In The
# Supreme Court of the United States
October Term, 1966

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|---|---|
| STATES OF WISCONSIN, MINNESOTA, OHIO, AND PENNSYLVANIA, *Complainants,* *v.* STATE OF ILLINOIS AND THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO, *Defendants*, UNITED STATES OF AMERICA, *Intervenor*. | No. 1 Original |
| STATE OF MICHIGAN, *Complainant,* *v.* STATE OF ILLINOIS AND THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO, *Defendants*, UNITED STATES OF AMERICA, *Intervenor*. | No. 2 Original |
| STATE OF NEW YORK, *Complainant,* *v.* STATE OF ILLINOIS AND THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO, *Defendants*, UNITED STATES OF AMERICA, *Intervenor*. | No. 3 Original |

APPENDIX

TO

RENEWED MOTION FOR PRELIMINARY INJUNCTION

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**U.S. Department of Justice**

Office of the Solicitor General

*Washington, D.C. 20530*

January 19, 2010

Honorable William K. Suter
Clerk
Supreme Court of the United States
Washington, D.C. 20543

Re: Wisconsin v. Illinois, Nos. 1, 2 and 3, Original

Dear Mr. Suter:

The government filed its response to the State of Michigan's motion for a preliminary injunction on January 5, 2010. The U.S. Army Corps of Engineers has informed us that, late in the day on Friday, January 15, while the motion was still pending before this Court, the Corps learned that the ongoing testing of samples from the Chicago Area Waterway System has yielded two additional positive eDNA results for silver carp, both lakeside of the O'Brien Lock. These new findings are summarized in the attached press release. The federal agencies involved in the Asian Carp Regional Coordinating Committee have just briefed representatives from the Great Lakes States (including Michigan and the other States supporting its motion) on these findings, and will shortly be making them public in the attached press release.

This Office learned of these further developments at 8:00 a.m. today (Tuesday morning). As we prepared to inform the Court about them, the Court issued its order denying the preliminary-injunction motion. We expect that any further developments will be addressed in the government's response to Michigan's motion to reopen, which is now due February 19.

Sincerely,

Elena Kagan
Solicitor General

cc: See Attached Service List

# NEWS RELEASE

**U.S. ARMY CORPS OF ENGINEERS** **BUILDING STRONG®**

For Immediate Release:
January 19, 2010

CONTACTS:
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**Agencies accelerate action in response to new test results suggesting Asian carp presence in Calumet Harbor**

(Chicago) – The multi-agency Asian Carp Regional Coordinating Committee (RCC) has received information from the University of Notre Dame about one positive environmental DNA result for silver carp in Calumet Harbor approximately one-half mile north of the Calumet River and one more at a location in the Calumet River north of O'Brien Lock. These samples were collected on December 8 and recently processed. Two previous tests of multiple water samples from this area were negative.

Dr. David Lodge, director of the eDNA project at the University of Notre Dame, said that only a portion of the samples collected have been analyzed, but he cautioned that there is no known correlation between the number of positive samples and the quantity of Asian carp. "Our current eDNA process provides indications of likely presence, but it does not yet provide information about Asian carp quantity that may be present, age, size, how they got there or how long they may have been there," said Lodge. Lodge further iterated that if Asian carp are present it is vital to keep the barriers operating in a continued defense. "It is important to keep additional fish from migrating into the lake to lower the possibility that a self-sustaining population will result," said Lodge.

"Clearly this is not good news," said Major General John Peabody, Commanding General of the U.S. Army Corps of Engineers' Great Lakes and Ohio River Division. "But eDNA technology provides the advanced warning of the possible presence of Asian carp, so that all agencies supporting the RCC can focus their efforts and resources to optimal effect. The Corps of Engineers will continue to collaborate with our partners to urgently execute already planned actions, and further develop other multi-agency measures that will defeat this threat to the Great Lakes," said Peabody.

The Regional Coordinating Committee (RCC) is comprised largely of agencies that participated in last month's successful "rapid response" action. It is now working to respond to the most recent eDNA results, including consideration of:

- Rapid deployment of intensive netting, including electrofishing and specialized netting alternatives, in the area near O'Brien Lock to reduce the possibility that a self-sustaining population might be established.

-more-

- Continued research into scientific advances to apply detection systems that will allow participating agencies to pinpoint the exact location and numbers of carp. Current eDNA testing does not yet provide this information.

- Planning to develop the concept of how existing structures, such as locks, could be operated in a way that would minimize the risk of carp migration while the U.S. Coast Guard, local public safety and emergency responders, needed cargo, and other traffic transits the waterway;

- Expedited construction of new electric dispersal Barrier IIB to complement existing barriers, and severance of culverts and other bypass routes in the event of flooding, that might allow carp entry from adjacent waterways. Interim obstructions will be completed this year;

- Accelerate development of possible biological controls for Asian carp; and

- Continued efforts to assess "ecological separation" as a long-term strategy that blocks invasive species from transferring between the Great Lakes and Mississippi River watersheds while still allowing cargo and "clean traffic" to pass, leveraging the Corps of Engineers' Great Lakes and Mississippi River Interbasin Transfer Study.

"The IDNR is committed to working with all of our partners in the coming weeks and months by using conventional sampling methods in the Chicago waterway system and near shore areas of Lake Michigan to help determine locations and abundance of Asian carp and try to confirm this new Environmental DNA evidence," said John Rogner, Illinois Department of Natural Resources Assistant Director.

Participating agencies will continue using eDNA and other monitoring methods to provide early warning about possible Asian carp presence. The cooler water during the winter months reduces the likelihood of Asian carp detection because of reduced algae and other food sources, and fish tendency to slow down their activity and reside in deeper waters. With decreased metabolism Asian carp are less active and, therefore, harder to detect. Still, participating agencies continue to view their top priority as keeping Asian carp from becoming established in Lake Michigan.

"From what we have seen in other parts of the country, Asian carp could out-compete our native, sport and commercial fish in southern Lake Michigan," said Charlie Wooley, Deputy Regional Director, U.S. Fish and Wildlife Service. "We call them an aquatic vacuum cleaner because they filter important food resources out of the water and turn it into carp biomass," said Mr. Wooley.

"The Service remains committed to supporting our partners by assisting in intensified field monitoring and focused fish sampling, exploring new methods of Asian carp control, and engaging community stakeholders."

-more-

"Defeating Asian carp will require working together," said Cameron Davis, senior advisor to U.S. Environmental Protection Agency Administrator Lisa P. Jackson on Great Lakes issues. "We have a strong, committed team in place that acted collaboratively and successfully during December's rapid response action. That's what it will take now."

"The Great Lakes Fishery Commission has more than 50 years experience controlling the invasive sea lamprey" said Dr. Michael Hansen, chair of the commission. "The commission fully recognizes the necessity to prevent Asian carp from establishing populations in the Great Lakes and strongly supports the efforts of the participating agencies to this end."

Additional information about the recent sampling efforts is available on the Army Corps of Engineers' website at www.lrc.usace.army.mil.

Additional information about multi-agency efforts is at www.asiancarp.org/rapidresponse.

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# Asian carp Update

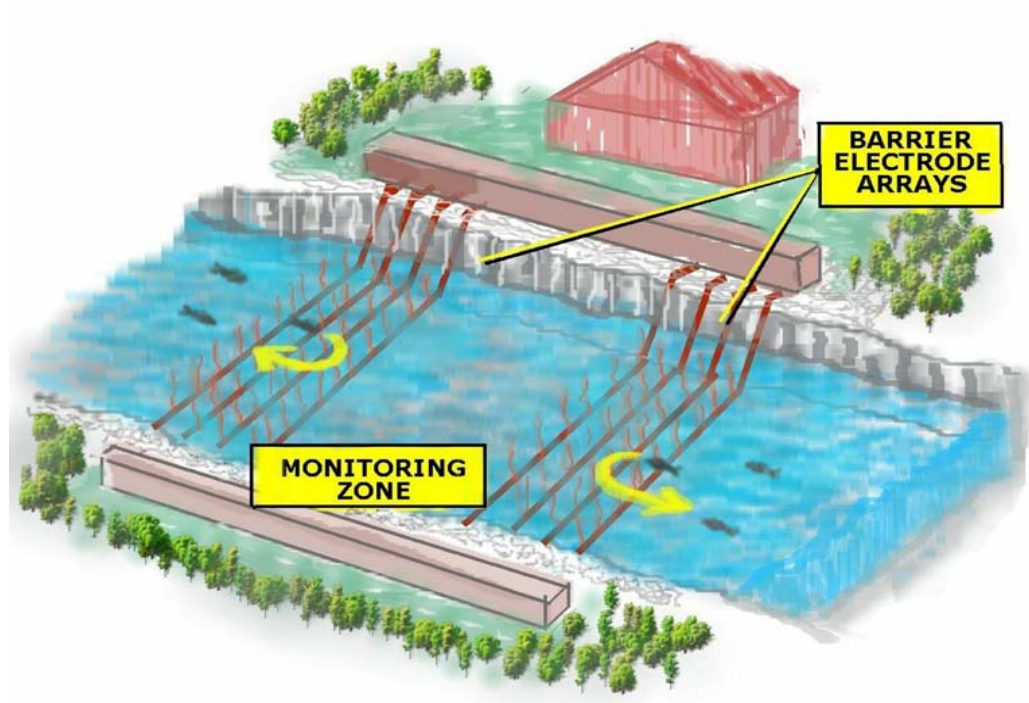
USEPA – Mr. Cam Davis

USACE – MG John Peabody

USFWS – Mr. Charlie Wooley

19 JAN 2010

Silver Carp




United States Coast Guard
U.S. Department of Homeland Security

# Briefing Purpose & Outline

Purpose: Highlight recent Asian carp monitoring efforts and multi-agency migration prevention strategies.

- Multi-Agency Collaboration
- Asian carp Monitoring Update
- Multi-Agency Response Actions
- USACE Strategy for Deterring Asian carp migration

Bighead Carp Recovered from Lockport Pool 3 Dec 2009

# Rapid Response Multi-Agency Collaboration

Functional Responsibility Matrix – Rapid Response

| Rapid Response Functions \ Response Section/ Agency | City of Chicago | IEPA | IDNR | Law Enforcement Agencies | MWRD | USACE | USCG | USEPA | USFWS | USDA-APHIS | Supporting Agencies** |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Incident Management | | | ● | | | | | ○ | ○ | ○ | |
| Operations | ○ | ○ | ● | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| Sites (Selection, Activation, Setup, Management) | | | ● | | ● | | | | | | |
| Communications | ○ | ○ | ● | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| Waterway Shutdown | | | | | | ○ | ● | | | | |
| Lock and Dam Closure | | | | | | ● | ○ | | | | |
| Site Staffing | ○ | | ● | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| EOC Staffing | ○ | | ● | | | | | ○ | | | |
| Liaison | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ● | ○ | ○ | ○ |
| Site Health and Safety | | ● | ○ | | | | | | | | |
| Public Information and Media | ○ | | ● | | | ○ | ○ | ○ | | | |
| Site Security | | | | ● | ● | | ● | | | | |
| Resource Management | ○ | ○ | ● | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| Science Advisory/Risk Analysis | | | ○ | | | | | | ● | | |
| Offsite Environmental Impacts | | ○ | ○ | | | | | ○ | ● | | |
| Cost/Time Tracking | ○ | ○ | ● | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| Procurement | ○ | ○ | ● | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |

* Does not factor in weather or other unexpected event that may alter or add additional responsibilities to this rapid response.

