Great Lakes and Mississippi River Interbasin Study (GLMRIS) Comments
March 31, 2011

Mr. David Wethington

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Re: **Comments Regarding Notice of Intent to Prepare a Draft Environmental Impact Statement (EIS), Initiate the Public Scoping Period and Host Public Scoping Meetings for the Great Lakes and Mississippi River Interbasin Study (‘‘GLMRIS’’)**

Dear Mr. Wethington,

Please accept these comments submitted on behalf of National Wildlife Federation, Prairie Rivers Network, the Alliance for the Great Lakes, Great Lakes United, and Natural Resources Defense Council, as well as our hundreds of thousands of members across the Great Lakes and Mississippi River basins and nationwide, regarding the U.S. Army Corps of Engineers (“Corps”), Chicago District’s Notice of Intent to Prepare a Draft Environmental Impact Statement (EIS), Initiate the Public Scoping Period and Host Public Scoping Meetings for the Great Lakes and Mississippi River Interbasin Study (‘‘GLMRIS’’).

The undersigned organizations appreciate the opportunity to comment. While we have several recommendations to improve GLMRIS which are highlighted below, we would like to first express that the overarching goal for GLMRIS and addressing the transfer of aquatic nuisance species (“ANS”) must be a permanent solution to this ongoing crisis.

The only permanent and sustainable solution to this problem is hydrologic separation of the Great Lakes and the Mississippi River basin. Very simply, if water does not flow between the two great watersheds, aquatic plants, animals and diseases will not be able to migrate actively or passively between the two. If done right, hydrologic separation will leverage new and existing smart, well-planned investments that will establish new transportation infrastructure in the Chicago area that make the region more globally competitive, and upgrade treatment of wastewater and storm water. The result can be a revitalized Chicago Area Waterway System (CAWS) that not only closes the highway for invasive species, but also enhances Chicago’s transportation system, creates local and regional jobs, reduces business costs across the region, and improves water quality, tourism, and recreation. Hydrologic separation means infrastructure

upgrades that will benefit the entire Great Lakes and Mississippi region by enhancing our economic competitiveness and allow us to live more sustainably with our freshwater resources.

A summary of our recommendations is as follows:

- The GLMRIS study was authorized by the U.S. Congress in 2007 to "prevent" rather than "reduce the risk" of aquatic invasive species movement between the Great Lakes and Mississippi River Basin. Risk reduction is not a credible strategy to prevent ANS movement through the CAWS or any of the other aquatic connections. Risk reduction and mitigation activities have been authorized and funded separately from GLMRIS, to deal with immediate threats associated with the open aquatic connections, and the long term threats associated with overland pathways. Expanding the scope of GLMRIS to address risk reduction will divert resources from quickly determining how to achieve prevention;

- The GLMRIS study takes too long. The Chicago portion of the study is not predicted to be complete until mid-2015, over four years from now. Corps staff have already indicated in at least one public meeting that this official timeline is likely optimistic and the actual end date is likely to be even later. The Corps should acknowledge the urgency of finding a permanent solution, narrow the scope of investigation to hydrological separation, condense the timeline and produce final results for the Chicago portion of GLMRIS within 18 months rather than mid-2015;

- Congress mandated that GLMRIS should only consider "options and technologies available to prevent the spread" of aquatic invasive species through the waterways. Hydrological separation would achieve this. It is beyond the scope of the Army Corps' statutory authorization for the GLMRIS study to look at any solutions that would not achieve "prevention," and it is not clear at this time that any alternative other than hydrological separation would do so;

- While GLMRIS requires a review of all invasive species that may credibly move between the two basins, it is obvious that investigating hydrological separation and abiding to the Congressional intent for GLMRIS will prevent all possible movements between the two basins. Other aquatic invasive species are established in the Great Lakes region that could invade the Mississippi, and in the Mississippi that could invade the Great Lakes. There are species that could invade either basin in the near future due to lax regulations on ballast and importation. However this review should in no way extend the study timeline and should not influence the recommendations that emerge since the statute's "prevention" mandate requires that the Army Corps address all invasive species that may move between the two basins;

- The obvious and critical threat of Asian carp establishing in the Great Lakes is a reason for urgent action. The Corps should study and provide a solution for the CAWS as the first priority, and where needed, act on other aquatic pathways, based on the greatest likelihood of invasion. If necessary, the Army Corps should consider a phased approach to separating the two watersheds, prioritizing measures to prevent Asian carp migration while still taking steps that will lead to permanent prevention of all movement of aquatic invasive species in both directions. Most importantly, the Army Corps should not assume that no steps toward separation in the CAWS can be taken until all water quality issues associated with re-reversal of the Chicago River are addressed. Rather, the Corps should consider whether a physical barrier that would block movement of Asian carp can be constructed that does not require immediate re-reversal of the River – such as by pumping water over the barrier to allow downstream flow to continue – as an initial phase of a plan to create the progressive improvements of infrastructure in the CAWS that will be necessary to separate the two watersheds;

- In order to accelerate the time frame of the study (and save resources), the Corps should not duplicate relevant work that has already been done or is currently in process by credible sources, in particular concerning risk assessments of species of concern by the Canadian Department of Fisheries and Oceans and U.S. Fish and Wildlife Service, and hydrological separation options being developed by the Great Lakes Commission and the Great Lakes-St. Lawrence Cities Initiative; instead, the Corps should integrate such work, following its own independent critical review;

- The Corps should create an opportunity for regular – preferably at least twice annually - discussion forums during which the public can interact with technical staff and consultants for detailed Q&A on project progress. This should be separate and in addition to the requirements of the NEPA process;

- The Congressionally mandated goal of preventing ANS transfer means that all options that meet the mandate have identical benefits. The economic analysis must therefore seek the least costly location to separate the watersheds. All must be compared to the cost of the no-action alternative, which must include the lifecycle costs of operating, maintaining and replacing existing infrastructure (CAWS; electric barriers) as well as all activities required to monitor, control and remediate future ANS threats. To the extent that an option can be integrated with broader infrastructure development plans (e.g. transportation), such incremental benefits could offset the cost of achieving that synergy;

- The U.S. Department of State should request that the Canadian Foreign Affairs Department organize a public meeting in Canada where the Corps study team would be

invited to hear comments from stakeholders in Canada who are concerned with the impact of an Asian carp invasion to shared international waters.

