

BEFORE THE ILLINOIS POLLUTION CONTROL BOARD

IN THE MATTER OF:)
)
WATER QUALITY STANDARDS AND) R08-9
EFFLUENT LIMITATIONS FOR THE) (Rulemaking - Water)
CHICAGO AREA WATERWAY SYSTEM)
AND THE LOWER DES PLAINES RIVER:)
PROPOSED AMENDMENTS TO 35 Ill.)
Adm. Code Parts 301, 302, 303 and 304)

NOTICE OF FILING

To: ALL COUNSEL OF RECORD
(Service List Attached)

PLEASE TAKE NOTICE that on the 15th day of April, 2010, I, on behalf of the Metropolitan Water Reclamation District of Greater Chicago, electronically filed with the Office of the Clerk of the Illinois Pollution Control Board, **Metropolitan Water Reclamation District of Greater Chicago's Final Comments on Recreational Use Designations.**

Dated: April 15, 2010

**METROPOLITAN WATER RECLAMATION
DISTRICT OF GREATER CHICAGO**

By: /s/ David T. Ballard
One of Its Attorneys

Fredric P. Andes
David T. Ballard
BARNES & THORNBURG LLP
One North Wacker Drive
Suite 4400
Chicago, Illinois 60606
(312) 357-1313

PROOF OF SERVICE

The undersigned, a non-attorney, certifies, under penalties of perjury pursuant to 735 ILCS 5/1-109, that I caused a copy of the forgoing, **Notice of Filing and Metropolitan Water Reclamation District of Greater Chicago's Final Comments on Recreational Use Designations**, to be served via First Class Mail, postage prepaid, from One North Wacker Drive, Chicago, Illinois, on the 15th day of April, 2010, upon the attorneys of record on the attached Service List.

/s/ Barbara E. Szynalik

Barbara E. Szynalik

SERVICE LIST
R08-9 (Rulemaking - Water)

Richard J. Kissel
Roy M. Harsch
Drinker, Biddle, Gardner, Carton
Suite 3700
191 N. Wacker Drive
Chicago, IL 60606-1698

Claire A. Manning
Brown, Hay & Stephens LLP
700 First Mercantile Bank Building
205 South Fifth St., P.O. Box 2459
Springfield, IL 62705-2459

Deborah J. Williams, Assistant Counsel
Stefanie N. Diers, Assistant Counsel
IEPA
Division of Legal Counsel
1021 North Grand Avenue East
P.O. Box 19276
Springfield, IL 62794-9276

Katherine D. Hodge
Monica T. Rios
Matthew C. Read
Hodge Dwyer & Driver
3150 Roland Avenue
P.O. Box 5776
Springfield, IL 62705-5776

Kevin G. Desharnais
Thomas W. Dimond
Thomas V. Skinner
Mayer, Brown LLP
71 South Wacker Drive
Chicago, IL 60606-4637

Jerry Paulsen
Cindy Skrukruud
McHenry County Defenders
132 Cass Street
Woodstock, IL 60098

Robert VanGyseghem
City of Geneva
1800 South Street
Geneva, IL 60134-2203

Lisa Frede
Chemical Industry Council of Illinois
Suite 100
1400 E. Touhy Ave.
Des Plaines, IL 60019-3338

Matthew J. Dunn, Chief
Office of the Attorney General
Environmental Bureau North
Suite 1800
69 West Washington Street
Chicago, IL 60602

James L. Daugherty, District Manager
Thorn Creek Basin Sanitary District
700 West End Avenue
Chicago Heights, IL 60411

Bernard Sawyer
Thomas Granato
Metropolitan Water Reclamation District
6001 W. Pershing Road
Cicero, IL 60804

Tracy Elzemeyer, General Counsel
American Water Company Central Region
727 Craig Road
St. Louis, MO 63141

Keith I. Harley
Elizabeth Schenkier
Chicago Legal Clinic, Inc.
4th Floor
205 West Monroe Street
Chicago, IL 60606

Frederick D. Keady, P.E., President
Vermilion Coal Company
1979 Johns Drive
Glenview, IL 60025

W.C. Blanton
Blackwell Sanders LLP
Suite 1000
4801 Main Street
Kansas City, MO 64112

James E. Eggen
Director of Public Works & Utilities
City of Joliet, Department of Public
Works & Utilities
921 E. Washington Street
Joliet, IL 60431

Traci Barkley
Prarie Rivers Networks
Suite 6
1902 Fox Drive
Champaign, IL 61820

Ann Alexander, Sr. Attorney
Natural Resources Defense Council
Floor 23
2 N. Riverside Plaza
Chicago, IL 60606

James Huff, Vice President
Huff & Huff, Inc.
Suite 3300
915 Harger Road
Oak Brook, IL 60523

Beth Steinhorn
2021 Timberbrook
Springfield, IL 62702

Cathy Hudzik
City of Chicago - Mayor's Office of
Intergovernmental Affairs
City Hall - Room 406
121 N. LaSalle Street
Chicago, IL 60602

Dr. Thomas J. Murphy
DePaul University
2325 N. Clifton Street
Chicago, IL 60614

Irwin Polls
Ecological Monitoring and Assessment
3206 Maple Leaf Drive
Glenview, IL 60025

Vicky McKinley
Evanston Environment Board
223 Grey Avenue
Evanston, IL 60202

Marc Miller, Senior Policy Advisor
Jamie S. Caston, Policy Advisor
Office of Lt. Governor Pat Quinn
Room 414 State House
Springfield, IL 62706

Kenneth W. Liss
Andrews Environmental Engineering
3300 Ginger Creek Drive
Springfield, IL 62711

Albert Ettinger, Senior Staff Attorney
Jessica Dexter
Environmental Law & Policy Center
Suite 1300
35 E. Wacker Drive
Chicago, IL 60601

Bob Carter
Bloomington Normal Water
Reclamation District
P.O. Box 3307
Bloomington, IL 61702-3307

Tom Muth
Fox Metro Water Reclamation District
682 State Route 31
Oswego, IL 60543

Kay Anderson
American Bottoms RWTF
One American Bottoms Road
Sauget, IL 62201

Jack Darin
Sierra Club
Illinois Chapter
Suite 1500
70 E. Lake Street
Chicago, IL 60601-7447

Kristy A. N. Bulleit
Brent Fewell
Hunton & Williams LLC
1900 K Street, NW
Washington, DC 20006

Marie Tipsord, Hearing Officer
John Therriault, Assistant Clerk
Illinois Pollution Control Board
100 W. Randolph Street
Suite 11-500
Chicago, IL 60601

Lyman C. Welch
Manager, Water Quality Programs
Alliance for the Great Lakes
17 N. State St., Suite 1390
Chicago, IL 60602

Stacy Meyers-Glen
Openlands
Suite 1650
25 East Washington
Chicago, Illinois 60602

Mark Schultz
Regional Environmental Coordinator
Navy Facilities and Engineering Command
201 Decatur Avenue
Building 1A
Great Lakes, IL 60088-2801

Susan M. Franzetti
Nijman Franzetti LLP
10 South LaSalle Street
Suite 3600
Chicago, IL 60603

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WATER QUALITY STANDARDS AND) R08-9
EFFLUENT LIMITATIONS FOR THE) (Rulemaking - Water)
CHICAGO AREA WATERWAY SYSTEM)
AND THE LOWER DES PLAINES RIVER:) Subdocket A
PROPOSED AMENDMENTS TO 35 Ill.)
Adm. Code Parts 301, 302, 303 and 304)

**METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO'S
FINAL COMMENTS ON RECREATIONAL USE DESIGNATIONS**

The Metropolitan Water Reclamation District of Greater Chicago (the "District"), by its attorneys Barnes & Thornburg LLP, and pursuant to the Board's March 18, 2010 Order, hereby submits its final comments on the Illinois Environmental Protection Agency's ("IEPA") proposed recreational use designations in subdocket A for this rulemaking. For its final comments on IEPA's proposed recreational use designations, the District states as follows:

INTRODUCTION

On March 18, 2010, the Board entered an Order creating four subdockets for this rulemaking. Among three others, the Board created subdocket A to specifically address IEPA's proposed recreational use designations. The Board also stated in its Order that it is "convinced that the issue of recreational use designations in subdocket A is ripe for decision. Therefore, the Board directs the participants to file final comments on the recreation use designations for CAWS and LDPR by April 15, 2010." *See* March 18, 2010 Order, at 19. Pursuant to the Board's Order, the District now submits its final comments on IEPA's proposed recreational use designations for the Chicago Area Waterway System ("CAWS").

As explained below, IEPA's proposed recreational use designations are inappropriate for four reasons. As an initial matter, IEPA incorrectly included the activity of fishing in its proposed definition for "Incidental Contact Recreation," which should instead be included in the

definition of “Non-contact Recreation.” Second, IEPA’s proposed Incidental Contact Recreation use designations for most of the waterways in the CAWS are inappropriate given the prevalent safety issues and physical hazards in the CAWS. Specifically, in its proposed rule, IEPA set forth three recreational use designations for the CAWS waterways: (1) Incidental Contact Recreation; (2) Non-contact Recreation; and (3) Non-recreation. *See* IEPA’s Statement of Reasons, at 25-26 (filed Oct. 26, 2007). The District proposes that the IEPA re-designate certain waterways in the CAWS because the physical hazards and safety issues present in those waterways make them more appropriately designated as Non-contact Recreation, as opposed to Incidental Contact Recreation. Set forth below are the waterway use designations proposed by IEPA (*id.* at 38-42), and those proposed by the District (re-designated waterways are in bold and underlined):

Incidental Contact Recreation

<u>IEPA’s Proposal</u>	<u>The District’s Proposal</u>
(a) North Shore Channel; (b) North Branch Chicago River from the confluence with North Shore Channel to the confluence with South Branch Chicago River and Chicago River; (c) Chicago River; (d) South Branch Chicago River and its South Fork; (e) Chicago Sanitary and Ship Canal from the confluence with South Branch Chicago River to the confluence of Calumet-Sag Channel; (f) Calumet River, from Torrence Avenue to the confluence with Grand Calumet River and Little Calumet River; (g) Lake Calumet; (h) Lake Calumet Connecting Channel;	(a) North Shore Channel; (b) <u>The North Branch of the Chicago River from the North Branch Dam to Ashland Avenue (i.e., the Upper North Branch Chicago River);</u> (c) Calumet River, from Torrence Avenue to the confluence with Grand Calumet River and Little Calumet River; (d) Lake Calumet; (e) Lake Calumet Connecting Channel; (f) Grand Calumet River; (g) Little Calumet River from the confluence with Calumet River and Grand Calumet River to the confluence with Calumet-Sag Channel; and (h) Lower Des Plaines River from the Brandon Road Lock and Dam to the

<p>(i) Grand Calumet River;</p> <p>(j) Little Calumet River from the confluence with Calumet River and Grand Calumet River to the confluence with Calumet-Sag Channel;</p> <p>(k) Calumet-Sag Channel; and</p> <p>(l) Lower Des Plaines River from the Brandon Road Lock and Dam to the Interstate 55 bridge.</p>		<p>Interstate 55 bridge.</p>
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Non-contact Recreation

<u>IEPA's Proposal</u>		<u>The District's Proposal</u>
<p>(a) Calumet River from Lake Michigan to Torrence Avenue.</p>		<p>(a) Calumet River from Lake Michigan to Torrence Avenue.</p> <p>(b) <u>Chicago Sanitary and Ship Canal from the confluence with South Branch Chicago River to the confluence of Calumet-Sag Channel;</u></p> <p>(c) <u>Calumet-Sag Channel;</u></p> <p>(d) <u>Chicago River;</u></p> <p>(e) <u>South Fork of the South Branch of the Chicago River (Bubbly Creek);</u></p> <p>(f) <u>South Branch of the Chicago River;</u> and</p> <p>(g) <u>The North Branch of the Chicago River from Ashland Avenue to its confluence with the South Branch of the Chicago River at Wolf Point (i.e., the Lower North Branch Chicago River).</u></p>

Non-recreation

<u>IEPA's Proposal</u>		<u>The District's Proposal</u>
<p>(a) Chicago Sanitary and Ship Canal from its confluence with the Calumet-Sag Channel to its confluence with Des Plaines</p>		<p>(a) Chicago Sanitary and Ship Canal from its confluence with the Calumet-Sag Channel to its confluence with Des Plaines</p>

River; and (b) Lower Des Plaines River from its confluence with Chicago Sanitary and Ship Canal to the Brandon Road Lock and Dam.		River; and (b) Lower Des Plaines River from its confluence with Chicago Sanitary and Ship Canal to the Brandon Road Lock and Dam.
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The data and testimony provided to the Board shows that IEPA should have designated the CAWS waterways according to the District's above proposal.

