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If you have questions or comments about the GLMRIS Newsletter or have suggestions for future topics you would like to see addressed, please contact the U.S. Army Corps of Engineers, Chicago District Public Affairs Office at ChicagoDistrict.PAO@usace.army.mil, or call us at 312-846-5330.

Additional information about GLMRIS, including previous issues of the newsletter, press releases and interim products are available online at [glmr.is.anl.gov](http://glmr.is.anl.gov).

The purpose of GLMRIS is to evaluate a range of options and technologies to prevent aquatic nuisance species transfer via aquatic pathways between the Great Lakes and Mississippi River basins by aquatic pathways.

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## GLMRIS Report released, comments submitted

The [GLMRIS Report](#), released at the start of the year, is a monumental milestone in the fight against aquatic nuisance species (ANS). The GLMRIS Report outlines eight potential control plans within the Chicago Area Waterway System (CAWS) to prevent the transfer of 13 aquatic nuisance fish, algae, virus, crustaceans and plants in all life stages with high or medium risk for transfer between the Great Lakes and Mississippi River basins. Although the threat of bighead and silver Asian carp has received significant publicity, the report also addresses 11 other ANS – 10 poised to transfer from the Great Lakes to the Mississippi River.

The eight potential plans range from continuing and improving upon current control efforts, like the operation of the electric barriers in the Chicago Sanitary and Ship Canal, to vastly complex efforts like the complete separation of the two watersheds.

Each of the plans uses one or more of three types of controls: nonstructural controls, technological controls, and hydrologic separation (physical barriers).

Examples of nonstructural control measures include removal, such as netting; chemical control, such as the use of herbicides; controlled waterway use, such as the inspection and cleaning of watercraft before or after entry to a water body; and educational programs.



*Dave Wethington, GLMRIS project manager, discusses the GLMRIS Report with faculty and students of the University of Ottawa's Departments of Civil Engineering and Environmental Engineering, March 28, 2014.*

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Other plans include technology controls, including a new GLMRIS Lock technology concept that includes a flushing lock, ANS treatment plants, and electric barriers. The GLMRIS Lock would use ANS-treated water to flush floating plants, spores and eggs out of the lock chamber, while still allowing for vessel transportation through the waterway. The GLMRIS ANS Treatment Plant is similar to a conventional water/wastewater treatment plant process, where nuisance species would either be screened/filtered out or inactivated by ultraviolet radiation. Electric barriers similar to those currently operating in Romeoville, Ill., would generate an electric field in the waterway to deter the passage of swimming fish. Screened sluice gates are also proposed to exclude Great Lakes fish from swimming into the CAWS during backflow events.

Five of the plans include placement of physical barriers at one or more points in the CAWS, which prevent the intermixing of surface waters. Some of the other plans include a hybrid of technologies and physical barriers.

Except for the nonstructural measures, alternatives presented in the GLMRIS Report would require Congressional authorization in order to construct them. Many of the nonstructural measures outlined in the GLMRIS Report can be implemented immediately by

numerous federal, state or local agencies, as their authorities and available resources allow. The nonstructural control technologies can be implemented relatively quickly, require no construction, and have been implemented previously in North America.

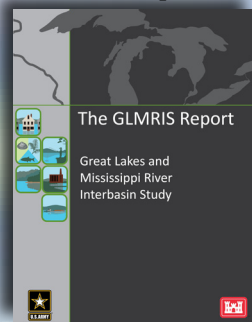
*The engagement of stakeholders has been a critical step in identifying and building consensus toward a collaborative path forward for GLMRIS to protect our natural resources.*

Our role in the report was to paint an objective picture of a range of alternatives and to offer decision makers and stakeholders various potential prevention methods and evaluation criteria, like estimated costs and timeline. ANS prevention is a shared responsibility, and the proposed alternatives could affect many different groups.

Since the submission of the report to Congress in January, the GLMRIS Team has been travelling across the region to present the report to decision makers, state agencies and the public - from Traverse City, Mich., down to New Orleans and back up to Canada. View pictures from the meetings: <http://bit.ly/1fSiszT>

*Continued on next page...*

**Click here to view the report!**



Jan. 6 - GLMRIS Report is submitted to Congress and released to the public. Public comment period opens.

