ENVIRONMENTAL DEFENSE, AMERICAN RIVERS NATIONAL WILDLIFE FEDERATION, MISSISSIPPI RIVER BASIN ALLIANCE, MISSOURI COALITION FOR THE ENVIRONMENT THE SIERRA CLUB

COMMENTS ON THE REVISED SUPPLEMENTAL ENVIRONMENTAL IMPACT STATEMENT FOR THE ST. JOHNS BASIN-NEW MADRID FLOODWAY PROJECT (OCTOBER 2001).

January 2, 2002

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Environmental Defense, American Rivers, the National Wildlife Federation the Mississippi River Basin Alliance, the Missouri Coalition for the Environment and the Sierra Club appreciate the opportunity to present these comments on the draft Revised Supplemental Environmental Impact Statement for the St. Johns Basin-New Madrid Floodway Project (October 2001).

The revised draft follows release of an original draft supplemental EIS in 1999 and a final proposed EIS in 2000. Environmental Defense and other conservation organizations submitted extensive comments on each of these documents dated June 24, 1999 and October 10, 2000. Included with these comments were extensive expert reports and supplemental documents. Except for the minor revisions to these comments as explained below, we continue to consider them valid comments for the new draft revised supplemental EIS. We therefore reaffirm these comments and incorporate them by reference as comments on the new draft. In these comments, we reiterate some of the critical elements of the earlier comments and offer some additional information and views. Included in these comments are the following:

- A new report by Dr. Bob Sheehan.
- A new report by Dr. Tom Stinson.
- Comments by Dr. Leonard Shabman for the U.S. Environmental Protection Agency on the Yazoo Pump, a report by Dr. Shabman regarding the economic analysis of that project and the economics of

non-structural alternatives, and an evaluation of that report and of the economic analysis of the U.S. Army Corps of Engineers for that project by economists at the U.S. Department of Agriculture.

- Two chapters from a 2001 report of the National Academy of Sciences regarding wetland mitigation.

- Excerpts from the draft EIS by the Corps of the Yazoo Pump project.

- The Action Plan for Reducing, Mitigation, and Controlling Hypoxia in the Northern Gulf of Mexico by the Mississippi River/Gulf of Mexico Watershed Nutrient Task Force (January 2001) along with a letter to EPA Administrator Christine Todd Whitman from Mississippi River basin state governors.

As we have earlier stated, the proposed project would cause significant adverse affects on aquatic resources and the environment in general, and the EIS is flawed because, despite presenting some of these impacts, it represents that overall the project will have no such adverse impacts. The project site provides the last remaining remnant of connected backwater on the lower Mississippi River, which has lost 95% of its once staggering floodplain. The backwater includes a valuable mosaic of habitats including floodplain forests and cleared areas, backwater lakes occasionally connected to the river, and an interconnected stream and ditch network that allows fish easy access and regress and concentrates fish resources as they enter the Mississippi River. Today, up to 84,000 acres flood occasionally, including more than 50,000 acres every three years, but the project would eliminate direct fish access through the floodplain of the New Madrid floodway and reduce this flooding by tens of thousands of acres. The project would eliminate valuable fishery resources, particularly the habitat for the species of greatest concern, harshly impact a rare, productive and diverse mussel area, eliminate temporary ponds of great value to reptiles and amphibians, and eliminate most of the area's benefits for waterfowl and shorebirds. The project would also likely increase the flow of nitrogen into the Mississippi River, contributing meaningfully to the large cumulative problem of the dead zone in the Gulf of Mexico. It has the potential to release pesticides in significant levels in a manner virtually not addressed by the EIS.

In addition, the project makes no sense at a time of huge crop surpluses in the United States and because it fails to address the key flooding problems of the Town of east Prairie. The project does not pass an honest benefit/cost analysis, both because half of the project uses an artificially low interest rate and because of other flaws, including an improper projection of huge increases in net returns for

agriculture in the area. The analysis does not properly analyze nonstructural or other less environmentally damaging alternatives, and would drain thousands of acres of wetlands in violation of the Clean Water Act and the Food Security Act of 1985 ("Swampbuster").

