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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 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 of the study are available online at glmr.is.anl.gov.

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

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GLMRIS Team Welcomes New Interim Program Manager

This spring brings “new life” to the Great Lakes and Mississippi River Interbasin Study (GLMRIS), as the U.S. Army Corps of Engineers (USACE) says farewell to retiring Program Manager Gary O’Keefe and welcomes the new Interim Program Manager Dave Romano. Romano brings 13 years of USACE Civil Works and Planning experience to the GLMRIS Team .



“The Corps expects to see continued success under the leadership of Mr. Romano, as he manages activities with officials across multiple Federal agencies, state and local governments and multiple non-governmental organizations devoted to preventing the migration of ANS between the two major watersheds,” said Brig. Gen. Margaret W. Burcham, U.S. Army Corps of Engineers Great Lakes and Ohio River Division commander.

Romano is temporarily leaving his position as the Chief of Planning in the Buffalo District to take on this interim role until a permanent replacement has been hired.

“Romano brings expertise in planning and policy, which will be extremely helpful for a study of this complexity, especially in dealing with National Environmental Policy Act matters and plan formulation, and has led prior expansive environmental programs with great success,” said O’Keefe. “With my retirement, I also wanted to express my appreciation for the quality work and dedication the team has put into this study; they are among the best I have had the opportunity to work with.”

Romano recently returned from deployment to Afghanistan as Deputy District Engineer for Programs and Project Management and was responsible for the direction and supervision of the entire District program in support of all Afghan National Security Forces.

“We are extremely fortunate to have another great leader take the helm on this multi-region study effort,” said Burcham.

“As we move through this transition period in program management, the team’s focus remains unchanged; our mission is to evaluate the most effective alternatives to prevent ANS transfer while keeping stakeholders engaged throughout the process. We look forward to the continued release of quality products to inform the best long-term solution for Great Lakes and Mississippi River communities,” said Chicago Area Waterway System Project Manager Dave Wethington.

Final Aquatic Nuisance Species Control Paper released

In response to public comment on the available options or technologies that may be effective at preventing the transfer of ANS through aquatic pathways in the Chicago Area Waterway System (CAWS), new information was added to the ANS Control Paper, and the final version was released April 18.

USACE received over 190 comments on the initial ANS Control Paper during the 60-day public comment period that ran from Dec. 21, 2011 to Feb. 17, 2012. In the category of “Lethal Temperature”, three new control methods are outlined, including: 1) freezing, 2) carbon dioxide pellet blasting and 3) desiccation (drying).

“Carbon dioxide (CO₂) pellet blasting is similar to sand blasting,” said GLMRIS Technology Team Lead Johnna Potthoff, “except that frozen CO₂ pellets are used instead of sand.” CO₂ pellet blasting leaves no blasting medium residue because the CO₂ pellets turn into a gas at room temperature. CO₂ pellet blasting works by flash-freezing the target organism, both killing it and making it brittle and easier to remove. This technology may be best applied where vessels can be removed from the waterway, and may not be immediately relevant to in-water applications.

The team has also expanded the discussion of predatory fish in the “Biological Controls” category to include fish that eat mollusks and added a new sub-section to the “Benthic Barriers” category regarding the use of silt as a type of sediment-surface barrier.

Public input is an important element of the GLMRIS study process, and the team is grateful to everyone who took the time to review the draft inventory and submit comments to make this a thorough inventory of potential controls.

*the viability of Zebra mussels. The upper incipient lethal limit for temperature for North American populations of Zebra has been found to be ~30°C. Survival above 30°C is possible for short time periods with gradual temperature increase and prior acclimation to warm temperatures. The graph above depicts selected temperatures that have important biological effects on Zebra mussels. Credit: Water Quality Special Study Report, Assessment of the Water Quality Conditions at Ed Zorinsky Reservoir and the Zebra Mussel (*Dreissena polymorpha*) Population Emerged after the Drawdown of the Reservoir, USACE, Omaha District, April 2012*