Third, IEPA's proposed recreational use designations fail to account for wet weather events that trigger combined sewer overflow ("CSO") and other wet weather flows. Fourth, IEPA's proposed recreational use designations fail to account for potential preventative measures being considered by governmental agencies for stopping the migration of Asian carp in the CAWS. Accordingly, the Board should reject IEPA's proposed recreational use designations for the CAWS and remand the proposed recreational use designations to IEPA to reconsider and reevaluate the designations based on the deficiencies described below. In the alternative, if the Board does not remand the proposed recreational use designations for full reconsideration by IEPA, the Board should at a minimum order IEPA (1) to remove the activity of fishing from the proposed definition of Incidental Contact Recreation, (2) to change the following waterways from the Incidental Contact Recreation designation to Non-Contact Recreation because of safety issues in the CAWS: the Chicago Sanitary and Ship Canal from the South Branch of the Chicago River to the junction with the Calumet-Sag Channel, the entire Calumet-Sag Channel, the Chicago River, the South Fork of the South Branch of the Chicago River (Bubbly Creek), the South Branch of the Chicago River, and the North Branch of the Chicago River from Ashland Avenue to its confluence with the South Branch of the Chicago River at Wolf Point (*i.e.*, the Lower North Branch Chicago River); (3) to reconsider the proposed recreational use designations to account for wet weather events that trigger CSO and other wet weather flows; and (4) to reconsider the proposed recreational use designations to account for potential

preventative measures being considered by governmental agencies for stopping the migration of Asian carp in the CAWS.

DISCUSSION

I. IEPA's definition of Incidental Contact Recreation should not include the activity of fishing.

As an initial matter, IEPA incorrectly included the activity of fishing in the definition of Incidental Contact Recreation, along with wading and small craft recreational boating, because fishing involves much less water contact and exposure than the other activities. In its proposed rule, IEPA defined Incidental Contact Recreation as “any recreational activity in which human contact with the water is incidental and in which the probability of ingesting appreciable quantities of water is minimal, such as fishing; commercial boating; small craft recreational boating; and any limited contact associated with shoreline activity such as wading.” *Id.* at 25, Proposed 35 Ill. Admin. Code § 301.282.

Individuals who fish along the banks of the CAWS waterways are safely out of range of barge traffic and have almost no contact with the water, unlike waders and small craft recreation or commercial boaters, and there is virtually no chance that fishing will lead to any direct ingestion of water. Given that fishing occurs out of the water unlike the other Incidental Contact Recreation activities, it should not be lumped into the proposed Incidental Contact Recreation definition. In fact, IEPA has not provided any justification or explanation for why fishing is included in the Incidental Contact Recreation definition, and it appears that IEPA has simply grouped together all of the existing recreational uses that do not take place in large motorized watercraft and presumed that these activities all result in similar water exposures and ingestion rates, even though fishing involves virtually no contact with the water except by hands and almost no chance of direct water ingestion.

Because fishing involves little contact with water and almost no chance of direct ingestion, it should be included within the definition of Non-contact Recreation instead of Incidental Contact Recreation. In IEPA's proposed rule, Non-contact Recreation is defined as "any recreational or other water use in which human contact with the water is unlikely, such as pass through commercial or recreational navigation, and where physical conditions or hydrologic modifications make direct human contact unlikely or dangerous." *See* IEPA's Statement of Reasons, at 26. Because fishing occurs on the banks of the CAWS and is not likely to lead to any significant contact with the water, and certainly will not lead to direct ingestion, Non-contact Recreation is the appropriate designation for fishing, and not Incidental Contact Recreation.

In the alternative, the Board should at least wait to determine whether fishing should be included within the definition of Incidental Contact Recreation until the Chicago Health, Environmental Exposure, and Recreation Study ("CHEERS"), currently being conducted by Dr. Samuel Dorevitch, is completed by late summer this year, as the CHEERS study will provide information on the actual water exposure involved with fishing. Thomas Granato, the District's Assistant Director of Research and Development managing the Environmental Monitoring and Research Division, testified and confirmed that the CHEERS study will clarify whether IEPA should include fishing within the definition of Incidental Contact Recreation:

MR. GRANATO: The CHEERS study will be helpful in assessing whether the recreational uses were appropriately designated because the CHEERS study includes an exposure study which will give us more information about whether uses that you have grouped into incidental contact recreation, for instance, do, in fact, has similar type of exposure.

In other words, what we're now calling limited contact recreation was really lumped together based on a best guess that those activities result in similar exposure to water contact exposure.

This study will enable us to begin to quantify the actual exposure and to determine whether it was appropriate to lump those activities under the same use.

Testimony of Thomas Granato, at 125 (Oct. 28, 2008); *see also id.* at 128 (“The CHEERS study, first and foremost, will tell us whether the designated uses are appropriate and are currently being attained.”). If the Board is not yet ready to rule that fishing should be removed from the definition of Incidental Contact Recreation, the Board should, at the very least, wait to rule on IEPA’s proposed recreational use designations until the CHEERS study is completed, which will provide relevant water exposure data related to fishing and other Incidental Contact Recreation activities, to determine whether fishing should be included in IEPA’s proposed definition.

II. IEPA’s proposed Incidental Contact Recreation use designations are inappropriate given the prevalent safety issues and physical hazards in the CAWS.

IEPA has incorrectly designated several of the CAWS waterways as Incidental Contact Recreation because it failed to give proper consideration to the physical hazards and other safety issues that are present in the CAWS waterways. Specifically, IEPA incorrectly designated the following waterways as Incidental Contact Recreation: the Chicago Sanitary and Ship Canal from the South Branch of the Chicago River to the junction with the Calumet-Sag Channel, the entire Calumet-Sag Channel, the Chicago River, the South Fork of the South Branch of the Chicago River (Bubbly Creek), the South Branch of the Chicago River, and the North Branch of the Chicago River from Ashland Avenue to its confluence with the South Branch of the Chicago River at Wolf Point (the “Lower North Branch Chicago River”). If IEPA had properly considered the hazards and safety issues in these CAWS waterways, it would have found that these waterways should be designated as Non-contact Recreation, which is defined in the proposed rule as “any recreational or other water use in which human contact with the water is unlikely, such as pass through commercial or recreational navigation, and where physical

conditions or hydrologic modifications make direct human contact unlikely or dangerous.” *See* IEPA’s Statement of Reasons, at 26.¹

Richard Lanyon, the District’s Executive Director who has worked at the District since 1963, testified as to the difference between a natural river and the CAWS that make incidental contact, such as wading or small craft recreational boating, in the designated waterways hazardous:

Features of a natural river, such as gradually sloping banks, varied sediment size, bends, aquatic vegetation, riffles, and a mix of shallows and deep pool areas, are absent in most of the CAWS.

The physical characteristics of the CAWS present safety issues that may render activities, such as, swimming, wading, and hand-powered boating hazardous to individuals.

The man-made waterways do not have a shallow area along the banks; the depth drops off very rapidly; sediments are soft and unstable, many banks are lined with high walls consisting of vertical sheet piling, concrete, wood or large limestone rocks; periodic draw downs of water levels cause unexpected, rapid increases in stream velocity; and there is frequent barge and large power boat traffic. . . . A diagram comparing the characteristics of a natural river versus the CAWS can be found in Attachment 5.

See Pre-Filed Testimony of Richard Lanyon, at 5 (filed Aug. 4, 2008) (emphasis added); *see also* Pre-Filed Testimony of Thomas Granato Recreational Uses and Standards, at 3-4 (filed Aug. 4, 2008) (“The man-made waterways do not have a substantial shallow area along the banks; the depth drops off very rapidly; the banks are lined with high vertical sheet piling or large limestone rocks; periodic draw downs of water levels cause unexpected, rapid increases in stream velocity; and there is frequent barge and large power boat traffic.”). In Attachment 5 to his Pre-Filed Testimony, Lanyon presented a graphic comparison of the typical Chicago Area Waterway and

¹ In its testimony during the rulemaking proceedings, the District did not request that the entire South Branch of the Chicago River and the Lower North Branch Chicago River be re-designated from Incidental Contact Recreation to Non-contact Recreation. However, given the data and testimony that was presented to the Board during its hearings, the District believes that these waterways were also incorrectly designated by IEPA because they have the same characteristics and physical hazards as the other CAWS waterways that should be re-designated as Non-contact Recreation instead of Incidental Contact Recreation.

the Typical Natural River. *See* Comparison of the Chicago Area Waterway System (CAWS) and a Natural River, attached hereto as Exhibit A. Moreover, as to the rapid increases in stream velocity, Lanyon explained that a “rapid draw down of water levels in the CAWS before or during a large storm is a necessary action for draining storm runoff to protect streets and basements in Cook County from flooding.” Pre-Filed Testimony of Lanyon, at 5. In his testimony before the Board, Thomas Granato further explained the dangers involved during a rapid draw down:

MR. GRANATO: Just to give some examples, when we drawdown the system, drawdown occurs by increasing flow at the Lockport Lock and Dam, and the drawdown then proceeds up the waterway to the east and north. **Elevation changes can be as great as seven feet and water velocity changes in terms of – water velocity in terms of feet per second can increase by factors of up to seven-and-a-half times during the drawdown event.**

Testimony of Thomas Granato, at 134-135 (Oct. 28, 2008) (emphasis added); *see also id.* at 135 (“Well, there’s guidance by USGS, which basically states that peak depth times velocity, depth in feet, velocity in feet per second should be less than 10 square feet per second for safe wading and recreational conditions.”); *see also* Testimony of Samuel Dennison, at 79-80 (Sept. 8, 2008) (“A drawdown that I remember on the Chicago Sanitary and Ship Canal upstream of the Lockport Lock and Dam was especially swift and dangerous and I don’t believe that I could have controlled a hand powered boat and possibly not even a fishing boat with an outboard motor at that point in the Chicago Sanitary and Ship Canal at that time.”).