I. Economics

Included in these comments is an additional report of Dr. Tom Stinson of the University of Minnesota and the state economist for Minnesota. Dr. Stinson points out that roughly 90% of the projected benefits for the project alternative 2 and the various alternatives under 3 are agricultural benefits. However, there are numerous flaws in this analysis. The New Madrid Floodway levee closure, whose benefit/cost ratio is now estimated at only 1.1 to 1, is analyzed using an interest rate of only 2.5%. This interest rate artificially depresses the estimated cost of the project by almost two thirds. With the interest rate used for the remainder of the project, the costs would greatly exceed benefits.

Another major problem identified by Dr. Stinson is that the estimates of agricultural benefits are based on an assumption that new technology will generate vastly increased crop yields (both with and without the project) while prices and the costs of inputs remain the same. In effect, the analysis presumes that all agriculture will become vastly more profitable, so that drainage improvements are worth far more in the future than they are today. However, history shows that while yields are likely to continue to increase, at the same time prices will decline (in inflation-adjusted terms) and input costs will rise. This is true because of basic economic experience that as farmers everywhere produce more crops on the same land, prices fall. This assumption, which both the U.S. Department of Agriculture and the Environmental Protection Agency have indicated is false, greatly inflates the projected benefits of the project. Correctly analyzed, the project almost certainly does not have benefits that exceed costs.

Dr. Stinson also points out that the results are inherently implausible and that the Corps should conduct an analysis of differential prices of land values in the area to check on the overall plausibility. Among the other problems, the economic analysis uses out-of-date crop prices, and even using normalized prices, prices should be updated to reflect prices through 2001.

In addition, the presentation of the economic analysis is not adequate because it does not present meaningful cost data. It is therefore impossible to determine the reasonableness of cost estimates. There is, for example, no estimate of mitigation costs presented or breakdown of such costs. Indeed, because there is no actual mitigation plan presented, it is not possible to estimate the costs of

mitigation meaningfully in any event. Before finalizing the EIS, the Corps should present a new draft with project costs meaningfully itemized to allow comment on these estimates and with a final mitigation plan capable of having cost estimates. That is particularly necessary because the projected benefit/cost ratio is so low that any meaningful increase in costs would cause the project to fail.

Dr. Stinson also points out that most of the potential mitigation sites identified are in the project area. These sites are frequently flooded croplands. If these sites are chosen, then the same lands will not provide economic benefits for the project, and so they cannot be included in the benefit/cost analysis.

Perhaps most fundamentally, Dr. Stinson observes that production to be enhanced by the project involves crops that are still in large surplus. He also notes that agricultural policies continue to favor removing more lands from crop production to ameliorate these surpluses. In light of this policy, it makes no sense to invest millions of dollars in generating further crop surpluses. We believe the project therefore does not meet the public interest test of the Rivers and Harbors Act. Moreover, the focus on NED benefits is an example of how the Corps is improperly treating policy guidance as binding rule.

II. Project Alternatives

For reasons presented in the earlier comments and in the affidavits of David Conrad and Dr. Stinson, we believe the revised EIS continues improperly to analyze reasonable project alternatives that would better serve the needs of the community and avoid adverse environmental affects. The analysis rejects an alternative to relieve flooding in East Prairie in part on grounds that it does not pass benefit/cost analysis. This claim is inconsistent with prior statements in previous documents without explanation. In addition, the Corps is treating guidance in this manner as binding rules improperly, and the failure to analyze project alternatives for their economic development benefits for East Prairie is inappropriate for a project whose special cost-sharing status is predicated on these benefits. The Corps also fails to analyze the health implications of regular flooding in East Prairie that will not be addressed.

The Corps also rejects an alternative focused on a levee along St. James Ditch and interior drainage projects on the grounds that it would not deal with access problems from flooding that leave East Prairie an island. However, nowhere else in the EIS are these access problems described, and Corps maps show that the flooding redressed by the project does not circle East Prairie or preclude access to the west and north. The failure to discuss specific access points

flooded or other specific roadways flooded is critical because it also means the Corps does not analyze any alternatives, such as raising roadways or improving culverts, to address these problems. And without information about the specific flood roadway problems in the community, it is not possible for others to examine the economic viability of alternatives.