*Report released*



Jan. 8 - USACE provides a presentation on the GLMRIS Report to Congressional offices in Washington, D.C. Pictured, from left: Chuck Shea, Great Lakes and Ohio River Division Regional Integration Team member; Dave Wethington, GLMRIS Chicago Area Waterway System project manager; Col. Frederic A. Drummond Jr., USACE Chicago District commander; and Jack Drolet, GLMRIS program manager.

*Congressional briefings*

Jan. 9 - More than 130 people attend the first public meeting held in Chicago. The panel, at bottom, included John Goss, White House Council on Environmental Quality Asian carp director; Dave Wethington; Jo-Ellen Darcy, assistant secretary of the Army (Civil Works); and Brig. Gen. Margaret W. Burcham, USACE Great Lakes and Ohio River Division commander. Col. Drummond also attended and spoke with members of the public.

**Click here to view the webinar!**



*First public meeting*



Jan. 13 - Col. Drummond hands a coin to a young fisherman at the Milwaukee public meeting.



Jan. 16 - Ohio Attorney General Mike DeWine discusses the report with some of the panel prior to the public meeting in Cleveland.



Jan. 21 - Brig. Gen. Burcham speaks at the public meeting in Ann Arbor, Mich. "This report is unique because it presents courses of action that may be incorporated now to reduce short-term risk."

**Click here to view the presentation!**



Jan. 23 - Sen. Debbie Stabenow and Sen. Carl Levin speak during the oral comment period of the GLMRIS Report public meeting in Traverse City, Mich.



Jan. 24 - Dave Wethington is interviewed by a local news station prior to a public meeting in Erie, Penn.



Jan. 27 - Upper Mississippi River Basin interests are heard at the public meeting in the Twin Cities, Minn.

*Public engagement continues with more public meetings and corresponding state agency meetings for each state visited*



Above left: Jan. 30 - Public meeting in Alton, Ill. Above right: Jan. 31 - Public meeting in New Orleans.

March - The GLMRIS Team travels to Canada for informational sessions and meetings in Ottawa and Toronto.

**Click above to view video!**



Feb. 11 - Indiana Attorney General Greg Zoeller makes a comment at a public meeting in Portage, Ind.



Feb. 13 - Lauren Flee, USACE environmental engineer, interim GLMRIS project manager during the month of February, speaks at public meeting in Buffalo, N.Y.



Feb. 19 - Members of the bi-national interagency Asian Carp Regional Coordinating Committee meet in Chicago to discuss GLMRIS's next steps.

**Click here to view more pictures from the meetings!**



*Dave Wethington, GLMRIS project manager, presents an overview of the GLMRIS Report to the Environmental Group of the Union League Club of Chicago and the Air and Waste Management Association at the Union League, March 18, 2014. The Environmental Group has been around since 1996, and they hold breakfast series that feature expert speakers and invite members to learn more about a variety of regional environmental and policy issues.*

The comment period closed March 31.

***During 11 public meetings, 930 minutes of diverse testimony were recorded from more than 600 meeting attendees – including state senators and attorneys general, fishermen and shipping interests, and the general public.***

While the oral comments may have been diverse dependent on region, one sentiment prevailed - no one wants to see Asian carp establishment in the Great Lakes.

You can view the transcripts for each of the public meetings, along with some videos here: <http://1.usa.gov/1cCakYs>

## 25 years and \$18 billion?

The GLMRIS Team extends its thanks and appreciation to all those who attended the public meetings to express their ideas and concerns on the report, as well as the thousands more who submitted comments via web or mail.

We are currently evaluating the comments submitted and preparing a report summarizing the content of opinions expressed. This summary report, plus a searchable database

of comments offered, will be available on the GLMRIS website this May.

In every city we visited, we observed a persistent dedication to preserving the valuable natural resources of the Great Lakes and the vitality of our nation's inland waterways. Significant concern was expressed with regard to the time and cost of implementation, as five of the eight alternatives identify a 25-year implementation timeline and up to \$18 billion in costs. Since most of the costs and timeline were associated with measures to mitigate the impacts of the invasive species controls on flooding or water quality, members of the public questioned whether the projects could be implemented without these mitigation measures.

The team wants to address some of these concerns.

