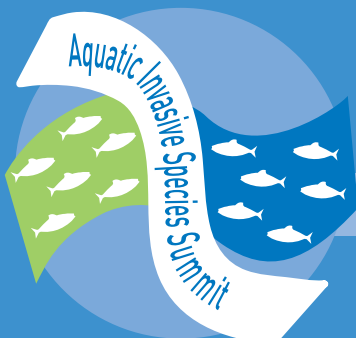


CLOSING THE REVOLVING DOOR

SUMMARY OF THE AQUATIC INVASIVE SPECIES SUMMIT PROCEEDINGS



Chicago, Illinois

Lake Michigan

The Great Lakes and Mississippi River Basins are connected by the Chicago Sanitary and Ship Canal and Cal-Sag Channel, which together constitute a “revolving door” for invasive species. Invasive species have moved from one basin to the other and more invasive species will move between the basins through the “revolving door” unless a solution is reached.



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SUMMIT PROCEEDINGS EXECUTIVE SUMMARY

On May 14–15, 2003, Mayor Richard M. Daley and the City of Chicago co-hosted the Aquatic Invasive Species Summit with the United States Fish and Wildlife Service. Summit attendees were specifically invited based upon how their expertise could contribute to the development of a solution to the aquatic invasive species problem. Almost 70 experts from around the world attended the summit. The purpose of the summit was to have the participants focus on the question of how to prevent the exchange of aquatic invasive species between the Mississippi River and Great Lakes basins. A general consensus emerged from the summit, with the top recommended actions being the following:

- Investigate and Evaluate Hydrologic Separation of the Two Basins
- Pursue Additional Control and Prevention Technologies
- Procure Broad-Based Political Support and Federal Funding

A Costly and Urgent Problem

Invasive species are the greatest environmental threat to the national economy and to the ecology of the Great Lakes and Mississippi River regions. At least 162 non-native aquatic species live in the Great Lakes drainage basin; nearly the same number inhabit the Mississippi River basin. There are more to come. Over the last 40 years, a newly established invasive species population has been found in the Great Lakes approximately every eight months.



Blasting Zebra Mussels. Photo credit: Detroit Edison



Fishing in the canal. Photo credit: Pam Thiel, USFWS

The ecological and economic risks are significant. In the Great Lakes, invasive species impact a very large area covering parts of both Canada and the United States:

- The economic activity of the Great Lakes region accounts for more than 50 percent of United States output.
- The Great Lakes contain 90 percent of the United States' surface freshwater.
- The Canadian Great Lakes region alone covers approximately 298,842 square miles, including most of Ontario.
- The Canadian commercial, landed and recreational fisheries combined are valued at approximately \$363 million annually.
- Over 1.5 million Canadian boaters are registered in the Great Lakes area.
- In the United States, there are 4.5 million boaters registered in the Great Lakes basin.
- Recreational fishing in the Great Lakes generates over \$2.5 billion in tackle sales, provides employment for more than 66,000 workers and creates a total economic output greater than \$7.5 billion.
- In the Mississippi River basin, aquatic invasive species threaten a region that includes 32 states and is home to 100 million people. The Mississippi River basin produces more than 90 percent of the United States' agricultural exports.

A well-known example of an invasive species with widespread impact is the zebra mussel, which has affected 29 states by blocking intake pipes and disrupting the aquatic food web that is critical to sustain valuable commercial fisheries and fishing sport. Annual maintenance costs associated with removing zebra mussels in the Great Lakes totals \$250 million.

The exchange of invasive species between the two basins requires urgent attention. Asian carp are swimming north from the Mississippi River toward the Great Lakes. As of June 2004 Asian carp had moved to within 50 miles of Lake Michigan. Along with other invasive species, they could severely impact the \$4.5 billion commercial and sport fishing industries of the Great Lakes by competing for the food of native organisms, causing a reduction in native fish populations (such as lake trout, walleye, yellow perch and whitefish). Conversely, the ruffe, round goby and spiny waterflea are advancing from Lake Michigan toward the Mississippi River, and threaten to disrupt the ecological balance of one of the world's most biologically diverse river systems.