The Corps also rejects alternatives that focus on alternative land uses. As Environmental Defense earlier commented, the analysis of these alternatives is unreasonable because the Corps only analyses alternative uses (such as reforestation) of the flooded areas that would cover all 52,000 acres flooded in a three-year flood. Reasonable alternatives may involve reforesting only the most flooded areas, including those flooded on average once every two years, or even those flooded only on average every year. By addressing these areas of greatest flood damage, a significant portion of project benefits might be achieved.

In addition, the analysis of these alternative land use alternatives is wholly inadequate because the Corps only examines potential private forestry benefits. It does not examine any potential public benefits, such as water quality improvement, carbon sequestration. Nor does it analyze potential hunting benefits. Dr. Stinson discusses this inadequacy, and it is wholly inconsistent with Corps analysis of the Yazoo pump and the non-structural analysis of Dr. Leonard Shabman for that pump which was largely endorsed by economists of the U.S. Department of Agriculture.

These inadequate analyses of non-structural alternatives and alternatives focused on providing benefits for East Prairie, along with the failure to present meaningful information about road access, compel a new draft EIS that analyze these issues more thoroughly and permit meaningful comment.

III. Wetland Analysis

The new analysis reduces areas of projected wetland impacts roughly in half. The changes in the analysis are never explained, so it is impossible to evaluate their appropriateness. More basically, the new analysis still does not perform a true wetland delineation of project areas, only guestimates using river gauge levels. Moreover, while the wetland analysis claims that river groundwater seepage will maintain the wetland status of all forested wetland areas, it fails to examine the impacts of this seepage in deciding which areas are wetlands in the first place.

By law, the Corps must follow the Clean Water Act in the same manner as any other party. Part of that is the preparation of a complete wetland delineation. The failure to perform such an analysis is illegal.

The 404(b)(1) analysis is also highly inadequate, particularly in its ultimate arbitrary judgment that impacts on aquatic resources will not be adverse. These findings, presented in conclusory manner, are inconsistent with much of the information elsewhere presented in the document. Among other problems, the overall focus of the EIS assumes that all impacts on fish or waterfowl or shorebirds can be generalized into one generic impact on average fisheries. Such an analysis improperly ignores the harsh impacts on particular species, such as white bass, and it wholly ignores impacts on amphibians and reptiles, and essentially brushes aside impacts on mussels. While it may be appropriate in some circumstances to make reasoned trade-offs among species, there is no effort to do so in the EIS. Nor could such a case be made in this case since the species adversely impacted are precisely the species of greatest conservation concern from the project precisely because the project site provides one of the last remaining backwater floodplain areas with access to the river.

IV. Fishery & Mussel Impacts

Dr. Bob Sheehan has updated his report on the fishery impacts and renews his expert judgment that the project would have significant adverse impacts on fish and mussels. Indeed, the EIS presents many of these impacts and then arbitrarily asserts that overall project impacts are not adverse. For example, it claims that mussel impacts will not be adverse because stream flow hydraulics will not change, but this judgment ignores the impacts of other judgments.

As Dr. Sheehan explains, the analysis ignores the fundamental problem that the project will cut off normal stream access from the Mississippi River to the New Madrid floodway. It is the mosaic of habitats and river access that provide the key benefits of the site.

Dr. Sheehan also points out that while the project analysis only examines areas flooded to a depth of greater than one foot, his data gathered for the Corps of Engineers for another project shows that juvenile fish actually prefer areas with lower water depths. This means that the Corps analysis needs to account for (and mitigate for) tens of thousands of additional acres. Some of this data is already in the possession of the Corps's St. Louis District, and we ask that this data be incorporated into the record. We would be happy to provide it directly to the Memphis District.

Dr. Sheehan also points out that the analysis arbitrarily excludes habitats flooded in winter or late spring, and habitats flooded less often that once every two years. That exclusion is based on no proper scientific basis and violates common sense. It is also inconsistent with Corps efforts elsewhere to claim environmental benefits associated with flooding less frequently.

In general, Dr. Sheehan explains that the potential mitigation sites analyzed could not mitigate the fish impacts.

