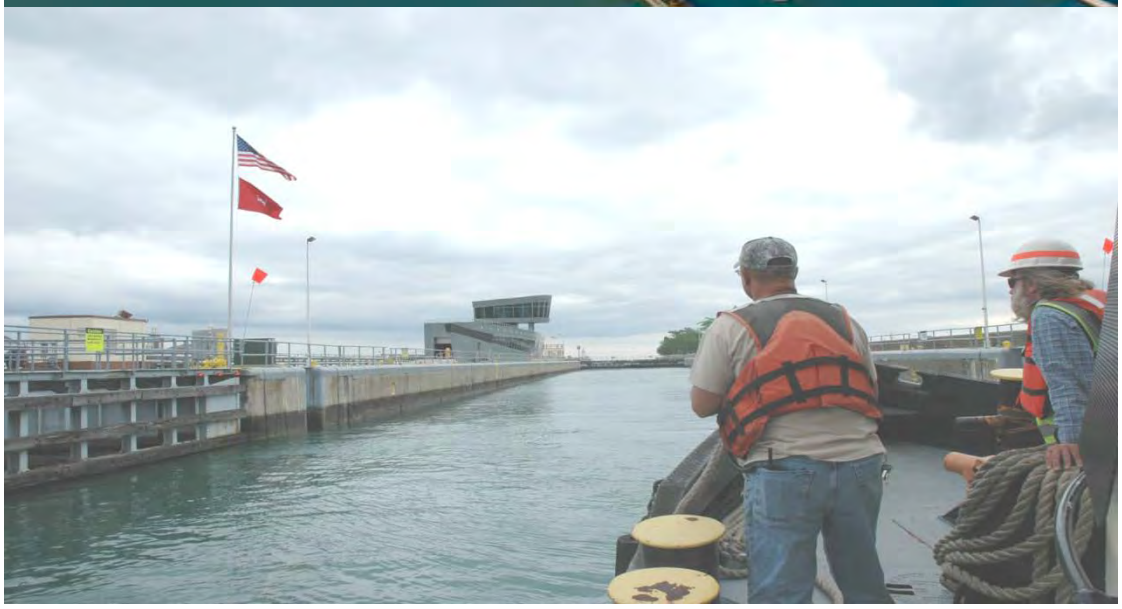
Dispersal Barrier Efficacy Study

INTERIM III – Modified Structures and Operations, Illinois & Chicago Area Waterways Risk Reduction Study and Integrated Environmental Assessment



June 2010

US Army Corps of Engineers ®
Rock Island District

US Army Corps of Engineers ®
Chicago District

Executive Summary

The U.S. Army Corps of Engineers (USACE) was directed in WRDA 2007, Section 3061(b)(1)(D) to conduct a study of a range of options or technologies for reducing impacts of hazards that may reduce the efficacy of the Electrical Dispersal Barriers located on the Chicago Sanitary and Ship Canal (CSSC), hereafter referred to as the Efficacy Study. The Electrical Dispersal Barriers were designed to reduce the risk of inter-basin transfer of fish from the Mississippi River and Great Lakes drainage basins via the CSSC. It consists of three electrical barriers, Barrier I, IIA and IIB that comprise the Electrical Dispersal Barrier Project. Barriers I and IIA are constructed and in operation. Construction of Barrier IIB is scheduled to be completed in 2010.

As Asian carp have migrated steadily northward up the Illinois River, the threat of these species gaining access to Lake Michigan and the rest of the Great Lakes has become generally recognized by many in the environmental community and among numerous federal, state and local government agencies as having potentially significant ecological and economic consequences, although many uncertainties remain about the ability of Asian carp to establish in the Chicago Area Waterways (CAWS) and Great Lakes. These issues have been the topic of a number of recent Congressional hearings and the subject of a Supreme Court action.

USACE and its multi-agency partners are not waiting to develop one comprehensive approach for near-term solutions. Rather, in order to address the increasing sense of concern surrounding the migration of Asian carp close to Lake Michigan, and consistent with the draft Asian Carp Control Strategy Framework recently released by the inter-agency Asian Carp Regional Control Committee, the Efficacy Study is being conducted in a series of interim studies as USACE identifies potentially implementable technologies and actions to deploy in support of this multi-agency effort.

(1) *Interim I*, *Dispersal Barrier Bypass Risk Reduction Study and Integrated Environmental Assessment* – This interim report was approved by the Assistant Secretary of the Army for Civil Works (ASA (CW)) on 12 January 2010 to construct measures to prevent Asian carp from bypassing the electrical barrier system during flood events on the Des Plaines River and through culverts in the Illinois and Michigan (I&M) Canal. The USACE awarded a construction contract on 21 April 2010 for the construction of the bypass barrier. Construction of the bypass barrier is expected to be completed by 28 October 2010.

(2) Interim II, *Electrical Barrier Optimum Operating Parameters* - The USACE is currently operating the existing Electrical Dispersal Barrier System at the optimal parameters based on prior test results. Under Interim II, the USACE is conducting further testing to confirm these optimal parameters, and this testing is scheduled to be completed by 30 September 2010.

(3) Interim III, *Modified Structures and Operations, Chicago Area Waterways Risk Reduction Study and Integrated Environmental Assessment* – This interim report is presented in this document. This report presents an evaluation of the potential for risk reduction that might be achieved through potential changes in the operation of the CAWS structures, such as locks, sluice gates, and pumping stations in consultation with the multi-agency working group. This report includes an assessment of operational changes that could be implemented as needed by agencies that are responsible for fish population management efforts such as electro-fishing,

spot piscicide application, or intensive commercial fishing efforts by the U.S. Fish and Wildlife (USFWS) and Illinois Department of Natural Resources (IDNR).

(4) Interim IIIA, *Fish Deterrent Barriers, Illinois and Chicago Area Waterways Risk Reduction Study and Integrated Environmental Assessment* – This interim report investigated and evaluated additional deterrent measures within USACE authority that could be quickly employed to potentially reduce the risk of the Asian carp dispersing into the Great Lakes. This report focuses on evaluating measures that apply readily available fish deterrent and guidance technologies at key locations in the CAWS and downstream in the Illinois Waterway (IWW). This analysis was initially included in the scope of Interim III, but was cycled out to consider fielding a developing technology that was thought to be quickly deployable and relatively inexpensive. All internal reviews have been completed, and it is anticipated that the report will be submitted to the ASA (CW) in June 2010.

(5) *Final Efficacy Report* - This report will provide a summary of all interim reports and recommend a multi-agency comprehensive strategy for improving the efficacy of the dispersal barriers and reducing the population effects of Asian carp within the area waterways. The report will evaluate additional risk reduction measures to specifically address the open pathways to Lake Michigan: the Grand Calumet River which outlets at the Indiana Harbor and Canal; and the Little Calumet River, which outlets at Burns Ditch. Near term efforts at population reduction of Asian carp will be carried out in cooperation with other agencies and concerned stakeholders. In all cases, permanent solutions to the inter-basin transfer of aquatic nuisance species will be evaluated in the longer term Great Lakes and Mississippi River Inter-Basin Study, (GLMRIS) which is underway.

Due to the perceived nature of the threat, an Interim Risk Reduction analysis was conducted following an existing USACE process to rapidly implement interim measures to mitigate unacceptable risks, USACE EC 1110-2-6064, Interim Risk Reduction Measures (IRRMs) for Dam Safety. While this expedited process was designed to evaluate dam structures, its concepts are applicable to other circumstances that require expedited development of solutions to reduce risk. The analysis identified four potential failure modes and then an analysis of alternatives was conducted to reduce risk and/or consequences associated with the failure modes.

The risk analysis considered modifications to structures, including locks, dams and water control structures, and lock operations to identify potential risk reduction measures that could be implemented by the USACE or other partner agencies. Included in the analysis were gate modifications, pumping station modifications and lock operation modifications. These measures have the potential to reduce the risk associated with successful challenges of Asian carp to the Electric Dispersal Barriers, and may have the potential to discourage the movement of Asian carp through the CAWS to Lake Michigan.

In this dynamic formulation process, the USACE PDT and the Interagency Team as well as the other members of the ACRCC are continuing to evaluate other methods to reduce the risk related to Asian carp migration in the CAWS. The intent is for the efforts of the ACRCC members, collectively and as individual agencies to implement measures that will complement each other. While extended lock closures have been suggested as an effective means of risk reduction, it was not further considered in this study because the expedited nature of this study

did not allow extended or permanent lock closure to be considered given the complicated nature of the impacts and issues that must be addressed as part of that evaluation.

The USACE is recommending implementation of risk reduction measures for Modified Structures and Operations that include the following: the installation of screens on the sluice gates at the O'Brien Lock and Controlling Works; and, the intermittent closure of locks in support of fish control efforts performed by resource agencies, upon request or in coordination with the U.S. Coast Guard.

Modified Structures and Operations to be implemented by other agencies include the installation of sluice gate screens at the Chicago River Controlling Works by the Metropolitan Water Reclamation District of Greater Chicago (MWRD), and Pumping Station Modifications to include the operation of the Wilmette Pumping Station by the MWRD for diversion water intake, if requested by resource agencies.

This report is integrated with an Environmental Assessment (EA) in compliance with the National Environmental Policy Act (NEPA) that assists with the planning and decision making. The EA provides environmental information and possible beneficial and adverse impacts of the proposed action available to the public and decision makers. The EA supports a Finding of No Significant Impact which concludes that an environmental impact statement is not required for this action.

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CHAPTER 1 – Introduction

1.1 – Dispersal Barrier Efficacy Study Purpose

The U.S. Army Corps of Engineers (USACE) was directed in Section 3061(b)(1)(D) of the Water Resources Development Act of 2007 (WRDA 2007), to conduct a study of a range of options or technologies for reducing impacts of hazards that may reduce the efficacy of the Electrical Dispersal Barrier located on the Chicago Sanitary and Ship Canal (CSSC), hereafter referred to as the Efficacy Study. The Electrical Dispersal Barrier was designed to reduce the risk of inter-basin transfer of fish from the Mississippi River and Great Lakes drainage basins via the CSSC, and it has been partially completed.

The first dispersal barrier was authorized as a demonstration project under section 1202(i)(3) of the Aquatic Nuisance Prevention and Control Act P.L. 101-646, and Barrier I has been in operation since April 2002. The second dispersal barrier was initially implemented by Section 1135 of WRDA 1986, P.L. 99-662, as further authorized by section 345 of the District of Columbia Appropriations Act of 2005, P.L. 108-335. Barrier II is a set of two barriers, Barrier IIA and Barrier IIB. Barrier IIA has been in operation since April 2009 and Barrier IIB is under construction and is scheduled for completion in 2010. The combination of these three barriers is designed to function together to reduce the risk of inter-basin transfer of fish from the Mississippi River and Great Lakes drainage basins. Any additional Interim Risk Reduction Measures (IRRMs) implemented as a result of this study will potentially complement the electrical dispersal barrier, so that the electrical dispersal barriers and these additional measures will be operated collectively as a system when fully functional.

Although the Electric Dispersal Barrier system is designed to prevent the movement of any fish species through the CSSC, the current species of concern are the Asian carp (Cypriniformes: Cyprinidae). Asian carp have the potential to damage the Great Lakes and confluent large riverine ecosystems. Two species of Asian carp, bighead carp (*Hypophthalmichthys nobilis*) and silver carp (*H. molitrix)*, have become well established in the Mississippi and Illinois Rivers exhibiting exponential population growth in recent years. Certain life history traits have enabled bighead and silver carp to achieve massive population numbers soon after establishing a presence in an area.

The USACE is implementing a four-pronged strategy to address the propagule pressure these two target species of Asian carp may be placing on the Electrical Dispersal Barrier. Propagule pressure is defined by the number and quality of invading organisms. Because propagule pressure is considered to be directly proportional to the success of invasions, “Minimizing the number of invading individuals is key to preventing the successful establishment of a species” (Chapman, 2010). The purpose of this Interim report is to evaluate whether modifying the operation of locks, gates, pumping stations and other structures within the Chicago Area Waterways (CAWS) and the Illinois Waterway (IWW) could be effectively applied to minimize the risk of Asian carp dispersal into Lake Michigan. The strategy is consistent with the February 2010 *Draft Asian Carp Control Strategy Framework*, developed by the Asian Carp Workgroup, which includes the United States Environmental Protection Agency (USEPA), the United States Fish and Wildlife Service (USFWS), the United States Coast Guard (USCG), the Illinois Department of Natural Resources (IDNR), the City of Chicago, the Metropolitan Water

Reclamation District of Greater Chicago (MWRD), the White House Council on Environmental Quality (CEQ), the United States Geological Survey (USGS), the Great Lakes Fishery Commission (GLFC) and the USACE. Operating within this framework, USACE is executing a four-pronged strategy consisting of:

(1) operation, maintenance, and improvement of the Electrical Dispersal Barrier;
(2) monitoring for the potential presence of Asian carp;
(3) using the Efficacy Study process to recommend additional measures to reduce the risk of Asian carp from entering Lake Michigan; and,
(4) using the Great Lakes and Mississippi River Inter-Basin Study to develop long term solutions.

The Efficacy Study is being conducted and documented in a series of interim studies and associated reports:

- Interim I*, Dispersal Barrier Bypass Risk Reduction Study and Integrated Environmental Assessment* – This interim report was approved by the Assistant Secretary of the Army for Civil Works (ASA(CW)) on 12 January 2010 to construct measures to prevent Asian carp from bypassing the electrical barrier system during flood events on the Des Plaines River and through culverts in the Illinois and Michigan (I&M) Canal. The USACE awarded a construction contract on 21 April 2010 for the construction of the bypass barrier. Construction of the bypass barrier is expected to be completed by 28 October 2010.

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Waterway (IWW). This analysis was initially included in the scope of Interim III, but was cycled out to consider fielding a developing technology that was thought to be quickly deployable and relatively inexpensive. All internal reviews have been completed, and it is anticipated that the report will be submitted to the ASA (CW) in June 2010.

- *Final Efficacy Report* - This report will provide a summary of all interim reports and recommend a multi-agency comprehensive strategy for improving the efficacy of the dispersal barriers and reducing the population effects of Asian carp within the area waterways. The report will evaluate additional risk reduction measures to specifically address the open pathways to Lake Michigan: the Grand Calumet River which outlets at the Indiana Harbor and Canal; and the Little Calumet River, which outlets at Burns Ditch. Near term efforts at population reduction of Asian carp will be carried out in cooperation with other agencies and concerned stakeholders. In all cases, permanent solutions to the inter-basin transfer of aquatic nuisance species will be evaluated in the longer term Great Lakes and Mississippi River Inter-Basin Study, (GLMRIS) which is underway.

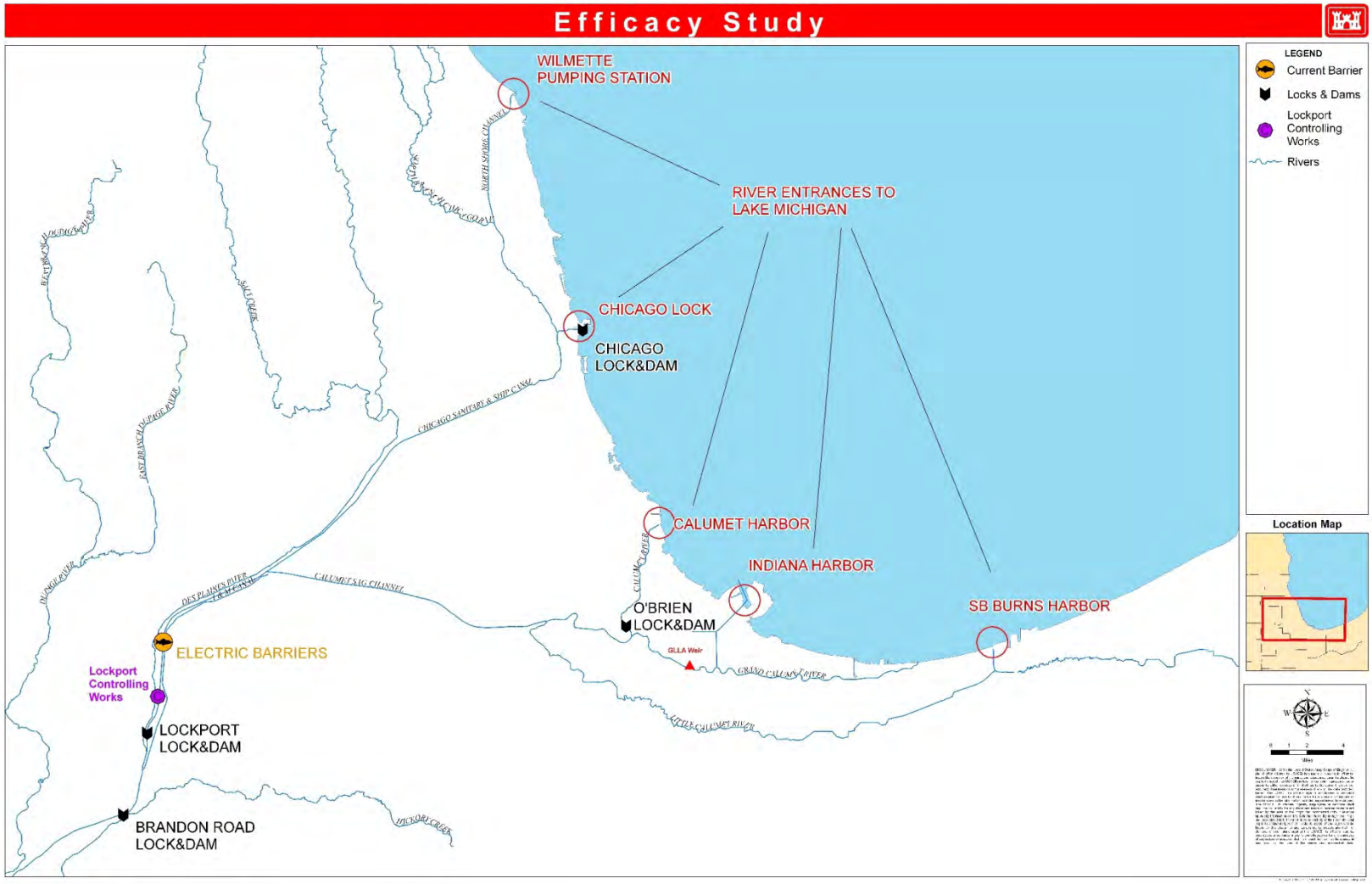
In this dynamic process, USACE and federal, state and local agencies are evaluating many options and cycling out concepts as they are ready for evaluation and potential implementation based on thorough analyses, review, approval and any necessary authorization. These options have independent utility, potentially each providing ways to impede Asian carp migration, and can be considered in separate decision-making processes. Ultimately, any implemented measures are expected to complement each other to provide a comprehensive solution pending further assessment of a possible permanent solution.

In collaboration with Federal, State and local agencies as well as nongovernmental entities USACE is conducting a Feasibility Study of the long-term options and technologies that could be applied to prevent or reduce the risk of aquatic nuisance species (ANS) transfer between the Great Lakes and Mississippi River basins through aquatic pathways, where aquatic pathways are defined as natural and manmade hydraulic connections between the Great Lakes and Mississippi River basins. The Great Lakes and Mississippi River Interbasin Study (GLMRIS) Feasibility Study will provide a thorough and comprehensive analysis of these Aquatic Nuisance Species (ANS) controls. Additionally, GLMRIS will analyze the affects each alternative plan would have on the current uses of the CAWS, including the CSSC, and other identified aquatic pathways between the GL and MR basins. Interim I of GLRMIS will specifically address the CAWS. The report will include evaluations of all current uses of the waterway and Lake Michigan including: commercial and recreational fishing, commercial navigation, small boat navigation, flood risk management, municipal and industrial water supplies, hydropower, and water quality diversion. The study shall also address the need to mitigate or provide alternative facilities or measures for current uses that may be affected by study recommendations.

This report presents the results of the Interim III study. The report consists of six (6) parts including a main report and five appendices with figures and tables. The report is structured as follows:

- Main Report and Integrated Environmental Assessment
- FONSI
- Appendix A – Hydrology and Hydraulics
- Appendix B - Civil Design
- Appendix C - Cost Engineering
- Appendix D – Planning Information
- Appendix E – Coordination

Figure 1 – Map of the IWW and CAWS with Key Points of Interest



1.2 – Study & Implementation Authorities

Several statutory authorities are relevant to the measures considered in this report. The first is Section 3061(b)(1)(D) of the Water Resources Development Act of 2007 (P.L. 110-114) which is a study authority only. This authority does not authorize implementation of any Efficacy Study recommendations. The second authority is from Section 126 of the Energy and Water Appropriations Act of 2010 (P.L. 111-85) which provides authority to implement recommendations from the Interim Efficacy Reports. The Section 126 authority expires on October 28, 2010. These two authorities are quoted below.

WRDA 2007 SEC. 3061. CHICAGO SANITARY AND SHIP CANAL DISPERSAL BARRIERS PROJECT, ILLINOIS.

> (a) TREATMENT AS SINGLE PROJECT.—The Chicago Sanitary and Ship Canal Dispersal Barrier Project (in this section referred to as ''Barrier I''), as in existence on the date of enactment of this Act and constructed as a demonstration project under section 1202(i)(3) of the Nonindigenous Aquatic Nuisance Prevention and Control Act of 1990 (16 U.S.C. 4722(i)(3)), and the project relating to the Chicago Sanitary and Ship Canal Dispersal Barrier, authorized by section 345 of the District of Columbia Appropriations Act, 2005 (Public Law 108–335; 118 Stat. 1352) (in this section referred to as ''Barrier II'') shall be considered to constitute a single project.
> (b) AUTHORIZATION.—
> (1) IN GENERAL.—The Secretary, at Federal expense, shall—
> (A) upgrade and make permanent Barrier I;
> (B) construct Barrier II, notwithstanding the project cooperation agreement with the State of Illinois dated June14, 2005;
> (C) operate and maintain Barrier I and Barrier II as a system to optimize effectiveness;
> (D) conduct, in consultation with appropriate Federal, State, local, and nongovernmental entities, a study of a range of options and technologies for reducing impacts of hazards that may reduce the efficacy of the Barriers; and
> (E) provide to each State a credit in an amount equal to the amount of funds contributed by the State toward Barrier II.

Energy and Water Development and Related Agencies Appropriation Act 2010. SEC. 126

> During the 1-year period beginning on the date of enactment of this Act, the Secretary of the Army shall implement measures recommended in the efficacy study, or provided in interim reports, authorized under section 3061 of the Water Resources Development Act of 2007 [121 Stat. 1121] with such modifications or emergency measures as the Secretary of the Army determines to be appropriate, to prevent aquatic nuisance species from bypassing the Chicago Sanitary and Ship Canal Dispersal Barrier Project referred to in that section and to prevent aquatic nuisance species from dispersing into the Great Lakes.

The remaining relevant authorities relate to the Corps' operation of the Chicago lock and the O'Brien lock and controlling works. The Chicago Harbor Lock was built by the Chicago Sanitary District in 1938 to accommodate existing navigation and comply with a 1930 Supreme Court decree regarding the amount of Lake Michigan water diverted at Chicago. In the Supplemental Appropriations Act of 1983, Public Law 98-63, 97 Stat. 311, Congress transferred the operation and maintenance responsibilities for the Chicago lock to the Corps, and in 1984 the Corps and the Metropolitan Sanitary District (later known as MWRD) entered into a Memorandum of

Agreement with regard to the operation of the lock and controlling works for purposes of navigation, water quality, and flood control. A specific regulation, 33 C.F.R. § 207.420, governs how the Chicago lock and controlling works are operated with regard to controlling water levels in the Chicago River. The statutory and regulatory provisions are quoted below.

—

Supplemental Appropriations Act of 1983, Public Law 98-63, 97 Stat. 311 (July 30, 1983)

> Section 107 of Public Law 97--88 // 95 Stat. 1137. // pertaining to maintenance and operation of the Chicago Sanitary and Ship Canal of the Illinois Waterway in the interest of navigation includes the Control Structure and Lock in the Chicago River, and other facilities as are necessary to sustain through navigation from Chicago Harbor on Lake Michigan to Lockport on the Des Plaines River.

33 C.F.R. § 207.420(a)&(b)(1)-(2)- Chicago River, Ill.; Sanitary District controlling works, and the use, administration, and navigation of the lock at the mouth of river, Chicago Harbor.

> (a) Controlling works. The controlling works shall be so operated that the water level in the Chicago River will be maintained at a level lower than that of the lake, except in times of excessive storm run-off into the river or when the level of the lake is below minus 2 feet, Chicago City Datum.
>
> (1) The elevation to be maintained in the Chicago River at the west end of the lock will be determined from time to time by the U.S. District Engineer, Chicago, Illinois. It shall at no time be higher than minus 0.5 foot, Chicago City Datum, and at no time lower than minus 2.0 feet, Chicago City Datum, except as noted in the preceding paragraph.
>
> (b) Lock--
>
> (1) Operation. . .The lock gates shall be kept in the closed position at all times except for the passage of navigation.
>
> (2) Description of lock. . . Depth over Sills – 24.4 feet. [FN1] This depth is below Chicago City Datum which is the zero of the gages mounted on the lock. The clear depth below Low Water Datum for Lake Michigan, which is the plane of reference for U.S. Lake Survey Charts, is 23.0 feet. . .

The Rivers and Harbors Act of 1946, Public Law 79-525, 60 Stat. 634, authorized the construction and operation of the O'Brien lock and controlling works by the Corps. In 1966, the Corps and MWRD entered into a Memorandum of Agreement to operate the lock and controlling works for the purpose of navigation, water levels and flood control. A specific regulation, 33 C.F.R. § 207.425, governs how the O'Brien lock and controlling works are operated with regard to controlling water levels in the Illinois Waterway. The statutory and regulatory provisions are quoted below.

Rivers and Harbors Act 1946, Public Law 79-525, 60 Stat. 634 (July 24, 1946)

> Construct in the Calumet River just north of its junction with the Little Calumet River a lock of suitable dimension for barge navigation, with necessary control works to prevent reversals of flow and to regulate water levels and water diversion.

33 C.F.R. § 207.425 - Calumet River, Ill.: Thomas J. O'Brien Lock and Controlling Works and the use, administration and navigation of the lock.

(a) Controlling Works.

(1) The controlling works shall be so operated that the water level at the downstream end of the lock will be maintained at a level lower than that of Lake Michigan, except in times of excessive storm run-off into the Illinois Waterway, or when the lake level is below minus 2 feet, Chicago City Datum.

(2) The elevation to be maintained at the downstream end of the lock shall at no time be higher than minus 0.5 feet, Chicago City Datum, and at no time lower than minus 2.0 feet, Chicago City Datum, except as noted in paragraph (a)(1) of this section.

(b) Lock--

(1) Operation. The Thomas J. O'Brien Lock and Dam is part of the Illinois Waterway which is a tributary of the Mississippi River. All rules and regulations defined in §207.300, Ohio River, Mississippi River above Cairo, Illinois, and their tributaries; use, administration and navigation shall apply.

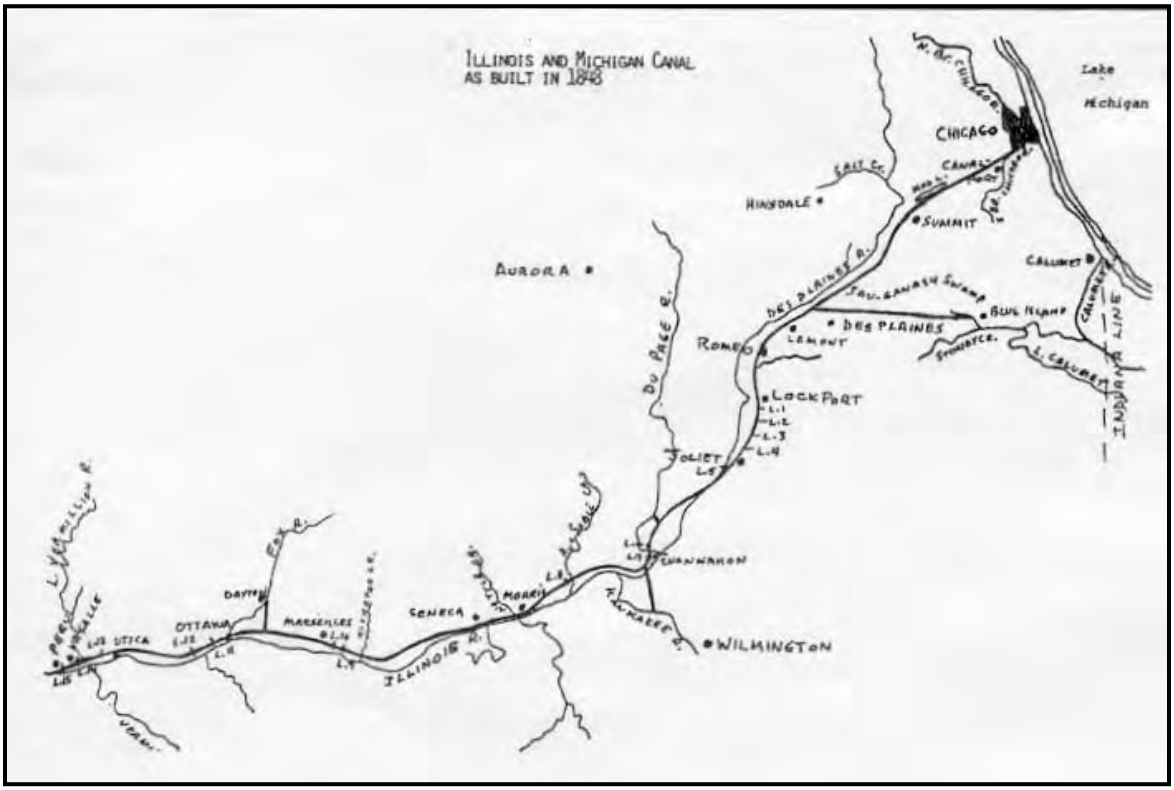
1.3 – Study Background

Prior to anthropogenic intervention, the Chicago and Calumet Rivers were essentially wetland complexes that sluggishly flowed east into Lake Michigan. The Des Plaines River naturally flowed west into the Mississippi River drainage. There were periods of high flow when the Des Plaines River changed its course and flowed into the Chicago and Calumet Rivers due to the relatively flat topography of the region. Two critical locations existed, referred to as hydraulic divides, and known as Mud Lake and Saganashkee Slough. Sporadically, during spring floods, Mud Lake and the Saganashkee Slough would overflow into the West Fork of the South Branch of the Chicago River near Kedzie Avenue and the Little Calumet River near Blue Island. This flow reversal provided a temporary connection between the respective drainage basins. The following description of the development of the CAWS illustrates the significant investments in the growth of the City of Chicago over the past 150 years to convert these natural waterways toward multiple human purposes associated with navigation and commerce, sanitary waste water management and recreation.

The economic opportunity provided by this natural occurrence was seized in 1848 with completion of the Illinois and Michigan (I&M) Canal (Figure 2). The dimensions of the original I&M Canal were 60-feet wide at the surface, 36-foot wide at the base, and 6-feet deep. Immediately after, in the spring of 1849, the Little Calumet River was connected to the Illinois and Michigan Canal via a 40-foot wide and 4-foot deep Calumet Feeder Canal, which ditched through the Saganashkee Slough. The I&M Canal gave way to a much larger Sanitary and Ship Canal started in 1892 that connected Lake Michigan with the Illinois Waterway. The permanent connection between the Lake Michigan and the Mississippi drainage was finalized with the completion of the Sanitary and Ship Canal in 1900. On the Calumet River, the Corps of Engineers removed sandbars and built piers at the mouth during 1870-1882; between 1888-1896 the river between Lake Michigan and Lake Calumet was straightened; between 1899 and 1916 the Calumet River was dredged to a depth of 16 feet; between 1911-1922 the Calumet Feeder Canal was obliterated by the construction of the Cal-Sag Channel, which was incised

through a vast and unique dolomite prairie, formerly the Saganashkee marshland. With the completion of joining the Cal-Sag Channel with the Calumet River, the Calumet Region's drainage was reversed; and in 1961 the Calumet River was completely reversed by the construction of the O'Brien lock and dam near the original confluence with Lake Michigan. The I&M Canal is no longer in operation.

Figure 2 - Map showing early configuration of CAWS (1848) and upper reaches of Illinois River.



Since the creation of the canal system, poorly treated wastewater, low dissolved oxygen concentrations, high ammonia concentrations and other contaminants formed an effective "barrier" not only to colonization of the canal by native pioneer species, but to introduced species as well. Significant improvements in water quality over the last two decades have allowed the aquatic conditions in the canal to become suitable for native and introduced species of the tolerant sort, which both share pioneering attributes.

There was inter-basin transfer of aquatic species between the Mississippi River and the Great Lakes naturally in the past after various glaciation and major flood events, which naturally drives speciation and biogeography; however the man-made connection in conjunction with non-native species introduction (both accidentally and purposefully) poses a great threat to these processes. This was first realized for fish in the early 1990s when the introduced eastern European *Neogobius melanostomus* round goby and the Atlantic slope *Morone americana* white perch were found in southern Lake Michigan. In an effort to contain their range expansion, the Nonindigenous Aquatic Nuisance Prevention and Control Act of 1990 P.L. 101-646 as amended

by the National Invasive Species Act of 1996 P.L. 104-332, authorized the Assistant Secretary of the Army for Civil Works (ASA(CW)) to examine potential methods to create an aquatic nuisance species dispersal barrier in the CSSC. In November 1997, Congress appropriated $500,000 to begin work on the project. In April 2002, the electrical barrier was turned on in an attempt to prevent fish from dispersing to and from the Great Lakes and Mississippi River basins after nearly 140 years of unnatural nexus. This dispersal barrier complex located at river mile 296.25 in the CSSC was to be the first stop gap measure to prevent the spread of aquatic nuisance species (ANS) species. Unfortunately, the round goby and white perch dispersed faster than anticipated and were well past the dispersal barrier site by the time construction was able to commence. The decision to construct the barriers was prudent since a new threat was imminent from the Mississippi River system – the silver and bighead carp.

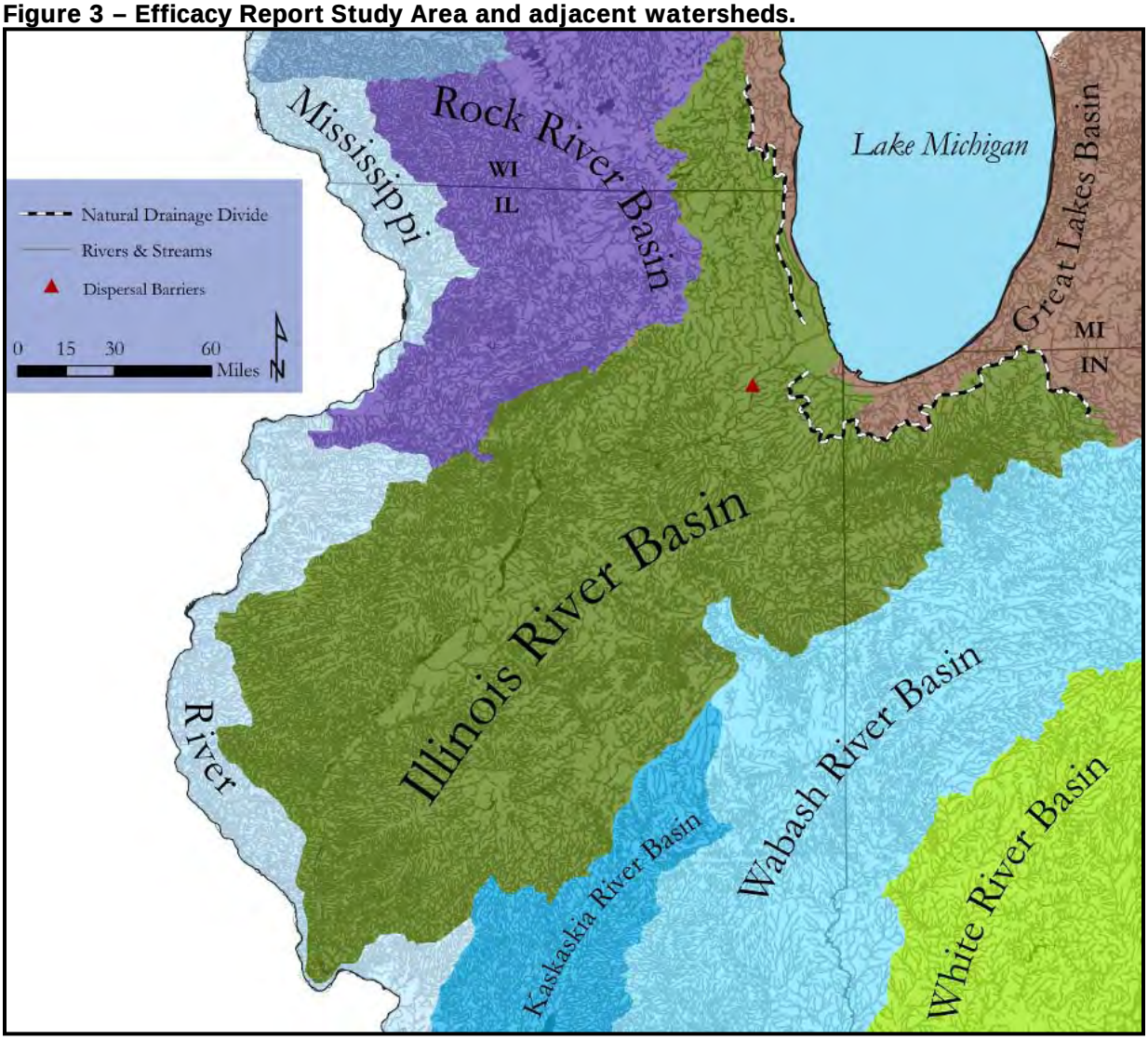
A number of government and non-governmental organizations led by the USFWS contributed to the *Management and Control Plan for Bighead, Black, Grass, and Silver carps in the United States*, dated October 2007. Due to heightened concern about the target species in the Great Lakes, the Asian Carp Regional Coordinating Committee comprised of Federal and State agencies is working collaboratively to bring their particular authorities and knowledge together to reduce the threat of Asian carp establishment in the Great Lakes. The group prepared the Draft Asian Carp Control Strategy Framework (referred to hereafter as the Framework) to document actions already undertaken and to identify potential courses of action to be implemented in both the near and short term. The actions outlined in the Framework, such as ongoing electro-fishing and netting and potential rotenone applications by our multi-agency partners, provides the context for the analysis in this report. The actions in the Framework have been divided into three categories, and there is a workgroup established for each. The categories are: (1) Invasion Control; (2) Monitoring and Rapid Response; and, (3) Communication and Outreach.

The Framework is designed to establish the need for participating agencies to act urgently to apply full authorities, capabilities and resources to prevent Asian carp from becoming established in the Great Lakes; to integrate and unify the impending actions of the participating agencies; and to facilitate cooperation by additional agencies. It also serves to identify lead agencies for particular actions.

1.4 – General Study Area

The regional study area for the fish dispersal system includes the Mississippi River and Great Lakes Basins, the IWW and the CAWS (See Figures 1 and 3). The general vicinity of the study area includes reaches of the CSSC, lower Des Plaines River, I&M Canal, Cal-Sag Channel, Calumet River, Little Calumet River, Grand Calumet River, Chicago River, South Branch Chicago River, North Branch Chicago River and North Shore Channel. The study area is in all or part of Cook, Du Page, Lake and Will Counties in the metropolitan Chicago area in Illinois, and in Lake County, Indiana. The electric Dispersal Barriers Project is located at river mile 296.25, roughly 0.2 miles or 1300-feet upstream of the 135th Street Bridge in Romeoville, IL (Figures 3 & 9). The electric Dispersal Barriers Project site lies in the southeast ¼ of the southwest ¼ of section 35, T37N R10E, Lockport Township, in Will County.

Figure 3 – Efficacy Report Study Area and adjacent watersheds.



1.5 – Existing Projects

Illinois Waterways

The Illinois Waterways, including the CAWS, provide a hydraulic connection between Lake Michigan and the Mississippi River. Natural flow regimes were modified through a series of engineered projects to establish the existing configuration of the waterways. Modifications occurred over the past 100 or more years to accommodate the needs of regional and local interests. Modifications included channel construction, lock and dam construction, and operation and maintenance activities. Presently, navigation is affected by maintenance of sufficient water levels in pools behind the dams, operation of locks to pass boat and barge traffic at the lock and dam sites, dredging in certain areas to maintain channel depth, and clearing and snagging to keep the channel clean. The formal authorization for the USACE to perform operation and maintenance activities on the Illinois Waterway was given in the Rivers and Harbors Act of 1927, 1930, and 1935, (P.L. 69-560, 71-520, and 74-409).

The Illinois Waterways include the Chicago, Des Plaines, and Illinois Rivers, plus numerous canals, in particular the CSSC, the Calumet Sag Channel and the navigable portions of the Little Calumet and Calumet Rivers. The completion of the I&M Canal linking Lake Michigan to the Illinois River was completed in 1848. In 1900, the upper end of the I&M Canal was replaced as far south as Lockport by the CSSC which, in addition to providing sanitation, was available for navigation. In 1922, the Metropolitan Water Reclamation District of Greater Chicago (MWRD) completed the construction of the Calumet Sag Channel for the purpose of preventing pollution of Lake Michigan by reversing the flow of the Calumet River. Today the Illinois Waterway is completely navigable with a minimum depth of nine feet over its stretch of 350-miles for commercial navigation to near Alton, IL. The physical components of the navigation system are the eight sets of locks, seven with accompanying dam structures, and the navigation channel.

The CAWS consists of 78 miles of canals and modified streams located within Cook and surrounding counties. The CAWS consists of the Chicago River, its two main branches (North Branch and South Branch), as well as the Calumet Sag Channel, the Chicago Sanitary and Ship Canal, and the tributaries in an area extending from the metropolitan Chicago area to the Lockport vicinity. It also includes Lake Calumet.

The diversion of water from Lake Michigan is closely regulated. Water is diverted for numerous purposes including water supply, navigation makeup and water quality. Currently, the Lake Michigan diversion accountable to the state of Illinois is limited to 3,200 cfs over a forty- year averaging period. The measurement of the quantity of Lake Michigan diversion water and the method for accounting are specified in the U.S. Supreme Court Decree and in a 1996 Memo of Understanding (MOU) between the U.S. Department of Justice and eight states bordering the Great Lakes. The Illinois Department of Natural Resources (IDNR) controls and regulates Lake Michigan diversion water. The USACE is responsible for computing the annual Illinois Lake Michigan diversion and preparing an annual diversion report for IDNR.

Chicago Lock – The Chicago Lock, also known as the Chicago Harbor Lock is situated at the mouth of the Chicago River (Plate 02). This lock is the primary controlling mechanism of the Illinois Waterway separating Lake Michigan from the Chicago River. The current lock was designed and built by the Sanitary District of Chicago (now the Metropolitan Water Reclamation District of Greater Chicago). An unusual aspect of the Chicago Lock is its use of sector gates, a gate type normally used in tidal reaches of rivers and canals.

The Chicago Lock complex is comprised of a lock chamber, concrete guide walls, and a lock control house. The lock chamber measures 600-feet long, 80-feet wide, and 22.4-feet deep and is equipped with two sets of rotating double-leaf sector gates (one set at each end). Sector gates resemble traditional miter gates, except each gate is shaped like a pie-sliced sector of a cylinder oriented to rotate about a vertical axis. This form of lock system does not utilize valves, sluices or culverts.

Also located at the Chicago Lock is the Chicago River Controlling Works (CRCW). The CRCW consists of two sets of four sluice gates. Each gate has a 10' x 10' opening.

The Chicago Lock/CRCW has three primary functions. First it serves as a hydraulic gateway between the Chicago River and Lake Michigan. Used by more than 40,000 commercial and

recreation vessels a year, this is the second-busiest navigational lock in the United States. The lock and CRCW also plays a role in reducing pollution, by letting controlled quantities of lake water into the Chicago River for water quality purposes. Lastly, the lock and CRCW functions as flood control releasing excess water from the Chicago River into the lake during periods of extreme high water.

T.J. O'Brien Lock and Dam – The Thomas J. (T.J.) O'Brien Lock and Dam is 326.0 miles above the confluence of the Illinois River with the Mississippi river at Grafton, Illinois (Plate 04). It is approximately 35 miles upstream of the Lockport Lock and Dam, in the southeastern portion of Chicago. T.J. O'Brien is located seven miles southwest from the entrance to Lake Michigan along the Calumet River. The facility is a unit of the Inland Waterway Navigation System and is one of eight such facilities between Chicago and Versailles, IL. It is composed of a navigational lock, fixed dam, and controlling works.

O'Brien is a low-lift sector gate lock. It provides a maximum lift of five feet for traffic passing from Lake Michigan to the Calumet River. The lock chamber is 1,000-feet long by 110-feet wide. The dam is 296.75 feet long. The controlling works consist of four large vertical slide gates (10 feet square) located near the center of the dam to regulate water flow. There are also two sets of sector gates weighing 216 tons each at both the river and lake ends. T.J. O'Brien Lock and Dam and controlling works control the movement of water between Lake Michigan and the Calumet River while maintaining navigation. The controlling works are used for flood control and water quality diversion.

Lockport Lock and Dam –The Lockport Lock and Dam is 291.0 miles above the confluence of the Illinois River with the Mississippi River at Grafton, IL (Plate 06). The complex is two miles southwest of the city of Lockport, Illinois. The lock opened in 1933. The lock is 110 feet wide by 600 feet long. Maximum vertical lift is 42.0 feet; the average lift is 39 feet. It averages 22.5 minutes to fill the lock chamber; 15 minutes to empty.

Lockport Lock was one of five designed and partially constructed by the state of Illinois over a period from 1923 to 1930. The complex was about 97 percent complete when construction was turned over to the federal government due to state financial difficulties. The USACE controls the lock at Lockport. The Lockport Dam consists of the MWRD lock, powerhouse and associated controlling works. The USACE has no ownership of the controlling works; however, it has the responsibility to maintain the foundation, piers, dolphins and all the concrete at the Lockport Controlling Works and the gravity structure at the dam. This dam serves the multiple purposes of power generation, flood control, and navigation. The role of the controlling works is primarily to control flooding due to large rainfall events. North of Lockport the CSSC lies between high retaining walls backed by earth embankments with the level of the canal being above the level of the surrounding terrain. The dam is a 260 foot long dam, which contains 15 gate openings. Eight of the gate openings have never been used and are sealed with concrete bulkheads. The seven remaining gates are equipped with 30 foot wide by 20 foot high vertical lift sluice gates. The gates are operated with a 3HP Electrical drive mechanism and counterweight.

Brandon Road Lock and Dam – Brandon Road Lock and Dam is 286 miles above the confluence of the Illinois River with the Mississippi river at Grafton, Illinois (Plate 07). The complex is located 27 miles southwest of Chicago; 2 miles southwest of Joliet, Illinois, near Rockdale. Brandon Road Dam, located on the Des Plaines River just below the city of Joliet, Illinois, is a

fixed concrete structure, 1,569 feet long. The height of the pool and discharge past the dam are controlled by twenty-one 50-foot tainter-type crest gates which hold the normal pool 27 inches above the crest of the masonry. Six openings through the dam, previously controlled by sluice gates, have been sealed and are no longer used. A 320-foot section of head gates which was designed for future addition of a powerhouse contains eight operating head gates used for passing water. An ice chute and two sections of earth embankment complete the dam. The major portion of the short pool is the city of Joliet and is in part contained between flood walls varying in height to a maximum of 35 feet.

The lock is 600 feet long, 110 feet wide. Nominal lift is 34 feet with an average 19-minute lock chamber fill time; 15-minute emptying time. The dam is 2,391 feet long (exclusive of fixed embankment and river wall). It contains 21 operational Tainter gates (50 feet wide by 2 feet, 3-1/2 inches high), six sluice gates (7 feet, 9 inches wide x 8 feet, five inches high, bulkheaded closed), and 16 pairs of 16 feet high by 15 feet wide headgates (eight operational, eight bulkheaded closed). The lock opened in 1933 and was one of five designed and partially constructed by the state of Illinois over a period from 1927 to 1930. The complex was about 70 percent complete when construction was turned over to the federal government due to state financial difficulties.

Wilmette Pumping Station – The Wilmette Pumping Station is located on the North Shore Channel, approximately 1500 feet from the open waters of Lake Michigan. The pump house forms a part of the structure of the Sheridan Road Bridge over the North Shore Channel in the City of Wilmette. The purpose of the pumping station is to control the movement of water between Lake Michigan and the North Shore Channel. The pumping station is also used for flood control and water quality diversions.

The Wilmette Pumping Station consists of a pump house and a large sluice gate. The sluice gate is located on the channel side south of the pump station is used to control the diversion of water from Lake Michigan. The sluice gate is 32 feet wide by 16 feet high. The pump house consists of four pumps, housed in individual bays fronted by trash racks, with flap gates at the downstream end of each bay to prevent backflow.

Locks and Controlling Works of the Chicago Area Waterways

Lockport Lock and Powerhouse, Lockport Controlling Works, Chicago River Controlling Works (CRCW), O'Brien Lock and Dam, and Wilmette Pumping Stations serve as controlling points to maintain proper water levels in the Chicago Waterway System to facilitate navigation and prevent flooding. Facilities at CRCW, O'Brien Lock and Dam and Wilmette Pumping Station also control the flows entering to the waterway system from Lake Michigan, whereas Lockport Lock and Powerhouse and Lockport Controlling Works control the flows leaving the system in the downstream end. Figures 4 through 8 show major structural components at Lockport Lock and Powerhouse, Lockport Controlling Works, CRCW, O'Brien Lock and Dam, and Wilmette Pumping Station, respectively.

Figure 4 - Lockport Lock and Powerhouse, CSSC RM 291

Figure 5 – Lockport Controlling Works, CSSC RM 293.2

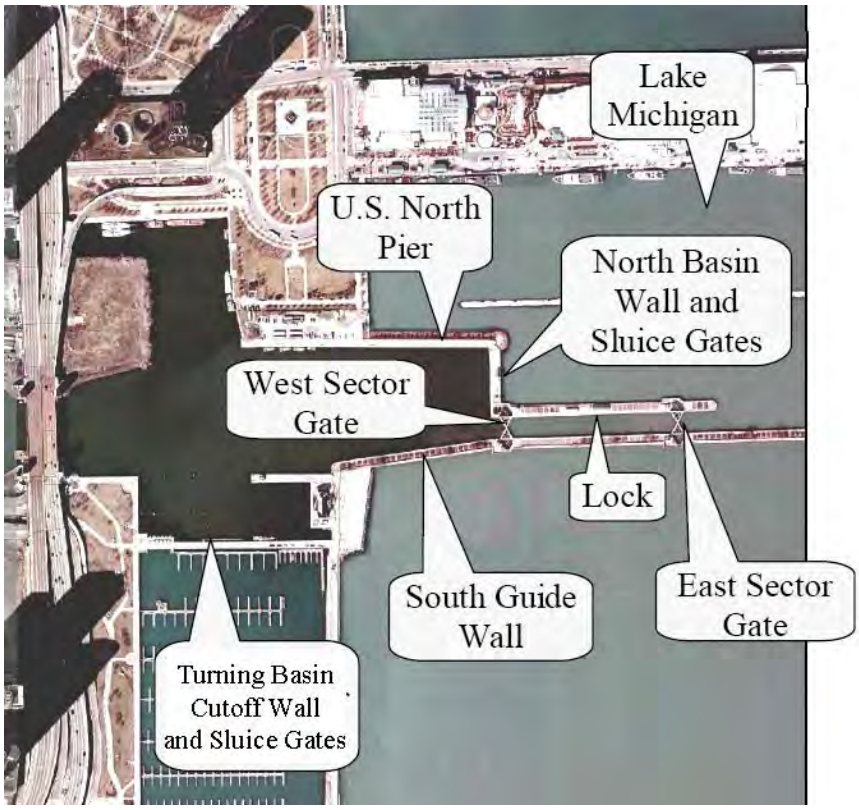


Figure 6 - Chicago River Lock and Controlling Works, RM 327.2

Figure 7 - O'Brien Lock and Dam, Calumet River mile 326.4

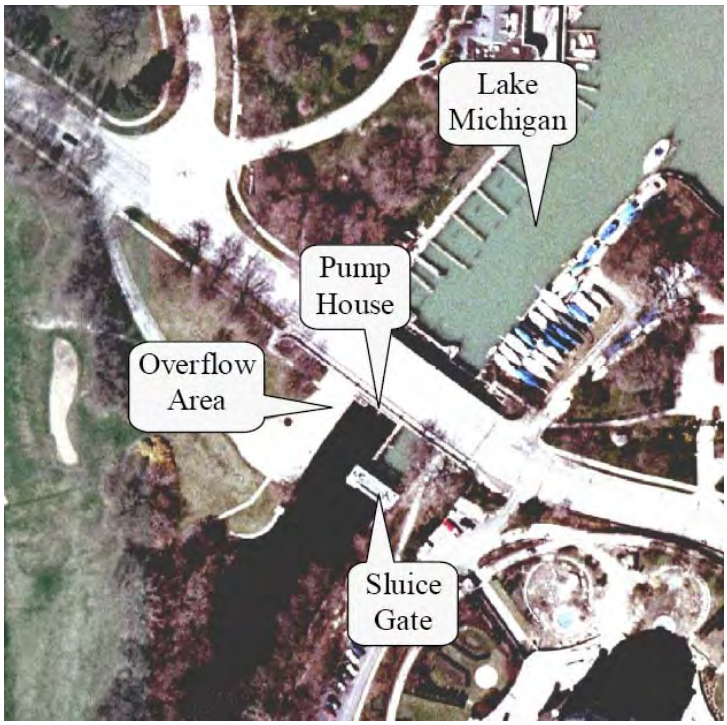


Figure 8 - Wilmette Pumping Station

Lock facilities at Lockport and O'Brien are owned and operated by the U.S. Army Corps of Engineers. The Chicago Harbor Lock facilities are owned and operated by the Corps. The MWRD owns and operates the facilities at Lockport powerhouse, Lockport Controlling Works, Wilmette Pumping Station, and the sluices gates at CRCW. As an exception, the Corps owns the sluice gates at the O'Brien Lock and Dam, and operates these sluice gates under the direction of MWRD per a 1966 agreement between these two agencies. Under the 1966 agreement, and an additional 1984 agreement, the Corps and MWRD coordinate their lock and controlling work operations in response to storm water, water quality and water diversion conditions.

The MWRD canal operation center has a control center in downtown Chicago which monitors the operating conditions of these facilities, and river stages on the Chicago Waterway System. Under normal conditions, water levels in most parts of the system are like a flat pool. When the MWRD receives a rainstorm forecast from their consultant, they start allowing more flows to pass the downstream of the system. This is achieved by passing more flow through the turbines and opening the sluice gates in the Lockport Powerhouse. In response to the increase of flow at Lockport, the canal water level is lowered – most at Lockport, and lessened away from Lockport. This operation is often referred to as *canal drawdown*. Canal drawdown serves two purposes: first, it evacuates water in the canal system preparing for anticipated large runoff to come; and secondly, it creates a steeper hydraulic gradient in the canal system that allows flood water to move out of the system faster. With very large rainstorm events, sluice gates at Lockport Controlling Works, which is located about two miles upstream from Lockport Lock and Powerhouse, will also be opened to divert additional water to the adjacent Des Plaines River.

During significant rainstorms characterized by heavy and intense precipitation, the conveyance and storage of the canal system may become inadequate to handle flood waters. Under this

condition, sluice gates at CRCW, O'Brien Lock and Dam and Wilmette Pumping Station need to be opened. Water will be reversed from the waterway to Lake Michigan by gravity. During the most severe rainstorm events, the locks at CRCW and O'Brien Lock and Dam also need to be opened in addition to opening of the sluice gates. This reversal of flow is also called *backflow*.

Table 1 shows the historical records of backflow at CRCW since 1949. It can be seen that most flow reversal events occurred during the summer months. Nine events have occurred since 1986, and four out of these nine events involved lock opening.

Other Structures and Outfalls: – The remainder of the Illinois Waterway has 5 additional navigation structures known as Dresden Island Lock and Dam (RM 271), Marseilles Dam (RM 246), Starved Rock Dam (RM 230) Peoria Dam (RM 158), and LaGrange Dam (RM 80).

There are two major types of outfalls into the CAWS: WWTP /industrial discharge outfalls and Combined Sewer Overflow (CSO) outfalls. There are four Waste Water Treatment Plants (WWTPs) that discharge into the CAWS. The four plants are Stickney, North Side, Calumet and Lemont. Normal long term (firm) capacity and short-term (peaking) capacity for each of the four plants is as follows: Stickney 1200 mgd and 1400 mgd; North Side 333 mgd and 450 mgd Calumet 354 mgd and 430 mgd; and, Lemont 2.3 mgd and 4 mgd. The permitted industrial discharge outfalls return the non-contact cooling, treated process water, and wastewater back to the waterway. The CSO outfalls relieve overload of the sewer network and the waste water treatment plants primarily during major storm events. There are more than three hundred CSO outfalls owned by the City of Chicago, MWRD, and local municipalities in the northeastern Illinois. Not all outfalls into the CAWS are permitted.

Table 1 - Historical Records of Backflow at CRCW

Date	MG*	Date	MG*
10/9-10/10/54	970	8/13-8/14/87	986
7/14/57	2,260	5/9-5/10/90	208
9/14/61	718	11/27-11/28/90	86
8/17/68	533	7/17-7/18/96	519
8/26/72	59	2/20-2/22/97	1,947
4/18/75	1,130	8/16-8/17/97	402
6/30/77	297	8/2/01	833.1
7/21/80	184	8/22/02	1,296.4
8/7/82	83	9/13-9/14/08	5,438.2
12/2-12/3/82	248		

* MG = Million Gallons Lock Gates Opened

Table 2 shows the historical records of backflow at O'Brien Lock and Dam since 1965. It can be seen that most flow reversal events occurred during the summer months. Four events have occurred since 1986, and half of these events involved lock opening.

Table 2 - Historical Records of Backflow at O'Brien Lock and Dam

Date	MG*	Date	MG*
12/24-12/25/65	898		
5/12/66	1,152		
6/13/81	377		
12/2-12/3/82	124		
11/27-11/28/90	224		
7/17-7/18/96	1,032		
2/20-2/22/97	1,458		
9/13-9/14/08	2,669		

* MG = Million Gallons Lock Gates Opened
Lock Gates Status Unknown

Table 3 shows the historical records of backflow at Wilmette Pumping Station since 1986. It can be seen that backflow at Wilmette Pumping Station is more frequent than that at the other two lakefront controlling works.

Table 3 - Historical Records of Backflow at Wilmette Pumping Station

Date	MG*	Date	MG*
10/3/86	53	8/2/2001	140
8/13-8/14/87	97	8/31/2001	75
8/25-8/26/87	18	10/13/01	91
8/3-8/4/89	52	8/22/02	455
5/9-5/10/90	289	8/23-8/24/07	224
8/17-8/18/90	10	9/13-9/14/08	2,942
11/27-11/28/90	154		
2/20-2/22/97	775		
8/16-8/17/97	157		
6/13/99	10		

* MG = Million Gallons

Chicago Sanitary & Ship Canal, Dispersal Barrier I

The CSSC's first dispersal barrier (Barrier I) was implemented as a demonstration project under authority granted by the Nonindigenous Aquatic Nuisance Prevention and Control Act of 1990, P.L. 101-646, 16 U.S.C. § 4722(i)(3) as amended. Barrier I consists of an array of DC electrodes which were installed on the channel bottom of the CSSC. When power is provided, an electrical field is created within the water that repels fish in order to prevent or reduce the dispersal of fish between the Great Lakes and the Mississippi River drainage basins. Barrier I is located approximately at river mile 296.25 about 1,000 feet from Barrier II. Barrier I was turned on in April 2002.

Chicago Sanitary & Ship Canal, Dispersal Barrier II

The second dispersal barrier (Barrier II) on the CSSC was initially implemented by the Corps under the Section 1135 program of the Water Resources Development Act of 1986, P.L. 99-662, as further authorized in Section 345 of the District of Columbia Appropriations Act, 2005, P.L. 108-335 and Section 3061(b)(1)(B) of WRDA 2007, P.L. 110-114. This second permanent dispersal barrier was determined to be necessary to provide continued protection against fish. Barrier II is also an Electrical field barrier, but includes design improvements identified during monitoring and testing of the demonstration barrier. Barrier II is being constructed in two phases, IIA and IIB. The first phase consists of construction of two underwater electrode arrays and one control house. This control house is able to operate one of the two arrays. Barrier IIA has been constructed and was placed in operation in 2009. The second phase consists of construction of a second control house that will allow both arrays to be operated as a system. Barrier II is located at approximately river mile 296.25, about 1000 feet from Barrier I. Barrier IIA was turned on in April 2009 and Barrier IIB is under construction and is scheduled to be completed in 2010.

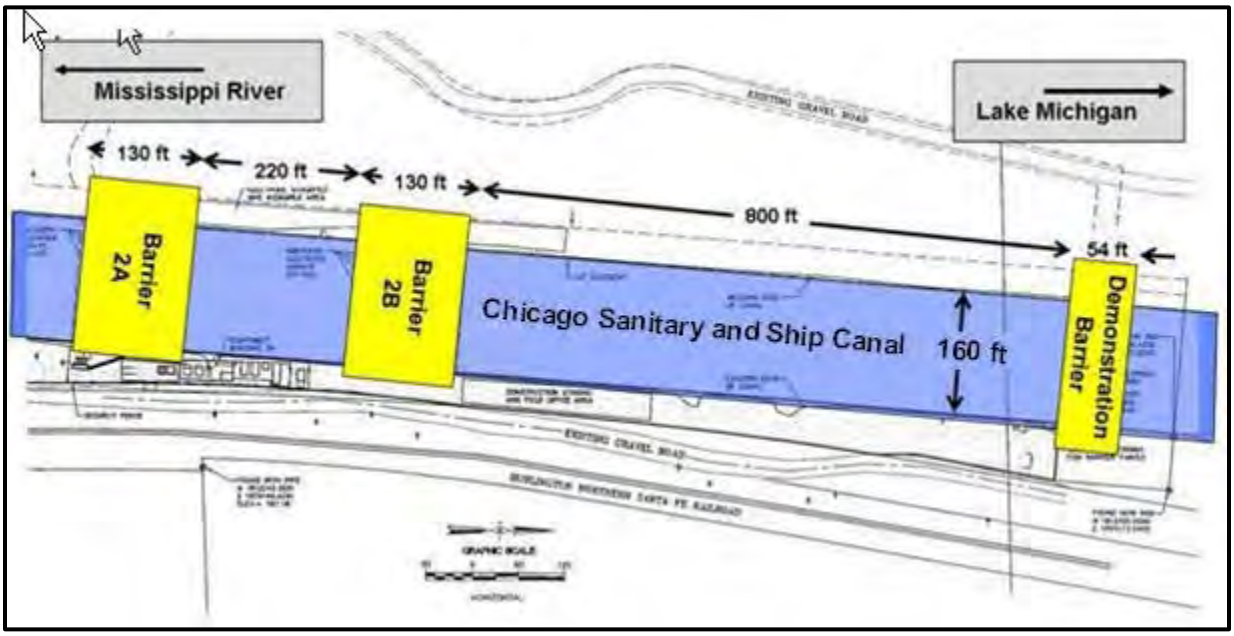


Figure 9 - Schematic of Electric Dispersal Barriers Project

1.6 – Status of Asian Carp Migration

As Asian carp have migrated steadily northward up the Illinois River, the threat of these species gaining access to Lake Michigan and the rest of the Great Lakes is of concern to many in the environmental community as well as to numerous federal, state and local government agencies. There is a potential for significant ecological and economic consequences, although many uncertainties about the ability of Asian carp to establish a sustainable population in the CAWS and Great Lakes remain. These issues have been the subject of recent Congressional hearings and a Supreme Court action. The following is a brief summary of the current circumstances, which are more fully explained in the draft Framework and in the various declarations submitted by various agencies to the Supreme Court. (Chapter 6, References, for link to USACE, USGS, FWS, IDNR Supreme Court declarations).

As part of a comprehensive review in the fall of 2008, USACE assessed the full suite of methods available to locate and monitor Asian carp as they migrated up the Illinois River. These fish sampling tools were evaluated for their ability to deliver a high level of confidence that USACE could locate the leading front of the migrating fish. USACE concluded that the available tools, principally all forms of netting (seine, gill, pound, etc.) and electro-fishing conducted primarily by partner agencies, could effectively locate Asian carp when the populations are high, but they were not necessarily effective in locating the fish when population numbers were low. Because the migratory front of fish is comprised of a few rapidly moving individuals, traditional sampling methods do not provide a good indication of their presence, and consequently additional technologies were investigated.

A technique developed by researchers at the University of Notre Dame referred to as environmental DNA (eDNA) analysis is presently the most sensitive technology available to detect the possible presence of the silver and bighead carp in the aquatic environment. In August 2009, identification of Asian carp eDNA in the Brandon Road pool, which is just over 6 miles downstream of the Dispersal Barriers, triggered the Corps' decision to increase the electrical output of Barrier IIA, although live bighead and silver carp had not yet been visually identified in that location. On November 17, 2009 Asian carp eDNA was detected in the Cal-Sag Channel and Calumet River near the O'Brien Lock, in three areas ranging from 10 to 30 miles upstream of the Electrical Dispersal Barriers. An intensive fishing effort followed and although over 1,000 fish were caught near the O'Brien Lock, none of them were the target species. Detection of Asian carp eDNA have been reported north of the fish barrier near the Wilmette Pumping Station and lakeward of the O'Brien Lock. Given that eDNA is an emerging technology being applied in a field setting for the first time, USACE cannot conclude that water samples testing positive for eDNA evidence confirms the presence of Asian carp. Until other methods for positive and confirmatory Asian carp detection become available and affordable, the ACRCC and USACE intend to use eDNA as a basis for precautionary and prudent actions.

Numerous questions remain regarding the ability of reproducing populations of Asian carp to become established in the CAWS, Lake Michigan and in the Great Lakes. Experts tend to agree that because of the variety of habitats available, environmental conditions in the Great Lakes and adjacent tributaries are suitable to support the survival of Asian carp but it is unknown if these species can establish reproducing populations. Although there are uncertainties, the federal and state partners are taking action now to reduce the risk that a sustainable population of Asian carp could threaten the Great Lakes.

1.7 – Agency Coordination Team

The Chicago District has been actively engaged as a member of the Asian Carp Regional Coordination Committee (ACRCC) since its inception, participating in all actions, advisory panels and regional sub-working groups. Notable recent collaborations include the shutdown of Barrier IIA for maintenance, the development and 12 February 2010 release of the ACRCC draft framework strategy just updated in May 2010, as well as significant collaboration on monitoring for Asian carp and Efficacy Study efforts among other initiatives.

Interagency coordination is essential when discussing the concept of modified structures and operations as risk reduction measures to impede the movement of Asian carps and their dispersal into Lake Michigan and the Great Lakes. Agencies first met to discuss the concept of Modified Structures and Operations on 12 January 2010. In attendance were representatives from two divisions (Mississippi Valley Division and Great Lakes and Ohio River Division) of the U.S. Army Corps of Engineers, the US EPA, USFWS, US Coast Guard, Illinois Department of Natural Resources, Metropolitan Water Reclamation District, and various departments from the City of Chicago (water management, fire and police, parks and recreation). Three subsequent meetings were held to look at elements each agency could bring to bear in the next few months as well as two separate engagements with the navigation community, reaching out to more than 100 individuals representing commercial and industrial vessels and recreational boaters, ports and Chambers of Commerce.

The USACE has continued to work closely with the MWRD on a number of issues related to MWRD structures that are critical elements of Modified Structures and Operations. Some elements of the analysis and design related to some CAWS structures have been undertaken by the MWRD as part of the ongoing collaborative effort. Measures evaluated that modify MWRD structures and structure operations at the CRCW and the Wilmette Pumping Station to reduce the risk associated with Asian carp dispersal from the CAWS into Lake Michigan are documented in the discussion on risk reduction measures in Chapter 4.

Monitoring and Rapid Response Work Group

The ACRCC formed a Monitoring and Rapid Response Work Group (MRRWG) to provide technical expertise and information. The current focus of this group is to assist the ACRCC in developing and executing short-term strategies to address Asian carp that might be present in the CAWS above the barrier project. The MRRWG was tasked with developing timely, science-based evaluations of the most effective monitoring and management of Asian carp and to provide assessment of the effectiveness of response actions. The group is comprised of six to eight technical specialists in Asian carp biology, invasion biology and/or aquatic species control and management. The MRRWG also includes members from each of the following agencies: IDNR, USACE (Chicago and Rock Island Districts), USFWS, USEPA and USCG. The MRRWG is co-chaired by representatives of the IDNR and the Great Lakes Fisheries Commission (GLFC).

Invasives Control Work Group

An Invasives Control Work Group (ICWG) was formed by the ACRCC to provide technical expertise, information and execution oversight to the ACRCC to support its strategic oversight role of long and short-term efforts to control Asian carp migration in the CAWS, and to minimize the possibility that any Asian carp that gain access to Lake Michigan could establish a viable population in Lake Michigan. The ICWG was tasked to develop and oversee execution of the most effective science-based methods to impede Asian carp migration through the CAWS to Lake Michigan. The group is comprised of six to eight technical specialists in Asian carp biology, invasion biology and/or aquatic species control and management, waterway operational representatives such as navigation and enforcement specialists. The ICWG also includes members from each of the following agencies: IDNR, Indiana Department of Natural Resources (InDNR), MWRD, USACE (Chicago District), USFWS, USEPA, USCG and USGS. The group is co-chaired by the USFWS and the USACE.

1.8 – USFWS Risk Assessment Panel

A Risk Assessment Panel was convened by the USFWS at the request of the USACE in February 2010 to consider risks associated with Asian carps in the IWW and CAWS. The panel was asked to review six alternative lock operation scenarios that had been developed by the Interagency Project Delivery Team and address to what degree those alternatives would reduce the risks that Asian carps could pass through the lock chamber as well as addressing a number of other questions related to Asian carps in the CAWS. . In addition, the panel members were asked to provide any additional information that might be useful to the USACE during the analysis of Modified Structures and Operations. In total, 32 questions were posed to the panel members.

The Risk Assessment Panel was comprised of ten (10) experts selected from state and federal agencies and academia; nine (9) panel members provided input to the Risk Assessment. Experts from the IDNR, IEPA, USFWS, USEPA and USACE to participated in the panel. Panel members were asked to complete their assessment on a Risk Worksheet which they provided to the USFWS facilitator. The USFWS facilitator compiled and summarized the results of the Risk Assessment Panel. A summary of the Risk Assessment is excerpted in the following section. A summary table of the questions posed to the panels, their responses and their assessment of risk is contained in Appendix D, Planning Information, Table 3. The full USFWS Risk Assessment is included in Appendix D as well.

The USACE is working with the ACRCC to convene a new expert panel to conduct a Risk Assessment based on the results of Interagency monitoring efforts in the CAWS and IWW over the past several years. The panel will be comprised of experts from agencies and academia and results will be used to inform the Final Efficacy Study.

Summary of the Risk Assessment

"In February 2010, the U.S. Fish and Wildlife Service (Service) received a formal request from the U.S. Army Corps of Engineers-Chicago District, to conduct risk analyses related to a suite of proposed alternatives for modifying operations of the Chicago and O'Brien Locks to address threats from Asian carp to the Great Lakes. Alternative scenarios for lock operation are being considered as a means of lowering risk of bighead and silver carp (Asian carp) establishment in Lake Michigan by way of the Chicago Area Waterways (CAWs). To complete the analysis, a panel of ten experts was formed; individuals were selected based on their expertise and knowledge related to the technical questions that formed the basis of the review, and in a manner to ensure broad representation of the various entities engaged in Asian carp prevention in the CAWs. Nine experts completed various components of the risk analysis form, which was composed of sections focusing on: 1) risk assessment of possible lock operation alternatives, and 2) biological, ecological, and risk management questions posed by the Corps. Some Experts completed only limited sections of the form, because their expertise was narrow.

In all cases, expert assessments of risk of projected Asian carp establishment and impact in Lake Michigan as the result of the pathway of the Chicago and O'Brien Locks were categorized as either medium or high (i.e., unacceptable). Although experts differed in their assignments of risk to the six alternatives, individual expert assessment of risk tended to not change across the suite of alternatives (which included a no-action alternative) for modifying lock operations at the Chicago and O'Brien Locks.

Of the six alternatives presented by the Corps, there is no individual or combination of lock operation scenarios that experts believe will lower risk of Asian carps establishing self-sustaining populations in Lake Michigan to an acceptable level. Experts provided limited options (control/prevention techniques, etc) that may, if implemented, potentially lower the risk of Asian carp establishment in Lake Michigan related to any lock operation alternative. None of the options provided by the experts to lower risk of lock operation alternatives were recommended by more than one expert." (USFWS, March 2010)

CHAPTER 2 – Affected Environment

This chapter includes a description of the affected environment in the study area and a description of waterway operations and the operations of the controlling works for water quality diversion and flood risk management.

2.1 – Physical Resources

Climate

The climate of the project area is typical of northeast Illinois and may be classified as humid continental, characterized by warm summers, cold winters, and daily, monthly, and yearly fluctuations in temperature and precipitation. National Weather Service data collected from the area around Chicago report average temperatures of 24.9° F in winter and 71° F in summer. Coldest average monthly temperatures range from daily lows and highs of 14° F and 30° F respectively, in January. July is the warmest month with an average daily low of 63°F and an average high of 84° F. Mean annual precipitation is 36.57 inches with the majority of the precipitation occurring April through October. Accumulated snowfall averages 46.2 inches for the study area. Wind speed averages 11 to 12 miles per hour. Early spring floods may occur when snow accumulations extend into a period of increasing temperature that results in melting. If this occurs when soils are already saturated, and given the amount of impervious surfaces within the study area, runoff increases dramatically. The start of the growing season as defined for agricultural purposes usually occurs from late April to early May, but in natural areas there may be blooming plants in ground water discharge zones as early as the last week in January, although most native organisms start their annual growth after cultivated and non-native species. The first frost typically occurs between late September and mid-October, with the frost free season ranging from 158 to 178 days.

Air Quality

The Chicago Metropolitan area, including the study area, is a non-attainment area for both ozone (and ozone precursors) and particulates (with a diameter less than 2.5 microns). Existing air quality data are available for Cook, DuPage, Lake and Will counties from the USEPA Air Data database. Although the trends show overall improvement over the last 10 years, individual measurements and monitoring stations still have measurements that exceed the national standards. The existing air quality should be considered marginal, but improving over time.

Geology

Bedrock located within the project area is primarily composed of dolomite and limestone with small amounts of shale present. The bedrock is covered by up to 300 feet of an unconsolidated formation comprised of clay, silt, sand, and gravel. Much of the material was directly deposited as glacial till and outwash from melting glaciers. The very young glacial geology of the region plays a significant role in the hydrology that drives the local ecosystems.

The project area lies entirely within the Central Lowland Province. Comprising the Province is the Great Lake Section and the Till Plains Section. The Great Lake Section is composed of the Wheaton Morainal Country and the Chicago Lake Plain. The Wheaton Morainal Country is

characterized by broad flat expanses spotted with steeply sloping Wisconsinan-age moraines and till plains that are approximately parallel to the Lake Michigan shoreline. The Chicago Lake Plain is approximately the area that is now metropolitan Chicago. It is relatively flat, glacio-lacustrine deposit formed by the slow moving waters of glacial Lake Chicago. Elevation ranges from 400 to 900 feet above sea level. The Till Plains Section is composed of the Bloomington Ridged Plain, with land surface elevation ranges from 585 to 855 feet above sea level.

Soils

The US Department of Agriculture Soil Surveys of Cook, DuPage, and Will Counties, Illinois describe 28 soil series found on the study area; twelve of the soil classes are hydric. Muskego and Houghton Mucks, which is a group of nearly level depressional areas composed primarily of herbaceous organic material over coprogenous deposits, is the only soil association. The 28 soil series encompass four soil orders: Alfisols, Entisol, Histosol, and Mollisols. Alfisols form in semiarid to humid areas and are typically found under hardwood forest cover. They have a clay-enriched subsoil and relatively high native fertility. The soil series included under Alfisols are Blount, Fox, Ozarkee, and Wauconda. The Entisol soil order is characterized by having no diagnostic soil horizons. Most of the soils within this order are unaltered from their parent material. The only soil series included under the Entisol order is Orthents. Soil comprised primarily of organic materials characterizes the Histosol soil order. For Histosol soils to be present, aquic conditions or artificial drainage must exist. The Muskego and Houghton soils are the only series included under the Histosol soil order. Finally, the largest order is the Mollisols including the Ashkum, Barrington, Channahon, Drummer, Faxon, Grundelein, Harpster, Joliet, Kane, Kankakee, Mundelein, Rockton, Romeo, and Sawmill soil series. The Mollisols form typically under grassland cover in semi-arid to semi-humid areas. These soils are characterized by a deep, high organic matter, nutrient-enriched surface soil. Prime farmlands do not occur along or on the project footprint.

Land Use

Pre-settlement land cover of the study area was primarily prairie, with pockets of rare dolomite prairie and wetland depressions. Along the riparian zones of the Des Plaines River and confluent streams, hardwood forest most likely occurred. The riparian zones of the Chicago and Calumet Rivers were much different than the Des Plaines River. These two river systems flowed through vast marshes and more often than not, had an undefined channel. Land use within the CAWS basin is generally urban with extensive industrial development. Basin stakeholders include the City of Chicago and 31 suburban municipalities. Flow in the CAWS is dominated by treated wastewater from 5 million residents and an additional industrial load of approximately 4.5 million population equivalents. Land use has been converted from these natural types to industrialized and residential grounds with intermittent pockets of highly disturbed forest and wetland. Most of the land adjacent to the rivers and canals is owned by the MWRD; certain parcels are leased to the Cook County and Du Page Forest Preserves and are used for recreational purposes.

General Hydrology

The CAWS consists of 78 miles of canals and modified streams. The CAWS consists of the Chicago River, its two main branches (North Branch and South Branch), as well as the Calumet Sag Channel, the CSSC, and the tributaries in an area extending from the metropolitan Chicago area to the Lockport vicinity. It also includes Lake Calumet. To facilitate a reversal of the flow of the Chicago River to divert water from Lake Michigan to the CAWS, the Chicago Sanitary and Ship Canal, the Calumet Sag Channel and the North Shore Channel were constructed over 100 years ago. The diversion and the artificial waterways facilitated navigation and protected the drinking water intakes in Lake Michigan from Chicago wastes. The Little Calumet River North Leg, the Chicago River, the South Branch of the Chicago River and North Branch of the Chicago River downstream from its confluence with the North Shore Channel are natural rivers that have been modified through channelization and widened and deepened.

Chicago's wastewater system was developed with a combined sewer system that accepted both stormwater and sanitary waste. After rainstorms, the capacity of the sewer system became overwhelmed on a regular basis and combined sewer overflows (CSO) occurred. These CSOs are discharged into the CAWS and frequently from the river into Lake Michigan. To address this problem, the MWRD developed the Tunnel and Reservoir project (TARP), which included the construction of the Deep Tunnel project. The Deep Tunnel is a series of tunnels that lie 250 to 300 feet below the Chicago River and are located parallel to it. The first phase of the TARP project or "Deep Tunnel" project has been completed. During periods of heavy rainfall, the TARP project directs combined sanitary waste and infiltrating rainwater into massive tunnels and collection reservoirs where it can be withdrawn for treatment after the rain subsides.

Water Quality

The North Shore Channel, North Branch Chicago River, Chicago River, South Branch Chicago River (including the South Fork), Chicago Sanitary and Ship Canal (CSSC), Des Plaines River, Cal-Sag Channel, Grand Calumet River, and Little Calumet River are all currently on the 2008 Final Draft Illinois 303(d) list of impaired waters. These waters include both natural and man-made waterways which serve as receiving waters for the tributary streams and water reclamation plant effluents, combined sewer overflows, and stormwater runoff, and are therefore of marginal quality, and unlikely to improve.

Within Illinois, the Chicago River, the North Shore Channel from the North Side Sewage Treatment Works to Lake Michigan, the Des Plaines River downstream of its confluence with the CSSC, and the Little Calumet River from the State Line to the Cal-Sag Channel are classified by the Illinois Pollution Control Board as "General Use Waters". General Use waters are protected for aquatic life, wildlife, agricultural use, primary contact (e.g. swimming, water skiing), secondary contact (e.g. boating, fishing), and most industrial uses. These General Use Waters are all currently listed as impaired for supporting aquatic life and primary contact recreation, and the Chicago River, North Shore Channel, and Des Plaines River are impaired for fish consumption as well. All other waters mentioned above are classified by the Illinois Pollution Control Board as "Secondary Contact and Indigenous Aquatic Life Use Waterways", which indicates a highly modified waterway, not suited for General Use activities (e.g. swimming, water skiing). These waters are capable of supporting indigenous aquatic life but are limited by the physical configuration of the body of water, characteristics, and origin of the water and the

presence of contaminants. These Secondary Contact waters are all currently listed as impaired for supporting indigenous aquatic life and/or fish consumption. See Appendix D, Table 1 for further details.

2.2 – Biological Resources

Riverine Habitat

Chicago Sanitary and Ship Canal - The Chicago Sanitary and Ship Canal (CSSC) in the study area was incised through the native dolomite limestone. Accordingly, aquatic habitat is fairly homogeneous, consisting of vertical limestone walls that extend 24 – 26 feet down to the bottom. These nearly perpendicular walls of the canal offer little or no littoral zone for aquatic species. The walls have crumbled down enough at various locations along the reach that may provide limited littoral habitat for present species. The bottom of the canal is essentially flat with virtually no fine substrates; however, rock or flagstone is present on the bottom of the canal where the vertical walls have been gouged away by barge traffic. There are also intermittent areas of woody debris and detritus that may be used as cover for certain benthic organisms.

Chicago River - The Chicago River serves as a vital transport link between Lake Michigan and the Illinois Waterway. By 1941, the river was transformed into its present configuration. The Main and North Branches of the Chicago River which include a 21-foot deep navigation channel from Rush Street to North Avenue. The South Branch of the Chicago River consists of a 9-foot deep navigation channel that is connected to the Illinois Waterway by the Chicago Sanitary and Ship Canal. The riverine habitat of the Chicago River for the most part consists of a manmade canal of varying depths, with no natural riverine function. The shoreline is retained by concrete, sheet pile or riprap revetment. Physical habitat structure consists of slumping riprap banks, sunken logs and man- made debris.

Des Plaines River - Des Plaines River starts near Union Grove, Racine County, Wisconsin. It then flows south through the center of Kenosha County, Wisconsin, eastern Lake County, the center of Cook County west of Chicago, the very southeast corner of DuPage County, then south-southwest through western Will County before merging with the Kankakee River to form the Illinois River in Grundy County. Habitats in the project area are varied. Some reaches are lower gradient and exhibit abundant backwater and side stream wetland habitats (near Channahon). Some reaches are higher gradient where the channel braids and exhibits swift currents over bedrock, thus forming many riffles (near Lockport and Romeoville). The Des Plaines River below Lockport is deeper and wider, a result of modification for commercial navigation.

Riparian Plant Communities

Generally, these areas are highly disturbed lands with small patches of volunteer plant communities. These sites have the following composition:

Old fields are dominated by Late Boneset (*Eupatorium serotinum*) and tall goldenrod (*Solidago altissima*). The woodland tree layer is dominated by White mulberry (*Morus alba*) and the shrub

layer is dominated by Elderberry (*Sambucus canadensis*). This area receives periodic floodwater. These species are indicative of a high level of past disturbance that decimated the original native plant species.

The forested areas are a mixture of wet floodplain forest and mesic woodland with small areas of emergent marsh. The forested areas are dominated by Cottonwood (*Populus deltoides*), Maple (*Acer* sp.*),* and Ash (*Fraxinus* sp.) with a shrub layer dominated by Japanese bush honeysuckle (*Lonicera* sp.). The dominant vine is Riverbank grape (*Vitis riparia*). The herbaceous layer is represented by mostly Creeping Charlie (*Glechoma hederacea*) and White snakeroot (*Eupatorium rugosum*). The forested areas are of low quality, typified by low coverage of herbaceous species and dominance of the invasive shrub species (*Lonicera japonica*). The emergent marsh areas are dominated by a mix of Cattails (*Typha latifolia*) and Common reed (*Phragmites australis*). Although the cattails are native, their dominance along with the high abundance of Common reed indicates this area is of low quality and is experiencing chronic disturbance.

The riverbanks are wooded with openings dominated by herbaceous species. The herbaceous species are dominated by Reed canary grass (*Phalaris arundinacea*), which is a highly invasive species and is typical of wet/mesic disturbed areas. The wooded areas are low quality as well with some larger trees and a shrub layer dominated by Japanese bush honeysuckle and European buckthorn (*Rhamnus cathartica*), both non-native, highly invasive species.

Aquatic Communities

The aquatic communities and riparian zones of the study area have been marginalized by previous impacts of hydrologic and fluvial-geomorphic modification. A total of 49 species of fish (Appendix D Table 1) have been collected from the Des Plaines River, CSSC, and I&M Canal: 43 from the Des Plaines River, 19 from the CSSC, and 21 from the I&M Canal. The majority of fish species that occur in the area are ecologically tolerant, meaning they are able to thrive in degraded habitats. Species intolerant to silt and turbid water are found in the Des Plaines River, CSSC, and I&M; however, abundance of these species is low.

Macroinvertebrate species diversity within the CAWS is lower than in the Des Plaines River due to poor habitat (Appendix D Table 2). Fissures in the man-made walls of the canals as well as organic matter inputs provide minimal habitat for invertebrates and other aquatic species. In 1999, the MWRD collected two crayfish species, *Orconectes rusticus* rusty crayfish and *Orconectes virilis* virile crayfish, from the CSSC. The rusty crayfish is introduced from the Ohio River system via the release of unused live fishing bait.

Other Wildlife

Terrestrial wildlife communities on the study area have been degraded due to hydrologic and geomorphic alterations and fragmentation of habitats by industrialization. The majority of the sites are covered in anthropogenically induced bottomland forest and ruined industrial parcels. Birds that are associated with these types of habitats and may inhabit the area include marsh birds, nesting and migrant waterfowl and woodland birds. Muskrat, beaver, mink, otter, and raccoons are mammals often associated with bodies of water because they construct their shelters in or near rivers and streams as well as gather food. Aquatic dependent mammals such

as these as well as other species of mammals may be found utilizing the study area. In addition, several species of reptiles that are semi-aquatic and feed on stream invertebrates and fish may use the area, as well as certain species of amphibians that utilize wetlands during reproduction.

Natural Areas

Because there are no natural areas close enough to the proposed sites, there is no opportunity for the proposed actions to affect habitat or ecological integrity.

Threatened & Endangered Species

Based on the location of the proposed sites, there would be no threatened and endangered species anticipated or critical habitat present. Consultation with the USFWS is ongoing in the project; however, the District has made a 'no effects' determination in regards to Threatened and Endangered Species. Consultation under Section 7 of the Endangered Species Act is not anticipated for this project.

Immediate ANS Target Species

There are two Asian carp (Cyprinidae) species of concern that are threatening to enter the Great Lakes basin via the CSSC. The following describes the current target species.

Bighead carp can grow to a length of 130 cm (51") and weigh up to 40 kg (88 lbs.). This carp feeds by filtering plankton from the water column with its large terminal and upturned mouth. This fish requires large river habitat where it reproduces prolifically and may grow rapidly. Bighead carp has been identified as a means to remove excess nutrients in wastewater by consuming algae which grow in eutrophic water. Since it can grow to a large size, it has the potential to deplete zooplankton populations; thereby indirectly, adversely impacting all species of larval fishes, planktivorous adult fishes, and native mussels (Unionoida). Bighead carp are native to Asia, in Southern and Central China. Bighead carp have been spotted in about 18 states in the United States and is established in Illinois within the Mississippi, Illinois and Ohio Rivers. It also can be found in the Cache, Big Muddy, Kaskaskia and Wabash Rivers and in Chain Lake.

Silver carp can grow to a length of 105 cm (41") and weigh up to 50 kg (110 lbs). This freshwater fish is biologically similar to the bighead carp and has also been stocked for phytoplankton control in eutrophic water bodies, and is used for food by humans. This fish feeds by filtering phytoplankton, zooplankton, bacteria and detritus from the water column. In great numbers, this fish could consume plankton required by larval fish, invertebrates and native mussels. Silver carp are native to Asia and can be found in several major Pacific drainages in eastern Asia from the Amur River of Eastern Russia to the Pearl River in China. In North American it has been documented in Alabama, Arizona, Arkansas, Colorado, Florida, Hawaii, Illinois, Indiana, Kansas, Louisiana, Missouri, Nebraska and Tennessee. In Illinois, it has been found in the Mississippi, Ohio, Cache, Illinois and Wabash Rivers, and several of their tributaries, including the Big Muddy River, Horseshoe Lake, the Cache River drainage, and the Embarras River below Lake Charleston.

2.3 – Cultural, Archaeological & Social Resources

Archaeological & Historical Properties

One site in the study area has been listed on the National Register of Historic Places, one that has been declared eligible for such a listing, and one that is potentially eligible. The Illinois and Michigan (I&M) Canal was listed on the National Register of Historic Places by the Illinois State Historic Preservation Agency. The Chicago Lock has been determined to be eligible for the National Register of Historic Places by the Illinois State Historic Preservation Agency based on its historic engineering importance. The T. J. O'Brien Lock and Controlling Works in Chicago were determined to be a noncontributing property to the eligible National Historic Register eligible property "Chicago to Grafton, Illinois Navigable Water Link, 1839-1946". Since then the lock has become over fifty years old, making it potentially eligible for the National Register of Historic Places.

The I&M Canal, is the only property within the project area that is both on the National Register of Historic Properties and that extends through all three Illinois counties. The CSSC also extends through all three counties, and although it is eligible for the National Register, it is not currently listed. Within this portion of Cook County, two properties in Western Springs are on the National Register of Historic Properties, the Western Springs First Congregational Church (listed 2006) and the Western Springs Water Tower (listed 1981). Three properties within the Village of Lemont are also listed on the National Register. These are the Lemont Central Grade School (listed 1975), the Lemont Methodist Episcopalian Church (listed 1986), and the St. James Catholic Church and Cemetery (listed 1984). With the exception of the I&M Canal, no properties in this area of Du Page County are listed on the National Register of Historic Properties. Properties listed on the National Register within this portion of Will County include the Red Round Barn (listed 1988) in Romeoville, and the five structures and two historic districts listed within Lockport, Illinois to the south of the project area. There will be no construction within the I&M Canal, and further, all of the other listed properties will be avoided and none will be within any of the selected sites within the project area.

Most prehistoric sites in the Des Plaines River, Chicago and Calumet watersheds occupy high or well-drained ground, in areas unlikely to be affected by proposed measures; however, the historic occupation of the Des Plaines valley was focused more on water accessibility putting the majority of historic sites within the floodplain. The region's history has been driven by its location and the developing waterway system. A trading post was established near the mouth of the Chicago River in the 1770's, followed by Fort Dearborn in 1803. Large-scale settlement in this area of northern Illinois only began after the area was ceded by the Potawatomi Indians to the United States Government in 1816 removing the threat of tribal conflict. Settlement was rapid with large numbers of German immigrants establishing farms in the area in the 1820s and 1830s. Chicago was incorporated in 1833 and granted a city charter in 1837. The city grew based on its favorable location between the Great Lakes and the Mississippi River system.

Farming was an early economic driver for the area, with grain and livestock shipped to the markets in Chicago. The first community along this stretch of the Des Plaines River was Lemont. The town was established in 1836 by land speculators gambling on future development stemming from the planned I&M Canal. The community soon served as the agricultural and commercial hub of the region. This area of Illinois experienced rapid population growth based

on construction of the I&M Canal from 1837 to 1848. After 1848 Lemont served as a departure point and transit stop for canal traffic. The first railroad was constructed through Lemont in 1854 and the town later developed into a railroad community as canal traffic dwindled. The commercial importance of Lemont faded after 1900 as additional railroads and other transportation links bypassed the town. Lemont's historic buildings and proximity to the I&M Canal National Heritage Corridor have made tourism a major element of the local economy. Recently the town has also developed into a bedroom community for the growing Chicago metropolitan area. Surrounding towns include Lockport, Bolingbrook, Darien, and Romeoville.

The I&M Canal ran 96 miles (155 km) from the Chicago River at the Bridgeport neighborhood in Chicago and joining the Illinois River at LaSalle-Peru, Illinois. It was finished in 1848 and allowed boat transportation between the Great Lakes to the Mississippi River and the Gulf of Mexico. The canal enabled navigation across the Chicago Portage and helped establish Chicago as the transportation hub of the United States, opening before railroads were laid in the area. It ceased transportation operations in 1933. Portions of the canal have been filled. One segment, including a number of engineering structures, between Lockport and LaSalle-Peru, was designated a National Historic Landmark in 1964. Today much of the canal is a long, thin park with canoeing and a 62.5 mile (100 km) hiking and biking trail (constructed on the alignment of the mule tow paths). It also includes museums and historical canal buildings. It was designated the first National Heritage Corridor by US Congress in 1984.

The CSSC was designed to carry treated sewage away from Chicago by reversing the flow of the Chicago River and directing its flow into the Illinois River drainage. Completed in 1900, the canal was also planned as a replacement for the outdated I&M, thus providing a shipping link between the Great Lakes and the Mississippi Valley. The CSSC is 28-miles long, 24-feet deep, with the width varying between 160-200-feet. The canal was extended to Joliet by 1907. The Cal-Sag Channel connected the CSSC to the Calumet River in 1922. Construction of the CSSC was the largest earth-moving operation that had been undertaken in North America up to that time, and provided important training to a number of engineers who later worked on the Panama Canal. Although not on the National Register of Historic Properties, The system has been named a Civil Engineering Monument of the Millennium by the American Society of Civil Engineers.

The presence of the I&M Canal and later the CSSC focused the economy of the project area toward the Des Plaines River valley and the water-based transportation of materials. Industries such as gravel quarries and refineries were developed in the region to take advantage of this transit corridor. Away from the river agriculture dominated the area's economy until recently. This portion of all three counties remained characterized by farms and widely separated small towns until the explosive development of the 1990s and early 2000s reshaped the area into suburban bedroom communities for Chicago.

Social Setting

The project area extends through portions of three Illinois counties, Cook, Du Page, and Will. Cook County, Illinois has a racially and ethnically diverse population of 5,294,664 (2008) with a median household income of $73,910.00 (2004) and a median home value of $290,800. Du Page County has a median household income of $105,400 and a median home value of $421,540. For Will County the median household income is $96,773 and the median home

value is $323,900. The portions of all three counties within our project area are comprised of a number of suburban communities that form a portion of the Chicago metropolitan area with its diverse industrial and commercial base.

Recreation

The undeveloped nature of large portions of the Des Plaines River valley, the Chicago Sanitary and Ship Canal, and the Cal-Sag Canal makes this area a popular destination for outdoor sports including bird watching, hunting, fishing and boating.

Hazardous, Toxic and Radioactive Wastes

A screening-level HTRW investigation has been performed. Due to the expedited schedule for the Interim III Report, a full HTRW investigation was not performed at this time, but no HTRW issues are anticipated with regard to the actions proposed by the Corps in this Report.

Chapter 3 – Analysis of Baseline Economic Conditions

3.1 – Navigation in the Chicago Area Waterways

Chicago Harbor Lock and O'Brien Lock are the two gateway locks between the Mississippi River Navigation System and the Great Lakes Navigation System. Over the past 10 years, annual traffic at Chicago and O'Brien has averaged 122 thousand and 8 million tons, respectively. The global recession in 2008, which continued in the U.S. into 2009, brought these averages down as traffic experienced significant declines in the latter two years in this historic period. Chicago Lock is sited in downtown Chicago, Illinois, fronting on Lake Michigan, making it an attractive passageway for commercial passenger services and recreational boaters. On average, over 700,000 passengers transit these locks and nearly 60,000 vessels are locked through Chicago and O'Brien locks each year.

Table 4 - Statistics for Chicago and T.J. O'Brien Locks

Chicago and O'Brien Locks
Historic Cargo, Commercial Passenger, and Recreation Traffic

Year	Cargo Tons		Commercial Pasengers		Recreation Vessels	
	Chicago	O'Brien	Chicago	O'Brien	Chicago	O'Brien
2000	146,518	8,436,175	818,099	341	42,006	32,981
2001	180,647	6,778,306	677,985	744	39,548	29,790
2002	147,136	7,618,898	693,483	677	40,596	30,314
2003	74,842	6,975,080	615,805	845	33,696	26,934
2004	86,785	9,674,528	605,356	719	30,509	23,922
2005	111,319	9,048,078	728,476	442	29,590	25,653
2006	127,800	9,482,367	686,408	292	25,549	20,744
2007	167,800	7,294,890	775,095	324	30,244	23,170
2008	105,484	6,822,254	732,448	230	27,141	19,208
2009	78,740	4,641,383	685,019	431	26,627	18,100
Average 2000 - 2009	122,707	7,677,196	701,817	505	32,551	25,082

Source: USACE OMNI/LPMS data.

Lock Performance Monitoring System (LPMS) data is collected at the locks and recognized as the Corps' official source for reporting lock traffic totals. The Corps' Waterborne Commerce Statistical Center (WCSC) data is collected from waterway carriers who are required to report vessel origin, destination, loading, and commodity data. The Corps WCSC data is a rich data set that allows analysts to conduct transportation rate analyses and make estimates of transportation costs and the transportation rate savings offered by waterway service.[1] Subsequent discussions will rely on the WCSC data, as it is the basis of rate estimations and the source of waterborne commodities flows and detailed commodity data. It is estimated that

[1] Traffic totals reported in these two data sets differ significantly in tonnage terms. Because LPMS data is collected at the locks, vessel counts are highly reliable. Data collected from vessel operators and compiled in WCSC data sets are very accurate with commodity descriptions, origins and destinations, and vessel loadings; however, confusion does occur regarding the responsible party for reporting vessels when chartered and leased vessels are involved, resulting in underreporting of vessels and low tonnage estimates. As a result, rate savings are likely understated, but indicative of the value of the Chicago and O'Brien locks.

transportation rate savings for shippers moving cargo through Chicago or O'Brien locks was $150 million in 2008.

Table 5 – Traffic and Transportation Rate Savings for Chicago and O'Brien Locks

Chicago and O'Brien Locks
2008 Traffic and Rate Savings

Project	LPMS Ktons	WCSC Ktons	Rate savings in $000s
Chicago	105	48	$ 1,796
Thomas J. O'Brien	6822	5784	$ 147,789
TOTAL	6928	5832	$ 149,585

Source: 2008 WCSC data and 2008 LPMS data.
Note: Rate Savings In $2009 based on 2008 WCSC tonnages.

While commercial cargo shippers realize benefit from these two locks, so too do passengers of commercial tour boats, recreational boaters, and government vessel operators engaged in the performance of safety and security missions. The highway-using public also enjoys the benefit of freight moving by a route that does not interfere with the movement of highway traffic and in fact takes truck freight traffic off congested city highways, reducing driver's exposure to accidents and emissions of pollutants.[2]

3.2 - Commercial Cargo Traffic

Commodities moving through Chicago and O'Brien locks in 2008 are valued at $1.5 billion.[3] Commodities related to the refining of oil or the production of steel dominated traffic at these two locks, though cement, wheat, and salts are important commodities. The top commodity movements are shown in the table below.

[2] *A Modal Comparison of Domestic Freight Transportation Effects on the General Public*, prepared by the Center for Ports and Waterways, Texas Transportation Institute for the U.S. Department of Transportation, Maritime Administration and the National Waterways Foundation, November 2007. Values reported are in $2007.
[3] Values are based upon estimates made and reported in *Commodity Valuation Analysis for the Great Lakes, Mississippi-Ohio, and Columbia-Snake Waterway Systems*, prepared for the U.S. Army Corps of Engineers, by the Upper Great Plains Transportation Institute, North Dakota State University, 30 November 2009

Table 6 – Major Commodities Shipped through Chicago and T.J. O'Brien Locks

Chicago and O'Brien Locks
Major Commodities, 2008

Commodity		2008 Tons	Percent of Total
5-digit	Description		
33540	Petro.Bitumen,Petro.Coke,Asphalt,Butumen mixes NEC	1,165,726	19.99%
67120	Pig Iron & Spiegeleisen,in Pigs,Blocks, Other Form	624,177	10.70%
67300	Flat-Rolled Products of Iron & Steel,Not Clad,Pltd	554,672	9.51%
32500	Coke, Semi-Coke of Coal, of Lignite or of Peat	377,530	6.47%
28200	Ferrous Waste & Scrap;Remelting Ingots of Iron/Stl	318,465	5.46%
27862	Slag, Dross, Scalings & Waste of Iron or Steel	307,482	5.27%
27830	Sodium Chloride,Pure & Common Salt(Incl Sea Water)	260,423	4.47%
33419	Other Light Oils from Petroleum & Bitum Minerals	237,117	4.07%
28100	Iron Ore and Concentrates	202,953	3.48%
4100	Wheat (Including Spelt) and Meslin, Unmilled	169,160	2.90%
66120	Portland, Aluminous, Slag, or Supersulfate Cement	168,630	2.89%
67140	Ferro-Manganese	117,853	2.02%
67150	Other Ferro-Alloys (Exc Radioactive Ferro-Alloys)	117,302	2.01%
27820	Clays and Other Refractory Minerals, NEC	110,760	1.90%
52322	Calcium Chloride	98,668	1.69%
56216	Urea Fertilizers	86,504	1.48%
67600	Iron and Steel Bars,Rods,Angles,Shapes & Sections	80,722	1.38%
33440	Fuel Oils, NEC	77,833	1.33%
28500	Aluminum Ores & Concentrates (Including Alumina)	71,481	1.23%
51221	Ethylene Glycol (Ethanedoil)	65,364	1.12%
28770	Manganese Ores and Concentrates	54,554	0.94%
	SUBTOTAL MAJOR COMMODITIES	5,267,376	90.32%
	TOTAL ALL COMMODITIES	5,831,757	100.00%

Source: 2008 WCSC data

The major terminals shipping these commodities through the Chicago and O'Brien locks are shown in the following tables:

Table 7 – Major Terminals supported by the Chicago and O'Brien Locks

Chicago Lock	
Terminal Name	*Commodity*
OCCIDENTAL CHEMICAL	Calcium Chloride
IMPERIAL OIL	Fuel Oils, Bitumen, Asphalt
MILWAUKEE BULK TERMINAL	Scrap Metals
GATX TERMINALS CORP	Chemicals
O'Brien Lock	
EXXON MOBIL	Petro. Coke, Bitumen, Asphalt
MORTON SALT	Sodium Chloride
STERLING FUEL	Iron Ore
ST. MARY'S CEMENT	Portland Cement
DELTA BULK TERMINAL	Flat Rolled Products of Iron

Information displayed in Table 8 indicates that a large portion of traffic moving through these locks originates in the New Orleans area. In fact, the Mississippi River competes with more proximate origins for dominance of movement origins. Table 9 indicates that the destination of Chicago and O'Brien locks movements is dominated by shippers in the Chicago area or along Lake Michigan.

Table 8 – Major Originating Waterways for Commodity Movements through Chicago and O'Brien Locks

Chicago and O'Brien Locks
Major Originating Waterways, 2008

Originating Waterway	Tons	% of Total
Mississippi River, Baton Rouge, LA to New Orleans, LA	1,487,613	26%
Lake Michigan	984,240	17%
Calumet Harbor and River, IL and IN	865,824	15%
Illinois River, IL	627,725	11%
Mississippi River, New Orleans, LA to Mouth of Passes	510,478	9%
Chicago Sanitary and Ship Canal, IL	446,560	8%
Gulf Intracoastal Waterway, Mississippi River, LA, to Sabi	195,356	3%
Lake Calumet, IL	110,266	2%
Tennessee River, TN, AL and KY	108,394	2%
Ohio River	98,071	2%
SUBTOTAL OF MAJOR WATERWAYS	5,434,527	93%
TOTAL	**5,831,757**	

Source: 2008 WCSC data

Table 9 – Major Destination Waterways for Commodity Movements through Chicago and O'Brien Locks

Chicago and O'Brien Locks
Major Destination Waterways, 2008

Destination Waterway	Tons	% of Total
Calumet Harbor and River, IL and IN	2,358,143	40%
Lake Michigan	1,013,073	17%
Lake Calumet, IL	480,164	8%
Illinois River, IL	306,802	5%
Mississippi River, Baton Rouge, LA to New Orleans, LA	253,023	4%
Mississippi River, Minneapolis, MN to Mouth of Missouri R	198,950	3%
Chicago Sanitary and Ship Canal, IL	193,988	3%
Ohio River	175,681	3%
Houston, TX	124,261	2%
Tennessee River, TN, AL and KY	110,950	2%
SUBTOTAL OF MAJOR WATERWAYS	4,610,155	79%
TOTAL	5,831,757	

Source: 2008 WCSC data

3.3 - Transportation Rate Savings

The 2008 commodity tonnage that moved through Chicago and O'Brien locks did so at a transportation rate savings of $2 million and $148 million, respectively (see Tables 10 and 11). The transportation rate savings is measured as the cost difference between the existing waterway routing and the least cost all overland routing.

Table 10 – Transportation Rate Savings for Chicago Lock

Chicago Lock
Estimation of Transportation Rate Savings, 2008

Commodity	Ave. Rate Savings	Tons	Total Rate Savings
Coal	$ -	-	$ -
Petrol	$ 31.12	15,421	$ 479,943
Aggs	$ -	-	$ -
Grains	$ -	-	$ -
Chemicals	$ 42.44	28,062	$ 1,190,812
Ores & Minerals	$ -	-	$ -
Iron & Steel	$ 27.22	4,610	$ 125,479
Other	$ -	-	$ -
TOTAL	$ 37.35	48,093	$ 1,796,233

Source: 2008 WCSC data and *2006 Transportation Rate Analysis for the Upper Mississippi and Illinois Waterways* , TVA, 2006
Note: Rate savings are in $2009.

Table 11 – Transportation Rate Savings for T.J. O'Brien

O'Brien Lock
Estimation of Transportation Rate Savings, 2008

Commodity	Ave. Rate Savings	Tons	Total Rate Savings
Coal	$ 30.14	409,583	$ 12,343,800
Petrol	$ 19.30	1,598,902	$ 30,853,373
Aggs	$ 10.94	90,871	$ 994,380
Grains	$ 19.82	223,740	$ 4,434,175
Chemicals	$ 34.84	286,142	$ 9,970,365
Ores & Minerals	$ 27.71	541,666	$ 15,010,641
Iron & Steel	$ 30.62	2,068,874	$ 63,348,688
Other	$ 19.21	563,886	$ 10,833,453
TOTAL	$ 25.55	5,783,664	$ 147,788,874

Source: 2008 WCSC data and *2006 Transportation Rate Analysis for the Upper Mississippi and Illinois Waterways* , TVA, 2006
Note: Rate savings are in $2009.

3.4 - Commercial Passenger and Recreation Traffic

Chicago Lock traffic averages nearly 702 thousand passengers on commercial vessels, such as ferries and dinner cruises. Commercial passenger vessels transit from the Chicago River to Lake Michigan and the Navy Pier and offer a unique dining experience. The dinner cruise industry which relies on transits through Chicago Lock generates an estimated $19.0 million in net income.

Recreational boaters are important users of the locks, especially in summer months. On average nearly 60,000 vessels are locked through Chicago and O'Brien locks each year. Estimates of recreation benefits, about $500 thousand per year, shown in the table below for each lock. These estimates are based upon a survey of recreational boaters in 1998 and their stated willingness to pay for a recreational lockage at Chicago.

Table 12 – Recreational Traffic for Chicago and T.J. O'Brien Locks

Chicago and O'Brien Locks
Historic Recreation Vessels Locked and Benefits

Year	Rec Vessels Locked		Rec Benefits	
	Chicago	O'Brien	Chicago	O'Brien
2000	42,006	32,981	$ 355,976	$ 279,494
2001	39,548	29,790	$ 335,146	$ 252,452
2002	40,596	30,314	$ 344,027	$ 256,893
2003	33,696	26,934	$ 285,553	$ 228,249
2004	30,509	23,922	$ 258,545	$ 202,725
2005	29,590	25,653	$ 250,757	$ 217,394
2006	25,549	20,744	$ 216,512	$ 175,793
2007	30,244	23,170	$ 256,300	$ 196,352
2008	27,141	19,208	$ 230,004	$ 162,776
2009	26,627	18,100	$ 225,648	$ 153,387
Average 2000 - 2009	32,551	25,082	$ 275,847	$ 212,552

Source: USACE OMBIL/LPMS data and Attachment 1 to the *Chicago Lock Project,Chicago Harbor Illinois, Chicago Lock, Major Rehabilitation Evaluation Report, FY2001* , March 1999, submitted by USACE Chicago District.
Note: Values have been indexed to $2009.

CHAPTER 4 – INTERIM III RISK REDUCTION

4.1 – Method of Risk Assessment

Due to the perceived nature of this threat and need to act promptly, this Interim Risk Reduction analysis follows an existing USACE process to rapidly implement interim measures to mitigate unacceptable risks, USACE EC 1110-2-6064, Interim Risk Reduction Measures (IRRMs) for Dam Safety. While this expedited process was designed to evaluate dam structures, its concepts can be applied to other circumstances that require expedited development of solutions to reduce risk. This expedited process requires the identification of potential failure modes; an analysis of the consequences identified with each identified potential failure mode, and an analysis of alternatives considered to reduce the probability of failure and/or consequences associated with the failure modes.

4.2 – Identified Failure Modes

For the purposes of this analysis, "Failure" is defined as the movement of bighead and/or silver carp from waters below (downstream of) the dispersal barrier system through the CAWS above (upstream of) the dispersal system and into Lake Michigan. Four general methods of bypass of the Electrical Dispersal Barriers were judged to be relevant potential failure modes to this analysis, as described below.

Inter-Basin cross-connections during flood events – The Des Plaines River runs parallel to and west of the CSSC for about 25 miles before merging with the CSSC just below Lockport Lock and Dam. Along the stretch where the river and CSSC run parallel are a number of low areas where water can cross over from the Des Plaines River to the CSSC during a flood event. In order for Asian carp to be transported around the barriers from the Des Plaines River, they would have to be present in the Des Plaines River at the time a flood occurred, then swim or be carried in waters of sufficient depth to pass over the divide between the river and CSSC. The frequency and intensity of precipitation necessary for flood waters to overtop the divide north of the barriers is not known.

Another potential pathway is through the Illinois & Michigan (I&M) Canal which runs parallel to the CSSC to the east. A set of culverts connects the I&M and CSSC upstream of the barrier. Below these culverts there are stretches of the I&M that often have little, if any, water and contain thick stands of vegetation. However, water does flow in the I&M during times of significant precipitation. The frequency and intensity of precipitation necessary to make the I&M a continuous waterway passable by fish from below the barriers to the culverts connecting to the CSSC is not known.

USACE is studying the frequency and intensity of storms necessary to create these potential bypasses as part of the Efficacy Study. A final analysis and recommendations for long-term solutions to reduce the risk of bypasses via these pathways will be included in the Final Efficacy Study Report. In the meantime, the Interim I report recommended short-term solutions to reduce the risk of these potential bypasses. The recommended solutions that include the installation of a physical barrier between the Des Plaines River and CSSC and a blockage in the I&M Canal were approved by the ASA (CW) on 12 January, 2010 and are scheduled to be fully implemented by October 2010.

Movement/Release by Humans – This can occur deliberately or inadvertently. Possible means include use of juvenile Asian carp as bait fish, release of captured or purchased live fish due to cultural practices (i.e., reportedly in some cultures it is customary to return a live fish or fishes to nature after capturing or purchasing fish for eating), release of fish previously held in aquaria, or deliberate movement of fish. Movement of live Asian carp has apparently occurred in the Chicago area. On several occasions in the last seven years, documented captures of bighead carp have occurred from lagoons in the City of Chicago. The lagoons have no tributaries and are isolated from other water sources; therefore, the only logical explanation of how they were introduced to the lagoons is live release.

Although sale of live bighead and silver carp once occurred in Illinois, the State of Illinois and the City of Chicago have enacted laws banning the sale of live bighead and silver carp. This includes a ban on sale for use as live bait, although there is concern that juvenile bighead or silver carp might be inadvertently included in bait because they are difficult to distinguish from some native species when small in size. The Illinois Department of Natural Resources is planning to investigate the bait sale industry to determine the likelihood of movement of Asian carp via this pathway and how it may be reduced or eliminated.

Inadvertent movement of fish by vessels – This can potentially occur by a vessel facilitated transfer of non-potable water across the fish barrier, by fish becoming attached or held on a vessel hull or between vessels (such as connected barges), or by fish becoming entrained and pulled along in the wake of vessels.

Ballast water from overseas ports is a well-documented pathway for movement of aquatic nuisance species into the Great Lakes. Vessels on inland rivers do not ballast at the same frequency or volume as larger vessels that traverse more open waters. However, the importance of ballast and bilge water as a pathway for movement of ANS within inland waterways is not well-defined. To address this risk vector, the Coast Guard issued a temporary interim rule in December 2009 prohibiting the transfer of non-potable water for discharge across the barrier. The Towboat/Barge Sampling Workgroup consisting of members from academia, industry, and regulatory agencies has been chartered to study this as a possible pathway or failure mode. This issue is slated to be addressed by the MRRWG of the ACRCC.

Failure of the Electrical Dispersal Barriers to perform as designed - This can occur if an electrical barrier loses all or partial power so that it is not operating at the set operating parameters or if the set operating parameters are not sufficient to deter fish.

All of the electrical barriers have backup diesel-powered generators that automatically activate if a complete or partial power loss occurs in the feed from the local electrical utility. Loss of power due to failure or malfunction of barrier electrical or mechanical equipment is also possible and has occurred on some occasions. The redundancy provided by multiple barriers helps reduce risk at these times. USACE is continuously working to improve the reliability of the electrical and mechanical systems.

The barrier electric fields can be controlled by manipulating the frequency, length (duration), and magnitude (voltage) of the direct current pulses in the CSSC. USACE is engaged in an ongoing research program to identify the optimal combination of these operating parameters

for deterring all sizes of bighead and silver carp. The Efficacy Study Interim II report will describe this research and summarize the results.

4.3 – Problems, Opportunities & Consequences

There are inherent uncertainties and unknowns in this evaluation process, both regarding the potential impact of Asian carp in the Great Lakes and the efficacy of various measures intended to impede carp migration. These problems dictate the need for a strategy that has the flexibility and robustness to develop and incorporate new and better monitoring techniques, methods and tools and to quickly apply them where appropriate.

The present opportunity is to prevent further movement of the two target invasive species, silver and bighead carps, between the Mississippi River and Great Lakes Basins. The full range of potential impacts of these two species of Asian carp could have on the Great Lakes system as whole in terms of ecology and economics is at present not fully defined; however, invasive species have been documented around the world to be one of the main causes of biodiversity loss (Wilson 1991, Kowarik 1995, Vitousek et. al. 1997, Ward 1998, Gido & Brown 1999, Lockwood & McKinney 2000, Blair 2000, Rahel 2000, McKinney 2001, Woodruff 2001, Mooney & Cleland 2001, Lake & Leishman 2004, Leung 2006, Lepriuer et al 2008). In general terms, to prevent adverse ecological and cultural effects of an alien species, several actions may be undertaken, which include: a cessation of the transport of live alien species; restoration of ecosystems structure and functions; and the eradication, or reduction of already established invasive species. Measures implemented under this interim to manage the dispersal of Asian carps into Lake Michigan via the CAWS can provide a means to address these action items.

The fact that a large and growing population of silver and bighead carp in the Illinois River are migrating upstream toward the electrical dispersal barriers and the possibility that Asian carp already exist in the CAWS beyond electrical dispersal barriers present two distinct problems. Interim measures that will be recommended to prevent or slow the invasive Asian carp from entering Lake Michigan from the CAWS are warranted because they reduce the risk and consequences associated with the dispersal of these species. However, there are various unknowns associated with the recommended approach that will be further discussed below.

Little Calumet River and Grand Calumet River Pathways

The Little Calumet and Grand Calumet Rivers have no USACE or MWRD control structures that might be evaluated for the potential to control passage of Asian carp into Lake Michigan. As discussed in Section 2, above, the Little Calumet and Grand Calumet River are part of the area waterways, and both channels have undergone significant modification as the area urbanized. The Grand Calumet River extends from its confluence with the Little Calumet River below the T.J. O'Brien Lock and Dam to its terminus in Gary, Indiana at the Marquette Lagoons. The Grand Calumet River is connected to Lake Michigan via the Indiana Harbor and Canal. The Little Calumet River extends both north and south from its confluence with the Calumet Sag Channel, with the northern portion terminating at the T.J. O'Brien Lock and Dam, and the southern portion extending eastward into Indiana and exiting via Burns Ditch into Lake Michigan.

A Great Lakes Legacy Act Project is currently underway on the West Branch of the Grand Calumet River near the Illinois-Indiana stateline. The project involves the removal of contaminated sediment from the Grand Calumet River. The sediment removal is being accomplished in the dry, so a temporary sheetpile weir has been installed on either end of the remediation reach. During construction of the project a dry reach of between 200 to 800 feet will be present. Weir locations will change as segments of the Legacy Act project are completed, but the dry area should remain approximately 200 feet for the duration of the project. The sheetpile weir was designed to overtop at a 10-year storm event, so that the project would not induce flooding in the adjacent community. A permanent weir structure will be installed on the upstream end of the project near the stateline at the completion of the remediation project. The permanent weir is intended to prevent recontamination of the project area by un-remediated segments of the river. Both the temporary and permanent weirs should inhibit the movement of Asian carp for storms up to the 10-year design event.

The Little Calumet River has been significantly modified as the area has urbanized. Portions of the Little Calumet River in Illinois are quite wide and deep, with the channel becoming smaller and shallower as it extends to the east. Significant overbank flooding for the past 50 plus years in both Illinois and Indiana has led to the construction of several large flood control projects; the Interim Thorn Creek Reservoir in Illinois by the MWRD, and the Little Calumet River Flood Control and Recreation Project in Indiana by the USACE and its non-Federal partner, the Little Calumet River Basin Development Commission.

In Interim IIIA, USACE considered the placement of an acoustic-bubble-strobe (ABS) fish deterrent near the confluence of the Little Calumet River and the Calumet Sag Channel that could function to deter fish away from this open pathway to the lake. However, the USACE concluded that the ABS deterrent measures need to be fully evaluated and tested at another location prior to implementation at other locations. USACE has also considered whether or not there are other easily implementable deterrents that could be implemented on the Little Calumet River to further reduce the risk of dispersal through this pathway. Because of concerns related to flood induced damages the PDT needs to consider the impacts of measures that might be implemented and what type of impacts those measures would have on water levels. Therefore, several measures were screened out by the USACE PDT as non-implementable. The PDT will continue to evaluate available technologies and methods that could be recommended for implementation to address the risk related to Asian carp migration through the Little Calumet River in the analysis for the Final Efficacy Study.

Both the Little Calumet and Grand Calumet Rivers will be addressed in the Final Efficacy Study. In the meantime, USACE does not believe that those pathways pose a significant threat that cannot be addressed by the ongoing fish control and eradication efforts performed by FWS and IDNR.