While it may not take 25 years to build a dam (or dams) in the CAWS; the GLMRIS alternatives must include features to ensure that these dams do not harm the public by causing significant flooding in the Chicagoland area, or create significant impacts to the water quality of Lake Michigan. The proposed mitigation measures for the hydrologic separation alternatives have been designed to mitigate the adverse impacts caused by the proposed dams, not to improve upon the status quo.

In order to provide a thorough and comprehensive analysis, the report includes analyses of the impacts to uses and users of the CAWS that might occur if any alternative were constructed.

***The time and cost figures provided in the report were based on the best data available and consultations with relevant experts. The GLMRIS Team worked closely with federal, state and local agencies that have expertise in areas such as flood risk management, water quality, waterway management and other regulatory requirements.***

## What is mitigation, and how much of it do we need?

Lake Michigan and the CAWS currently serve many important uses including: navigation, water supply and conveyance, flood risk management, and recreation, among others. Installation of ANS controls, such as dams, in the waterway can be expected to cause adverse impacts to one or more of these uses. The GLMRIS study evaluates the extent of these impacts likely to be caused by each of the eight alternative plans. Based on the findings, additional measures were identified to lessen, or mitigate for the adverse impacts.

Mitigation measures for adverse impacts outlined in the report include: ANS treatment plants, conveyance tunnels, reservoirs and sediment remediation.

Our analyses show that physically separating the waterways is likely to cause the most severe adverse impacts, particularly to flooding, water quality, and navigation. Technology-based ANS controls were found to cause fewer impacts, and, therefore, require less mitigation compared to the hydrologic separation, or physical barriers, alternatives.

Hydrologic and hydraulic (H&H) modeling was conducted to determine how much flooding would result from building physical barriers in the middle of the waterways. The H&H modeling showed that constructing physical barriers at the lakefront, as proposed in Alternative Plan 5, imposes a significant risk of additional flooding to Chicagoland communities, even with the existing online Tunnel and Reservoir Plan (TARP). Barriers constructed at mid-system locations, as proposed in Alternative Plan 6, would also result in increased flooding, but considerably less than the lakefront locations. Additional flood-

risk mitigation consisting of tunnels and reservoirs is proposed to prevent damages to homes, businesses, and other structures. The size of the tunnels and reservoirs needed to contain the floodwaters are so great that their construction makes up the majority of the project cost and implementation timeline in the case of Alternative Plan 5. Tunnels and reservoirs were sized to store the volume of water that would typically be backflowed to Lake Michigan during a 500-year flood event. Some have argued that physical barriers should only be built to withstand a 100-year storm. This would mean that any storm larger than the 100-year event would create a pathway over or around the barriers and increase the risk of ANS transfer. The GLMRIS study adopted a 500-year (or 0.2 percent chance of exceedance) level of protection to reduce the risk of ANS transfer even during largest storm events, which have become increasingly frequent in recent years. In fact, over the past five years, there have been at least three storm events in the Chicago region that had precipitation amounts greater than the equivalent 100-year storm.

The locations of the separation barriers in Alternative Plan 6 were selected to minimize flood impacts, and, therefore, reduce the flood mitigation necessary. Under this Mid-System Separation alternative, storm water would freely drain both to Lake Michigan and to the Illinois River System, and, therefore, require very little additional tunnel/reservoir storage. This alternative provides benefits to flood risk management; however, continuous draining of Chicago-treated wastewater effluent, combined sewer overflows, and storm water to Lake Michigan would supply significant levels of contamination to Lake Michigan over time.

Water quality modeling was conducted to determine what would happen to water quality in Lake Michigan and the CAWS if physical barriers were installed. The GLMRIS Team found that the Mid-System Separation alternative would produce contaminant loads to Lake Michigan that are significantly higher than existing conditions. Phosphorus inputs to Lake Michigan could be increased by more than 400 metric tons annually (MTA) and annual nitrogen and chloride (salt) loads could increase by more than 3,700 MTA and 140,000 MTA, respectively. Over-enrichment of nutrients, primarily phosphorus and nitrogen, is known to result in nuisance algal blooms, toxic algal blooms, nuisance benthic algae, and hypoxia (lack of oxygen), which degrades habitats and food chains and causes economic and social impacts to beaches, recreation, tourism, fisheries and drinking water. Increased loads of chloride, bacteria, and other contaminants in Lake Michigan are also likely to impact aquatic life, recreation and other beneficial uses.