The remainder of this letter provides more background and details in support of these recommendations.

Statutory and Legal Responsibilities

Congress directed the Corps to conduct "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."[1] In response to this directive, the Corps has stated that it plans to study "the options and technologies . . . that could be applied to prevent *or reduce the risk* of aquatic nuisance species transfer" between the basins.[2] The Corps has explained that it "plans to evaluate reduction of risk because considering the risk reduction afforded by various alternatives even by hydrological separation, [sic] is inherent in the thorough consideration of alternatives to prevent spread of aquatic nuisance species."[3]

By including the feasibility of options and technologies that merely "reduce the risk" of transferring aquatic nuisance species ("ANS"), the Corps would impermissibly expand the scope of the study ordered by Congress. This is plain from the words Congress used, Congress's intent, and the interests of the people living, working, and recreating in the Great Lakes and Mississippi River Basins.

The language of § 3061(d) of the Water Resources Development Act of 2007 ("WRDA") plainly requires the Corps to study only those alternatives that can stop the transfer of species between the two basins. Section 3061(d) of the 2007 WRDA provides as follows:

(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.[4]

In *Chevron U.S.A., Inc. v. National Resources Defense Council*, the U.S. Supreme Court held that when "Congress has spoken directly" on an issue and "the intent of Congress is clear; that is

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[1] Water Resources Development Act of 2007, Pub. L. No. 110-114, § 3061(d) (2007) (emphasis added).
[2] U.S. Army Corps of Engineers ("USACE"), *Project Management Plan: Great Lakes and Mississippi River Basin Interbasin Feasibility Study* 1 (2010) (emphasis added).
[3] U.S. Army Engineer Division, Great Lakes and Ohio River ("CELRD"), USACE, *Memorandum for Record* ¶ 2, dated December 15, 2010, *available at* http://glmris.anl.gov/documents/docs/GLMRIS_prevent_whitepaper.pdf.
[4] Water Resources Development Act of 2007 ("2007 WRDA"), Pub. L. No. 110-114, § 3061(d) (2007) (emphasis added).

the end of the matter; for the court, as well as the agency, must give effect to" that intent.[5] "The plainness or ambiguity of statutory language is determined by reference to the language itself, the specific context in which that language is used, and the broader context of the statute as a whole."[6] "Where Congress includes particular language in one section of a statute but omits it in another section of the same Act, it is generally presumed that Congress acts intentionally and purposely."[7]

When § 3061(d) is placed in the broader context of WRDA, the inappropriateness of the Corps' plans to study alternatives that reduce, rather than prevent the risk of transfer becomes apparent. In particular, elsewhere in § 3061 of WRDA, Congress directed the Corps to "conduct . . . a study of the range of options and technologies for *reducing* impacts of hazards that may reduce the efficacy of the [Chicago Sanitary and Ship Canal Dispersal] Barriers."[8] Congress thus knew how to say "reduce" when it meant "reduce." Its decision to use "prevent" in § 3061(d) instead of "reduce" must therefore be presumed to be intentional. It indicates that Congress perceived a difference between the two words and deliberately chose to require the Corps to study alternatives that would prevent, not reduce the transfer of ANS.[9] Expanding the scope of the study to include "reducing the risk of" transfer, would ignore the clear distinction Congress drew between the different terms in §§ 3061(b)(1)(D) and 3061(d).

In addition to the language of § 3061(d), the legislative history strongly indicates that Congress did not intend the Corps to study alternatives that "reduce the risk" of transferring ANS. In 2005, the Great Lakes Fishery Commission sent a letter to members of the House Transportation and Infrastructure Committee requesting that Congress authorize a study of "alternatives to *reduce* or eliminate potential for and risk of future introduction and spread of non-native species" between the basins.[10] However, when H.R. 1495 was introduced, the bill called for a study using virtually the identical language that was enacted in WRDA.[11] Thus, when Congress provided for a study only of alternatives that "prevent the spread" of ANS, it narrowed the scope of the study requested by the Great Lakes Fishery Commission, demonstrating that it was uninterested in "solutions" that merely reduce the risk of transfer.

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[5] 467 U.S. 837, 842-43 (1984).
[6] *Robinson v. Shell Oil Co.*, 519 U.S. 337, 341 (1997); *see also Clark v.U.S.Dept. of Agriculture*, 537 F.3d 934, 940 (8th Cir. 2008) ("In reviewing statutory language" courts "read individual words . . . in the context in which they are used and in the context of the statute as a whole.").
[7] *Duncan v. Walker*, 533 U.S. 167, 173 (2001) (internal quotation marks omitted).
[8] WRDA § 3061(b)(1)(D) (2007) (emphasis added).
[9] *See, e.g., Taracorp, Inc. v. NL Industries, Inc.*, 73 F.3d 738, 744-45 (7th Cir. 1996) (stating that "the same words . . . have the same meaning in a given act and that the choice of substantially different words to address analogous issues signifies a different approach) (citations omitted).
[10] Great Lakes Fishery Commission, letter to Sen. Voinovich dated Feb. 3, 2005, Attachment 2 (emphasis added).
[11] H.R. 1495, 110th Cong. § 3043(d) (as referred to H.R. Transportation and Infrastructure Comm., Mar. 13, 2007) ("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 pathways.")