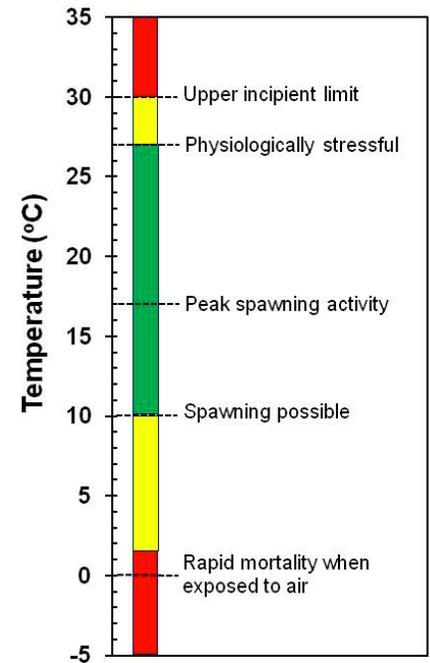
Commercial Fisheries Report released

On May 1, the GLMRIS Team released the “Commercial Fisheries Baseline Economic Assessment - U.S. Waters of the Great Lakes, Upper Mississippi River, and Ohio River Basins” (Commercial Fisheries Report).

“This baseline report provides a thorough summary of the most recently available commercial fisheries data in the GLMRIS study area,” said GLMRIS Chicago Area Waterway System Project Manager Dave Wethington. “We will use this and other baseline reports to further our understanding of existing conditions, as well as to help forecast impacts from potential aquatic nuisance species transfer.”

The harvest level in the U.S. waters of the Great Lakes is estimated at 19.3 million pounds of commercially-caught fish with an associated value of \$22.5 million.

The report further shows 10 million pounds with an associated value of \$4 million for the Upper Mississippi River Basin and 1.4 million pounds with an associated value of about \$2 million in the Ohio River Basin. The harvest level is calculated from the average of the most recent five years of state-licensed and tribal commercial fishing annual harvest data available.



How Temperature Can Help Control ANS:

Zebra mussels are ectothermic (i.e., cold blooded) making temperature play an important role in the timing and rate of biological processes such as metabolism, growth, and reproduction. Due to its role in the regulation of biological activity, water temperature is an important constraint on



Interim Products Expected for Release Spring 2012

Fisheries Reports

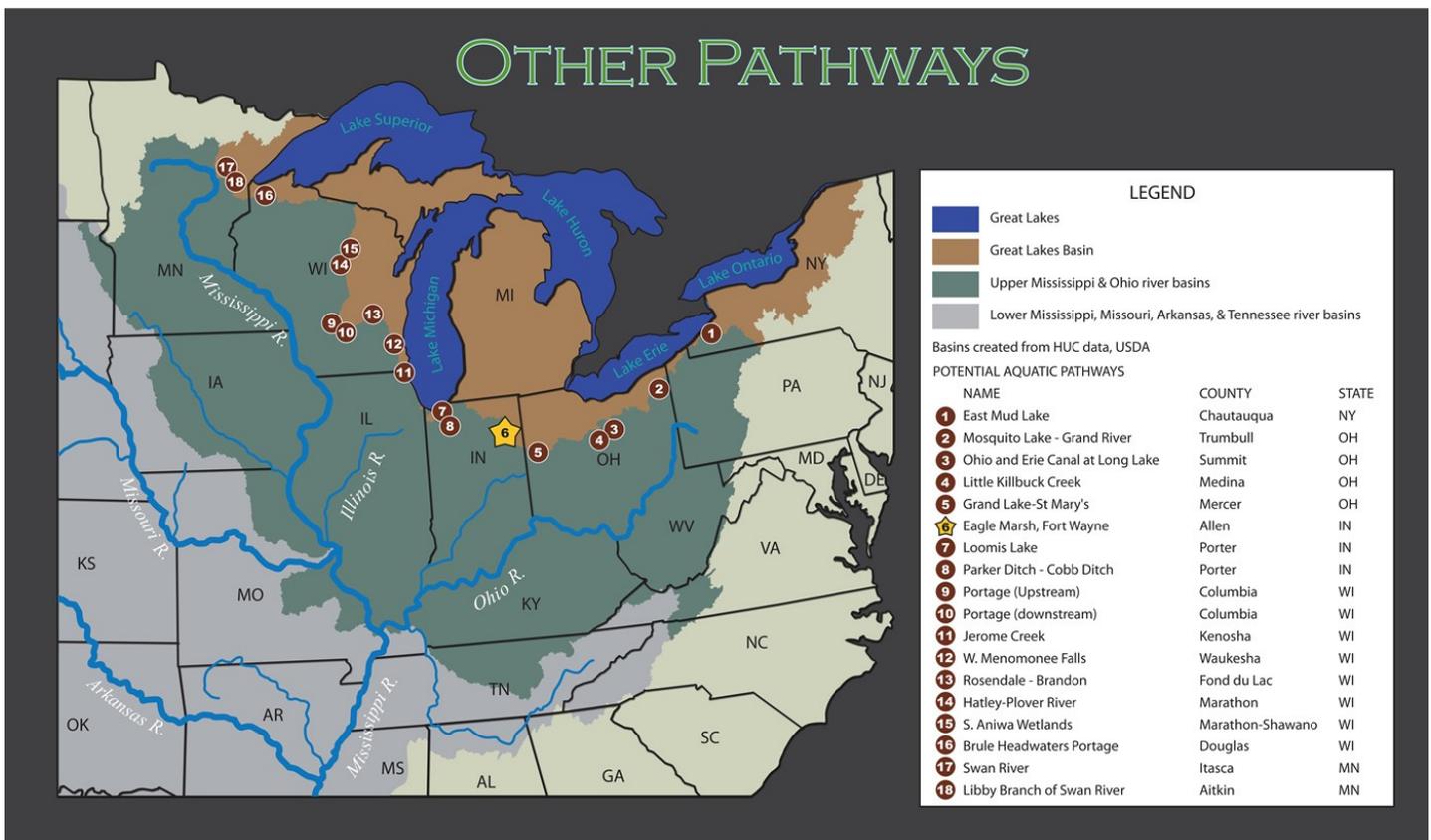
Two fisheries baseline assessments complimentary to the Commercial Fisheries Report will be released later this spring: subsistence fisheries and pro-fishing tournaments reports.