4.4 – Interim Risk Reduction Measures – Modified Structures and Operations Alternatives Analysis

A suite of Interim Risk Reduction Measures (IRRMs) consisting of modified structures and operations (MSOs) were considered by both the Interagency Team as well as the USACE Project Development Team (PDT), to reduce the risks and/or consequences associated with the failure modes identified in Section 4.2. MSOs were considered within the following three areas: Gate

Modifications; Pumping Station Modifications; and Lock Operations Modifications. An additional area of modified structures operations was also considered by the PDT based on previous evaluations by the City of Chicago and others. As part of the Aquatic Invasive Species Summit held in Chicago in May 2003, an interagency panel recommended consideration of the development of an anoxic zone in the CAWS to deter to movement of Aquatic Invasive Species. An anoxic zone could be established through the use of a chemical or biological agent that could significantly reduce the availability of oxygen in the zone. Because of the complexity of this issue in terms of implementation, permitting, water quality, etc., further evaluation of this measure was deferred.

No Action Alternative

The no-action alternative assumes no modification to the current configuration and/or operation of the lakefront structures, which includes the Wilmette Pumping Station, the Chicago Lock and Chicago River Controlling Works (CRCW), T.J. O'Brien Lock and Controlling Works, and the CAWS to facilitate risk reduction associated with the movement of Asian carps through the CAWS into Lake Michigan.

Gate Modifications

As discussed in Section 2.4 the sluice gates located at the CRCW and T.J. O'Brien Controlling Works are utilized to help modify water levels during flood events (Figures 10-12). The sluice gates are also utilized for water quality diversion which occurs throughout the warm weather months. In order to maintain the full functionality of these structures while still addressing the risk associated with flow between the CAWS and Lake Michigan, the Interagency PDT considered several alternatives, including the installation of screens on the gates that would facilitate the use of the gates for diversion water intake. The sluice gates are used for the intake of diversion water for about six months of the year. The installation of screens on those sluice gates would inhibit the movement of adult and some juvenile Asian carp through the open sluice gates. The gate screens will be removed if the sluice gates need to be used to allow backflow during a significant storm event, because there is a high probability that the screens would become clogged with debris during a storm event. Inability to allow backflow through all sluice gates during a backflow event would induce flooding along the CAWS. Current hydraulic analysis indicates that an increase in water levels on the CAWS of up to 6 feet could be realized if an emergency backflow could not occur. (See Appendix A).

MWRD has installed screens on two of the four south sluice gates at the CRCW. The gate screens were placed into service on 14 May 2010. The screens were placed on the gates in the controlling works that are used for the intake of diversion water from Lake Michigan. Operation and Maintenance (O&M) of the screens at the CRCW will be performed by MWRD. Because the CRCW sluice gates are owned and operated by MWRD independently of USACE, this report does not consider those screens further except to note their role in ongoing efforts to inhibit Asian carp migration.

Figure 10 Chicago Lock and CRCW

For T.J. O'Brien, the recommended proposal is for the Corps, in coordination with MWRD, to install screens on the two outer sluice gates. These are the sluice gates which are used for the intake of diversion water from Lake Michigan and thus are in an open position for about six months of the year. During an urgent and significant backflow event, all gates will be utilized for backflow, and the screens will be removed so that any impediments to backflow are minimized as previously discussed. The operation plan may change dependent on waterway conditions. The addition of the screens on the two sluice gates would provide risk reduction by reducing the available pathways at the lock for Asian carp migration into Lake Michigan during the period when the gates are opened for the intake of diversion water.

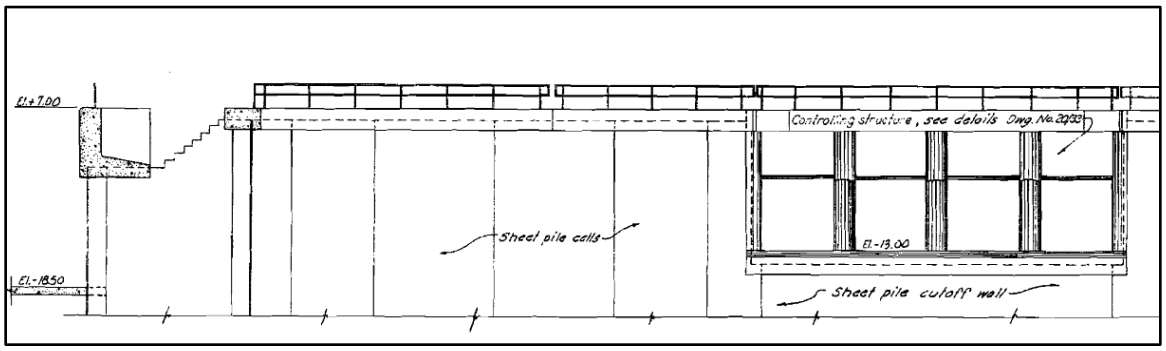


Figure 11 Cross Section of T.J. O'Brien Lock and Gates

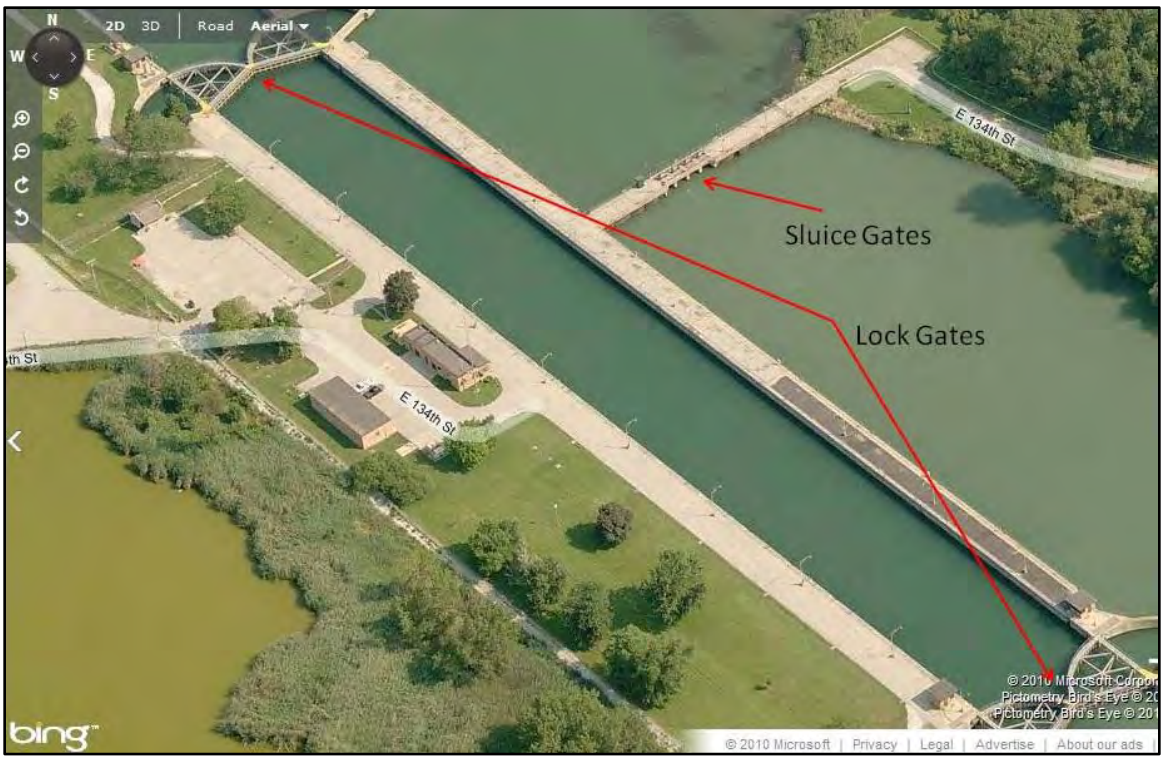


Figure 12 T.J. O'Brien Lock and Controlling Works

An analysis of the impacts to water levels in the CAWS was performed utilizing hydrologic and hydraulic computer simulation models to evaluate any potential impacts associated with the installation of the screens on two of the sluice gates. The evaluations were performed for two lake level conditions: a low lake level that approximates current conditions (+0.8 feet CCD); and a high lake level (+3.8 feet CCD). Simulations were run for the 20, 50, 100 and 500 year events for both lake level conditions for free-flow and blocked conditions. The computed impact of the screens on river stages was between 0.0 feet to 0.19 feet for the 100 year event. Stage impacts were 0.07 feet for the with-screen condition, and 0.19 feet for a fully blocked screen condition. Therefore, the installation of the screens should not significantly impact water levels in the canal, and with appropriate maintenance water level impacts should be minimal. A complete discussion of the H&H evaluation is contained in Appendix A, Hydrology and Hydraulics.

Operation and Maintenance (O&M) of the screens at the T.J. O'Brien Lock and Dam will be performed by the USACE. Design drawings of the screens are located in Appendix B, Civil Design. An estimate of the cost for the screen fabrication, installation and annual O&M, developed by the MWRD, is included in Appendix C. The USACE has developed an independent cost estimate for the installation and maintenance of the sluice gate screens. Costs for the construction and operation of the recommended measure are contained in Table 13, below. The certified cost estimate is contained in Appendix C.

Table 13 - Costs for Recommended Risk Reduction Measure

Item	Estimate	Contingency	Total
Construction			
Land			
Preconstruction, Eng & Design			
Eng & Design During Construction			
Construction Management			
Total Project Costs			
Annual O&M Costs			

The PDT also considered the installation of bar screens on the lock gates as a potential IRRM. Because the screens could only be installed on the lock gates if the locks were closed to navigation for an extended period, the only use for such screens would be during a backflow event to inhibit the movement of some juvenile and adult fish while allowing the passage of backflow water. However, there is a high probability that the screens would become clogged with debris during a storm event and thus inoperable during a backflow event. Inability to backflow through the lock gates during a significant backflow event would induce flooding along the CAWS, so to minimize potential flood impacts the lock gate screens would be removed prior to a backflow event. Therefore, screens on the lock gates would not function as risk reduction measures. Further, installation and removal of the screens would require the use of an onsite crane. Neither the Chicago or O'Brien locks have an onsite crane, so a dedicated crane would need to be rented, with a crew on standby in the event removal of the screens was needed for an emergency backflow. Because the lock gate screens would likely not function as risk reduction measures during a backflow event through the lock gates, and because long-term lock closures are not being evaluated in this report, the PDT decided to eliminate this measure from further consideration. However, measures such as the lock screens may be considered as part of the GLMRIS study, which will include an evaluation of long-term closures.

Pumping Station Operation Modifications

The Wilmette Pumping station is located at the headwaters of the North Shore Channel in Wilmette, Illinois (Figure 13). As discussed in Section 1.5 above, the Wilmette Pumping Station, which is operated by the MWRD consists of a large sluice gate (32X16 feet) and a 250 cfs pumping station. The sluice gate is normally opened for the intake of diversion water and to backflow under flood conditions. Water is diverted from Lake Michigan to the North Shore Channel for approximately six months per year. While in an open position, sluice gate could provide a large pathway for the passage of Asian carp to Lake Michigan. The MWRD could utilize the Wilmette Pumping Station, for the intake of the diversion water, rather than using the sluice gate for the intake of diversion water, if they were requested to do so by the MRRWG or a resource agency. With the sluice gate in a closed position and the pump station being utilized for water intake, the pathway for Asian carp from the North Shore Channel could be eliminated. With this change in diversion intake, however, the sluice gate would still be utilized for backflow, if needed. Any operation plan may change dependent on waterway conditions. Because the Wilmette Pumping Station is owned and operated by MWRD independently of USACE, this report does not consider this potential operational change further except to note its role in ongoing efforts to inhibit Asian carp migration.

Figure 13 Wilmette Pumping Station and Gate at the mouth of the North Shore Channel

Lock Operation Modifications

Modifications to lock operations alternatives were considered by the Interagency Team, as well as the USACE Project Development Team (PDT) as a means to control access to Lake Michigan for any Asian carp that might be present in the CAWS above the electric dispersal barriers. These modifications were considered as Interim Risk Reduction Measures to address failure modes associated with the electric dispersal barriers discussed in Section 4.2, above.

USFWS Risk Assessment Panel Review of Alternatives

The Interagency Team and the USACE PDT developed a number of operation alternatives that would limit the operation of the locks for navigation for different periods of time. Lock closure periods were paired with control efforts in the waterways by resource agencies and others. The original suite of alternatives that were presented to the USFWS Risk Assessment Panel included five (5) different closure scenarios, plus a no-action alternative. The original suite of alternatives consisted of:

- Alternative 1 - Continue current operations (No-Action)
- Alternative 2 - Lock closure of 3 to 4 days a week and normal operations for the remaining days of the week, with extensive monitoring, testing and commercial fishing in the CAWS while the locks were closed;
- Alternative 3 - Lock closure of 1 week/month and normal operation for the remaining days of the month, with extensive monitoring, testing and commercial fishing in the CAWS while the locks were closed;

- Alternative 4 - Lock closure every other week and normal operations for the alternative weeks, with extensive monitoring, testing and commercial fishing in the CAWS while the locks were closed;
- Alternative 5 - Lock closure of 2 months with extensive monitoring to determine if Asian carps are in the CAWs. If no Asian carps are collected during the closed period, then lock operations will be resumed at the end of the closure period. Locks would remain open, unless there was a significant flow event that could trigger fish movement. Locks would be closed on an emergency basis while monitoring activities were executed.
- Alternative 6 - Two-week lock closure, in late Spring 2010, during which extensive surveillance and monitoring would be conducted. If no Asian carps are recovered, then the locks would operate normally. However, if there is a significant rainfall event that results in elevated flows (and a possible stimulus for Asian carps to move upstream) after the two weeks of surveillance/monitoring, then the locks would be closed as soon as possible. During the lock closure, resources could be mobilized to complete surveillance/monitoring for a week. If no Asian carps are captured during the week, then the locks would be reopened.

The Risk Assessment Panel of experts provided responses to each of the alternatives based on a measure of anticipated risk and/or risk reduction. A summary of the responses provided for each of the six (6) alternatives evaluated by the panel follows.

- Alternative 1 - Continue current operations (no action, as required by NEPA) – A majority of the experts believed that there would be a medium to high (6 to 1) probability of AC establishing self-sustaining populations in Lake Michigan if no action was the recommended alternative. The basis for assessment is the possibility that a small population of Asian carp may be present in the CAWS above the barrier.

- Alternative 2 - Lock closure of 3 to 4 days a week and normal operations for the remaining days of the week – The majority of the experts believed that there would be a medium to high (5 to 2) probability of AC establishing self-sustaining populations in Lake Michigan if this alternative were to be implemented. Most of the responses centered on the closure time being inadequate for effective monitoring and assessment of the monitoring data.

- Alternative 3 - Lock closure of 1 week/month and normal operation for the remaining days of the month – The majority of the experts believed that there would be a medium to high (6 to 1) probability of AC establishing self-sustaining populations in Lake Michigan if this alternative were to be implemented. While there was consensus on the recommendation of risk the panel members also provided comments to support their ratings. A few of the responses suggested that the one week monitoring period would not be sufficient to allow adequate monitoring and assessment of the data.

- Alternative 4: Lock closure every other week and normal operations for the alternative weeks – The majority of the experts believed that there would be a medium to high (5 to 2) probability of AC establishing self-sustaining populations in Lake Michigan if this alternative were to be implemented. A few of the responses suggested that the one

week monitoring period would not be sufficient to allow adequate monitoring and assessment of the data.

- Alternative 5: Lock closure of 2 months with extensive monitoring to determine if Asian carps are in the CAWs. The majority of the experts believed that there would be a medium to high (5 to 2) probability of AC establishing self-sustaining populations in Lake Michigan if this alternative were to be implemented. A few of the experts felt a long-term closure might lower the risk of Asian carp establishment in the Great Lakes. Other experts felt that while a two month closure might reduce Asian carp migration during the closure period, once the locks were reopened, there would be no long term risk reduction associated with Asian carp migration.

- Alternative 6: Two-week lock closure, in late Spring 2010, during which extensive surveillance and monitoring would be conducted. The majority of the experts believed that there would be a medium to high (6 to 1) probability of AC establishing self-sustaining population in Lake Michigan if this alternative were to be implemented. This alternative was recommended by some of the experts.

In summary, out of the six alternatives considered by the Risk Assessment Panel, there was no alternative or combination of alternatives that the Panel Members determined would lower the risk of Asian carps establishing self-sustaining populations in Lake Michigan to an acceptable level. In other words, there was not a high probability that recommending regularly scheduled closures would reduce the risk of Asian carp establishment in Lake Michigan. Other recommendations provided by the panel for decreasing risk were considered as part of the development of new alternatives and were also considered by the Monitoring and Rapid Response and Invasive Species Control Working Groups as their short-term and long term plans were developed.

Based on the results of the Risk Assessment Panel's findings, the USACE and Interagency PDT reconsidered the conditions under which Modified Lock Operations would be most appropriate to reduce the risk related to Asian carps in the CAWS, and would allow the Corps to facilitate navigation and flood control through the locks and controlling works. Therefore, a new suite of alternatives was developed that will be evaluated as Interim Risk Reduction Measures. These new alternatives combined short-term lock closures with traditional fish control efforts that would be executed by resource agencies. The level of risk reduction afforded by the alternatives will be informed by ongoing fish control efforts, as discussed later in this section, and the results of subsequent expert panel evaluations on the monitoring efforts. The alternatives considered are as follows and will be further discussed below:

- No change in operation (No Action)
- Regularly Scheduled Lock Closures to Support Control Efforts
- Intermittent Lock Closures to Support Control Efforts

Extended Lock Closure

In this dynamic formulation process, the USACE PDT and the Interagency Team as well as the other members of the ACRCC are continuing to evaluate other methods to reduce the risk

related to Asian carp migration in the CAWS. The intent is for the efforts of the ACRCC members, collectively and as individual agencies to implement measures that will complement each other. While extended lock closures have been suggested as an effective means of risk reduction, it was not further considered in this study because the expedited nature of this study did not allow extended or permanent lock closure to be considered given the complicated nature of the impacts and issues that must be addressed as part of that evaluation.

Conducting a detailed analysis prior to making a decision on extended lock closure is critical to understanding and mitigating potentially significant impacts. In addition, taking the time necessary to conduct this analysis is reasonable in light of the fact that USACE has insufficient information to conclude that Asian carp are actually present above the fish barrier. In addition, USACE does not currently have evidence that there is an imminent threat that a sustainable population of Asian carp may establish itself in Lake Michigan if the locks are not closed. This assessment is based on the information currently available, including the eDNA results and consultation with state and federal partners.

USACE continues to assess the need for more extended or permanent lock closures in studies more suited to evaluate this alternative. In addition the Corps intends to fully analyze permanent hydrologic separation of the two basins, which may include permanent lock closures, in the GLMRIS study. Extended or permanent lock closures would assume that the locks and controlling works would not be opened to facilitate navigation, flood control, emergency access or water quality diversion. A full assessment of the impacts related to long terms closures would need to be accomplished in order to quantify the mitigation requirements to implement these closures. This assessment must take into account the authorized purposes of the CAWS structures for water diversion, navigation, and flood control. The potential implications of permanent or extended lock closures, and other means to separate the basins, require thoughtful and detailed analysis. Analysis would include the following assessments at a minimum: full economic assessment on the impacts to the national and regional economy; full hydrologic and hydraulic assessment of the impacts on the Chicago area if backflow during significant rainfall events was not facilitated; assessment of water quality impacts if diversion intake water was not permitted. Evaluations would also need to address life-safety issues, as well as other social effects.

However, USACE is prepared to respond, with its partners, to any new information that arises on an emergency or expedited basis. If additional or new information becomes available, which in the judgment of appropriate experts represents a significant threat that a sustainable population of Asian carp could become established in Lake Michigan and the likely consequences of such a threat are adequately understood, USACE is prepared to make recommendations related to lock closure and to consider any other appropriate actions as allowable under available authorities.

No Change in Operations (No Action)

This alternative consists of the normal operation of the Chicago and O'Brien locks, with no change in operation related to control of Aquatic Nuisance Species and no changes in support of the efforts of others to control Aquatic Nuisance Species.

Regularly Scheduled Lock Closures to Support Control Efforts

This alternative was developed through the process of re-analysis after the completion of the USFWS Risk Assessment and can be described as a lock closure on a regular, scheduled interval needed to support fish control efforts of other resource agencies. This alternative assumes that regularly scheduled lock closure may be requested by other resource agencies including IDNR and USFWS to facilitate the execution of regularly scheduled periodic monitoring and response activities such as regularly scheduled piscicide application or commercial fishing in the navigation channel immediately adjacent to the lock structures. Electro-shocking activities would not require a closure of the navigation channel, and would therefore not trigger the need for a regular lock closure. The request for a regularly scheduled closure could apply to either the Chicago or O'Brien Locks or to both.

During any regularly scheduled lock closure, provisions must be made to ensure that emergency operations for flooding, security or safety reasons will remain in place and, if needed, coordination with USCG will be initiated and any necessary emergency actions/operations will be performed upon USCG approval.

Lock closures and waterway restrictions fall under the authority of the Corps and the Coast Guard respectively. These authorities can be implemented upon request from the MRRWG, a resource agency, or any other partnering agency.

Upon the receipt of a lock closure request from a resource agency to close the navigation locks to support regularly scheduled control efforts the Corps of Engineers and others will complete the following actions:

- The Corps will notify the USCG about an impending lock closure
- The resource agency will coordinate with the USCG on the location of the Asian carp control efforts and concur on impacts to navigation that would require notification;
- The USCG will inform waterway users via broadcast notice to mariners;
- The Corps will initiate coordination with industry regarding the closure;
- The Corps will release a navigation notice after completion of industry coordination activities;
- The Corps will close the locks for the necessary period;
- The Corps will re-open the locks when the control efforts are completed.

The USCG may receive a request from a resource agency to close a portion of the CAWS to navigation in support of regularly scheduled Asian carp control efforts. Under these conditions, the Corps of Engineers and others will complete the following actions:

- The USCG will issue a navigation notice about an impending closure in support of Asian carp control efforts;
- The USCG will determine if a safety zone is necessary to complete the control actions and the Corps of Engineers will determine if a lock closure would be required;
- The Corps will initiate coordination with industry regarding the closure;
- The Corps will release a navigation notice after completion of industry coordination activities;
- The Corps will close the locks for the necessary period;
  The Corps will re-open the locks when the control efforts are completed.

The proposed monitoring plan for 2010 developed by the MRRWG does not currently require regular scheduled closure of the navigation channel or lock structures to execute the monitoring plan. The plan may require closures of portions of the navigation channel to accommodate control activities, such as commercial fishing or spot piscicide applications by the supporting agencies on an intermittent basis. If Asian carp are discovered above the barrier, then more periodic and extensive efforts may be implemented. These more extensive control efforts may require regular navigation channel and subsequent lock closure for the duration of a given control event. The impacts of these actions on navigation in the Chicago Area Waterways cannot be fully estimated until the number and extent of the closures is identified. Subsequent evaluations of those impacts may be needed if a request for regularly scheduled lock operation modification is requested by a resource agency to support fish control efforts.

Intermittent Lock Closures to Support Control Efforts

This alternative was developed through the process of re-analysis after the completion of the USFWS Risk Assessment as well as extensive coordination with members of the MRRWG. Intermittent lock closure would be requested by agencies responsible for the execution of periodic monitoring and response activities, piscicide application or commercial fishing in the navigation channel immediately adjacent to the lock structures. Based on the high level of concern regarding the possible presence of Asian carps in the Chicago area waterways, it is very likely that any requests for lock closures from resources agencies will be provided to the USACE with very little lead time for coordination with the USCG and industry on an impending closure. The request for a closure could apply to either the Chicago or O'Brien Locks or to both.

During any intermittent lock closure, provisions must be made to ensure that emergency operations for flooding, security or safety reasons will remain in place and, if needed, coordination with USCG will be initiated and any necessary emergency actions/operations will be performed upon USCG approval.

Lock closures and waterway restrictions fall under the authority of the Corps and the Coast Guard respectively. These authorities can be implemented upon request from the MRRWG, a resource agency, or any other partnering agency.

Upon the receipt of a lock closure request from a resource agency to support control efforts the Corps of Engineers and others will complete the following actions:

- The Corps will notify the USCG about an impending lock closure

- The resource agency will coordinate with the USCG on the location of the Asian carp control efforts and concur on impacts to navigation that would require notification;
- The USCG will inform waterway users via broadcast notice to mariners;
- The Corps will initiate coordination with industry regarding the closure;
- The Corps will release a navigation notice after completion of industry coordination activities;
- The Corps will close the locks for the necessary period;
- The Corps will re-open the locks when the control efforts are completed

The USCG may receive a request from a resource agency to close a portion of the CAWS to navigation in support of Asian carp control efforts. Under these conditions, the Corps of Engineers and others will complete the following actions:

- The USCG will issue a navigation notice about an impending closure in support of Asian carp control efforts;
- The USCG will determine if a safety zone is necessary to complete the control actions and the Corps of Engineers will determine if a lock closure would be required;
- The Corps will initiate coordination with industry regarding the closure;
- The Corps will release a navigation notice after completion of industry coordination activities;
- The Corps will close the locks for the necessary period;
- The Corps will re-open the locks when the control efforts are completed.

In December 2009, the USACE closed the Lockport and Brandon Locks to navigation during the the application of piscicides by the IDNR which was in support of a maintenance shutdown of Barrier IIA. Lockport Lock was closed from December 2 through December 6, 2009 and Brandon Road Lock was closed from December 2 through December 5, 2009, although local traffic was allowed transit by the USCG through the small Brandon Road pool during this period. The Corps partnered with the IDNR, USFWS and USEPA on the combined activities needed for a successful maintenance standown of Barrier IIA. Once the decision was made to implement the rotenone action to coincide with the maintenance standown, the USACE coordinated with the USCG and appropriate notices were issued. The U.S Coast Guard (USCG) began enforcing a safety zone on the CSSC on December 2, 2009 in support of Asian Carp Rapid Response Operations. Maintenance on the electric barrier, IIA, was completed and the barrier was returned to operation at 10 p.m. on Friday, December 4, 2009. In support of scheduled routine barrier maintenance, biologists working with the Asian Carp Rapid Response Workgroup began applying rotenone, on Wednesday, December 2, 2009 on a 5.7-mile stretch of the canal. Rotenone application was chosen as the best option for keeping Asian carp from breaching the lower voltage demonstration barrier while the more powerful Barrier IIA was taken down for scheduled routine maintenance. The application of rotenone and a detoxifying agent, potassium permanganate was successful and the clean-up of visible dead fish are complete at this time. One Bighead Asian carp was discovered nearly 500 feet above the Lockport Lock on Thursday afternoon, December 3, 2009. Biologists with the workgroup believe there is a high probability that additional Asian carp were killed during the toxicant application but may not be found.

In addition to the closure of the CSSC and the Lockport and Brandon Road Locks, the O'Brien lock was closed to accommodate commercial fishing in the Calumet Sag Channel and the Little Calumet River beginning on December 1, 2010. The IDNR conducted a commercial fishing

operations near the T.J. O'Brien Lock in an attempt to locate Asian carp after eDNA sampling in the area tested positive for the invasive species. Commercial fishermen and federal fisheries personnel deployed nearly 3,000 yards of fishing nets along a 5.5-mile stretch of the Cal-Sag Channel. While the nets were successful in collecting more than 800 fish, no Asian carp were found. The catch included more than 700 common carp and 10 other species. The fishing was initiated on December 1, 2009 and terminated on December 7, 2009. The U.S. Coast Guard reopened the Calumet-Sag Channel and Little Calumet River to vessel traffic on December 7, 2009.

In May 2010, the USACE closed the O'Brien Lock to navigation to support an application of the piscicide, rotenone by the IDNR in the Calumet Sag Channel. A notice to navigation was issued on May 10, 2010 by the USCG. Safety zone restrictions for the rotenone application were established on the Calumet River and Little Calumet River between mile marker 321.5 and 326.5 were lifted on May 25, 2010 by the U.S. Coast Guard Captain of the Port. The safety zone was initiated on May 21, 2010.

The length and location of the application and fish removal area was chosen to maximize the opportunity to capture Asian carp by including a variety of habitats along a substantial length of river channel that has had a high frequency of positive eDNA detections. Water was introduced into the system via sluice gates at T. J. O'Brien Lock and Dam to dilute rotenone to acceptable levels and to move the water that contained rotenone downstream into the area where it was acceptable to treat with permanganate. Measured discharges increased from near 100 CFS to about 3200 CFS during this action.

Fisheries biologists from the Illinois Department of Natural Resources (IDNR), the U.S. Fish and Wildlife Service (USFWS) and other supporting agencies collected just over 100,000 pounds fish during the week long operation. Over 40 species of fish were collected though no bighead or silver Asian carps were found. In addition to the Rotenone action, simultaneous electro-fishing and commercial netting will take place between the downstream block net and Acme Bend. Electro-fishing and netting will allow for an expansion of the area sampled and a comparison of conventional methods with Rotenone sampling.

USACE has the ability under its existing project authorities for the CRCW, Public Law 98-63, and the O'Brien Lock, Public Law 79-525, as well as under 33 U.S.C. 2316, to temporarily close locks upon request by other agencies to support monitoring and control efforts as set forth in this alternative, since extended closures are not anticipated. In contrast, alternatives which include extended closures or some regularly scheduled closures of significant duration may require other authority, such as Section 126 authority.

4.5 - Economic Impacts Associated with Lock Closures

As previously discussed, this Interim report does not include an alternative that would consider long-term or extended closures of the navigation locks. As a result, any adverse economic impacts associated with Interim Risk Reduction Measures would be temporary in nature.

It is anticipated that temporary closures of a lock to navigation to support fish control or eradication efforts could result in economic impacts based on underutilization of commercial vessels, increased transportation and logistics costs for shippers, temporary inconvenience to

recreational boaters, and, potentially, induced and indirect effects to local and regional employment as related to port activities. The primary impacts at these locks are related to commercial traffic, though recreational traffic could be inconvenienced in varying degrees depending upon the timing and duration of these temporary interruptions in service.

These identified impacts likely do not account for the full range of impacts of temporary closures because companies may keep many barges in fleeting areas and loading docks during the closure period; nor does it provide any information about the potential impact to customers awaiting deliveries or services. However, apart from these recent experiences, USACE cannot determine with specificity the precise nature of economic impacts because the timing and length of any closures will be dependent on the needs of resource agencies.

USACE estimates average transportation rate savings based on use of the CAWS at $500,000 per day across the user community. Based on the results of surveys conducted in the Great Lakes and Ohio River basins, shippers can protect most of these savings over short durations with advance notice. Thus, anticipated impacts to navigation will be lessened to some extent by sufficient notice periods prior to a lock closure, possibly allowing waterway carriers to re-route shipments through the Chicago Lock (at additional cost due to the lengthier transit, possibly as much as $25,000 per day across the total number of shippers re-routing through Chicago Lock) or local shippers to schedule shipments ahead of or after the closure. Towing companies and commercial passenger vessels may get little relief from the fixed operations cost of their towboats and crews during the period of closure even with an extended notice period prior to the closure and shippers may incur additional logistics costs. If tows sit idle, costs spread across affected entities could cost up to approximately $54,000 per day, taking into account fixed costs, lost sales of fuel, and lost wages.

Table 14 Opportunity Costs - Chicago and O'Brien

Lock	Ave. Tows per year 2003-2007	Ave. Tow Transits per day	Hourly Operating Costs	Daily Operating Costs	Daily Impacts
Chicago	54	0.147945205	$ 237.00	$ 5,688.00	$ 842
O'Brien	2172	5.950684932	$ 369.00	$ 8,856.00	$ 52,699
Both Locks	2226	6.098630137	$ 365.80	$ 8,779.15	$ 53,541

Source: Tow transits are pulled from NaSS Schema database developed by the Corps' Institute for Water Resources (IWR) from LPMS data. Hourly Operating Costs are derived from *Shallow Draft/Inland Vessel Operating Costs,* prepared for IWR by Informa Economics, 15 April 2008. The information in this table was prepared for 178 navigation locks operated by the Corps as part of a study entitled *Inland Navigation Lock Projects, Estimations of Value and Main Chamber Lock Closures, DRAFT, 23 March 2009.*

USACE cannot determine with specificity the precise nature of these economic impacts because the timing and length of any closures will be dependent on the needs of resource agencies and/or the Coast Guard and because USACE does not know when shippers might switch to overland routes if such a switch is practicable. However, USACE does not believe that economic impacts resulting from these temporary closures will be significant due to the intermittent

nature of the closures, the advance warning afforded the shipping and recreational community, and the relatively brief nature of anticipated closures.

As previously noted, a detailed assessment of the navigation and related industries in the study area and the impacts to navigation and regional and national economics from extended or long term closures of the navigation structures will be part of the GLRMIS study.

4.6 – The Recommended Interim Risk Reduction Measure/Alternatives

The PDT evaluated IRRMs that could potentially reduce the risk associated with Asian carp migration in the CAWS. The risks associated with the potential failure modes, identified in Section 4.2, above, may be reduced through the implementation of the measures discussed in this report by the USACE or by other agencies. These measures have the potential to reduce the risk associated with successful challenges of Asian carp to the Electric Dispersal Barriers, and may have the potential to discourage the movement of Asian carp through the CAWS to Lake Michigan.

The USACE is recommending implementation of risk reduction measures related to sluice gate operations and modified lock operations. Specifically, USACE recommends:

1. The installation of screens on the sluice gates at the O'Brien Lock and Controlling Works.

2. The intermittent closure of locks in support of fish control and eradication efforts performed by other entities, upon request of those entities or in coordination with the U.S. Coast Guard.

USACE intends to proceed with recommendation (2) as necessary, because no approval is required for that action which falls within USACE's normal authority and operating parameters.

USACE is seeking ASA(CW) approval of recommendation (1) Section 126, to allow the modification of the O'Brien Controlling Works.

The recommended risk reduction measures, along with the risk reduction measures that will be implemented by others will serve to further reduce the risk of Asian carp migration through the CAWS into Lake Michigan. The measures to be implemented by others include: the installation of the sluice gate screens at the CRCW by the MWRD; and potential modifications to the Wilmette Pumping Station operations, if requested by resource agencies.

The cost of the recommended gate operation risk reduction plan is $[redacted], with estimated annual O&M costs of $[redacted]. The cost of the recommended risk reduction plan for modified lock operations should be covered by the current costs of operations of the Chicago and O'Brien Locks.

4.7 – Implementation of the Recommended Interim Risk Reduction Measures

Subject to available implementation authority and sufficient funding, implementation of the sluice gate screens, IRRM can be accomplished relatively quickly. If approval and funding are

available in July 2010, then fabrication and installation should be complete before 28 October 2010.

The screen units would be fabricated off-site in 3 foot sections with two inch on center spacing between the bars. After fabrication is complete, the screens and lifting mechanism would be installed. The screens would be installed in the riverside stop log grooves of the two outer sluice gates at the O'Brien Dam. Each gate would have 3-3 foot sections of screen installed, similar to the design of the existing stop logs. In addition to the screens, two one-ton jib cranes will be installed adjacent to the first sluice gates and the other adjacent to the last sluice gate. The crane would be used to install and also be available to lift the screen sections for maintenance.

The screens will be installed on the O'Brien Dam which is Federal property under the control of the Rock Island District of the US Army Corps of Engineers. The Chicago and Rock Island districts will coordinate on the construction and O&M of the sluice gate screens.

CHAPTER 5 – ENVIRONMENTAL ASSESSMENT

5.1 – Need & Purpose of Proposed Action

The U.S. Army Corps of Engineers (USACE) was directed in Section 3061(b)(1)(D) of WRDA 2007 to conduct a study of a range of options or technologies for reducing impacts of hazards that may reduce the efficacy of the Electrical Dispersal Barrier located in the CSSC, hereafter referred to as the Efficacy Study. The Electrical Dispersal Barrier was designed to reduce the risk of inter-basin transfer of fish from the Mississippi River and Great Lakes drainage basins via the CSSC, and it has been partially completed. This study is one component of that effort and is evaluating both ways to further enhance the efficacy of the dispersal barrier system and to evaluate methods to prevent any carp above the barrier from dispersing into the Great Lakes in numbers that may pose a threat.

5.2 – Coordination

A scoping letter was released to the public on 05 February 2010 of the Corps' intent to perform a study on modified lock operations. In addition, a number of public meetings were held by the Corps and other agencies in February 2010 and March 2010 to address public questions on the proposed study. All comments received by the Chicago District were considered and are summarized in Appendix E, Coordination.

Federal Statues and Regulation Compliance

The recommended plan (IRRMs) presented in this Integrated Environmental Assessment is in compliance or the compliance is expected with appropriate statutes and executive orders including the Natural Historic Preservation Act of 1966, the Endangered Species Act of 1973, the Fish and Wildlife Coordination Act, Executive Order 12898 (environmental justice), Executive Order 11990 (protection of wetlands), Executive Order 11988 (floodplain management), the Rivers and Harbors Act of 1899, the Clean Air Act, the Clean Water Act, and the National Environmental Policy Act of 1969. Table 5 provides a summary of the compliance status for the primary environmental requirements associated with the study.

EO12898 – Environmental Justice – To the greatest extent practicable and permitted by law, and consistent with the principles set forth in the report on the National Performance Review, each Federal agency shall make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations in the United States and its territories and possessions, the District of Columbia, the Commonwealth of Puerto Rico, and the Commonwealth of the Mariana Islands. The project area is primarily a checker board of industrial lands and low quality forest. The recommended IRRMs do not have any adverse impacts to any minority or low income populations.

Clean Air Act – Due to the small scale, short construction period duration and existing quality of the immediate project area, the project is considered below the de minimis level of particulate matter of 100 tons per year. By way of reference, other Chicago District projects that are much

larger in scale and earthwork have readings well below the particulate matter of 100 tons per year.

Table 5 - Compliance with Environmental Statutes and Executive Orders

Reference	Environmental Statutes and Executive Orders	Compliance Status*
16 USC 1531, et seq.	Endangered Species Act, as amended	Compliant
16 USC 460 (L),(12)	Federal Water Project Recreation Act, as amended	Compliance Unknown
16 USC 470a, et seq.	National Historic Preservation Act (NHPA), as amended	Compliant
16 USC 661	Fish and Wildlife Coordination Act, as amended	Compliant
16 USC 703 et seq.	Migratory Bird Treaty Act of 1918,as amended	Compliant
16 USC469, et seq.	Archaeological and Historical Preservation Act as amended	Compliant
25 USC 3001, et seq.	Native American Graves Protection and Repatriation Act	Compliant
33 USC. 1251 et seq.	Clean Water Act, of 1977, as amended	Compliant
42 USC 4321, et seq.	National Environmental Policy Act (NEPA), as amended	Compliant
42 USC 4901, et seq.	Quiet Communities Act of 1978	Compliant
42 USC 6901, et seq.	Resource Conservation and Recovery Act of 1976, as amended	Compliant
42 USC 7401	Clean Air Act (CAA) of 1970 as amended	Compliant
42 USC 9601	CERCLA of 1980	Compliant
7 USC 4201, et seq.	Farmland Protection Policy Act	Compliant
PL 79-525, 60 Stat 634	Rivers and Harbors Act of 1946	Compliant
CEQ Memo Aug 11,1980	Prime or Unique Agricultural Lands NEPA	Compliant
E.O. 11514	Protection and Enhancement of Environmental Quality	Compliant
E.O. 11593	Protection and Enhancement of the Cultural Environment	Compliant
E.O. 11988 (1977)	Floodplain Management	Compliant
E.O. 11990 (1977)	Protection of Wetlands	Compliant
E.O. 12088 (1978)	Federal Compliance with Pollution Control Standards	Compliant
E.O. 12898 (1994)	Federal Actions to Address EJ in Minority and Low-Income Populations	Compliant
E.O. 13007 (1996)	Indian Sacred Sites	Compliant
E.O. 13186	Responsibilities of Federal Agencies to Protect Migratory Birds	Compliant
E.O. 13340	Great Lakes Designation of National Significance to Promote Protection	Compliant

*pending agency and public review

Clean Air Act – Due to the small scale, short duration and existing quality of the immediate project area, the project is considered below the de minimis level of particulate matter of 100 tons per year. As a reference, other Chicago District projects that are much grander in scale and earthwork have readings well below the particulate matter of 100 tons per year.

Section 404(b)(1) of the Clean Water Act – The recommended IRRMs would have no impact on wetlands or waters of the United States.

Section 401 Compliance – The recommended IRRM would have no adverse or degrading affects on water quality or wetlands.

USF&WS Coordination – Under provisions of the Endangered Species Act a Federal Agency must consult with the USFWS for activities that may impact Federally listed species. The minimal foot print of the IRRM at O'Brien and the industrialized nature of the recommended sites are indicative that Federal or State listed species would not be affected, nor would any critical habitats be affected. A no effects determination has been made by the USACE. Coordination with the USFWS will be completed. A coordination letter will be included in the file when received.

SHPO Coordination – The Corps recommends a determination of no significant effects to cultural, historical or archaeological resources associated with the preferred risk reduction measures. Coordination with the Illinois Historic Preservation coordination will beinitiated and will be completed prior to the finalization of the Environmental Assessment. The coordination letter will be placed in the project files upon receipt.

The National Environmental Policy Act (40 CFR 1501.6) allows the action agency to establish a cooperating agency relationship with other Federal agencies that have jurisdiction by law or special expertise relevant to the project. The USACE established a relationship with the USFWS and USEPA, in which they are serving significant roles in the management and monitoring of the CSSC Dispersal Barrier project.

5.3 – Alternatives (IRRMs) Considered

As discussed in detail above (see section 3.4) a range of IRRMs and sites were assessed, and based on the best available information, these measures and locations provide the best opportunities to reduce risk of Asian carp dispersing through the CAWS . The following IRRMs, were considered to reduce the risks associated with the failure modes identified in Section 4.2:

Gate Modifications
Pumping Station Modifications
Lock Operation Modifications

The Preferred Interim Risk Reduction Measure (IRRM)

The recommended IRRM includes the implementation of sluice gate screens at the O'Brien Lock and the modification of lock operations to accommodate fish control activities in the CAWS.

The No-Action alternative was not selected because it did not address the objectives of the study, which are to reduce risks associated with Asian carp dispersal.

5.4 – The Affected Environment

The affected environment is described in detail in Chapter 2 – Affected Environment, with comprehensive species lists located in Appendix D.

5.5 – Direct & Indirect Effects

Climate

The recommended IRRM would not directly or indirectly affect the regional climate. The rationale behind no affects is that all of the considered IRRMs are temporary and surficial in character. There would be no pollutants or chemicals or activities that could possibly affect climate involved.

Geology

The recommended IRRM would not directly or indirectly affect regional geology, unique geologic features or geological processes. The rationale behind no affects is that all of the considered IRRMs are temporary and surficial in character.

Soils

The recommended IRRM would not directly or indirectly affect the natural soils series of the preferred sites. The rationale behind the no affect determination is that sites selected have no natural soils series present and were destroyed with industrialization of these areas.

Land Use

The recommended IRRM would not directly or indirectly affect the current land uses of the study area. The rationale behind the no affect determination is that land use would not change, since these areas are classified as industrial already.

Hydrology & Hydraulics

The recommended IRRM would not appreciably affect the current hydrology and hydraulics of the study area. The rationale behind the no affect determination is that hydrology and hydraulics will not be affected by either the gate modifications or lock operation modifications. The sluice gate screens will be removed if a backflow event is indicated; lock operation modifications are intermittent and would have a short-term effect on flow regimes while the locks were closed to facilitate Asian carp control activities.

Air Quality

The recommended IRRMs would not directly or indirectly affect the current air quality of the study area. The rationale behind the no affects determination is appropriate for the sluice gate screens that would be installed and left in place, except for cleaning or removal. The crane used to install or remove the screens would have a de minimus impact on air quality. No affect to air quality is anticipated from the modification of lock operations.

Water Quality

The recommended IRRMs would not directly or indirectly affect the current water quality of the study area. The rationale behind the no affects determination is appropriate for the sluice gate screens that would be installed and left in place, except for cleaning or removal. The presence of the gates is not likely to impact local water quality. Further, no affect to water quality is anticipated from the modification of lock operations. This assessment does not consider the impacts of Asian carp control activities that would be executed by others.

Riverine Habitat

The preferred IRRM would not directly or indirectly affect the riverine habitat of the Des Plaines River. The rationale behind no affects is that CAWS is already devoid of natural riverine habitat,

and the sluice gate screens will not alter any of the existing habitat structure for native riverine fauna. Modification of lock operations would not alter riverine habitat.

Riparian Plant Communities

The recommended IRRM would not directly or indirectly affect the immediate riparian plant communities of the study area. The rationale behind the no affect determination is that land use would not change, since these areas are classified as industrial already.

Aquatic Communities

The recommended IRRM would adversely impact communities of aquatic organisms during the operation of the project. The screens on the sluice gates at the O'Brien Lock would inhibit the movement of all fish species larger than the 2 inch mesh screen from the CAWS to Lake Michigan. It is anticipated that most of the adverse impacts would be to migrating fish species attempting to traverse the CAWS. The fish assemblages identified in the proposed location are populated mostly by pollution-tolerant species. If it is anticipated significant adverse impacts will occur to non-target species, measures will be undertaken through application of best management practices to minimize those impacts.

Other Wildlife

The recommended IRRM would not directly or indirectly terrestrial wildlife within the CAWS study area. The rationale behind the no affect determination is that the gate screens will be installed below the water, and that changes to lock operations should not affect terrestrial wildlife

Natural Areas

The recommended IRRM would not directly or indirectly affect any natural areas within the CAWS study area. The rationale behind the no affect determination is that land use would not change, and natural areas do not occur in the vicinity of the proposed sites.

Threatened & Endangered Species

The recommended IRRM would not directly affect threatened and endangered species or their critical habitats within the immediate project area; however, it would protect many threatened and endangered planktivorous species in the Great Lakes basin such as the listed ciscoes and whitefish (*Coregonus* sp.). Under provisions of the Endangered Species Act a Federal Agency must consult with the USFWS for activities that may impact Federally listed species. The small foot print of the proposed measures and the industrialized nature of the recommended site are indicative that Federal or State listed species would not be affected. There would be no effect to Threatened or Endangered Species from the modification of lock operations.

Archaeological & Historical Properties

The recommended IRRM would not directly or indirectly affect archaeological or historic properties in the project area.

Social Setting

The recommended IRRM would not directly or indirectly affect the social setting of the study area since they would not impair the daily lives of local residents or commercial activities for extended periods of time. However, commercial and recreational vessel traffic would be disrupted for modified lock operations in support of Asian carp control efforts.

Recreation

The preferred IRRM could directly or indirectly affect local recreation during modification of lock operations for Asian carp control activities. The extent of the impact to recreational users of the waterway would be dependent on the location of the navigation channel closure and which navigation lock was closed to support the control activities, as well as the location of the recreational vessel and the destination of the boat owners. These impacts should be limited to the period of the lock and channel closure.

Hazardous, Toxic and Radioactive Wastes

There are no HTRW concerns associated with the recommended IRRMs.

Prime Farmlands

None of the IRRMs considered, including the recommended IRRM, would directly or indirectly affect farmland or prime farmlands, since none occur in the affected area.

17 Points of Environmental Quality

The 17 points are defined in Section 122 of Rivers, Harbors & Flood Control Act of 1970 (P.L. 91-611) and include noise, displacement of people, aesthetic values, community cohesion, desirable community growth, tax revenues, property values, public facilities, public services, desirable regional growth, employment, business and industrial activity, displacement of farms, man-made resources, natural resources, air and water. Impacts to these identified points are not expected. Discussion on some of these points is as follows:

Noise –None of the IRRMs considered, including the recommended IRRM, would have significant increases in noise levels.

Displacement of People – The recommended IRRM would not displace any local residents within the townships of the proposed sites.

Aesthetic Values – The recommended IRRM would not have adverse affects to local aesthetics.

Community Cohesion –None of the IRRMs considered, including the recommended IRRM, would disrupt community cohesion. The project site is primarily a patch work of industrial lands.

Desirable Community Growth – None of the IRRMs considered, including the recommended IRRM, would adversely affect community growth.

Desirable Regional Growth – None of the IRRMs considered, including the recommended IRRM, would adversely affect regional growth.

Tax Revenues – None of the IRRMs considered, including the recommended IRRM, would affect tax revenues.

Property Values – The recommended IRRM would not affect property values.

Public Facilities –None of the IRRMs considered, including the recommended IRRM, would have a significant adverse affect on public facilities. Short term effects would be associated with lock closures implemented to facilitate fish control efforts by other agencies.

Public Services – None of the IRRMs considered, including the recommended IRRM, would have an adverse affect on public services.

Employment – None of the IRRMs considered, including the recommended IRRM, would adversely affect employment. Short term induced impacts to local and regional employment related to port activities could be realized during implementation of the lock closures to facilitate fish control efforts by other agencies.

Business and Industrial Activity – The recommended IRRM would have a short term adverse effect on business and industrial activity during the period that the lock is closed to facilitate fish control activities by other agencies. Impacts to navigation, local and regional business including lost transportation rate savings, costs associated with delays, impacts to commercial passenger vessels and recreational boating.

Displacement of Farms – None of the IRRMs considered, including the recommended IRRM, would adversely affect farmland. There are no farms at the proposed project sites.

Man-made Resources – None of the IRRMs considered, including the recommended IRRM, would adversely affect man-made resources.

Natural Resources – The no action alternative could adversely affect the Great Lakes basin by allowing the dispersal of Asian carp into the basin. Any of the IRRMs considered, including the recommended IRRM, has the potential to assist in protecting the Great Lakes basin from the invading Asian carp.

4.6 – Cumulative Effects Assessment

Consideration of cumulative effects requires a broader perspective than examining just the direct and indirect effects of a proposed action. It requires that reasonably foreseeable future effects be assessed in the context of past and present effects to important resources. Often it requires consideration of a larger geographic area than just the immediate “project” area. One of the most important aspects of cumulative effects assessment is that it requires consideration of how actions by others (including those actions completely unrelated to the proposed action)

have and will affect the same resources. In assessing cumulative effects, the key determinant of importance or significance is whether the incremental effect of the proposed action will alter the sustainability of resources when added to other present and reasonably foreseeable future actions.

Cumulative environmental effects for the proposed ecosystem protection project were assessed in accordance with guidance provided by the President's Council on Environmental Quality (USEPA, EPA 315-R-99-002, May 1999). This guidance provides an eleven-step process for identifying and evaluating cumulative effects in NEPA analyses.

Scope

In this environmental assessment, cumulative effect issues and assessment goals are established, the spatial and temporal boundaries are determined, and the reasonably foreseeable future actions are identified. Cumulative effects are assessed to determine if the sustainability of any of the resources is adversely affected with the goal of determining the incremental impact to key resources that would occur should the proposal be permitted.

The spatial boundary for the assessment has been broadened to consider effects beyond the footprint of the dispersal barrier area and to include far reaching influence this action would have on the Great Lakes ecosystem.

The temporal boundaries considered are:

- Past –1920s because this is the approximate time that the modification of the Illinois Waterway System was complete providing an unimpeded dispersal route to and from the Great Lakes and Mississippi River basins.
- Present – 2010 when the decision is being made on an interim risk reduction measure that would aid in preventing Asian carp from entering the Great Lakes
- Future – 2010 -2020, the time frame used for implementing a final plan to address the issue of inter-basin migration of ANS.

Projecting the reasonably foreseeable future actions is difficult at best. Clearly, the proposed action is reasonably foreseeable; however, the actions by others that may affect the same resources are not as clear. Projections of those actions must rely on judgment as to what are reasonable based on existing trends and where available, projections from qualified sources. Reasonably foreseeable does not include unfounded or speculative projections. In this case, reasonably foreseeable future actions include:

- Continued navigation in the Illinois Waterway, CSSC and Calumet Sag Channel
- Continued increase in floodplain profiles due to development and land use change
- Continued introduction of non-native species
- Continued application of environmental requirements such as those under the Clean Water Act and water quality improvement
- Implementation of various programs and projects to deal with runoff and waste water pollution and to restore degraded environments

Cumulative Effects on Physical Resources

The physical resources of the immediate spatial boundary (geology, soils, topography, land cover, hydrology) were altered from their natural condition. The creation of the Illinois and Chicago Waterway systems significantly altered what the retreating glaciers had created. The implementation of the recommended IRRM would not restore physical resources or alter them in the study area or the conjoined Great Lakes and Mississippi basins. Cumulative, adverse physical effects are not anticipated.

Cumulative Effects on Ecological Resources

The ecological resources of the spatial boundary (plants, fish, birds, prairies, streams, wetlands, etc) were altered from their natural condition. There are remnant patches left, however, that merit protection. The extensive change in hydrology, geology and land cover significantly impacted rare plant communities such as the dolomite prairie and valley seeps that etched the lower Des Plaines River Valley. The degradation of natural and native communities has allowed for invasive species to easily take over by filling in niches that were once occupied by native species. The implementation of the recommended plan will not restore ecological resources or degrade them in the Illinois Waterway or the Chicago Area Waterways but would indirectly aid in protecting the Great Lakes aquatic ecosystem when fully functional. It is possible that non-target species could also be deterred by the sluice gate screens. If it is anticipated significant adverse impacts will occur to non-target species, measures will be undertaken through application of best management practices to minimize non-target fish impacts In summary, while there are some effects that must be considered, implementation the recommended IRRM should not have a significant incremental effect on the status of ecological integrity within the study area. Cumulative, adverse ecological effects are not anticipated.

Cumulative Effects on Archaeological & Cultural Resources

The implementation of the recommended IRRM has no affect upon archaeological or cultural resources, either pre-European or post. Significant cultural or archaeological resources are not present in the affected area. Cumulative, adverse archaeological or cultural effects are not anticipated.

Cumulative Effects on Aesthetic Values

Aesthetics are typically a matter of conjecture. The implementation of submerged features or operational changes would not detract from the current aesthetics of the sites. Cumulative, adverse aesthetical effects are not anticipated.

Cumulative Effects Summary

Along with direct and indirect effects, cumulative effects of the recommended risk reduction measures were assessed following the guidance provided by the President's Council on Environmental Quality. There have been numerous effects to resources from past and present actions, and reasonably foreseeable future actions can also be expected to produce both beneficial and adverse affects. In this context, the increments of effects from the proposed risk

reduction measures are relatively minor in terms of effects, but indirectly helps protect the long term viability of the Great Lakes ecosystem. Based on the expectation of continued sustainability of all resources, cumulative effects are not considered significantly adverse. Table 6 summarizes the factors considered in the cumulative effects summary. A draft FONSI is attached.

Table 6 – Cumulative Effects Summary

	1920 - Present (Past Actions)	No Action	Recommended Risk Reduction Measure
Air Quality	Significantly Adverse	No Effect	No Effect
Noise	Significantly Adverse	No Effect	No Effect
Geology and Soils	Significantly Adverse	No Effect	No Effect
Hydrology & Hydraulics	Significantly Adverse	No Effect	No Effect
Land Use	Significantly Adverse	No Effect	No Effect
T & E Species	Significantly Adverse	Significantly Adverse	No Effect
Wetlands	Significantly Adverse	No Effect	No Effect
Aquatic Resources	Significantly Adverse	Significantly Adverse	Minor Adverse
Terrestrial Resources	Significantly Adverse	No Effect	No Effect
Recreation & Aesthetic Values	Significantly Adverse	Minor Adverse	Minor Adverse
Pre-1830 Cultural Resources	Significantly Adverse	No Effect	No Effect
Post-1830 Cultural Resources	Significantly Beneficial	No Effect	No Effect
Economic Resources	Significantly Beneficial	No Effect	Minor Adverse
Total Impacts	Significantly Adverse	Significantly Adverse	Minor Adverse

CHAPTER 6 – INTERIM III RECOMMENDATION

I have considered all relevant aspects of the problems and opportunities as they relate to the high risk of bighead and silver carp in the Illinois Waterway and the Chicago Area Waterways. Those aspects include environmental, social, and economic effects, as well as engineering feasibility and the authority granted the Secretary of the Army under Section 126 of the Energy and Water Development and Related Agencies Appropriation Act 2010 to implement measures recommended in the efficacy study and all relevant authorities relating to the Corps' operation of the Chicago lock and the O'Brien lock and controlling works.

Provided the Section 126 Authority granted to the Secretary of the Army is extended, I recommend approval of an Interim Risk Reduction Measure for the installation of sluice gate screens at the Thomas J. O'Brien Lock and Dam.

Further, I intend to implement modified lock operations, under existing authorities, as needed for Asian carp control efforts that will be implemented by other agencies including the Illinois Department of Natural Resources and the US Fish and Wildlife Service.

The recommendations contained herein reflect the information available at this time and current Departmental policies governing formulation of individual projects. They do not reflect program and budgeting priorities inherent in the formulation of a national Civil Works construction program nor the perspective of higher review levels within the Executive Branch.

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Chicago District

_____

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CHAPTER 7 – REFERENCES AND GLOSSARY OF TERMS

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GLOSSARY OF TERMS

ABS – Acoustic Bubble Strobe Fish Deterrent

AIS - Aquatic Invasive Species

ANS - Aquatic Nuisance species

ASA (CW) - Assistant Secretary of the Army for Civil Works

ACRCC - Asian Carp Regional Coordinating Committee

CAWS - Chicago Area Waterways

CEQ - White House Council on Environmental Quality

CRCW - Chicago River Controlling Works

CSO - Combined Sewer Overflow

CSSC - Chicago Sanitary and Ship Canal

EA - Environmental Assessment

I&M Canal - Illinois and Michigan Canal

IDNR - Illinois Department of Natural Resources

InDNR – Indiana Department of Natural Resources

IWW - Illinois Waterway

EA – Environmental Assessment

GLFC - Great Lakes Fishery Commission

GLMRIS - Great Lakes and Mississippi River Inter-Basin Study

IRRM - Interim Risk Reduction Measure

MRRWG - Monitoring and Rapid Response Work Group

MOU - Memorandum of Understanding

MWRD - Metropolitan Water Reclamation District of Greater Chicago

NEPA - National Environmental Policy Act

PDT - Project Development Team

PED - Planning, Engineering and Design

TARP - Tunnel and Reservoir Project

USACE - U.S. Army Corps of Engineers

USCG - United States Coast Guard

USEPA - United States Environmental Protection Agency

USFWS - U.S. Fish and Wildlife

USGS - United States Geological Survey

Dispersal Barrier Efficacy Study

INTERIM III – Modified Structure Operations, Illinois & Chicago Area Waterways Risk Reduction Study and Integrated Environmental Assessment

APPENDIX A – Hydrology and Hydraulics

May 2010

US Army Corps of Engineers ®
Rock Island District

US Army Corps of Engineers ®
Chicago District

INTERIM III – Modified Structure Operations, Illinois & Chicago Area Waterways Risk Reduction Study and Integrated Environmental Assessment

APPENDIX A – Hydrology and Hydraulics

INTRODUCTION

As part of the Fish Barrier Efficacy Interim III study installation of bar screens to the sluice gates at Chicago River Controlling Works (CRCW) and O'Brien Lock and Dam is being considered. This bar screen would reduce the probability of Asian Carp entering to Lake Michigan during normal diversion, which includes discretionary use of water to maintain water quality in the Chicago Area Waterway System (CAWS) and navigation makeup. However, such structural change might reduce the hydraulic efficiency of these gates. This study is to quantify the effect of bar screens. The baseline condition that includes the existing structures and operation rules, and a hypothetical condition that all sluice and lock gates at the lakefront controlling works would be closed are included in comparison as two extreme operation scenarios. Figure 1 shows the CAWS.

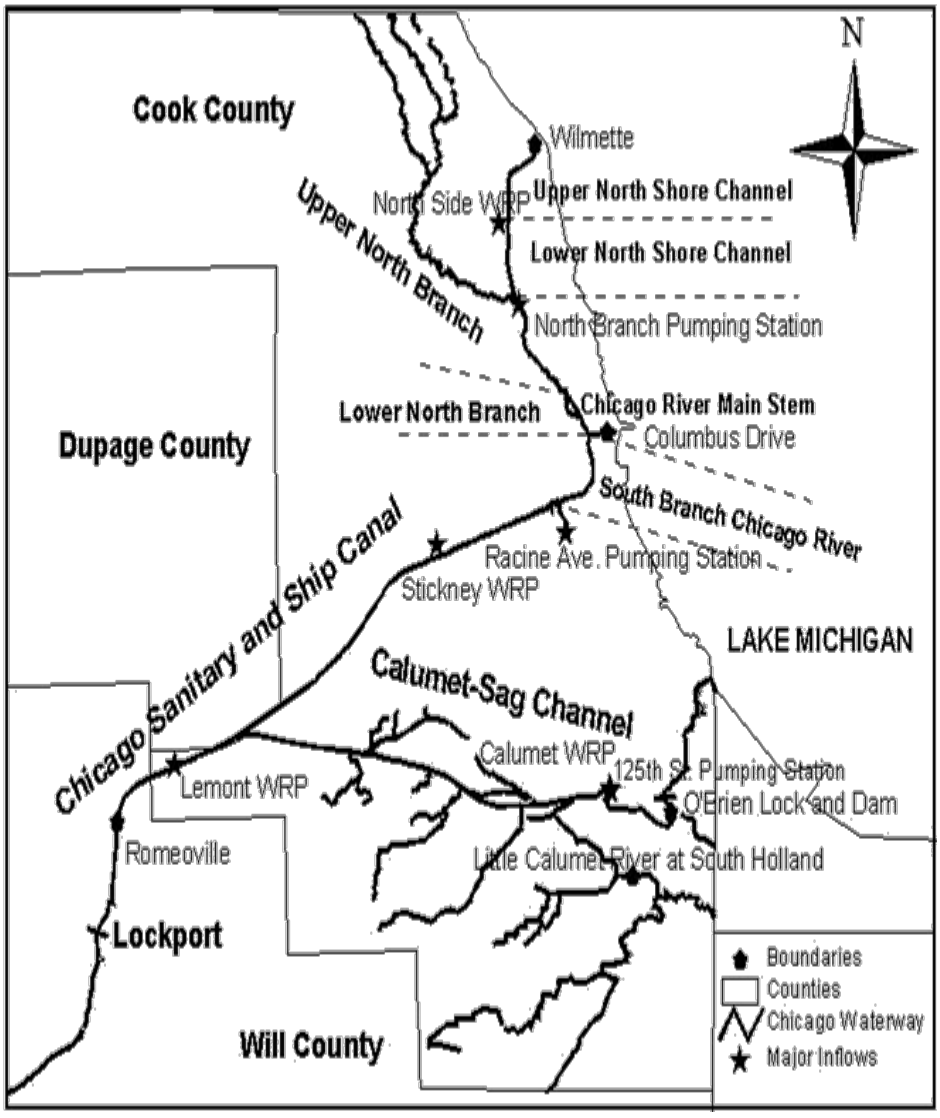

Figure 1 – Schematic Diagram of the Chicago Area Waterway System (CAWS)

The CAWS consists of portion of the North Branch of Chicago River, Chicago River, South Branch of Chicago River, portion of the Little Calumet River, Calumet River, North Shore Channel (NSC), Chicago Sanitary and Ship Canal (CSSC) and Calumet-Sag Channel. Flows in the CAWS are mainly effluent from the wastewater treatment plants (aka water reclamation plants) during dry weather, and include treatment plant effluent and Combined Sewer Overflow (CSO) during wet weather. The CAWS also receives inflows from the non-navigable reaches of the North Branch of Chicago River, Little Calumet River and Grand Calumet River. In addition, the CAWS also receive water directly diverted from Lake Michigan at lakefront controlling works. The CAWS is a regulated waterway; it is controlled by Lockport Powerhouse and Lockport Controlling Works to the southwest and regulated by Wilmette Pumping Station, Chicago River Controlling Works and O'Brien Lock and Dam to the northeast, east and southeast.

Lockport Powerhouse was built in 1900. It consists of two units of turbines and generators, nine pit gates and one federal lock. At the site, it also has an abandoned lock. During the normal operation, one turbine usually runs to pass dry weather flow to the downstream to maintain a relatively flat pool and adequate depth of water between a 35-mile stretch of the waterway between Lockport and the lakefront to support navigation. Pit gates are used to pass floodwaters to the downstream. Lockport Controlling Works is located about 2 miles upstream from Lockport Powerhouse. It consists of 7 sluice gates that can divert floodwaters from the CAWS to Des Plaines River in addition to the pit gates in the powerhouse during significant flood events. Coordinated operation of the pit gates in the powerhouse and the sluice gates at the controlling works is one of the key elements in the operations of CAWS. The Metropolitan Water Reclamation District of Greater Chicago (MWRDGC) owns and operates these assets in Lockport Powerhouse and Controlling Works except Lockport Lock. The discharge rating of the pit gates in the Powerhouse was studied in 1961 (Reference [4]). Recently, the Corps Rock Island District funded the Illinois USGS office to develop discharge rating for the sluice gates at Lockport Controlling Works. At this point in time, multiple stage sensors and acoustic velocity meters have been installed on the CSSC and Des Plaines River near the control structure. Data collection and data analyses are expected to begin soon.

The CSSC is the first man-made canal in the CAWS. It was completed in 1900; the canal connects Chicago River to Illinois River and remaps several hundred square miles of Great Lakes Basin to the Upper Mississippi River Basin. The CRCW was built in 1938 to reduce lake diversion and provide better flood control to downtown Chicago. Figure 2 shows the CRCW which consists of a low-lift lock and two sets of sluice gates.

Figure 2 – Chicago River Controlling Works at the Mouth of Chicago River

Each set of sluice gate contains four 10' by 10' sluice gates. The south sluice gates were moved to the new turning basin cutoff wall in 2001. The new sluice south gates are routinely used for diverting lake water for maintaining mandated water elevation on the Chicago River at Chicago Lock and meeting the water quality standards in the CAWS. The north sluice gates are exercised every other month to ensure they are in an operable condition. During significant rainstorm events opening all sluice gates to reverse floodwaters to Lake Michigan are often needed to prevent flooding in metropolitan Chicago. The Corps owns and operates the lock, whereas the MWRDGC owns and operates the sluice gates.

The NSC was completed in 1910 which connects the North Branch of Chicago River to Lake Michigan. The NSC does not have a commercial navigation function, but it can divert lake water to improve water quality in the canal itself and the North Branch of Chicago River between its confluence and downtown Chicago. Besides, NSC can also convey floodwaters from the upper portion of the CAWS to Lake Michigan during significant rainstorm events. At the mouth of NSC a pumping station, i.e., Wilmette Controlling Works (also known as Wilmette Pumping Station), was constructed at the same time as the NSC. Figure 3 shows the picture of the Wilmette Controlling Works. Today the Wilmette Pumping Stations is equipped with one sluice gate (converted from a lock) and several pumps. When the lake level is higher than the river level, diversion flow is withdrawn through the sluice gate by gravity.

Figure 3 – Wilmette Controlling Works at the Mouth of North Shore Channel

During the period when the hydraulic head difference is reversed, pumps must be used. Pumps can only lift water from lake to river. During significant rainstorm events, the sluice gate is the only hydraulic structure at the site that can reverse floodwaters to Lake Michigan. MWRDGC owns and operates the Wilmette Pumping Station.

The Calumet-Sag Channel was completed in 1922 which connects the Calumet watershed to the CSSC. This man-made waterway also converts a sizable amount of Great Lakes Basin to the Upper Mississippi River Basin. Calumet-Sag Channel was enlarged in 1960. In 1965 O'Brien Lock and Dam was built on the Calumet River to replace the Blue Island Lock on the Little Calumet River. O'Brien Lock and Dam consists of a low-lift lock and four sluice gates. Figure 4 shows the O'Brien Lock and Dam. The Corps owns and operates the facilities at this location.

Figure 4 – O'Brien Lock and Dam on the Calumet River

HYDROLOGIC MODELS

Hydrologic modeling is to transform rainfall to runoff and route runoff to the water reclamation plants, TARP tunnels or CAWS as overflows during rainstorm events. In this study, 20, 50, 100 and 500-year events were chosen. The depth and distribution of precipitation follow the guidelines documented in ISWS Bulletin 70. A multiplication factor was used to reduce the point precipitation depth to the uniform areal precipitation throughout the watershed tributary to the CAWS. A large portion of the watershed is serviced by combined sewer systems. The sewer network, which consists of lateral, sub-main and main trunk sewers and intercepting sewers, collects storm runoff and sanitary flows and conveys them to the water reclamation plants. When the flows exceed the plant capacity, they will be diverted to TARP tunnels if the sewer has drop shaft connection to the TARP system and the TARP system has available storage space. Otherwise, excess flows will be directed to the CAWS via Combined Sewer Overflow (CSO) discharge points along the waterway. Most of the combined sewer area in the Metropolitan Chicago is ungaged. Therefore, a common approach of hydrologic modeling was performed.

HSPF Modeling

Hydrologic Simulation Program Fortran (HSPF) was used to simulate unit runoff (i.e., the depth of runoff per unit area) hydrograph in response to synthetic rainstorm events. Inputs to the model include hourly hydro-meteorological data, land topographic and soil physical properties. Three types of land cover are considered in HSPF modeling: impervious, grass and forest. Since most backflows at Chicago and O'Brien Locks occurred in summer months. A typical summer weather condition was considered in the

simulation. There are a couple dozens of parameters related to soil moisture accounting for pervious lands. The U.S. EPA provided typical range of these parameters, and modelers adjust these parameter values to calibrate the model. The HSPF model for the CAWS watershed has been continuously reviewed and improved by Lake Michigan Diversion Accounting. The model was calibrated by water balance checks at MWRDGC's water reclamation plants and the entire waterway system. In addition, regional parameter transfer methodology was also used in model calibration. Therefore, the latest HSPF model was used without further calibration.

SCALP Modeling

Special Contributing Area Loading Program (SCALP) was used to compute inflow and infiltration from each special contributing area (SCA), i.e., the catch basin of combined sewer, by multiplying the surface and sub-surface unit runoff computed by HSPF to the land areas. SCALP was also used to compute the sanitary flow from SCA and route the combined sewer flow to the water reclamation plant. In the process it also computes the excess flow that goes to TARP tunnels or the waterway. Routing in SCALP is based on hydrologic inflow-outflow-storage modeling. The areas of impervious, grass and forest lands for each SCA are input to SCALP along with a few routing parameters. Output from SCALP includes the hydrographs for the flows routed to the water reclamation plant and overflows. SCALP model has been used in conjunction with HSPF and TNET for Lake Michigan Diversion Accounting.

HYDRAULIC MODELS

Hydraulic modeling uses the inflows from the hydrologic modeling as the forcing function to drive water movement in conduits or open channels. The governing equations of unsteady water flow in the conduit or open channel include the continuity equation and the equation of motion. Stage and discharge are two unknowns to be solved for all model nodes at each time step. To model the CAWS, two hydraulic models were developed.

TNET Modeling

Tunnel NETwork (TNET) program was used to model the hydraulic of sewer flows in TARP tunnels. TNET computes the discharge hydrographs of TARP pumping to the water reclamation plants when the plants have unused capacity to process sewer flows in addition to the flows coming to the plants through the intercepting sewers. TNET model was developed by Dr. Robert Barkau in 1990s. The model is based on solving the unsteady one-dimensional Saint Venant equation using an implicit finite difference numerical scheme. The major inputs to the TNET model are the overflows computed by SCALP, where as the major outputs from the model include the discharge hydrographs for the flows pumped to the water reclamation plant and the overflows (to the waterways) that cannot be accepted by the tunnel systems. The pumps at the Mainstream and Calumet TARP Pumping Stations during significant rainstorms are usually not in operation because Stickney and Calumet Water Reclamation Plants are overwhelmed by sewer flows from the intercepting sewers. The overflows computed by the TNET model are input to the HEC-RAS model as unsteady flow boundary conditions.

HEC-RAS Modeling

The River Analysis System (RAS) developed by the Corps Hydrologic Engineering Center (HEC) was used to model the hydraulics of CAWS. The unsteady HEC-RAS model computes stages and discharges in the CAWS in response to inflows computed by TNET and the hydraulic models for the adjacent watersheds that were developed by other projects. The controlling works in the CAWS were modeled by the in-line and lateral structures as stage-controlled gates or the rule-based controlled gates.

Cross Section Data

The echo sounder hydrographic survey data were collected by the Corps Rock Island and Detroit Districts. The bathymetric survey covered the navigatible portions of the CAWS. Recent survey data for the upper portion of the North Branch of Chicago River and NSC are not available. The cross sections included in the previous UNET model were reviewed and geo-referenced before being integrated into the HEC-RAS model.

Control Structures

As described in a previous section the water level and flow in the CAWS are regulated by five control structures: Chicago River Controlling Works, O'Brien Lock and Dam, Wilmette Pumping Station, Lockport Powerhouse, and Lockport Controlling Works. During the normal condition, the water level in the CAWS is maintained with a very mild slope that allows dry weather flow, primarily consisted of the wastewater discharges from the water reclamation (or wastewater treatment) plants, to the downstream through the turbine in the Lockport Powerhouse. Prior to and during a rainstorm event, additional flow would be passed through the turbine as well as one or two pit gates in the Powerhouse to drawdown the canal preparing for large runoff and flood discharge.

Chicago River Controlling Works

The east and west lock gates of Chicago Lock are represented by two separate gate structures. The gate type is modeled as overflow gate open to air as these lock gates swing open and close in a horizontal plane. The discharge through the lock gates is controlled by the broad-crest weir. A discharge coefficient 3.0 is used. The south sluice gates (4) are represented by 4 separate gates. The gate type is modeled as sluice gate. The discharge through the sluice gate is controlled by the sluice gate, submerged orifice or weir flow depending on the water levels on the river and lake. However, in most cases, the flow regime behaves as discharge through a submerged orifice. The north sluice gates (4) are modeled in the same manner as the gates in the cutoff wall to the south. A couple fictitious gates are included in the model to represent two physical gates that are being used to divert lake water to maintain the required water level at the mouth of Chicago River per the CFR regulation. These two fictitious gates have the same dimensions and invert elevation as the real gates and they are created for modeling convenience without compromising any model accuracy. In the HEC-RAS model, the water levels which trigger open and close the gates are specified for the real gates for backflow operation, whereas a different set of open and close levels are specified for the fictitious gates for diversion operation.

O'Brien Lock and Dam

Figure 5 (Reference [6]) shows the key elevations of O'Brien Lock and sluice gates. The lock gate sill is at -18.5 CCD and the top of the lock wall is at +7 CCD. The invert elevation of the gate sill for all four 10' by 10' sluice gates is at -13.0 CCD.

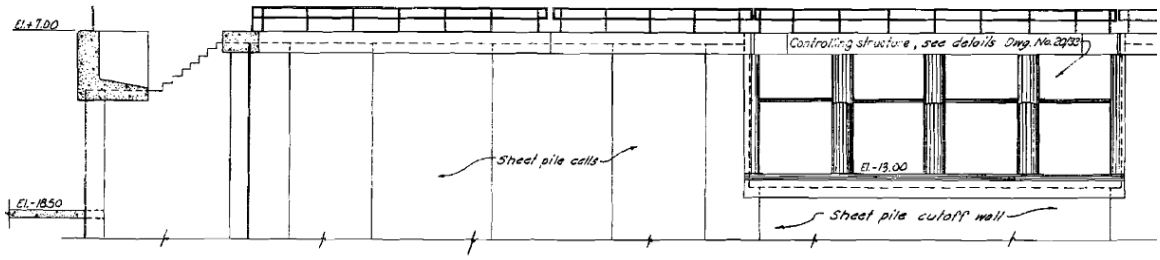

Figure 5 – Cross Section of O'Brien Lock and Sluice Gates

The south and north lock gates are represented by a single gate structure. The gate type is modeled as overflow gate open to air as these lock gates open and close in a horizontal plane. The discharge through lock gates is controlled by the broad-crest weir. A discharge coefficient 2.6 is used. The sluice gates (4) are represented by a single gate group. The gate type is modeled as sluice gate. The discharge through the sluice gate is controlled by the sluice gate, submerged orifice or weir flow depending on the water levels in the Calumet River and lake. However, in most cases, the flow behaves as discharge through a submerged orifice.

Wilmette Pumping Station

Figure 6 (Reference [6]) shows the cross section of the Wilmette Pumping Station. The pump house is in the middle of Figure 6 and the sluice gate next to the pump house has a width of 32', and it can be opened up to 15'. The sluice gate at Wilmette Pumping Station is represented by a single gate in HEC-RAS. The gate type is modeled as sluice gate. The discharge through the sluice gate is controlled by the sluice gate, submerged orifice or weir flow depending on the water levels in the North Shore Channel and lake. However, in most cases, the flow behaves as discharge over a broad crest weir.

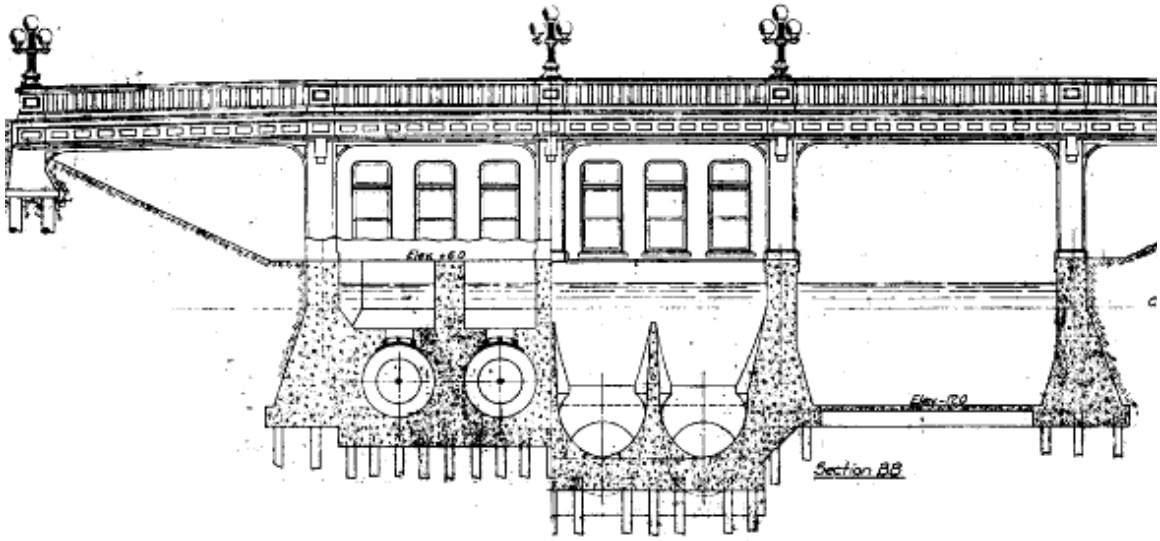

Figure 6 – Cross Section of Wilmette Pumping Station

Lockport Powerhouse
Lockport Powerhouse includes two turbines and nine (9) pit gates. The pit gates are grouped in three bays each of which has a dimension of 14' (height) by 9' (width) and can be operated separately. Pit gates are opened to pass floodwaters to the downstream. Due to vibration concern, a pit gate will be either open or close, and will not be stopped at the partially open position.

Lockport Controlling Works
Lockport Controlling Works is located at about two miles upstream from Lockport Powerhouse. It consists of seven (7) sluice gates whose normal is perpendicular to the main flow in the CSSC, and each has a dimension of 20' (height) by 30' (width). They are modeled as a lateral gate structure in HEC-RAS.

CUP Reservoirs
Modeling includes the storm water storage effect of TARP tunnels, but the potential storage capacity of McCook and Thornton reservoirs was not modeled in this study because these reservoirs will be on-line until 2015 and 2020 or even later.

Boundary Conditions
Boundary conditions include stage-controlled gates at CRCW, O'Brien Lock and Dam, and Wilmette Pumping Station; rule-controlled gates at Lockport Powerhouse and Lockport Controlling Works; inflows from the North Branch of Chicago River at Albany Avenue; Little Calumet River at its junction to the Calumet-Sag Channel; and Grand Calumet River at the mouth. In addition, boundary conditions include inflows from the water reclamation plants and a number of CSO outfalls.

Initial Condition
Base flows were specified to each reach of the CAWS model. The initial water levels in the waterways were computed and water levels quickly converged to an "equilibrium" condition before storm runoff reaches the CAWS. Therefore, the simulated stage and discharge hydrographs during significant rainstorm events would not be sensitive to the initial condition.

Model Calibration
The unsteady HEC-RAS model was calibrated using the rainstorm events in August 2001 and August 2002 during which the lock gates at CRCW were opened. Details of model calibration are documented in reference [1].

MODELING SCENARIOS

Three lake levels were included in the downtown Chicago flooding study: +0.8 CCD, +3.8 CCD and +6.7 CCD. In this study, +0.8 CCD and +3.8 CCD were modeled. Since the recent level on the southern Lake Michigan is near 0 CCD, +0.8 CCD more closely

represents the lake condition at present and in the near future. Therefore, the results for the +0.8 CCD scenario are presented in this report.

Baseline Condition

The baseline condition reflects the current plans of hydraulic structures at controlling works and the canal operation rules. The operation rules include the minimum water levels that need to be maintained at Lockport Controlling Works, Calumet-Sag Channel Junction, Chicago Lock and O'Brien Lock during drawdown, and the open and close elevations of water levels at CRCW, O'Brien Lock and Dam, and Wilmette Pumping Station. These rules are documented in MWRDGC's Canal Operation Manual. These rules were programmed into the HEC-RAS model. One exception is that the lock and sluice gates at CRCW and O'Brien would only be opened when the river level is higher than the lake level. For example, the south sluice gates will first be opened when the river level reaches +3.0 CCD. However, under the study scenario that the lake level is at +3.8 CCD, the gates will be opened when the river stage is above the lake level.

Modified Condition

MWRDGC designed bar screens that can fit in the existing stoplog grooves of the sluice gages at CWCR and O'Brien Lock and Dam. The requirements and details of the screen design are documented in reference [2]. In summary, the bar screen is 10-ft wide and 3-ft tall. Multiple bar screen sections can be stacked up. The vertical bars have a dimension of 0.375 inches by 2 inches, and the clear spacing between the vertical bars is 2 inches. The screen is intended to be used for diverting flow from Lake Michigan for improving the water quality in the CAWS and maintaining the required navigation depths on the river side of Chicago Lock and O'Brien Lock and Dam. The Screen will be removed before backflow operation starts (reference [5]). However, in this study, it is assumed that the screens will remain in place throughout the backflow event. The second modified condition assumes that the bar screens will be completely blocked by debris. Floodwaters must be back to the lake through the remaining sluice gates without bar screens and the lock gates. The third modified condition assumes that all sluice and lock gates at the lakefront controlling works are shut. This represents the worst case scenario as far as the flood risk is concerned.

CRCW

Bar screen will be deployed to two sluice gates at CRCW. The dimensions and discharge coefficient for the gate structure are modified to reflect the bar screen effect on the hydraulics. To reduce the weight of the screen section, the bar screens at the CRCW uses 2.5-foot sections, and the size of the bars is .375" x 2". Four sections will be stacked up from the bottom of the gate sill, and aluminum stoplogs will be placed on the top. The south sluice gates will open at +3.0 CCD and close at +2.7 CCD; the north sluice gates will open at +3.2 CCD and close at +2.9 CCD; and the lock gates will open at +3.4 CCD and close at +2.9 CCD.

O'Brien Lock and Dam

Bar screen will be deployed to two sluice gates at O'Brien Lock and Dam. The dimensions and discharge coefficient for the gate structure are modified to reflect the bar

screen effect on the hydraulics. The bar screens at O'Brien Lock and dam uses 3-foot sections, and the size of the bars is .375" x 1.75". Six sections will be stacked up from -13 CCD to +5 CCD.

HEC-RAS Modifications
The discharge coefficient for the sluice gates at CRCW and O'Brien Lock and Dam will be reduced by the presence of bar screen due to the turbulence effect. There are several formulae that are available for computing the head loss due to bar screens.

Discharge Coefficient
The design formula for screen was taken from http://www.fao.org/docrep/X5744E/x5744e09.htm#5.%20design%20formula%20for%20screen (Reference [3]).

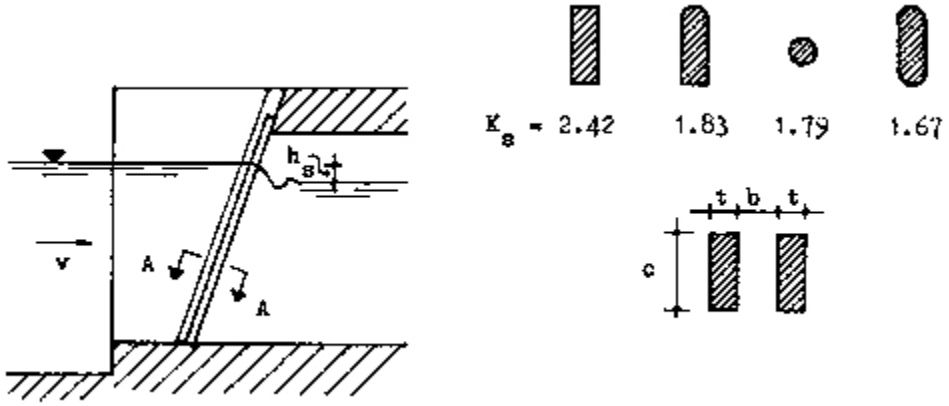

Figure 7 – Schematic Diagram of Bar Screen and Hydraulic Head Loss

The head loss due to bar screen is:

$$hs = Ks\left(\frac{t}{b}\right)^{\frac{4}{3}} \frac{v2}{2g} sin\alpha$$

in which

hs = loss of head
Ks = screen loss coefficient
t = thickness of bars
b = clear spacing between bars
v = velocity of approach
α = angle of bar inclination in degrees

With the bar screens designed for the sluice gates at CRCW and O'Brien Lock and Dam, Ks = 2.42, t = 0.375 inches, b = 2 inches, α = 90°. The computed discharge coefficient for submerged orifice flow is 0.74, as oppose to 0.80 for the condition without screen.

Area Adjustment
The frame of bar screen, bracing members and bars block a portion of the 10' by 10' gate open area. The gate width and height were reduced in the HEC-RAS model accordingly.

Debris Effect
Debris accumulation at the bar screen in front of any hydraulic intake structure is common. The coast guard and the City of Chicago maintain the waterway near locks; debris is removed periodically. It is unknown how severe the debris situation would be during floods. To be most conservative, it was assumed in the analysis that two sluice gates would be completely blocked, and floodwaters must be reversed to the lake through the remaining sluice gates and lock gates. It should, however, be noted that this is a hypothetical operation scenario because at this point in time the MWRDGC intends to remove bar screens during the backflow operation.

MODELING RESULTS

HEC-RAS modeling was performed with two lake level conditions: +0.8 CCD and +3.8 CCD. Still lake level does not change rapidly, and +0.8 CCD is a better representation of the current lake condition. To make this document concise, most results presented in the following are pertaining to +0.8 CCD lake level. A short discussion about the lake level effect, however, is included to illustrate a few important points.

Figure 8 shows the stage hydrographs in the Chicago River at the tailwater of CRCW for the baseline condition. The four hydrographs represents the 20, 50, 100 and 500-year conditions. The elevation of walls around CRCW varies from +6.3 CCD (585.5 NAVD) at the turning basin cutoff wall to +8.8 CCD (588.0 NAVD) at U.S. North Pier. The top of the North Basin wall is at +7.0 CCD (586.2 NAVD). The stage of the 500-year event +3.9 CCD (583.1NAVD) would not overtop any wall.

Figure 9 shows the stage hydrographs in the Chicago River at the tailwater of CRCW for the 100-year storm event. The four hydrographs represents the baseline, bar screen, blocked bar screen, and full closure conditions. The peak stage would reach about +4.0 CCD (583.2 NAVD) for the first three conditions, whereas the stage would reach about +9.1 CCD (588.3 NAVD) for the full closure condition.

Figure 10 shows the stage hydrographs in the Calumet River at the tailwater of O'Brien Lock and Dam for the baseline condition. The four hydrographs represents the 20, 50, 100 and 500-year conditions. The top elevation of the dam structure is at +8.5 CCD (587.5 NAVD). The stage of the 500-year event +3.8 CCD (583.0 NAVD) would be far below the top of dam.

Figure 11 shows the stage hydrographs in the Calumet River at the tailwater of O'Brien Lock and Dam for the 100-year storm event. The four hydrographs represents the baseline, bar screen, blocked bar screen, and full closure conditions. The peak stage would reach about +3.8 CCD (583.0 NAVD) for the first three conditions, whereas the stage would reach about +9.0 CCD (588.2 NAVD) for the full closure condition.

Figure 12 shows the stage hydrographs in the North Shore Channel at the tailwater of Wilmette Pumping Station for the baseline condition. The four hydrographs represents the 20, 50, 100 and 500-year conditions. The top elevation of the overflow area is at +6.0 CCD (585.2 NAVD). The stage of the 500-year event +5.5 CCD (584.7 NAVD) would not overflow.

Figure 13 shows the stage hydrographs in the North Shore Channel at the tailwater of Wilmette Pumping Station for the 100-year storm event. The four hydrographs represents the baseline, bar screen, blocked bar screen, and full closure conditions. The peak stage would reach about +5.5 CCD (584.7 NAVD) for the first three conditions, whereas the stage would reach about +10.6 CCD (589.8 NAVD) for the full closure condition.

Figure 14 shows the maximum stages in Chicago River between its junction with NBCR and SBCR and CRCW for the 100-year storm event. The four curves represent the baseline, bar screen, blocked bar screen, and full closure conditions. It can be seen that the effect of bar screens on the river stage is very minor in comparison to the full closure of sluice and lock gates.

Figure 15 shows the maximum stages in the CAWS between Lockport Powerhouse and Wilmette Pumping Station for the baseline condition with lake level at +0.8 CCD (580.0 NAVD). The four curves represent the 20, 50, 100 and 500-year conditions.

Figure 16 shows the maximum stages in the CAWS between Lockport Powerhouse and Wilmette Pumping Station for the baseline condition with lake level at +3.8 CCD (583.0 NAVD). The four curves represent the 20, 50, 100 and 500-year conditions.

Figure 17 shows the maximum stages in Calumet River between its junction with Little Calumet River and the mouth of Calumet River for the 100-year storm event. The four curves represent the baseline, bar screen, blocked bar screen, and full closure conditions. It can be seen that the effect of bar screens on the river stage is very minor in comparison to the full closure of sluice gates and lock gates.

Figure 18 shows the maximum stages in the CAWS between Lockport Powerhouse and the mouth of Calumet River for the baseline condition with lake level at +0.8 CCD (580.0 NAVD). The four curves represent the 20, 50, 100 and 500-year conditions.

Figure 19 shows the maximum stages in the CAWS between Lockport Powerhouse and the mouth of Calumet River for the baseline condition with lake level at +3.8 CCD (583.0 NAVD). The four curves represent the 20, 50, 100 and 500-year conditions.

Figure 20 shows the stage hydrographs at Calumet-Sag Junction for the baseline condition. The four hydrographs represents the 20, 50, 100 and 500-year conditions. It can be seen that the minimum stage at this location is limited by -4.0 CCD throughout the rainstorm.

Figure 21 shows the discharge hydrographs at Calumet-Sag Junction for the baseline condition. The four hydrographs represents the 20, 50, 100 and 500-year conditions.

CONCLUSIONS

The preliminary modeling results indicated that the bar screens, which will be installed to two sluice gates at CRCW and O'Brien Lock and Dam, would increase the stages on the CAWS between 0 and 0.19 ft for the 100-year event. The maximum increase in stage would be 0.07 ft if the screens are free of blockage, whereas the maximum increase would be 0.19 ft if the screens are assumed to be fully blocked by debris in the water column. Because the screen effect on the stage is small, deployment of bar screens is recommended.

The increase of water levels on the CAWS, however, is significant if all sluice and lock gates at the lakefront controlling works were shut. The effect could be as high as 5-6 ft. Therefore, the modified operation that requires full closure of sluice gates and lock gates is not recommended, and further study is needed if this scenario will be considered a probable option for stopping Asian Carp migration to Great Lakes or implementing hydrologic separation between the Great Lakes and Mississippi River basins.

For lake levels at 580.0 NAVD and 583.0 NAVD the maximum stage difference in CAWS is about 1.0 ft. The higher lake level condition requires that the gates at the CRCW and O'Brien Lock and Dam be opened late. This delayed backflow causes the higher stages on the CAWS.

FUTURE WORK

Currently, the USACE Rock Island District contracted the Illinois USGS to conduct a study on discharge rating for the sluice gates at Lockport Controlling Works. The discharge coefficient for the sluice gates may be refined after the study results are available.

The tailwater at Lockport Controlling Works was fixed at a constant level. A stage hydrograph on the Des Plaines River may be developed to better represent the hydraulic condition at this location.

The sluice and lock gates at lakefront controlling woks are modeled as stage-controlled in-line or lateral gate structures. The reference river station is the first cross section on the river side of the structure. The reference river station, the computational time step, and the speed of gate open and close in the HEC-RAS model may be fine tuned to eliminate jitters of computed hydrograph near the gate open elevation.

REFERENCES

1. AECOM, “Chicago Downtown Flooding Study – Final Report,” prepared for the USACE, Chicago District, February 2010.

2. Collins Engineers, “Design Calculations for MWRD Bar Screens,” prepared for the MWRDGC, March 2010.

3. Kövári, J. (editor), “Chapter 8 -- Hydraulic Formulas Used in Designing Fish Farms, Aquaculture Development and Coordination Programme,” Lectures presented at the ADCP Inter-regional Training Course in Inland Aquaculture Engineering, Budapest, 6 June – 3 September 1983.

4. Munga, Bruce J., “The Lockport Sluice Gate Model Study,” M.S. Thesis, The University of Illinois, Urbana, IL, February 1961.

5. Staudacher, Ed, MWRDGC, Personal Communication, April 26, 2010.

6. USACE, Rock Island District, “Illinois Waterway, Appendix 1, Master Reservoir Regulation Manual – Lockport Lock and O’Brien Lock and Controlling Works, “ June 1986.

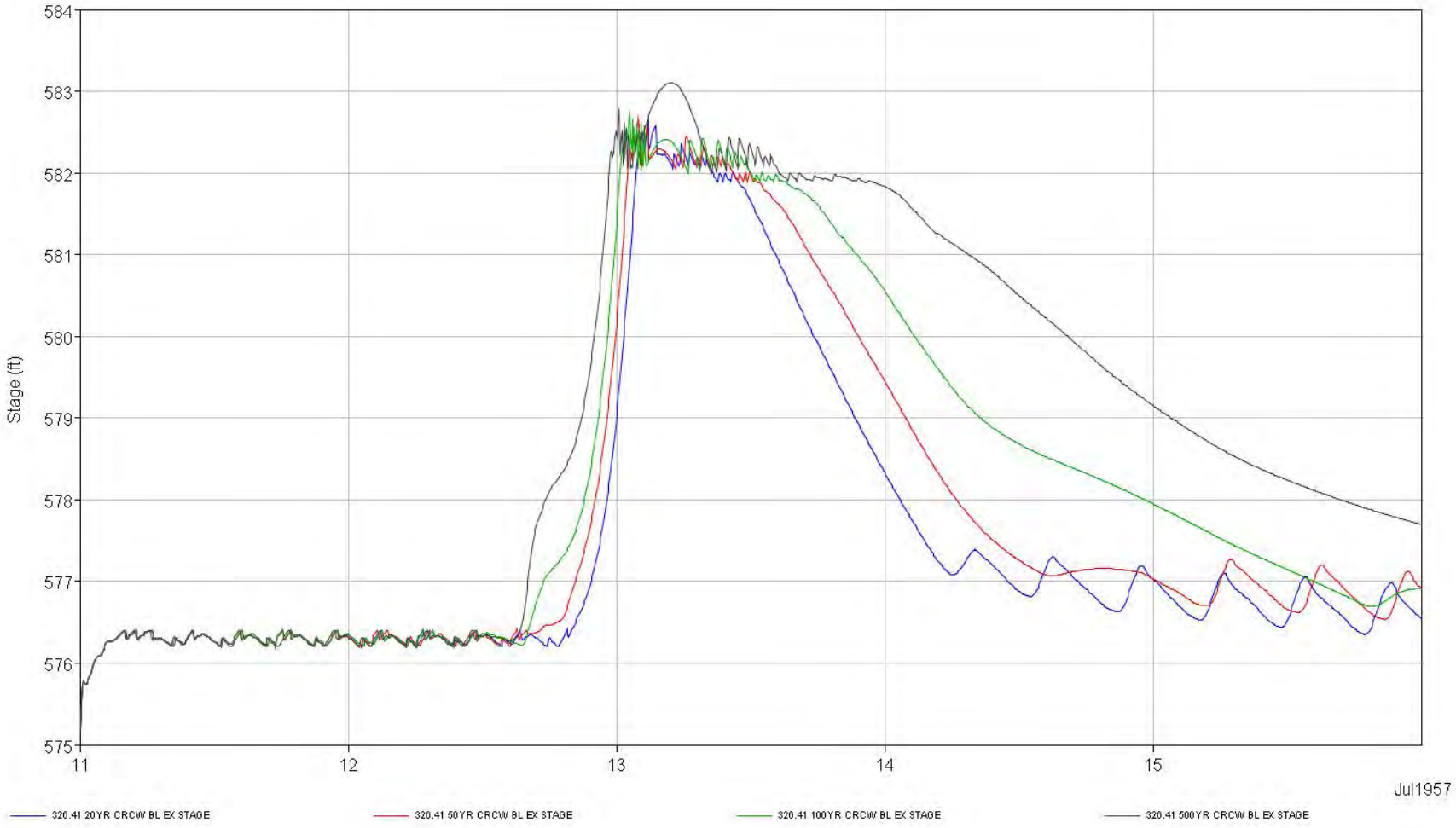

Figure 8 – Stage Hydrographs at Tailwater of CRCW for Baseline Condition (Lake Level = 580.0 NAVD)

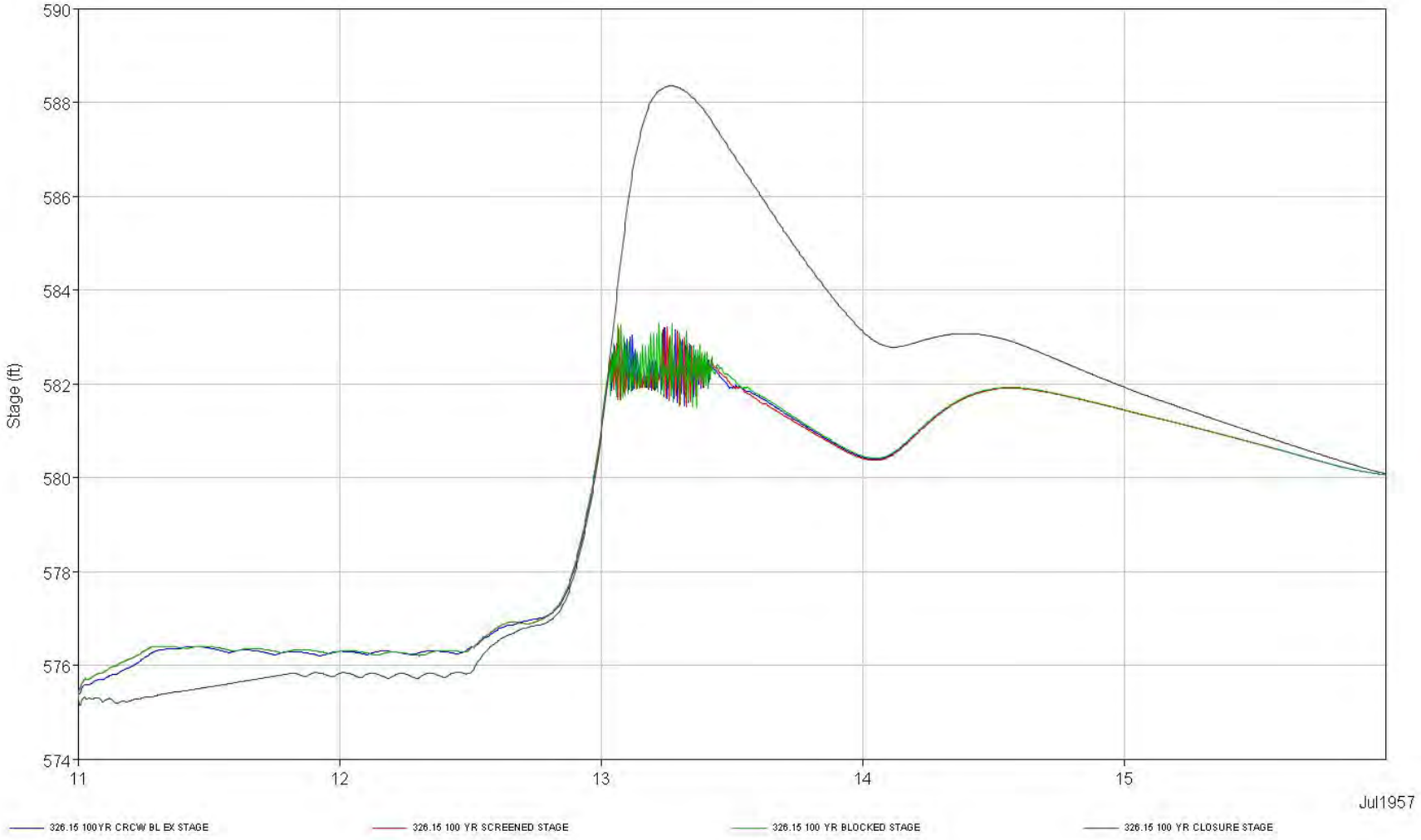

Figure 9 – Stage Hydrographs at Tailwater of CRCW for 100-year Event (Lake Level = 580.0 NAVD)

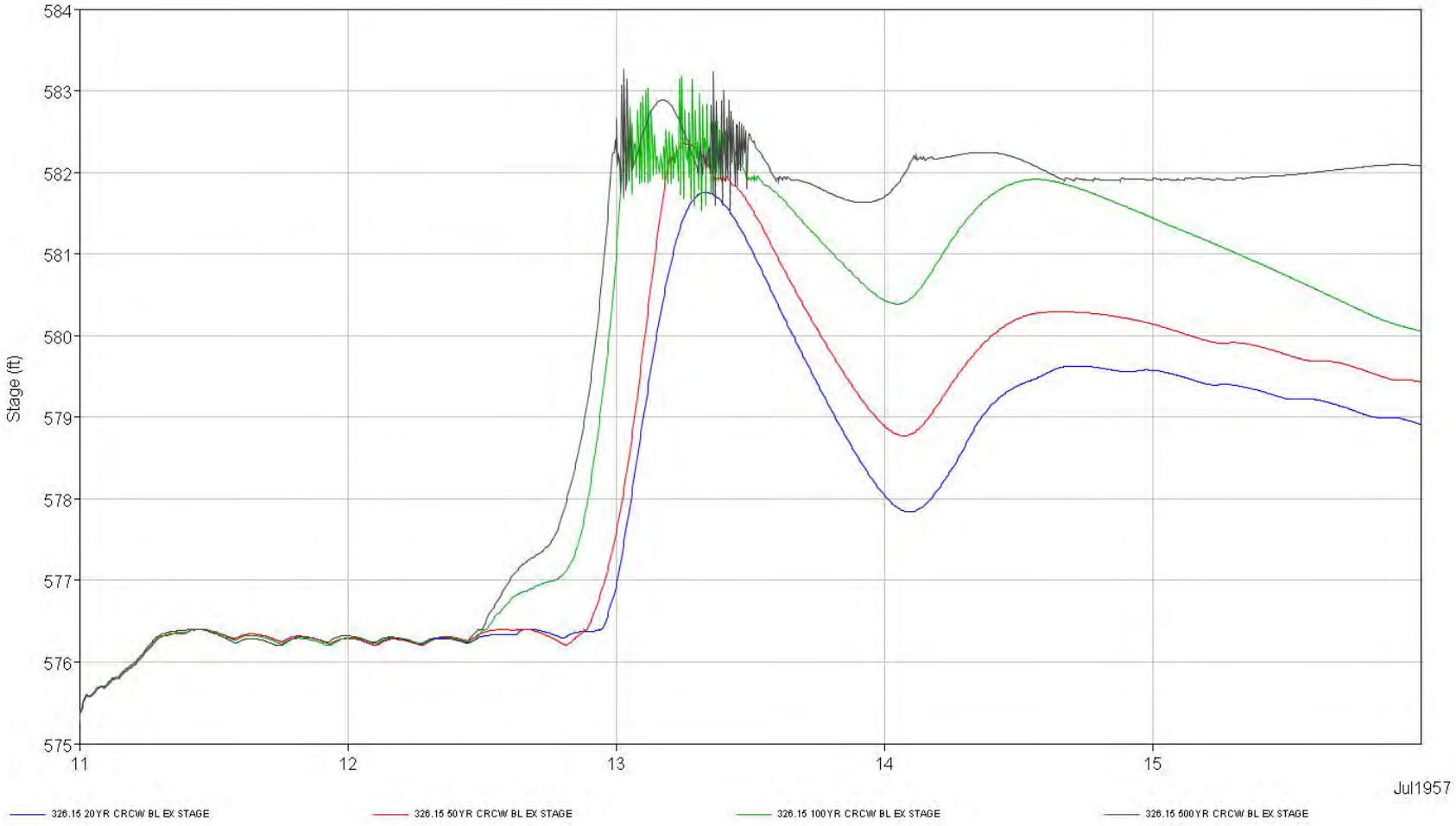

Figure 10 – Stage Hydrographs at Tailwater of O'Brien Lock and Dam for Baseline Condition (Lake Level = 580.0 NAVD)

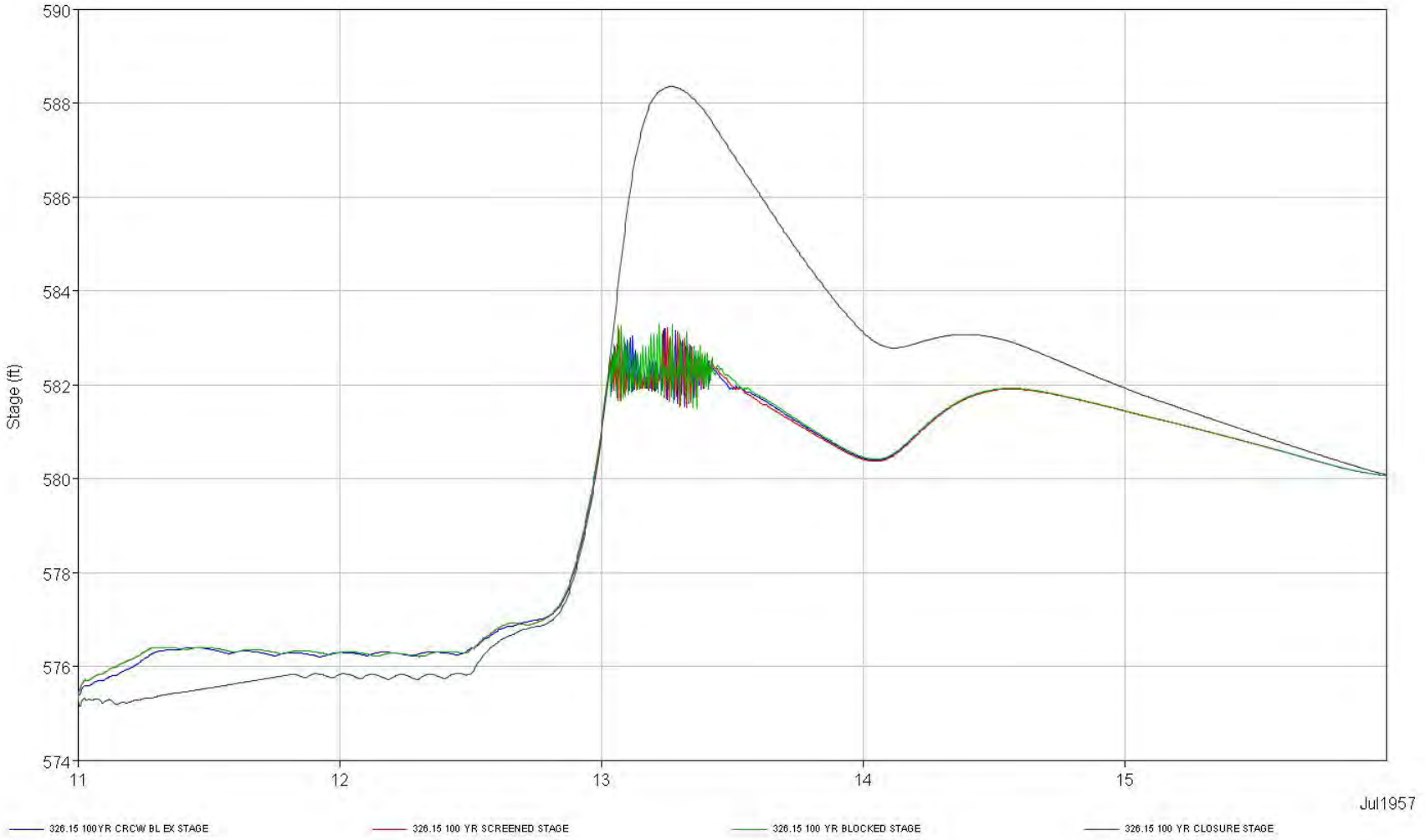

Figure 11 – Stage Hydrographs at Tailwater of O'Brien Lock and Dam for 100-year Event (Lake Level = 580.0 NAVD)

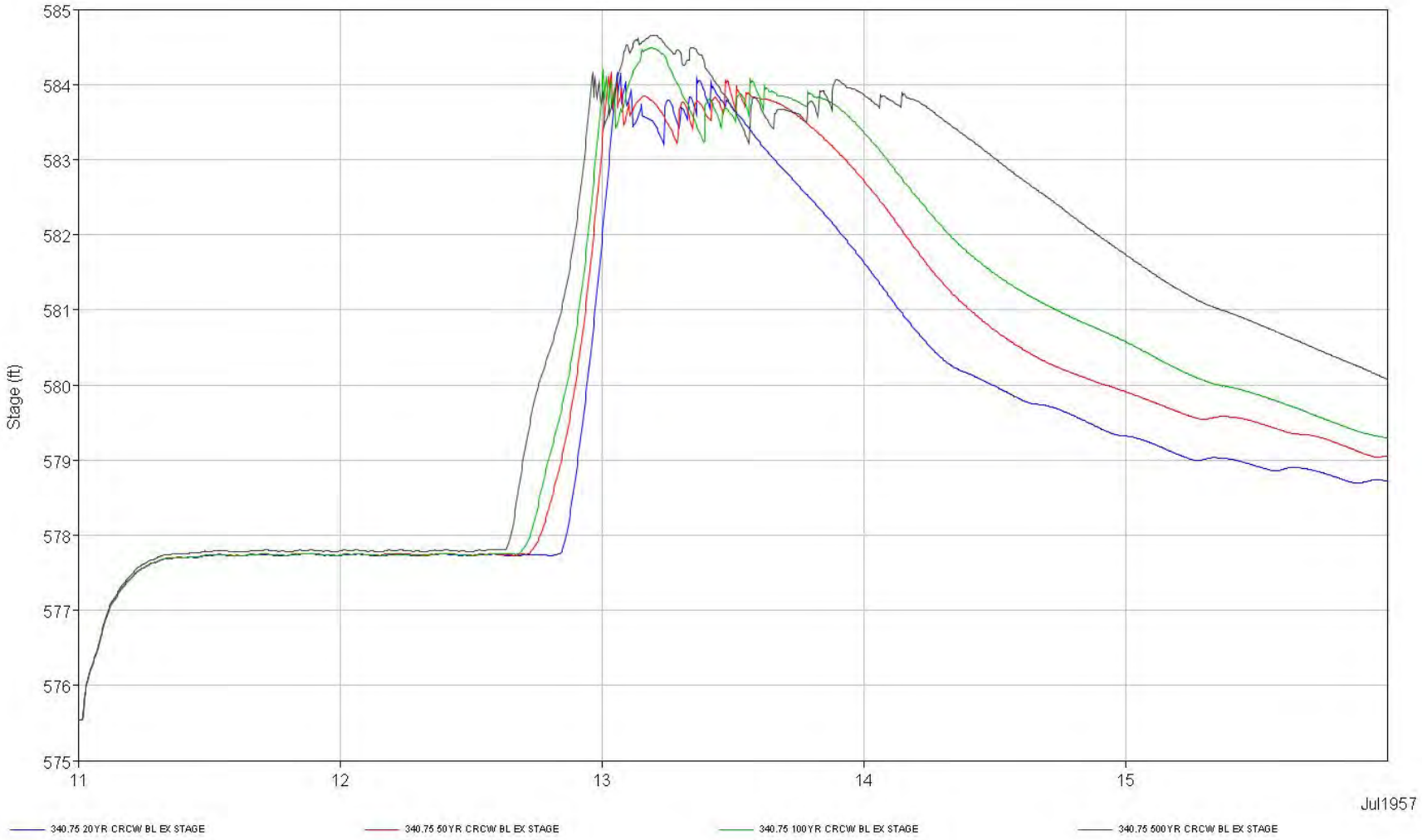

Figure 12 – Stage Hydrographs at Tailwater of Wilmette Pumping Station for Baseline Condition (Lake Level = 580.0 NAVD)

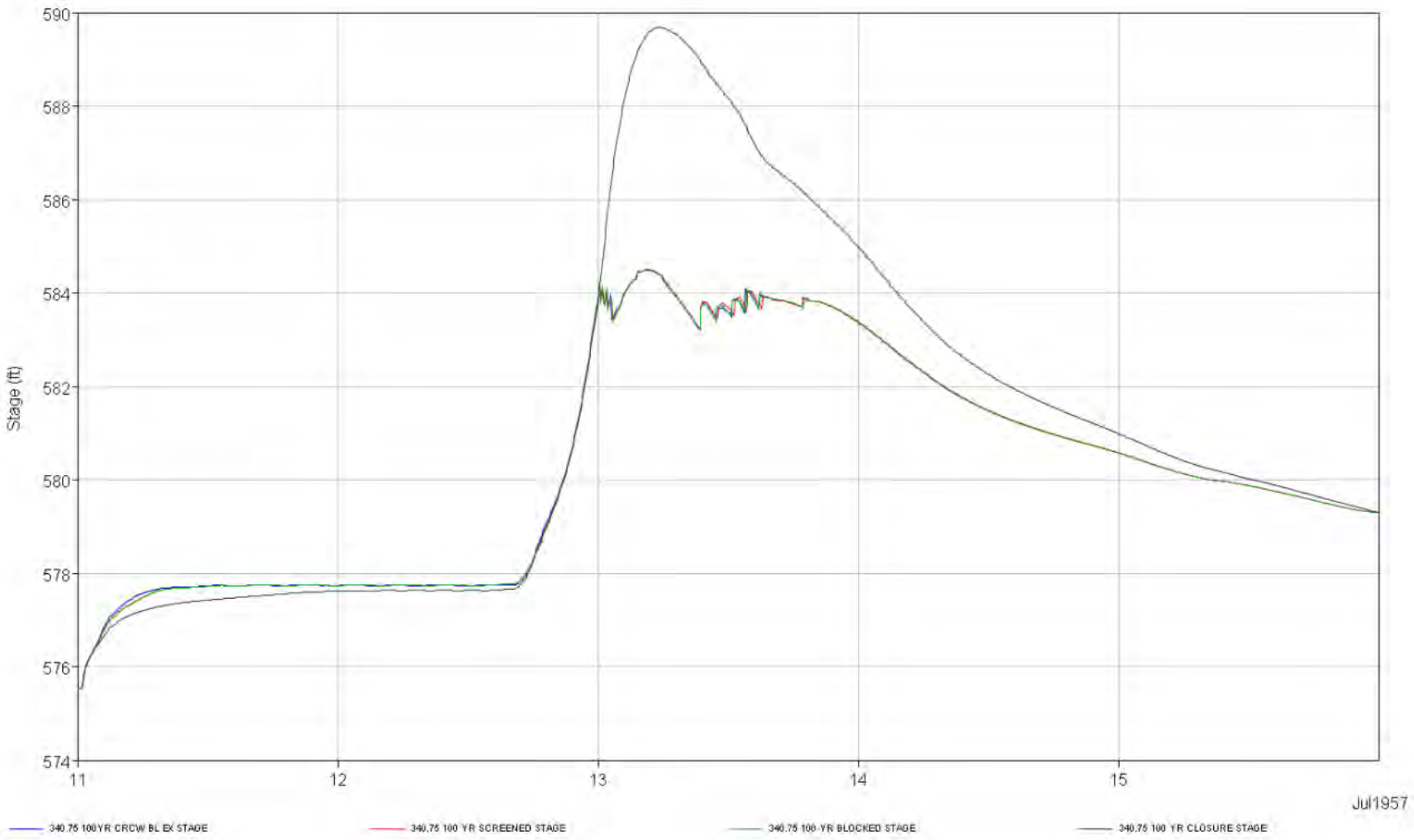

Figure 13 – Stage Hydrographs at Tailwater of Wilmette Pumping Station for 100-year Event (Lake Level = 580.0 NAVD)

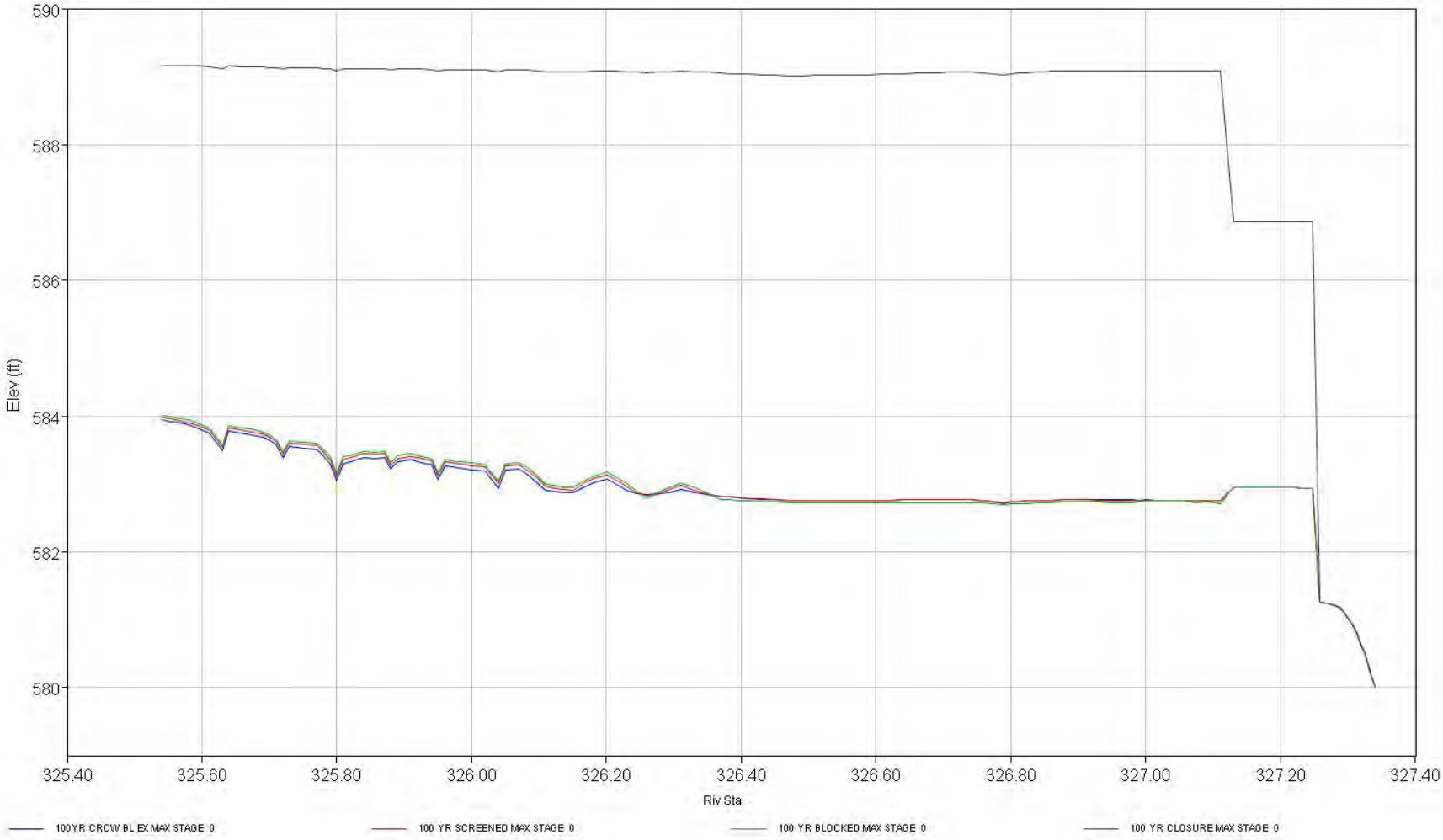

Figure 14 – Maximum Stages on Chicago River for 100-year Event (Lake Level = 580.0 NAVD)