Congress's decision to restrict the scope of the study to prevention is consistent with the grave concern members of Congress expressed about the spread of ANS, particularly Asian carp. Early in the debate concerning WRDA, Representative Rahm Emanuel recognized that "invasive species pose a severe threat to Lake Michigan, capable of billions of dollars in economic losses and inestimable environmental damage."[12] Another Illinois Representative, Judy Biggert, agreed, stating that "[o]ur Great Lakes are too important to just leave them vulnerable to invasive species like the Asian carp."[13] Senator Carl Levin stressed that the "Great Lakes are one of the world's greatest natural resources" and that the bill will help "protect and restore them" while noting that the feasibility study provision authorizes the Corps "to study options for *hydrologic separation* . . . so that we can determine what a long-term solution should be."[14] The Senator later said that § 3061 is an "important provision for the health of the Great Lakes" providing for completion of the Barriers and the feasibility study "to prevent the spread of invasive between the Great Lakes and Mississippi River."[15]

Moreover, Congress voted to override the President's veto of the bill, demonstrating the critical importance Congress attached to preventing the spread of ANS. Representative Jim Oberstar stated that the legislation "represents a culmination of seven years of bipartisan, bicameral consensus to invest in our nation's future."[16]

Even the Corps elsewhere recognizes that Congress's intent was to find a solution to prevent the transfer of ANS. The January 2010 Dispersal Barrier Efficacy Study (Interim I Report) notes that the Energy and Water Development and Related Agencies Appropriations Act of 2010 requires the Corps to "implement measures recommended in the efficacy study, or provided in interim reports, authorized under § 3061 of the [2007 WRDA] . . . to prevent [ANS] from bypassing the [CSSC dispersal barrier] referred to in that section *and to prevent* [ANS] *from dispersing into the Great Lakes*."[17] The Corps recognizes that this new authority was granted by Congress in "response to eDNA testing results that indicate Asian carps may potentially be one mile south of the barrier system within the CSSC and located in both the Des Plaines River and Illinois & Michigan (I&M) Canal."[18]

Only preventing the transfer of ANS will effectively address the harm caused by invasive species. They can have, and already have had devastating impacts on the economy and ecology of the Great Lakes regions. Merely *reducing* the risk of invasive species spread is inadequate. The nature of the risk posed by ANS is different than the risk to water quality posed by other

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[12] 153 Cong. Rec. H3600, H3609 (Apr. 19, 2007) (statement of Rep. Emanuel).
[13] *Id.* at H3605 (statement of Rep. Biggert).
[14] *See* 153 Cong. Rec. S6157, S6183-84 (May 16, 2007) (statement of Sen. Levin) (emphasis added).
[15] 153 Cong. Rec. S11974, S11990 (Sep. 24, 2007) (statement of Sen. Levin).
[16] 153 Cong. Rec. H12788, H12796-97 (Nov. 6, 2007) (statement of Rep. Oberstar).
[17] USACE, *Dispersal Barrier Efficacy Study (Interim I Report)*, Executive Summary (April 2010) (emphasis added).
[18] *Id.*

pollutants. Unlike nutrients and chemicals, ANS "can reproduce and increase over time, persist indefinitely and spread over large regions."[19] "[V]ery large, widespread and long-term impacts could potentially result from the discharge of a small number of individual organisms—in some cases as few as a single mated pair, or in the case of asexually-reproducing species, a single individual."[20] An example is the seaweed *Caulerpa taxifolia*, which has invaded "thousands of acres in the Mediterranean Sea and . . . two bays in California . . . [and which] consists of a single clone, and thus derives from a single individual."[21] Eliminating the spread of ANS is therefore the only option that would be sure to protect both basins.

In sum, the Corps' intention to study alternatives "that could be applied to prevent or *reduce the risk* of ANS transfer between the Great Lakes and Mississippi River Basins" goes beyond the scope of the study Congress ordered in WRDA. As part of the study, the Corps *will* have to evaluate the likelihood or probability that various alternatives will succeed in preventing transfer completely. In the end, any alternatives that have too low a likelihood or probability of success would have to be rejected. But the Corps may not set the bar too low by studying alternatives that appear from the outset to be less than fully effective.

Because the Corps' current study plan goes beyond the scope of its congressional authorization, and because failing to develop options and technologies that prevent invasive species transfers could cause irreversible harm to the Great Lakes and Mississippi River systems and the people living in the region, the Corps should limit the scope of the feasibility study authorized under § 3061(d) to evaluating only those alternatives that would result in the *prevention* of the transfer of invasive species between the basins.

Resources at Risk from ANS Transfer via The Chicago Area Waterway System

Both the Great Lakes Basin and the Mississippi River Basin are significant, unique systems. The Mississippi River is the third longest in the world, draining nearly one-eighth of North America (including parts of two Canadian provinces), and over 58% of the contiguous U.S. (including all or parts of 31 states). The Mississippi Basin has the richest fish fauna in North America, including over 375 species, with one-third endemic to the area (mostly the highlands in the eastern portion of the basin).[22]

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[19] California State Lands Commission, *Report on Performance Standards for Ballast Water Discharges in California Waters*, Appendix A, at 4 (2005), *available at* http://www.slc.ca.gov/Spec_Pub/MFD/Ballast_Water/Documents/Appendix_A.pdf.

[20] *Id*.

[21] *Id*., at Appendix 3.

[22] Burr, B.M., Ladonski, J.B. The Mississippi River Basin: Its megafauna and hydrological modifications, *In* Abell, R.A. et al. (Eds.) Freshwater Ecoregions of North America: A Conservation Assessment, Island Press, Washington, D.C. 2000.

The river has seen a number of stresses through the years, including major hydrological modifications for navigation and flood control over the past two centuries, which have impaired habitat for some species. An ongoing severe stress is the presence of ANS, introduced both through stocking as well as inadvertent/accidental introductions. Four species of Asian carp (bighead, silver, black, and grass carp) were introduced for various purposes (including aquaculture operations) in the southern U.S. in the 1960s to 1980s, and have since spread into the wild, including moving up the Mississippi and Missouri Rivers and various tributaries. As voracious plankton-eating fish, bighead and silver carp have significant diet overlap with other species, including gizzard shad and bigmouth buffalo. [23]

The Great Lakes are a unique aquatic ecosystem, holding nearly one-fifth of the Earth's fresh surface water, providing habitat to over 100 fish and wildlife species, providing millions in both the U.S. and Canada with drinking water, and providing for numerous industrial and recreational benefits. By one estimate, the Great Lakes recreational, commercial and tribal fishery is valued at over $7 billion annually,[24] and the broader recreational fishery in the eight Great Lakes states accounts for over $10.7 billion in annual expenditures.[25]