V. Cumulative Analysis

The EIS now contains a generalized discussion of cumulative impacts. However, this analysis is completely inadequate and is inconsistent with guidelines on how to analyze cumulative impacts prepared by the Council on Environmental Quality and previously submitted for the record. Each of the adverse environmental impacts has to be evaluated in light of its contribution to the cumulative adverse impacts of past and reasonably foreseeable future actions. But that is almost completely absent here. For example, there is no analysis of how the water quality changes would affect the cumulative problem of redressing the dead zone in the Gulf of Mexico or what would need to be done to offset the impacts of this project. To the extent the present situation is discussed, cumulative problems are dismissed in an arbitrary or irrelevant manner. For example, on page 99, after noting that the project area contains some of the largest remaining forested wetland tracts in southeast Missouri, this concern is dismissed with the statement that the Corps found they would remain jurisdictional. This statement ignores the changes in the functional value of these sites.

In general, the project area is of exceptional value precisely because it is of a type that was once ubiquitous but has become extremely rare. The proposed mitigation would not replace apples for apples but, at best, oranges for apples, and it is apples that are in such short supply. The EIS fails to analyze the cumulative effects of the project meaningfully.

VI. Water Quality Analysis

Earlier comments on the potential and likely significant adverse effects of the project on water quality were provided through the reports of Dr. Sheehan and Richard Webster dated June 23, 1999, the affidavit of Dr. Barry Kohl and the report of Dr. Christopher Woltemade submitted in October, 2000. The new

revised draft EIS contains no new water quality analysis and these comments remain fully valid.

We here submit some additional information on two topics. First, the states adjoining the Mississippi River have now joined with EPA in committing to reduce nitrogen flows into the Mississippi by 30% to clean-up the dead zone in the Gulf of Mexico. Reflecting this commitment is a copy of the Action Plan by the Mississippi River/Gulf of Mexico Watershed Nutrient Task Force (attached), which includes these states and a recent letter from state governors to EPA Administrator Christine Todd Whitman. As earlier discussed in other comments, one of the most cost-effective means of redressing these impacts identified by the Task Force is the restoration of wetlands to filter agricultural drainage water. This project would significantly reduce wetlands perfectly situated to filter agricultural drainage water. No data was collected of the nitrogen load and concentrations coming into the wetland sump area, but it is likely if such data were collected that the project area would be found to provide significant removal of such nitrogen. In essence, the basic effect of this project may be to require that additional agricultural acreage in other areas be converted back into wetlands to offset the increased nitrogen flows.

Second, earlier drafts of the EIS at least discussed the possibility that dredging of the St. James ditch would release mercury and pesticides into the water column. As the affidavit of Richard Webster commented, the data showed high reason for concern about mercury, and the 1999 draft EIS only stated in a summary manner, without backing of any data presented in any documents, that mercury was not a concern. However, the earlier draft dismissed these concerns largely on the basis of analyses performed in 1978. No updated sampling has been done.

Since 1978, there has been a dramatic improvement in sampling techniques and analytical methods and corresponding legal requirements. In 1997, the Corps established a leachate guidance testing memorandum to reflect the new science (available at http://www.wes.army.mil/el/dots/pdfs/letter.pdf.) Extensive additional information is available through a suite of guidance materials available at http://www.wes.army.mil/el/dots/guidance.html. The information reflects the major changes that have occurred in the understanding and sampling of potential contaminants since the work done in this study. Studies dated from 1978 are simply out of date.

Alternative 3-1-A would excavate 2,432,000 total cubic yards of material from the St. Johns Bayou basin, sediments eroded from agricultural lands that used heavy quantities of pesticides for decades. The limited data used is not acceptable

given the improvements in sampling and analytical techniques and changes in criteria particularly for a site that is closely analogous to the Big Sunflower River discussed in the Kohl affidavit.

In any event, the new draft EIS offers virtually no discussion of these issues at all. For this reason, it is impossible to determine if the Corps is still relying on these out of date studies. The Corps should republish a draft EIS that includes appropriate data developed using up-to-date techniques and that permits comments on the Corps' approach to this issue.

