6 November 2019

Governor Gretchen Whitmer
P.O. Box 30013
Lansing, Michigan 48909

Dear Governor Whitmer:

We are the Eagle Lake and Crooked Lake Associations and adjacent sister neighborhoods of Texas Township in Kalamazoo, Michigan. We desperately need your help with our ongoing flooding crisis. **We urgently request that you act as necessary to reverse the recent decision by the Michigan Department of Environment, Great Lakes, and Energy (EGLE) (formerly Michigan Department of Environmental Quality) to lower our pumping rate and thereby restore the original pumping rate granted in our original EGLE permit. Without such restoration, our project to mitigate area flooding likely will end in failure.** Our associations represent several hundred flood affected lake resident homeowners in addition to several other hundreds of flooded homeowners in Texas Township. The most recent decision made by EGLE to arbitrarily lower the permit pumping rate has caused Texas Township water levels to rise again. So, once again Texas Township residents are faced with millions of dollars' worth of additional property damage, as well as, additional irreparable harm and habitat destruction to our local lake wetlands and trees.

Specifically, on 25 September 2019, EGLE mandated a reduction in pumping from 2,000 gallons per minute to 1,000 gallons per minute, with the accompanying threat of additional pumping reductions for our existing EGLE permit. This permit allows pumping from Eagle and Crooked Lakes (lakes without natural outlets) into a wetland area that drains into Bass Lake which has a natural outflow. The EGLE decision was based on downstream monitoring that noticed "stress" on approximately 20 acres of wetland vegetation. The EGLE rationale is apparently focused on potential, unrealized damage to wetlands that are "immediately downstream of the pumping" while at the same time seemingly ignoring the actual, ongoing damage to wetlands "upstream of the pumping". In addition, EGLE appears to be largely unconcerned about thousands of mature trees that have died due to continuous upstream flooding conditions. Without question, there will be additional significant mature tree losses, if flooded water is not pumped at a rate of 2,000 gallons per minute.

However, far more important than the tree loss or wetland stress, EGLE is ignoring the plight of hundreds of residents who have lost homes or are spending millions to protect them from flooding conditions. While being overly cautious in anticipating worst-case scenarios of what might happen "downstream", EGLE is now responsible for failing to provide adequate relief for residents living in already "severely flooded upstream" areas in Texas Township. It seems to us, that residents of Texas Township are experiencing a relentless, enduring crisis that State officials are deliberately ignoring. Please see Enclosures 1-6; they document the extent of the ongoing damage and summarize what we are doing to overcome this unending, local catastrophe.

It is now time for the State of Michigan to take action to protect the homes and property of residents that are in Texas Township. We desperately need this recent arbitrary EGLE decision overturned and our pumping rate of 2,000 gallons per minute reinstated to protect our homes and property. We believe the testimony at a recent Texas Township Task Force meeting by environmental scientist Dr. Dale McLaughlin (Enclosures 7-8) refutes the rationale for the EGLE decision to reduce the pumping rate.

In sum, EGLE must be forced to reconsider the reasoning behind reducing the pumping rates and must consider the continued overall impact to areas upstream that are already flooded. We certainly do not want to cause flooding of anyone's home or property damage for residents that are downstream. However, records being maintained by Kalamazoo County and Texas Township officials have been rigorously kept during the months of pump operation, and they clearly show that the system can handle this rate of flow. To allow the hundreds of upstream property owners to continue to suffer property destruction, emotional stress and financial loss at the possible cost of some vegetation in a small wetland area is unmerited and unjust.

Please help us, Governor Whitmer. We extend to you a personal invitation to please come visit us and see firsthand our situation. We are confident that if you visit our Township, you will see our request is not unreasonable. At the very least, we are asking for your direct intervention to re-instate the 2,000 gallon per minute pumping rate.

We sincerely thank you for your attention to this matter,

Amy Coon, President of Eagle Lake Association

Jim Roberts, President of Crooked Lake Association

Nick McLaughlin, Task Force Lead, Pine Island Lake

Dian Latora, Task Force Lead, Pine Island Subdivision

Marc Rose, Task Force Lead, Vineyards Neighborhood

Enclosures:

1. Pictures of Texas Township Devastation
2. Pictures of Texas Township Wetland Comparisons
3. Crisis Background Summary
4. Details and Impacts of Recent EGLE Decision
5. Damage Cost Assessment
6. The Long-Term Permanent Solution
7. Thoughts on Wetland Impact by D. McLaughlin
8. Resume of D. McLaughlin - 10-24-2019

The enclosed documents, including letters, pictures, reports, charts, graphs and maps have been compiled from many sources, all of whom are involved in one way or another with the on-going flooding crisis in Kalamazoo County's Texas Township. During the weeks it has taken to compile the information being presented, the impact of the flooding has continued, and unfortunately, the level of the flood waters has actually increased. Additional information and documentation about our situation is available on the Texas Township website WWW.texastownship.org under the heading FLOODING CRISIS. Also, we wish to express sincere thanks to Texas Township and Kalamazoo County officials for support rendered during our crisis.

The next meeting of the Texas Township Flood Advisory Committee, which includes representatives from the lake boards, as well as representatives from Texas Township, the Kalamazoo County Board of Commissioners, the County Road Commission, the County Drain Office, the engineering firm of Prine&Newhof and EGLE is scheduled for 10:30am, Thursday, 21 November, at the Texas Township Office. If your schedule permits, we would encourage and welcome you to join us, and have a chance to view first-hand the severity and impact of the flooding crisis, and have an opportunity for dialogue with affected residents.

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120 College Avenue S. E.
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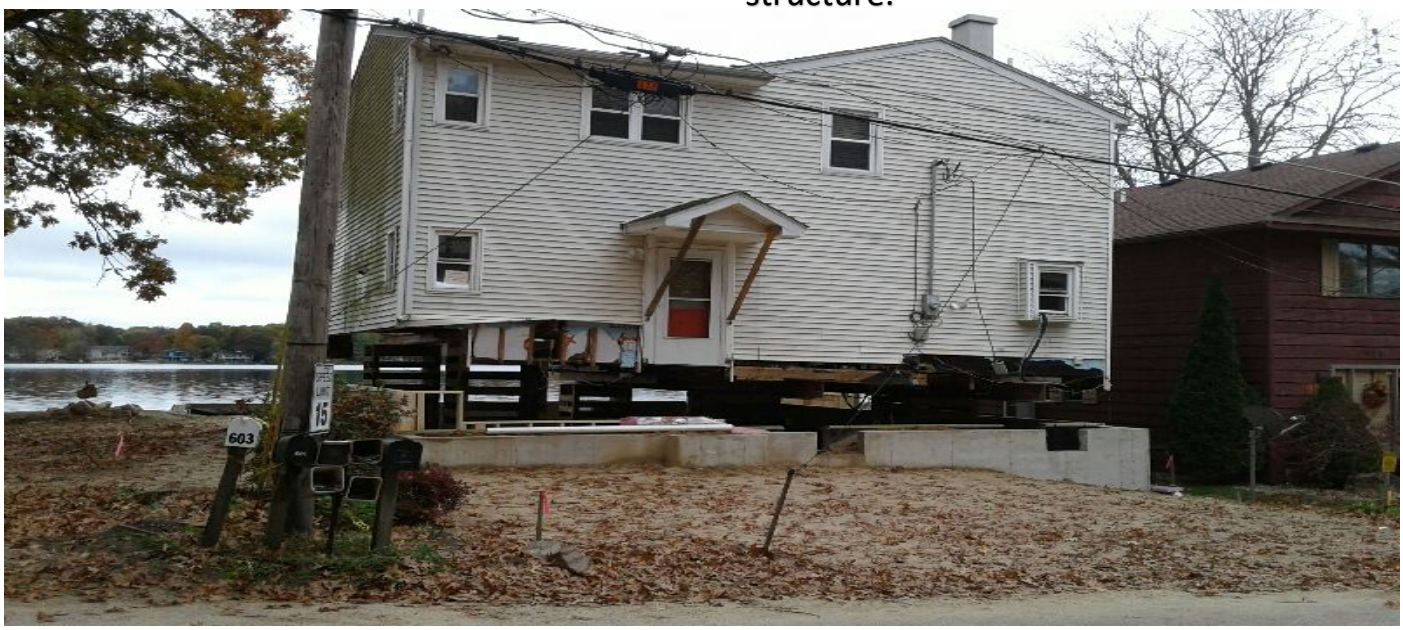
Attn: I Team