Yet while the lakes continue to provide numerous services, they continue to be under stress due to a number of factors, including ANS. Over 180 ANS are now present in the system,[26] and the threat of new introductions remains from multiple vectors. While shipping has been responsible for the plurality of introductions over the past 170 years, the related issue of development and operation of canals have been an important vector as well, contributing to the increased invasion rate (compared to natural) over this period.[27] One of the canal-facilitated ANS that has been particularly harmful in the lakes is the sea lamprey, which were first observed in Lake Erie in 1921 following modifications to the Welland Canal,[28] and continue to require extensive control measures to this day. Canals continue to serve as vectors for ANS – for example, in recent

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

[24] Hansen, M. J. 2010. Testimony before the U. S. House of Representatives Committee on Transportation and Infrastructure Subcommittee on Water Resources and Environment Oversight hearing on "Asian Carp and the Great Lakes". February 9, 2010, available from http://www.glfc.org/fishmgmt/Hansen_testimony_aisancarp.pdf. (accessed March 24, 2010).

[25] US Fish and Wildlife Service, 2006 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation, and 2006 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation, Errata Sheet for National Report, available from http://www.census.gov/prod/www/abs/fishing.html (accessed Feb. 27, 2011).

[26] Great Lakes Environmental Research Laboratory, Great Lakes Aquatic Nonindigenous Species Information System, available from http://www.glerl.noaa.gov/res/Programs/ncrais/glansis.html (accessed February 27, 2011).

[27] Ricciardi, A., Patterns of invasion in the Laurentian Great Lakes in relation to changes in vector activity, *Diversity and Distributions*, 12:425-433

[28] Great Lakes Fishery Commission, 2000. Sea Lamprey: A Great Lakes invader, available from http://www.glfc.org/pubs/FACT_3.pdf (accessed February 27, 2011).

decades, the blueback herring has expanded its range into upstate New York, and reached Lake Ontario. The economic costs of these introductions are significant. For example, sea lamprey control costs amount to over $25 million annually, through activities of the Great Lakes Fishery Commission and other parties..[29] Recent research has indicated that ANS introduced via the shipping vector, in aggregate, cost the Great Lakes region over $200 million annually.[30]

Researchers, policy makers, industry and the public are increasingly recognizing the value of more aggressive restoration efforts in the region, both to the environment and the economy. A 2007 report found that implementation of all measures identified through the 2005 Great Lakes Regional Collaboration (with an estimated price tag of $26 billion) would result in benefits of up to $50 billion to the national economy, and up to $50 billion in short-term benefits to the regional economy.[31] But while recognizing the numerous financial and other benefits of restoration, it is important to stop the addition of new stresses, including potential new ANS such as Asian carp that could significantly impair the ability to reach many other restoration goals.

The potential entry and establishment of Asian carp (in particular bighead and silver carp) in the Great Lakes is currently a major concern regarding potential new ANS in the Great Lakes. Progression of the fish up the Illinois River has been well-documented over the past decade; an earlier study showed exponential increase in captured individuals of one reach of the lower river in the 1990s, and a 2003-04 telemetry study finding an average movement rate of 1.7 km/day.[32] A newer technique now being used to identify presence of Asian carp at the leading edge of the invasion front and elsewhere is environmental DNA (eDNA) analysis. Researchers using the technique have found evidence over the past two years of both bighead and silver carp in multiple locations in the CAWS area. The researchers note that results from their technique have been generally consistent with data from electrofishing (with more positive eDNA hits in areas of greater capture efficiency through electrofishing). The findings of eDNA upstream of the electric dispersal barrier (as well as the finding of a bighead carp within 13 km of Lake Michigan, upstream of the barrier), led the researchers to note that: "Regardless of the source of the carps north of the electric barrier…, eDNA surveillance has revealed much more imminent

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[29] Great Lakes Fishery Commission, 2008, Program Requirements and Cost Estimates, FY2010, available from http://www.glfc.org/staff/PRCE_10.pdf (accessed February 27, 2011).

[30] Lodge, D. and Finnoff, D. 2008. Annual Losses to Great Lakes Region by Ship-borne Invasive Species at least $200 Million, available from http://www.glu.org/sites/default/files/lodge_factsheet.pdf (accessed March 23, 2011).

[31] Austin J.C., Anderson, S., Courant, P.N., Litan, R.E., 2007. America's North Coast: A benefit-cost analysis of a program to protect and restore the Great Lakes, available from http://www.healthylakes.org/site_upload/upload/America_s_North_Coast_Report_07.pdf (accessed February 27, 2011).

[32] Peters, L.M., Pegg, M.A., and Reinhardt, U.G., 2006. Movements of adult radio-tagged bighead carp in the Illinois River, Transactions of the American Fisheries Society, 135:1205-1212.

risks of invasion of Lake Michigan by both silver and bighead carps than had been indicated by standard surveillance methods."[33]

While it is clear that the risk of invasion by Asian carp into Lake Michigan is high, it is also clear that there is significant potential for broad establishment in the Great Lakes Basin. A broad assessment utilizing environmental niche modeling found that the region in general could support all four of the Asian carp species of concern.[34] Based upon general understanding of the species' life history, bighead and silver carp would likely need specific riverine conditions to spawn; yet research has shown that 22 tributaries in the upper four Great Lakes could offer suitable spawning habitat (i.e., undammed stretches for at least 100km) for the species.[35] Recent research using bioenergetics modeling indicated limited supplies of plankton in the open waters, but adequate supplies in many bays, coastal wetlands, and embayments in the Great Lakes would have sufficient food sources (in particular plankton) to support growth of bighead and silver carp.[36] These potential locations include some of the most productive fisheries in the Great Lakes, including Western Lake Erie, where an extensive recreational fishery for fish such as walleye and yellow perch has existed for decades.[37] Furthermore, it is important to note that though they are primarily planktivores, Asian carp can potentially feed on detritus as well.[38]

Other waters could potentially be at risk of invasion as well, including drowned river mouth lakes (such as Muskegon Lake, Pere Marquette Lake, and White Lake adjacent to Lake Michigan). As voracious feeders, Asian carp could potentially compete with other plankton-eating species, including gizzard shad, bigmouth buffalo, spotfin shiner, as well as juvenile yellow perch and walleye.[39] In addition to the several Asian carp risk assessments involving the Great Lakes that have been completed, an additional effort is underway involving Environment Canada researchers and others, coordinated through the Great Lakes Fishery Commission.[40]

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[33] Jerde, C.L., Mahon, A.R., Chadderton, W.L., Lodge, D.M. 2011. "Sight-unseen" detection of rare aquatic species using environmental DNA, Conservation Letters, 00:1-8.

