



November 14, 2017

US Army Corps of Engineers, Chicago District  
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ATTN: GLMRIS – Brandon Road Comments  
Chicago, IL 60604

**Re: GLMRIS-BR Report and Tentatively Selected Plan**

Thank you for the opportunity to comment on the Brandon Road Lock Report and the tentatively selected plan. The undersigned groups all support the Army Corps' continued work on keeping Asian Carp out of the Great Lakes Basin, and urge the Corps to move as quickly as possible on the tentatively selected plan for Brandon Road. We also urge the Corps to simultaneously review the Brandon Road report. Below we outline our concerns with the report and hope new information will be provided to better inform a final decision on the Brandon Road Lock.

**Economic Impact of Asian Carp on the Great Lakes**

The report identifies many economic impacts throughout the Great Lakes and Mississippi River basins that could occur based on the different plans and whether or not Asian carp establish in the Great Lakes. We have two major concerns with the analysis of economic impacts in the draft report: 1. whether all economic impacts were adequately identified and 2. how the economic impact to navigation and Great Lakes recreation was compared.

**Identification of Impacts**

In our opinion, the report fails to properly identify the economic impacts to the Great Lakes if Asian carp were to become established. First, the data in the report is inadequate to address the potential impacts. Second, it does not appear that the report plans or assumes a worst case scenario. Finally, the report fails to acknowledge existing data on the Great Lakes economy and the effects Asian carp could have on that economy.

The report on page 185 identifies at least 70 distinct potential impacts Asian carp establishment may have on the economy of the Great Lakes Basin. Out of those 70 impacts, only three are the subject of further analysis in the report. Those impacts are commercial, recreational and charter fishing in Lake Erie. Subjecting only three fishing based impacts in a single lake to further study could lead to a gross undervaluation of what is at stake if Asian carp were to become established in the Great Lakes Basin.

The NOAA Great Lakes Environmental Research Laboratory model<sup>1</sup> used also raises more questions than answers regarding what would happen if carp were to be established. The NOAA model includes seven scenarios which all make various assumptions about Asian carp feeding habits and predation habits of Great Lakes fish. Given the length of time the fish have been found in the Mississippi Basin and the amount of effort given to studying them over the past decade we feel that some of that data or data from around the world may be useful in informing economic models. If it is not useful it should be addressed and dismissed for specific reasons, instead of broadly limiting the report to only a single model specific to

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<sup>1</sup> Zhang, et. al,( 2016)

Lake Erie with built in uncertainty seems to simply add more confusion to what the economic impacts would be.

We understand the want and need for the best data possible, but limiting the report to one study without looking at conclusions of any other study is highly questionable. Studies about Asian carp feeding habits and economic impacts in other locations as well as predation by native fish are all relevant and could provide clarity to this section and allow for a better selection of scenarios used in the NOAA model and estimations for the effects on the other 67 distinct economic impact areas.

Secondly, the NOAA model utilizes 7 scenarios with various carp and predator habits with varying impacts. Instead of only noting that “the results of economic consequences analysis provide a strong indication of the uncertainty of the economic consequences should Asian carp become established...”<sup>2</sup>, we believe the report should assume that Scenario 7 would be the impact to Lake Erie should Asian carp become established, as that is the worst case scenario presented. In making public policy of this magnitude, we believe that precautionary principle should be applied. To do that, since each scenario is seemingly weighted as equally likely, the report should utilize the worst case scenario when analyzing any decisions. Since we have very detailed numbers on the costs to navigation per year in each of the scenarios, there needs to be a single comparison to those numbers in the Great Lakes. Even knowing that significant holes still exist in the modeling in the report, the Scenario 7 numbers for Lake Erie show a large yearly impact in that lake alone.

Finally, in addition to overlooking data outside of the NOAA model for economic impact, the report fails to account for many known pieces of data on the Great Lakes economy. The report notes on page 132 that annual economic value of recreational fishing alone in the areas of Great Lakes Basin is \$13.3 billion. The report does not make any mention of any recreational value of Great Lakes activities outside of fishing, despite identifying them as potential impact in Table 5-3. A 2003 study by the US Army Corps of Engineers placed an economic value of nearly \$30 billion dollars on recreational boating in the Great Lakes.<sup>3</sup> With current polling showing 59% of people living near the Illinois River changed their boating habits once Asian carp became established<sup>4</sup>, it is improper to ignore the potential damage to the recreational boating economy. Even knowing that the potential impact of Asian carp establishment is difficult to model, acknowledging the scope of the sector and potential impacts allows for a better framing of the choice alternative and puts into perspective the magnitude of a potential carp invasion.

