

BEFORE THE ILLINOIS POLLUTION CONTROL BOARD

IN THE MATTER OF:

)	PCB 16-14 (Homewood)
VILLAGE OF HOMEWOOD, HOMEWOOD)	PCB 16-15 (Orland Park)
ILLINOIS, VILLAGE OF ORLAND PARK,)	PCB 16-16 (Midlothian)
ORLAND PARK ILLINOIS, VILLAGE OF)	PCB 16-17 (Tinley Park)
MIDLOTHIAN, MIDLOTHIAN ILLINOIS,)	PCB 16-18 (ExxonMobil)
VILLAGE OF TINLEY PARK, TINLEY)	PCB 16-20 (Wilmette)
PARK ILLINOIS, EXXONMOBIL OIL)	PCB 16-21 (Country Club Hills)
CORPORATION, VILLAGE OF)	PCB 16-22 (Noramco-Chicago)
WILMETTE, WILMETTE ILLINOIS, CITY)	PCB 16-23 (Flint Hills Resources)
OF COUNTRY CLUB HILLS, COUNTRY)	PCB 16-25 (Evanston)
CLUB HILLS ILLINOIS, NORAMCO-)	PCB 16-26 (Skokie)
CHICAGO, INC., FLINT HILLS)	PCB 16-27 (IDOT)
RESOURCES JOLIET LLC, CITY OF)	PCB 16-29 (MWRDGC)
EVANSTON, EVANSTON ILLINOIS,)	PCB 16-30 (Richton Park)
VILLAGE OF SKOKIE, SKOKIE ILLINOIS,)	PCB 16-31 (Lincolnwood)
ILLINOIS DEPARTMENT OF)	PCB 16-33 (Oak Forest)
TRANSPORTATION, METROPOLITAN)	PCB 19-7 (Lynwood)
WATER RECLAMATION DISTRICT OF)	PCB 19-8 (Citgo Holdings)
GREATER CHICAGO, VILLAGE OF)	PCB 19-9 (New Lenox)
RICHTON PARK, RICHTON PARK)	PCB 19-10 (Lockport)
ILLINOIS, VILLAGE OF LINCOLNWOOD,)	PCB 19-11 (Caterpillar)
LINCOLNWOOD ILLINOIS, CITY OF OAK)	PCB 19-12 (Crest Hill)
FOREST, OAK FOREST ILLINOIS,)	PCB 19-13 (Joliet)
VILLAGE OF LYNWOOD, LYNWOOD)	PCB 19-14 (Morton Salt)
ILLINOIS, CITGO HOLDINGS, INC.,)	PCB 19-15 (Palos Heights)
VILLAGE OF NEW LENOX, NEW LENOX)	PCB 19-16 (Romeoville)
ILLINOIS, CITY OF LOCKPORT,)	PCB 19-17 (IMTT Illinois)
LOCKPORT ILLINOIS, CATERPILLAR,)	PCB 19-18 (Stepan)
INC., CITY OF CREST HILL, CREST HILL)	PCB 19-19 (Park Forest)
ILLINOIS, CITY OF JOLIET, JOLIET)	PCB 19-20 (Ozinga Ready Mix)
ILLINOIS, MORTON SALT, INC., CITY OF)	PCB 19-21 (Ozinga Materials)
PALOS HEIGHTS, PALOS HEIGHTS)	PCB 19-22 (Midwest Marine)
ILLINOIS, VILLAGE OF ROMEOVILLE,)	PCB 19-23 (Mokena)
ROMEOVILLE ILLINOIS, IMTT ILLINOIS)	PCB 19-24 (Oak Lawn)
LLC, STEPAN CO., VILLAGE OF PARK)	PCB 19-25 (Dolton)
FOREST, PARK FOREST ILLINOIS,)	PCB 19-26 (Glenwood)
OZINGA READY MIX CONCRETE, INC.,)	PCB 19-27 (Morton Grove)
OZINGA MATERIALS, INC., MIDWEST)	PCB 19-28 (Lansing)
MARINE TERMINALS LLC, VILLAGE OF)	PCB 19-29 (Frankfort)
MOKENA, MOKENA ILLINOIS, VILLAGE)	PCB 19-30 (Winnetka)
OF OAK LAWN, OAK LAWN ILLINOIS,)	PCB 19-31 (La Grange)
VILLAGE OF DOTON, DOTON ILLINOIS,)	PCB 19-33 (Channahon)
VILLAGE OF GLENWOOD, GLENWOOD)	PCB 19-34 (CCDTH)