** Supporting agencies include GLFC and multiple states fisheries management agencies and Canadian provinces.

EOC Emergency Operations Center

Legend: ○ = Support, Coordination, and Involvement ● = Primary Responsibility

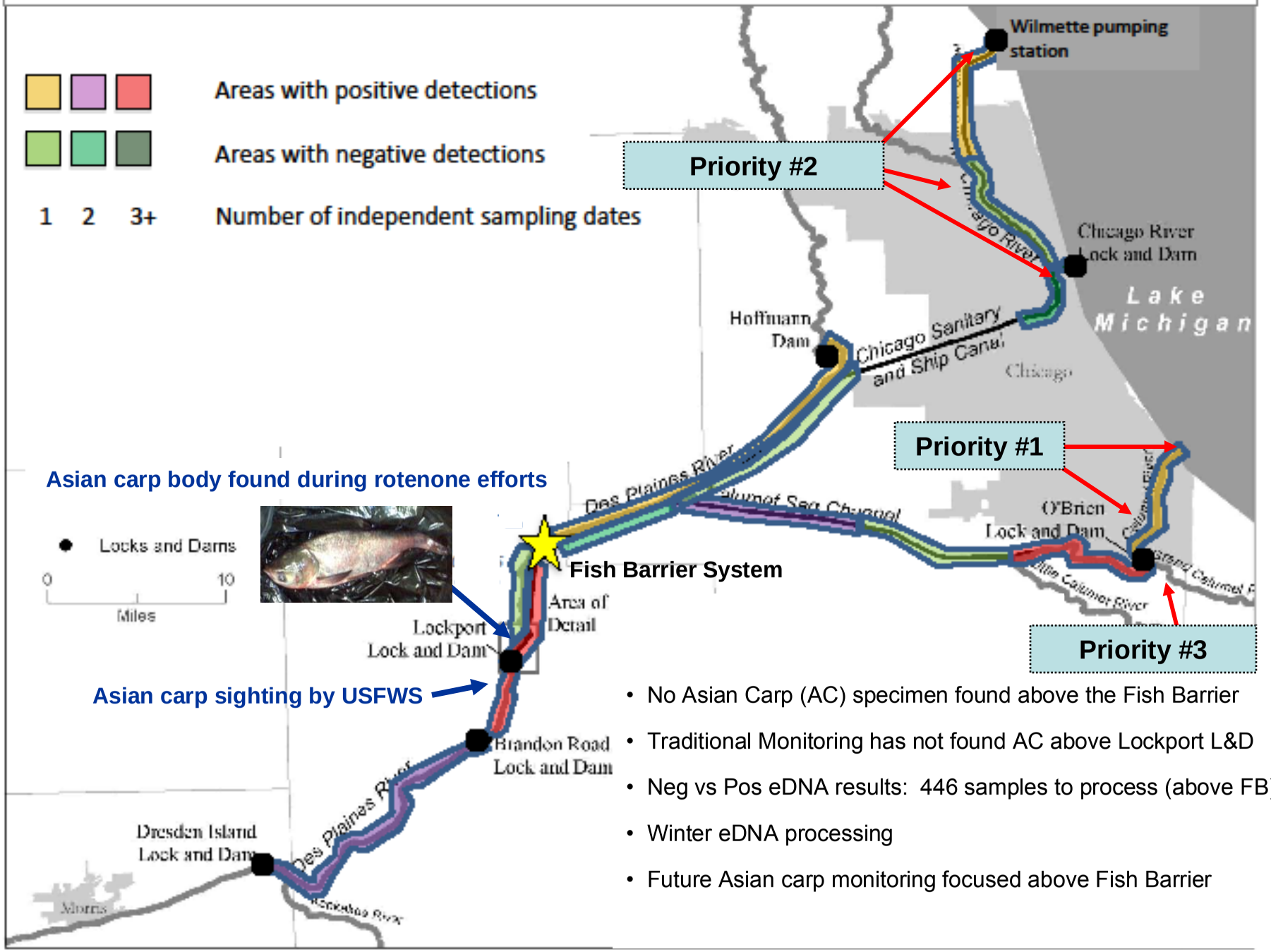
**Primary Rapid Response Planning Organizations**

- IL Department of Natural Resources (IDNR)
- United State Coast Guard (USCG)
- Metropolitan Water Reclamation District (MWRD)
- US Army Corps of Engineers (USACE)
- US Environmental Protection Agency (USEPA)
- US Fish and Wildlife Service (USFWS)

**Supporting Rapid Response Planning Organizations**

- Great Lakes Fishery Commission (GLFC)
- City of Chicago
- International Joint Commission (IJC)
- Midwest Generation, LLC
- Affected Counties
- Other Support State and Provincial Agencies

## Fig. 1 Environmental DNA results as of January 15, 2010.




- No Asian Carp (AC) specimen found above the Fish Barrier
- Traditional Monitoring has not found AC above Lockport L&D
- Neg vs Pos eDNA results: 446 samples to process (above FB)
- Winter eDNA processing
- Future Asian carp monitoring focused above Fish Barrier

# Asian Carp Monitoring Efforts

**Electrofishing & Netting**

USACE & USFWS & IDNR

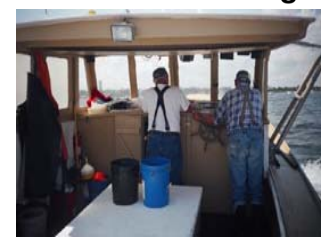
+

**eDNA**

USACE – Notre Dame

+

**Intensive Netting**



IDNR – Contract

## eDNA Validation Efforts

**~55,000 lbs Common Fish**

← **Recent Rapid Response (Piscicide)** →

**One Bighead Carp**

### Near Term (Phases I-III)

- **Phase I = Field Tests (Fishing, Rotenone & Netting)**
- **Phase II = Lab QC completed by EPA (Dec 2009)**
- **Phase III = Lab Testing (ERDC): Feb 2010**
  - Confirm eDNA accuracy to detect presence
  - Test whether eDNA detects common carp/other

### Longer Term (Phase IV)

- **Comprehensive Field Experiment (ERDC)**
  - Will take several months (target Jun 2010)
  - Study will consider presence & population abundance

# Comprehensive Plan to Address Asian Carp Migration

**Short-Term (before warm weather):**

- Continue monitoring where winter conditions permits **(All)**

- Process on hand eDNA samples above Fish Barrier

- Finalize plans to prepare for near term efforts **(All)**

**Near – Term (thru end of 2010):**

- Track leading edge of movement (**USACE**, FWS, IDNR)

- Prevent migration with barriers and other operational changes - **(USACE)** & rotenone **(IDNR)** as needed

- Prevent fish bypass from flanking waterways (Des Plaines/I&M) (**USACE**)

- Coordinate investigation of risk posed by towboat and barge ballast/bilge water (**USCG**, FWS)

- Investigate new technologies/controls (**DOI**)

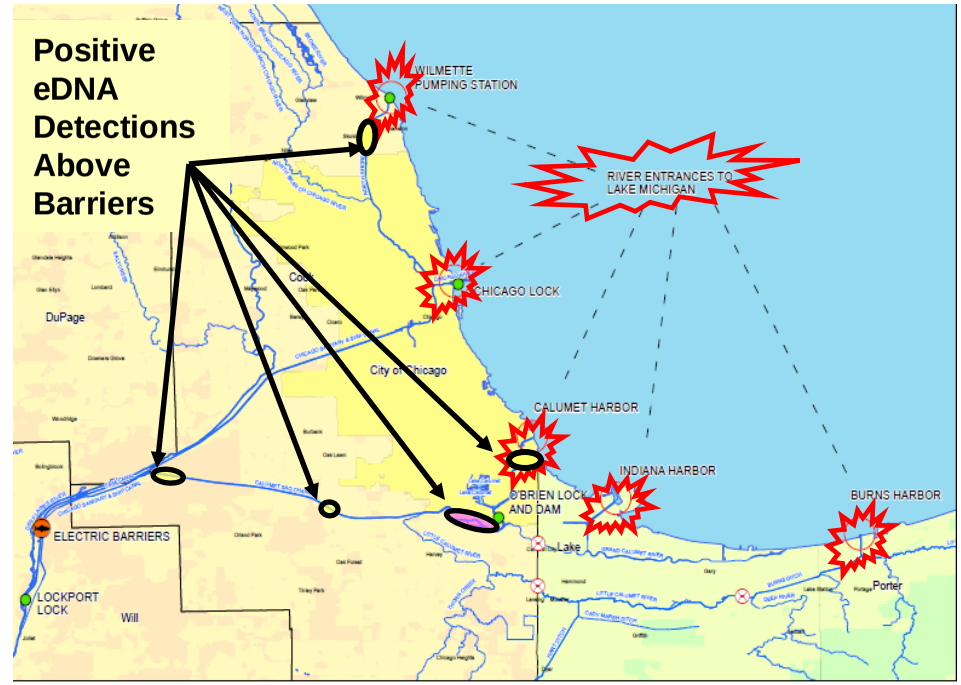
- Nest State AIS management plans (**USFWS**)

- Assessing new biological/toxicant controls (**USGS**)

- Initiating public/stakeholder prevention outreach program (**USFWS**)

- Funding to support actions including technology development (**USEPA**)

Multiple Agencies Working Within Full Authorities to Fulfill Common Goal




**Long-Term (2011 and beyond):**

- Complete Interim Interbasin study/EIS focusing on Chicago-area access points (**USACE**)

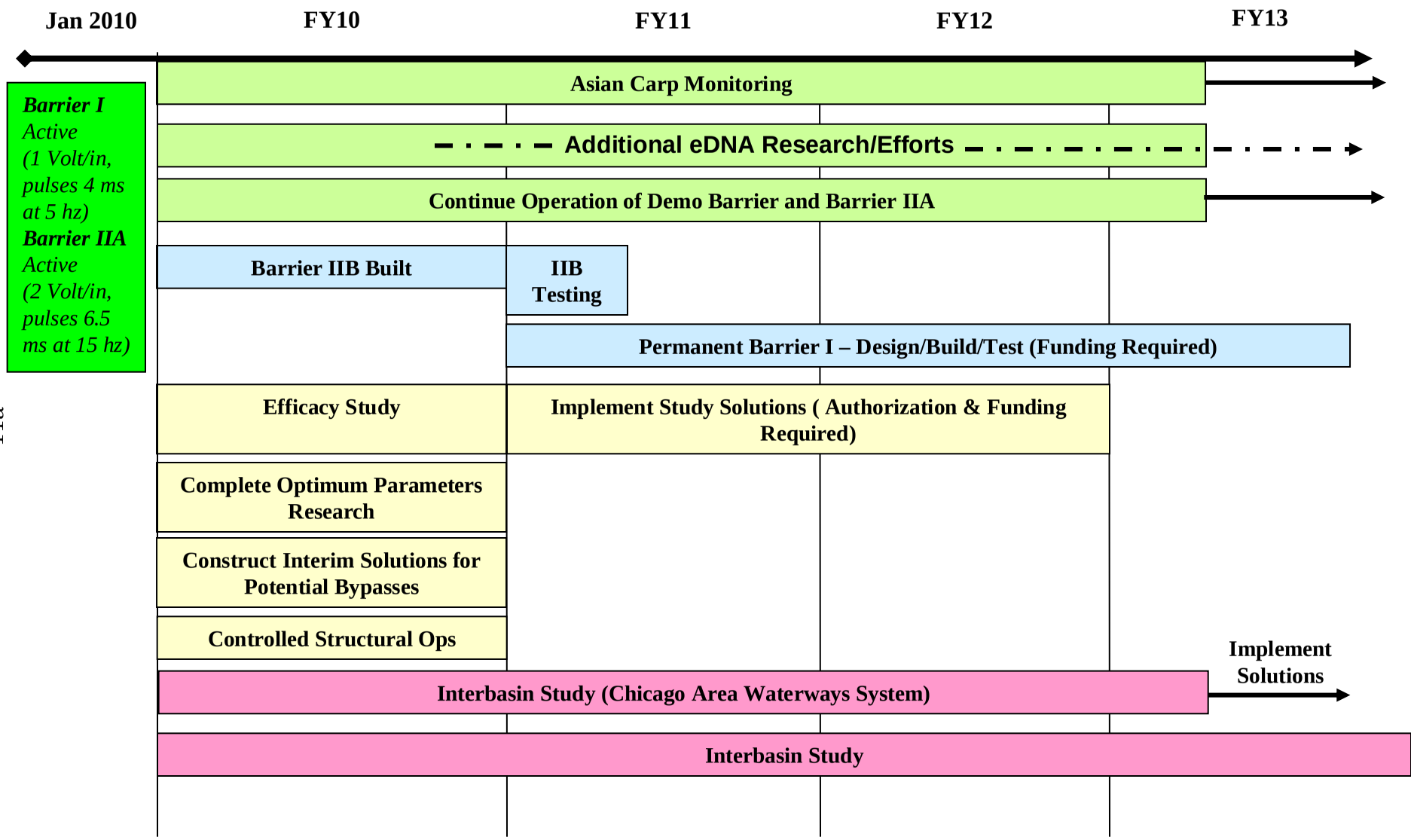
- Complete Final Interbasin study/EIS (**USACE**)

- Screening additional measures to include secondary fish barriers (**All**)

- Implement chosen recommendations (**All**)

- Increase species-specific controls (**All**)