The pro-fishing report acts as a snapshot of pro-fishing tournaments within the study area. It provides qualitative data for various tournaments, including descriptions of the types of tournaments and information on the rules and other elements.

The subsistence fishing report is an overview of the harvest activities by Native American tribes through treaty rights within the study area. This study assesses the economic and cultural importance of subsistence harvesting for tribal communities. Included within the report: a listing of federally recognized treaty and non-treaty tribes within the study area; definition of subsistence; information on traditional methods of subsistence and cultural values; the harvesting methods used (gill nets, fish spears, etc.), harvest locations, the names of the species being taken, and the costs associated with the harvests; valuation of subsistence harvests; explanation of relevant treaties and an estimate of the economic value of subsistence activities.

Other Aquatic Pathways Reports

Two other products are due later this summer further describing other potential connections between the Great Lakes and Mississippi River basins, outside of the Chicago area: (1) The 18 Focus Area 2 Aquatic Pathway Assessments for the area outside of the CAWS will be released for public comment. These assessments will build on the results from the 2010 Other Pathways Preliminary Risk Characterization Report. Each report will further characterize the probability of an aquatic pathway existing at each location, and some will also assess the probability of specific ANS in being able to transfer between the basins through that potential aquatic pathway. (2) The Aquatic Nuisance Species Controls Report for Wabash-Maumee Basins Connection, Fort Wayne, Indiana, will identify potential available controls to prevent ANS from transferring between the two watersheds during flooding.



Q & A's with the Navigation and Economics Team about the Commercial Fisheries Report

Q. What is a baseline condition?

A. According to the U.S. Army Corps of Engineers' IWR 96-R-21, *Planning Manual*, the base condition- referred to as the baseline condition in the *Commercial Fisheries Baseline Economic Assessment- U.S. Waters of the Great Lakes, Upper Mississippi, and Ohio River Basins*- is the "conditions that exist at the time of the study." The Planning Manual states that a study may "rely on average conditions in recent years rather than precise data for the year of the study" if "the average reasonably represents the relevant study area conditions."

Q. Why couldn't you get more recent data sets than year 2009 (Great Lakes Basin) and year 2005 (Upper Mississippi River and Ohio River Basins)?

A. State agencies were requested to provide annual harvest levels and the associated ex-vessel prices for the years between 1989 through 2009 in order to generate analyses of harvesting trends over approximately 20 years. Due to lags in data entry, most states were not able to provide harvest data for years 2010 and 2011 in the Great Lakes Basin. Similarly, most states in the Upper Mississippi River and Ohio River Basins were able to provide harvest data up until year 2005.

