the monitoring was repeated in 2021. During June and July, the Kasota Ponds wetlands were sampled for macroinvertebrate and aquatic plant assemblages. These data were used to assess the health of the Kasota Ponds wetlands relative to other wetlands in the state and to establish baseline records for the wetlands.

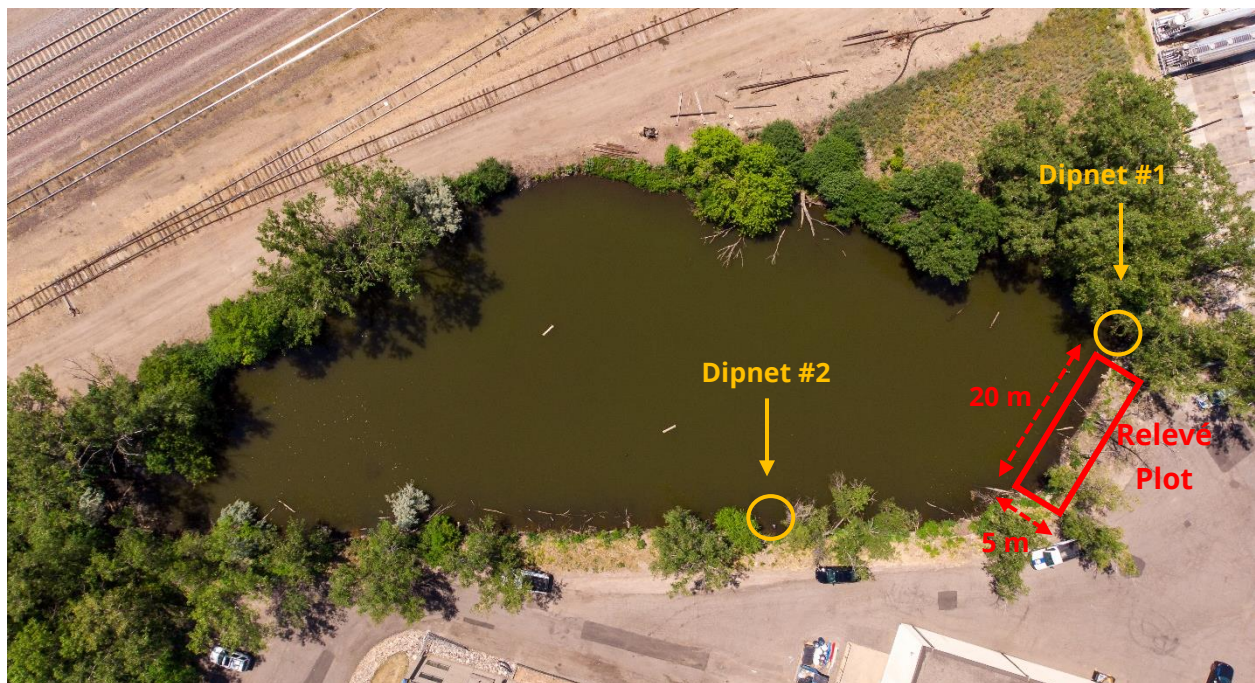


Figure 1. Aerial view of Kasota Ponds West sampling locations a week before the biological survey began.