# USACE Strategy for Deterring AIS Migration



# Impact Uncertainties

**Flooding:**

- Flood Damage Reduction Structures
- TARP Impacts
- Property Loss / Damage ($B)
- Loss of Life

**Public Health & Safety/EM:**

- USCG/DHS/Chicago Fire & Police

**Commerce / Economics:**

- Transportation System Upset
- Critical Infrastructure
- Revenue Impacts
- Job Impacts

**Water Quality:**

- TARP Impacts

**Recreation / Tourism:**

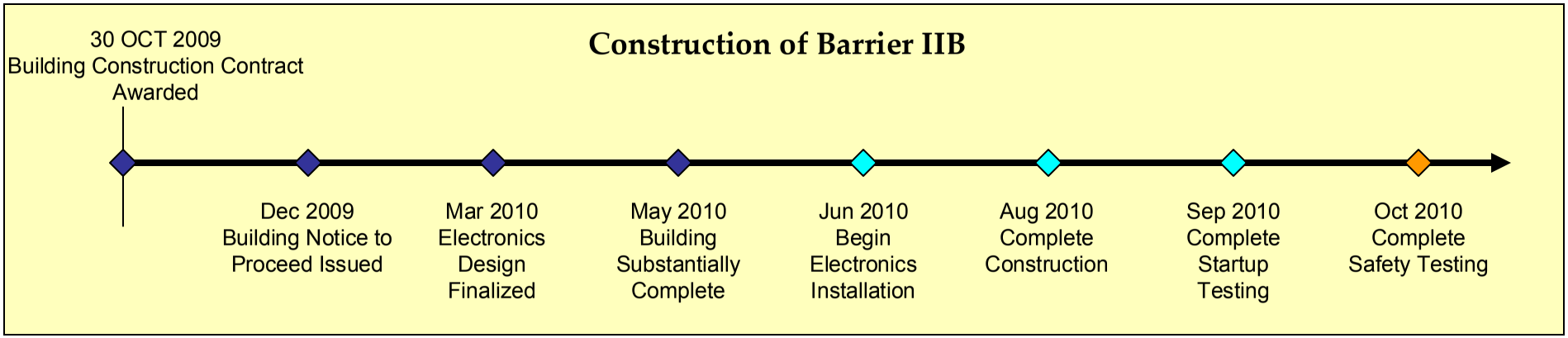
- Navy Pier
- Great Lakes Shoreline
- Great Lakes Fishing

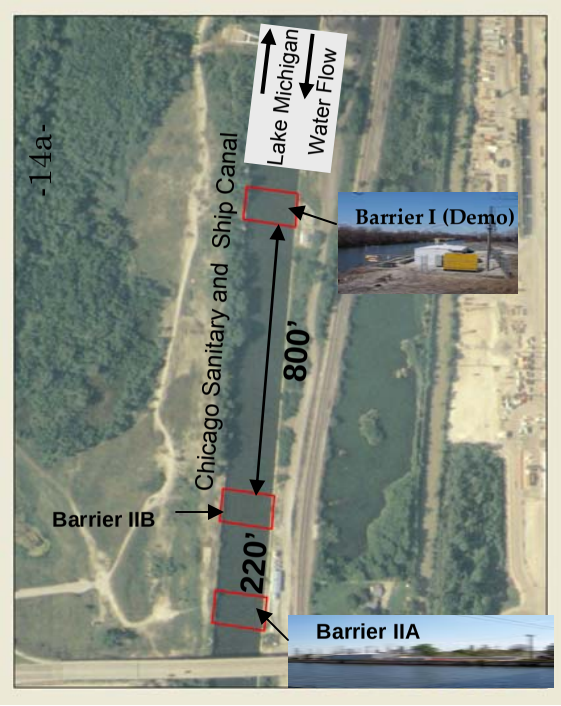
**Great Lakes Ecosystem:**

- Asian Carp (AC) Adaptability
- AC Impacts to Shoreline and Tributaries
- AC Impacts to Great Lakes Fisheries ($B)

# Back - Up Slides

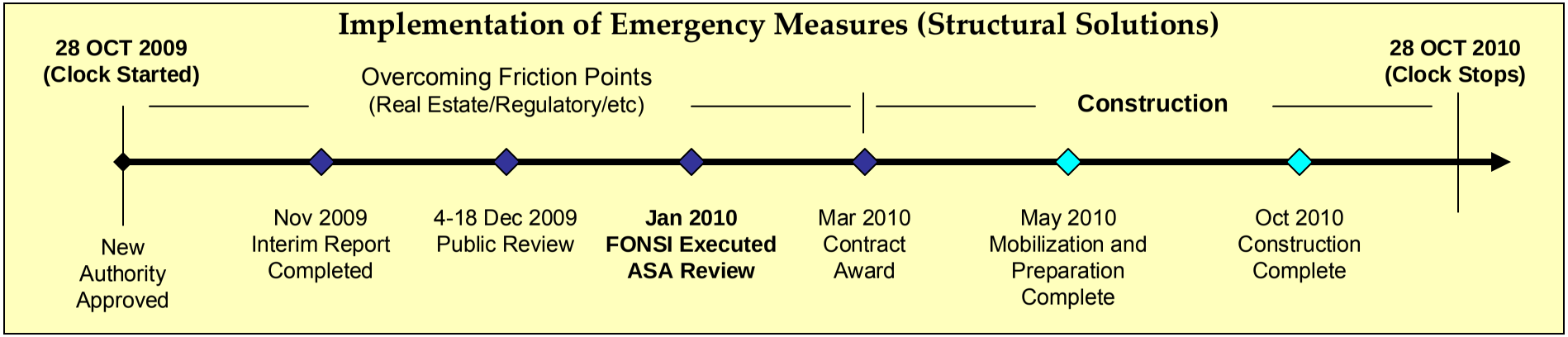
# Construction of Barrier IIB & Permanent Barrier I




- IIB Capabilities: Range of Operating Parameters Same As IIA
- Improvements for Barrier IIB Vs. Barrier IIA
  - Closed-Loop Cooling System
  - All System Components Enclosed in Sealed Building
- Upgrade of Barrier I to Permanent
  - Similar to IIB
  - Initiate Once Barrier II is Fully Operational

# Efficacy Study




## Recommended Emergency Measures from Interim Report I

**Des Plaines Structural Solutions:** ~13.5 miles of structures (~7 miles of chain-link fence with ¼-inch openings & ~6.5 miles of concrete barriers at 6 different locations)

**I&M Canal Structural Solutions:** Block channel at location of natural flow divide

**Tank Tests**

### Efficacy Study - Interim Report II

**Determination of Optimal Operating Parameters**

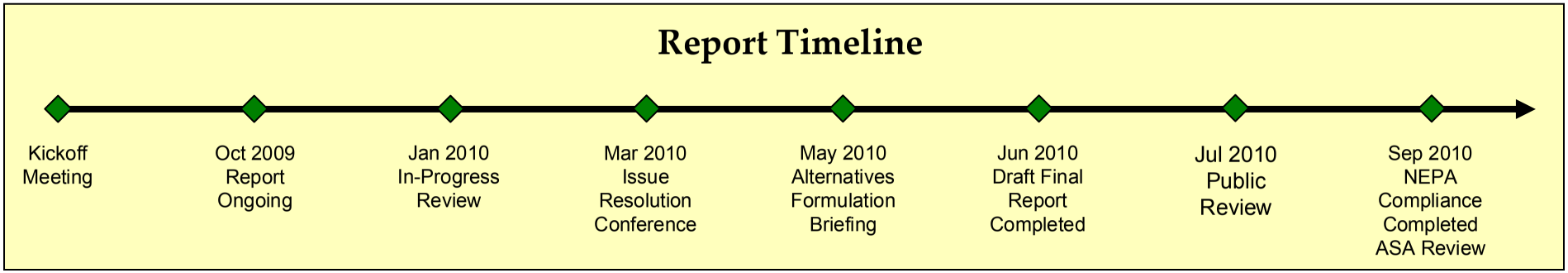
- Phase A & B – Tank testing for various combinations of technical factors. Completed DEC 09.
- Phase C – Testing of technical factors in small flumes & swim tunnels (TBD).

### Efficacy Study - Interim Report III

**Controlled Operations**

- Report will consider potential controlled operations of existing structures & other actions to impede Asian carp migration before warmer weather.

# Efficacy Study – Final Report

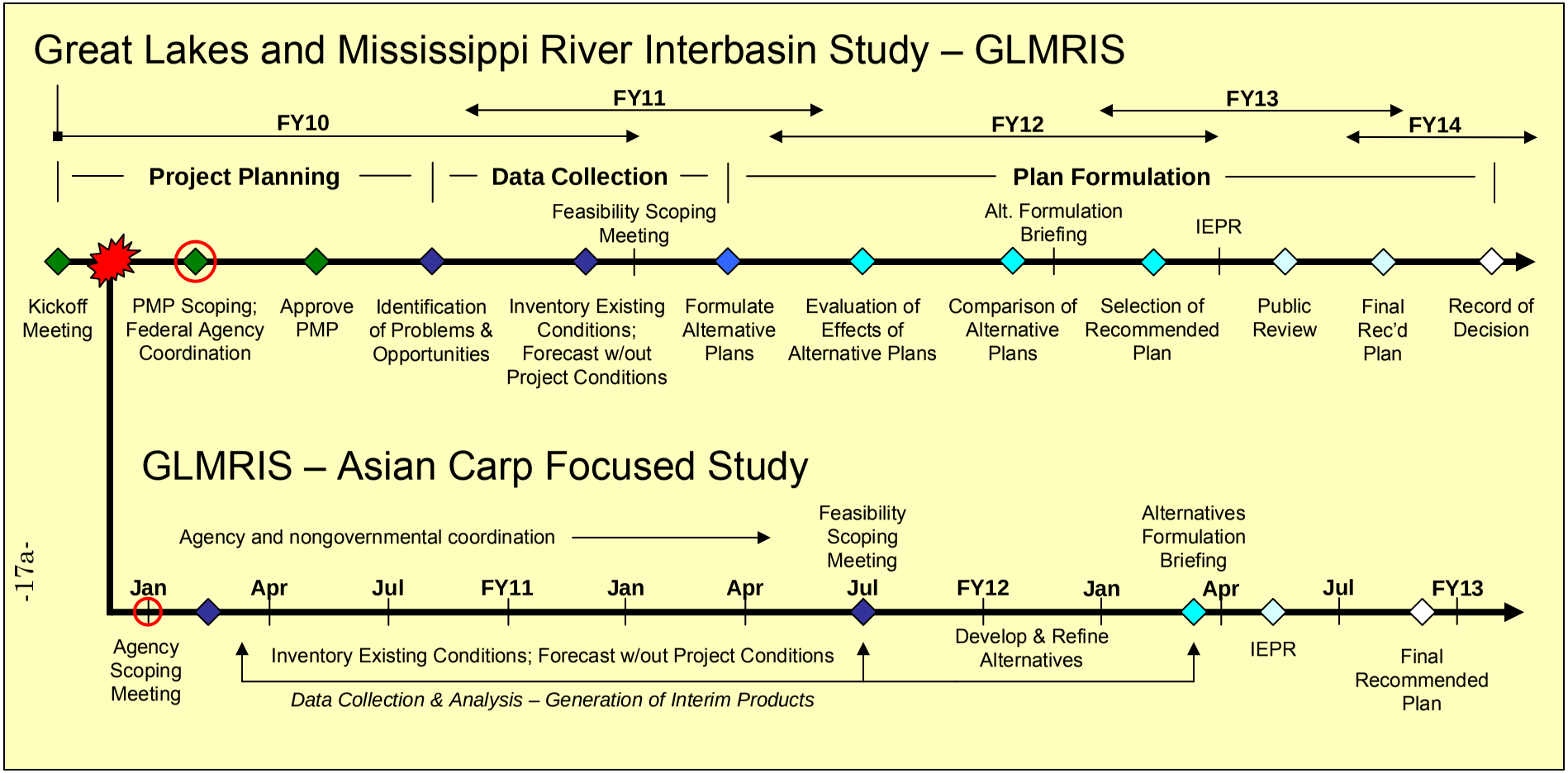



## Evaluation of Other Potential Emergency Measures to Deter Migration Including:

- Other Electrical Barriers
- Other Types of Behavioral Barriers
- Review of Existing Structures (Operational Changes, Temporary Lock Closures, Dams, etc.)
- Other Assisted Transits (Ballast Water, Bait Buckets, etc.)
- Carp Population Control (Harvesting, etc.)
- Impacts (Flooding, Navigation, Recreation, Water Quality)

## Implementation Challenges:

- Implementing Authority
- Funding
- Real Estate
- Regulatory
- Other Agency Support

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- **Baseline Assessment:**
  - Fisheries Survey – Value of GL Fisheries
  - Environmental Modeling: Water & Air Quality
  - Sustainability of Asian carp in GL
  - Economic Analyses: Flood & Navigation impacts

- **Challenges:**
  - Funding to support studies and implementation

- **Partners:**
  - USEPA, USFWS, USCG, USGS, numerous State and local agencies and NGOs

Classification: UNCLASSIFIED
Caveats: NONE

PRESS RELEASE
U.S. Army Corps of Engineers
Chicago District
Date: January 14, 2009

U.S. Army Corps of Engineers reports new eDNA results within the Chicago Waterway System

Chicago - On January 7, 2010 the University of Notre Dame confirmed that a small number of water samples taken on the North Shore Channel near the Wilmette Pumping Station in late October 2009 have tested positive for the presence of Silver carp DNA.