Q. What is ex-vessel revenue?

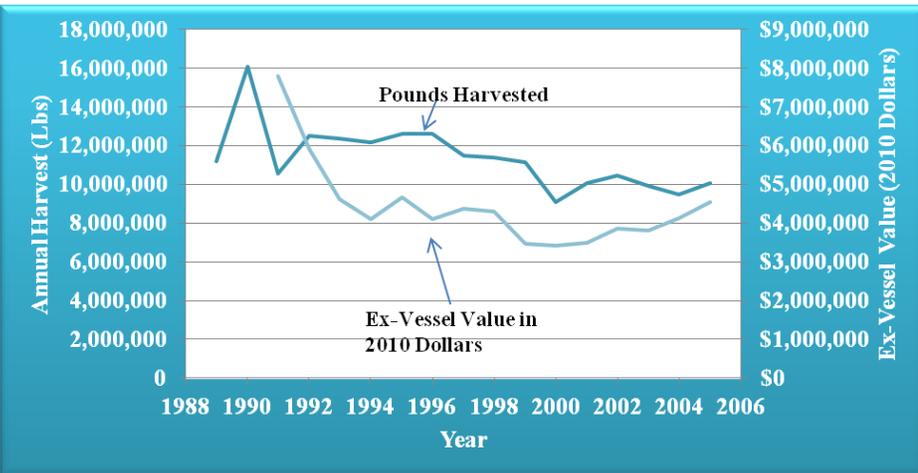
A. According to the National Oceanic and Atmospheric Association's (NOAA) National Marine Fisheries Services' (NMFS) report *Our Living Oceans; Report on the Status of U.S. Living Marine Resources, 1999*, the ex-vessel revenue is defined as "the quantity of fish landed by commercial fishermen multiplied by the average price [ex-vessel price] received by them at the first point of sale... The estimate of economic value often takes... commercial catches and multiplies them by an average price to arrive at a baseline measure of economic worth among various user groups."

Q. How was the value generated?

A. Harvest Level (Pounds) × Ex-Vessel Price (Dollars per Pound) = Ex-Vessel Value (Dollars). The average was determined to be a more accurate representation of current commercial fishing harvests due to the fact that actual harvest levels fluctuate on an annual basis.



GLMRIS Navigation and Economics Product Delivery Team meeting at the USACE Chicago District, May 15, 2012. The team discussed milestones, the current status of upcoming interim products and challenges and successes. Specific tasks of the team are to analyze impacts each potential aquatic nuisance species control may have on existing and forecasted uses of the lakes and waterways within the study area and to come up with mitigation measures, if necessary, for the recommended plan. (U.S. Army Photo by Sarah Gross)



Upper Mississippi River Basin Commercial Fishing Harvest Data displays the aggregated commercial fishing harvest levels and ex-vessel values for the years 1989 through 2005 for the following rivers: Upper Mississippi River, Illinois River, Kaskaskia River and Rock River.

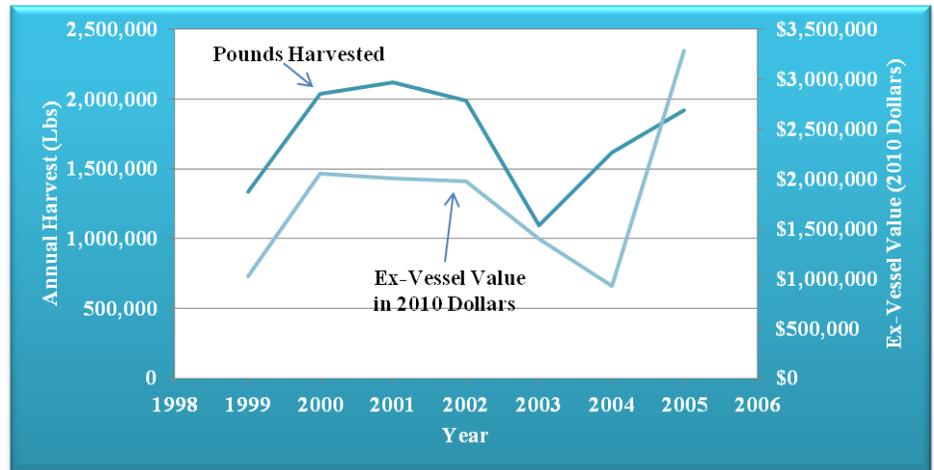
Q. What do you mean by 2010 dollars?