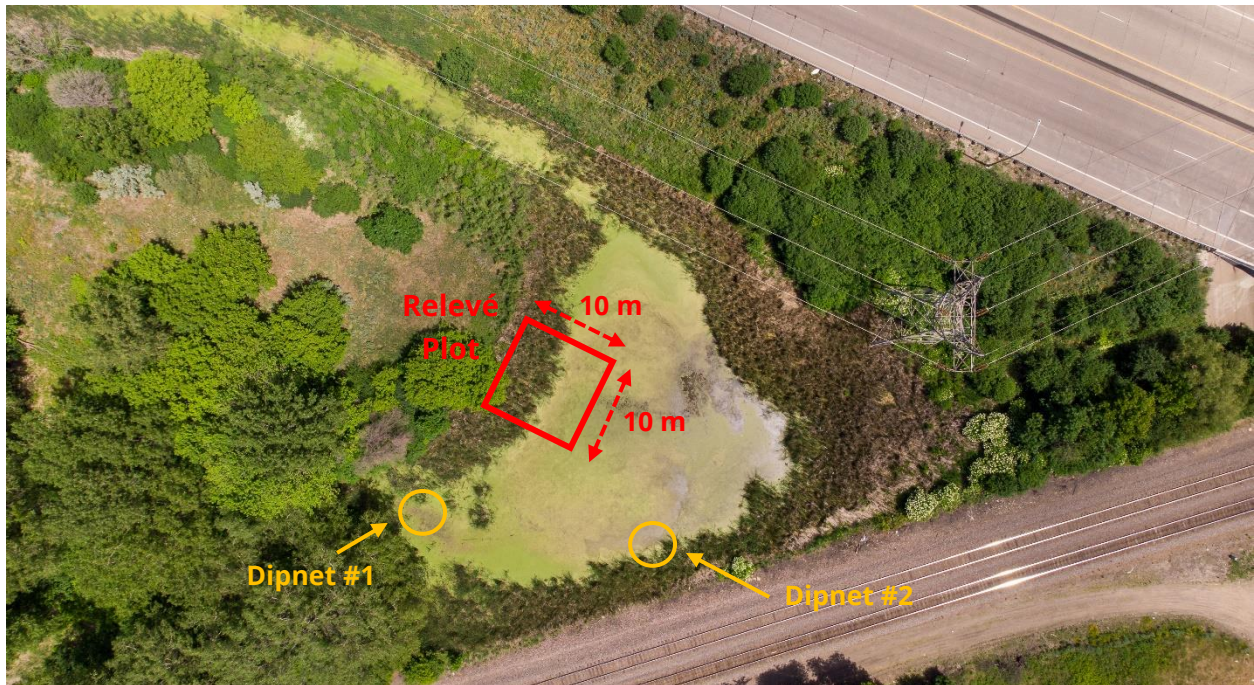


Figure 2. Aerial view of Kasota Ponds North sampling locations a week before the biological survey began.



Figure 3. Aerial view of Kasota Ponds East sampling locations a week before the biological survey began.

Wetland Macroinvertebrate Sampling

Sample Collection, Handling and Preservation Methods

Macroinvertebrate samples were collected in June 2021 by following the MPCA's Macroinvertebrate Community Sampling Protocol for Depressional Wetland Monitoring Sites (MPCA, 2014). Similar to the methods used in 2016, at each of the three wetlands, two samples were collected from the water column and vegetation above the substrate using dipnets (see Figures 1-3). Unlike the 2011 macroinvertebrate sampling, activity traps were not used in 2016 or 2021. The MPCA reviewed activity trap use in wetland macroinvertebrate sampling and determined that it required significant staff time relative to its contribution to the IBI score calculation and also had the potential to cause fatalities of nontargeted species such as tadpoles and minnows (Bouchard, Chirhart, and Genet, 2011).

Sample Processing and Data Analysis

After sampling, macroinvertebrates were preserved in 95% ethyl alcohol. Macroinvertebrates were later identified to the genus or family level by staff at Fortin Consulting. An IBI score was calculated for each wetland using methods described in Indexes of Biological Integrity for Large Depressional Wetlands in Minnesota (Gernes and Helgen, 2002).

Due to the omission of activity traps which target specific groups of macroinvertebrates, the number of metrics used to calculate Macroinvertebrate IBI scores has decreased from nine metrics to the following five metrics: Leech Taxa, Odonata (Dragonfly/Damselfly) taxa, ETSD Taxa (genera of mayflies, caddisflies, fingernail claims, dragonflies), Snail Taxa and Total Taxa. Therefore, the range of possible IBI scores shifted from 9–45 in 2011 to 5–25 in 2016 and 2021.