Several hundred environmental DNA (eDNA) samples have been collected in waterways above the electric fish dispersal barrier in Romeoville, Illinois. Only a small percentage, less than five percent, have tested positive for the presence of Asian carp. Areas sampled include the Chicago Sanitary and Ship Canal, the Des Plaines River, the Illinois and Michigan (I&M) Canal, the Cal-Sag Channel, the Calumet River, the Chicago River and the North Shore Channel. Of those, positive eDNA detections have been found only in the Des Plaines River, portions of the Calumet Sag Channel and on the North Shore Channel.

"While we have reports of positive eDNA hits for Asian carp at a few locations above the fish barrier, it is important to remember that to date we have not found a single live or dead Asian Carp specimen where eDNA samples indicate that Asian carp genetic material may be present," said Col. Vincent Quarles, Commander of the U.S. Army Corps of Engineers, Chicago District.

According to the Metropolitan Water Reclamation District, The Wilmette Pumping Station does not generally operate in the winter. Typically, gates are only operated during flood events until warm weather when gates are also operated to maintain or improve water quality in North Shore Channel. Due to maintenance work on the gates the pumps are currently sealed shut, preventing any fish from traversing into Lake Michigan.

"The eDNA test is not a fool-proof indicator of the actual presence of live Asian carp, but a precautionary indication of what might be. MWRD views it as useful for strategic planning and evaluation of potential tactical operations," said Richard Lanyon, Executive Director of the Metropolitan Water Reclamation District.

Near term efforts by the Corps of Engineers are focused on tracking the leading edge of Asian carp movement, preventing migration via the barrier system in the Chicago Sanitary and Ship Canal and preventing fish bypasses via flanking waterways, primarily the Des Plaines River and the I&M Canal.

On January 12th, under an emergency authority provided by Congress, the Army Corps of Engineers received approval to execute a series of interim structural solutions to possible bypass routes from the Des Plaines River and I&M Canal. Construction of those measures will begin in spring 2010.

The U.S. Army Corps of Engineers will continue to work in cooperation with the Illinois Department of Natural Resources, U.S. Environmental Protection Agency, U.S. Coast Guard, U.S. Fish and Wildlife Services and other state and local agencies with the common goal to keep the Asian carp from migrating into the Great Lakes. These agencies, working through the Chicago Area Waterway System Team, are actively considering all options to prevent the possibility of Asian carp that may be above the fish barrier from migrating into Lake Michigan, including the controlled operation of existing structures, intensive fishing efforts, and potential application of fish toxicants, like rotenone.

"As a result of the latest eDNA findings, the Army Corps of Engineers, working in collaboration with our federal, state, and local partners, is prepared to use its authorities to support actions as part of a comprehensive plan that leverages the full authorities, capabilities and resources of all relevant agencies," said Maj. Gen. John Peabody, Commander of the U.S. Army Corps of Engineers, Great Lakes and Ohio River Division.

"We know eDNA is an indicator of the potential presence of live Asian carp, but eDNA has limitations. It can't tell us how many fish exist, whether they are juveniles or adults, or whether the source of the DNA evidence is from live or dead Asian carp. We have planned research with the University of Notre Dame that is designed to address these information gaps. However, we believe eDNA is an important tool to assist in informing management decisions, especially in combination with other sampling efforts such as electro fishing, netting, toxicant applications, and so forth," Peabody said.

As new eDNA results are recorded, they will be posted to the U.S. Army Corps of Engineers website at www.lrc.usace.army.mil.

Classification: UNCLASSIFIED

Caveats: NONE

In The
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AFFIDAVIT OF JOHN C. TAYLOR, Ph.D.

John C. Taylor, Ph.D., being first duly sworn, states:

1. I am an Associate Professor of Supply Chain Management and Director of Supply Chain Programs in the Department of Marketing and Supply Chain Management at Wayne State University in Detroit, Michigan.

2. I received my B.A. Degree from Michigan State University in 1975, my Master of Business Administration from Michigan State University in 1977, and my Ph.D. in logistics and marketing from Michigan State University in 1991.

3. My teaching focuses on supply chain management, transportation policy, and logistics. I have researched and published articles on a variety of issues relating to logistics, trucking, waterborne transportation, and intermodal transportation. I am also editor of the *Journal of Transportation Management*. A copy of my curriculum vitae is attached to this Affidavit as Attachment 1.

4. In December 2009, I was asked by the State of Michigan to preliminarily assess additional transportation and logistics costs that would be incurred if barriers were established in the Chicago Waterway System to ecologically separate that waterway system from Lake Michigan, in order to prevent the inter-basin transfer of invasive aquatic species, including Asian carp. More specifically, this assessment focuses on the establishment of physical barriers in the Waterway System at: (a) the Chicago River Controlling Works (Chicago Locks) in downtown Chicago; and (b) the O'Brien Lock and Dam located south of Lake Calumet. It is assumed these barriers will preclude water passage of any type of recreational or commercial vessel. For purposes of this analysis, it is also assumed that vessels will still be able to navigate in

the remainder of the system, including the Lockport Locks and the electrical Dispersal Barriers constructed by the U.S. Army Corps of Engineers. In that regard, it is my understanding that Michigan is not now seeking changes in water levels within the System or in operating parameters for the dispersal barriers that would preclude navigation.

5. I was assisted in this project by Mr. James L. Roach, a transportation consultant, with whom I have previously collaborated on transportation-related research projects. Mr. Roach previously served for many years as the manager of the Intermodal Section of the Michigan Department of Transportation. In that capacity, he was responsible for water, rail, and trucking modes of transportation.

6. Mr. Roach and I were already familiar with the Chicago Waterway System, having inspected the entire system from the water aboard a Metropolitan Water Reclamation District of Greater Chicago boat in 2006. We also observed portions of the study area by land in January 2010. In addition, we reviewed publicly available aerial photographs, as well as Illinois Waterway Navigation Charts published by the United States Army Corps of Engineers.

7. We researched publicly available information concerning waterway traffic and lock use, including that reported by the U.S. Army Corps of Engineers, Navigation Data Center, as well as other published sources of economic and transportation information. These include, among other things:

a. ENO Transportation Foundation, 20th Edition, 2007.

b. Association of American Railroads, Railroad Facts, 2009 Edition.

c. A Modal Comparison of Domestic Freight Transportation Effects on the General Public; Texas Transportation Institute, Center for Ports and Waterways. December 2007, amended March 2009.

d. Prairie Rivers Network Action Alert dated February 6, 2009. prairierivers.org/alerts/2009/02/action-alert.

e. Congressional Budget Office, May 1992. Paying for Highways, Airways, and Waterways: How can users be charged?

f. Chicago-Naperville-Michigan City CFS area; United States Department of Transportation Commodity Flow Survey, 2007.

g. The Federal Highway Administration Freight Analysis Framework.

h. Illinois Department of Transportation website, Statewide Traffic Maps, Truck Count. www.gettingaroundillinois.com/default.aspx.

i. Chicago Region Environmental and Transportation Project (CREATE). United States Department of Transportation, Federal Railroad Administration Issue Brief dated May 17, 2009.

j. Bureau of Economic Analysis, United States Department of Commerce. 2008 GDP for Chicago-Naperville-Joliet MSA. www.bea.gov/regional/gdpmetro/action.cfm.

k. National Transportation Statistics, 2009, Table 1-46b, updated September 2009, Bureau of Transportation Statistics, U.S. Department of Transportation.

8. We have also reviewed, as they pertain to transportation issues, the following documents submitted to the United States Supreme Court in opposition to the State of Michigan's December 21, 2009 Motion for Preliminary Injunction:

a. Memorandum for the United States in Opposition to Motion for Preliminary Injunction.

b. Declaration of Vincent W. Quarles. (U.S. App. 44a-78a.)

c. Declaration of Michael Cox, U.S. Army Corps of Engineers. (U.S. App. 86a-95a.)

d. Response of State of Illinois to Motion for Preliminary Injunction.

e. Affidavit of Lynn M. Muench, American Waterways Operators. (Ill. App. 28a-46a.)

f. Affidavit of James P. Farrell, Illinois Chamber of Commerce. (Ill. App. 47a-61a.)

g. Affidavit of John Groundwater, Passenger Vessel Association. (Ill. App. 62a-71a.)

9. We have prepared a report, summarizing our review and analysis entitled, "Chicago Waterway System Ecological Separation: The Logistics and Transportation Related Cost Impact of Waterway Barriers," a copy of which is attached to this Affidavit as Attachment 2.

10. For the reasons detailed in that Report, it is my professional opinion that the documents submitted by the United States and Illinois to this Court, referenced in paragraph 8 above, have seriously exaggerated the economic and transportation impacts associated with closure of portions of the Chicago Waterway System at the Chicago and O'Brien Locks requested by the State of Michigan. Key facts supporting that conclusion may be summarized as follows:

a. Only approximately seven million tons of cargo per year would be affected and some of this would incur relatively minor inconvenience.

b. That affected volume represents less than one percent of all the freight traffic in the Chicago Region and only thirty percent of the total Port of Chicago traffic.

c. The affected barge traffic is the equivalent of two daily loaded rail unit trains in a region that has approximately 500 daily freight trains.

d. Truck traffic in Chicago would increase less than 1/10 of one percent.

e. Most of the affected cargo would continue to move on the inland waterway system, through the Lockport Locks, but would have to stop a few miles short of its former destination.

f. Most of the claimed environmental, air quality, safety, and energy benefits associated with barge transportation would continue since most of the barge traffic would continue.

g. Some of the affected cargo traffic may require transfer to another mode of transportation such as rail, truck, or pipeline at transload locations. Such transfers are the norm in an intermodal transportation system (e.g., grain moves by truck to an elevator, by rail to a port, and by barge to an end user to an export location). Indeed, much of the traffic in the inland waterway system already uses several modes.

h. The suggestion that other modes of transportation are not available is incorrect. Virtually all of the major shippers have direct or proximity access to both rail and highway. The assertion that there are not enough rail cars or trucks to handle the traffic is also very wrong. There is more than sufficient capacity to handle seven million tons annually and it could readily be provided.

i. We conservatively estimate that, if barriers are established at the O'Brien and Chicago Locks, transportation and handling costs would increase by less than $70 million annually in a Chicago metropolitan area economy of $521 billion.

j. There would be more cargo-related jobs, not less, associated with closures at the O'Brien and Chicago Locks. There likely would be some loss of barge jobs, but these would be more than replaced by truck, rail, and pipeline jobs needed for transload and transfer movements of the affected cargo. That is why there would be additional transportation costs.

k. A significant portion of the costs savings associated with barge transportation is because of federal subsidies for waterway operation, including lock construction and maintenance.

l. Despite these subsidies, inland waterway traffic has declined significantly in recent years. For example, cargo through the

O'Brien Lock was down 45 percent during the 1994 – 2007 period. The number of loaded barges transiting that Lock in 2008 was only about half of what it was in 1994.

m. Domestic water transportation in general is losing traffic to other modes. During the 1994-2007 period railroads increased revenue ton-miles by 49 percent, trucking increased by 33.3 percent, and the inland waterway system traffic decreased by 8.8 percent.

n. Land along the Chicago Waterway System has many vacant and converted sites formerly occupied by waterway users. This is consistent with the overall shift in the local economy toward high-value service production and away from freight-laden manufacturing.

o. In sum, waterway closure at the Chicago and O'Brien Locks would have a localized impact on already declining commercial cargo traffic that comprises only a tiny fraction of economic activity in the metropolitan Chicago area. The conservatively estimated additional transportation and logistical costs of shifting a portion of the existing barge traffic to other modes of transportation along a small portion of its route is far less than that suggested by the Corps and Illinois, and is orders of magnitude less than the estimated economic impact of sport and commercial fishing in the Great Lakes.

p. The claim that "even a temporary closure of the locks will devastate the local economy and Illinois' role in the regional, national and global economy..." (Ill. Opposition p. 10 and Ill. App. 50a) cannot reasonably be supported.