In addition to the physical characteristics of the CAWS that make the Incidental Contact Recreation use designations inappropriate, certain CAWS waterways should not be used for activities such as wading or small hand-powered boating because of the industrial land use and

commercial barge traffic present in the CAWS. Again, Lanyon testified as to these aspects of the CAWS that make the Incidental Contact Recreation use unsuitable for several of the waterways:

Much of the CAWS consists of man-made, deep, trapezoidal-shaped channels that experience heavy barge traffic.

Approximately 17,000 barges locked through Lockport Lock and Dam, and over 9,000 barges locked through O'Brien Lock and Dam in 2006.² United States Army Corp of Engineers data indicates that 8,792 barges traveled along the Calumet-Sag Channel in 2006. Attachment 7 presents barge statistics for various waterways. In addition to this barge traffic, there is a high volume of associated commercial offloading throughout the CAWS. Finally, industrial riparian land use is common along the CAWS, which is no surprise for a system designed for the conveyance of treated wastewater effluent and stormwater and commercial navigation.

See Pre-Filed Testimony of Lanyon, at 7; *see also* Pre-Filed Testimony of Granato, at 4. This frequent barge and large power boat traffic makes incidental contact recreational activities such as wading and hand-powered boating in the CAWS unsafe, as it is apparent that barges and large boats could have perilous collisions with waders or hand-powered boats. As an example of the dangers of recreational use of the waterways designated Incidental Contact Recreation, the District submitted photographs showing barge traffic, which demonstrate that it is hazardous to commercial boating, small craft recreational boating, or wading, given the fact that the barges take up much of the width of the waterways they travel through. *See* Photographs of Barges in the CAWS, attached as Exhibit B. As the photographs show, the barges would be a danger to any hand-powered boater, and a collision with a barge given the difference in size of the water vessels could have dire consequences. Even IEPA recognized this danger, as it stated in its Statement of Reasons “[w]akes coupled with vertical-wall construction in many of the waterway reaches make recreational uses dangerous. Small craft can easily be capsized and persons in the water will have little if any route for escape.” *See* IEPA’s Statement of Reasons, at 33.

² Lockage data is available on USACE website: <http://www.iwr.usace.army.mil/ndc/lpms/lock2006web.htm>.

The testimony of Samuel G. Dennison further bolsters the conclusion that certain CAWS waterways should not be designated for Incidental Contact Recreation because of safety issues. Dennison has first-hand experience in the CAWS, as he has been employed with the District since 1971, from 1974 to 2003 had the primary responsibility of monitoring the fish populations in the CAWS, and since 2003 has served as the Head of the Aquatic Ecology and Water Quality Section within the Environmental Monitoring and Research Division. *See* Pre-Filed Testimony of Samuel G. Dennison on Behalf of the Metropolitan Water Reclamation District of Greater Chicago Concerning Recreational Designations of the Chicago Area Waterway System, at 1 (filed Aug. 4, 2008). As part of his professional duties with the District, Dennison's "work often included collecting fish from many 400-meter long sample locations throughout the CAWS." *Id.* Dennison obtained extensive first-hand knowledge about the characteristics of the CAWS because "[w]hile collecting fish or traveling to and from the sample locations, I had plenty of time to observe the physical conditions of the waterways, such as the condition and structure of the banks and what was present on the riparian areas." *Id.* at 1-2. Consistent with the testimony of Lanyon and Granato, Dennison found from his experience that numerous factors in the CAWS make swimming, wading, and boating dangerous activities:

Safety issues in the CAWS include: (1) the man-made and modified waterways do not have a shallow area along the banks; (2) the depth along the banks increase very rapidly proceeding away from the sides of the waterways; (3) the banks of the waterways are lined with high vertical sheet piling or large limestone rocks; (4) periodic draw downs of the water level cause an unexpected rapid increase in stream velocity; and (5) a large number of commercial barges and large private power boats operate in the CAWS.

Id. at 2. Dennison observed first-hand occasional "close calls" over the years that emphasize the dangers that exist in the CAWS:

I have had occasional, unexpected, “close calls” over the years that have reinforced the idea that the CAWS can be extraordinarily dangerous for recreational activities throughout its entire length. One time as my sampling crew and I were on the north side of the Calumet-Sag Channel, just inside the point where the Channel bisects the Illinois Michigan Canal (Attachment 1), a barge that broke loose from a tow swiftly and silently moved towards a not so silent collision with the Channel wall just a few feet from our electrofishing boat. I had no warning that the barge was headed straight for us and I would not be giving this testimony today had we decided to head out into the Calumet-Sag Channel a minute or so previous to the barge’s collision with the channel wall.

There were also many times while I was operating our electrofishing boat that I had to avoid the wakes of large pleasure craft or barges in order to keep from getting capsized.

Id. at 2. Dennison further testified as to the specific CAWS waterways and why IEPA incorrectly designated the waterways as Incidental Contact Recreation:

- **The Chicago Sanitary and Ship Canal from the South Branch of the Chicago River to the confluence with Calumet-Sag Channel:** The waterway “has unsafe depths for wading and lacks points of egress due to vertical sheet-pile channel walls. This is a pass through area for recreational craft and commercial barge traffic (Attachment 2). The proposed Incidental Contact Recreation use designation for the Chicago Sanitary and Ship Canal is alarmingly inconsistent with IEPA’s realistic verbiage describing the CAWS on page 33 in the Statement of Reasons.”
- **The Calumet-Sag Channel:** The waterway “has unsafe depths for wading along the banks of the waterway. It is a pass through area for recreational craft and commercial barge traffic (Attachment 3). Similar to the Chicago Sanitary and Ship Canal, the Calumet-Sag Channel is a man-made, deep, trapezoidal-shaped channel. The United States Army Corps of Engineers (USACE), who operate the Chicago area Locks, reported 8,792 barges traveled up or down the Calumet-Sag Channel during 2006 alone (data available on USACE website at www.iwr.usace.army.mil/ndc/wcsc/wcsc.htm). The Calumet-Sag Channel lacks points of egress along the waterway if a boat capsizes or an emergency situation arises. Industrial riparian land use is common along the Calumet-Sag Channel, except for an approximately 5 mile reach upstream of the confluence with the Chicago Sanitary and Ship Canal, which is forest preserve. Steep limestone channel walls, soft contaminated sediments, and steep drop-offs along the banks characterize most of the Calumet-Sag Channel.”
- **The South Fork of the South Branch of the Chicago River (Bubbly Creek):** The waterway “has extremely deep fine particulate silt sediments deposited on the bottom resulting in unsafe conditions for wading. The sediments are contaminated

with organic pollutants and heavy metals. There are steep banks and vertical sheet pile walls in some reaches (Attachment 4). During and following wet weather events, the District's Racine Avenue Pumping Station discharges a large volume of combined sewage overflow into Bubbly Creek that causes an unexpected rise in the water level along with a substantial increase in flow velocity in the narrow creek. These hydrologic conditions are dangerous for any individual in the water and for boaters. In addition to these dangerous conditions, points of egress are very limited due to steep banks and steel sheet piling along the banks of most of the waterway reaches."

- **The Chicago River:** The waterway "is analogous to the section of the Calumet River from Lake Michigan to Lake Calumet, which the IEPA has designated as Non-Contact Recreation in IPCB R08-9. Similar to the comparable section of the Calumet River, recreational boaters use the Chicago River as a gateway to enter Lake Michigan from the inland waterways. Like the Calumet River, the Chicago River has high vertical sheet-pile channel walls and no shallow areas occur along the waterway. The same reasoning that IEPA used to designate the Calumet River Non-Contact Recreational should be applied to the Chicago River. While the number of commercial barges operating in the Chicago River is small, the river does support navigation from a significant and growing number of large commercial tour boats, in addition to the high volume of recreational power boats. The Chicago River lacks points of egress from the waterway should a boat capsize or an emergency situation arise (Attachment 5)."

Id. at 4-6; *see also* Attachments to Pre-Filed Testimony of Dennison, attached hereto as Exhibit C.

In addition, IEPA should have followed the precedent of other states and environmental protection agencies by considering safety factors in setting recreational use designations. In his testimony before the Board, Granato testified as to other states that assessed recreational uses based on safety considerations. For example:

MR. GRANATO: The Alabama Department of Environmental Management conducted a UAA on the Mobile River in Alabama after designating it a limited warm water fishery.

The Alabama Department of Environmental Management's rationale for not designating the lower Mobile River for primary contact recreation includes unsafe conditions due to barge traffic, industrialization in the area and subsequent lack of shoreline access.

US EPA approved Alabama Department of Environmental Management's UAA on March 15th, 2001.

Testimony of Thomas Granato, at 148-49 (Oct. 28, 2008). Granato further testified that as to other rulemakings in which the state and local environmental protection agencies considered safety factors in setting use designations, citing the Pennsylvania Department of Environmental Resources' UAA for the Presque Isle Bay and outer Erie Harbor in 1985 and the UAA for the Lower Delaware River and Delaware Estuary in 1989, and the Los Angeles Regional Water Quality Control Board's suspension of recreational uses in Los Angeles' engineer channels. *Id.* at 152-156. IEPA should have followed these precedents and considered the physical hazards in the CAWS in setting its recreational use designations.

The physical hazards, hydrological modifications, and commercial traffic described above makes Non-Contact Recreation uses more appropriate than Incidental Contact Recreation uses for several of the CAWS waterways. *See* Pre-Filed Testimony of Granato, at 3 (“However, the CAWS presents many safety issues that may render contact recreational activities such as swimming, wading and hand-powered boating hazardous to individuals.”) Based on the safety issues that exist in the CAWS waterways, the District proposes that the following waterways be designated for Non-Contact Recreation, instead of Incidental Contact Recreation as designated in IEPA's proposal: the Chicago Sanitary and Ship Canal from the South Branch of the Chicago River to the junction with the Calumet-Sag Channel, the entire Calumet-Sag Channel, the Chicago River, the South Fork of the South Branch of the Chicago River (Bubbly Creek), the South Branch of the Chicago River, and the Lower North Branch Chicago River. Accordingly, the Board should remand IEPA's proposed rule so that IEPA can modify the recreational use designations for the waterways in the CAWS.

III. IEPA's proposed recreational use designations fail to account for wet weather events that trigger CSO and other discharges.

Based on the expert testimony and documents (including, but not limited to, the Dry and Wet Weather Risk Assessment of Human Health Impacts of Disinfection vs. No Disinfection of the Chicago Area Waterways System (the "Risk Assessment Report")) presented during the rulemaking, the District submits that there is no significant risk of gastrointestinal illness associated with recreational use of the CAWS in either dry or wet weather conditions. As a result, disinfection of the effluent from the water reclamation plants will have minimal effects on overall recreational illness rates. *See* Pre-Filed Testimony of Granato, at 4-5; Pre-Filed Testimony of Chriso Petropoulou (filed Aug. 4, 2008); Pre-Filed Testimony of Charles P. Gerba (filed Aug. 4, 2008); Pre-Filed Testimony of Keith Tolson (filed Aug. 4, 2008). The District intends to address these issues at length in subdocket B, which is dedicated to issues relating to disinfection and whether or not disinfection may be necessary to meet the proposed recreational use designations.