Aquatic Plant Surveys

Survey Methods

Aquatic plants were surveyed using the relevé sampling method, following the MPCA's Wetland Monitoring Standard Operating Procedures: Vegetation Sampling Procedure for Wetland Biological Monitoring Sites (MPCA, 2019). Relevé surveying involves the selection of a 100 square meter plot that contains a representative portion of the entire wetland's vegetation, including emergent and submerged vegetation, when applicable. Surveyors then identify all of the species within the plot and estimate the percentage of the plot covered by each species. Aquatic plant surveys were conducted in July 2021 and an IBI score was calculated by MWMO staff for each wetland, following methods described in Indexes of Biological Integrity for Large Depressional Wetlands in Minnesota (Gernes and Helgen, 2002).

Biological Monitoring Results

Macroinvertebrates

The macroinvertebrate assemblages of KP indicate that the wetlands are in poor health. KP North received the lowest macroinvertebrate IBI score while KP East and KP West received the same macroinvertebrate IBI score (Figure 4). Results from each of the metrics that contribute to the overall IBI score are shown in Tables 1-3 for each pond. In 2011, 29 different macroinvertebrate taxa were identified across all three ponds (MWMO, 2011), 18 taxa were identified in 2016 (MWMO, 2016), and 22 taxa were identified in 2021. Overall IBI scores also decreased from 2011 to 2016. However, it is important to consider the fact that activity traps were not used in 2016 and 2021. Activity traps target a specific group of macroinvertebrates and, due to the omission of activity traps, the metrics contributing to the IBI calculation and the overall score range have changed since 2011. Therefore, while biodiversity and overall wetland health may have decreased since 2011, it is unlikely that the change is as drastic as the data comparison would suggest. When looking at the change from 2016 to 2021, where activity traps were not used, there was an increase in IBI scores for KP East and KP West, whereas KP North remained the same.

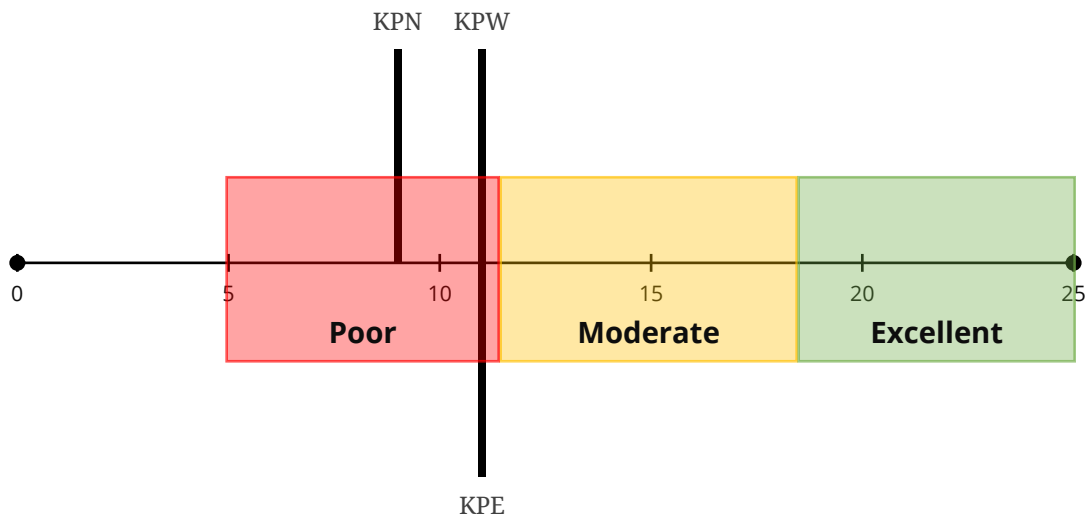


Figure 4. 2021 Macroinvertebrate IBI scores showing health relative to other wetlands in MN as set by the MPCA.