ILLINOIS, VILLAGE OF MORTON)	PCB 19-35 (Niles)
GROVE, MORTON GROVE ILLINOIS,)	PCB 19-36 (Skyway)
VILLAGE OF LANSING, LANSING)	PCB 19-37 (Elwood)
ILLINOIS, VILLAGE OF FRANKFORT,)	PCB 19-38 (Chicago)
FRANKFORT ILLINOIS, VILLAGE OF)	PCB 19-40 (Crestwood)
WINNETKA, WINNETKA ILLINOIS,)	PCB 19-48 (Riverside)
VILLAGE OF LA GRANGE, LA GRANGE)	
ILLINOIS, VILLAGE OF CHANNAHON,)	
CHANNAHON ILLINOIS, COOK COUNTY)	
DEPARTMENT OF TRANSPORTATION)	
AND HIGHWAYS, VILLAGE OF NILES,)	
NILES ILLINOIS, SKYWAY CONCESSION)	
COMPANY LLC, VILLAGE OF ELWOOD,)	
ELWOOD ILLINOIS, CITY OF CHICAGO,)	
CHICAGO ILLINOIS, VILLAGE OF)	
CRESTWOOD, CRESTWOOD ILLINOIS)	
and VILLAGE OF RIVERSIDE, RIVERSIDE)	
ILLINOIS)	
Petitioners,)	

v.

ILLINOIS ENVIRONMENTAL
PROTECTION AGENCY,

(Time Limited Water Quality
Standards)
(Consolidated)

Respondent.

NOTICE OF ELECTRONIC FILING

PLEASE TAKE NOTICE that on January 17, 2020, I electronically filed with the Clerk of the Illinois Pollution Control Board, PRE-FILED TESTIMONY OF LAURA BARGHUSEN, OPENLANDS, concerning the Petition in PCB2016-014, a copy of which is attached hereto and herewith served upon you.

Dated: January 17, 2020

Openlands

By:

A handwritten signature in cursive script, reading "Stacy Meyers".

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VILLAGE OF HOMEWOOD, HOMEWOOD ILLINOIS, VILLAGE OF ORLAND PARK, ORLAND PARK ILLINOIS, VILLAGE OF MIDLOTHIAN, MIDLOTHIAN ILLINOIS, VILLAGE OF TINLEY PARK, TINLEY PARK ILLINOIS, EXXONMOBIL OIL CORPORATION, VILLAGE OF WILMETTE, WILMETTE ILLINOIS, CITY OF COUNTRY CLUB HILLS, COUNTRY CLUB HILLS ILLINOIS, NORAMCO-CHICAGO, INC., FLINT HILLS RESOURCES JOLIET LLC, CITY OF EVANSTON, EVANSTON ILLINOIS, VILLAGE OF SKOKIE, SKOKIE ILLINOIS, ILLINOIS DEPARTMENT OF TRANSPORTATION, METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO, VILLAGE OF RICHTON PARK, RICHTON PARK ILLINOIS, VILLAGE OF LINCOLNWOOD, LINCOLNWOOD ILLINOIS, CITY OF OAK FOREST, OAK FOREST ILLINOIS, VILLAGE OF LYNWOOD, LYNWOOD ILLINOIS, CITGO HOLDINGS, INC., VILLAGE OF NEW LENOX, NEW LENOX ILLINOIS, CITY OF LOCKPORT, LOCKPORT ILLINOIS, CATERPILLAR, INC., CITY OF CREST HILL, CREST HILL ILLINOIS, CITY OF JOLIET, JOLIET ILLINOIS, MORTON SALT, INC., CITY OF PALOS HEIGHTS, PALOS HEIGHTS ILLINOIS, VILLAGE OF ROMEOVILLE, ROMEOVILLE ILLINOIS, IMTT ILLINOIS LLC, STEPAN CO., VILLAGE OF PARK FOREST, PARK FOREST ILLINOIS, OZINGA READY MIX CONCRETE, INC., OZINGA MATERIALS, INC., MIDWEST MARINE TERMINALS LLC, VILLAGE OF MOKENA, MOKENA ILLINOIS, VILLAGE OF OAK LAWN, OAK LAWN ILLINOIS, VILLAGE OF DOTON, DOTON ILLINOIS, VILLAGE OF GLENWOOD, GLENWOOD

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ILLINOIS ENVIRONMENTAL)	(Time Limited Water Quality
PROTECTION AGENCY,)	Standards)
)	(Consolidated)

Respondent.

**Pre-filed Testimony of Laura Barghusen, Openlands
(January 17, 2020)**

I. Introduction.

My name is Laura Barghusen and I am an Aquatic Ecologist for Openlands. Founded in 1963, Openlands protects the natural and open spaces of Northeastern Illinois and the surrounding region to ensure cleaner air and water, protect natural habitats and wildlife, and help balance and enrich our lives. For decades, Openlands has supported improvements to the waterways of our region as natural assets, economic drivers and community treasures. Openlands and its supporters recreate on and along waterways that are affected by this

proceeding. They paddle, watch wildlife, fish, hike and bike on trails and in parks along the riverbanks, and otherwise enjoy these natural resources.