However, in this rulemaking, IEPA is challenging the District's expert witnesses and the findings in the Risk Assessment Report that support the fact that disinfection is not necessary to treat effluent in the CAWS, and has stated its view that:

it is clear that as a result of CSOs during wet weather, any level of recreational activity in the waterway is unhealthy during periods when raw sewage is present. Until completion and operability of the reservoir phase of the Tunnel and Reservoir Project system, numerous CSO discharges will continue to produce highly elevated bacterial levels that likely create an unacceptably high health risk for recreational activity during and immediately following these periods. While there may be an argument that most of the current recreational activity may be reasonably attained during dry weather, conditions under wet weather are clearly incompatible with recreational activity and the recreational use is not being attained during those conditions at any reasonably acceptable risk level.

See IEPA's Statement of Reasons, at 45.

While the District does not agree with IEPA's assessment of risks during wet weather and intends to challenge its assessment in subdocket B, in the event that the Board accepts IEPA's assessment, then IEPA's proposed recreational use designations must be modified, as IEPA's proposal fails to provide for wet weather recreational use designations to address events involving CSO and other wet weather flows. Adrienne Nemura, a civil engineer who has 24 years of experience evaluating impacts of pollutants on watersheds and waterways, and who has "focused the last 11 years on evaluating the impacts of sewer overflows on water quality and development of appropriate control measures to meet water quality standards," (see Pre-Filed Testimony of Adrienne D. Nemura, at 1 (filed Aug. 4, 2008)), testified that

IEPA has failed to define "dry weather" or what recreational activity can be attained at different locations or different times along the CAWS. The agency has not demonstrated that it assessed how CSOs and other wet weather discharges prevent attainment of the designated uses along the waterways, during or after a wet weather event.

Id. at 3. Nemura then attached a detailed description of "the impact of CSOs, pump station bypasses, and tributary runoff on bacteria levels in the CAWS," which "shows that the magnitude, frequency and duration of the CSO impact on bacteria levels vary from location to location and from storm to storm. In some instances, these impacts are calculated to last several days after wet weather discharges have ceased." *Id.* at 3-4; *see also* Attachment 2 to Pre-Filed Testimony of Adrienne D. Nemura, attached hereto as Exhibit D. Nemura further explained why it is critical to have wet weather exemption uses due to CSOs: "If no regulatory target is provided to address wet weather conditions, the public will not know when the water is safe for recreation and when it is not, and decisions about appropriate levels of control for sources other than wastewater treatment facilities will be arbitrary." *Id.* at 4.

Because IEPA found that “conditions under wet weather are clearly incompatible with recreational activity,” IEPA should adopt wet weather uses similar to other states. As Nemura testified:

Several states have modified their water quality standards to reflect the challenges associated with attaining uses during wet weather (Freedman, 2007, p. ES-5). Examples include state legislation in Indiana, Maine, and Massachusetts as described in Attachment 3. Indiana allows for a temporary suspension of the recreational uses if CSO discharges are in accordance with an approved long-term control plan and a UAA. Massachusetts allows for a partial use designation for recreational or aquatic life uses with a UAA or a variance. Maine allows for a CSO subcategory where recreational and aquatic life uses may be temporarily suspended. Several UAAs have also been conducted that allow for suspension of recreational uses due to wet weather discharges (Attachment 3).

Id. at 7-8; *see also* Attachment 3 to Pre-Filed Testimony of Adrienne D. Nemura, attached hereto as Exhibit E. Attachment 3 to Nemura’s pre-filed testimony describes the wet weather water quality standards that were set for Indiana, Massachusetts, Maine, the Ohio River Valley Water Sanitation Commission, the City of Indianapolis UAA, the Massachusetts Water Resources Authority, Santa Ana River UAA, California, and Engineered Flood Channels UAA in Ballona Creek, California, to address conditions that trigger CSO and other wet weather flows. *See Ex. E.*

Considering IEPA found that “numerous CSO discharges will continue to produce highly elevated bacterial levels that likely create an unacceptably high health risk for recreational activity during and immediately following these periods . . . [and] the recreational use is not being attained during [wet weather] conditions at any reasonably acceptable risk level,” (*See* IEPA’s Statement of Reasons, at 45), IEPA failed to set uses that account for CSO and other wet weather flows. Instead, even though CSO and other wet weather flows will inevitably occur in the CAWS, IEPA’s proposed recreational use designations during such events will still allow for

incidental contact, including wading and small craft recreational boating. Should the Board accept IEPA's findings that there is an unacceptably high health risk when CSO discharges occur in the CAWS, the Board should remand IEPA's proposed rule so that IEPA includes wet weather recreational use designations similar to Indiana, Maine, and Massachusetts that allow for temporary suspension of recreational uses during wet weather events that trigger CSO and other wet weather flows.

IV. IEPA's proposed recreational use designations fail to account for potential preventative measures being considered for stopping the migration of Asian carp.

IEPA's proposed recreational designated uses also fail to take into account the potential preventative measures that are being considered for stopping the migration of Asian carp, such as implementing and using "kill zones," poisons, electric barriers, intentional lowering of water quality, reducing diversions, and closing navigational locks. *See* documents from <www.asiancarp.org>. Specifically, in the Draft Asian Carp Control Strategy Framework (the "Asian Carp Framework"), a document assembled by the United States Environmental Protection Agency, the United States Coast Guard, the United States Fish & Wildlife Service, and the Illinois Department of Natural Resources, among others, lists possible short- and long-term actions to stop the migration of Asian carp. A copy of the Asian Carp Framework is attached hereto as Exhibit F. As to the short-term actions, the Asian Carp Framework outlined the following, which will directly affect recreational uses in the CAWS:

- "Utilize chemical, netting and other mechanisms in known eDNA priority zones (Cal-Sag Channel, O'Brien Lock and Dam, Wilmette pumping station, and Calumet Harbor)." Ex. F, at ES-2;
- "Ensure Rotenone (a piscicide) supplies and fishing capabilities are adequate for possible responses." *Id.*
- "Deploy more frequent and intense harvesting methods in conjunction with rotenone applications where feasible and coordinate efforts with eDNA sampling to increase likelihood of successful collection." *Id.*

- “Change the manner in which existing CAWS structures, such as locks & dams, sluice gates and pumping stations, are operated in combination with other management actions, to impede the migration of Asian carp into the Great Lakes.” *Id.*
- “In conjunction with continued population suppression, continue to field new methodologies as they become available, such as acoustic bubble barriers or electric barriers, . . .” *Id.* at ES-3.
- “Construct emergency engineering measures to block passage of water and fish between (1) Des Plaines River and CSSC and (2) Illinois and Michigan (I&M) Canal and CSSC.” *Id.*
- “Sustained operations of the current electric dispersal barriers and construction of the new planned electric barrier, both important impediments to the Asian carp expansion in the Great Lakes.” *Id.*

As to the long-term actions, the Asian Carp Framework set forth the following:

- “Efficacy studies to investigate the construction and implementation of additional barriers such as electric, light, and/or bio-acoustic bubble barriers” *Id.*
- “Additional possible rotenone applications where testing suggests Asian carp presence” *Id.*
- “Suppression of Asian carp populations in CAWS and in downstream areas utilizing a variety of methods” *Id.*
- “Development of biological controls similar to those used for lamprey suppression” *Id.*
- “Sustained operations of electric barriers” *Id.*
- “Controlled lock operations using chemical and other means to reduce migration” *Id.* at ES-4.

Further, if the operations of the locks & dams, sluice gates, and pumping stations for the CAWS are significantly altered, as may result from litigation before the United States Supreme Court, the recreational uses of the CAWS would significantly change. Specifically, Richard Lanyon stated in an affidavit before the Supreme Court that “[i]f the District is prohibited from opening its sluice gates at [the Wilmette Pumping Station], [the Chicago River Controlling Works] and the [O’Brien Lock & Dam], it will be unable to take water from the Lake. The

District's inability to do so will result in stagnation in certain reaches of the Chicago River, the Little Calumet River and the North Shore Channel." *See* Affidavit of Richard Lanyon before U.S. Supreme Court, at 14, ¶ 85 (Jan. 4, 2010), attached as Exhibit G. Such a prohibition, if ordered by the Court, would result in numerous changes in the CAWS that would affect recreational uses:

86. Stagnation in the waterways will cause the following: (1) stream velocities decrease to near zero; (2) a substantial loss in recreational use; (3) loss of natural re-aeration causing dominance in the oxygen demand of sediments; (4) loss of dissolved oxygen in the water; and (5) fish avoidance due to low dissolved oxygen.
87. Lack of diversion for navigational purposes will also impact commercial navigation and recreational users of the CAWS. The inability to open sluice gates to maintain proper water levels will result in the water levels to decrease during dry weather and limit the ability of boaters, canoeists and kayakers to utilize the waterways.
88. Low water levels and stagnant conditions will give rise to nuisance odors along the waterways adversely affecting the livability of nearby neighborhoods.

Id. at 14-15. IEPA has not considered any of these detriments to the CAWS that may result from the Asian carp litigation before the Supreme Court, even though low water levels in the CAWS will negatively affect the ability of boaters to launch into the CAWS, will reduce stream velocities, and will create nuisance odors.

Incidental Contact Recreation contemplates activities "such as fishing; commercial boating; small craft recreational boating; and any limited contact associated with shoreline activity such as wading." *See* IEPA's Statement of Reasons, at 25; Proposed 35 Ill. Admin. Code § 301.282. These activities are clearly incompatible with the proposed measures to address the migration of Asian carp. Wading and small craft recreational boating in the CAWS cannot coexist with netting, piscicides, acoustic bubble, light, electric barriers, and changes in the

operations of locks & dams, sluice gates and pumping stations. It is undisputed that IEPA's proposed rule did not account for any of these potential preventative measures that may be imposed to stop the migration of Asian carp. In order to issue appropriate recreational use designations, IEPA needs to consider the Asian carp measures and reassess the proposed use designations. Accordingly, the Board should remand IEPA's proposed rule for further consideration.

Dated: April 15, 2010

**METROPOLITAN WATER RECLAMATION
DISTRICT OF GREATER CHICAGO**

By: /s/ Fredric P. Andes
One of Its Attorneys

Fredric P. Andes
David T. Ballard
BARNES & THORNBURG LLP
One North Wacker Drive
Suite 4400
Chicago, Illinois 60606
(312) 357-1313

Exhibit A

Comparison of the Chicago Area Waterway System (CAWS) and a Natural River

TYPICAL CHICAGO AREA WATERWAY

Deep Draft

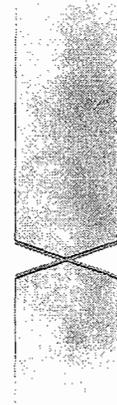
The CAWS was constructed specifically to facilitate urban drainage and commercial barge traffic. The steep sides allow for maximum volume capacity and barge navigation, but provide little habitat for fish.

Lack of Shade

The CAWS receives little shade from trees relative to the overall channel widths, especially in areas of urban or industrial land-use. These conditions encourage algae growth and discourage fish colonization.