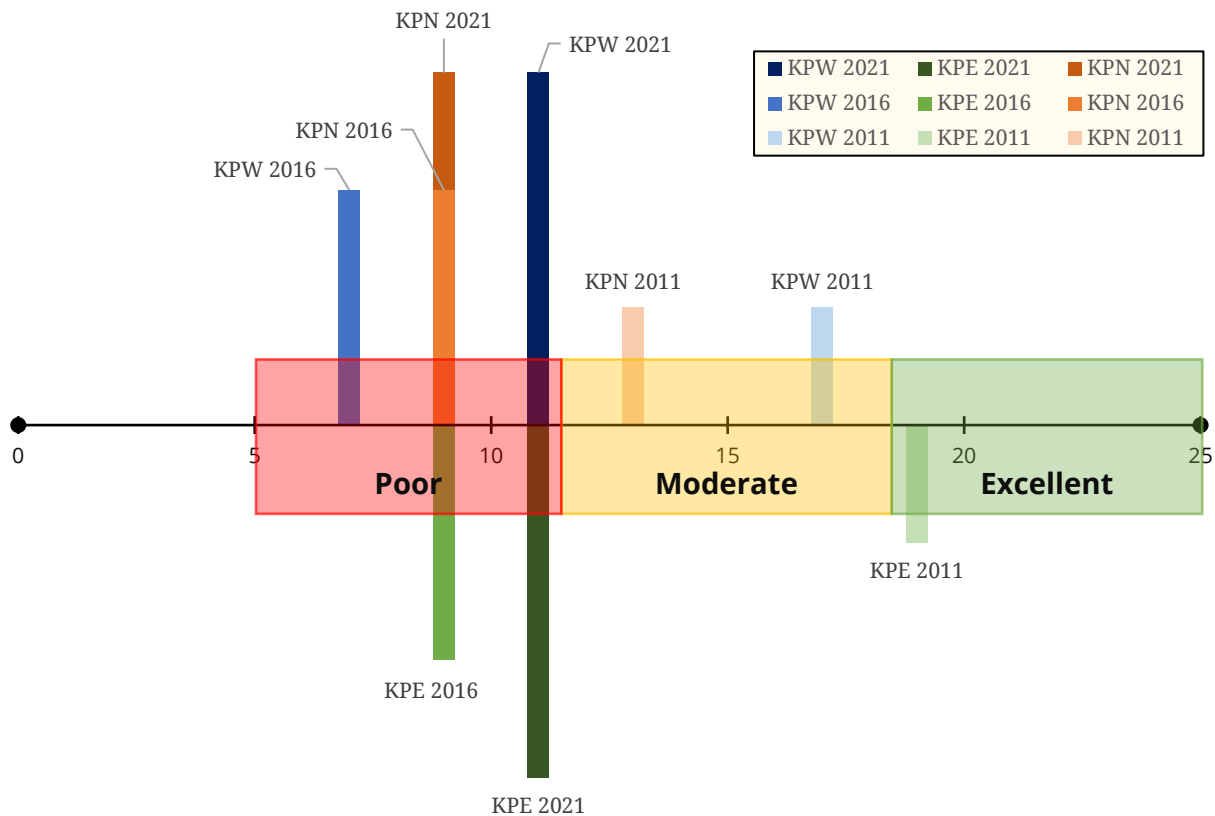


Figure 5. All KP Macroinvertebrate IBI scores relative to previous sampling years (2011 IBI scores were on a 9-45 scale).

Table 1. Macroinvertebrate IBI scores for KP West

Invertebrate Metrics	Total Taxa	IBI Score ³
Leech Taxa	2	3
Odonata Taxa ¹	1	1
ETSD Taxa ²	2	3
Snail Taxa	2	1
Total Taxa	9	3
Total IBI Score		11

1 Dragonfly/Damselfly

2 Number of genera of Mayflies, Caddisflies, Fingernail clams, Dragonflies

3 Possible score of 1, 3, or 5

Table 2. Macroinvertebrate IBI scores for KP East

Invertebrate Metrics	Total Taxa	IBI Score³
Leech Taxa	1	1
Odonata Taxa ¹	0	1
ETSD Taxa ²	1	1
Snail Taxa	4	5
Total Taxa	9	3
Total IBI Score		11