Enclosure 1: Pictures of Texas Township Devastation.

These pictures are representative of the flooding situation and they show the devastation experience of Texas Township homeowners.

Swimming pool being filled with soil to prevent the collapse of pool walls and base by external ground water pressure.

House being raised in an effort to bring it above the water level and save the structure.



Sand-bagged sanitary sewer pump station.

Sump-pump pumping into storm sewer

Enclosure 2: Pictures of Texas Township Wetland Comparisons.

The 20 acre wetlands that are recipients of the Eagle/Crooked Lake pumping discharge is shown below. EGLE decision is based on this wetland property showing stress.

8TH ST. AT BENTWOOD

Other wetlands in Texas Township that have been impacted by flooding are shown on the following pages. The stress on these wetlands is evident in these photos, as well as showing large trees being impacted.

CORNER 3RD ST. & P AVE.

7694 WEST S AVE.

TREASURE ISLAND
CAUSWAY

Q AVE. BETWEEN 5TH ST. AND 3RD ST.

O AVE. CLOSED DUE TO HIGH WATER

11055 8TH ST. NEAR U AVE. WITH BARRICADES BY COUNTY ROAD COMMISSION

Enclosure 3: Crisis Background Summary.

The residents of Crooked, Eagle and Pine Island Lakes along with several other smaller water bodies in Texas Township of Kalamazoo County, as well as many of the residents in the areas surrounding these lakes, are experiencing a severe, ongoing crisis flooding situation that began in October 2017. Rising ground-water levels due to well-above normal precipitation has raised the water level of Crooked Lake by over 43" above the normal level, and the water level of Eagle Lake by over 49" above the normal level; neither of which has an inlet or outlet. The flooding has forced the evacuation of eighteen homes located on or near the lakes, has led to the complete loss of eleven homes, and has caused significant damage/loss to roughly 70% of the other homes on the lakes. The emotional toll on many adults/children living in flood conditions for two years has been immeasurable.

Residents have used tens of thousands of sand bags and installed permanent seawalls to protect their homes and properties. Homeowners have installed several hundred sump pumps (in some cases 8 to 10 pumps in a single dwelling) to prevent their homes from flooding. Pumps are running non-stop, and resident's utility bills have become significant enough that the utility companies have been asked to consider rate adjustments. Storm, sanitary sewer and private septic systems have been brought to capacity. Emergency pumping has become necessary to keep sewer and septic systems operational to avoid a public health catastrophe.

Due to flooding, the Kalamazoo County Road Commission was forced to both raise and close several roads in the Township. Flood related damage/losses, reduced property values, road repairs, and damage to township infrastructure are estimated in excess of tens of millions of dollars. Final losses will not be able to be assessed until normal levels return. Damage and property losses have reached the point that the township assessor's office will be reviewing the assessments of the properties in the area. Property values are expected to decrease dramatically (as well as tax revenue). Property values are anticipated to be adversely impacted for the next five years

The "short-term" pumping solution implemented through a Texas Township SAD cost $1.9 million. The "long-term" solution will cost another $1.7 million of Township spending. However, until short-term pumping lowers water levels to pre-flood level, **construction of the long-term solution would not be economically feasible**. Currently, short-term pumping permits and easements **expire fall of 2020** and property owners are unlikely to renew existing easements. Given all that, the recent EGLE decision will not reduce lake levels to normal until May 2021 which then means the long-term solution cannot be implemented in 2020. Consequently, if the decision stands, hundreds of homes will remain flood-affected for as much as two more years. **Delaying the long-term solution for eighteen-plus months is simply untenable**.

Note: Because of Texas Township pushback at the monthly Task Force meeting on Monday, 28 October 2019, concerning the EGLE decision to lower the pumping rate, permit revisions were offered by EGLE to increase the rate from 1000 GPM to 1200 GPM, on condition that two ground-water monitoring test wells be put in place. Depending on subsequent field assessments of wetland conditions, EGLE will determine if/when the increase to 1200 GPM can begin. Frankly stated, this 200 GPM increase is simply not enough; as clearly evidenced by the rise in lake levels due to heavy rains occurring after implementation of the pumping reduction to 1,000 GPM mandated by EGLE on 25 September 2019.

Enclosure 4: Details and Impacts of The Recent EGLE Decision.

On September 25th, EGLE made a decision to reduce our short-term pumping rate from 2,000 GPM to 1,000 GPM. With the reduced rate in place, rainfall had brought the water levels up in excess of three inches eleven days later. Twenty-eight days after the pump rate reduction began; Eagle Lake remained three quarters of an inch above the level when the reduction began. This decision greatly impacts the future success of our short-term solution in a negative way. Because of this decrease in the pumping rate, if the previous rate is not reinstated, hydrologist estimates are that we will not see our flooding levels reduced to normal lake levels until May of 2021, and this is predicated on the assumption of average precipitation and the continuance/extension of the permit and easements after their respective expirations in September and December of 2020.

The EGLE decision must be changed in order to bring about the relief needed by so many residents. According to the EGLE representative on the task force, observations of the vegetation at the downstream wetland monitoring station where the discharge waters from the Crooked Lake pump enters the system are showing the wetland may be experiencing "stress". This has resulted in cutting back the rate of flow to a maximum combined rate of 1,000 GPM. Though the two-day-off pump limitation has been lifted during the period of reduced pumping rate, it is also recognized that rainfall could cause enough additional water flow so as to raise the down-stream levels again causing the pumps to be shut off. Further flow reductions are under consideration by EGLE if the observed "stress" continues. It is worthy of noting that EGLE failed to monitor wetlands not connected to this drainage to have a comparison of changes that might occur, and a means to assess a true cause and effect.