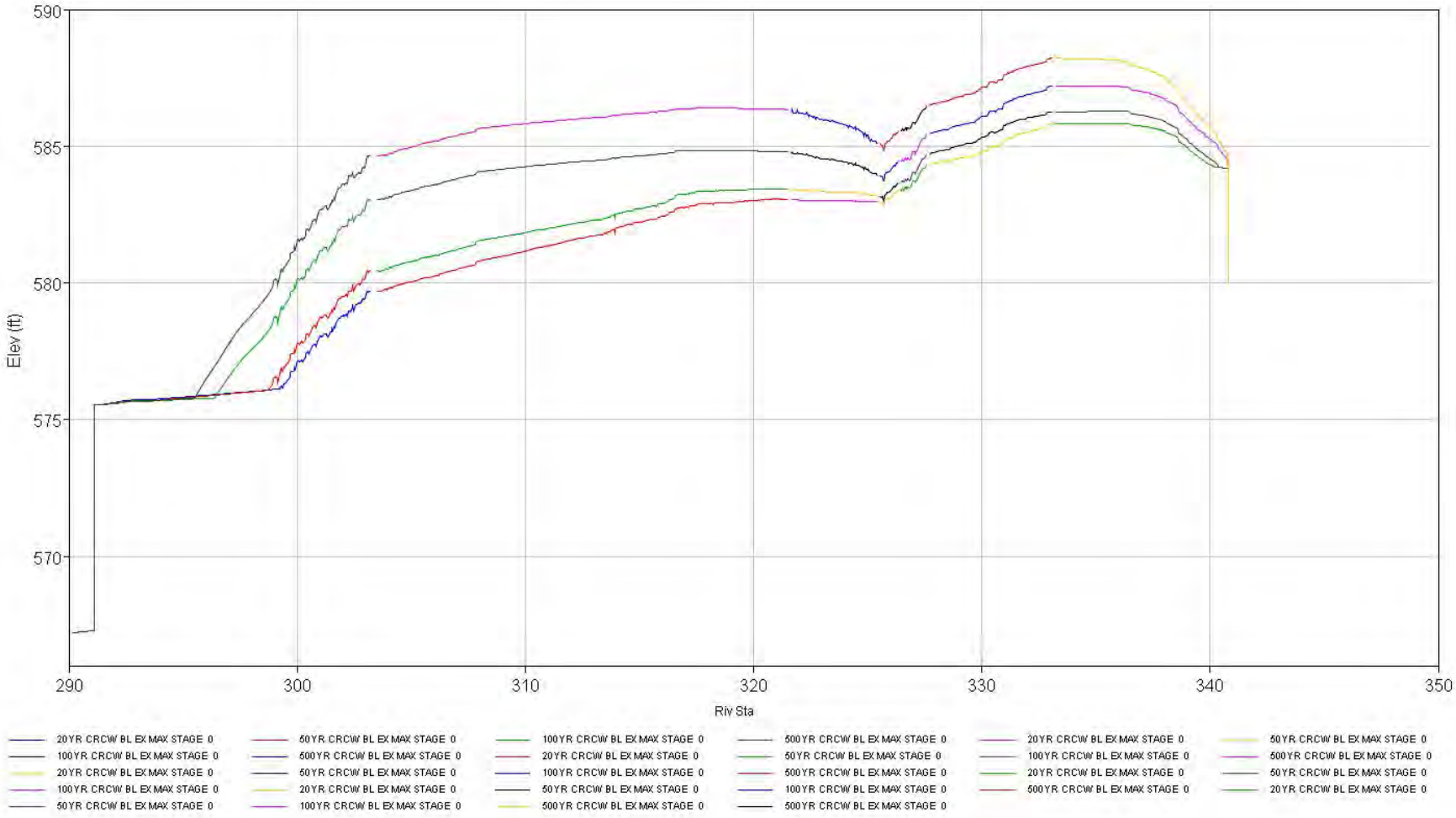

Figure 15 – Maximum Stages from Lockport to Wilmette Pumping Station for Baseline Condition (Lake Level = 580.0 NAVD)

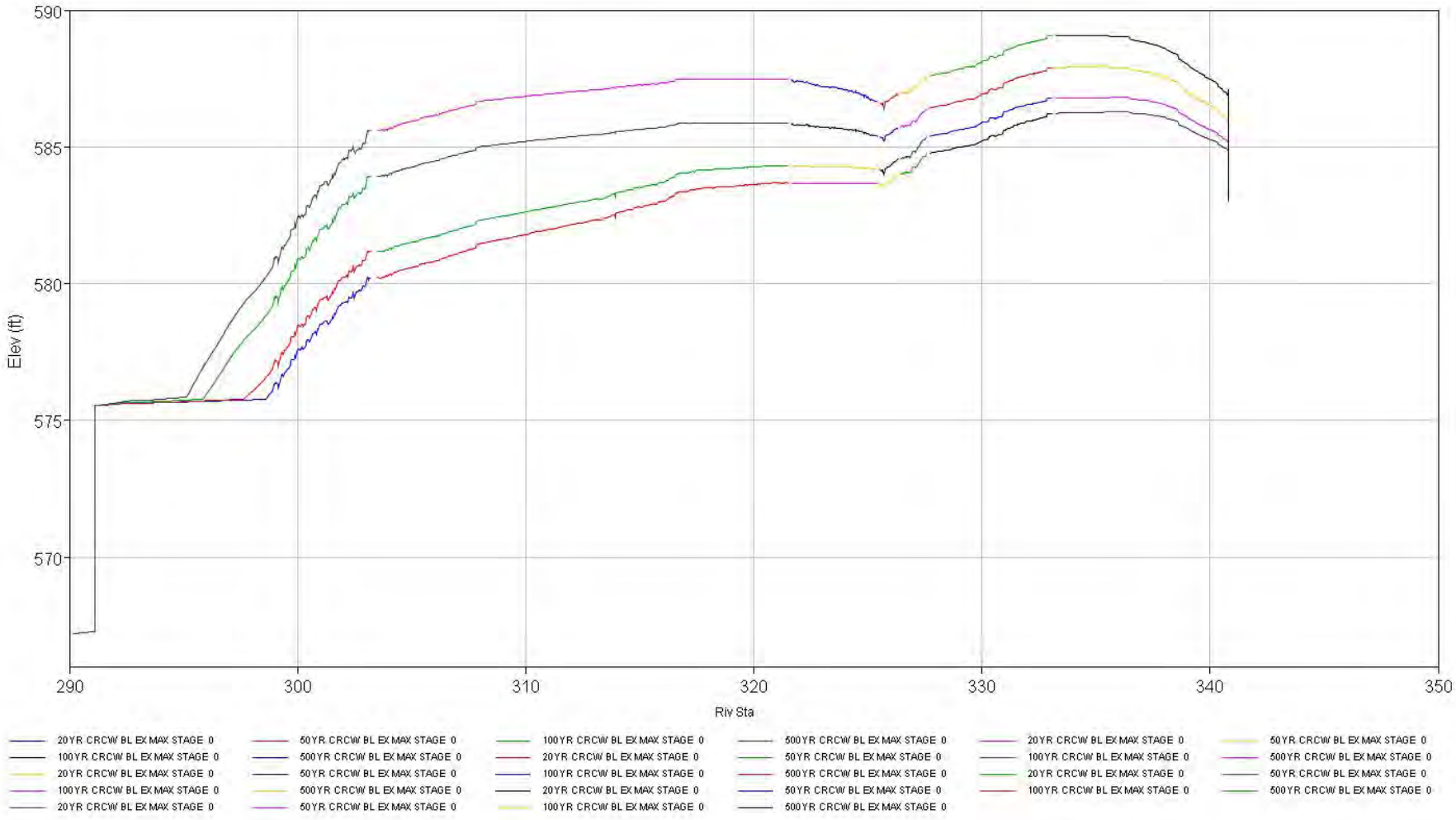

Figure 16 – Maximum Stages from Lockport to Wilmette Pumping Station for Baseline Condition (Lake Level = 583.0 NAVD)

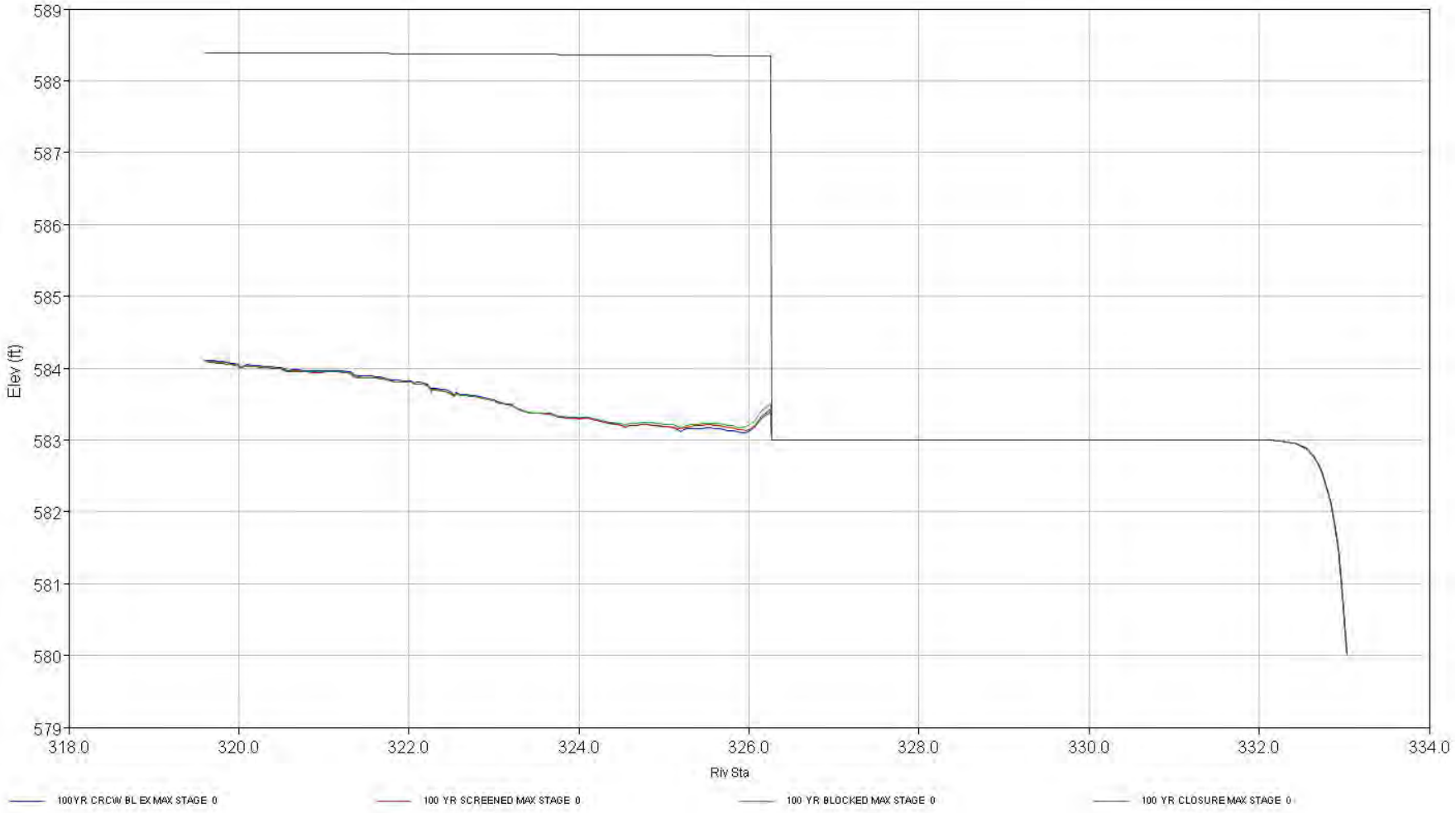

Figure 17 – Maximum Stages on Calumet River for 100-year Event

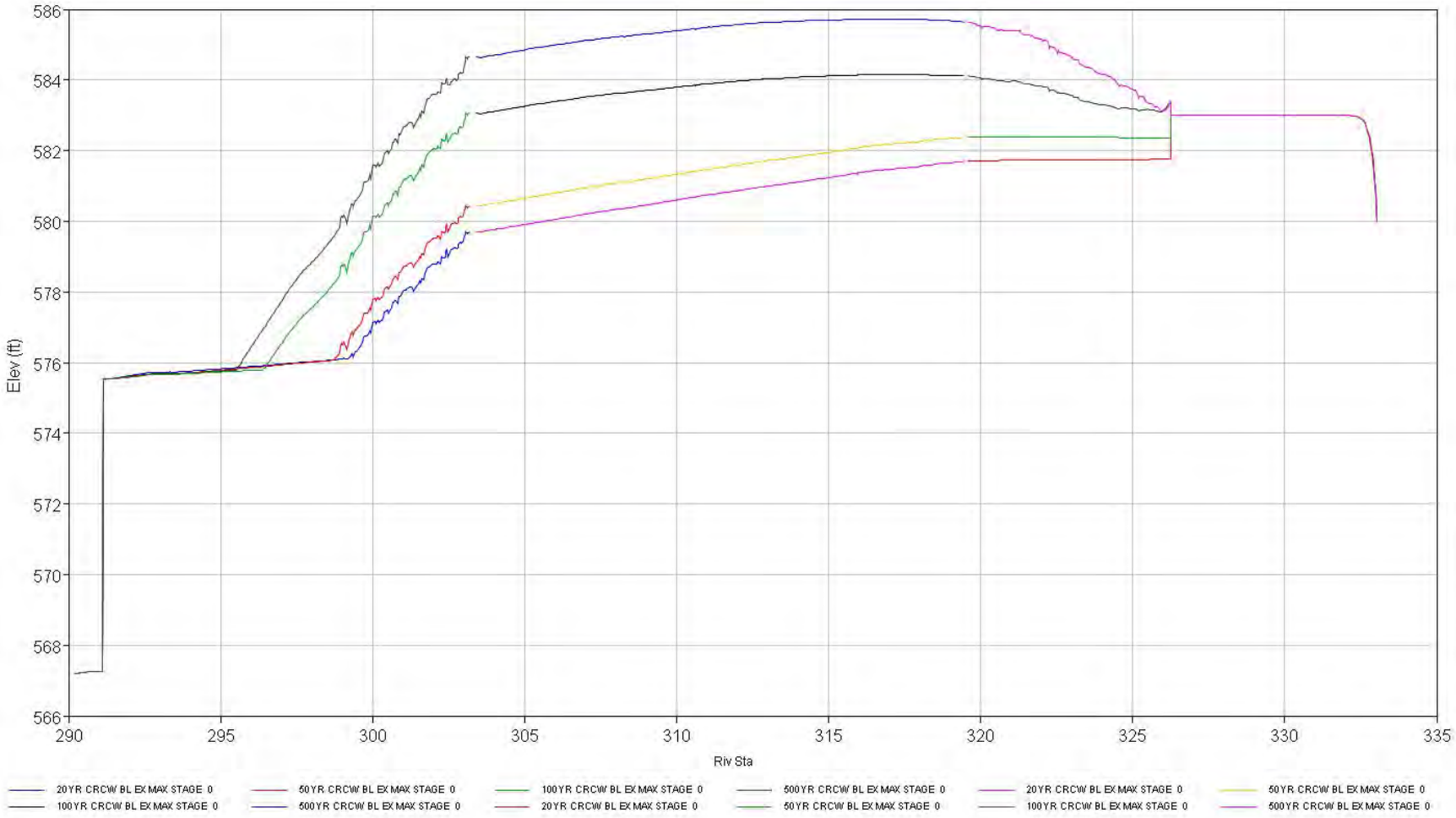

Figure 18 – Maximum Stages from Lockport to O'Brien Lock and Dam for Baseline Condition (Lake Level = 580.0 NAVD)

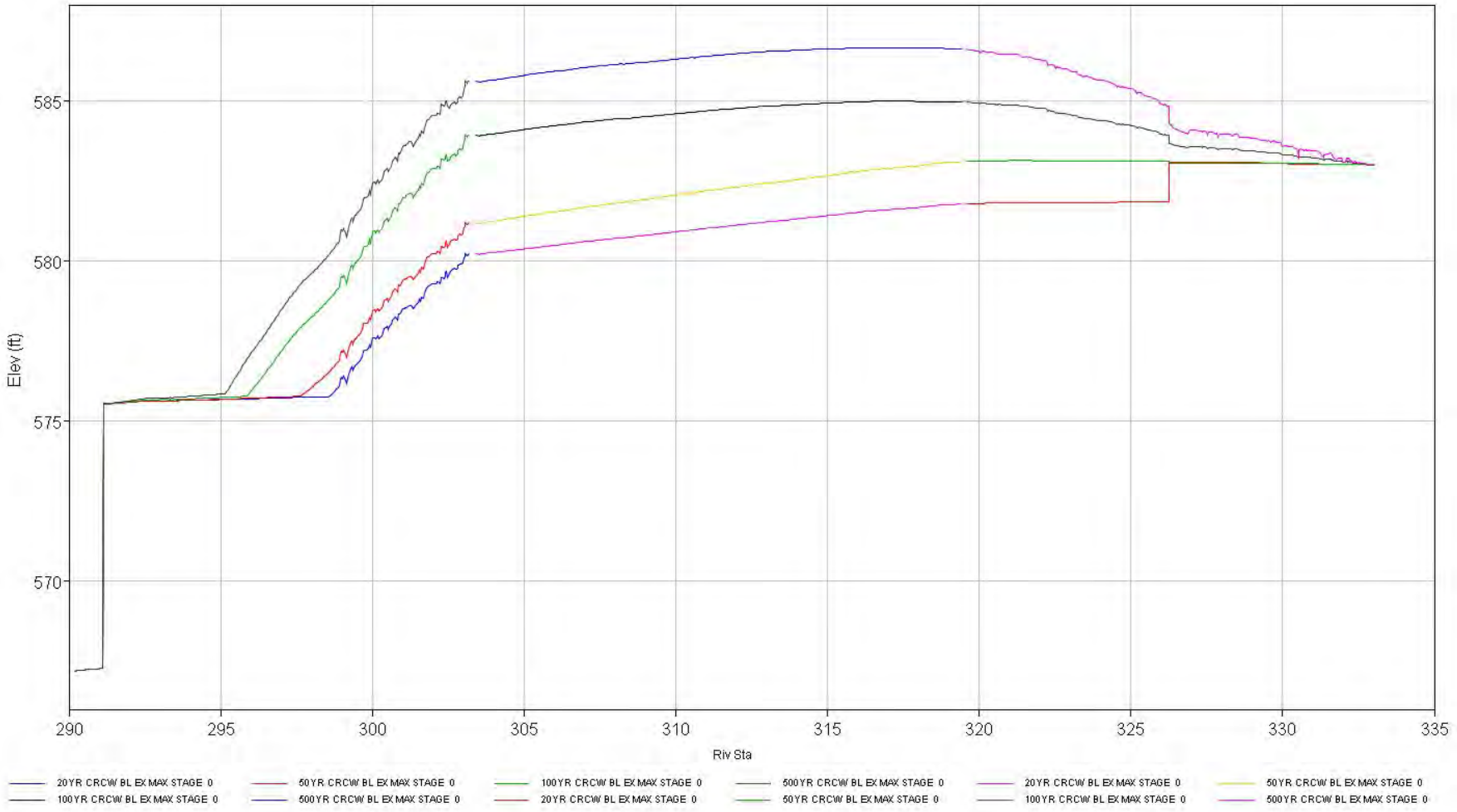

Figure 19 – Maximum Stages from Lockport to O'Brien Lock and Dam for Baseline Condition (Lake Level = 583.0 NAVD)

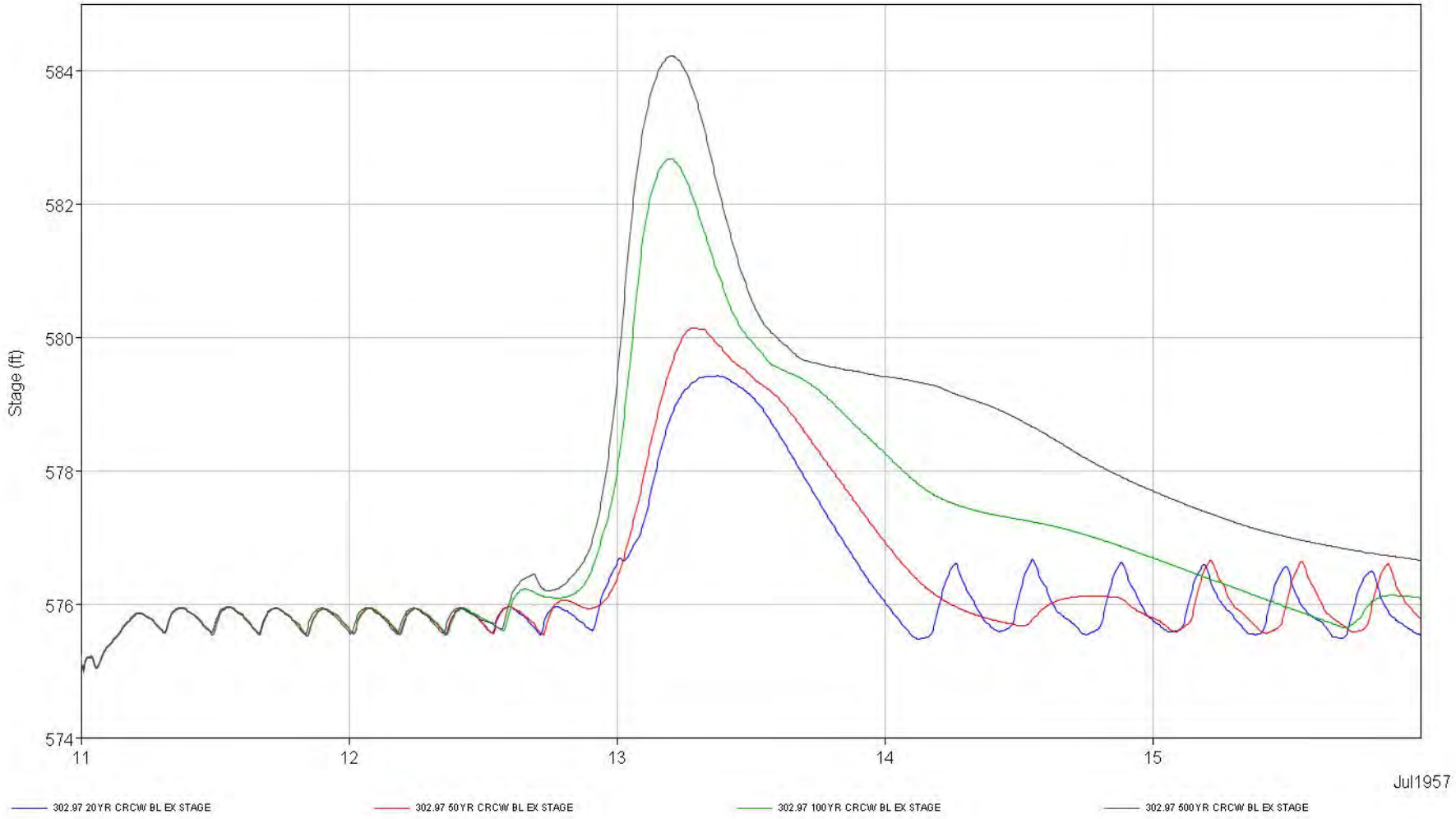

Figure 20 – Stage Hydrographs at Calumet-Sag Channel Junction for Baseline Condition (Lake Level = 580.0 NAVD)

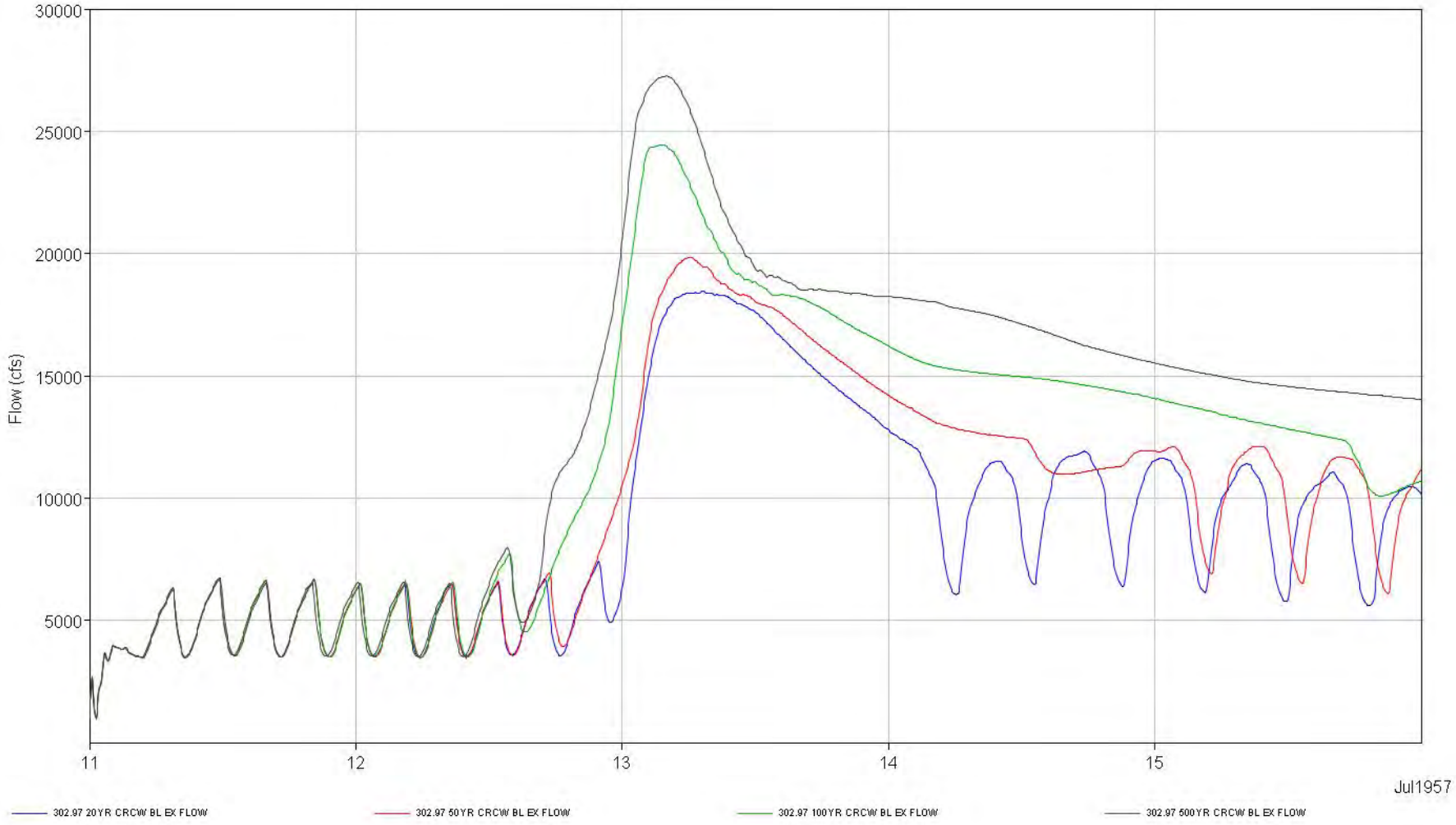

Figure 21 – Discharge Hydrographs at Calumet-Sag Channel Junction for Baseline Condition (Lake Level = 580.0 NAVD)

Dispersal Barrier Efficacy Study

INTERIM III – Modified Structure Operations, Illinois & Chicago Area Waterways Risk Reduction Study and Integrated Environmental Assessment

APPENDIX D – PLANNING INFORMATION

May 2010

US Army Corps of Engineers ®
Rock Island District

US Army Corps of Engineers ®
Chicago District

INTERIM III – Modified Structure Operations, Illinois & Chicago Area Waterways Risk Reduction Study and Integrated Environmental Assessment

Appendix D, Planning Information

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Information Tables

Table 1 – Waterway Impairments from 2008 Final Draft Illinois 303(d) List

	Impairment	Potential Cause of Impairment
General Use		
N. Shore Channel (N. Side Sewage Treatment Works to Lake Michigan)	• Fish Consumption	PCBs
	• Aquatic Life	Nickel, phosphorus (total), zinc
	• Primary Contact Recreation	Fecal coliform
Chicago River	• Aquatic Life	Phosphorus (total), silver
	• Fish Consumption	Mercury, PCBs
	• Primary Contact Recreation	Fecal coliform
Des Plaines River (CSSC confluence to Du Page River confluence)	• Fish Consumption	Mercury, PCBs
	• Aquatic Life	Chloride, DDT, hexachlorobenzene, iron, nickel, pH, phosphorus (total), PCBs, sedimentation/siltation, TSS
	• Primary Contact Recreation	Fecal coliform
Little Calumet River (from IL-IN State Line to Cal-Sag)	• Aquatic Life	Fluoride, hexachlorobenzene, oil & grease, pH, phosphorus (total), sedimentation/siltation, TSS, cyanide
	• Primary Contact Recreation	Fecal coliform
Secondary Contact		
N. Shore Channel	• Fish Consumption	Mercury, PCBs
N. Branch Chicago River	• Fish Consumption	PCBs
	• Indigenous Aquatic Life	Iron, oil & grease, phosphorus (total)
S. Branch Chicago River	• Fish Consumption	PCBs
S. Fork S. Branch CR	• Indigenous Aquatic Life	pH, phosphorus (total)
Chicago Sanitary and Ship Canal	• Fish Consumption	Mercury, PCBs
	• Indigenous Aquatic Life	Iron, oil & grease, ammonia (un-ionized), phosphorus (total)
Cal-Sag Channel	• Fish Consumption	Mercury, PCBs
	• Indigenous Aquatic Life	Iron, phosphorus (total), TSS
Little Calumet River (from Grand Cal to Cal-Sag)	• Fish Consumption	Mercury, PCBs
	• Indigenous Aquatic Life	Aldrin, iron, phosphorus (total), silver
Grand Calumet River	• Indigenous Aquatic Life	Ammonia (un-ionized), arsenic, barium, cadmium, chromium (total), copper, DDT, iron, lead, nickel, phosphorus (total), PCBs, sedimentation/siltation, silver, zinc

Table 2 - Fishes occupying listed reaches of the Chicago River, Calumet River, Cal-Sag Channel, CSSC, and Des Plaines River. Data were collected by the Field Museum of Natural History, Illinois Department of Natural Resources, and Illinois Natural History Survey from 1975-2004.

Species	Common Name	Sites					
		Chicago Lock	Chicago River at Throop Street	Calumet River at O'Brien Lock	Cal-Sag Channel at I&M Canal	CSSC at Lockport Lock	Des Plaines River at Brandon Lock
Lepisosteus osseus	Longnose gar						X
Dorosoma cepdianum	Gizzard shad			X	X		X
Carassius auratus	Goldfish				X	X	X
Ctenopharyngodon idella	Grass carp	X					
Cyprinella spiloptera	Spotfin shiner						X
Cyprinus carpio	Common carp	X		X	X	X	X
Notemigonus crysoleucas	Golden shiner	X					X
Notropis atherinoides	Emerald shiner			X			X
Notropis hudsonius	Spottail shiner	X					X
Notropis volucellus	Mimic shiner	X					
Pimephales notatus	Bluntnose minnow	X		X			
Pimephales promelas	Fathead minnow				X		X
Semotilus atromaculatus	Creek chub						X
Carpiodes carpio	River carpsucker						X
Catostomus commersoni	White sucker			X			X
Ictiobus bubalus	Smallmouth buffalo						X
Moxostoma erythrurum	Golden redhorse						X
Moxostoma macrolepidotum	Shorthead redhorse						X
Ameiurus melas	Black bullhead				X		X
Ictalurus punctatus	Channel catfish						X
Noturus gyrinus	Tadpole madtom						X
Esox americanus	Grass pickerel						X
Umbra limi	Central mudminnow				X		
Osmerus mordax	Rainbow smelt	X					
Salmo trutta	Brown trout	X					
Gambusia affinis	Western mosquitofish						X
Labidesthes sicculus	Brook silverside	X					
Cottus ricei	Spoonhead sculpin	X					

Species	Common Name	Sites					
		Chicago Lock	Chicago River at Throop Street	Calumet River at O'Brien Lock	Cal-Sag Channel at I&M Canal	CSSC at Lockport Lock	Des Plaines River at Brandon Lock
Morone americana	White perch		X	X			
Morone chrysops	White bass					X	
Morone mississipiensis	Yellow bass				X		
Ambloplites rupestris	Rock bass	X		X			
Lepomis cyanellus	green sunfish	X		X	X		X
Lepomis gibbosus	pumpkinseed	X		X	X		
Lepomis macrochirus	Bluegill	X	X	X	X		X
Micropterus dolomieu	Smallmouth bass			X			X
Micropterus salmoides	Largemouth bass	X		X	X		X
Pomoxis annularis	White crappie						X
Pomoxis nigromaculatus	Black crappie	X		X			X
Perca flavescens	Yellow perch	X					
Sander vitreum	Walleye						X
Aplodinotus grunniens	Freshwater drum						X
Oncorhynchus kisutch	Coho salmon	X					
Oncorhynchus tshawytscha	Chinook salmon	X					
Gasterosteus aculeatus	Threespine stickleback	X					
Pungitius pungitius	Ninspine stickleback	X					
Neogobius melanostomus	Round goby			X			
Misgurnus anguillicaudatus	Weather loach						X

Table 3 - Macroinvertebrates occupying listed reaches of the Chicago River, Calumet River, Cal-Sag Channel, CSSC, and Des Plaines River. Data were collected from 2001-2004 by the MWRD of Greater Chicago, via Hester-Dendy Artificial Substrate Samplers and Petite Ponar grabs.

Taxon	Sites					
	Chicago Lock	Chicago River at Throop Street	Calumet River at O'Brien Lock	Cal-Sag Channel at I&M Canal	CSSC at Lockport Lock	Des Plaines River at Brandon Lock
Ablabesmyia janta			X		X	
Ablabesmyia mallochi					X	X
Amnicola				X		X
Argia						X
Baetis intercalaris						X
Berosus					X	
Caecidotea				X	X	X
Caenis					X	X
Ceratopsyche morosa						X
Cheumatopsyche	X				X	X
Chironomidae			X	X	X	X
Cladopelma	X					
Cladotanytarsus vanderwulpi grp.						X
Corbicula fluminea					X	X
Corixidae						X
Cricotopus					X	
Cricotopus bicinctus grp.	X		X	X	X	X
Cricotopus sylvestric grp.	X		X	X	X	
Cricotopus trifascia grp.						X
Cryptochironomus	X			X	X	X
Cyranellus fraternus				X	X	
Dicrotenipes						X
Dicrotendipes neomodestus	X		X			X
Dicrotendipes simpsoni	X	X		X	X	
Dreissena polymorpha	X				X	X
Enallagma			X			
Erpobdella punctata punctata			X		X	X
Ferrissia					X	X

Taxon	Sites					
	Chicago Lock	Chicago River at Throop Street	Calumet River at O'Brien Lock	Cal-Sag Channel at I&M Canal	CSSC at Lockport Lock	Des Plaines River at Brandon Lock
Gammarus fasciatus	X			X	X	X
Glossiphoniidae					X	
Glyptotendipes	X	X		X	X	X
Helobdella					X	
Helobdella papillata					X	
Helobdella stagnalis			X		X	X
Helobdella triserialis		X			X	
Hemerodromia						X
Heterotrissocladius	X					
Hydra	X	X		X	X	X
Hydropsyche					X	X
Hydropsyche betteni						X
Hydropsyche bidens						X
Hydropsyche orris						X
Hydropsyche simulans						X
Hydroptila	X					
Macronychus glabratus						X
Menetus dilatatus					X	X
Mooreobdella microstoma			X	X	X	
Musculium					X	X
Musculium transversum						X
Nanocladius crassicornus/rectinervis						X
Nanocladius distinctus	X			X	X	X
Natarsia sp.						X
Nematoda						X
Oligochaeta	X	X	X	X	X	X
Orconectes virilis						X
Orthocladius						X
Palmacorixa						X
Parachironomus	X	X	X	X		
Paratanytarsus				X		
Pericoma					X	

Taxon	Sites					
	Chicago Lock	Chicago River at Throop Street	Calumet River at O'Brien Lock	Cal-Sag Channel at I&M Canal	CSSC at Lockport Lock	Des Plaines River at Brandon Lock
Petrophila						X
Physa				X	X	X
Physella		X				
Pleurocerida						X
Plumatella	X			X	X	X
Polypedilum flavum					X	X
Polypedilum halterale grp.	X					X
Polypedilum illinoense				X	X	X
Polypedilum scalaenum grp.					X	X
Procladius (Holotanypus)				X	X	X
Rheotanytarsus						X
Simulium						X
Stenacron					X	X
Stenelmis						X
Stenelmis crenata grp.						X
Stenochironomus					X	X
Stenonema integrum					X	
Tanypus			X		X	
Tanytarsus				X		X
Tanytarsus guerlus grp.						X
Thienemanniella similis						X
Thienemanniella xena						X
Thienemannimyia grp.		X				X
Trepobates						X
Tribelos fuscicorne						X
Tricorythodes						X
Turbellaria		X		X	X	X
Tventenia discoloripes grp.						X
Xenochironomus xenolabis					X	

Table 4 – USFWS Risk Assessment: Response percentages for section IV and V assessment questions posed by the Corps.

Question	Response			Risk Category*			Uncertainty Code+				
	#	Yes	No	Low	Medium	High	VC	RC	MC	RU	VU
IV. Responses to Questions Posed by the Corps											
1.) Is there an imminent threat that AC will establish a sustainable population in Lake Michigan in the near future?	8	63	38	-	-	-	0	14	14	71	0
2.) Is there a threshold of AC needed to establish a sustainable population?	6	100	0	-	-	-	-	-	-	-	-
3.) A few AC were found in Lake Erie in the past. Are the populations of AC in Lake Erie self-sustaining?	5	0	100	-	-	-	17	17	0	33	33
4.) In your opinion, would a sustainable population of AC adversely impact the commercial fisheries of the GL?	6	-	-	17	50	33	0	50	0	17	33
5.) If the AC were allowed to migrate into the GL unimpeded how long would it take to establish demonstrable, sustainable populations capable of adversely impacting the commercial fisheries of the GL?	**Refer to Text**										
6.) Do AC carry any viral, bacterial, protozoan or other parasites or diseases that may adversely impact the native fish populations of the GL?	1	100	0	-	-	-	-	-	-	-	-
7.) If the AC become established in the GL, then are there any beneficial impacts that would result from their presence?	7	29	71	-	-	-	17	67	0	17	0
8.) If the AC establish sustainable populations, would they adversely impact any of the other established invasive aquatic organisms of the GL?	5	60	40	-	-	-	20	60	0	20	0
9.) What are the triggers (high water flows, warm water, availability of Chlorophyll a, etc.) for movement of AC?	**Refer to Text**										
10.) Will warmer weather in the spring make it more likely that the AC will migrate upstream toward Lake Michigan?	6	83	17	-	-	-	-	-	-	-	-
11.) Given the habits of the AC how likely are the fish to develop significant contaminant loads in their edible tissues?	-	-	-	0	0	0	0	20	0	60	20

Section V. Responses to Risk Management Questions											
Question	**Response**			**Risk Category***			**Uncertainty Code+**				
	#	**Yes**	**No**	**Low**	**Medium**	**High**	**VC**	**RC**	**MC**	**RU**	**VU**
1.) If a single AC is collected during monitoring accompanying a lock closure, then would the spot application of rotenone be an appropriate response?	6	50	50	-	-	-	0	20	20	60	0
1a.) What is the risk associated with reopening the locks at least 72 hours after completion of rotenone treatment?	6	-	-	0	33	67	-	-	-	-	-
2.) If multiple AC are collected during monitoring accompanying lock closure, then would the spot application of rotenone be an appropriate response?	5	60	40	-	-	-	0	0	20	40	40
2b.) What is the risk associated with reopening the locks at least 72 hours after completion of rotenone treatment?	3	-	-	0	33	67	-	-	-	-	-
3.) Would closing the lock gates be effective in significantly impeding the migration of AC into Lake Michigan given that there may still be gaps of up to one inch between the lock gates and the sides or bottom of the canal?	7	86	14	-	-	-	0	29	0	71	0
4.) Could such gaps allow fish eggs or small juveniles to pass through the locks, and if so, what is the associated risk?	7	71	29	-	-	-	0	0	17	83	0
5.) Would simply reducing the number of openings of the lock gates have a beneficial effect of impeding AC migration by itself, without additional control technologies?	7	14	86	-	-	-	0	11	0	44	44
6.) Given AC behavior, would fewer openings statistically reduce the likelihood of AC passing through the locks?	7	14	86	-	-	-	0	17	17	17	50
7.) Would AC aggregate near the lock during closure and pass en mass through the locks during the scheduled openings?	6	-	-	-	-	-	33	0	0	17	50
8.) Would scheduling lock gate openings in conjunction with other control technologies such as netting, electrofishing, rotenone, as discussed above, help deter the dispersal of AC into Lake Michigan?	7	86	14	-	-	-	17	0	17	50	17
9.) Is it reasonable to assume that if netting, electrofishing,	6	83	17	-	-	-	-	-	-	-	-

rotenone, other monitoring technologies do not recover an AC body, that a significant population of AC is not present in the waterway?											
Question	**Response**			**Risk Category***			**Uncertainty Code+**				
	#	**Yes**	**No**	**Low**	**Medium**	**High**	**VC**	**RC**	**MC**	**RU**	**VU**
10.) Is it reasonable to assume that a longer period of extensive monitoring (through netting, electrofishing, rotenone, other technologies) without the recovery of an AC body, provides increased confidence that a significant population of AC is not present in the waterway?	7	71	29	-	-	-	0	0	29	57	14
11.) If no AC bodies are recovered through netting, electrofishing, rotenone and other monitoring activities upstream of the Barriers, how significant is the threat/risk to Lake Michigan?	7	71	29	-	-	-	0	0	0	33	67
12.) The Corps and MWRD are considering installing mesh grates over the sluice gates near the Chicago and O'Brien locks. Would a mesh grate with 1 inch openings be beneficial in deterring carp migration?	3	33	67	-	-	-	0	20	60	0	20
13.) What significant monitoring would be adequate for helping to verify the absence or presence of AC in the canal system?	**Refer to Text**										
14.) What methods and equipment are recommended?	**Refer to Text**										
15.) What are the biological indicators for the recommended monitoring methods and what are the thresholds for action for these indicators?	**Refer to Text**										
16.) At what duration of monitoring without capturing an AC body is the risk of migration reduced to the extent that it would be reasonable to open the lock gates?	**Refer to Text**										
17.) Is one of the other alternatives discussed in the Background preferable from a risk perspective?	**Refer to Text**										
18.) If an AC movement trigger (such as high cholorophyll, warm water, high flow) is manifested in the CAWs should the locks be closed?	6	83	17	-	-	-	0	0	0	50	50

19.) Are there additional structural modifications or other actions you would recommend to be considered to reduce the risk of AC dispersing into Lake Michigan?	**Refer to Text**

*Risk Categories: Low (Acceptable risk – organism of little concern for establishment and/or ecological consequence), Medium (Unacceptable risk – organism of moderate concern), and High (Unacceptable risk – organism of major concern)
+Uncertainty Codes: VC (Very Certain – as certain as I can be), RC (Reasonably certain), MC (Moderately certain – more certain than not), RU (Reasonably uncertain), VU (Very uncertain – A guess)

Expert Risk Analysis Submissions
Issue: Evaluations of Risk of Asian Carps Establishing and Impacting the Great Lakes: Evaluations by Lock Operation Scenario

Report Submitted to the U.S. Army Corps of Engineers
By
U.S. Fish and Wildlife Service

On Behalf of Expert Risk Analysis Panelists

Illinois Department of Natural Resources

Illinois Environmental Protection Agency

U.S. Army Corps of Engineers

U.S. Fish and Wildlife Service

U.S. Geological Survey

And

Illinois Natural History Survey

February 26, 2010

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SUMMARY and SYNTHESIS

In February 2010, the U.S. Fish and Wildlife Service (Service) received a formal request from the U.S. Army Corps of Engineers-Chicago District, to conduct risk analyses related to a suite of proposed alternatives for modifying operations of the Chicago and O'Brien Locks to address threats from Asian carp to the Great Lakes. Alternative scenarios for lock operation are being considered as a means of lowering risk of bighead and silver carp (Asian carp) establishment in Lake Michigan by way of the Chicago Area Waterways (CAWs). To complete the analyses, a panel of ten Experts was formed; individuals were selected based on their expertise and knowledge related to the technical questions that formed the basis of the review, and in a manner to ensure broad representation of the various entities engaged in Asian carp prevention in the CAWs. Nine Experts completed various components of the risk analysis form, which was composed of sections focusing on: 1) risk assessment of possible lock operation alternatives, and 2) biological, ecological, and risk management questions posed by the Corps. Some Experts completed only limited sections of the form, because their expertise was narrow.

In all cases, Expert assessments of risk of projected Asian carp establishment and impact in Lake Michigan as the result of the pathway of the Chicago and O'Brien Locks were categorized as either Medium or High (i.e., unacceptable) (Table 1). Although Experts differed in their assignments of risk to the six alternatives, individual Expert assessment of risk tended to not change across the suite of alternatives (which included a no-action alternative) for modifying lock operations at the Chicago and O'Brien Locks.

Table 1. Expert Panel assessment of Asian carp risk potential to Lake Michigan associated with six lock operation alternatives. Experts 1, 4, and 8 did not conduct the risk assessments. Risk potential = integration of Risk of Establishment and Risk of Impact. Risk potential of Medium and High is unacceptable. Refer to Section I of text for description of lock operation alternatives.

Expert	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5	Alternative 6
1	--	--	--	--	--	--
2	Medium	Medium	Medium	Medium	Medium	Medium
3	High	Medium	High	High	High	High
4	--	--	--	--	--	--
5	Medium	Medium	Medium	Medium	Medium	Medium
6	Medium	Medium	Medium	Medium	Medium	Medium
7	High	High	High	High	Medium	High
8	--	--	--	--	--	--
9	Medium	Medium	Medium	Medium	Medium	Medium
10	High	High	High	High	High	High

The level of uncertainty described by Experts relative their ability to assess risk of projected of Asian carp establishment and impact in Lake Michigan ranged from Very Uncertain to Very Certain (Table 2). Although Experts differed between individuals in the level of uncertainty assigned to their ability to assess the risk of the six alternatives, individual Expert level of uncertainty tended to be consistent during their evaluation of the suite of alternatives for modifying lock operations at the Chicago and O'Brien Locks.

Table 2. Uncertainty in Expert assessment of Risk Potential for Asian carp associated with six lock operation alternatives. (Uncertainty Codes: VU=Very Uncertain, RU=Reasonably Uncertain, MC=Moderately Certain, RC=Reasonably Certain, VC=Very Certain.) Experts 1, 4, and 8 did not conduct the risk assessments. Refer to Section I of text for description of lock operation alternatives.

Expert	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5	Alternative 6
1	--	--	--	--	--	--
2	RU	RU	RU	RU	RU	RU
3	MC	MC	MC	MC	RU	MC
4	--	--	--	--	--	--
5	RC	RC	RC	RC	RC	RC
6	RC	RC	RC	RC	RC	RC
7	VC	VC	VC	VC	VC	RU
8	--	--	--	--	--	--
9	VC	VU	VU	VU	VU	VU
10	MC	MC	MC	MC	MC	MC

Of the six alternatives presented by the Corps, there is no individual or combination of lock operation scenarios that Experts believe will lower risk of Asian carps establishing self-sustaining populations in Lake Michigan to an acceptable level, Experts provided limited options (control/prevention techniques, etc) that may, if implemented, potentially lower the risk of Asian carp establishment in Lake Michigan related to any lock operation alternative. None of the options provided by the Experts to lower risk of lock operation alternatives were recommended by more than one Expert.

Collation of Expert Risk Analysis Submissions

Issue: Evaluations of Risk of Asian Carps Establishing and Impacting the Great Lakes: Evaluations by Lock Operation Scenario

Instructions to Risk Assessor:

- Read the Background (Section I) prepared by the U.S. Army Corps of Engineers (Corps)
- Answer the Background Question in Section II
- Complete the Risk Assessments in Section III
    a. Results from all respondents will be tabulated
    b. If either a broad or detailed consensus is reached on risk, then that information will be included in the Team's Report to the U.S. Army Corps of Engineers
- Answer the additional questions, posed by the Corps, in Section IV and V
    a. Results from all respondents will be placed into a matrix; we will convene a call, if needed to attempt to develop a consensus recommendation
- If you have information to list in Sections VI and VII, then please do so.
- Submit this completed form to Mike Hoff (Michael_Hoff@fws.gov) within 48 hours of completion of our conference call.

Section I: Background

The Corps, which operates and maintains the navigation structures at the Chicago Lock and the T.J. O'Brien Lock, is considering modifications to lock operations and structures to reduce the risk of Asian carps (bighead and silver carps) passing through those locks in the Chicago Area Waterways (CAWs) into Lake Michigan. Possible modifications considered include minimizing impacts to the navigation industry and minimizing impacts from flooding. In the short term, the Corps is considering a range of alternative lock operations that will increase the time the locks will be closed. The alternatives include:

1. Continue current operations (no action, as required by NEPA)
2. Lock closure of 3 to 4 days a week and normal operations for the remaining days of the week
3. Lock closure of 1 week/month and normal operation for the remaining days of the month
4. Lock closure every other week and normal operations for the alternative weeks
5. Lock closure of 2 months with extensive monitoring to determine if Asian carps are in the CAWs. If no Asian carps are collected during the closed period, then lock operations will be resumed at the end of the closure period. Locks would remain open, unless there was a significant flow event (flow rate trigger TBD) that could trigger fish movement. Locks would be closed on an emergency basis while monitoring activities were executed.
6. Two-week lock closure, in mid-late April, during which extensive surveillance and monitoring is conducted. If no Asian carps are recovered, then the locks will operate normally. However, if there is a significant rainfall event that results in elevated flows (and a possible stimulus for Asian carps to move upstream) after the two weeks of surveillance/monitoring, then the locks would be closed as soon as possible. During the lock closure, resources could be mobilized to complete surveillance/monitoring for a week. If no Asian carps are captured during the week, then the locks would be reopened.

[Note: The Corps has not identified a flow trigger, but will be working with fisheries staff to identify a range of change that could necessitate an emergency closure.]

During the periods of lock closure there would be a monitoring effort undertaken up stream of the barriers that could include commercial fishing (netting), electro-fishing, the spot application of rotenone, eDNA testing and any other technologies that may be developed to help determine if an Asian carp population exists. If Asian carps are not captured, then the locks would be reopened for normal operations for the time identified. If an Asian carp(s) is/are caught above electrical barriers, the Corps, in coordination with other agencies, would follow a contingency plan which would potentially include immediate closure of the lock gates until the extent of population is determined and reopening the locks is determined not to be a significant risk for dispersing Asian carp into Lake Michigan. The Corps is also considering structural modifications to the navigation features in the CAWs including adding screens to the sluice gates at both locks and acoustic directional barriers in the CAWs to encourage movement of fish into areas that can be monitored for Asian carp.

To evaluate the proposed actions, the Corps needs expert input from you. Please complete the remaining sections of this form, which was developed to: 1) compare your evaluation of risk of establishment of bighead and silver carps in Lake Michigan under each of the Corps' presently considered lock operation scenarios, and 2) submit management-oriented questions, posed by the Corps, to you.

Expert 10: Although not given as a management option, I strongly feel that the locks should be closed immediately and indefinitely until a permanent separation can be designed and implemented. Seeing that this does not look like an option at this time, Option 5 would be the best to give us more time to survey the waterway, while minimizing the risk of more Asian carp getting past these physical barriers. The other scenarios of alternating lock openings and closures will do little to deter Asian carp upstream movements. My inclination is that the Asian carp will simply school beneath the structures during closures and move upstream when open to navigation.

Section II: Risk Assessment Background Question

1. Where are populations of silver and bighead carp self sustaining? (Base your answer to this question on your expert opinion)
   Expert 5: LaGrange Pool of Illinois River, maybe the Marseilles Pool, not so sure.
   Expert 6: Based on my experience in the Illinois River since 2004, I believe there are self sustaining population in the Alton, LaGrange, Peoria, Starved Rock, and Marseilles pools of the Illinois River. These are pools where we have captured juveniles.
   Expert 10: Silver and bighead carp have self-sustaining populations in the Alton, La Grange, and Peoria reaches of the Illinois River. No young of the year fish have been captured upstream of these reaches, to my knowledge. I believe that a juvenile fish has been captured upstream of the lower reaches, but it could have easily traveled upstream from the downstream reaches.
      i. I believe that there is no evidence that silver carp and bighead carp established self-sustaining populations either above the electrical barriers or any location within the Great Lakes.

Expert Response Counts: Yes= 6 No=1.
Expert Response Counts for Uncertainty code: Very Certain=0 , Reasonably Certain=1, Moderately Certain=0, Reasonably Uncertain=2, Very Uncertain=3.
Expert 1: To the best of my knowledge, I believe this is a true statement

ii. If yes, then please provide supporting information.

Expert 1: While I believe this is a true statement, all indications of AC above the barriers are based on eDNA evidence, not collections of actual fish. The QA / QC of this technique has not been released for professional review. While we have been made aware that respectable professionals from US EPA have assessed the technique as "actionable within a management context" (Chadderton testimony to Senate Environment Committee), this is not adequate information with which to perform an adequate risk analysis. Therefore analysis of risk is directly related to information not yet obtainable.

Expert 2: Extensive netting and electrofishing surveys have been conducted on portions of the CAWS upstream of the electric barrier. These surveys have failed to turn up even one asian carp. If there was a self-sustaining population of asian carp in this area one would have been collected.

Expert 6: Bighead carp have been captured in Lake Erie in 2000 and in Lake Ontario in 2003 – at least 4 specimens. There have not been silver carp captured in the Great Lakes. I believe that the fish are not "self-sustaining" in that there does not seem to be evidence of reproduction, but there are reports of occasional specimens captured – likely due to release from aquaculture or sale of live fish in local markets. So although there are reports of bighead in the Great Lakes, I have not seen evidence of a self-sustaining population.
Reference: Biological invasions in Lake Ontario: past, present and future. Ian C. Duggan, Sarah A. Bailey, Robert I. Colautti, Derek K. Gray, Joseph, C. Makarewicz, and Hugh J. MacIsaac, State of Lake Ontario (SOLO) – Past, Present and Future, Ecovision World Monograph Series 2003 Aquatic Ecosystem Health and Management Society Bighead and silver carp DNA has been located in the CSSC, Cal-Sag, Calumet River, and in Lake Michigan (all above the Barrier). Physical presence of these species has not been verified. Although I think that the eDNA indicates the presence of fish, I cannot agree that there is a self-sustaining population based on this information.

Expert 9: I am **certain** that there is no evidence that bighead and silver carp have established a self-sustaining population in the Great Lakes. However, I am **reasonably uncertain** that lack of evidence in this case is enough to conclude that the fish have not invaded successfully already. Asian carps are remarkably cryptic in their behavior and may be present for long periods without our knowledge. Aging structures from the two bighead carp from Lake Erie which have been examined in this fashion were consistent with fish which began in aquaculture (Morrison et al, Fisheries). There is no evidence that any fish from Lake Erie was the result of spawning that occurred in Lake Erie, but unfortunately aging structures have not been examined for most of those fish. Stable isotopes from the otoliths of those fish would have been even more

revealing, but they have not been examined. We have no idea how many if any fish may have already escaped or been released to to Lake Michigan.

Expert 10: At this time, there is no scientific evidence or collections upstream of the barriers or in the Great Lakes to suggest established populations in these locations.

Section III: Risk Assessment

Probability of bighead and/or silver carp Establishment in Lake Michigan via pathways OTHER THAN Chicago and O'Brien Locks (i.e., all pathways other than those locks including pathways such as, but not limited to, bait bucket, food trade, aquaculture). Complete Columns 1 and 2.

Element Rating (Low, Medium, High) Counts of Expert Ratings	Uncertainty Code (VC-VU: See codes and descriptions below. You may also list specific uncertainties) Counts of Expert Ratings	Element (Support Data with Reference Code: See codes and descriptions below)	Comments
L = 3 M = 4 H = 0	VC = 2 RC = 1 MC = 3 RU = 1 VU = 0	Bighead and silver carps are associated with the pathway. The Assessor answers whether there is a convincing temporal and spatial association with the pathway. Reference Code:	See individual Expert Responses
L = 0 M = 2 H = 6	VC = 2 RC = 5 MC = 1 RU = 0 VU = 0	Bighead and silver carps can survive above the electrical barrier and the Great Lakes. Reference Code:	See Individual Expert Responses; also see Expert 9 comment in Section VI, A.
L = 1 M = 5 H = 2	VC = 1 RC = 4 MC = 1 RU = 0 VU = 2	Bighead and silver carps can establish self-sustaining populations in the Great Lakes	See Individual Expert Responses; also see Expert 9 comment Section VI, B.

		Reference Code:	
L = 3 M = 2 H = 3	VC = 1 RC = 3 MC = 3 RU = 0 VU = 1	Bighead and silver carp can spread throughout a substantial portion of the Great Lakes Reference Code:	See Individual Expert Responses; also see Section Expert 9 comment in Section VI, A

Alternative 1

Probability of bighead and/or silver carp Establishment in Lake Michigan via Chicago and O'Brien Locks:

Scenario 1 -- No modification to current lock operations.

Element Rating (Low, Medium, High) Counts of Expert Ratings	Uncertainty Code (VC-VU: See codes and descriptions below. You may also list specific uncertainties) Counts of Expert Ratings	Element (Support Data with Reference Code: See codes and descriptions below)	Recommendations
L = 1 M = 3 H = 3	VC = 2 RC = 2 MC = 2 RU = 1 VU = 0	Bighead and silver carps can establish self-sustaining populations in the Great Lakes Reference Code:	Expert 3: Recommend dropping this scenario. Expert 5: The data to date of the continual monitoring of Asian carps shows that they are not passed the barrier system or in Lockport / Brandon Pools either. eDNA is not a valid method as of yet. Expert 6: We have not captured a live Asian carp from above the Barrier to confirm the eDNA. However, the frequency of eDNA detection may indicate a presence of a few Asian carp above the Barrier. I rated this as MEDIUM because we have spent hundreds of hours fishing trying to capture one Asian carp, without success. This tells me that if there are fish there, the numbers are so low that only an extremely sensitive test (eDNA) could detect

			them, and therefore there is not likely enough fish to establish a sustaining population. Expert 7: See comments 2a-2d below for detailed action that would likely be effective using a segregate (via block net/BAFF), locate (via eDNA), eliminate (via rotenone) approach. Expert 9: See comment, Section VI, C. Expert 10: The likelihood of establishment is much greater in this scenario because propagule pressure will be greatest through the connections of Lake Michigan with the CSSC.

Alternative 2.

Probability of bighead and/or silver carp Establishment in Lake Michigan via Chicago and O'Brien Locks: Modification of operations Scenario 2 -- Closing locks either 3 or 4 days/week, and then conducting normal operations for the remaining days of the week. If Element Rating (Column 1), is either High or Medium, then enter in the Comments column any recommendations for specific management actions (e.g., chemical application, commercial fishing…) that could be realistically implemented to reduce the Element Rating, of Probability of Establishment, to Low.

Element Rating (Low, Medium, High) Counts of Expert Ratings	Uncertainty Code (VC-VU: See codes and descriptions below. You may also list specific uncertainties) Counts of Expert Ratings	Element (Support Data with Reference Code: See codes and descriptions below)	Recommendations
L = 2 M = 3 H = 2	VC = 1 RC = 2 MC = 2 RU = 1 VU = 1	Bighead and silver carps can establish self-sustaining populations in the Great	Expert 2: Intensive commercial fish removal could help reduce this rating to low Expert 3: 3 or 4 days is not enough time to complete monitoring and assess monitoring results.Recommend dropping

		Lakes Reference Code:	this scenario. Expert 5: The data to date of the continual monitoring of Asian carps shows that they are not passed the barrier system or in Lockport / Brandon Pools either. eDNA is not a valid method as of yet. Expert 6: I think this is one of the best choices because the frequent closing interval will remove bias in seasonal movements. It will be more representative of the conditions at that point in time and will allow for an accurate assessment of the threat and level of invasion. Expert 7: There are no actions that will be effective and reasonably completed over a 3-4 day closure window. See comments 2a-2d. Expert 9: See Comment, Section VI, C. Expert 10: Such actions will do little to impede upstream movements by Asian carps. Asian carps could simply school below the locks when closed and move upstream when opened. The only realistic way to decrease the probability of establishment to low is to permanently close the locks and develop a permanent disconnection of the basins.

Alternative 3.

Probability of bighead and/or silver carp Establishment in Lake Michigan via Chicago and O'Brien Locks: Modification of operations Scenario 3 – Closing locks 1 week/month, followed by normal operation for the remaining days of the month. Complete Columns 1 and 2. If Element Rating (Column 1), is either High or Medium, then enter in the Comments column any recommendations for specific management actions (e.g., chemical application, commercial fishing…) that could be realistically implemented to reduce the Element Rating, of Probability of Establishment, to Low.

Element	Uncertainty Code (VC-VU: See codes and		

Rating (Low, Medium, High) Counts of Expert Ratings	descriptions below. You may also list specific uncertainties) Counts of Expert Ratings	Element (Support Data with Reference Code: See codes and descriptions below)	Recommendations
L = 1 M = 4 H = 2	VC = 1 RC = 2 MC = 2 RU = 1 VU = 1	Bighead and silver carps can establish self-sustaining populations in the Great Lakes Reference Code:	Expert 2: Intensive commercial fish removal could help reduce this rating to low Expert 3: Too much time (three weeks) in between monitoring events. Also, one week may barely be enough time to complete monitoring and assess monitoring results. Recommend dropping this scenario. Expert 5: The data to date of the continual monitoring of Asian carps shows that they are not passed the barrier system or in Lockport / Brandon Pools either. eDNA is not a valid method as of yet. Expert 6: This is a risky alternative and allows for bias in fish movements – we might miss an observation if extensive monitoring is only one week a month. To lower element rating, extensive monitoring should be conducted for at least two additional weeks (with locks open). Expert 7: There are no actions that will be effective and reasonably completed over a 1 week closure window. See comments 2a-2d. In addition, so much can change over the course of the ~3 weeks that the lock would be operated, that it would be somewhat irrelevant what was done over the course of a week of searching/controlling that occurred weeks in the past.

			Expert 9: See comment, Section VI, C. Expert 10: Such actions will do little to impede upstream movements by Asian carps. Asian carps could simply school below the locks when closed and move upstream when opened. The only realistic way to decrease the probability of establishment to low is to permanently close the locks and develop a permanent disconnection of the basins.

Alternative 4

Probability of bighead and/or silver carp Establishment in Lake Michigan via Chicago and O'Brien Locks: Modification of operations Scenario 4 -- Lock closure of every other week and normal operations for the alternative weeks.

Complete Columns 1 and 2. If Element Rating (Column 1), is either High or Medium, then enter in the Comments column any recommendations for specific management actions (e.g., chemical application, commercial fishing…) that could be realistically implemented to reduce the Element Rating, of Probability of Establishment, to Low.

Element Rating (Low, Medium, High) Counts of Expert Ratings	Uncertainty Code (VC-VU: See codes and descriptions below. You may also list specific uncertainties) Counts of Expert Ratings	Element (Support Data with Reference Code: See codes and descriptions below)	Recommendations
L = 2 M = 3 H = 2	VC = 1 RC = 2 MC = 2 RU = 1 VU =1	Bighead and silver carps can establish self-sustaining populations in the Great Lakes Reference Code:	Expert 2: Intensive commercial fish removal could help reduce this rating to low Expert 3: (One week may barely be enough time to complete monitoring and assess monitoring results. Recommend 2-week closure with monitoring followed by one week of normal lock operation, however,

			given the difficulty of effectively monitoring deep-draft channels, would be uncertain if even one week of normal operation is not risky. See other recommendations in answers to questions below.) Expert 5: The data to date of the continual monitoring of Asian carps shows that they are not passed the barrier system or in Lockport / Brandon Pools either. eDNA is not a valid method as of yet. Expert 6: This seems to be on the more representative side of the scenarios – as long as we are monitoring extensively during closure and doing baseline during open times. Expert 7: There are no actions that will be effective and reasonably completed over a 1 week closure window. See comments 2a-2d. Expert 9: See comment, Section VI, C. Expert 10: Such actions will do little to impede upstream movements by Asian carps. Asian carps could simply school below the locks when closed and move upstream when opened. The only realistic way to decrease the probability of establishment to low is to permanently close the locks and develop a permanent disconnection of the basins.

Alternative 5

Probability of bighead and/or silver carp Establishment in Lake Michigan via Chicago and O'Brien Locks: Modification of operations Scenario 5 -- Lock closure of two months with extensive monitoring to determine if Asian carps are in the Chicago Area Waterways. Complete Columns 1 and 2. If Element Rating (Column 1), is either High or Medium, then enter in the Comments column any recommendations for specific management actions (e.g., chemical

application, commercial fishing…) that could be realistically implemented to reduce the Element Rating, of Probability of Establishment, to Low.

Element Rating (Low, Medium, High) Counts of Expert Ratings	Uncertainty Code (VC-VU: See codes and descriptions below. You may also list specific uncertainties) Counts of Expert Ratings	Element (Support Data with Reference Code: See codes and descriptions below)	Recommendations
L = 2 M = 4 H =1	VC = 1 RC = 2 MC = 1 RU = 2 VU =1	Bighead and silver carps can establish self-sustaining populations in the Great Lakes Reference Code:	Expert 2: Intensive commercial fish removal could help reduce this rating to low Expert 3: Yes, then follow up with a modified (See above recommendations) Scenario 4 operation. Expert 5: The data to date of the continual monitoring of Asian carps shows that they are not passed the barrier system or in Lockport / Brandon Pools either. eDNA is not a valid method as of yet. Expert 6: Extensive two month monitoring would ensure a complete and accurate description of level of invasion. Expert 7: See comments 2a-2d. I'm a bit confused how to answer this one. If solely based on closing the lock with intensive monitoring (particularly eDNA) occurring over 2 months, then it would be reasonable to expect that a fish would be detected if present in which case I could go with a "low" rating. But this is ONLY IF eDNA turn around time is much quicker than it currently is and if appropriate management actions to remove any fish found are implemented (i.e., rotenone). Because of the "ifs," I left rating as moderate. Expert 9: See comment, Section VI, C. Expert 10: This scenario is slightly better, but still doesn't address a long

			term solution. If no carp are found, which will be the most likely result, then propagules will be free to travel to Lake Michigan unimpeded as the locks resume normal operations. We need to deal with the fact that a long term solution (permanent separation) is needed now.

Alternative 6

Probability of bighead and/or silver carp Establishment in Lake Michigan via Chicago and O'Brien Locks: Modification of operations Scenario 6 -- Two-week lock closure, in mid-late April, during which extensive surveillance and monitoring is conducted. If no Asian carps are recovered, then the locks will operate normally. However, if there is a significant rainfall event that results in elevated flows (and a possibly stimulus for Asian carps to move upstream) after the two weeks of surveillance/monitoring, then the locks would be closed as soon as possible. During the lock closure, resources could be mobilized to complete surveillance/monitoring for a week. If no Asian carps are captured during the week, then the locks would be reopened. Complete Columns 1 and 2. If Element Rating (Column 1), is either High or Medium, then enter in the Comments column any recommendations for specific management actions (e.g., chemical application, commercial fishing…) that could be realistically implemented to reduce the Element Rating, of Probability of Establishment, to Low.

Element Rating (Low, Medium, High) Counts of Expert Ratings	Uncertainty Code (VC-VU: See codes and descriptions below. You may also list specific uncertainties) Counts of Expert Ratings	Element (Support Data with Reference Code: See codes and descriptions below)	Recommendations
L = 1 M = 4 H = 2	VC = 0 RC = 2 MC = 2 RU = 2 VU = 1	Bighead and silver carps can establish self-sustaining	Expert 2: Intensive commercial fish removal could help reduce this rating to low Expert 3: Due to the nature of CAWS and the Chicago area weather patterns, significant movement of Asian carp may occur at a moment's notice at any time. A modified

		populations in the Great Lakes Reference Code:	(See above recommendations) Scenario 4 operation is recommended. Expert 5: The data to date of the continual monitoring of Asian carps shows that they are not passed the barrier system or in Lockport / Brandon Pools either. eDNA is not a valid method as of yet. Expert 6: Extensive monitoring during peak movement times would decrease risk of further spread, but only closing them for a week after a significant rainfall may be troublesome – you may miss some movement. What if the flood pulse persists? Recommend you implement extensive monitoring beyond the one week closure period. Expert 7: See comments 2a-2d. 2 weeks is too short a period to complete adequate initial surveillance given current efforts and timeframes, and 1 week of follow up after a rain event is definitely too short a period. Expert 9: See comment, Section VI, C. Expert 10: This scenario is slightly better, but still doesn't address a long term solution. If no carp are found, which will be the most likely result, then propagules will be free to travel to Lake Michigan unimpeded as the locks resume normal operations. We need to deal with the fact that a long term solution (permanent separation) is needed now. All of these scenarios suggest that the electric barriers will be 100% effective. This has not been the case and will not be the case, in my opinion. Therefore, any other stop gap measures (rotenone, commercial fishing) will not solve the longer term problem.

Consequence of Establishment

Consequence of Establishment in Lake Michigan (no matter how introduced).

Element Rating (Low, Medium, High)	Uncertainty code (VC-VU: See codes and descriptions below. You may also list specific uncertainties)	Element (Support Data with	

Counts of Expert Ratings	Counts of Expert Ratings	Reference Code: See codes and descriptions below)	Comments
L = 0 M = 5 H = 2	VC = 0 RC = 2 MC = 3 RU = 0 VU = 0	Estimate environmental impact if established in the Great Lakes Reference Code:	See: Individual Expert Responses
L = 1 M = 5 H = 1	VC = 0 RC = 2 MC = 1 RU = 2 VU =0	Estimate economic impact if established in the Great Lakes (based on your knowledge of fishing economics in the Great Lakes). The assessor is not expected to take on the role of an economist, but instead provides information on impacts the species would broadly have on fishery-related economics of the Great Lakes. Reference Code:	
L = 1 M = 3 H = 3	VC = 1 RC = 3 MC = 0 RU = 1 VU = 0	Estimate impact on the Great Lakes from social and/or political influences (based on your knowledge of politics and societal concerns about Great Lakes fishing) .The assessor is not expected to take on the role of an political scientist or sociologist, but instead provides information on impacts the species would broadly have on fishery-related societal and political issues of the Great Lakes. Reference Code:	

Risk Category Definitions

Risk Category	Definition
Low	Acceptable risk – organism of little concern for establishment and/or ecological consequence (i.e., impact)
Medium	Unacceptable risk – organism of moderate concern

High	Unacceptable risk – organism of major concern

Uncertainty Codes and Descriptions

Uncertainty Code	Description
Very Certain	As certain as I can be
Reasonably Certain	Reasonably certain
Moderately Certain	More certain than not
Reasonably Uncertain	Reasonably uncertain
Very Uncertain	A guess

Reference codes and descriptions

Reference Code	Reference Type
G	General knowledge; no specific source
J	Judgmental evaluation
E	Extrapolation; information specific to pest not available. However, information available on similar organisms supplied
Author, year	Literature Cited

Section IV. Responses to Questions Posed by the Corps.

1. Is there an imminent threat that Asian carp (silver and bighead) will establish a sustainable population in Lake Michigan in the near future? Expert Response Counts: Yes=5, No=3. Expert Response Counts for Uncertainty code: Very Certain=0, Reasonably Certain=1, Moderately Certain=1, Reasonably Uncertain=5, Very Uncertain=0.

   Expert 5: I believe Asian carp dispersal into the Great Lakes may not be possible since it is improbable for fish to pass through the electric barriers, or through the Brandon and Lockport Locks with appropriate measures and managed operations. If Asian carps do pass through these obstacles, it would be in very limited numbers for awhile.

   Expert 6: I think the Barrier is working, and any fish that have been able to get around it are in low numbers (that is why we haven't caught ANY) and are at a manageable level.

   Expert 9: See comment, Section VI D !!

   a. If yes, then by when do you predict a sustainable population of bighead carp?
      i. Year Range of Responses: 2012-2035.
      ii. Lower 95% Confidence limit (Year) Range of Responses: 2009-2025.
      iii. Upper 95% Confidence limit (Year) Range of Responses: 2030-2045.

      Expert 2: Asian carp became established in Illinois anywhere from 10-15 years after they were first detected. As an example the first record of as Asian carp came from the Kaskaskia River in 1984. By 1994 asian carp were firmly established in that river.

   b. If yes, then by when do you predict a sustainable population of silver carp?
      i. Year Range of Responses: 2012-2035.
         1. Lower 95% Confidence limit (Year) Range of Responses: 2009-2025

2. Upper 95% Confidence limit (Year) Range of Responses: 2030-2045.

Expert 10: Asian carps were present in the Illinois River about 10 years before we noted recruitment. Due to the size of Lake Michigan, establishment would likely take longer.

2. Is there a threshold of Asian carp needed to establish a sustainable population? Expert Response Counts: Yes=6, No=0. If yes, then what is that threshold?

Input from Hoff: The only published stock-recruit model (in the world) for either bighead or silver carp is that for bighead carp in parts of the Illinois and Mississippi Rivers (Hoff et al. In Press). That model was based on relative abundance of adults, instead of absolute abundance. Also, that model cannot be directly applied to Lake Michigan. What is known for the Illinois and Mississippi River populations of bighead carp is recruitment (to summer young-of-the-year stage) is most affected by abundance of adults, which explained 72% of the variability in recruitment. An additional 11% in the variability of recruitment was explained by the coefficient of variation of discharge in July. Model predictions and empirical data indicated that management efforts to reduce stock size abundance from the optimum of 0.07 adults/unit of standardized fishing effort to 0.02 adults/unit of effort should be the most effective tool to reduce recruitment over the long term. This level of adult abundance (approximately 25% of the mean during 2001-2004) should be the target maximum for bighead carp control efforts in the study areas. Recruitment was inversely correlated with variation in river discharge, so it is possible to combine control of stock size abundance and management of river discharge in an integrated pest management program for bighead carp in the two river reaches. It is reasonable to assume that recruitment in Lake Michigan would also be most driven by abundance of adults, but there is no way to predict what minimum abundance of adults will result in self-sustaining populations. In addition, it is possible, based on stock-recruit theory and the model for bighead carp in the Illinois and Mississippi Rivers, for a minimum level of adult abundance to establish a population that is self sustaining at low levels for a period of years. However, in a year when other biotic and abiotic conditions are favorable, then recruitment can increase greatly.

Expert 5: refer to Hoff's model

Expert 6: see Hoff's model

Expert 10: The most extreme example is that it only takes one mature male and female fish and the right spawning conditions to establish a population. This low number is very unlikely to result in a sustainable population, but it is possible. My point here is that we shouldn't be worried about how many. The more fish we allow to enter the Great Lakes, the higher the probability of establishment.

a. Specifically, what number of Asian Carp would need to enter Lake Michigan to constitute a founding population that could, under the right environmental conditions, develop into a sustainable population in the Great Lakes?

Expert 3: Several dozen adults, few hundred YOY

Expert 2: There has to be a minimum number needed to establish a population, but I have no idea what that would be.

Expert 7: 5-50

3. A few Asian carp were found in Lake Erie in the past. Are the populations of Asian carps in Lake Erie self sustaining? Expert Response Counts: Yes=0, No=5. Expert Response Counts for Uncertainty code: Very Certain=1, Reasonably Certain=1, Moderately Certain=0, Reasonably Uncertain=2, Very Uncertain=2.

   Expert 7: I'm not particularly aware of sampling efforts that take place in Lake Erie tribs to know what the likelihood is of a self-sustaining population being present and detected. I'm surprised that only a few adult fish have been collected if sampling is reasonably intense (particularly in the tribs), would have expected an adult and or juvenile fish would have been collected by this time if their was a self-sustaining population.

   a. If yes, then are conditions that support Asian Carp in Lake Erie similar to conditions in Lake Michigan near the Chicago Lock and T.J. O'Brien Locks? Expert Response Counts: Yes=0, No=0. [Please provide details, and cite any references used.]

      Expert 10: This is a loaded question. The method of introduction to Lake Erie (likely live cultural belief releases) is completely different the most likely method of transfer to Lake Michigan through the CSSC. The release of a few individuals into a large water body has a low probability for the species to establish. In the case of the CSSC, without physical separation of the basins, a continual source of Asian carps to Lake Michigan from downstream in the Illinois River increases the likelihood of a population becoming established.

4. In your opinion would a sustainable population of Asian Carp (both species) adversely impact the commercial fisheries of the GL? (use your ratings from Section II) Expert Response Counts for: High=1, Medium=3, Low=2. Expert Response Counts for Uncertainty code: Very Certain=0, Reasonably Certain=3, Moderately Certain=0, Reasonably Uncertain=1, Very Uncertain=2. [Please provide details, and cite any references used]

   Expert 1: Kolar and Lodge (2002) predict a slow rate of spread for silver carps in the Great Lakes, with a non-nuisance level of impact. Comparatively, redear sunfish (Lepomis microlophus) have a similar predicted rate of spread (slow), but a level of impact rated as "nuisance".] GLFC (personal Comm.) has expressed concern that AC might develop into a commercial fishery resource and therefore some members of that group could expect sustainable management. It is unknown what those impacts could be, either positive or negative.

   Expert 2: There has been no commercial fishing activity in Lake Michigan from the state of Illinois for at least the last 10 years and likely much more than that. Therefore, there is no commercial fishery the asian carp could impact in Illinois.

   Expert 5: If you look at the documented history of the Great Lakes commercial fishery and ecosystem, one quickly realizes that all of the Great Lakes, with the exception of certain portions of Lake Superior, were commercially extinct by the late 1890s, early 1900s. See Koelz's 1927 treatise on the Coregonid fishes of the Great Lakes; and also look at the old fishery records and anecdotes such as (Goode 1884). Also, recent records show that in fact, a good deal of the commercial fisheries in the Great Lakes are based on non native species (i.e. alewife, rainbow smelt). With all that the Great Lakes have been through, the addition of Asian carp into the system, sadly enough, does not make matters

worse or better, they would just be another fish in the big aquarium that the Great Lakes are now. The worry lies in that Asian carps may infest confluent rivers and further disrupt already stressed riverine ecosystems.

Expert 7: I suspect that it would be particularly an issue for commercial fishers who would be likely to have commercial gear filled with Asian carp that would require extra time, effort, and cost to remove from nets and would lessen the fishers' ability to effectively capture target species.

5. If the Asian Carp (both species) were allowed to migrate into the GL unimpeded how long would it take to establish demonstrable, sustainable populations capable of adversely impacting the commercial fisheries of the GL? (assuming they would result in adverse impacts)

   Expert 2: Unknown and not an issue in Illinois (see question 4)

   Expert 7: Not sure what is meant by "unimpeded." For the sake of my answer, I'll assume that it is talking about not being impeded by closing of the lock gates. If the assumption is that they are also unimpeded by the dispersal barrier and other efforts to keep them out of the Great Lakes, then I would probably take 10 years or so off the estimates.

   a. Year Range of Responses: 2030-2050

      Expert 6: It took thirty years for the fish that escaped the aquaculture ponds to establish in the Illinois River – an environment with ample diverse habitat, flowing water, and lots of plankton resources. I think it would take much longer for that to happen in the GL, if at all.

      i. Lower 95% Confidence limit (Year) Range of Responses: 2020-2035
      ii. Upper 95% Confidence limit (Year) Range of Responses: 2027-2060

6. Do Asian Carp carry any viral, bacterial, protozoan or other parasites or diseases that may adversely impact the native fish populations in the Great Lakes?

   Expert Response Counts: Yes=1, No=0. [Provide details, and cite references]

   Expert 3: Not evaluated.

   Expert 8: The U.S. Fish and Wildlife Service's La Crosse Fish Health Center has detected the following target pathogens from the Mississippi and Illinois river drainages: spring viremia of carp (SVC, etiologic agent spring viremia of carp virus, SVCv) from common carp in the Calumet-Sag Channel; aquareoviruses from silver carp from Weldon Springs, Missouri River and Starved Rock, Illinois River; asian tapeworm (Bothriocephalus acheilognathi) from common carp from the Little Calumet River; bacterial kidney disease (Renibacterium salmoninarum) from common carp in the Upper Mississippi River and Calumet-Sag Channel; edwardsiellosis (Edwardsiella tarda) from common carp in Lake Pepin (Pool 4) of the Upper Mississippi River; and columnaris disease (Flavobacterium columnare) from common carp in the Upper Mississippi River.

   SVC is a highly contagious and serious hemorrhagic disease of common carp (and koi carp), grass carp, silver carp, bighead carp, cyprinids and ictalurids (OIE 2009). In the U.S., it has also been detected in bluegill and largemouth bass from Clear Fork Reservoir, Ohio, and in emerald shiners from the Ohio River (La Crosse Fish Health Center, Onalaska, WI). Its affect on non-cyprinid hosts is unknown. In the Great Lakes it has been reported from common carp in Hamilton Harbor, Lake Ontario (Garver et al. 2007). State, federal and international agencies regulate SVCv and it is listed by the World Organization for Animal Health (OIE) as notifiable (OIE 2009). Spread of this virus

from the Mississippi River and Calumet-Sag Channel into Lake Michigan should be prevented.

Asian tapeworms are a non-native species that was introduced into the U.S. with grass carp imported from Asia. It has been reported from over 100 different fish species and infections can damage intestines and cause abnormal growth. It can cause high mortalities in new hosts and are of a particular threat to small prey species. The only report from the Great Lakes was in bluntnose minnows from the Detroit River (Marcogliese 2008). Further spread and establishment of Asian tapeworms in Lake Michigan fish species should be prevented.

Aquareoviruses have been isolated from a wide variety of aquatic animals and the group is rapidly expanding as new viruses are being described. While some members produce subclinical infections, others are responsible for severe hemorrhagic disease (e.g., golden shiner virus, channel catfish aquareovirus, smelt reovirus, and grass carp reovirus) (McEntire et al. 2003). Because the effect of the aquareoviruses isolated from silver carp is unknown, further spread into the Great Lakes should be prevented.

Columnaris disease is widespread and a significant problem for aquaculture in warmer climates. The F. columnare strain isolated from common carp in the Upper Mississippi River appeared to be more virulent than other F. columnare strains. It was responsible for a common carp kill in Pool 8 of the Upper Mississippi River and it has also been used in laboratory studies where it caused high mortalities of experimentally infected channel catfish and rainbow trout (pers. com., M. Tuttle-Lau, U.S. Geological Survey).

Numerous other pathogens and parasites have been reported from common and Asian carp (Hoffman 1999; Woo and Bruno 1999; Hoole 2001; Woo 2006; Kolar et al. 2007; Dixon 2008;). Two viruses of concern are viral hemorrhagic septicemia virus (VHSv) and koi herpes virus (KHv) (both are listed by OIE as notifiable pathogens). Bacterial pathogens of concern that have been isolated from carp species include Aeromonas salmonicida (causing furunculosis), Aeromonas hydrophila (motile aeromonad septicemia) and Yersinia ruckeri (enteric redmouth disease). Parasites of concern include the ciliate Ichthyophthirius multifilis, coccida causing coccidioses in common, bighead and silver carp (Eimeria spp.), myxozoan species (especially Myxobolus spp.), the microsporidian Heterosporis sp. (experimental infection in common carp), monogeneans Dactylogyrus spp. and Gyrodactylus spp., digeneans Sanguinicola spp. (blood flukes) and the eye fluke Diplostomum spathaceum, cestodes Khawia spp. and Ligula intestinalis, nematodes Anisakis spp., Camallanus spp. Rhaphidascaris acus, and Rhabdochona cascadilla, the acanthocephalan Pomphorhynchus bulbocolli, copepods Lernaea cyprinacea and Ergasilus spp. and the branchiuran Argulus spp. Many of the pathogens listed above exhibit wide host specificity, are pathogenic and capable of causing epizootics in wild and cultured fish. They would represent significant risks to the health of Great Lakes fish if newly introduced or if their prevalence and intensity increased dramatically in the lakes.

Expert 9: Kolar et al 2007 provides a reasonably complete list of bighead and silver carp pathogens, nearly all, if not all, of which can affect fishes native to the Great Lakes. However, although some of those pathogens were first imported to the United States with Asian carps, any of the important pathogens of these fishes are also present in North American fishes, and could just as easily be transported to the Great Lakes by native fishes as by the carp themselves. There appears to be very little difference in this regard

between invasions by Asian carps or any other fish that could make it through or around the barrier. Most of the pathogens are already present in the Great Lakes already, and were present before the introduction of Asian carps. While the canal is a potential vector of disease both ways, the carp themselves are at this time only one minor component of that threat.

7. If the Asian Carp become established in the GL, then are there any beneficial impacts that would result from their presence? Expert Response Counts: Yes=2, No=5. Expert Response Counts for Uncertainty code: Very Certain=1, Reasonably Certain=4, Moderately Certain=0, Reasonably Uncertain=1, Very Uncertain=0. [Provide details and cite any references]

   Expert 1: Potential competitor for zebra and quagga mussels… potential commercial species. Wild Guess on both of these statements!

   Expert 3: May compete with zebra mussel, however, this is a very small benefit.

   Expert 5: Ecologically, the addition of another nonnative species to the Great Lakes would not be a good thing, especially for riverine systems? The lakes themselves would probably not feel any adverse affects.

   Expert 6: Dr. Holden of Heartland Processing has developed a technology that turns Asian carp into omega-3 fish oil. Perhaps a sustainable commercial fishery would results and take pressure off other GL species that are exploited.

   Expert 7: I say no, but because ecological interactions are terribly complex and my understanding of them is limited, it is very difficult to predict what potential benefits might occur from the presence of Asian carp in terms of their potentially balancing out the negative effects of other invasive species, providing an additional source of commercial fish flesh, or otherwise providing some benefit.

   Expert 9: Asian carps now provide a substantial commercial fishery in the Mississippi River basin, and that fishery is growing substantially as markets are developed. Where Asian carps have been introduced around the world, the total commercial catch has almost invariably increased (from a weight perspective, not necessarily a value perspective). Nevertheless, the value of this fishery is likely to be MUCH LOWER than fisheries that are likely to be replaced. So the overall impact is likely to be negative.

   Expert 10: The only benefit would be for commercial fishing, since they are not a recreational fish species. Duane can fill you in on how difficult these species are to capture in pelagic environments. I do not see a commercial fishery in the Great Lakes being feasibly, nor desired. Further, markets would have to expand greatly. Commercial fishermen on the Illinois River, where these fishes are hyper abundant, are still limited by a small market.

8. If the Asian Carp (both species) establish sustainable populations, would they adversely impact any of the other established invasive aquatic organisms of the GL? Expert Response Counts: Yes=3, No=2. Expert Response Counts for Uncertainty code: Very Certain=1, Reasonably Certain=3, Moderately Certain=0, Reasonably Uncertain=1, Very Uncertain=0. [Provide details, and cite any references]

   Expert 3: Would compete with planktonivors.

   Expert 5: Anytime you add another species to the mix that becomes a major presence, such as the round goby and zebra mussel, there will be noticeable effects within the systems food web, other nonnative species inclusive.

Expert 9: Asian carp in Lake Balaton eat substantial amounts of dreissenid veligers, but there is no evidence that they have controlled dreissenids in any meaningful way (Dr. Istvan Tatrai, Hungary, personal communication)

Expert 10: Asian carps may outcompete zebra and quagga mussels for limited planktonic resources. I view Asian carps as having the same capabilities as these invasive mussels, but they have the advantage of being able to move around. Therefore, Asian carps can move to areas of greater resources, whereas mussels could not. My inclination is that any invasive organism that relies upon zoo- and/or phytoplankton at certain stages of life or throughout their life history will be negatively influenced.

9. What are the triggers (high water flows, warm water, availability of Chlorophyll a etc.) for movement of Asian carp? [Answer question and cite references]

   Expert 1: Stainbrook et. al., 2007

   Expert 2: Others will be more qualified to answer this. In general terms an increase in flow seems to trigger upstream movement.

   Expert 3: Higher temperatures and periods of increased stream flow, however, such condition are common – less related to normal seasonal fluctuations - throughout the year in CAWS. In other words, it would be difficult to identify specific triggers in CAWS.

   Expert 5: There are several publications that show temperature and spring floods trigger Asian carps to rush up stream to spawn, but these are not dispersal movements. I believe dispersal movements occur when areas become over populated and space and food become scarce. Fish then move to find new sources of food and space. Based on monitoring to date, there is still plenty of room in the Dresden pool, so the dispersal threat to Brandon and Lockport pools is low. If we can overharvest fish all the way down to the Mississippi, it would be unlikely viable populations would try to migrate through the CAWS and then into Lake Michigan.

   Expert 6: A rise in river stage is documented as a trigger for movement. Reference my 2006 MS thesis and 2008 publication (when I was still DeGrandchamp):"Movement and Habitat Selection by Invasive Asian Carps in a Large River" DeGrandchamp et al 2008, Transactions of the American Fisheries Society 137:45–56.

   Expert 7: DeGrandchamp et al. 2008. Transactions, found that movement was positively correlated with flow but not temperature.

   Expert 9: Bighead and silver carp are known to move upstream during periods of high flow in rivers, when temperature is in the spawning range, apparently for spawning (unpublished data, and also Transactions article on carp in Illinois River, also Yi et al. 1980). In my data on the Missouri River, silver carp selected areas of higher chlorophyll concentration.

   Expert 10: Triggers for movement are relatively uncertain. Anecdotally, Asian carp just seem to be a fish that tries to move upstream whether it be for spawning, better food resources, and/or intra-specific competition for food or space. Asian carp movements appear slower in winter under colder water temperatures.

10. Will warmer weather in the spring make it more likely that the Asian carp will migrate upstream toward Lake Michigan? Expert Response Counts: Yes=5, No=1. [Explain and cite references]

    Expert 2: Asian carp are cold-blooded and their activity will increase as water temperatures warm, the same as any other fish.

Expert 3: Perhaps. However, artificially higher temperatures and episodic, rain and snowmelt related increases in stream flow can and do occur frequently and without much warning throughout the year. It may not be wise to focus on specific triggers during specific seasons in CAWS.

Expert 5: The Brandon and Lockport pools never see temperatures below 50°F, and are usually 65°F in the dead of winter and 80°F in summer, so the natural temperature regimes that trigger spawning are not the same here, as compared to the lower pools such as LaGrange and Marseilles.

Expert 6: More likely yes – but temperature is not a cue for movement. In fact high temps have the opposite effects. Spring is aliekly time for movement because of river stage cues. Reference "Movement and Habitat Selection by Invasive Asian Carps in a Large River" DeGrandchamp et al 2008, Transactions of the American Fisheries Society 137:45–56.

Expert 7: Yes, but as noted in question 9, not so much because of the warm weather as because of the higher flows that will most likely accompany that warm weather.

Expert 9: See 9 above

Expert 10: High movement rates have been observed in summer. If movements are triggered by spawning, summer also provides the preferred temperatures for reproduction in these fishes.

11. Given the habits of the Asian Carp (both species) how likely are the fish to develop significant contaminant loads in their edible tissues?
    a. Expert Response Counts: High=0, Medium=0, Low=0.
    b. Expert Response Counts for Uncertainty code: Very Certain=0, Reasonably Certain=1, Moderately Certain=0, Reasonably Uncertain=3, Very Uncertain=1.
    c. [Explain and cite references]

Expert 1: Rigowski et al. 2005

Expert 3: Feed directly on suspended plankton and grow rapidly, which may lessen opportunities and maginitude of biomagnification.

Expert 5: Asian carps eat from the bottom of the food chain (primary producers: phytoplankton), and they grow very fast. I would be really surprised to see any bioaccumulation in these fish.

Expert 7: based purely on them being filter feeders and thus not as likely to bioacummulate contaminants and because of work I've heard of through IDNR where fish were tested for contaminants on the Illinois River as part of a viability assessment for use of Asian carp as food fish (never saw a paper to cite but Steve Shults could provide details I'm sure)

Expert 9: Two studies (Orazio in press and ILDNR study) have found that Asian carps are reasonably low in contaminants, although bighead carp had slightly higher mercury concentrations in both studies, and individual bighead carp sometimes had mercury concentrations higher than the lowest threshold. However, Asian carps in the Great Lakes might behave or feed differently than carps in the rivers of the USA

Expert 10: Asian carps are not a very fatty fish, which will result in low concentrations of PCB's. Further, Asian carp feed at the very bottom of the food chain and grow very fast relative to other fishes. This will also result in low concentrations of methyl mercury and PCB's.

Section V. Responses to Risk Management Questions Posed by the Corps.

1. If a single Asian carp is collected during monitoring accompanying a lock closure, then would the spot application of rotenone be an appropriate response? Expert Response Counts: Yes=3, No=3. Expert Response Counts for Uncertainty code: Very Certain=0, Reasonably Certain=1, Moderately Certain=1, Reasonably Uncertain=3, Very Uncertain=0.

   Expert 2: Depends on water temperatures, rotenone application should not be conducted if the water temps are too low.

   Expert 3: Given Asian carps' ability to defy capture through traditional methods, one carp collected through such methods may represent only the tip of the population iceburg.

   Expert 7: a single carp "collected" infers that you have a fish in hand that was collected by conventional sampling gear that is pretty ineffective at capturing Asian carp in low abundance and thus would be a pretty likely indicator that there are many more fish present…but in fairness, it would be extremely difficult to make any generalizations about fish abundance based on one fish capture because that one fish could be the only one present or could represent 10 or 100 other fish in the area that the sampling gear did not catch…in my mind though, it would be prudent to over-react than to under react…I also presume that I would have eDNA sampling following the collection to indicate the likely presence of other Asian carp which would also feed into my decision/recommendation…an accompanying question would be what would I do if I had an eDNA hit that was a few days old and in that case, I would recommend blocking off the area (ditto for one caught with conventional gear) and retest the area to confirm the continued presence of a fish(es) and then would also recommend rotenone use

   Expert 9: (The act of fishing will likely drive any uncaptured fish from the area. Asian carps are sensitive to fishing and will leave the area. Asian carps are usually not highly attached to a specific site, so there is no particular reason for them to return, unless the site had some particularly important reason to be attractive for Asian carps, such as a sewage treatment effluent. In this case, repeated netting and perhaps rotenone applications might be desirable, with a rest between fishing events to allow the fish to return)

   Expert 10: I feel that this is just another stop gap measure that does not get at the larger issue. Further, how sustainable and feasible will it be to apply rotenone every single time an individual Asian carp is captured? This solution may make the public feel better, but does not address the most pressing issue.

   a) List other desirable actions, in addition to rotenone treatment, that would be recommended.

      Expert 1: Concentration of other sampling gears.

      Expert 2: If water temperatures are too low, intensive commercial fish removal would be more effective.

      Expert 3: No other chemical measures come to mind that would not present greater safety hazards (e.g. chlorination-dechlorination; ammonia and pH adjustment and readjustment), or that would not result in potentially greater downstream collateral damage, or that could not be implemented due to virtually

insurmountable regulatory hurdles (By-passing ammonia rich, primary-treated, domestic wastewater effluent.)

Expert 5: Traditional sampling efforts, electro-fishing, netting

Expert 6: Electrofishing, netting

Expert 7: if it is not possible to block off the area and rotenone within a acceptable length of time, I would advocate for very intensive fishing with conventional gear in the vicinity, but this would be a very distant second recommendation to rotenone

Expert 9: See Comments in section VI

Expert 10: Indefinite closure of these locks and immediate action towards a permanent separation of the basins.

a) What is the risk associated with reopening the locks after at least 72 hours after completion of rotenone treatment? Expert Response Counts for: H=0, M=2, L=4. Expert Response Counts for Uncertainty code: Very Certain=0, Reasonably Certain=0, Moderately Certain=0, Reasonably Uncertain=0, Very Uncertain=0.

Expert 1: Where is the rotenone applied? Above, below, or IN the lock?

Expert 3: A moderate risk of Asian carp passage would continue, if at least one Asian carp body was collected prior to rotenoning and rotenoning was only performed through spot application in limited areas. Risk would be lessened the more wide-spread the rotenone operation. Again, given Asian carps' ability to defy capture through traditional methods, one carp collected through such methods could represent only the tip of the population iceburg.

Expert 5: if rotenone is applied correctly it can effectively eliminate all gill breathing organisms.

Expert 6: As long as the chemical is applied and neutralized properly it shouldn't be a problem.

Expert 7: depends on the extent of the treatment…more area treated, the longer it is likely to take carp to move into the area, but flows would also be a major factor in how far a fish is likely to move and thus the likelihood of reinfesting the area below the lock and thus the likelihood of moving through the lock

Expert 9: I do not see any change in risk that would result from rotenone operations

Expert 10: Although this may kill Asian carp in the immediate vicinity, they can travel great distances in short amounts of time, so the risk may be back soon after the rotenone treatment.

2. If multiple Asian carps are collected during monitoring accompanying lock closure, then would the spot application of rotenone be an appropriate response? Expert Response Counts: Yes=3, No=2. Expert Response Counts for Uncertainty code: Very Certain= 0, Reasonably Certain=0, Moderately Certain=1, Reasonably Uncertain=2, Very Uncertain=2.

Expert 1: Same as above.

Expert 2: Depends on water temperatures, rotenone application should not be conducted if the water temps are too low.

Expert 7: ditto to answer for question 1

Expert 9: Same comments as above

a) List other desirable actions, in addition to rotenone treatment, that would be recommended.
Expert 2: If water temperatures are too low, intensive commercial fish removal would be more effective
Expert 3: More thorough, widespread rotenoning.
Expert 6: As long as the chemical is applied and neutralized properly it shouldn't be a problem.

b) What is the risk associated with reopening the locks after at least 72 hours after completion of rotenone treatment? Expert Response Counts: H=0, M=1, L=2. Expert Response Counts for Uncertainty code: Very Certain=0, Reasonably Certain=0, Moderately Certain=0, Reasonably Uncertain=0, Very Uncertain=0.
Expert 3: assuming rotenone application was thorough down through the electrical barrier.
Expert 6: As long as the chemical is applied and neutralized properly it shouldn't be a problem.
Expert 10: Please see comments from Question 1.

3. Would closing the lock gates be effective in significantly impeding the migration of Asian carp into Lake Michigan given that there may still be gaps of up to one inch between the lock gates and the sides or bottom of the canal? Expert Response Counts: Yes=6, No=1. Expert Response Counts for Uncertainty code Very Certain=0, Reasonably Certain=2, Moderately Certain=0, Reasonably Uncertain=5, Very Uncertain=0.
Expert 2: This would prohibit adult fish from entering Lake Michigan
Expert 3: if other controls are not also instituted.
Expert 6: I don't think we have small Asian carp up this far yet
Expert 7: It would be likely to stop the majority of fish in the area that I hypothesize are young adults or adults.
Expert 9: But a delaying tactic only.
Expert 10: My inclination is that we are dealing with larger Asian carps in the upper river. Further, high flow through these gaps may preclude any small Asian carp from moving upstream. This is the best scenario at this time and then permanent separation should be developed and implemented. If all of this is accomplished, then the overall threat of establishment to the Great Lakes is reduced to bait bucket introduction, etc. That risk cannot be controlled.

4. Could such gaps allow fish eggs or small juveniles to pass through the locks, and if so, what is the associated risk? Expert Response Counts: Yes=5, No=2. Expert Response Counts for Uncertainty code: Very Certain=0, Reasonably Certain=0, Moderately Certain=1, Reasonably Uncertain=5, Very Uncertain=0.
Expert 1: This is two questions… As below in the comments, ARE JUVENILES present? Is there a sustainable , reproducing population in the CAWs above the barrier.
Expert 2: The passage of juveniles or fertilized eggs would still provide a mechanism for asian carp to enter Lake Michigan
Expert 3: especially when there is little head differential between the lake and CAWS or when the lake level is lower than CAWS. Note also that multi-directional, multi-depth density currents occur in Chicago and Calumet Rivers, especially in areas near the locks at interfaces between dense treatment plant and land runoff water and lake water.

Expert 5: I do not believe Asian carp would be spawning in this part of the system, not would eggs flow upstream through the lock gaps.

Expert 6: I don't think we have small Asian carp up this far yet

Expert 7: over time it becomes more and more likely that eggs or small juveniles could be present around the locks due to populations becoming established in the CAWS and associated streams and with flow occurring in both directions at various times, it is entirely possible that eggs or small juveniles could pass through the locks or through screens on the sluice gates…however, I'm not entirely certain of the likelihood of reproducing populations in the CAWS because I'm not sure how much open river we have in the major tributaries

Expert 9: Certain that they could pass, but I do not believe that they are present in the CAWS (Reasonably uncertain).__ I don't think that carp will spawn in the CAWS, although I am not certain nor sufficiently familiar with the hydrology of the CAWS. In any case, escapement of eggs to the Great Lakes would not probably result in a problem because our best understanding is that eggs would not survive in the Great Lakes proper (moderately uncertain). Because it seems unlikely that juvenile AC would have been in the Des Plaines when it overflowed, it seems unlikely that juveniles will be present in the CAWS unless they are the result of bait bucket transfer.

Expert 10: I find it unlikely that eggs will travel against current in an upstream direction and I'm not sure very small juveniles will have the swimming ability to move upstream against the current.

5. Would simply reducing the number of openings of the lock gates have a beneficial effect of impeding Asian Carp migration by itself, without additional control technologies? Expert Response Counts: Yes=1, No=6. Expert Response Counts for Uncertainty code: Very Certain= , Reasonably Certain=1, Moderately Certain= , Reasonably Uncertain=4, Very Uncertain=4.

   Expert 2: Reducing the number of lock openings would reduce the number of opportunities that asian carp have available to enter Lake Michigan. However, if lock openings coincide with a period of asian carp movement this benefit would be lost.

   Expert 3: Not if lock operations continue in a manner that allows untreated CAWS water to pass through to the lake (Assuming there is evidence of Asian carp in CAWS upstream of the electrical barrier).

   Expert 5: the locks would either need to remain closed all the time or it is pointless, unless effective eradication techniques were employed such as rotenone.

   Expert 7: "opening the door" fewer times, still leaves plenty of time with the door open and if fish are in the area looking to pass, they won't need too many door openings to get through

   Expert 6: No we need targeted mechanical removal of fish

   Expert 9: It might be a delaying tactic. If they want out, they will get out if the gates open.

6. Given Asian carp behavior, would fewer openings statistically reduce the likelihood of Asian carp passing through the locks? Expert Response Counts: Yes=1, No=6. Expert Response Counts for Uncertainty code: Very Certain=0, Reasonably Certain=1, Moderately Certain=1, Reasonably Uncertain=1, Very Uncertain=3.

   Expert 2: See Question 5

Expert 3: It depends on hydraulic conditions at the time of openings. If openings occurred when adult carp are on the move, and the lake level is higher than CAWS or navigation makeup is occurring, then risk is higher for adults to pass through. If flow is stagnant or density currents are moving flow towards the lock, then risk is higher for eggs and/or larvae to pass through.

Expert 5: it is very easily when a barge is entering the lock for fish to follow.

Expert 6: Not if you leave the locks open – our telemetry data indicate they use the locks regularly

Expert 7: statistically speaking a fish has a certain probability to navigate the lock each time it is opened and thus fewer openings gives fewer opportunities for fish to pass; however, if a fish has say a 1 in 10 chance of passing through the lock and over time you provide that fish 100 or more times to pass through, statistics say that the fish will get through

7. Would Asian carps aggregate near the lock during closure and pass en mass through the locks during the scheduled openings? Expert Response Counts: Yes=0, No=0. Expert Response Counts for Uncertainty code: Very Certain=2, Reasonably Certain=0, Moderately Certain=0, Reasonably Uncertain=1, Very Uncertain=3.

   Expert 2: Given that locks have to be opened and closed in order to operate, this scenario could occur under any operating schedule.

   Expert 5: if Asian carps are having pressure on their local population to migrate in order to find new food or spawning areas, the fish will migrate.

   Expert 6: Yes they use the lock chamber to traverse though the lock and dam structures – we have telemetry data to support this

   Expert 7: I sure suspect that they would…perhaps not en mass, but arguably steadily during schedule openings as they find the right opportunity and navigate their way into and through the lock chamber.

   Expert 9: They might do this, but if substantial boat activity is present, they may avoid the boats. Based on how locks on the Ohio and Illinois Rivers apparently caused delays in invasion of Asian carps, I don't think that Asian carps like to pass through locks. But these locks might be different in operation and size from the River locks.

8. Would scheduling lock gate openings in conjunction with other control technologies such as netting, electro-fishing, rotenone, as discussed above, help deter the dispersal of Asian carps into Lake Michigan? Expert Response Counts: Yes=6, No=1. Expert Response Counts for Uncertainty code: Very Certain=1, Reasonably Certain=0, Moderately Certain=1, Reasonably Uncertain=3, Very Uncertain=1.

   Expert 2: This seems like an extraordinary measure to implement, given that extensive netting and electrofishing has yet to yield the collection of a single asian carp.

   Expert 3: Depends upon the extent of rotenoning.

   Expert 6: If you could time it right and control it adequately– seems like a complicated strategy

   Expert 7: yes, but only if sampling and control efforts are sufficient (see comments 2a-2d).

   Expert 10: Control measures such as netting and electrofishing will not decrease the risk of passage during an opening. Rotenone would decrease the risk of passage, but does not seem feasible. I find it highly unlikely that a rotenone event would occur every few days under some of the alternative lock opening/closing scenarios.

9. Is it reasonable to assume that if netting, electro-fishing, rotenone, other monitoring technologies do not recover an Asian carp body, that a significant population of Asian carp is not present in the waterway? Expert Response Counts: Yes=5, No=1. Expert Response Counts for Uncertainty code: Very Certain=0, Reasonably Certain=0, Moderately Certain=0, Reasonably Uncertain=0, Very Uncertain=0.
   Expert 5: rotenone is very effective at providing an answer.
   Expert 7: yes but this answer depends on the level of effort of applied and on what is considered a significant population…if extensive sampling and rotenone do not recover a body, then it is my opinion that the fish in the CAWS would not number in the thousands
   Expert 10: These fishes are simply difficult to sample at all levels of population abundance. Further, many fishes sank during the previous rotenone event and it is unknown how many were Asian carp.
10. Is it reasonable to assume that a longer period of extensive monitoring (through netting, electro-fishing, rotenone, other technologies) without the recovery of an Asian carp body, provides increased confidence that a significant population of Asian carp is not present in the waterway? Expert Response Counts: Yes=5, No=2. Expert Response Counts for Uncertainty code: Very Certain=0, Reasonably Certain=0, Moderately Certain=2, Reasonably Uncertain=4, Very Uncertain=1.
   Expert 1: It is a matter of statistics… however, at some level, the return is not worth the extra resource expenditure… you more than double efforts to move from 95 to 98% confidence levels.
   Expert 2: Statistical analysis needs to be conducted to answer questions such as how much sampling effort is needed to have a reasonable chance of detecting as asian carp.
   Expert 3: Again, it depends on the extent of rotenoning. Even still, rotenone killed carp may sink and not be recovered.
   Expert 7: yes, but particularly in the case of rotenone use which would be the most effective of the techniques listed and particularly in conjunction with eDNA samples to direct efforts…
   Expert 9: See comments in Section VI
   Expert 10: The aforementioned gears do not sample Asian carps well in this stretch of the river. This has been proven in other areas of the Illinois River where we know they are present and also in the previous rotenone application.
11. If no Asian Carp bodies are recovered through netting, electrofishing, rotenone and other monitoring activities upstream of the Barriers, how significant is the threat/risk to Lake Michigan? In other words, if the population is so small that a single individual cannot be recovered, what level of risk is present? Expert Response Counts: Yes=5, No=2. Expert Response Counts for Uncertainty code: Very Certain=0, Reasonably Certain=0, Moderately Certain=0, Reasonably Uncertain=1, Very Uncertain=2.
   Expert 1: SEE NOTES BELOW.
   Expert 2: Until an asian carp is collected upstream of the barriers, the threat of them establishing in Lake Michigan is low.
   Expert 3: (The assumption that a single recovered individual means the population is so small is a weak one.) (These are not yes-no questions.) Assuming limited target rotenoning is part of the monitoring regime, I am moderately certainty that there is a risk, even if a carp body is not recovered.

Expert 5: not significant at all.

Expert 6: This isn't a yes/no question. I think the risk is LOW if the population is so small we cannot detect it with literally HUNDREDS of hours of effort.

Expert 7: Not a yes or no question. I would consider the risk moderate as opposed to high, but because an unknown number of fish have very likely already gotten into Lake Michigan, the addition of another 10-20 fish (which could be present but missed by sampling efforts), could be just the additional number of fish to cause a population to become established in Lake Michigan. At the same time, there may have already been a sufficient number of fish that have made it into Lake Michigan to start a population with or without another 10-20 fish. The fact is, we don't know where we are at in the game so in my opinion, we need to continue to act aggressively and manage conservatively until there is evidence to act differently. I would rather look back in 20 years and be disappointed that we over-reacted then to look back in 20 years and realize that we under-reacted and could have been successful with a little more effort.

Expert 9: These are not yes/no questions. It is my opinion that if there are a hundred carp in the CAWS, you would have difficulty catching one with standard commercial fishing techniques and electrofishing, unless it is possible to locate aggregations of the fish, as perhaps near a sewage treatment outfall. If there are more, then perhaps you might start to catch fish. Very Uncertain.

Expert 10: This is not a yes or no question. The threat to Lake Michigan is great whether an individual is captured or not. Most likely, Asian carps are already in Lake Michigan. We need to be working on ways to permanently disconnect the basins to decrease future propagule pressure and introductions to the lake. By doing so, we provide the Great Lakes the best chance of not seeing a sustainable population. In this fashion, the hope would be that the current individuals that are present would not be sufficient to establish a population.

12. The Corps and Metropolitan Water Reclamation District are considering installing mesh grates over the sluice gates near the Chicago and O'Brien locks. Would a mesh grate with 1 inch openings be beneficial in deterring carp migration? Expert Response Counts: Yes=1, No=2. Expert Response Counts for Uncertainty code: Very Certain=0, Reasonably Certain=1, Moderately Certain=3, Reasonably Uncertain=0, Very Uncertain=1.

    Expert 1: Help with adults.

    Expert 2: Juveniles and eggs could pass through these structures.

    Expert 3: Assuming locks are not operating, yes for adult carp and no for eggs and carp larvae.

    Expert 5: if Asian carp are present, they would not be able to get through 1 inch mesh, but the mesh will constantly clog with debris.

    Expert 6: Yes but it will clog up so fast it will be ineffective – you will have to keep cleaning it. 1 inch isn't practical.

    Expert 7: It would be very successful for adult fish, but of course wouldn't address eggs, larvae, or small juvenile fish if over time Asian carp establish spawning populations in the CAWS.

    Expert 9: No additional benefit if the openings are already only an inch wide. Reasonably certain

Expert 10: It may be effective for large Asian carp, but there is still uncertainty for smaller individuals if they have the swimming ability to move through the gates.

13. What significant monitoring would be adequate for helping to verify the absence or presence of Asian Carp in the canal system?

Expert 2: This needs to be answered by somebody with experience in designing sampling strategies to detect rare/elusive species.

Expert 3: Other than eDNA, none that I know of. Full rotenoning may be the next best method, except that rotenoned Asian carp have a tendency to sink and not be recoverable.

Expert 5: Continued conventional sampling (primarily electro-fishing). This method worked years past as we were documenting Asian carps coming up from Marseilles into Dresden, and I believe it is still working since we see increasing numbers in Dresden, but no fish in Brandon or Lockport.

Expert 6: Presence/absence is determined by eDNA methods for genetic presence, as well as electrofishing and netting for physical presence. I think telemetry is also an important tool to assess movement, locations (habitat) and to see if the Barrier is working.

Expert 7: see comments 2a-2d

Expert 9: You will not be able to verify the absence of Asian carp under any circumstances. You cannot prove a negative. I cannot recommend a reasonable method which would be secure in proving a positive, if the fish are at low densities. In Section VI, I provide some ideas that might improve the ability to catch a fish.

Expert 10: Methodologies other than the netting used right now, electrofishing, and rotenone need to be developed. I would suggest a system of large lift nets. These nets would be dropped to the bottom and lifted at appropriate intervals and would not interfere with barge traffic and recreational boaters. Perhaps a system where a net is dropped to the bottom and lifted a week later? These nets would have to be large scale. Perhaps a km long and the width of the CSSC? I would suggest using a net like this immediately below the electric barriers and below the O'Brien and Chicago locks. All fishes would be collected from the nets and any Asian carp counted and removed from the system. If the system works appropriately, it would trap most fishes in the water column in the net. A large-scale purse seine might also be appropriate in the CSSC.

14. What methods and equipment are recommended?

Expert 2: See Question 14

Expert 5: electro fishing

Expert 7: see comments 2a-2d

Expert 9: See Section VI

Expert 10: Three large nets deployed below barriers to migration. Four small cranes or winches at the corners of each to pick up and deploy nets. A boat and crew to collect captured fishes and release natives and destroy invasives.

a) How long would a monitoring/event take (3-4 days, for example)

Expert 3: A few weeks

Expert 5: 3-4 days

Expert 6: 3-4 days

Expert 7: see comments 2a-2d

Expert 9: Three days?

Expert 10: If the process became efficient, I would suggest no more than one day to pick up an individual net, collect fishes, and redeploy the net.

b) How often would such monitoring/sampling events be recommended (once a month, twice a month or more, for example) to reduce risk of migration to an acceptable level?

Expert 1: SAMPLING does not reduce risk.. It merely confirms presence / absence. Extensive, concentrated sampling for one week per month, or two-three weeks per quarter would be a substantial effort.

Expert 3: Daily, except that the lag time for eDNA analysis time turnaround is problematic.

Expert 5: Once a month

Expert 6: Once a week

Expert 7: at least the eDNA portion of the intensive effort (see comments 2a-2d) should occur at least quarterly until we determine over time that all fish have been removed from the CAWS and that all pathways through or around the Dispersal Barrier are adequately address…then perhaps 1-2x/year would suffice.

Expert 9: I don't know that fishing can substantially reduce risk, unless novel methods are incorporated. See Section VI

Expert 10: I would recommend picking and deploying the nets every week or every two weeks at the latest.

15. What are the biological indicators for the recommended monitoring methods and what are the thresholds for action for these indicators?

Expert 1: POPULATION of AC in an area upstream of the barriers warrants further actions. Without faster laboratory results, we may never capture an Asian carp if there are only few present. Note that one AC captured could indicate many more not captured (Chapman, pers. Comm.).

Expert 3: Death of sentinel fish, in the case of determining whether rotenone was effective. Unknown for other methods.

Expert 5: A bunch of Asian carps.

Expert 6: eDNA should be used as a baseline due to its sensitivity. Once a positive hit is detected, physical verification (Electrofishing, netting) should be deployed to verify.

Expert 7: Not sure I understand the question. In my mind, the indicator for eDNA is a positive hit which is an indication of bighead or silver carp DNA being present and this indication is sufficient in my mind to take any needed action that you would take if you had a live specimen in hand. For the other methods (e.g., netting and electrofishing), a body in hand (or not) is the only indication that it can provide and if collected, appropriate actions should be taken. The last element that could be separated out would be the rotenone and ideally it would result in a body in hand as well. However, this one gets confounded because the lack of a body doesn't indicate the lack of a fish having been present. However, if done well, any fish present would be dead. Unfortunately, we don't know what eDNA signature that dead fish would produce (I presume a positive hit), and you would not be able to distinguish between that dead fish and a live fish that may have moved into the area since the rotenone application. Perhaps if eDNA sampling could be conducted very intensively at the sight of the positive hit such that you would either drive the fish (if alive) out of the area thus indicating a live fish or could

conversely conclude by the lack of movement that the fish is dead and could perhaps do some trawling to try and recover/remove the fish.

Expert 9: The only biological indicators I know of are eDNA or capture of one or more fish. If spawning in the CAWS is considered possible or likely, then it would also be advisable to sample for eggs and larvae of AC during or immediately after substantial water rises. Larval fish collections do not usually provide immediate data, but they could be structured to give short term turnaround of two days or so. eDNA could accomplish the same end to some extent, because sperm is likely to show up heavily in eDNA analyses (Not only would spawning eject many cells into the water, but sperm are heavily endowed with mitochondria – thus eDNA should show extremely strong hits downstream of spawning events. I don't know what the action would be so I don't have any way to compute a threshold for it.

Expert 10: If physical capture is a main goal of the risk analysis, this should be implemented immediately to try to determine the relative abundance of Asian carp in the waterway, which may inform a long term solution.

16. At what duration of monitoring without capturing an Asian carp body is the risk of migration reduced to the extent that it would be reasonable to open the lock gates? For example, is our scenario of lock closure with corresponding monitoring of 1 week/month and normal operation for the remaining days of the month, assuming no Asian carp body is recovered, reasonable from a risk perspective?

Expert 2: See Question 14

Expert 3: Unknown

Expert 5: Not to beat around the bush, but I feel all of these measures/alternatives are unnecessary at this point.

Expert 7: Not at all…much more intensive efforts would be needed.

Expert 9: I don't think it matters much if the locks are closed part of the time or not, if they are to be open most of the time. It might make a difference of months or a year, but in the larger scheme of things, it is not that important.

Expert 10: Monitoring and lock closure should be continued until permanent separation is achieved regardless of whether a physical specimen is captured or not.

a) Why?

Expert 5: There is no reason to believe Asian carps are even present in the Brandon/Lockport pools, let alone past the barrier system.

Expert 6: Enough time to eliminate a 'seasonal' bias – I would say one month

Expert 7: See comments 2a-2d.

Expert 10: This is the only precautionary approach that will have the highest probability of preventing further transfers of Asian carp to Lake Michigan. This should be the ultimate goal.

17. Is one of the other alternatives discussed in the Background (above) preferable from a risk perspective?

Expert 3: Not really

Expert 5: No, all unnecessary at this point. When it becomes necessary they will need to stay closed permanently

Expert 7: a lock closure of 2 months would be my preferred alternative if I had to select one

Expert 10: The locks should be closed indefinitely. If that cannot be the case, the longer the immediate closure the better in my mind. The only pitfall to longer-term closures may be a stockpiling of fish that could all pulse through at one time. This may increase the probability of establishment if this pulse of fish stayed together and reached Lake Michigan.

a) Why?

Expert 3: See comments throughout rest of response.