1 Dragonfly/Damselfly

2 Number of genera of Mayflies, Caddisflies, Fingernail clams, Dragonflies

3 Possible score of 1, 3, or 5

Table 3. Macroinvertebrate IBI scores for KP North

Invertebrate Metrics	Total Taxa	IBI Score³
Leech Taxa	1	1
Odonata Taxa ¹	1	1
ETSD Taxa ²	2	3
Snail Taxa	2	1
Total Taxa	7	3
Total IBI Score		9

1 Dragonfly/Damselfly

2 Number of genera of Mayflies, Caddisflies, Fingernail clams, Dragonflies

3 Possible score of 1, 3, or 5

Aquatic Plants

Aquatic plant assessments showed all three wetlands to remain in poor health relative to other wetlands in the state of Minnesota (Figure 6). KP East (Table 4) and KP North (Table 5) were dominated by cattails and lacked diversity. KP North's IBI score shows a general trend of continuous improvement over the last decade, yet still lies within the poor condition range. KP East did not show a change in IBI scores from 2011 to 2016, but improved in 2021. In 2021, both KP East and North IBI scores improved in the Aquatic Guild category due to an increase in the observed submergent aquatic forbs and floating leaved aquatic forbs. KP East also improved in the Persistent Litter category, whereas KP North improved in the Vascular Genera category. As in the 2011 and 2016 assessment, no aquatic plants were observed in KP West.

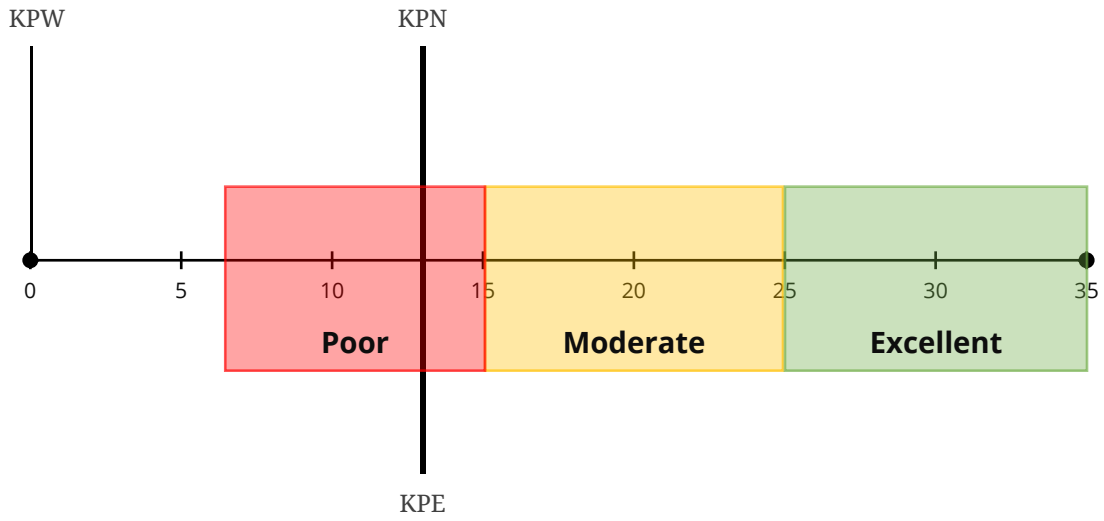


Figure 6. 2021 Aquatic Plant IBI scores showing health relative to other wetlands in the state as set by the MPCA.