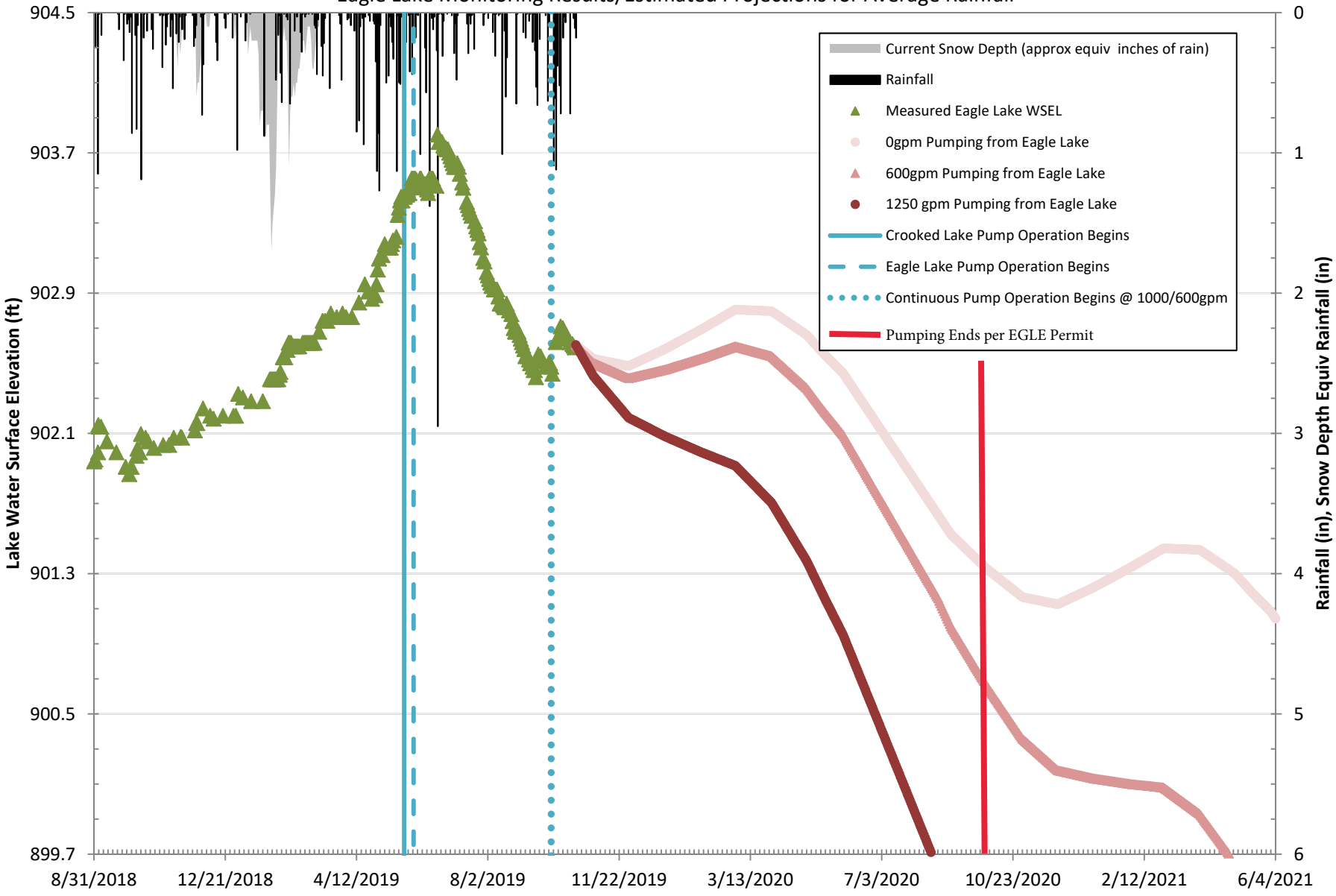
Since pump operation began, the level of Eagle Lake has dropped from the all-time high a total of just over 14", while Crooked Lake has dropped just under 17". However, to reach the "normal" level, Eagle Lake needs to drop another 35+ inches, and Crooked Lake another 27+ inches. The residents of Pine Island Lake and the subdivisions between Pine Island and Eagle Lakes will only see relief from their flooded homes as the level of Eagle Lake slowly drops. (Eagle Lake drops at a rate slower than Crooked Lake due to the surrounding areas seeping (and actually pumping) into Eagle and refilling it as water is pumped away.) Projections at the 2,000 gallon per minute combined pumping rate had Crooked Lake back to normal by July of 2020 and Eagle Lake back to normal by August of 2020**.**

The reduced pumping rate now imposed by the EGLE/DEQ stretches out those projections to September of 2020 and May of 2021 respectively. This means that homes and properties will remain flooded (or under the potential for flooding) for another 12-18 months. During the upcoming months, above-normal precipitation like we have experienced the last couple of years has the potential to extend this even more. Additionally, continued high water table levels will continue to have an impact on road closures in the area. Please see the accompanying graphs prepared by Prein&Newhof (an engineering firm for Texas Township) that show the effects for the differing pumping rates from Eagle and Crooked Lakes.

Charter Township of Texas Flood Study

Figure

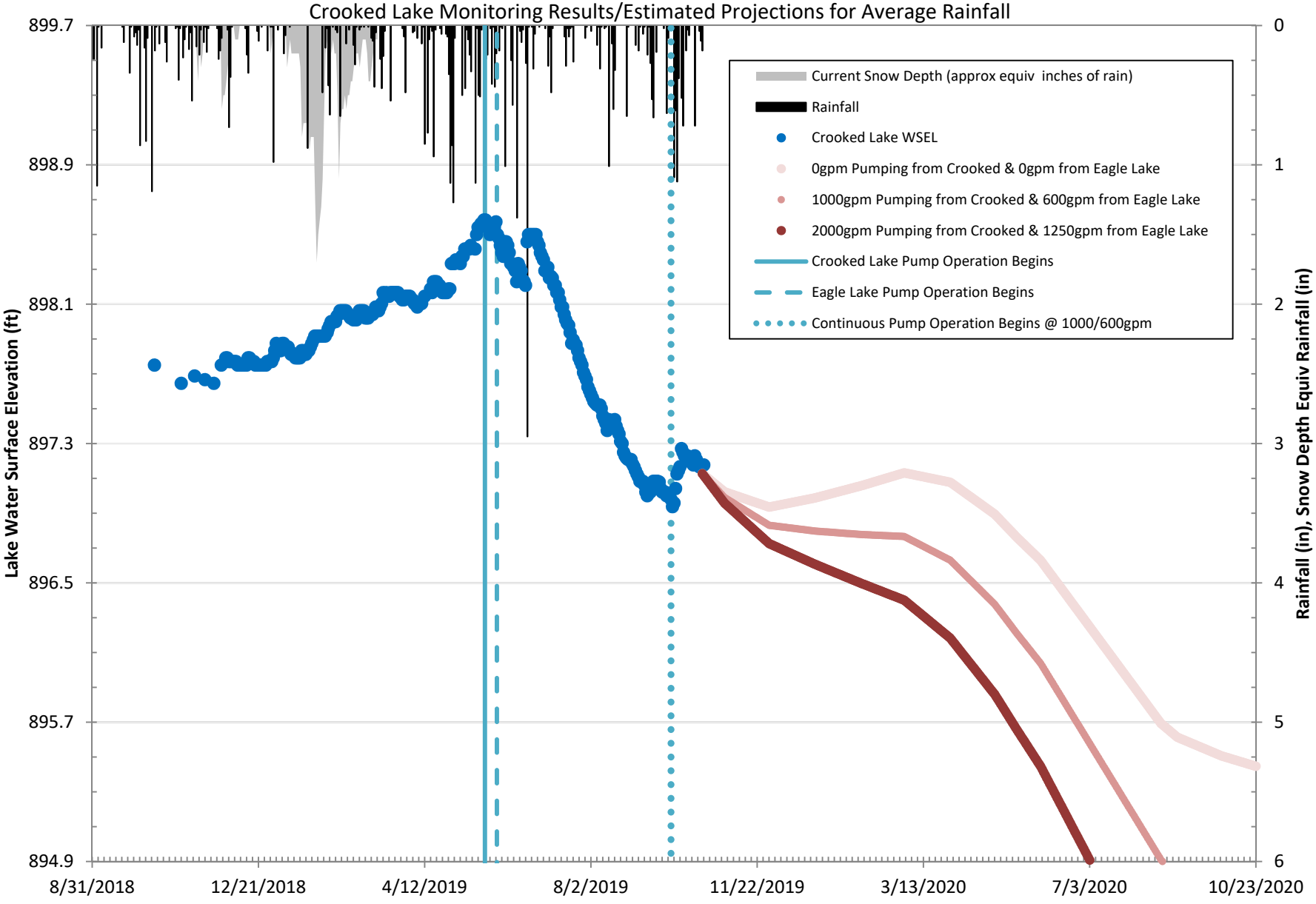
Eagle Lake Monitoring Results/Estimated Projections for Average Rainfall