Channelized Waterways

Most of the CAWS was constructed or modified to be straight with little variation in width and depth. It was designed specifically for wastewater conveyance and commercial navigation, without accounting for any aquatic life or recreational uses. There is no riffle or pool development.



Controlled Flow

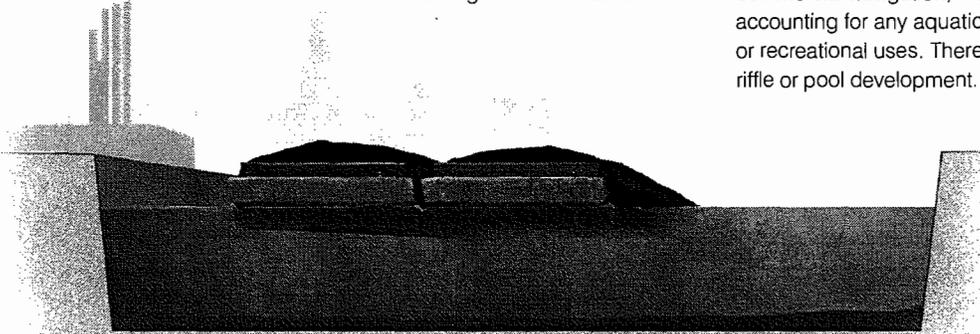
Hydrologic control structures (locks, dams, etc.) adjust water levels in the CAWS based on anticipated rain events to protect public health and prevent flooding of homes and businesses. Most of the time, flow in the CAWS is much slower than that of a natural river of comparable size. During rain events, however, rapid draw-down in water levels can lead to unsafe flow conditions.

Impaired Sediments

Homogenous silty sediments dominate the CAWS. These fine-grain sediments are not conducive to healthy invertebrate or fish communities, and are generally more likely to be associated with organic and heavy metal contaminants.

Barge Traffic

Commercial barges are prevalent in much of the CAWS. In 2006, over 12 million tons of commercial goods were shipped up through Lockport Lock into the Chicago Sanitary and Ship Canal on barges.



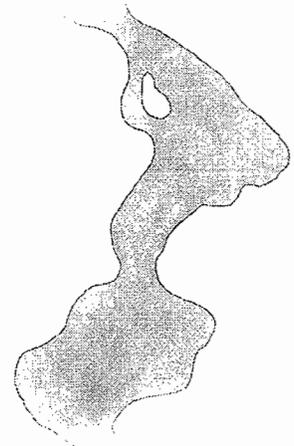
TYPICAL NATURAL RIVER

Gradually Sloping Banks

Natural banks allow light to penetrate to aquatic plants. They also offer a safer exit pathway for recreators.

Canopy Cover

Trees provide shade for aquatic life, keep the temperature down, and limit algae growth.



Sinuous Path

A natural river meanders around curves and has varying depths, widths, and flow velocities. This variety functions to support a diverse assemblage of fish and invertebrates. Riffles increase the amount of oxygen in the water.

Varied Sediment Size

Heterogeneous sediment particles are able to support a diverse variety of aquatic invertebrates. Coarse sediments are more stable and not usually associated with chemical contamination.

Rocks and Aquatic Vegetation

In-stream habitat provides shelter and spawning area for fish, along with substrate for aquatic insects.

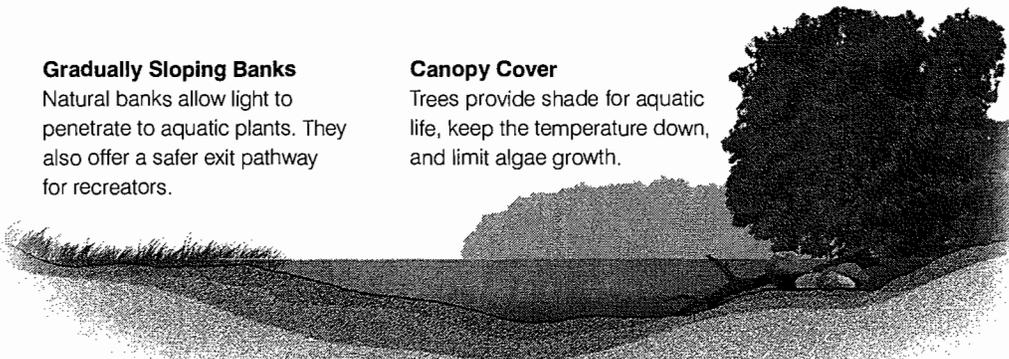
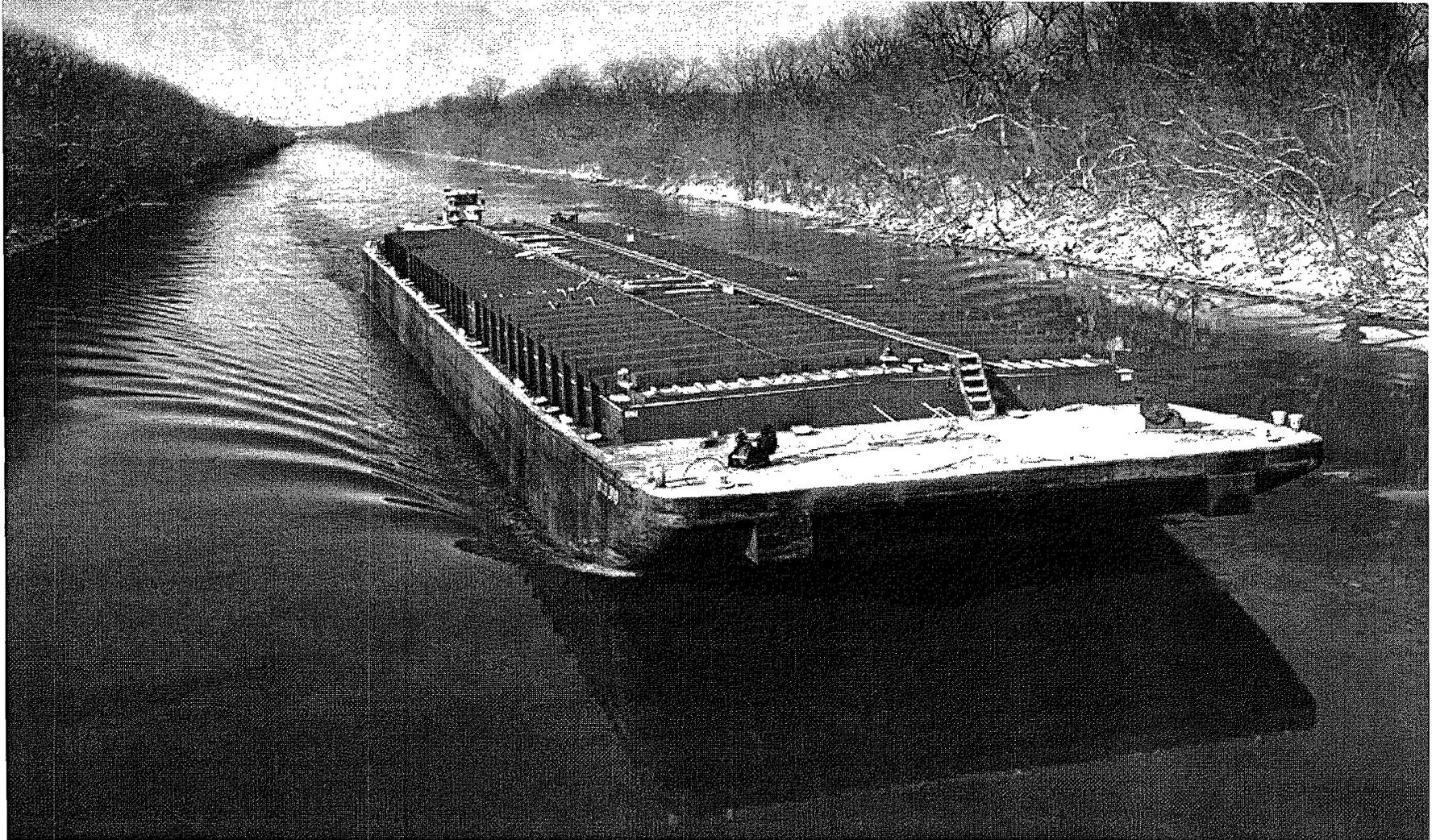


Exhibit B



Barge on the Calumet-Sag Channel looking west from 104th Street Bridge (Exhibit 66 on Board docket)



Barge on the Chicago Sanitary and Ship Canal in front of McCook Reservoir (under construction)



Attachment 3: Barge on Calumet-Sag Channel looking East from 104th Avenue Bridge.

Exhibit C

Attachments

Attachment 1. Looking north at junction of Calumet-Sag Channel (right foreground) with the Chicago Sanitary and Ship Canal (left background). Opening to Illinois and Michigan Canal visible to the left of the first barge on the Calumet-Sag Channel).

Attachment 2. Barge traffic on Chicago Sanitary and Ship Canal. TARP reservoir under construction. Des Plaines River is visible on the other side of the highway.

Attachment 3. Barge on Calumet-Sag Channel looking East from 104th Avenue Bridge.

Attachment 4. Bubbly Creek, view looking north from 35th Street.

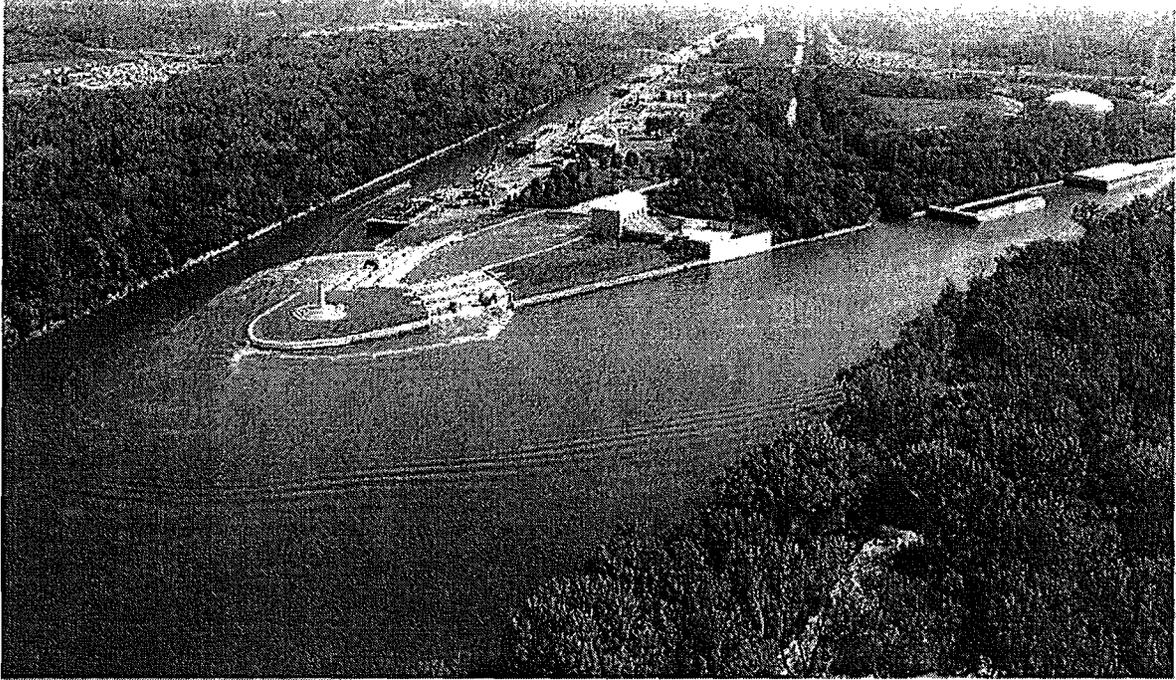
Attachment 5. Chicago River, view looking West from the Wells St. Bridge.