Expert 5: There is no reason to believe Asian carps are even present in the Brandon/Lockport pools, let alone past the barrier system.

Expert 6: I like 2, 4 and 5. I think the more frequent and prolonged closures will give you the best bet for adequately assessing the threat and will eliminate any "flukes" or bias that may be associated with a short closure. Please note that the benefit of these closures, as I see it, is the extensive monitoring to detect this "rare" species in the upper waterway.

Expert 7: See comments 2a-2d

Expert 10: The goal should be to prevent more Asian carp from reaching Lake Michigan to reduce the probability of establishment. Therefore, these locks should be closed immediately until a long term solution of permanent separation is developed and implemented. Anything less does not support this goal and increases the probability of Asian carp establishment.

18. If an Asian carp movement trigger (such as high chlorophyll, warm water, high flow) is manifested in the CAWs should the locks be closed? Expert Response Counts: Yes= 5, No=1. Expert Response Counts for Uncertainty code: Very Certain=0, Reasonably Certain=0, Moderately Certain=0, Reasonably Uncertain=2, Very Uncertain=2.

Expert 1: YES if AC are present, NO if AC are still contained below the barrier.

Expert 2: Provided these triggers are accurately identified and validated they could be used to determine lock operation

Expert 3: In an all-season warm water and frequently erratic flow system such as CAWS, I am uncertain whether there would be definable triggers for movement. Carp may frequently be triggered to move, perhaps all the time.

Expert 5: this won't happen because of the stability of temperature and lack of the proper algae Asian carp prefer to consume.

Expert 7: An increase in flows would be a trigger for fish to actively move upstream and potentially thru the locks. On the one hand, this would be an ideal time for fish to concentrate themselves below barriers, but on the other hand, it would be a difficult time to sample and to do a rotenone effort due to potential debris in the water and higher water volumes.

Expert 9: High turbulence at the locks might attract spawning fishes This should be avoided. But I don't know how that would relate to the ability to close the locks.

Expert 10: The locks should be closed indefinitely right now.

19. Are there additional structural modifications or other actions you would recommend to be considered to reduce the risk of Asian carp dispersing into Lake Michigan?

Expert 2: Increased commercial harvest of asian carps from the Illinois River downstream of the barriers.

Expert 3:

a. Don't use the gate valve controlling works to perform discretionary and navigation make-up diversions. Rather, only use the Wilmette Pump station pumps and the pumps located at Chicago Harbor. The pumps at Chicago Harbor would have to be modified (reversed); presently, they are set up to only pump Chicago River water out of CAWS and into Lake Michigan.
b. In order to further reduce the frequency of having to backflow CAWS out to the lake, lower CAWS levels 3 or more feet below "normal navigational level" (A 2-ft. lowering is typical and may be specified in USACE regulation) in advance of a storm and consider redefining and maintaining "normal navigational level" at an elevation below current operations in order to gain more storm retention space in CAWS.
c. Prioritize the north half of the TARP Mainstream service area for capture by the TARP Mainstream tunnels. The north half of the service area is the principle contributor of storm water that must be diverted out to the lake through the Chicago lock and controlling works.

Expert 5: No

Expert 6: Fill the canal in with dirt – complete separation of basins.

Expert 7: See comments 2a-2d. I would want to be sure that Wilmette Lock is addressed, that the sheet piling on the Grand Calumet River is addressed, and that someone does additional dye or other work to identify additional connections via culverts. Of course physical separation at all locations would be ideal. Aggressive use of SPA BAFFs is the only other immediate tool that comes to mind. These should be used at locations such as the locks or other choke points to firm up our lines of defense.

Expert 9: SPA/Baff near the locks.

Expert 10: Physical separation of the basins is the only long term solution to reduce this risk. The stop gap measures proposed all appear to be vulnerable to Asian carp transfers. Although physical separation does not ensure bait bucket introductions won't occur, there are no methods to prevent this possibility except for increased outreach to decrease this vector. As a team, we should be rapidly working towards a physical separation of the two basins.

Section VI: Additional Comments and Recommendations

List comments you wish to include in your Risk Assessment and recommendation for Risk Management

Expert 1: All of the scenarios above (establishment via XX pathway) require an assumption that fishes are present within the CAWs above the electrical barrier, and that the dispersal barrier is not functioning or not adequate to prevent upstream migration of Asian carp. This is an assumption which may or may not be accurate.

Further, all of the modified lock operation scenarios assume an establishment of AC into Lake Michigan via CSSC. Again, this assumption may not be correct. In other words, the answers to questions above are likely to change dramatically over time. In the next 60-days (i.e, while there are no (or few) AC in the CAWS near TJ O'Brien), the risk of population establishment (not an individual fish migration) into Lake Michigan is extremely low. However, in the future IF (and only IF) there is a catastrophic barrier failure, or migration of fishes through another route into CSSC or CAWs, resulting in an ESTABLISHMENT of a POPULATION in the CAWs, (resulting in more numbers of AC being found in CAWs), then the risk of ESTABLISHMENT

would increase exponentially. For this reason, it is impossible to assess significant risk of establishment via TJ O'Brien lock at this time. For that reason, I choose not to assess an arbitrary risk, but only note that some permutation of scenario 6 is the only reasonable modification to operations which seems both biologically and economically justifiable.

Expert 2: There is a pressing need for a statistically sound and defensible sampling/monitoring strategy.

Expert 3: As an additional monitoring tool, suggest making underwater recordings of boat motor sounds that elicit jumping behavior in Asian carp and playing such recordings back sub-surfacely from a travelling watercraft throughout areas being monitored.

Expert 5: There is no reason to believe Asian carps are even present in the Brandon/Lockport pools, let alone past the electrical barrier system. All of these emergency alternatives are in knee jerk reaction to a problem that does not currently exist. I recommend stopping Asian carps dispersal at the Brandon Lock gates.

Expert 6: My recommendation is that a long term monitoring plan needs to be in place soon. I think it should build upon what the monitoring subgroup put together last year, and the emphasis should be on monitoring sites above the Barrier. However, it is also my recommendation that we include Brandon Road and Lockport Pools in that monitoring plan - to include such tools like this acoustic analysis and telemetry. We need to assess if the Barrier is working - tools like acoustic imagery (including the DIDSON) and telemetry can help answer that question. I think we should use the more descriptive tools below the Barrier to see where the fish are - and then use eDNA above the Barrier as early detection tools - with electrofishing and netting for physical verification.

If we are able to detect these fish at low densities we should be able to easily control their numbers before they become a problem. Monitoring is at the heart of managing the risk, and I think that is where we should focus our efforts.

Expert 7:

1. In addition to Chicago and O'Brien locks and dams, the Wilmette L&D and Grand Calumet River connection through Indiana must be addressed. For purposes of answering all risk assessment questions, I excluded these pathways from consideration of risk levels under the assumption that they are addressed. If they are not addressed, then my risk level would be "high" for all actions taken at Chicago and O'Brien because we would be leaving two other major pathways open and even if we effectively closed 2 doors, if we left 2 others open, our risk would be high. I assume they are address because it is my understanding that there is sheet piling on the Grand Calumet River (perhaps have the name of the river incorrect…but it is the part of the CAWS that crosses into Indiana and then connects to Lake Michigan). It is a total assumption on my part regarding the Wilmette L&D, but my assumption is that it will be closed to navigation. Again, if the sheet piling were removed, or the Wilmette Lock will be opened, then I would categorize all alternatives as "high."

2. There are currently no detection tools available that will allow us to have a reasonable level of certainty about the presence, and particularly the abundance, of Asian carp that can be completed quickly.
    a. eDNA is the only tool currently on the table that has a very good probability of detecting Asian carp, but the turn around time is too long for the controlled lock operations scenarios. Even if samples were turned around in a 48 hr timeframe, those samples would only represent locations where the samples were collected and at the time they were collected. Given that Asian carp can move miles/day, they could very easily move from areas not sampled to areas sampled for eDNA over the course of the time it would take to process samples (even if 48 hrs). Thus to truly be effective, you would need extensive, intense (i.e., closely spaced samples throughout the CAWS) sample collection each time you were going to test for the presence of Asian carp.
    b. Netting, electrofishing, or any other "standard gears" are very poor indicators of the presence of Asian carp. Even intensive sampling with these gears would be unlikely to detect Asian carp over any short period of time. With extensive application of these techniques, it is possible, perhaps even likely, that we will ultimately collect a fish(es). However, this is definitely not an approach that I would advocate for giving the green light to opening a lock. These are not techniques that demonstrate the "absence" of a fish, which is really what we're looking for before we open a lock gate.
    c. Rotenone could be an effective tool, but only if extensive applications are used repeatedly. Again given the ability for Asian carp to move miles/day, a rotenone application will only have localized and temporary effects. The only reasonably sure way I can see to use this tool would be to do a complete kill of all areas above an effective barrier (e.g., presumably the Dispersal Barrier).
    d. Our best bet is to throw the whole tool box at the issue. Perhaps we can create temporary barriers (possibly SPA BAFFs or block nets) to section off the CAWS, follow up with rapid eDNA assessment (and possibly netting and electrofishing), with rotenone treatments of areas with positive eDNA hits. This 3 step process is the best way I can think of to assure that Asian carp are absent from the system prior to any lock gate openings. It would also be the best long-term strategy I can envision to deal with the Asian carp that are currently above the barrier. Perhaps with the implementation of this action (segregate, locate, eliminate), concurrent with other actions such as Barrier IIB, I&M blockage, Des Plaines separation, and any improvements to the voltage settings, we can be reasonably secure that our efforts will prevent movement between the basins. However, the best way to stop movement remains to severe the connection permanently by stopping water flow between the basins.

Expert 9:

A. Survival and maturation of individual Asian carp in the Great Lakes

I believe that individual Asian carps can survive and mature quite well in the Great Lakes. Five or six bighead carp are known to have been captured from Lake Erie. I have length and weight data from only two of those fish, but those two were exceptionally fat and apparently healthy fish. A bioenergetics model has been completed that predicts that bighead and silver carp would not be able to survive by filterfeeding on the plankton available in the open waters of Lake Michigan or the other larger Great Lakes, but that they would find adequate nutrition in Lake

Erie, and in some bays and inlets of Lake Michigan. That model indicated that a chlorophyll concentration over 10 µg/L would be required for survival of bighead and silver carp. The model is in conflict with information from other sources. Notably, in Lake Balaton, Hungary, where (since the invasion of zebra mussels) chlorophyll concentrations have averaged 6 to 8 µg/L, bighead and silver carp are extremely large and fat, and are apparently successfully filterfeeding on available plankton. Furthermore, anecdotal information indicates that bighead and silver carp have other potential feeding behaviors other than filterfeeding on plankton. However, even if planktonic or alternative food sources are inadequate in the open waters of those lakes, Asian carps are quite mobile and can select habitats within the basin that do have the food resources they need.

Likewise, I do not believe that ambient temperatures will be too low for survival and maturation of Asian carps in at least some parts of the Great Lakes. Silver carp are native to the Amur River that borders Russia and China, and bighead carp are either native or successfully introduced there. The latitudes and air temperatures found within the Asian range of bighead and silver carp encompass most if not all of the area of the Great Lakes. Russian research in the 1980s indicated that Asian carps need approximately 2700 degree-days annually for maturation and spawning. Large expanses of the Great Lakes, even open water areas, provide well over that minimum annual amount of heat, and Asian carps are quite mobile and capable of selecting waters that are best suited to their survival.

B. Potential for Asian carp establishment in the Great lakes

The likely survival and growth of individual Asian carp does not necessarily mean that, even with a large propagule pressure, Asian carp would successfully invade the Great Lakes and develop extremely large populations that would cause undesirable economic and environmental problems. This remains an unknown. Completion of the life cycle and substantial population growth relies on many variables that cannot be adequately evaluated, and unforeseen variables are likely to play a part in this equation. There are no environments similar to the larger Great Lakes elsewhere in the world where Asian carps have been introduced. Asian carps have precise spawning requirements that may or may not be adequately provided in the Great Lakes. We do not know how native and introduced predators in the Great Lakes will interact with Asian carps. No aquatic predators in the Great Lakes (except the also-introduced and problematic sea lamprey) have the ability to prey substantially on adult Asian carps, but juvenile Asian carps may be preyed upon by many resident predacious species. We do not know if adequate nursery habitat exists for juvenile Asian carps in or near the tributary rivers in which Asian carps are likely to spawn. Perhaps most importantly, we do not know if the complex stimuli which act on Asian carps to induce spawning behavior will function adequately in the Great Lakes. The only way we will know for sure if Asian carps are able to form large populations in the Great Lakes will be if substantial numbers of fish successfully enter the Great Lakes.

Any model that attempts to determine if Asian carps will be able to produce a large, self-sustaining population in the Great Lakes *will* be acted on by unforeseeable factors and complications. It is impossible to predict with precision whether Asian carps will be able adapt, produce a large population, and become problematic in the Great Lakes. Nevertheless, as we stated in our book on bighead and silver carp, if Asian carps do develop a large population in the Great Lakes, we believe that substantial undesirable consequences to fisheries and recreation will occur.

C. Capture of Asian Carp from the CAWS, risk of various options

Because Asian carps are so cryptic and difficult to capture, capturing all carp from the CAWS could reasonably be compared to the difficulty of capturing all rats from a terrestrial habitat in Chicago of similar size and shape – without using bait. While the different lock operation scenarios may have some very minor effects on short-term ability of fish to escape the CAWS and enter Lake Michigan, in the larger scheme of things, I do not believe that any of the proposed options will have enough effect to change the risk rating or uncertainty rating. Even complete closure of the locks might not change those ratings, if the locks are overtopped during floods or fish could bypass them even when closed. Nevertheless, I do believe it makes sense to at least attempt to capture some of the fish in the CAWS, because 1) the number of fish that escape is likely to be directly proportional to the probability of

establishment in the Great Lakes, 2)continued efforts may be useful in later estimating how many fish were there, and 3) doing nothing is politically untenable.

Regarding fishing in the waterways for Asian carps: Catching an individual bighead or silver carp with static nets or electrofishing, or a combination thereof (like chasing the fish into nets with the electrofisher), ***even when you know where the fish is and can corner it in a cul-de-sac*** , is very, very, difficult. I also had the advantage that I knew pretty much the size of the telemetered fish I was trying to catch, so I could choose an appropriate mesh size. I have hundreds of man-hours invested in the recapture of 6 telemetered fish (plus a commercial fisher caught one and returned it to me. In the attempt to capture these tagged fish, we did not always keep track of the number of AC we caught that were not the tagged fish. These numbered in at least the hundreds, possibly thousands, of untagged fish. Using inferred logic, if you catch one fish, without previously knowing where it was, there may easily be hundreds of fish down there you did not catch. Granted, these tagged AC may have been more resistant to capture than fish that have never before been captured with similar gear. Nevertheless, fishing for rare AC with these techniques alone, without knowing exactly where the fish are, is searching for a needle in a haystack. **You might be able to do something different to increase your chances, but in any case capture of one fish probably means there are many uncaptured fish.** And furthermore, we don't have any way to put a numerical value on the chances of catching a fish, so we cannot quantify this in any meaningful way. The eDNA folks are planning to do some studies on how much eDNA is put out by a fish that would allow us to back-calculate, in the future, some kind of estimate of how many fish are out there now, based on the samples they have already analyzed. If funded, that work will be done within a year. But that does not help you now.

Thoughts on catching fish in the canal/river system:
I am not familiar with the system in question, so I am somewhat hampered in my ideas, but I know carp behavior and carp catching pretty well, so I am going to brainstorm anyway. Two things that might help your situation are 1) fishing at **night** with trammel nets, trapping the fish in cul de sacs or other places where they can be completely caged in with nets **while** driving the fish with boats and electrofishing gear, and 2) use of very large haul seines, if at all possible in your situation (it is not, in mine, because of the terrain and submerged woody debris). In a pond situation, bighead carp are extremely vulnerable to seines, and I can catch nearly 100% of bighead carp in a pond with one draw of a bag seine. Bighead carp behavior is to run from a seine, going as far from it as possible, and balling up at the furthest point from the seine, where they can be easily corralled, if you cover the water column top to bottom when you get close to them. I think that you would not even have to cover the entire water column (just most of it, so as to avoid debris on the bottom) with a floating seine until you got within 50 feet or so of the bighead carp – they don't attack a seine normally, they just run. Silver carp are the exact opposite, however, and in a pond situation will attack the seine, going over or under or around it as soon as they see it. In a mixed pond of bighead and silver carp, you can sometimes catch all of the bighead carp and none of the silver carp on the first pull – but you will see most of the silver carp, if you are keeping contact with the substrate most of the time, and not allowing any room to get by on the ends. However, if there is a cul de sac that could be covered with a seine, side to side, that may contain carp, and you could clear out a place to pull the seine at the end of the cul de sac, this might be effective. It would take a very large net, of the beach seine variety, such as used to be used in the striped bass fishery on the east coast. Also, note that these fish hate boats with a passion. Any place you are going to fish, keep boats out of the area for a few days before you fish it, and you may increase the chance that bighead or silver carp would enter the area and stay. If there are areas of very low boat traffic, pick on them. Warmwater effluents, or shallow areas that may be warmed by the sun, may be good choices too. I rarely find adult bighead or silver carp in shallow water except when 1) it is the only place they can find clear or green water, or 2) telemetered silver carp on sunny days in winter sometimes chose shallow water.

Other things that might be done might be 1) use of Judas carp, (invalidates eDNA sampling work, though) 2) nets combined with rotenone (like cove rotenone studies – of course some or most carp may sink and possibly never float, but even dead fish can be seined if the bottom is smooth), 3) nets combined with the use of noxious (not necessarily lethal) chemical smells that could drive the fish, possibly including ground carp skin (for alarm pheromone, but this would totally invalidate any new eDNA work for a while) 4) choice of fishing locations enhanced with rapid-turnaround eDNA sampling (two days is the shortest possible turnaround, according to Chadderton), perhaps combined with block nets that would minimize fish movement. My telemetered fish in an

open setting had random movements that averaged a km change in position when encountered more than once in a three day period. 4) Setting up boat-free areas that are attractive to Asian carp, increasing both the attractiveness and fishability of those areas, perhaps even including a seine net that would lie on the bottom around the fished area, with an inflatable float line, so that you don't spook the fish with a boat while laying out the net. If this could be combined with a warmwater effluent, that would be best. Basically, provide the best potential habitat available anywhere, and make it fishable in the most deadly ways possible. At the same time, you might make every other reasonably nearby habitat living hell for the fish, with boat activity or anything else they hate. I have found you can drive these fish very long distances with just boat movement/noise, if they don't have to cross shallow water. Give them the refuge of death.

Note I don't think that DIDSON technology is going to be very useful in locating fish because you won't be able to tell AC from the native buffalos, and maybe not from common carp, and you just can't see that far that well.

D. Timing of establishment of a population of Asian carp in the Great Lakes

I answered this question as to when I believed a population of fish could begin living and breeding in the Great Lakes, NOT meaning that they would be abundant or problematic in the times specified. If this question is meant to ask when Asian carp populations would be abundant enough to be problematic or even noticeable, I would have answered as below:

a. If yes, then by when do you predict a sustainable population of bighead carp? Year _2035___. Lower 95% Confidence limit (Year) _2025___. Upper 95% Confidence limit (Year)_2050__.
b. If yes, then by when do you predict a sustainable population of silver carp?
    i. Year 2035____.
        1. Lower 95% Confidence limit (Year) 2025____
        2. Upper 95% Confidence limit (Year) 2050___.

While we cannot be sure if Asian carps will successfully establish a large population in the Great Lakes, the best information available provides evidence that if such an invasion does occur, it will probably take many years for the population to become problematic. *This does not mean that we are not currently at a critical juncture.* Fish that invade the Great Lakes now may survive and reproduce for many generations before populations become sufficiently large to become problematic. I draw from multiple lines of logic to arrive at this conclusion. 1) A model based on the life history characteristics of many invaders of the Great Lakes, published in the journal *Science*, indicates that silver carp would spread slowly in the Great Lakes. 2) Invading organisms often go through a population lag phase of several generations when they invade a new environment, after which populations sometimes increase dramatically. The history of Asian carp invasion of the Mississippi River basin followed this pattern, and Asian carps were present for decades before their populations entered an exponential growth phase. 3) Mean temperatures in the Great Lakes basin, while clearly warm enough in many parts to support growth and maturation, are lower than those experienced by Asian carps in the central United States. Asian carp maturation rate will be decreased, and the length of a fish generation time will be increased. This should slow the rate of population increase in the Great Lakes, at least until a reasonably large number of mature spawners is present in the population. 4) The immense size of the Great Lakes provides so much habitat that I believe that multiple successful generations of population expansion would be required to have a substantial effect. There is some uncertainty to this prediction, but it is my strong belief that an Asian carp population expansion to numbers that would cause widespread substantial economic and environmental damage is *most likely* to take at least one to three decades.

This probable pattern of invasion provides both opportunities and problems. If Asian carps are able to establish in the Great Lakes, we may have some time to devise control methods that would prevent their eventual population expansion. On the other hand, it is probable that if Asian carps do invade the Great Lakes and do not quickly expand their populations, the perception of a problem may fade quickly. Support for efforts to control Asian carp in the Great Lakes is likely to wane during the extended period of low population when effects or even presence of the carp are not observed, and when control efforts are most likely to be successful. Because of their feeding

methods, Asian carps are not often captured by anglers. They are more net-averse than most native fishes. When at low densities, adult Asian carps are amazingly difficult to capture with any standard fisheries technique. Because of these characteristics, small populations can exist without detection. Small numbers of fish could expand over very large distances in the Great Lakes, before conditions that precipitate a large population increase are encountered by the fish. Thankfully, with the eDNA technique developed by the University of Notre Dame group, we now have a tool that can give early warning of small populations of Asian carp, or of Asian carp spawning events that would otherwise go undetected. (Sperm have a very high concentration of the mitochondrial DNA detected by the eDNA technique, therefore spawning events should be detectable by the assay.) However, it is important to remember in the coming years that failure of Asian carps to cause undesirable effects in the Great Lakes over the short term does not mean that undesirable effects have been avoided.

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APPENDIX: FORMS COMPLETED BY EXPERT PANELISTS

Expert 1
Risk Analysis Form
Issue: Evaluations of Risk of Asian Carps Establishing and Impacting the Great Lakes: Evaluations by Lock Operation Scenario

Instructions to Risk Assessor:

- Read the Background (Section I) prepared by the U.S. Army Corps of Engineers (Corps)
- Answer the Background Question in Section II
- Complete the Risk Assessments in Section III
    a. Results from all respondents will be tabulated
    b. If either a broad or detailed consensus is reached on risk, then that information will be included in the Team's Report to the U.S. Army Corps of Engineers
- Answer the additional questions, posed by the Corps, in Section IV and V
    a. Results from all respondents will be placed into a matrix; we will convene a call, if needed to attempt to develop a consensus recommendation
- If you have information to list in Sections VI and VII, then please do so.
- Submit this completed form to Mike Hoff (Michael_Hoff@fws.gov) within 48 hours of completion of our conference call.

Section I: Background

The Corps, which operates and maintains the navigation structures at the Chicago Lock and the T.J. O'Brien Lock, is considering modifications to lock operations and structures to reduce the risk of Asian carps (bighead and silver carps) passing through those locks in the Chicago Area Waterways (CAWs) into Lake Michigan. Possible modifications considered include minimizing impacts to the navigation industry and minimizing impacts from flooding. In the short term, the Corps is considering a range of alternative lock operations that will increase the time the locks will be closed. The alternatives include:

1. Continue current operations (no action, as required by NEPA)
2. Lock closure of 3 to 4 days a week and normal operations for the remaining days of the week
3. Lock closure of 1 week/month and normal operation for the remaining days of the month
4. Lock closure every other week and normal operations for the alternative weeks
5. Lock closure of 2 months with extensive monitoring to determine if Asian carps are in the CAWs. If no Asian carps are collected during the closed period, then lock operations will be resumed at the end of the closure period. Locks would remain open, unless there was a significant flow event (flow rate trigger TBD) that could trigger fish movement. Locks would be closed on an emergency basis while monitoring activities were executed.
6. Two-week lock closure, in mid-late April, during which extensive surveillance and monitoring is conducted. If no Asian carps are recovered, then the locks will operate normally. However, if there is a significant rainfall event that results in elevated flows (and a possible stimulus for Asian carps to move upstream) after the two weeks of surveillance/monitoring, then the locks would be closed as soon as possible. During the lock closure, resources could be mobilized to complete surveillance/monitoring for a week. If no Asian carps are captured during the week, then the locks would be reopened.

[Note: The Corps has not identified a flow trigger, but will be working with fisheries staff to identify a range of change that could necessitate an emergency closure.]

During the periods of lock closure there would be a monitoring effort undertaken up stream of the barriers that could include commercial fishing (netting), electro-fishing, the spot application of rotenone, eDNA testing and any other technologies that may be developed to help determine if an Asian carp population exists. If Asian carps are not captured, then the locks would be reopened for normal operations for the time identified. If an Asian carp(s) is/are caught above electrical barriers, the Corps, in coordination with other agencies, would follow a contingency plan which would potentially include immediate closure of the lock gates until the extent of population is determined and reopening the locks is determined not to be a significant risk for dispersing Asian carp into Lake Michigan. The Corps is also considering structural modifications to the navigation features in the CAWs including adding screens to the sluice gates at both locks and acoustic directional barriers in the CAWs to encourage movement of fish into areas that can be monitored for Asian carp.

To evaluate the proposed actions, the Corps needs expert input from you. Please complete the remaining sections of this form, which was developed to: 1) compare your evaluation of risk of establishment of bighead and silver carps in Lake Michigan under each of the Corps' presently considered lock operation scenarios, and 2) submit management-oriented questions, posed by the Corps, to you.

Section II: Risk Assessment Background Question

1. Where are populations of silver and bighead carp self sustaining? (Base your answer to this question on your expert opinion)
    b. I believe that there is no evidence that silver carp and bighead carp established self-sustaining populations either above the electrical barriers or any location within the Great Lakes. Yes___ No ___
    To the best of my knowledge, I believe this is a true statement.

        i. Uncertainty Code (see Uncertainty Codes and Descriptions on Page 8)

        ____

        ii. If yes, then please provide supporting information.

While I believe this is a true statement, all indications of AC above the barriers are based on eDNA evidence, not collections of actual fish. The QA / QC of this technique has not been released for professional review. While we have been made aware that respectable professionals from US EPA have assessed the technique as "actionable within a management context" (Chadderton testimony to Senate Environment Committee), this is not adequate information with which to perform an adequate risk analysis. Therefore analysis of risk is directly related to information not yet obtainable.

Section III: Risk Assessment

Probability of bighead and/or silver carp Establishment in Lake Michigan via pathways OTHER THAN Chicago and O'Brien Locks (i.e., all pathways other

than those locks including pathways such as, but not limited to, bait bucket, food trade, aquaculture). Complete Columns 1 and 2.

Element Rating (Low, Medium, High)	Uncertainty Code (VC-VU: See codes and descriptions below. You may also list specific uncertainties)	Element (Support Data with Reference Code: See codes and descriptions below)	Comments
		Bighead and silver carps are associated with the pathway. The Assessor answers whether there is a convincing temporal and spatial association with the pathway. Reference Code:	Please list pathways by descending order of risk to establishment of populations in Lake Michigan.
High	VC	Bighead and silver carps can survive above the electrical barrier and the Great Lakes. Reference Code:Kolar et al 2007, Rasmussen, 2002, Kolar and Lodge 2002, Rixon et. al. 2004	These fishes are similar in requirements to other fishes which inhabit these waters. Capture (not establishment) of these species has occurred in other Great Lakes.
High	RC	Bighead and silver carps can establish self-sustaining populations in the Great Lakes Reference Code: Kolar and Chapman 2005, Mandrak and Cudmore 2004, Rixon et. al. 2004	
High	RC	Bighead and silver carp can spread throughout a substantial portion of	***** Kolar and Lodge (2002) predict a slow rate of spread for

		the Great Lakes Reference Code: Kolar and Lodge 2002, Mandrak and Cudmore 2004	silver carps in the Great Lakes, with a non-nuisance level of impact. Comparatively, redear sunfish (Lepomis microlophus) have a similar predicted rate of spread (slow), but a level of impact rated as "nuisance".

Probability of bighead and/or silver carp Establishment in Lake Michigan via Chicago and O'Brien Locks: Scenario 1 -- No modification to current lock operations. Complete Columns 1 and 2.

Element Rating (Low, Medium, High)	Uncertainty Code (VC-VU: See codes and descriptions below. You may also list specific uncertainties)	Element (Support Data with Reference Code: See codes and descriptions below)	Recommendations
		Bighead and silver carps can establish self-sustaining populations in the Great Lakes Reference Code:	

Probability of bighead and/or silver carp Establishment in Lake Michigan via Chicago and O'Brien Locks: Modification of operations Scenario 2 -- Closing locks either 3 or 4 days/week, and then conducting normal operations for the remaining days of the week. Complete Columns 1 and 2. If Element Rating (Column 1), is either High or Medium, then enter in the Comments column any recommendations for specific management actions (e.g., chemical application, commercial fishing…) that could be realistically implemented to reduce the Element Rating, of Probability of Establishment, to Low.

Element Rating (Low, Medium, High)	Uncertainty Code (VC-VU: See codes and descriptions below. You may also list specific uncertainties)	Element (Support Data with Reference Code: See codes and descriptions below)	Recommendations
		Bighead and silver carps can establish self-sustaining populations in the Great Lakes Reference Code:	

Probability of bighead and/or silver carp Establishment in Lake Michigan via Chicago and O'Brien Locks: Modification of operations Scenario 3 – Closing locks 1 week/month, followed by normal operation for the remaining days of the month. Complete Columns 1 and 2. If Element Rating (Column 1), is either High or Medium, then enter in the Comments column any recommendations for specific management actions (e.g., chemical application, commercial fishing…) that could be realistically implemented to reduce the Element Rating, of Probability of Establishment, to Low.

Element Rating (Low, Medium, High)	Uncertainty Code (VC-VU: See codes and descriptions below. You may also list specific uncertainties)	Element (Support Data with Reference Code: See codes and descriptions below)	Recommendations
		Bighead and silver carps can establish self-sustaining populations in the Great Lakes Reference Code:	

Probability of bighead and/or silver carp Establishment in Lake Michigan via Chicago and O'Brien Locks: Modification of operations Scenario 4 -- Lock closure of every other week and normal operations for the alternative weeks. Complete Columns 1 and 2. If Element Rating (Column 1), is either High or Medium, then enter in the Comments column any recommendations for

specific management actions (e.g., chemical application, commercial fishing…) that could be realistically implemented to reduce the Element Rating, of Probability of Establishment, to Low.

Element Rating (Low, Medium, High)	Uncertainty Code (VC-VU: See codes and descriptions below. You may also list specific uncertainties)	Element (Support Data with Reference Code: See codes and descriptions below)	Recommendations
		Bighead and silver carps can establish self-sustaining populations in the Great Lakes Reference Code:	

Probability of bighead and/or silver carp Establishment in Lake Michigan via Chicago and O'Brien Locks: Modification of operations Scenario 5 -- Lock closure of two months with extensive monitoring to determine if Asian carps are in the Chicago Area Waterways. Complete Columns 1 and 2. If Element Rating (Column 1), is either High or Medium, then enter in the Comments column any recommendations for specific management actions (e.g., chemical application, commercial fishing…) that could be realistically implemented to reduce the Element Rating, of Probability of Establishment, to Low.

Element Rating (Low, Medium, High)	Uncertainty Code (VC-VU: See codes and descriptions below. You may also list specific uncertainties)	Element (Support Data with Reference Code: See codes and descriptions below)	Recommendations
		Bighead and silver carps can establish self-sustaining populations in the Great Lakes Reference Code:	

Probability of bighead and/or silver carp Establishment in Lake Michigan via Chicago and O'Brien Locks: Modification of operations Scenario 6 -- Two-

week lock closure, in mid-late April, during which extensive surveillance and monitoring is conducted. If no Asian carps are recovered, then the locks will operate normally. However, if there is a significant rainfall event that results in elevated flows (and a possibly stimulus for Asian carps to move upstream) after the two weeks of surveillance/monitoring, then the locks would be closed as soon as possible. During the lock closure, resources could be mobilized to complete surveillance/monitoring for a week. If no Asian carps are captured during the week, then the locks would be reopened. Complete Columns 1 and 2. If Element Rating (Column 1), is either High or Medium, then enter in the Comments column any recommendations for specific management actions (e.g., chemical application, commercial fishing…) that could be realistically implemented to reduce the Element Rating, of Probability of Establishment, to Low.

Element Rating (Low, Medium, High)	Uncertainty Code (VC-VU: See codes and descriptions below. You may also list specific uncertainties)	Element (Support Data with Reference Code: See codes and descriptions below)	Recommendations
		Bighead and silver carps can establish self-sustaining populations in the Great Lakes Reference Code:	

<u>Consequence of Establishment in Lake Michigan (no matter how introduced). Complete Columns 1 and 2</u>

Element Rating (Low, Medium, High)	Uncertainty code (VC-VU: See codes and descriptions below. You may also list specific uncertainties)	Element (Support Data with Reference Code: See codes and descriptions below)	Comments
Medium	MC	Estimate environmental impact if established in the Great Lakes Reference Code: Kolar and Lodge	*** Kolar and Lodge (2002) predict a slow rate of spread for silver carps in the Great Lakes, with a

		2002, J	non-nuisance level of impact. Comparatively, redear sunfish (Lepomis microlophus) have a similar predicted rate of spread (slow), but a level of impact rated as "nuisance".
Medium	RU	Estimate economic impact if established in the Great Lakes (based on your knowledge of fishing economics in the Great Lakes). The assessor is not expected to take on the role of an economist, but instead provides information on impacts the species would broadly have on fishery-related economics of the Great Lakes. Reference Code:G	
High	VC	Estimate impact on the Great Lakes from social and/or political influences (based on your knowledge of politics and societal concerns about Great Lakes fishing) .The assessor is not expected to take on the role of an political scientist or sociologist, but instead provides	

		information on impacts the species would broadly have on fishery-related societal and political issues of the Great Lakes. Reference Code:J	

Summary of Organism Risk Potential to the Great Lakes
(Note: Hoff will compile this summary)
Probability of Establishment Risk Category (from table above)=
Consequence of Establishment Risk Category (from table above) =
Organism Risk Potential =

Risk Category Definitions

Risk Category	Definition
Low	Acceptable risk – organism of little concern for establishment and/or ecological consequence (i.e., impact)
Medium	Unacceptable risk – organism of moderate concern
High	Unacceptable risk – organism of major concern

Uncertainty Codes and Descriptions

Uncertainty Code	Description
Very Certain	As certain as I can be
Reasonably Certain	Reasonably certain
Moderately Certain	More certain than not
Reasonably Uncertain	Reasonably uncertain
Very Uncertain	A guess

Reference codes and descriptions

Reference Code	Reference Type
G	General knowledge; no specific source
J	Judgmental evaluation
E	Extrapolation; information specific to pest not available. However, information available on similar organisms supplied
Author, year	Literature Cited

Section IV. Questions from the Corps. Please respond to the questions.

1. Is there an imminent threat that Asian carp (silver and bighead) will establish a sustainable population in Lake Michigan in the **near** future? Yes ___ No__X__. Uncertainty code __RC__
    d. If yes, then by when do you predict a sustainable population of bighead carp? Year ____. Lower 95% Confidence limit (Year) ____. Upper 95% Confidence limit (Year)___.
    e. If yes, then by when do you predict a sustainable population of silver carp?
        i. Year ____.
            1. Lower 95% Confidence limit (Year) ____
            2. Upper 95% Confidence limit (Year) ___.
2. Is there a threshold of Asian carp needed to establish a sustainable population? Yes __X_ No____. If yes, then what is that threshold (Note: Hoff's [Hoff Accepted] stock-recruit model is probably the best science support. He will draft a reply based on that model. All other experts can submit their beliefs.)
    f. Specifically, what number of Asian Carp would need to enter Lake Michigan to constitute a founding population that could, under the right environmental conditions, develop into a sustainable population in the Great Lakes? _____
3. A few Asian carp were found in Lake Erie in the past. Are the populations of Asian carps in Lake Erie self sustaining? Yes ___ No ___. Uncertainty code ___.
    g. If yes, then are conditions that support Asian Carp in Lake Erie similar to conditions in Lake Michigan near the Chicago Lock and T.J. O'Brien Locks? Yes___ No ___. [Please provide details, and cite any references used.]
4. In your opinion would a sustainable population of Asian Carp (both species) adversely impact the commercial fisheries of the GL? (use your ratings from Section II) High ___ Medium__C__ Low ___. Uncertainty code __RU_. [Please provide details, and cite any references used Kolar and Lodge (2002) predict a slow rate of spread for silver carps in the Great Lakes, with a non-nuisance level of impact. Comparatively, redear sunfish (Lepomis microlophus) have a similar predicted rate of spread (slow), but a level of impact rated as "nuisance".] GLFC (personal Comm.) has expressed concern that AC might develop into a commercial fishery resource and therefore some members of that group could expect sustainable management. It is unknown what those impacts could be, either positive or negative.

5. If the Asian Carp (both species) were allowed to migrate into the GL unimpeded how long would it take to establish demonstrable, sustainable populations capable of adversely impacting the commercial fisheries of the GL? (assuming they would result in adverse impacts)
    h. Year __2030_____
        i. Lower 95% Confidence limit (Year) __2020__
        ii. Upper 95% Confidence limit (Year) __2060_
6. Do Asian Carp carry any viral, bacterial, protozoan or other parasites or diseases that may adversely impact the native fish populations in the Great Lakes? (See Duane: Do you want to include the information in Kolar et al. 2007. Becky you can also respond. The remainder of us do not need to weigh in, unless we have detailed information/literature to cite) Yes ___ No ___. [Provide details, and cite references]

7. If the Asian Carp become established in the GL, then are there any beneficial impacts that would result from their presence? Yes _X__ No ___. Uncertainty code _RU__. [Provide details and cite any references] Potential competitor for zebra and quagga mussels… potential commercial species. Wild Guess on both of these statements!
8. If the Asian Carp (both species) establish sustainable populations, would they adversely impact any of the other established invasive aquatic organisms of the GL? Yes _X__ No___. Uncertainty code _RU__. [Provide details, and cite any references]
9. What are the triggers (high water flows, warm water, availability of Chlorophyll a etc.) for movement of Asian carp? Stainbrook et. al., 2007
10. Will warmer weather in the spring make it more likely that the Asian carp will migrate upstream toward Lake Michigan? Yes ___ No ___ [Explain and cite references]
11. Given the habits of the Asian Carp (both species) how likely are the fish to develop significant contaminant loads in their edible tissues?
    i. High ___ Medium ___ Low _X__
    j. Uncertainty code _RC__.
    k. [Explain and cite references] Rigowski et al. 2005

Section V. Risk Management Questions Posed by the Corps. Please respond to the questions.

1. If a single Asian carp is collected during monitoring accompanying a lock closure, then would the spot application of rotenone be an appropriate response? Yes __ No _X_. Uncertainty code __RU_
    b) List other desirable actions, in addition to rotenone treatment, that would be recommended. Concentration of other sampling gears.
    c) What is the risk associated with reopening the locks after at least 72 hours after completion of rotenone treatment? H___ M___ L__X_. Uncertainty Code__MC _Where is the rotenone applied? Above, below, or IN the lock?
    d)
2. If multiple Asian carps are collected during monitoring accompanying lock closure, then would the spot application of rotenone be an appropriate response? Yes __ No __. Uncertainty code ___
    e) List other desirable actions, in addition to rotenone treatment, that would be recommended.
    f) What is the risk associated with reopening the locks after at least 72 hours after completion of rotenone treatment? H___ M___ L___. Uncertainty Code___Same as above.
3. Would closing the lock gates be effective in significantly impeding the migration of Asian carp into Lake Michigan given that there may still be gaps of up to one inch between the lock gates and the sides or bottom of the canal? Yes __ No _X_. Uncertainty code __RU_
4. Could such gaps allow fish eggs or small juveniles to pass through the locks, and if so, what is the associated risk? Yes _X_ No __. Uncertainty code ___ This is two questions… As below in the comments, ARE JUVENILES present? Is there a sustainable , reproducing population in the CAWs above the barrier.

5. Would simply reducing the number of openings of the lock gates have a beneficial effect of impeding Asian Carp migration by itself, without additional control technologies? Yes __ No _X_. Uncertainty code _RC__
6. Given Asian carp behavior, would fewer openings statistically reduce the likelihood of Asian carp passing through the locks? Yes __ No _X_. Uncertainty code _MC__
7. Would Asian carps aggregate near the lock during closure and pass en mass through the locks during the scheduled openings? Yes _X_ No __. Uncertainty code _VU__
8. Would scheduling lock gate openings in conjunction with other control technologies such as netting, electro-fishing, rotenone, as discussed above, help deter the dispersal of Asian carps into Lake Michigan? Yes __ No __. Uncertainty code ___
9. Is it reasonable to assume that if netting, electro-fishing, rotenone, other monitoring technologies do not recover an Asian carp body, that a significant population of Asian carp is not present in the waterway? Yes _X_ No __. Uncertainty code _MC__
10. Is it reasonable to assume that a longer period of extensive monitoring (through netting, electro-fishing, rotenone, other technologies) without the recovery of an Asian carp body, provides increased confidence that a significant population of Asian carp is not present in the waterway? Yes _X_ No __. Uncertainty code _RC__ It is a matter of statistics… however, at some level, the return is not worth the extra resource expenditure… you more than double efforts to move from 95 to 98% confidence levels.
11. If no Asian Carp bodies are recovered through netting, electrofishing, rotenone and other monitoring activities upstream of the Barriers, how significant is the threat/risk to Lake Michigan? In other words, if the population is so small that a single individual cannot be recovered, what level of risk is present? Yes __ No __. Uncertainty code ___ SEE NOTES BELOW.
12. The Corps and Metropolitan Water Reclamation District are considering installing mesh grates over the sluice gates near the Chicago and O'Brien locks. Would a mesh grate with 1 inch openings be beneficial in deterring carp migration? Yes _X_ No __. Uncertainty code _MC__ Help with adults.
13. What significant monitoring would be adequate for helping to verify the absence or presence of Asian Carp in the canal system?
14. What methods and equipment are recommended?
    c) How long would a monitoring/event take (3-4 days, for example)
    d) How often would such monitoring/sampling events be recommended (once a month, twice a month or more, for example) to reduce risk of migration to an acceptable level? SAMPLING does not reduce risk.. It merely confirms presence / absence. Extensive, concentrated sampling for one week per month, or two-three weeks per quarter would be a substantial effort.
15. What are the biological indicators for the recommended monitoring methods and what are the thresholds for action for these indicators? POPULATION of AC in an area upstream of the barriers warrants further actions. Without faster laboratory results, we may never capture an Asian carp if there are only few present. Note that one AC captured could indicate many more not captured (Chapman, pers. Comm.).
16. At what duration of monitoring without capturing an Asian carp body is the risk of migration reduced to the extent that it would be reasonable to open the lock gates? For example, is our scenario of lock closure with corresponding monitoring of 1 week/month

and normal operation for the remaining days of the month, assuming no Asian carp body is recovered, reasonable from a risk perspective?

g) Why?

17. Is one of the other alternatives discussed in the Background (above) preferable from a risk perspective?

h) Why?

18. If an Asian carp movement trigger (such as high chlorophyll, warm water, high flow) is manifested in the CAWs should the locks be closed? Yes _*__ No _*__. Uncertainty code _MC__ YES if AC are present, NO if AC are still contained below the barrier.
19. Are there additional structural modifications or other actions you would recommend to be considered to reduce the risk of Asian carp dispersing into Lake Michigan?

Section VI: Additional Comments and Recommendations

List comments you wish to include in your Risk Assessment and recommendation for Risk Management

All of the scenarios above (establishment via XX pathway) require an assumption that fishes are present within the CAWs above the electrical barrier, and that the dispersal barrier is not functioning or not adequate to prevent upstream migration of Asian carp. This is an assumption which may or may not be accurate.

Further, all of the modified lock operation scenarios assume an establishment of AC into Lake Michigan via CSSC. Again, this assumption may not be correct. In other words, the answers to questions above are likely to change dramatically over time. In the next 60-days (i.e, while there are no (or few) AC in the CAWS near TJ O'Brien), the risk of population establishment (not an individual fish migration) into Lake Michigan is extremely low. However, in the future IF (and only IF) there is a catastrophic barrier failure, or migration of fishes through another route into CSSC or CAWs, resulting in an ESTABLISHMENT of a POPULATION in the CAWs, (resulting in more numbers of AC being found in CAWs), then the risk of ESTABLISHMENT would increase exponentially. For this reason, it is impossible to assess significant risk of establishment via TJ O'Brien lock *at this time.* For that reason, I choose not to assess an arbitrary risk, but only note that some permutation of scenario 6 is the only reasonable modification to operations which seems both biologically and economically justifiable.

Section VII: List of Important References

Hoff, M. H., M. A. Pegg, and K. Irons. Accepted. Management Implications from a Stock-recruit Model for Bighead Carp in Portions of the Illinois and Mississippi Rivers. International Asian Carp Symposium, American Fisheries Society Special Publication. Bethesda, MD.

Kolar, C. S., D. C. Chapman, W. R. Courtenay, C. M. Housel, J. D. Williams, and D. P. Jennings. 2007. Bigheaded carps: A biological synopsis and environmental risk assessment. American Fisheries Society Special Publication 33, Bethesda, MD.

Garvey, J. E., K. L. DeGrandchamp, and C. J. Williamson. 2006. Life history attributes of Asian carps in the Upper Mississippi River system. *ANSRP Technical Notes Collection* (ERDC/EL ANSRP-07-1), U.S. Army Corps of Engineer Research and Development Center, Vicksburg, MS. www.wes.army.mil/el/emrrp.

Mandrak, N.E. and B. Cudmore. 2004. Risk Assessment for Asian carps in Canada. Canadian Science Advisory Secretariat Research Document 2004/103, 48pp.

Rasmussen, J.L. 2001. The Cal-Sag and Chicago Sanitary and Ship Canal: A Perspective on the Spread and Control of Selected Aquatic Nuisance Fish Species. U.S. Fish and Wildlife Service, 4469 - 48th Avenue Court, Rock Island, IL 61201. 26 pp.

Rixon, Corrine A.M., Ian C. Duggan, Nathalie M.N. Bergeron, Anthony Ricciardi and Hugh MacIsaac. 2004. Invasion risks posed by the aquarium trade and live fish markets on the Laurentian Great Lakes. Biodiversity and Conservation 00:1-17, 2004.

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Karen M Stainbrook, John M Dettmers, and Thomas N Trudeau. 2007. Predicting suitable Asian carp habitat in the Illinois Waterway using geographic information systems. INHS Technical Report 2007 (7)

Rigowski et. al. 2005. A preliminary ecotoxicological assessment of Asian carp species in the Mississippi and Illinois Rivers. INHS Technical Report.

Expert 2
Risk Analysis Form
Issue: Evaluations of Risk of Asian Carps Establishing and Impacting the Great Lakes: Evaluations by Lock Operation Scenario

Instructions to Risk Assessor:

- Read the Background (Section I) prepared by the U.S. Army Corps of Engineers (Corps)
- Answer the Background Question in Section II
- Complete the Risk Assessments in Section III
    a. Results from all respondents will be tabulated
    b. If either a broad or detailed consensus is reached on risk, then that information will be included in the Team's Report to the U.S. Army Corps of Engineers
- Answer the additional questions, posed by the Corps, in Section IV and V
    a. Results from all respondents will be placed into a matrix; we will convene a call, if needed to attempt to develop a consensus recommendation
- If you have information to list in Sections VI and VII, then please do so.
- Submit this completed form to Mike Hoff (Michael_Hoff@fws.gov) within 48 hours of completion of our conference call.

Section I: Background

The Corps, which operates and maintains the navigation structures at the Chicago Lock and the T.J. O'Brien Lock, is considering modifications to lock operations and structures to reduce the risk of Asian carps (bighead and silver carps) passing through those locks in the Chicago Area Waterways (CAWs) into Lake Michigan. Possible modifications considered include minimizing impacts to the navigation industry and minimizing impacts from flooding. In the short term, the Corps is considering a range of alternative lock operations that will increase the time the locks will be closed. The alternatives include:

1. Continue current operations (no action, as required by NEPA)
2. Lock closure of 3 to 4 days a week and normal operations for the remaining days of the week
3. Lock closure of 1 week/month and normal operation for the remaining days of the month
4. Lock closure every other week and normal operations for the alternative weeks
5. Lock closure of 2 months with extensive monitoring to determine if Asian carps are in the CAWs. If no Asian carps are collected during the closed period, then lock operations will be resumed at the end of the closure period. Locks would remain open, unless there was a significant flow event (flow rate trigger TBD) that could trigger fish movement. Locks would be closed on an emergency basis while monitoring activities were executed.
6. Two-week lock closure, in mid-late April, during which extensive surveillance and monitoring is conducted. If no Asian carps are recovered, then the locks will operate normally. However, if there is a significant rainfall event that results in elevated flows (and a possible stimulus for Asian carps to move upstream) after the two weeks of surveillance/monitoring, then the locks would be closed as soon as possible. During the lock closure, resources could be mobilized to complete surveillance/monitoring for a week. If no Asian carps are captured during the week, then the locks would be reopened.

[Note: The Corps has not identified a flow trigger, but will be working with fisheries staff to identify a range of change that could necessitate an emergency closure.]

During the periods of lock closure there would be a monitoring effort undertaken up stream of the barriers that could include commercial fishing (netting), electro-fishing, the spot application of rotenone, eDNA testing and any other technologies that may be developed to help determine if an Asian carp population exists. If Asian carps are not captured, then the locks would be reopened for normal operations for the time identified. If an Asian carp(s) is/are caught above electrical barriers, the Corps, in coordination with other agencies, would follow a contingency plan which would potentially include immediate closure of the lock gates until the extent of population is determined and reopening the locks is determined not to be a significant risk for dispersing Asian carp into Lake Michigan. The Corps is also considering structural modifications to the navigation features in the CAWs including adding screens to the sluice gates at both locks and acoustic directional barriers in the CAWs to encourage movement of fish into areas that can be monitored for Asian carp.

To evaluate the proposed actions, the Corps needs expert input from you. Please complete the remaining sections of this form, which was developed to: 1) compare your evaluation of risk of establishment of bighead and silver carps in Lake Michigan under each of the Corps' presently considered lock operation scenarios, and 2) submit management-oriented questions, posed by the Corps, to you.

Section II: Risk Assessment Background Question

1. Where are populations of silver and bighead carp self sustaining? (Base your answer to this question on your expert opinion)
    c. I believe that there is no evidence that silver carp and bighead carp established self-sustaining populations either above the electrical barriers or any location within the Great Lakes. Yes_X__ No ___
        i. Uncertainty Code (see Uncertainty Codes and Descriptions on Page 8) _VC___
        ii. If yes, then please provide supporting information. Extensive netting and electrofishing surveys have been conducted on portions of the CAWS upstream of the electric barrier. These surveys have failed to turn up even one asian carp. If there was a self-sustaining population of asian carp in this area one would have been collected.

Section III: Risk Assessment

Probability of bighead and/or silver carp Establishment in Lake Michigan via pathways OTHER THAN Chicago and O'Brien Locks (i.e., all pathways other than those locks including pathways such as, but not limited to, bait bucket, food trade, aquaculture). Complete Columns 1 and 2.

	Uncertainty Code (VC-VU: See codes	Element (Support Data with	

Element Rating (Low, Medium, High)	and descriptions below. You may also list specific uncertainties)	Reference Code: See codes and descriptions below)	Comments
Low – Bait Bucket Low – Food Trade Low – Aquaculture Medium – Colonization from other sources ie. Lake Erie or other tributaries	MC MC MC RC	Bighead and silver carps are associated with the pathway. The Assessor answers whether there is a convincing temporal and spatial association with the pathway. Reference Code:	Regulations have been implemented that greatly reduce the likelihood of establishment via the first 3 elements. Seems likely that fish could find their way into Lake Michigan from sources outside of Illinois
Medium	RC	Bighead and silver carps can survive above the electrical barrier and the Great Lakes. Reference Code:	Asian Carp should be able to find enough food resources to survive above the barrier and at selected locations within Lake Michigan ie. Harbors and tributaries
Medium	VU	Bighead and silver carps can establish self-sustaining populations in the Great Lakes Reference Code:	It remains to be seen is asian carp can find enough food resources to establish self-sustaining populations in Lake Michigan
Medium	VU	Bighead and silver carp can spread throughout a substantial portion of the Great Lakes Reference Code:	Completely unknown at this time

Probability of bighead and/or silver carp Establishment in Lake Michigan via Chicago and O'Brien Locks: Scenario 1 -- No modification to current lock operations. Complete Columns 1 and 2.

Element Rating (Low, Medium, High)	Uncertainty Code (VC-VU: See codes and descriptions below. You may also list specific uncertainties)	Element (Support Data with Reference Code: See codes and descriptions below)	Recommendations
Medium	RU	Bighead and silver carps can establish self-sustaining populations in the Great Lakes Reference Code:	

Probability of bighead and/or silver carp Establishment in Lake Michigan via Chicago and O'Brien Locks: Modification of operations Scenario 2 -- Closing locks either 3 or 4 days/week, and then conducting normal operations for the remaining days of the week. Complete Columns 1 and 2. If Element Rating (Column 1), is either High or Medium, then enter in the Comments column any recommendations for specific management actions (e.g., chemical application, commercial fishing…) that could be realistically implemented to reduce the Element Rating, of Probability of Establishment, to Low.

Element Rating (Low, Medium, High)	Uncertainty Code (VC-VU: See codes and descriptions below. You may also list specific uncertainties)	Element (Support Data with Reference Code: See codes and descriptions below)	Recommendations
Medium	RU	Bighead and silver carps can establish self-sustaining populations in the Great Lakes Reference Code:	Intensive commercial fish removal could help reduce this rating to low

Probability of bighead and/or silver carp Establishment in Lake Michigan via Chicago and O'Brien Locks: Modification of operations Scenario 3 – Closing locks 1 week/month, followed by normal operation for the remaining days of

the month. Complete Columns 1 and 2. If Element Rating (Column 1), is either High or Medium, then enter in the Comments column any recommendations for specific management actions (e.g., chemical application, commercial fishing…) that could be realistically implemented to reduce the Element Rating, of Probability of Establishment, to Low.

Element Rating (Low, Medium, High)	Uncertainty Code (VC-VU: See codes and descriptions below. You may also list specific uncertainties)	Element (Support Data with Reference Code: See codes and descriptions below)	Recommendations
Medium	RU	Bighead and silver carps can establish self-sustaining populations in the Great Lakes Reference Code:	Intensive commercial fish removal could help reduce this rating to low

Probability of bighead and/or silver carp Establishment in Lake Michigan via Chicago and O'Brien Locks: Modification of operations Scenario 4 -- Lock closure of every other week and normal operations for the alternative weeks. Complete Columns 1 and 2. If Element Rating (Column 1), is either High or Medium, then enter in the Comments column any recommendations for specific management actions (e.g., chemical application, commercial fishing…) that could be realistically implemented to reduce the Element Rating, of Probability of Establishment, to Low.

Element Rating (Low, Medium, High)	Uncertainty Code (VC-VU: See codes and descriptions below. You may also list specific uncertainties)	Element (Support Data with Reference Code: See codes and descriptions below)	Recommendations
Medium	RU	Bighead and silver carps can establish self-sustaining populations in the Great Lakes Reference Code:	Intensive commercial fish removal could help reduce this rating to low

Probability of bighead and/or silver carp Establishment in Lake Michigan via Chicago and O'Brien Locks: Modification of operations Scenario 5 -- Lock closure of two months with extensive monitoring to determine if Asian carps are in the Chicago Area Waterways. Complete Columns 1 and 2. If Element Rating (Column 1), is either High or Medium, then enter in the Comments column any recommendations for specific management actions (e.g., chemical application, commercial fishing…) that could be realistically implemented to reduce the Element Rating, of Probability of Establishment, to Low.

Element Rating (Low, Medium, High)	Uncertainty Code (VC-VU: See codes and descriptions below. You may also list specific uncertainties)	Element (Support Data with Reference Code: See codes and descriptions below)	Recommendations
Medium	RU	Bighead and silver carps can establish self-sustaining populations in the Great Lakes Reference Code:	Intensive commercial fish removal could help reduce this rating to low

Probability of bighead and/or silver carp Establishment in Lake Michigan via Chicago and O'Brien Locks: Modification of operations Scenario 6 -- Two-week lock closure, in mid-late April, during which extensive surveillance and monitoring is conducted. If no Asian carps are recovered, then the locks will operate normally. However, if there is a significant rainfall event that results in elevated flows (and a possibly stimulus for Asian carps to move upstream) after the two weeks of surveillance/monitoring, then the locks would be closed as soon as possible. During the lock closure, resources could be mobilized to complete surveillance/monitoring for a week. If no Asian carps are captured during the week, then the locks would be reopened. Complete Columns 1 and 2. If Element Rating (Column 1), is either High or Medium, then enter in the Comments column any recommendations for specific management actions (e.g., chemical application, commercial fishing…) that could be realistically implemented to reduce the Element Rating, of Probability of Establishment, to Low.

	Uncertainty Code (VC-VU: See codes	Element (Support Data with	

Element Rating (Low, Medium, High)	and descriptions below. You may also list specific uncertainties)	Reference Code: See codes and descriptions below)	Recommendations
Medium	RU	Bighead and silver carps can establish self-sustaining populations in the Great Lakes Reference Code:	Intensive commercial fish removal could help reduce this rating to low

Consequence of Establishment in Lake Michigan (no matter how introduced). Complete Columns 1 and 2

Element Rating (Low, Medium, High)	Uncertainty code (VC-VU: See codes and descriptions below. You may also list specific uncertainties)	Element (Support Data with Reference Code: See codes and descriptions below)	Comments
		Estimate environmental impact if established in the Great Lakes Reference Code:	I am not qualified to comment
		Estimate economic impact if established in the Great Lakes (based on your knowledge of fishing economics in the Great Lakes). The assessor is not expected to take on the role of an economist, but instead provides information on impacts the species would broadly have on fishery-related economics of the Great Lakes. Reference Code:	I am not qualified to comment

		Estimate impact on the Great Lakes from social and/or political influences (based on your knowledge of politics and societal concerns about Great Lakes fishing) .The assessor is not expected to take on the role of an political scientist or sociologist, but instead provides information on impacts the species would broadly have on fishery-related societal and political issues of the Great Lakes. Reference Code:	I am not qualified to comment

Summary of Organism Risk Potential to the Great Lakes
(Note: Hoff will compile this summary)
Probability of Establishment Risk Category (from table above)=
Consequence of Establishment Risk Category (from table above) =
Organism Risk Potential =

Risk Category Definitions

Risk Category	Definition
Low	Acceptable risk – organism of little concern for establishment and/or ecological consequence (i.e., impact)
Medium	Unacceptable risk – organism of moderate concern
High	Unacceptable risk – organism of major concern

Uncertainty Codes and Descriptions

Uncertainty Code	Description
Very Certain	As certain as I can be
Reasonably Certain	Reasonably certain
Moderately Certain	More certain than not

Reasonably Uncertain	Reasonably uncertain
Very Uncertain	A guess

Reference codes and descriptions

Reference Code	Reference Type
G	General knowledge; no specific source
J	Judgmental evaluation
E	Extrapolation; information specific to pest not available. However, information available on similar organisms supplied
Author, year	Literature Cited

Section IV. Questions from the Corps. Please respond to the questions.

1. Is there an imminent threat that Asian carp (silver and bighead) will establish a sustainable population in Lake Michigan in the near future? Yes X No____. Uncertainty code RU
    l. If yes, then by when do you predict a sustainable population of bighead carp? Year ____. Lower 95% Confidence limit (Year) ____. Upper 95% Confidence limit (Year)___. Asian carp became established in Illinois anywhere from 10-15 years after they were first detected. As an example the first record of as Asian carp came from the Kaskaskia River in 1984. By 1994 asian carp were firmly established in that river.
    m. If yes, then by when do you predict a sustainable population of silver carp?
        i. Year ____.
            1. Lower 95% Confidence limit (Year) ____
            2. Upper 95% Confidence limit (Year) ___.
2. Is there a threshold of Asian carp needed to establish a sustainable population? Yes _X__ No____. If yes, then what is that threshold (Note: Hoff's [Hoff Accepted] stock-recruit model is probably the best science support. He will draft a reply based on that model. All other experts can submit their beliefs.)
    n. Specifically, what number of Asian Carp would need to enter Lake Michigan to constitute a founding population that could, under the right environmental conditions, develop into a sustainable population in the Great Lakes? There has to be a minimum number needed to establish a population, but I have no idea what that would be.
3. A few Asian carp were found in Lake Erie in the past. Are the populations of Asian carps in Lake Erie self sustaining? Yes ___ No ___. Uncertainty code VU.
    o. If yes, then are conditions that support Asian Carp in Lake Erie similar to conditions in Lake Michigan near the Chicago Lock and T.J. O'Brien Locks? Yes___ No ___. [Please provide details, and cite any references used.]
4. In your opinion would a sustainable population of Asian Carp (both species) adversely impact the commercial fisheries of the GL? (use your ratings from Section II) High ___ Medium____ Low X. Uncertainty code VC. [Please provide details, and cite any references used] There has been no commercial fishing activity in Lake Michigan from the state of Illinois for at least the last 10 years and likely much more than that. Therefore, there is no commercial fishery the asian carp could impact in Illinois.

5. If the Asian Carp (both species) were allowed to migrate into the GL unimpeded how long would it take to establish demonstrable, sustainable populations capable of adversely impacting the commercial fisheries of the GL? (assuming they would result in adverse impacts) Unknown and not an issue in Illinois (see question 4)
    p. Year _____
        i. Lower 95% Confidence limit (Year) ____
        ii. Upper 95% Confidence limit (Year) ___

6. Do Asian Carp carry any viral, bacterial, protozoan or other parasites or diseases that may adversely impact the native fish populations in the Great Lakes? (See Duane: Do you want to include the information in Kolar et al. 2007. Becky you can also respond. The remainder of us do not need to weigh in, unless we have detailed information/literature to cite) Yes ___ No ___. [Provide details, and cite references]
7. If the Asian Carp become established in the GL, then are there any beneficial impacts that would result from their presence? Yes ___ No _X__. Uncertainty code _RC__. [Provide details and cite any references]
8. If the Asian Carp (both species) establish sustainable populations, would they adversely impact any of the other established invasive aquatic organisms of the GL? Yes ___ No___. Uncertainty code _VU__. [Provide details, and cite any references]
9. What are the triggers (high water flows, warm water, availability of Chlorophyll a etc.) for movement of Asian carp? [Answer question and cite references] Others will be more qualified to answer this. In general terms an increase in flow seems to trigger upstream movement.
10. Will warmer weather in the spring make it more likely that the Asian carp will migrate upstream toward Lake Michigan? Yes X No ___ [Explain and cite references] Asian carp are cold-blooded and their activity will increase as water temperatures warm, the same as any other fish.
11. Given the habits of the Asian Carp (both species) how likely are the fish to develop significant contaminant loads in their edible tissues?
    q. High ___ Medium ___ Low ___
    r. Uncertainty code ___.
    s. [Explain and cite references]

Section V. Risk Management Questions Posed by the Corps. Please respond to the questions.

1. If a single Asian carp is collected during monitoring accompanying a lock closure, then would the spot application of rotenone be an appropriate response? Yes __ No __. Uncertainty code ___ Depends on water temperatures, rotenone application should not be conducted if the water temps are too low.
    i) List other desirable actions, in addition to rotenone treatment, that would be recommended. If water temperatures are too low, intensive commercial fish removal would be more effective.
    j) What is the risk associated with reopening the locks after at least 72 hours after completion of rotenone treatment? H___ M___ L_X__. Uncertainty Code_RU__
2. If multiple Asian carps are collected during monitoring accompanying lock closure, then would the spot application of rotenone be an appropriate response? Yes __ No __.

Uncertainty code ___ Depends on water temperatures, rotenone application should not be conducted if the water temps are too low.

k) List other desirable actions, in addition to rotenone treatment, that would be recommended. If water temperatures are too low, intensive commercial fish removal would be more effective

l) What is the risk associated with reopening the locks after at least 72 hours after completion of rotenone treatment? H___ M___ L_X__. Uncertainty Code_RU__

3. Would closing the lock gates be effective in significantly impeding the migration of Asian carp into Lake Michigan given that there may still be gaps of up to one inch between the lock gates and the sides or bottom of the canal? Yes X__ No __. Uncertainty code _RC__ This would prohibit adult fish from entering Lake Michigan
4. Could such gaps allow fish eggs or small juveniles to pass through the locks, and if so, what is the associated risk? Yes X__ No __. Uncertainty code RC – The passage of juveniles or fertilized eggs would still provide a mechanism for asian carp to enter Lake Michigan
5. Would simply reducing the number of openings of the lock gates have a beneficial effect of impeding Asian Carp migration by itself, without additional control technologies? Yes X No __. Uncertainty code ___ Reducing the number of lock openings would reduce the number of opportunities that asian carp have available to enter Lake Michigan. However, if lock openings coincide with a period of asian carp movement this benefit would be lost.
6. Given Asian carp behavior, would fewer openings statistically reduce the likelihood of Asian carp passing through the locks? Yes X No __. Uncertainty code ___ See Question 5
7. Would Asian carps aggregate near the lock during closure and pass en mass through the locks during the scheduled openings? Yes X__ No __. Uncertainty code ___ Given that locks have to be opened and closed in order to operate, this scenario could occur under any operating schedule.
8. Would scheduling lock gate openings in conjunction with other control technologies such as netting, electro-fishing, rotenone, as discussed above, help deter the dispersal of Asian carps into Lake Michigan? Yes X No __. Uncertainty code RC This seems like an extraordinary measure to implement, given that extensive netting and electrofishing has yet to yield the collection of a single asian carp.
9. Is it reasonable to assume that if netting, electro-fishing, rotenone, other monitoring technologies do not recover an Asian carp body, that a significant population of Asian carp is not present in the waterway? Yes X__ No __. Uncertainty code _RC__
10. Is it reasonable to assume that a longer period of extensive monitoring (through netting, electro-fishing, rotenone, other technologies) without the recovery of an Asian carp body, provides increased confidence that a significant population of Asian carp is not present in the waterway? Yes X No __. Uncertainty code MC Statistical analysis needs to be conducted to answer questions such as how much sampling effort is needed to have a reasonable chance of detecting as asian carp.
11. If no Asian Carp bodies are recovered through netting, electrofishing, rotenone and other monitoring activities upstream of the Barriers, how significant is the threat/risk to Lake Michigan? In other words, if the population is so small that a single individual cannot be recovered, what level of risk is present? Yes __ No __. Uncertainty code ___ Until an

asian carp is collected upstream of the barriers, the threat of them establishing in Lake Michigan is low.

12. The Corps and Metropolitan Water Reclamation District are considering installing mesh grates over the sluice gates near the Chicago and O'Brien locks. Would a mesh grate with 1 inch openings be beneficial in deterring carp migration? Yes __ No X_. Uncertainty code _MC__ Juveniles and eggs could pass through these structures.
13. What significant monitoring would be adequate for helping to verify the absence or presence of Asian Carp in the canal system? This needs to be answered by somebody with experience in designing sampling strategies to detect rare/elusive species.
14. What methods and equipment are recommended?
    e) How long would a monitoring/event take (3-4 days, for example)
    f) How often would such monitoring/sampling events be recommended (once a month, twice a month or more, for example) to reduce risk of migration to an acceptable level? See Question 14
15. What are the biological indicators for the recommended monitoring methods and what are the thresholds for action for these indicators?
16. At what duration of monitoring without capturing an Asian carp body is the risk of migration reduced to the extent that it would be reasonable to open the lock gates? For example, is our scenario of lock closure with corresponding monitoring of 1 week/month and normal operation for the remaining days of the month, assuming no Asian carp body is recovered, reasonable from a risk perspective? See Question 14
    m) Why?
17. Is one of the other alternatives discussed in the Background (above) preferable from a risk perspective?
    n) Why?
18. If an Asian carp movement trigger (such as high chlorophyll, warm water, high flow) is manifested in the CAWs should the locks be closed? Yes X___ No ___. Uncertainty code ___ Provided these triggers are accurately identified and validated they could be used to determine lock operation
19. Are there additional structural modifications or other actions you would recommend to be considered to reduce the risk of Asian carp dispersing into Lake Michigan? Increased commercial harvest of asian carps from the Illinois River downstream of the barriers.

Section VI: Additional Comments and Recommendations

List comments you wish to include in your Risk Assessment and recommendation for Risk Management

There is a pressing need for a statistically sound and defensible sampling/monitoring strategy.

Section VII: List of Important References

Hoff, M. H., M. A. Pegg, and K. Irons. Accepted. Management Implications from a Stock-recruit Model for Bighead Carp in Portions of the Illinois and Mississippi Rivers. International Asian Carp Symposium, American Fisheries Society Special Publication. Bethesda, MD.

Kolar, C. S., D. C. Chapman, W. R. Courtenay, C. M. Housel, J. D. Williams, and D. P. Jennings. 2007. Bigheaded carps: A biological synopsis and environmental risk assessment. American Fisheries Society Special Publication 33, Bethesda, MD.

Expert 3
Risk Analysis Form
Issue: Evaluations of Risk of Asian Carps Establishing and Impacting the Great Lakes: Evaluations by Lock Operation Scenario

Section II: Risk Assessment Background Question

1. Where are populations of silver and bighead carp self sustaining? (Base your answer to this question on your expert opinion) ***Dresden Island Pool***
    d. I believe that there is no evidence that silver carp and bighead carp established self-sustaining populations either above the electrical barriers or any location within the Great Lakes. Yes___ No _**X**_
        i. Uncertainty Code (see Uncertainty Codes and Descriptions on Page 8) _**RU**_
        ii. If yes, then please provide supporting information.

Section III: Risk Assessment

Probability of bighead and/or silver carp Establishment in Lake Michigan via pathways OTHER THAN Chicago and O'Brien Locks (i.e., all pathways other than those locks including pathways such as, but not limited to, bait bucket, food trade, aquaculture). Complete Columns 1 and 2.

Element Rating (Low, Medium, High)	Uncertainty Code (VC-VU: See codes and descriptions below. You may also list specific uncertainties)	Element (Support Data with Reference Code: See codes and descriptions below)	Comments
Medium	**RU**	Bighead and silver carps are associated with the pathway. The Assessor answers whether there is a convincing temporal and spatial association with the pathway. Reference Code: **J**	Please list pathways by descending order of risk to establishment of populations in Lake Michigan. **1. Bait Bucket** **2. Malicious Release** **3. Food trade**
High	**RC**	Bighead and silver carps can survive above the electrical barrier and the Great Lakes. Reference Code: **G**	
Medium	**MC**	Bighead and silver carps can establish self-sustaining populations in the Great Lakes Reference Code: **G**	
Medium	**MC**	Bighead and silver carp can spread throughout a substantial portion of the Great Lakes Reference Code: **G**	

Probability of bighead and/or silver carp Establishment in Lake Michigan via Chicago and O'Brien Locks: Scenario 1 -- No modification to current lock operations. Complete Columns 1 and 2.

Element Rating (Low, Medium, High)	Uncertainty Code (VC-VU: See codes and descriptions below. You may also list specific uncertainties)	Element (Support Data with Reference Code: See codes and descriptions below)	Recommendations
High	**MC**	Bighead and silver carps can establish self-sustaining populations in the Great Lakes Reference Code: **G**	**Recommend dropping this scenario.**

Probability of bighead and/or silver carp Establishment in Lake Michigan via Chicago and O'Brien Locks: Modification of operations Scenario 2 -- Closing locks either 3 or 4 days/week, and then conducting normal operations for the remaining days of the week. Complete Columns 1 and 2. If Element Rating (Column 1), is either High or Medium, then enter in the Comments column any recommendations for specific management actions (e.g., chemical application, commercial fishing…) that could be realistically implemented to reduce the Element Rating, of Probability of Establishment, to Low.

Element Rating (Low, Medium, High)	Uncertainty Code (VC-VU: See codes and descriptions below. You may also list specific uncertainties)	Element (Support Data with Reference Code: See codes and descriptions below)	Recommendations
Medium	**MC**	Bighead and silver carps can establish self-sustaining populations in the Great Lakes Reference Code: **G**	**3 or 4 days is not enough time to complete monitoring and assess monitoring results. Recommend dropping this scenario**.

Probability of bighead and/or silver carp Establishment in Lake Michigan via Chicago and O'Brien Locks: Modification of operations Scenario 3 – Closing locks 1 week/month, followed by normal operation for the remaining days of the month. Complete Columns 1 and 2. If Element Rating (Column 1), is either High or Medium, then enter in the Comments column any recommendations for specific management actions (e.g., chemical application, commercial fishing…) that could be realistically implemented to reduce the Element Rating, of Probability of Establishment, to Low.

Element Rating (Low, Medium, High)	Uncertainty Code (VC-VU: See codes and descriptions below. You may also list specific uncertainties)	Element (Support Data with Reference Code: See codes and descriptions below)	Recommendations
Medium	**MC**	Bighead and silver carps can establish self-sustaining populations in the Great Lakes Reference Code: **G**	**Too much time (three weeks) in between monitoring events. Also, one week may barely be enough time to complete monitoring and assess monitoring results. Recommend dropping this scenario.**

Probability of bighead and/or silver carp Establishment in Lake Michigan via Chicago and O'Brien Locks: Modification of operations Scenario 4 -- Lock closure of every other week and normal operations for the alternative weeks. Complete Columns 1 and 2. If Element Rating (Column 1), is either High or Medium, then enter in the Comments column any recommendations for specific management actions (e.g., chemical application, commercial fishing…) that could be realistically implemented to reduce the Element Rating, of Probability of Establishment, to Low.

Element Rating (Low, Medium, High)	Uncertainty Code (VC-VU: See codes and descriptions below. You may also list specific uncertainties)	Element (Support Data with Reference Code: See codes and descriptions below)	Recommendations
Medium	**MC**	Bighead and silver carps can establish self-sustaining populations in the Great Lakes Reference Code: **G**	**(One week may barely be enough time to complete monitoring and assess monitoring results. Recommend 2-week closure with monitoring followed by one week of normal lock operation, however, given the difficulty of effectively monitoring deep-draft channels, would be uncertain if even one week of normal operation is not risky. See other recommendations in answers to questions below.)**

Probability of bighead and/or silver carp Establishment in Lake Michigan via Chicago and O'Brien Locks: Modification of operations Scenario 5 -- Lock closure of two months with extensive monitoring to determine if Asian carps are in the Chicago Area Waterways. Complete Columns 1 and 2. If Element Rating (Column 1), is either High or Medium, then enter in the Comments column any recommendations for specific management actions (e.g., chemical application, commercial fishing…) that could be realistically implemented to reduce the Element Rating, of Probability of Establishment, to Low.

Element Rating (Low, Medium, High)	Uncertainty Code (VC-VU: See codes and descriptions below. You may also list specific uncertainties)	Element (Support Data with Reference Code: See codes and descriptions below)	Recommendations
Medium	**RU**	Bighead and silver carps can establish self-sustaining populations in the Great Lakes Reference Code: **G**	**Yes, then follow up with a modified (See above recommendations) Scenario 4 operation.**

Probability of bighead and/or silver carp Establishment in Lake Michigan via Chicago and O'Brien Locks: Modification of operations Scenario 6 -- Two-week lock closure, in mid-late April, during which extensive surveillance and monitoring is conducted. If no Asian carps are recovered, then the locks will operate normally. However, if there is a significant rainfall event that results in elevated flows (and a possibly stimulus for Asian carps to move upstream) after the two weeks of surveillance/monitoring, then the locks would be closed as soon as possible. During the lock closure, resources could be mobilized to complete surveillance/monitoring for a week. If no Asian carps are captured during the week, then the locks would be reopened. Complete Columns 1 and 2. If Element Rating (Column 1), is either High or Medium, then enter in the Comments column any recommendations for specific management actions (e.g., chemical application, commercial fishing…) that could be realistically implemented to reduce the Element Rating, of Probability of Establishment, to Low.

Element Rating (Low, Medium, High)	Uncertainty Code (VC-VU: See codes and descriptions below. You may also list specific uncertainties)	Element (Support Data with Reference Code: See codes and descriptions below)	Recommendations
Medium	**MC**	Bighead and silver carps can establish self-sustaining populations in the Great Lakes Reference Code: **G**	**Due to the nature of CAWS and the Chicago area weather patterns, significant movement of Asian carp may occur at a moment's notice at any time. A modified (See above recommendations) Scenario 4 operation is recommended.**

Consequence of Establishment in Lake Michigan (no matter how introduced). Complete Columns 1 and 2

Element Rating (Low, Medium, High)	Uncertainty code (VC-VU: See codes and descriptions below. You may also list specific uncertainties)	Element (Support Data with Reference Code: See codes and descriptions below)	Comments
High	**MC**	Estimate environmental impact if established in the Great Lakes Reference Code: **G**	
Medium	**MC**	Estimate economic impact if established in the Great Lakes (based on your knowledge of fishing economics in the Great Lakes). The assessor is not expected to take on the role of an economist, but instead provides information on impacts the species would broadly have on fishery-related economics of the Great Lakes. Reference Code: **G**	
High	**RC**	Estimate impact on the Great Lakes from social and/or political influences (based on your knowledge of politics and societal concerns about Great Lakes fishing) .The assessor is not expected to take on the role of an political scientist or sociologist, but	

		instead provides information on impacts the species would broadly have on fishery-related societal and political issues of the Great Lakes. Reference Code: **G**	

Section IV. Questions from the Corps. Please respond to the questions.

1. Is there an imminent threat that Asian carp (silver and bighead) will establish a sustainable population in Lake Michigan in the near future? Yes _**X**_ No____. Uncertainty code _**RU**_, **assuming near future means next 30 years.**
    t. If yes, then by when do you predict a sustainable population of bighead carp? Year _**2030**_. Lower 95% Confidence limit (Year) _**2020**_. Upper 95% Confidence limit (Year) _**2040**_.
    u. If yes, then by when do you predict a sustainable population of silver carp?
        i. Year _**2030**_.
            1. Lower 95% Confidence limit (Year) _**2020**_
            2. Upper 95% Confidence limit (Year) _**2040**_.
2. Is there a threshold of Asian carp needed to establish a sustainable population? Yes _X_ No____. If yes, then what is that threshold (Note: Hoff's [Hoff Accepted] stock-recruit model is probably the best science support. He will draft a reply based on that model. All other experts can submit their beliefs.)
    v. Specifically, what number of Asian Carp would need to enter Lake Michigan to constitute a founding population that could, under the right environmental conditions, develop into a sustainable population in the Great Lakes? _**Several dozen adults, few hundred YOY**_
3. A few Asian carp were found in Lake Erie in the past. Are the populations of Asian carps in Lake Erie self sustaining? Yes ___ No _**X**_. Uncertainty code _**RU**_.
    w. If yes, then are conditions that support Asian Carp in Lake Erie similar to conditions in Lake Michigan near the Chicago Lock and T.J. O'Brien Locks? Yes___ No ___. [Please provide details, and cite any references used.]
4. In your opinion would a sustainable population of Asian Carp (both species) adversely impact the commercial fisheries of the GL? (use your ratings from Section II) High ___ Medium _**X**_ Low ___. Uncertainty code _**MC**_. [Please provide details, and cite any references used]
5. If the Asian Carp (both species) were allowed to migrate into the GL unimpeded how long would it take to establish demonstrable, sustainable populations capable of adversely impacting the commercial fisheries of the GL? (assuming they would result in adverse impacts)
    x. Year _**2025**_
        i. Lower 95% Confidence limit (Year) _**2015**_

ii. Upper 95% Confidence limit (Year) _**2035**_

6. Do Asian Carp carry any viral, bacterial, protozoan or other parasites or diseases that may adversely impact the native fish populations in the Great Lakes? (See Duane: Do you want to include the information in Kolar et al. 2007. Becky you can also respond. The remainder of us do not need to weigh in, unless we have detailed information/literature to cite) Yes ___ No ___. [Provide details, and cite references] **Not evaluated.**
7. If the Asian Carp become established in the GL, then are there any beneficial impacts that would result from their presence? Yes _**X**_ No ___. Uncertainty code _**MC**_. [Provide details and cite any references] **May compete with zebra mussel, however, this is a very small benefit.**
8. If the Asian Carp (both species) establish sustainable populations, would they adversely impact any of the other established invasive aquatic organisms of the GL? Yes _**X**_ No___. Uncertainty code _**MC**_. [Provide details, and cite any references] **Would compete with planktonivors.**
9. What are the triggers (high water flows, warm water, availability of Chlorophyll a etc.) for movement of Asian carp? [Answer question and cite references] **Higher temperatures and periods of increased stream flow, however, such condition are common – less related to normal seasonal fluctuations - throughout the year in CAWS. In other words, it would be difficult to identify specific triggers in CAWS.**
10. Will warmer weather in the spring make it more likely that the Asian carp will migrate upstream toward Lake Michigan? Yes _**X**_ No ___ [Explain and cite references] **Perhaps. However, artificially higher temperatures and episodic, rain and snowmelt related increases in stream flow can and do occur frequently and without much warning throughout the year. It may not be wise to focus on specific triggers during specific seasons in CAWS.**
11. Given the habits of the Asian Carp (both species) how likely are the fish to develop significant contaminant loads in their edible tissues?
    y. High ___ Medium ___ Low _**X**_
    z. Uncertainty code _**RU**_.
    aa. [Explain and cite references] **Feed directly on suspended plankton and grow rapidly, which may lessen opportunities and maginitude of biomagnification.**

Section V. Risk Management Questions Posed by the Corps. Please respond to the questions.

1. If a single Asian carp is collected during monitoring accompanying a lock closure, then would the spot application of rotenone be an appropriate response? Yes _**X**_ No __. Uncertainty code _**MC**_. **Given Asian carps' ability to defy capture through traditional methods, one carp collected through such methods may represent only the tip of the population iceburg.**
    o) List other desirable actions, in addition to rotenone treatment, that would be recommended. **No other chemical measures come to mind that would not present greater safety hazards (e.g. chlorination-dechlorination; ammonia and pH adjustment and readjustment), or that would not result in potentially greater downstream collateral damage, or that could not be implemented due to virtually insurmountable regulatory hurdles (By-passing ammonia rich, primary-treated, domestic wastewater effluent.)**

p) What is the risk associated with reopening the locks after at least 72 hours after completion of rotenone treatment? H___ M _**X**_ L___. Uncertainty Code _**MC**_. **A moderate risk of Asian carp passage would continue, if at least one Asian carp body was collected prior to rotenoning and rotenoning was only performed through spot application in limited areas. Risk would be lessened the more wide-spread the rotenone operation. Again, given Asian carps' ability to defy capture through traditional methods, one carp collected through such methods could represent only the tip of the population iceburg.**

2. If multiple Asian carps are collected during monitoring accompanying lock closure, then would the spot application of rotenone be an appropriate response? Yes __ No _**X**_. Uncertainty code _**MC**_

   q) List other desirable actions, in addition to rotenone treatment, that would be recommended. **More thorough, widespread rotenoning.**

   r) What is the risk associated with reopening the locks after at least 72 hours after completion of rotenone treatment? H___ M___ L_**X**_. Uncertainty Code_**RC**_, **assuming rotenone application was thorough down through the electrical barrier.**

3. Would closing the lock gates be effective in significantly impeding the migration of Asian carp into Lake Michigan given that there may still be gaps of up to one inch between the lock gates and the sides or bottom of the canal? Yes __ No _**X**_. Uncertainty code _**RC**_**, if other controls are not also instituted.**
4. Could such gaps allow fish eggs or small juveniles to pass through the locks, and if so, what is the associated risk? Yes _**X**_ No __. Uncertainty code _**MC**_, **especially when there is little head differential between the lake and CAWS or when the lake level is lower than CAWS. Note also that multi-directional, multi-depth density currents occur in Chicago and Calumet Rivers, especially in areas near the locks at interfaces between dense treatment plant and land runoff water and lake water.**
5. Would simply reducing the number of openings of the lock gates have a beneficial effect of impeding Asian Carp migration by itself, without additional control technologies? Yes __ No _**X**_. Uncertainty code _**MC**_ **Not if lock operations continue in a manner that allows untreated CAWS water to pass through to the lake (Assuming there is evidence of Asian carp in CAWS upstream of the electrical barrier).**
6. Given Asian carp behavior, would fewer openings statistically reduce the likelihood of Asian carp passing through the locks? Yes __ No _**X**_. Uncertainty code _**MC**_ **It depends on hydraulic conditions at the time of openings. If openings occurred when adult carp are on the move, and the lake level is higher than CAWS or navigation makeup is occurring, then risk is higher for adults to pass through. If flow is stagnant or density currents are moving flow towards the lock, then risk is higher for eggs and/or larvae to pass through.**
7. Would Asian carps aggregate near the lock during closure and pass en mass through the locks during the scheduled openings? Yes _**X**_ No __. Uncertainty code _**RU**_
8. Would scheduling lock gate openings in conjunction with other control technologies such as netting, electro-fishing, rotenone, as discussed above, help deter the dispersal of Asian carps into Lake Michigan? Yes _**X**_ No __. Uncertainty code _**RU**_ **Depends upon the extent of rotenoning.**

9. Is it reasonable to assume that if netting, electro-fishing, rotenone, other monitoring technologies do not recover an Asian carp body, that a significant population of Asian carp is not present in the waterway? Yes __ No _**X**_. Uncertainty code _**RU**_
10. Is it reasonable to assume that a longer period of extensive monitoring (through netting, electro-fishing, rotenone, other technologies) without the recovery of an Asian carp body, provides increased confidence that a significant population of Asian carp is not present in the waterway? Yes _**X**_ No __. Uncertainty code _**RU**_ **Again, it depends on the extent of rotenoning. Even still, rotenone killed carp may sink and not be recovered.**
11. If no Asian Carp bodies are recovered through netting, electrofishing, rotenone and other monitoring activities upstream of the Barriers, how significant is the threat/risk to Lake Michigan? In other words, if the population is so small that a single individual cannot be recovered, what level of risk is present? **(The assumption that a single recovered individual means the population is so small is a weak one.)** Yes __ No __. **(These are not yes-no questions.)** Uncertainty code _**MC**_ **Assuming limited target rotenoning is part of the monitoring regime, I am moderately certainty that there is a risk, even if a carp body is not recovered.**
12. The Corps and Metropolitan Water Reclamation District are considering installing mesh grates over the sluice gates near the Chicago and O'Brien locks. Would a mesh grate with 1 inch openings be beneficial in deterring carp migration? Yes _**X**_ No _**X**_. Uncertainty code _**RC & RU**_ **Assuming locks are not operating, yes for adult carp and no for eggs and carp larvae.**
13. What significant monitoring would be adequate for helping to verify the absence or presence of Asian Carp in the canal system? **Other than eDNA, none that I know of. Full rotenoning may be the next best method, except that rotenoned Asian carp have a tendency to sink and not be recoverable.**
14. What methods and equipment are recommended?
    g) How long would a monitoring/event take (3-4 days, for example) **A few weeks.**
    h) How often would such monitoring/sampling events be recommended (once a month, twice a month or more, for example) to reduce risk of migration to an acceptable level? **Daily, except that the lag time for eDNA analysis time turnaround is problematic.**
15. What are the biological indicators for the recommended monitoring methods and what are the thresholds for action for these indicators? **Death of sentinel fish, in the case of determining whether rotenone was effective. Unknown for other methods.**
16. At what duration of monitoring without capturing an Asian carp body is the risk of migration reduced to the extent that it would be reasonable to open the lock gates? For example, is our scenario of lock closure with corresponding monitoring of 1 week/month and normal operation for the remaining days of the month, assuming no Asian carp body is recovered, reasonable from a risk perspective? **Unknown.**
    s) Why? Traditional monitoring methods are fairly ineffective in deep-draft channels, and CAWS is principally a large deep-draft channel.
17. Is one of the other alternatives discussed in the Background (above) preferable from a risk perspective? **Not really.**
    t) Why? **See comments throughout rest of response.**

18. If an Asian carp movement trigger (such as high chlorophyll, warm water, high flow) is manifested in the CAWs should the locks be closed? Yes _**X**_ No ___. Uncertainty code _**RU**_ **In an all-season warm water and frequently erratic flow system such as CAWS, I am uncertain whether there would be definable triggers for movement. Carp may frequently be triggered to move, perhaps all the time.**
19. Are there additional structural **or operational** modifications or other actions you would recommend to be considered to reduce the risk of Asian carp dispersing into Lake Michigan?
    - **u) Don't use the gate valve controlling works to perform discretionary and navigation make-up diversions. Rather, only use the Wilmette Pump station pumps and the pumps located at Chicago Harbor. The pumps at Chicago Harbor would have to be modified (reversed); presently, they are set up to only pump Chicago River water out of CAWS and into Lake Michigan.**
    - **v) In order to further reduce the frequency of having to backflow CAWS out to the lake, lower CAWS levels 3 or more feet below "normal navigational level" (A 2-ft. lowering is typical and may be specified in USACE regulation) in advance of a storm and consider redefining and maintaining "normal navigational level" at an elevation below current operations in order to gain more storm retention space in CAWS.**
    - **w) Prioritize the north half of the TARP Mainstream service area for capture by the TARP Mainstream tunnels. The north half of the service area is the principle contributor of storm water that must be diverted out to the lake through the Chicago lock and controlling works.**

Section VI: Additional Comments and Recommendations

List comments you wish to include in your Risk Assessment and recommendation for Risk Management

As an additional monitoring tool, suggest making underwater recordings of boat motor sounds that elicit jumping behavior in Asian carp and playing such recordings back sub-surfacely from a travelling watercraft throughout areas being monitored.

Section VII: List of Important References

Hoff, M. H., M. A. Pegg, and K. Irons. Accepted. Management Implications from a Stock-recruit Model for Bighead Carp in Portions of the Illinois and Mississippi Rivers. International Asian Carp Symposium, American Fisheries Society Special Publication. Bethesda, MD.

Kolar, C. S., D. C. Chapman, W. R. Courtenay, C. M. Housel, J. D. Williams, and D. P. Jennings. 2007. Bigheaded carps: A biological synopsis and environmental risk assessment. American Fisheries Society Special Publication 33, Bethesda, MD. **(Read by this participant)**

Additional Reference Relied Upon By this Participant

CDM for Illinois EPA, Bureau of Water. August 2007. Chicago Area Waterway System (CAWS) Use Attainability Analysis.

Illinois Pollution Control Board, R2008-009, In the Matter of: Water Quality Standards and Effluent Limitations for the Chicago Area Waterway System (CAWS) and the Lower Des Plaines River: Proposed Amendments to 35 Ill. Adm. Code 301, 302, 303 and 304. (http://www.ipcb.state.il.us/COOL/External/CaseView.aspx?case=13363)

Institute for Urban Risk Management, Marquette University, Milwaukee, WI for MWRDGC, Department of Research and Development. September 2003. Hydraulic Calibration of an Unsteady Flow Model for the Chicago Waterway System, R&D Report No. 03-18.

Leung, B., D. M. Lodge, D. finnoff, J. F. Shogren, M. A. Lewis and G. Lamberti. 2002. An ounce of prevention or a pound of cure: bioeconomic risk analysis of invasive species. Proc. R. Soc., London. 269, 2407-2413.

Tetra Tech, Inc for U.S. EPA Office of Science and Technology. August 13, 2008. Non-Indigenous Species Migration Through the Chicago Area Waterways (CAWs): Comparative Risk of Water Quality Criteria.

Ven Te Chow Hydrosystems Laboratory, Department of Civil and Environmental Engineering, University of Illinois at Urbana-Champaign for MWRDG, Department of Research and Development. December 2003. Hydraulic Model Study of Chicago River Density Currents, R&DReport No. 03-26.

Expert 4 did not submit a risk analysis form.

Expert 5
Risk Analysis Form
Issue: Evaluations of Risk of Asian Carps Establishing and Impacting the Great Lakes: Evaluations by Lock Operation Scenario

Instructions to Risk Assessor:

- Read the Background (Section I) prepared by the U.S. Army Corps of Engineers (Corps)
- Answer the Background Question in Section II
- Complete the Risk Assessments in Section III
    a. Results from all respondents will be tabulated
    b. If either a broad or detailed consensus is reached on risk, then that information will be included in the Team's Report to the U.S. Army Corps of Engineers
- Answer the additional questions, posed by the Corps, in Section IV and V
    a. Results from all respondents will be placed into a matrix; we will convene a call, if needed to attempt to develop a consensus recommendation
- If you have information to list in Sections VI and VII, then please do so.
- Submit this completed form to Mike Hoff (Michael_Hoff@fws.gov) within 48 hours of completion of our conference call.

Section I: Background

The Corps, which operates and maintains the navigation structures at the Chicago Lock and the T.J. O'Brien Lock, is considering modifications to lock operations and structures to reduce the risk of Asian carps (bighead and silver carps) passing through those locks in the Chicago Area Waterways (CAWs) into Lake Michigan. Possible modifications considered include minimizing impacts to the navigation industry and minimizing impacts from flooding. In the short term, the Corps is considering a range of alternative lock operations that will increase the time the locks will be closed. The alternatives include:

1. Continue current operations (no action, as required by NEPA)
2. Lock closure of 3 to 4 days a week and normal operations for the remaining days of the week
3. Lock closure of 1 week/month and normal operation for the remaining days of the month
4. Lock closure every other week and normal operations for the alternative weeks
5. Lock closure of 2 months with extensive monitoring to determine if Asian carps are in the CAWs. If no Asian carps are collected during the closed period, then lock operations will be resumed at the end of the closure period. Locks would remain open, unless there was a significant flow event (flow rate trigger TBD) that could trigger fish movement. Locks would be closed on an emergency basis while monitoring activities were executed.
6. Two-week lock closure, in mid-late April, during which extensive surveillance and monitoring is conducted. If no Asian carps are recovered, then the locks will operate normally. However, if there is a significant rainfall event that results in elevated flows (and a possible stimulus for Asian carps to move upstream) after the two weeks of surveillance/monitoring, then the locks would be closed as soon as possible. During the lock closure, resources could be mobilized to complete surveillance/monitoring for a week. If no Asian carps are captured during the week, then the locks would be reopened.

[Note: The Corps has not identified a flow trigger, but will be working with fisheries staff to identify a range of change that could necessitate an emergency closure.]

During the periods of lock closure there would be a monitoring effort undertaken up stream of the barriers that could include commercial fishing (netting), electro-fishing, the spot application of rotenone, eDNA testing and any other technologies that may be developed to help determine if an Asian carp population exists. If Asian carps are not captured, then the locks would be reopened for normal operations for the time identified. If an Asian carp(s) is/are caught above electrical barriers, the Corps, in coordination with other agencies, would follow a contingency plan which would potentially include immediate closure of the lock gates until the extent of population is determined and reopening the locks is determined not to be a significant risk for dispersing Asian carp into Lake Michigan. The Corps is also considering structural modifications to the navigation features in the CAWs including adding screens to the sluice gates at both locks and acoustic directional barriers in the CAWs to encourage movement of fish into areas that can be monitored for Asian carp.

To evaluate the proposed actions, the Corps needs expert input from you. Please complete the remaining sections of this form, which was developed to: 1) compare your evaluation of risk of establishment of bighead and silver carps in Lake Michigan under each of the Corps' presently considered lock operation scenarios, and 2) submit management-oriented questions, posed by the Corps, to you.

Section II: Risk Assessment Background Question

1. Where are populations of silver and bighead carp self sustaining? (Base your answer to this question on your expert opinion) LaGrange Pool of Illinois River, maybe the Marseilles Pool, not so sure.
    e. I believe that there is no evidence that silver carp and bighead carp established self-sustaining populations either above the electrical barriers or any location within the Great Lakes. Yes X No ___
        i. Uncertainty Code (see Uncertainty Codes and Descriptions on Page 8) Very Certain
        ii. If yes, then please provide supporting information.

Section III: Risk Assessment

Probability of bighead and/or silver carp Establishment in Lake Michigan via pathways OTHER THAN Chicago and O'Brien Locks (i.e., all pathways other than those locks including pathways such as, but not limited to, bait bucket, food trade, aquaculture). Complete Columns 1 and 2.

Element Rating (Low, Medium,	Uncertainty Code (VC-VU: See codes and descriptions below. You may also list specific	Element (Support Data with Reference Code: See codes and descriptions below)	

High)	uncertainties)		Comments
LOW	MC: based on Lake Erie introduction	Bighead and silver carps are associated with the pathway. The Assessor answers whether there is a convincing temporal and spatial association with the pathway. Reference Code: J	All alternative paths have a LOW probability since release from these would be very small numbers.
MEDIUM	MC	Bighead and silver carps can survive above the electrical barrier and the Great Lakes. Reference Code: J	as of now it is uncertain to whether or not these fish can survive in the canal system above the barrier or be able to use Lake Michigan as a dispersal route to other large rivers.
MEDIUM	Very Uncertain	Bighead and silver carps can establish self-sustaining populations in the Great Lakes Reference Code: J	These fish are excellent at adapting, which makes them efficient invasive species; anything could happen
LOW	MC	Bighead and silver carp can spread throughout a substantial portion of the Great Lakes Reference Code: J	If there is an invasion, I believe it would only be limited to the confluent tribs of Lake Michigan that are suitable.

Probability of bighead and/or silver carp Establishment in Lake Michigan via Chicago and O'Brien Locks: Scenario 1 -- No modification to current lock operations. Complete Columns 1 and 2.

	Uncertainty Code (VC-VU: See codes	Element (Support Data with	

Element Rating (Low, Medium, High)	and descriptions below. You may also list specific uncertainties)	Reference Code: See codes and descriptions below)	Recommendations
LOW	RC	Bighead and silver carps can establish self-sustaining populations in the Great Lakes Reference Code: J / E	The data to date of the continual monitoring of Asian carps shows that they are not passed the barrier system or in Lockport / Brandon Pools either. eDNA is not a valid method as of yet.

Probability of bighead and/or silver carp Establishment in Lake Michigan via Chicago and O'Brien Locks: Modification of operations Scenario 2 -- Closing locks either 3 or 4 days/week, and then conducting normal operations for the remaining days of the week. Complete Columns 1 and 2. If Element Rating (Column 1), is either High or Medium, then enter in the Comments column any recommendations for specific management actions (e.g., chemical application, commercial fishing…) that could be realistically implemented to reduce the Element Rating, of Probability of Establishment, to Low.

Element Rating (Low, Medium, High)	Uncertainty Code (VC-VU: See codes and descriptions below. You may also list specific uncertainties)	Element (Support Data with Reference Code: See codes and descriptions below)	Recommendations
LOW	RC	Bighead and silver carps can establish self-sustaining populations in the Great Lakes Reference Code: J/E	The data to date of the continual monitoring of Asian carps shows that they are not passed the barrier system or in Lockport / Brandon Pools either. eDNA is not a valid method as of yet.

Probability of bighead and/or silver carp Establishment in Lake Michigan via Chicago and O'Brien Locks: Modification of operations Scenario 3 – Closing locks 1 week/month, followed by normal operation for the remaining days of the month. Complete Columns 1 and 2. If Element Rating (Column 1), is either High or Medium, then enter in the Comments column any recommendations for specific management actions (e.g., chemical application, commercial fishing…) that could be realistically implemented to reduce the Element Rating, of Probability of Establishment, to Low.

Element Rating (Low, Medium, High)	Uncertainty Code (VC-VU: See codes and descriptions below. You may also list specific uncertainties)	Element (Support Data with Reference Code: See codes and descriptions below)	Recommendations
LOW	RC	Bighead and silver carps can establish self-sustaining populations in the Great Lakes Reference Code: J/E	The data to date of the continual monitoring of Asian carps shows that they are not passed the barrier system or in Lockport / Brandon Pools either. eDNA is not a valid method as of yet.

Probability of bighead and/or silver carp Establishment in Lake Michigan via Chicago and O'Brien Locks: Modification of operations Scenario 4 -- Lock closure of every other week and normal operations for the alternative weeks. Complete Columns 1 and 2. If Element Rating (Column 1), is either High or Medium, then enter in the Comments column any recommendations for specific management actions (e.g., chemical application, commercial fishing…) that could be realistically implemented to reduce the Element Rating, of Probability of Establishment, to Low.

Element Rating (Low, Medium, High)	Uncertainty Code (VC-VU: See codes and descriptions below. You may also list specific uncertainties)	Element (Support Data with Reference Code: See codes and descriptions below)	Recommendations

LOW	RC	Bighead and silver carps can establish self-sustaining populations in the Great Lakes Reference Code: J/E	The data to date of the continual monitoring of Asian carps shows that they are not passed the barrier system or in Lockport / Brandon Pools either. eDNA is not a valid method as of yet.

Probability of bighead and/or silver carp Establishment in Lake Michigan via Chicago and O'Brien Locks: Modification of operations Scenario 5 -- Lock closure of two months with extensive monitoring to determine if Asian carps are in the Chicago Area Waterways. Complete Columns 1 and 2. If Element Rating (Column 1), is either High or Medium, then enter in the Comments column any recommendations for specific management actions (e.g., chemical application, commercial fishing…) that could be realistically implemented to reduce the Element Rating, of Probability of Establishment, to Low.

Element Rating (Low, Medium, High)	Uncertainty Code (VC-VU: See codes and descriptions below. You may also list specific uncertainties)	Element (Support Data with Reference Code: See codes and descriptions below)	Recommendations
LOW	RC	Bighead and silver carps can establish self-sustaining populations in the Great Lakes Reference Code: J/E	The data to date of the continual monitoring of Asian carps shows that they are not passed the barrier system or in Lockport / Brandon Pools either. eDNA is not a valid method as of yet.

Probability of bighead and/or silver carp Establishment in Lake Michigan via Chicago and O'Brien Locks: Modification of operations Scenario 6 -- Two-

week lock closure, in mid-late April, during which extensive surveillance and monitoring is conducted. If no Asian carps are recovered, then the locks will operate normally. However, if there is a significant rainfall event that results in elevated flows (and a possibly stimulus for Asian carps to move upstream) after the two weeks of surveillance/monitoring, then the locks would be closed as soon as possible. During the lock closure, resources could be mobilized to complete surveillance/monitoring for a week. If no Asian carps are captured during the week, then the locks would be reopened. Complete Columns 1 and 2. If Element Rating (Column 1), is either High or Medium, then enter in the Comments column any recommendations for specific management actions (e.g., chemical application, commercial fishing…) that could be realistically implemented to reduce the Element Rating, of Probability of Establishment, to Low.

Element Rating (Low, Medium, High)	Uncertainty Code (VC-VU: See codes and descriptions below. You may also list specific uncertainties)	Element (Support Data with Reference Code: See codes and descriptions below)	Recommendations
LOW	RC	Bighead and silver carps can establish self-sustaining populations in the Great Lakes Reference Code: J/E	The data to date of the continual monitoring of Asian carps shows that they are not passed the barrier system or in Lockport / Brandon Pools either. eDNA is not a valid method as of yet.

Consequence of Establishment in Lake Michigan (no matter how introduced). Complete Columns 1 and 2

Element Rating (Low, Medium, High)	Uncertainty code (VC-VU: See codes and descriptions below. You may also list specific uncertainties)	Element (Support Data with Reference Code: See codes and descriptions below)	Comments
MEDIUM	RC	Estimate environmental impact	The affects/effects of

		if established in the Great Lakes Reference Code: J	introducing another planktivorous species into the Great Lakes is unknown and pretty much impossible to predict. There will be changes to the system, but the natural condition of the Great Lakes is all but gone, so it would just morph this new Great Lakes community I like to call the "big fish bowl".
LOW	RC	Estimate economic impact if established in the Great Lakes (based on your knowledge of fishing economics in the Great Lakes). The assessor is not expected to take on the role of an economist, but instead provides information on impacts the species would broadly have on fishery-related economics of the Great Lakes. Reference Code: J/E	The Great Lakes native fishery, with the exception of portions of Lake Superior, have been commercially impaired since the late 1890's, and slowly got worse through the 1960s. Most of the fish harvesting value are from put and take fisheries, which would not be affected by Asian carp introduction.
LOW	RC	Estimate impact on the Great Lakes from social and/or political influences (based on	If Asian carps were to become abundant in the Great Lakes,

		your knowledge of politics and societal concerns about Great Lakes fishing) .The assessor is not expected to take on the role of an political scientist or sociologist, but instead provides information on impacts the species would broadly have on fishery-related societal and political issues of the Great Lakes. Reference Code:	they would undoubtedly be annoying to recreational activities, or some folks may find them entertaining. It would be a big deal initially, but then forgot about, just like one of those bogus reality shows the American public love these days.

Summary of Organism Risk Potential to the Great Lakes
(Note: Hoff will compile this summary)
Probability of Establishment Risk Category (from table above)=
Consequence of Establishment Risk Category (from table above) =
Organism Risk Potential =

Risk Category Definitions

Risk Category	Definition
Low	Acceptable risk – organism of little concern for establishment and/or ecological consequence (i.e., impact)
Medium	Unacceptable risk – organism of moderate concern
High	Unacceptable risk – organism of major concern

Uncertainty Codes and Descriptions

Uncertainty Code	Description
Very Certain	As certain as I can be
Reasonably Certain	Reasonably certain
Moderately Certain	More certain than not
Reasonably Uncertain	Reasonably uncertain
Very Uncertain	A guess

Reference codes and descriptions

Reference Code	Reference Type
G	General knowledge; no specific source
J	Judgmental evaluation
E	Extrapolation; information specific to pest not available. However, information available on similar organisms supplied
Author, year	Literature Cited

Section IV. Questions from the Corps. Please respond to the questions.

1. Is there an imminent threat that Asian carp (silver and bighead) will establish a sustainable population in Lake Michigan in the near future? Yes ___ No X. Uncertainty code RC, I believe Asian carp dispersal into the Great Lakes may not be possible since it is improbable for fish to pass through the electric barriers, or through the Brandon and Lockport Locks with appropriate measures and managed operations. If Asian carps do pass through these obstacles, it would be in very limited numbers for awhile.
    bb. If yes, then by when do you predict a sustainable population of bighead carp? _____. Lower 95% Confidence limit (Year) ____. Upper 95% Confidence limit (Year)___.
    cc. If yes, then by when do you predict a sustainable population of silver carp?
        i. Year ____.
            1. Lower 95% Confidence limit (Year) ____
            2. Upper 95% Confidence limit (Year) ___.
2. Is there a threshold of Asian carp needed to establish a sustainable population? Yes X, refer to Hoff's model No____. If yes, then what is that threshold (Note: Hoff's [Hoff Accepted] stock-recruit model is probably the best science support. He will draft a reply based on that model. All other experts can submit their beliefs.)
    a. Specifically, what number of Asian Carp would need to enter Lake Michigan to constitute a founding population that could, under the right environmental conditions, develop into a sustainable population in the Great Lakes? _____
3. A few Asian carp were found in Lake Erie in the past. Are the populations of Asian carps in Lake Erie self sustaining? Yes ___ No X. Uncertainty code VC. If yes, then are conditions that support Asian Carp in Lake Erie similar to conditions in Lake Michigan near the Chicago Lock and T.J. O'Brien Locks? Yes___ No ___. [Please provide details, and cite any references used.]
4. In your opinion would a sustainable population of Asian Carp (both species) adversely impact the commercial fisheries of the GL? (use your ratings from Section II) High ___ Medium____ Low X. Uncertainty code VC. [Please provide details, and cite any references used] If you look at the documented history of the Great Lakes commercial fishery and ecosystem, one quickly realizes that all of the Great Lakes, with the exception of certain portions of Lake Superior, were commercially extinct by the late 1890s, early 1900s. See Koelz's 1927 treatise on the Coregonid fishes of the Great Lakes; and also look at the old fishery records and anecdotes such as (Goode 1884). Also, recent records show that in fact, a good deal of the commercial fisheries in the Great Lakes are based on non native species (i.e. alewife, rainbow smelt). With all that the Great Lakes have been through, the addition of Asian carp into the system, sadly enough, does not make matters worse or better, they would just be another fish in the big aquarium that the Great Lakes

are now. The worry lies in that Asian carps may infest confluent rivers and further disrupt already stressed riverine ecosystems.

5. If the Asian Carp (both species) were allowed to migrate into the GL unimpeded how long would it take to establish demonstrable, sustainable populations capable of adversely impacting the commercial fisheries of the GL? (assuming they would result in adverse impacts)
    dd. Year 10 to 15 years for Lake Michigan, longer for the rest and maybe never in the other lakes, especially Lake Superior
        i. Lower 95% Confidence limit (Year) 15
        ii. Upper 95% Confidence limit (Year) 10
6. Do Asian Carp carry any viral, bacterial, protozoan or other parasites or diseases that may adversely impact the native fish populations in the Great Lakes? (See Duane: Do you want to include the information in Kolar et al. 2007. Becky you can also respond. The remainder of us do not need to weigh in, unless we have detailed information/literature to cite) Yes ___ No ___. [Provide details, and cite references] I am unaware/unknowledgeable of any of these biological matters.
7. If the Asian Carp become established in the GL, then are there any beneficial impacts that would result from their presence? Yes ___ No _X. Uncertainty code ___. [Provide details and cite any references] Ecologically, the addition of another nonnative species to the Great Lakes would not be a good thing, especially for riverine systems? The lakes themselves would probably not feel any adverse affects.
8. If the Asian Carp (both species) establish sustainable populations, would they adversely impact any of the other established invasive aquatic organisms of the GL? Yes X No___. Uncertainty code RC. [Provide details, and cite any references] Anytime you add another species to the mix that becomes a major presence, such as the round goby and zebra mussel, there will be noticeable effects within the systems food web, other nonnative species inclusive.
9. What are the triggers (high water flows, warm water, availability of Chlorophyll a etc.) for movement of Asian carp? [Answer question and cite references] There are several publications that show temperature and spring floods trigger Asian carps to rush up stream to spawn, but these are not dispersal movements. I believe dispersal movements occur when areas become over populated and space and food become scarce. Fish then move to find new sources of food and space. Based on monitoring to date, there is still plenty of room in the Dresden pool, so the dispersal threat to Brandon and Lockport pools is low. If we can overharvest fish all the way down to the Mississippi, it would be unlikely viable populations would try to migrate through the CAWS and then into Lake Michigan.
10. Will warmer weather in the spring make it more likely that the Asian carp will migrate upstream toward Lake Michigan? Yes ___ No X [Explain and cite references] The Brandon and Lockport pools never see temperatures below 50°F, and are usually 65°F in the dead of winter and 80°F in summer, so the natural temperature regimes that trigger spawning are not the same here, as compared to the lower pools such as LaGrange and Marseilles.
11. Given the habits of the Asian Carp (both species) how likely are the fish to develop significant contaminant loads in their edible tissues?
    a. High ___ Medium ___ Low X

b. Uncertainty code VC.
c. [Explain and cite references] Asian carps eat from the bottom of the food chain (primary producers: phytoplankton), and they grow very fast. I would be really surprised to see any bioaccumulation in these fish.

Section V. Risk Management Questions Posed by the Corps. Please respond to the questions.

1. If a single Asian carp is collected during monitoring accompanying a lock closure, then would the spot application of rotenone be an appropriate response? Yes X No __. Uncertainty code RC
    a. List other desirable actions, in addition to rotenone treatment, that would be recommended. Traditional sampling efforts, electro-fishing, netting
    b. What is the risk associated with reopening the locks after at least 72 hours after completion of rotenone treatment? H___ M___ L X. Uncertainty Code RC, if rotenone is applied correctly it can effectively eliminate all gill breathing organisms.
2. If multiple Asian carps are collected during monitoring accompanying lock closure, then would the spot application of rotenone be an appropriate response? Yes __ No __. Uncertainty code ___ SAME AS 1
    a. List other desirable actions, in addition to rotenone treatment, that would be recommended.
    b. What is the risk associated with reopening the locks after at least 72 hours after completion of rotenone treatment? H___ M___ L___. Uncertainty Code___
3. Would closing the lock gates be effective in significantly impeding the migration of Asian carp into Lake Michigan given that there may still be gaps of up to one inch between the lock gates and the sides or bottom of the canal? Yes X No __. Uncertainty code RC
4. Could such gaps allow fish eggs or small juveniles to pass through the locks, and if so, what is the associated risk? Yes __ No X. Uncertainty code RC, I do not believe Asian carp would be spawning in this part of the system, not would eggs flow upstream through the lock gaps.
5. Would simply reducing the number of openings of the lock gates have a beneficial effect of impeding Asian Carp migration by itself, without additional control technologies? Yes __ No X. Uncertainty code VC, the locks would either need to remain closed all the time or it is pointless, unless effective eradication techniques were employed such as rotenone.
6. Given Asian carp behavior, would fewer openings statistically reduce the likelihood of Asian carp passing through the locks? Yes __ No X. Uncertainty code VC, it is very easily when a barge is entering the lock for fish to follow.
7. Would Asian carps aggregate near the lock during closure and pass en mass through the locks during the scheduled openings? Yes X No __. Uncertainty code VC, if Asian carps are having pressure on their local population to migrate in order to find new food or spawning areas, the fish will migrate.
8. Would scheduling lock gate openings in conjunction with other control technologies such as netting, electro-fishing, rotenone, as discussed above, help deter the dispersal of Asian carps into Lake Michigan? Yes X No __. Uncertainty code VC

9. Is it reasonable to assume that if netting, electro-fishing, rotenone, other monitoring technologies do not recover an Asian carp body, that a significant population of Asian carp is not present in the waterway? Yes X No __. Uncertainty code VC, rotenone is very effective at providing an answer.
10. Is it reasonable to assume that a longer period of extensive monitoring (through netting, electro-fishing, rotenone, other technologies) without the recovery of an Asian carp body, provides increased confidence that a significant population of Asian carp is not present in the waterway? Yes X No __. Uncertainty code RC
11. If no Asian Carp bodies are recovered through netting, electrofishing, rotenone and other monitoring activities upstream of the Barriers, how significant is the threat/risk to Lake Michigan? In other words, if the population is so small that a single individual cannot be recovered, what level of risk is present? Yes __ No __. Uncertainty code VC, not significant at all.
12. The Corps and Metropolitan Water Reclamation District are considering installing mesh grates over the sluice gates near the Chicago and O'Brien locks. Would a mesh grate with 1 inch openings be beneficial in deterring carp migration? Yes X No __. Uncertainty code VC, if Asian carp are present, they would not be able to get through 1 inch mesh, but the mesh will constantly clog with debris.
13. What significant monitoring would be adequate for helping to verify the absence or presence of Asian Carp in the canal system? Continued conventional sampling (primarily electro-fishing). This method worked years past as we were documenting Asian carps coming up from Marseilles into Dresden, and I believe it is still working since we see increasing numbers in Dresden, but no fish in Brandon or Lockport.
14. What methods and equipment are recommended? electro fishing
    a. How long would a monitoring/event take (3-4 days, for example) 3-4 days
    b. How often would such monitoring/sampling events be recommended (once a month, twice a month or more, for example) to reduce risk of migration to an acceptable level? Once a month.
15. What are the biological indicators for the recommended monitoring methods and what are the thresholds for action for these indicators? A bunch of Asian carps.
16. At what duration of monitoring without capturing an Asian carp body is the risk of migration reduced to the extent that it would be reasonable to open the lock gates? For example, is our scenario of lock closure with corresponding monitoring of 1 week/month and normal operation for the remaining days of the month, assuming no Asian carp body is recovered, reasonable from a risk perspective? Not to beat around the bush, but I feel all of these measures/alternatives are unnecessary at this point.
    a. Why? There is no reason to believe Asian carps are even present in the Brandon/Lockport pools, let alone past the barrier system.
17. Is one of the other alternatives discussed in the Background (above) preferable from a risk perspective? No, all unnecessary at this point. When it becomes necessary they will need to stay closed permanently.
    a. Why? There is no reason to believe Asian carps are even present in the Brandon/Lockport pools, let alone past the barrier system.
18. If an Asian carp movement trigger (such as high chlorophyll, warm water, high flow) is manifested in the CAWs should the locks be closed? Yes ___ No X. Uncertainty code

RC, this won't happen because of the stability of temperature and lack of the proper algae Asian carp prefer to consume.

19. Are there additional structural modifications or other actions you would recommend to be considered to reduce the risk of Asian carp dispersing into Lake Michigan? No

Section VI: Additional Comments and Recommendations

List comments you wish to include in your Risk Assessment and recommendation for Risk Management

There is no reason to believe Asian carps are even present in the Brandon/Lockport pools, let alone past the electrical barrier system. All of these emergency alternatives are in knee jerk reaction to a problem that does not currently exist. I recommend stopping Asian carps dispersal at the Brandon Lock gates.

Section VII: List of Important References

Hoff, M. H., M. A. Pegg, and K. Irons. Accepted. Management Implications from a Stock-recruit Model for Bighead Carp in Portions of the Illinois and Mississippi Rivers. International Asian Carp Symposium, American Fisheries Society Special Publication. Bethesda, MD.

Kolar, C. S., D. C. Chapman, W. R. Courtenay, C. M. Housel, J. D. Williams, and D. P. Jennings. 2007. Bigheaded carps: A biological synopsis and environmental risk assessment. American Fisheries Society Special Publication 33, Bethesda, MD.

Goode, G.B. 1884. Natural history of useful aquatic animals, In G.B. Goode and associates, The fisheries and fishery industries of the United States. Pp. 486-497. Section 1. U.S. Commission of Fish and Fisheries, Washington D.C.

Koelz, Walter. 1927. Coregonid Fishes of the Great Lakes. Bulletin of the Bureau of Fisheries, Volume XLVIII, 1927, Part II. Document No. 104

Expert 6
Risk Analysis Form
Issue: Evaluations of Risk of Asian Carps Establishing and Impacting the Great Lakes: Evaluations by Lock Operation Scenario

Instructions to Risk Assessor:

- Read the Background (Section I) prepared by the U.S. Army Corps of Engineers (Corps)
- Answer the Background Question in Section II
- Complete the Risk Assessments in Section III
    a. Results from all respondents will be tabulated
    b. If either a broad or detailed consensus is reached on risk, then that information will be included in the Team's Report to the U.S. Army Corps of Engineers
- Answer the additional questions, posed by the Corps, in Section IV and V
    a. Results from all respondents will be placed into a matrix; we will convene a call, if needed to attempt to develop a consensus recommendation
- If you have information to list in Sections VI and VII, then please do so.
- Submit this completed form to Mike Hoff (Michael_Hoff@fws.gov) within 48 hours of completion of our conference call.

Section I: Background

The Corps, which operates and maintains the navigation structures at the Chicago Lock and the T.J. O'Brien Lock, is considering modifications to lock operations and structures to reduce the risk of Asian carps (bighead and silver carps) passing through those locks in the Chicago Area Waterways (CAWs) into Lake Michigan. Possible modifications considered include minimizing impacts to the navigation industry and minimizing impacts from flooding. In the short term, the Corps is considering a range of alternative lock operations that will increase the time the locks will be closed. The alternatives include:

1. Continue current operations (no action, as required by NEPA)
2. Lock closure of 3 to 4 days a week and normal operations for the remaining days of the week
3. Lock closure of 1 week/month and normal operation for the remaining days of the month
4. Lock closure every other week and normal operations for the alternative weeks
5. Lock closure of 2 months with extensive monitoring to determine if Asian carps are in the CAWs. If no Asian carps are collected during the closed period, then lock operations will be resumed at the end of the closure period. Locks would remain open, unless there was a significant flow event (flow rate trigger TBD) that could trigger fish movement. Locks would be closed on an emergency basis while monitoring activities were executed.
6. Two-week lock closure, in mid-late April, during which extensive surveillance and monitoring is conducted. If no Asian carps are recovered, then the locks will operate normally. However, if there is a significant rainfall event that results in elevated flows (and a possible stimulus for Asian carps to move upstream) after the two weeks of surveillance/monitoring, then the locks would be closed as soon as possible. During the lock closure, resources could be mobilized to complete surveillance/monitoring for a week. If no Asian carps are captured during the week, then the locks would be reopened.