A. 2010 dollars is a statement that provides the reader the ability to make annual price comparisons without the effects of inflation. Values in the report have been indexed to 2010 dollars using the Producer Price Index from the Bureau of Labor Statistics.

Q & A's with the Navigation and Economics Team about the Commercial Fisheries Report

Q. Does this \$22.5 million replace the \$7 billion estimated which has previously been reported as the value of the Great Lakes fishery?

A. No. The \$22.5 million in value for U.S. waters of the Great Lakes is strictly an assessment of *commercial* fishing value and not comparable to the \$7 billion used frequently for the recreational fishing activities. The \$7 billion figure that is often quoted as the value of the Great Lakes Fishery was produced by Southwick Associates for the American Sportfishing Association in 2007. This figure is a compilation of regional economic input-output associated with the Great Lakes recreational fishery in the U.S., including related retail sales, salaries, jobs and tax revenues.



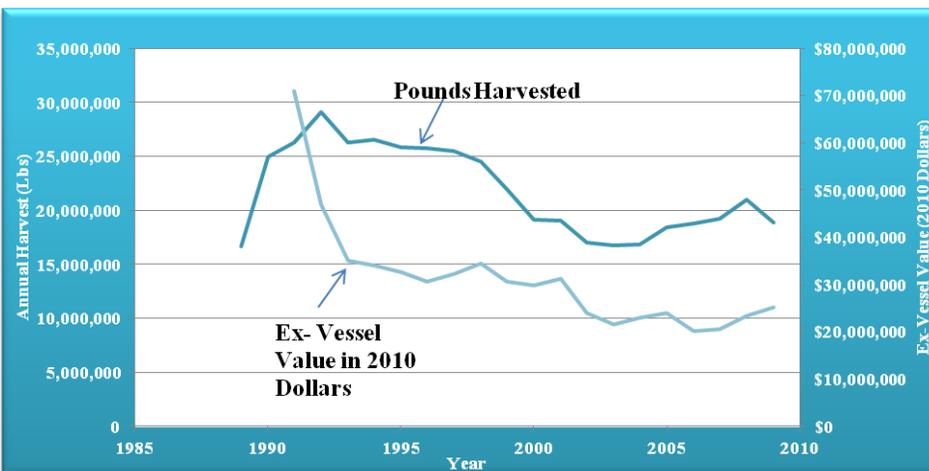
Ohio River Basin Commercial Fishing Harvest Data displays the aggregated commercial fishing harvest levels and ex-vessel values for the years 1999 through 2005 for the following rivers: Ohio River, Wabash River, Cumberland River, Kentucky River and Salt River

For the purposes of GLMRIS, USACE is seeking to establish defensible economic benefits associated with the various types of fisheries in the project study area. These would include assessment of the commercial, recreational, charter, subsistence and pro-sport fisheries.

The team is currently collecting additional information to help determine the economic value of the charter fishing industry and recreational fishery in the project study area. USACE anticipates that the recreational fishing report will be near the end 2012, with the charter fishery report following in early 2013, along with the pro-fishing and subsistence reports due out later in spring 2012.

Q. Why were the commercial values of the basins kept separate?

A. The goal of the Fisheries Economics Team is to determine the impacts to fisheries in the case of aquatic nuisance species transfer between the Great Lakes basin and the Upper Mississippi River and Ohio River Basins. Consequently, this called for the analyst to formulate a separate baseline assessment for each watershed as a prerequisite for the forthcoming analysis which will attempt to determine the relative impacts of ANS transfer on each of the three basins' commercial fisheries.



Great Lakes Commercial Fishing Harvest Data displays Great Lakes annual commercial fishing harvest data from the years 1989 through 2009. Harvest levels have dropped by over fifteen percent in recent years (2000-2009) compared to historic levels (1989-2009). Great Lakes fisheries harvest declines will be explored in more detail for each individual Great Lake.

USACE Announces New Interim Products, Array of Alternatives Report in 2013

U.S. Army Corps of Engineers (USACE) announced in May that it has identified two significant opportunities next year to provide input on GLMRIS in an effort to continue to keep stakeholders engaged in the study process. With these important new steps in the study, USACE will release several new Interim Products, including an Array of Alternatives Report, expected for completion in December 2013.