References

<http://www.iwr.usace.army.mil/ndc/lpms/lock2006web.HTM>

www.iwr.usace.army.mil/ndc/wsc/wsc.htm

Attachment 1



Attachment 1, Looking north at junction of the Calumet-Sag Channel (right foreground) with the Chicago Sanitary and Ship Canal (left background). Opening to Illinois and Michigan Canal visible to the left of the first barge on the Calumet-Sag Channel).

Attachment 2



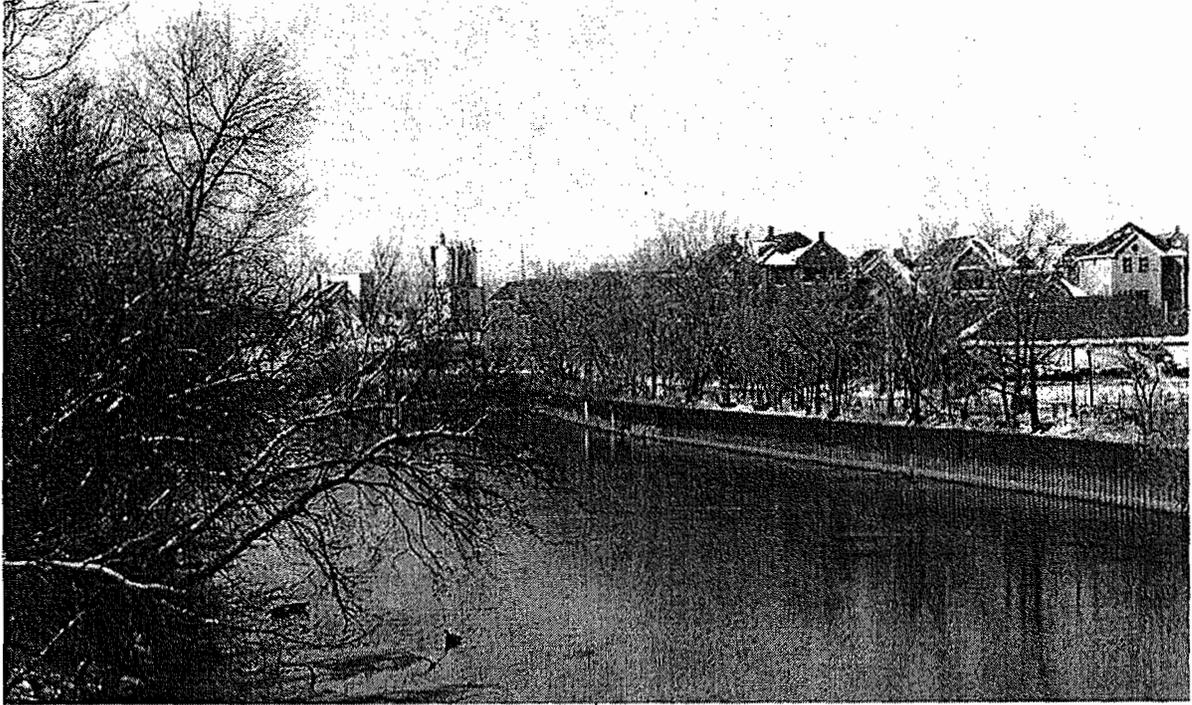
Attachment 2 Barge traffic on Chicago Sanitary and Ship Canal. TARP reservoir, under construction. DesPlaines River is visible on the other side of the highway.

Attachment 3



Attachment 3: Barge on Calumet-Sag Channel looking East from 104th Avenue Bridge.

Attachment 4



Attachment 4. Bubbly Creek, view looking north from 35th Street.

Attachment 5



Attachment 5. Chicago River, view looking West from the Wells St. Bridge.

Exhibit D

BEFORE THE ILLINOIS POLLUTION CONTROL BOARD

IN THE MATTER OF:)	
)	
WATER QUALITY STANDARDS AND)	
EFFLUENT LIMITATIONS FOR THE)	R08-9
CHICAGO AREA WATERWAY SYSTEM)	(Rulemaking - Water)
AND THE LOWER DES PLAINES RIVER:)	
PROPOSED AMENDMENTS TO 35 ILL.)	
Adm. Code Parts 301, 302, 303 and 304)	

ATTACHMENT 2 TO

PRE-FILED TESTIMONY OF ADRIENNE D. NEMURA

This attachment provides a description of the impact of combined sewer overflows (CSOs), pump station bypasses, and tributary runoff on bacteria levels in the Chicago Area Waterway System (CAWS). The information presents fecal coliform results of the District's water quality model for a simulation from July 12, 2001 to November 10, 2001 for the following scenarios: (1) Existing Conditions with assumed CSO and pump station bypass concentrations of 1,100,000 colony forming units per 100 milliliters (cfu/100ml); (2) Existing Conditions with assumed CSO and pump station bypass concentrations of 170,000 cfu/100ml; (3) Elimination of bacteria in the CSO and pump station bypass discharges (concentration set at 0 cfu/100ml); and (4) Disinfection of the Water Reclamation Plants (WRPs). For the WRP disinfection scenario, the following concentrations were assumed: 1,030 cfu/100ml at the North Side and Calumet WRPs and 2,740 cfu/100ml at the Stickney WRP. These scenarios were conducted in the summer of 2005 for the North Side WRP Facility Planning effort.

In summary, the results presented in this attachment (based on two representative storms) show that:

Adrienne D. Nemura, Attachment 2

- The effect of CSO and pump station discharges can increase in-stream fecal coliform concentrations by 15,000 to 230,000 cfu/100ml depending on the discharge concentration and location;
- The effect of these discharges can persist for at least three to five days depending on location; and
- These effects will remain even if disinfection is provided at the WRPs.

Model results for these scenarios are provided for eight representative locations shown in Figure 1. These locations include three locations (Addison Street, Fullerton Avenue, and Kinzie Street) on the North Branch Chicago River (NBCR); Halsted Street on the South Branch Chicago River (SBCR); the B&O Railroad Bridge on the Chicago Sanitary Ship Canal (CSSC); Halsted Street on the Little Calumet River (LCR); and two locations (Cicero Avenue, and 104th Avenue) on the Calumet-Sag Channel (CSC). Results are presented for two CSO events shown in Table 1: July 25, 2001 and August 2-3, 2001. These results are representative of the range of the 15 CSO events for the portions of 2001 and 2002 that were modeled.

Table 1. Representative CSO Events for Model Simulation Periods in 2001 and 2002

Date(s) of CSO Event	Total Gravity CSO (million gallons)	Total Pump Station Bypass (million gallons)	Total Discharge (million gallons)
July 25, 2001	585	963	1,548
August 2-3, 2001	3,136	1,118	4,254
Range for Portions of 2001 and 2002 that were Modeled	0 to 11,417	0 to 2,347	409 to 12,982

Adrienne D. Nemura, Attachment 2

Figures 2 through 9 provide plots of the fecal coliform levels the eight locations for July 24 to August 10, 2001 which includes the two CSO events in Table 1. Results are presented for existing conditions with the CSO and pump station discharge concentrations set at 1,100,000 cfu/100ml (green line) and 170,000 cfu/100 ml (blue line). This represents the hypothetical range of CSO impacts as documented by Marquette University (Manache and Melching, 2005).

Bacteria concentrations in these discharges are likely to vary from event to event. The dashed brown line shows the effect of zeroing out the CSO and pump station discharge concentrations. This line represents lower concentrations than would be calculated with a scenario of actual treatment or elimination of CSO because the associated "clean" flow from the CSO discharges is still entering the CAWS in the simulation and diluting the calculated in-stream concentrations.

The effects of the bacteria loads from the North Side WRP, North Branch Pumping Station, and the NBCR tributary (which includes storm water runoff and CSOs) can be seen at Addison Road. If the assumed concentrations for the CSOs and pump station discharges are 1,100,000 cfu/100ml, the maximum difference in in-stream concentration with the scenario where the fecal coliform is zero is approximately 100,000 cfu/100ml for the first event and 230,000 cfu/100ml for the second event. If the assumed concentrations for the CSOs and pump station discharges are 170,000 cfu/100ml, then the maximum in-stream difference is reduced to 16,000 cfu/100ml and 35,000 cfu/100ml respectively. The effect of the wet weather discharges lasts approximately three days for the first event and four days for the second event.

The effect of wet weather discharges is similar, and more pronounced, at Fullerton Avenue and Kinzie Street on the NBCR (Figures 3 and 4). The higher peak concentrations in these figures show the effect of the additional bacteria load from the CSOs located upstream of

Adrienne D. Nemura, Attachment 2

these locations. The effect of the wet weather discharges lasts approximately three to five days at these locations.

Figure 5 shows the effect of the CSO and pump station discharges at Halsted Street on the SBCR. Again, the higher peak concentrations and longer duration of the wet weather impacts resulting from additional CSO is shown. The second event in Figure 5 also shows the effect of flow reversals caused by the Racine Avenue Pump Station discharge where in-stream bacteria concentrations increase on August 7 and 8, 2001. A similar effect is seen at the B&O Railroad Bridge on the CSSC, as shown in Figure 6.

Figure 7 shows the effect of the CSOs, Calumet WRP, 125th Street Pump Station, and other wet weather discharges on in-stream concentrations at Halsted Street on the Little Calumet River. For the first event, the difference between the existing situation (with an assumed discharge concentration of 1,100,000 cfu/100ml in the CSOs and pump stations) is 100,000 cfu/100ml and 150,000 cfu/100ml for the second event. If the assumed discharge concentration is 170,000 cfu/100ml, the impact of the CSOs and pump station discharges on in-stream concentrations is 15,000 cfu/100ml and 23,000 cfu/100ml respectively. The duration of the wet weather impacts at this location is four to five days.

As shown in Figures 8 and 9, the wet weather effects become more pronounced in the CSC both in terms of peak concentrations and duration of impact of the wet weather discharges. This is because of increased wet weather loads along the CSC and longer travel times.