11. I have personal knowledge of the matters stated in this Affidavit and if called as a witness would testify to them.

/s/
John C. Taylor, Ph.D.

Subscribed and sworn to before me this
3rd day of February, 2010.
/s/
Nancy E. Hart
Notary Public, Ingham County, Michigan
Acting in Ingham County, Michigan
My Commission expires: July 10, 2012

Taylor Affidavit – Attachment 1

# John Taylor

Associate Professor of Supply Chain Management
Director of Supply Chain Programs
Department of Marketing and Supply Chain Management
School of Business Administration
Wayne State University

**I. Academic Degrees**

- Ph.D, Michigan State University, 1991
- MBA, Michigan State University, 1977
- BA, Michigan State University, 1975

**II. Teaching Interests**

- Supply chain management
- Transportation policy and management
- International logistics

**III. Research Interests**

- U.S.-Canada-Mexico logistics and transportation issues
- U.S.-Canada border issues
- Trucking economic regulation/deregulation
- Ocean shipping in the Great Lakes
- Intermodal transportation
- Michigan highway funding
- Supply chain "in-stock" performance

**IV. Bio**

Dr. Taylor is a tenured Associate Professor of Supply Chain Management and Director of Supply Chain Programs in the Department of Marketing and Supply Chain Management at Wayne State University. Dr. Taylor co-developed the Logistics Major at Wayne State University between 1995-2002, before returning to head up Supply Chain programs in 2009. Prior to returning to Wayne State he created and developed the Supply Chain Management Major at Grand Valley State University. His teaching focuses on supply chain management, transportation policy, and international logistics.

His Ph.D. dissertation dealt with the manufacturing plant and distribution center location implications of the NAFTA. He has also conducted many academic studies on U.S.-Canada-Mexico border

crossing issues. Additional research has been published on trucking economic regulation, ocean shipping in the Great Lakes, intermodal transportation, Michigan highway funding, and supply chain "in-stock" performance. Dr. Taylor recently completed major policy studies on the cost-benefits of ocean shipping in the Great Lakes, and on, Michigan highway funding. His articles have been published in journals such as the *Transportation Journal, Journal of Public Policy and Marketing, Regulation, the International Journal of Logistics Management, the Journal of Business Logistics, the International Journal of Purchasing and Materials Management, and the International Journal of Physical Distribution and Logistics Management.*

Dr. Taylor is a past member of the National Commission on Intermodal Transportation, an 11 person Presidential Commission on national transportation policy. He is also a past member of the National Motor Carrier Advisory Committee to the U.S. DOT. He also has served on various Michigan DOT and Detroit Chamber committees focusing on Michigan transportation and logistics issues. He is a frequent witness on transportation policy issues before administrative, legislative and judicial forums. He is frequently quoted in national publications such as The Wall Street Journal, and in local publications such The Detroit News, Free Press, and Crain's Detroit Business.

He has served as a policy consultant to a number of governmental and business organizations on trade and transportation public policy issues, and on topics related to logistics management. Clients have included the American Automobile Manufacturer's Association, the City of Detroit, the International Warehousing and Logistics Association, the U.S. and Michigan Departments of Transportation, Burlington Northern Santa Fe Railroad, Canadian National and Canadian Pacific Railroads, Parsons Brinckerhoff, The Corradino Group, URS Corporation and UPS. Dr. Taylor also is a past partner in a Partnership that acquired, developed, and sold the rights to the existing Detroit River Railroad Tunnel, and a part owner of Intellitec Products, Inc..

Dr. Taylor obtained a Ph.D. in logistics and marketing from Michigan State University in 1991. Previously, he spent seven years in international operations with Clark Equipment Company, a then Fortune 500 firm; and three years with a logistics consulting firm. He has lived and worked for extended periods of time in both Sydney, Australia and Sao Paulo, Brazil; and is fluent in Portuguese.

**V. Professional Experience & Certification**

- Clark Equipment Company, 1977 -1984 - International Marketing and Supply Chain Management

- Dialog Systems, Inc. , 1984-1987 - Supply Chain Management Consulting

- Border Line Associates, LLC, 2000-2007 – Partner, Development and Sale of Interests in the Detroit River Railroad Tunnel

- Intellitec Products, LLC, 2009 – Present – Part Owner, Energy Management Electrical Control Products

## VI. Publications & Presentations

### Journal Publications

- Taylor, John C. and James L. Roach (2009), "Ocean Shipping in the Great Lakes: An Analysis of Industry Transportation Cost Savings," *Transportation Journal*, Volume 48, No. 1, p. 53-67.

- Taylor, John C., Douglas R. Robideaux and George C. Jackson (2004), "U.S.-Canada Transportation and Logistics: Border Impacts and Costs, Causes, and Possible Solutions," *Transportation Journal,* Volume 43, No. 2, 5-21.

- Taylor, John C., Stanley E. Fawcett, and George C. Jackson (2004), "Catalog Retailer In-Stock Performance: An Assessment of Customer Service Levels," *Journal of Business* Logistics, Volume 25, No. 2, 119-138.

- Taylor, John C., Douglas R. Robideaux and George C. Jackson (2004), "Costs of the U.S.-Canada Border," in North American Economic and Financial Integration, ed. By Alan M. Rugman, Indiana University, *Research in Global Management*, Vol. 10, 283-296.

- Taylor, John C., Robideaux, Douglas R. and George C. Jackson (2003), "U.S.-Canada Border Policy: Costs and Options," *Journal of Transportation Law*, *Logistics and Policy*, Volume 71 (Fall), 20-39.

- Taylor, John C. and Douglas R. Robideaux (2003), "Canada-U.S. Border Cost Impacts and Their Implications for Border Management Strategy," *Horizons,* Vol. 6, No. 3, 47-50.

- Taylor, John C. and Stanley E. Fawcett (2001), "Retail On Shelf Performance of Advertised Items: An Assessment of Supply Chain Effectiveness at the Point of Purchase," *Journal of Business Logistics*, 22 (No. 1), 73-90.

- Taylor, John C. and George C. Jackson (2000), "Conflict, Power and Evolution in the Intermodal Transportation Industry's Channel of Distribution," *Transportation Journal*, 39, (Spring), 6-17.

- Daugherty, Patricia J., John C. Taylor and Alexander E. Ellinger (1999), "Automatic Replenishment Programs and Level of Involvement: Performance Implications,"

*International Journal of Logistics Management*, 10, no. 1, 25-35.

**Academic Proceedings**

- Taylor, John C., Proceedings of the 15h Annual International Conference on Aquatic Invasive Species, Institute for Inland Water Management, abstract on Ocean Shipping in *North America's Great Lakes: Invasive Species Costs vs. Transportation Cost Savings*, Amsterdam, Netherlands, September 23-27, 2007, p. 41.

- Taylor, John C. (2005), "U.S.-Canada Border Costs and Future Research Needs," Summary *Proceedings of the Conference on Border Security and Canada-US Integration: Toward a Research Policy Agenda*, Western Washington University, Center for Canadian American Studies, Bellingham, Washington, April 26, 2005, pp.1 electronic.

- Taylor, John C., Douglas R. Robideaux, and George C. Jackson (2003), "Border Related Costs Attributable to U.S.-Canadian Border Crossings," *Proceedings of the 38th Annual Canadian Transportation Research Forum*, Ottawa, Ontario, Canada, May 11-14, 1-15.

- Taylor, John C., Douglas R. Robideaux, and George C. Jackson (2003), "The U.S.-Canada Border and Transit Time Costs," Proceedings (CD) of the *44th Annual Transportation Research Forum*, Washington D.C., March 6-8, 1-28.

- Taylor, John C. and Stanley E. Fawcett (1999), "Retail In-Stock Performance on Promotional Items: An Assessment of Logistics Effectiveness," *28th Proceedings of the Council of Logistics Management Educator's Conference*, Toronto, Canada, October 17, 111-119.

**Academic Policy Monographs and Reports**

- Taylor, John C. and James L. Roach (2007), *Ocean Shipping in the Great Lakes: An Analysis of Issues*, for The Joyce Foundation, Lansing, Michigan, October, 2007, 1-48.

- Taylor, John C. (2007), Michigan Highway Funding: *Analysis and Recommendations*, for the Mackinac Center for Public Policy, Midland, Michigan, April 14, 2007, 1-95.

- Taylor, John C. and James L. Roach (2005), Taylor, John C. and James L. Roach (2005), *Ocean Shipping in the Great Lakes: Transportation Cost Increases That Would Result From A Cessation of Ocean Vessel Shipping*, Lansing, Michigan, August, 2005, 1-89.

- Taylor, John C., Douglas R. Robideaux and George C. Jackson (2003), The U.S.-Canada Border: *The Impacts of Transit Time, Uncertainty and Other Border Related Costs*, for the U.S, Michigan and New York Departments of

Transportation and the Canadian Embassy to the United States of America, Lansing, Michigan, February 6, 2003, 1-216.

**Meeting Presentations**

- China Automated Warehousing Symposium, *U.S. Logistics Trends*, Shanghai, China, August 1, 2008.
- Taylor, John C., paper on *Transaction Costs of the U.S.-Canada Border*, at the Regional Integration in North America and Border Transaction Costs Workshop, El Colegio de Mexico, Center for International Studies, Mexico City, Mexico, March 13, 2008.
- Taylor, John C., Michigan State University Conference on *Aquatic Invasive Species*, Michigan State University, East Lansing, Michigan, forthcoming October 8, 2007.
- Grand Forum, speaker on *Great Lakes Ocean Shipping*, Muskegon, Michigan, September 27, 2007.
- Taylor, John C., 15h Annual International Conference on Aquatic Invasive Species, Institute for Inland Water Management, presentation on Ocean *Shipping in North America's Great Lakes: Invasive Species Costs vs. Transportation Cost Savings*, Amsterdam, Netherlands, September 23-27, 2007.
- Great Lakes United, speaker on *Cost-Benefits of Great Lakes Ocean Shipping*, Toronto, Ontario, June 16, 2007.
- International Joint Commission, Conference on the Great Lakes, panel member on *Economic Issues Related to Separation of the Chicago Sanitary and Ship Canal from Lake Michigan* , Chicago, Illinois, June 8, 2007.
- Taylor, John C. and James L. Roach, 50th Annual Conference on Great Lakes Research: Past, Present and Future, presentation and Proceedings Abstract on *Ocean Shipping in the Great Lakes: Cost Benefits*, International Association of Great Lakes Researchers, State College, PA, May 28-June 1, p. 195, 2007.
- Detroit Intermodal Association, speaker on Ocean Shipping in the Great Lakes, Detroit, Michigan, October 25, 2006.
- Department of Homeland Security, presentation on U.S.-Canada Border Costs and Policy Options, and on *Ocean Shipping in the Great Lakes – Security Issues?*, Washington D.C., October 2, 2006.
- Delta Nu Alpha Transportation and Logistics Society – Holland Chapter, lunch speaker on *Great Lakes Ocean Shipping: Cost-Benefits*, Holland, Michigan, September 27, 2006.

- Taylor, John C. and James L. Roach, National Academy of Sciences, Transportation Research Board, Committee on the St. Lawrence Seaway: Options to Eliminate Introduction of Non-indigenous Species Into the Lakes, Phase II, presentation on *Transportation Cost Penalties From Ending Ocean Shipping Into the Lakes*, Washington DC, May 24, 2006.

- Taylor, John C., Michigan State University, Invasive Species Symposium: Challenges and Opportunities, Panel presentation on *Ocean Shipping in the Lakes: Transportation Cost – Benefits*, East Lansing, Michigan, May 12, 2006.

- Inland Seas Education Association, speaker on Great Lakes Ocean Shipping Cost Benefits, Traverse City, Michigan, May 2, 2006.