[Note: The Corps has not identified a flow trigger, but will be working with fisheries staff to identify a range of change that could necessitate an emergency closure.]

During the periods of lock closure there would be a monitoring effort undertaken up stream of the barriers that could include commercial fishing (netting), electro-fishing, the spot application of rotenone, eDNA testing and any other technologies that may be developed to help determine if an Asian carp population exists. If Asian carps are not captured, then the locks would be reopened for normal operations for the time identified. If an Asian carp(s) is/are caught above electrical barriers, the Corps, in coordination with other agencies, would follow a contingency plan which would potentially include immediate closure of the lock gates until the extent of population is determined and reopening the locks is determined not to be a significant risk for dispersing Asian carp into Lake Michigan. The Corps is also considering structural modifications to the navigation features in the CAWs including adding screens to the sluice gates at both locks and acoustic directional barriers in the CAWs to encourage movement of fish into areas that can be monitored for Asian carp.

To evaluate the proposed actions, the Corps needs expert input from you. Please complete the remaining sections of this form, which was developed to: 1) compare your evaluation of risk of establishment of bighead and silver carps in Lake Michigan under each of the Corps' presently considered lock operation scenarios, and 2) submit management-oriented questions, posed by the Corps, to you.

Section II: Risk Assessment Background Question

1. Where are populations of silver and bighead carp self sustaining? (Base your answer to this question on your expert opinion)

Based on my experience in the Illinois River since 2004, I believe there are self sustaining population in the Alton, LaGrange, Peoria, Starved Rock, and Marseilles pools of the Illinois River. These are pools where we have captured juveniles.

f. I believe that there is no evidence that silver carp and bighead carp established self-sustaining populations either above the electrical barriers or any location within the Great Lakes. Yes X_ No ___

i. Uncertainty Code (see Uncertainty Codes and Descriptions on Page 8) _ Very Certain

ii. If yes, then please provide supporting information.

Bighead carp have been captured in Lake Erie in 2000 and in Lake Ontario in 2003 – at least 4 specimens. There have not been silver carp captured in the Great Lakes. I believe that the fish are not "self-sustaining" in that there does not seem to be evidence of reproduction, but there are reports of occasional specimens captured – likely due to release from aquaculture or sale of live fish in local markets. So although there are reports of bighead in the Great Lakes, I have not seen evidence of a self-sustaining population.

Reference: **Biological invasions in Lake Ontario: past, present and future**
Ian C. Duggan1, Sarah A. Bailey, Robert I. Colautti, Derek K. Gray, Joseph, C. Makarewicz, and Hugh J. MacIsaac, *State of Lake Ontario (SOLO) – Past, Present and Future, Ecovision World Monograph Series 2003 Aquatic Ecosystem Health and Management Society*

Bighead and silver carp DNA has been located in the CSSC, Cal-Sag, Calumet River, and in Lake Michigan (all above the Barrier). Physical presence of these species has not been verified. Although I think that the eDNA indicates the presence of fish, I cannot agree that there is a self-sustaining population based on this information.

Section III: Risk Assessment

Probability of bighead and/or silver carp Establishment in Lake Michigan via pathways OTHER THAN Chicago and O'Brien Locks (i.e., all pathways other than those locks including pathways such as, but not limited to, bait bucket, food trade, aquaculture). Complete Columns 1 and 2.

Element Rating (Low, Medium, High)	Uncertainty Code (VC-VU: See codes and descriptions below. You may also list specific uncertainties)	Element (Support Data with Reference Code: See codes and descriptions below)	Comments
LOW	Moderately Certain	Bighead and silver carps are associated with the pathway. The Assessor answers whether there is a convincing temporal and spatial association with the pathway. Reference Code: J	All can be classified as low – assuming release numbers are small and do not result in fish establishing.
HIGH	Reasonably Certain	Bighead and silver carps can survive above the electrical barrier and the Great Lakes. Reference Code: G	I don't see why they would not survive in the canal above the Barrier. In fact, the Cal-Sag with access to more tributaries and backwater habitat (more than Lockport pool CSSC) seems ideal based on my knowledge of habitat for both species. As far as survival in the Great Lakes, I think they would for sure "survive". There is access to different habitat types that they, as opportunistic species, would find and exploit. The documented life history traits for both species don't seem to be a limiting factor, as they do quite well in all habitat types they have encountered in the Illinois River.
MEDIUM	Reasonably	Bighead and silver	Ecological Predictions and Risk Assessment

	Certain	carps can establish self-sustaining populations in the Great Lakes Reference Code: Ecological Predictions and Risk Assessment for Alien Fishes in North America (Kolar and Lodge 2002) Asian Carp Environmental Risk Assessment (Kolar et al 2005): Risk Assessment for Asian Carps in Canada (Mandrak and Cudmore 2004)	for Alien Fishes in North America (Kolar and Lodge 2002): This paper developed quantitative models using species characteristics to predict potential alien species and their impact. Their model predicted "the silver carp, Hypophthalmichthys molitrix, which has quickly spread through the upper Mississippi-Illinois river systems and sometimes hurts boaters as the fish leap from the water, would neither spread quickly nor be perceived as a nuisance in the Great Lakes. These species exhibit characteristics (diet specialization of black carp on abundant molluscan resources in the Great Lakes, and rare leaping behavior in silver carp) that differ substantially from those of species on which the models were developed, and our models may not be robust to such deviations. In addition, all our predictions are applicable to the Great Lakes proper, not to tributaries and large river systems in which these carp species, for example, are already established and causing strongly negative consequences." Asian Carp Environmental Risk Assessment (Kolar et al 2005): This assessment of the organism risk potential of each of the three species of Hypophthalmichthys to the United States uses the Generic Nonindigenous Aquatic Organisms Risk Analysis Review Process (Risk Assessment Management Committee 1996) and draws on information presented throughout the document, which is quite comprehensive. This model involves the rating of seven elements of risk (four assessing the probability of establishment and three the consequences of establishment) to determine the overall organism risk potential. Each element is assigned an estimated level of risk, rated as high, medium, or low. The degree of certainty associated with risk-level assignment is also expressed for each of the seven risk elements. Categories for uncertainty include Very Certain, as certain as we are going to get; Reasonably Certain,

			certain within reason; Moderately Certain, more certain than not; Reasonably Uncertain, uncertain within reason; and Very Uncertain, a guess. Risk assignments and the associated degree of certainty are provided for each of the seven elements of risk required to assess the organism risk potential for each species of Hypophthalmichthys. "The risk associated with all components of the probability of establishment (organism within pathway, entry potential, colonization potential, and spread potential) was rated high for bighead carp. Therefore, the probability of establishment earned a high rating. Two components of the consequences of establishment were rated medium to high (economic and environmental impacts), and one was rated medium (perceived or social impacts), requiring that the consequence of establishment be rated as medium to high. The organism risk potential of bighead carp in the United States, therefore, which combines the probability of establishment and the consequences of establishment, was determined to be a high, or an unacceptable risk. This classification justifies mitigation to control negative effects and means that bighead carp are organisms of major concern for the United States. The risk associated with all components of the probability of establishment (organism within pathway, entry potential, colonization potential, and spread potential) was rated high for silver carp, requiring a high rating. Two components of the consequences of establishment were rated medium to high (economic and environmental impacts), and one was rated medium (perceived or social impacts), requiring that the consequence of establishment be rated as medium to high. The organism risk potential of silver carp in the United States, therefore, was determined to be a high, or an unacceptable risk. This classification justifies mitigation to control negative effects and means that silver carp are organisms of major concern for the United States."

			Figure 29 on page 115 of the document illustrates the 22 rivers flowing into Lakes Erie, Huron, Michigan, and Superior that could potentially serve as spawning sites for these carps. Pages 129 and 130 better describe the variables that went into the model. I think that the third variable "Estimate probability of the organism successfully colonizing and maintaining a population where introduced: Bighead Carp: High—Very Certain; Silver Carp: High—Very Certain" is the most relevant when we ask the question: "OK so if they get there will they survive?" The paper concludes that: "Appropriate habitats (lakes, ponds, reservoirs, canals, rivers, streams, and associated backwaters), a hospitable climate, and abundant food resources to support all three species of Hypophthalmichthys are found in much of the United States. Preferred food of Bighead Carp is zooplankton whereas Silver and Largescale Silver carps prefer phytoplankton. All three species can consume other foods as well. Both zooplankton and phytoplankton are locally abundant in U.S. waters, especially in large rivers and reservoirs. Both Bighead and Silver carps have demonstrated abilities to colonize and maintain populations in the United States and other countries. Furthermore, both species continue to expand their distribution within the United States. Given the successful establishment and spread of Bighead and Silver carps in the United States and elsewhere, we can say with complete certainty that the probability of successful colonization of those species is high." Risk Assessment for Asian Carps in Canada (Mandrak and Cudmore 2004): This risk assessment was specific to Canadian waters, and the conclusions drawn for bighead and silver carp were drawn almost entirely from Cindy Kolar's work. Again, they found for bigheads and silvers the estimate for

			probability for successful colonization and maintaining a population: HIGH for survival and reproduction. I also want to add a couple of my personal opinions. Bighead and silver carp are highly adaptive species, and reported life history characteristics may not always apply. For example, they do require riverine habitat to spawn to keep their buoyant eggs afloat (where they presumably are transported downriver to more suitable, slack water nursery habitat) - but Duane Chapman always like to tell the story of how he was doing sediment sampling in the Missouri River and inadvertently caught some bighead carp eggs - and a few days later they hatched and he had little baby bigheads swimming in the sediment/water collection bag. So we need to be careful when sticking to the documented life history (most of which comes from their native waters). Hypophthalmichthys is an opportunistic species, and can adapt and survive in bizarre places - which is why they have done so well over here. So these risk assessments that are largely based on this documented life history information shouldn't be taken as the gospel, but it's the best we have. Although I personally think that any establishment in the Great Lakes will be nowhere near the biomass we are seeing in the Illinois River, I think that there is enough documentation to support the concern of establishment. We have to define our terms carefully. Both species might "establish" - generally defined as having enough resources to grow, survive, and reproduce, but the production of the lakes is nowhere near what we have in our nutrient-rich Illinois River to sustain the 90% biomass we see, for example, in the LaGrange pool. I think the only where we will see these fish would be in the more productive tributary marsh areas. Therefore, I rate this one as MEDIUM.

LOW	Moderately Certain	Bighead and silver carp can spread throughout a substantial portion of the Great Lakes Reference Code: J	I am unsure of what type of movement we would see, and how they would inhabit the lakes, but I would venture to predict that spreading throughout most of the Great Lakes would be a low probability. I think they would focus on areas where food resources are abundant instead of swimming miles and miles searching for food. So I think the spread would be limited. The Risk Assessments cite tributaries and marsh areas as the probable areas of invasion.

Probability of bighead and/or silver carp Establishment in Lake Michigan via Chicago and O'Brien Locks: Scenario 1 -- No modification to current lock operations. Complete Columns 1 and 2.

Element Rating (Low, Medium, High)	Uncertainty Code (VC-VU: See codes and descriptions below. You may also list specific uncertainties)	Element (Support Data with Reference Code: See codes and descriptions below)	Recommendations
MEDIUM	Reasonably Certain	Bighead and silver carps can establish self-sustaining populations in the Great Lakes Reference Code: J	We have not captured a live Asian carp from above the Barrier to confirm the eDNA. However, the frequency of eDNA detection may indicate a presence of a few Asian carp above the Barrier. I rated this as MEDIUM because we have spent hundreds of hours fishing trying to capture one Asian carp, without success. This tells me that if there are fish there, the numbers are so low that only an extremely sensitive test (eDNA) could detect them, and therefore there is not likely enough fish to establish a sustaining population.

Probability of bighead and/or silver carp Establishment in Lake Michigan via Chicago and O'Brien Locks: Modification of operations Scenario 2 -- Closing locks either 3 or 4 days/week, and then conducting normal operations for the remaining days of the week. Complete Columns 1 and 2. If Element Rating (Column 1), is either High or Medium, then enter in the Comments column

any recommendations for specific management actions (e.g., chemical application, commercial fishing…) that could be realistically implemented to reduce the Element Rating, of Probability of Establishment, to Low.

Element Rating (Low, Medium, High)	Uncertainty Code (VC-VU: See codes and descriptions below. You may also list specific uncertainties)	Element (Support Data with Reference Code: See codes and descriptions below)	Recommendations
LOW	Reasonably Certain	Bighead and silver carps can establish self-sustaining populations in the Great Lakes Reference Code: J	I think this is one of the best choices because the frequent closing interval will remove bias in seasonal movements. It will be more representative of the conditions at that point in time and will allow for an accurate assessment of the threat and level of invasion.

Probability of bighead and/or silver carp Establishment in Lake Michigan via Chicago and O'Brien Locks: Modification of operations Scenario 3 – Closing locks 1 week/month, followed by normal operation for the remaining days of the month. Complete Columns 1 and 2. If Element Rating (Column 1), is either High or Medium, then enter in the Comments column any recommendations for specific management actions (e.g., chemical application, commercial fishing…) that could be realistically implemented to reduce the Element Rating, of Probability of Establishment, to Low.

Element Rating (Low, Medium, High)	Uncertainty Code (VC-VU: See codes and descriptions below. You may also list specific uncertainties)	Element (Support Data with Reference Code: See codes and descriptions below)	Recommendations
MEDIUM	Reasonably Certain	Bighead and silver carps can establish self-sustaining populations in the Great Lakes Reference Code:	This is a risky alternative and allows for bias in fish movements – we might miss an observation if extensive monitoring is only one week a month. To lower element rating, extensive monitoring should be conducted for at least two additional weeks (with locks open).

Probability of bighead and/or silver carp Establishment in Lake Michigan via Chicago and O'Brien Locks: Modification of operations Scenario 4 -- Lock closure of every other week and normal operations for the alternative weeks. Complete Columns 1 and 2. If Element Rating (Column 1), is either High or Medium, then enter in the Comments column any recommendations for specific management actions (e.g., chemical application, commercial fishing…) that could be realistically implemented to reduce the Element Rating, of Probability of Establishment, to Low.

Element Rating (Low, Medium, High)	Uncertainty Code (VC-VU: See codes and descriptions below. You may also list specific uncertainties)	Element (Support Data with Reference Code: See codes and descriptions below)	Recommendations
LOW	Reasonably Certain	Bighead and silver carps can establish self-sustaining populations in the Great Lakes Reference Code:	This seems to be on the more representative side of the scenarios – as long as we are monitoring extensively during closure and doing baseline during open times.

Probability of bighead and/or silver carp Establishment in Lake Michigan via Chicago and O'Brien Locks: Modification of operations Scenario 5 -- Lock closure of two months with extensive monitoring to determine if Asian carps are in the Chicago Area Waterways. Complete Columns 1 and 2. If Element Rating (Column 1), is either High or Medium, then enter in the Comments column any recommendations for specific management actions (e.g., chemical application, commercial fishing…) that could be realistically implemented to reduce the Element Rating, of Probability of Establishment, to Low.

Element Rating (Low, Medium, High)	Uncertainty Code (VC-VU: See codes and descriptions below. You may also list specific uncertainties)	Element (Support Data with Reference Code: See codes and descriptions below)	Recommendations
LOW	Reasonably Certain	Bighead and silver carps can establish self-sustaining populations in the	Extensive two month monitoring would ensure a complete and accurate description of level of invasion.

		Great Lakes Reference Code:	

Probability of bighead and/or silver carp Establishment in Lake Michigan via Chicago and O'Brien Locks: Modification of operations Scenario 6 -- Two-week lock closure, in mid-late April, during which extensive surveillance and monitoring is conducted. If no Asian carps are recovered, then the locks will operate normally. However, if there is a significant rainfall event that results in elevated flows (and a possibly stimulus for Asian carps to move upstream) after the two weeks of surveillance/monitoring, then the locks would be closed as soon as possible. During the lock closure, resources could be mobilized to complete surveillance/monitoring for a week. If no Asian carps are captured during the week, then the locks would be reopened. Complete Columns 1 and 2. If Element Rating (Column 1), is either High or Medium, then enter in the Comments column any recommendations for specific management actions (e.g., chemical application, commercial fishing…) that could be realistically implemented to reduce the Element Rating, of Probability of Establishment, to Low.

Element Rating (Low, Medium, High)	Uncertainty Code (VC-VU: See codes and descriptions below. You may also list specific uncertainties)	Element (Support Data with Reference Code: See codes and descriptions below)	Recommendations
MEDIUM	Reasonably Certain	Bighead and silver carps can establish self-sustaining populations in the Great Lakes Reference Code:	Extensive monitoring during peak movement times would decrease risk of further spread, but only closing them for a week after a significant rainfall may be troublesome – you may miss some movement. What if the flood pulse persists? Recommend you implement extensive monitoring beyond the one week closure period.

Consequence of Establishment in Lake Michigan (no matter how introduced). Complete Columns 1 and 2

	Uncertainty code (VC-VU: See codes and descriptions	Element (Support Data with	

Element Rating (Low, Medium, High)	below. You may also list specific uncertainties)	Reference Code: See codes and descriptions below)	Comments
MEDIUM	Moderately Certain	Estimate environmental impact if established in the Great Lakes Reference Code: J and Kolar Chapman Risk Assessment	The environmental impact would be noticeable in areas of high density (predicted by the Risk Assessment) but specific effects are nearly impossible to predict. Likely sources of impact would be due to density dependent factors and competition for plankton resources, but these effects may not even be observed for many years.
		Estimate economic impact if established in the Great Lakes (based on your knowledge of fishing economics in the Great Lakes). The assessor is not expected to take on the role of an economist, but instead provides information on impacts the species would broadly have on fishery-related economics of the Great Lakes. Reference Code:	I am not an economist and cannot answer this question
		Estimate impact on the Great Lakes from social and/or political influences (based on your knowledge of politics and societal concerns about Great Lakes fishing) .The assessor is not expected to take on the role of an political scientist or sociologist, but instead provides	I am not a sociologist and cannot answer this question

		information on impacts the species would broadly have on fishery-related societal and political issues of the Great Lakes. Reference Code:	

Summary of Organism Risk Potential to the Great Lakes
(Note: Hoff will compile this summary)
Probability of Establishment Risk Category (from table above)=
Consequence of Establishment Risk Category (from table above) =
Organism Risk Potential =

Risk Category Definitions

Risk Category	Definition
Low	Acceptable risk – organism of little concern for establishment and/or ecological consequence (i.e., impact)
Medium	Unacceptable risk – organism of moderate concern
High	Unacceptable risk – organism of major concern

Uncertainty Codes and Descriptions

Uncertainty Code	Description
Very Certain	As certain as I can be
Reasonably Certain	Reasonably certain
Moderately Certain	More certain than not
Reasonably Uncertain	Reasonably uncertain
Very Uncertain	A guess

Reference codes and descriptions

Reference Code	Reference Type
G	General knowledge; no specific source
J	Judgmental evaluation
E	Extrapolation; information specific to pest not available. However, information available on similar organisms supplied
Author, year	Literature Cited

Section IV. Questions from the Corps. Please respond to the questions.

1. Is there an imminent threat that Asian carp (silver and bighead) will establish a sustainable population in Lake Michigan in the near future? Yes ___ No__X__. Uncertainty code Reasonably Certain

I think the Barrier is working, and any fish that have been able to get around it are in low numbers (that is why we haven't caught ANY) and are at a manageable level.

   a. If yes, then by when do you predict a sustainable population of bighead carp? Year ____. Lower 95% Confidence limit (Year) ____. Upper 95% Confidence limit (Year)___.
   b. If yes, then by when do you predict a sustainable population of silver carp?
      iii. Year ____.
         1. Lower 95% Confidence limit (Year) ____
         2. Upper 95% Confidence limit (Year) ___.

2. Is there a threshold of Asian carp needed to establish a sustainable population? Yes X, No____. If yes, then what is that threshold (Note: Hoff's [Hoff Accepted] stock-recruit model is probably the best science support. He will draft a reply based on that model. All other experts can submit their beliefs.) see Hoff's model as noted
   a. Specifically, what number of Asian Carp would need to enter Lake Michigan to constitute a founding population that could, under the right environmental conditions, develop into a sustainable population in the Great Lakes? _____
3. A few Asian carp were found in Lake Erie in the past. Are the populations of Asian carps in Lake Erie self sustaining? Yes ___ No X. Uncertainty code _RC__.
   a. If yes, then are conditions that support Asian Carp in Lake Erie similar to conditions in Lake Michigan near the Chicago Lock and T.J. O'Brien Locks? Yes___ No ___. [Please provide details, and cite any references used.]
4. In your opinion would a sustainable population of Asian Carp (both species) adversely impact the commercial fisheries of the GL? (use your ratings from Section II) High ___ Medium____ Low ___. Uncertainty code ___. [Please provide details, and cite any references used] I am not familiar enough with Great Lakes commercial fishery to answer this question.
5. If the Asian Carp (both species) were allowed to migrate into the GL unimpeded how long would it take to establish demonstrable, sustainable populations capable of adversely impacting the commercial fisheries of the GL? (assuming they would result in adverse impacts)
   a. Year _2050

   It took thirty years for the fish that escaped the aquaculture ponds to establish in the Illinois River – an environment with ample diverse habitat, flowing water, and lots of plankton resources. I think it would take much longer for that to happen in the GL, if at all.

      iv. Lower 95% Confidence limit (Year) _2035___
      v. Upper 95% Confidence limit (Year) _2060_
6. Do Asian Carp carry any viral, bacterial, protozoan or other parasites or diseases that may adversely impact the native fish populations in the Great Lakes? (See Duane: Do you want to include the information in Kolar et al. 2007. Becky you can also respond. The remainder of us do not need to weigh in, unless we have detailed information/literature to cite) Yes ___ No ___. [Provide details, and cite references] I am not an expert here
7. If the Asian Carp become established in the GL, then are there any beneficial impacts that would result from their presence? Yes ___ No _ X.__. Uncertainty code __RU_.

[Provide details and cite any references] Dr. Holden of Heartland Processing has developed a technology that turns Asian carp into omega-3 fish oil. Perhaps a sustainable commercial fishery would results and take pressure off other GL species that are exploited.

8. If the Asian Carp (both species) establish sustainable populations, would they adversely impact any of the other established invasive aquatic organisms of the GL? Yes ___ No_ X.__. Uncertainty code _VU__. [Provide details, and cite any references]
9. What are the triggers (high water flows, warm water, availability of Chlorophyll a etc.) for movement of Asian carp? A rise in river stage is documented as a trigger for movement. Reference my 2006 MS thesis and 2008 publication (when I was still DeGrandchamp): "Movement and Habitat Selection by Invasive Asian Carps in a Large River" DeGrandchamp et al 2008, Transactions of the American Fisheries Society 137:45–56

Will warmer weather in the spring make it more likely that the Asian carp will migrate upstream toward Lake Michigan? Yes X No ___ [Explain and cite references] More likely yes – but temperature is not a cue for movement. In fact high temps have the opposite effects. Spring is aliekly time for movement because of river stage cues. Reference "Movement and Habitat Selection by Invasive Asian Carps in a Large River" DeGrandchamp et al 2008, Transactions of the American Fisheries Society 137:45–56

10. Given the habits of the Asian Carp (both species) how likely are the fish to develop significant contaminant loads in their edible tissues?
    ee. High ___ Medium ___ Low ___
    ff. Uncertainty code ___.
    gg. [Explain and cite references]
    I am not qualified to answer this question.

Section V. Risk Management Questions Posed by the Corps. Please respond to the questions.

1. If a single Asian carp is collected during monitoring accompanying a lock closure, then would the spot application of rotenone be an appropriate response? Yes X __ No __. Uncertainty code _ ___
    a. List other desirable actions, in addition to rotenone treatment, that would be recommended. Electrofishing, netting
    b. What is the risk associated with reopening the locks after at least 72 hours after completion of rotenone treatment? H___ M___ L_X __. Uncertainty Code_VC_As long as the chemical is applied and neutralized properly it shouldn't be a problem.
2. If multiple Asian carps are collected during monitoring accompanying lock closure, then would the spot application of rotenone be an appropriate response? Yes X __ No __. Uncertainty code _VC __
    a. List other desirable actions, in addition to rotenone treatment, that would be recommended. Electrofishing, netting
    b. What is the risk associated with reopening the locks after at least 72 hours after completion of rotenone treatment? H___ M___ L_X __. Uncertainty Code_ VC_As long as the chemical is applied and neutralized properly it shouldn't be a problem.

3. Would closing the lock gates be effective in significantly impeding the migration of Asian carp into Lake Michigan given that there may still be gaps of up to one inch between the lock gates and the sides or bottom of the canal? Yes X __ No __. Uncertainty code _RC __I don't think we have small Asian carp up this far yet
4. Could such gaps allow fish eggs or small juveniles to pass through the locks, and if so, what is the associated risk? Yes X _ No __. Uncertainty code _RC _I don't think we have small Asian carp up this far yet
5. Would simply reducing the number of openings of the lock gates have a beneficial effect of impeding Asian Carp migration by itself, without additional control technologies? Yes __ No _X _. Uncertainty code __VC_ No we need targeted mechanical removal of fish
6. Given Asian carp behavior, would fewer openings statistically reduce the likelihood of Asian carp passing through the locks? Yes __ No X _. Uncertainty code _VC__Not if you leave the locks open – our telemetry data indicate they use the locks regularly
7. Would Asian carps aggregate near the lock during closure and pass en mass through the locks during the scheduled openings? Yes _X _ No __. Uncertainty code _VC __ Yes they use the lock chamber to traverse though the lock and dam structures – we have telemetry data to support this
8. Would scheduling lock gate openings in conjunction with other control technologies such as netting, electro-fishing, rotenone, as discussed above, help deter the dispersal of Asian carps into Lake Michigan? Yes X __ No __. Uncertainty code _RC __ If you could time it right and control it adequately– seems like a complicated strategy
9. Is it reasonable to assume that if netting, electro-fishing, rotenone, other monitoring technologies do not recover an Asian carp body, that a significant population of Asian carp is not present in the waterway? Yes _X _ No __. Uncertainty code _VC __
10. Is it reasonable to assume that a longer period of extensive monitoring (through netting, electro-fishing, rotenone, other technologies) without the recovery of an Asian carp body, provides increased confidence that a significant population of Asian carp is not present in the waterway? Yes __X No __. Uncertainty code __VC _
11. If no Asian Carp bodies are recovered through netting, electrofishing, rotenone and other monitoring activities upstream of the Barriers, how significant is the threat/risk to Lake Michigan? In other words, if the population is so small that a single individual cannot be recovered, what level of risk is present? Yes __ No __. Uncertainty code _VC __ This isn't a yes/no question. I think the risk is LOW if the population is so small we cannot detect it with literally HUNDREDS of hours of effort.
12. The Corps and Metropolitan Water Reclamation District are considering installing mesh grates over the sluice gates near the Chicago and O'Brien locks. Would a mesh grate with 1 inch openings be beneficial in deterring carp migration? Yes _X _ No __. Uncertainty code ___ Yes but it will clog up so fast it will be ineffective – you will have to keep cleaning it. 1 inch isn't practical.
13. What significant monitoring would be adequate for helping to verify the absence or presence of Asian Carp in the canal system? Presence/absence is determined by eDNA methods for genetic presence, as well as electrofishing and netting for physical presence. I think telemetry is also an important tool to assess movement, locations (habitat) and to see if the Barrier is working.
14. What methods and equipment are recommended?
    a. How long would a monitoring/event take (3-4 days, for example) 3-4 days

b. How often would such monitoring/sampling events be recommended (once a month, twice a month or more, for example) to reduce risk of migration to an acceptable level? Once a week

15. What are the biological indicators for the recommended monitoring methods and what are the thresholds for action for these indicators?

eDNA should be used as a baseline due to its sensitivity. Once a positive hit is detected, physical verification (Electrofishing, netting) should be deployed to verify.

16. At what duration of monitoring without capturing an Asian carp body is the risk of migration reduced to the extent that it would be reasonable to open the lock gates? For example, is our scenario of lock closure with corresponding monitoring of 1 week/month and normal operation for the remaining days of the month, assuming no Asian carp body is recovered, reasonable from a risk perspective?
    a. Why? Enough time to eliminate a 'seasonal' bias – I would say one month
17. Is one of the other alternatives discussed in the Background (above) preferable from a risk perspective?
    a. Why? I like 2, 4 and 5. I think the more frequent and prolonged closures will give you the best bet for adequately assessing the threat and will eliminate any "flukes" or bias that may be associated with a short closure. Please note that the benefit of these closures, as I see it, is the extensive monitoring to detect this "rare" species in the upper waterway.
18. If an Asian carp movement trigger (such as high chlorophyll, warm water, high flow) is manifested in the CAWs should the locks be closed? Yes _X__ No ___. Uncertainty code _RC__
19. Are there additional structural modifications or other actions you would recommend to be considered to reduce the risk of Asian carp dispersing into Lake Michigan? Fill the canal in with dirt – complete separation of basins.

Section VI: Additional Comments and Recommendations

List comments you wish to include in your Risk Assessment and recommendation for Risk Management

My recommendation is that a long term monitoring plan needs to be in place soon. I think it should build upon what the monitoring subgroup put together last year, and the emphasis should be on monitoring sites above the Barrier. However, it is also my recommendation that we include Brandon Road and Lockport Pools in that monitoring plan - to include such tools like this acoustic analysis and telemetry. We need to assess if the Barrier is working - tools like acoustic imagery (including the DIDSON) and telemetry can help answer that question. I think we should use the more descriptive tools below the Barrier to see where the fish are - and then use eDNA above the Barrier as early detection tools - with electrofishing and netting for physical verification.

If we are able to detect these fish at low densities we should be able to easily control their numbers before they become a problem. Monitoring is at the heart of managing the risk, and I think that is where we should focus our efforts.

Section VII: List of Important References

Hoff, M. H., M. A. Pegg, and K. Irons. Accepted. Management Implications from a Stock-recruit Model for Bighead Carp in Portions of the Illinois and Mississippi Rivers. International Asian Carp Symposium, American Fisheries Society Special Publication. Bethesda, MD.

Kolar, C. S., D. C. Chapman, W. R. Courtenay, C. M. Housel, J. D. Williams, and D. P. Jennings. 2007. Bigheaded carps: A biological synopsis and environmental risk assessment. American Fisheries Society Special Publication 33, Bethesda, MD.

Expert 7
Risk Analysis Form
Issue: Evaluations of Risk of Asian Carps Establishing and Impacting the Great Lakes: Evaluations by Lock Operation Scenario

Instructions to Risk Assessor:

- Read the Background (Section I) prepared by the U.S. Army Corps of Engineers (Corps)
- Answer the Background Question in Section II
- Complete the Risk Assessments in Section III
    a. Results from all respondents will be tabulated
    b. If either a broad or detailed consensus is reached on risk, then that information will be included in the Team's Report to the U.S. Army Corps of Engineers
- Answer the additional questions, posed by the Corps, in Section IV and V
    a. Results from all respondents will be placed into a matrix; we will convene a call, if needed to attempt to develop a consensus recommendation
- If you have information to list in Sections VI and VII, then please do so.
- Submit this completed form to Mike Hoff (Michael_Hoff@fws.gov) within 48 hours of completion of our conference call.

Section I: Background

The Corps, which operates and maintains the navigation structures at the Chicago Lock and the T.J. O'Brien Lock, is considering modifications to lock operations and structures to reduce the risk of Asian carps (bighead and silver carps) passing through those locks in the Chicago Area Waterways (CAWs) into Lake Michigan. Possible modifications considered include minimizing impacts to the navigation industry and minimizing impacts from flooding. In the short term, the Corps is considering a range of alternative lock operations that will increase the time the locks will be closed. The alternatives include:

1. Continue current operations (no action, as required by NEPA)
2. Lock closure of 3 to 4 days a week and normal operations for the remaining days of the week
3. Lock closure of 1 week/month and normal operation for the remaining days of the month
4. Lock closure every other week and normal operations for the alternative weeks
5. Lock closure of 2 months with extensive monitoring to determine if Asian carps are in the CAWs. If no Asian carps are collected during the closed period, then lock operations will be resumed at the end of the closure period. Locks would remain open, unless there was a significant flow event (flow rate trigger TBD) that could trigger fish movement. Locks would be closed on an emergency basis while monitoring activities were executed.
6. Two-week lock closure, in mid-late April, during which extensive surveillance and monitoring is conducted. If no Asian carps are recovered, then the locks will operate normally. However, if there is a significant rainfall event that results in elevated flows (and a possible stimulus for Asian carps to move upstream) after the two weeks of surveillance/monitoring, then the locks would be closed as soon as possible. During the lock closure, resources could be mobilized to complete surveillance/monitoring for a week. If no Asian carps are captured during the week, then the locks would be reopened.

[Note: The Corps has not identified a flow trigger, but will be working with fisheries staff to identify a range of change that could necessitate an emergency closure.]

During the periods of lock closure there would be a monitoring effort undertaken up stream of the barriers that could include commercial fishing (netting), electro-fishing, the spot application of rotenone, eDNA testing and any other technologies that may be developed to help determine if an Asian carp population exists. If Asian carps are not captured, then the locks would be reopened for normal operations for the time identified. If an Asian carp(s) is/are caught above electrical barriers, the Corps, in coordination with other agencies, would follow a contingency plan which would potentially include immediate closure of the lock gates until the extent of population is determined and reopening the locks is determined not to be a significant risk for dispersing Asian carp into Lake Michigan. The Corps is also considering structural modifications to the navigation features in the CAWs including adding screens to the sluice gates at both locks and acoustic directional barriers in the CAWs to encourage movement of fish into areas that can be monitored for Asian carp.

To evaluate the proposed actions, the Corps needs expert input from you. Please complete the remaining sections of this form, which was developed to: 1) compare your evaluation of risk of establishment of bighead and silver carps in Lake Michigan under each of the Corps' presently considered lock operation scenarios, and 2) submit management-oriented questions, posed by the Corps, to you.

Section II: Risk Assessment Background Question

1. Where are populations of silver and bighead carp self sustaining? (Base your answer to this question on your expert opinion)
    g. I believe that there is no evidence that silver carp and bighead carp established self-sustaining populations either above the electrical barriers or any location within the Great Lakes. Yes___ No __x_
        i. Uncertainty Code (see Uncertainty Codes and Descriptions on Page 8) _very certain___
        ii. If yes, then please provide supporting information. Just to clarify that my "no" is interpreted correctly, yes, I believe there is no evidence. In other words, there is "no" evidence. The other part of this question would be to remove the "evidence" and ask whether I believe there are self-sustaining populations, in which case I do not believe there are but I would only be reasonably certain.

Section III: Risk Assessment

Probability of bighead and/or silver carp Establishment in Lake Michigan via pathways OTHER THAN Chicago and O'Brien Locks (i.e., all pathways other than those locks including pathways such as, but not limited to, bait bucket, food trade, aquaculture). Complete Columns 1 and 2.

	Uncertainty Code	Element	

Element Rating (Low, Medium, High)	(VC-VU: See codes and descriptions below. You may also list specific uncertainties)	(Support Data with Reference Code: See codes and descriptions below)	Comments
Med	Moderately certain	Bighead and silver carps are associated with the pathway. The Assessor answers whether there is a convincing temporal and spatial association with the pathway. Reference Code:	Please list pathways by descending order of risk to establishment of populations in Lake Michigan. See comment 1 below re. addressing Wilmette L&D and Grand Calumet River. Generally speaking, all of the pathways below are a lower risk than that of fish swimming through open waterways. I consider ballast water to be the highest risk of the pathways listed below with those remaining being of much lower risk. 1. ballast water 2. food trade 3. bait bucket 4. aquaculture
High	VC	Bighead and silver carps can survive above the electrical barrier and the Great	

		Lakes. Reference Code:	
High	VC	Bighead and silver carps can establish self-sustaining populations in the Great Lakes Reference Code:	
High	VC	Bighead and silver carp can spread throughout a substantial portion of the Great Lakes Reference Code:	

Probability of bighead and/or silver carp Establishment in Lake Michigan via Chicago and O'Brien Locks: Scenario 1 -- No modification to current lock operations. Complete Columns 1 and 2.

Element Rating (Low, Medium, High)	Uncertainty Code (VC-VU: See codes and descriptions below. You may also list specific uncertainties)	Element (Support Data with Reference Code: See codes and descriptions below)	Recommendations
High	Very certain	Bighead and silver carps can establish self-sustaining populations in the Great Lakes Reference Code:	See comments 2a-2d below for detailed action that would likely be effective using a segregate (via block net/BAFF), locate (via eDNA), eliminate (via rotenone) approach.

Probability of bighead and/or silver carp Establishment in Lake Michigan via Chicago and O'Brien Locks: Modification of operations Scenario 2 -- Closing locks either 3 or 4 days/week, and then conducting normal operations for the remaining days of the week. Complete Columns 1 and 2. If Element Rating

(Column 1), is either High or Medium, then enter in the Comments column any recommendations for specific management actions (e.g., chemical application, commercial fishing…) that could be realistically implemented to reduce the Element Rating, of Probability of Establishment, to Low.

Element Rating (Low, Medium, High)	Uncertainty Code (VC-VU: See codes and descriptions below. You may also list specific uncertainties)	Element (Support Data with Reference Code: See codes and descriptions below)	Recommendations
High	Very certain	Bighead and silver carps can establish self-sustaining populations in the Great Lakes Reference Code:	There are no actions that will be effective and reasonably completed over a 3-4 day closure window. See comments 2a-2d.

Probability of bighead and/or silver carp Establishment in Lake Michigan via Chicago and O'Brien Locks: Modification of operations Scenario 3 – Closing locks 1 week/month, followed by normal operation for the remaining days of the month. Complete Columns 1 and 2. If Element Rating (Column 1), is either High or Medium, then enter in the Comments column any recommendations for specific management actions (e.g., chemical application, commercial fishing…) that could be realistically implemented to reduce the Element Rating, of Probability of Establishment, to Low.

Element Rating (Low, Medium, High)	Uncertainty Code (VC-VU: See codes and descriptions below. You may also list specific uncertainties)	Element (Support Data with Reference Code: See codes and descriptions below)	Recommendations
High	Very certain	Bighead and silver carps can establish self-sustaining populations in the Great Lakes Reference Code:	There are no actions that will be effective and reasonably completed over a 1 week closure window. See comments 2a-2d. In addition, so much can change over the course of the ~3

			weeks that the lock would be operated, that it would be somewhat irrelevant what was done over the course of a week of searching/controlling that occurred weeks in the past.

Probability of bighead and/or silver carp Establishment in Lake Michigan via Chicago and O'Brien Locks: Modification of operations Scenario 4 -- Lock closure of every other week and normal operations for the alternative weeks. Complete Columns 1 and 2. If Element Rating (Column 1), is either High or Medium, then enter in the Comments column any recommendations for specific management actions (e.g., chemical application, commercial fishing…) that could be realistically implemented to reduce the Element Rating, of Probability of Establishment, to Low.

Element Rating (Low, Medium, High)	Uncertainty Code (VC-VU: See codes and descriptions below. You may also list specific uncertainties)	Element (Support Data with Reference Code: See codes and descriptions below)	Recommendations
High	VC	Bighead and silver carps can establish self-sustaining populations in the Great Lakes Reference Code:	There are no actions that will be effective and reasonably completed over a 1 week closure window. See comments 2a-2d.

Probability of bighead and/or silver carp Establishment in Lake Michigan via Chicago and O'Brien Locks: Modification of operations Scenario 5 -- Lock closure of two months with extensive monitoring to determine if Asian carps are in the Chicago Area Waterways. Complete Columns 1 and 2. If Element Rating (Column 1), is either High or Medium, then enter in the Comments column any recommendations for specific management actions (e.g., chemical

application, commercial fishing…) that could be realistically implemented to reduce the Element Rating, of Probability of Establishment, to Low.

Element Rating (Low, Medium, High)	Uncertainty Code (VC-VU: See codes and descriptions below. You may also list specific uncertainties)	Element (Support Data with Reference Code: See codes and descriptions below)	Recommendations
Moderate	VC	Bighead and silver carps can establish self-sustaining populations in the Great Lakes Reference Code:	See comments 2a-2d. I'm a bit confused how to answer this one. If solely based on closing the lock with intensive monitoring (particularly eDNA) occurring over 2 months, then it would be reasonable to expect that a fish would be detected if present in which case I could go with a "low" rating. But this is ONLY IF eDNA turn around time is much quicker than it currently is and if appropriate management actions to remove any fish found are implemented (i.e., rotenone). Because of the "ifs," I left rating as moderate.

Probability of bighead and/or silver carp Establishment in Lake Michigan via Chicago and O'Brien Locks: Modification of operations Scenario 6 -- Two-

week lock closure, in mid-late April, during which extensive surveillance and monitoring is conducted. If no Asian carps are recovered, then the locks will operate normally. However, if there is a significant rainfall event that results in elevated flows (and a possibly stimulus for Asian carps to move upstream) after the two weeks of surveillance/monitoring, then the locks would be closed as soon as possible. During the lock closure, resources could be mobilized to complete surveillance/monitoring for a week. If no Asian carps are captured during the week, then the locks would be reopened. Complete Columns 1 and 2. If Element Rating (Column 1), is either High or Medium, then enter in the Comments column any recommendations for specific management actions (e.g., chemical application, commercial fishing…) that could be realistically implemented to reduce the Element Rating, of Probability of Establishment, to Low.

Element Rating (Low, Medium, High)	Uncertainty Code (VC-VU: See codes and descriptions below. You may also list specific uncertainties)	Element (Support Data with Reference Code: See codes and descriptions below)	Recommendations
High	Reasonably certain	Bighead and silver carps can establish self-sustaining populations in the Great Lakes Reference Code:	See comments 2a-2d. 2 weeks is too short a period to complete adequate initial surveillance given current efforts and timeframes, and 1 week of follow up after a rain event is definitely too short a period.

Consequence of Establishment in Lake Michigan (no matter how introduced). Complete Columns 1 and 2

Element Rating (Low, Medium, High)	Uncertainty code (VC-VU: See codes and descriptions below. You may also list specific uncertainties)	Element (Support Data with Reference Code: See codes and descriptions below)	Comments
Medium	Reasonably uncertain	Estimate environmental impact	There is such a wide range on

		if established in the Great Lakes Reference Code: J	the potential impact and my level of certainty is so high, that anything I put here would be speculation. However, in my professional judgment, those impacts could range from a major disruption of the food chain in nutrient rich areas that have major negative consequences to existing Great Lakes fisheries (along with extensive physical dangers from jumping carp in these areas) to much lesser impacts if populations are relatively confined in their spawning areas and thus can be effectively controlled by excluding them from those areas or trapping them out of those areas.
Med	Reasonably uncertain	Estimate economic impact if established in the Great Lakes (based on your knowledge of fishing economics in the Great Lakes). The	If not easily controlled at spawning sites and if populations reach high abundances,

		assessor is not expected to take on the role of an economist, but instead provides information on impacts the species would broadly have on fishery-related economics of the Great Lakes. Reference Code: J	then I could foresee major economic consequences of a filter feeding fish altering the food base in a system where food can definitely be a limited resource.
Med	Reasonably uncertain	Estimate impact on the Great Lakes from social and/or political influences (based on your knowledge of politics and societal concerns about Great Lakes fishing) .The assessor is not expected to take on the role of an political scientist or sociologist, but instead provides information on impacts the species would broadly have on fishery-related societal and political issues of the Great Lakes. Reference Code: J	My personal belief is that there will be tremendous public and political outcry initially followed by lessor levels of frustration if populations can be effectively managed, but with long-term residual anger that more wasn't done when we had the chance and an overall feeling that the government let the public down and that aquaculture is to blame for the fish getting into the wild in the first place.

Summary of Organism Risk Potential to the Great Lakes
(Note: Hoff will compile this summary)
Probability of Establishment Risk Category (from table above)=
Consequence of Establishment Risk Category (from table above) =

Organism Risk Potential =

Risk Category Definitions

Risk Category	Definition
Low	Acceptable risk – organism of little concern for establishment and/or ecological consequence (i.e., impact)
Medium	Unacceptable risk – organism of moderate concern
High	Unacceptable risk – organism of major concern

Uncertainty Codes and Descriptions

Uncertainty Code	Description
Very Certain	As certain as I can be
Reasonably Certain	Reasonably certain
Moderately Certain	More certain than not
Reasonably Uncertain	Reasonably uncertain
Very Uncertain	A guess

Reference codes and descriptions

Reference Code	Reference Type
G	General knowledge; no specific source
J	Judgmental evaluation
E	Extrapolation; information specific to pest not available. However, information available on similar organisms supplied
Author, year	Literature Cited

Section IV. Questions from the Corps. Please respond to the questions.

1. Is there an imminent threat that Asian carp (silver and bighead) will establish a sustainable population in Lake Michigan in the near future? Yes _X_ No____. Uncertainty code __reasonably certain__
    a. If yes, then by when do you predict a sustainable population of bighead carp? Year _2025___. Lower 95% Confidence limit (Year) __2017__. Upper 95% Confidence limit (Year)_2040__.
    b. If yes, then by when do you predict a sustainable population of silver carp?
        i. Year _2030___.
            1. Lower 95% Confidence limit (Year) __2022__
            2. Upper 95% Confidence limit (Year) _2045__.
2. Is there a threshold of Asian carp needed to establish a sustainable population? Yes _x__ No____. If yes, then what is that threshold (Note: Hoff's [Hoff Accepted] stock-recruit model is probably the best science support. He will draft a reply based on that model. All other experts can submit their beliefs.)
    hh. Specifically, what number of Asian Carp would need to enter Lake Michigan to constitute a founding population that could, under the right environmental

conditions, develop into a sustainable population in the Great Lakes? ___5-50_____

3. A few Asian carp were found in Lake Erie in the past. Are the populations of Asian carps in Lake Erie self sustaining? Yes ___ No _x__. Uncertainty code _reasonably uncertain__. –---- I'm not particularly aware of sampling efforts that take place in Lake Erie tribs to know what the likelihood is of a self-sustaining population being present and detected. I'm surprised that only a few adult fish have been collected if sampling is reasonably intense (particularly in the tribs), would have expected an adult and or juvenile fish would have been collected by this time if their was a self-sustaining population.
    a. If yes, then are conditions that support Asian Carp in Lake Erie similar to conditions in Lake Michigan near the Chicago Lock and T.J. O'Brien Locks? Yes___ No ___. [Please provide details, and cite any references used.]
4. In your opinion would a sustainable population of Asian Carp (both species) adversely impact the commercial fisheries of the GL? (use your ratings from Section II) High ___ Medium__x__ Low ___. Uncertainty code _reasonably certain__. [Please provide details, and cite any references used]. ---- I suspect that it would be particularly an issue for commercial fishers who would be likely to have commercial gear filled with Asian carp that would require extra time, effort, and cost to remove from nets and would lessen the fishers' ability to effectively capture target species.
5. If the Asian Carp (both species) were allowed to migrate into the GL unimpeded how long would it take to establish demonstrable, sustainable populations capable of adversely impacting the commercial fisheries of the GL? (assuming they would result in adverse impacts) ----Not sure what is meant by "unimpeded." For the sake of my answer, I'll assume that it is talking about not being impeded by closing of the lock gates. If the assumption is that they are also unimpeded by the dispersal barrier and other efforts to keep them out of the Great Lakes, then I would probably take 10 years or so off the estimates.
    ii. Year __2035_____
        i. Lower 95% Confidence limit (Year) _2027___
        ii. Upper 95% Confidence limit (Year) _2050__
6. Do Asian Carp carry any viral, bacterial, protozoan or other parasites or diseases that may adversely impact the native fish populations in the Great Lakes? (See Duane: Do you want to include the information in Kolar et al. 2007. Becky you can also respond. The remainder of us do not need to weigh in, unless we have detailed information/literature to cite) Yes ___ No ___. [Provide details, and cite references]
7. If the Asian Carp become established in the GL, then are there any beneficial impacts that would result from their presence? Yes ___ No _x__. Uncertainty code __very uncertain_. [Provide details and cite any references] ----I say no, but because ecological interactions are terribly complex and my understanding of them is limited, it is very difficult to predict what potential benefits might occur from the presence of Asian carp in terms of their potentially balancing out the negative effects of other invasive species, providing an additional source of commercial fish flesh, or otherwise providing some benefit.

8. If the Asian Carp (both species) establish sustainable populations, would they adversely impact any of the other established invasive aquatic organisms of the GL? Yes ___ No___. Uncertainty code ___. [Provide details, and cite any references]
9. What are the triggers (high water flows, warm water, availability of Chlorophyll a etc.) for movement of Asian carp? [Answer question and cite references] ---DeGrandchamp et al. 2008. Transactions, found that movement was positively correlated with flow but not temperature.
10. Will warmer weather in the spring make it more likely that the Asian carp will migrate upstream toward Lake Michigan? Yes _x__ No ___ [Explain and cite references] --- Yes, but as noted in question 9, not so much because of the warm weather as because of the higher flows that will most likely accompany that warm weather.
11. Given the habits of the Asian Carp (both species) how likely are the fish to develop significant contaminant loads in their edible tissues?
    a. High ___ Medium ___ Low __x_
    b. Uncertainty code __reasonably certain_.
    c. [Explain and cite references] --- based purely on them being filter feeders and thus not as likely to bioacummulate contaminants and because of work I've heard of through IDNR where fish were tested for contaminants on the Illinois River as part of a viability assessment for use of Asian carp as food fish (never saw a paper to cite but Steve Shults could provide details I'm sure)

Section V. Risk Management Questions Posed by the Corps. Please respond to the questions.

1. If a single Asian carp is collected during monitoring accompanying a lock closure, then would the spot application of rotenone be an appropriate response? Yes _x_ No __. Uncertainty code __reasonably certain_ --- a single carp "collected" infers that you have a fish in hand that was collected by conventional sampling gear that is pretty ineffective at capturing Asian carp in low abundance and thus would be a pretty likely indicator that there are many more fish present…but in fairness, it would be extremely difficult to make any generalizations about fish abundance based on one fish capture because that one fish could be the only one present or could represent 10 or 100 other fish in the area that the sampling gear did not catch…in my mind though, it would be prudent to over-react than to under react…I also presume that I would have eDNA sampling following the collection to indicate the likely presence of other Asian carp which would also feed into my decision/recommendation…an accompanying question would be what would I do if I had an eDNA hit that was a few days old and in that case, I would recommend blocking off the area (ditto for one caught with conventional gear) and retest the area to confirm the continued presence of a fish(es) and then would also recommend rotenone use
    a. List other desirable actions, in addition to rotenone treatment, that would be recommended. --- if it is not possible to block off the area and rotenone within a acceptable length of time, I would advocate for very intensive fishing with conventional gear in the vicinity, but this would be a very distant second recommendation to rotenone
    b. What is the risk associated with reopening the locks after at least 72 hours after completion of rotenone treatment? H___ M_x__ L___. Uncertainty Code_reasonably certain__ --- depends on the extent of the treatment…more area

treated, the longer it is likely to take carp to move into the area, but flows would also be a major factor in how far a fish is likely to move and thus the likelihood of reinfesting the area below the lock and thus the likelihood of moving through the lock

2. If multiple Asian carps are collected during monitoring accompanying lock closure, then would the spot application of rotenone be an appropriate response? Yes _x_ No __. Uncertainty code _very certain__ ---ditto to answer for question 1
    a. List other desirable actions, in addition to rotenone treatment, that would be recommended.
    b. What is the risk associated with reopening the locks after at least 72 hours after completion of rotenone treatment? H___ M___ L___. Uncertainty Code___
3. Would closing the lock gates be effective in significantly impeding the migration of Asian carp into Lake Michigan given that there may still be gaps of up to one inch between the lock gates and the sides or bottom of the canal? Yes _x_ No __. Uncertainty code _reasonably certain__ --- It would be likely to stop the majority of fish in the area that I hypothesize are young adults or adults.
4. Could such gaps allow fish eggs or small juveniles to pass through the locks, and if so, what is the associated risk? Yes _x_ No __. Uncertainty code __reasonably certain_ --- over time it becomes more and more likely that eggs or small juveniles could be present around the locks due to populations becoming established in the CAWS and associated streams and with flow occurring in both directions at various times, it is entirely possible that eggs or small juveniles could pass through the locks or through screens on the sluice gates…however, I'm not entirely certain of the likelihood of reproducing populations in the CAWS because I'm not sure how much open river we have in the major tributaries
5. Would simply reducing the number of openings of the lock gates have a beneficial effect of impeding Asian Carp migration by itself, without additional control technologies? Yes __ No _x_. Uncertainty code __very certain_ --- "opening the door" fewer times, still leaves plenty of time with the door open and if fish are in the area looking to pass, they won't need too many door openings to get through
6. Given Asian carp behavior, would fewer openings statistically reduce the likelihood of Asian carp passing through the locks? Yes __ No _x_. Uncertainty code __reasonably certain_ --- statistically speaking a fish has a certain probability to navigate the lock each time it is opened and thus fewer openings gives fewer opportunities for fish to pass; however, if a fish has say a 1 in 10 chance of passing through the lock and over time you provide that fish 100 or more times to pass through, statistics say that the fish will get through
7. Would Asian carps aggregate near the lock during closure and pass en mass through the locks during the scheduled openings? Yes _x_ No __. Uncertainty code __very certain_ --- I sure suspect that they would…perhaps not en mass, but arguably steadily during schedule openings as they find the right opportunity and navigate their way into and through the lock chamber.
8. Would scheduling lock gate openings in conjunction with other control technologies such as netting, electro-fishing, rotenone, as discussed above, help deter the dispersal of Asian carps into Lake Michigan? Yes _x_ No __. Uncertainty code __moderately certain_ --- yes, but only if sampling and control efforts are sufficient (see comments 2a-2d).

9. Is it reasonable to assume that if netting, electro-fishing, rotenone, other monitoring technologies do not recover an Asian carp body, that a significant population of Asian carp is not present in the waterway? Yes _x_ No __. Uncertainty code __moderately certain_ --- yes but this answer depends on the level of effort of applied and on what is considered a significant population…if extensive sampling and rotenone do not recover a body, then it is my opinion that the fish in the CAWS would not number in the thousands
10. Is it reasonable to assume that a longer period of extensive monitoring (through netting, electro-fishing, rotenone, other technologies) without the recovery of an Asian carp body, provides increased confidence that a significant population of Asian carp is not present in the waterway? Yes _x_ No __. Uncertainty code __reasonably certain_ --- yes, but particularly in the case of rotenone use which would be the most effective of the techniques listed and particularly in conjunction with eDNA samples to direct efforts…
11. If no Asian Carp bodies are recovered through netting, electrofishing, rotenone and other monitoring activities upstream of the Barriers, how significant is the threat/risk to Lake Michigan? In other words, if the population is so small that a single individual cannot be recovered, what level of risk is present? Yes _x_ No __. Uncertainty code __reasonably uncertain_ ---- Not a yes or no question. I would consider the risk moderate as opposed to high, but because an unknown number of fish have very likely already gotten into Lake Michigan, the addition of another 10-20 fish (which could be present but missed by sampling efforts), could be just the additional number of fish to cause a population to become established in Lake Michigan. At the same time, there may have already been a sufficient number of fish that have made it into Lake Michigan to start a population with or without another 10-20 fish. The fact is, we don't know where we are at in the game so in my opinion, we need to continue to act aggressively and manage conservatively until there is evidence to act differently. I would rather look back in 20 years and be disappointed that we over-reacted then to look back in 20 years and realize that we under-reacted and could have been successful with a little more effort.
12. The Corps and Metropolitan Water Reclamation District are considering installing mesh grates over the sluice gates near the Chicago and O'Brien locks. Would a mesh grate with 1 inch openings be beneficial in deterring carp migration? Yes _x_ No __. Uncertainty code __moderately certain_ --- It would be very successful for adult fish, but of course wouldn't address eggs, larvae, or small juvenile fish if over time Asian carp establish spawning populations in the CAWS.
13. What significant monitoring would be adequate for helping to verify the absence or presence of Asian Carp in the canal system? --- see comments 2a-2d
14. What methods and equipment are recommended? ---see comments 2a-2d
    a. How long would a monitoring/event take (3-4 days, for example) --- see comments 2a-2d
    b. How often would such monitoring/sampling events be recommended (once a month, twice a month or more, for example) to reduce risk of migration to an acceptable level? --- at least the eDNA portion of the intensive effort (see comments 2a-2d) should occur at least quarterly until we determine over time that all fish have been removed from the CAWS and that all pathways through or around the Dispersal Barrier are adequately address…then perhaps 1-2x/year would suffice.

15. What are the biological indicators for the recommended monitoring methods and what are the thresholds for action for these indicators? --- Not sure I understand the question. In my mind, the indicator for eDNA is a positive hit which is an indication of bighead or silver carp DNA being present and this indication is sufficient in my mind to take any needed action that you would take if you had a live specimen in hand. For the other methods (e.g., netting and electrofishing), a body in hand (or not) is the only indication that it can provide and if collected, appropriate actions should be taken. The last element that could be separated out would be the rotenone and ideally it would result in a body in hand as well. However, this one gets confounded because the lack of a body doesn't indicate the lack of a fish having been present. However, if done well, any fish present would be dead. Unfortunately, we don't know what eDNA signature that dead fish would produce (I presume a positive hit), and you would not be able to distinguish between that dead fish and a live fish that may have moved into the area since the rotenone application. Perhaps if eDNA sampling could be conducted very intensively at the sight of the positive hit such that you would either drive the fish (if alive) out of the area thus indicating a live fish or could conversely conclude by the lack of movement that the fish is dead and could perhaps do some trawling to try and recover/remove the fish.
16. At what duration of monitoring without capturing an Asian carp body is the risk of migration reduced to the extent that it would be reasonable to open the lock gates? For example, is our scenario of lock closure with corresponding monitoring of 1 week/month and normal operation for the remaining days of the month, assuming no Asian carp body is recovered, reasonable from a risk perspective? ---- Not at all…much more intensive efforts would be needed.
    a. Why? --- See comments 2a-2d.
17. Is one of the other alternatives discussed in the Background (above) preferable from a risk perspective? --- a lock closure of 2 months would be my preferred alternative if I had to select one
    a. Why? --- See comments 2a-2d
18. If an Asian carp movement trigger (such as high chlorophyll, warm water, high flow) is manifested in the CAWs should the locks be closed? Yes _x__ No ___. Uncertainty code __very certain_ --- An increase in flows would be a trigger for fish to actively move upstream and potentially thru the locks. On the one hand, this would be an ideal time for fish to concentrate themselves below barriers, but on the other hand, it would be a difficult time to sample and to do a rotenone effort due to potential debris in the water and higher water volumes.
19. Are there additional structural modifications or other actions you would recommend to be considered to reduce the risk of Asian carp dispersing into Lake Michigan? --- See comments 2a-2d. I would want to be sure that Wilmette Lock is addressed, that the sheet piling on the Grand Calumet River is addressed, and that someone does additional dye or other work to identify additional connections via culverts. Of course physical separation at all locations would be ideal. Aggressive use of SPA BAFFs is the only other immediate tool that comes to mind. These should be used at locations such as the locks or other choke points to firm up our lines of defense.

Section VI: Additional Comments and Recommendations

List comments you wish to include in your Risk Assessment and recommendation for Risk Management.

1. In addition to Chicago and O'Brien locks and dams, the Wilmette L&D and Grand Calumet River connection through Indiana must be addressed. For purposes of answering all risk assessment questions, I excluded these pathways from consideration of risk levels under the assumption that they are addressed. If they are not addressed, then my risk level would be "high" for all actions taken at Chicago and O'Brien because we would be leaving two other major pathways open and even if we effectively closed 2 doors, if we left 2 others open, our risk would be high. I assume they are address because it is my understanding that there is sheet piling on the Grand Calumet River (perhaps have the name of the river incorrect…but it is the part of the CAWS that crosses into Indiana and then connects to Lake Michigan). It is a total assumption on my part regarding the Wilmette L&D, but my assumption is that it will be closed to navigation. Again, if the sheet piling were removed, or the Wilmette Lock will be opened, then I would categorize all alternatives as "high."
2. There are currently no detection tools available that will allow us to have a reasonable level of certainty about the presence, and particularly the abundance, of Asian carp that can be completed quickly.
    a. eDNA is the only tool currently on the table that has a very good probability of detecting Asian carp, but the turn around time is too long for the controlled lock operations scenarios. Even if samples were turned around in a 48 hr timeframe, those samples would only represent locations where the samples were collected and at the time they were collected. Given that Asian carp can move miles/day, they could very easily move from areas not sampled to areas sampled for eDNA over the course of the time it would take to process samples (even if 48 hrs). Thus to truly be effective, you would need extensive, intense (i.e., closely spaced samples throughout the CAWS) sample collection each time you were going to test for the presence of Asian carp.
    b. Netting, electrofishing, or any other "standard gears" are very poor indicators of the presence of Asian carp. Even intensive sampling with these gears would be unlikely to detect Asian carp over any short period of time. With extensive application of these techniques, it is possible, perhaps even likely, that we will ultimately collect a fish(es). However, this is definitely not an approach that I would advocate for giving the green light to opening a lock. These are not techniques that demonstrate the "absence" of a fish, which is really what we're looking for before we open a lock gate.
    c. Rotenone could be an effective tool, but only if extensive applications are used repeatedly. Again given the ability for Asian carp to move miles/day, a rotenone application will only have localized and temporary effects. The only reasonably sure way I can see to use this tool would be to do a complete kill of all areas above an effective barrier (e.g., presumably the Dispersal Barrier).
    d. Our best bet is to throw the whole tool box at the issue. Perhaps we can create temporary barriers (possibly SPA BAFFs or block nets) to section off the CAWS, follow up with rapid eDNA assessment (and possibly netting and electrofishing), with rotenone treatments of areas with positive eDNA hits. This 3 step process is

the best way I can think of to assure that Asian carp are absent from the system prior to any lock gate openings. It would also be the best long-term strategy I can envision to deal with the Asian carp that are currently above the barrier. Perhaps with the implementation of this action (segregate, locate, eliminate), concurrent with other actions such as Barrier IIB, I&M blockage, Des Plaines separation, and any improvements to the voltage settings, we can be reasonably secure that our efforts will prevent movement between the basins. However, the best way to stop movement remains to severe the connection permanently by stopping water flow between the basins.

Section VII: List of Important References

Hoff, M. H., M. A. Pegg, and K. Irons. Accepted. Management Implications from a Stock-recruit Model for Bighead Carp in Portions of the Illinois and Mississippi Rivers. International Asian Carp Symposium, American Fisheries Society Special Publication. Bethesda, MD.

Kolar, C. S., D. C. Chapman, W. R. Courtenay, C. M. Housel, J. D. Williams, and D. P. Jennings. 2007. Bigheaded carps: A biological synopsis and environmental risk assessment. American Fisheries Society Special Publication 33, Bethesda, MD.

Expert 8
Risk Analysis Form
Issue: Evaluations of Risk of Asian Carps Establishing and Impacting the Great Lakes: Evaluations by Lock Operation Scenario

Instructions to Risk Assessor:

- Read the Background (Section I) prepared by the U.S. Army Corps of Engineers (Corps)
- Answer the Background Question in Section II
- Complete the Risk Assessments in Section III
    a. Results from all respondents will be tabulated
    b. If either a broad or detailed consensus is reached on risk, then that information will be included in the Team's Report to the U.S. Army Corps of Engineers
- Answer the additional questions, posed by the Corps, in Section IV and V
    a. Results from all respondents will be placed into a matrix; we will convene a call, if needed to attempt to develop a consensus recommendation
- If you have information to list in Sections VI and VII, then please do so.
- Submit this completed form to Mike Hoff (Michael_Hoff@fws.gov) within 48 hours of completion of our conference call.

Section I: Background

The Corps, which operates and maintains the navigation structures at the Chicago Lock and the T.J. O'Brien Lock, is considering modifications to lock operations and structures to reduce the risk of Asian carps (bighead and silver carps) passing through those locks in the Chicago Area Waterways (CAWs) into Lake Michigan. Possible modifications considered include minimizing impacts to the navigation industry and minimizing impacts from flooding. In the short term, the Corps is considering a range of alternative lock operations that will increase the time the locks will be closed. The alternatives include:

1. Continue current operations (no action, as required by NEPA)
2. Lock closure of 3 to 4 days a week and normal operations for the remaining days of the week
3. Lock closure of 1 week/month and normal operation for the remaining days of the month
4. Lock closure every other week and normal operations for the alternative weeks
5. Lock closure of 2 months with extensive monitoring to determine if Asian carps are in the CAWs. If no Asian carps are collected during the closed period, then lock operations will be resumed at the end of the closure period. Locks would remain open, unless there was a significant flow event (flow rate trigger TBD) that could trigger fish movement. Locks would be closed on an emergency basis while monitoring activities were executed.
6. Two-week lock closure, in mid-late April, during which extensive surveillance and monitoring is conducted. If no Asian carps are recovered, then the locks will operate normally. However, if there is a significant rainfall event that results in elevated flows (and a possible stimulus for Asian carps to move upstream) after the two weeks of surveillance/monitoring, then the locks would be closed as soon as possible. During the lock closure, resources could be mobilized to complete surveillance/monitoring for a week. If no Asian carps are captured during the week, then the locks would be reopened.

[Note: The Corps has not identified a flow trigger, but will be working with fisheries staff to identify a range of change that could necessitate an emergency closure.]

During the periods of lock closure there would be a monitoring effort undertaken up stream of the barriers that could include commercial fishing (netting), electro-fishing, the spot application of rotenone, eDNA testing and any other technologies that may be developed to help determine if an Asian carp population exists. If Asian carps are not captured, then the locks would be reopened for normal operations for the time identified. If an Asian carp(s) is/are caught above electrical barriers, the Corps, in coordination with other agencies, would follow a contingency plan which would potentially include immediate closure of the lock gates until the extent of population is determined and reopening the locks is determined not to be a significant risk for dispersing Asian carp into Lake Michigan. The Corps is also considering structural modifications to the navigation features in the CAWs including adding screens to the sluice gates at both locks and acoustic directional barriers in the CAWs to encourage movement of fish into areas that can be monitored for Asian carp.

To evaluate the proposed actions, the Corps needs expert input from you. Please complete the remaining sections of this form, which was developed to: 1) compare your evaluation of risk of establishment of bighead and silver carps in Lake Michigan under each of the Corps' presently considered lock operation scenarios, and 2) submit management-oriented questions, posed by the Corps, to you.

Section II: Risk Assessment Background Question

1. Where are populations of silver and bighead carp self sustaining? (Base your answer to this question on your expert opinion)
    h. I believe that there is no evidence that silver carp and bighead carp established self-sustaining populations either above the electrical barriers or any location within the Great Lakes. Yes___ No ___
        i. Uncertainty Code (see Uncertainty Codes and Descriptions on Page 8) ____
        ii. If yes, then please provide supporting information.

Section III: Risk Assessment

Probability of bighead and/or silver carp Establishment in Lake Michigan via pathways OTHER THAN Chicago and O'Brien Locks (i.e., all pathways other than those locks including pathways such as, but not limited to, bait bucket, food trade, aquaculture). Complete Columns 1 and 2.

Element Rating (Low, Medium, High)	Uncertainty Code (VC-VU: See codes and descriptions below. You may also list specific uncertainties)	Element (Support Data with Reference Code: See codes and descriptions below)	Comments

		Bighead and silver carps are associated with the pathway. The Assessor answers whether there is a convincing temporal and spatial association with the pathway. Reference Code:	Please list pathways by descending order of risk to establishment of populations in Lake Michigan.
		Bighead and silver carps can survive above the electrical barrier and the Great Lakes. Reference Code:	
		Bighead and silver carps can establish self-sustaining populations in the Great Lakes Reference Code:	
		Bighead and silver carp can spread throughout a substantial portion of the Great Lakes Reference Code:	

Probability of bighead and/or silver carp Establishment in Lake Michigan via Chicago and O'Brien Locks: Scenario 1 -- No modification to current lock operations. Complete Columns 1 and 2.

Element Rating (Low, Medium, High)	Uncertainty Code (VC-VU: See codes and descriptions below. You may also list specific uncertainties)	Element (Support Data with Reference Code: See codes and descriptions below)	Recommendations
		Bighead and silver carps can establish self-sustaining	

		populations in the Great Lakes Reference Code:	

Probability of bighead and/or silver carp Establishment in Lake Michigan via Chicago and O'Brien Locks: Modification of operations Scenario 2 -- Closing locks either 3 or 4 days/week, and then conducting normal operations for the remaining days of the week. Complete Columns 1 and 2. If Element Rating (Column 1), is either High or Medium, then enter in the Comments column any recommendations for specific management actions (e.g., chemical application, commercial fishing…) that could be realistically implemented to reduce the Element Rating, of Probability of Establishment, to Low.

Element Rating (Low, Medium, High)	Uncertainty Code (VC-VU: See codes and descriptions below. You may also list specific uncertainties)	Element (Support Data with Reference Code: See codes and descriptions below)	Recommendations
		Bighead and silver carps can establish self-sustaining populations in the Great Lakes Reference Code:	

Probability of bighead and/or silver carp Establishment in Lake Michigan via Chicago and O'Brien Locks: Modification of operations Scenario 3 – Closing locks 1 week/month, followed by normal operation for the remaining days of the month. Complete Columns 1 and 2. If Element Rating (Column 1), is either High or Medium, then enter in the Comments column any recommendations for specific management actions (e.g., chemical application, commercial fishing…) that could be realistically implemented to reduce the Element Rating, of Probability of Establishment, to Low.

Element Rating (Low, Medium, High)	Uncertainty Code (VC-VU: See codes and descriptions below. You may also list specific uncertainties)	Element (Support Data with Reference Code: See codes and descriptions below)	Recommendations

		Bighead and silver carps can establish self-sustaining populations in the Great Lakes Reference Code:	

Probability of bighead and/or silver carp Establishment in Lake Michigan via Chicago and O'Brien Locks: Modification of operations Scenario 4 -- Lock closure of every other week and normal operations for the alternative weeks. Complete Columns 1 and 2. If Element Rating (Column 1), is either High or Medium, then enter in the Comments column any recommendations for specific management actions (e.g., chemical application, commercial fishing…) that could be realistically implemented to reduce the Element Rating, of Probability of Establishment, to Low.

Element Rating (Low, Medium, High)	Uncertainty Code (VC-VU: See codes and descriptions below. You may also list specific uncertainties)	Element (Support Data with Reference Code: See codes and descriptions below)	Recommendations
		Bighead and silver carps can establish self-sustaining populations in the Great Lakes Reference Code:	

Probability of bighead and/or silver carp Establishment in Lake Michigan via Chicago and O'Brien Locks: Modification of operations Scenario 5 -- Lock closure of two months with extensive monitoring to determine if Asian carps are in the Chicago Area Waterways. Complete Columns 1 and 2. If Element Rating (Column 1), is either High or Medium, then enter in the Comments column any recommendations for specific management actions (e.g., chemical application, commercial fishing…) that could be realistically implemented to reduce the Element Rating, of Probability of Establishment, to Low.

	Uncertainty Code (VC-VU: See codes and descriptions	Element (Support Data with Reference Code: See	

Element Rating (Low, Medium, High)	below. You may also list specific uncertainties)	codes and descriptions below)	Recommendations
		Bighead and silver carps can establish self-sustaining populations in the Great Lakes Reference Code:	

Probability of bighead and/or silver carp Establishment in Lake Michigan via Chicago and O'Brien Locks: Modification of operations Scenario 6 -- Two-week lock closure, in mid-late April, during which extensive surveillance and monitoring is conducted. If no Asian carps are recovered, then the locks will operate normally. However, if there is a significant rainfall event that results in elevated flows (and a possibly stimulus for Asian carps to move upstream) after the two weeks of surveillance/monitoring, then the locks would be closed as soon as possible. During the lock closure, resources could be mobilized to complete surveillance/monitoring for a week. If no Asian carps are captured during the week, then the locks would be reopened. Complete Columns 1 and 2. If Element Rating (Column 1), is either High or Medium, then enter in the Comments column any recommendations for specific management actions (e.g., chemical application, commercial fishing…) that could be realistically implemented to reduce the Element Rating, of Probability of Establishment, to Low.

Element Rating (Low, Medium, High)	Uncertainty Code (VC-VU: See codes and descriptions below. You may also list specific uncertainties)	Element (Support Data with Reference Code: See codes and descriptions below)	Recommendations
		Bighead and silver carps can establish self-sustaining populations in the Great Lakes Reference Code:	

Consequence of Establishment in Lake Michigan (no matter how introduced). Complete Columns 1 and 2

Element Rating (Low, Medium, High)	Uncertainty code (VC-VU: See codes and descriptions below. You may also list specific uncertainties)	Element (Support Data with Reference Code: See codes and descriptions below)	Comments
		Estimate environmental impact if established in the Great Lakes Reference Code:	
		Estimate economic impact if established in the Great Lakes (based on your knowledge of fishing economics in the Great Lakes). The assessor is not expected to take on the role of an economist, but instead provides information on impacts the species would broadly have on fishery-related economics of the Great Lakes. Reference Code:	
		Estimate impact on the Great Lakes from social and/or political influences (based on your knowledge of politics and societal concerns about Great Lakes fishing) .The assessor is not expected to take on the role of an political	

		scientist or sociologist, but instead provides information on impacts the species would broadly have on fishery-related societal and political issues of the Great Lakes. Reference Code:	

Summary of Organism Risk Potential to the Great Lakes
(Note: Hoff will compile this summary)
Probability of Establishment Risk Category (from table above)=
Consequence of Establishment Risk Category (from table above) =
Organism Risk Potential =

Risk Category Definitions

Risk Category	Definition
Low	Acceptable risk – organism of little concern for establishment and/or ecological consequence (i.e., impact)
Medium	Unacceptable risk – organism of moderate concern
High	Unacceptable risk – organism of major concern

Uncertainty Codes and Descriptions

Uncertainty Code	Description
Very Certain	As certain as I can be
Reasonably Certain	Reasonably certain
Moderately Certain	More certain than not
Reasonably Uncertain	Reasonably uncertain
Very Uncertain	A guess

Reference codes and descriptions

Reference Code	Reference Type
G	General knowledge; no specific source
J	Judgmental evaluation
E	Extrapolation; information specific to pest not available. However, information available on similar organisms supplied
Author, year	Literature Cited

Section IV. Questions from the Corps. Please respond to the questions.

1. Is there an imminent threat that Asian carp (silver and bighead) will establish a sustainable population in Lake Michigan in the near future? Yes ___ No____. Uncertainty code ____
    a. If yes, then by when do you predict a sustainable population of bighead carp? Year ____. Lower 95% Confidence limit (Year) ____. Upper 95% Confidence limit (Year)___.
    b. If yes, then by when do you predict a sustainable population of silver carp?
        iii. Year ____.
            1. Lower 95% Confidence limit (Year) ____
            2. Upper 95% Confidence limit (Year) ___.
2. Is there a threshold of Asian carp needed to establish a sustainable population? Yes ___ No____. If yes, then what is that threshold (Note: Hoff's [Hoff Accepted] stock-recruit model is probably the best science support. He will draft a reply based on that model. All other experts can submit their beliefs.)
    a. Specifically, what number of Asian Carp would need to enter Lake Michigan to constitute a founding population that could, under the right environmental conditions, develop into a sustainable population in the Great Lakes? _____
3. A few Asian carp were found in Lake Erie in the past. Are the populations of Asian carps in Lake Erie self sustaining? Yes ___ No ___. Uncertainty code ___.
    a. If yes, then are conditions that support Asian Carp in Lake Erie similar to conditions in Lake Michigan near the Chicago Lock and T.J. O'Brien Locks? Yes___ No ___. [Please provide details, and cite any references used.]
4. In your opinion would a sustainable population of Asian Carp (both species) adversely impact the commercial fisheries of the GL? (use your ratings from Section II) High ___ Medium____ Low ___. Uncertainty code ___. [Please provide details, and cite any references used]
5. If the Asian Carp (both species) were allowed to migrate into the GL unimpeded how long would it take to establish demonstrable, sustainable populations capable of adversely impacting the commercial fisheries of the GL? (assuming they would result in adverse impacts)
    a. Year _____
        iv. Lower 95% Confidence limit (Year) ____
        v. Upper 95% Confidence limit (Year) ___
6. Do Asian Carp carry any viral, bacterial, protozoan or other parasites or diseases that may adversely impact the native fish populations in the Great Lakes? (See Yes __X_ No ___. If the Asian Carp become established in the GL, then are there any beneficial impacts that would result from their presence? Yes ___ No ___. Uncertainty code ___. [Provide details and cite any references]

The U.S. Fish and Wildlife Service's La Crosse Fish Health Center has detected the following target pathogens from the Mississippi and Illinois river drainages: spring viremia of carp (SVC, etiologic agent spring viremia of carp virus, SVCv) from common carp in the Calumet-Sag Channel; aquareoviruses from silver carp from Weldon Springs, Missouri River and Starved Rock, Illinois River; asian tapeworm (*Bothriocephalus acheilognathi*) from common

carp from the Little Calumet River; bacterial kidney disease (*Renibacterium salmoninarum*) from common carp in the Upper Mississippi River and Calumet-Sag Channel; edwardsiellosis (*Edwardsiella tarda*) from common carp in Lake Pepin (Pool 4) of the Upper Mississippi River; and columnaris disease (*Flavobacterium columnare*) from common carp in the Upper Mississippi River.

SVC is a highly contagious and serious hemorrhagic disease of common carp (and koi carp), grass carp, silver carp, bighead carp, cyprinids and ictalurids (OIE 2009). In the U.S., it has also been detected in bluegill and largemouth bass from Clear Fork Reservoir, Ohio, and in emerald shiners from the Ohio River (La Crosse Fish Health Center, Onalaska, WI). Its affect on non-cyprinid hosts is unknown. In the Great Lakes it has been reported from common carp in Hamilton Harbor, Lake Ontario (Garver et al. 2007). State, federal and international agencies regulate SVCv and it is listed by the World Organization for Animal Health (OIE) as notifiable (OIE 2009). Spread of this virus from the Mississippi River and Calumet-Sag Channel into Lake Michigan should be prevented.

Asian tapeworms are a non-native species that was introduced into the U.S. with grass carp imported from Asia. It has been reported from over 100 different fish species and infections can damage intestines and cause abnormal growth. It can cause high mortalities in new hosts and are of a particular threat to small prey species. The only report from the Great Lakes was in bluntnose minnows from the Detroit River (Marcogliese 2008). Further spread and establishment of Asian tapeworms in Lake Michigan fish species should be prevented.

Aquareoviruses have been isolated from a wide variety of aquatic animals and the group is rapidly expanding as new viruses are being described. While some members produce subclinical infections, others are responsible for severe hemorrhagic disease (e.g., golden shiner virus, channel catfish aquareovirus, smelt reovirus, and grass carp reovirus) (McEntire et al. 2003). Because the effect of the aquareoviruses isolated from silver carp is unknown, further spread into the Great Lakes should be prevented.

Columnaris disease is widespread and a significant problem for aquaculture in warmer climates. The *F. columnare* strain isolated from common carp in the Upper Mississippi River appeared to be more virulent than other *F. columnare* strains. It was responsible for a common carp kill in Pool 8 of the Upper Mississippi River and it has also been used in laboratory studies where it caused high mortalities of experimentally infected channel catfish and rainbow trout (pers. com., M. Tuttle-Lau, U.S. Geological Survey).

Numerous other pathogens and parasites have been reported from common and Asian carp (Hoffman 1999; Woo and Bruno 1999; Hoole 2001; Woo 2006; Kolar et al. 2007; Dixon 2008;). Two viruses of concern are viral hemorrhagic septicemia virus (VHSv) and koi herpes virus (KHv) (both are listed by OIE as notifiable pathogens). Bacterial pathogens of concern that have been isolated from carp species include *Aeromonas salmonicida* (causing furunculosis), *Aeromonas hydrophila* (motile aeromonad septicemia) and *Yersinia ruckeri* (enteric redmouth disease). Parasites of concern include the ciliate *Ichthyophthirius multifilis*, coccida causing coccidioses in common, bighead and silver carp (*Eimeria* spp.), myxozoan species (especially *Myxobolus* spp.), the microsporidian *Heterosporis* sp. (experimental infection in common carp),

monogeneans *Dactylogyrus* spp. and *Gyrodactylus* spp., digeneans *Sanguinicola* spp. (blood flukes) and the eye fluke *Diplostomum spathaceum*, cestodes *Khawia* spp. and *Ligula intestinalis*, nematodes *Anisakis* spp., *Camallanus* spp. *Rhaphidascaris acus*, and *Rhabdochona cascadilla*, the acanthocephalan *Pomphorhynchus bulbocolli*, copepods *Lernaea cyprinacea* and *Ergasilus* spp. and the branchiuran *Argulus* spp. Many of the pathogens listed above exhibit wide host specificity, are pathogenic and capable of causing epizootics in wild and cultured fish. They would represent significant risks to the health of Great Lakes fish if newly introduced or if their prevalence and intensity increased dramatically in the lakes.

7. If the Asian Carp (both species) establish sustainable populations, would they adversely impact any of the other established invasive aquatic organisms of the GL? Yes ___ No___. Uncertainty code ___. [Provide details, and cite any references]
8. What are the triggers (high water flows, warm water, availability of Chlorophyll a etc.) for movement of Asian carp? [Answer question and cite references]
9. Will warmer weather in the spring make it more likely that the Asian carp will migrate upstream toward Lake Michigan? Yes ___ No ___ [Explain and cite references]
10. Given the habits of the Asian Carp (both species) how likely are the fish to develop significant contaminant loads in their edible tissues?
    a. High ___ Medium ___ Low ___
    b. Uncertainty code ___.
    c. [Explain and cite references]

Section V. Risk Management Questions Posed by the Corps. Please respond to the questions.

1. If a single Asian carp is collected during monitoring accompanying a lock closure, then would the spot application of rotenone be an appropriate response? Yes __ No __. Uncertainty code ___
    a. List other desirable actions, in addition to rotenone treatment, that would be recommended.
    b. What is the risk associated with reopening the locks after at least 72 hours after completion of rotenone treatment? H___ M___ L___. Uncertainty Code___
2. If multiple Asian carps are collected during monitoring accompanying lock closure, then would the spot application of rotenone be an appropriate response? Yes __ No __. Uncertainty code ___
    a. List other desirable actions, in addition to rotenone treatment, that would be recommended.
    b. What is the risk associated with reopening the locks after at least 72 hours after completion of rotenone treatment? H___ M___ L___. Uncertainty Code___
3. Would closing the lock gates be effective in significantly impeding the migration of Asian carp into Lake Michigan given that there may still be gaps of up to one inch between the lock gates and the sides or bottom of the canal? Yes __ No __. Uncertainty code ___
4. Could such gaps allow fish eggs or small juveniles to pass through the locks, and if so, what is the associated risk? Yes __ No __. Uncertainty code ___

5. Would simply reducing the number of openings of the lock gates have a beneficial effect of impeding Asian Carp migration by itself, without additional control technologies? Yes __ No __. Uncertainty code ___
6. Given Asian carp behavior, would fewer openings statistically reduce the likelihood of Asian carp passing through the locks? Yes __ No __. Uncertainty code ___
7. Would Asian carps aggregate near the lock during closure and pass en mass through the locks during the scheduled openings? Yes __ No __. Uncertainty code ___
8. Would scheduling lock gate openings in conjunction with other control technologies such as netting, electro-fishing, rotenone, as discussed above, help deter the dispersal of Asian carps into Lake Michigan? Yes __ No __. Uncertainty code ___
9. Is it reasonable to assume that if netting, electro-fishing, rotenone, other monitoring technologies do not recover an Asian carp body, that a significant population of Asian carp is not present in the waterway? Yes __ No __. Uncertainty code ___
10. Is it reasonable to assume that a longer period of extensive monitoring (through netting, electro-fishing, rotenone, other technologies) without the recovery of an Asian carp body, provides increased confidence that a significant population of Asian carp is not present in the waterway? Yes __ No __. Uncertainty code ___
11. If no Asian Carp bodies are recovered through netting, electrofishing, rotenone and other monitoring activities upstream of the Barriers, how significant is the threat/risk to Lake Michigan? In other words, if the population is so small that a single individual cannot be recovered, what level of risk is present? Yes __ No __. Uncertainty code ___
12. The Corps and Metropolitan Water Reclamation District are considering installing mesh grates over the sluice gates near the Chicago and O'Brien locks. Would a mesh grate with 1 inch openings be beneficial in deterring carp migration? Yes __ No __. Uncertainty code ___
13. What significant monitoring would be adequate for helping to verify the absence or presence of Asian Carp in the canal system?
14. What methods and equipment are recommended?
    a. How long would a monitoring/event take (3-4 days, for example)
    b. How often would such monitoring/sampling events be recommended (once a month, twice a month or more, for example) to reduce risk of migration to an acceptable level?
15. What are the biological indicators for the recommended monitoring methods and what are the thresholds for action for these indicators?
16. At what duration of monitoring without capturing an Asian carp body is the risk of migration reduced to the extent that it would be reasonable to open the lock gates? For example, is our scenario of lock closure with corresponding monitoring of 1 week/month and normal operation for the remaining days of the month, assuming no Asian carp body is recovered, reasonable from a risk perspective?
    a. Why?
17. Is one of the other alternatives discussed in the Background (above) preferable from a risk perspective?
    a. Why?
18. If an Asian carp movement trigger (such as high chlorophyll, warm water, high flow) is manifested in the CAWs should the locks be closed? Yes ___ No ___. Uncertainty code ___

19. Are there additional structural modifications or other actions you would recommend to be considered to reduce the risk of Asian carp dispersing into Lake Michigan?

Section VI: Additional Comments and Recommendations

List comments you wish to include in your Risk Assessment and recommendation for Risk Management

Section VII: List of Important References

Hoff, M. H., M. A. Pegg, and K. Irons. Accepted. Management Implications from a Stock-recruit Model for Bighead Carp in Portions of the Illinois and Mississippi Rivers. International Asian Carp Symposium, American Fisheries Society Special Publication. Bethesda, MD.

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Hoole, D., D. Bucke, P. Burgess, and I. Welby, editors. 2001. Diseases of carp and other cyprinid fishes. Wiley-Blackwell. 280 pages.

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Expert 9
Risk Analysis Form
Issue: Evaluations of Risk of Asian Carps Establishing and Impacting the Great Lakes: Evaluations by Lock Operation Scenario

Instructions to Risk Assessor:

- Read the Background (Section I) prepared by the U.S. Army Corps of Engineers (Corps)
- Answer the Background Question in Section II
- Complete the Risk Assessments in Section III
    a. Results from all respondents will be tabulated
    b. If either a broad or detailed consensus is reached on risk, then that information will be included in the Team's Report to the U.S. Army Corps of Engineers
- Answer the additional questions, posed by the Corps, in Section IV and V
    a. Results from all respondents will be placed into a matrix; we will convene a call, if needed to attempt to develop a consensus recommendation
- If you have information to list in Sections VI and VII, then please do so.
- Submit this completed form to Mike Hoff (Michael_Hoff@fws.gov) within 48 hours of completion of our conference call.

Section I: Background

The Corps, which operates and maintains the navigation structures at the Chicago Lock and the T.J. O'Brien Lock, is considering modifications to lock operations and structures to reduce the risk of Asian carps (bighead and silver carps) passing through those locks in the Chicago Area Waterways (CAWs) into Lake Michigan. Possible modifications considered include minimizing impacts to the navigation industry and minimizing impacts from flooding. In the short term, the Corps is considering a range of alternative lock operations that will increase the time the locks will be closed. The alternatives include:

1. Continue current operations (no action, as required by NEPA)
2. Lock closure of 3 to 4 days a week and normal operations for the remaining days of the week
3. Lock closure of 1 week/month and normal operation for the remaining days of the month
4. Lock closure every other week and normal operations for the alternative weeks
5. Lock closure of 2 months with extensive monitoring to determine if Asian carps are in the CAWs. If no Asian carps are collected during the closed period, then lock operations will be resumed at the end of the closure period. Locks would remain open, unless there was a significant flow event (flow rate trigger TBD) that could trigger fish movement. Locks would be closed on an emergency basis while monitoring activities were executed.
6. Two-week lock closure, in mid-late April, during which extensive surveillance and monitoring is conducted. If no Asian carps are recovered, then the locks will operate normally. However, if there is a significant rainfall event that results in elevated flows (and a possible stimulus for Asian carps to move upstream) after the two weeks of surveillance/monitoring, then the locks would be closed as soon as possible. During the lock closure, resources could be mobilized to complete surveillance/monitoring for a week. If no Asian carps are captured during the week, then the locks would be reopened.

[Note: The Corps has not identified a flow trigger, but will be working with fisheries staff to identify a range of change that could necessitate an emergency closure.]

During the periods of lock closure there would be a monitoring effort undertaken up stream of the barriers that could include commercial fishing (netting), electro-fishing, the spot application of rotenone, eDNA testing and any other technologies that may be developed to help determine if an Asian carp population exists. If Asian carps are not captured, then the locks would be reopened for normal operations for the time identified. If an Asian carp(s) is/are caught above electrical barriers, the Corps, in coordination with other agencies, would follow a contingency plan which would potentially include immediate closure of the lock gates until the extent of population is determined and reopening the locks is determined not to be a significant risk for dispersing Asian carp into Lake Michigan. The Corps is also considering structural modifications to the navigation features in the CAWs including adding screens to the sluice gates at both locks and acoustic directional barriers in the CAWs to encourage movement of fish into areas that can be monitored for Asian carp.

To evaluate the proposed actions, the Corps needs expert input from you. Please complete the remaining sections of this form, which was developed to: 1) compare your evaluation of risk of establishment of bighead and silver carps in Lake Michigan under each of the Corps' presently considered lock operation scenarios, and 2) submit management-oriented questions, posed by the Corps, to you.

Section II: Risk Assessment Background Question

1. Where are populations of silver and bighead carp self sustaining? (Base your answer to this question on your expert opinion)
    i. I believe that there is no evidence that silver carp and bighead carp established self-sustaining populations either above the electrical barriers or any location within the Great Lakes. Yes_X__ No ___
        i. Uncertainty Code (see Uncertainty Codes and Descriptions on Page 8) _reasonably uncertain___
        ii. If yes, then please provide supporting information.

I am certain that there is no evidence that bighead and silver carp have established a self-sustaining population in the Great Lakes. However, I am reasonably uncertain that lack of evidence in this case is enough to conclude that the fish have not invaded successfully already. Asian carps are remarkably cryptic in their behavior and may be present for long periods without our knowledge. Aging structures from the two bighead carp from Lake Erie which have been examined in this fashion were consistent with fish which began in aquaculture (Morrison et al, Fisheries). There is no evidence that any fish from Lake Erie was the result of spawning that occurred in Lake Erie, but unfortunately aging structures have not been examined for most of those fish. Stable isotopes from the otoliths of those fish would have been even more revealing, but they have not been examined. We have no idea how many if any fish may have already escaped or been released to to Lake Michigan.

Section III: Risk Assessment

Probability of bighead and/or silver carp Establishment in Lake Michigan via pathways OTHER THAN Chicago and O'Brien Locks (i.e., all pathways other than those locks including pathways such as, but not limited to, bait bucket, food trade, aquaculture). Complete Columns 1 and 2.

Element Rating (Low, Medium, High)	Uncertainty Code (VC-VU: See codes and descriptions below. You may also list specific uncertainties)	Element (Support Data with Reference Code: See codes and descriptions below)	Comments
Medium	Reasonably uncertain. I do not have direct information on the incidence of bait bucket transfer of Asian carps, or quantifiable information on previous releases of Asian carp from the food trade.	Bighead and silver carps are associated with the pathway. The Assessor answers whether there is a convincing temporal and spatial association with the pathway. Reference Code:	Pathways in order of risk, 1)Previously introduced bighead carp from live food sources. 2)Live bait 3)escape or human-assisted movement of bighead carp unintentionally transported with stocker catfish, either already introduced into ponds and lakes, or transported in the future 4) Future introductions from live food sources (this risk is much reduced because this pathway is now mostly banned)
High	Reasonably Certain	Bighead and silver carps can survive above the electrical	See comment in Section VI, A.

		barrier and the Great Lakes. Reference Code:	
Medium	Reasonably Uncertain	Bighead and silver carps can establish self-sustaining populations in the Great Lakes Reference Code:	See comment Section VI, B.
High (If "spread" means dispersal and survival of introduced individuals. If 'spread' entails an element of successful recruitment and population growth, then *Medium*)	Reasonably Certain (If "spread" means dispersal and survival of introduced individuals. If 'spread' entails an element of successful recruitment and population growth, then *Reasonably Uncertain*)	Bighead and silver carp can spread throughout a substantial portion of the Great Lakes Reference Code:	Section VI, A

Probability of bighead and/or silver carp Establishment in Lake Michigan via Chicago and O'Brien Locks: Scenario 1 -- No modification to current lock operations. Complete Columns 1 and 2.

Element Rating (Low, Medium, High)	Uncertainty Code (VC-VU: See codes and descriptions below. You may also list specific uncertainties)	Element (Support Data with Reference Code: See codes and descriptions below)	Recommendations
Medium	Very Uncertain	Bighead and silver carps can establish self-sustaining populations in the Great Lakes Reference Code:	Section VI, C.

Probability of bighead and/or silver carp Establishment in Lake Michigan via Chicago and O'Brien Locks: Modification of operations Scenario 2 -- Closing

locks either 3 or 4 days/week, and then conducting normal operations for the remaining days of the week. Complete Columns 1 and 2. If Element Rating (Column 1), is either High or Medium, then enter in the Comments column any recommendations for specific management actions (e.g., chemical application, commercial fishing…) that could be realistically implemented to reduce the Element Rating, of Probability of Establishment, to Low.

Element Rating (Low, Medium, High)	Uncertainty Code (VC-VU: See codes and descriptions below. You may also list specific uncertainties)	Element (Support Data with Reference Code: See codes and descriptions below)	Recommendations
Medium	Very Uncertain	Bighead and silver carps can establish self-sustaining populations in the Great Lakes Reference Code:	Section VI, C.

Probability of bighead and/or silver carp Establishment in Lake Michigan via Chicago and O'Brien Locks: Modification of operations Scenario 3 – Closing locks 1 week/month, followed by normal operation for the remaining days of the month. Complete Columns 1 and 2. If Element Rating (Column 1), is either High or Medium, then enter in the Comments column any recommendations for specific management actions (e.g., chemical application, commercial fishing…) that could be realistically implemented to reduce the Element Rating, of Probability of Establishment, to Low.

Element Rating (Low, Medium, High)	Uncertainty Code (VC-VU: See codes and descriptions below. You may also list specific uncertainties)	Element (Support Data with Reference Code: See codes and descriptions below)	Recommendations
Medium	Very Uncertain	Bighead and silver carps can establish self-sustaining populations in the Great Lakes Reference Code:	Section VI, C.

Probability of bighead and/or silver carp Establishment in Lake Michigan via Chicago and O'Brien Locks: Modification of operations Scenario 4 -- Lock closure of every other week and normal operations for the alternative weeks. Complete Columns 1 and 2. If Element Rating (Column 1), is either High or Medium, then enter in the Comments column any recommendations for specific management actions (e.g., chemical application, commercial fishing…) that could be realistically implemented to reduce the Element Rating, of Probability of Establishment, to Low.

Element Rating (Low, Medium, High)	Uncertainty Code (VC-VU: See codes and descriptions below. You may also list specific uncertainties)	Element (Support Data with Reference Code: See codes and descriptions below)	Recommendations
Medium	Very Uncertain	Bighead and silver carps can establish self-sustaining populations in the Great Lakes Reference Code:	Section VI, C.

Probability of bighead and/or silver carp Establishment in Lake Michigan via Chicago and O'Brien Locks: Modification of operations Scenario 5 -- Lock closure of two months with extensive monitoring to determine if Asian carps are in the Chicago Area Waterways. Complete Columns 1 and 2. If Element Rating (Column 1), is either High or Medium, then enter in the Comments column any recommendations for specific management actions (e.g., chemical application, commercial fishing…) that could be realistically implemented to reduce the Element Rating, of Probability of Establishment, to Low.

Element Rating (Low, Medium, High)	Uncertainty Code (VC-VU: See codes and descriptions below. You may also list specific uncertainties)	Element (Support Data with Reference Code: See codes and descriptions below)	Recommendations
Medium	Very Uncertain	Bighead and silver carps can establish self-sustaining populations in the	Section VI, C.

		Great Lakes Reference Code:	

Probability of bighead and/or silver carp Establishment in Lake Michigan via Chicago and O'Brien Locks: Modification of operations Scenario 6 -- Two-week lock closure, in mid-late April, during which extensive surveillance and monitoring is conducted. If no Asian carps are recovered, then the locks will operate normally. However, if there is a significant rainfall event that results in elevated flows (and a possibly stimulus for Asian carps to move upstream) after the two weeks of surveillance/monitoring, then the locks would be closed as soon as possible. During the lock closure, resources could be mobilized to complete surveillance/monitoring for a week. If no Asian carps are captured during the week, then the locks would be reopened. Complete Columns 1 and 2. If Element Rating (Column 1), is either High or Medium, then enter in the Comments column any recommendations for specific management actions (e.g., chemical application, commercial fishing…) that could be realistically implemented to reduce the Element Rating, of Probability of Establishment, to Low.

Element Rating (Low, Medium, High)	Uncertainty Code (VC-VU: See codes and descriptions below. You may also list specific uncertainties)	Element (Support Data with Reference Code: See codes and descriptions below)	Recommendations
Medium	Very Uncertain	Bighead and silver carps can establish self-sustaining populations in the Great Lakes Reference Code:	Section VI, C.

<u>Consequence of Establishment in Lake Michigan (no matter how introduced). Complete Columns 1 and 2</u>

Element Rating (Low, Medium, High)	Uncertainty code (VC-VU: See codes and descriptions below. You may also list specific uncertainties)	Element (Support Data with Reference Code: See codes and descriptions below)	Comments

Medium (If high densities of carp are eventually realized. Low, if established but high densities never occur. I believe that high densities are likely to eventually occur in some areas if the carp establish.)	Moderately Certain	Estimate environmental impact if established in the Great Lakes Reference Code:	Best indications are that some impacts would occur but that some fisheries would not be substantially effected. In German study, fishes like European walleye were substantially effected but fishes with littoral early life stages were not. Difficult to predict the interplay between dreissenids and carp.
Medium (If high densities of carp are eventually realized. Low, if established but high densities never occur. I believe that high densities are likely to eventually occur in some areas if the carp establish.)	Reasonably uncertain My knowledge of Great Lakes Fisheries Economics is very limited.	Estimate economic impact if established in the Great Lakes (based on your knowledge of fishing economics in the Great Lakes). The assessor is not expected to take on the role of an economist, but instead provides information on impacts the species would broadly have on fishery-related economics of the Great Lakes. Reference Code:	
Medium	Reasonably uncertain	Estimate impact on the Great Lakes from social and/or political influences (based on	

		your knowledge of politics and societal concerns about Great Lakes fishing) .The assessor is not expected to take on the role of an political scientist or sociologist, but instead provides information on impacts the species would broadly have on fishery-related societal and political issues of the Great Lakes. Reference Code:	

Summary of Organism Risk Potential to the Great Lakes
(Note: Hoff will compile this summary)
Probability of Establishment Risk Category (from table above)=
Consequence of Establishment Risk Category (from table above) =
Organism Risk Potential =

Risk Category Definitions

Risk Category	Definition
Low	Acceptable risk – organism of little concern for establishment and/or ecological consequence (i.e., impact)
Medium	Unacceptable risk – organism of moderate concern
High	Unacceptable risk – organism of major concern

Uncertainty Codes and Descriptions

Uncertainty Code	Description
Very Certain	As certain as I can be
Reasonably Certain	Reasonably certain
Moderately Certain	More certain than not
Reasonably Uncertain	Reasonably uncertain
Very Uncertain	A guess

Reference codes and descriptions

Reference Code	Reference Type
G	General knowledge; no specific source
J	Judgmental evaluation
E	Extrapolation; information specific to pest not available. However, information available on similar organisms supplied
Author, year	Literature Cited

Section IV. Questions from the Corps. Please respond to the questions.

1. Is there an imminent threat that Asian carp (silver and bighead) will establish a sustainable population in Lake Michigan in the near future? Yes X___ No____. Uncertainty code __Reasonably uncertain__See comment VI D !!
    jj. If yes, then by when do you predict a sustainable population of bighead carp? Year _2012___. Lower 95% Confidence limit (Year) _2009___. Upper 95% Confidence limit (Year)_2030__.
    kk. If yes, then by when do you predict a sustainable population of silver carp?
        i. Year 2012____.
            1. Lower 95% Confidence limit (Year) 2009____
            2. Upper 95% Confidence limit (Year) 2030___.
2. Is there a threshold of Asian carp needed to establish a sustainable population? Yes ___ No____. If yes, then what is that threshold (Note: Hoff's [Hoff Accepted] stock-recruit model is probably the best science support. He will draft a reply based on that model. All other experts can submit their beliefs.)
    ll. Specifically, what number of Asian Carp would need to enter Lake Michigan to constitute a founding population that could, under the right environmental conditions, develop into a sustainable population in the Great Lakes? _____
3. A few Asian carp were found in Lake Erie in the past. Are the populations of Asian carps in Lake Erie self sustaining? Yes ___ No _X__. Uncertainty code Reasonably certain___.
    mm. If yes, then are conditions that support Asian Carp in Lake Erie similar to conditions in Lake Michigan near the Chicago Lock and T.J. O'Brien Locks? Yes___ No ___. [Please provide details, and cite any references used.]
4. In your opinion would a sustainable population of Asian Carp (both species) adversely impact the commercial fisheries of the GL? (use your ratings from Section II) High ___ Medium__X__ Low ___. Uncertainty code _Reasonably uncertain__. [Please provide details, and cite any references used]
5. If the Asian Carp (both species) were allowed to migrate into the GL unimpeded how long would it take to establish demonstrable, sustainable populations capable of adversely impacting the commercial fisheries of the GL? (assuming they would result in adverse impacts)
    nn. Year _2035_____
        i. Lower 95% Confidence limit (Year) _2025___
        ii. Upper 95% Confidence limit (Year) _2050__
6. Do Asian Carp carry any viral, bacterial, protozoan or other parasites or diseases that may adversely impact the native fish populations in the Great Lakes?

Yes _X__ No ___. [Provide details, and cite references] Kolar et al 2007 provides a reasonably complete list of bighead and silver carp pathogens, nearly all, if not all, of which can affect fishes native to the Great Lakes. However, although some of those pathogens were first imported to the United States with Asian carps, any of the important pathogens of these fishes are also present in North American fishes, and could just as easily be transported to the Great Lakes by native fishes as by the carp themselves. There appears to be very little difference in this regard between invasions by Asian carps or any other fish that could make it through or around the barrier. Most of the pathogens are already present in the Great Lakes already, and were present before the introduction of Asian carps. While the canal is a potential vector of disease both ways, the carp themselves are at this time only one minor component of that threat.

7. If the Asian Carp become established in the GL, then are there any beneficial impacts that would result from their presence? Yes _X__ No ___. Uncertainty code _Reasonably uncertain__. [Provide details and cite any references] Asian carps now provide a substantial commercial fishery in the Mississippi River basin, and that fishery is growing substantially as markets are developed. Where Asian carps have been introduced around the world, the total commercial catch has almost invariably increased (from a weight perspective, not necessarily a value perspective). Nevertheless, the value of this fishery is likely to be MUCH LOWER than fisheries that are likely to be replaced. So the overall impact is likely to be negative.

8. If the Asian Carp (both species) establish sustainable populations, would they adversely impact any of the other established invasive aquatic organisms of the GL? Yes ___ No_X__. Uncertainty code _Reasonably uncertain__. [Provide details, and cite any references] Asian carp in Lake Balaton eat substantial amounts of dreissenid veligers, but there is no evidence that they have controlled dreissenids in any meaningful way (Dr. Istvan Tatrai, Hungary, personal communication)
9. What are the triggers (high water flows, warm water, availability of Chlorophyll a etc.) for movement of Asian carp? [Answer question and cite references]
   Bighead and silver carp are known to move upstream during periods of high flow in rivers, when temperature is in the spawning range, apparently for spawning (unpublished data, and also Transactions article on carp in Illinois River, also Yi et al. 1980). In my data on the Missouri River, silver carp selected areas of higher chlorophyll concentration.
10. Will warmer weather in the spring make it more likely that the Asian carp will migrate upstream toward Lake Michigan? Yes _X__ No ___ [Explain and cite references]See 9 above
11. Given the habits of the Asian Carp (both species) how likely are the fish to develop significant contaminant loads in their edible tissues?
    oo. High ___ Medium ___ Low _X__
    pp. Uncertainty code _reasonably uncertain__.
    qq. [Explain and cite references]Two studies (Orazio in press and ILDNR study) have found that Asian carps are reasonably low in contaminants, although bighead carp had slightly higher mercury concentrations in both studies, and individual bighead carp sometimes had mercury concentrations higher than the lowest threshold. However, Asian carps in the Great Lakes might behave or feed differently than carps in the rivers of the USA

Section V. Risk Management Questions Posed by the Corps. Please respond to the questions.

1. If a single Asian carp is collected during monitoring accompanying a lock closure, then would the spot application of rotenone be an appropriate response? Yes __ No _X_. Uncertainty code _Moderately certain__ (The act of fishing will likely drive any uncaptured fish from the area. Asian carps are sensitive to fishing and will leave the area. Asian carps are usually not highly attached to a specific site, so there is no particular reason for them to return, unless the site had some particularly important reason to be attractive for Asian carps, such as a sewage treatment effluent. In this case, repeated netting and perhaps rotenone applications might be desirable, with a rest between fishing events to allow the fish to return)
    x) List other desirable actions, in addition to rotenone treatment, that would be recommended. See Comments in section VI
    y) What is the risk associated with reopening the locks after at least 72 hours after completion of rotenone treatment? H___ M___ L___. Uncertainty Code___ I do not see any change in risk that would result from rotenone operations
2. If multiple Asian carps are collected during monitoring accompanying lock closure, then would the spot application of rotenone be an appropriate response? Yes __ No X__. Uncertainty code Moderately Certain___
   Same comments as above
    z) List other desirable actions, in addition to rotenone treatment, that would be recommended.
    aa) What is the risk associated with reopening the locks after at least 72 hours after completion of rotenone treatment? H___ M___ L___. Uncertainty Code___
3. Would closing the lock gates be effective in significantly impeding the migration of Asian carp into Lake Michigan given that there may still be gaps of up to one inch between the lock gates and the sides or bottom of the canal? Yes _X_ No __. Uncertainty code _Reasonably uncertain__ But a delaying tactic only.
4. Could such gaps allow fish eggs or small juveniles to pass through the locks, and if so, what is the associated risk? Yes _X_ No __. Uncertainty code _Reasonably Certain that they could pass, but I do not believe that they are present in the CAWS (Reasonably uncertain).__ I don't think that carp will spawn in the CAWS, although I am not certain nor sufficiently familiar with the hydrology of the CAWS. In any case, escapement of eggs to the Great Lakes would not probably result in a problem because our best understanding is that eggs would not survive in the Great Lakes proper (moderately uncertain). Because it seems unlikely that juvenile AC would have been in the Des Plaines when it overflowed, it seems unlikely that juveniles will be present in the CAWS unless they are the result of bait bucket transfer.
5. Would simply reducing the number of openings of the lock gates have a beneficial effect of impeding Asian Carp migration by itself, without additional control technologies? Yes __ No _X_. Uncertainty code _Reasonably uncertain__ It might be a delaying tactic. If they want out, they will get out if the gates open.
6. Given Asian carp behavior, would fewer openings statistically reduce the likelihood of Asian carp passing through the locks? Yes __ No X__. Uncertainty code _Reasonably uncertain__

7. Would Asian carps aggregate near the lock during closure and pass en mass through the locks during the scheduled openings? Yes __ No X__. Uncertainty code _Very uncertain__ They might do this, but if substantial boat activity is present, they may avoid the boats. Based on how locks on the Ohio and Illinois Rivers apparently caused delays in invasion of Asian carps, I don't think that Asian carps like to pass through locks. But these locks might be different in operation and size from the River locks.
8. Would scheduling lock gate openings in conjunction with other control technologies such as netting, electro-fishing, rotenone, as discussed above, help deter the dispersal of Asian carps into Lake Michigan? Yes _X_ No __. Uncertainty code _Very uncertain__
9. Is it reasonable to assume that if netting, electro-fishing, rotenone, other monitoring technologies do not recover an Asian carp body, that a significant population of Asian carp is not present in the waterway? Yes __ No X__. Uncertainty code _Reasonably Certain__
10. Is it reasonable to assume that a longer period of extensive monitoring (through netting, electro-fishing, rotenone, other technologies) without the recovery of an Asian carp body, provides increased confidence that a significant population of Asian carp is not present in the waterway? Yes __ No X__. Uncertainty code _Reasonably Certain__See comments in Section VI
11. If no Asian Carp bodies are recovered through netting, electrofishing, rotenone and other monitoring activities upstream of the Barriers, how significant is the threat/risk to Lake Michigan? In other words, if the population is so small that a single individual cannot be recovered, what level of risk is present? Yes __ No __. Uncertainty code ___ These are not yes/no questions. It is my opinion that if there are a hundred carp in the CAWS, you would have difficulty catching one with standard commercial fishing techniques and electrofishing, unless it is possible to locate aggregations of the fish, as perhaps near a sewage treatment outfall. If there are more, then perhaps you might start to catch fish. Very Uncertain.
12. The Corps and Metropolitan Water Reclamation District are considering installing mesh grates over the sluice gates near the Chicago and O'Brien locks. Would a mesh grate with 1 inch openings be beneficial in deterring carp migration? Yes __ No __. Uncertainty code ___ No additional benefit if the openings are already only an inch wide. Reasonably certain
13. What significant monitoring would be adequate for helping to verify the absence or presence of Asian Carp in the canal system? You will not be able to verify the absence of Asian carp under any circumstances. You cannot prove a negative. I cannot recommend a reasonable method which would be secure in proving a positive, if the fish are at low densities. In Section VI, I provide some ideas that might improve the ability to catch a fish.
14. What methods and equipment are recommended? See Section VI
    i) How long would a monitoring/event take (3-4 days, for example)

Three days?

    j) How often would such monitoring/sampling events be recommended (once a month, twice a month or more, for example) to reduce risk of migration to an acceptable level?

I don't know that fishing can substantially reduce risk, unless novel methods are incorporated. See Section VI

15. What are the biological indicators for the recommended monitoring methods and what are the thresholds for action for these indicators?

The only biological indicators I know of are eDNA or capture of one or more fish. If spawning in the CAWS is considered possible or likely, then it would also be advisable to sample for eggs and larvae of AC during or immediately after substantial water rises. Larval fish collections do not usually provide immediate data, but they could be structured to give short term turnaround of two days or so. eDNA could accomplish the same end to some extent, because sperm is likely to show up heavily in eDNA analyses (Not only would spawning eject many cells into the water, but sperm are heavily endowed with mitochondria – thus eDNA should show extremely strong hits downstream of spawning events. I don't know what the action would be so I don't have any way to compute a threshold for it.

16. At what duration of monitoring without capturing an Asian carp body is the risk of migration reduced to the extent that it would be reasonable to open the lock gates? For example, is our scenario of lock closure with corresponding monitoring of 1 week/month and normal operation for the remaining days of the month, assuming no Asian carp body is recovered, reasonable from a risk perspective? I don't think it matters much if the locks are closed part of the time or not, if they are to be open most of the time. It might make a difference of months or a year, but in the larger scheme of things, it is not that important.

    bb) Why?

17. Is one of the other alternatives discussed in the Background (above) preferable from a risk perspective?

    cc) Why?

18. If an Asian carp movement trigger (such as high chlorophyll, warm water, high flow) is manifested in the CAWs should the locks be closed? Yes _X__ No ___. Uncertainty code ___High turbulence at the locks might attract spawning fishes This should be avoided. But I don't know how that would relate to the ability to close the locks.

19. Are there additional structural modifications or other actions you would recommend to be considered to reduce the risk of Asian carp dispersing into Lake Michigan? SPA/Baff near the locks.

Section VI: Additional Comments and Recommendations

List comments you wish to include in your Risk Assessment and recommendation for Risk Management

E. Survival and maturation of individual Asian carp in the Great Lakes

I believe that individual Asian carps can survive and mature quite well in the Great Lakes. Five or six bighead carp are known to have been captured from Lake Erie. I have length and weight data from only two of those fish, but those two were exceptionally fat and apparently healthy fish. A bioenergetics model has been completed that predicts that bighead and silver carp would not be able to survive by filterfeeding on the plankton available in the open waters of Lake Michigan or the other larger Great Lakes, but that they would find adequate nutrition in Lake Erie, and in some bays and inlets of Lake Michigan. That model indicated that a chlorophyll concentration over 10 µg/L would be required for survival of bighead and silver carp. The model is in conflict with information from other sources. Notably, in Lake Balaton, Hungary, where (since the invasion of zebra mussels) chlorophyll concentrations have averaged 6 to 8 µg/L, bighead and silver carp are extremely large and fat, and are apparently successfully filterfeeding on available plankton. Furthermore, anecdotal information indicates that bighead and silver carp have other potential feeding behaviors other than filterfeeding on plankton. However, even if planktonic or alternative food sources are inadequate in the open waters of those lakes, Asian carps are quite mobile and can select habitats within the basin that do have the food resources they need.

Likewise, I do not believe that ambient temperatures will be too low for survival and maturation of Asian carps in at least some parts of the Great Lakes. Silver carp are native to the Amur River that borders Russia and China, and bighead carp are either native or successfully introduced there. The latitudes and air temperatures found within the Asian range of bighead and silver carp encompass most if not all of the area of the Great Lakes. Russian research in the 1980s indicated that Asian carps need approximately 2700 degree-days annually for maturation and spawning. Large expanses of the Great Lakes, even open water areas, provide well over that minimum annual amount of heat, and Asian carps are quite mobile and capable of selecting waters that are best suited to their survival.

F. Potential for Asian carp establishment in the Great lakes

The likely survival and growth of individual Asian carp does not necessarily mean that, even with a large propagule pressure, Asian carp would successfully invade the Great Lakes and develop extremely large populations that would cause undesirable economic and environmental problems. This remains an unknown. Completion of the life cycle and substantial population growth relies on many variables that cannot be adequately evaluated, and unforeseen variables are likely to play a part in this equation. There are no environments similar to the larger Great Lakes elsewhere in the world where Asian carps have been introduced. Asian carps have precise spawning requirements that may or may not be adequately provided in the Great Lakes. We do not know how native and introduced predators in the Great Lakes will interact with Asian carps. No aquatic predators in the Great Lakes (except the also-introduced and problematic sea lamprey) have the ability to prey substantially on adult Asian carps, but juvenile Asian carps may be preyed upon by many resident predacious species. We do not know if adequate nursery habitat exists for juvenile Asian carps in or near the tributary rivers in which Asian carps are likely to spawn. Perhaps most importantly, we do not know if the complex stimuli which act on Asian carps to induce spawning behavior will function adequately in the Great Lakes. The only way we will know for sure if Asian carps are able to form large populations in the Great Lakes will be if substantial numbers of fish successfully enter the Great Lakes.

Any model that attempts to determine if Asian carps will be able to produce a large, self-sustaining population in the Great Lakes *will* be acted on by unforeseeable factors and complications. It is impossible to predict with precision whether Asian carps will be able adapt, produce a large population, and become problematic in the Great Lakes. Nevertheless, as we stated in our book on bighead and silver carp, if Asian carps do develop a large population in the Great Lakes, we believe that substantial undesirable consequences to fisheries and recreation will occur.

G. Capture of Asian Carp from the CAWS, risk of various options

Because Asian carps are so cryptic and difficult to capture, capturing all carp from the CAWS could reasonably be compared to the difficulty of capturing all rats from a terrestrial habitat in Chicago of similar size and shape – without using bait. While the different lock operation scenarios may have some very minor effects on short-term ability of fish to escape the CAWS and enter Lake Michigan, in the larger scheme of things, I do not believe that any of the proposed options will have enough effect to change the risk rating or uncertainty rating. Even complete closure of the locks might not change those ratings, if the locks are overtopped during floods or fish could bypass them even when closed. Nevertheless, I do believe it makes sense to at least attempt to capture some of the fish in the CAWS, because 1) the number of fish that escape is likely to be directly proportional to the probability of establishment in the Great Lakes, 2)continued efforts may be useful in later estimating how many fish were there, and 3) doing nothing is politically untenable.

Regarding fishing in the waterways for Asian carps: Catching an individual bighead or silver carp with static nets or electrofishing, or a combination thereof (like chasing the fish into nets with the electrofisher), ***even when you know where the fish is and can corner it in a cul-de-sac*** , is very, very, difficult. I also had the advantage that I knew pretty much the size of the telemetered fish I was trying to catch, so I could choose an appropriate mesh size. I have hundreds of man-hours invested in the recapture of 6 telemetered fish (plus a commercial fisher

caught one and returned it to me. In the attempt to capture these tagged fish, we did not always keep track of the number of AC we caught that were not the tagged fish. These numbered in at least the hundreds, possibly thousands, of untagged fish. Using inferred logic, if you catch one fish, without previously knowing where it was, there may easily be hundreds of fish down there you did not catch. Granted, these tagged AC may have been more resistant to capture than fish that have never before been captured with similar gear. Nevertheless, fishing for rare AC with these techniques alone, without knowing exactly where the fish are, is searching for a needle in a haystack. **You might be able to do something different to increase your chances, but in any case capture of one fish probably means there are many uncaptured fish.** And furthermore, we don't have any way to put a numerical value on the chances of catching a fish, so we cannot quantify this in any meaningful way. The eDNA folks are planning to do some studies on how much eDNA is put out by a fish that would allow us to back-calculate, in the future, some kind of estimate of how many fish are out there now, based on the samples they have already analyzed. If funded, that work will be done within a year. But that does not help you now.

Thoughts on catching fish in the canal/river system:
I am not familiar with the system in question, so I am somewhat hampered in my ideas, but I know carp behavior and carp catching pretty well, so I am going to brainstorm anyway. Two things that might help your situation are 1) fishing at **night** with trammel nets, trapping the fish in cul de sacs or other places where they can be completely caged in with nets **while** driving the fish with boats and electrofishing gear, and 2) use of very large haul seines, if at all possible in your situation (it is not, in mine, because of the terrain and submerged woody debris). In a pond situation, bighead carp are extremely vulnerable to seines, and I can catch nearly 100% of bighead carp in a pond with one draw of a bag seine. Bighead carp behavior is to run from a seine, going as far from it as possible, and balling up at the furthest point from the seine, where they can be easily corralled, if you cover the water column top to bottom when you get close to them. I think that you would not even have to cover the entire water column (just most of it, so as to avoid debris on the bottom) with a floating seine until you got within 50 feet or so of the bighead carp – they don't attack a seine normally, they just run. Silver carp are the exact opposite, however, and in a pond situation will attack the seine, going over or under or around it as soon as they see it. In a mixed pond of bighead and silver carp, you can sometimes catch all of the bighead carp and none of the silver carp on the first pull – but you will see most of the silver carp, if you are keeping contact with the substrate most of the time, and not allowing any room to get by on the ends. However, if there is a cul de sac that could be covered with a seine, side to side, that may contain carp, and you could clear out a place to pull the seine at the end of the cul de sac, this might be effective. It would take a very large net, of the beach seine variety, such as used to be used in the striped bass fishery on the east coast. Also, note that these fish hate boats with a passion. Any place you are going to fish, keep boats out of the area for a few days before you fish it, and you may increase the chance that bighead or silver carp would enter the area and stay. If there are areas of very low boat traffic, pick on them. Warmwater effluents, or shallow areas that may be warmed by the sun, may be good choices too. I rarely find adult bighead or silver carp in shallow water except when 1) it is the only place they can find clear or green water, or 2) telemetered silver carp on sunny days in winter sometimes chose shallow water.