[34] Herborg, L-M, Mandrak, N.E., Cudmore, B.C., MacIsaac, H.J., 2007. Comparative distribution and "Invasion risk of snakehead (Channidae) and Asian carp (Cyprinidae) species in North America, *Canadian Journal of Fisheries and Aquatic Sciences*, 64:1723-1735.

[35] Kolar, C.S., et.al. (Note that Lake Ontario was not considered in the assessment.)

[36] Cooke, S.L., and Hill, W.L., 2010. Can filter-feeding Asian carp invade the Laurentian Great Lakes? A bioenergetic modelling exercise, *Freshwater Biology*, 55:2138-2152.

[37] Bence, J.R., and Smith, K.D. 1999. An overview of recreational fisheries of the Great Lakes, in Taylor, W.W. and Ferreri, C.P. (Eds.) Great Lakes Fishery Policy and Management, pp. 259-306.

[38] Kolar et al. 2007, *Op. Cit*

[39] Michigan Department of Natural Resources and Environment, 2010. Proposed plan for the prevention, detection, assessment, and management of Asian carps in Michigan waters, available from http://www.michigan.gov/documents/dnr/AsianCarpManagementPlan_334348_7.pdf (accessed December 14, 2010).

[40] Cudmore, B., 2010. Binational risk assessment of Asian carps in the Great Lakes, presentation to Great Lakes Panel on Aquatic Nuisance Species, December 9, 2010, Ann Arbor, MI, available from http://glc.org/ans/pdf/GLP_Dec2010_Cudmore_Asian%20Carp%20RA.pdf (accessed February 28, 2011).

Asian carp are of course not the only ANS of concern regarding potential for interbasin movement. Other species are at risk of moving through the CAWS and causing harm to either basins. The round goby, first identified in the St. Clair River in 1990, has made its way through the CAWS and most of the way down the Illinois River towards the Mississippi River.[41] A recent study reported that 156 invasive species in the U.S. are restricted to either the Great Lakes or Mississippi River Basin. Among these species, 17 species were identified as present (or likely present) in the Mississippi River Basin and pose high risk of invading the Great Lakes, and 10 species were identified as present in the Great Lakes, and high risk to the Mississippi River Basin. [42]

While it is important to consider the various species that might pose a particular risk of Great Lakes-Mississippi River Basin transfer via the CAWS, it is important to recognize that given the various life stages of potential species of concern (e.g. eggs, veligers, juveniles, depending on species), any type of hydrological connection between the basins presents a finite risk of transfer. Thus, we do not believe that an additional, full-blown assessment of relative risks of movement is necessary, and ask that GLMRIS should instead focus on identifying ways to prevent the interbasin transfer of all known ANS via the CAWS, as well as types of ANS (already identified in other assessments) that could conceivably pose invasion risks in the future. It seems obvious that diverting time and effort studying relative risks of ANS movement through the CAWS will undermine the goal of achieving prevention in the most timely and least costly manner. The PMP provides no scientific evidence to the contrary.

Economic analysis framework

Comparing economic cost of alternatives is straightforward

NEPA requires that options be compared to a "no action alternative". This base case will be characterized by a stream of future costs of operating the CAWS and related infrastructure that currently serves many purposes including transportation, wastewater and stormwater management, and ANS management.

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[41] Fuller et al., Fuller, P., A. Benson, and E. Maynard. 2011. *Neogobius melanostomus*. USGS Nonindigenous Aquatic Species Database, Gainesville, FL. Available from http://nas.er.usgs.gov/queries/FactSheet.aspx?SpeciesID=713 (accessed March 23, 2011)

[42] Jerde, C.L., Lodge, D.M., Mahon, A.R., Chadderton, W.L., Barnes, M.A., McNulty, J. Final Report: Aquatic Invasive Species Risk Assessment for the Chicago Sanitary and Ship Canal. 2010. Report to the United States Army Corps of Engineers, Environmental Laboratories, Cooperative Environmental Studies Unit, Vicksburg, Mississippi.

All options for preventing ANS transfer would require capital investments to modify the CAWS, and will change the future stream of costs for operating the affected transportation and water infrastructure. For example physical separation of the watershed might increase freight transportation costs, but would reduce some operating costs by eliminating the need to operate the electric barriers and suppress Asian Carp populations in the Illinois River. Thus the cost streams associated with each alternative can be estimated with reasonable accuracy and compared in a straightforward manner to that of the base case.

Some of the costs inherent in the no-action alternative will be reduced or eliminated by implementing any of the alternatives. It is therefore important to quantify these costs in the baseline analysis so the appropriate fraction of those costs can be netted out of the project costs attributable to each alternative. Example cost streams include the following:

- Long term operation, maintenance and replacement of CAWS infrastructure (Corps, Coast Guard, others?)
- O&M expenditures on electric barriers, 13-mile barrier along the Des Plaines, etc.
- Monitoring, surveillance, capture and other actions to reduce propagule pressure at both ends of the CAWS
- Highway traffic delays now caused by opening bridges to accommodate barge traffic
- Lock delays experienced by vessels accessing the Lake from the Chicago River

Comparing economic benefits is problematic

The economic benefits of separating the Great Lakes and Mississippi River basins are extremely difficult to estimate. For example it is virtually impossible to quantify the extent of damage that would be caused by Asian Carp if they establish a reproducing population in the Great Lakes, or to estimate to what extent the electric barriers have already been bypassed or breached. The same applies to the threats posed by all ANS, whether already established or yet to be introduced; their potential damage caused by their passage to the other watershed is simply unknowable.