Charter Township of Texas Flood Study

Figure

Crooked Lake Monitoring Results/Estimated Projections for Average Rainfall



Enclosure 5: Damage Cost Assessment.

Area residents continue to deal with the effects of the flooding of their homes, which has now passed the two-year mark. Texas Township officials and the County Drain Office, along with many others, have invested countless hours in trying to help develop a solution. The damage estimate is significant. Texas Township has spent over $275,000.00 in providing assistance with flood mitigation efforts, including legal fees, engineering, publications and repairing roads, and an additional $30,000.00 in upfront expenses for developing the long-term solution. The Kalamazoo Drain office has spent about $190,000 (to date) in providing assistance to residents impacted by the flooding. It is estimated that the Kalamazoo County Road Commission has spent over $300,000 in repairing the road infrastructure. Freedom of Information Act requests have been submitted to various local government entities to fully capture the exact spend to date.

In addition to the spending by government, Texas Township residents have been assessed approximately $1.9 million in a new Special Assessment District to implement the short-term pumping solution designed to provide relief for our flooding situation. The tree damage for residents is extensive and catastrophic – we estimate there are thousands of acres damaged and tens of thousands of trees (many very mature) that have died because they have been standing in water for over two years. Out-of-pocket costs for seawalls, basement drainage systems, and other emergency repairs by residents are estimated to be well over $5 million and are likely to double with further home repairs and thousands of tree removals when the flood waters recede.

Enclosure 6: The Long-Term Permanent Solution.

While the "short-term" solution has been in place and operational for several months, it has also been our goal to develop a "long-term" permanent solution to help assure that the potential for future flooding is eliminated. To that end, a Texas Township Taskforce committee has been established to develop such a plan, drawing its members from the original (and ongoing) task force. A plan has been developed which will utilize a gravity fed system rather than requiring pumps. Because the flow rate will be much lower once the "short-term" solution has brought the lakes back down to a more normal level, a horizontal well system of introducing the water into the drainage pipes will eliminate the need for pumps and filtration equipment. Efforts are currently being made to secure the required easements.

The process of establishing a legal lake level has begun with the initiation of the required petition drive to bring the matter to the County Board for action. Once the petitions are secured and the County Board approves, the proposed solution moves to the Drain Office. The Drain Office will then commence a study to determine a proposed legal lake level, and provide the outline of the special assessment district to provide funding. This study will then be presented to the Court for hearings and a determination. If the judgment of the Court is affirmative, the Drain Office would then assume responsibility for project implementation. Even the best timeline projections anticipate that it will be at least two more years until the "long-term" system could be operational.

Enclosure 7: Thoughts on the Texas Township Flooding Crisis from D. McLaughlin

I've read the two-page EGLE document titled "Crooked and Eagle Lakes Dewatering Update" (referred to here as "EGLE document") and spent some time reviewing the weekly monitoring reports posted on the Texas Township website ("GEI reports"). My goal was to assess the scientific basis presented in these documents for EGLE's decision to substantially limit the pumping rate out of Crooked Lake based on their determination of adverse impact to downstream wetlands caused by the Crooked Lake pumping project.

In my view, the scientific basis presented by EGLE is weak. The EGLE document does not reflect a careful analysis of the data in the GEI reports, and misses several important details that are relevant to this decision. For example, it seems to over-emphasizes stress in individual plants observed in the wetlands, including some plants that are actually invasive/aggressive species whose presence poses risks to wetland ecosystems. Because these are not species that occur naturally in the wetlands being monitored, they cannot be considered good indicators of wetland condition with the level of analysis presented here. The EGLE document also doesn't accurately reflect the fact that measured water level changes in the tamarack swamp (Sites 1-4) were zero to minimal, not nearly as much as the 8 inches referenced in the EGLE document as occurring at "some sites". This calls into question the attribution of symptoms of stress to Crooked Lake pumping, especially in the tamarack swamp. Third, the document doesn't reflect an understanding of the importance of hydrologic variation to the long term biodiversity and health of these dynamic ecosystems, especially in emergent wetlands where the largest increases in water levels were reported. Below, I offer some additional explanation for these comments.

Comment 1. The use of invasive, aggressive plant species as indicators of wetland health and biodiversity is not appropriate.

The GEI report from July 24, 2019 states:

> "The species most visibly stressed in Sites 1-4 was glossy buckthorn (Frangula alnus) with most individuals losing leaves or exhibiting discoloration of the foliage."

Glossy buckthorn is an undesirable invasive species. Information provided by the state of Michigan (Michigan Invasive Species at https://www.michigan.gov/invasives/0,5664,7-324-68002_71240_73850-379568--,00.html) on glossy buckthorn states:

> "This invasive shrub is a threat to native plants in prairie fens and other ecologically important wetland communities. It is a host for alfalfa mosaic virus and crown fungus, and may be a possible host for the soybean aphid."

Information provided by the Michigan Natural Features Inventory (MNFI) on "rich tamarack swamp" wetlands (https://mnfi.anr.msu.edu/communities/description/10660/Rich-Tamarack-Swamp) , where Sites 1-4 are located, states:

> "Glossy buckthorn is probably the greatest threat to rich tamarack swamps as it is capable of completely dominating the shrub and ground layers."

Because buckthorn is not native to the tamarack swamp community, and even represents a significant threat to the long term viability of this ecosystem, the value of using observations of this plant as an indicator of hydrologic stress and risk to the ecosystem is questionable.

In addition, adverse impacts to red maple also are reported by GEI. Red maple is a very common, aggressive plant (Michigan Department of Natural Resources at https://www.michigan.gov/dnr/0,4570,7-350-79135_79218_79615_85482---,00.html) that can pose risks to wetland habitats. MDNR information also indicates that this species is a preferred host for the invasive pest Asian longhorn beetle that is being watched by MDNR.

Information provided by the MNFI states:

> "Invasion by red maple can cause rich tamarack swamp to shift toward hardwood domination, resulting in a significant decrease in shrub-layer cover and loss of shade-intolerant species such as tamarack."