Effective Long-Term Solutions are Needed

To maintain natural biodiversity and ecological function, the aquatic ecosystems of the Mississippi and Great Lakes basins should be restored as separate and distinct systems. The threat of Asian carp reaching the Great Lakes underscores the compelling need to act now to permanently protect both the Great Lakes and Mississippi basins from

invasive species. The development of an electric dispersal barrier that repels fish is a wise investment for the short term, and a second barrier will be installed by the fall of 2004. However, the barriers will not last forever. With the passage of time—through



Silver carp. Photo credit: Duane Chapman, USGS



Chicago River. Photo credit: City of Chicago

human error, accident, or natural disaster—the effectiveness of the barriers could be compromised.

Is it wise to rely solely on technological and behavioral barriers—such as those employing electric and/or acoustic technologies—to protect the health of these ecosystems? Behavioral barriers may repel fish species, but will not affect organisms like mussels, water fleas or other species that float with currents or attach themselves to boats and other vessels. When the barriers fail, the economic impacts resulting from ecosystem change will be long-term, far-reaching and significant for both the Great Lakes and Mississippi River basins.

The Chicago Sanitary and Ship Canal (Canal) is a man-made navigational link connecting the Great Lakes and Mississippi River drainage basins. The Canal was constructed in the late

1800s to primarily convey sewage away from Lake Michigan and to provide a navigation corridor between the Illinois River and the Great Lakes. Historically, water quality in the man-made canal was poor, such that chemical pollution prevented the transfer of aquatic organisms between the Great Lakes and the Mississippi River basin. Over the last 100 years, the Metropolitan Water Reclamation District of Greater Chicago has invested over 17 billion dollars to improve water quality in the Chicago Canal and Upper Illinois River. Today, the Canal supports 27 species of fish. However, the Canal forms a two-way corridor for the inter-basin transfer of aquatic invasive species between the two basins.

The Canal provides an opportune location to permanently alter a man-made connection to halt the spread of aquatic invasive species between these two basins. It is vital to identify approaches that can be implemented effectively, efficiently and economically while also maintaining commerce and protecting water quality. Now is the time to demonstrate leadership and commitment by permanently closing this revolving door on aquatic invasive species. With each delay, another opportunity is lost to permanently protect the health of the Great Lakes and Mississippi basins.

Once established, the impacts of invasive species on ecosystem health are permanent and irreversible. Preventing the

transfer and introduction of invasive species into these aquatic environments is the only cost-effective and practical solution to prevent irreversible damage to these remarkable ecosystems.

Summit Goals and Outcomes

The purpose of the summit was not to solve the entire aquatic invasive species problem. Rather, the focus was on the specific problem of invasive species dispersal via the Chicago Canal between the Great Lakes and Mississippi

River basins. During the summit, discussions often progressed to other needed remedies, such as first preventing introductions through ballast water discharges and other primary pathways of introduction, and the need for regulations of intentional importations of exotic species. All of these are important factors, but are being addressed through other avenues. Even in the absence of a comprehensive solution addressing all pathways, it is essential to find a way to shut down the Chicago Canal conduit that enables biological species exchange between the Great Lakes and Mississippi River basins. The goal of the

summit was to find a long-term solution to this exchange of species, addressing all aquatic species and all life stages. There were numerous ideas generated during the summit, and they are included as reference items in the appendices to the full proceedings.



*Chicago Sanitary Ship Canal.
Photo credit: MWRDGC2002-7*

IDENTIFIED SOLUTIONS

A host of ideas resulted from the summit. Three general approaches emerged, all of which require more information regarding their effectiveness and feasibility. The approaches identified were:

- Completely separate the waters of the Great Lakes and Mississippi River basins by creating a physical or other type of barrier in the Chicago Canal System in order to cause a hydrologic separation of the basins;
- Establish a biological eradication zone—a reach of the Chicago Canal where methods such as removing oxygen from the water, maintaining high temperatures, or applying chemicals would eradicate most aquatic organisms; and
- Employ technologies that affect animal behavior (e.g., electric and/or acoustic technologies) to deter fish from advancing through the Chicago Sanitary and Ship Canal.

should lead the development of concepts for additional technological barriers with the goal of developing recommendations within one year. Additional federal funding is urgently needed to investigate promising new technologies.