The experience of Openlands supporters would be diminished by allowing for a more lenient highest attainable condition and relaxed conditions in a Time Limited Water Quality Standard (TLWQS) for chlorides, which would ultimately result in greater pollution in these waters, making it more hostile for aquatic life to live and reach their potential. More Openlands supporters would recreate on these systems if the quality continued to improve and become “fishable and swimmable” under the Clean Water Act. Openlands is concerned with rising levels of chloride in the Chicago Area Waterways (CAWs) and the Lower Des Plaines River (LDPR), which are vital to and relied upon by both people and wildlife.

Overall, Openlands assists government, nonprofits, and community groups, and engages the public to enhance and protect water quality and aquatic habitats through planning, education, restoration projects, land preservation, and monitoring of streams and rivers throughout Northeastern Illinois and the surrounding region. Openlands partners with state government agencies, municipalities and other organizations to make our region’s waterways more open and accessible for recreational use to connect people to nature where they live. Openlands is one of the original organizations to partner with the Illinois Department of Natural Resources to develop and promote the first water trails throughout Northeastern Illinois. It has partnered with communities and agencies to install canoe and kayak launches and signage, and to hold workshops and events to engage local communities in paddling and stewarding their rivers, streams and lakes. Openlands offers canoeing and kayaking maps and brochures and maintains an interactive website for the public to learn about opportunities to paddle and enjoy trails across the region.

For decades, Openlands has provided technical assistance to agencies and communities to acquire and preserve land to protect streams across the region. Openlands has conducted more than \$50 million in wetland and stream restoration initiatives, improving aquatic habitat in degraded systems. Openlands provides technical assistance in acquiring riparian corridors to protect waterways, ranging from the pristine Kishwaukee River and Nippersink Creek to

the Chicago River system.

Openlands has utilized its experience to raise scientific evidence and scrutiny before the Illinois Pollution Control Board in past proceedings, such as the CAWs Water Quality Standards rulemaking (R08-09) and Amendments to the Water Quality Standards for Chlorides rulemaking (R18-32) to strengthen protections for existing and attainable conditions for species that depend upon the quality of our region's waterways. As an aquatic ecologist, I testified during the CAWS and LDPR water quality standards proceedings about how water quality affects aquatic life throughout the system, including connected high-quality rivers and tributaries. I provided evidence of the tremendous growth of recreational uses within the context of our paddling programs and the myriad of opportunities for people across the Chicagoland area to connect to and access these valuable resources.

My testimony is informed by years of involvement in scientific studies and field work on the health of headwater streams and conditions for mussel populations as indicator species. I have an M.S. degree in Zoology from Miami University, Oxford, Ohio and an M.A. in Environmental and Urban Geography from the University of Illinois at Chicago. I represent Openlands in leading the Chicago Wilderness Priority Species effort to improve conditions for the ellipse mussel to increase its population numbers throughout the Chicago Wilderness region. Several agencies are coordinating to research and protect mussels as part of the Chicago Wilderness ellipse management group, including the Illinois Natural History Survey, the Wisconsin Department of Natural Resources, the Indiana Department of Natural Resources, the Forest Preserve District of DuPage County, and the Forest Preserve District of DeKalb County. This group documents the existence of the ellipse in Chicago Wilderness rivers and streams, estimates the size of ellipse populations, and suggests management actions that would benefit ellipse mussels through knowledge gained from research and statistical modeling of ellipse populations.

As Openlands staff, I also led the creation of the Field Guide to the Freshwater Mussels of Chicago Wilderness, a detailed field guide to the identification of the 40 species of native freshwater mussels that live in the Chicago Wilderness region. The guide raises awareness

among land managers and community groups of freshwater mussels as taxa in urgent need of conservation. It encourages natural resource agencies and community groups to conduct mussel surveys, using indices to assess the mussel resource value of streams in Chicago Wilderness.

In addition, Openlands works to protect headwater streams throughout the Chicago Wilderness region, which harbor the kinds of aquatic life at issue in this proceeding. In 2017, Openlands published the report *Headwater Streams of Chicago Wilderness: Status and Recommendations* as a resource for local governments and land managers to better understand the value of headwater streams and the biodiversity they support. Through the guide and our work, Openlands demonstrates land acquisition, restoration and policy strategies to preserve and protect these resources.