- Council of Supply Chain Management Professionals, Grand Rapids Roundtable, dinner speaker on *Challenging the Conventional Wisdom: Do You Have Enough Inventory?*, Grand Rapids, Michigan, April 19, 2006.

- Save the River Conference: Upper St. Lawrence Riverkeeper, speaker on *Pros and Cons of Ocean Going Vessels in the Seaway*, Thousand Islands, New York, February 11, 2006.

- International Transportation & Logistics Forum, presentation titled *Are Borders Obsolete?*, Windsor, Ontario, Canada, June 23, 2005.

- Taylor, John C., International Joint Commission of Canada and the United States of America, Great Lakes Water Quality Agreement Biennial Meeting, Panel Session on *Halting the Introduction of Alien Aquatic Species, panel/paper presentation on Transportation Cost Impacts of Ocean Vessel Shipping in the Great Lakes*, Kingston, Ontario, Canada, June 9, 2005.

- Taylor, John C., Western Washington University, Center for Canadian American Studies, Conference on Border Security and Canada-US Integration: Toward a Research Policy Agenda, presentation on U*.S.-Canada Border Costs and Future Research Needs*, Bellingham, Washington, April 26, 2005.

- Industry Canada Ministry, Roundtable on Canadian Firms in the Global Supply Chain, presentation on *Supply Chain Integration in North America*, Ottawa, Canada, March 11, 2005.

**VII. Professional Memberships**

- Council of Supply Chain Management Professionals
- Delta Nu Alpha National Transportation Association
- Transportation Club of Detroit
- American Marketing Association

Taylor Affidavit – Attachment 2

# Chicago Waterway System Ecological Separation:

# The Logistics and Transportation Related Cost Impact of Waterway Barriers

John C. Taylor, PhD

And

James L. Roach

For

The State of Michigan

Department of Attorney General

Lansing, Michigan

February 2, 2010

# Chicago Waterway System Ecological Separation:

## The Logistics and Transportation Related Cost Impact of Waterway Barriers

### 1. Introduction

This research effort provides an assessment of transportation and logistics impacts associated with an ecological separation, in the Chicago area, between the Mississippi River and Great Lakes Basins. An ecological separation, which could involve the construction of physical barriers, would be designed to prevent the inter-basin transfer of invasive aquatic species including the Asian Carp. The construction of these barriers could be disruptive to commercial shipping and recreational boating important to the economy of the region. This study is intended to provide an assessment of additional transportation and logistics costs that would be incurred if these barriers were constructed. This report supplements and replaces a preliminary assessment performed by the authors in December 2009. The intervening time has allowed for an on-site inspection of the Chicago Waterway System (CWS)[1] as well as an opportunity to review materials submitted in response to State of Michigan filings to the Supreme Court.

### 2. System Overview

The Chicago Waterway System contains six distinct segments comprising about 72 miles[2] of navigable waterway. This system is shown in Exhibit 1.

- Chicago River, Main and North Branch—7.0 miles (9'-21' draft)

[1] In 2006, the authors inspected the entire CWS from the water aboard a Metropolitan Water Reclamation District of Greater Chicago boat. Detailed notes, observations, and pictures were taken at that time. The 2010 observations were necessarily by land given the January time period for the work. Google aerial photos were also consulted.

[2] Mileage calculations from US Army Corps of Engineers (USACOE), Illinois Waterway, Navigation Charts. Navigation depth information from USACOE, Waterborne Commerce of the United States, navigation segment data.

- Chicago River, South Branch—4.6 miles (9’ draft)
- Chicago Sanitary and Ship Canal—30.1 miles (9’ draft)
- Calumet Harbor and River—6.1 miles (27-29’ draft)
- Lake Calumet-- 0.4 miles (27’draft)
- Calumet-Sag Canal—23.9 miles (9’ draft)

About 62 miles are maintained to minimum depths of 9 feet to accommodate barge traffic. The remaining 10 miles are maintained to depths of 21-29 feet. This includes the Calumet River and Lake Calumet that are maintained to a depth of 27-29 feet to accommodate laker or ocean vessels. There are three locks that handle commercial and recreational traffic

- “Chicago Lock” located near downtown Chicago by the Navy Pier
- “O’Brien Lock” located near Lake Calumet on the Calumet-Sag Canal just south of Lake Calumet
- “Lockport Lock” located about 35 miles southwest of downtown Chicago

3. Research Approach and Assumptions

This research effort assumed that physical barriers would be constructed at two locations; one at the Chicago River Controlling Works (Chicago Lock) near the Navy Pier in downtown Chicago and the other at the O’Brien Lock located south of Lake Calumet. These barriers would preclude water passage of any type of recreational or commercial vessel. Transport of recreational vessels across the barrier on a marine railway or mechanical lifts may be feasible. We assume that it would not be economically feasible to move loaded commercial barges across the barrier but the options could be examined in a more detailed study.[3] It is important to state that these barriers are located on waterway segments that carry only barge, recreational and

[3] There are examples elsewhere in the world where this does occur. However, the time and cost associated with this does not seem economically feasible. Brammeier et al discuss various vessel transit options in their report (pg 76).

tour boat traffic. Deeper draft ocean or laker vessels would be generally unaffected[4] and could continue to move freely into Calumet Harbor, Calumet River, and Lake Calumet. Our research assumes that adequate navigation depth will be available on the waterway segments affected by the barriers. Issues such as navigation depth, flood control, access for police, Coast Guard, and fire control boats are outside of the transportation-oriented scope of this research.

4. Traffic Impacts

The proposed barriers would preclude about 7 million tons[5] of cargo from providing direct water access to existing customers. About 98 percent of this represents traffic passing through the O'Brien Lock.

Table 1

Chicago and O'Brien Lock Tonnage

| | 2007 | 2008 |
|---|---|---|
| Chicago Lock Tons | 167,800 | 105,484 |
| O'Brien Lock Tons | 7,294,890 | 6,822,254 |
| Total | 7,462,690 | 6,927,738 |

Source: US Army Corps of Engineers, Navigation Data Center, Lock Use, Performance and Characteristics.

a. Chicago Lock Barrier

The Chicago River Controlling Works was constructed in 1938. The lock portion is 800 feet in length and 80 feet wide. It lifts vessels 2 feet.[6] Table 2 provides lock usage data for 1994, 2007, and 2008.

[4] Larger vessels could potentially utilize the Chicago River Main and North Branch segments, which are maintained to 21 feet of draft. To our knowledge, this seldom occurs due to the lack of traffic opportunities. Virtually all laker and ocean vessels utilize the Calumet River.

[5] The authors choose to use 7 million tons to simplify calculations. This value is based on 7,463,000 tons in 2007 and 6,927,000 in 2008 handled at the two locks. It also reflects a possible overstatement of traffic at the O'Brien Lock (see footnote 8)

[6] Brammeier et al

Table 2

Chicago Lock Usage Statistics

| | 1994 | 2007 | 2008 |
|---|---|---|---|
| Barges empty | 55 | 28 | 14 |
| Barges loaded | 228 | 50 | 39 |
| Tonnage handled | 1,341,595 | 167,800 | 105,484 |
| Tons/loaded barge | 5,884 | 3,356 | 2,705 |
| Recreational vessels | 40,974 | 26,661 | 23,886 |
| Commercial vessels | 15,038 | 11,199 | 10,363 |

Source: US Army Corps of Engineers, Navigation Data Center

All categories of traffic have been declining over the 1994-2008 period shown in this table. Tonnage is down dramatically from 1.3 million tons to about 100 thousand tons. Recreational vessel traffic is also down significantly from peak years of 1994-95 when levels in the 40,000 per year range were experienced. Commercial vessels, which are principally tour boats operating in and around the Chicago downtown area, are down by about a third. Only 39 loaded barges used the Chicago Lock in 2008 carrying 105,000 tons of cargo.

A barrier at the Chicago Lock will have little effect on shippers on the North and South Branches of the Chicago River. The large majority of cargo to these shippers passes through the CSSC and would be unaffected by the closure of either the Chicago or O'Brien locks. Most of the impacts would be experienced by recreational and tour boat operators. Although recreational and commercial volumes are down from their peak years, they are still significant. These numbers suggest that recreational traffic during the boating season may, on average, be between 200-300 boats per day with higher peaks on summer weekends and holidays. It may be possible to accommodate some of these users through a marine railway, lift machines, or other means. However, it is unlikely that all of the demand could be accommodated on peak days.

b. O'Brien Lock Barrier

The Thomas J. O'Brien Lock and Dam was opened in 1960 and is 1,000 feet in length and 110 feet wide. It lifts vessels 4 feet. Table 3 provides lock use statistics for 1994, 2007, and 2008.

Table 3

O'Brien Lock Usage Statistics

| | 1994 | 2007 | 2008 |
|---|---|---|---|
| Barges empty | 5,687 | 3,098 | 2,804 |
| Barges loaded | 8,360 | 4,475 | 4,259 |
| Tonnage handled | 13,291,318 | 7,294,890 | 6,822,254 |
| Tons/ loaded barge | 1,590 | 1,630 | 1,602 |
| Recreational vessels | 17,165 | 18,381 | 15,184 |
| Commercial vessels | 4,267 | 2,383 | 2,272 |

Source: US Army Corps of Engineers, Navigation Data Center

A barrier located at or near the O'Brien Lock has been discussed given the recent detection of Asian Carp in the Calumet-Sag Channel.[7] This location would affect virtually all of the barge traffic passing through the Calumet-Sag Channel. For example, Corps data indicates that, in 2007, 6,256,000 tons of cargo used the Calumet-Sag Channel and 6,053,000 tons[8] or 97 percent passed through the entire length. Only 3 percent had an origin or destination on the Calumet-Sag Channel. This route is a very important pathway for traffic moving to and from the Mississippi River and the Chicago region. A significant portion of

[7] Corps Briefing Paper, December 2009.

[8] The authors were unable to reconcile the difference between Corps data, which showed 6,053,000 tons of through traffic in 2007 on the Cal-Sag Channel, and O'Brien Lock data, which indicated 7,294,000 tons. This data should be identical or very close. Part of the reason may be that segment data and lock data is obtained from different sources. For purposes of this report, we used the O'Brien Lock data since it presents the greatest amount of impact. The authors were also informed by Corps personnel that some commodities such as petroleum coke might have been misclassified as coal coke at the lock. This accounts for some of the differences in commodity volumes between the segment data and the lock data.

this is traffic relating to coal, coke, and steel products moving long distances. Interviews indicated that some of this traffic includes coke products originating in China, transloaded to barge in New Orleans, moved up the Mississippi and Illinois Rivers, through the Cal-Sag and into Lake Michigan for delivery to steel plants. These barges may return with slag or steel products. It is important to state that a barrier near the O'Brien Lock would not affect the larger deeper draft laker and ocean vessels that can move through the Calumet River into Lake Calumet. These channels are maintained to a minimum draft of 27 feet whereas the Cal-Sag Channel and most other segments of the Chicago Waterway System are maintained to a 9-foot draft to accommodate barge traffic.

O'Brien lock commodity data are shown in Table 4 for 2007 and 2008.

Table 4

O'Brien Lock Commodity Data

(Thousands of short tons)

| Commodity | 2007 | 2008 |
|---|---|---|
| 10 Coal, lignite, coal coke | 1,689 | 2,426 |
| 20 Petroleum products | 550 | 411 |
| 30 Chemical products | 227 | 213 |
| 40 Crude materials (e.g., sand, slag, scrap) | 1,645 | 1,645 |
| 50 Primary manuf. goods (e.g., cement, steel plates, bars, sheets) | 2,654 | 1,754 |
| 60 Food and farm products | 417 | 315 |
| 70 Manuf. equipment & machinery | 74 | 44 |
| 80 Waste material | 10 | 4 |
| 90 Unknown or not classified | 28 | 12 |
| Total | 7,295 | 6,822 |

Source: US Army Corps of Engineers, Navigation Data Center.

5. Barriers will impact the movement of barge traffic

The construction of these barriers will result in seven million tons of barge traffic that will be unable to directly access existing customers by water. This could result in the closure of certain businesses and increased costs associated with the movement of cargo in the Chicago region. Other impacts have been articulated in verified statements and materials submitted as part of the US and State of Illinois responses. We accept that there are negative impacts but believe that they are greatly overstated.