The MNFI description of the rich tamarack swamp section on biodiversity management considerations indicates that prolonged flooding can be an important risk factor to this wetland community; however, water is also important to this ecosystem as a means of limiting the replacement of tamarack by less desirable species.

Signs of stress are reported for species other than buckthorn and red maple. However, no information is provided on the spatial extent of observed stress in relation to observed water level changes. In addition, none of the GEI reports appear to identify any concerns to individual tamarack trees at these sites. Furthermore, as described in the next comment, water level changes recorded in the tamarack swamp from May through October were minimal, and even decreasing and zero at two of the study sites. Consequently, there is no basis for linking the apparent stress in individual plants to Crooked Lake pumping in the tamarack swamp wetland.

<u>Comment 2. Water elevation change at Sites 1-4 (Rich Tamarack Swamp) is minimal, much less than the 8 inches identified in the EGLE document</u>

Information presented in Table 8 of the most recent GEI report (included below for reference) indicates that there are only small changes in water levels at Sites 1-4, with Site 1 showing a decrease of 0.5", Site 2 unchanged, Site 3 showing an increase of 0.5" and Site 4 an increase of 1.9" from May 13 through July 22, a time period over which some plants exhibit stress as reported by GEI. With respect to adverse impacts associated with pumping, it's hard to see how this combination of water elevation data, where there is a decrease at one station and no increase at another, provides evidence that Crooked Lake pumping is causing adverse impacts on any plant species in these ecosystems. These elevation changes are very small compared to the broad statement in the EGLE document that "some sites have increased approximately eight inches" (in fact, Table 8 shows that an increase of eight inches was only observed at Site 7 near the middle of the emergent wetland, not in the tamarack swamp or at any other site).

In addition, the EGLE document states that

> "While stable wetland systems are adapted to seasonal and some annual fluctuations in hydrology, extreme short-term changes, taking place here over just four months, appears to be reaching the stress tolerance capacity of many individual species, and thus adversely impacting the entire wetland community."

The EGLE document does not distinguish between observed elevation changes in the tamarack swamp and the emergent wetland (Sites 5-7), leaving the impression that "extreme short-term changes" are

occurring throughout the site, including the tamarack swamp. The water elevation data clearly show that this is not the case.

Furthermore, with no assessment of the size of the wetland areas that may be experiencing significantly higher water levels or adverse impacts, there is no way to determine the significance of observations on individual plants to the ecosystems as a whole. This idea appears to be underscored in the August 13 GEI report, which states:

> "Elevated water levels may be causing stress to trees and shrubs within the wetlands surrounding Sites 5, 6, and 7, but it remains unclear to what extent."

No further explanation of this statement is provided.

Comment 3. The long term health and biodiversity of emergent wetlands depends on periods of high water

The EGLE document expresses concern that the increased water levels observed in the shrub/emergent wetland (Sites 5-7) pose long term adverse impacts to this ecosystem. In my view, EGLE's focus on water stress to individual plants, including invasive species, rather than the emergent wetland as an ecosystem is not well founded scientifically. EGLE appears to be placing limits on the pumping rate without acknowledging the dynamic nature of water levels and associated impacts in these wetland ecosystems that occur naturally. In fact, emergent wetland ecosystems and their functions, including biodiversity, depend on water level fluctuations including high water years. It is true that a change in the hydrologic conditions of a wetland occurring over a long period (on the order of years) can eliminate a wetland ecosystem. However, periodic high water ensures that there are open water areas interspersed with emergent vegetation, creating large amounts of edge habitat where water and vegetation meet. These zones are highly productive and tend to support an increased diversity of plant and animal species within emergent wetlands.

In light of this fact, increased water levels on the order of inches in the emergent wetland should not be viewed as putting the ecosystem at substantial long term risk. Open water areas in this wetland may increase during the pumping of water from Crooked Lake, but the duration of pumping is limited and the degree of risk to this wetland ecosystem overall seems small or nonexistent.

Summary

In summary, EGLE appears to be placing excessive concern on adverse impacts to individual plants, and apparently even on invasive, aggressive plants that themselves pose risks to the wetland ecosystems of concern, without regard to the wetland ecosystem as a whole. Water level change at the tamarack swamp sites has been minimal. Larger water level changes have been observed at the emergent wetland. However, EGLE is not acknowledging that the long term health and biodiversity in these ecosystems depends on cycles of high and low water. Therefore, in my view there is little evidence that the pumping of Crooked Lake water at project design rates poses significant long term risks to either the tamarack or emergent wetland ecosystems.

Screen shot of Table 8 from the October 15, 2019 GEI report:

Table 8. Staff Gage Water Level:

Date	Monitoring Site Water Elevations (NAVD88)							Notes
	Site 1	Site 2	Site 3	Site 4	Site 5	Site 6	Site 7	
5/13/2019	875.22	875.82	877.76	878.50	885.02	885.24	885.14	None
5/21/2019	875.22	875.82	877.76	878.51	885.00	885.22	885.13	None
5/28/2019	875.22	875.82	877.78	878.52	885.15	885.35	885.34	None
6/4/2019	875.22	875.82	877.78	878.58	885.30	885.58	885.34	None
6/11/2019	875.22	875.82	877.78	878.63	885.34	885.58	885.34	None
6/18/2019	875.22	875.82	877.78	878.66	885.40	885.58	885.56	None
6/25/2019	875.22	875.82	877.78	878.60	885.20	885.30	885.23	None
7/2/2019	875.22	875.82	877.80	878.62	885.39	885.78	885.88	None
7/9/2019	875.22	875.82	877.80	878.60	885.40	885.70	885.80	None
7/16/2019	875.22	875.82	877.76	878.60	885.40	885.70	885.74	None
7/22/2019	875.18	875.82	877.76	878.64	885.42	885.52	885.54	None
7/29/2019	875.18	875.82	877.76	878.64	885.40	885.70	885.78	None
8/5/2019	875.18	875.82	877.76	878.64	885.34	885.46	885.44	None
8/13/2019	875.18	875.82	877.76	878.64	885.37	885.62	885.69	None
8/20/2019	875.18	875.82	877.76	878.64	885.37	885.55	885.62	None
8/26/2019	875.18	875.82	877.76	878.66	885.38	885.76	885.80	None
9/4/2019	875.18	875.82	877.76	878.68	885.38	885.56	885.62	None
9/10/2019	875.18	875.82	877.76	878.66	885.16	885.33	885.07	None
9/17/2019	875.18	875.82	877.76	878.66	885.35	885.48	885.49	None
9/24/2019	875.18	875.86	877.80	878.65	885.36	885.49	885.54	None
10/1/2019	875.18	875.86	877.83	878.64	885.18	885.32	885.08	None
10/7/2019	875.18	875.86	877.83	878.70	885.34	885.40	885.39	None
10/15/2019	875.18	875.86	877.83	878.66	885.34	885.40	885.43	None

Additional thoughts after the recent Texas Township Taskforce meeting:

In light of the discussion at the task force meeting yesterday regarding the lack of basis for reducing the Crooked Lake pumping rate, I want to offer a few additional thoughts. The lack of an appropriate set of reference, or "control" observations to provide a comparison with observations made in the downstream wetlands is important, is a symptom of the general lack of a plan for systematically assessing pumping impacts, and should be addressed before next spring. But the lack of a control is only part of the issue, in my view. Generally speaking, the absence of a good control or reference area can limit the ability to conclude that there is no evidence of impact (i.e., prevent a conclusion of "no impact"). I think that is partly what led to EGLE's decision to reduce the pumping rate, with reasoning something like this: with what appears to be stress in plants of the downstream wetlands of concern, and lacking a control to compare those observations against that could show the same signs of stress due to other factors not related to pumping, EGLE decides to restrict pumping out of "an abundance of caution" for the downstream wetlands.