The purpose of my testimony in this proceeding is, with this background, to share and discuss scientific findings that indicate the proposed TLWQS conditions are insufficient to protect existing aquatic life in the CAWs and LDPR. Recent studies indicate that intolerant aquatic species in these river systems could be adversely affected by the interim criterion and minimal compliance monitoring conditions proposed in the TLWQS. Studies show that greater exposure to chlorides could be especially detrimental to certain species of glochidia and juvenile mussels. The Petitioners do not take a science-based approach to demonstrate the effect of its proposed TLWQS on existing aquatic life, nor do they recommend adequately frequent and widespread monitoring to ensure reduction of chloride loadings and no degradation of aquatic life during the TLWQS period.

II. The Proposed Interim Criterion Would Not Protect Aquatic Life in the CAWs and LDPR

A. The Proposed Interim Criterion Would Not Protect Known Aquatic Life

Freshwater mussels are one of the most imperiled groups of organisms. Nearly 70 percent of these species are designated either as threatened, endangered or in decline (Williams et al 1993). Recent studies have shown that for some contaminants, freshwater mussel glochidia

and juveniles are more sensitive than standard test organisms, leading to concerns that water quality regulations do not adequately protect freshwater mussels (Wang et al. 2018a, 2018b). Gillis (2011) points out that for glochidia, the end point for studies of acute chloride toxicity is not death, but loss of ability to attach to a host species, which is necessary for their survival, and renders them “effectively dead.” In their study of acute chloride toxicity of Fatmucket, *Lampsilis siliquoidea*, juveniles and glochidia, Wang et al. (2018b) state that including their more recent mussel data in the toxicity database would “likely lower the [Water Quality Criteria] and [Water Quality Standards] for [Chlorides].” Wang et al (2018a) made a similar statement in their study of the chronic chloride toxicity of the Fat Mucket, in which they state “inclusion of the data from the present study and recent publications to update the national chronic water quality criterion or Iowa chronic water quality standard would likely lower the criterion or standard.”

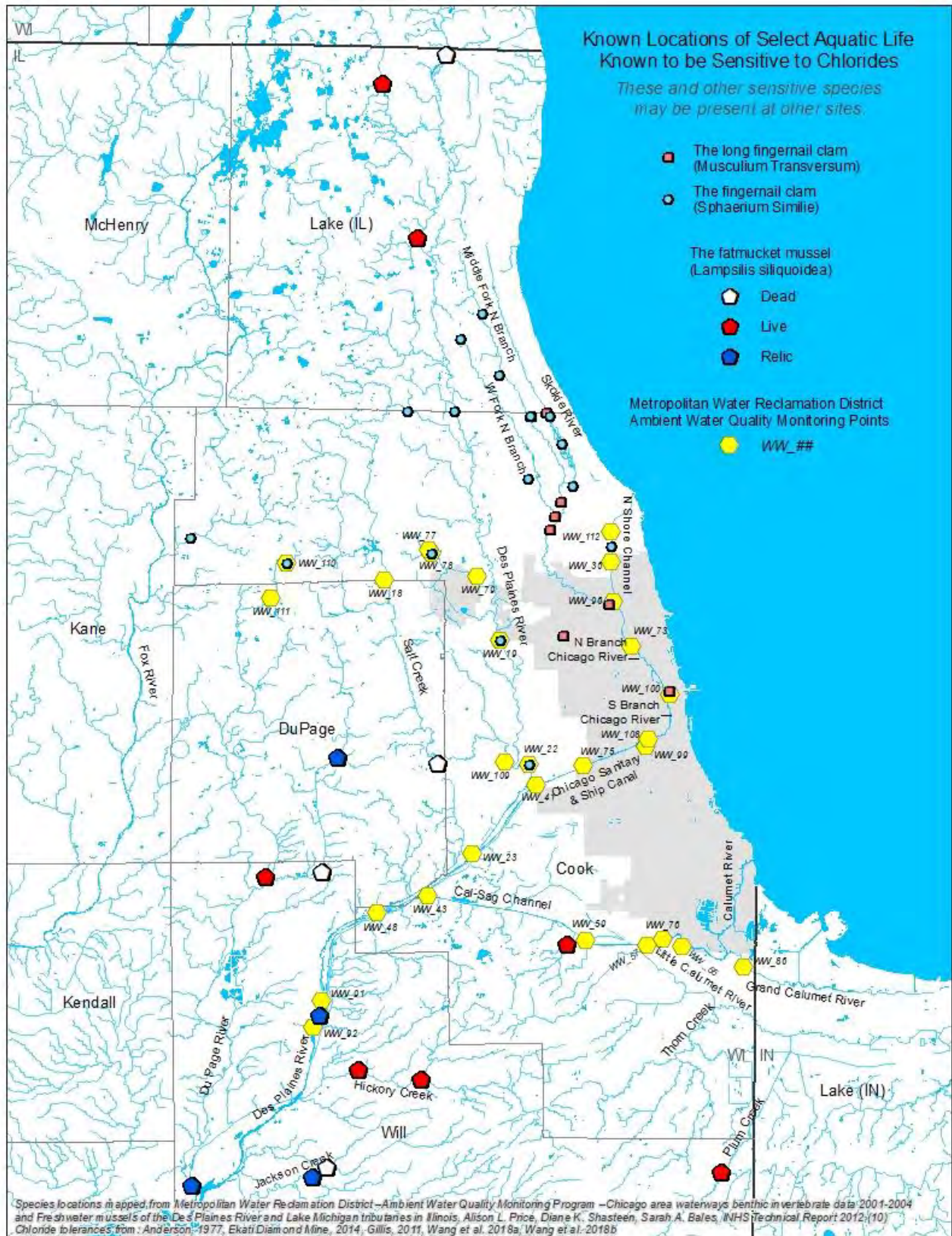
A study by the Great Lakes Environmental Center (GLEC) and the Illinois Natural History Survey (INHS) tested the acute toxicity of chloride to four freshwater invertebrate species including a species of fingernail clam, *Sphaerium simile*. GLEC and INHS found that “[f]ingernail clams are approximately 5.6 times more acutely sensitive to chloride at 50 and 200 mg/L total hardness than tubificid worms, and approximately 2.7 to 4.2 times more sensitive than the snail” (USEPA 2008). A 2014 study looked at a range of effects on the fingernail clam to determine whether the Site Specific Water Quality Objective (SSWQO) developed for chloride at the Ekati Diamond Mine in Canada was protective of the species given its known sensitivity to chloride. The results indicated that the SSWQO would be sufficiently protective because it had been determined using sublethal toxicity threshold data for other freshwater invertebrate species, “with effects concentrations ranging from 368 mg/L to 519 mg/L Cl (Elphick et al. 2011) which are lower than the most sensitive endpoint in the fingernail clam test (579 mg/L Cl; biomass)” (ERM Rescan 2014).