6. Alternative Transportation Options and Cost Impacts

Barriers at the Chicago and O'Brien locks will require alternative transportation approaches so that end-use customers can continue to receive cargo. This may involve new transload facilities or different modes of transportation such as laker vessel, rail, truck, or pipeline. It is also likely that some cargo will shift to other facilities or terminals that still have direct water access. This could include those on the CSSC, the Chicago River or points on the Cal-Sag below the proposed barrier. Origin or destination points for cargo could also change as a result of changes in cost structure.

This research looked at three alternative approaches to meeting new transportation needs associated with the barriers. These are:

- Alternative A. Transload all cargo between barge and truck. All existing cargo passing through the Chicago and O'Brien locks would continue to move by barge. New transload facilities would be built downstream of the barrier. All cargo would be trucked between the transload center and existing customers.

- Alternative B. Transload but some rail. Most cargo would continue to be transferred to and from trucks at the transload facilities. However, some would shift to an all rail movement.
- Alternative C. Transload, rail, pipeline, and use of other terminals. Half of cargo would continue to transfer to and from trucks at the transload facilities. There would be more rail. Some cargo would continue to move by barge via other routes to terminals elsewhere in the region, and some would move by pipeline.

Cargo passing through the Chicago Locks is mainly construction and building materials. A small transload facility could handle the small amount of traffic passing through this lock. The 105,000 tons handled in 2008 amounts to about 15 trucks a day. Another approach would be to use an existing terminal on the Calumet River and truck to and from that location. It is important to state that most of the cargo moving on the North and South Branch of the Chicago River would be unaffected as it passes through the CSSC.

Cargo passing through the O'Brien Lock is moving to and from a wide range of terminals on Lake Calumet, the Calumet River and nearby points on Lake Michigan such as steel mills. A barrier at the O'Brien Lock would require that transload terminals be constructed downstream of the lock to facilitate transloading of cargo to trucks or other modes. Depending on location, such a terminal would be from 2-15 or so miles from existing users. For purposes of this analysis, the authors choose to use 12.5 miles meaning that a 25-mile round trip would be required for a truck move from a new transload terminal to existing users. This distance is longer then the existing water or road distance between the O'Brien Lock and existing shippers on the Calumet River[9] or in Whiting, Indiana. It is much longer then the distance between the Chicago Lock and shippers on the Chicago River. The generous 12.5-mile estimate was used to reflect the uncertainties associated with actual transload locations.

[9] It is about 7 miles by river from the O'Brien Lock to Lake Michigan.

We also assumed truck operating costs of $100 per hour. Handling costs estimated at $5/ton assumed truck and driver wait time, paperwork time, loading equipment and operator time and other costs. Trucks were assumed to carry 25 tons of cargo. Rail costs were estimated at $9.40 per ton more than barge. This was based on ton-mile costs of 3.34 cents for rail and 2.4 cents for barge for a thousand mile trip.[10] Capital and operating costs associated with the transload terminal were assumed to be $1 per ton. For alternative A, this would amount to about $7 million annually.

Detailed cost calculations are shown in Table 7 at the end of this report.

Table 5

Additional Transportation Costs Incurred with Barriers

| | |
|---|---|
| Alternative A | $69.270,000 |
| Alternative B | $68,439,000 |
| Alternative C | $63,867,000 |

The authors of this report calculated that the proposed barriers would result in additional annual transportation costs of $64-69 million. This amounts to additional costs of $9.12-$9.90 per ton. This compares with a US Army Corps of Engineers estimate of $190 million for the O'Brien Lock and $2 million annually for the Chicago Lock (App72-73a). The Corps estimates are based on" the cost difference between the existing waterway routing and the least cost overland alternative." (App72a). This results in an additional cost of $27 per ton. By comparison, a recent report done by the Texas Transportation Institute (TTI) for the National Waterways Association and the US Maritime Administrations states:

[10] Calculated from ENO Transportation Foundation, 20th Edition, 2007, pg 46. Association of American Railroads, Railroad Facts, 2009 Edition, pg 31.

"In 2005, inland waterways maintained by the US Army Corps of Engineers (Corps) handled over 624 million tons of freight (274 billion ton miles) valued at over $70 billion resulting in an average transportation cost savings of $11/ton (as compared to other modes)." [11]Underline added

The results of our approach were reasonably comparable to the TTI study. We showed about $9-10/ ton of additional cost while they showed $11/ton for 2005. It is understood that these are not strictly comparable kinds of assessments. Interestingly, the use of the TTI estimate would result in additional costs of $77 million which is only slightly higher then our figures.

We believe the Corps approach is faulty. It assumes that since the barge cannot travel the last few miles in a trip the cargo would be shifted in its entirety to the rail or truck mode for the entire distance of a trip. Thus, a cargo of petroleum products from New Orleans to a point on the Calumet River would shift to rail for the entire trip from New Orleans. We do not believe the barge industry would allow that to happen. There are sufficient cost advantages in barge transportation that would allow the barge move to continue to a point below the O'Brien Lock where a transload to truck, pipeline or rail would take place for the few remaining miles (e.g., it is about 1400 miles[12] to the O'Brien Lock from New Orleans and less then 7 additional miles to any point on the Calumet River). Much of the cargo is transloaded in any event so additional costs would be relatively small compared to the overall revenues associated with the move. Thus, most of the economic and environmental advantages of barge transportation would not be lost.

The opponents of the proposed barriers wrongly imply that the cost, energy, air quality and safety benefits of barge transportation would be lost. This is incorrect since, in most cases, the cargo would continue to move most of the distance by

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[11] A Modal Comparison of Domestic Freight Transportation Effects on the General Public"; Texas Transportation Institute, Center for Ports and Waterways. December 2007, Amended March 2009. Page 1.
[12] USACOE Distance Finding Chart for Mississippi River System. Shows 1408 miles from New Orleans to the S. Damen Street Bridge near downtown Chicago.

barge. The revenues to the barge industry for a long distance move from New Orleans would not be easily given over to some other mode.

As stated elsewhere in this report, a significant portion of barge traffic moves into the Illinois Waterway System from points on the lower Mississippi River.[13] We can understand how the Corps might come up with such a high estimate if it assumed that a total shift to another mode would occur. We believe their assumption is unrealistic and fails to consider the multi-modal nature of transportation where movements among and between modes are common. For example, a high percentage of the cargo moved by barge also moves by truck, pipeline, or rail for some portion of its trip. Grain, for example, may move by truck to an elevator, by train to a river port, and by barge to an export or consuming location.

The arguments presented in the filings by the AWO and the Illinois Chamber of Commerce that transloading is not feasible flies in the face of what is actually happening. Almost everything is transloaded in some manner. There are long lines of trucks on 100th Boulevard waiting to pick up salt from Calumet River terminals. Other trucks pick up sand for delivery to off water customers. A large volume transload occurs at the Will County Power Generating Station where coal is transloaded from rail to barge for delivery to the Fisk and Crawford power plants. There are examples of petroleum products being offloaded from barge to tank farms for onward movement by truck or pipeline. There are other examples of rail to water transload in the region. There are many examples in the Chicago area of cargo being unloaded from a barge onto a truck for movement to final destination. The reverse also occurs where trucks bring products to a water terminal for onward movement by barge.

7. Cost Impacts Ignore Inland Waterway Subsidies

[13] Origin-destination data from Corps reports indicate that 57% of Illinois Waterway System traffic origins are destined to points below Baton Rouge on the Mississippi River or on the Gulf of Mexico. About 39% of IW originating traffic has destinations in this same area.

The inland waterway system receives considerable support from the federal government for the construction, maintenance, and operation of navigation locks and channels. The 1986 Water Resources Development Act requires the nation's barge companies to contribute 50 percent of the costs of new construction or major rehabilitation of inland waterway locks, dams, and channels. Taxpayers pay the entire cost of operations and maintenance of the inland waterways.[14] In 2008, the barge companies contributed only $92 million out of total expenditures of $930 million.[15] A 1992 Congressional Budget Office Study found that "on a percentage basis, the inland waterway system is the most heavily subsidized of the three modes of transportation, although aviation is more heavily subsidized in absolute terms."[16] The issue of support levels for inland waterways has been a major issue for many years with railroads and environmental groups especially opposed to the level of federal support. Railroads claim government funded competition whereas environmental groups are concerned that the locks, dams, and channels are disruptive to the natural environment. It is nonetheless clear that on a per ton basis inland waterways receive a disproportionate share of federal government support. This tends to disrupt market forces and results in lower costs for water transportation then would be the case if they paid a larger share of their costs.

8. Traffic Impacts Need to be Placed in Perspective

The traffic passing through the Chicago Lock and the O'Brien Lock amounts to about 7 million tons annually. We estimate that there is from 790 million to one billion tons of freight that has an origin or a destination in the Chicago region.

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[14] Operation and maintenance in this context refers to dredging, navigation devices, lock operation etc. The actual ownership and operation of the towboat including vessels, barges, crew wages, fuel, etc is paid entirely by the barge company. They also pay a fuel tax that amounts to slightly less then $100 million annually.

[15] Prairie Rivers Network Action Alert dated February 6, 2009. They are the Illinois Affiliate of the National Wildlife Federation.

[16] Congressional Budget Office, May 1992. Paying for Highways, Airways, and Waterways: How can users be charged? Pg.2.

This is based on a review of several different sources including the CREATE project, the Illinois Railroad Association, the US Census 2007 Commodity Flow Survey, and the Chicago Metropolis 2020 Report published in December 2004. The 2007 Commodity Flow Survey indicated 790,000 tons in the region[17]. The Chicago Metropolis 2020[18] study provided a modal estimate for 2002 and a 2010 forecast for the State of Illinois[19]. This indicated a total of 1.289 billion tons for all freight modes in 2002 and 1.589 billion tons for 2010 for the State of Illinois. Given that Chicago is the transportation and commercial center for the State of Illinois and contains 74% of its population[20] the one billion ton value represents a reasonable upper value for the 2007-08 period used in this analysis.

Thus, the seven million tons affected by the barriers represents only .70 -.88% of all traffic in the region—less than one percent of all traffic originating or terminating in the Chicago region. For simplicity and to acknowledge the uncertainties associated with the regional numbers we assume that a full one percent is affected.

It is also important to note that the seven million tons represents only about 30 percent of Port of Chicago traffic and only 18 percent of Illinois Waterway traffic.

If all seven million tons were transported by truck it would mean an additional 1000 daily truck trips[21] on a system that has several hundred thousand daily truck trips. The portion of I-80/I-94 south of Chicago carries 30,000-40,000 daily trucks. Many of the other Interstate Highways carry 10,000-20,000 daily trucks.[22]

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[17] 2007 Commodity Flow Survey for Chicago-Naperville-Michigan City area. US Census American Fact Finder.
[18] The Metropolitan Freight Plan: Delivering the Goods; Chicago Metropolis 2020; December 2004, pg 8.
[19] The source of the forecast was the Freight Analysis Framework, Federal Highway Administration, Office of Freight Management and Operations.
[20] Chicago-Naperville-Joliet Metropolitan Statistical Area in 2007 estimated by US Census at 9,524,673 population. State of Illinois estimated by US Census in 2007 at 12,852,548.
[21] 7,000,000/25 tons per truck=280,000 annually/275 equivalent (less truck traffic on weekends etc.) days=1,018 daily trucks.
[22] Illinois Department of Transportation website, Statewide Traffic Maps, Truck Count. www.gettingaroundillinois.com/default.aspx.

A further review of truck vehicle miles of travel (VMT) indicates that overall truck traffic in the region would increase by only 1/10 of one percent.[23] The reason for this small increase is that the truck trips to and from a transload facility are only a few miles in length whereas the Chicago region contains tens of thousands of trucks moving to and from points in the region as well as tens of thousands of trucks passing through the region.

The seven million tons of traffic represents about two rail unit trains[24] on a daily basis. This compares to many rail lines in the Chicago area that handle 50-100 daily freight trains. The CREATE project estimates that there are 500 daily freight trains in the Chicago area handling 37,500 rail carloads.[25] More significantly perhaps is the fact that two daily unit trains represents about the amount that a single 2,000 MW electric generating plant would receive on a daily basis. For example, the J.H. Campbell generating plant in West Olive, Michigan (on Lake Michigan south of Muskegon) is rated at 1,440 MW and uses 5 million tons of coal annually. All of this is delivered by rail in 1-2 daily unit trains.[26] The Will County Generating Station in Romeoville, IL is rated at 1,269 MW and also receives all of its coal by rail. It is used on-site at the plant and some is transloaded to barge to serve the Fisk (326 MW) and Crawford (542 MW) generating stations.[27]

Opponents of the barriers, among other claims, suggest that the regional economy would be devastated, costs would make the region uncompetitive and the region would be overwhelmed with truck traffic. The facts are the following:

- Only about one percent of overall freight traffic in the region would be affected and some would experience only minor inconvenience.