### **Comparing Economic Impacts**

When looking at the economic impacts to recreation and the navigation industry in the Great Lakes and the Mississippi River Basin, we have concerns that the costs discussed in the report are not able to be adequately compared. Instead of comparing the potential impacts to the Great Lakes to cost to navigation in the Mississippi Basin, the navigation costs are used in a cost benefit analysis correlating to the probability of Asian carp establishment in the Great Lakes. Though that is certainly an appropriate way to judge this investment, it lacks an acknowledgement of the real world consequences to the Great Lakes of an Asian carp invasion. Instead of ending the analysis at a simple cost benefit, the risk to the Great Lakes economy should be weighed directly against the economic impacts to navigation in all of the alternatives. Though the National Economic Development analysis of navigation is limited to transportation cost savings, and not full economic impact, \$318 million per year due to lock

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<sup>2</sup> Page 195 of the GLMRIS-BR report

<sup>3</sup> <http://www.miseagrant.umich.edu/discovernemi/images/PDF/GLC-rec-boating-final.pdf>

<sup>4</sup> Page 176 of the GLMRIS-BR report

closure<sup>5</sup> is a full order of magnitude less than the Great Lakes Basin economy that the Asian Carp could affect. Without a full economic impact study for both the Great Lakes and the navigation industry weighted against the true probabilities of Asian carp establishment, we will not have a good idea of whether lock closure is the proper alternative. While we hope the Army Corps does continue to move forward with the selected alternative, we hope that concurrent to that process these needed economic analyses can be done so we can have a true apples to apples comparison of economic impacts when it comes to protecting the Great Lakes.

### **Shortfalls of the Probability analysis**

To analyze the risks to the Great Lakes, the report dedicates a large amount of time to an expert elicitation process to determine the probability of Asian Carp establishment under certain scenarios. We do not question the experts' credentials for working to determine the probability of Asian Carp establishment; however we do have specific concerns about the process and the results.

First, the process of expert elicitation, though commonly used in public policy decisions, can produce poor results if not done correctly. We are sure the experts are at the top of their field, but this analysis method may not be the best fit for this problem. Though the outline provided is quite comprehensive, we have two specific concerns on the process: first, the number of experts and second the elicitation questions. To begin, we question whether having only six experts was proper, especially given the two major outliers on every alternative. The only time this small of a number may suffice is when all experts adopt a very similar model of the underlying science.<sup>6</sup> Of the six experts, one was always very high and another was very low, which indicates a diversity of opinion on the underlying models which prompts us to believe more experts are needed. This is compounded by bias inherent in any subjective estimation. When given a baseline value, in this case the no new alternative, experts "typically do not adjust sufficiently."<sup>7</sup> This anchoring may lead to skewed results. When there are two extremes to start, more data is needed to see which, if either, may be an outlier. More experts would allow for a better probability model and would assure that there are no major outliers in the dataset. Additionally, the questions asked of the experts seem to be more subjective than objective in some ways. It is important that questions are phrased in a way to assure the best estimate is given by the experts. For example, questions 7-9 of the elicitation seem to fail the "clairvoyant test"<sup>8</sup> in that there is not enough data for the expert to give a precise answer to the line of questions. These potential problems in the process should be remedied by adding additional experts to the elicitation and remodeling.

Our second concern is about the use of a simple composite expert in this scenario. Appendix C to the report even states that "the use of a linear opinion pool like this is widely debated in the literature."<sup>9</sup> Though there is significant debate over using weighted averages as well, further discussion of this point should be included, especially with the two major outliers on each analysis.

Finally, we have issues with the way the probabilities are used in the report. The report and US Army Corps officials both note that these probabilities are not new knowledge and should instead be used as a relative measure of effectiveness to compare the different alternatives. While applicable in some analyses it seems inappropriate for this study as it lacks the proper

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<sup>5</sup> Page 371 of the GLMRIS-BR report

<sup>6</sup> Morgan, M. G. (2014). Use (and abuse) of expert elicitation in support of decision making for public policy. PNAS, 7176-7184.

<sup>7</sup> Morgan, M. G. (2014).

<sup>8</sup> Morgan, M. G. (2014).

<sup>9</sup> GLMRIS-BR Report, Appendix C, Page C-16

finesse for a full analysis between the cost to shipping and the cost to the Great Lakes if Asian carp were to establish.

The cost/benefit analysis comparing navigation cost to decrease in probability of establishment is the clearest case of an issue that runs throughout the report: this is considered to be a comparison of the cost to navigation in the Mississippi River basin to keeping the carp from getting past Brandon Road. What this report truly should be about is the cost to the Great Lakes against the cost to navigation. Most of the analysis in the report, including this probability modelling seems to be designed to produce an argument for the chosen alternative. We ask that the Army Corps continue to work on these probability models to produce true probabilities for policy makers to use when comparing the costs to navigation and the cost to the Great Lakes.

### **Two-way Solution**

Though we do have concerns about two major aspects of the report, we hope the Army Corps continues to follow the tentatively selected plan and do so as quickly as possible. The plan is better than the current situation and will reduce the relative risk of Asian Carp establishment. However, we also urge all involved to not view this as the final step, and instead view it only as an interim solution. While completing work on the tentatively selected plan, we ask the Army Corps to do the economic and probability analysis outlined above. That data will lay the ground work for what we think the ultimate goal of this project should be: a two-way separation of the basins that prevents all flow of invasive species between the two. With a fully fleshed out economic analysis of effects to the Great Lakes and to navigation, combined with true probability modeling, decision makers will be armed with the knowledge they need to make the two-way solution work.

Signed:

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