3. Procure Broad-Based Political Support and Federal Funding

The consequences of the transfer of aquatic invasive species between the Great Lakes and Mississippi drainages affect many states and provinces in the U.S. and Canada. Support for developing and implementing solutions should reflect this scope of interest.

Work should begin immediately to develop strategies for creating broad-based political support and funding mechanisms. A coordinating body comprised of the City of Chicago, Metropolitan Water Reclamation District of Greater Chicago, Great Lakes Mayors, International Joint Commission, Great Lakes Commission, Great Lakes Fishery Commission, Mississippi Interstate Cooperative Resource Association, Northeast-Midwest Institute, state legislators and officials and federal legislators from Great



Lockport Lock. Photo courtesy of Irwin Polls

Lakes and Mississippi River basin states, among others, should be established to guide the funding process for the feasibility study, the recommended actions needed for the long term hydrologic separation of the basins and the short term alternative strategies to be implemented.

For more information, contact:

Chicago Department of Environment
30 North LaSalle, Suite 2500
Chicago, IL 60602
(312) 744-7606
www.cityofchicago.org/Environment

Chicago Field Office
U.S. Fish and Wildlife Service
1250 S. Grove Avenue, Suite 103
Barrington, IL 60010
(847) 381-2253

RECOMMENDED ACTION ITEMS

Overall, summit participants stressed that an integrated approach of control and prevention, employing short- and long-term solutions and combined technologies, would increase the likelihood of reaching the goal of 100 percent effectiveness. They also stressed the importance of engaging a broad audience—local, national and bi-national in nature—and developing a coalition of entities possessing diverse interests (e.g., commercial navigation, recreational boaters and wastewater and stormwater agencies), to plan and implement a solution. The summit participants also agreed on the need for a more proactive, decisive approach for solving the problem.

The approaches noted above were transformed into the following action items:

1. Separate the Two Basins

A project should be established that would result in the hydrologic separation of the Great Lakes and Mississippi River basins within 10 years. This long-term solution should consider options including lock modifications and the placement of physical barriers at one or more locations in the Chicago Canal, or other means.

Careful assessment is needed in pursuing this approach, as navigation, wastewater and stormwater challenges



Silver carp. Photo credit: Duane Chapman, USGS



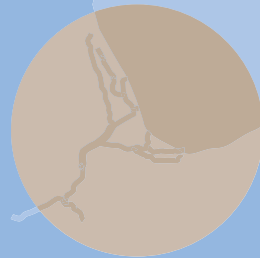
Electric dispersal barrier sign. Photo credit: Charles Shea, USACOE

exist. A feasibility study on hydrologic separation should be conducted and completed within 2 years of the appropriation of funds.

The agency that receives the authority to perform the feasibility study should bring together experts to investigate and conduct a comprehensive study of various approaches to hydrologic separation of the two basins. The study team should be established under the direction of a local lead. This team should be interdisciplinary and include appropriate representatives from governmental agencies, universities and the private sector. Representatives should include consulting engineers, hydrologists, aquatic biologists, economists and other professionals who represent the highest level of expertise.

2. Develop Additional Technical Barriers

The existing Dispersal Barrier Advisory Panel should continue to operate with input from summit participants, local stakeholders and others to recommend technological alternatives and solutions to augment the existing electric barrier and the planned second electric barrier in the Chicago Sanitary and Ship Canal to stem the flow of invasive species to both the Great Lakes and Mississippi River basins. The United States Army Corps of Engineers should remain the action agency in implementing these recommendations. The Dispersal Barrier Advisory Panel



Sponsors of the Aquatic Invasive Species Summit

City of Chicago Department of Environment
United States Fish and Wildlife Service

Great Lakes Commission
Illinois-Indiana Sea Grant
International Joint Commission

Metropolitan Water Reclamation District of Greater Chicago
Mississippi Interstate Cooperative Resource Association

United States Army Corps of Engineers

United States Army Engineer Research and Development Center Waterways Experiment Station

United States Environmental Protection Agency

University of Wisconsin Sea Grant Institute