But my take on the evidence presented in the GEI reports is different, even after ignoring information on invasive species (which, of course, are not good indicators to begin with and should be affirmatively excluded from the plant stress analysis). I think EGLE has, in fact, missed evidence that actually supports a conclusion of "no significant pumping impact". That evidence is in the lack of significant water level change at Sites 1-3 located in the most at-risk wetland ecosystem present in the area of concern, the tamarack swamp. The GEI reports indicate that signs of plant stress are present at these sites too. But if the water level hasn't changed during the pumping period, when the pumping rate has clearly varied, then the observed "stress" has to be caused by some other factor. The cause is not Crooked Lake pumping.

In effect, Sites 1-3 are actually serving as a useful reference/control. Combined with anecdotal evidence that similar plants in other area wetlands are showing similar stress indications, and the fact that GEI has reported no signs of stress to tamarack, it is reasonable to conclude that there is no evidence of adverse

impact in this wetland due to pumping. What about the emergent wetland where water level changes are much larger? Emergent wetlands are more resilient to water level changes, and actually benefit from periodic changes in water levels as discussed in my comments and those of others at the meeting.

So, I'll finish my thoughts here with the following paragraph that might be offered to EGLE to consider using in support of reinstating the 2000 gpm pumping rate:

> "After further review of the information collected from the wetlands being monitored to assess the effects of Crooked Lake pumping, we conclude that water level changes in the tamarack swamp have been insignificant. In addition, no adverse impact on individual tamarack trees has been observed. Similar signs of plant stress have also been reported outside of the area of concern associated with the pumping permit. Therefore, at this point in time, increased flow due to the pumping project is determined not to be the cause of the apparent stress observed in plants that are native to this wetland type. Larger water level changes have been observed in the emergent wetland, but this wetland type is typically more resilient than the tamarack swamp, and there is no evidence that pumping poses a significant risk to the long-term functions provided by this wetland. Monitoring of both wetland types will continue."

DOUGLAS B. MCLAUGHLIN, PH.D.

Current Position:
Senior Scientist/Director of Environmental Engineering
Kieser & Associates, LLC

AREAS OF EXPERTISE:

Water Resources Management, Nutrient Management, Water Quality Criteria Development, TMDL Development, NPDES Permitting, Forest Product Industry Water and Wastewater Management, Ecological Risk Assessment, Freshwater Wetlands Ecology, Water Quality Monitoring Strategies, Modeling Stressor-Response Relationships, Statistical Methods, Uncertainty Analysis, Sources and Fate of Polychlorinated Biphenyls (PCBs), Contaminated Sediment Management.

EDUCATION:

Ph.D., Land Resources (Research Program: Water Chemistry), Institute for Environmental Studies, University of Wisconsin – Madison (1994) Thesis Title: "Natural and Induced Transformations of Polychlorinated Biphenyls in Sediments."

M.S., Aquatic Biology, University of Wisconsin - Green Bay (1985) Thesis Title: "Aquatic Insect Emergence Patterns of Two Marshes on Green Bay, Lake Michigan."

B.S., Biology. University of Wisconsin - Green Bay (1983).

SELECTED PROFESSIONAL APPOINTMENTS, SCIENCE ADVISORY ROLES, AWARDS:

Member, Illinois Nutrient Science Advisory Committee, appointed by Illinois Environmental Protection Agency and Illinois Department of Agriculture to guide the development of numeric nutrient water quality standards to protect aquatic life in Illinois waters. 2015-2018.

Member of U.S. Environmental Protection Agency Science Advisory Board Lake Erie Phosphorus Objectives Review Panel. 2016-2017.

Invited presenter at Invited Expert Meeting on Revising USEPA's Guidelines for Deriving Aquatic Life Criteria, September 14-16, 2015, Arlington, VA. Presentation title: "Improving Uncertainty Characterization in USEPA's Guidelines for Deriving Aquatic Life Criteria Using Decision Contexts."

U.S. Environmental Protection Agency Science Advisory Board peer review panel for EPA draft "Effects of Mountaintop Mines and Valley Fills on Aquatic Ecosystems of the Central Appalachian Coalfields" and draft "Aquatic Life Benchmark for Conductivity in Central Appalachian Streams." 2010-2011.

Consulting expert augmenting the U.S. Environmental Protection Agency Science Advisory Board Ecological Processes and Effects Committee to conduct a peer review of EPA's draft guidance document, "Empirical Approaches for Nutrient Criteria Derivation." 2009-2010.

Member, Federal Advisory Committee on Water Information (ACWI, 2003 - 2018).

Member, ACWI/ USGS Monitoring Challenges Workgroup (2012 – 2014).

Member, National Water Quality Monitoring Council (NWQMC, 2009- 2018).

Co-chair, Water Quality Statistics and Assessments Workgroup of NWQMC (2009 - 2018).

Member, NWQMC National Network of Reference Watersheds Committee (2013 - 2018).
Wisconsin Department of Natural Resources Phosphorus Criteria Advisory Committee, technical support. 2008.

Florida Department of Environmental Protection scientific peer review panel to assist in revision of dissolved oxygen criteria for freshwaters. 2011.

University of Wisconsin – Green Bay Environmental Management and Business Institute 2018 Earth Caretaker Award Recipient

SELECTED RECENT EXPERIENCE:

Development of an Approach to Establish the Scientific Basis for a Stream Restoration Crediting Protocol Using Field Data to Assess Stressor-Response Relationships and Build Ecosystem Response Models: DuPage River Salt Creek Workgroup, Naperville, IL with TetraTech, Inc. 2018-present.

Development of a Clearinghouse Framework for Phosphorus Reduction Programs in Wisconsin including WQT, Adaptive Management and Multiple Discharger Variance: Newtrient, LLC with funding from USDA, 2018.

Coauthor on "Comparison of NTT to Region 5/DRP Calculator Results for 2018 Erie P Market Agricultural Pilot Crediting Sites", a Kieser & Associates technical memorandum provided to the Great Lakes Commission to Evaluate Uncertainty in Quantification Tools in Order to Identify and Prioritize Model Improvements. 2018.

Previous to Kieser & Associates

Provided Science Support to the Pulp and Paper Industry for Water Quality Criteria Development and Evaluation, Including the Assessment of Methods for Criteria Derivation and Uncertainty Characterization. 2003-2018.

Analyzed Long Term Water Quality and Macroinvertebrate Data Sets to Assess Impacts of Pulp and Paper Mill Effluents on Receiving Streams. 2013-2018.

Developed Quantitative Approaches for the Analysis of Field Data to Derive Numeric Nutrient Criteria and Estimate the Probability of Adverse Biological Community Impacts. 2010-2018.