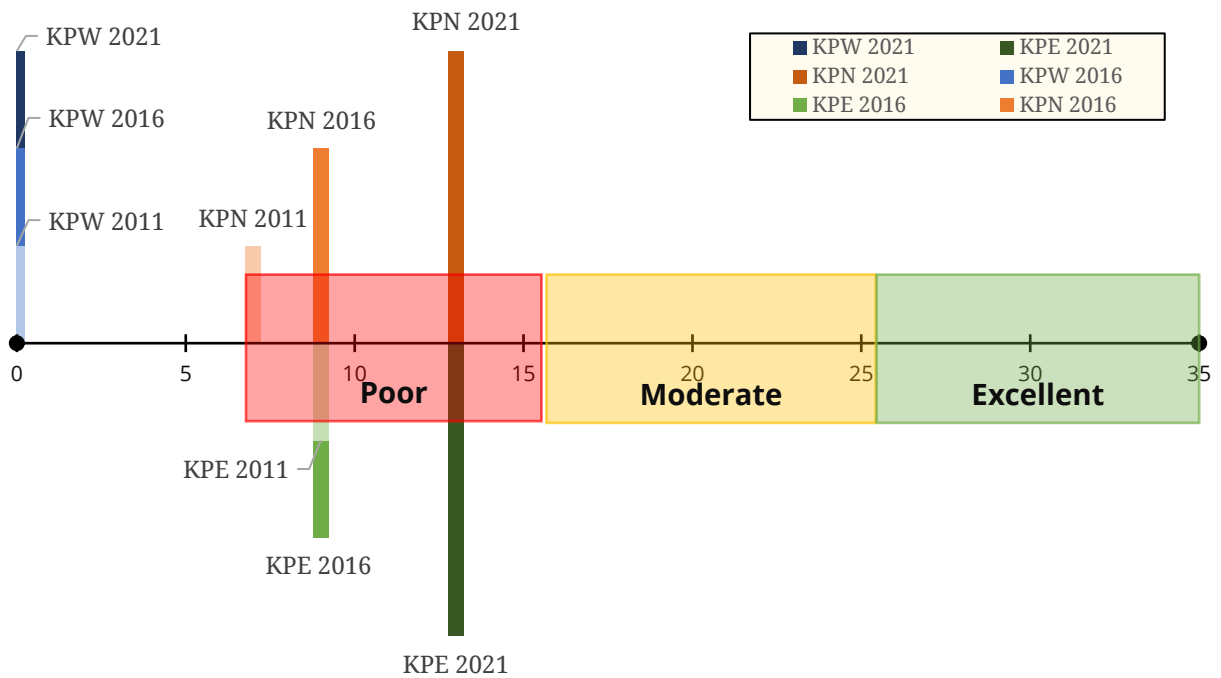


Figure 7. All Kasota Ponds Aquatic Plant IBI scores showing health relative to previous years.

Table 4. Aquatic Plant IBI scores for KP East

Aquatic Plant Metrics	Metric Value	IBI Score¹
Vascular Genera	7	1
Nonvascular Genera	0	1
Grass-Like Genera	0	1
<i>Carex</i> Cover	0	1
<i>Utricularia</i> present	Absent	1
Aquatic Guild Genera	6	5
Persistent Litter	38%	3
Total IBI Score		13

¹ Possible Score of 1, 3, or 5

Table 5. Aquatic Plant IBI scores for KP North

Aquatic Plant Metrics	Metric Value	IBI Score¹
Vascular Genera	9	3
Nonvascular Genera	0	1
Grass-Like Genera	0	1
<i>Carex</i> Cover	2	3
<i>Utricularia</i> present	Absent	1
Aquatic Guild Genera	3	3
Persistent Litter	63%	1
Total IBI Score		13

¹ Possible Score of 1, 3, or 5

Conclusion

Biological monitoring provides a good indicator of the health of the wetlands. Hydrology and water chemistry monitoring report physical and chemical conditions in a wetland, but animals and plants living in the wetlands indicate the overall health of the wetland. Monitoring the ecological condition of wetlands shows how the biota react to changes in their environment.

Though most of the Kasota Ponds showed some improvement in 2021, all of the Kasota Ponds remained in poor health with regards to the aquatic plant and macroinvertebrate communities. These results are unsurprising given the proximity of the ponds to highly disturbed areas including rail yards, industrial centers and Highway 280. Unless efforts are made to restore the wetlands, the IBI scores are not likely to improve.