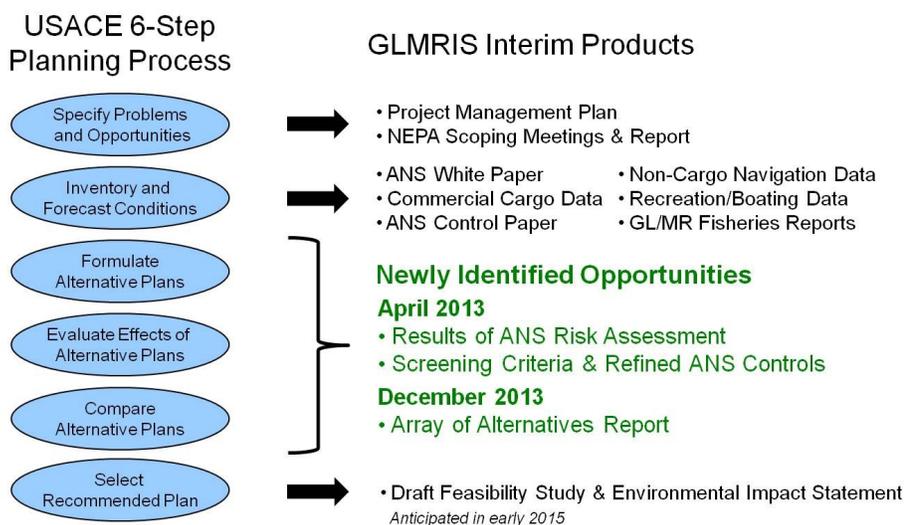
To date, the GLMRIS CAWS Team has released six Interim Products covering a range of baseline environmental, economic, and social/cultural data. At least four more are anticipated through early 2013, focusing primarily on fisheries - subsistence, pro-tournament, charter, and recreation - in GLMRIS study area. The GLMRIS Team continues to strive to maintain a high level of stakeholder engagement through availability of information on the GLMRIS Web site (<http://glmris.anl.gov>), via social media including Facebook and Twitter, by publishing this quarterly newsletter, providing opportunities to ask questions or comment on Interim Products, and participating in a wide variety of publicly-available meetings, conferences, and stakeholder engagement forums.

Risk Assessment & Screening Criteria

As discussed earlier in this issue, the GLMRIS ANS Control Paper identifies over 90 ANS Controls that could serve as potential building blocks for alternative plans in the CAWS. Later this year, the GLMRIS Team will work with other agencies and stakeholders, as appropriate, to identify criteria to refine the controls that warrant further consideration. The screening of ANS Controls is anticipated to occur during the fall/winter of 2012/2013. The results of this screening process, including the

details of the criteria utilized to screen the controls, are currently scheduled to be released as part of a public input opportunity in April 2013.

In addition, the GLMRIS Team is currently performing a risk assessment to identify which of the 39 identified ANS of Concern are of significant risk for transfer in the CAWS, as well as subsequent establishment in the basin for which they would be invasive. For the CAWS portion of GLMRIS, USACE will continue its planning efforts on ANS identified as high- or medium- risk for the CAWS, and will include recommendations for monitoring of those identified as low-risk.



Array of Alternatives Report

The Array of Alternatives Report will be an Interim Product of GLMRIS outlining an assortment of alternatives that meet the established planning objectives. This product will be based on information compiled during the formulation of alternative plans, which includes active coordination with Federal, state, local and nongovernmental stakeholders. Each alternative plan is anticipated to have a:

- General description of the ANS Control(s) and how they would be employed in the alternative;
- Preliminary design and engineering requirements;
- Reference map;
- Range of expected costs, and;
- An overview of mitigation measures needed to offset adverse impacts to existing waterway uses of the CAWS.

At least one of these alternatives will include a full hydrologic separation scenario. This input opportunity is a significant milestone in advance of the anticipated study completion date as it will allow all stakeholders, including Congress and potential non-federal sponsors, to examine and comment on the options and technologies that could be applied to prevent the interbasin transfer of aquatic nuisance species between the Great Lakes and Mississippi River through aquatic pathways in the CAWS.