Other things that might be done might be 1) use of Judas carp, (invalidates eDNA sampling work, though) 2) nets combined with rotenone (like cove rotenone studies – of course some or most carp may sink and possibly never float, but even dead fish can be seined if the bottom is smooth), 3) nets combined with the use of noxious (not necessarily lethal) chemical smells that could drive the fish, possibly including ground carp skin (for alarm pheromone, but this would totally invalidate any new eDNA work for a while) 4) choice of fishing locations enhanced with rapid-turnaround eDNA sampling (two days is the shortest possible turnaround, according to Chadderton), perhaps combined with block nets that would minimize fish movement. My telemetered fish in an open setting had random movements that averaged a km change in position when encountered more than once in a three day period. 4) Setting up boat-free areas that are attractive to Asian carp, increasing both the attractiveness and fishability of those areas, perhaps even including a seine net that would lie on the bottom around the fished area, with an inflatable float line, so that you don't spook the fish with a boat while laying out the net. If this could be combined with a warmwater effluent, that would be best. Basically, provide the best potential habitat available anywhere, and make it fishable in the most deadly ways possible. At the same time, you might make every other reasonably nearby habitat living hell for the fish, with boat activity or anything else

they hate. I have found you can drive these fish very long distances with just boat movement/noise, if they don't have to cross shallow water. Give them the refuge of death.

Note I don't think that DIDSON technology is going to be very useful in locating fish because you won't be able to tell AC from the native buffalos, and maybe not from common carp, and you just can't see that far that well.

H. Timing of establishment of a population of Asian carp in the Great Lakes

I answered this question as to when I believed a population of fish could begin living and breeding in the Great Lakes, NOT meaning that they would be abundant or problematic in the times specified. If this question is meant to ask when Asian carp populations would be abundant enough to be problematic or even noticeable, I would have answered as below:

c. If yes, then by when do you predict a sustainable population of bighead carp? Year _2035___. Lower 95% Confidence limit (Year) _2025___. Upper 95% Confidence limit (Year)_2050__.
d. If yes, then by when do you predict a sustainable population of silver carp?
    i. Year 2035____.
        1. Lower 95% Confidence limit (Year) 2025____
        2. Upper 95% Confidence limit (Year) 2050___.

While we cannot be sure if Asian carps will successfully establish a large population in the Great Lakes, the best information available provides evidence that if such an invasion does occur, it will probably take many years for the population to become problematic. *This does not mean that we are not currently at a critical juncture.* Fish that invade the Great Lakes now may survive and reproduce for many generations before populations become sufficiently large to become problematic. I draw from multiple lines of logic to arrive at this conclusion. 1) A model based on the life history characteristics of many invaders of the Great Lakes, published in the journal *Science*, indicates that silver carp would spread slowly in the Great Lakes. 2) Invading organisms often go through a population lag phase of several generations when they invade a new environment, after which populations sometimes increase dramatically. The history of Asian carp invasion of the Mississippi River basin followed this pattern, and Asian carps were present for decades before their populations entered an exponential growth phase. 3) Mean temperatures in the Great Lakes basin, while clearly warm enough in many parts to support growth and maturation, are lower than those experienced by Asian carps in the central United States. Asian carp maturation rate will be decreased, and the length of a fish generation time will be increased. This should slow the rate of population increase in the Great Lakes, at least until a reasonably large number of mature spawners is present in the population. 4) The immense size of the Great Lakes provides so much habitat that I believe that multiple successful generations of population expansion would be required to have a substantial effect. There is some uncertainty to this prediction, but it is my strong belief that an Asian carp population expansion to numbers that would cause widespread substantial economic and environmental damage is *most likely* to take at least one to three decades.

This probable pattern of invasion provides both opportunities and problems. If Asian carps are able to establish in the Great Lakes, we may have some time to devise control methods that would prevent their eventual population expansion. On the other hand, it is probable that if Asian carps do invade the Great Lakes and do not quickly expand their populations, the perception of a problem may fade quickly. Support for efforts to control Asian carp in the Great Lakes is likely to wane during the extended period of low population when effects or even presence of the carp are not observed, and when control efforts are most likely to be successful. Because of their feeding methods, Asian carps are not often captured by anglers. They are more net-averse than most native fishes. When at low densities, adult Asian carps are amazingly difficult to capture with any standard fisheries technique. Because of these characteristics, small populations can exist without detection. Small numbers of fish could expand over very large distances in the Great Lakes, before conditions that precipitate a large population increase are encountered by the fish. Thankfully, with the eDNA technique developed by the University of Notre Dame group, we now have a tool that can give early warning of small populations of Asian carp, or of Asian carp spawning events that would otherwise go undetected. (Sperm have a very high concentration of the

mitochondrial DNA detected by the eDNA technique, therefore spawning events should be detectable by the assay.) However, it is important to remember in the coming years that failure of Asian carps to cause undesirable effects in the Great Lakes over the short term does not mean that undesirable effects have been avoided.

Section VII: List of Important References

Hoff, M. H., M. A. Pegg, and K. Irons. Accepted. Management Implications from a Stock-recruit Model for Bighead Carp in Portions of the Illinois and Mississippi Rivers. International Asian Carp Symposium, American Fisheries Society Special Publication. Bethesda, MD.

Kolar, C. S., D. C. Chapman, W. R. Courtenay, C. M. Housel, J. D. Williams, and D. P. Jennings. 2007. Bigheaded carps: A biological synopsis and environmental risk assessment. American Fisheries Society Special Publication 33, Bethesda, MD.

Expert 10
Risk Analysis Form
Issue: Evaluations of Risk of Asian Carps Establishing and Impacting the Great Lakes: Evaluations by Lock Operation Scenario

Instructions to Risk Assessor:

- Read the Background (Section I) prepared by the U.S. Army Corps of Engineers (Corps)
- Answer the Background Question in Section II
- Complete the Risk Assessments in Section III
    a. Results from all respondents will be tabulated
    b. If either a broad or detailed consensus is reached on risk, then that information will be included in the Team's Report to the U.S. Army Corps of Engineers
- Answer the additional questions, posed by the Corps, in Section IV and V
    a. Results from all respondents will be placed into a matrix; we will convene a call, if needed to attempt to develop a consensus recommendation
- If you have information to list in Sections VI and VII, then please do so.
- Submit this completed form to Mike Hoff (Michael_Hoff@fws.gov) within 48 hours of completion of our conference call.

Section I: Background

The Corps, which operates and maintains the navigation structures at the Chicago Lock and the T.J. O'Brien Lock, is considering modifications to lock operations and structures to reduce the risk of Asian carps (bighead and silver carps) passing through those locks in the Chicago Area Waterways (CAWs) into Lake Michigan. Possible modifications considered include minimizing impacts to the navigation industry and minimizing impacts from flooding. In the short term, the Corps is considering a range of alternative lock operations that will increase the time the locks will be closed. The alternatives include:

1. Continue current operations (no action, as required by NEPA)
2. Lock closure of 3 to 4 days a week and normal operations for the remaining days of the week
3. Lock closure of 1 week/month and normal operation for the remaining days of the month
4. Lock closure every other week and normal operations for the alternative weeks
5. Lock closure of 2 months with extensive monitoring to determine if Asian carps are in the CAWs. If no Asian carps are collected during the closed period, then lock operations will be resumed at the end of the closure period. Locks would remain open, unless there was a significant flow event (flow rate trigger TBD) that could trigger fish movement. Locks would be closed on an emergency basis while monitoring activities were executed.
6. Two-week lock closure, in mid-late April, during which extensive surveillance and monitoring is conducted. If no Asian carps are recovered, then the locks will operate normally. However, if there is a significant rainfall event that results in elevated flows (and a possible stimulus for Asian carps to move upstream) after the two weeks of surveillance/monitoring, then the locks would be closed as soon as possible. During the lock closure, resources could be mobilized to complete surveillance/monitoring for a week. If no Asian carps are captured during the week, then the locks would be reopened.

[Note: The Corps has not identified a flow trigger, but will be working with fisheries staff to identify a range of change that could necessitate an emergency closure.]

During the periods of lock closure there would be a monitoring effort undertaken up stream of the barriers that could include commercial fishing (netting), electro-fishing, the spot application of rotenone, eDNA testing and any other technologies that may be developed to help determine if an Asian carp population exists. If Asian carps are not captured, then the locks would be reopened for normal operations for the time identified. If an Asian carp(s) is/are caught above electrical barriers, the Corps, in coordination with other agencies, would follow a contingency plan which would potentially include immediate closure of the lock gates until the extent of population is determined and reopening the locks is determined not to be a significant risk for dispersing Asian carp into Lake Michigan. The Corps is also considering structural modifications to the navigation features in the CAWs including adding screens to the sluice gates at both locks and acoustic directional barriers in the CAWs to encourage movement of fish into areas that can be monitored for Asian carp.

To evaluate the proposed actions, the Corps needs expert input from you. Please complete the remaining sections of this form, which was developed to: 1) compare your evaluation of risk of establishment of bighead and silver carps in Lake Michigan under each of the Corps' presently considered lock operation scenarios, and 2) submit management-oriented questions, posed by the Corps, to you.

Although not given as a management option, I strongly feel that the locks should be closed immediately and indefinitely until a permanent separation can be designed and implemented. Seeing that this does not look like an option at this time, Option 5 would be the best to give us more time to survey the waterway, while minimizing the risk of more Asian carp getting past these physical barriers. The other scenarios of alternating lock openings and closures will do little to deter Asian carp upstream movements. My inclination is that the Asian carp will simply school beneath the structures during closures and move upstream when open to navigation.

Section II: Risk Assessment Background Question

1. Where are populations of silver and bighead carp self sustaining? (Base your answer to this question on your expert opinion)

   Silver and bighead carp have self-sustaining populations in the Alton, La Grange, and Peoria reaches of the Illinois River. No young of the year fish have been captured upstream of these reaches, to my knowledge. I believe that a juvenile fish has been captured upstream of the lower reaches, but it could have easily traveled upstream from the downstream reaches.

   j. I believe that there is no evidence that silver carp and bighead carp established self-sustaining populations either above the electrical barriers or any location within the Great Lakes. Yes_X__ No ___

      i. Uncertainty Code (see Uncertainty Codes and Descriptions on Page 8) _RC___

      ii. If yes, then please provide supporting information.

At this time, there is no scientific evidence or collections upstream of the barriers or in the Great Lakes to suggest established populations in these locations.

Section III: Risk Assessment

Probability of bighead and/or silver carp Establishment in Lake Michigan via pathways OTHER THAN Chicago and O'Brien Locks (i.e., all pathways other than those locks including pathways such as, but not limited to, bait bucket, food trade, aquaculture). Complete Columns 1 and 2.

Element Rating (Low, Medium, High)	Uncertainty Code (VC-VU: See codes and descriptions below. You may also list specific uncertainties)	Element (Support Data with Reference Code: See codes and descriptions below)	Comments
Low	Very Uncertain	Bighead and silver carps are associated with the pathway. The Assessor answers whether there is a convincing temporal and spatial association with the pathway. Reference Code: J	Please list pathways by descending order of risk to establishment of populations in Lake Michigan. 1. Food trade 2. Bait bucket 3. Aquaculture These mechanisms of transfer have been around since Asian carp were brought to this country. I rate this as low priority because introductions would likely be small as far as the number of individuals and establishment potential is negatively

			correlated with abundance.
High	Reasonably Certain	Bighead and silver carps can survive above the electrical barrier and the Great Lakes. Reference Code: J	A bighead carp was found immediately downstream of the electrical barrier, which suggests no issues with surviving upstream. I'm also reasonably confident that they could survive in Lake Michigan and have been found in Lake Erie, but they might not be able to spawn. Nevertheless, establishment in tributaries of the Great Lakes must be considered.
Low	Reasonably Uncertain	Bighead and silver carps can establish self-sustaining populations in the Great Lakes Reference Code: Kolar et al. (2007)	Asian carps may not be able to reproduce in the Great Lakes proper, but several tributaries have been identified that may have adequate habitat for reproduction.
Low	Reasonably Uncertain	Bighead and silver carp can spread throughout a substantial portion of the Great Lakes Reference Code: DeGrandchamp et al.	Asian carps can move great distances over short time scales. Therefore, they have the potential to move quickly to

		(2008)	find suitable habitat. However, I believe this pathway is of minimal importance compared to upstream movements through the CSSC and other canals.

Probability of bighead and/or silver carp Establishment in Lake Michigan via Chicago and O'Brien Locks: Scenario 1 -- No modification to current lock operations. Complete Columns 1 and 2.

Element Rating (Low, Medium, High)	Uncertainty Code (VC-VU: See codes and descriptions below. You may also list specific uncertainties)	Element (Support Data with Reference Code: See codes and descriptions below)	Recommendations
High	Moderately Certain	Bighead and silver carps can establish self-sustaining populations in the Great Lakes Reference Code: J	The likelihood of establishment is much greater in this scenario because propagule pressure will be greatest through the connections of Lake Michigan with the CSSC.

Probability of bighead and/or silver carp Establishment in Lake Michigan via Chicago and O'Brien Locks: Modification of operations Scenario 2 -- Closing locks either 3 or 4 days/week, and then conducting normal operations for the remaining days of the week. Complete Columns 1 and 2. If Element Rating (Column 1), is either High or Medium, then enter in the Comments column any recommendations for specific management actions (e.g., chemical application, commercial fishing…) that could be realistically implemented to reduce the Element Rating, of Probability of Establishment, to Low.

Element Rating (Low, Medium, High)	Uncertainty Code (VC-VU: See codes and descriptions below. You may also list specific uncertainties)	Element (Support Data with Reference Code: See codes and descriptions below)	Recommendations
High	Moderately Certain	Bighead and silver carps can establish self-sustaining populations in the Great Lakes Reference Code: J	Such actions will do little to impede upstream movements by Asian carps. Asian carps could simply school below the locks when closed and move upstream when opened. The only realistic way to decrease the probability of establishment to low is to permanently close the locks and develop a permanent disconnection of the basins.

Probability of bighead and/or silver carp Establishment in Lake Michigan via Chicago and O'Brien Locks: Modification of operations Scenario 3 – Closing locks 1 week/month, followed by normal operation for the remaining days of the month. Complete Columns 1 and 2. If Element Rating (Column 1), is either High or Medium, then enter in the Comments column any recommendations for specific management actions (e.g., chemical application, commercial fishing…) that could be realistically implemented to reduce the Element Rating, of Probability of Establishment, to Low.

Element Rating (Low, Medium, High)	Uncertainty Code (VC-VU: See codes and descriptions below. You may also list specific uncertainties)	Element (Support Data with Reference Code: See codes and descriptions below)	Recommendations
High	Moderately Certain	Bighead and silver	Such actions will

		carps can establish self-sustaining populations in the Great Lakes Reference Code: J	do little to impede upstream movements by Asian carps. Asian carps could simply school below the locks when closed and move upstream when opened. The only realistic way to decrease the probability of establishment to low is to permanently close the locks and develop a permanent disconnection of the basins.

Probability of bighead and/or silver carp Establishment in Lake Michigan via Chicago and O'Brien Locks: Modification of operations Scenario 4 -- Lock closure of every other week and normal operations for the alternative weeks. Complete Columns 1 and 2. If Element Rating (Column 1), is either High or Medium, then enter in the Comments column any recommendations for specific management actions (e.g., chemical application, commercial fishing…) that could be realistically implemented to reduce the Element Rating, of Probability of Establishment, to Low.

Element Rating (Low, Medium, High)	Uncertainty Code (VC-VU: See codes and descriptions below. You may also list specific uncertainties)	Element (Support Data with Reference Code: See codes and descriptions below)	Recommendations
High	Moderately Certain	Bighead and silver carps can establish self-sustaining populations in the Great Lakes Reference Code: J	Such actions will do little to impede upstream movements by Asian carps. Asian carps could simply school below the locks

			when closed and move upstream when opened. The only realistic way to decrease the probability of establishment to low is to permanently close the locks and develop a permanent disconnection of the basins.

Probability of bighead and/or silver carp Establishment in Lake Michigan via Chicago and O'Brien Locks: Modification of operations Scenario 5 -- Lock closure of two months with extensive monitoring to determine if Asian carps are in the Chicago Area Waterways. Complete Columns 1 and 2. If Element Rating (Column 1), is either High or Medium, then enter in the Comments column any recommendations for specific management actions (e.g., chemical application, commercial fishing…) that could be realistically implemented to reduce the Element Rating, of Probability of Establishment, to Low.

Element Rating (Low, Medium, High)	Uncertainty Code (VC-VU: See codes and descriptions below. You may also list specific uncertainties)	Element (Support Data with Reference Code: See codes and descriptions below)	Recommendations
High	Moderately Certain	Bighead and silver carps can establish self-sustaining populations in the Great Lakes Reference Code: J	This scenario is slightly better, but still doesn't address a long term solution. If no carp are found, which will be the most likely result, then propagules will be free to travel to Lake Michigan unimpeded as the locks resume normal

			operations. We need to deal with the fact that a long term solution (permanent separation) is needed now.

Probability of bighead and/or silver carp Establishment in Lake Michigan via Chicago and O'Brien Locks: Modification of operations Scenario 6 -- Two-week lock closure, in mid-late April, during which extensive surveillance and monitoring is conducted. If no Asian carps are recovered, then the locks will operate normally. However, if there is a significant rainfall event that results in elevated flows (and a possibly stimulus for Asian carps to move upstream) after the two weeks of surveillance/monitoring, then the locks would be closed as soon as possible. During the lock closure, resources could be mobilized to complete surveillance/monitoring for a week. If no Asian carps are captured during the week, then the locks would be reopened. Complete Columns 1 and 2. If Element Rating (Column 1), is either High or Medium, then enter in the Comments column any recommendations for specific management actions (e.g., chemical application, commercial fishing…) that could be realistically implemented to reduce the Element Rating, of Probability of Establishment, to Low.

Element Rating (Low, Medium, High)	Uncertainty Code (VC-VU: See codes and descriptions below. You may also list specific uncertainties)	Element (Support Data with Reference Code: See codes and descriptions below)	Recommendations
High	Moderately Certain	Bighead and silver carps can establish self-sustaining populations in the Great Lakes Reference Code: J	This scenario is slightly better, but still doesn't address a long term solution. If no carp are found, which will be the most likely result, then propagules will be free to travel to Lake Michigan unimpeded as the locks resume

			normal operations. We need to deal with the fact that a long term solution (permanent separation) is needed now. All of these scenarios suggest that the electric barriers will be 100% effective. This has not been the case and will not be the case, in my opinion. Therefore, any other stop gap measures (rotenone, commercial fishing) will not solve the longer term problem.

Consequence of Establishment in Lake Michigan (no matter how introduced). Complete Columns 1 and 2

Element Rating (Low, Medium, High)	Uncertainty code (VC-VU: See codes and descriptions below. You may also list specific uncertainties)	Element (Support Data with Reference Code: See codes and descriptions below)	Comments
High	Reasonably Uncertain	Estimate environmental impact if established in the Great Lakes Reference Code: J	The environmental impact could be devastating throughout, localized, or unnoticeable. We simply do not know how these fishes will respond to the

			conditions of the Great Lakes and its tributaries. Further, establishment could take many years, if it happens at all. If established, we can be certain that they will eat zooplankton and phytoplankton, which other fishes need. This could have negative effects on upper trophic levels.
High	Reasonably Uncertain	Estimate economic impact if established in the Great Lakes (based on your knowledge of fishing economics in the Great Lakes). The assessor is not expected to take on the role of an economist, but instead provides information on impacts the species would broadly have on fishery-related economics of the Great Lakes. Reference Code: J	If established in the Great Lakes and tributaries, my inclination is that the sportfishery will be affected negatively. Asian carps will surely alter plankton communities and abundances, which will affect upper trophic levels.
High	Reasonably Uncertain	Estimate impact on the Great Lakes from social and/or political influences (based on your knowledge of politics and societal concerns about Great	Allowing these fishes to establish in the Great Lakes, while we have had years to prevent this

		Lakes fishing) .The assessor is not expected to take on the role of an political scientist or sociologist, but instead provides information on impacts the species would broadly have on fishery-related societal and political issues of the Great Lakes. Reference Code: J	problem and have spent millions of dollars in this attempt, will be a major black mark against state and federal agencies tasked with this mission. Injuries caused to boaters if silver carp reach high abundances could also be a concern.

Summary of Organism Risk Potential to the Great Lakes
(Note: Hoff will compile this summary)

Probability of Establishment Risk Category (from table above)**=**

Consequence of Establishment Risk Category (from table above) **=**

Organism Risk Potential =

Risk Category Definitions

Risk Category	Definition
Low	Acceptable risk – organism of little concern for establishment and/or ecological consequence (i.e., impact)
Medium	Unacceptable risk – organism of moderate concern
High	Unacceptable risk – organism of major concern

Uncertainty Codes and Descriptions

Uncertainty Code	Description
Very Certain	As certain as I can be
Reasonably Certain	Reasonably certain
Moderately Certain	More certain than not
Reasonably Uncertain	Reasonably uncertain
Very Uncertain	A guess

Reference codes and descriptions

Reference Code	Reference Type
G	General knowledge; no specific source

J	Judgmental evaluation
E	Extrapolation; information specific to pest not available. However, information available on similar organisms supplied
Author, year	Literature Cited

Section IV. Questions from the Corps. Please respond to the questions.

1. Is there an imminent threat that Asian carp (silver and bighead) will establish a sustainable population in Lake Michigan in the near future? Yes _X__ No____. Uncertainty code __Moderately Certain__
    a. If yes, then by when do you predict a sustainable population of bighead carp? Year __2035__. Lower 95% Confidence limit (Year) __2025__. Upper 95% Confidence limit (Year)_2045__.
    b. If yes, then by when do you predict a sustainable population of silver carp?
        ii. Year __2035__.
            1. Lower 95% Confidence limit (Year) ___2025_
            2. Upper 95% Confidence limit (Year) __2045_.

Asian carps were present in the Illinois River about 10 years before we noted recruitment. Due to the size of Lake Michigan, establishment would likely take longer.

2. Is there a threshold of Asian carp needed to establish a sustainable population? Yes __X_ No____. If yes, then what is that threshold (Note: Hoff's [Hoff Accepted] stock-recruit model is probably the best science support. He will draft a reply based on that model. All other experts can submit their beliefs.)

   The most extreme example is that it only takes one mature male and female fish and the right spawning conditions to establish a population. This low number is very unlikely to result in a sustainable population, but it is possible. My point here is that we shouldn't be worried about how many. The more fish we allow to enter the Great Lakes, the higher the probability of establishment.
    a. Specifically, what number of Asian Carp would need to enter Lake Michigan to constitute a founding population that could, under the right environmental conditions, develop into a sustainable population in the Great Lakes? ____ Two of each species (one mature male and one mature female)_____
3. A few Asian carp were found in Lake Erie in the past. Are the populations of Asian carps in Lake Erie self sustaining? Yes ___ No _X__. Uncertainty code Very Uncertain___.
    a. If yes, then are conditions that support Asian Carp in Lake Erie similar to conditions in Lake Michigan near the Chicago Lock and T.J. O'Brien Locks? Yes___ No ___. [Please provide details, and cite any references used.]

   This is a loaded question. The method of introduction to Lake Erie (likely live cultural belief releases) is completely different the most likely method of transfer to Lake Michigan through the CSSC. The release of a few individuals into a large water body has a low probability for the species to establish. In the case of the CSSC, without physical separation of the basins, a continual source of Asian carps to Lake Michigan from downstream in the Illinois River increases the likelihood of a population becoming established.

4. In your opinion would a sustainable population of Asian Carp (both species) adversely impact the commercial fisheries of the GL? (use your ratings from Section II) High __X_ Medium____ Low ___. Uncertainty code __Reasonably Uncertain_. [Please provide details, and cite any references used]
5. If the Asian Carp (both species) were allowed to migrate into the GL unimpeded how long would it take to establish demonstrable, sustainable populations capable of adversely impacting the commercial fisheries of the GL? (assuming they would result in adverse impacts)
    a. Year ____2035___
        iii. Lower 95% Confidence limit (Year) __2025__
        iv. Upper 95% Confidence limit (Year) ___2045
6. Do Asian Carp carry any viral, bacterial, protozoan or other parasites or diseases that may adversely impact the native fish populations in the Great Lakes? (See Duane: Do you want to include the information in Kolar et al. 2007. Becky you can also respond. The remainder of us do not need to weigh in, unless we have detailed information/literature to cite) Yes ___ No ___. [Provide details, and cite references]
7. If the Asian Carp become established in the GL, then are there any beneficial impacts that would result from their presence? Yes ___ No X___. Uncertainty code _Reasonably Uncertain__. [Provide details and cite any references]
   The only benefit would be for commercial fishing, since they are not a recreational fish species. Duane can fill you in on how difficult these species are to capture in pelagic environments. I do not see a commercial fishery in the Great Lakes being feasibly, nor desired. Further, markets would have to expand greatly. Commercial fishermen on the Illinois River, where these fishes are hyper abundant, are still limited by a small market.
8. If the Asian Carp (both species) establish sustainable populations, would they adversely impact any of the other established invasive aquatic organisms of the GL? Yes _X__ No___. Uncertainty code _Reasonably Uncertain__. [Provide details, and cite any references]
   Asian carps may outcompete zebra and quagga mussels for limited planktonic resources. I view Asian carps as having the same capabilities as these invasive mussels, but they have the advantage of being able to move around. Therefore, Asian carps can move to areas of greater resources, whereas mussels could not. My inclination is that any invasive organism that relies upon zoo- and/or phytoplankton at certain stages of life or throughout their life history will be negatively influenced.

9. What are the triggers (high water flows, warm water, availability of Chlorophyll a etc.) for movement of Asian carp? [Answer question and cite references]
   Triggers for movement are relatively uncertain. Anecdotally, Asian carp just seem to be a fish that tries to move upstream whether it be for spawning, better food resources, and/or intra-specific competition for food or space. Asian carp movements appear slower in winter under colder water temperatures.
10. Will warmer weather in the spring make it more likely that the Asian carp will migrate upstream toward Lake Michigan? Yes _X__ No ___ [Explain and cite references]

High movement rates have been observed in summer. If movements are triggered by spawning, summer also provides the preferred temperatures for reproduction in these fishes.

11. Given the habits of the Asian Carp (both species) how likely are the fish to develop significant contaminant loads in their edible tissues?
    a. High ___ Medium ___ Low __X_
    b. Uncertainty code __Reasonably Certain_.
    c. [Explain and cite references]

Asian carps are not a very fatty fish, which will result in low concentrations of PCB's. Further, Asian carp feed at the very bottom of the food chain and grow very fast relative to other fishes. This will also result in low concentrations of methyl mercury and PCB's.

Section V. Risk Management Questions Posed by the Corps. Please respond to the questions.

1. If a single Asian carp is collected during monitoring accompanying a lock closure, then would the spot application of rotenone be an appropriate response? Yes __ No _X_. Uncertainty code ___Reasonably Certain

I feel that this is just another stop gap measure that does not get at the larger issue. Further, how sustainable and feasible will it be to apply rotenone every single time an individual Asian carp is captured? This solution may make the public feel better, but does not address the most pressing issue.

    a. List other desirable actions, in addition to rotenone treatment, that would be recommended. Indefinite closure of these locks and immediate action towards a permanent separation of the basins.
    b. What is the risk associated with reopening the locks after at least 72 hours after completion of rotenone treatment? H___ M_X__ L___. Uncertainty Code__Reasonably Uncertain_
    Although this may kill Asian carp in the immediate vicinity, they can travel great distances in short amounts of time, so the risk may be back soon after the rotenone treatment.

2. If multiple Asian carps are collected during monitoring accompanying lock closure, then would the spot application of rotenone be an appropriate response? Yes __ No _X_. Uncertainty code __Reasonably Certain_
    a) List other desirable actions, in addition to rotenone treatment, that would be recommended.
    b) What is the risk associated with reopening the locks after at least 72 hours after completion of rotenone treatment? H___ M__X_ L___. Uncertainty Code__Reasonably Uncertain_

    Please see comments from Question 1.

3. Would closing the lock gates be effective in significantly impeding the migration of Asian carp into Lake Michigan given that there may still be gaps of up to one inch between the lock gates and the sides or bottom of the canal? Yes _X_ No __. Uncertainty code __Reasonably Certain_

    My inclination is that we are dealing with larger Asian carps in the upper river. Further, high flow through these gaps may preclude any small Asian carp from moving upstream. This is the best scenario at this time and then permanent separation should be developed and implemented. If all of this is accomplished, then the overall threat of establishment to the Great Lakes is reduced to bait bucket introduction, etc. That risk cannot be controlled.

4. Could such gaps allow fish eggs or small juveniles to pass through the locks, and if so, what is the associated risk? Yes __ No X__. Uncertainty code ___Moderately Certain
   I find it unlikely that eggs will travel against current in an upstream direction and I'm not sure very small juveniles will have the swimming ability to move upstream against the current.
5. Would simply reducing the number of openings of the lock gates have a beneficial effect of impeding Asian Carp migration by itself, without additional control technologies? Yes __ No _X_. Uncertainty code _Very Certain__
6. Given Asian carp behavior, would fewer openings statistically reduce the likelihood of Asian carp passing through the locks? Yes __ No _X_. Uncertainty code _Very Certain__
7. Would Asian carps aggregate near the lock during closure and pass en mass through the locks during the scheduled openings? Yes _X_ No __. Uncertainty code _Reasonably Certain__
8. Would scheduling lock gate openings in conjunction with other control technologies such as netting, electro-fishing, rotenone, as discussed above, help deter the dispersal of Asian carps into Lake Michigan? Yes __ No X__. Uncertainty code _Reasonably Uncertain__
   Control measures such as netting and electrofishing will not decrease the risk of passage during an opening. Rotenone would decrease the risk of passage, but does not seem feasible. I find it highly unlikely that a rotenone event would occur every few days under some of the alternative lock opening/closing scenarios.
9. Is it reasonable to assume that if netting, electro-fishing, rotenone, other monitoring technologies do not recover an Asian carp body, that a significant population of Asian carp is not present in the waterway? Yes __ No _X_. Uncertainty code _Moderately Certain__
   These fishes are simply difficult to sample at all levels of population abundance. Further, many fishes sank during the previous rotenone event and it is unknown how many were Asian carp.
10. Is it reasonable to assume that a longer period of extensive monitoring (through netting, electro-fishing, rotenone, other technologies) without the recovery of an Asian carp body, provides increased confidence that a significant population of Asian carp is not present in the waterway? Yes __ No _X_. Uncertainty code _Moderately Certain__

The aforementioned gears do not sample Asian carps well in this stretch of the river. This has been proven in other areas of the Illinois River where we know they are present and also in the previous rotenone application.

11. If no Asian Carp bodies are recovered through netting, electrofishing, rotenone and other monitoring activities upstream of the Barriers, how significant is the threat/risk to Lake Michigan? In other words, if the population is so small that a single individual cannot be recovered, what level of risk is present? Yes __ No __. Uncertainty code ___
    This is not a yes or no question. The threat to Lake Michigan is great whether an individual is captured or not. Most likely, Asian carps are already in Lake Michigan. We need to be working on ways to permanently disconnect the basins to decrease future propagule pressure and introductions to the lake. By doing so, we provide the Great Lakes the best chance of not seeing a sustainable population. In this fashion, the hope

would be that the current individuals that are present would not be sufficient to establish a population.

12. The Corps and Metropolitan Water Reclamation District are considering installing mesh grates over the sluice gates near the Chicago and O'Brien locks. Would a mesh grate with 1 inch openings be beneficial in deterring carp migration? Yes _X_ No __. Uncertainty code __Reasonably Uncertain_
    It may be effective for large Asian carp, but there is still uncertainty for smaller individuals if they have the swimming ability to move through the gates.
13. What significant monitoring would be adequate for helping to verify the absence or presence of Asian Carp in the canal system?
    Methodologies other than the netting used right now, electrofishing, and rotenone need to be developed. I would suggest a system of large lift nets. These nets would be dropped to the bottom and lifted at appropriate intervals and would not interfere with barge traffic and recreational boaters. Perhaps a system where a net is dropped to the bottom and lifted a week later? These nets would have to be large scale. Perhaps a km long and the width of the CSSC? I would suggest using a net like this immediately below the electric barriers and below the O'Brien and Chicago locks. All fishes would be collected from the nets and any Asian carp counted and removed from the system. If the system works appropriately, it would trap most fishes in the water column in the net. A large-scale purse seine might also be appropriate in the CSSC.
14. What methods and equipment are recommended?

Three large nets deployed below barriers to migration. Four small cranes or winches at the corners of each to pick up and deploy nets. A boat and crew to collect captured fishes and release natives and destroy invasives.

    a) How long would a monitoring/event take (3-4 days, for example)
       If the process became efficient, I would suggest no more than one day to pick up an individual net, collect fishes, and redeploy the net.
    b) How often would such monitoring/sampling events be recommended (once a month, twice a month or more, for example) to reduce risk of migration to an acceptable level?
       I would recommend picking and deploying the nets every week or every two weeks at the latest.

15. What are the biological indicators for the recommended monitoring methods and what are the thresholds for action for these indicators?
    If physical capture is a main goal of the risk analysis, this should be implemented immediately to try to determine the relative abundance of Asian carp in the waterway, which may inform a long term solution.
16. At what duration of monitoring without capturing an Asian carp body is the risk of migration reduced to the extent that it would be reasonable to open the lock gates? For example, is our scenario of lock closure with corresponding monitoring of 1 week/month and normal operation for the remaining days of the month, assuming no Asian carp body is recovered, reasonable from a risk perspective?
    Monitoring and lock closure should be continued until permanent separation is achieved regardless of whether a physical specimen is captured or not.

a) Why? This is the only precautionary approach that will have the highest probability of preventing further transfers of Asian carp to Lake Michigan. This should be the ultimate goal.

17. Is one of the other alternatives discussed in the Background (above) preferable from a risk perspective? The locks should be closed indefinitely. If that cannot be the case, the longer the immediate closure the better in my mind. The only pitfall to longer-term closures may be a stockpiling of fish that could all pulse through at one time. This may increase the probability of establishment if this pulse of fish stayed together and reached Lake Michigan.
    a) Why? The goal should be to prevent more Asian carp from reaching Lake Michigan to reduce the probability of establishment. Therefore, these locks should be closed immediately until a long term solution of permanent separation is developed and implemented. Anything less does not support this goal and increases the probability of Asian carp establishment.
18. If an Asian carp movement trigger (such as high chlorophyll, warm water, high flow) is manifested in the CAWs should the locks be closed? Yes _X__ No ___. Uncertainty code _Very Certain__ The locks should be closed indefinitely right now.
19. Are there additional structural modifications or other actions you would recommend to be considered to reduce the risk of Asian carp dispersing into Lake Michigan?
    Physical separation of the basins is the only long term solution to reduce this risk. The stop gap measures proposed all appear to be vulnerable to Asian carp transfers. Although physical separation does not ensure bait bucket introductions won't occur, there are no methods to prevent this possibility except for increased outreach to decrease this vector. As a team, we should be rapidly working towards a physical separation of the two basins.

Section VI: Additional Comments and Recommendations

List comments you wish to include in your Risk Assessment and recommendation for Risk Management

Section VII: List of Important References

Hoff, M. H., M. A. Pegg, and K. Irons. Accepted. Management Implications from a Stock-recruit Model for Bighead Carp in Portions of the Illinois and Mississippi Rivers. International Asian Carp Symposium, American Fisheries Society Special Publication. Bethesda, MD.

Kolar, C. S., D. C. Chapman, W. R. Courtenay, C. M. Housel, J. D. Williams, and D. P. Jennings. 2007. Bigheaded carps: A biological synopsis and environmental risk assessment. American Fisheries Society Special Publication 33, Bethesda, MD.

Dispersal Barrier Efficacy Study

INTERIM III – Modified Structure Operations, Illinois & Chicago Area Waterways Risk Reduction Study and Integrated Environmental Assessment

APPENDIX E – COORDINATION

May 2010

US Army Corps of Engineers ®
Rock Island District

US Army Corps of Engineers ®
Chicago District

INTERIM III – Modified Structure Operations, Illinois & Chicago Area Waterways Risk Reduction Study and Integrated Environmental Assessment

APPENDIX E – COORDINATION

CONTENTS

SUMMARY OF PUBLIC COORDINATION MEETINGS AND COMMENTS

A public meeting was held in Chicago on February 12th. Approximately 300 people were present and78 members of the public spoke or submitted statements over the internet. Of the 78 statements, 43 wanted the locks to stay open, 23 wanted the lock closed immediately, and 12 folks just wanted the problem fixed quickly without impacting navigation or the economy. A second public meeting was held in Ypsilanti, Michigan on February 17, 2010.

A total of 84 public comments were received by letter or email regarding the proposed EA. Thirty three comments were received from individuals, 20 were from navigational companies, 8 were from the recreational boating industry, 23 letters were from businesses that utilize river transport, and one was from a Federal agency. An additional dozen comments were received by phone. All but one comment expressed opposition to changing the manner in which the Chicago and TJ O'Brien locks are operated, as well as any closing of the locks. Among individuals and companies commenting on the proposed changes, only The Great Lakes Boating Federation expressed a willingness to accept a modified lock operating schedule. A perceived threat to existing jobs was the main concern although there was strong support for controlling he spread of Asian Carp.

SCOPING LETTER

DEPARTMENT OF THE ARMY
CHICAGO DISTRICT, U.S. ARMY CORPS OF ENGINEERS
111 NORTH CANAL STREET
CHICAGO IL 60606-7206

REPLY TO
ATTENTION OF

Planning Branch
Environmental Formulation Section

Kenneth Westlake, Chief
Environmental Review Branch
U.S. EPA ME-19J
77 West Jackson
Chicago, IL 60604

5

Dear Mr. Westlake,

The Chicago District is preparing a National Environmental Policy Act (NEPA) document to investigate the environmental impacts including related economic and social impacts associated with modifying the operation of the Chicago and T.J. O'Brien locks on the Chicago Area Waterway. The Chicago River Lock and Controlling Works were completed and placed in operation in the 1930's and are located in Lake Michigan near downtown Chicago at the mouth of the Chicago River (Plate 1). The Thomas J. O'Brien Lock and Controlling Works were completed in 1960 and placed in operation in 1965. They are located on the Illinois Waterway River Mile 326.5, Cook County, Illinois at approximately 5.5 miles south of Calumet Harbor at Lake Michigan and the mouth of the Calumet River (Plate 2). Modifications of the lock operations are being considered to reduce the risk of Asian Carp from dispersing from the Illinois Waterway into Lake Michigan.

The NEPA document will consider a range of alternatives to modify the lock operations that would allow for passage through the locks at specific times with temporary closure at other times. Details on the alternatives are currently being developed. Your comments on this action will contribute to a more comprehensive environmental evaluation.

We are requesting your timely input to identify significant issues that you believe should be addressed in the NEPA document. Please comment by letter or email to reach our office not later than February 15, 2010, marking your reply to the attention of Mr. Peter Bullock, U.S. Army Corps of Engineers, 111 North Canal Street, Suite 600, Chicago, Illinois 60606. Questions may be directed to Mr. Bullock at 312/846-5587, or at peter.y.bullock@usace.army.mil. Your assistance is appreciated.

Sincerely,

Enclosure

/S/

Susanne J. Davis, P. E.
Chief of Planning Branch

MFR: Scoping letter as required by NEPA.

Bullock PM-PL-E 1/5/10
Fleming PM-PL-E
Sabo OC KJS 2/5/10
Davis PM-PL-E SJD

AGENCY LETTERS

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Chicago Ecological Services Field Office
1250 South Grove Avenue, Suite 103
Barrington, Illinois 60010
Phone: (847) 381-2253 Fax: (847) 381-2285

IN REPLY REFER TO:
FWS/AES-CIFO/2009-FA-0522

February 12, 2010

Mr. Peter Bullock
U.S. Army Corps of Engineers
111 North Canal Street, Suite 600
Chicago, Illinois 60606

Dear Mr. Bullock:

This responds to your February 5, 2010 request for Fish and Wildlife Service Ecological Services (FWS-ES) identification of significant issues that should be addressed in the preparation of your National Environmental Policy Act (NEPA) document for the modifications to the operation of the Chicago and the Thomas J. O'Brien locks on the Chicago Area Waterway. We are providing general comments as they relate to Service trust resources and environmental impacts that may be affected by your proposed alternative modifications to lock operation activities and recommend inclusion of the following in your analysis:

- Anticipated changes to movements of all fishes, both native and invasive, including impacts to native fishes in Lake Michigan. Include whether the proposed change in lock operations would significantly alter the risk of invasive species to Lake Michigan fish communities.

- Impacts associated with federal threatened or endangered species or designated critical habitat. For consultation steps, please access http://www.fws.gov/midwest/Endangered and click on the Section 7 Technical Assistance green shaded box in the lower right portion of the screen.

- Impacts associated with migratory bird species.

This letter provides comment under the authority of, and in accordance with, the provisions of the National Environmental Policy Act of 1969 (83 Stat. 852 as amended P.L. 91-190, 42 U.S.C. 4321 *et seq.*), the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661 *et seq.)* and the Endangered Species Act of 1973, as amended (87 Stat. 884. as amended; 16 U.S.C. 1531 *et seq.*).

The Service looks forward to working with the Corps and other involved parties in addressing this significant issue.

If you have any questions, please contact Cathy Pollack of my staff at 847-381-2253, ex. 20.

Sincerely,

Janice C. Engle
Field Supervisor

PUBLIC COMMENTS

-----Original Message-----
From: Berczek, David J LTC LRC
Sent: Monday, February 15, 2010 9:56 PM
To: Quarles, Vincent V COL LRC; Sorn, Linda M LRC; Whelan, Lynne E LRC; Deda, Roy J LRC; Kozak, Scott
Davis, Susanne J LRC; Abou-El-Seoud, Shamel LRC; Sabo, Kimberly J LRC; McLean, James R LRC
Subject: Fw: Fwd: CHICAGO BOATERS OPEN TO LESS FREQUENT USE OF LOCKS

FYI

From: Carey, Pat <pat.carey@cityofchicago.org>
To: Berczek, David J LTC LRC
Sent: Mon Feb 15 15:41:07 2010
Subject: Fwd: CHICAGO BOATERS OPEN TO LESS FREQUENT USE OF LOCKS

FYI

Sent from my AT&T wireless device.

Begin forwarded message:

> From: Press Release <press@greatlakesboating.com>
> Date: February 15, 2010 12:17:42 PM PST
> To: "press@greatlakesboating.com" <press@greatlakesboating.com>
> Subject: CHICAGO BOATERS OPEN TO LESS FREQUENT USE OF LOCKS
>
> Great Lakes Boating Federation
>
> 1032 N. LaSalle, Chicago, IL 60610
>
> Phone: (312) 266-8408
>
> Contact: Karen Malonis, (312) 266-8408

kmalonis@greatlakesboating.com <mailto:kmalonis@greatlakesboating.com>

FOR IMMEDIATE RELEASE

CHICAGO BOATERS OPEN TO LESS FREQUENT USE OF LOCKS

CHICAGO - FEBRUARY 15, 2010 – Boaters are against the proposed closures of Chicago-area locks because of the major role the locks play in their lives as they traverse back-and-forth from the water to the winter storage facilities for their boats. They instead prefer the Obama Administration's solution, which includes a $78.5 million approach to slow the advance of the Asian carp and a search for other means to halt the invasion, rather than closing the locks. There are 7,000 boaters in the Chicago area with moorings and winter storage areas in the Chicago harbors and in the river system. One in five Great Lakes residents is either a boat owner or a boating enthusiast.

The boaters' combined economic contribution to Chicago's economy is enormous, commanding more than $100 million. Of this total, $15 million goes to the Chicago Park District for mooring fees, which in turn subsidizes the costs of maintaining jogging tracks and tennis courts for the citizens of Chicago. Shutting the locks in-question would cripple the recreational boating industry and would reduce the amount of funding it delivers to Chicago.

The Great Lakes Boating Federation proposes the idea that more evidence is needed to support the locks closure than the so far undefined eDNA evidence. No disclosed information has identified whether the eDNA is from live fish, dead fish or fish that were cooked and discarded in the lakes. No marine biologist employed by the concerned bodies has shared a statistical understanding of the eDNA found, despite the fact that it is coming from Lake Calumet, which is one of the dirtiest lakes in the world. The source of the one and only Asian silver carp found in the five-mile stretch before the electric barriers is still unknown.

The boating community that uses southern Lake Michigan would be willing to consider using the locks less often in an effort to combat the invasive species. "In an effort to fight the Asian Carp invasion, boaters would be open to less frequent use of the locks, similar to the flotilla protocol that is utilized for bridge openings on the Chicago River during the boaters' seasonal migratory transits to and from their storage yards to the lake," stated F. Ned Dikmen, chairman of the Great Lakes Boating Federation, which represents the 4.3 million boaters on the Great Lakes.

###

Bullock, Peter Y LRC

From: Davis, Susanne J LRC
Sent: Tuesday, February 09, 2010 4:48 PM
To: Bullock, Peter Y LRC; Fleming, Eugene J LRC
Cc: Quarles, Vincent V COL LRC; Deda, Roy J LRC; Sorn, Linda M LRC; Walker, Wesley W LRH; Kramer, Mark J LRC; Abou-El-Seoud, Shamel LRC
Subject: Fw: Chicago Harbor and O'Brien Locks

A scoping period comment.

S

From: Quarles, Vincent V COL LRC
To: Abou-El-Seoud, Shamel LRC; Davis, Susanne J LRC; Sorn, Linda M LRC; Shea, Charles B LRC
Cc: Deda, Roy J LRC
Sent: Tue Feb 09 14:20:52 2010
Subject: Fw: Chicago Harbor and O'Brien Locks

From: Jennifer <jenniferperry25@gmail.com>
To: Quarles, Vincent V COL LRC
Cc: brogers@vesselalliance.com <brogers@vesselalliance.com>
Sent: Tue Feb 09 14:13:00 2010
Subject: Chicago Harbor and O'Brien Locks

Dear Colonel Quarles,

This is an appeal to keep the Chicago Harbor Lock, the Chicago River and O'Brien Lock open during the next planned phase to eradicate Asian Carp. As one of many commercial boat captains who rely upon "On Demand" lock operations, closing the lock and river at any designated intervals will result in a loss of jobs, loss of revenue, and adversely impact commerce. There are thousands of us who earn our livings on the river that supports our families.

Requiring tour boat companies, barge, towing, and material industries to modify operations due to lock/river closures impact Chicago and beyond. The Chicago commercial boats are a multi-million dollar industry that greatly supports Chicago tourism, thus greatly needed Chicago revenue. Any lock/river closure will negatively affect every tour boat company, every tour boat employee, every tour boat vendor, barge companies, barge employees, material services, tow boat companies and employees, hotels, concierges, restaurants, travel agencies, all of the marinas along the Chicago River, all of the boaters harbored in those marinas, kayak companies, and largely, tax revenue. Commerce; The frequency of barge traffic on the Illinois and Chicago Rivers and out of Calumet. Those goods will have to be trucked, increasing the cost of the goods, more trucks on the highways, delaying the arrival of the goods. A single barge can hold as much cargo as 15 rail cars or 60 semi trailer trucks, and tow boats are more fuel efficient.

Commuters that take Chicago Water Taxi's to and from work daily would have to find other means of transportation regardless of lock closures, but due to river poisoning and/or electric currents and/or fencing. Together, the Chicago Water Taxi's hold 163 passengers, which is more than a city bus full of commuters, and uses HALF the emissions of 2 buses. The water taxis together make 104 daily trips from Madison St. to Michigan Avenue. At capacity, that's in excess of 8400 passengers per day or 58,800 passengers weekly.

The plan to close the locks and river intermittently is irresponsible and will cause thousands of people to lose their jobs and financially destroy many families. The U.S. Army Corps of Engineers must develop a strategy that will eliminate the threat of Asian Carp, while keeping our working rivers working, and not costing thousands of jobs.

Thank you,

1

Capt. Jennifer Perry

Wendella Boats and Chicago Water Taxi

312.337.1446

CHICAGO'S
FIRST LADY
CHICAGO'S FINEST FLEET

February 10, 2010

Colonel Vincent V. Quarels
US Army Corps of Engineers
Chicago District
111 N. Canal St.
Chicago, IL 60606-7206

Dear Colonel Quarels;

I write as a Chicago River vessel operator conducting almost 2000 River and Lakefront excursions every year. I would hope my status, as likely the most frequent commercial user of the Chicago River, would require that the sentiments I express be given extraordinary weight.

I write to you today as the President and leader of my team of 65 staff and crew members. My customers and employees cannot survive without continuous access to Lake Michigan via the Chicago River Controlling Lock. My company, Chicago's First Lady Cruises will celebrate its 20th year in business this summer. We operate 3 cruising yachts which have two tasks each day. During the daytime hours our vessels serve as the official ships for the Chicago Architecture Foundation cruising the Chicago River 9 – 13 times per day on 90-minute voyages. These scheduled River Tours depart from our only dock at Michigan Avenue and Wacker Drive from May 1 through November 15th each year. During the evening hours our vessels are transformed to private party venues suitable for corporate, association, convention, family and wedding events cruising to Lake Michigan to capture a view of the magnificent skyline. As a certified Woman Owned Enterprise I will be unable to compete with the male-owned corporations located on Navy Pier.

Not only am I responsible for the employment and support of my licensed crew members and professional sales staff, but I am charged with honest and responsible business practices to those clients who have contracted my services. Simply said, there are Professional Associations, Corporations and Private Wedding Events depending upon my sales literature which promises a lakefront cruise complete with food and beverage and also Lakefront Fireworks as a finale to their event. To date I have 34 private party cruise clients who have signed a 5 page legal contract representing 2,915 passengers expecting to transit the Chicago River Lock to Lake Michigan during their event. Specifically 15 Family Wedding Events have made plans for the biggest event of their lives with dreams of watching the sun set on the Chicago Skyline as the highlight of their family portraits.

As the Official Cruiseline for the Chicago Architecture Foundation, our three vessels ply the Chicago River waterway 1714 times per year. We require dependable service and availability of the Chicago River for navigation all day, every day during our season. Any interruption of this service would not only cause hardship for our company, but it will interrupt the reputation and service of both the Chicago Architecture Foundation and Ticketmaster. School Groups, Tour Groups and members of the General Public who plan and reserve space on these cruises months in advance have very little empathy for interruptions to our service.

Over 100 volunteer guides serve the Chicago Architecture Foundation to offer detailed commentary for the duration of the 90-minute voyage which travels East, West, North and South on the Main and North Branches of the Chicago River. The vessels make their turn on the eastern sector of the tour at the Chicago Harbor turning basin. Any closure of this section of the river due to work with potential Asian Carp could cause customers to demand a refund of their tour. The revenue generated by the Chicago Architecture Foundation River Tour not only supports employees within their offices, but is one of the sole supporters of the free exhibitions and educational work vital to the Foundation's mission. We respectfully ask that you consider only an over-night river and/or lock closure during December through April to facilitate your work. If this tour is regularly interrupted, at least 20 jobs and families will be jeopardized.

To date over 4,300 hundred customers have reserved their space aboard this year's Official Chicago Architecture Foundation River Cruise representing school, tour and corporate groups and revenue of more than $100,000. Please help us maintain our reputation for superior customer service and keep the Chicago River open for business this summer. Please consider using December through April for testing and treatment of the River's waters to prevent the Asian Carp from traveling through the electronic fish barrier and up 33 miles of riverfront into downtown Chicago.

In conclusion I ask that you think about a member of your family who may have a wedding rehearsal dinner, wedding ceremony and reception planned with us or your parents 50th wedding anniversary. How do I articulate to my clients that the Obama administration is more concerned about the potential movement of the Asian Carp through an electronic fish barrier and 33 miles of waterways than their celebration, not to mention the job security of my staff and crew. If our vessels are unable to cruise onto Lake Michigan from the Chicago River, our private event business will be devastated. Not will only members

of my team be immediately terminated, staff members of my partners; the Chicago Architecture Foundation, Caterers, Carpet Cleaners, Beer and Liquor Distributors, Florists, Entertainers, Photographers, Waste and Fuel delivery companies will be immediately impacted as well. The multiplier effect will easily cost over 200 jobs.

Please consider closing the locks every evening 11pm – 11am year round as a resolution to this hysterical situation. My staff, crew, vendors and students of the Chicago Architecture Foundation depend on your support and concern. Please use scientific methods and nets to capture the fish in the 33 mile span between the current fish barrier and downtown Chicago.. Partial closure of the locks and river will only serve as an immediate hardship for those whose livelihood depends on navigating the river and lakefront. Consider the disruption of the dreams of clients and the plans they have made to enjoy Chicago's waterways. Please consider the 20 years of work to build a reputation and business enterprise and the pleasure sightseeing brings to our visitors from all over the world. And finally, please consider the over $500,000 in taxes and fees we contribute to our City and State annually during a time in our history when governments need it most.

Very truly yours,

Holly H. Agra
President

Cc: US Army Corps of Engineers Headquarters
Senator Richard Durbin
Mayor Richard M. Daley
Representative Melissa Bean

Chicago's First Lady Cruises| Michigan Ave. & Wacker Dr.|Chicago |USA |Cruisechicago.com |847-358-1330

Bullock, Peter Y LRC

From: Rick [rick@gooseislandboatyard.com]
Sent: Thursday, February 11, 2010 1:47 PM
To: PAO LRC
Subject: Chicago Lock

Lynn Whelan

We at Goose Island Boatyard located on the North Branch of the Chicago River at Halsted street are sending this email to voice our objection to any altering of the operations of the Chicago lock. Any disruption or alteration to the Chicago Lock would be detrimental to our boatyard as well as every other boatyard/marina on the Chicago River & Sanitary Canal as well as the Cal-Sag waterway. We believe that altering lock operations is not the appropriate long term solution to this problem and has not been thought out thoroughly and we think more time should be given to exploring all other options before disrupting numerous business's along an extremely busy river system. We welcome any further information on meetings and any updates on progress.

Thank You

Rick Haislip

General Manager

Goose Island Boatyard

Bullock, Peter Y LRC

From: Wjmmmandr@aol.com
Sent: Thursday, February 11, 2010 2:40 PM
To: PAO LRC
Subject: Asian Carp

I am president of the Marine Navigation and Training Assn. Inc., an all volunteer group that operates the former naval training ship YP 671, better known as the MANATRA. We are docked in the police marine/USCG basin across from your lock facility. We have been in operation since 1946.

We operate from March to Nov, training US Naval Sea Cadets, college NROTC, and Chicago HS JNROTC with this 80 foot training vessel. the vessel is still owned by the US Navy, but we operate it and pay for everything. Most of our trips on weekends.

We hope that what ever is worked out with the tour boat operators will apply to us as well, in so far as locking is concerned. In the past the lock has always allowed us to go thru the lock on the amber light, with the tour boats. Occasionally we go out during the week, but do not have a set schedule so they we can accommodate what is set up.

Let me know if you require any further information from us.

Warren Marwedel
312 445 5310

Chicago Cruises.com

Chicago Cruises LLC

February 9, 2010

COL Vincent Quarles
Chicago District Commander
U.S. Army Corps of Engineers Chicago District (CELRC)
111 N. Canal Street (Suite 600)
Chicago, IL 60606-7206

Sent via US Mail and
Sent via email to: vincent.v.quarles@usace.army.mil

Re: Chicago Area Asian Carp Control Initiatives

Dear COL Quarles,

I am going to be brief and to the point to make this communication as effective as possible. Here are the facts as we see them;

- **Our Operations** Chicago Cruises LLC operates multiple vessels in the Chicago River and Lake Michigan. 95% of our trips transit the Chicago Lock at times dictated by our customers. Our Operations are from May 1 through Sept. 30 each year. We will be forced to cease our operations, if the locks are operated in any of the alternatives….other than alternative #1, of your Modified Structural Operations. Our largest vessel is a 98 Ton, 225 passenger vessel that is not readily re-locatable. We have already booked customers and trips for the upcoming season.

- **History of Support** For years our company and industry have supported the already existent Multi-Agency Task Force that was charged to control or stop the migration of the carp into Lake Michigan. Until two months ago, the actions being taken by the Task Force which included the electric fish barriers, and other down rivers initiatives were deemed to be reasonable, prudent, and sufficient to all parties. You should argue that they still are! No carp have been found upstream of the fish barriers.

  We continue to support all other initiatives that we have heard and seen to accomplish your goals of controlling the movement of the carp.

1408 Ridge Road, Munster, IN 46321
Phone/Fax 219-972-1596 www.chicagocruises.com

- **Recommended Action** In order, we recommend the following actions to satisfy the new call for Carp Control measures….

    1. Immediately apply Rotenone to areas from the Chicago Lock and O'Brian lock and down river for 5 miles. This will accomplish not only assurance of no eminent release of carp into the lake, but allow an accurate accounting of the threat level and substantiation (or not) of the eDNA test methodology. Given the initial eDNA test data, one could argue that the Carp have come into the river from the lake!....not the other way around.
    2. Install bubble or acoustic barrier's in both waterways.
    3. Expedite the completion of Barrier IIB.
    4. Other longer term assessment and control measures as necessary

COL Quarles, now is the time for the Army Corp to shine. Today the President of the United States stated that he did not want to see the locks close and pledged $78.5 million in funding for Carp control. This to me seems like the materials necessary to implement all actions necessary to limit or stop the migration of the Asian Carp into Lake Michigan.

We stand ready to help or answer any questions that you may have.

Regards,

Captain Michael D. Strain
President

Captain James C. Folk
Vice-President

Bullock, Peter Y LRC

From: Davis, Susanne J LRC
Sent: Friday, February 12, 2010 7:08 AM
To: Fleming, Eugene J LRC; Bullock, Peter Y LRC
Subject: RE: Comments on Modified Chicago Lock Operations - Asian Carp Issue

I didn't have them either. Should we contact the original senders?
S

Susanne J. Davis, P.E.
Chief, Planning Branch
Chicago District, U.S. Army Corps of Engineers
111 North Canal Street, Suite 600
Chicago, IL 60606-7206
312-846-5580
susanne.j.davis@usace.army.mil

-----Original Message-----
From: Fleming, Eugene J LRC
Sent: Friday, February 12, 2010 6:14 AM
To: Davis, Susanne J LRC; Bullock, Peter Y LRC
Subject: RE: Comments on Modified Chicago Lock Operations - Asian Carp Issue

No attachment

-----Original Message-----
From: Davis, Susanne J LRC
Sent: Friday, February 12, 2010 5:36 AM
To: Fleming, Eugene J LRC; Bullock, Peter Y LRC
Subject: Fw: Comments on Modified Chicago Lock Operations - Asian Carp Issue

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From: Quarles, Vincent V COL LRC
To: Davis, Susanne J LRC
Cc: Abou-El-Seoud, Shamel LRC; Sorn, Linda M LRC; Sabo, Kimberly J LRC
Sent: Fri Feb 12 03:25:38 2010
Subject: Fw: Comments on Modified Chicago Lock Operations - Asian Carp Issue

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From: ewelch@passengervessel.com <ewelch@passengervessel.com>
To: jim_folk@comcast.net <jim_folk@comcast.net>; Quarles, Vincent V COL LRC
Cc: brogers@vesselalliance.com <brogers@vesselalliance.com>; ewelch@passengervessel.com <ewelch@passengervessel.com>; mstrain@sbcglobal.net <mstrain@sbcglobal.net>
Sent: Thu Feb 11 16:35:35 2010
Subject: Re: Comments on Modified Chicago Lock Operations - Asian Carp Issue

Thank you, Jim and Mike - Well done

Sincerely,

Ed Welch
Legislative Director

Passenger Vessel Association
901 North Pitt Street, Suite 100
Alexandria, VA 22314
Phone: 800-807-8360 x27
Fax: 703-518-5151
Email: ewelch@passengervessel.com
www.passengervessel.com

From: J Kindra [jkindra@kindralake.com]
Sent: Monday, February 15, 2010 2:00 PM
To: Bullock, Peter Y LRC
Cc: Jacque Kindra
Subject: NEPA document response

KINDRA LAKE TOWING, LP
9864 South Avenue N
Chicago, IL 60617

February 12, 2010

Mr. Peter Bullock
U. S. Army Corp of Engineers
111 N. Canal Street, Suite 600
Chicago, IL 60606

Dear Mr. Bullock:

Subject: Asian Carp Control

We are the owners and operators of Kindra Lake Towing. We have been in business on the Calumet River above the O'Brien lock since 1983, and 70% of our business comes through the O'Brien Locks. We are a tugboat and barge service business, employing 30 people and we move and service 3,000 barges annually that arrive at our facility through the O'Brien Lock.

We are against a Modified Lock Operations schedule as well as a permanent closure of the Chicago and T J O'Brien locks. A Lock Closure will destroy the barge traffic north of the O'Brien Lock on the Calumet River and northwest Indiana. Over $29 billion dollars worth of petroleum, chemicals, building materials, construction aggregates, farm products, and raw materials depend on the Illinois waterways.

Barge transportation is the most Eco friendly and cost efficient method of moving materials. IF barges cannot transport these materials, the alternative would be trucks, which is not only more costly, but would put a strain on our highway infrastructures and create many social impacts.

Now, let's talk "green":

Consider the tons of carbon dioxide per million ton-miles for trucks vs. barges that would be generated if the locks are closed:

Trucks produce 72 tons of CO_2
Barges produce 19 tons of CO_2

One barge carries the same tonnage of 70 trucks

Our great country has three major modes of transportation: barge, rail, and trucks. ALL THREE ARE NECESSARY and each play a different role. NONE OF THESE MODES ARE OUT DATED, and to say otherwise shows the total lack of understanding regarding the way our nation moves products throughout our country.

The reason commerce grew in Chicago, northwest Indiana and beyond is because we have all three modes of transportation here -- we have the location. The mills and refineries in northwest Indiana specifically located here because of the access to water transportation.

We challenge the conclusions in Dr. John C. Taylor's report entitled "Chicago Waterway System Ecological Separation: The Logistics and Transportation Related Cost of Waterway Barriers". He states that "7,000,000 (7 million) tons of cargo would be affected and some would incur relatively minor inconvenience". 7 million tons is 350,000 truckloads. Putting 350,000 more trucks on our highways in the Chicago area that is already heavily congested is irresponsible. Think of the impact that this will cause. As you read Dr. Taylor's entire report, it appears that he will say anything in this report to attempt to support his preconceived conclusion to close the locks and thereby avoid a responsible analysis using all the facts. Advocating that 7 million tons of freight be moved off the waterways and onto the highway will be a relatively minor inconvenience is unbelievable and irresponsible.

Dr. Taylor further states that some of the affected cargo traffic may require transfer to another mode of transportation such as rail, truck or pipeline at transload locations. Here he goes again. Writing about something with which he obviously has no or extremely little experience. The majority of freight above O'Brien Lock is dry cargo so a pipeline is of little value. Furthermore, for the liquid cargoes, any pipeline access has to be near the river at both the origin and the destination. If not, can you imagine the cost of unloading a truck at a downriver terminal, trucking it to a pipeline access point, using the pipeline to move the product to a terminal location near Chicago or northwest Indiana and then trucking to the storage and distribution facility where the barge was originally taking this cargo. Then on top of all of this, you have the pipeline cleaning fee to make the pipeline ready for the next products – most pipelines are privately owned and dedicated to specific products.

In a typical year, one steel mill imports 10% of the 7 million tons themselves. The product imported is furnace coke which is very brittle and fragile. The more it is handled, the more it breaks into smaller pieces and becomes unusable. These 700,000 tons go from the barge to the blast furnace and is never trucked. Why do we want to increase the costs of producing steel? The impact of increasing the cost of steel will be wide ranging.

To state that barge transportation is outdated is simply untrue and proffered by someone who does not know the barge industry and how industrial raw materials are moved. Moving low valued raw materials for the steel mills is a lot different than moving high valued consumer goods.

We do not want to increase the cost of doing business for the industries in Chicago and northwest Indiana and making them uncompetitive and eventually causing them to be replaced by some other company outside our area. This leads to job losses here and this is not acceptable.

As a reaction to the State of Michigan's lawsuit, all attention has become focused on some type of lock closure as if this will immediately resolve the Asian Carp migrating into Lake Michigan. Note: they are already in the western end of Lake Erie. These Asian carp are just 90 miles from Lake Huron—a path straight up the Detroit River through Lake St. Clair and up the Huron River to Lake Huron.

Lake St. Clair is very similar to Peoria Lake on the Illinois River – they are both shallow water lakes. What action is the State of Michigan taking with regard to stopping the Asian carp from getting into Lake Huron and then into Lake Michigan?

Destroying any industry and their related jobs, whether in Michigan or Illinois, is irresponsible. Please understand that closing the locks will also negatively impact Michigan's economy. The steel mills in northwest Indiana are key suppliers to Michigan's struggling manufacturing sector, and cost increases will further hinder their recovery. Can Michigan really afford one more negative impact to their economy?

In order to really stop the migration of this invasive species, all government agencies and industries should be working together on real solutions. We cannot afford to get this wrong, because if we do not focus on a rational solution to stop this migration and save free flowing commerce, we will end up with drastic job lose and Asian carp in Lake Michigan.

Respectfully,

John Kindra

Bullock, Peter Y LRC

From: AmerTerminals@aol.com
Sent: Wednesday, February 10, 2010 9:24 AM
To: PAO LRC
Subject: Chicago and O'Brien Locks

Colonel Quarles;

American Terminals, Inc. is a small community based company; we have served our community for 25 years. We employ local workers and give back to our community. On an average we unload/load 25 barges a year. We are fearful that lock closures will cause a major financial hardship on our company. Closures lead to log jams and other severe difficulties with weather issues. We are concerned that barge companies will raise prices because of closures, which puts my company in a unfortunate financial position. This creates a downward spiral effect, in concerns with my employees losing their jobs, medical insurance and no opportunity for my company to grow.

Sincerely,

John Sabol
Vice President
American Terminals, Inc.
3600 Canal Street
East Chicago, IN 46312
219-398-4900
Amerterminals@AOL.com

February 11, 2010

CHICAGO DRY DOCK, INC.
3025 E. 104th ST.
Chicago, IL 60617

U. S. Army Corps of Engineers
Attn: Colonel Vince Quarles

CHICAGO DRY DOCK, INC. opposes the closure or restriction of navigation at the O'Brian and downtown Chicago locks. Restriction of navigation would cost the Chicago area thousands of jobs. Barge transportation is the greenest and most economic form of transportation and should be encouraged not restricted. Closing or restricting navigation at O'Brian and downtown Chicago locks will not in and of itself stop the Asian Carp from entering the Great Lakes.

CHICAGO DRY DOCK, INC. is a small shipyard located on the Calumet River on the Lake Michigan side of O'Brian lock. In 2008 we dry docked and repaired 27 boats and 94 barges. Our business is comprised of 3 lines of business: repair of inland river barges and tow boats, repair of Great Lakes tugs and barges, repair of passenger vessels operating on the Chicago River. We estimate that we would loose 75% of our business if the locks were closed at O'Brian and Downtown. All 20 of our employees will loose their jobs if the locks are closed. You will find many businesses in a similar situation to ours up and down the Calumet River and at Lake Michigan terminals in Northwest Indiana.

Barge transportation is the greenest and most economic form of transportation and should be encouraged not restricted. The Corps of Engineers reports that 6,822,254 tons of cargo moved thru O'Brian Lock in 2008. That equates to 4,873 barge loads or 342,112 truckloads. Do we really want to add 332,112 trucks to our roads every year? The added traffic, wear and tear on our roads and pollution makes closing O'Brian locks a harmful environmental option for the Chicago region. The idea of having a canal to link the Great Lakes to the Inland River system made sense when Marquette and Joliet first explored the Chicago Region and it still makes sense today. Just because an idea is old doesn't mean it's not environmentally friendly.

The closure or restriction of navigation at the O'Brian and Chicago locks will not stop the advance of the Asian Carp into the Great Lakes, it will only cost our economy jobs and increase pollution in the region. The locks are not water tight. Even if they are closed small fish or eggs will be able to pass through them to Lake Michigan. We think there are several steps that can be taken to stop the advance of the Asian Carp without killing our economy or polluting our environment.

1. Turn off waterfalls the Metropolitan water reclamation district operates on the Sag and Sanitary Canal. Less oxygen in the river makes it less likely fish can live in those areas.
2. Build another fish barrier south of the current fish barrier, which will allow a larger buffer between the fish and Lake Michigan.

3. Most Lock openings are for pleasure craft. Restrict openings for pleasure craft to a limited number of openings per day. Make them raft through in large groups or with commercial tows. (Similar to bridge openings in downtown Chicago)
4. Make sure the Carp remain south of the Fish barrier. Use chemicals, electric shock and netting to continuously monitor the river north of the fish barrier.

We think it makes sense economically and environmentally to leave the link open between the Inland River System and the Great Lakes. This link is one of the main reasons Chicago has turned into the great transportation hub of the Midwest. With cooperation from the public and private sectors the canal system can be managed for the benefit of all.

Sincerely

CHICAGO DRY DOCK, INC.
Haven Kern
President

INGRAM BARGE COMPANY

TEL 615-298-8200
FAX 615-298-8379

ONE BELLE MEADE PLACE
4400 HARDING ROAD • P. O. BOX 23049
NASHVILLE, TENNESSEE 37202-3049

February 12, 2010

VIA E-MAIL (vincent.v.quarles@usace.army.mil)

Col. Vincent Quarles
Chicago District Commander
U.S. Army Corps of Engineers
111 N. Canal Street, Suite 600
Chicago, IL 60606-7206

Re: Conceptual Approach to Modified Structural Operations

Dear Col. Quarles:

I am writing on behalf of Ingram Barge Company ("Ingram") concerning the February 5, 2010 conceptual proposal entitled "Conceptual Approach to Modified Structural Operations." It is our understanding that this conceptual proposal is under consideration by the Asian Carp Regional Coordinating Committee ("ACRCC"), and that the U.S. Army Corps of Engineers has played an instrumental role in developing the proposal's "modified structural operations concept" including the various "scenario alternatives." Pursuant to the Corps' request, Ingram has reviewed the conceptual proposal and completed a preliminary analysis of the potential impact of the various scenario alternatives, with particular focus on "Alternative 2." Our initial feedback is set forth below.

Ingram Barge Company is a leading inland marine transportation company and has operations throughout most of the nation's navigable waterways. Our corporate headquarters are in Nashville, Tennessee, and our base of operations is in Paducah, Kentucky. We operate a fleet of over 120 towboats and approximately 4,000 barges. Ingram is an active member of the American Waterways Operators ("AWO"), the national trade association for the U.S. tugboat, towboat and barge industry.

Notwithstanding our commercial navigation focus, we stand with AWO in supporting robust protections for the Great Lakes from the Asian carp. Nonetheless, Ingram would strongly urge the Corps and the other members of the ACRCC and the Asian Carp Work Group to exhaust all other available options before proceeding with lock closures of more than a very minimal duration. For its part, the Corps has a congressional mandate to operate these locks in a manner that facilitates commercial navigation. If there are simply no other reasonable alternatives, we would urge the Corps to work with their federal, state, and industry partners to ensure that any lock closures occur with sufficient congressional authorization in place, as well as occur on a limited and predictable basis with minimal disruptions to commercial navigation. Lock closures should be viewed, in all scenarios under consideration, as temporary solutions only. Long-term solutions to the Asian carp problem must be based upon an assumption of ongoing operation of the Chicago-area locks.

The Illinois River, the Chicago Sanitary & Ship Canal, and the Calumet-Sag Channel, along with the congressionally-authorized locks that enable commercial navigation along these routes, are important thoroughfares for water-based transportation between the Mississippi River System and the Great Lakes. Ingram, alone, transports millions of tons of cargos for customers with facilities located above the locks near Chicago. For example, in 2009, Ingram transported over 600,000 tons of cargo outbound from, or inbound to, points above O'Brien Lock, including large volumes of iron, coke, steel, scrap metal, and other cargos. The total dollar value of these cargos is estimated at over $80 million. In any given week, there are as many as 40 Ingram barges located above O'Brien Lock. Additionally, while we recognize that the Corps has not proposed closures of Lockport, it is worth noting that, in 2009, Ingram transported over 900,000 tons of cargo, with a total value of over $100 million, outbound from, or inbound to, points above Lockport Lock.

While we applaud the Corps for continuing to evaluate all reasonable options, we are concerned that the concept of extended (or even permanent) lock closures appears to remain a possibility. For instance, the Asian Carp Work Group recently published a draft document entitled "Asian Carp Control Strategy Framework." This framework proposes various short-term and long-term action items aimed at reducing the risk of an Asian carp invasion into Lake Michigan. Although the framework recognizes that lock closures could have "serious" economic consequences, Section 2.2.3 of the Framework acknowledges that a proposed action under consideration is the "potential for extended (temporary or permanent) closure of locks ..." It is important to keep in mind that even the discussion of permanent or extended lock closures could have a detrimental impact to Chicago-area business operations, so we greatly appreciate that the framework states that one of the "four general goals for modified structural operations" is to "maintain navigation through the locks." Nevertheless, if water-based transportation in the Chicago-area is not considered to be reliable over the long-term, it is less likely that businesses that depend on this mode of transportation would invest in infrastructure and new jobs in the Chicago-area.

The draft framework recognizes that simply closing the locks will not prevent carp from passing through the locks unless additional structural modifications are made or other preventative steps are taken in the vicinity of the locks. As the Solicitor General of the United States explained recently in the government's brief filed with the U.S. Supreme Court, "The locks were not designed to be fish barriers; they are not perfectly watertight, and small fish or eggs conceivably could penetrate even a permanently closed lock. The Corps does not have readily available bulkheads to make the O'Brien Lock watertight, and although bulkheads are available at the Chicago lock, they may not be perfectly watertight either."

The Corps' Conceptual Approach to Modified Structural Operations contains a chart showing several "scenario alternatives" with various lock closure alternatives. Under Alternative 1, the Chicago and O'Brien Locks would operate "as normal." Under Alternative 2, the Chicago and O'Brien Locks would be open "3-4 days per week," with plans to potentially "place screens on the sluice gates and the lock gates during periods of closure." Under Alternatives 3 and 4, these locks would be closed to navigation 1 week per month or 2 weeks per month (every other week), respectively. The focus of our review has been on Alternative 2. We will plan to supplemental and/or revise these comments when a more definitive proposal is published.

Ingram's Planning & Analysis Department reviewed the lock utilization data for O'Brien Lock and considered the potential impact of Alternative 2 on the movement of vessels. A review of available data from 2008 indicates that the three-day period of Friday through Sunday was usually the busiest three-day period each week for lockages at O'Brien.[1] Accordingly, when evaluating the impact of Alternative 2, Ingram assumed that O'Brien would be open Friday-Sunday and closed Monday-Thursday. In addition, the average time for locking a tow through O'Brien was approximately 45 minutes.

Ingram's preliminary analysis indicates that, with respect to O'Brien Lock only, Alternative 2 would impose additional direct transportation costs on the barge industry of approximately **$40 million annually**. As part of this analysis, we identified three general categories of additional costs which would be incurred by barge operators under Alternative 2 including: (1) additional costs incurred as a result of fleeting barges while awaiting an opportunity to lock through O'Brien; (2) the loss of barge productivity as barge utilization rates decrease due to closures at O'Brien; and (3) the loss of productivity of linehaul boats as those boats wait longer to pickup barges below O'Brien.

Importantly, this preliminary estimate of additional direct costs does not include additional costs incurred by our customers or those companies that depend on barge transportation in this area. The costs incurred by other industries and companies under Alternative 2 would likely exceed, by a wide margin, the direct transportation costs incurred by the barge industry. Our analysis also assumes that all barges transiting O'Brien are dry cargo barges, even though many tank barges rely on O'Brien. Our analysis also did not capture the additional costs associated with using more harbor boats to monitor fleets and facilitate more compressed lockages. And perhaps most importantly, this preliminary analysis of Alternative 2 takes into account closures of O'Brien Lock only, and not Chicago Harbor Lock.[2] We would anticipate that a more thorough economic impact analysis of Alternative 2 would result in significantly higher economic impact figures.

Ingram stands ready to work with the Corps and the other federal and state members of the Asian Carp Work Group to find solutions to this important issue. We agree with the American Waterways Operators that other steps, besides lock closures, can do a better job of addressing the Asian carp problem including, as examples, (1) the expedited and immediate completion of the third electrical barrier in a way that will allow the safe movement of waterborne commerce while preventing the migration of Asian carp; (2) the expedited and immediate completion of flood control structures to guard against Carp entering Lake Michigan during flood events; and (3) more scientific studies about the potential of Carp to survive within

[1] This may be due, at least in part, to the operating schedules of the terminals located near the lock. As those terminals usually load and unload barges from Monday-Friday, the data indicates that there is a tendency for the busiest locking days to be Friday through Sunday, although the variation observed was not significant.

[2] Importantly, it continues to appear that the lock closures contemplated by the Asian Carp Work Group (including the Corps) would encompass O'Brien and Chicago Locks only, and not Lockport Lock. It is critical that the Corps not expand these closures to include Lockport. It is also critical that all of the relevant agencies coordinate their activities to ensure that other measures taken to reduce the carp threat, such as chemical fish kills and more intensive use of the electrical fish barriers, do not unnecessarily or unreasonably curtail commercial navigation, particularly as the timing of those activities correlate to the timing of any lock closures.

the Great Lakes ecosystem and ways to mitigate population growth. AWO has offered many good ideas on these points, and we would urge the Corps and the Asian Carp Work Group to continue to work with AWO on addressing these issues.

We understand that the Corps (and/or the Asian Carp Work Group) intends to issue an official proposed plan in the coming weeks for comprehensively addressing the threat posed by the Asian carp. We trust that an opportunity for meaningful public notice and comment, including public hearings, will be provided. Moreover, it is our hope that the Corps will, in that proposal, further describe their specific plans for any lock closures or other activities (whether performed by the Corps or other agencies) that might impact navigation (e.g., fish kills, more intensive use of the existing electrical barriers, etc.). In order to fully evaluate the proposed action, the navigation community needs to know the answers to a wide range of questions such as:

1) What are the goals of lock closures, and what activities will be undertaken during the closures?
2) What data or scientific evidence supports the proposed action?
3) What benefits will be achieved by the work performed during lock closures?
4) What are the specific start and stop dates for any closures, and how will the navigation community be informed of lock closures and openings?
5) How will safety and security issues be addressed during the proposed closures?
6) Will there be flexibility in the plan to take into account weather conditions?
7) Will the Corps coordinate lock closures with other activities (e.g., fish kills, more intensive use of the existing electrical barriers, etc.) in order to minimize the overall disruption to commercial navigation?
8) Does sufficient congressional authorization exist to support the proposed action?
9) Have all applicable procedural requirements been followed, including any applicable requirements of the Administrative Procedure Act, the National Environmental Policy, the Federal Advisory Committee Act, or other relevant laws and regulations?

Again, thank you for your kind attention to this matter. We greatly appreciate the efforts of the Corps to ensure that the navigation community has a voice in this process. If you have any questions about these comments, please do not hesitate to contact me directly.

Sincerely,

P.B. Shah
President

PORTS OF INDIANA

PORT OF INDIANA-BURNS HARBOR
6625 S. BOUNDARY DRIVE
PORTAGE, IN 46368-1280
TELEPHONE (219) 787-8636
FAX (219) 787-8842
WWW.PORTSOFINDIANA.COM

February 12, 2010

Mr. Peter Bullock
U.S. Army Corps of Engineers
111 North Canal Street Suite 600
Chicago, IL 60606

Dear Mr. Bullock:

Importance of Chicago Locks to the Port of Indiana

Thank you for the opportunity to allow our port to make comments on this issue of major importance to the economies and environment of the Chicago and Northwest Indiana region, the broader Great Lakes region, and to the Port of Indiana.

The Chicago locks are vital to the Port of Indiana-Burns Harbor. Roughly one third of the port's shipments transit those locks which connect Lake Michigan to the Mississippi River system. They provide a critical link to the Gulf of Mexico where cargoes can be transloaded between river barges and ocean-going vessels for shipment to and from anywhere in the world. Since the St. Lawrence Seaway closes every winter, this river connection is the only waterway with year-round access to the port.

On average, the Port of Indiana-Burns Harbor ships more than 400 barges and 700,000 tons of cargo through the locks every year. These shipments create more than 3,000 total jobs and $350 million in business revenues. They also account for nearly $8 million in state tax revenue and more than $84 million in personal income. This does not include the impacts on other businesses and ports along Lake Michigan that depend on the locks, such as ArcelorMittal, U.S. Steel, BP Whiting, Port of Chicago, Port of Milwaukee, western Michigan ports, regional railroads, etc. Northwest Indiana is home to the largest steel-producing region in the U.S. and the Chicago-area locks are vital to these operations.

Barges are one of the most efficient modes of transportation because one tugboat with a 15-barge tow can haul the same amount of cargo as 1,050 trucks or 240 railcars. Shipping by barge creates significant benefits versus alternative modes by reducing shipping costs, fuel consumption, ozone emissions, highway congestion and transportation-related accidents. If the average annual barge shipments moving through the Port of Indiana-Burns Harbor were switched to trucks, it would add more than 28,000 semi-trucks to one of the most highly congested highway systems in the country.

Even companies that do not ship by barge would suffer if the locks were closed. The slightest change in logistics costs often determine whether Indiana grain is shipped around the world or

down the road. Having multiple transportation modes allows companies to shop around for the best prices, and having options makes all the difference when there are supply-chain disruptions. To completely shut down one mode of transportation would have a catastrophic affect on many types of businesses by cutting them off from certain markets or suppliers and raising rates for other modes. Eliminating barge shipping as an option would likely increase truck and rail rates, as these modes would no longer have to be cost-competitive with barge movements. Competition is crucial to controlling transportation costs.

Here is a summary of the annual economic impacts of barge shipments going to and from the Port of Indiana-Burns Harbor through the Chicago-area locks, based on annual shipping averages for 1990-2009:

TOTAL BARGES	**439**	**TONS OF CARGO**	**713,786**
TOTAL RELATED JOBS	**3,020**	**TOTAL PERSONAL INCOME**	**$84,243,000**
STATE & LOCAL TAXES	**$7,919,000**	**BUSINESS REVENUE**	**$351,271,000**

The Ports of Indiana is a self-funded enterprise that operates a system of three ports on Lake Michigan and the Ohio River – located at Burns Harbor, Mount Vernon and Jeffersonville. The mission of the Ports of Indiana is to develop and maintain a world-class port system dedicated to growing Indiana's economy.

Again, we would like to thank you for allowing the Ports of Indiana an opportunity to comment on potential modifications to the operation of the Chicago and T.J. O'Brien locks on the Chicago Area Waterway.

Respectfully,

Peter Laman
Port Director
Port of Indiana-Burns Harbor

3020 EAST 194TH STREET
CHICAGO IL 60617

February 10, 2010

Colonel Vincent Quarles
Chicago District Commander
US Army Corp of Engineers
111 N. Canal Street, Suite 600
Chicago IL 60606-7206

RE: Chicago and O'Brien Docks

Dear Colonel Vince Quarles:

I am writing this letter in response to the proposed Modified Lock Operations that may take place sometime in April in an effort to control the Asian carp invading the waterways. Beelman River Terminals operates a river terminal located at the 331.1 mile marker on the Calumet River. This terminal is capable of receiving barges from the Gulf of Mexico via Mississippi and Illinois Rivers as well as lake vessels from the Great Lakes. The Modified Lock Operations could possibly result in a full lock closure which would cut Beelman River Terminals off from receiving any barges which would result in loss of business and potential closing of the terminal.

Other options available to stop the Asian carp could be construction of bubble or acoustic barriers; commercial fishing; sampling of barges for carp eggs; biological control agents; completion of Barrier IIB; tagged fish research for effectiveness of physical barriers; and completion of structures to guard against carp entering Great Lakes. All of these options need to be explored before a decision to shut down the lock operations is made. The locks are not water tight therefore the closure of them does not necessarily guarantee that no invasion will take place once closed.

The Corps should fully explain the program including the goal of the lock closure, start and stop dates, any measurable benefit and how will this action be evaluated for benefits.

I urge you to not take this action without examining any other option that may be available other than the lock closure.

Sincerely,

Sam Beelman
President

American River Transportation Company
16700 Des Plaines River Road, P.O. Box 391
Lemont, IL 60439
T 630.739.2030 F 630.739.2041

Dear Mr. Bullock:

I would like to thank you and the Corps for allowing American River Transportation Company, a wholly owned Subsidiary of Archer Daniels Midland Company, to respond to the potential modified lock operations and closure of surrounding waters. ARTCO operates 10 commercial tow boats in the waters of the Chicago Sanitary Ship Canal, Cal Sag Channel and their tributaries. ARTCO provides towing services for all base products used in power, construction and manufacturing.

ARTCO also supplies base products, such as salt, sand, gypsum, coal, coke, gravel, cement scrap steel, finished steel and construction equipment, to many of Chicago's larger employers, such as Ozinga Redi-Mix, Prairie Material, Vulcan Materials, Arcelor-Mittal, U.S. Steel, Lafarge Cement, Holcim Cement , Morton salt, Central Salt, U.S. Gypsum, Amoco, Citgo, Mobil Oil, and many others. The businesses of ARTCO and those it supplies are based on reliable, rate-able and consistent service in highly competitive markets. As a result, the proposed changes threaten the survival of their businesses, as well as ours, in light of the current economic conditions. The country is faced with the largest unemployment numbers in many years and the Corps' proposal threatens to add many more.

ARTCO believes there are several alternatives to lock modification and river closures and that the Corps should consider suggested options that do not involved lock closures, such as

- Construction of bubble or acoustic barriers.
- Commercial fishing, electro-fishing, netting, and targeted fish sampling done in a planned and scheduled time frame with clear objectives.
- Sampling of barges and other vessels for potential carp eggs or small fish. (There is a multi-agency working group that is being formed on this issue.)
- Assessment of further restrictions or law enforcement options to preclude the importation of Aquatic Invasive Species.
- Research to develop biological control agents.
- Expedited completion of Barrier IIB.
- Conducting tagged fish research to validate the effectiveness of all physical barriers.

- Expedited and immediate completion of structures to guard against carp entering the Great Lakes when floods occur.
- General scientific study about the potential of carp to survive within the Great Lakes ecosystem and, if survival is believed to be possible, urging continued study of ways to mitigate population growth.

ARTCO has been in the commercial navigation business since 1971, and we operate 60 commercial towing vessels and over 1,700 barges within the waters of the United States. We are extremely familiar with locks and know they were not designed to be water tight nor to be a fish barrier.

ARTCO believes there are numerous unanswered questions regarding the effectiveness of measures that have been taken to date to avoid the carp entering Lake Michigan, the potential effectiveness of lock closures, whether the carp are capable of developing a sustainable population in the lake and, if they do, what the impact would be. As a result of these uncertainties, we do not know if there would be any significant impact if the locks are not closed. On the other hand, it is readily apparent that such closure would have a very significant impact on many businesses reliant on water transportation and, in turn, the economy of the Chicagoland area. Thus, ARTCO believes that it is inappropriate to proceed with lock closures as proposed.

Sincerely,

Royce Wilken
President
American river Transportation Company a Delaware Corporatio

P.O. Box 1308
Jackson, MS
39215-1308

601-933-3000

Magnolia Marine Transport

February 12, 2010

Colonel Vincent Quarles, District Commander
Chicago District (CELRC) U.S. Army Corps of Engineers
111 N. Canal Street, Suite 600
Chicago, IL 60606-7206
Email: vincent.v.quarles@usace.army.mil

RE: Magnolia Marine Transport Company's comments to proposed Alternative 2 of the Modified Lock Operations scenarios on slide 6 of the ACRCC's Conceptual Approach to Modified Structural Operations presentation dated February 5, 2010

Dear Colonel Quarles:

Please accept this letter as the comments of Magnolia Marine Transport Company, a Vicksburg, Mississippi-based inland rivers towing company, regarding the economic impacts of Alternative 2 of the Modified Lock Operations scenarios on slide 6 of the ACRCC's Conceptual Approach to Modified Structural Operations presentation dated February 5, 2010 (hereinafter "Alternative 2"). Our understanding of Alternative 2, and the scenario to which these comments apply, is that each week the Chicago and O'Brien navigation locks and adjacent Chicago-area waterways would be open to commercial navigation for 3 or 4 days and then closed for 3 or 4 days. The implementation of Alternative 2 would have a severe negative impact on our company and our customers whose products we transport, with such negative impacts coming at an extremely tough time for our industry and customers as we struggle in this weak economy.

To illustrate the potential negative impacts to our company and customers, in recent months our company has been making three or four trips per month to the Chicago area using the waterways that would be impacted by Alternative 2, with each trip averaging 2 to 3 weeks. These trips typically involve a 3-barge tow hauling 52,000 barrels of heated petroleum products valued at approximately $2,500,000. Each tow employees eight (8) full-time, family wage-earning employees. To put these 3 or 4 trips per month to the Chicago area in perspective, our company has a total of 18 towboats, so 4 tows per month represents almost one fourth of our fleet.

On these trips to the Chicago area, we charge approximately $16,000 per day for each of our 3-barge tows; therefore, each trip to the Chicago area generates about $300,000 in revenue, or total revenue in a 4-trip month of $1.2 million, or $14.4 million per year.

If the waterways in the Chicago area are closed for 3 or 4 days each week pursuant to Alternative 2, our tows travelling to Chicago would be delayed for a minimum of 6 to 8 days—3 or 4 days on the inbound trip and then 3 or 4 days after loading/discharge on the outbound trip. These delay estimates are conservative in that they do not account for additional vessel traffic and lock delays that would result from vessel traffic backing up due to the waterways closures.

Each day of delay caused by Alternative 2 waterways closures would result in about $14,000 additional costs per tow, which is our $16,000 daily charge less fuel savings while the tow is delayed. Thus, a 6- or 8-day delay on each trip to the Chicago area would result in additional costs of between $84,000 and $112,000 per trip, or a total additional cost in a 4-trip month of $336,000 to $448,000, or **$4 million to $5.4 million each year**.

These enormous additional costs would result in some combination of the following negative impacts on our and our customers' businesses:

- Our company would absorb some or all of the additional costs, making our trips to the Chicago area unprofitable in the current market of extremely tight margins; and/or

- Our company could attempt to pass some of the additional costs to our customers, which, in turn, would force our customers to use alternate, more expensive, less efficient, and less environmentally-friendly modes of transportation and could cause our customers to stop or slow production altogether.

While it is impossible to predict the exact outcome of implementation of Alternative 2, the impacts on our company would almost certainly include fewer trips to the Chicago area, less revenue, decreased utilization of our equipment, and less work (including lost jobs) for our towboat employees and support staff. Impacts that are difficult to quantify include, for some of our employees and their families, the personal tragedy of job loss and, for our company and the economy, slower growth, fewer capital expenditures, and wasting equipment.

Our customers would experience a sharp increase in transportation costs; fewer, more expensive alternatives to get their products to market; and, as previously mentioned, the possible stoppage or slowing of production, which could have devastating impacts on area jobs and our struggling economy.

The alternative modes of transportation available to our customers, rail and trucks, are approximately 2 and 3.5 times, respectively, more expensive than our barges. Furthermore, the rail cars and trucks needed to substitute for the volume of our barges are not readily available and, in the case of rail cars, require multi-year lease commitments. These alternate modes of transportation are also less safe and more harmful to the environment as substituted rail cars and trucks would travel through congested, populated areas, emitting exponentially more greenhouse gasses.

Accordingly, Alternative 2, or any other regular closing of the Chicago area navigation waterways, would have a drastic impact on our business, our employees, and our customers who

rely on our safe and efficient services, including, as illustrated above, between $4 million and $5.4 million in additional costs each year. We implore you and your agency partners to find other strategies to fight the advance of Asian carp which do not threaten our industry and employees and the industries and employees of the companies we serve.

Sincerely,

Roger Harris /w/ permission

Roger Harris
Vice President of Operations
Magnolia Marine Transport Company

ILLINOIS MARINE TOWING, INC.
P.O. Box 536 · Lemont, IL 60439
Phone: 630/257-3400 · Fax: 630/257-8968

Col. Vincent Quarles
Chicago District Commander
U.S. Army Corps of Engineers Chicago District (CELRC)
111 N. Canal Street (Suite 600)
Chicago, IL 60606-7206

Col. Quarles:

On behalf of Illinois Marine Towing, Inc. ("IMT"), thank you for the opportunity to comment on the Corps' proposed modified lock operations plan for the O'Brien and Chicago locks.

Based on the discussion at the public meeting held on Friday, February 7, we will restrict our comments to Alternative 2 (i.e. locks are closed 3-4 days per week). As an initial matter, we note that it is impossible to give a well-informed comment on the plan without knowing more operational details, such as what steps will be taken during periods of closure and whether traffic will be restricted during those periods. For the purposes of our comment, we assume that vessel traffic will be restricted during times of lock closure, as has been the case with recent rotenone treatments and repairs to the electric fish barrier.

Put simply, if the Corps were to implement Alternative 2, it would be devastating to Illinois Marine Towing for the following reasons:

1) IMT transits the O'Brien lock on a near-daily basis, and moved over 3 million tons of cargo through the lock in 2009 (more than 60% of total cargo that passed through the lock). On each trip, IMT brings 4-6 barges loaded with petcoke to South Chicago and then brings 4-6 empties back on the return trip. There is no suitable fleeting or storage facility on either side of the lock to hold barges for any length of time, so any reduction in lock operating days will have a corresponding effect on IMT's activity. If our barges cannot pass through, then our customers will likely have to reduce their production schedule accordingly. A 50-60% reduction in operated days will result in a 50-60% reduction in IMT's activity and revenue tied to operations above the lock.

2) While IMT does not transit the Chicago lock, it does operate daily within the "Control Zone" just below the Chicago lock that would presumably be closed to navigation during times the lock is closed under Alternative 2. Thus, IMT is equally impacted by any closures of the Chicago lock as they are the O'Brien lock, and would be prevented from serving its customers that rely on IMT to bring salt, aggregates, petroleum and iron and steel products.

3) IMT, like most towing vessel operators, crews its vessels on a rotating basis of "21 on/21 off," meaning that our crews serve onboard for 21 straight days and then are home for 21 days. IMT's crews live throughout the Upper Midwest, and must travel to/from Chicago to board their respective vessels. It would be near impossible to fully crew our vessels on the basis of a "3 day on/4 day off" schedule given the travel times involved, and the loss of crew continuity would negatively impact our operational efficiencies and safety performance.

4) During prior occasions when the Corps closed traffic to perform fish-kills and/or repair the fish barrier, IMT was forced to idle equipment and send vessel crews home due to reduced activity. These layoffs will likely become permanent in the event the Corps enacts Alternative 2, or any other program that routinely closes the locks.

In recent years, IMT has adapted to the needs of the Corps when traffic was halted to effect repairs to the electric barrier or conduct fish-kills, and IMT remains willing to work with the Corps to find solutions to the Asian carp problem. However, any modified lock schedule that closes the Chicago and O'Brien locks on a regular basis would be catastrophic to our business.

We strongly urge the Corps to find other solutions that do not include periodic lock closures. Thank you for your attention to this important matter.

Sincerely,

Leo J. Cattoni
President
Illinois Marine Towing, Inc.

American Commercial Lines

1701 East Market Street, Jeffersonville IN 47130-4717

BRADLEY E. CUNNINGHAM
brad.cunningham@aclines.com
Phone 812-288-1936
Fax 812-288-0294

February 12, 2010

VIA E-MAIL

Col. Vincent Quarles
Chicago District Commander
U.S. Army Corps of Engineers
vincent.v.quarles@usace.army.mil

RE: Chicago and O'Brien Locks
Proposal for Modified Lock Operations to Control Asian Carp Migration

Dear Colonel Quarles:

Thank you for the opportunity to provide industry input regarding the current proposals to modify lock operations in the Chicago area for the purpose of controlling the migration of Asian carp. American Commercial Lines ("ACL") is one of the largest and most diversified marine transportation and services companies in the United States, providing barge transportation and related services under the provisions of the Jones Act, as well as manufacturing barges and other vessels. We are the third largest provider of dry cargo barge transportation and second largest provider of liquid tank barge transportation on the United States Inland Waterways, accounting for approximately 12.5% of the total inland dry cargo barge fleet and approximately 13.1% of the total inland liquid cargo barge fleet as of December 31, 2008.

In addition, our manufacturing subsidiary, Jeffboat LLC ("Jeffboat"), is the second largest manufacturer of dry cargo barges in the United States. We believe this also approximates our ranking in terms of construction of liquid tank barges.

The waterways in and around Chicago are vital to ACL's business. ACL operates a terminal and fleeting facility at Lemont, Illinois on the Chicago Sanitary & Ship Canal that supports approximately 102 employees. At least 41 customers of ACL in the Chicago area depend exclusively or predominantly on barge shipments to operate. In 2008, ACL transported approximately 1.5 million tons of cargo valued at over $450 million above the O'Brien Lock and nearly twice this amount of cargo above the Lockport Lock. ACL operates 60 to 100 barges in the Chicago area on a typical day, making deliveries to at least 25 different facilities above the O'Brien Lock. Permanent or temporary closure of one or more of the locks, even on an intermittent basis, would severely impact ACL's employees, vendors, and customers in the Chicago area. Furthermore, any reduction in barge demand generally would also negatively impact our Jeffboat manufacturing operation.

Barge transportation plays an integral role in the nation's economy due to the fact that it is the safest, cleanest, and most economical mode of freight transportation. For instance, a typical inland barge has a dry cargo capacity at least 16 times greater than a single rail car, and 70 times

greater than a single semi-trailer truck. A single tank barge, in turn, can carry as much liquid cargo as 144 trucks or 46 rail cars.

Products commonly moved by barge in the Chicago area include salt, sand, gypsum, coal, coke, gravel, industrial chemicals, petroleum products, cement, scrap steel, finished steel, and industrial steel. These are the base products that a variety of industries in the Chicago area and beyond depend upon for their day-to-day operations. Area steel mills, power companies, construction companies, manufacturers, and distributors would suffer severe economic hardship if forced to rely upon modes of transportation such as rail and truck for their high volume shipments of base products. In an already struggling economy, this would inevitably lead to lost jobs and higher prices for consumers.

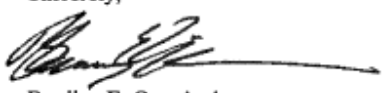
To date there have been no Asian carp visually confirmed above the existing electrical barrier on the Chicago Sanitary & Ship Canal. Although e-DNA testing suggests that Asian carp *may* be present above the barrier, further validation of the e-DNA methodology should be undertaken before relying upon it as a justification for taking drastic measures such as lock closures or modified lock operations. Moreover, and perhaps more importantly, even closing the locks would not guarantee that Asian carp or their eggs would not escape into the Great Lakes. The locks around Chicago were neither designed to be watertight nor to serve as a fish barrier. As such, small fish or eggs could conceivably penetrate even a permanently closed lock.

ACL believes that balanced solutions to the problem of invasive species in the Great Lakes are achievable, but the problem must be addressed by using logic and not emotion. To this end, ACL supports the following alternatives to lock modification and river closures that would protect the environment while also preserving the free flow of commerce:

- Expedite construction of the third barrier on the Chicago Sanitary and Ship Canal, known as Barrier IIB.
- Consider other types of fish barriers to prevent Asian carp from moving into the Great Lakes, such as bubble or acoustic technology barriers.
- Immediately complete barriers to guard against Asian carp entering the Great Lakes when floods occur.
- Conduct tagged fish research to validate the effectiveness of all primary and secondary barriers.
- Employ consistent measures to catch fish, such as electro-fishing, netting and commercial fishing.
- Fund research on Asian carp-specific biological control agents.
- Sample barges and other vessels for Asian carp or their eggs.
- Impose further restrictions on the importation of aquatic invasive species.
- Conduct more scientific studies about the ability of Asian carp to survive within the Great Lakes ecosystem.

It is our hope that the Corps will make every effort to address the issue of invasive species in a manner that takes into account the severe economic consequences that would result from lock closures or modified lock operations. We believe that the alternatives listed above should be fully explored before any decision is made that would impede the vital flow of products moved by barge – products relied upon by a number of industries that are vital not only to the Chicago economy, but to the national economy.

Sincerely,



Bradley E. Cunningham
Corporate Counsel

cc: Benjamin Rogers
brogers@vesselalliance.com

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S. H. Bell Company
S. H. Bell Company (Baltimore), LLC

644 Alpha Drive • P. O. Box 11495 • Pittsburgh, PA • 15238-3190
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Background;

Benjamin Rogers
Government Affairs Associate
The American Waterways Operators
801 North Quincy Street, Suite 200
Arlington, VA 22203
www.americanwaterways.com
(703) 841-9300, Extension 264

Without a quick and coordinated industry effort, the Army Corps of Engineers could close Chicago-area locks each week, beginning as early as April 1, in a misguided attempt to prevent the Asian carp from reaching the Great Lakes. The Corps has asked industry to comment on this potential situation, which they call a "worst case scenario," and it is detailed as Alternate #2 on slide 6 of the attached presentation. Unfortunately, industry has a limited time frame to communicate the absurdity of the this proposal and the disastrous effect it will have on regional waterborne commerce and the economy. We urge all individuals with operations in or through the Chicago area to send a letter to the Corps (contact information below) by this **Friday, February 12** that includes the following:

- Examples of options to take to address the problem of Asian Carp that do not involve lock closures (see attached document for a list of options, some of which were suggested by AWO, and some by the EPA – all have been endorsed by the AWO Asian Carp working group);
- Be explicit in your comments that closing the locks will not stop the carp from reaching Lake Michigan. You may want to quote the United States brief in the case of Michigan v. Illinois, "The locks were not designed to be fish barriers; they are not perfectly watertight, and small fish or eggs conceivably could penetrate even a permanently closed lock. The Corps does not have readily available bulkheads to make the O'Brien Lock watertight, and although bulkheads are available at the Chicago lock, they may not be perfectly watertight either.";
- Ask the Corps to further describe their intent and actions, including: 1) what are the goals of lock closures?; 2) why is there an urgency?; 3) what will happen during the closure that produces a measurable benefit?; 4) what are the start and stop dates?; 5) what other actions are being considered?; 6) how will the Corps evaluate these actions, or how will adaptive management fit into this process?; 7) how will safety and security issues be addressed during the proposed closures?; and, 8) will there be flexibility in the plan to take into account weather conditions?; and,
- A statement that the issue needs to be addressed using logic and not emotion.

Send your comments to and please forward a copy to me at brogers@vesselalliance.com.
We encourage you to also send this letter to your Congressman and Senators with a cover letter. We will be sending a template later this week. The letter should be faxed to the local and DC office, and followed up with a phone call. We will also be sending a list of contact information for Congressional offices later this week.
AWO will be sending comments containing the above as well.

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As far as upcoming meetings and events are concerned, there are two public meetings in the Chicago and Detroit areas on Feb. 12 and Feb. 17, respectively. Also, Del Wilkins from Illinois Marine Towing will be testifying before the House of Representatives at a hearing on the Asian Carp issue that begins at 2:00 PM EST today. Please see attachment for the meeting schedule. To listen in to the hearing, click here for a link to the audio/video.

Thank you.

Benjamin Rogers
Government Affairs Associate
The American Waterways Operators
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(703) 841-9300, Extension 264

Bullock, Peter Y LRC

From: Mary Mees [mmees@luhr.com]
Sent: Wednesday, February 10, 2010 3:13 PM
To: Bullock, Peter Y LRC

Dear Peter Bullock:

Luhr Bros., Inc. is a family owned business of some 70 years. We are in the Navigation Business and employ approximately 400 people. Closing the Chicago Locks, even on a temporary basis, would be a disaster to us.

Recently, we were awarded a 500,000 ton Jetty job for the City of Chicago on Lake Michigan. Closing O'Brian Lock would cut us off from getting into the Lake. We also have invested over 2 million dollars on Property in South Chicago to aid in our commerce to and from the Lake, which would be of no value if the locks are not in operation.

Please fight the Asian Carp issue to save billions of dollars of commerce from the Rivers to the Lakes.

Sincerely,

Michael A. Luhr

President

Luhr Bros., Inc.

250 W. Sand Bank Road

Columbia IL 62236

618-281-4106

618-281-4288 = Fax

CICI | Chemical Industry Council of Illinois

February 12, 2010

Col. Quarles
US Army Corps of Engineers
Chicago District
111 N. Canal Street, Suite 600
Chicago IL 60606

Re: Asian Carp Control Strategy in the Chicago Area Waterways

Dear Col. Quarles,

The Chemical Industry Council of Illinois ("CICI") would like to register its voice in the matter of the Asian Carp Control Strategy Plan in the Chicago Area Waterways (CAWS). CICI is a statewide trade association representing the chemical industry in Illinois. CICI has 203 member companies employing over 48,575 workers at an average annual wage of $81,400 in 726 manufacturing facilities and 877 wholesale and distribution facilities in Illinois.

CICI has reviewed the Asian Carp Control Strategy Plan and attended the U.S. Army Corps of Engineers (USACE) industry stakeholders meeting on February 5, 2010.

CICI feels that any closure of the locks in the CAWS is unacceptable. With that being said, CICI is more than willing to assist and accommodate the USACE and the other agencies involved in the suppression of Asian carp in the CAWS when the locks need to be closed during a fish kill event or any other event relating to the removal and collection Asian carp.

In 2008, the port of Chicago was ranked 6th in the United States for exports to other countries by the U.S. Commerce Department. The industries that allowed for this 6th place ranking are the chemical and electronics industries. The Chicago region's five biggest exports were chemicals ($6.1 billion), computers and electronic products ($5.2 billion), non-electrical machinery ($3.4 billion), transportation equipment ($3.2 billion) and electrical equipment, appliances and components ($1.7 billion).

It has been quoted in many documents that the commerce that transverses these waterways is $17 billion dollars annually. We estimate that CICI members account for approximately $2 billion of the commodities moved by barge through the Chicago area. CICI feels that those numbers are low because they do not take into account the potential loss of jobs; lost money to the local economy from the employees of our companies; loss of the tax base to local communities; the additional cost, not only to the companies but to the consumers, of doing business if transportation needs to switch from barge to rail or truck; the compromising of the local infrastructure due to additional rail and roads that

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Springfield
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Website: www.cicil.net

will be needed to compensate the delays, or in worst case scenario, closure of the locks; and not to mention the impact of air emissions on the Chicago Metro area.

The closure of the locks should be the last line of defense for suppression of the Asian carp, not the first. There is no guarantee that the closure will keep the Asian carp out of Lake Michigan, but it is guaranteed that it will depress the economy even further in the Chicago Metro area. Chicago would not be the strategic transportation hub of the Midwest if not for the CAWS. Closure of the locks, for any period of time, will have a ripple effect nationwide.

At the request of USACE, CICI has tried to gather as much information as possible, about the chemical industry's contribution to the economy in the Chicago metro area. Since the time frame is so short, CICI feels that this is a reliable snapshot of the chemical industry along the CAWS.

CICI has 18 members that are directly impacted by any closure of the locks in the CAWS. Of those 18 members, they receive 2,865 barges annually. If the use of barges is taken away as a means of transportation, there would have to be replaced by an additional 80,774 rail cars or 338,595 semi trailer trucks to transport product to these facilities.

According to the U.S. Department of Transportation modeling, truck transportation in the Chicago area accounts for 60% of the commodity flow. The annual addition of 300,000 trucks would be an additional 848 tons of nitrogen oxides alone to the air emissions to the Chicago metro area. See "Assessing the Effects of Freight Movement on Air Quality at the National and Regional Level" for the U.S. Federal Highway Administration. That is equivalent to at least one natural gas peaker plant in Illinois or the same as about 20,600 residential natural gas furnaces for the year. Mobile emissions are not regulated like stationary sources are.

Many of CICI member companies are located in very localized areas. The additional truck traffic could be a public nuisance to residents, create the possibility for more road accidents, added congestion, and the cause for more local money to be spent on road repairs and emergency response.

Another concern that CICI has regarding any kind of lock closure involves the security of our products on barges and the safety of the personnel. If there is a lock closure, there will be a stock pile of loaded barges along the CAWS that may contain hazardous, flammable, or combustible materials. It would not be difficult for someone to sabotage these barges if they were sitting unattended in an unsecured area. Many of CICI facilities must comply with the U.S. Maritime Security Act and must follow federal law. CICI sees the potential of many unauthorized barges tied to CICI facilities docks. Not only would this be a security violation, it would violate corporate policy and create a potential liability issue.

Headquarters
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Due to the uniqueness of the CAWS, CICI believes that the USACE should use the waterways to its advantage in preventing the Asian carp migration. CICI urges that the USACE consider the distance from the existing electric barriers through the Chicago Sanitary and Ship Canal to the Chicago Locks, and to the O'Brien Locks. This distance is an important stretch that could be used as a buffer zone.

The Chicago Sanitary and Ship Canal (CSSC) is a "secondary contact" water and is clearly not a good habitat for aquatic life; its existing structures could be used in support of the USACE's mission to protect Lake Michigan from Asian Carp. "The canal consists of vertical concrete walls and steep rockfill embankments with an average width and depth of 200 to 300 feet and 27 to 50 feet respectively." Most of the land use along the canal is industrial and commercial. An evaluation of the CSSC's aquatic habitat by Illinois Environmental Protection Agency (IEPA) found that the habitat ranged from poor to very poor. "The factors limiting the habitats include silty substrates, poor substrate material, little in stream cover, channelization and no sinuosity." See Camp Dresser & McKee, "Chicago Waterway System, Use Attainability Analysis" (September, 2007) at pp 4-69, 4-80.

In addition, the water in the CSSC is "effluent dominated." Over half of the average flow in the CSSC is made up of the effluent from the Stickney wastewater treatment plant of the Metropolitan Water Reclamation District of Greater Chicago (MWRDGC), and about 70% of the water flowing through the Lockport locks comes from the MWRDGC treatment plants. That discharge, or the presence of three MWRDGC facilities along the CSSC and the Cal-Sag channel, might provide another tool for facilities to be used to prevent the possible migration of Asian Carp toward Lake Michigan.

The IEPA has determined that the CSSC, as well as the Cal-Sag Channel, cannot attain the uses of waters of the United States as provided under the Clean Water Act. IEPA found three different factors which prevented the attainment of Clean Water Act goals for these waters:

--Human caused conditions or sources of pollution prevent the attainment of the use and cannot be remedied or would cause more environmental damage to correct than to leave in place; or

-- Dams, diversions or other types of hydrologic modifications preclude the attainment of the use, and it is not feasible to restore the water body to its original condition or to operate such modification in a away that would result in the attainment of the use; or

-- physical conditions related to the natural features of the water body, such as the lack of a proper substrate, cover, flow, depth, pools riffles and the like unrelated to water quality, preclude attainment of aquatic life protection uses;...

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See 40 CFR 131.10(g)(3),-(4),-(5).

Because the CSSC, and the Cal-Sag channel, are not able to meet the aquatic uses expected under the Clean Water Act, CICI urges the USACE to consider and evaluate a strategy which considers the feasibility of chemical separation, either through the entire length of the CSSC, as a "dead zone" in a segment of one or both channels, or in specific lockage scenarios.

Given these existing water quality-related conditions, CICI urges the USACE to develop strategies that would utilize the channelized features of the CSSC as a further protection method against the movement of Asian Carp from the waters beneath the Lockport locks toward Lake Michigan. Doing so would remove or dramatically reduce the need to employ the very expensive and disruptive measures of even occasionally closing the locks along Lake Michigan.

To compensate for the "dead zone" areas, CICI suggests that following a "dead zone" with a remedial oxygenation program, or a SEPA-like station, be installed to protect the ecosystem below the CAWS.

CICI encourages the Illinois Department of Natural Resources' (IDNR) efforts to increase the use of commercial fishing in areas south of the Lockport lock to reduce the biological pressure of the already established Asian carp populations. Any reduction will ensure that no Asian carp will breach the electric barrier.

The use of acoustic/bubble barriers as a deterrent should also be implemented not just at the tributaries of the CAWS but also in conjunction with additional electric barriers or the use of the acoustic/bubble barriers before and after the locks.

CICI appreciates the hard work and dedication of the USACE and the other participating agencies in their fight to suppress the Asian carp. CICI and its' members are a willing participant in assisting in the fight.

Respectfully submitted,

Lisa Frede

Lisa Frede
Director of Regulatory Affairs
Chemical Industry Council of Illinois

CHICAGO ARCHITECTURE FOUNDATION

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February 10, 2010

Colonel Vincent V. Quarels
US Army Corps of Engineers
Chicago District
111 N. Canal St.
Chicago, IL 60606-7206

Attention: Pubic Affairs Officer - Lynn Wayland

Dear Colonel Quarels:

As the leader of the Chicago Architecture Foundation, it is my duty to notify you about how any closures of the Chicago River due to Asian carp mitigation efforts will affect our non-profit mission. We have been educating the public about Chicago's world-class architecture and design for over 45 years, and the Chicago River is a major factor in how we fulfill this mission. The 191,000 people who take the Official Architecture River Cruise every year make up over 41% of our annual audience and makes up 47% of our annual budget, so it is crucial that we do not lose the river as a primary method of fulfilling our mission.

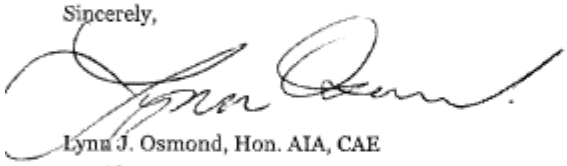
As a non-profit organization, we depend upon the revenue generated by the Architecture River Cruise to fund our free or low-cost exhibitions and youth education programming. The delivery and support of these programs employs over 50 people, many of whom would lose their jobs if their programs were not funded through River Cruise operations. A three-day closure of the Chicago River on a weekly basis could potentially lower our revenue by 62%, an irreplaceable loss for our relatively small organization.

Chicago is famous around the world for its architecture, and our organization is the recognized authority for interpreting it to a global audience. After shopping and theater, architecture is the primary attraction for out-of-town visitors to Chicago. Our Architecture River Cruise is the #1 tourist activity in the city, largely based upon our reputation for high-quality tours led by expert volunteer docents. Limiting access to the Chicago River would seriously damage Chicago's reputation as an international destination for architecture tourists. Tourism contributes $11.8 billion to the Chicago economy each year. With tourism already in decline due to the global recession, closing the river would be a fatal blow to our already-struggling industry.

Our tours depend on regular availability of the Chicago River for navigation all day, every day during our season (May – November). Any interruption of this service would not only cause hardship for our company, but may irreparably harm our local and international reputation.

We respectfully ask that you consider only an overnight river and/or lock closure during December through April for testing and treatment of the River's waters to prevent the Asian Carp from traveling through the electronic fish barrier and into downtown Chicago. To date over 4,300 hundred customers have reserved their space aboard this year's Official Chicago Architecture Foundation River Cruise representing school, tour and corporate groups and revenue of more than $100,000. Please help us maintain our reputation for superior customer service and keep the Chicago River open for business this summer.

Sincerely,



Lynn J. Osmond, Hon. AIA, CAE
President & CEO

NORTHWEST INDIANA FORUM
6100 Southport • Portage, IN 46368 • 219.763.6303 Phone • 219.763.2653 Fax

January 26, 2010

Attorney General Greg Zoeller
Office of the Attorney General
302 West Washington Street
Indianapolis, Indiana 46204

Dear Attorney General Zoeller:

The Northwest Indiana Forum (Forum) is a membership based, not for profit regional economic development organization. Our membership of 123 and growing represents industrial and commercial businesses, financial entities, universities and municipalities within Lake, Porter, LaPorte and Starke counties – a diverse group. In total, our membership reflects $40 Billion in commerce annually on behalf of the State of Indiana.

Thank you for the opportunity to meet with you today on behalf of our members and businesses who would experience negative economic impacts related to the proposed closure of the Inland Waterway System/Chicago Locks.

The closure of the lock system would immediately disrupt the cost effective method of raw material and finished products shipping for multiple industries located in Northwest Indiana. It is anticipated the collective annual financial impact would be $49,000,000. This estimate does not account for economic impacts beyond the immediately affected industries.

The loss of utilization of the efficient barge transportation system would place a new burden on rail and roadway transportation systems. Businesses dependent upon barge deliveries would have to redirect materials to these transportation modes should the locks be closed on a temporary or permanent basis. If closed, site modifications needed to accommodate these transportation changes at some of the affected businesses are not possible due to lack of available property within their plant boundaries to expand to accommodate alternative delivery methods.

Additionally, the transfer of shipping to rail and road modals will have an impact on the air quality of Northwest Indiana. The recent IDEM air quality attainment designation request to the U.S. Environmental Protection Agency (EPA) may be in jeopardy with this transportation change. Actions taken by Northwest Indiana citizens and businesses to accomplish air quality improvements will be negated by this alteration of product movement.

The Northwest Indiana Forum members recognize the significant financial impact to the recreational and fishing industries should the Asian Carp invade the Great Lakes waters. Discussions with our environmental stakeholder partners have focused upon the determination of a resolution to address the invasion under the assumption that the Asian Carp have entered the Great Lakes system. The Forum recommendation for Indiana to partner with the Great Lakes states and Canadian provinces on the Great Lakes to initiate a study to determine a resolution is supported by stakeholders.

The Forum is available to work with your staff and other Indiana agencies to address this issue. Again, thank you for your consideration in this matter.

Sincerely,

Mark T. Maassel
Interim President & CEO
Northwest Indiana Forum

Bullock, Peter Y LRC

From: Kay Nelson [knelson@nwiforum.org]
Sent: Thursday, February 11, 2010 3:01 PM
To: PAO LRC
Subject: Northwest Indiana Chicago & O'Brien Locks Comments

Attachments: Asian Carp Zoeller 012610Final.pdf

Asian Carp Zoeller 012610Final...

Dear Colonel Quarles,

The Northwest Indiana Forum is a non-profit, regional economic organization representing 120+ industrial, commercial business, financial and academia members. The commercial impact of our members is $40 Billion on an annual basis. The Northwest Indiana Forum members have 3 major areas of concern regarding the proposed Chicago waterway lock closure alternatives:

1. Economic impact and transportation efficiency
2. Environmentally effective Asian carp management
3. Flooding impact to residential and commercial areas of Northwest Indiana

The proposed Chicago waterway lock closure alternatives being considered by the Army Corps of Engineers in response to the potential invasion of the Asian Carp have raised serious concerns from our member industries reliant upon the inland waterway system for raw material and finished product transportation.

Environmental stewardship is a core value for Northwest Indiana Forum members. Therefore, our members fully support the selection and implementation of Asian carp prevention and removal measures. However, the lock system was not constructed with the intent to provide a full proof barrier to the migration of aquatic species and as such is not an effective management solution. Additionally, waterway transportation is a fuel efficient mode. If business operations are forced to utilize rail and/or truck transportation to move materials and product, the corresponding increase in fuel consumption and related air quality reductions would be detrimental to environmental sustainability and stewardship.