In terms of chronic long-term effects on invertebrate assemblages, Wallace and Biastoch (2016) found that in streams in Toronto, Canada, the macroinvertebrate community demonstrated the most taxa changes (declining frequency and abundance of taxa sensitive to

chloride and increasing frequency and abundance of taxa tolerant of chloride) at a threshold of approximately 50 to 90 mg Cl-/L. The authors point out that this is below the Canadian Water Quality Guideline of 120 mg Cl-/L for chronic exposure and suggest that chloride may be having nonlethal effects on the benthic macroinvertebrate communities in the Toronto, Ontario region.

The fatmucket glochidia attaching to fish are known to be present in waters subject to this proceeding, in warmer as well as colder months. For the fingernail clams, which do not produce glochidia but instead reproduce directly, Soucek (2018) found that there was no difference in chronic chloride toxicity in colder water. “Chronic sodium chloride toxicity to the clam was not reduced at 10 °C relative to its response at 25 °C.” Therefore, chloride could have a chronic effect on fingernail clams present in these waters in the winter months and there is no evidence to suggest that colder temperatures would moderate this effect. The map, “Known Locations of Select Aquatic Life Known to be Sensitive to Chlorides” (Sensitive Species Map) below illustrates, only as an example, locations at which fingernail clams and fatmucket mussels have been found within the CAWs and the LDPR. It is likely that other species intolerant to chloride are present in these waters as well.

Taking into account these chronic and acute thresholds, nothing in the proposed TLWQS indicates that the suggested interim criterion, assessed for compliance only as a four-year seasonal average across the entire CAWs and LDPR, would protect known aquatic life species. The Petitioners used a five-year seasonal average at the Lockport Forebay (289 mg/L) as well as averages and estimates from the Ruby St. Bridge in Joliet and the USGS gauge in Channahon to calculate a proposed 3 to 7 percent reduction in chloride loading, with a goal seasonal average of 280 mg/L (J. Sub. at 8.1 – 8.2). By this method, it is not scientifically shown how adverse impacts to aquatic species known to be present in the CAWs and LDPR would be avoided. Dischargers could achieve compliance with the proposed interim criterion, allowing higher chloride concentrations within the range of thresholds known to have negative and lethal effects on aquatic life, so long as the average concentration throughout the entire system over the course of the first four years is 280 mg/L.