Fortunately in the context of the GLMRIS assessment of economic impacts, the benefits of preventing ANS transfer are identical – by definition – for all the options that meet the prevention mandate.

Principles and Guidelines issued in 1983 pursuant to the Water Resources Planning Act govern planning and evaluation efforts conducted by the Corps of Engineers when planning of flood control, drainage and water supply projects. Chapter 1 of the guidance document states the objective:

> *The Federal objective of water and related land resources planning is to contribute to national economic development consistent with protecting the Nation's environment*[43]

[43] USACE, "Economic and environmental principles and guidelines for water and related land resources , implementation studies" Chapter 1 Section IIa, 1983 http://www.usace.army.mil/CECW/PlanningCOP/Documents/library/Principles_Guidelines.pdf

Chapter 2 describes the procedure for quantifying the national economic development (NED) benefits of a project:

> *Net NED benefits of the plan are calculated in average annual equivalent terms.*[44] [by subtracting the present value of the cost stream from the benefit stream, and levelizing over the project life]

When benefits of all options are identical, NED benefits are maximized my selecting the least-cost option. This approach is commonly employed when costs can be quantified more easily than benefits. For example because the benefits of national security are difficult to quantify, Congress defines the level of security desired so DOD and DHS can compare the costs of alternative ways of achieving it. In the case of GLMRIS the goal has been defined by Congress (prevent ANS transfer via the CAWS) so it is now up to the Army Corps to determine the least-cost alternative means of achieving prevention.

The vast majority of GLMRIS resources should be allocated for identifying and analyzing alterative locations for separating the basins.

It is obvious that physical separation prevents transfer of all aquatic organisms via aquatic connections, and that Congressionally mandated goal could be met by placing the divide at one of many alternative locations, each having very different costs and impacts. For example some locations may minimize the impacts on freight transport but complicate adjustments to wastewater infrastructure. Other locations may offer an ideal site for intermodal terminals that offset disruption of barge traffic by facilitating connections to the CREATE project's new rail network.

Other possibilities that fall short of closing the aquatic connection (e.g. a chemically, radiologically or biologically-induced "dead zone") might theoretically be capable of preventing 2-way spread of all species of ANS including micro-organisms, but it is difficult to imagine how they might be implemented in practice, or operate during floods, etc.

Implement the preferred option in a manner that minimizes the cumulative risk of ANS transfer during the construction period.

All options that do not involve physical separation of the watersheds will have efficacy less than 100% and therefore merely postpone rather than prevent transfer of AIS through the CAWS. Many such options have already been analyzed elsewhere, for example in the 2004 report to the Minnesota DNR.[45] While their efficacy may fall short of meeting the GLMRIS mandate of prevention, such measures (e.g. the electric barriers) may be cost-effectively employed as

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[44] USACE 1983, op. cit. Chapter 2 Section I, 2.1.3

[45] FishPro, *Feasibility Study to Limit the Invasion of Asian Carp into the Upper Mississippi River Basin: Report to Minnesota Department of Natural Resource, Table V-1* (2004), *available at* http://files.dnr.state.mn.us/natural_resources/invasives/aquaticanimals/asiancarp/umrstudy.pdf

temporary risk reduction measures during the period while permanent barriers are under construction.

Because of the time required to design and construct barriers that achieve the mandated goal of prevention, it is imperative to stage construction in a manner that minimizes cumulative risk of ANS transfer during the construction period. The following examples illustrate opportunities for minimizing cumulative risk of ANS passage through aquatic pathways while permanent barriers are under construction.

- State and Federal Agencies erected a chain link fence in Eagle Marsh to reduce the risk of Asian Carp transfer while more extensive studies are underway to identify best option for preventing transfer of all ANS.
- The option proposed by NRDC[46] notes that a physical barrier could be placed in the CSSC that could prevent northbound transfer of Asian Carp and other species, but would require pumping water over the barrier until other structural and water quality modifications could be made upstream.
- Prevention of all ANS transfers would not require complete separation of Chicago's combined sewers, only those lying below the high water marks of the Lake Michigan and the Des Plaines River. Some temporary level of protection is provided by the current routing of stormwater through treatment plants.

Define each alternative in a way that maximizes synergy with planned and potential evolution of affected infrastructure (transport; wastewater; stormwater)

Impacts on transportation and water infrastructure will have strong influence on the cost of all options for preventing AIS transfer. Therefore it is necessary for the GLMRIS study to be coordinated closely with MWRD and local transportation planning agencies that have the data and expertise to help identify the most cost-effective locations for separating the watersheds.

The opportunity to improve rail-water connectivity is one example, recently documented in a recent report prepared for the Chicago Metropolitan Agency for Planning.

> *Little connectivity exists between water and rail. For example, no water dock is located near the Logistics Park Chicago intermodal facility in Elwood. However the private sector ranks connectivity between water and rail as among the top three issues in the survey.*[47]

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[46] Henderson, H., Cmar, T., Hobbs, K. 2010. Re-Envisioning the Chicago River: Adopting comprehensive regional solutions to the invasive species crisis, available from http://www.nrdc.org/water/chicagoriver/chicagoriver.asp (accessed February 28, 2011); Shaw Environmental Technical Report and Appendix available at http://docs.nrdc.org/water/wat_10102001.asp (accessed March 10, 2011)

[47] Cambridge Systematics Inc., "*Regional Freight System Planning Recommendations Study*" 2009 http://www.cmap.illinois.gov/freight-system-planning

Consider the significant benefits to freight transportation might be achieved by separating the watersheds at one of the four locations where the CREATE project's new rail network will cross the CSSC. Two of these locations are about 3 miles upstream of the Stickney WRP and another is a similar distance downstream. Obviously the upstream locations would require only minor alterations of the Stickney plant, while the downstream location would necessitate pumping effluent over the divide into the CSSC, investing in advanced treatment technology to send it to the Lake. The costs of sending it to the Lake, of course, might be offset by the economic benefits of diverting a substantial fraction of Chicago's Lake Michigan allocation to other uses.

Options that present such opportunities for synergistic benefits may not be the least costly alternative. However the incremental cost may leverage huge benefits to the region at large. Even if the potential benefits are difficult to quantify, they could be considered along with other difficult-to-quantify social, environmental and cultural impacts.