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[23] Truck vehicle miles of travel (VMT) would increase by .0009% and truck ton-miles would increase by .0010%. Regional data from 2007 US Census Commodity Flow Survey.
[24] Per TTI Report: 108 cars @ 110 tons/car=11,880 tons train x 300 days=3,564,000 tons/year x two trains =7,128,000 tons/year.
[25] Source: Chicago Region Environmental and Transportation Project (CREATE). USDOT, Federal Railroad Administration Issue Brief dated May 17, 2009.
[26] Consumers Energy Brochure on J.H. Campbell power plant.
[27] Midwest Generation Fact Sheets and other information.

- Overall transportation costs would increase by less then $70 million annually in a Chicago metropolitan area economy of $521 billion.[28]
- Truck traffic would increase by about a thousand trucks a day in the worse case (alternative A).
- Regional truck traffic would increase by 1/10 of one percent or less (VMT and ton-miles)
- Affected traffic is the equivalent of only two daily rail unit trains—about the amount needed to supply coal to a single large power plant. There are over 500 daily freight trains in the Chicago region.

Our conclusion is that seven million tons of cargo, whether carried by truck, barge or rail represents a very small portion of Chicago's freight transportation traffic.

8. Waterway traffic has been declining

Statistics provided by the US Army Corps of Engineers show that overall water traffic in the region is declining and barge traffic has declined more rapidly then overall traffic.

Table 6

Trends in Waterborne Traffic

1994-2007

(000's of tons)

| | 1994 | 2007 | % Change |
|---|---|---|---|
| Cal-Sag Channel | 12,874 | 6,256 | -51.4% |
| O'Brien Lock | 13,291 | 7,295 | -45.1% |
| Chicago Lock | 1,341 | 167 | -87.5% |
| Port of Chicago | 29,422 | 24,482 | -16.8% |

[28] Bureau of Economic Analysis, US Department of Commerce. 2008 GDP for Chicago-Naperville-Joliet MSA.

Source: U.S. Army Corps of Engineers, Waterborne Commerce Data, and Lock Usage Data

These declines occurred during a time when other modes of transportation such as rail and truck traffic were growing rapidly. For example, in the 1994-2007 period, US railroad revenue ton-miles grew by 49.0 percent; truck ton-miles grew by 33.3 percent and inland waterway ton-miles declined by 8.8 percent. [29]

The nationwide decline in domestic water transportation was evident on the component parts of the CWS and especially so on the Cal-Sag Channel and the O'Brien Lock where respectively traffic declined by 51 percent and 45 percent between 1994 and 2007. The actual number of loaded barges (see Table 3) handled at the O'Brien Lock declined from 8,360 in 1994 to 4,259 in 2008—only about half of the number handled in 1994.

9. The decline is evident in a survey of the system

The authors undertook a land based survey of the CWS on January 9-10, 2010. Because of time limitations, most of the effort was expended on the Cal-Sag Channel, Lake Calumet, and the Calumet River. We also looked at the Chicago North and South Branches and portions of the CSSC. We utilized 1998 charts of the Illinois Waterway System published by the US Army Corps of Engineers. Publicly avaiable aerial photos were also used. One striking observation was the fact that many of the 1998 shippers listed as receiving cargo on the waterway were no longer in business. Many former shipping sites were now vacant lots or converted to other non-industrial uses. This was especially evident on the North Branch of the Chicago River where only 3-5 active shippers remain. The North Chicago area is becoming gentrified and the long-term future for heavy industrial use is questionable. Other portions of the waterway similarly contained vacant

[29] Source: National Transportation Statistics 2009, Table 1-46b, updated September 2009; Bureau of Transportation Statistics, US Department of Transportation.

plots of land where there were former shippers, or large vacant or abandoned steel mills, elevators or other industrial structures. The effects of the deindustrialization of America are very evident in a visit to these areas. Various sources including the Federal Reserve Bank of Chicago mention "…Chicago's economy shifting toward high-value service production and away from freight – laden manufacturing."[30]

10. Other issues

a. Relocation Compensation. The construction of the proposed barriers would adversely affect certain businesses that would lose the direct water transportation option. In some cases, this would have little affect on the overall business since transportation cost may be a small part of their overall operating costs. In other cases, especially for a marine terminal business, it may be infeasible to continue. There are significant legal and political issues that need to be explored as to what compensation, if any, is owed to these businesses.

b. Job Impacts. The Illinois International Port District indicates that, in 2002, there were 3,367 direct jobs generated by activities at the port. These jobs are with terminal operators, stevedores, International Longshoreman's Association trucking firms, railroads, steamship agents, freight forwarders and customhouse brokers, warehousemen, federal government agencies, towing companies, pilot organizations, and marine construction companies.[31] The American Waterways Association indicates, "over 400 jobs would be put in jeopardy by lack of access to waterways"[32]if portions of the waterway were blocked.

The authors believe that the closure of portions of the Chicago Waterway System to commercial navigation would result in increased employment in the

[30] Federal Reserve Bank of Chicago Newsletter. 12-4-2006.

[31] Illinois International Port District web site Executive Summary.

[32] AWO website: Chicago Asian Carp Impact Fact Sheet; dated December 18, 2009. AWO notes this is based on responses from less than 50% of towing companies in the region.

transportation sector. There will, however, be a dislocation of jobs from areas where navigation is reduced to areas where it continues. There will likely be some loss of jobs association with the barge industry and for some terminals. However, there is still cargo to be loaded and unloaded even though the location may change somewhat. Jobs in certain sectors such as trucking and cargo handling should increase given the need to move cargo to and from areas that have lost direct barge service. Much of the estimated $64-69 million in additional costs associated with the barriers will be expended on wages for new truck driver and material handling jobs. There may also be additional railroad jobs.

c. New Transload Terminals. The barriers would require the construction of one or more transload terminals downstream of the blockage points. These could be funded by either the public or private sector. The public sector could conceivably purchase land, develop the terminal, and sublease it to private operators. There are numerous approaches and options that could be considered. The authors recognize the need but costs cannot be determined since they are dependent on location and development approach. A $1/ton cost was built into the costing estimate to reflect the need for this expenditure. In alternative A, this would amount to an income stream of about $7 million annually. This flow of funds could provide either the public or private sector monies for land acquisition, construction, and operation of a transload terminal.

11. Summary and conclusions

This analysis assumes that physical barriers would be constructed at or near the Chicago Lock and the O'Brien Lock. These barriers would preclude the waterborne passage of barges and require alternative approaches to continue to service end-user customers. It was assumed that new transload terminals would be constructed downstream of the barriers. Some or all of existing cargo movements would be offloaded at these locations and moved by truck, rail, or

pipeline to the customer. This would entail terminal, handling and transportation costs that are estimated at $64-$69 million or approximately $9-10 per ton.

The claims that “even a temporary closure of the locks will devastate the local economy and Illinois’ role in the regional, national, and global economies, endanger public safety and cause serious environmental harm” (Ill. Pg 10 and App.50a) cannot reasonably be supported. This analysis shows that freight traffic affected by the barriers represents less then one percent of freight traffic in the region and some of this would be inconvenienced in only a minimal way.

**END OF REPORT**

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Comment | | | | | | |
| Total tonnage | | | | | 6927000 | | 2008 tonnage at O'Brien Lock and Chicago Lock | | | | | | |
| **Costing parameters** | | | | | | | | | | | | | |
| Truck cost/hour | | | | | $100 | | 25-mile RT @ 25mph urban =1 hour @ $100/hour | | | | | | |
| Maximum load in tons | | | | | 25 | | 80,000# truck limit in Illinois. Assume 50,000# cargo | | | | | | |
| Truck operating cost/ton/hour (Drive time only) | | | | | $4/ton | 4 | $100/25 tons=$4/ton | | | | | | |
| Add'l handling costs for transload (Includes truck wait, equi | | | | | $5/ton | 5 | Bulk is $5 or less. Some cargo higher. | | | | | | |
| Additional costs for rail | | | | | $9.40/ton | 9.4 | Asssume 3.34 cents/ton mile for rail & 2.4 cents for barge @1000 miles (Eno Fdn) | | | | | | |
| Additional costs to resource or other | | | | | $7/ton | 7 | Assume some addl handling & higher costs in general. Considerable variance here | | | | | | |
| Additional terminal costs | | | | | $1/ton | 1 | New transload construction and operation | | | | | | |
| | | | | | | | | | | | | | |
| **Alternative A (Transload all and truck to/from existing business)** | | | | | | | | | Annual | Annual | Annual | Annual | Daily |
| | | % by | Tons by | Add'l handl | Add'l trans | Add'l term | Add'l Total | Total add'l | Add'l truck | Add'l truck | Add'l ton | Add'l ton | Est add'l |
| Total tons | | mode | mode | cost/ton | cost/ton | costs | cost/ton | costs | trips | VMT | miles w tare | mi cargo | trk trips |
| Truck | | 100 | 6927000 | $5 | $4.00 | $1 | $10.00 | $69,270,000 | 277080 | 6927000 | 190492500 | 86587500 | 1008 |
| Rail | | 0 | | | $9.4 | | $9.40 | $0 | | | note 1 | note 2 | |
| Other | | 0 | | | $7 | | $7.00 | $0 | | | | | |
| | | | | | | | | $69,270,000 | | | | | |
| **Alternative B (Transload and some rail)** | | | | | | | | | | | | | |
| Truck | | 80 | 5541600 | $5 | $4.00 | $1 | $10.00 | $55,416,000 | | | | | |
| Rail | | 20 | 1385400 | | $9.4 | | $9.40 | $13,022,760 | | | | | |
| Other | | 0 | 0 | | $7 | | $7.00 | $0 | | | | | |
| | | | | | | | | $68,438,760 | | | | | |
| **Alternative C (Transload rail, change terminals and pipeline)** | | | | | | | | | | | | | |
| Truck | | 50 | 3463500 | $5 | $4.00 | $1 | $10.00 | $34,635,000 | | | | | |
| Rail | | 30 | 2078100 | | $9.4 | | $9.40 | $19,534,140 | | | | | |
| Other (see note 4) | | 20 | 1385400 | | $7 | | $7.00 | $9,697,800 | | | | | |
| | | | | | | | | $63,866,940 | | | | | |
| | | | | | | | | | | | | | |
| | | 1. Assumes half of trip loaded (12.5 miles) @ 40 tons (includes tare) & half empty at 15 tons. | | | | | | | | | | | |
| | | 2. Assumes half of trip (12.5 miles) loaded with 25 tons of cargo. | | | | | | | | | | | |
| | | 3. Appears high for rail. Our estimates are that rail is about $4/ton higher for 500 miles; $8 for 1000. | | | | | | | | | | | |
| | | The high rail cost makes alternatives that use rail cost more. | | | | | | | | | | | |
| | | 4. Cargo could be delivered by barge to another location (eg., CSSC) or move into area from other sources | | | | | | | | | | | |
| | | by laker or other means. Pipeline could be used more extensively for certain products. | | | | | | | | | | | |
| | | Origin point of the traffic could be very different from todays origin (or destination). | | | | | | | | | | | |
| 1/30/2010Final | | | | | | | | | | | | | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | |
| | | | | | % of Region | | | |
| | | | | | | | | |
| Add'l truck VMT (from Table 7) | | | | 6927000 | 0.0009 | | | |
| Add'l ton miles (incl truck) | | | | 190492500 | NA | | | |
| Add'l ton miles (cargo only) | | | | 86587500 | 0.0010 | | | |
| | | | | | | | | |
| Total Chicago region truck VMT | | | | 7446170690 | | | | |
| Total Chicago region truck ton-miles | | | | 86985000000 | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | Emissions (Grams per Ton-Mile)see note1 | | | | | |
| | | | HC | CO | NOX | PM | CO2 | |
| | | | 0.02 | 0.136 | 0.732 | 0.018 | 64.96 | |
| Grams (based on 190492500 tm's) | | | 3809850 | 25906980 | 139440510 | 3428865 | 12374392800 | |
| Pounds (453.59gpp) | | | 8399 | 57115 | 307415 | 7559 | 27281009 | |
| | | | | | | | | |
| note1. TTI report used as a source | | | | | | | | |
| | | | | | | | | |
| 1/30/2010 | | | | | | | | |