B. The Proposed Highest Attainable Condition Does Not Take into Account Projects That Will Improve Riparian Habitat

The proposed TLWQS does not appear to account for existing plans and projects that will restore and improve habitat throughout the CAWs. For example, in July of 2019, the U.S. Army Corps of Engineers (USACE) requested comment on the scope of work for the Chicago Rivers Restoration Framework Plan, which will be completed by the end of 2020 in cooperation with the City of Chicago River Ecology and Governance Task Force (Final Draft, Chicago Rivers Restoration Framework Plan – Scope of Work, July 2019). Openlands provided comments on the scope of the Draft Plan, which focuses USACE and City of Chicago Department of Planning and Development efforts on the full restoration potential of the CAWs and the balance of complementary uses of the system (Openlands, Public Comment Letter, Final Draft, Chicago Rivers Restoration Framework Plan – Scope of Work, Aug. 12, 2019). Investments like this joint effort over the 15-year duration of the TLWQS will continue to expand habitat and improve water quality to the benefit of aquatic life in these waterways, requiring chloride limits and data that protect aquatic life uses that are foreseeably attainable in the CAWs and the LDPR.

III. The Proposed Monitoring Conditions Would Not Adequately Ensure the Reduction of Chloride Loadings Throughout the System

Although Petitioners have only requested a TLWQS for the winter months, chlorides can remain high into warmer months by deposit in soil and transportation through stormwater flow, necessitating year-round continuous chemical monitoring. For example, chloride loadings from road salt may seep into the soil or into groundwater that feeds a particular stream and be released throughout the year into that surface water as a result of snow melt (Williams et al. 2000). Williams et al found chloride contamination in groundwater in springs in the greater Toronto area resulting from the application of de-icing salts and ultimately found those chloride levels to be more seasonally stable than chloride levels in streams and rivers.

Furthermore, while it is true that chloride reduction efforts would be implemented on a

watershed-wide basis, assessing compliance only at two points within the watershed would not inform Petitioners as to whether spikes in chloride levels occur within range of existing and intolerant aquatic life. The Metropolitan Water Reclamation District's Ambient Water Quality Monitoring (AWQM) Program includes chloride monitoring once per month in at least 28 locations throughout its service area and once per week downstream at the Lockport Forebay, as shown on the Sensitive Species Map. Because chemical characteristics of a waterbody can change rapidly and the District already has an AWQM program in place, monitoring for chloride should, at a minimum, be conducted once per week at many locations throughout the watershed, most importantly within the vicinity of known chloride-intolerant aquatic life uses. This evidence-based approach is important to support any assertion that the TLWQS will not have the unintended consequences of harming species that must be protected.

IV. Conclusion

In sum, the proposed TLWQS does not adequately account for recent research on the sensitivity of fingernail clams, the glochidia of fatmucket mussels, and several other sensitive or intolerant species in the CAWs and the LDPR. Recent studies produced for USEPA and USGS (Wang et al 2018a and 2018b) assert if new data for sensitive aquatic species, such as the fatmucket mussel and fingernail clam, were added to databases used to calculate water quality criteria and standards for waterways, then the permissible chloride would need to be lowered to protect these species. Gillis (2011) also found that glochidia of several mussel species had acute chloride toxicities that indicated they may be among the most sensitive species to chloride. These species, as well as other sensitive or intolerant species, are present within the CAWs and the LDPR, as shown on the Sensitive Species Map and should be considered when setting appropriate chloride levels in the TLWQS.



Laura Barghusen
Aquatic Ecologist
Openlands

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LITERATURE CITED IN SENSITIVE SPECIES MAP

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EXPERIENCE

Aquatic Ecologist, Openlands

(Chicago, IL, 9/2004 – Present)

Leads volunteers in sampling streams for aquatic biodiversity to monitor stream quality, advocate for stream health, and assess the impact of restoration practices on biodiversity. This includes sampling and analysis of macroinvertebrates, mussels and fish to gauge the health and recovery of aquatic systems.

Funded and led the development of a Field Guide to the Freshwater Mussels of Chicago Wilderness to assist professionals (e.g. land managers and consultants) and volunteers in evaluating the health of mussel populations.

Co-authored the Headwater Streams of the Chicago Wilderness Region: Status and Recommendations to raise awareness of the value of headwaters and encourage the assessment, preservation and restoration of such waterways.

Implements the Northeastern Illinois Regional Water Trail Plan by improving canoe and kayak access on waterways in the Chicago region through planning, advocacy, events, outreach, and assisting volunteer Water TrailKeepers in organizing clean ups and monitoring water trail conditions.

Created, updates and maintains paddleillinoiswatertrails.org, an Openlands interactive website that is a guide to paddling water trails throughout the Chicago Region.