Concerns of Canadian Stakeholders

An Asian carp invasion to the Great Lakes presents a threat to the health and welfare of Canadians. Approximately 40 percent of the shoreline of the Great Lakes and 36 percent of their waters lie within the boundaries of Ontario, Canada.[48] The consequences of the establishment of Asian carp species on ecological and native ecosystems in Canada are significant. A risk assessment study conducted by the Canadian Department of Fisheries and Oceans concluded that if Asian carp successfully colonize the Great Lakes there is a high probability they would spread across the Great Lakes basin and possibly even through the prairie provinces.[49] The study stresses that such an invasion would have a significant impact on the food web and trophic structure of aquatic systems. The Department of Fisheries and Oceans stated that, unlike the sea lamprey, no control solution exists for the Asian carp; the only hope is to keep them out.[50] Furthermore, the Ontario government has stated that if Asian carp enters the Great Lakes there will be serious adverse impacts on Ontario's recreational and commercial fisheries, which are valued at approximately CAD$400 million per year.[51] Environment Canada has made a similar assessment.[52]

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[48] Brief of Amicus Curiae Her Majesty The Queen In Right of Ontario in Support of the State of Michigan's Motion For a Preliminary Injunction (31 December 2009) (Ontario Amicus Brief).

[49] Department of Fisheries and Ocean Canada (Canadian Science Advisory Secretariat), *Risk Assessment for Asian Carp in Canada*. Department of Fisheries and Ocean Canada., 2009), at 19 – 27.

[50] Department of Fisheries and Oceans Canada (DFO), *Will Asian Carp Invade Canada?* DFO, undated), available at <http://www.dfo-mpo.gc.ca/science/Publications/article/2006/01-01-2006-eng.htm>.

[51] See Ontario Amicus Brief, n. 2 above, at 9.

[52] Environment Canada, *Invasive Alien Species of the Month* (Environment Canada, undated), available at <http://www.ec.gc.ca/eee-ias/default.asp?lang=En&n=8E8C2C22-1>.

In 2010 four not-for profit organizations in Canada requested the U.S. Secretary of State to formally request a public hearing in Canada regarding international pollution matters under section 310(a) of the *Clean Water Act.*[53] A response to this petition was never received. Providing an forum to hear the concerns of Canadian stakeholders in GLMRIS should be a priority for the federal U.S. government, and we strongly encourage a request be made to Foreign Affairs to host a public hearing on Asian carp where the Corps study team, and the Environmental Protection Agency are present.

Resources at Risk from ANS Transfer Via Other Aquatic Pathways

Our organizations consulted a variety of sources while researching the issue of other pathways risk characterization in preparing these comments. We consulted experts from state and federal agencies, members of the ENGO community, researchers and citizens for their views and opinions.

Timeframe

We are impressed with the speed of Phase II of GLMRIS. We are also encouraged by the caliber of the experts involved, and the Corps' effort to be as thorough and comprehensive as possible in identifying all potential points of AIS transfer between the Mississippi River and Great Lakes basins. We were impressed with the rapidity with which the Corps and other agencies initiated efforts to block passage of Asian carp at Eagle Marsh, Indiana, and are hopeful that future responses can be deployed in a similar timeframe as AIS are found to be moving along other pathways.

Research

Information on individual sites of potential interbasin AIS transfer is lacking in detail, and the quality of information is uneven. We hope that in Phase II of the Study information on each site will be more consistent. To achieve this, we recommend that each site be visited and analyzed by a team of experts from state and federal agencies, representatives from the ENGO community, local users familiar with the pathway locations and members of the business community. Prevention strategies for each pathway must be conceived with a wide range of AIS species in mind, and more research may be required to devise effective deterrents. It is important to note that no prevention strategy can anticipate the risk posed by AIS that have not yet been identified. Prevention methods must be periodically reassessed and updated as needed.

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[53] Petition on behalf of the Waterkeepers Alliance, Great Lakes United, Environmental Defence Canada and Georgian Bay Forever to the U.S. Secretary of State and to the Administrator of the U.S. Environmental Protection Agency concerning s. 310 of the *Clean Water Act.* May 2010

Stakeholder participation

We recommend that the Corps move forward with plans to establish panels of experts to review data on the pathways, including representatives of the ENGO community, citizen action groups, members of the business community and other key stakeholders. Canadian experts should also be invited to provide comments on the Study. It is unclear how public comments will be incorporated into the Study. It would be valuable for the Study team to explain how the results of the NEPA scoping meetings will be reflected in the final report.

Action plan

We would like confirmation that the PMP will be modified to produce factual information that is actionable, and not bogged down with further research and reconnaissance. We would like to see a complete work plan for the highest risk pathways, including estimated time lines from the planning through the construction phases. The actors needed to complete the work plan should be identified in the PMP. We hope the Corps will work with the states to implement action plans as quickly as possible. It would be useful to establish an AIS monitoring system in collaboration with local stakeholders to ensure that invasion fronts are carefully tracked. A warning system should be established to alert stakeholders and management experts of the need to act in the case of storms, floods or other natural events that may increase the chances of AIS entering specific pathways.

Artificial barriers

Spontaneous AIS transfer via many pathways listed in the Study is virtually impossible because access to the sites listed in the Study are blocked by dams and other barriers on one or both sides. Detailed information about such barriers is therefore critical to an accurate assessment of risk, and must be presented up front in site evaluations. Barrier maintenance, changes in regulation, and structural modifications will be a critical component in any effective AIS prevention strategy.

Human intervention

In cases where there are physical barriers blocking the free movement of species between the basins, AIS transfer could only take place with human intervention. The U.S. Congress did not authorize the Corps to prevent AIS transfer by human intervention or any other unforeseeable occurrence. As a preventative measure, we recommend that the Corps partner with other agencies in broad-scale public education initiatives on the importance of not moving species between ecosystems, as well as guidelines for cleaning boats properly and disposing of bait safely. This would be a long term project not in connection with GLMRIS.