Adrienne D. Nemura, Attachment 2

Figure 2. Comparison of Fecal Coliform Levels at Addison Road, NBCR for Existing Conditions and Elimination of CSO/Pump Station Bacteria Concentration (2001)

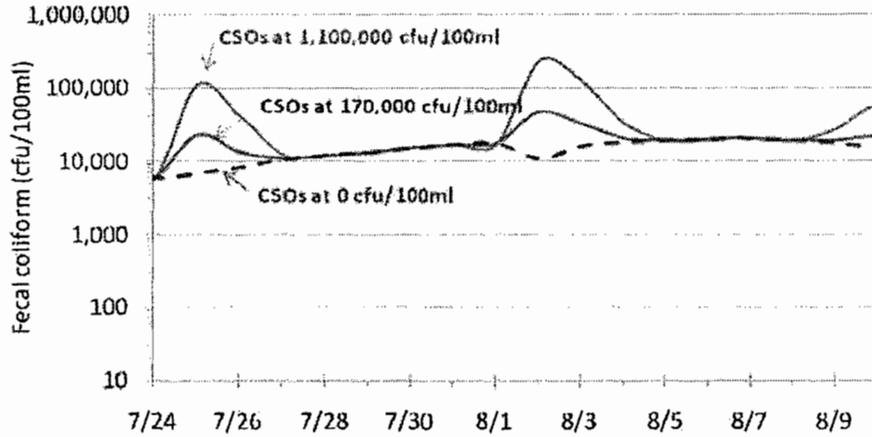


Figure 3. Comparison of Fecal Coliform Levels at Fullerton Avenue, NBCR for Existing Conditions and Elimination of CSO/Pump Station Bacteria Concentration (2001)

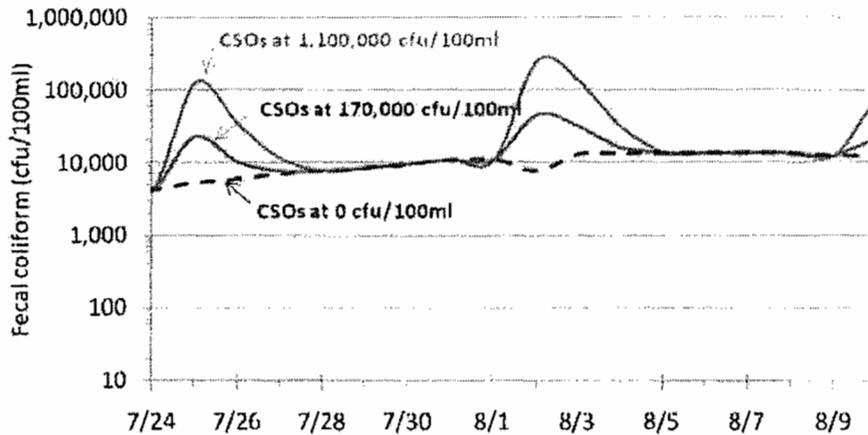
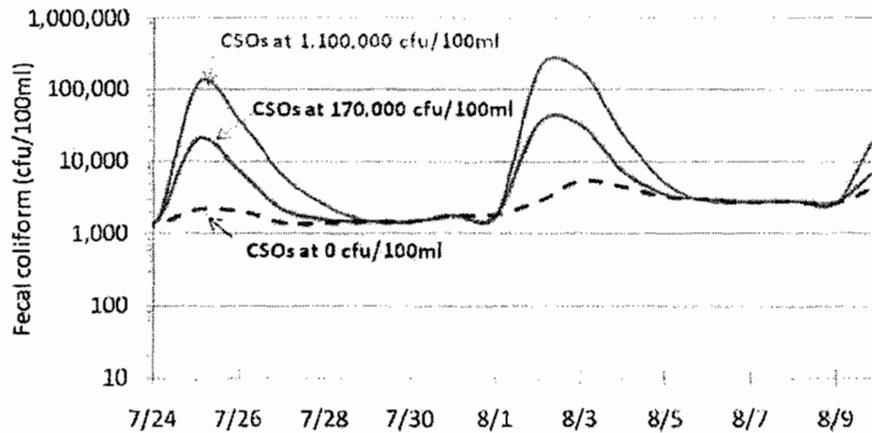


Figure 4. Comparison of Fecal Coliform Levels at Kinzie Street, NBCR for Existing Conditions and Elimination of CSO/Pump Station Bacteria Concentration (2001)



Adrienne D. Nemura, Attachment 2

Figure 5. Comparison of Fecal Coliform Levels at Halsted Street, SBCR for Existing Conditions and Elimination of CSO/Pump Station Bacteria Concentration (2001)

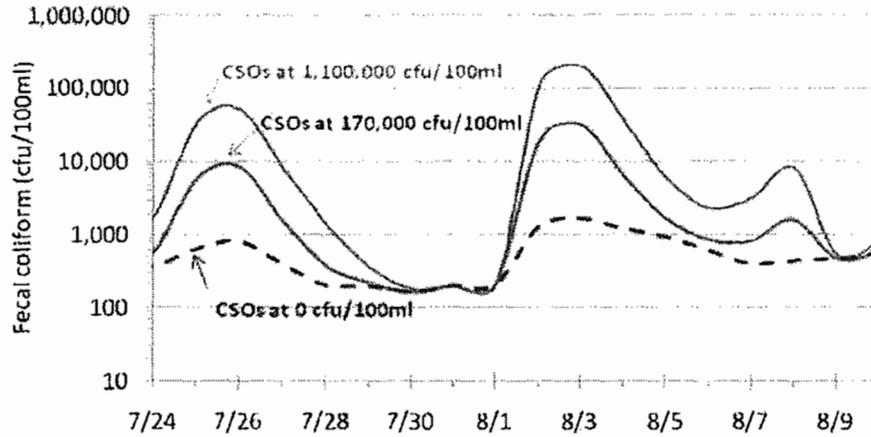


Figure 6. Comparison of Fecal Coliform Levels at B&O Railroad Bridge, CSSC for Existing Conditions and Elimination of CSO/Pump Station Bacteria Concentration (2001)

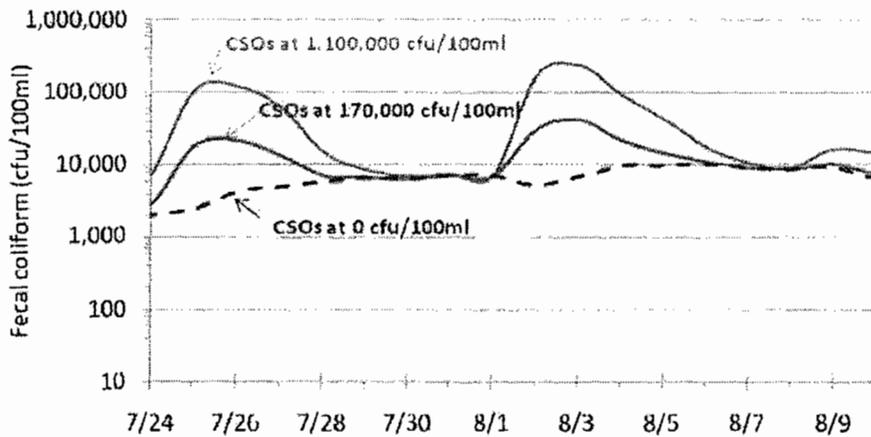
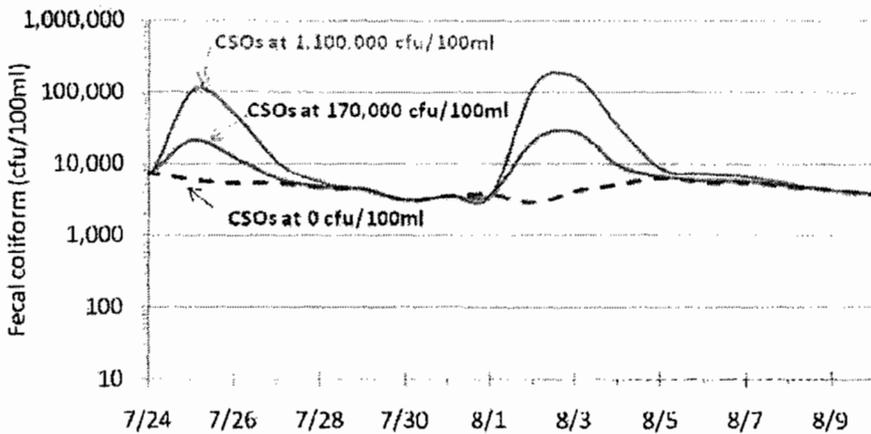


Figure 7. Comparison of Fecal Coliform Levels at Halsted Street, LCR for Existing Conditions and Elimination of CSO/Pump Station Bacteria Concentration (2001)



Adrienne D. Nemura, Attachment 2

Figure 8. Comparison of Fecal Coliform Levels at Cicero Avenue, CSC for Existing Conditions and Elimination of CSO/Pump Station Bacteria Concentration (2001)

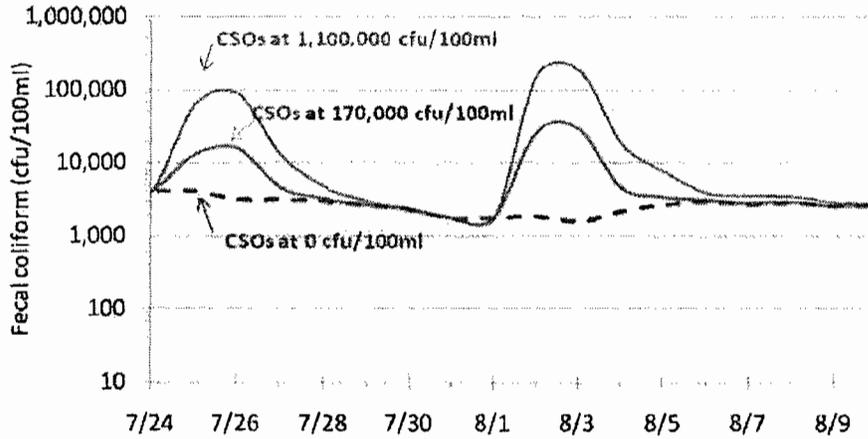
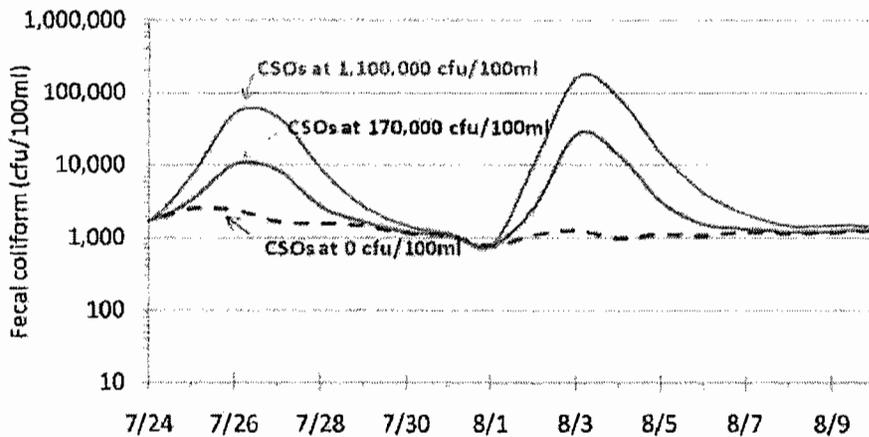


Figure 9. Comparison of Fecal Coliform Levels at 104th Avenue, CSC for Existing Conditions and Elimination of CSO/Pump Station Bacteria Concentration (2001)



Adrienne D. Nemura, Attachment 2

Figures 10 to 17 provide a comparison of the existing condition (with an assumed CSO and pump station discharge concentration of 170,000 cfu/100ml) to a scenario where the WRP effluents are disinfected. Along the NBCR (Addison Street, Fullerton Avenue, and Kinzie Street) there is a slight reduction in peak concentrations during the wet weather events due to disinfection at the North Side WRP. Concentrations, however, are still in excess of 10,000 cfu/100ml. At the other locations, WRP disinfection does not reduce the peak concentrations during the wet weather events.