***The GLMRIS Team worked with other relevant regulatory agencies to formulate alternatives that protect the environment in a way that does not add other undue environmental risks or harm area residents.***

Based on this analysis of water quality impacts to both the CAWS and Lake Michigan resulting from mid-system separation, the GLMRIS Report proposes water-quality mitigation features to provide the alternative with the greatest chance of environmental acceptability and regulatory compliance. Tunnels are proposed to relocate the outfalls of two of the nation's largest wastewater treatment plants back to the Mississippi River-basin side of the physical barrier. This was found to be more feasible and cost effective than upgrading the plants to meet the higher water-quality standards of Lake Michigan. This configuration has the added benefit of continuing to supply a consistent volume of water to meet current navigation needs in the Illinois Waterway. Additionally, tunnels and reservoirs are proposed to capture the untreated, combined sewer overflows (CSOs) regularly discharged to the CAWS; sediment remediation is proposed to prevent mobilization of contaminated sediments to Lake Michigan; and ANS treatment plants are also included to maintain the flow of Lake Michigan water to the downstream sections of the CAWS and the Illinois River.

This extensive water quality mitigation makes up the majority of the project cost and implementation time for Alternative Plan 6. While efficiencies may be gained through further study, this is a reasonable estimate of the scope of work necessary to provide an implementable plan consistent with the Clean Water Act and other laws designed to ensure environmental protection.

It is important to note that the cost estimates for each alternative include all the costs associated with the implementation of the alternative, regardless of whether those costs would be included as part of the federal portion of the project. In general, costs associated with water-quality mitigation tend to be borne by local entities. However, it is appropriate to identify these costs as part of the alternative, since a plan to mitigate significant impacts to Lake Michigan would like be required prior to obtaining regulatory approval for the installation of the dams for hydrologic separation. In addition, it is important to weigh all of the potential impacts and costs associated with each alternative for purposes of comparison.

The GLMRIS Team also evaluated the effects of project alternatives on navigation and regional economics. Physical separation was found to induce an estimated \$211 million and \$251 million in average annual losses to commercial cargo navigation for the Lakefront and Mid-System Hydrologic Separation alternatives, respectively.

Two options were examined to potentially mitigate these impacts: a multi-modal facility that would transfer commodities from barge to truck or rail, and transloading facilities that would lift vessels over a physical barrier. Through a survey of commercial waterway operators, we found that most commercial shippers would not utilize a transloading facility due to additional re-handling costs. The docks and shippers surveyed, representing more than 90 percent of docks and 93 percent of all tonnage in the CAWS, responded that they would not utilize a transloading facility. Since a multi-modal facility would also involve an increase in the costs of material handling, it is likely shippers would not use these facilities either. Therefore, the GLMRIS Report proposes no mitigation for impacts to navigation.

The GLMRIS Report presents an array of alternatives to prevent ANS transfer between the Great Lakes and Mississippi River basins. Mitigation projects were identified to offset adverse impacts caused by the ANS controls. Construction of measures to offset these impacts would be completed prior to or simultaneously with construction of the control measures. Mitigation measures make up a majority of the costs and timeline.

The results of the GLMRIS Report show that there are challenging tradeoffs to be weighed in addressing potential interbasin transfer of ANS. The most effective measures for controlling ANS transfer (i.e. physical barriers) also cause the greatest impacts to existing uses of the waterways, particularly to flood risk, water quality and navigation. The impacts to existing uses should not be overlooked as issues regarding ANS transfer are addressed.

***Today's solution should not become tomorrow's problem.***

Stakeholders from around the region, including the Asian Carp Regional Coordinating Committee, the Great Lakes Commission, and others, are in active discussions regarding the next steps in the fight against invasive species. The GLMRIS Team has been providing technical briefings to a variety of groups to help inform their discussions, including meeting with our Canadian counterparts.

Aquatic nuisance species control is a shared responsibility, and the team looks forward to continued collaboration with those who have a vested interest in these important issues.

Additional information about the hydrologic and hydraulic modeling can be found in Appendix E of the GLMRIS Report, and the water quality modeling performed is described in Appendix F. The economics and navigation analyses are discussed in Appendices A and D. The GLMRIS Report and its appendices are available online in their entirety on the GLMRIS website.