Northwest Indiana has experienced historically significant flooding, the most recent in 2008. Thousands of homes, families and businesses were impacted by the flood waters. As reported in the February 11, 2010 Northwest Indiana Times newspaper, homes destroyed were not covered by insurance for the flood damage. The road to returning to a livable home has been long and some are still waiting to rebuild. Any proposal to modify lock operations that would increase the likelihood of flooding reoccurrence is not satisfactory to the 790,000 residents of Northwest Indiana.

It is imperative that time and deliberation be taken to fully evaluate the proposed alternatives in conjunction with a multi-state initiative to determine a suite of permanent options for Asian carp control.

Attached you will find a copy of the letter presented to Indiana Attorney General Zoeller submitted in January. The Northwest Indiana Forum will be preparing additional comment letters for formal submittal to the Army Corps of Engineers National Environmental Policy Act planning process as well as the multi-agency response team.

Thank you for your consideration in this important matter affecting human health, safety, environment and commerce for the citizens of Northwest Indiana and the Great Lakes basin.

Kay L. Nelson

Director, Environmental Affairs

Northwest Indiana Forum

6100 Southport Road

Portage, IN 46368

Phone: 219.763.6303 ext. 190

knelson@nwiforum.org <mailto:knelson@nwiforum.org>

Joseph J. Calfe
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February 10, 2010

Col. Vincent V. Quarles
USACE
Commander, Chicago District
111 North Canal Street
Suite 600
Chicago, IL 60606

Subject: Chicago and O'Brien Locks

Dear Col. Quarles,

I wanted to communicate my concerns over the proposed actions by the USACE regarding the Asian Carp issue. Koppers operates an industrial facility in Stickney, IL that will be severely impacted by the proposed concept of Modified Lock Operations. Koppers is intensely focused on environmental stewardship but feels that these actions will do little to stop the infiltration of Asian Carp into the Great Lakes while causing an economic hardship in the region. While we understand that the Corps faces some difficult decisions, we believe the Modified Lock Operations plan is a deceptive facade that does little to address the problem. What it will do, however, is endanger the 120 jobs at our plant and it's annual economic impact of $40 million in local spending. The logistical entanglement the Corps will create, directly effects the viability of our plant. Also, if material that currently moves by barge is shifted to truck movements, an additional 4600 trucks per year will crowd our already congested streets.

We urge you to explore the scientific and technical solutions that are being proposed rather than the rotating lock closure that will ultimately be ineffective.

Sincerely,

Joseph J. Calfe

Col. Vincent Quarles, Army Corp of Engineers 12/29/2009
cc. Linda Sorn, Army Corp of Engineers
Mary McCarthy, American Waterways Operators

I write on behalf of Occidental Chemical Corporation and at the request of the American Waterways Operators to outline the detrimental commercial impact that closure of the Chicago area locks (Cal-Sag canal and Chicago Sanitary and Ship Canal) would have on our business. I am Supply Chain Manager at Occidental Chemical Corporation's Ludington, Michigan facility.

This facility is the largest producer of Calcium Chloride products in North America. Calcium chloride is especially important for safety during winter months because of its use in controlling snow and ice on sidewalks, parking lots and roads. It is also used to suppress dust on unpaved surfaces, for road stabilization and multiple other applications.

The Ludington facility ships approximately 100,000 tons of calcium chloride salt solution via barge to a distribution terminal in Lemont, Ill. To access this terminal, the barges transit the Chicago Sanitary and Ship Canal from Lake Michigan and then return to the lake empty by way of the Cal-Sag canal. The terminal in Lemont serves as the distribution point for sale to the Chicago area as well as a point to transfer product to river barges to ship to customers located on the Mississippi and Ohio river systems. Closure of the Chicago and Cal-Sag locks will cut our access to the Lemont terminal from Lake Michigan via barge and would force the business to relocate to a new terminal for distribution. It would also require barge-supplied customers on the inland river system to be served by an alternate mode of transportation, either rail or truck.

The financial impact of these changes would be significant. The value of the product that passes thru Lemont (100,000 tons) is approximately $5 Million annually. An immediate closure of the lock system would put a significant portion of this business at risk in the short term until an alternate terminal location could be established. The short-term solution would be to convert this volume to other modes of transportation, resulting in an additional $ 3 Million of cost to the customers in the Chicago market annually. It is estimated that it would take at least one year to relocate from the current terminal facility in Lemont.

The details above can be summarized as follows:

Product	Calcium Chloride solution
Company	Occidental Chemical Corp.
Volume of product impacted annually	100,000 solution tons
Value of product impacted annually	$5,000,000
Financial impact on an annual basis	$3,000,000 increase in transportation cost

I urge you to fully consider the negative economic impact that would result in the closure of these important shipping routes. Thank you.

Regards
Jeff Rhein
Calcium Chloride Products
Supply Chain Manager.
Ludington Plant
Ph. 231-845-4396

Confidential Information

Bullock, Peter Y LRC

From: Jeffrey_Rhein@oxy.com
Sent: Thursday, February 11, 2010 1:30 PM
To: PAO LRC
Cc: mmccarthy@vesselalliance.com; Neil_R._Ackerman@oxy.com; John_Stuart@oxy.com
Subject: Impact of periodic Chicago lock closures to Occidental Chemical's Calcium Chloride business

Attachments: Lock Closure letter.doc

Lock Closure letter.doc (33 KB...

To: USACE - Chicago District

Enclosed is a letter that I sent to you last month which described the impact of a complete Chicago area lock closure on the Calcium Chloride business of Occidental Chemical. In a meeting held last Friday February 5th, Col. Quarles of the USACE requested further information regarding the impact of partial lock closures.

The peak shipping season for this product occurs during the months of May - August. Closure of the locks for more then a day or two each month (Obrien or Chicago) would create potential supply interruptions for our Chicago area terminal and could result in lost sales for up to a week or two due to limited ability to schedule barge trips around closures. Alternate supply modes during this period would also not be feasible due to lack of adequate transportation assets (railcars, trucks) and prohibitive cost. During the months of September - April, the business could manage scheduling around a one week per month lock closure. If you have additional questions please feel free to contact me.

Regards
Jeff Rhein
OxyChem Supply Chain
Ludington Plant
Ph: 231-845-4396
Fax: 231-845-4312
E-mail: jeffrey_rhein@oxy.com

Parker Sales Co., Inc.
10038 South Ewing Avenue
Chicago IL 60617

773-731-5925 vx -- 773-731-0557 fx
rjh@g-lakes.com

re: Chicago and O' Brien Locks

Good day:

Kindly accept this note as my position on the pending action involving the Chicago and O' Brien Locks.

I strongly feel that in light of current understanding of the invasive carp species (Big-Headed Hypophthalmichthys nobilis; and Silver Carp Hypophthalmichthys molitrix), any action that would alter the operation Chicago-area locks is premature.

The electric barriers in place seem to be effective in preventing the fish from proceeding toward Lake Michigan. With the discovery of E-DNA above the barrier(s), additional concern is understandable. After the December application of Rotenone, a powerful piscicide, failed to reveal any of the carp, some confidence should be indicated.

I am fully aware that the eventual presence of these carp in Lake Michigan is almost certain. They have already been found in Lake Erie. The ability to intercept all the potential fish eggs is as unlikely as thwarting a culturally based release of live fish and errant release of bait fish. Closing the locks on either a permanent or intermittent basis will do nothing to arrest the advance of the carp, it will only cripple commerce.

Too many questions remain regarding the carp's preferred habitat, feeding strategies and temperature/depth tolerance. The use of more physical barriers (eg narrow mesh fencing) will create several maintenance issues involving debris removal and repair. The current approach of electric barriers teamed with exhaustive testing above those barriers for physical evidence of the carp's presence seems a more measured approach. The 'dead zone' use of piscicides leaves little room for carp survival but as with all poisons, must be monitored carefully.

Thank you for your courtesy and attention in this matter.

Robert Hansen
Parker Sales/Chicago

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COL Vincent Quarles, Chicago District Commander
vincent.v.quarles@usace.army.mil
U.S. Army Corps of Engineers Chicago District (CELRC)
111 N. Canal Street (Suite 600)
Chicago, IL 60606-7206,

10 February 2010

Dear Commander Quarles;

If someone made a threat to close off and stop commerce on a major land or waterway artery in this country, most people would say that was a terrorist act in this political climate.

It seems the Asian carp problem hasn't ended the world as we know it below the Chicago area locks which are in the focus of this potential action. Given that fact, risks above the Chicago area locks seem manageable and not as expressed a calamity.

If you are asked what effect such action would have, and it seems to be an open ended action, you could list our firm as one which would be negatively affected. Approximately half to ¾ of our business volume arrives via the waterways from the Mississippi River and the Gulf of Mexico by barge.

Contrast the loss of half or more of our employees jobs against the potential risks of having a non native fish in the ecosystem in the Great Lakes even with the lock closure. I estimate at least 10 families (those of our employees) would be added to the rolls of those unemployed and out of work.

I guess asking for the rule of law is all we who are involved in the critical business and infrastructure of the Chicago IL metro area are asking. If this action is really going to an end game such as a closure, at least it should be adjudicated in the Supreme Court of the USA, before any action is taken.

Regards,
Samuel H. Bell
S H Bell Company
Operating (2) two marine warehouses and logistics sites at
10218 South Avenue O / Chicago IL
12800 South Butler Drive / Chicago IL
644 Alpha Drive
Pittsburgh PA 15238

February 12, 2010

COL Vincent Quarles
Chicago District Commander
vincent.v.quarles@usace.army.mil
U.S. Army Corps of Engineers Chicago District (CELRC)
111 N. Canal Street (Suite 600)
Chicago, IL 60606-7206

Dear Col Quarles:

ELG Metals, Inc. ships stainless steel scrap via the Calumet River and would like to make you aware of the economic impacts that would result from closing the Chicago-area locks (Lockport, O'Brien, and Chicago Harbor Locks).

- Aspects of our business that would no longer be viable if any or all of these locks were closed include the following: shipping metal scrap to a mill at the lowest possible cost per ton.

- Considering that the closing of the locks will be inefficient and put ELG at a competitive disadvantage.

- Our company depends significantly on barge transportation to ship cargos such as stainless steel scrap. If we were required to transport this cargo by other modes such as rail or truck, our transportation costs would increase by two times if by truck and one and one-half times if by rail. Current rate is $24/GT via barge; $48/GT via truck and $36/GT via rail. In addition, traffic congestion on the roads and rails would increase.

- Our facility is located at 103rd Street and the Calumet River at mile marker 331.1 Calumet River. A closure of the Thomas O'Brien located at 134th and the Calumet River and Lockport locks would shut off the route to the Illinois River.

- We would estimate the total dollar value of our cargos which move through the Chicago-area locks to be approximately twenty million dollars. We would estimate the total tonnage of our cargos which move through the Chicago-area locks to be approximately 85,000 tons.

- We sell a large quantity of scrap to a mill located on the Ohio River which demands delivery via barge from four U.S. locations including Chicago. A closure will disrupt our ability to deliver scrap from our Chicago facility which buys a significant amount of scrap from the heavily industrial Midwest.

The U.S. Army Corps of Engineers may use this information to support its efforts to inform members of Congress; other federal and state agencies, the courts, and other interested parties about the importance of continuing barge transportation to and from points above these locks.

Sincerely,

Richard Jones
General Manager

ArcelorMittal USA
Indiana Harbor

ArcelorMittal

11 February 2010

Col. Vincent V. Quarles, USA
Commander, Chicago District, U.S. Army Corps of Engineers
111 North Canal Street
Chicago, IL 60606-7206

Dear Colonel Quarles:

O'Brien and Chicago Locks
Proposed Modified Operations for Asian Carp Control

Thank you for the opportunity to participate in Friday's meeting on this issue of major importance to the economies and environment of the Chicago and Northwest Indiana region, the broader Great Lake region, and to ArcelorMittal. In response to your request for comments, and in light of the economic and social impact from Asian Carp control strategies, ArcelorMittal respectfully requests that the U.S. Army Corps of Engineers does not implement lock closures or restricted operations, but use other control measures.

The evidence clearly illustrates that curtailing lock operations could eliminate hundreds if not thousands of jobs on the Great Lakes (including in the state of Michigan), are ineffective as fish can pass through the locks even when closed, and do not fully consider the disastrous unintended impacts from flooding on people's lives and property if the locks are sealed.

ArcelorMittal has approximately 10,000 employees in the Chicago/NW Indiana region. This alone makes us one of the largest private employers in the region. However, there is an estimated 7/1 ratio of steel-related jobs to direct mill employment, so the mills that ring the southern end of the lake are the economic drivers of the region. These plants bring in raw materials and ship out well over $100,000,000 of finished steel through the O'Brien Lock.

Our Nation's leaders helped to site our mills to take advantage of the efficient water transportation of the vast quantity of raw materials available on the Great Lakes and needed for steelmaking. Integrated steel production starts with iron ore, coke, coal and stone. Virtually all of the iron ore and stone are delivered by Lake vessels, but domestic coke supplies are not adequate to support full production. To enable full production (the pace of operations through the 1st half of 2008) at ArcelorMittal's seven Lake Michigan blast furnaces, we must annually import approximately 750,000 NT or more of blast furnace coke, typically originating in Asia and transferred directly from ocean vessel to barge in the lower Mississippi River. After

transiting the O'Brien Locks, the barges are delivered directly to the point of use, the dockside blast furnaces.

If the O'Brien Lock was closed, this coke would have to be transshipped to rail or truck somewhere downriver, at a terminal that would have to be created. Not only would this additional modal transfer be pure cost addition, but coke is fragile. There is significant degradation in size each time it is handled, and the cost of this degradation would nearly double the cost impact of the transfer. This, in turn, raises the incremental cost of the related tons of steel output and will weigh on our decision-making regarding restarting blast furnaces and where to invest limited capital dollars. Given the direct employment and the multiplier, even a small blast furnace represents 1,000 jobs.

On the outbound side, in a typical year we barge approximately 270,000 NT of steel through the locks. Low-cost barge transportation lets the Lake Michigan mills compete effectively to waterside customers in Texas, Alabama, and elsewhere in the southern U.S. Take away the barge alternative, or add a lot of cost to it, and we will lose much of this business.

It is ironic, given Michigan's stated goal of permanently sealing off the Great Lakes basin from the Mississippi basin, that Michigan jobs would be lost if this occurred. The biggest employers in Michigan's job-starved Upper Peninsula are the iron ore mines and stone quarries whose biggest customers are Lake Michigan blast furnaces. Further, these mills are key suppliers to Michigan's struggling manufacturing sector and cost increases could further retard their recovery.

Once the carp have migrated to the threshold of the locks they have a number of other paths to Lake Michigan, including the Little Calumet and Grand Calumet Rivers, with the latter joining the Little Calumet just below the entrance to the O'Brien Locks. We know that physical carp barriers on the Little and Grand Calumet Rivers are being considered, but we also hope that full consideration is given to any impairment they would pose to water flow in this already drainage-challenged region. (An extreme example was the flooding after the record rains in September 2008 which destroyed hundreds of homes in the region and closed I-94 for a week). Included in that assessment has to be how the barriers will be maintained so they do not clog up over time.

Intermittent closure periods are also unworkable. Long closures induce feast/famine operations at the loading and unloading docks, reduce throughput, increase cost by reducing tug, barge, and dock equipment utilization, and defeat the ability to mesh our steel production schedules with our customers' requirements. A barge that "just misses" the open window would have a long wait for the next window, and Lake Michigan weather or other uncontrollable delays will cause these misses despite the best efforts in scheduling. These homemade restrictions on trade would seriously put U.S. producers at a disadvantage to our competitors who do not face these limitations.

One of ArcelorMittal's core values is sustainability, including our use of resources and our relation to the broader environment. Closing the locks or severely hampering their utility appears to be a poor line of defense for sustainability of the Great Lakes ecosystem. Cutting off the Lake from this portal to the world certainly will have a negative effect on the economic potential of this region.

Respectfully,

Daniel J. Cornillie,
Manager, Marine and Raw Material Logistics
ArcelorMittal USA – Indiana Harbor

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Mr. Peter Y. Bullock
Chicago District
U S Army Corp of Engineers
111 N Canal Street, Ste 600
Chicago, IL 60606

February 12, 2010

Subject: Chicago and O'Brien locks

Dear Mr. Bullock,

I am writing to express our strong interest in any changes in lock service that will impact barge traffic in and out of the Chicago harbor. My company operates a large grain facility in the Calumet Harbor. It is the only operating grain facility in the City of Chicago. This grain facility services farmers and grain elevator operators in Illinois, Wisconsin, Michigan and beyond. Even more important is the vital role this specific facility plays in the performance of the Chicago Board of Trade grain contracts based on its unique ability to act as a link between futures contacts & the physical grain market. It is by multiples the most active grain elevator "regular for delivery" and the Chicago Board of Trade.

The Chicago Board of Trade is the largest futures market in the world and represents the primary pricing mechanism for the world grain markets. The CBOT pricing system is used by U.S. farmers, grain elevators, and domestic & export consumers to hedge price risk. The dependability of the process is created by a system of elevators licensed by the CME as "Regular for Delivery" that creates "convergence" between the prices of physical commodities and futures. The Commodity Futures Trading Commission is well aware of the critical nature of this system and its role in assuring that futures prices reflect the true value of commodity prices for U.S. farmers and consumers. It is the CBOT delivery system that assures reliable market prices free of manipulation. Our Chicago facility and a grain facility in Burns Harbor are the most versatile facilities in the CBOT delivery system and the only facilities that are regular for delivery of all CBOT grain products; corn, beans, wheat and oats. The loss of barge access to these facilities will not just have a devastating impact on the facilities. The loss of barge access will dramatically restrict the ability of the Chicago facility to service grain shippers in surrounding states of Wisconsin, Iowa and as far away as North Dakota and reduce the pricing reliability of the Chicago Board of Trade for all market users.

A few recent examples can demonstrate the special utility of the Chicago facility. In the last 2 months, this facility has received soybeans by barge from as far away as Kentucky and wheat by barge from St.Louis. These barges were shipped to Chicago because there was no other market for this grain. The effective operation of the regular elevators is most critical during the expiration period to assure proper market performance. Our Chicago facility represented 78% of all soybeans tendered for delivery to the CBOT during the January 2010 expiration period.

It might be easy for someone unfamiliar with the CBOT system to undervalue the importance of a single grain elevator in Chicago. However, it is important to recognize that the Chicago facility is not just the most versatile, it is also over 5 times larger than any CBOT corn or bean facility south of the proposed lock closure. The Chicago facility is essentially ground zero for pricing of corn & soybeans for world markets.

We recognize the Asian carp issue is a genuine concern. We are writing today to be sure our situation is understood and to be involved in the dialog to seek solutions. A complete closure of the locks would be devastating to our Chicago facility and our crew. Restrictions on traffic will certainly be less devastating, but it will reduce the flexibility and utility of our facility. Quantifying the impact is difficult, but there was once a large number of grain facilities in Chicago; including 2 owned by the Chicago International Port. Our facility is the only facility still operating. Any restrictions will place a serious burden on our business.

Please contact us if you would like more information about our business and if there is an opportunity to participate in consideration of alternatives to avoid or limit restrictions on barge traffic to Calumet Harbor. We are anxious to participate.

Sincerely,

Thomas P. Coyle

Thomas P. Coyle
Vice President & General Manager

KINDER MORGAN
LIQUIDS TERMINALS LLC

February 12, 2010

Mr. Peter Bullock
Department of the Army
Chicago District, U.S. Army Corps of Engineers
111 North Canal Street
Chicago, Illinois 60606-7206

Dear Mr. Bullock:

The Kinder Morgan Argo Terminal is located at Mile Marker 312 on the east side of the Chicago Sanitary and Ship Canal. The terminal currently stores 1,490,000 bbls of liquid chemical and petroleum products in 61 above ground liquid tanks that are directly accessible from one of the three docks. The terminal receives an average of 300 canal barges each year from 33 different customers. These customers generate over $5.5 million in revenue annually for the terminal. Their throughput supports numerous jobs, both at the terminal and across the customer's entire supply chain. Over the past five years the terminal has handled an average of more than 2,500,000 barrels (105,000,000 gallons) of annual liquid throughput across our docks. Our customers almost always traverse the Lockport Lock to access the Argo terminal. Closing this lock would sever the barge traffic link between the Midwest and the Gulf Coast of the United States and any secondary international destinations. This would have a tremendous impact on the supply chain and overall market storage location of each of our customers. The secondary effect on the transportation market would also be profound. On the back side of the barge movements, more than half of these customers move their considerable barge delivered volumes from the terminal via truck with the remainder via rail car. Each inbound barge equates to between 70 and 80 outbound truck loads.

The Kinder Morgan Chicago Terminal is located at approximately Mile Marker 327 on the Calumet-Sag Channel at Lake Calumet-Port of Chicago. This facility would be similarly impacted by closing the Lockport or O'Brien locks. Between approximately 500,000 and 1,000,000 barrels of petroleum and chemical commodities that are handled at the two docks annually would be eliminated. Supply points between the Gulf Coast and the Midwest would be cut off.

Bottom line - the Chicago bulk liquid transportation and storage market would suffer a major decrement (potentially up to 40%) by lock closures on the CS&SC. Although the Lockport lock has a larger impact, the closure of the O'Brien lock would also impact our business as well. Please contact me at (708) 496-2871 or joshua_etzel@kindermorgan.com if you have any further questions.

Sincerely,
Kinder Morgan Liquids Terminals, LLC

Joshua A. Etzel
Argo Terminal Manager

8500 W. 68th Street Argo, IL 60501 Office: 708-458-1330 Fax: 708-496-2540

SIMS METAL MANAGEMENT

2500 S Paulina Street
Chicago, IL 60608

Telephone 773-254-1200
Facsimile 773-650-6415
info@simsmm.com
www.simsmm.com

February 11, 2010

Sims Metal Management Midwest
2500 S Paulina Street
Chicago, IL 60608

Dear Mr. Bullock:

Sims Metal Management has six locations in the Chicago area that use river transportation thru the Chicago and O'Brien locks to ship material to our customers.

We average 400 barges per year to ship our material to market.

If normal barge traffic were disrupted, we would require alternative methods of transportation to ship our products to market. This would result in a significant increase in truck transportation, resulting in increased greenhouse gas emissions from that truck traffic. It also would place our company at a seriously competitive disadvantage, which could result in lost sales and lost employment for our workers.

It takes approximately 70 trucks to haul what we put into one barge.

We employ a total of 358 people in our six Chicago-area locations.

We also provide employment to those who sell to us and those who deliver material to our Chicago-area facilities as well as those who provide services to keep our operations running.

Local businesses such as ours need competitive, available transportation. To keep business and jobs in this area, we need an uninterrupted supply of barges. Please consider the wide ranging effects a partial or complete lock closure will have on local industry and their employees.

Sincerely,

Lew Ross
President – Central Region

Bullock, Peter Y LRC

From: James Banker, Jr. [jbanker@execsg.com]
Sent: Sunday, February 14, 2010 6:08 AM
To: Bullock, Peter Y LRC
Cc: Peter Laman
Subject: Locks, carp, and business

Attachments: image001.gif; image002.gif; image003.gif


image001.gif (2 KB)

image002.gif (6 KB)

image003.gif (34 KB)

Dear Mr. Bullock,

My company uses the locks and waterways to ship out to the Mississippi. My customers do the same. Any action that closes or restricts the locks to our traffic will harm our competitiveness at a time we cannot afford it. I don't know what real threat the Asian carp plays to our world, but I see the devastating effect of lost jobs and shuttered businesses every day and ask that you take a real world view in your study and favor working people and business over emotional environmental arguments.

Thanks you,

Jim Banker

Acting President, Beta Steel

Portage, IN

Beta Steel Corp

James M. Banker Jr.
Executive Vice President, Commercial
Corporate Services Group
15 Roemer Blvd
Farrell, PA 16121

ph: (724)983-6464 x1080
fx: (724)308-4098
cell: (513)235-9699

Duferco Farrell Corp

Sharon Coating, LLC

It is not the strong but the responsive that survive

1

February 12, 2010

Colonel Vincent V. Quarles
Commander, Chicago District
111 North Canal Street, Suite 600
Chicago, Il 60606

Dear Colonel Vincent Quarles,

I am writing on behalf of NuStar Energy to express serious concern over plans currently under consideration by the Army Corps of Engineers to close several waterways in the Chicago area.

NuStar Energy is a Master Limited Partnership based in San Antonio, Texas that specializes in providing transportation, storage, and complete logistical solutions for petroleum based products. The company owns 8,417 miles of crude oil and refined product pipelines; 86 terminal facilities that store and distribute crude oil, refined products and specialty liquids with over 91 million barrels of storage capacity; and two asphalt refineries with a combined throughput capacity of 104,000 barrels per day. The company owns and operates a 722,000 barrel capacity terminal in Blue Island, IL that relies heavily on the Lockport Lock for the movement of products to and from the terminal.

Having waterborne access to the Blue Island terminal is critical to the survivability of the facility. Nearly half of the business conducted at the facility relies on import and export shipments via the Lockport Lock. Plans by the Army Corps of Engineers to shutter the lock puts as much as $1.8 million of business per year in jeopardy, which could likely make the facility uneconomical to operate and puts good quality jobs at risk.

The inability for NuStar to utilize its dock would require the increased usage of rail and trucks to move the products that are stored at the Blue Island facility. Significant infrastructure improvements would be required to accommodate NuStar's the need for over 120 railcars, or 420 trucks, to move product to and from the facility. Transporting product utilizing marine vessels is far more logistically efficient and environmentally friendly than using trucks and railcars.

So, we urge you to delay plans for any lock closures until the Army Corps of Engineers can properly assess the economic impact that could be realized should the locks in the Chicago area, including the Lockport Lock, be closed. Please contact me at (316) 721-7052 with any questions you may have about NuStar and our concerns related to the closure of the Lockport Lock. Thank you for your consideration of this very important issue.

Sincerely,

Gerald R Koegelboehn

Gary Koegeboehn

7340 West 21st St. N., Suite 200 • Wichita, Kansas 67205 • (316) 773-9000

Bullock, Peter Y LRC

From: Simons, Sharon [sharonsimons@ozinga.com]
Sent: Monday, February 15, 2010 4:08 PM
To: Bullock, Peter Y LRC
Subject: Chicago and O'Brien Locks

February 15, 2010

Via E-mail

Mr. Peter Bullock

U.S. Army Corps of Engineers

111 N. Canal Street

Suite 600

Chicago, IL 60606

<mailto:peter.y.bullock@usace.army.mil> peter.y.bullock@usace.army.mil <mailto:peter.y.bullock@usace.army.mil>

Dear Mr. Bullock:

As owners of Ozinga Ready Mix Concrete, Inc., we write to solicit your assistance in stopping government agencies from implementing any program of scheduled lock closures on the Chicago Area Waterway System as part of the legitimate fight against Asian Carp migrating to the Great Lakes. Such lock closures would bankrupt our Corporation, proximately causing the loss of hundreds of highly paid jobs as well as millions of dollars in federal, state and local annual tax revenues without guaranteeing that Asian Carp will not reach the Great Lakes.

Ozinga, Inc. is an 80-year-old family concrete business that has grown to become one of the largest privately held ready mix companies in the nation, employing hundreds of Illinois citizens with highly desired, highly paid, union jobs, all dependent on unimpeded access to the Chicago Area Waterway System.

Concrete is one of Chicagoland's most basic construction materials because it can be cast in almost any shape and once hardened can become a structural, load-bearing element. Chicago is a world class city built with concrete as part of its bridges, roads, and highways, sports venues, high rises, hospitals and universities. And Ozinga concrete is a workable, durable and economical material consisting of sand and gravel, cement and water.

But the millions of cubic yards of concrete mixed, shipped and placed throughout Chicagoland require that mountains of sand, gravel and cement be brought to production plants in the heart of populated centers because the relatively short plastic state of freshly mixed concrete requires that our red-and-white striped mixing trucks reach any job site, in any neighborhood, within 60 to 90 minutes.

If we depended on dump trucks and diesel haulers to move the mountains of sand, gravel and cement to our production plants, we conservatively estimate that 100,000 heavy truck loads a year--almost 400 big trucks a work day--would lumber down local streets burning fuel, impacting the environment with exhaust, creating wear and tear on our infrastructure, clogging traffic and contributing to road hazards.

Instead, Ozinga Ready Mix has made a substantial financial investment to plan for an environmentally friendly future by locating our concrete plants on the Chicago Area Waterway System so that barges--instead of trucks--can supply us with sand, gravel and cement. Just one barge can handle the load of 60 trucks or 40 rail cars. However, unlike trucks and trains that stop and clog city traffic, barges pass quietly beneath Chicagoland bridges and overpasses.

Moreover, our business decision is vindicated by studies showing that barges move a ton of cargo 576 miles with a single gallon of fuel while trains get 413 and trucks 155 "ton-miles per gallon." These same studies show that after adjusting for the differences in quantity of cargo moved by each mode, for each person injured in a barge accident, 125 are injured in rail accidents and 2,171 are injured in truck accidents. For every death from a barge incident, 155 people die in truck accidents and 22 from trains. (See, "A Modal Comparison of Freight Transportation Effects on the General Public," Texas Transportation Institute, Center for Ports and Waterways, November 2007, http://www.nationalwaterwaysfoundation.org <http://www.nationalwaterwaysfoundation.org/>).

Therefore, we now have a deep water port on Lake Calumet with several river terminals. One Ozinga Ready Mix Concrete plant serves the north side of the city on the north branch of the Chicago River at Armitage Street and the Kennedy Expressway; another is located on the south branch of the Chicago River at Cermak Road and the Dan Ryan. We have similar plants on the waterways served by barges in Joliet, Lemont and Alsip, with expensive, 40-year leases from the Metropolitan Water Reclamation District. Most recently we have begun mining operations on the Illinois River near Henry--following a substantial financial investment--to load sand on barges for our Chicagoland plants. As a good corporate citizen, we have mortgaged our future, betting on the Chicago Area Waterway System to serve the concrete requirements of Chicagoland in the safest and cleanest way possible.

And because concrete plants with small footprints are required in populated centers like Chicago, materials cannot be adequately stockpiled to last during periods of intermittent lock closures. The daily production requirements of concrete in a metropolis like Chicago are unrelenting and entirely dependent on regular "show and go" river barge traffic arriving daily, with choreographed docking, unloading and departures of barges carrying sand, gravel, or cement. Intermittent lock operations would destroy Ozinga Ready Mix Concrete, Inc.

But if these lock closures would kill concrete, they would not kill carp. Locks are not designed to be water tight fish barriers and intermittent closures would not be nearly as effective as a combination of all the other options that have already worked and do not involve lock closures. Moreover, we have also read the scientific studies showing some evidence that bighead carp already exist in the Great Lakes having been collected in 1995, 2000, 2002, and 2003 in Lake Erie. We can see on a map the unimpeded natural rivers and creeks draining into Lake Michigan from below the locks, even when closed. We know from experience how periodic flooding in Chicago gives fish another avenue into the Lake.

In conclusion, Ozinga Ready Mix Concrete, Inc. supports the efforts to ensure that the migration of Asian carp is monitored and proactively addressed by government agencies. All we ask is that the government gives great weight and consideration to the certain, irreparable harm caused to major businesses like Ozinga's when locks are closed on the Chicago Area Waterway System when there is no countervailing certainty that such closures will guarantee that Asian Carp do not migrate into Lake Michigan.

Sincerely yours,

Marty Ozinga IV

Executive Vice President

Chicago Division

Ozinga Ready Mix Concrete, Inc.

Aaron Ozinga

President

Ozinga Materials

PAMELA MILLAS
3924 N. GRANT
WESTMONT, IL 60559

February 10, 2010

Army Corp of Engineers
Colonel Vince Quarles

Dear Colonel Quarles,

I am an employee with Kindra Lake Towing, LP which operates between the O'Brien lock and Lake Michigan on the Calumet River. I have been with Kindra Lake Towing since 1994. I am their bookkeeper and have enjoyed the barge business.

My biggest fear is that even with a modified lock operations this will cause business to dwindle to nothing and the effect will be the locks will be closed completely. If this should happen, I will no longer have a job.

As a single mom who is over age 55, this would be devastating. I enjoy what I do, I support my family, I pay taxes and I vote. I do not want to be one of the millions of American who are out of work.

I firmly believe it is the responsibility of the government agencies and the businesses involved to reach a solution that will protect the many great paying jobs in the marine transportation industry.

Respectfully,

Pamela Millas

February 9, 2010

To Whom It May Concern,
This message is for the Committee that is in charge of the decision to close the Chicago locks. I am asking special attention to this by Governor Quinn and the Army Corps of Engineers. I would you to take into consideration that by closing the locks it will hurt all of our family's income, including mine. My boats go through the Lock every day, all day. My feelings are, that you should find a way to go under water and try to exterminate this Asian Carp. I am guessing there are other solutions. I want you to come up with a way for everyone to unite, find a solution. Find a better solution to resolve this instead of closing our locks. We need them to open for us. Please do not close the locks. I know there is a better intelligent answer to this chaos, since our intelligence is way better than a fish. I need my job and so does my family.
Thank you.

Camillo Navarro P
7527 Jefferson Ave
Hammond, IN 46324

Bullock, Peter Y LRC

From: Jason Garvett [jason.garvett@gmail.com]
Sent: Wednesday, February 10, 2010 11:16 AM
To: PAO LRC
Subject: c/o Ms. Lynn Wayland, Public Affairs Officer

February 10, 2009

Colonel Vincent V. Quarels

US Army Corps of Engineers

111 N. Canal St.

Chicago, IL 60606-7206

Dear Colonel Quarels,

My name is Jason Garvett, and I attended the public meeting on Friday, February 5, 2010 at the Holiday Inn Mart Plaza. I have worked for Mercury Cruiselines for 5 years now. I want you to know that I oppose any temporary or permanent closure of the Chicago Lock and the T.J. O'Brian Lock. I could go into how tourism will be affected and I will loose hours, and not be able to support my family. However I know you have received hundreds of letters stating this. I want to point out another issue with closing the lock.

Over the past 5 years I have given educational tours to thousands of children who ride aboard our boats. I truly believe that 90% of the major problems we face in this world could be solved if we had properly educated that generation when they were younger. I know as a father you highly value the education of your two children, as I value my sons education.

By shutting down the Chicago Lock, you will be depriving a whole generation the experience of Lake Michigan. With my girlfriend and my mother in the teaching profession, I know the limited budget that schools have. Closing the Chicago Lock will force the teachers to make a decision on either a River or Lake Tour, not both. By depriving a generation of kids from lake Michigan, when they grow older and become Captains, Senators, and work for the U.S. Army Corps of Engineers my fear is that they won't care as much about Lake Michigan as we do today, because they will have had no personal connection of it as a child. Because of the Chicago Lock we are able to have children experience both bodies of water.

From one father to another, I ask you to look out all alternative measures to keep the carp out of Lake Michigan before shutting down the lock, and depriving our future generations the experience of our lake.

Sincerely,

--
Jason Garvett
5445 N Sheridan Rd Unit 2701
Chicago, IL 60640
617-943-0408

February 9, 2010

To Whom It May Concern,

Can we build numerous Dam's or Locks going down bound? Build it where the river is not so wide. In the new locks, implement some sort of net or other means to avoid fish crossing into uncontaminated waters?

Or, since Chicago River is in the City, just use it as a one way only to exit to the Lake? South Calumet looks to be used as an entrance.

Is there a predator for the Asian Carp?
If there is, can it be brought to help get rid of the Asian Carp? We are trying to use poison or other means that seems useless.

Biologically speaking, can we make the Asian Carp be sterile? No Reproduction?

Can you infect it witha bacteria that only attacks their gills on Asian Carp?

I work on this River and will not be working if you change the lock opening schedule.

Jose Sandoval

2323 W Pershing

Chicago, IL 60609

February 9, 2010

United States Army Corps of Engineers,

I was born and raised in Detroit, Michigan and when the jobs were scarce, I moved to Chicago. Now after a few years on these boats, you want to close the locks which will make me suffer loss of hours, loss of wages per hour and then loss of my job due to your uninformed decision. There is some other way down South.
Maybe you should listen to the people here for a change and find a better solution before you kill an entire industry that has over 75 years of history in Chicago.
Questions for the USACE:
1. Why isn't your first line of defense at the Lockport lock or where the fish are?
2. Are you rushing this and bypassing procedure so you won't lose your funding?
3. Why don't you use a better DNA test to really see where the fish are at?
4. Why don't you look at other ways of fixing this without us losing our jobs?
5. Can we get a guarantee if you do this that you will employ our boats and boat crews instead of other contractors from other areas?

James T. Crowther

First Engineer

3229 W McLean

Apt 2

Chicago, IL 60647

February 9, 2010

Person in Charge,

Summer is approaching. Why did you wait for the season of summer jobs? Why did you let this go so long? You should of built a gate south last year. Now many people are going to be out of jobs. My work consists of just making most of income out of the summer. I know a lot of my co workers are depending on locks and rivers to make ends meet. They are Captains and boat men. They will all go hungry and so will our family.

Sincerely,

Hector Berrios

2225 N 73rd Ave

Elmwood Park, IL

February 9, 2010

To Whom It May Concern,

I have been working on the Chicago River for 7 years and now am at the ripe age of 21. I am now a Captain on Chicago's First Lady Cruise line Vessels and I love my job. This kneejerk response to closing the Chicago Locks based on little or in some cases no scientific proven fact is not only alarming but crushing for myself and the younger generation of upcoming mariners. The temporary closing of the locks forces me to search for another job away from the city I love and is devastating for my family, since I can no longer afford to support them through these tough economic times where unemployment is rampant within my family. I am now victim to this situation.

There must be another way to first study and base these decisions on scientific fact. Is this impossible to comprehend? If you close this Lock I will lose my job.

Gabriel Argumendo

Chicago's First lady Cruises

1 847 358 1330

Stafford Crossland

3114 Taunton

Elgin IL. 60124

Ph. 847. 531.5433

Fax 847.531.5433

Dear Ms. Whelan,

First I am against invasive species of all kinds in the Great Lakes. I grew up in Colorado. We in the west love the land, and water. I grew up out doors. I began skiing at 9 years old and my Mom taught me to sail the next summer.

The proposal to close the locks however makes no sense. This is an act first think later reaction.

I currently work on the river for Chicago's First Lady Cruises. We give architectural tours in conjunction with "The Chicago Architectural Foundation". I give three 90 Minutes tours a day. My boat holds 149 passengers, thus I carry 447 passengers in a day. We have three boats which are giving these tours, with this same kind of capacity. Thus we carry just short of 10,000 passengers a week.

These tours are educational as well as entertainment for tourists. We are covering the history and architecture of the city of Chicago as seen from the river. This is a perspective that many people do not get to see.

The boat I work on has a crew of four including myself as captain; some of these people are college students, or young people just out of college. This is a great way to explore a maritime career.

If the Locks or the river is closed for what ever reason, and my employer is unable to fill the boats, due to the schedule, or fear that we may not be operating. I will have my hours reduced or my job might be eliminated.

There is a whole other side of the business which is evening charters. This allows businesses and families to host social events and activities. Most of these charters however require navigating on both the river and the lake, this necessitates a

trip th ru the locks which many passengers find interesting. Many of these trips are being scheduled at this time of the year, and so have a long lead time. Uncertainty in this area may cause potential customers to think in entirely different areas and locations for their outings.

This once again causes the company I work for to reduce my hours or eliminate me, or and my crew all together. This is the way I make my livelihood. If I do not have a job, I can not pay my bills, including housing, only increasing the problems in housing.

If the locks become the only answer, I can understand, and will help, but as I said earlier, this seems like we are acting first and thinking later

Sincerely,

Captain Stafford Crossland

Bullock, Peter Y LRC

From: superengineer1@aol.com
Sent: Tuesday, February 09, 2010 1:28 PM
To: PAO LRC; captmcm@yahoo.com
Subject: chicago harbor lock closure

I WOULD LIKE TO FIRST SAY THAT I'AM AGAINST THE MODIFICATION / CLOSURE OF THE CHICAGO HARBOR LOCK. IT WILL AFFECT BUSINESSESS WHICH IN TURN WILL PUT ALOT OF PEOPLE OUT OF WORK. IT WILL ALSO AFFECT THE REVENUE THAT THE CITY OF CHICAGO IS RECIEVING IN THE MEANS OF TAXES AND TOURISM.
IF AND I MEAN IF THIS IS TO GO THROUGH WHAT ARE YOU'LL PREPARED TO DO TO ENSURE NO ONE IS PUT OUT OF WORK, LOSE THEIR HOUSE, NOT BEING ABLE TO FEED THEIR FAMILIES ?
THESE ARE PEOPLES LIVES / CAREERS THAT ARE BEING PLAYED WITH AND IT ISNT FAIR TO THE BUSINESS OWNERS, EMPLOYEES AND OUR FAMILIES. I REALLY THINK THAT THIS MODIFICATION/CLOSURE OF THE LOCK SHOULD BE RE-EXPLORED AND RECONSIDERED.

THANK YOU
CHIEF ENGINEER
MARCUS DAVIS
WENDELLA BOATS

February 10 2010

Dear USACE,

My name Is Artimio Romero, I clean the Skyline Queen, skyline Princess, Chicago's First Lady, Chicago's Little Lady, and Chicago's Fair Lady. I also work security for the company. My main concern is for my family. If you close the Lock too much it will affect my family. My wife and children depend on me to survive. Please help. I cannot afford to lose my employment.

Thank you,

Artemio Romero

2615 w Estes

Chicago,Ill, 60645

773 992 7365

February 9, 2010

Commanding Officer, USACE Chicago District

I, Alvin Mahus, have been employed by Mercury Yacht Charters for almost 40 years and I am concerned for my employment because of closing of the Chicago River Controlling Locks. As employment is very bad now, this situation makes it much worse for a 74 year old man like me. I have seen this company meet many challenges but this one will put them out of business for sure. Find another way.

Sincerely,

Alvin Mahus

4105 N Kedvale Ave

Chicago, IL 60641

Bullock, Peter Y LRC

From: Jeff Lyons [jefflyons407@yahoo.com]
Sent: Thursday, February 11, 2010 2:32 PM
To: PAO LRC
Cc: jenniferperry25@gmail.com
Subject: Asain carp problem

To whom it may concern,
As a professional mariner i would like to express my concerns r/e the closing of the Chicago and O'brian lock chambers.
First and foremost i implore you to consider the economic impact that closing the above mentioned locks would create.
As unemployment is at an all time high,this is absolutley unacceptable.
You as a government agency are secure in your careers,with top notch job security assurance.(pension,benifits,ect.) Now lets consider the little guy in your kneejerk bandaid remedy to this issue.
The out of work mariners who will add to the unemployment statistics,and no doubt will become a burden on the allready out of control unemployment statistics.
The farmer who no longer has a affordable means of transpotring their goods to the buyers.
The fuel and support groups who will see a dramatic decrease in their sales,more unemployment,and on and on and on.
As a goverment agency i'm sure that you can remedy this situation,by other means.
This is a foolish and poorly planned remedy.
I prefer to end my messages with the phrase...(with all due respect),however i cannot end this message with that courtesy
Captain Jeffrey Lyons

From: Jacque Kindra [jacquekindra@kindralake.com]
Sent: Tuesday, February 09, 2010 3:16 PM
To: PAO LRC
Subject: Chicago and O'Brien Lock

Dear Colonel Quarles:

Subject: Chicago and O'Brien Lock Closure

I am an owner of Kindra Lake Towing, and we have been in business since 1983. We are a family owned and operated tug boat and barge business employing 30 people and we service 3,000 barges annually that arrive at our facility on the Calumet River in South Chicago through the O'Brien Lock.

I was in attendance at the Asian Carp meeting in Chicago on February 5 at the Holiday Inn Merchandise Mart. As you requested, below are my comments regarding the Modified Lock Operation.

First I am relieved to see that the permanent lock closure appears to be off the table. A permanent lock closure would put my company and all of my employees out of work immediately.

Although closing the locks for a couple of days each week would be a costly operation for all involved, I believe we could make it work if this was our only alternative. The "bunching" of barges that would be created at both sides of the lock would be a difficult logistics situation. It would put all of our boats and crews working 24/7 during the time that the locks are open, but when the locks are closed most of crew and equipment would be idle. This type of operation is more expensive than how we currently operate. There is one important question out there that has not been answered, and that is the time line for this Modified Lock Closure? Also I do not feel I have a complete understanding of what the goals of closing the locks are, and what will happen during the closure? What other actions will be taken to impede the carp migration, and will this continue to be done in conjunction with the lock closure?

I am a small business owner and by definition we are problem solvers. Any type of lock closure is a reaction to Michigan's law suit and not a solution to the possible migration of the asian carp. We should not be willing to destroy commerce and jobs in Chicago and northwest Indiana in order to save the fishing and tourism jobs in Michigan. Every job in every industry is valuable, and the goal should be to save them all.

In order to really impede the migration of this invasive species, all agencies, governments, and industries should be working together on a real solution. We cannot afford to get this wrong, because if we do not develop a rational solution to this migration AND save commerce, we will end up with drastic job lose and the Asian Carp in Lake Michigan.

Respectfully,
Jacqueline Kindra
Kindra Lake Towing

9/Feb/2010

Colonel Quarrels

Sir, I am writing to you asking for mercy. I have been employed by Mercury Sightseeing boats for twenty two years this year. as a deck hand, first mate, Captain, mechanic and fellow Engineer, I have observed the rise and fall of the lock water levels as we passed through them thousands of times. I was raised on the boats that rely on the Chicago Controlling Lock for survival.

I've helped build them, tend to their pains and ensure that they are staffed with the finest Marine crew in Chicago. The USCG can speak for the value of our beloved craft. We have a mutual respect. We watch the waterways for suspicious activity, patrol the waters that the police cannot and pull the drowning people out of the water when no one else can. We perform these duties as we make our way through the Chicago lock, our vessels full of tourists that come to see the finest skyline around. A skyline that will be unavailable to my vessels should this plan endure.

A few weeks ago my employer made me aware of what was going on with the Efficacy plan. This week I had to break the news to my crew that they may need to write letters begging to keep their jobs. The past few years have caused us all to tighten our belts to the point of breaking. We made it through this poor economy, September 11 terrorist attacks and loss of business as a result of the wide spread fear of transportation hubs. We took no pay increases, took longer layoffs, cut our hours and took part time jobs on the side. If the Lock is not open our ships will be land locked.

I am writing you sir to ask that the Chicago Lock is operated in a manner that is sympathetic to the vessels that transport our precious cargo. We rely on the lock to open all day long, several times a day. This seasonal business cannot endure the possibilities suggested in the matrix you displayed at the meeting last week. The short amount of time we have to operate barely provides the funds needed to keep our workers busy all winter long. My men are not capable of losing any more than they already have during this economy. We have seen cuts for the past two years. Sir, please consider looking at the potential for closing the waterway at Lemont. Build a new intermodal facility to transport vessels and cargo over an engineered sea wall South of RM305. This project could create jobs rather than take them away. I thing all of our goals can be satisfied. You did say that you like to build things. Let's do it and stop this fish.

Captain Mike McElroy

Mercury Yacht Charters

Chief Engineer/ Director of Vessel Operations

captmcm@yahoo.com

312 907 5891

February 9, 2010

To Whom It May Concern,

Since the DNA of the Asian Carp was found on the river, where is it located now? Can it be contained by building a lock? Can the Lock gate be down further on the river? Why wait until April and why not take action now? Build one. If you can't do this, I do not have another place to work. It is hard to find a job now.

Luis Robles

Mercury Sightseeing Boats

4705 S Hickory Ave.

Hammond, IN 46327

-----Original Message-----
From: Daytrader7@aol.com [mailto:Daytrader7@aol.com]
Sent: Monday, February 15, 2010 5:41 PM
To: Quarles, Vincent V COL LRC
Subject: Chicago Lock & River Closures

Colonial Quarles,

I hope that the Army Corps of Engineers will recommend other less invasive but more effective tools that can be used to kill and stop Asian carp migrations. Closing the Chicago Lock, the second busiest in the nation and the Chicago River would not accomplish those goals as stated by Officials in regards to the Supreme Court Law Suit. What I cannot figure out is why we can't just get a fleet of fishing boats and over fish them all in a week. They are currently confined in a river that is not that wide. On the Deadliest Catch they can find crab at the bottom of the bering sea in the middle of winter at night why can't we find these 50 pound carp in a river during daylight hours and kill them.

Thanks for your time.

Gregg Pupecki

U.S.C.G. Lic. Captain & Concerned Citizen

312-205-4051

1

Kindra Lake Towing, LP

9864 Avenue N

Chicago, IL 60617

773-721-1180

February 10, 2010

U S Army Corp of Engineers

Chicago District

Public Affairs Office

Dear Colonel Quarles :

Kindra Lake Towing is a small family company with 30 employees. We are most concerned with this "tool" of Modified Lock Operations for O'Brien lock. We believe that this tool should be the tool of last resort.

In response to your request to comment on the Modified Lock Operations proposal, I am making the assumption that my customers, the barge transportation companies, will continue to bring their barges above O'Brien Lock to deliver and pick up cargoes. If the barge companies do not continue as a result of all the adverse consequences that will occur, the impact will be much greater than I describe below.

The consideration of Modified Lock Operations at O'Brien Lock will have adverse consequences on my tugboat operations located on the Calumet River. As you advised, the worst case scenario may be that the lock is closed for 4 consecutive days every week beginning April 1. With this scenario, we expect the following:

Bunching of Barges:

We expect barges to be bunched up on each side of the lock waiting for it to reopen. On the Lake side, normally there is plenty of nearby fleeting. On the river side, nearby fleeting/mooring does not exist making the staging of barges more difficult and will add to congestion. This will result in higher operating costs as boats wait to drop their downbound tow and pick up their upbound tows for the Calumet River. The annual movement of pleasure craft to and from Lake Michigan from downriver marinas will only add to the congestion and exacerbate the entire situation. Loss productivity will result in higher costs. We expect a loss of productivity.

Sporadic inclement weather on Lake Michigan will prevent the movement of barges to and from the docks in northwest

Indiana. This will cause the barges to stack up on the Calumet River until the weather improves and the waves diminish so that the barges can move again across the Lake. Not only will longer transit times occur for the receiving companies, but the concentration of barges above O'Brien Lock has been so great that congestion and reduced channel widths for the lake freighter ships has occurred.

Hours of Operation to Increase but the Number of Barges to remain the Same:

Our normal daytime operations of 0600 to 1700 hours will not be enough time to move the slug of barges that will arrive every 4 days. There will be an urgency to get the barges moved in and out of the docks so that they will not miss the next lock opening. If the lock opening is missed, the barges will have to wait another 4 days.

Once the lock closes for the 4 day period, I expect the number of crews working will be much less. This type of operations of high peaks and low valleys is a costly way to operate. We will experience overtime wages and costs for additional crews to accommodate this "boom bust" type of operation—all the while, the same number of barges will be arriving and departing.

Safety Issues:

The high concentration of barges and pleasure crafts both plying the same river to go to the same lock causes me concerns for the safety of the pleasure craft operators. Many of these pleasure craft owners and operators do not know the navigational rules of the road especially with towboats and barges. They do not know how long it takes a tow to stop, how empty barges can become big sails and get windbound and blown sideways and finally, how far to stay away from the back of the towboat to avoid the wheel wash turbulence.

Kindra Lake Towing is most concerned with the duration of this type of Modified Lock Operations and that these limited operations could very easily lead to a complete lock closure.

The Modified Lock Operations should be coupled with an action that will kill the Asian carps and bring the reduced locking operations to an end. Just shutting the locks 4 days a week will not win the battle. I want the battle to be fought to win-to kill the carp and not to impede them. I want total eradication of these species so that commerce and jobs in the barge transportation industry can prevail.

We believe that the "tool" of Modified Lock Operations should be the tool of last resort.

Respectfully

John R. Kindra

-----Original Message-----
From: Kowal.Kathleen@epamail.epa.gov [mailto:Kowal.Kathleen@epamail.epa.gov]
Sent: Wednesday, February 17, 2010 9:59 AM
To: Davis, Susanne J LRC
Subject: Request for Scoping Comments -Chicago and O'Brien lock modification

Sue,
We do not have any scoping comments to offer on your 2/5/10 request.
Thanks,
Kathy

Kathleen R. Kowal
Life Scientist
NEPA Implementation Section
Office of Science, Ecosystems & Communities U.S. Environmental Protection Agency
77 West Jackson Blvd.
Mailcode: E-19J
Chicago, IL 60604-3590
312/353-5206
312/385-5523 (FAX)

From: Don Campbell [dcampbell@kindralake.com]
Sent: Monday, February 08, 2010 1:34 PM
To: PAO LRC
Subject: Asian Carp proposed Lock Closure

Dear Colonel Quarles,

I am writing to express my deep concern in regard to the proposed modified lock closure and the affect it will have on business in the Chicago area as well as Indiana and the other states bordering Lake Michigan. The companies that rely on barge transportation to move the freight necessary to operate their perspective businesses will be adversely affected. I have been employed in the barge transportation business for the past 16 years as the General Manager of Kindra Lake Towing, LP. Prior to my employment with Kindra Lake Towing I worked as a terminal manager for Lafarge Corporation for 15 years. Both of these companies rely on barge transportation to operate and provide or receive freight at a competitive rate, therefore passing those savings on to the end users.

In addition all of the companies on the river, Burns Harbor, Gary and Indiana Harbor that count on barges coming into the Chicago area provide jobs. I find it irresponsible to even discuss an option in this current economic climate that would possibly put many people out of work. I strongly disagree with the idea that a modified lock closure is the answer to this problem. If allowed to carry through this drastic plan it will undoubtedly eliminate many jobs immediately.

In regard to the State of Michigan's Renewed Motion for Preliminary Injunction to completely close the Chicago and O'Brian Locks, my greatest concern is that a modified lock operation is just a stepping stone to a full closure. This is a trust issue, and in light of the devastating ramifications I find it hard to trust that level heads will prevail and not a knee jerk reaction to a perceived problem.

Kindra Lake Towing is a small family owned business. I would like you to consider how this ridiculous "solution" will affect just this one small business:

Number of employees out of work	30
Number of barges we moved into the Chicago Area in 2009	3000
Percent of Kindra Lake Towing Business affected	70%

NOW MULTILPY THE AFFECTS BY THE NUMBER OF SIMILAR AND LARGE BUSINESSES. The numbers will be staggering.

This solution has obviously not been thought through completely, consider:

1. Loss of jobs (completely opposite of President Obama's plan to put people to work)
2. Higher costs

3. More trucks on the roads which equates to more pollution issues, traffic issues and fuel consumption. From an environmental standpoint consider these facts: Tons of Co2 per million tonmiles – Trucks 71.6 vs Barges 19.3

In closing I am asking you to not support any lock closure modified or other. It is my understanding that the modified lock closure suggestions are being made based on theory or speculation that Asian Carp may be above the electrical barrier, and not on scientific fact. The negative affects of closing the locks in any manner are facts.

Respectfully,

Donald A. Campbell

430 Edith Court

Crown Point, IN 46307

-----Original Message-----
From: Wagner Richard [mailto:WagnerRW@koppers.com]
Sent: Thursday, February 11, 2010 10:41 AM
To: PAO LRC
Subject: Chicago and O'Brien Locks

Dear Colonel Quarles:

Re: Chicago and O'Brien Locks

My name is Richard Wagner and I am the plant manager of a chemical facility operated by Koppers, Inc. We are located on the Chicago Sanitary and Ship Canal, mile marker 316 located in Stickney, IL. Our corporation and the life of this plant is dependent upon materials shipped on the Illinois Waterways. We also receive material by rail and ground transportation but material receipts by barge make the plant viable and allows it to thrive at its current location. We expect to transport approximately 110,000 tons of various liquid phase commodities during the 2010 fiscal year on the CSSC and the Illinois Waterways. This material is comprised of 64 separate barge shipments using the Illinois Waterway System. This material is generally classified as feed stock to be processed into our finished products. On-time delivery is critical to the production and viability of our plant. Partial closure of the lock systems will seriously jeopardize continued and efficient operations.

Koppers' Stickney facility provides 120 permanent jobs to the surrounding community with an additional 15 to 20 daily contract positions. There is approximately $35,000,000 dollars pumped into the local economy though payroll, operating supplies, taxes and fees needed to operate the plant. The plant pays over $300,000 in property taxes, $660,000 in water bills to the Village of Stickney, $6,000,000 in natural gas, and $6,200,000 in electricity bills yearly. We continue to invest in our facility with well over $3,000,000 in capital improvements each year.

Continued efficient operation of the Chicago Sanitary and Ship Canal is vital to the viability of Koppers' facility and the local community. Closure of the lock system could potentially result in closure of our Stickney plant. If a Modified Lock closure is the only answer, it must be thoroughly thought through and implemented slowly with ample time for industry to react to the changes.

Sincerely,

Richard W. Wagner

Plant Manager - Stickney

Koppers, Inc.

3900 S. Laramie Ave.

Cicero, IL 60804

708-222-3483

wagnerrw@koppers.com

Classification: UNCLASSIFIED
Caveats: NONE

BLESSEY
Marine Services, Inc.

P.O. Box 23734 • Harahan, Louisiana 70183 Phone (504) 734-1156 • Fax (504) 734-1195

February 12, 2010

COL Vincent Quarles
Chicago District Commander
U.S.Army Corps of Engineers Chicago District (CELRC)
111 N. Canal Street, Ste. 600
Chicago, IL 60606-7206

Dear COL Quarles,

Blessey Marine Services is a tow boat and barge company with over six hundred employees and nearly two hundred vessels. We proudly transport hundreds of thousands of barrels of asphalt and slurry oil per month to over seven facilities in approximately ten cities in the State of Illinois. We thank you for the opportunity to comment on the Corps' proposed modified lock operations for the Chicago and O'Brien Locks.

As of today's date, the consequences of your proposed lock closure for 3-4 days per week will put us at a significant risk of a revenue **loss near seven million dollars ($7,000,000.00)** per year. The proposed closure and corresponding financial impact to our business could result in a loss of jobs for our employees and liquidation of equipment due to the fact that these vessels are specifically designed to transit the Chicago area.

Our company, employees and entire industry believe in the protection and preservation of the environment. Quite simply, we depend on a thriving ecological and waterway system for our business! Nonetheless, this protection and preservation requires a symbiotic balance with society and commerce. In order to achieve this balance, we simply ask that decisions be made on sound scientific date, not emotion. Unfortunately, this issue has become more of a political and legal drama as opposed to one based upon facts and science.

The current "science" cited in support of closure concerning the presence of eDNA remains unproven, incredible and inaccurate. While the objective facts are:

1. All the data shows that **closing the locks is not an absolute deterrent for the Asian Carp movement**
2. The December 2009 planned Rotenone "Fish Kill" resulted in only 1 Asian Carp being killed of 30,000 fish.
3. The most recent commercial netting exercise which caught 1,000 fish revealed the presence of **zero** Asian Carp.

Thus, it is clear to see that the proposed closure seems to constitute a knee-jerk reaction to a phantom punch.

Despite the absence of objective data substantiating this threat, the course of action proposed contravenes the nature and purpose of the lock system all the while still failing to prevent the perceived potential problem. The function of a lock does not parallel that of a damn. The concept of closing the locks for any period of time does not address the issue nor offers a viable solution to the problem. What's more, the proposed lock closure will **not** prevent the perceived problem from occurring. In short, closing the locks, whether intermittently or completely, does not strike a balance between economic and environmental concerns. Instead, it simply creates problems for business and industry and provides no deterrent for the original problem which is stopping the Asian Carp progression.

As an active member in AWO, we endorse and recommend the following nine actions which address the perceived Asian Carp movement while concomitantly maintaining commerce:

1. Construction of bubble or acoustic barriers as is commonly done in Europe.
2. Commercial fishing, electro-fishing, netting, and targeted fish sampling done in a planned and scheduled time frame with clear objectives.
3. Sampling of barges and other vessels for potential carp eggs or small fish. There is a multi-agency working group that is being formed on this issue. AWO has agreed to sit on this working group.
4. Assessment of further restrictions or law enforcement options to preclude the importation of Aquatic Invasive Species.
5. Research to develop biological control agents.
6. Expedited completion of Barrier IIB.

7. Conducting of tagged fish research to validate the effectiveness of all physical barriers.
8. Expedited and immediate completion of structures to guard against carp entering the Great Lakes when floods occur.
9. General scientific study about the potential of carp to survive within the Great Lakes ecosystem and, if survival is believed to be possible, urging continued study of ways to mitigate population growth.

In conclusion, it is evident that closing the locks is not the answer. We urge you to take a step back and find a solution that better balances the needs of the economic and environmental stakeholders. We, as a company and industry, are committed to working with all parties to ensure the sustainability of the Great Lakes and to be good stewards of the environment. If there is further information that you request, please do not hesitate to contact me.

Regards,

Angie Fay
Director of Quality Assurance/Corporate Compliance

cc: Pat Carey – Mayor Daley's Office (via email)
Commissioner Tom Powers – Chicago DOT (via email)
John Pope – Alderman of 10th Ward (via email)
Senator Dick Durbin (via email)
Hon. Judy Biggert (via email)
Hon. Daniel Lipinski (via email)
Hon. Jerry Costello (via email)
Hon. Jessie Jackson, Jr. (via email)
Hon. Tim Johnson (via email)
Hon. Aaron Schock (via email)
Hon. Phil Hare (via email)
Hon. Peter Roskam (via email)

Ms. Wayland,

I have been a docent at the Chicago Architecture Foundation (CAF) for four years. I became a docent specifically to give CAF River Cruises aboard the three CAF boats. Each summer, we have thousands of tourists on our many cruises (9/day during the week and 13/day on weekends). We have visitors from all over the world who come to Chicago to see and hear about our world-class architecture. The CAF tours River Cruises are recognized as the one to take and are generally considered a "must do" when visiting Chicago.

As a volunteer docent, I see with each tour the impact that our tours have on visitors and Chicagoans alike. Chicago is known for its architecture and I have personally seen how our tours change the way people understand and appreciate our city. Any closure of the Chicago River to prevent Asian carp migration would seriously damage my ability as a volunteer to educate the public about Chicago's beautiful architecture.

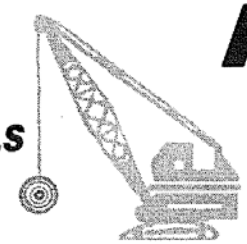
I understand the serious nature of the Asian carp threat, but I respectfully ask that you consider only an overnight river and/or lock closure during December through April for testing and treatment of the River’s waters to prevent the Asian Carp from traveling through the electronic fish barrier and into downtown Chicago. Please help us maintain our ability to serve our mission and keep the Chicago River open for business this summer.

Claudia Winkler
Tivoli ISS Sales Specialist
IBM Internet Security Systems
773-883-9181 - Remote Office
312-529-1663 - IBM Voice Mail
773-398-2133 - Cell
clwinkl@us.ibm.com

"Ahead of the Threat" preemptive protection

RESERVE MARINE TERMINALS

RMT



February 11, 2010

Colonel Vince Quarles
United States Army Corp of Engineers
Chicago, IL District

Dear Colonel Quarles,

I am writing you to make sure you understand the catastrophic effect that closing and/or altering the operation of the Chicago and/or O'Brien Locks will have on mine and others' business. Reserve Marine Terminals operates a stevedoring, warehousing, material handling and scrap processing facility on a 175 acre, former steel mill property on the Calumet River. Loading and unloading barges is an essential part of our business and without it we would have never purchased the facility.

Many of the materials/products we buy, sell, handle and warehouse are related serving the steel making industry. As you may know, this industry and related industries that serve and/or supply steel companies has suffered enormous losses of employment for many reasons probably not appropriate to debate in this correspondence. Nonetheless, closing or altering the operation of the locks, which provide a critical pathway to industry will, without question, add cost to the supply chain of raw materials and semi-finished materials to all industries dependant on waterborne transportation.

What inevitably will occur is that the consumers of the waterborne cargo, who can't sustain the cost of interruption in the supply chain, will find alternative means of acquiring the same materials. This will lead to cargo being handled down river, for example maybe St. Louis. The material will then be moved from St. Louis by truck or rail (if possible) to its final destination. The result of these actions will cause the following:

1. Loss of more jobs in the Chicago region related to manufacturing
2. Higher cost of goods, inflationary pressures, less competitive manufacturing
3. Increased pollution as a result of increased rail/truck movements vs. barging

Reserve Marine Terminals, in normal economic conditions, handles in excess 500,000 tons per year of bulk and break bulk cargo. We have extensive investment in plant, property, equipment and employees. I estimate that the value of goods we buy, sell and handle for others is in excess of $200,000,000. The current economic conditions have made employment of the 65 union employees and 12 staff challenging enough. Any further deterioration, which closing and/or altering the lock operations would cause, will be devastating to the future operations of Reserve Marine Terminals and our employees. These are real risks.

And all this related to a fish that no one has demonstrated the real risk.

Sincerely,

Hal Tolin
Reserve Marine Terminals

11600 South Burley Avenue • Chicago, Illinois 60617 • (773) 721-8740 • Fax (773) 721-8798

Dear Lynn Wayland,
I have been a volunteer docent for the Chicago Architecture Foundation since 1997 and give the very popular boat tour. I come up from Peoria to give the tours at great personal expense. We hope you can find a better solution than shutting down all river traffic to the thousands of tourists that enjoy our factual tours. The impact is not just financial, but cultural as well. It must seem that yours is Mission Impossible. Reversing the river seemed impossible in 1900 but it did happen with great effort. Good luck in finding a solution that outwits those jumpy asians (carp that is)!
Sincerely,
Bennett Johnson
309-686-6886

Colonel Vincent V. Quarles
District Commander
United States Army Corp of Engineers
111 North Canal Street
Chicago, IL 60606

Dear Colonial Quarles:

Please accept this letter as Wendella Sightseeing Company's preliminary response to the United States Army Corps of Engineers (USACE) plans of the modified structural operations of the Chicago Lock.

We would like to state that our comments are based on the following premise: The O'Brien Lock and the Chicago Lock should not be considered one entity. Each lock has a unique set of users: The Chicago Lock is predominantly commercial passenger vessels, emergency vessels and recreational vessels. The O'Brien Lock serves mainly commercial barge traffic. These different vessels require different operating procedures at each lock. Any final conclusions must take into account the different needs and service levels required by their users to remain a viable commercial operations. Additionally, the success and health of the locks' are measured in different terms. The O'Brien Lock track is measured in tonnage of cargo. Using the same measure, the Chicago Lock would appear inconsequential. However, it is the second busiest lock in the country based on vessel use.

While Wendella will comment on all the Alternatives presented, it will only be speaking to the Chicago Lock. However, our comments will be based on the non specific information provided for comment. The Control Strategy Framework simply does not provide enough detail in its plan for full and complete comments to be made. For example, while the USACE has spoken of lock closure, we have recently learned lock closure may or may not also means lock and river closure.

Wendella Sightseeing Company is a locally owned, family business that has provided a variety of guided boat tours, private charters and Chicago Water Taxi service to millions of tourists and Chicago area residents on Lake Michigan and the Chicago River since 1935. Our operating season runs from Mid-March through Mid-December. Wendella provides high quality-good paying jobs that support 140 families. More than 150 vendors and subcontractors rely on Wendella for revenue and job creation. Wendella's currently has millions of dollars invest in vessels and equipment, in addition, a new vessel is currently under construction with a scheduled completion date of June of 2010.

During our 2009 operating season, Wendella served more than a half-million passengers aboard eight, *(listed below),* United States Coast Guard (USCG) documented vessels. Over 70% of the gross revenues generated by our services are attributed to the Chicago Lock. In addition to tours, Wendella operates the Chicago WaterTaxi (CWT). The CWT is key component in the transportation plans of both Chicago and the Chicagoland region, providing passenger ferry service between the commuter train stations and points along the Chicago River. All aspect of our operation, whether tourism or water transportation, are reliant upon the consistent operation of the Chicago Lock.

Therefore, Wendella can only support Alternative 1 as highlighted in the plan – No Action; the Chicago Lock operates as normal. *Any* closure of the Chicago Lock, which may or may not include river closure, as outlined in Alternative 2, 3 or 4, will have a devastating, catastrophic effect on our operations.

The uncertainly of the future of the lock has already begun to paralyze our normal operations. The uncertainty has affected our future bookings, whether by individual customers, groups or private events. Nobody wants to purchase a ticket for a tour or activity that may be closed on the day they choose. The uncertainty has already affected the job growth at Wendella. Despite numerous applications and employment inquiries, Wendella has not begun any hiring for the upcoming season. In short, your public discussion of closing the Locks, which may or may not mean the closure of the river, has already had a negative economic affect on Wendella.

All Alternatives, other than Alternative number 1, will cripple Wendella's ability to recruit and retain the standard of employee required in a competitive marketplace.

Wendella is part of a $12 billion dollar tourism industry. To remain competitive in that market, Wendella needs to consistently recruit, hire, train and retain the best people possible. Offering a qualified candidate employment 3 days a week, or every other week will be simply unacceptable to that candidate.

All Alternatives, other than Alternative number 1 will cripple Wendella's revenue opportunities.

Wendella relies on capturing a percentage of Chicago's 32 million yearly visitors. These visitors base their purchasing choices on the availability of tour, when they are ready and motivated to take one. With the number of entertainment options available, Wendella must have the ability to capture this revenue in the exact window of time the customer is ready to commit to purchase. We do not have the luxury of dictating to our potential guests when to make the purchasing decision. If we are not available on the hour, day or week that meets the customers' needs, we have lost that revenue. Sporadic days of operation caused by intermittent lock and river closure will make it impossible for Wendella to meet our potential customers needs.

Another practical concern is the boat size itself. As USCG licensed vessels, we are only permitted a certain number of passengers each trip. A seat on our vessels is a commodity that we can only sell once per trip. Therefore, we rely on that seat be available for purchase as many times as possible, or as many trips as possible. Once again, if we are not operating due to a lock and river closure, that seat will not be producing revenue.

All Alternatives, other than Alternative number 1, will cripple Wendella's ability to raise capital for growth.

Like most businesses, Wendella relies on the ability to raise capital for expansion and normal operation. Projects ranging from vessel construction to infrastructure improvements require needed capital in the forms of loans or investment. Closing the Locks and river, and the subsequent loss of business make Wendella a poor credit or investment risk. This will raise the cost of lending and make projects such as those described above economically unsound. That is, if Wendella can raise the needed capital. No investment bank, venture capitalist or lender will provide funds to a business that is forced to shut down operations as described in Alternative 2, 3 or 4.

All Alternatives, other than Alternative number 1, will cripple Wendella's ability to remain a profitable, viable business.

Like all businesses. Wendella has a number of fixed costs. These costs include such items as lease payments of our docks (rent), Insurance, debit service and vessel maintenance. These expenses remain and payment is required whether we sell the above mentioned seat once or one hundred times. Unlike expenses such as payroll or fuel, Wendella cannot adjust these costs to meet current conditions. These expenses and obligations have been incurred based on certain revenue assumptions and levels. Closing the lock as outlined in Alternatives 2, 3 and 4 will disrupt that revenue stream and will result default on our financial obligations and soon after insolvency with the loss of jobs, equipment and infrastructure.

The USACE has published the fact the there has been no physical carp seen or captured above our barrier system…33 miles from Lake Michigan, south." The measures currently in use are proving effective. Closing the Chicago Lock will not advance the USACE stated goal of keeping the Asian carp from migrating to Lake Michigan. It will only serve to destroy Wendella and other Commercial Passenger Vessels. We strongly urge you to remove all Alternatives, except Alternative 1, No action for consideration.

Once again, please accept these comments with the understanding that the USACE and the Asian Carp Workgroup has requested these comments without fully disclosing how lock closure will be implement, what that closure will mean to the Chicago River. Additionally please understand that we have been asked to submit detailed comments within a weeks' time on a document that has taken years to author without any input from the stakeholders.

As stated before, Wendella has been a stakeholder on the Chicago Waterways for 75 years. In fact, we've used the lock since its first opening in 1938. As such, we have a vested interest in the continued health of the system. Wendella supports the efforts taken by the USACE to date to impede the progress of the Asian Carp. We agree that a multi-layered plan, using a variety of tools is needed to combat that migration. However, none of the Alternatives proposed, except Alternative 1 should be considered. All Alternatives, except Alternate 1 will place Wendella at risk of insolvency, and eventually cause it to cease operations. Wendella supports the plan proposed by the Illinois Chamber of Commerce which includes:

- Conduct a study of the ability of Asian Carp to survive and/or thrive in Lake Michigan.
- Study the efficacy of eDNA testing.
- Expand as planned the fish barrier system.
- Utilize the five miles between Lockport Lock and the fish barrier at Romeoville as a designated "Kill Zone".
- Install chemical kills and/or acoustical barriers in, and adjacent to, the 600-ffoot lock chamber at Lockport.
- Block the passage of fish of all types on the 15-mile section of the Sanitary and Ship Canal as well as the Cal Sag Channel.
- Install south of Lockport a remedial oxygenation program to enhance water quality south of the Chicago Area Waterways.
- Provide incentives and support commercial harvesting of Asian Carp.

Sincerely,

Michael Borgstrom
President
Wendella Sightseeing Boats

405 North Wabash
Chicago, IL 60611
312-337-1446

VESSEL OPERATED BY WENDELLA SIGHTSEEING COMPANY.

M/V Wendella
O/N 1194977

89'L x 30'W
Passenger Capacity 340

M/V Ouilmette
O/N 1110462

65'Lx 22'W
Passenger Capacity: 217

M/V Wendella Ltd
O/N D980988

65' L x 20.2' W
Passenger Capacity: 217*

M/V Sunliner
O/N D285077
62' L x 14.4'W
Passenger Capacity: 97

M/V Bravo
O/N 1117105

50'L x 18'Wx 6'W
Passenger Capacity: 107

M/V Alpha
O/N 1081233

38'Lx 10'W,
Passenger Capacity: 56

M/V Wendella
O/N D276122

662' L x 18W
The M/V Linnea
Currently under construction

From: Steve Mosher [mailto:smosher@qsl.com]
Sent: Friday, February 12, 2010 1:42 PM
To: PAO LRC
Subject: Chicago and O'Brien locks

Dear Col Quarles:

Our company is a stevedoring terminal that offloads ships in South Chicago and barges from the inland water way system. The purpose of the operation is to take significant amounts of cargo closer to the end user via vessel in the most economical and safest mode of transportation. We also conduct transloading operations where we either receive material by barge or ship, then reload to barge or ship. This eliminates cargos having to be moved by truck. Our operation is multi-model, meaning the terminal consisting of 100 acres is capable of consolidating significant cargo volumes then moving it out by all surface transportation modes including rail.

Closure of the locks or even partial closure of the locks will dramatically reduce opportunities to design and develop short sea concepts that divert more cargo to the water way thus reducing truck traffic and pollution in the Chicago and North West Indiana area. Currently we are looking at; quartz from Ontario, Canada to Chicago to barge into the river system; wood chips from Michigan to the Gulf; sand from Missouri to Chicago then by vessel to Windsor, Canada; Gypsum from Wisconsin to Chicago then barge to the Ohio River system for power plant scrubbers; lime stone from the UP of Michigan to Chicago then barge to cement companies along the inland waterway system; iron ore from Minnesota to Chicago then barged to the Gulf to only name a few immediate opportunities. I am also exploring short sea shipping of containers, possibly from BNSF yard in Elwood where they are arriving from the West Coast then being trucked to points east using I-80. If we could shuttle them by barge to our location on the South Side of Chicago and truck from here to destinations needing to go east, then a significant amount trucks would not be on the highway between Joliet and Chicago.

We are now a global economy, closure of the locks will eliminate jobs and shipping alternatives to move commerce from all the Great Lake States to the Gulf and vice versa. Chicago is the hub, able to access the Gulf and the Atlantic via the St Lawrence River. Closure of the locks or an interim closure will impact all the USA states and Canadian provinces along the Great Lakes and St. Lawrence River. This is not being comprehended by these other states, waterborne commerce has existing capacity to take trucks of the road, reduce pollution and move products cheaper than any other mode of transportation, thus allowing our country to remain competitive in a global economy.

Respectfully,

Stephen H. Mosher, M.B.A.

General Manager

NORTH AMERICA STEVEDORING COMPANY, LLC

773 734-4885

773 484-3573

773 734-4831

<mailto:r@qsl.com>

www.qsl.com <blocked::http://www.qsl.com/>

To those involved in discussion of Chicago Locks and River closures because of Asian Carp,

There are many impacts of closing the river that detrimentally affect commerce and commuting in Chicago. There must be other alternatives that do not have such a grave impact on the economics and services of the Chicago River. Please use alternative approaches and do not close the river!!

Best regards,

Dr. Joan Cook-Mills, Ph.D.

Associate Professor

Northwestern University Feinberg School of Medicine

McGaw M-304

240 E. Huron

Chicago, IL 60611

Phone: 312-503-0906

Fax: 312-503-0078

Email: j-cook-mills@northwestern.edu

To: Lynn Wayland, Public Affairs Officer, Chicago District

This Asian carp business is serious. I'm a responsible citizen and understand the pros and cons. However, I do not understand the noisy politics about shutting down Illinois waterways to deal with the problem. How could all of the industries reliant on these waterways cope? Surely there is a way to treat this hazard without endangering so many industries and economies. We're tried, and a lot of money and effort have been expended, but still the carp has us quaking in our boots. The zebra mussel is another pest, to put it mildly, that had us quaking. However, we did not shut down Illinois's waterways to deal with that.

Let's find another way. Promoting carp as an edible product is one. (Not for me, but one businessman has found it a great business opportunity, given our high population of Asian Americans.) But, if we just shut down Illinois waterways, we would be only arresting the carp's migration, wouldn't we, not killing it?

Now, my vested interest beyond my interest as a concerned citizen is that I am a tour guide for the Chicago Architecture Foundation. I narrate the hugely popular River Cruise from May through November. I probably address some 6,000 passengers each season. I always manage to work in the value of the five Great Lakes to the world: "...some 20% of the world's fresh surface water..." It would be disastrous to the Chicago Architecture Foundation and to the Chicago's First Lady fleet of ships if we could not navigate the Chicago River during our May to November season. And we may be a minor loser among the hundreds of other economies dependent upon the River.

I attach a letter...more formally composed...to Col. Quarels and also paste it in.

I know the Corps is taking this matter very seriously. Egad, it might get to the Supreme Court. My sincere best wishes for expert and reasoned thinking. Do the right thing. But do NOT close the Chicago River!

Sincerely,

Rebecca Dixon

2001 Sherman Ave., #302

Evanston, IL 60201-3263

February 12, 2010

Colonel Vincent V. Quarels
US Army Corps of Engineers, Chicago District
111 N. Canal Street
Chicago, IL 60606-7206

Dear Col. Quarels:

I have followed with interest and concern media reports on the dilemma of how to prevent Asian carp migration into our Great Lakes. As a volunteer docent (tour guide) on the very popular River Cruise of the Chicago Architecture Foundation, I point out to passengers that the five lakes comprise almost 20% of the world’s fresh surface water, an invaluable resource. From May to November, I address approximately 6,000 passengers.

I’m sure you are familiar with the Official Chicago Architecture Foundation River Cruise aboard Chicago's First Lady and its essential part of our city's cultural landscape. Visitors from all over the world, but substantially from Illinois and nearby states, come to admire our world-class architecture The Chicago Architecture Foundation is the leading expert in showcasing the city for a global audience. Docents’ narratives include much information about the River and the importance of Lake Michigan. No other city celebrates its architecture like Chicago, and I have personally seen how our tours change the way people understand and appreciate the city and our collective attention to ecological features.

Any closure of the Chicago River to prevent Asian carp migration would seriously damage my ability as a volunteer to educate the public about Chicago's distinctive architecture and the related natural environment.

I understand the serious nature of the Asian carp threat, but I cannot understand how the state, the economies dependent on the River, or even the U. S. could withstand the closure of the Illinois water system as it relates to Lake Michigan. I respectfully ask that, if a River closure is absolutely critical for testing or treatment, you consider an overnight river and/or lock shutdown from December through April only for testing and treatment to prevent the Asian carp from traveling through the electronic fish barrier. No closure is best; a shorter closure would have less injurious impact.

Sincerely,

Rebecca Dixon

KINDER MORGAN

February 12, 2010
Col. Vincent V. Quarles, USA
Commander, Chicago District, U.S. Army Corps of Engineers
111 North Canal Street
Chicago, IL 60606-7206

RE: Obrien and Chicago Locks – Proposed Modified Operations for Asian Carp Control

Dear Colonel Quarles:

Kinder Morgan currently operates 3 Terminals on Chicago area waterways that would be severely impacted by lock closures or restricted operations on the Sanitary Ship Canal and/or the Cal Sag Channel.

Kinder Morgan Terminals:

Argo, IL - Mile Marker 312 (Sanitary Ship Canal)
- 300 river barges per year (105,000,000 gallons of liquid cargo)

Chicago, IL - Mile Marker 327 (Cal Sag Channel – property leased from the Il Port District)
- 100 river barges per year (42,000,000 gallons of cargo)

Chicago, IL – Mile Marker 331(Cal Sag Channel)
- 150 river barges per year (180,000 tons of dry cargo)

These Kinder Morgan Terminals represent 300 jobs that could potentially be lost if Chicago area locks are closed or have restricted operations that would have the same devastating effect on marine traffic and activities that are critical to operations at all three of Kinder Morgan's storage/distribution terminals.

Kinder Morgan respectfully asks that the U.S. Army Corps of Engineers explore other alternative measures for controlling the migration of Asian Carp that would not have a devastating effect on Kinder Morgan's facilities, employees and families.

Respectfully,

Timothy Berens
Commercial Director – Midwest Region
Kinder Morgan Liquids Terminals LLC

Bullock, Peter Y LRC

From: Barbara Butz [bkbutz@sbcglobal.net]
Sent: Friday, February 12, 2010 3:55 PM
To: PAO LRC
Subject: Lock closing proposals

Greetings:

I am a river cruise docent for the Chicago Architecture Foundation and over the past few years have met literally thousands of tourists from all over the world, who have come to take our tour to admire out city from the water, and learn about its history in so doing.

I'm very aware that in response to the problem of Asian carp, there are proposals that would close the locks going into the lake. This action would have a serious impact on our tours! Hundreds of thousands of people take our tours, and those of competitors, every year. It is one of the major draws for tourism in Chicago. The river is much more than a ribbon of water running through the city. Its rich history and stunning architecture tell a story that fascinates tourists and increases their appreciation of our rich city.

I hope you will consider less radical solutions to this problem. You will hear from others regarding the economic and environmental toll that closing the locks would bring. But please do not forget the tourism dollars that these tours attract, or, perhaps more important, the long-lasting appreciation that tourists - from everywhere in the world - gain from them.

Barbara Butz
CAF docent 2006

Bullock, Peter Y LRC

From: Thomas Carmichael [tcarmichael@ameritech.net]
Sent: Friday, February 12, 2010 12:39 PM
To: PAO LRC
Subject: Impact of Closing Chicago River Lock

Dear Ms. Wayland,

As a volunteer with the Chicago Architecture Foundation, I am very concerned about the negative impact that the proposal to close the Chicago River Lock will have on our city from both a cultural and a financial point of view. The Official Chicago Architecture Foundation River Cruise is an essential part of our city's cultural landscape. The New York Times says of the architecture cruise that "there is no better way to see what makes Chicago Chicago." Visitors come from all over the world to admire our world-class architecture, and the Chicago Architecture Foundation is the leading expert in showcasing the city for a global audience.

As a volunteer docent, I lead many tours on the river and know the impact that they have on visitors and Chicagoans alike. No other city celebrates its architecture like Chicago, and I have personally seen how our tours change the way people understand and appreciate our city. Any closure of the Chicago River to prevent Asian carp migration would seriously damage my ability as a volunteer to educate the public about Chicago's amazing architecture.

I understand the serious nature of the Asian carp threat, but I respectfully ask that you consider only an overnight river and/or lock closure during December through April for testing and treatment of the River's waters to prevent the Asian Carp from traveling through the electronic fish barrier and into downtown Chicago. Please help us maintain our ability to server our mission and keep the Chicago River open for business this summer."

Sincerely,

Tom Carmichael

Tour Director, Architecture River Cruise

Bullock, Peter Y LRC

From: bgrund42@comcast.net
Sent: Saturday, February 13, 2010 2:41 PM
To: PAO LRC
Subject: Chicago River Potential Closing

"The Official Chicago Architecture Foundation River Cruise aboard Chicago's First Lady is an essential part of our city's cultural landscape. Visitors come from all over the world to admire our world-class architecture, and the Chicago Architecture Foundation is the leading expert in showcasing the city for a global audience.

As a volunteer docent, I lead tours on the river and know the impact that our tours have on visitors and Chicagoans alike. No other city celebrates its architecture like Chicago, and I have personally seen how our tours change the way people understand and appreciate our city. Any closure of the Chicago River to prevent Asian carp migration would seriously damage my ability as a volunteer to educate the public about Chicago's amazing architecture.

I understand the serious nature of the Asian carp threat, but I respectfully ask that you consider only an overnight river and/or lock closure during December through April for testing and treatment of the River's waters to prevent the Asian Carp from traveling through the electronic fish barrier and into downtown Chicago. Please help us maintain our ability to server our mission and keep the Chicago River open for business this summer."

Patricia Grund

River Docent Chicago Architecture Foundation

Bullock, Peter Y LRC

From: Peg Leonard [leonard.peg@sbcglobal.net]
Sent: Friday, February 12, 2010 2:43 PM
To: PAO LRC
Subject: Chicago River

Dear Ms. Wayland:

I am a volunteer docent for the Chicago Architecture Foundation River Cruise . The cruise is the most popular tourist attraction in our city (recommended by most hotels to tourists) and we have guests from all over the world who take our cruise. Chicago is foremost in the U.S.A. for architecture and the river cruise shows off our beautiful architecture.

Any closure of the Chicago River to prevent Asian carp migration would seriously damage our ability to educate the public. It would also rob many people of their favorite summertime Chicago adventure. Please keep the river open for us from May through November. Thank you.

Sincerely, Peg Leonard

Bullock, Peter Y LRC

From: Lowe Jill [jilllowe@earthlink.net]
Sent: Friday, February 12, 2010 1:41 PM
To: PAO LRC
Subject: river and lock closure

To Lynn Wayland Public affairs officer

Dear Lynn:

"The Official Chicago Architecture Foundation River Cruise aboard Chicago's First Lady is an essential part of our city's cultural landscape. Visitors come from all over the world to admire our world-class architecture, and the Chicago Architecture Foundation is the leading expert in showcasing the city for a global audience.

As a volunteer docent, I lead tours on the river and know the impact that our tours have on visitors and Chicagoans alike. No other city celebrates its architecture like Chicago, and I have personally seen how our tours change the way people understand and appreciate our city. Any closure of the Chicago River to prevent Asian carp migration would seriously damage my ability as a volunteer to educate the public about Chicago's amazing architecture.

I understand the serious nature of the Asian carp threat, but I respectfully ask that you consider only an overnight river and/or lock closure during December through April for testing and treatment of the River's waters to prevent the Asian Carp from traveling through the electronic fish barrier and into downtown Chicago. Please help us maintain our ability to server our mission and keep the Chicago River open for business this summer."

Thanks you Jill Lowe
Docent for CAF
312 751 9759

Bullock, Peter Y LRC

From: susanpappas@comcast.net
Sent: Monday, February 15, 2010 9:00 AM
To: PAO LRC
Subject: Chicago River closure

To Public Affairs Officer Lynn Wayland

Dear Public Affairs Officer Wayland,

The Official Chicago Architecture Foundation River Cruise aboard Chicago's First Lady is a unique experience for visitors who come to our city from all over the country and from all over the world. The cruise tells the incredible stories of our early explorers and settlers who saw and then developed the potential of this site along Lake Michigan and the swampy stream. How amazing that that stream became our Chicago River and essential to our water transportation system. Now it is an essential part of our city's cultural landscape because of the magnificent and incomprarable views from the river. Visitors come from all over the world to admire our world-class architecture, and the Chicago Architecture Foundation is the leading expert in showcasing the city for a global audience.

As a volunteer docent, I lead tours on the river and know the impact that our tours have on visitors and Chicagoans alike. No other city celebrates its architecture like Chicago, and I have personally seen how our tours change the way people understand and appreciate our city. Any closure of the Chicago River to prevent Asian carp migration would seriously damage my ability as a volunteer to educate the public about Chicago's amazing architecture.

I understand the serious nature of the Asian carp threat, but I respectfully ask that you consider only an overnight river and/or lock closure during December through April for testing and treatment of the River's waters to prevent the Asian Carp from traveling through the electronic fish barrier and into downtown Chicago. Please help us maintain our ability to serve our mission and keep the Chicago River open for business this summer.

Thank you for your consideration on this matter.

Sincerely,

Susan Pappas

CAF volunteer river docent

Bullock, Peter Y LRC

From: james crissey [crisseytp@att.net]
Sent: Friday, February 12, 2010 5:04 PM
To: PAO LRC; brian.colgan@mai.house.gov; rick.bryant@mail.house.gov; "sally brown-shaklee"@durbin.senate.gov
Cc: thomas.powers@cityofchicago.org; jpope@cityofchicago.org
Subject: CHicago lock closures

Please except my statement regarding the closures of either or both the lake access locks on the Chicago Wateway System (CWS).
1. I am in the marine support and consulting,service and training business in Chicago.
2. My business Total Marine Safety Great Lakes is part of the Parker Sales Co., Inc. goup, and also includes Chicago Steamship Supply, a vessel foods provisioner, and Parker Sales SHIPSTORE, a chandlery. We employ 10 people and have been in the marine supply and support business over 60 years.
3. Our business services both the laker carriers and the river carrriers, as well as the foreign flagged vessels.
4. The Port of Chicago according to USACE published statistics in 2001 is the 29th largest port in the US measured by tonnage, and Illinois is the 5th larges state in the US by water borne traiffic.
5. Our experience tells us that the majority of that cargo is moves thru our port from the lake to the rivers and vice versa. IT DOES NOT TERMINATE IN OUR PORT.
6. By closing any lock on the Chicago Waterway System (CWS) such as Chicago Controlling or O'Brien or Illinois Waterway System (ILWS) such as Lockport or Brandon Road, this flow of commerce will be cut-off.
7. The Chicago Controlling Lock is the busiest lock in the US according to the number of vessel passages. This does not count in the USACE statistics since the USACE only counts cargo tonnage not passengers.
8. Our companies existance depends on the movement of ALL maritime traffic thru the Port of Chicago. The closing of any of these locks will threaten our business's existance eliminating our jobs and cause a loss of our revenue of $2 million a year .
9. Thank you for considering my information in making your decision on this issue.
On behalf of Parker Sales Co., Inc.
James F. (Jay) Crissey

AL WARREN OIL CO. INC.

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SERVICE

www.alwarrenoil.com

February 10, 2010

Col. Vincent Quarles
U.S. Army Corps of Engineers
Chicago District Office
111 N. Canal St.
Chicago, IL 60606-7206

Dear Col. Vincent Quarles,

We at Al Warren Oil Company, Inc. do understand the concerns regarding the Asian Carp's access to Lake Michigan and how that can affect the eco-system. We also understand the local businesses concerns about the loss of their business in connection with the closing of their access to the Chicago Harbor Lock. In this economy the public is worried about eco as well as economic concerns. If the access is denied, this could in turn raise fuel prices and damage local business. Along with the people that rely on that for their family's financial stability. Our Company alone has over 161 employees that this denial of access could potentially affect. We ask that another avenue is taken with this potential access elimination.

Sincerely,

Tom Warren, Jr.
Vice President of Operations

Phone: 800-327-8903 **Fax: 708-594-3679**

Corporate Office
7439 West Archer Avenue
Summit, IL 60501

Terminal Office
4243 South Knox Avenue
Chicago, IL 60632

Hammond Indiana Sales Office
111 East 142nd Street
Hammond, IN 46327

Indiana Office
729 East 131st Place
Hammond, IN 46320

AL WARREN OIL CO. INC.

FUEL AT ITS BEST

PROMPT
DEPENDABLE
SERVICE

www.alwarrenoil.com

February 10, 2010

Col. Vincent Quarles
U.S. Army Corps of Engineers
Chicago District Office
111 N. Canal St.
Chicago, IL 60606-7206

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Sincerely,

Mark Ivers
Vice President/Sales

Phone: 800-327-8903 **Fax: 708-594-3679**

Corporate Office
7439 West Archer Avenue
Summit, IL 60501

Terminal Office
4243 South Knox Avenue
Chicago, IL 60632

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February 10, 2010

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U.S. Army Corps of Engineers
Chicago District Office
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Chicago, IL 60606-7206

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Sincerely,

Mike Orloff
Al Warren Oil Company Operations Manager

Phone: 800-327-8903 **Fax: 708-594-3679**

Corporate Office
7439 West Archer Avenue
Summit, IL 60501

Terminal Office
4243 South Knox Avenue
Chicago, IL 60632

Hammond Indiana Sales Office
111 East 142nd Street
Hammond, IN 46327

Indiana Office
729 East 131st Place
Hammond, IN 46320

21 James Drive
Westmont, Illinois 60559
February 12, 2010

Colonel Vincent V. Quarels
U.S. Army Corps of Engineers
Chicago District
111 N. Canal Street
Chicago, Illinois 60606-7206

Dear Colonel Quarels,

The Official Chicago Architecture Foundation River Cruise aboard Chicago's First Lady is an essential part of our city's cultural landscape. Visitors come from all over the world to admire our world-class architecture, and the Chicago Architecture Foundation is the leading expert in showcasing the city for a global audience.

As a volunteer docent for the past several years, I lead tours on the river and know the impact that our tours have on visitors and Chicagoans alike. No other city celebrates its architecture like Chicago, and I have personally seen how our tours change the way people understand and appreciate our city. Any closure of the Chicago River to prevent Asian carp migration would seriously damage my ability as a volunteer to educate the public about Chicago's amazing architecture.

I understand the serious nature of the Asian carp threat, but I respectfully ask that you consider only an overnight river and/or lock closure during December through April for testing and treatment of the River's waters to prevent the Asian Carp from traveling through the electronic fish barrier and into downtown Chicago. Please help us maintain our ability to serve our mission and keep the Chicago River open for business this summer.

Thank you for taking the time to consider other alternatives to solving this challenge.

Yours truly,
Adina VanBuren
(Mrs. W. D.) Adina Van Buren

STEVEN G. GERSTEN

55 E. ERIE STREET, APARTMENT 4701 - CHICAGO, ILLINOIS 60611
312-951-1110 (H) - 312-952-3262 (M)

Colonel Vincent V. Quarels
US Army Corps of Engineers
Chicago District
111 N. Canal St.
Chicago, IL 60606-7206

Dear Sir,

The Official Chicago Architecture Foundation River Cruise aboard Chicago's First Lady is an essential part of our city's cultural landscape. Visitors come from all over the world to admire our world-class architecture, and the Chicago Architecture Foundation is the leading expert in showcasing the city for a global audience.

As a volunteer docent, I lead tours on the river and know the impact that our tours have on visitors and Chicagoans alike. No other city celebrates its architecture like Chicago, and I have personally seen how our tours change the way people understand and appreciate our city. Any closure of the Chicago River to prevent Asian carp migration would seriously damage my ability as a volunteer to educate the public about Chicago's amazing architecture.

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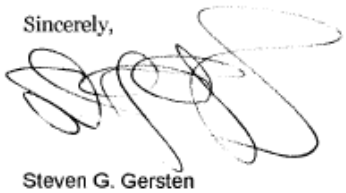
Sincerely,



Steven G. Gersten

Hanson
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Fax 815-838-8166

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COL Vincent Quarles
U.S. Army Corps of Engineers
Commander, Chicago District
111 N. Canal Street
Suite 600
Chicago, Illiois 60606

February 11, 2010

Modified Lock Operations – Chicago Area Waterways

Dear COL Quarles,

Thank you for the opportunity to provide feedback regarding the proposal to modify locking operations within the Chicago Area Waterways. It is my understanding that the most likely proposal would eliminate passage through the Chicago and O'Brien Locks for up to four (4) days per week. In addition, the adjacent waterways below the locks would also be closed to the navigation community for the same period to allow for monitoring and eradication efforts. Any type of closure or modifications to these navigational locks and adjacent waterways will have a detrimental impact to our operations including the loss of jobs and shut down of operations.

We currently service four facilities within the Chicago Area Waterway System that utilize barge transportation. These facilities all receive aggregate products for the production of ready mix concrete for use in the building trades and highway construction. The modifications being proposed would have an immediate impact on these facilities as well as our operations. These facilities are located on small tracts of land which requires "just in time" deliveries to keep up with demand. Trying to service our customers within the three (3) day window will not be practical based on time and space constraints. The customers would be forced to truck commodities to their facilities to meet their "just in time" needs thus eliminating the need for our barge transportation service. The proposal would also eliminate the need for our sand production at our Morris, Illinois facility if we can no longer service the Chicago market via barge. This will have an immediate impact of approximately sixty (60) jobs within our Marine Operations and our Morris Quarry. **This proposal threatens the marine transportation system in Chicago which we have been navigating since 1929.**

I have been involved with the pending issue for ten (10) years and I believe that the actions being considered are fear based rather than fact based. The facts as I understand them are stated below:

- There have been no Asian Carp found in the Sanitary Ship Canal, Cal-Sag Channel, or any portion of the Chicago River System.
- There has not been a single Asian Carp documented, caught, trapped, or otherwise captured in any portion of the waterway above the electric barriers in Romeoville, IL.
- The electric barrier has been tested using tagged fish and other methods including tank testing and is believed to be working as designed.

- The eDNA testing that has created the media hysteria is an unproven technology. In addition the presence of eDNA may come from sources other than live fish. Also, the eDNA testing had no baseline for comparison so there is no proof that recent results would not have been present five or even ten years ago.
- The leading sustainable edge of the Asian Carp population is still below the Brandon Road Locks and this is where the focus should remain.

I would challenge your office to look at alternatives to modifying lock operations. This is an approach that will devastate the navigational community and not prevent the passage of the Asian Carp. Alternative solutions that have been discussed at recent meetings and we support are:

1. Installation of additional barrier structures such as acoustical or bubble systems that would be placed in strategic areas below the electric barriers near the lower mitre gates at Lockport and Brandon Road Locks.
2. Conducting tagged fish monitoring between Lockport Lock and the electric barriers to validate the barriers are working successfully.
3. Perform increased monitoring to identify the location of all invasive species with a recordable baseline to use against future testing.
4. Continue to research biological control agents that can be targeted at the individual species which cause concern.
5. Sample various vessels that transit the system including barges to ensure that juvenile fish and eggs are not being carried across the barrier systems.
6. Impose further restrictions on the importation or transport of aquatic invasive species and explore solutions to prevent the fish from being introduced through other methods such as bait buckets.

Please consider these or any other options that may be available before closing any navigational locks or modify operational schedules. Together we can find a workable solution that will both prevent the migration of the Asian Carp while still allowing commerce to remain viable.

Thank you for the opportunity to provide comments on this high profile subject.

Sincerely,

Darren Melvin
Manager, Marine Operations

cc: J Rancilio

474 N. Lake Shore Drive · Suite 3511 · Chicago, Illinois 60611 · Tel: 312-222-9328 · Fax: 312-321-0632

February 12, 2010

Colonel Vincent V. Quarles
U.S. Army Corps of Engineers
111 North Canal Street, Suite 600
Chicago, Illinois 60606-7206

Re: Impact of Modified Lock Operations on Shoreline Marine Company

Colonel Quarles:

We are writing this letter to detail the potential impact of the modified lock operations on Shoreline Marine Company. Please let us take this opportunity to illustrate the size and scope of our company's operations, the services we provide, and the economic benefits that Shoreline Marine Company brings to the Chicago metro area.

Shoreline Marine Company was started in 1935 by our great uncle James Martin and has succeeded through three generations of family ownership. The company began with two wooden speedboats giving boat rides up and down the Chicago lakefront and has since grown to a fleet of 20 subchapter T and subchapter K passenger vessels that operate on the Chicago lakefront as well as on the Chicago River. Shoreline gives sightseeing tours and architectural tours from docks located on the Chicago lakefront and the Chicago River, with trips departing from both sides of the Chicago River controlling locks. Shoreline also operates water taxis from eight docks that are located on both sides of the Chicago River controlling lock.

Shoreline has dock leases with a variety of public agencies and private landowners along the Chicago lakefront and on the Chicago River. Currently we operate 11 water taxis and 10 vessels that are used for architectural cruises, sightseeing tours, and private parties. (Please see attached list of vessels and details.)

Our company has grown from a small, seasonal operation that once employed only family members to a large, year-round concern. Shoreline employs 29 full-time salaried, benefited employees year-round. These jobs include licensed mariners, licensed engineers, deckhands, and ticket agents in our fleet operation as well as several administrative, sales and marketing positions.

During our peak summer months Shoreline's gross weekly payroll exceeds $250,000. Our annual payroll exceeds $5 million. Most of our 29 full-time employees are heads of households that depend on Shoreline to provide a living for their families. Currently

Shoreline employs three combat veterans in its Engineering Department as well as several other veterans who fill roles as deckhands, captains and bartenders. Shoreline also employs hundreds of students each summer, providing them with work experience and the funds necessary to continue their education.

The employees and vessels are the tools that we use to carry riders from all over the globe, showcasing the City of Chicago and the USA. Shoreline carries in excess of 750,000 people annually from the Chicago metro area as well as the rest of the United States and overseas. Sixty percent of our customers are purchasing tickets for architectural cruises and sightseeing tours; 30 percent of our customers ride our water taxis; and 10 percent of our customers are enjoying a corporate event or one of our catered charters. Our passengers run the gamut from the impulse-purchase passersby, the Internet comparison shopper maximizing the entertainment budget, and the daily water taxi commuters, to the brides, corporate executives, school groups and senior citizens who charter our boats for their annual events. In short, almost anyone living in, or visiting the Chicago area is a potential Shoreline customer.

Similar to the Chicago River locks, Shoreline is a "show-and-go" business. Many customers make reservations; however, most purchase tickets on our docks. Turning away customers from our docks due to river closures would have a devastating impact in the short term as well as the long term. Imagine your family with tickets coming in from the suburbs to take the water taxi from Ogden Slip to Navy Pier, only to find it closed. Not only would you not take our taxi in the future, but you would tell all your friends about the unreliability of the water taxi service we have spent considerable time and money developing.

The contemplated lock and navigation closures will have a tremendous adverse effect on our business. Fifty-six percent of our company's gross sales are generated from boats operating on the Chicago River; last year Shoreline carried 562,701 passengers on the Chicago River. On a typical Saturday we will have eight water taxis transiting our five docks on the River, making stops every ten minutes. We will also have four larger vessels giving architecture tours. On weekdays we generally have six water taxis operating and three large vessels providing architecture tours from our docks in Ogden Slip. One Saturday navigational closure could create a loss of almost 1 percent of gross sales.

- Shoreline's water taxi service has an average weekday ridership of 1,579 passengers. Our average weekend ridership on the Chicago River is 3,773 passengers.
- Shoreline's architecture tours have an average weekday ridership of 1,086 passengers and an average weekend ridership of 1,908 passengers. For example:
  - On Tuesday, 8-18-09, Shoreline generated $46,486 from its operations on the Chicago River.
  - On Saturday, 7-11-09, Shoreline generated $104,650 from its operations on the Chicago River, approximately 1 percent of our annual gross sales.
- The contemplated three- or four-day weekday closures would have a tremendous impact. If you were to close the River to navigation for three or four days on

alternating weeks, Shoreline estimates that we would lose $2,185,000 in gross sales.

This $2 million loss would have devastating effects on our organization. Initially we would lay off dozens of employees and would also be forced to sell equipment. Continued lock closures and navigational closures could threaten the solvency of our company.

As mentioned earlier, Shoreline has the largest fleet of passenger vessels on the Great Lakes. We have purchased existing vessels and converted them as well as built several vessels for our own fleet. Our current fleet represents a capital commitment of $17 million. All of our vessels were purchased wholly by the two of us or Shoreline Marine Company with standard bank financing. At this time we have personally guaranteed more than $7 million worth of loans to construct this fleet.

We build and repair our vessels at Sturgeon Bay Shipbuilding, Anderson Boatworks in Douglas, Michigan, and at the Chicago Dry Dock on the Calumet River in Chicago. We currently have a boat under construction at Anderson Boatworks that will create $1 million worth of economic activity in Michigan. Every year we have vessels in dry dock in both Wisconsin and Illinois, providing jobs and economic activity in these states as well.

Shoreline is the culmination of both of our lives' work and something we both have aspired to since we were children. We would like to carry this tradition on to future generations, and we would also like to continue to provide jobs for our employees and the dozens vendors and various suppliers that we use annually.

Please consider the ramifications of lock closures on our business and industry as you make your decision.

Thank you,

Charles E. (Chip) Collopy
President

Matthew Collopy
Vice President

Enclosures

Cc: Ed Welch
Steven Bers

Boat Documentation

Vessel	Gross Tonnage	Passenger Capacity	Cert Date	Official Number	Hull Number	Illinois Registration	Radio Call Sign	Year Built
1. M.V. ***Allons-Y***	25	49	05/05/97	D1050798	56348	1208JT	WCX4969	1978
2. M.V. ***Andale Andale***	16	49	04/26/99	D1043283	84376	1210JT	WCW7259	1971
3. M.V. ***Andiamo***	25	49	05/05/97	D1050135	93472	1209JT	WCX4970	1980
4. M.V. ***Blue Dog***	31	140	08/11/99	D643126	-	2596HW	WCR7375	1981
5. M.V. ***Bright Star***	93	336	05/05/03	D1140326	753	1211JT	WDB4311	2003
6. M.V. ***Cap Streeter***	28	300	11/16/98	D924785	ILZA5648B494	794HR	WCX3809	1987
7. M.V. ***Celebration***	51	150	03/16/04	D1065556	962	-	WDC4921	1998
8. M.V. ***Evening Star***	93	305	06/13/01	D1112990	748	1212JT	WDA8319	2001
9. M.V. ***Giddy Up***	42	88	08/01/07	D1202084	1202084	3486KC	WDD9155	2007
10. M.V. ***Gotta Go Now***	16	42	09/17/97	D1025968	25734	5154HW	WCU4947	1981
11. M.V. ***Ikanakya***	25	49	05/27/98	D1061559	93468	1216JT	WCY6327	1979
12. M.V. ***Lickety-Split***	45	100			IANSSWTD808			2010
13. M.V. ***Marlyn***	70	300	10/27/97	D285127	8567	8052GZ	WAB9757	1961
14. M.V. ***Shake A Leg***	40	88	06/13/08	D1212945	IANSSWT2D808		WDE5311	2008
15. M.V. ***Shoreline II***	89	350	11/16/98	D912514	152	8139GZ	WTJ5539	1987
16. M.V. ***Skedaddle***	12	49	03/08/02	D1124472	654	1217JT	WDB7264	1966
17. M.V. ***South Shore*** -		-	-	D247657	-	-	-	-
18. M.V. ***Star of Chicago***	73	230	10/21/99	D1079044	302	1218JT	WCZ2384	1999
19. M.V. ***Vamos***	25	49	05/05/97	D1053722	41978	1219JT	WCX5635	1983
20. M.V. ***Voyageur***	98	146	06/28/02	D282089	282089	8384JW	WM5508	1983
21. M.V. ***Wai Wai***	12	49	04/05/00	D1094348	58189	1220JT	WDA7573	1980

- Frequent departures
- Fast connections to help you make the most of your visit
- Easy walk to many other city attractions
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Daily from Memorial Day to Labor Day
10 am–6 pm

SCHEDULE SUBJECT TO CHANGE DUE TO WEATHER AND CUSTOMER TRAFFIC

FROM	TO	ADULT	CHILD
200 South Wacker (Sears Tower*)			
	Michigan Avenue	$3	$2
	Navy Pier	$6	$4
	Museum Campus	$13	$7
Michigan Avenue (401 N. Michigan)			
	200 South Wacker	$3	$2
	Navy Pier	$3	$2
	Museum Campus	$10	$5
Navy Pier			
	200 South Wacker	$6	$4
	Michigan Avenue	$3	$2
	Museum Campus	$7	$3
Museum Campus (Shedd Aquarium)			
	200 South Wacker	$13	$7
	Michigan Avenue	$10	$5
	Navy Pier	$7	$3

ALL TAXES INCLUDED
*Sears Tower to be renamed Willis Tower in 2009

Subject to change without notice
Prices effective 01/09

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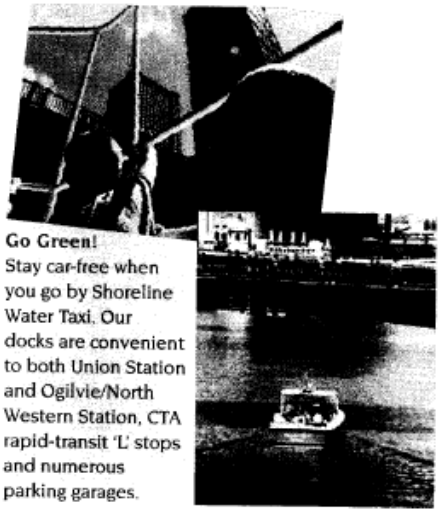
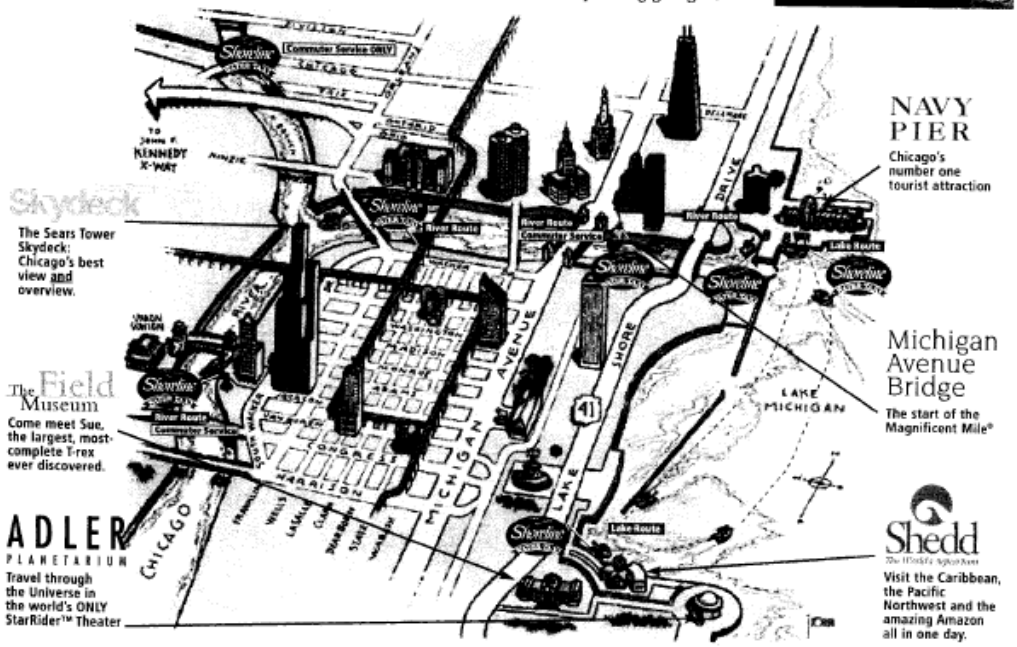
Take an exciting Shoreline Harbor Water Taxi between Chicago's most popular visitor destinations—Navy Pier and the Museum Campus with its Field Museum of Natural History, Shedd Aquarium/Oceanarium, and Adler Planetarium.

Or ride Shoreline's River Water Taxi, a dramatic way to connect exciting Navy Pier, the famous Magnificent Mile® of Michigan Avenue and the lofty Sears Tower.



Go Green!
Stay car-free when you go by Shoreline Water Taxi. Our docks are convenient to both Union Station and Ogilvie/North Western Station, CTA rapid-transit 'L' stops and numerous parking garages.

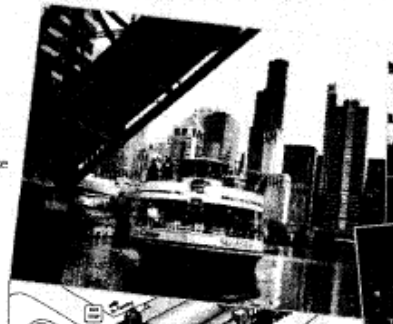


Shoreline's Famous Architecture Cruises

Take a Shoreline Architecture Cruise for an awe-inspiring one-hour tour on the historic Chicago River.

Our entertaining and professional docents bring the city's great buildings to life. Learn how Chicago rose from the Great Fire of 1871 to become the birthplace of the skyscraper and home of modern American architecture.

For a special evening, enjoy our 75-minute Architecture/Fireworks Combination Cruise with an evening Architecture River Cruise concluding with fireworks viewing from the deck of our vessel moored in Ogden Slip.



Architecture Cruise Schedule & Rates

DEPARTING OUR OGDEN-SLIP NAVY PIER DOCK

APRIL 1–MAY 30 AND OCTOBER 1–NOVEMBER 30

[Weekdays Departing]

[Mondays] 11:30 AM, 1:00 PM, 2:30 PM, 4:00 PM, 5:30 PM

[Weekends] 10:00 AM, 11:30 AM, 12:15 PM, 1:00 PM, 1:45 PM, 2:30 PM, 3:15 PM, 4:00 PM, 5:30 PM

JUNE 1–SEPTEMBER 30

[Mondays] 10:00 AM, 10:45 AM, 11:30 AM

[Afternoons] Every half hour from Noon to 5:30 PM

[Evenings] 5:30 PM, 7:00* PM, 8:00* PM *Check availability for specific dates

TOUR	ADULT	*SENIOR	*CHILD
One-Hour River Architecture Cruise			
Weekdays	**$24**	**$21**	**$12**
Saturday & Sunday	**$28**	**$25**	**$15**

ALL TAXES INCLUDED. RATES ON HOLIDAYS AND DURING SPECIAL EVENTS MAY VARY. *SENIORS OVER 65 *CHILDREN UNDER 12

Schedule subject to change due to weather, equipment availability & customer traffic. Price effective 3/1/2009

Combination River Architecture & Fireworks Cruise Schedule & Rates

DEPARTING OUR OGDEN-SLIP NAVY PIER DOCK

[June 13 to August 15] Wednesday at 8:30 PM & Saturday at 9:15 PM

TOUR	ADULT	*SENIOR	*CHILD
75-Minute River Architecture/Fireworks Cruises			
Wednesday**	**$27**	**$25**	**$12**
Saturday**	**$32**	**$29**	**$14**

ALL TAXES INCLUDED *SENIORS OVER 65 CHILDREN UNDER 12

**special rates apply July 3rd and 4th and Venetian Night

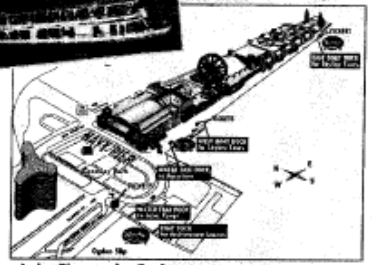
Schedule subject to change due to weather, equipment availability & customer traffic. Price effective 3/1/2009

Skyline Boat Tours—A Chicago Tradition

Board Shoreline's sparkling red, white and blue boats for a 30-minute Skyline Boat Tour of Chicago's amazing lakefront and skyline. Hear the story of Chicago's flamboyant history and landmarks while enjoying the sights. It's the perfect way to see Chicago day or evening.

Join us for our special 45-minute Sunset Cruise one-half-hour before sunset from June 13 to August 15!

For a special treat, take a Fireworks Cruise Wednesday or Saturday evenings May to September plus holidays and special events.



Lake Fireworks Cruise Schedule & Rates

DEPARTING OUR WEST-END DOCK, FIRST DOCK ON NAVY PIER

[Memorial Day to Labor Day] Wednesday at 8:45 PM & Saturday at 9:30 PM

TOUR	ADULT	*SENIOR	*CHILD
One-Hour Lake Fireworks Cruises			
Wednesday**	**$24**	**$22**	**$12**
Saturday**	**$24**	**$22**	**$12**

ALL TAXES INCLUDED *SENIORS OVER 65 CHILDREN UNDER 12

**special rates apply July 3rd and 4th and Venetian Night

Schedule subject to change due to weather, equipment availability & customer traffic. Price effective 3/1/2009

Skyline Boat Tour Schedule & Rates

DEPARTING OUR WEST-END DOCK, FIRST DOCK ON NAVY PIER:

APRIL & OCTOBER

[Weekdays] Departs every hour from 11:00 AM to 4:00 PM

[Weekends] Departs every hour from Noon to 4:00 PM

MAY

[Weekdays] Departs every hour from 11:00 AM to 4:00 PM

[Weekends] Departs every hour from 11:00 AM–4:00 PM

JUNE, JULY & AUGUST

[Mondays] 10:30 AM, 11:30 AM

[Afternoons] Every half-hour Noon to 5:00 PM

[Evenings] Every hour until 10:00 PM *Except during Shoreline Short Fireworks Cruises

SEPTEMBER

[Daily] 10:30 AM to Sunset

DEPARTING OUR EAST-END DOCK, NEAR BEER GARDEN:

MAY 1–JUNE 14 and AUGUST 17–SEPTEMBER 30

[Weekends] Regular departures

JUNE 15–AUGUST 16

[Daily] Regular departures

TOUR	ADULT	*SENIOR	*CHILD
Lake Michigan 30-Minute Skyline Boat Tour or Lake Michigan 45-Minute Sunset Cruise			
Weekdays	**$14**	**$13**	**$6**
Saturday & Sunday	**$15**	**$14**	**$7**

ALL TAXES INCLUDED. RATES ON HOLIDAYS AND DURING SPECIAL EVENTS MAY VARY. *SENIORS OVER 65 *CHILDREN UNDER 12

Schedule subject to change due to weather, equipment availability & customer traffic. Price effective 3/1/2009

General Observations and Questions Concerning the USACE Current Plan to interrupt navigation on the Chicago waterway and questions regarding the probability of success as a deterrent to Asian carp propagation

Purpose

This document was prepared an effort to persuade the United States Army Corps (USACE) from moving forward with a plan to alter the operation of the Chicago Controlling Lock and creating a unwarranted economic hardship on the marine community. Restricting lock operation will cause unnecessary loss of jobs, endanger an already fragile economy and spell disaster for the local Marine Industry.

To provide additional comment urging the USACE to follow the correct, well established, procedural policy as it relates to NEPA document formulation. Historically, this procedure is required for all decisions of such great magnitude. A full Environmental Impact Statement (EIS) should be formulated, prepared and made available for public comment. Indications are that the USACE is only preparing the much simpler and less encompassing Environmental Assessment (EA).

The immediate and hasty implementation of plans and incomplete studies suggests that the USACE is misinterpreting the intent of Congress in utilizing Sec. 126 authority. Bypassing the required studies, tests and time proven analysis that would be involved in a typical EIS for the sake of a "quick fix" prior to Sec 126. expiration in OCT 2010.

To suggest additional studies be undertaken, patience be observed for studies and analysis not yet brought to completion in order to make an educated decision on the contingency for protecting our environment. We suggest a complete and separate EIS be completed for the modification of operations of The Chicago Controlling Lock.

We suggest pursuit of an alternate and more encompassing strategy for halting the progress of invasive aquatic species into the upper Illinois Waterway and Lake Michigan. We ask special consideration in protecting not only Lake Michigan and our shores but also the upper Illinois waterway including the Chicago River and its connecting branches. The threat for this area is not only the Asian carp, but also from a hastily created, inefficient plan that could cause severe economic and

environmental impact to an waterway that provides jobs, goods, tourism, and a myriad of recreational activities for the City of Chicago and the surrounding Suburbs.