Among other requirements of a 404(b)(1) analysis is a determination of whether a project meets state water quality standards. The 404(b)(1) analysis fails to discuss any state water quality standards. For the reasons presented in our comments and various papers, we believe this project violates several Missouri water quality standards including 10 CSR 20-7.031(2), (3)(G), 20-7.031(4)(D)(Q), and 2(B). The project may also be violations of other standards related to toxicity but insufficient data are present to permit this analysis. We similarly believe the project violates water quality standards for the Gulf of Mexico.

VII. Mitigation

In violation of established procedures under the Clean Water Act applicable to Corps projects, the draft EIS continues to fail to set forth specific mitigation sites and specific mitigation plans that are necessary to permit an evaluation of the viability of mitigation and likely costs. However, the revised draft does identify a variety of potential mitigation sites. Nowhere does it describe the availability of these sites, and apparently some may already be designated for use for mitigation for other purposes or may even involve public land. This identification of potential sites is still inadequate for reasons discussed previously in the affidavits of Logan Russell, and Dr. Leonard Shabman and Dr. Dennis King.

Because the mitigation site description is not precise, it may also be the case that some of the identified potential sites are not available. For example, the Eagles Nest site may already be the site of a Wetland Reserve Program project. Similarly, one of the sites as St. Johns Bayou may also be a preexisting mitigation site of a private wetland permit.

However, what is clear from the new sites is that no hydrologic restoration is contemplated. For this reason, the mitigation cannot result in no net loss of wetlands. The revised EIS acknowledges that many cropped wetlands will lose their wetland hydrology, and the lack of hydrologic restoration means that no new

wetlands will be restored in their place. This action therefore violates the Corps's Memorandum of Understanding with other agencies regarding wetland mitigation.

More fundamentally, as a new report of the National Academy of Sciences has reiterated, hydrology is critical to all wetland restoration and wetland functions. The failure of the mitigation to perform any hydrologic mitigation or even to analyze the mitigation that will exist is a crucial failure.

Similarly, the revised EIS still fails to demonstrate that the mitigation will be successful or to account for any risk of failure. The excerpts from the new report of the National Academy of Sciences demonstrate that most wetland mitigation has not been successful. National Research Council, *Compensating for Wetland Losses Under the Clean Water Act* (2001). The EIS assumes that the mitigation will be fully successful. This factual experience precludes any reasonable finding that mitigation will mean that the project will not cause adverse environmental affects.

Finally, the mitigation continues to fail to account for the functions lost during the mitigation period when reforestation occurs. The EIS makes a passing reference that fishery functions are not dependent on mature forests. However, that claim contradicts the claims that flooded forest land so surpasses flooded farmland in fishery value that reforestation alone mitigates for the loss of flooded acres. As Dr. Sheehan points out, there is no scientific basis for this assertion.

VIII. Acres with Reduced Flood Damage

At no point does the EIS or any attached document reveal precisely which acres are flooded to which frequency without the project and how this flood regime will change with the project. No such map is provided. This is the single most basic information required to analyze the benefits and costs of the project. Without this information, it is really not possible to evaluate the overall quality of the analysis.

The information that is presented raises serious concerns. For example, the economic analysis states that benefits are anticipated on 37,305 acres of land that is now subject to flooding once every three years but will no longer be flooded so frequently. Page 15, Appendix B. It similarly states that the project will reduce acres flooded by headwater in the project area at least every other year by 20,360 acres from an existing total of 21,631. But elsewhere, the EIS indicates that in the New Madrid Floodway, the project will only mean the reduction of average

flooding in April on 990 acres, and only 29 acres in May. This average number would suggest minimal project benefits.

Only more precise information would allow a proper evaluation of the economics of the project and the economics of alternatives. The EIS should be represented in draft form with clear maps indicating which acres have which degree of flood frequency and for how long, and how these flood levels and frequencies would be reduced by the project.

IX. 401 Certification

Previously, the Corps sought Section 401 certification from the state of Missouri. It has withdrawn this application and now indicates that it will only seek 401 certification after project completion. However, as indicated by the Missouri DNR in its original grant of certification, the certification could require extensively greater mitigation for the project, which would in turn affect project design and project economics. For this reason, it is inappropriate to design the project first and then seek certification.