Collaborates with Friends of the Chicago River and other environmental groups to strengthen water quality standards for Chicago Area Waterways to better protect people that recreate on and in our rivers. Provided aquatic life use testimony during Water Quality Standards hearings before the Illinois Pollution Control Board (R08-09), which explored the importance of connectivity and interplay between habitat and water quality.

Lead the Chicago Wilderness Ellipse Management Recovery Team for this Chicago Wilderness priority mussel species. Coordinate with other natural resource agencies

to create and implement a plan to increase ellipse population numbers and improve habitat for the ellipses, including estimating ellipse population sizes and considering modeling results to make project decisions to benefit ellipses.

**Environmental Planner & GIS Specialist,
Northeastern Illinois Planning Commission,
Natural Resources Department**

(Chicago, IL, 12/2000-9/2004)

Constructed GIS models to predict the highest habitat values and potential impacts from infrastructure for use in natural resource planning.

Mapped and assessed Kane County wetlands for habitat value and stormwater storage value for an Advanced Identification of Aquatic Resources (ADID) in collaboration with U.S. EPA, Kane County Department of Stormwater Management, and U.S. FWS.

Led an inventory of stream restoration projects undertaken in Chicago Wilderness to assess what techniques functioned best under different circumstances in collaboration with U.S.G.S., U.S. FWS, and Openlands.

Provided technical assistance to local governments and watershed groups in watershed planning.

**Environmental and Conservation Programs Intern
& GIS Technician, The Field Museum of Natural History**

(Chicago, IL, 08/1999-11/2000)

Used land use maps and remote sensing to analyze land cover of the Chicago region.

Authored reports for researchers and land managers to understand the different methodologies of the project to calculate acreages to contribute an understanding of losses or gains of various land cover types over time.

Fisheries Intern, Salmon-Challis National Forest

(Salmon, ID, 05/1999-08/1999)

Monitored water chemistry in incubators located on private and National Forest Service land containing steelhead eggs and assisted in placing eggs in incubators.

Engaged landowners regarding their choice to host incubators.

Teaching Assistant, (Chicago, IL 08/1998-12/1998 and 08/1999-12/1999)
University of Illinois at Chicago

Science Curriculum Specialist, American School (Lansing, IL 09/1996-08/1998)

EDUCATION

Master of Arts, Environmental and Urban Geography, 2001
University of Illinois at Chicago, Chicago, IL

Master of Science, Zoology, 1994
Miami University, Oxford, OH

Bachelor of Arts with General Honors, History, 1987
University of Chicago, Chicago, IL

SELECTED PUBLICATIONS AND REPORTS

Anderson, D and L Barghusen. 2017. *Headwater Streams of the Chicago Wilderness Region: Status and Recommendations*. Chicago, Illinois: Openlands.

Barghusen, L and RJ Klocek. 2015. *Biological Richness of Headwater Streams*: report for the Indiana Lake Michigan Coastal Program Grant CZ213, granted to Openlands. Chicago, Illinois: Openlands.

Klocek, RJ and L Barghusen. 2014. Aquatic Faunal Surveys at the Hadley Valley Forest Preserve, Spring Creek, Will County, Illinois, 2014 Results. Chicago, Illinois: Openlands.

Klocek, RJ, J Bland, and L Barghusen. 2008. *A Field Guide to the Freshwater Mussels of Chicago Wilderness*. Chicago, Illinois: Openlands.

Barghusen, Laura. *Endangered Animals and Habitats: The Bear*. San Diego: Lucent Books, 1999. Barghusen, L., and N. Toomy, 1998. *Study Guide for Ecology*. Chicago, Illinois: American School.

Barghusen, L.E., D.L. Claussen, M.S. Anderson and A.J. Bailer. 1997. The effects of temperature on the web-building behavior of the common house spider, *Achaearanea tepidariorum*. *Functional Ecology* 11:4-10.

BEFORE THE ILLINOIS POLLUTION CONTROL BOARD

IN THE MATTER OF:

)	PCB 16-14 (Homewood)
VILLAGE OF HOMEWOOD, HOMEWOOD)	PCB 16-15 (Orland Park)
ILLINOIS, VILLAGE OF ORLAND PARK,)	PCB 16-16 (Midlothian)
ORLAND PARK ILLINOIS, VILLAGE OF)	PCB 16-17 (Tinley Park)
MIDLOTHIAN, MIDLOTHIAN ILLINOIS,)	PCB 16-18 (ExxonMobil)
VILLAGE OF TINLEY PARK, TINLEY)	PCB 16-20 (Wilmette)
PARK ILLINOIS, EXXONMOBIL OIL)	PCB 16-21 (Country Club Hills)
CORPORATION, VILLAGE OF WILMETTE,)	PCB 16-22 (Noramco-Chicago)
WILMETTE ILLINOIS, CITY OF COUNTRY)	PCB 16-23 (Flint Hills Resources)
CLUB HILLS, COUNTRY CLUB HILLS)	PCB 16-25 (Evanston)
ILLINOIS, NORAMCO-CHICAGO, INC.,)	PCB 16-26 (Skokie)
FLINT HILLS RESOURCES JOLIET LLC,)	PCB 16-27 (IDOT)
CITY OF EVANSTON, EVANSTON)	PCB 16-29 (MWRDGC)
ILLINOIS, VILLAGE OF SKOKIE, SKOKIE)	PCB 16-30 (Richton Park)
ILLINOIS, ILLINOIS DEPARTMENT OF)	PCB 16-31 (Lincolnwood)
TRANSPORTATION, METROPOLITAN)	PCB 16-33 (Oak Forest)
WATER RECLAMATION DISTRICT OF)	PCB 19-7 (Lynwood)
GREATER CHICAGO, VILLAGE OF)	PCB 19-8 (Citgo Holdings)
RICHTON PARK, RICHTON PARK)	PCB 19-9 (New Lenox)
ILLINOIS, VILLAGE OF LINCOLNWOOD,)	PCB 19-10 (Lockport)
LINCOLNWOOD ILLINOIS, CITY OF OAK)	PCB 19-11 (Caterpillar)
FOREST, OAK FOREST ILLINOIS,)	PCB 19-12 (Crest Hill)
VILLAGE OF LYNWOOD, LYNWOOD)	PCB 19-13 (Joliet)
ILLINOIS, CITGO HOLDINGS, INC.,)	PCB 19-14 (Morton Salt)
VILLAGE OF NEW LENOX, NEW LENOX)	PCB 19-15 (Palos Heights)
ILLINOIS, CITY OF LOCKPORT,)	PCB 19-16 (Romeoville)
LOCKPORT ILLINOIS, CATERPILLAR,)	PCB 19-17 (IMTT Illinois)
INC., CITY OF CREST HILL, CREST HILL)	PCB 19-18 (Stepan)
ILLINOIS, CITY OF JOLIET, JOLIET)	PCB 19-19 (Park Forest)
ILLINOIS, MORTON SALT, INC., CITY OF)	PCB 19-20 (Ozinga Ready Mix)
PALOS HEIGHTS, PALOS HEIGHTS)	PCB 19-21 (Ozinga Materials)
ILLINOIS, VILLAGE OF ROMEOVILLE,)	PCB 19-22 (Midwest Marine)
ROMEOVILLE ILLINOIS, IMTT ILLINOIS)	PCB 19-23 (Mokena)
LLC, STEPAN CO., VILLAGE OF PARK)	PCB 19-24 (Oak Lawn)
FOREST, PARK FOREST ILLINOIS,)	PCB 19-25 (Dolton)
OZINGA READY MIX CONCRETE, INC.,)	PCB 19-26 (Glenwood)
OZINGA MATERIALS, INC., MIDWEST)	PCB 19-27 (Morton Grove)
MARINE TERMINALS LLC, VILLAGE OF)	PCB 19-28 (Lansing)
MOKENA, MOKENA ILLINOIS, VILLAGE)	PCB 19-29 (Frankfort)
OF OAK LAWN, OAK LAWN ILLINOIS,)	PCB 19-30 (Winnetka)
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VILLAGE OF WINNETKA, WINNETKA)	PCB 19-38 (Chicago)
ILLINOIS, VILLAGE OF LA GRANGE, LA)	PCB 19-40 (Crestwood)
GRANGE ILLINOIS, VILLAGE OF)	PCB 19-48 (Riverside)

CHANNAHON, CHANNAHON ILLINOIS,)
COOK COUNTY DEPARTMENT OF)
TRANSPORTATION AND HIGHWAYS,)
VILLAGE OF NILES, NILES ILLINOIS,)
SKYWAY CONCESSION COMPANY LLC,)
VILLAGE OF ELWOOD, ELWOOD)
ILLINOIS, CITY OF CHICAGO, CHICAGO)
ILLINOIS, VILLAGE OF CRESTWOOD,)
CRESTWOOD ILLINOIS and VILLAGE OF)
RIVERSIDE, RIVERSIDE ILLINOIS)

Petitioners,

v.

ILLINOIS ENVIRONMENTAL
PROTECTION AGENCY,

Respondent.

(Time Limited Water Quality
Standards)
(Consolidated)

CERTIFICATE OF SERVICE

I, the undersigned, certify that on January 17, 2020, I served electronically the attached PRE-FILED TESTIMONY OF LAURA BARGHUSEN, OPENLANDS to the participants listed on the attached SERVICE LIST.



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