Scope

This document has been prepared using existing studies and published data that have been made public prior to February 7 2010. It is based on the expedited attempt of the USACE to formulate an EA, and act upon its recommendations as well as recommendations from reports and studies not yet completed. FOIA requests have been sent, yet to be answered, on more current studies and related reports.

This document recognizes that invasive species can be a threat to certain areas that are environmentally suited for species propagation but only addresses the upper Illinois water way and nearby Lake Michigan.

This document is meant to supplement a much larger effort to mitigate the USACE current plan to alter Chicago lock operations.

This document was generated as an inquiry, as requested, by Commander of the Chicago District, USACE, Colonel Quarles, at the public meeting that took place FEB 2010. We provide questions related to the USACE's strategy in dealing with the Asian carp crisis. Pursuant to NEPA we ask that these questions be answered and included in project literature by the USACE prior to a ROD or FONSI.

Format

We address five basic argument topics regarding the USACE plan for implementing restricted lock operations in Chicago. Questions for the USACE are printed below each argument in **bold type** and are numbered 1-51

Topics

1. Flawed procedural process
2. Additional research is needed
3. Slight chance of species proliferation
4. Impending economic impact of Lock modification
5. Alternatives to existing plan yet to be implemented

Argument

1. Flawed procedural process

The National Environmental Policy Act (NEPA) requires federal agencies to integrate environmental values into their decision making processes by considering the environmental impacts of their proposed actions and reasonable alternatives to those actions.

To meet NEPA requirements federal agencies prepare a detailed statement known as an **Environmental Impact Statement (EIS)**. EPA reviews and comments on EISs prepared by other federal agencies, maintain a national filing system for all EISs, and assure that its own actions comply with NEPA.

The Purpose of an EIS is to ultimately help public officials make informed decisions that are a reflection of an understanding of environmental consequences and the alternatives available.

An **EIS** is required to describe the following.

a.) The environmental impacts of the proposed action

b.) Any adverse environmental impacts that cannot be avoided should the proposal be implemented

c.) The reasonable alternatives to the proposed action

d.) The relationship between local short-term uses of man's environment and the maintenance and enhancement of long-term productivity

e.) Any irreversible and irretrievable commitments of resources that would be involved in the proposed action should it be implemented.

An EIS would address our concerns, allow for industry's input and allow time for the proper scientific studies to be digested prior to making a decision that could substantially affect the well being of the maritime industry in Chicago.

Unfortunately it appears that the USACE is viewing an Environmental assessment as a viable alternative and an allowable separation from protocol to the significantly more comprehensive and inclusive EIS.

An EA is described in Section 1508.9 of the Council's NEPA regulations. Generally, an EA includes a brief **discussion** of the following:

a.) The need for the proposal; alternatives (when there is an unresolved conflict concerning alternative uses of available resources)
b.) The environmental impacts of the proposed action and alternatives
c.) A listing of agencies and persons consulted

The EIS is by far the most inclusive and complete document. There is additional discussion and more paperwork, investigation and documentation. The EIS would require much more data, time and public involvement and unfortunately for the USACE it also would involve more time. The stakeholders that will be most adversely affected by this process have had no longer than one week of notification.

It appears that there is a rush to implement a contingency plan and the USACE is certainly moving forward quickly. The pace at which implementation of certain very invasive tools in this plan is astounding. Just the act of closing the lock by itself is a process that should call for an EIS and several public hearings. It appears that the USACE wishes to push through the process to include all activities involving the Asian carp into one EA.

Question 1: We request a full Environmental Impact statement for modification of lock operations and an economic impact study to include losses from tourism, material cargo transport and loss of employment as a result of lock structure operational modifications prior to a ROD. When can we expect this document to be completed for public review?

Question 2: We are requesting a public hearing, pursuant to NEPA. When will this occur?

It is clear from SEC .126 of the 2009 appropriations act that congress implied a specific intent to assist the Secretary of the Army in stepping up efforts to make our barriers work. Without appropriate funding we could not possibly maintain or ensure our deterrents to this invasive species would be effective. It appears that the USACE is misinterpreting SEC 126. There is no correlation between SEC 126 and the closure of Chicago Lock. In fact, Chicago Lock is not mentioned in the act or documents that are incorporated by reference. Please see the act below.

> *SEC. 126. During the 1-year period beginning on the date of Enactment of this Act, the Secretary of the Army shall implement measures recommended in the efficacy study, or provided in interim reports, authorized under section 3061 of the Water Resources Development Act of 2007 (121 Stat. 1121), with such modifications or emergency measures as the Secretary of the Army determines to be appropriate, to prevent aquatic nuisance species from bypassing the Chicago Sanitary and Ship Canal Dispersal Barrier Project referred to in that section and to prevent aquatic nuisance species from dispersing into the Great Lakes.*

The above text suggests that the Secretary of the Army shall implement measures that are recommended. It also gives specific locations from whence these recommendations may be taken. There are two and they can be found below.
The current Efficacy study provided by the USACE dated JAN 2010 and as of the writing of this document describes the *Dispersal Barrier Bypass Risk Reduction Study and Integrated Environmental Assessment*. This document does not address the closure, modification or repair of the Chicago or O'Brien Lock and dam.
We can assume, based on the Colonel's comments that at some point in the future an additional Efficacy plan may be introduced for the control of invasive species beyond the Barrier system, however the applicability of SEC 126 would have to be re addressed because its abilities are exhausted after OCT 2010.The USACE did not indicate that an additional Efficacy study was available until 2012.

In the matter of interim reports a clear meaning of the subject matter for these reports has been established in sec 3061 below. There is no correlation to a lock or dam within this context. There is direction to produce a feasibility study. This feasibility study was not available for public review to date.

1) Efficacy study.

This study does not mention the closure or modification of any lock or dam.

2) Interim reports authorized under section 3061 of the WRDA of 2007.

The reports authorized by 3061 of the WRDA of 2007 **also does not contain verbiage that addresses any lock or dam. (See below)**

SEC. 3061. CHICAGO SANITARY AND SHIP CANAL DISPERSAL BARRIERS PROJECT, ILLINOIS.

(A) TREATMENT AS SINGLE PROJECT.—the Chicago Sanitary And Ship Canal Dispersal Barrier Project (in this section referred To as "Barrier I"), as in existence on the date of enactment of This Act and constructed as a demonstration project under section 1202(I) (3) of the Nonindigenous Aquatic Nuisance Prevention and Control Act of 1990 (16 U.S.C. 4722(i) (3)), and the project relating To the Chicago Sanitary and Ship Canal Dispersal Barrier, authorized By section 345 of the District of Columbia Appropriations Act, 2005 (Public Law 108–335; 118 Stat. 1352) (in this section Referred to as "Barrier II") shall be considered to constitute a Single project.

(B) AUTHORIZATION.—

(1) IN GENERAL.—the Secretary, at Federal expense, Shall—

(A) Upgrade and make permanent Barrier I;

(B) Construct Barrier II, notwithstanding the project

Cooperation agreement with the State of Illinois dated June 14, 2005;
(C) Operate and maintain Barrier I and Barrier II As a system to optimize effectiveness;
(D) Conduct, in consultation with appropriate Federal, State, local, and nongovernmental entities, a study of a Range of options and technologies for reducing impacts Of hazards that may reduce the efficacy of the Barriers; And
(E) Provide to each State a credit in an amount equal To the amount of funds contributed by the State toward Barrier II.

(2) USE OF CREDIT.—A State may apply a credit provided To the State under paragraph (1) (E) to any cost sharing responsibility for an existing or future Federal project carried out By the Secretary in the State.

(c) CONFORMING AMENDMENT.—Section 345 of the District of Columbia Appropriations Act, 2005 (Public Law 108–335; 118 Stat. 1352) is amended to read as follows:

"SEC. 345. CHICAGO SANITARY AND SHIP CANAL DISPERSAL BARRIER, ILLINOIS.

"There are authorized to be appropriated such sums as May Be necessary to carry out the Barrier II element of the project For the Chicago Sanitary and Ship Canal Dispersal Barrier, Illinois, Initiated pursuant to section 1135 of the Water Resources Development Act of 1986 (33 U.S.C. 2294 note; 100 Stat. 4251).".
(d) FEASIBILITY STUDY.—the Secretary, in consultation with Appropriate Federal, State, local, and nongovernmental entities, Shall conduct, at Federal expense, a feasibility study of the range Of options and technologies available to prevent the spread of Aquatic nuisance species between the Great Lakes and Mississippi River Basins through the Chicago Sanitary and Ship Canal and Other aquatic pathways.

Question 3: Pursuant to the language set forth by SEC 126. We request that the USACE review the applicability of section 126 authority to the action of closing or altering operations at the Chicago lock. We request a public hearing on the topic. When will this public hearing occur?

Question 4: We request that a clarification statement be created regarding the USACE's interpretation of SEC.126 applicability to closure of the Chicago lock and the provisions contained therein. It appears that there are no provisions therein that relate to the closure of a navigable waterway. There are clear

indications of emergency economic support for existing projects. When will this clarification statement occur?

Question 5: How can the USACE justify the use of SEC.126 *specifically* for the closure of Chicago lock or any other project that is not specifically and directly connected to the fish barriers?

Question 6: We understand that the Efficacy study dated 6/JAN/2010 does not mention closure of the Chicago lock as an alternative. How can the USACE restrict lock operations when no suggestion to do this has been established in a completed study?

Question 7: How can the USACE approve provisions of the interim 3 Efficacy when it has yet to be completed?

QUESTION 8: Based on the impending loss of jobs and severe economic impact of altering operation of the Chicago Lock. What justification does the Army have for not issuing a separate EIS for closing the Chicago Lock intermittently?

Question 9: Will USACE commit to make decisions that affect the livelihood and well being of the people working on the Chicago River using incomplete studies and unproven science?

2) Additional research is needed

1.) It appears that within the current expedited time frame that has been established by the USACE, the several circumstances have been ignored.

Testing and proving of the pivotal technology driving the current understanding of Asian carp migration, eDNA, has not been completely vetted or passed by an independent laboratory . The USACE has admitted that the EPA has not completed its analysis and or approval of this technology. No physical proof exists to date that the Asian carp has cleared the Barrier system. The assumption that eDNA technology characterizes the actual location of invasive species in the upper Illinois waterway is presumptuous at best. Until a true benchmark or peer review has been established, alternate methods reviewed and a true understanding of species migration is proven. It is poor science to rely on this novel method to support a decision making process.

There is also some doubt associated with the hurried approach being displayed by the USACE in closing Chicago Lock. The Corps have stated that they will alter Lock operations by 1 APR 2010. Historical water temperature analysis for the shore line of Lake Michigan indicate a temperature between 37 and 42 deg f for the month of April (plate 1). It is known that Asian carp are unlikely to travel great distances in cold water such as this (*Report to U.S. Fish and Wildlife Service per Interagency Agreement 94400-3-0128).*

With cold Lake water and an even cooler river approach present during early spring, it appears that the Asian carp would be less likely to migrate during this cooler time than in the warm summer months. It appears that a better understanding of Carp migration and tolerances be observed as recommended in sec 3.6.2.2 of *the Management and Control Plan for Bighead, Black, Grass and Silver Carps of the United States.2007*

From many years of local observation, the Chicago River and Calumet Sag Canal are cooler in temperature than the Lake in early Spring. The temperature rises as Lake water is brought in for navigational makeup. Typically this information is available at RIVERGUAGES or the USGS data bank. A USGS server error has made historic data unavailable but it certainly will reflect average water temperature as is described above.

2.) Several recent studies indicate that a more thorough understanding of migratory, reproductive and behavioral patterns of the Asian carp must be explored. These studies have been accepted for publication by *asiancarp.org* and have been used as "go to" documents by the USACE in discussions with the public. The following items summarize the need for additional studies. Many studies have yet to be completed.

a.) Biological synopsis and environmental risk analysis, USGS, 2005 et, al pg 109 *states that, "For competition to occur there must first be resources that are limiting for fishes. At this time it is not known whether plankton resources are limiting for fishes in the large rivers of the United States, or whether the introduction of the carp species could cause resources to be limited. Further research in this area is needed."*

b.) *"Control programs that successfully reduce the abundance or control the distribution of Nonindigenous fishes typically integrate a variety of control strategies targeting the species of concern Little research has been conducted on Bighead and Silver carps regarding control of undesired populations." (Dawson and Kolar 2003).*

c.) "*The location of areas in the United States presently inhabited by Hypophthalmichthys suggests that more research is needed on this requirement for successful reproduction (Fig. 27)." (Report to U.S. Fish and Wildlife Service per Interagency Agreement 94400-3-0128)*

d.) **The Aquatic Nuisance Species Task Force** is the driving force behind the multi agency approach to the invasive species issue and has adopted the *Management and Control Plan for Big head, Black, Grass and Silver Carp*. This plan establishes seven goals. One of the most significant of these seven is number six. It reads as follows. " *To conduct research to provide accurate and scientifically valid information necessary for the effective management and control of big head, black, Grass and silver carp in the United States."*

e.) Little information also exists on the ecology of wild Silver Carp in the fingerling stage. Yi et al. (1988b) and Wang et al. (2003a) reported that large lakes connected to rivers often serve as nursery areas for Silver Carp. Abdusamadov (1987) reported that

juvenile Silver Carp typically remain in the floodplain and in backwater habitats whereas adults are typically found in main channels of rivers, and in the Terek Region of Russia, juvenile Silver Carp migrated into coastal areas of the Caspian Sea.

Question 10: We ask that alternate methods be employed in conjunction to eDNA testing. What other methods have underlined the necessity to alter operations at Chicago Lock?

Question 11: We also ask that the EPA approval for eDNA testing be completed prior to its acceptance for diagnostic use. How can the USACE rely on unproven science as a diagnostic tool supporting a decision making process?

Question 12: What Industry accepted, bench mark technology will be used to prove effectiveness of eDNA?

Question 13: Will the USACE close down a Navigable waterway resulting in countless jobs lost based on the finding of an unproven technology?

Question 14: Will eDNA technology be proven and accepted by an independent laboratory prior to its acceptance for use as an indicator for the presence of Asian carp in the Illinois waterway?

Question 15: We ask that further research be conducted as suggested by the cognizant scientific community. Will the USACE allow for the time needed to provide the appropriate scientific studies?

Question 16: Will funding for additional studies be provided by SEC 126 authority?

Question 17: We ask that additional scientific studies be allowed to take place, be proven and explored prior to rash decisions and destructive action. Will the USACE deny our request?

Question 18: We ask that additional testing and appropriate time shall be allocated in order to achieve this important goal, prior to taking action beyond the CSSC. Will the USACE follow the specific guidance provided by *The Aquatic Nuisance Species Task Force,* **goal number six, and allow for research to provide accurate and scientifically valid information necessary for the effective management and control of big head, black, Grass and silver carp in the United States?**

Question 19: With April water temperatures placed at levels found non conducive to carp migration, why is the USACE attempting to force lock closures so soon?

Question 20: With water temperatures in April being non conducive to fish migration, why is the USACE altering lock operations for a fish that is not there?

Question 21: Is Modified structural operations of Chicago lock just a method to appease political pressure?

Question 22: What form of mitigation for the collateral marine life damage will be performed after destroying the marine life in kill zones?

Question 23: What National laboratory was involved in studies supporting the implementation of the USACE's current plan?

Question 24: What study has been performed to analyze the potential long term damage the current plan may have on the Waterways above the barrier?

Question 25: What variation from water quality standards are being discussed as it relates to MWRD's effluent in the waterway and this project?

Question 26: How will the USACE mitigate for marine life losses that are the result of 40 years of clean water and the passage of the CWA?

3) Slight chance of invasive species propagation in the Lake

a.) Through modern scientific research we understand that the silver carp requires substantial lengths of flowing water to spawn (Gorbach 1981). This specific velocity of water ~~cannot be~~ achieved in the ~~Upper Illinois River~~, Cal sag, Little Calumet and the Chicago river let alone Lake Michigan. In fact, the silver carp are documented to be incapable of reproducing in waters without the equivalent of 100km or more of un dammed flowing water at a velocity of >300 cfs or ~~1.1 to 1.9 m~~/s.

b.) We also have determined from recent studies that the Lake Michigan will not supply the required food to allow a species so reliant on zooplankton to exist en mass. The following excerpt is from a recent study.*Evaluating Asian Carp Colonization Potential and Impact in the Great Lakes, An Aquatic Invasive Species Research Project,* Walter Hill, Principal Investigator, University of Illinois, Mark Pegg, Co-Principal Investigator 2008.*"A tacit assumption made in identifying Asian carp as significant threats to Great Lake ecosystems is that they will be able to grow on the relatively dilute plankton that occurs in large portions of the Great Lakes. Flourishing associated with eutrophic conditions that feature abundant phytoplankton and zooplankton. Most areas of the Great Lakes are oligotrophic to slightly mesotrophic, and feature relatively low abundances of phytoplankton and zooplankton, especially since the arrival of zebra mussels. For example, mean chlorophyll a values in Lake Michigan and Lake Superior are <1 µg/L (EPA*

c.) GLNPO Open Water Surveillance Program data), whereas mean chlorophyll a values in areas of the Mississippi River where Asian carp now thrive are >20 µg/L (J. Chick, INHS, personal5 communication). The ability of Asian carp to successfully exploit

10

the relatively sparse food environment of the Great Lakes may be limited, particularly since these filter-feeding fish are likely to devote a substantial portion of their energy budget to swimming expenditures."

Question 27: How is it possible for this species to become a threat to Lake Michigan when the environment provided by the lakes is non conducive to species propagation as indicated in studies ~~above~~? BY THE UNIVERSITY of ILLINOIS ?

Question 28: How can the species spawn and reproduce without the required amount of water velocity as indicated in ~~studies above~~? STUDIES BY (COREACH) 1981

Question 29: How can the Asian carp live in a water body that will not support its feeding habits as indicated above?

Question 30: We understand that Asian carp have been found in Lake Erie as early as 1995. Lake Erie is less deep as Lake Michigan. Why would the carp not thrive in Lake Erie to date?

Question 31: What other Lake has been used to model the potential risk for Asian carp proliferation?

4) Impending Economic Impact of Lock Closure

Question 32: What assurances can the USACE give to the industry that jobs generated by this plan and sec 126 authority will be fairly provisioned to those who loose work as a result of altering operations at Chicago lock?

Question 33: Will the Army Corps ensure that vessels that become land locked as a result of Lock closure are placed first in line to be hired by the Government for use in this project?

Question 34: Will the USACE provide jobs to the Merchant Mariners that are let go from employment as a result of this project?

Question 35: Will Sec 126 authority be used to pay for the economic damages that existing companies and workers endure as a result of Lock closures?

Question 36: Will the USACE agree to pay for damages to vessel personnel that come into contact with chemicals that may injure their health?

Question 37: How will the USACE mitigate for lost revenue and tourism as a result of lock closures?

Question 38: Will the USACE pay COBRA expenses for the employees that lose their job as a result of closures of the Chicago lock?

Question 39: Will the USACE provide advertizing expenses to mitigate for the loss of local tourism attractions as a result of this project?

Question 40 Will the USACE commit to hiring mariners who are displaced by Lock closures as commercial fishermen with salary commensurate to their regular pay?

Question 41: Will the USACE ensure that vessels from outside Illinois are not given priority for project use when local vessels are available as a result of Lock closures?

5) Alternatives to existing plan

There are a number of potential actions that can be taken to ensure that the Asian carp are deterred from entering the upper Illinois Waterway. Multiple agencies have partnered with the USACE in formulating barrier or barrier like methodology to prevent the Asian carp from moving North. The great majority of time has been allocated to research and construction of the electrical fish barriers. Several alternate, rather novel techniques have yet to be utilized. It would now appear prudent to exercise a less economically invasive attempt in lieu of creating an environmental and economic disaster such as would occur should the Chicago Lock operations be reduced. Funding has become available to the USACE for exploration and application of such methodology.

The Asian carp migration should be halted at the best geographic gauntlet or bottle neck available. This exact opportunity exists below the confluence of the Cal sag and CSSC at RM 305 (plate 2). This portion of the waterway is much narrower that its counterparts to the North. A multi level, multi technology barrier system can be constructed that introduces several obstacles to the movement of the invasive species without restricting marine commerce to the North and East. Should it become necessary, the Cal Sag and South branch of the Chicago river could become the final front.

All efforts should be made to maintain the Navigable waterways to the North. Keeping most major operations below RM 305 will not only provide for a tighter defense but will also allow the defense team to operate nearly un inhibited. Barge traffic can be staged and schemed, recreational traffic restricted. This option is surely more appropriate and with the cooperation of multiple agencies can be conducted with the least Environmental and economic impact.

The act of enlarging the gap between control points, such as between the barriers and Chicago/O'Brien lock(s) is less efficient than creating a series of connected fronts that defend not just Lake Michigan, but the two river systems above the barrier system.

Our fall back should be considered the area above the confluence at RM 305 (plate 2) Below are examples of alternate methods that may be employed in such a defense system.

1) Recent studies imply that the outer membranes of fertilized carp eggs absorb water and expand rapidly if the incubating medium has a lower ionic concentration than the egg. If this occurs, premature bursting from excessive water absorption will occur (*Chadhuri 1979*). A study has shown that reducing water hardness <200mg/l calcium carbonate will cause bursting of the carp egg.

2) As we know from research (Pegg, Chick 2006 etal) Bubble barriers along with acoustic countermeasures can be as much as 95% effective in causing Asian carp to turn back from the emulating source.

3) *The Management and Control Plan for Bighead, Black, Grass and Silver Carp in the United states 2008* ,Strategies and recommendations , 3.2.1.3, urges us to, " promote, support and provide technical analysis and comment for the field testing of novel containment methods.

4) *The Management and Control Plan for Bighead, Black, Grass and Silver Carp in the United states 2008*, Strategies and recommendations 3.2.2.3. Specifically urges "the construction and operation of sound projector array-based acoustic bubble curtain fish deterrent at two locks and dams on the upper Mississippi waterway."

5) A series of defense mechanisms or barriers would ensure that each novel technology be placed, one after the other along the CSSC. Noting that vessels would need the stability required for passage in the form of displacement.(spread out curtains).

6) Attention should be given to the tendency for water to be displaced by a loaded barge. This creates a suction and pressure pocket that may draw or push contaminated water past barriers.

7) Introduction of CO2 or other gasses should be considered in bubble technology.

8) Construction of an intermodal transfer facility at river mile 305.

An alternate plan could consider permanently closing off the CSSC South of RM 305. A quarter mile wall could be constructed with sheet piling on both sides and rock and sand fill could be used to seal the wall center. Concrete with drainage leading South could be poured to cap the foundation. This wall would be positioned in such a way that the

narrowest portion of the river would be sealed (plate 3). Intakes on the North end of the wall could pull water from the uncontaminated pool and discharge it in to the southern pool that is contaminated with the invasive species. No other hydraulic connection leading from the lower South pool would be allowed to enter the upper North pool. Flood waters and treated waste water of sufficient amounts from Chicago would be allowed to be pumped across the barrier thus reducing the effects of flooding. All water transfer could be controlled by the USACE or the MWRD as the local sponsor. The MWRD has an established expertise and is well aware of how much water needs to be removed from the upper pool in the event of a precipitation event.

A barrier such as this would satisfy the States of Michigan and Wisconsin. The Tour vessels would no longer be affected by Lock closures. The towing industry, who already deal with the narrow channel, would utilize the intermodal for transfer of barges either over the wall via a commercially available TRAVELLIFT or a submerged rail scheme as is used in other parts of the world (plate 4). During the transfer process the hull of vessels wishing to pass may be inspected by USCG or local authorities. Decontamination efforts could also be used to ensure invasive species eggs are not attached to vessel appendages.

The current generated by the pumps required to move water from one pool to the next could also be used to generate power or lure invasive species to the lower pool discharge for destruction if required. An intermodal of this size could also be incorporated into the existing towing industry infrastructure in Lamont.

With the Fish barriers already in final stages of completion, the potential location of this intermodal could be moved farther South. This would place the barriers on the Northern pool as a secondary defense.

This intermodal plan can also address navigation concerns in several ways. If it is constructed North of the barriers, the existing protection will cover the construction area. If it is constructed South of the barriers then once it is complete the funding used to maintain the barrier system could be transferred to the intermodal operation. The barriers could be moved North or destroyed. This Wall could be destroyed in the future if it was determined to no longer be required to prevent the spread of invasive species.

I believe this project could be viable, quickly constructed and would create not only a universal solution but employment for an industry that needs the jobs. All at a cost of much less than the 78 million dollars .

Question 42: Has an effort to alter ionic properties of the CSSC, in the vicinity of the barrier system being used to assure Asian carp egg destruction?

Question 43: If not, what is the justification for this process not being implemented at this time?

Question 44: Why are the USACE not constructing a bubble barrier above the existing electrical barriers given the funding released by SEC 126?

Question 45: A series of bubble barriers would appear to be less economically taxing, more environmentally acceptable and more strategically well suited than restricting operations of the Chicago Lock. Why has the USACE not included this method in current practice?

Question 46: Pursuant to recommendation 3.2.1.3 of the *The Management and Control Plan for Bighead, Black, Grass and Silver Carp in the United states 2008.* **Why has there not been additional "novel "methods such as, bubble and sound curtains etc employed as tools in the CSSC?**

Question 47: The goals of recommendation 3.2.2.3 of the *The Management and Control Plan for Bighead, Black, Grass and Silver Carp in the United states 2008* **have not been met. Will the USACE complete the recommendations and strategies of this study prior to altering operation of the Chicago lock?**

Question 48: Will the USACE commit to the use of less invasive barrier technologies, to deter carp prior to using the more invasive plan of lock closures?

Question 49: Can the USACE slow the implementation of its current plan to alter Lock operation in order for new technologies to be developed?

Question 50: Will the USACE consider moving its main focus from the more expansive current extremes and Chicago Lock to a more easily managed 6 mile area around RM 305?

Question 51: Will the USACE consider construction of an intermodal transfer facility South of RM 305?

I would appreciate a response to the questions contained herein and request this document be included in the forth coming EIS or EA.

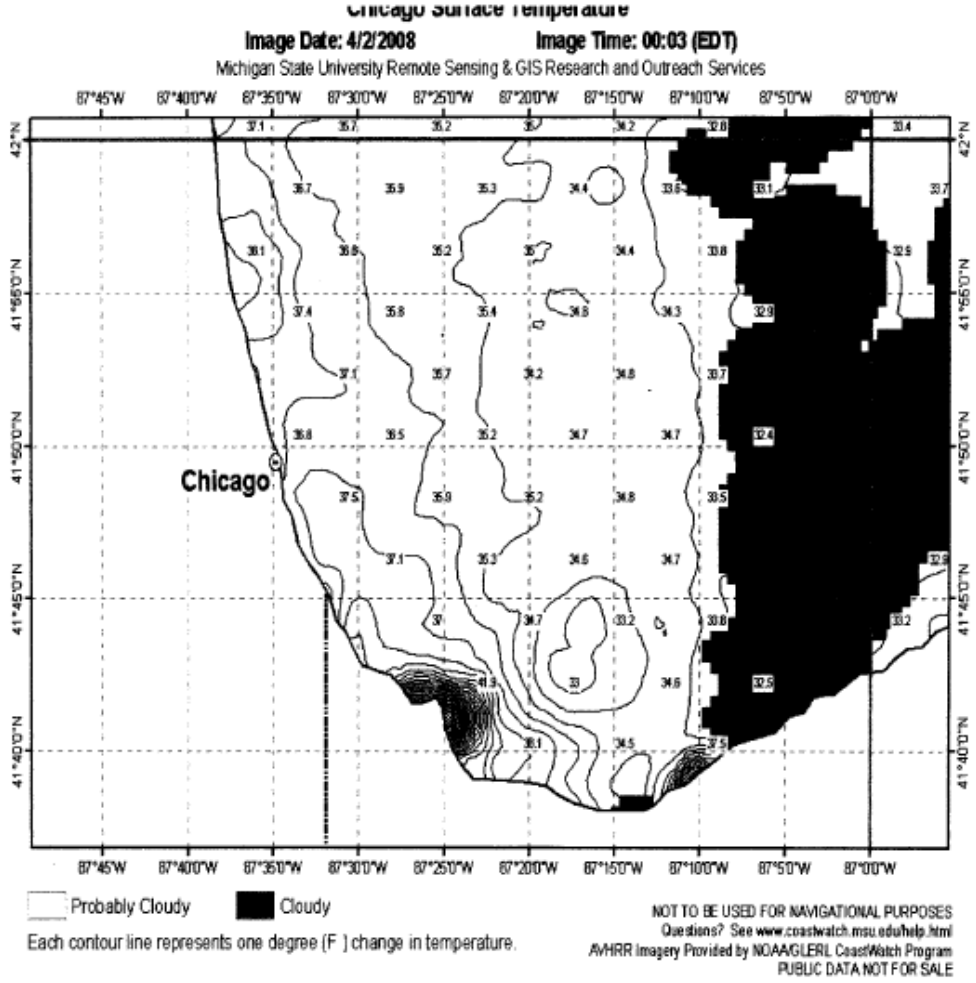
Respectfully submitted,

Captain Mike McElroy

Chief Engineer

Mercury Sightseeing Boats

7301 w 114 place, Worth, Ill 60482 Captmcm@yahoo.com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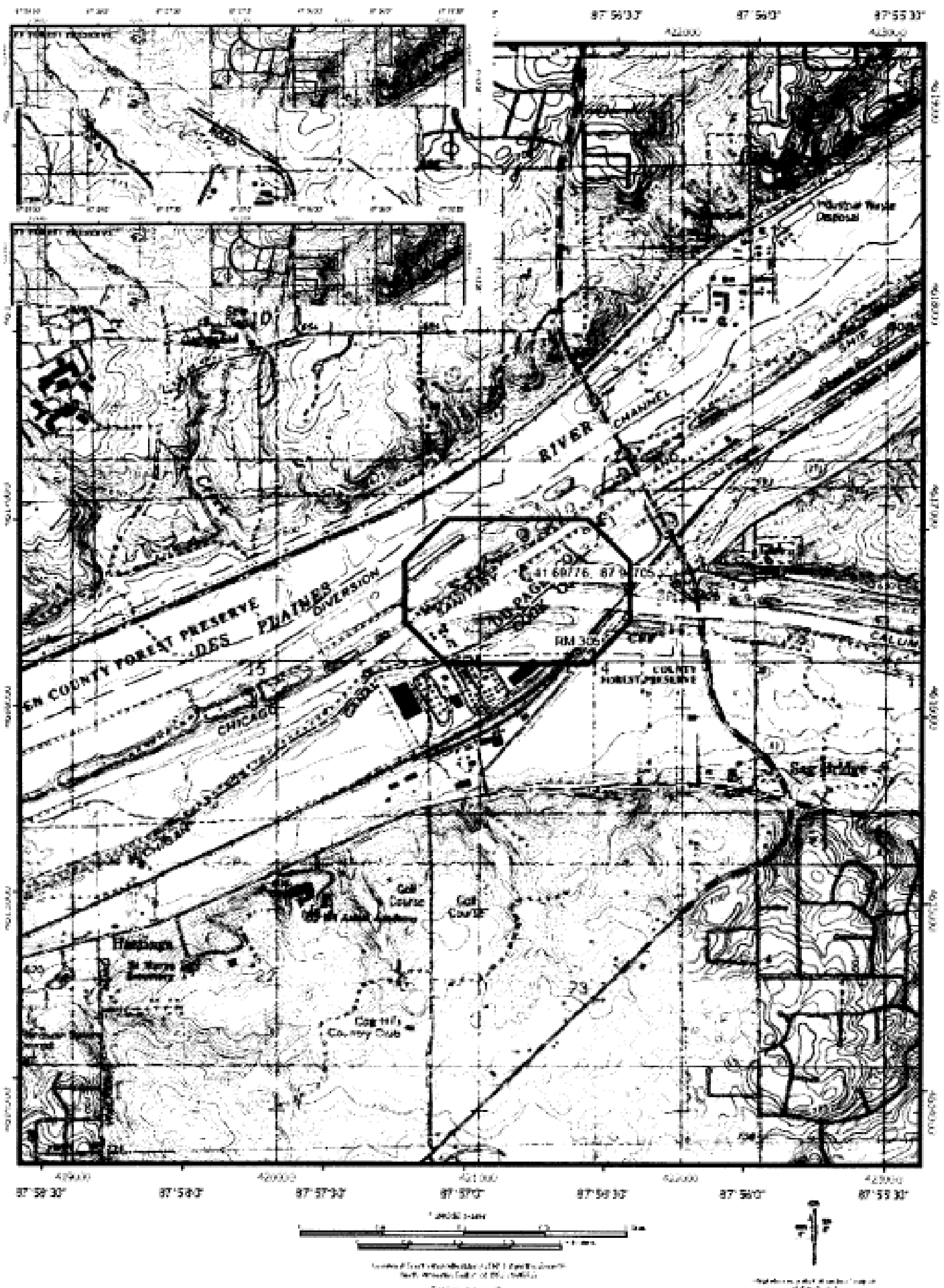
87°10'0"W
87°5'0"W
87°0'0"W
42°N
41°55'0"N
41°50'0"N
41°45'0"N
41°40'0"N
Chicago
Probably Cloudy
Cloudy
Each contour line represents one degree (F) change in temperature.
NOT TO BE USED FOR NAVIGATIONAL PURPOSES
Questions? See www.coastwatch.msu.edu/help.html
AVHRR Imagery Provided by NOAA/GLERL CoastWatch Program
PUBLIC DATA NOT FOR SALE

Plate 1



DES PLAINES
RIVER
DIVERSION
CHANNEL
CHICAGO
COUNTY FOREST PRESERVE
RM 305
Golf Course
Country Club

plate 2

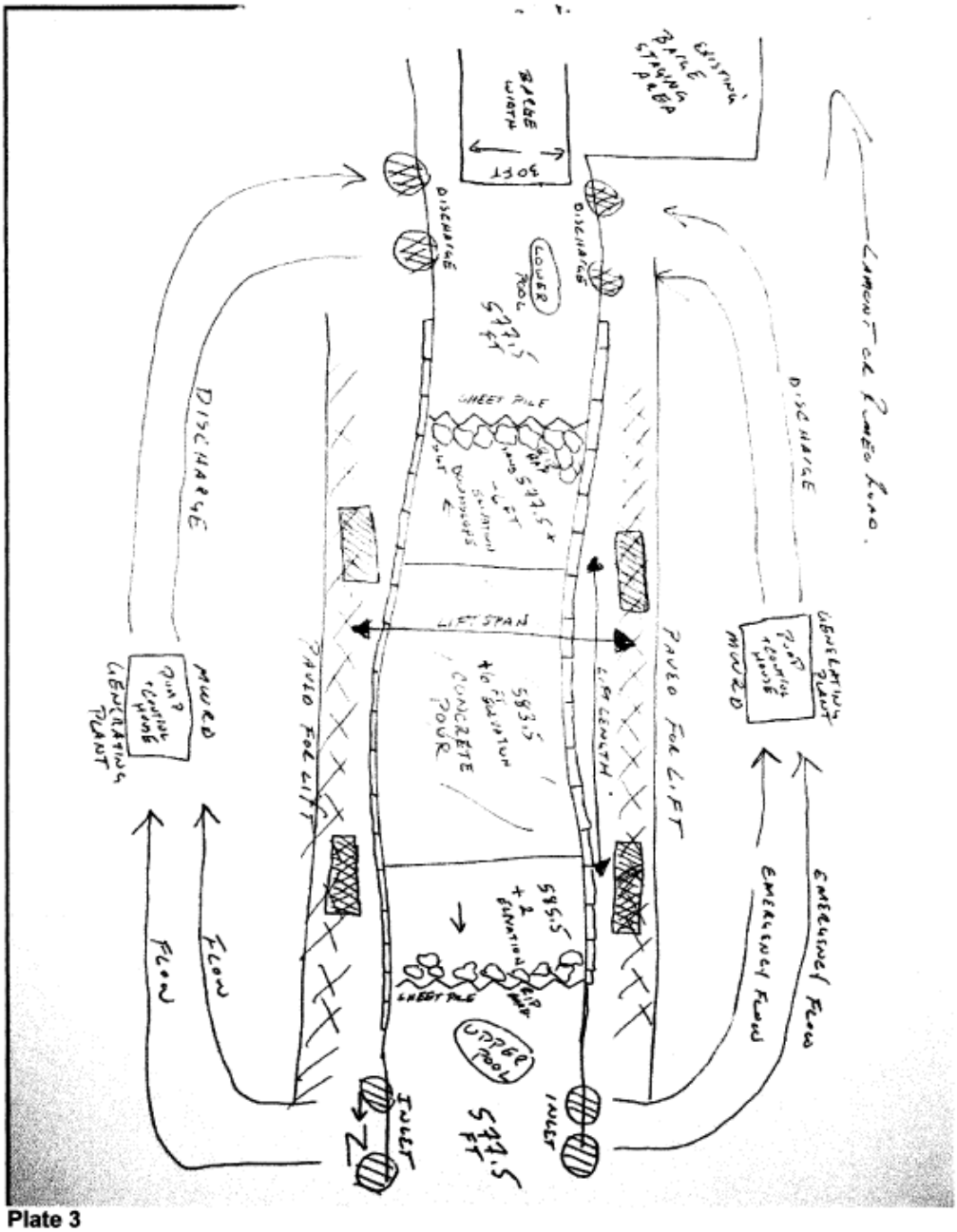

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Plate 3

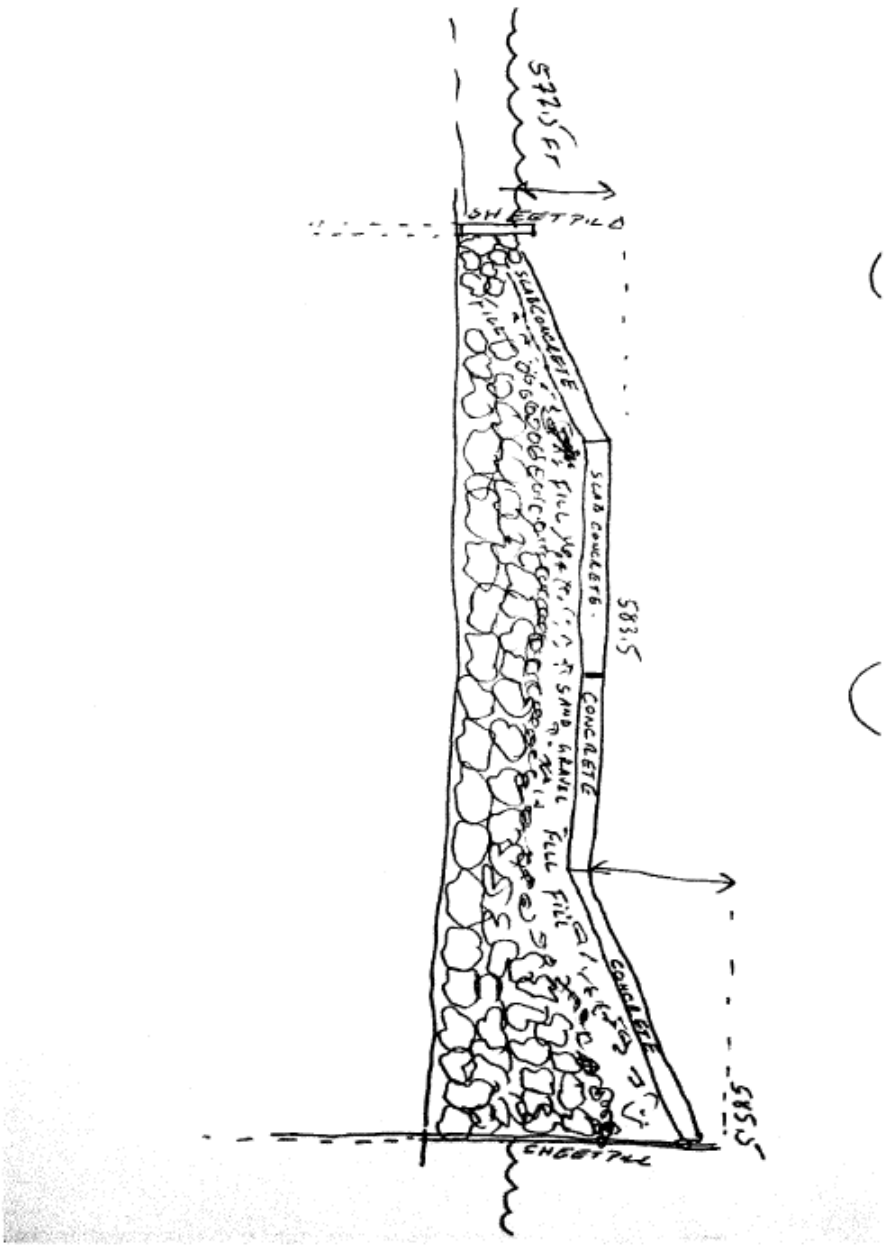

Plate 4

Dear Mr. Peter Bullock,

I understand that this letter is delayed in getting to you however I wanted to give you the feedback on behalf of Holcim (US) Inc.

I am writing this letter in preparation for the NEPA document and to comment on a proposal to modify the structural operations of the Chicago and O'Brien locks which could entail weekly closures. The closures of these key locks would have an adverse effect on Holcim (US) operations.
Specifically, our Chicago Skyway plant, which supplies over 200,000 tons of critical construction materials to our water-served terminals across the country, would be forced to terminate operations, resulting in the loss of jobs, sales, and tax revenue. As detailed in a previous letter the modification or closure of the lock would lead to a loss in revenue of approximately $11.2 Million, this does not included the decrease margin on sales due to using alternative modes of transportation. This modification could also lead to the loss of 2 jobs, and if possibly the closure of the facility that would lead to the loss of 25 to 30 jobs.

Holcim is committed to finding a solution that reconciles both environmental and economic considerations. Holcim believes that the threat posed by the Asian carp needs to be addressed; however, solutions must be based on sound scientific principles and not impose unnecessary economic costs.

To that end, Holcim supports the majority of the proposed solutions. These solutions work to protect both the economy and the environment, as it will be of the utmost importance that we work together to keep the carp out of the Great Lakes. However, there is a notable exception: Holcim is unable to support the modified lock operations as proposed by the U.S Army Corps of Engineers, the Environmental Protection Agency, the Department of Interior, and the U.S. Coast Guard on February 8, 2010.

It is important that we move forward with these alternative methods of keeping the carp out of the lakes because closing the locks is not an effective solution. As stated in United States brief in the case Michigan v. Illinois, "the locks were not designed to be fish barriers; they are not perfectly watertight, and small fish or eggs conceivably could penetrate even a permanently closed lock. The Corps does not have readily available bulkheads to make the O'Brien Lock watertight, and although bulkheads are available at the Chicago lock, they may not be perfectly watertight either."

When evaluating the proposed options and determining the appropriate path forward, I respectfully ask you to consider the following questions:

- What is the goal of lock closures?
- Why is there an urgency?
- What will happen during the closure that produces a measurable benefit?
- What are the start and stop dates?
- What other actions are being considered?
- How will the Corps evaluate these actions, or how will adaptive management fit into this process?
- How will safety and security issues be addressed during the proposed closures?
- And finally, will there be flexibility in the plan to take into account weather conditions?

Following the aggressive strategy to reduce the threat of Asian carp in the Great Lakes outlined by Federal Officials without the modified lock operations should provided the needed barriers to keep the Asian Carp out of the Great Lakes.

Thank you for providing me with the opportunity to provide my perspectives on this critical issue.

Sincerely,

Rob Innis
Marine, Manager Holcim (US) Inc.
_____

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Www.passengervessel.com

February 12, 2010

Colonel Vincent V. Quarles
U.S. Army Corps of Engineers – Chicago District
(CELRC)
111 North Canal Street, Suite 600
Chicago, IL 60606 - 7206

Dear Colonel Quarles:

The Passenger Vessel Association (PVA) – the national trade association representing owners and operators of commercial U.S.-flagged passenger vessels of all types – respectfully submits these comments in response to your invitation issued during the February 5 meeting with the maritime industry in Chicago.

PVA appreciated your outreach last week to the maritime industry, including the passenger vessel segment, and we are grateful for the opportunity to provide further written comments on the alternate scenarios for modified structural operations of the locks and waterways of the Chicago River system.

While PVA understands that the Army Corps of Engineers has put forward the alternate scenarios in good faith, and while PVA acknowledges that there is intense public pressure on the Corps to make changes in waterway management to impede the spread of the Asian Carp toward the Great Lakes, PVA must report frankly that the alternatives presented, including Alternative 2, will cause grievous economic harm to the Chicago-area passenger vessel operators. This is because continued operation of the Chicago Harbor Lock and the nearby Chicago River are essential to the thriving passenger vessel industry in Chicago. Because of this industry's integral role in Chicago's tourism industry, jeopardizing passenger vessel operations, including the famous Chicago Architectural Tours, will eliminate jobs, cause widespread economic harm as "ripple effects" engulf businesses that service, support, and supply the passenger vessel operators, and deprive Chicago of a unique attraction to visitors and tourists.

Rather than closing (in full or in part) the Chicago Harbor Lock and restricting navigation on the nearby Chicago River during the operating season of the commercial passenger vessels, PVA urges the Corps to adopt countermeasures against the Asian Carp that are more effective and less destructive economically. PVA stands ready to assist the Corps and federal agencies in identifying such measures.

Six PVA members utilize the Chicago Harbor Lock and the nearby Chicago River. PVA believes you will receive written comments from each describing how the alternative operating scenarios will affect and damage them economically. They are all "small businesses" pursuant to the federal government's criteria, and so federal agencies owe a special duty to consider their situations. They include:

Chicago Cruises (Great Lakes Development LLC) (www.chicagocruises.com)
Chicago's First Lady Cruises (www.cruisechicago.com)
Chicago from the Lake, Ltd. (www.chicagoline.com)
Mercury Sightseeing Boats (www.chicagocruises.com)
Shoreline Marine Company (www.shorelinesightseeing.com)
Wendella Sightseeing Boats (www.wendellaboats.com)

The Corps must understand the business operating model of the passenger vessel companies. Most of them use the same vessels to provide two services, often on the same day: scheduled ticketed tours open to the public at large and private chartered events. One operator confines itself to charters only.

Despite being "small businesses," the Chicago passenger vessel companies employ more than 600 individuals each year. In responding to a PVA inquiry in December, the operators declared that they provide at least 604 workers in high-quality, good paying jobs. The combined payroll for these workers exceeds $7 million.

At the meeting in Chicago last week, several of those employees spoke publicly of their fears about their jobs. The harm that will be inflicted on them if the passenger vessel operators cannot maintain these jobs is real. We know what will happen if the operators cannot sail because of closures of the lock and river; these jobs will go away and will do so this very year. With respect to the captains and other maritime workers on the vessels, it will be difficult if not impossible to locate replacement jobs in the maritime sector without leaving Chicago. PVA does not wish to denigrate the predictions of economic harm that might occur if Asian Carp reach the Great Lakes and establish a destructive population there; nevertheless, predictions of that harm are just that – predictions. In PVA's view, the Corps should give greater weight to the foreseeable, immediate loss of existing jobs in Chicago.

It would be ironic if, at the same time that the Congress of the United States is on the verge of enacting multi-billion dollar legislation to create jobs, federal agencies adopted an Asian Carp prevention strategy that would cause substantial jobs loss this year!

Alternative 2 will prevent the passenger vessel operators from conducting their tours at least half of the time during their restricted business season; no small entity can absorb such a blow and still survive. It is essential for the Corps to understand that these businesses don't conduct their vessel tours year-round but instead do so in the months between spring and fall. Their operating seasons differ somewhat, but most have

a business season of seven months or so. However, their peak revenue periods are concentrated in just a few weeks in mid- and late summer.

At last week's meeting in Chicago, you made clear that operators should expect that additional preventive measures would take place in conjunction with closures of the Chicago Harbor Lock. Therefore, the passenger vessel industry is to assume that commercial navigation on the Chicago River would be shut down at the same time the lock is closed. As a result, under Alternative 2, at the same time lake-to-river and river-to-lake vessel tours would be blocked by the closed locks, all-river tours would also be shut down because of the complementary preventive measures. In essence, under Alternative 2, nearly all passenger vessel operations would have to cease from 3-4 days each week during the vessel operating season, including the peak revenue periods.

The economic damage to the passenger vessel operators cannot be calculated by simply using a "straight-line" method (that is, shutting down navigation for three days out of seven would result in loss of 3/7 of expected revenue). A business that caters to tourists and visitors must be available when they wish to enjoy it. The scheduling uncertainty and unreliability that would be introduced under Alternative 2 would deter and repel customers, especially the many that make relatively "spur of the moment" decisions to take advantage of the tours.

Passenger vessels compete for charter business against shoreside venues; moreover, advance contracting is common. At the Chicago meeting, one operator told you of how many charters she has already booked for the coming summer season. The Corps must reasonably expect that implementation of Alternative 2 under any configuration will inevitably mean that many of those contracted-for charters will fall on days when the lock and river will be shut down. The Corps must also understand that it will be extremely hard, if not impossible, for the vessel operators to reschedule those weddings, prom dinners, and other date-sensitive events to times and days when vessel operations will be achievable. The result will be the loss of those contracts as the chartering parties make arrangements for other venues. Furthermore, the loss of good will and reputation, and the perception that the vessel operator is an unreliable business that is unable to perform a contracted-for service will impede the ability to attract and contract for other charters.

Customers, especially those who charter vessels, want river-to-lake and lake-to-river vessels tours. A vessel operator who can not provide this risks losing the charter altogether.. As you will see from the submissions from the individual vessel companies, their vessels are usually based entirely at river facilities or based entirely on Lake Michigan. They don't have some vessels at one location and more at the other (although one company does have boats so located). Thus, it is not possible, as Michigan's Attorney General recently suggested, that a single company can offer lake tours with its lake-based vessels and river tours with its river-based vessels. To provide its customers with both lake and river experiences on the same cruise, the vessel operator must transit the Chicago Harbor Lock. If it is closed for 3-4 days each week, the customer will not receive the desired experience and the likelihood of the charter goes down immensely.

Alternative 2 will jeopardized the world-famous Chicago Architecture Vessel Tours. One might be tempted to conclude that these tours, so much a part of the city's tourism draw, would be unaffected by closures of the Chicago Harbor Lock. This is not the case. As was made clear at last week's Chicago meeting, other preventive measures will render the nearby Chicago River unavailable to commercial navigation when the lock is closed. Thus, for 3 or 4 days per week, the Chicago Architecture tours could not be performed. Also, there is great concern about the water level and quality of the Chicago River. Would closure of the lock and other associated measures alter the river's water levels? Would it make the river stagnant, or dirty, or smelly? Anything that might make the river experience less appealing to someone on the passenger vessel will jeopardize this tour. In its Architecture Tour, Chicago can offer a visitor an experience unlike anything available in any other American city. The federal government must do everything it can to ensure that this experience is preserved.

PVA takes seriously any credibly-demonstrated harm that could ensue to the ecology of the Great Lakes should the Asian Carp establish a presence there. Maintenance of healthy natural aquatic communities is critical to PVA's vessel members wherever they operate, and PVA members operate throughout the Great Lakes in addition to Chicago. Nevertheless, PVA believes that the federal government can prevent the migration of the Asian Carp into the Great Lakes by employing a range of concerted actions other than closure of the Chicago River and Chicago Harbor Lock pursuant to the alternatives presented (including Alternative 2).

Can not the Corps concentrate its "defense in depth" strategies in locations further down the South Branch of the Chicago River below the area of navigation for Chicago's passenger vessels? Could not the Corps also employ defensive measures in the 15-mile downriver zone discussed by several speakers at the Chicago meeting? Would it not make sense to employ the anti-Carp techniques in spots that inflict the least economic harm on existing going concerns, including the Chicago passenger vessel operators. PVA encourages the Army Corps of Engineers to rethink its strategies along these lines and not confine itself to the economically damaging alternatives recently presented, especially Alternative 2.

Thank you for the opportunity to provide these observations. PVA stands ready to provide the Corps with more information about the Chicago-area passenger vessel industry and to work with all federal agencies on a viable, effective, and economically constructive strategy to fight the Asian Carp.
Sincerely,

Edmund B. Welch
Legislative Director

Chicago Cruises (Great Lakes Development LLC) (www.chicagocruises.com)
Chicago's First Lady Cruises (www.cruisechicago.com)
Chicago from the Lake, Ltd. (www.chicagoline.com)
Mercury Sightseeing Boats (www.cruisechicago.com)
Shoreline Marine Company (www.shorelinesightseeing.com)
Wendella Sightseeing Boats (www.wendellaboats.com)

Most operators offer the famous boat tours to showcase Chicago's architecture. Should the lock be closed, each would be prevented from providing lake-to-river and river-to-lake excursions, upon which their businesses rely. For Chicago vessel companies and their hundreds of employees, lock closure would be economically injurious or completely crippling. A vibrant, successful part of Chicago's tourism industry would be tossed aside.

PVA member companies operate at least 36 vessels with a combined passenger capacity of 4,115 that must pass through the Chicago River lock. Their vessels carried at least

PVA member companies operate at least 36 vessels with a combined passenger capacity of 4,115 that must pass through the Chicago River lock. Their vessels carried at least 691,674 passengers and made at least 7,790 transits through the lock in 2009. These PVA members employ at least 604 workers in high-quality, good-paying jobs and have an annual payroll of at least $7,033,396. Tens of millions of dollars of investment assets and resources are at risk if the passenger vessels can not be employed in their normal income-producing activity.

PVA takes seriously any credibly-demonstrated harm that could ensue to the ecology of the Great Lakes should the Asian carp establish a population there. Maintenance of healthy natural aquatic communities is crucial to PVA's vessel members that operate in Chicago and throughout the Great Lakes. Nevertheless, PVA believes that the federal government can prevent the migration of the Asian carp by employing a range of concerted actions other than closure of the Chicago River and the lock connecting the river with Lake Michigan.

Sincerely,

Bill Clark

Captain Bill Clark

Asian Carp Control Strategy Framework

Questions on the plan, potential impacts and its implications to the marine community of the Chicago Area Waterway FEB 2010

Background

On 5 February 2010, the *United States Army Corps of Engineers* (USACE), in coordination with *The Asian Carp Regional Coordinating Committee* invited members of the Chicago marine community to a public meeting. The purpose of this meeting was to establish a rapport with the marine community and explain the possibilities that may arise during the implementation of modified structural operations. This discussion was the first public notification to industry that, additional closures of the Chicago and O'Brien Lock's was to be implemented no later than 2 April 2010.

Industry was provided copies of the power point presentation highlights that included drawings of the Chicago Area Waterway (CAWS). These drawings included indications of lock closures; modified water quality discharges and kill zones throughout our vessels operating area. Included in the hand out was a matrix describing the four alternatives that had been pre established by the USACE for modified lock operations. The members of the marine community that attended the meeting that day immediately realized the potential environmental and economic impact of what the USACE was suggesting. It also became clear that the current plan was un sympathetic of the Marine Industries needs related to usage of the CAWS and the Chicago and Obrien Locks.

The Chicago Marine industry along with our Illinois Waterway brethren concurrently agreed that we are strongly opposed to the modification of operations at the CAWS lock structures. Initial questions and letters were subsequently sent to the PAO at the USACE Chicago District and to our local and Federal representation. It has became apparent that the Marine Industry had not been adequately represented during the early planning stages of this plan nor had representation been solicited by the planning agencies in charge of such solicitation. Opposition to this plan now continues to grow.

This document identifies questions that have been raised as a result of the most recent document made available to the CAWS Marine Industry, *The Asian Carp Control Strategy Framework* (CSF). We would like this document to be submitted for review and inclusion into the forthcoming EIS as is required by NEPA regulations. Should Section *126 of HR 3183 ,The 2010 Energy and Water Appropriations act* be used to bypass NEPA then we request it be submitted to the Council on Environmental Quality in protest to the use of Sec 126 for such purposes. Additional objections and concerns are forthcoming.

Observations ,Comment and Questions

1.) In the executive summary of the CSF pg ES-1 you state that the purpose of this CSF and or main objectives include "Recognizing potential hurdles that may complicate CSF implementation". Historic documentation such as related Environmental Assessments

and Environmental impact statements provides that the USACE would pursue and study data to support any effort that would result in an adverse impact to the environment. No such inquiries or studies have been published to date and the affected community has not been asked for data relating to potential undesirable impacts as a result of implementation of this plan.

Question 1: Does the fact that altering structural operations or closing of the Chicago lock will cause substantial adverse impacts on the marine and tourism industry consist of a "hurdle" or an adverse environmental impact?

2.) It is stated on page ES-2 of the CSF that the "best science available underscores the CSF". It has also been discussed that the eDNA method that is being used to guide certain actions relating to the CSF has not been proven as a reliable indicator of the presence of Asian Carp. There are many in the scientific community that would debate the accuracy of such testing. There has been no independent verification of this "cutting edge " technology and continues to be no alternative to such methods. Additional independent laboratories should be employed to establish a benchmark method and ensure that all confidence levels remain high prior to taking action.

Question 2: Can you explain the term " best science available" as it relates to the usage of EDNA?

Question 3: Did the USACE seek out alternate DNA testing techniques that have been tested by an independent laboratory that has not directly involved in the implementation of this project, unlike the EPA?

3.) On Pg ES-2 ,the CSF quotes DR. David Lodge as stating "The establishment of a self sustaining population of either silver carp or bighead carp in Lake Michigan- what biologists call an invasion – is not a foregone conclusion." It has also been observed by the *Annis Water Resources Institute* of Grand Valley State University that they are skeptical that the carp could migrate through the waters of Lake Michigan. The Institute suggests more scientific testing be employed prior to assuming an invasion or the probability of species proliferation in the Lake. There appears to be much doubt and no conclusive evidence to support any actions based on unproven and one sided science.

Question 4: How then, when the question of the likelihood of this species propagation in Lake Michigan was challenged based on the lack of evidence and the feeding and spawning habit requirements of this fish could Mr. Charlie Wooley of the National Fish and Wildlife Service respond that : It is not a concern that the fish would prosper in Lake Michigan but in low marshland and river wetlands along the lake?

Question 5: based on the above statement from Mr. Charlie Wooley of the National Fish and Wildlife service, are we not concluding that the Species is not a threat to the Lake? If so why is the USACE taking action that will result in adverse impacts to the environment?

4.) On Pg ES-2 it states that the CSF is " inclusive, allowing new agencies to engage in the process of implementing, developing and consulting on other possible control actions." There has been no inclusion of the professionals that have the exact skill sets required to make decisions based on the CAWS. The mariners and vessel owners and operators have been left out of the decision making process prior to being made aware of the alteration of a waterway they need for survival.

Question 6: How has the Marine Industry, who uses these waterways the most, been involved in the development or consultation concerning the framework, other than being contacted after the decisions on alternatives had already been decided upon?

5.) The CSF states that all actions, in the matrix of actions will be in full compliance with all NEPA regulations.

Question 7: Based on the statement above, How can the Agencies justify taking action now using Sec. 126 authority to close the Locks, at any interval ,prior to all NEPA provisions being followed? Specifically considering those studies that are required by NEPA , including environmental and economic impacts as a result of this action, an environmental assessment and finally an environmental Impact statement based on the SUBSTANTIAL IMPACT of the proposed action.

6.) The CSF specifically indicates that modified structural modifications, and the impact of this measure, will be evaluated pursuant to applicable laws such as the NEPA. The NEPA calls for the creation of an EA or an EIS if required. A project of such magnitude and consequence should certainly require coverage by NEPA, would require an EA and should not be seen as having no significant impact (FONSI). With the aforementioned conditions noted an Environmental Impact Statement should be created that would satisfy the need for additional studies and explore ALL alternatives related to the action.

Question 8: How can the CSF state that implementation of modified structural operations WILL take place prior to the actual study of the potential for environmental and economic impact?

7.) It is clear from the three phase implementation plan described in the CSF that phase #2 includes no other alternative than " structural operations modification". NEPA requires that all alternatives be used in the decision making process. NEPA also calls out for alternatives that are beyond the capabilities of the agency to be explored. Even the use of an Environmental Assessment would demand additional measures to be explored.

Question 9: How can this single approach occur pursuant to NEPA and where are the required alternatives?

8.) The CSF allows in Phase #1 for engaging with the navigation industry but gives no relevance to the results of this activity or its applicability to phase actions. Pursuant to NEPA regulations and protocol a comprehensive approach to potential adverse affects needs to be employed prior to taking action on the proposed project.

Question 10: How is this lack of industry involvement a viable measure when pursuing this decision making process?

9.) Based on observation of the three phase implementation plan of the CSF. The selection of modified structural operations is apparently already chosen to be implemented prior to "fielding" of other available measures such as those described later in the process.

Question 11: Should these other, less invasive, measures be scoped, fielded and put in place prior to committing to a plan that involves closing a navigable waterway and disrupting marine commerce?

10.) Phase #3 calls for the adjustment of initial methodologies mentioned in phase #2 based on field reports. The only methodology mentioned in phase #2 is structural operations modifications. These adjustments will be based on field results to sustain longer term operations. It appears that during the short term use of lock closures the potential for long term lock closures will be considered for future implementation. It is

unclear as to what criteria will be used to compare “field reports” and use them to make a decision supporting long term lock closures.

Question 12: This statement implies that although on the short term list, modified structural operations may be implemented as a long term operation. Is this true and if so, why is the act of modifying lock operations not requiring its own EIS?

11.) Again at ES-3 the CSF assumes the probability of a self sustaining population is confirmed although papers and comment from the scientific community, including Doctor David Lodge, is available that suggests the probability of this, based on the lack of certain environmental requirements that the species needs to thrive, is unlikely.

12.) The CSF indicates that long term actions will include “ efficacy studies to investigate the construction of additional barriers.”

Question 13: Why has there not been an efficacy study performed to investigate modified structural operations <u>prior</u> to implementing modified structural operations when the impact of this invasive action is measurable?

13.) Modified structural operations is identified in section 2.2.3 of the CSF as a long term action. Not once in this section is the potential and certain economic and environmental impact of this action discussed in the section.

Question 14: Why is the environmental and economic impact of the aforementioned procedure not addressed in this section as a “hurdle” or challenge and how can an action that will cause a severe impact to the economic environment not be addressed as such?

14.) It is mentioned in the CSF that the possibility of permanent lock closures is proposed in the Inter Basin FES that is under way.

Question 15: If a study is underway concerning the potential closing of the CAWS lock system permanently, why is this data and its valuable resources not being brought to the table for use in the decision making process for this study?

15.) Bubble and acoustic barrier systems are reported to be as much as 95% effective in deterring this species according to the USACE and other sources. It has also been noted that the technology required to construct such barriers is much more economically viable than the losses estimated to occur as a result of structural operations modifications.

Question 16.: Why has the USACE not constructed a bubble and acoustic barrier system to augment security measures for the CAWS vs. initiation of modified structural operations considering that the latter method is unproven and has no published confidence level indicator for efficacy by any scientific measure?

Question 17: Has the CSF been created in order to provide the interim studies and suggestions needed by the USACE pursuant to Sec. 126 of H.R. 3183-9 in an effort to close of modify lock operations? Prior to this publication the Closure of any lock had not been given as a recommendation.

Question 18: What mitigation will the USACE provide for impacts occurring as a result of these actions and will the substantial losses accrued from the alteration of Lock operations in the CAWS be reimbursed to those affected?

16.) Page 6 of the CSF indicates that it is very unlikely that Asian carp would flourish when feeding on the sparse plankton that is typical of the Great Lakes. The CSF also goes on to conclude that filter feeding Silver and Bighead carp will be unable to colonize most open regions of the Great Lakes. Unlike other invaders of the Great Lakes the carp have proven less suited for life in the Great Lakes. There are multiple sources that provide

species specific information concerning the Asian carp including reproductive and feeding requirements. The Great Lakes appear to not provide what the species needs to thrive.

Question 19: Why are the Asian carp being portrayed as being similar to the other invasive species when there is scientific evidence that they will not overtake Lake Michigan and do not share the same characteristics as the other invasive species?

Question 20: Has the potential effects of this species release into the lake based on the above information been used to compare the probable adjusted losses that the Great Lakes may suffer from species introduction while understanding that the Lake itself will not support the propagation of this species?

17.) Page 115 of a study titled *Asian carp Biological Synopsis and Risk Management* , contracted by the USGS in 2008 indicates that it is very unlikely that this species of carp would flourish in Lake Michigan. The study also identifies seven areas on Lake Michigan that are well suited for Asian carp survival and spawning. These locations, the nearest of which, is approximately 100 miles East of the Chicago Lock are a great distance for undernourished fish to navigate in cold Lake water. There are nine documented environmentally suitable locations for the species to thrive on Lake Erie. These locations are within 25 miles of where Asian carp have been physically found unlike the seven on Lake Michigan where none have been physically found.

Question 21: How can the Task force commit to altering operations of the Chicago and O'Brien Lock when the potential for this action to assist in prevention of the Asian carp migration is minimal at best?

Question 22: Why is the USACE considering closure of the CAWS Lock systems when no such measures have been conducted in areas on the Great Lakes where fish have been found previously?

Question 23: How can the USACE justify the impacts that will occur as a byproduct of Lock closures when compared to the actions taken on Lake Erie?

Questions 24: How can the USACE commit to closing, temporarily or permanently, a navigable water way thus creating economic and environmental hardships, when studies have shown that an action to defend the environment most suited for fish propagation would be more effective?

18.) Page 8 of the CSF states that the current information available describing economic impacts of Lock closures as being preliminary. It also describes that what information is available on impacts can be seen as " having serious consequences."Pursuant to NEPA any action that will have a serious impact on the environment must be addressed by an EIS.

Question 25: How can the USACE consider taking an action ,such as altering lock operations with the foreknowledge that serious consequences will occur?

Question 26: Does the information provided on page 8 describing serious consequences not call automatically out for an EIS and completion of this study prior to taking an action that could create such consequences?

19.) The CSF describes on page 8 that "the impacts to the economy, such as jobs and business, the environment and other modes of transportation amongst other issues will be evaluated in the environmental review process as part of the USACE inter basin FES, expedited to 2012.

Question 27: How can the USACE study potential impacts of a process when the process will have already begun according to the CSF plan?
Question 28: Would the fact that this process is calling into use efforts and measures that will create a significant impact to the operational environment and its economics preclude the decision to actually use the measures that have been recommended?
Question 29: How can the USACE study the potential effects of an action, as the CSF dictates, after already taking such action?
20.) In section 2.1.1 of the CSF 2 million dollars is appropriated for targeted removal within the CAWS. It specifically is stated that additional rigs and crews will be used.
Question 30: Will the Multi Agency Task Force charter the commercial tour vessels and their crews that have been economically adversely affected by the implementation of modified structural operations?
21.) The CSF describes eDNA as an emerging and cutting edge technology. The CSF also seeks to "validate" its use as an effective tool.
Question 31: Should the USACE use a un validated tool in an effort to support a decision that will certainly produce adverse effects and economic injury to the marine industry in the CAWS?
22.) It is expected that the EPA will complete laboratory testing on eDNA technology. The EPA is currently the lead agency in the Multi Agency Task Force and intricately involved in the project. The EPA is thus NOT an independent laboratory and should not be allowed the burden of approval or disapproval of this science for the intended use.
Question 32: What independent laboratory will be used to prove the confidence level of eDNA testing for invasive species in the CAWS? It would be unethical for an agency involved in this process to review this technology. What laboratory will conduct the independent study?
Question 33: As an unproven science, eDNA is being used to indicate the potential presence of Asian carp and guide the task force on its decision making process. How can this occur when a peer review or confidence level has not yet been established?
Question 34: How can the USACE take action not only without the proper NEPA protocol but also with indicators that show eDNA as scientifically unproven?
23.) Section 2.1.4 clearly states that the potential impacts of controlled operations, as well as specific parameters of such operations would be assessed and understood under any applicable laws such as NEPA PRIOR to deciding to proceed with implementation. The Council on Environmental Quality is also reviewing the CSF to ensure that it complies with NEPA.
Question 35: How can the implementation of structural operations modification take place in light of the above statement when we know that NEPA has been bypassed by utilization of sec 126 authority?
Question 36: Has the Council on Environmental Quality authorized such a deviation from NEPA protocol?
Question 37: Is it not true that the current plan places implementation of elements into effect before complete studies and scientific validation of measures supporting these elements has been completed?
24.) The CSF identifies the need for rule making and public notice as potential hurdles associated with this project.

Question 38: Has the USACE approached the above as hurdles rather than necessary decision making tools that will support a well executed and viable solution to the invasive species issue? If not then why are these requirements identified as such?
Question 39: How can the USACE identify public participation and rule making as a hurdle when the implications of the recommended action will produce an economic burden and devastating environmental consequence?

25.) Section 2.2.11 and 2.1.12 calls for additional studies to be performed. These studies are to establish where carp would survive and spawn if allowed to enter the tributaries and connected waterways of the Great Lakes region. The budgeted amount for these studies is 250.000 a year. These studies would help to assess whether much more expensive actions should take place or be implemented.

Question 40: Why are these studies not being placed on the short term action list of goals and tools?
Question 41: Why is the funding for these studies disproportionally small as compared to the experimental studies of Dr. Lodge and eDNA?

26.) The section 2.2.1 USACE includes the need to extend Sec 126 authority in order to implement certain measures of the CSF.

Question 42: Why, if the USACE is stating that they will follow all NEPA requirements would it need Sec 126 authority?
Question 43: Is the implementation of modified structural operations prior to meeting NEPA requirement not a backwards approach to complete analysis and NEPA policy?
Question 44: Is the USACE using section 126 authority to eliminate the need for an much more inclusive study like an EIS to be completed?

27.) Section 2.2.2 of the CSF describes the potential for an ecological separation of the CAWS and the Great Lakes from the Mississippi River system. This action would have less of an economic impact to the Marine Industry than closing the CAWS to navigation temporarily or permanently especially if provisions for cargo and barge transport over the ecological separation has been made. It would appear that this option would serve ALL interests involved including the need to keep water flowing through the CSSC and Cal Sag via a pumping system designed to regulate water downstream of the Ecological barrier.

Question 45: Why has this simple alternative not been discussed in the framework?
Question 46: Why would the USACE not implement this permanent method to stop the invasive species migration into the CAWS prior to committing to modified structural operations?
Question 47: The technology exists to implement this alternative to closing lock structures in a short time and has it been used successfully in Europe. Why has the USACE not committed to seeking and employing novel methods to completely address this issue?
Question 48: Why has the possibility of closing the very narrow CSSC above or below the current barriers been discussed in the CSF?
Question 49: Why would closure or alteration of a much more utilized lock system be suggested prior to discussing a less invasive method such as closure of the lower lock system?

28.) Section 2.2.3 provides no mention of the impacts expected to occur to the tourism or maritime industry or economy of the CAWS as a result of the suggested action. It is

obvious that temporary or permanent lock closures will adversely impact the operational environment of the CAWS and should not be an option that is employed without a full EIS to address all elements of the suggested action and it's after effects.

Question 50: Why has the USACE bypassed the laws that have been put in place to protect the citizens of the United States of America in order to protect the Lakes from an enemy that has not been seen past the countermeasures that are already in effect at the whim of attorney general who has used false propaganda to support his claims and with a science that has not been proven?

Respectfully submitted,
Captain Mike McElroy
312 907 5891
captmcm@yahoo.com

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Bullock, Peter Y LRC

From: Mike McElroy [captmcm@yahoo.com]
Sent: Sunday, February 28, 2010 7:58 PM
To: Bullock, Peter Y LRC
Subject: EA concerning Efficacy III

Peter,
I would like to comment on the use of additional structures that may be implimented to deter the Asian Carp from propagation in the CAWS.

1) The use of bubble barriers and acoustic methodologies has been shown to be as much as 95% effective in deterring certain species of fish. This minimaly invasive method should be employed prior to other more environmentally invasive methods.

2) The construction of sdditional barriers should take place at the most effective location South of RM 305 on the CSSC thus the barrier would be less intrusive to navigation on the upper CSSC and Cal Sag waterways. The CSSC South of RM 305 creates a gauntlet and bottle kneck from wich the Invasive species could be stopped.

3) During the construction and design phases barriers engineering practice should consider the density of water required for vessels to remain afloat as they pass through the barrier. The vessels rely on the displacement of water to float. Excessive air in the water could create a hazard should required minimum densitys be ignored.

4) Any inclusion of modified structural operations and lock closures should be addressed in a seperate EA as required by NEPA.

5) The Construction and operation of additional barriers South of RM 305 appears to have no potential adverse affects on the commercial tour vessels that operate in Chicago based on the information provided by the USACE Chicago District and the implimentation of said measures will be much more successful in comparison to restricting the operations of the Chicago Lock.

6) Construction and operation of additional barriers South of RM 305 should commence immediately in an effort to prevent the spread of invasive Species into the upper CAWS and Lake Michigan.

7) I suggest that the construction and implimentation of additional barriers should merit a FONSI and a ROD should follow concurrently.

Respectfully submitted,
Captain Mike McElroy
Worth, Illinois
312 907 5891

February 12, 2010

Col. Quarles
US Army Corps of Engineers
Chicago District
111 N. Canal Street, Suite 600
Chicago IL 60606

Re: Asian Carp Control Strategy in the Chicago Area Waterways (corrected version)

Dear Col. Quarles,

The Chemical Industry Council of Illinois ("CICI") would like to register its voice in the matter of the Asian Carp Control Strategy Plan in the Chicago Area Waterways (CAWS). CICI is a statewide trade association representing the chemical industry in Illinois. CICI has 203 member companies employing over 48,575 workers at an average annual wage of $81,400 in 726 manufacturing facilities and 877 wholesale and distribution facilities in Illinois.

CICI has reviewed the Asian Carp Control Strategy Plan and attended the U.S. Army Corps of Engineers (USACE) industry stakeholders meeting on February 5, 2010.

CICI feels that any closure of the locks in the CAWS is unacceptable. With that being said, CICI is more than willing to assist and accommodate the USACE and the other agencies involved in the suppression of Asian carp in the CAWS when the locks need to be closed during a fish kill event or any other event relating to the removal and collection of Asian carp.

In 2008, the port of Chicago was ranked 6th in the United States for exports to other countries by the U.S. Commerce Department. The industries that allowed for this 6th place ranking are the chemical and electronics industries. The Chicago region's five biggest exports were chemicals ($6.1 billion), computers and electronic products ($5.2 billion), non-electrical machinery ($3.4 billion), transportation equipment ($3.2 billion) and electrical equipment, appliances and components ($1.7 billion).

It has been quoted in many documents that the commerce that travels these waterways is worth $17 billion dollars annually. We estimate that CICI members account for approximately $2 billion of the commodities moved by barge through the Chicago area. CICI feels that the $17 billion number is low because it does not take into account the potential loss of jobs; lost money to the local economy from the employees of our companies; loss of the tax base to local communities; the additional cost, not only to the companies but to the consumers, of doing business if transportation needs to switch from barge to rail or truck; the compromising of the local infrastructure due to additional rail and roads that will be needed to compensate the delays, or in worst case scenario, closure of the locks; and not to mention the impact of air emissions on the Chicago Metro area.

The closure of the locks should be the last line of defense for suppression of the Asian carp, not the first. There is no guarantee that the closure will keep the Asian carp out of Lake Michigan, but it is guaranteed that it will depress the economy even further in the Chicago Metro area. Chicago would not be the strategic transportation hub of the Midwest if not for the CAWS. Closure of the locks, for any period of time, will have a ripple effect nationwide.

At the request of USACE, CICI has tried to gather as much information as possible, about the chemical industry's contribution to the economy in the Chicago metro area. Since the time frame is so short, CICI feels that this is a reliable snapshot of the chemical industry along the CAWS.

CICI has 18 members that are directly impacted by any closure of the locks in the CAWS. Of those 18 members, they receive 2,865 barges annually. If the use of barges is taken away as a means of transportation, the barges would have to be replaced by an additional 118,724 rail cars or 457,395 semi trailer trucks to transport product to these facilities.

According to the U.S. Department of Transportation modeling, truck transportation in the Chicago area accounts for 60% of the commodity flow. The annual addition of 300,000 trucks would be an additional 848 tons of nitrogen oxides alone to the air emissions to the Chicago metro area. See "Assessing the Effects of Freight Movement on Air Quality at the National and Regional Level" for the U.S. Federal Highway Administration. That is equivalent to at least one natural gas peaker plant in Illinois or the same as about 20,600 residential natural gas furnaces for the year. Mobile emissions are not regulated like stationary sources are in Illinois.

Many of CICI member companies are located in very localized areas. The additional truck traffic could be a public nuisance to residents, create the possibility for more road accidents, added congestion, and the cause for more local money to be spent on road repairs and emergency response.

Another concern that CICI has regarding any kind of lock closure involves the security of our products on barges and the safety of the personnel. If there is a lock closure, there will be a stock pile of loaded barges along the CAWS that may contain hazardous, flammable, or combustible materials. It would not be difficult for someone to sabotage these barges if they were sitting unattended in an unsecured area. Many of CICI facilities must comply with the U.S. Maritime Security Act and must follow federal law. CICI sees the potential of many unauthorized barges tied to CICI facilities docks. Not only would this be a security violation, it would violate corporate policy and create a potential liability issue.

Due to the uniqueness of the CAWS, CICI believes that the USACE should use the waterways to its advantage in preventing the Asian carp migration. CICI urges that the USACE consider the <u>distance</u> from the existing electric barriers through the Chicago

Sanitary and Ship Canal to the Chicago Locks, and to the O'Brien Locks. This distance is an important stretch that could be used as a buffer zone.

The Chicago Sanitary and Ship Canal (CSSC) is a "secondary contact" water and is clearly not a good habitat for aquatic life; its existing structures could be used in support of the USACE's mission to protect Lake Michigan from Asian Carp. "The canal consists of vertical concrete walls and steep rockfill embankments with an average width and depth of 200 to 300 feet and 27 to 50 feet respectively." Most of the land use along the canal is industrial and commercial. An evaluation of the CSSC's aquatic habitat by Illinois Environmental Protection Agency (IEPA) found that the habitat ranged from poor to very poor. "The factors limiting the habitats include silty substrates, poor substrate material, little in stream cover, channelization and no sinuosity." See Camp Dresser & McKee, "Chicago Waterway System, Use Attainability Analysis" (September, 2007) at pp 4-69, 4-80.

In addition, the water in the CSSC is "effluent dominated." Over half of the average flow in the CSSC is made up of the effluent from the Stickney wastewater treatment plant of the Metropolitan Water Reclamation District of Greater Chicago (MWRDGC), and about 70% of the water flowing through the Lockport locks comes from the MWRDGC treatment plants. That discharge, or the presence of three MWRDGC facilities along the CSSC and the Cal-Sag channel, might provide another tool for facilities to be used to prevent the possible migration of Asian Carp toward Lake Michigan.

The IEPA has determined that the CSSC, as well as the Cal-Sag Channel, cannot attain the uses of waters of the United States as provided under the Clean Water Act. IEPA found three different factors which prevented the attainment of Clean Water Act goals for these waters:

-- Human caused conditions or sources of pollution prevent the attainment of the use and cannot be remedied or would cause more environmental damage to correct than to leave in place; or

-- Dams, diversions or other types of hydrologic modifications preclude the attainment of the use, and it is not feasible to restore the water body to its original condition or to operate such modification in a away that would result in the attainment of the use; or

-- physical conditions related to the natural features of the water body, such as the lack of a proper substrate, cover, flow, depth, pools riffles and the like unrelated to water quality, preclude attainment of aquatic life protection uses;...

See 40 CFR 131.10(g)(3),-(4),-(5).

Because the CSSC, and the Cal-Sag channel, are not able to meet the aquatic uses expected under the Clean Water Act, CICI urges the USACE to consider and evaluate a strategy which considers the feasibility of chemical separation, either through the entire

length of the CSSC, as a “dead zone” in a segment of one or both channels, or in specific lockage scenarios.

Given these existing water quality-related conditions, CICI urges the USACE to develop strategies that would utilize the channelized features of the CSSC as a further protection method against the movement of Asian Carp from the waters beneath the Lockport locks toward Lake Michigan. Doing so would remove or dramatically reduce the need to employ the very expensive and disruptive measures of even occasionally closing the locks along Lake Michigan.

To compensate for the “dead zone” areas, CICI suggests that following a “dead zone” with a remedial oxygenation program, or a SEPA-like station, be installed to protect the ecosystem below the CAWS.

CICI encourages the Illinois Department of Natural Resources’ (IDNR) efforts to increase the use of commercial fishing in areas south of the Lockport lock to reduce the biological pressure of the already established Asian carp populations. Any reduction will ensure that no Asian carp will breach the electric barrier.

The use of acoustic/bubble barriers as a deterrent should also be implemented, not just at the tributaries of the CAWS, but also in conjunction with additional electric barriers or the use of the acoustic/bubble barriers before and after the locks.

CICI appreciates the hard work and dedication of the USACE and the other participating agencies in their fight to suppress the Asian carp. CICI and its members are a willing participant in assisting in the fight.

Respectfully submitted,

Lisa Frede
Director of Regulatory Affairs
Chemical Industry Council of Illinois

Richard W. Wagner
Plant Manager

Koppers Inc.
Carbon Materials and Chemicals
3900 S. Laramie Avenue
Cicero, IL 60804-4523
Tel 708 222 3483
Fax 708 222 3451
WagnerRW@koppers.com
www.koppers.com

February 9, 2010

Dear Colonel Quarles:

Re: Chicago and O'Brien Locks

My name is Richard Wagner and I am the plant manager of a chemical facility operated by Koppers, Inc. We are located on the Chicago Sanitary and Ship Canal, mile marker 316 located in Stickney, IL. Our corporation and the life of this plant is dependent upon materials shipped on the Illinois Waterways. We also receive material by rail and ground transportation but material receipts by barge make the plant viable and allows it to thrive at its current location. We expect to transport approximately 110,000 tons of various liquid phase commodities during the 2010 fiscal year on the CSSC and the Illinois Waterways. This material is comprised of 64 separate barge shipments using the Illinois Waterway System. This material is generally classified as feed stock to be processed into our finished products. On-time delivery is critical to the production and viability of our plant. Partial closure of the lock systems will seriously jeopardize continued and efficient operations.

Koppers' Stickney facility provides 120 permanent jobs to the surrounding community with an additional 15 to 20 daily contract positions. There is approximately $35,000,000 dollars pumped into the local economy though payroll, operating supplies, taxes and fees needed to operate the plant. The plant pays over $300,000 in property taxes, $660,000 in water bills to the Village of Stickney, $6,000,000 in natural gas, and $6,200,000 in electricity bills yearly. We continue to invest in our facility with well over $3,000,000 in capital improvements each year.

Continued efficient operation of the Chicago Sanitary and Ship Canal is vital to the viability of Koppers' facility and the local community. Closure of the lock system could potentially result in closure of our Stickney plant. If a Modified Lock closure is the only answer, it must be thoroughly thought through and implemented slowly with ample time for industry to react to the changes.

Sincerely,

Richard W. Wagner

Bullock, Peter Y LRC

From: DeBeaussaert, Ken (DNRE) [DEBEAUSSAERTK@michigan.gov]
Sent: Monday, March 08, 2010 4:12 PM
To: Bullock, Peter Y LRC
Subject: Comments on Environmental Assessment

March 8, 2010

Peter Bullock

U.S. Army Corps of Engineers

Thank you for the opportunity to comment on the level of analysis and impacts to be considered in the Environmental Assessment for implementing additional in-stream barrier/deterrent technologies in the Chicago Area Waterways to reduce the risk of Asian carp dispersal into Lake Michigan.

Given the lack of specificity in the notice, it is difficult to provide any detailed comment on what level of environmental assessment need to be undertaken, but as a general matter, the severe adverse ecological effects associated with continued Asian carp migration through the Chicago waterway into Lake Michigan would certainly far outweigh any potential local adverse environmental effects of the proposed barriers/structures themselves. Accordingly, the Corps' Environmental Assessment of the latter can and should be streamlined, in order to expedite the implementation of proposed barriers and reduce the grave risk of establishing an Asian carp population in the Lakes.

On a more fundamental level, the Corps can and should implement a broader range of barrier technologies/methods, e.g. physical barriers such as screens, block nets, etc. that can reduce the risk of fish migration though open pathways such as sluice gates and the Little Calumet River.

Michigan considers stopping the dispersal of Asian carp into Lake Michigan to be a critical emergency action. Time is of the essence and this work must proceed immediately. If you have any questions, feel free to contact me.

Ken DeBeaussaert

Director

Michigan Office of the Great Lakes

Department of Natural Resources and Environment

525 W. Allegan

Lansing, MI 48909

National Material Trading LLC
1965 Pratt Boulevard
Elk Grove Village, IL 60007 U.S.A.
Tel: 847-806-7200
Fax: 847-806-2929

January 5, 2010

Colonel Vincent V. Quarles
Commander Chicago District, USACE
111 North Canal Street – Suite 600
Chicago, IL 60606
Vincent.v.quarles@usace.army.mil
(312) 846-5300

Colonel Quarles:

We are writing this letter to express our opposition to certain members of Congress who are mounting a campaign to urge federal agencies to permanently close the locks on the Chicago Sanitary and Ship Canal and connected waterways (including the Chicago lock, the O'Brien lock and the Lockland lock) to prevent invasive species of fish from entering the Great Lakes. The permanent closure of any or all of these locks would have a far reaching economic impact on our inland river terminal, the many companies we supply with raw materials from that terminal, and the end users of the goods produced by the raw materials we transport via the inland waterways via barge.

National Material Trading LLC is one of the largest importer of alternative metals in the United States for the purpose of redistribution to the foundry and steel making industry. The economic downturn that began in our industry in October 2008 decreased our import volume, but in that year we still managed to import more than 560,000 MT of pig iron, at a sales value of over $300,000,000, through the Mississippi River via ocean going vessels. Of that tonnage, approximately $120,000,000.00 in sales (40%) was transported via barge to our inland river terminal, Maryland Pig Services of Illinois, which is located at 12901 South Stony Island Ave., Chicago, IL 60633 (Cal-Sag mile marker 327.08).

Maryland Pig Services of Illinois has been in operation since 2002. It employs twelve people directly and indirectly. We have invested over $5 million in equipment to operate that terminal. The strategic advantage of our owning and operating this terminal is that we can transload material from inland river barge to lake (deck) barges and supply our U.S. and Canadian customers via the Great Lakes, we have a direct rail spur interchange with every Class I railroad in North America allowing us to supply our customers in the U.S., Mexico and Canada via rail, and we can also transload material to truck and easily access the U.S. interstate highway system.

We hope you can see how the permanent closure of any or all of these locks would sever the main artery of our supply chain. It would significantly increase our transportation and handling costs to meet our existing supply contracts with our customers, and in turn, affect our customers' ability to meet their contractual obligations as suppliers. For these reasons, we would like to express our firm oppostion to the permanent closure of the locks on the Chicago Sanitary and Ship Canal and connected waterways.

We applaud your efforts to ensure our voices of opposition are heard. If you have any questions regarding this correspondence, or our operations in general, please do not hesitate to contact me at 847-806-2920.

Regards,

Timothy P. Hogan
Vice President / General Manager
National Material Trading LLC

CONFIDENTIAL

National Material Trading LLC

IMPORT TONNAGE REPORT

Shipments from 1/1/2008 to 12/31/2008

Vessel Name	Year Built	GRT	Ship Date	Origin	Destination	Commodity	MT	CFR (Cost + Freight) Import Value
Sea Rainbow	1984	22,361	1/6/2008	Paul, Vitoria, Brazil	New Orleans, LA	Pig iron	26,656	$11,812,240.00
Bulk Cedar	1998	38,995	1/14/2008	Ponta da Madeira, Brazil	New Orleans, LA	Pig iron	71,382	$17,196,916.00
Seagate	1989	17,590	1/20/2008	Vila do Conde, Brazil	New Orleans, LA	Pig iron	27,500	$10,169,425.00
Sukarawan Naree	1985	14,880	3/1/2008	Vila do Conde, Brazil	New Orleans, LA	Pig iron	24,400	$9,630,625.00
Nirefs	2001	40,570	3/17/2008	Ponta da Madeira, Brazil	New Orleans, LA	Pig iron	73,476	$17,407,645.00
Ji Qing Men	1984	23,525	4/9/2008	Itaqui, Brazil	New Orleans, LA	Pig iron	33,602	$14,933,005.00
Orient Carp	1999	20,947	5/3/2008	Paul, Vitoria, Brazil	New Orleans, LA	Pig iron	8,872	$3,770,296.00
Tai Plenty	2000	38,382	5/8/2008	Ponta da Madeira, Brazil	New Orleans, LA	Pig iron	10,026	$4,345,744.00
Palawan	2007	19,795	5/23/2008	Vila do Conde, Brazil	New Orleans, LA	Pig iron	19,900	$11,464,427.00
Orhan Deval	1984	16,605	6/15/2008	Paul, Vitoria, Brazil	New Orleans, LA	Pig iron	9,452	$10,295,492.50
Princess I	1994	22,147	6/22/2008	Itaqui, Brazil	New Orleans, LA	Pig iron	28,687	$16,485,770.00
Clipper Mermaid	2001	17,944	7/5/2008	Vila do Conde, Brazil	New Orleans, LA	Pig iron	13,586	$9,603,816.00
Clipper Trader	2006	19,971	7/29/2008	Vila do Conde, Brazil	New Orleans, LA	Pig iron	17,494	$12,199,449.00
Aristea M	1997	26,239	7/29/2008	Paul, Vitoria, Brazil	New Orleans, LA	Pig iron	15,197	$12,735,397.00
Yang Hai	1998	27,858	8/14/2008	Itaqui, Brazil	New Orleans, LA	Pig iron	22,280	$14,872,232.00
Capt. P. Egglezos	2007	41,115	9/10/2008	Ponta da Madeira, Brazil	New Orleans, LA	Pig iron	11,770	$8,289,055.00
Lorentzos	2005	31,198	9/30/2008	Vila do Conde, Brazil	New Orleans, LA	Pig iron	17,641	$13,874,470.00
Swift Freedom	1982	36,950	9/30/2008	Paul, Vitoria, Brazil	New Orleans, LA	Pig iron	14,296	$13,205,041.00
Maritime Christine	2004	39,964	10/7/2008	Ponta da Madeira, Brazil	New Orleans, LA	Pig iron	17,331	$8,843,833.35
Grain Harvester	2004	39,989	10/9/2008	Ponta da Madeira, Brazil	New Orleans, LA	Pig iron	28,070	$19,738,826.00
Pole	1997	39,989	10/29/2008	Ponta da Madeira, Brazil	New Orleans, LA	Pig iron	38,257	$28,606,569.00
Pleiades	1997	35,878	11/1/2008	Ponta da Madeira, Brazil	New Orleans, LA	Pig iron	30,267	$11,365,804.21
Total							**560,142**	**$280,846,078.06**

Bullock, Peter Y LRC

From: burrowsm@windsor.ijc.org
Sent: Thursday, March 04, 2010 4:51 PM
To: Bullock, Peter Y LRC
Cc: philip.moy@uwc.edu
Subject: Interim Efficacy Report IIIA

Mr. Peter Bullock –This is in regard to the Feb 26, 2010 EA notice regarding the possible addition of in-stream structures in the CAWs ref: http://www.lrc.usace.army.mil/pao/EfficacyIIIa_EA_26Feb2010.pdf

The technologies under consideration have been recommended by the Barrier advisory panel and have been the subject of past studies as options for the dispersal barrier were explored about 6 years ago. The IJC helped fund some work on this topic back in 2002 and reference to previous work of this sort was made in Bigheaded Carps: A Biological Synopsis and Environmental Risk Assessment, American Fisheries Society Spec. Pub 33 that was jointly funded by IJC and USGS.

Panel recommendations to use this technology to reduce the numbers of carp headed upstream, reducing pressure on the barrier and perhaps using the technology to steer fish into confined waters where other means could be used to trap and eliminate them are excellent recommendations that merit serious consideration. I would echo the comments made by Dr. Moy during a recent public meeting that it is important to build on this past work and move ahead rapidly to implement measures like these to increase the efficacy of the dispersal barrier. This is not a new topic to many scientists and engineers. By consulting with and building on the work of Pegg, Lovell, FishPro and others that have experimented with/used this gear, the USACE can save a lot of time and help make the most efficient use of its resources to implement an effective integrated control strategy. Time saved by avoiding a duplication of efforts could be better spent on designing, building and deploying equipment to best effect.

I also recommend that you use GLIN announce and other list servers to draw attention to these notices. With a deadline of March 8th, there isn't much time to allow people to discover it on the USACE website. I do appreciate the effort made to operate in an open and transparent manner and to balance that need with tight deadlines so you can move ahead quickly to address this problem. Best of luck in completing the assessment. – best regards – Mark

Mark J. Burrows

Secretary, Council of Great Lakes Research Managers

International Joint Commission Great Lakes Regional Office

100 Ouellette Avenue, Windsor, Ontario N9A 6T3

or P.O. Box 32869, Detroit, MI 48232

Tel: (519) 257-6709, or (313) 226-2170 ext 6709

Fax: (519) 257-6740

Natural Resources Defense Council • Great Lakes United • Alliance for the Great Lakes • Prairie Rivers Network • Sierra Club • National Wildlife Federation • Healing Our Waters-Great Lakes Coalition

March 12, 2010

VIA ELECTRONIC AND FIRST-CLASS MAIL

Peter Y. Bullock
U.S. Army Corps of Engineers
111 North Canal Street, 6th Floor
Chicago, IL 60606
peter.y.bullock@usace.army.mil

Re: **Comments Regarding Preparation of Environmental Assessment**

Dear Mr. Bullock,

Please accept these comments submitted on behalf of the Natural Resources Defense Council, Great Lakes United, Alliance for the Great Lakes, Prairie Rivers Network, Sierra Club, National Wildlife Federation, and Healing Our Waters-Great Lakes Coalition, as well as our hundreds of thousands of members across the Great Lakes region and nationwide, regarding the U.S. Army Corps of Engineers, Chicago District's ("Army Corps") February 26, 2010 public notice that it is preparing, pursuant to the National Environmental Policy Act ("NEPA"), 42 U.S.C. § 4332(2)(C), an Environmental Assessment ("EA") "regarding the possible addition of in-stream structures in the Chicago Area Waterways (CAWs) to further reduce the risk of Asian carp dispersing from the CAWs into Lake Michigan."[1]

The undersigned organizations appreciate the opportunity to comment at this stage. However, we have only been given 10 days to submit comments and have not been given any specific proposals for additional "in-stream structures" in the Chicago waterway system, let alone supporting documentation, upon which to comment. We request that the Army Corps provide the public with further opportunities to comment once specific proposals are announced, so that any future comments we submit can address proposed changes in detail, as they emerge.

Many of the undersigned organizations submitted comments on December 18, 2009 on the draft EA entitled, "Dispersal Barrier Efficacy Study: INTERIM 1." We attach those comments as Exhibit 1 and incorporate them by reference. In those comments, we noted the urgent threat that Asian carp pose to the Great Lakes ecosystem, and we argued that it is important that the Army Corps initiate a comprehensive Environmental Impact Statement ("EIS") process as soon as possible to solicit public comment on permanent, long-term solutions to the Asian carp threat, in connection with the congressionally ordered "feasibility study of the range of options and

[1] The public notice is currently available at http://www.lrc.usace.army.mil/pao/EfficacyIIIa_EA_26Feb2010.pdf. On March 5, 2010, the Army Corps also issued a second public notice, extending the public comment period until March 15, 2010. This second public notice is currently available at http://www.lrc.usace.army.mil/pao/05March2010_EA_Notice.pdf.

technologies available to prevent the spread of aquatic nuisance species between the Great Lakes and the Mississippi River Basins," Pub. L. No. 110-114, 121 Stat. 1121 (2007).[2] Most importantly, in our December 18, 2009 comments we emphasized that the only real solution to the Asian carp threat is permanent separation of the Mississippi River from the Great Lakes to re-establish natural barriers between the two ecosystems. Moreover, our concerns go well beyond the current threat, as until the Mississippi River basin is hydrologically disconnected from the Great Lakes Basin, the Chicago waterway system will continue to serve as a conduit for all kinds of invasive species that will have harmful effects on the ecology and economy in both regions.

With week after week bringing more environmental DNA evidence that Asian carp have made it past the electric barriers and entered the Chicago canal system, the Army Corps and other agencies in the Asian Carp Regional Coordinating Committee need to implement short-term "zero tolerance" strategies to ensure both that carp do not continue to breach the electric barriers, and that any carp swimming north of the electric barriers are found and eradicated, to ensure that carp do not establish a breeding population in Lake Michigan.

If it can be accomplished quickly, deployment of the "in-stream barrier / deterrent technologies" described in the February 26, 2010 public notice – including "Acoustic Deterrents, Air Bubble Curtains and/or Strobe Lights" – may well be one component of a reasonable short-term strategy to supplement the electric barriers and impede the Asian carp's rapid advance toward Lake Michigan long enough to buy time for a permanent separation to be achieved. Based on publicly available information, however, none of these additional "in-stream" technologies appears on its own to be a perfect – or even adequate – solution. *See, e.g.*, Brammeier, J., et al., *Preliminary Feasibility of Ecological Separation of The Mississippi River and the Great Lakes to Prevent the Transfer of Aquatic Invasive Species*, 74, 79-82 (2008) (describing the effectiveness of different chemical, electrical, and behavioral barriers), *available at* http://www.greatlakes.org/Document.Doc?id=473.[3] Rather, available evidence indicates that technologies such as these work best when used in combination.

We strongly urge the Army Corps to recognize that no short-term strategies are likely to be successful unless they are rationally integrated into a well coordinated plan that has as its metric of success the prevention of any additional movement of Asian carp both past the electric barriers and into Lake Michigan, and the detection and eradication of any Asian carp that have already moved past the electric barriers until a permanent solution is achieved. This plan must also include a "channel by channel" strategy that effectively closes off all pathways to the Asian carp's advance. It is our understanding that the Army Corps is at work on such a strategy as part

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[2] The feasibility study and associated programmatic planning efforts constitute a "major Federal action[] significantly affecting the quality of the human environment," 42 U.S.C. § 4332(2)(C), for which a full NEPA process is required. *See, e.g.*, *Blue Mtns. Biodiversity Project v. Blackwood*, 161 F.3d 1208, 1212 (9th Cir. 2002) (federal agency required to prepare EIS whenever "substantial questions are raised" as to "whether a project may have a significant effect on the environment").

[3] *See also* Malchoff, M., *et al.*, Feasibility of Champlain Canal Aquatic Nuisance Species Barrier Options (2006), *available at* http://www.uvm.edu/~seagrant/communications/assets/ansbarrierrprt06.pdf; FishPro, *Feasibility Study to Limit the Invasion of Asian Carp into the Upper Mississippi River Basin: Report to Minnesota Department of Natural Resources* (2004), *available at* http://files.dnr.state.mn.us/natural_resources/invasives/aquaticanimals/asiancarp/umrstudy.pdf.

of the broader "Efficacy Study" and in connection with its review of "modified structural operations" as discussed in the Asian Carp Control Strategy Framework. We urge the Army Corps to finalize the "modified structural operations" review as soon as possible and to disclose, when the review is finalized, the full range of specific actions that it intends to take in response to specific triggers, so that the public has the opportunity to evaluate the Army Corps' entire short-term "battle plan" for stopping the Asian carp's forward movement, as well as detecting and eradicating any Asian carp that may have bypassed the electric barriers. Achieving the objectives above will no doubt depend on deployment of other state and federal agencies; as such, the "channel by channel" strategy should describe the specific actions and triggers of all partners required for success.

It may be reasonable for the Army Corps to consider, in connection with this "modified structural operations" review, deployment of acoustic, bubble, or light barriers at or near the navigational locks, sluice gates, or other connecting channels between the Chicago waterway system and Lake Michigan. It may also be reasonable to consider such "in-stream" supplemental barriers downstream of the existing electric barriers and below the confluence of the Des Plaines River and the CSSC. To the extent that subsequent monitoring of environmental DNA and other parameters demonstrates that these "in-stream" supplement barriers reduce the density of populations challenging the electrical barriers and minimize carp presence in adjacent waters like the Des Plaines River, they are likely to reduce the risk that the electric barriers are breached.[4]

Regardless of whether they are considered in locations near Lake Michigan or as downstream supplements to the electric barriers, deployment of "in-stream" technologies should only be taken if (1) the technologies can be deployed quickly; (2) they are used in combination with other response techniques as part of a well coordinated plan; (3) the unambiguous goal of the plan is to stop all movement of Asian carp into Lake Michigan; and (4) the measures do not result in any additional delays to the study and implementation of a permanent solution.

We also urge the Army Corps to disclose publicly all evidence that it has reviewed or considered in evaluating these and other potential options or technologies. Further, we urge the Army Corps to disclose the details of any scientific experiments or field tests that are planned or already underway to measure the performance of these "in-stream" technologies, as well as the electric barriers already in place. This should include details of the methodology and results, not just general summaries, so that every scientist, engineer, or interested member of the public who is concerned with the movement of Asian carp and other invasive species can have access to it and fully evaluate it. An open and transparent decision making process that meaningfully engages the public is critical to ensuring that all appropriate options are considered and finding the one that best protects the health, environment, and economy of both the Great Lakes and Mississippi River Basins.

Thank you for the opportunity to comment.

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[4] Recommendations on placement more generally were summarized in Conover, G., R. Simmonds, and M. Whalen, editors. 2007. Management and control plan for bighead, black, grass, and silver carps in the United States. Asian Carp Working Group, Aquatic Nuisance Species Task Force, Washington, D.C. 223 pp.

Sincerely,

Thomas Cmar
Attorney
Natural Resources Defense Council
Chicago, IL
(312) 651-7906
tcmar@nrdc.org

Jennifer Nalbone
Director, Navigation and Invasive Species
Great Lakes United
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Andy Buchsbaum
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National Wildlife Federation
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Chad Lord
Policy Director

Healing Our Waters-Great Lakes Coalition
Washington, DC
(202) 454-3385
clord@npca.org

RMT

RESERVE MARINE TERMINALS

March 17, 2010

Peter Y. Bullock
United States Army Corp of Engineers
Chicago District
Chicago, IL

Dear Mr. Bullock,

I am writing you to make sure you understand the catastrophic effect that closing and/or altering the operation of the Chicago and/or O'Brien Locks will have on mine and others' business. Reserve Marine Terminals operates a stevedoring, warehousing, material handling and scrap processing facility on a 175 acre, former steel mill property on the Calumet River. Loading and unloading barges is an essential part of our business and without it we would have never purchased the facility.

Many of the materials/products we buy, sell, handle and warehouse are related serving the steel making industry. As you may know, this industry and related industries that serve and/or supply steel companies has suffered enormous losses of employment for many reasons probably not appropriate to debate in this correspondence. Nonetheless, closing or altering the operation of the locks, which provide a critical pathway to industry will, without question, add cost to the supply chain of raw materials and semi-finished materials to all industries dependant on waterborne transportation.

What inevitably will occur is that the consumers of the waterborne cargo, who can't sustain the cost of interruption in the supply chain, will find alternative means of acquiring the same materials. This will lead to cargo being handled down river, for example maybe St. Louis. The material will then be moved from St. Louis by truck or rail (if possible) to its final destination. The result of these actions will cause the following:

1. Loss of more jobs in the Chicago region related to manufacturing
2. Higher cost of goods, inflationary pressures, less competitive manufacturing
3. Increased pollution as a result of increased rail/truck movements vs. barging

Reserve Marine Terminals supports acoustic deterrents, air bubble curtains and strobe lights as well as other technologies that will deter Asian carp migration into the great lakes, but DOES NOT support the closing of the locks.

Reserve Marine Terminals, in normal economic conditions, handles in excess 500,000 tons per year of bulk and break bulk cargo. We have extensive investment in plant, property, equipment and employees. I estimate that the value of goods we buy, sell and handle for others is in excess of $200,000,000. The current economic conditions have made employment of the 65 union employees and 12 staff challenging enough. Any further deterioration, which closing and/or altering the lock operations would cause, will be devastating to the future operations of Reserve Marine Terminals and our employees. These are real risks.

And all this related to a fish that no one has demonstrated the real risk.

Sincerely,

Hal Tolin
Reserve Marine Terminals

11600 South Burley Avenue • Chicago, Illinois 60617 • (773) 721-8740 • Fax (773) 721-8798

March 29, 2010

Mr. Peter Bullock
U.S. Corps of Engineers
Chicago District
111 North Canal Street, Suite 600
Chicago, IL 60606

Dr. Mr. Bullock:

In my job I work closely with area businesses and know of the struggle the business community is currently experiencing. As a member of the Board of Directors for the Glendale Heights Chamber of Commerce I am also in touch with businesses.

I am in agreement with Senator Durbin, Congresswoman Halvorson, Congresswoman Biggert, and others in opposition to any manner of lock closure. I feel closure of the locks will have a serious effect on the area economy. I feel certain a viable alternative means of stopping the migration of Asian carp into Lake Michigan can be found. I urge you to seek other means of addressing this critical issue.

Sincerely,

Mary Lou Emami

Director
Glendale Heights Chamber of Commerce

Vice President
Training Plus, Inc.

F. H. Ayer Manufacturing Co.
2015 HALSTED STREET
P.O. BOX 247
CHICAGO HEIGHTS, IL 60411-0247
PHONE: 708-755-0550
FAX: 708-755-7435
E-mail: fhayer@fhayer.com
Visit our website at www.fhayer.com

March 15, 2010

MS. SUSANNE DAVIS
111 N. Canal Street
Suite 600
Chicago, IL 60606

Dear Ms. Davis:

I have followed the press reports regarding the Asian Carp and their migration north toward Lake Michigan. This is indeed a problem and no one wants these fish in the Great Lakes.

I do not agree with those who want to close the water route from the Great Lakes to the Gulf. There must be another way to accomplish the goal: more electronic barriers; some type of gene alteration that would eliminate the reproductive cycle; electronic sound system that would move the fish to one side of the canal into places of confinement; capture them, destroy them and let other fish free.

If the Chicago River and canals are closed jobs will be lost, businesses closed, commerce severely curtailed and the cost of goods will increase.

The water system is a direct link with the world. We need it to promote trade at a time when we need to help the economy; we don't need to impede commerce.

If we can go to the outer reaches of space we can surely figure out how to stop carp from reaching the Great Lakes.

PLEASE do not close the river/canal system.

Thank you,

Robert C. DeBolt
President
F.H. Ayer Manufacturing Co., Inc.

Via E-Mail Transmission

[Date]

_____
_____
_____
_____

Re: Results of Wendella's Peer Review Regarding Asian Carp Movement and Impact on the Great Lakes – There Is No Scientific Basis to Support Lock Closures:

Dear _____:

This firm represents the Wendella Sightseeing Company, Incorporated ("Wendella"). Wendella is a commercial tour boat company that has spent the last seventy-five years serving millions of tourists and Chicagoans seeking to view the beauty of Chicago from the Chicago River and Lake Michigan. Having navigated through the Chicago Lock for decades, Wendella has a unique respect for the Chicago waterways and Lake Michigan. Wendella's operations are wholly dependent on access to Lake Michigan through the Chicago Lock. The U.S. Army Corps of Engineers ("USACE") is currently considering temporary and permanent closure or modified operations of two navigational locks of the Chicago Area Waterways System, known as the Chicago Lock and the O'Brien Lock (the "Locks"). The USACE has relied on Dr. David Lodge's incomplete and unreliable research in its consideration of closing the Locks. As a result of months of study, Wendella has concluded that there is no basis for the USACE to permanently or temporarily close the Locks, or modify the operation of the Locks (hereinafter, temporary or permanent closures or modified operations shall be called, "Lock Closures"). The Locks should remain open indefinitely and continue to operate on an on-demand basis.

I. BRIEF OVERVIEW

Summarized below is the information which unequivocally proves: 1) that Dr. Lodge's work in the area of environmental DNA ("eDNA"), which the USACE is relying on in its consideration of Lock Closures, has not been subject to peer review; 2) that Dr. Lodge's work is, at best, incomplete; 3) that there is serious doubt if Asian carp or Asian carp eDNA is in the water above the electric fish barriers in Romeoville, Illinois; 4) that the USACE, the States of Michigan, Indiana, Wisconsin, Ohio, New York and the provinces of Ontario and Quebec have no scientific basis by which to conclude that Asian carp will destroy Lake Michigan and its flourishing fishing industry; and, 5) there is substantial doubt as to the potential risk that Asian carp can maintain a self-sustaining population in Lake Michigan.

The USACE should consider implementing the numerous alternatives addressed in the November 2007 study commissioned by the U.S. Fish and Wildlife Service (USFWS), "*Management and Control Plan for Bighead, Black, Grass, and Silver Carps in the United States* ("Control Plan"). The Control Plan contains a comprehensive list of recommendations for preventing the movement of Asian carp. This study was conducted by the Asian Carp Working Group, whose members included a large, diverse group of scientists, academia, business owners, government agencies and other interested parties. Nowhere in the 251 page report is there a recommendation for Lock Closures in any form. Wendella supports the recommendations of the Control Plan.

There are approximately thirty viable alternatives to Lock Closures. In the Control Plan, the authors outlined various methods that could be implemented to prevent Asian carp movement. Lock Closures was not offered as an alternative. Since that time, only a couple of the recommended alternatives have been implemented. It was not until after Michael Cox, Attorney General of the State of Michigan (and Gubernatorial hopeful in that State) made his incorrect and unsupported conclusions before the United States Supreme Court that Lock Closures became central to the Asian carp discussion.

To the extent that a decision is made to close the Locks, permanently or temporarily, we will initiate legal action. The time is now to resolve this controversial issue. We have included below, a summary of the evidence that we have gathered to date.

II. THE SCIENCE USED TO SUPPORT LOCK CLOSURES IS UNDEVELOPED AND UNRELIABLE

Dr. David Lodge's research is incomplete and cannot be relied on as a basis to show that Asian carp have been located above the electric barrier. There has been no independent peer review of Dr. Lodge's incomplete work. Dr. Lodge is not the only scientist in the field of eDNA research in water. We located and contacted the scientist who created the study of eDNA in water along with three other experts in this eDNA field. What we learned was enlightening. These experts were never asked to review Dr. Lodge's work nor his conclusions. Two of these experts told us that they asked Dr. Lodge for his data and he refused.

There have been many written and oral statements made by Mr. Cox that Asian carp, once introduced into Lake Michigan, will destroy the fishing industry on the Great Lakes. This conclusion has been repeated by other states on the Great Lakes despite the lack of any scientific analysis. Mr. Cox erred in making this unsupported statement without a full study of the science and economic impacts of Lock Closures. We know of no study that substantiates the accuracy of his bold statements.

We retained one of the preeminent experts who considered the potential impact of Asian carp in Lake Michigan. Most scientists are willing to say that it is unknown what Asian carp will do, if introduced into Lake Michigan. Our consultant participated in a recent completed study, which considered the feeding habits of these fish in relation to the current environment of Lake Michigan. Based on this study and her own independent work, our consultant has rendered informed opinions on the probable outcome of Asian carp reaching Lake Michigan.

We have carefully investigated the impact of Lock Closures and we cannot find one expert who can or will say that Lock Closures serve any real purpose in inhibiting the movement of Asian carp. There had never been a discussion of Lock Closures until Mr. Cox made this a part of his political agenda. There are many alternatives to Lock Closures that will better control the movement of Asian carp that will not result in substantial economic damage and threat to public safety.

A. <u>The USACE Must Not Rely on Dr. Lodge's eDNA Research</u>

Dr. Lodge's research is incomplete. His methodology and findings have not publicly released and have not been peer reviewed - independently or otherwise. Although the U.S. Environmental Protection Agency (the "USEPA") performed an audit of Dr. Lodge's laboratory, *Laboratory Audit Report Lodge Laboratory Department of Biological Sciences University of Notre Dame* (the "USEPA Audit"), this audit is not scientific peer review. The USEPA acknowledges that it, "did not address the interpretation of the eDNA results in regard to the presence or absence, proximity or abundance of Silver or Bighead Carp, the presumed source of the eDNA." There were no eDNA or DNA experts included in the USEPA Audit. Despite the assertions and assumptions of some, this report makes no assessment as to the validity of Dr. Lodge's findings and does not purport to do so.

A team of scientists from Europe were the first to use eDNA research for locating aquatic species in water. We have retained one of the lead members of that team to review Dr. Lodge's findings. Because Dr. Lodge has not published sufficient data by which to conclude that Asian carp are above the electric barrier, our consultant cannot draw any conclusions as to the validity of Dr. Lodge's findings. Yet Mr. Cox has relied on Dr. Lodge's findings, blindly concluding that Asian carp are ready to or have invaded Lake Michigan. We demand that Dr. Lodge release his data for independent peer review.

We have contacted who we believe to be all of the eDNA experts in the world. Dr. Lodge refused to share his data with at least two of these experts. Not one of the remaining experts indicated that they are privy to Dr. Lodge's data.

Despite months of intensive fishing and searching, there have been no Asian carp caught above the electric fish barriers in Romeoville, Illinois.

B. The "Sky Isn't Falling"

There is no expert who has yet to come forward to opine that Asian carp will establish a significant population and will out-compete all other fish in Lake Michigan. Our consultant and other experts conducted a modeling study of the impact of Asian carp in Lake Michigan (the "Modeling Study"). Mr. Cox and Dr. Lodge have fostered the idea that Lake Michigan will never survive an invasion of Asian carp. There have been numerous statements about what might occur if Asian carp reach Lake Michigan. No expert seems to be willing to go beyond the statement that the effect of Asian Carp in Lake Michigan is unknown – until now.

Our consultant concludes, in part, that there does not appear to be a correlation between the environment in the Illinois River and Lake Michigan such that survival in the Illinois River proves that Asian carp can thrive in Lake Michigan. Asian carp do not eat fish: rather they subsist on plankton. Southern Lake Michigan does not contain plankton in sufficient quantities to sustain an Asian carp population. The Modeling Study described Lake Michigan as a "plankton desert". Asian carp do not have the ability to cross the plankton deprived areas of Southern Lake Michigan to get to other locations in the Great Lakes where more plankton may be available. The Southern part of Lake Michigan is not an ideal environment for Asian carp and is substantially different than the environment in the Illinois River and the Chicago Area Waterway System ("CAWS"). Asian carp can coexist with other species of fish and do not eat other fish.

Wendella agrees that all reasonable precautionary steps should be taken to prevent Asian carp access to Lake Michigan. However, as set forth below, experts have provided numerous alternatives short of Lock Closures that will keep Asian carp out of the Great Lakes.

III. THERE ARE OVER THIRTY ALTERNATIVES TO LOCK CLOSURES

The USACE has been presented with numerous alternatives to address the migration of Asian carp in the Control Plan. This study was conducted by the Asian Carp Working Group, which included a large, diverse group of scientists, academia, business owners, government agencies and other interested parties (the "Working Group")[1]. Nowhere in the 251 page report is there a recommendation for Lock Closures. Wendella supports the recommendations of the report.

The Working Group recommended that the USACE implement these alternatives as a sound program to keep Asian carp out of Lake Michigan. To date only a few of these alternatives have

[1] A sample of the fifty plus representative agencies of the Working Group are: The U.S. Geological Survey; The U.S. Army Corps of Engineers; The U.S. Fish and Wildlife Service: B.A.S.S./ESPN; Mississippi State University; and the University of Wisconsin Sea Grant.

been implemented. None of the alternatives recommended Lock Closures, which would result in job losses, would foster untold economic damages, and compromise public safety. New jobs are actually contemplated in some of the recommended alternatives.

IV. THERE HAVE BEEN INVASIVE SPECIES IN THE GREAT LAKES FOR OVER A CENTURY AND THE ENTRY POINT IS NOT ONLY IN CHICAGO.

There are currently over one hundred and seventy five species in the Great Lakes that are not native to these lakes, which have entered the Great Lakes from numerous entry points. Despite this, the fishing industry on the Great Lakes has survived and flourished. Although Wendella agrees that Asian carp are not welcome in Lake Michigan, Lock Closures are not a viable method to keep the fish out of Lake.

V. CONGRESSIONALLY MANDATED EFFICACY STUDIES PROVIDED BY THE USACE TO THE SECRETARY OF THE ARMY HAVE NOT REQUESTED OR RECOMMENDED LOCK CLOSURES

Congress has provided that the Secretary of the Army may, in consultation with appropriate partner agencies, conduct a study to describe a range of options and technologies for reducing impacts of hazards that may reduce the efficacy of the electric fish barriers. The Secretary of the Army also has the authority, subject to the requirements of USACE regulations, policy and guidelines, to implement the efficacy study and to take discretionary emergency measures to prevent aquatic nuisance species from dispersing in the Great Lakes. Such authority was exercised by Jo Ellen Darcy, Assistant Secretary of the Army, in November, 2009, to apply rotenone, a fish toxin, in a section of the Chicago Sanitary and Ship Canal ("CSSC") during a maintenance shutdown of the electric barriers.

The first efficacy study was released in January of 2010. This study recommended the construction of physical barricades and a chain link fence over a stretch of the Des Plaines River upstream of the electric barriers that is prone to flooding and the disabling of two culverts (ditches) between the Des Plaines River and the CSSC. In this study, there was no mention of Lock Closures. Without this barrier, it is possible that Asian carp and other aquatic species could spread from the Des Plaines River to the CSSC upstream of the electric barriers. It is our understanding that the physical barrier is currently under construction and we fully support this measure.

In her declaration to the Supreme Court in January, 2010, Assistant Secretary Darcy stated that the USACE had concluded that there was insufficient information to support a finding that the threat of Asian carp in the waterways warrants Lock Closures.

We agree with Assistant Secretary Darcy's findings and actions to this point and we offer the information herein to further assist her and the USACE in finding that Lock Closures are not warranted now or at any time.

VI. THERE ARE NO STUDIES THAT SHOW THAT LOCK CLOSURES WOULD BE A USEFUL DETERRENT TO ASIAN CARP

We reviewed a "Draft" Asian Carp Strategy Framework developed by the Working Group in January of this year. This group concluded that neither permanent nor temporary Lock closure will effectively prevent Asian carp from entering Lake Michigan. Although we have yet to find a final report at this time, we urge the USACE to consider this draft report.

Other than this draft report, there appears to be no other studies, reports or other documents, relating to the efficacy of closing the Locks. Because of the timing of Mr. Cox's proclamation that Lock Closures are necessary, there has been little done by which to corroborate the need for closures. It is certain that the result of Lock Closures would be tragic in dramatic proportions. Balanced against the several alternatives to Lock Closures that would prevent the movement of Asian carp, selecting Lock Closures as an option is arbitrary and capricious.

VII. CONCLUSION: DON'T CLOSE THE LOCKS

The science purportedly supporting the threatened Lock Closures is undeveloped and unreliable. There are many alternatives to prevent Asian carp from invading Lake Michigan other than Lock Closures. Most of the findings and strategies of the Asian Carp Working Group, which did not include Lock Closures, have not yet been designed or implemented and should be fully vetted before they are summarily rejected in favor of Lock Closures.

In this letter, I have not addressed the severe economic damage to the Great Lakes region and the safety concerns of a frightened public, resulting from Lock Closures. The Illinois Chamber of Commerce has provided independent research which reports the vast economic damage that Lock Closures will cause. Instead, we have focused on providing you with an outline of the real facts of Asian carp and their movement.

We ask that the USACE reject any further consideration of Lock Closures. We ask that the USACE engage in an ongoing and open dialogue. We ask that the USACE implement some or all of the remaining alternatives contained in the Working Group's plan. We ask that the USACE ask Mr. Cox to provide detailed support and justification for his assertion that introduction of Asian carp into Lake Michigan is an end game. It is now the time to stand up to

Mr. Cox and to put to rest the "witch hunt" that he has fostered. We abhor the prospect of litigation in this matter, but we are fully prepared to fight if we must.

Very truly yours,

Stuart P. Krauskopf

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