Designed and Conducted Field and Data Analyses To Assess Status and Trends of PCB Contamination in Water, Sediment, and Fish to Support the Evaluation of Alternatives for Sediment Remediation in the Fox River, Wisconsin on Behalf of the Fox River Group of Companies. 1997 – 2003.

Provided Ecosystem Modeling Support to Ohio Environmental Protection Agency in Development of Quantitative Tools for Managing Water Quality and Macroinvertebrate Community Health in Headwater Streams. 2017-2018.

PREVIOUS POSITIONS HELD:

Principal Research Scientist, National Council for Air and Stream Improvement, Inc., Kalamazoo, Michigan (2002-2018).

Senior Scientist, Blasland, Bouck, and Lee, Inc., Syracuse, New York and DePere, Wisconsin. 1997-2002.

Environmental Research Manager and Analytical Services Laboratory Supervisor. Fort Howard Corporation, Green Bay, Wisconsin. 1993-1997.

Environmental Specialist, Research and Development, Fort Howard Corporation, Green Bay, Wisconsin. 1985-1990.

Lecturer, Western Michigan University. Water and Residuals Management Topics in the Forest Products Industry, (PAPR 3531, Fall semester, 2004, 2006, 2009, 2010, 2012, 2013)

Adjunct Professor, University of Wisconsin - Green Bay. Hazardous and Toxic Materials Spring semester, 2001.

SELECTED PUBLICATIONS AND PRESENTATIONS:

Journal Publications

Miltner, R. and D.B. McLaughlin. 2019. Management of headwaters based on macroinvertebrate assemblages and environmental attributes. Science of the Total Environment 650: 438–451.

McLaughlin, D.B., K.H. Reckhow. 2017. A Bayesian Network Assessment of Macroinvertebrate Responses to Nutrients and Other Factors in Streams of the Eastern Corn Belt Plains, Ohio, USA. Ecological Modelling. 345: 21-29. DOI: 10.1016/j.ecolmodel.2016.12.004.

McLaughlin, D.B., C.A. Flinders. 2016. Quantifying variability in four US streams using a long-term data set: patterns in water quality endpoints. Environmental Management. 57(2):368-388. DOI 10.1007/s00267-015-0609-7.

Flinders, C.A., D.B. McLaughlin, and R.L. Ragsdale. 2015. Quantifying variability in four U.S. streams using a long-term dataset: patterns in biotic endpoints. Environmental Management. 56(2): 447-466. DOI 10.1007/s00267-015-0509-x

McLaughlin, D.B. 2015. Assessing the fit of biotic ligand model validation data in a risk management decision context. Integrated Environmental Assessment and Management, 11(4): 610-617. DOI: 10.1002/ieam.1634

McLaughlin, D.B. 2014. Maximizing the accuracy of field-derived numeric nutrient criteria in water quality regulations. Integrated Environmental Assessment and Management 10(1): 133-137.

McLaughlin, D.B. 2012a. Assessing the predictive performance of risk-based water quality criteria using decision error estimates from ROC analysis. Integrated Environmental Assessment and Management. 8(4): 674-684.

McLaughlin, D.B. 2012b. Estimating the designated use attainment decision error rates of USEPA's proposed numeric total phosphorus criteria for Florida colored lakes. Integrated Environmental Assessment and Management 8(1):167-174.

McLaughlin, D.B. and V. Jain. 2011. Using Monte Carlo analysis to characterize the uncertainty in final acute values derived from aquatic toxicity data. Integrated Environmental Assessment and Management 7(2): 269-279.

McLaughlin, D.B. and H.J. Harris. 1990. Aquatic insect emergence in two Great Lakes marshes. Wetlands Ecology and Management. 1(2): 111-121.

Conference Proceedings

McLaughlin, D.B. 2009. Evaluating the Implications of End-of-Pipe Effluent Limits for Achieving Site- Specific Instream Water Quality Criteria: An Example From Wisconsin. Water Environment Federation TMDL Conference Proceedings, August. Minneapolis, Minnesota.

McLaughlin, D.B., Treasure, T., and Wiegand, P. 2008. Assessing variation in concentrations of dissolved iron in minimally disturbed streams to improve water quality criteria. Proceedings of the WEFTEC Environmental Conference, Chicago, Illinois.

Ice, G.G., J.P. Unwin, T.J. Hall, P. Wiegand, and D.B. McLaughlin. 2007. Addressing Infrequent, Brief, and Small Excursions of Water Quality. Proceedings of the 4th American Society of Agricultural and Biological Engineers Conference on Watershed Management to Meet TMDLs. San Antonio, Texas.

Beebe, J. and D.B. McLaughlin. 2005. Availability of Water Quality data for TMDL Development. Conference Proceedings: TMDL 2005. Water Environment Federation. Philadelphia, Pennsylvania.

McLaughlin, D.B. 1997. Congener specific PCB concentrations in fish from the Fox River, Wisconsin, USA. Proceedings of the 1997 TAPPI Environmental Conference, May 5-7, Minneapolis, Minnesota. p. 27-31.

McLaughlin, D.B., A. Andren, and D. Armstrong. 1992. Oxidation of PCB congeners adsorbed to particles. Proceedings of the 48th Annual Purdue Industrial Waste Conference, May 10-12, West Lafayette, Indiana.

NCASI Technical Bulletins and Special Reports

McLaughlin, D.B.and G. Ice. 2012. Considerations and Statistical Approaches for Effects-Based Site- Specific Numeric Nutrient Criteria. National Council for Air and Stream Improvement (NCASI). Technical Bulletin No. 1004. Research Triangle Park, North Carolina.

McLaughlin, D.B. 2012. PCBs in the Environment: A Summary of Their Distribution and Sources Relevant to Total Maximum Daily Load Studies. National Council for Air and Stream Improvement (NCASI) Technical Bulletin No. 1014. Research Triangle Park, North Carolina.

McLaughlin, D.B. and V. Jain. 2010. Using Monte Carlo Analysis to Characterize the Uncertainty in Final Acute Values Derived from Aquatic Toxicity Data. National Council for Air and Stream Improvement (NCASI). Technical Bulletin No. 972. Research Triangle Park, North Carolina.

McLaughlin, D.B., and P. Lagace. 2008. Investigation of the main sources of PCBs at a TMP/recycle pulp mill and a bleached kraft pulp mill. Special Report No. 08-04. Research Triangle Park, N.C.: National Council for Air and Stream Improvement, Inc.

McLaughlin, D.B. 2008. Evaluating trends in hydrophobic organic contaminants in biological tissues using linear regression. National Council for Air and Stream Improvement (NCASI). Technical Bulletin No. 950. Research Triangle Park, North Carolina.

Selected Presentations

McLaughlin, D.B. 2015. Improving Uncertainty Characterization in USEPA's Guidelines for Deriving Aquatic Life Criteria Using Decision Contexts. Presented at Invited Expert Meeting on Revising USEPA's Guidelines for Deriving Aquatic Life Criteria, September 14-16, 2015, Arlington, VA.

McLaughlin, D.B. 2014. How Well Do BLM Predictions Fit Model Validation Data? A WQC Attainment Decision Perspective. SETAC North America 35th Annual Meeting. November, 2014. Vancouver, BC.

McLaughlin, D.B. 2014. Using a Long Term Data Set to Evaluate the Role of Variability and Decision Error Tolerance in Making Water Quality Assessment Decisions. SETAC North America 35th Annual Meeting. November, 2014. Vancouver, BC.