Specific Locations

Eagle Marsh, Indiana

We agree with the Corps that Eagle Marsh, Indiana is the only pathway identified in the Study that poses a significant imminent danger of transferring AIS between the basins. The wire mesh fence erected by the Corps in partnership with the Indiana Department of Natural Resources (IDNR) is a strong deterrent for adult Asian carp, however would not prevent the passage of fry and eggs, or other AIS small enough to pass through the mesh. Because Eagle Marsh is a natural floodwater drainage area for the St. Marys and Maumee Rivers, any strategy that blocked the passage of water between the basins would have to be constructed to avoid flooding surrounding communities and natural areas. In mounting a long term response strategy at Eagle Marsh that considers blockage of Asian carp fry and eggs, as well as other species of AIS, more time will be needed to incorporate the results of IDNR telemetry research in the Wabash and Little River. This research will be completed in late 2012.

Wetlands of the Libby Branch and Swan River in Itasca and Aitkin Counties, Minnesota

The perennial hydraulic connection between the Mississippi River and Great Lakes basins via extensive wetlands across the Tamarack Lowlands would present a highly complex management problem should AIS gain access to this sensitive area. The best course of action is therefore to prevent AIS from arriving there. Multiple dams on the Upper Mississippi River and the St. Louis River could present the best opportunity to prevent AIS transfer via Minnesota if they were properly managed.

Long Lake, Ohio

We encourage the Corps to investigate hydro-separation as an effective means of preventing the movement of AIS from the Ohio River to Lake Erie via Long Lake. The Tuscarawas and Muskingum Rivers have a number of structures that have not yet been assessed. It is essential that these structures are evaluated via site visits and other assessments to determine the possibility that AIS could move past them and into Long Lake. The Dover Dam on the Tuscarawas River allows for the passage of water when water levels are low. We recommend research into modifying or regulating the dam to ensure that AIS do not pass through.

Grand Lake St. Mary's, Ohio

We encourage the Corps to investigate hydro-separation as an effective means of preventing the movement of AIS between the Mississippi River and Great Lakes basins via Grand Lake St. Mary's, the Wabash River and Lake Erie.

Effects of Potential ANS Controls on Current Waterway Uses

Given the multiple uses of waterways in the Great Lakes Basin (in particular in the CAWS), it is appropriate to consider the potential impacts of control measures on those uses. However, in order to accelerate the study and develop recommendations for action that can be implemented as soon as possible, the study should focus on the impacts of ecological separation measures. Furthermore, the Corps should draw on the work and findings of other studies that have examined infrastructure changes and other issues associated with ecological separation, in particular in the CAWS.

Alliance for the Great Lakes conducted an assessment of options for ecological separation (including building on an earlier assessment, and through interviews of various stakeholders), and noted that non-physical barriers were unlikely to prevent the transfer of ANS in the CAWS. The report provides an overview of potential impacts on various uses in the area, identified five locations of potential ecological separation, and highlighted the potential value of interim application of multiple barrier technologies, while also noting that transportation in the system could be enhanced if part of a broader assessment of area infrastructure.[54] A recent assessment by Natural Resources Defense Council focused on two potential ecological separation locations, and found that such projects (including incorporation of green infrastructure) could focus water infrastructure improvements at fewer facilities, minimize impacts of high flow event wastewater discharges, provide the greatest potential for flood protection, and minimize impacts on recreational traffic.[55]

Furthermore, a study is underway coordinated by the Great Lakes Commission and the Great Lakes and St. Lawrence Cities Initiative to develop and evaluate separation scenarios for the Mississippi River and Great Lakes watersheds to prevent ANS transfer. The study will include a detailed assessment of impacts (including to wastewater, transportation, and the environment) as well as economic costs of ecological separation, and is slated for completion by January 2012.[56] The Corps should consult with the project leads on this study to determine ways to both utilize findings in this assessment and minimize additional impacts work needed through GLMRIS.

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[54] Brammeier, J., Polls, I., Mackey, S., 2008. Preliminary feasibility of ecological separation of the Mississippi River and the Great Lakes to prevent the transfer of aquatic invasive species, available from http://www.greatlakes.org/Page.aspx?pid=818 (accessed, February 28, 2011).

[55] Henderson, H., Cmar, T., Hobbs, K. 2010. Re-Envisioning the Chicago River: Adopting comprehensive regional solutions to the invasive species crisis, available from http://www.nrdc.org/water/chicagoriver/chicagoriver.asp (accessed February 28, 2011); Shaw Environmental Technical Report and Appendix available at http://docs.nrdc.org/water/wat_10102001.asp (accessed March 10, 2011)

[56] Great Lakes Commission and Great Lakes and St. Lawrence Cities Initiative, 2010. Envisioning a Chicago Waterway System for the 21st Century, Fact sheet, available from http://www.glc.org/ans/chicagowaterway.html (accessed February 28, 2011).

Summary

Both the Great Lakes Basin and the Mississippi River Basin are significant, unique systems. The Mississippi River is the third longest in the world, and provides tremendous recreational opportunities.

The Great Lakes are a phenomenal natural resource, a network of five inland seas that span 94,000-square miles of surface area, contain nearly 20 percent of all surface freshwater on the planet and comprise the world's largest freshwater ecosystem.

The five lakes — Superior, Michigan, Huron, Erie and Ontario —provide drinking water for 25 million people, support a $7 billion fishery and are an integral part of North America's cultural and economic heritage.

Unfortunately, these magnificent lakes are under siege from 186 invasive species — nonnative fish, mussels and other creatures that entered via manmade canals, ocean freighters, and by other means. Asian carp is the latest threat and it could be the worst invader of all time if it establishes breeding populations in the lakes.

In summary, our organizations strongly encourage the Corps to adhere to the Congressional authority to '*prevent* the spread of aquatic nuisance species between the Great Lakes and Mississippi River Basins" and not 'reduce the risk'; and accelerate the timeline for completion of GLMRIS by focusing on the various separation options, feasibility, and recognizing impacts of AIS transfer between the two Basins. Please contact Marc Smith, senior policy manager with National Wildlife Federation (msmith@nwf.org) for more information or if you have questions.

Thank you for the opportunity to comment.

Sincerely,

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