An Update on Other Aquatic Nuisance Species Projects

Calendar of Events -- 2012 --

- May 22 – Great Lakes Day
www.greatlakesday.com/
- June 3-9 – National Environmental Week
- June 5 – World Environment Day
- June 6 – Annual Meeting of Great Lakes Fishery Commission, in Buffalo, N.Y. www.glfc.org
- June 26-28 – Annual Meeting of Great Lakes-St. Lawrence Cities Initiative, in Quebec City, Quebec
www.glslcities.org/annual-meetings/2012.cfm
- June 27-28 – Ohio River Asian Carp Forum, in Pittsburgh, Pa.
- July 11-12 – GLMRIS Executive Steering Committee Meeting and ACRCC Meeting, in Chicago
- July 13 – Great Lakes Commission & St. Lawrence Cities Initiative Advisory Committee Meeting
- August 4-7 – USCG Days
- August 19-23 – Annual Meeting of the American Fisheries Society, in Minneapolis, in St. Paul, Minn.
www.Afs2012.org
- September 10-14 – Great Lakes Week, in Cleveland, Ohio
www.glri.us/glweek.html
- September 11-12 – Great Lakes Commission Annual Meeting, in Cleveland, Ohio
www.Great-lakes.net
- October 23-24 – Meeting of Council of Lake Committees, Great Lakes Fishery Commission, in Romulus, Mich. www.glfc.org

Asian Carp Environmental DNA Calibration Study

The Asian Carp Regional Coordinating Committee's (ACRCC) Monitoring and Rapid Response Workgroup remains committed to working together to find and refine Asian carp detection technologies, such as Asian carp Environmental DNA (eDNA), to monitor the threat and deploy necessary prevention efforts to keep Asian carp out of the Great Lakes,

eDNA is a process in which genetic material (cells containing DNA from mucus, feces and/or urine) is extracted from water samples to detect the possible presence of Asian carp. The tool's main purpose is to act as an early warning tool in detecting Asian carp DNA to refocus prevention efforts, such as targeted netting, suppression tools or piscicides, if there are repeated positive samples in one area over time.

"At present, eDNA evidence cannot verify whether live Asian carp are present, whether the DNA may have come from a dead fish, or whether water containing Asian carp DNA may have been transported from other sources such as bilge water, storm sewers or fish-eating birds," said Kelly Baerwaldt, ACRCC eDNA program manager.

The U.S. Army Corps of Engineers is leading a two-year Asian Carp Environmental DNA Calibration Study (ECALS), funded through the Great Lakes Restoration Initiative, in conjunction with the U.S. Geological Survey and the U.S. Fish and Wildlife Service to reduce the uncertainty surrounding Asian carp environmental DNA (eDNA) results.

ECALS will investigate alternative sources and pathways for eDNA detections beyond a live fish. The study will also examine how environmental variables such as light, temperature and water velocity impact eDNA detections; explore the correlation between the number of positive samples and the strength of the DNA source; develop more efficient eDNA markers to cut the sampling processing time in half and model eDNA transport specific to the Chicago Area Waterway System.

This first interim report, released March 15, provides results to date from the study, including storm sewer experiments, fertilization analysis and alternative sampling trials to make the sampling process more efficient. For example, an initial trial on Chinatown storm sewers demonstrates that ice contaminated with Asian carp DNA and deposited into storm drains may serve as a source of eDNA and testing on two brands of fertilizer, as Asian carp are used as ingredients in some, failed to detect bighead or silver carp DNA. Moreover, the differences in sampling at different depths were investigated, and it was found that surface sampling was the most successful in detecting eDNA.

In April, the team began a telemetry study on cormorants in the Illinois Waterway down to Peoria to document migratory and foraging behavior, as well as testing the feces for Asian carp DNA. Lab studies will also be conducted to determine the detectable amounts of Asian carp DNA in cormorant and bald eagle feces when they are fed these fish, and also feathers will be sampled to determine if DNA can be carried on the bodies of these birds.

A new ECALS page on the ACRCC's website [Asiancarp.us](http://www.asiancarp.us) will host interim reports and tentative release dates for upcoming interim reports and document the progress of the study.
<http://www.asiancarp.us/ecals.htm>



Approximately 300 double-crested cormorants on rookery, Baker's Lake, Barrington, Ill. (Photo by Dr. Richard Fischer, U.S. Army Corps of Engineers Engineering Research and Development Center)