McLaughlin, D.B. 2013. Numeric Nutrient Criteria Development and the U.S. Forest Products Industry. Mississippi Manufacturers Association Environmental & Safety Conference, Nutrient Criteria Panel, October 17-18, 2013

McLaughlin, D.B. 2013. Translating Prediction Uncertainty Into Decision Uncertainty: A Numeric Nutrient Criteria Example. North American Lake Management Society 33rd International Symposium, San Diego, CA. October 30 - November 1, 2013.

Flinders, C.A., and D.B. McLaughlin. 2013. Quantifying Spatial and Temporal Variation Using a Long-term Dataset: Implications for Management. Society for Freshwater Science Annual Conference. May 19-23, 2013. Jacksonville FL.

McLaughlin, D.B., D. Sullivan, L. McGeorge. 2012. Better Access to Water Quality Statistical and Assessment Methods: Developing a New Component of the National Environmental Methods Index (NEMI). Eighth National Monitoring Conference. April 30-May 5, 2012, Portland, OR.

McLaughlin, D.B. 2012. An update on the development of numeric nutrient criteria in the United States: a forest industry perspective. IWA Annual Conference, Concepcion, Chile. January, 2012. (presented by Paul Wiegand).

McLaughlin, D.B. 2012. An Introduction to NCASI and Prediction Uncertainty, Bright Lines, and the Search for

Useful Indicator Benchmarks for Ecosystem Management. Presented at NOAA GL Environmental Research Lab, Ann Arbor, MI, January 10, 2012.

McLaughlin, D.B., and H. Bohra. 2011. Uncertainty Estimates for USEPA's Freshwater Acute Ambient Aquatic Life Water Quality Criterion for Acrolein. AWRA 2011, Albuquerque, NM November 7, 2011.

McLaughlin, D.B. 2010. Considering Water Quality Impairment Decision Errors in Numeric Nutrient Criteria Development. SETAC North America 31st Annual Meeting, November 7-11, 2010, Portland, OR.

McLaughlin, D.B., L. McGeorge, and D. Sullivan. 2010. Increasing Awareness, Understanding, and Availability of Statistical Methods for Water Quality Monitoring and Assessment. Seventh National Monitoring Conference - Monitoring From the Summit to the Sea. April 25-29, 2010, Denver, CO

Ice, G., McLaughlin, D.B., Wiegand, P., Beebe, J., Schilling, E., Greathouse, E., Rhoades, C.C., Johnson, S, Sebestyen, S., and Sugden, B. 2010. Nutrient Criteria and Standards for Forested Headwater Streams: An Overview of Issues and Solutions. Seventh National Monitoring Conference - Monitoring From the Summit to the Sea. April 25-29, 2010, Denver, CO.

McLaughlin, D.B. 2009. A Review of Approaches Used to Establish Regional and Site-Specific Numeric Nutrient Criteria. American Water Resources Association 2009 Annual Water Resources Conference. Seattle, Washington.

McLaughlin, D.B. Evaluating the Implications of End-of-Pipe Effluent Limits for Achieving Site-Specific Instream Water Quality Criteria: An Example From Wisconsin. Water Environment Federation TMDL Conference, Minneapolis, Minnesota. August 2009.

McLaughlin, D.B., C. Thompson, and P. Bollerman. Quantifying Trends in Color Increases Across Aerated Stabilization Basins at a Pulp and Paper Mill in Florida, USA. 9th International Wastewater Association Symposium on Forest Industry Wastewaters, Fredricton, New Brunswick. June 2009.

McLaughlin, D.B. Some Water Program Activities of the National Council for Air and Stream Improvement (NCASI). Advisory Committee on Water Information Annual Meeting, Herndon, Virginia. February 11, 2009.

McLaughlin, D.B. and V. Jain. Characterizing the Uncertainty of Final Acute Values Used in Aquatic Life Water Quality Criteria. Presented at SETAC North America, 29th Annual Meeting, Tampa, Florida, November, 2008.

McLaughlin, D.B., T. Treasure, and P. Wiegand. Assessing variation in concentrations of dissolved iron in minimally disturbed streams to support improved water quality criteria. Presented at WEFTEC, Chicago, Illinois. October, 2008.

McLaughlin, D.B. 2008. More Than Doable: An Examination of Statistical Methods Used to Analyze Time Trends in Contaminant Data Containing Nondetects. Presented at the National Water Quality Monitoring Conference, Atlantic City, New Jersey.

McLaughlin, D.B, and J. Beebe. 2008. Using GIS to Characterize Multiple Watersheds of Interest to Forest Products Industry Stakeholders. Presented at the American Water Resources Association Spring Specialty Conference - GIS and Water Resources V, San Mateo, California.

McLaughlin, D.B. 2007. Addressing Eutrophication in Freshwater Ecosystems: Water Quality Regulations and NPDES Limits. Presented at the NCASI Effluent Nutrients Workshop. Green Bay, Wisconsin.

McLaughlin, D.B. 2007. Handling Nondetects in Contaminant Time Trend Analysis: An Example Using Some Contemporary Methods. Presented at the USEPA Annual Conference on Managing Environmental Quality Systems. Cleveland, Ohio.

McLaughlin, D.B. 2006. Interpreting Tissue Contaminant Trend Data Using Linear Regression. Presented at the NCASI West Coast Regional Center Water Toxics Workshop. Portland, Oregon.

Barden, M. and D.B. McLaughlin. 2004. Regulatory Background and Perspectives on the Current and Future Role Water Quality Modeling in TMDLs. Presented at the NCASI Surface Water Quality Modeling/TMDL Workshop. Portland, Maine.

McLaughlin, D.B., D.S. Pham, and V.L. Menting. 2001. PCB Releases During Environmental Dredging of Contaminated Sediments in the Fox River, Wisconsin. U.S. EPA Forum on Managing Contaminated Sediments at Hazardous Waste Sites, Washington, D.C.

McLaughlin, D.B., D.S. Pham, J. Wolfe and H. Holmberg. 2001. Assessing the Effectiveness of Remedial Alternatives for Contaminated Sediments in Large River Systems. International Association for Great Lakes Research Annual Conference. Green Bay, Wisconsin.

Dekker, T., D.B. McLaughlin, and J. Wolfe. 2001. Development of Guidelines for Fish PCB Trend Analysis. International Association for Great Lakes Research Annual Conference. Green Bay, Wisconsin.

McLaughlin, D.B. 2000. "The Role of Natural Attenuation/Recovery Processes in Managing Contaminated Sediments." 16th Annual International Conference on Contaminated Soils, Sediments, and Water. Amherst, Massachusetts.

McLaughlin, D.B., and K.M. Janus. 1997. "Multidimensional gas chromatography for the analysis of PCB congeners in fish from the Fox River, Wisconsin." Presented at the annual meeting of the Midwest Regional Chapter of the Society for Environmental Toxicology and Chemistry. Green Bay, Wisconsin.

McLaughlin, D.B., J. Steuer, D. Armstrong, A. Andren, D. Patterson, and C. Buelow. 1993. PCB homolog and congener patterns in Fox River sediments. Presented at the International Association on Water Quality, First International Specialized Conference on Contaminated Aquatic Sediments. Milwaukee, Wisconsin.