Figure 10. Wet Weather Impacts at Addison Road, NBCR (2001)

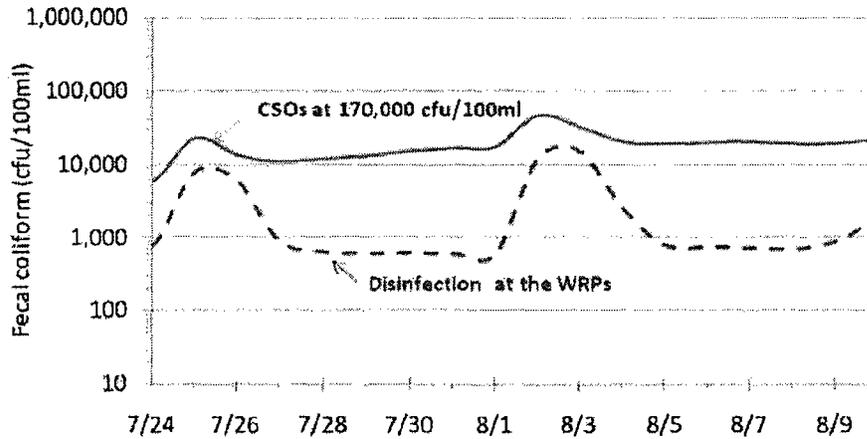
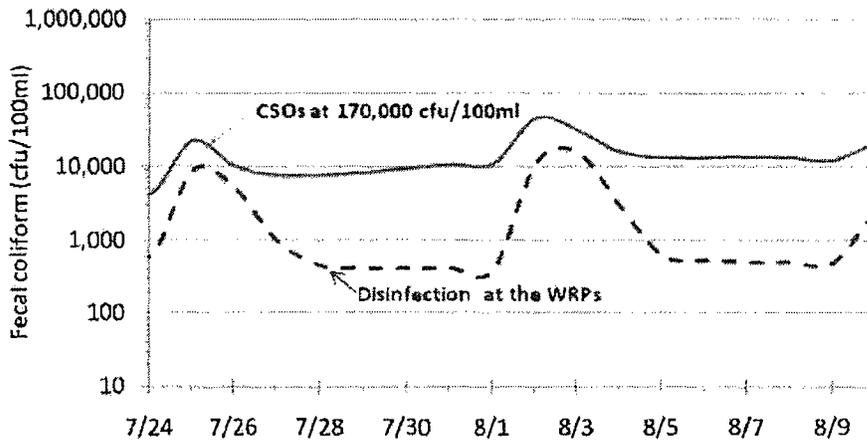


Figure 11. Wet Weather Impacts at Fullerton Avenue, NBCR (2001)



Adrienne D. Nemura, Attachment 2

Figure 12. Wet Weather Impacts at Kinzie Street, NBCR (2001)

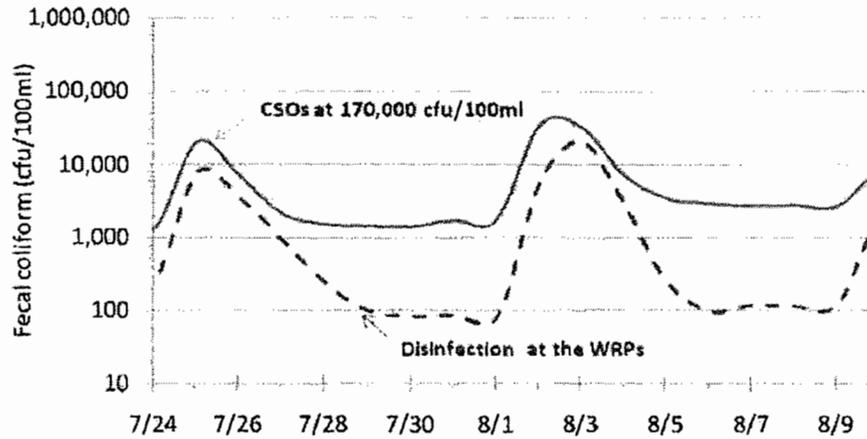


Figure 13. Wet Weather Impacts at Halsted Street, SBCR (2001)

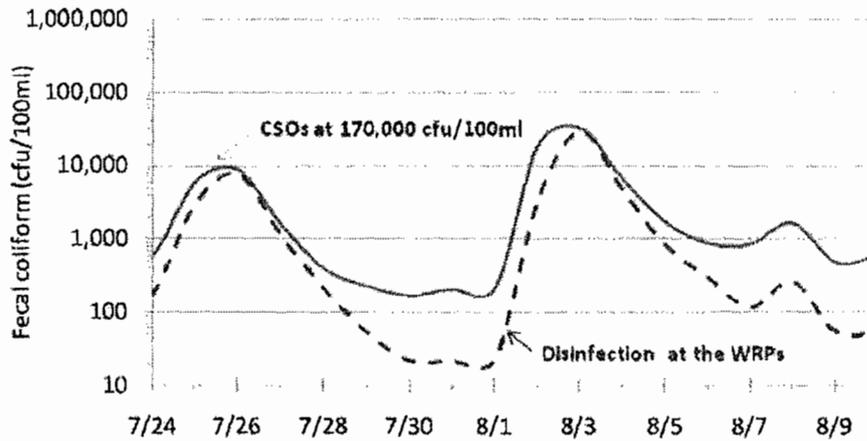
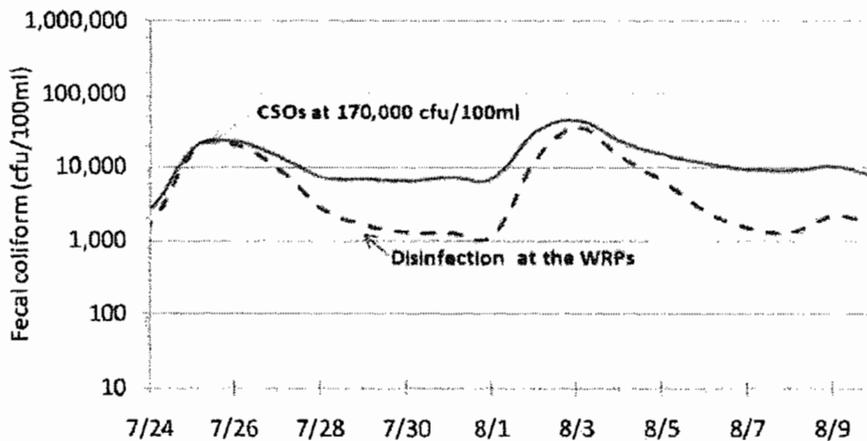


Figure 14. Wet Weather Impacts at B&O Railroad Bridge, CSSC (2001)



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Figure 15. Wet Weather Impacts at Halsted Street, LCR (2001)

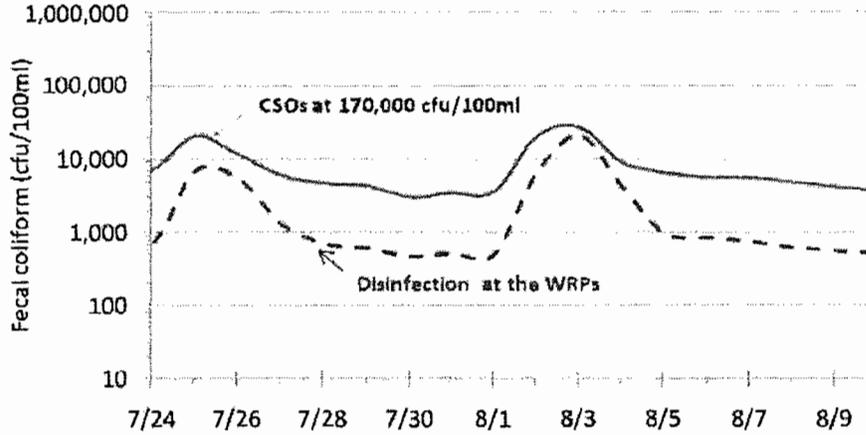


Figure 16. Wet Weather Impacts at Cicero Avenue, CSC (2001)

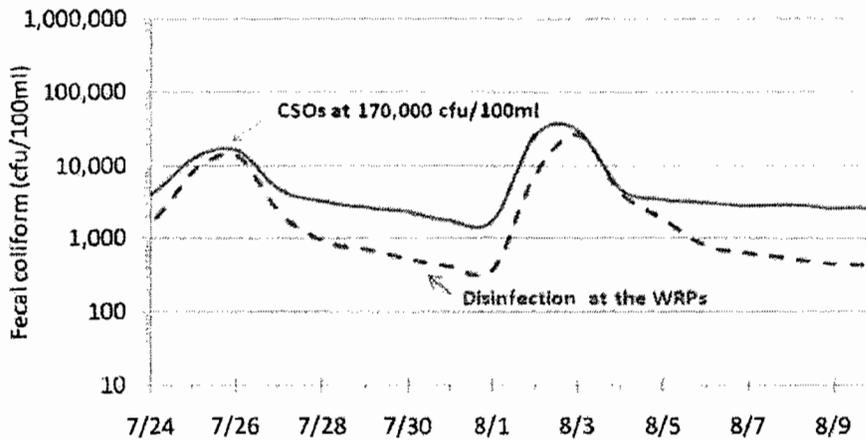
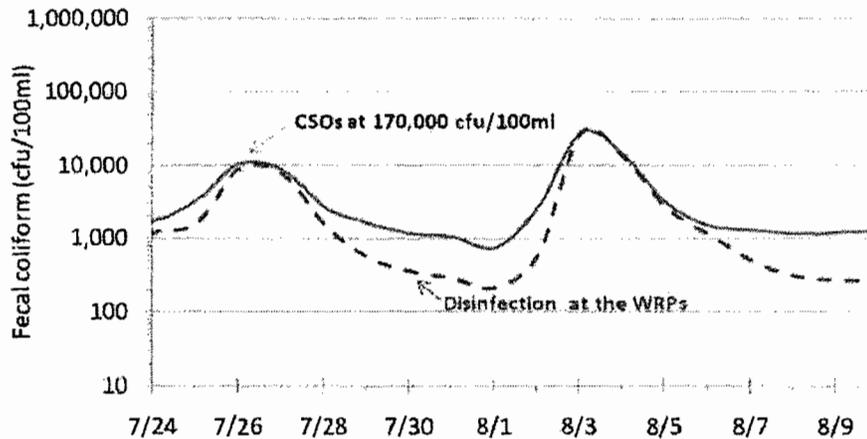


Figure 17. Wet Weather Impacts at 104th Avenue, CSC (2001)



Adrienne D. Nemura, Attachment 2

REFERENCES

Manache, G. and Melching, C.S. (2005) Simulation of fecal coliform concentrations in the Chicago Waterway System under unsteady flow conditions, Technical Report 16, Institute of Urban Environmental Risk Management, Marquette University, Milwaukee, WI, and Metropolitan Water Reclamation District of Greater Chicago, Department of Research and Development Report No. 2005-9, Chicago, IL.