SUPPLEMENTAL REPORT OF DR. ROBERT J. SHEEHAN REGARDING THE DRAFT REVISED SUPPLEMENTAL ENVIRONMENTAL IMPACT STATEMENT FOR THE ST. JOHNS BAYOU/NW MADRID FLOODWAY PROJECT

January 2, 2002

The following supplements the report I submitted through the June 23, 1999 comments of the Environmental Defense Fund. I described my professional background in that report. Since that time I have done extensive additional research into Mississippi River fisheries on behalf of the U.S. Army Corps of Engineers (USACE). I am in the 6th year of a research project funded by the St. Louis District of the ASACE to study the habitat needs of the pallid sturgeon in the middle Mississippi River. This $200,000+ study has also been partially funded by the U.S. Fish & Wildlife Service. I am also principal investigator of a project funded ($150,000+) by the St. Louis District USACE examining the use of navigation dams to manipulate water levels to induce the production of non-persistent wetland vegetation. The goal of the study is to determine the benefits and liabilities of this management technique for fish and waterfowl species. I have also served as a paid consultant for the St. Louis District USACE on two recent occasions, once to develop a middle Mississippi River pallid sturgeon plan of study and the other to develop a plan of study to evaluate the impacts of navigation on river fishes.

I have reviewed the new draft Revised Environmental Impact Statement (October 1, 2001) and continue to adhere to the views expressed in my earlier report. (All my references to the EIS are to this document.) Below I review some of the changes and discuss some additional scientific research which support the view that both what is described as the authorized project and the various avoid and minimize alternatives expressed under the category of alternative 3 would have severe, adverse effects on ecologically important fish of the Mississippi River and on important mussel resources.

I. Critical Importance of Fish Passage.

The draft Environmental Impact Statement (EIS) describes a range of new alternative pump operations for the New Madrid Floodway. These alternatives include two new possible levee alignments along with different pumping alternatives. The draft dismisses the alternatives that involve new levee

alignments as uneconomic. In this section, I discuss the alternatives that are based on different pumping plans. These plans would, in varying degrees, preserve slightly larger inundated sump areas behind the levee. Variation C in particular would every third year reduce pumping to try to maintain water elevations at 287 NGVD from March 1 to May 15.

A major failing of this alternative is that it provides no guarantee that this level of inundation could actually be achieved. Merely turning off pumping at a certain elevation does not indicate how long water will remain at or near this elevation. In theory, however, as much as 5,000 acres could remain inundated every third year behind the closed levee.

This alternative, while it might provide some slightly greater fish habitat for some fish, does not eliminate the fundamental, critical, adverse and irremediable impact of the project, which is the closure of the floodway. The EIS acknowledges that this open access to backwater is a unique attribute of this habitat for a significant stretch of the river. However, the EIS analyses fish impacts independently of this closure affect. All fish habitat impacts are based on a model that focuses on the cover type of the lands flooded between one and three feet up to the two year flood event during the late winter or early spring spawning seasons. The analysis does not take account of the special characteristics of the floodway habitat that I discussed previously, which are a function of direct river to floodplain access; i.e., calm floodplain habitat, an interconnected stream network, and wetland refugia. These characteristics are largely unavailable (with the exception of the proposed project area) throughout the entire Missouri portion of the Mississippi River floodplain at the present time. These habitat conditions are strongly linked to the productivity and well being of river fishes, based on our current understanding of the function of large river floodplains.

The EIS implicitly argues that because some river fish are found in the St. Johns Bayou area, that this means that fish will easily be able to pass through the 10 by 10 foot box culvert, and then treats this barrier as essentially irrelevant to the analysis. However, to the extent that this comparison is useful, it points to the contrary. As the EIS points out, of young of year fish spawned in the floodplain, sampling revealed only 11 different species in the St. Johns floodway as opposed to young of year fish for 24 different fish species in the New Madrid floodway. I gathered this data for the Corps of Engineers. I believe it is not tenable to generalize from these findings, which may result from other differences in characteristics between the basins, but to the extent this evidence is relevant at all, it points in the *opposite* direction of the contentions of the USACE in the EIS.

Notwithstanding the statements in the EIS, I believe the following statements could be made about the problems caused by this project without fear of contradiction by any credible river fish ecologist.

- Replacement of a 1,500 foot gap with a ten foot by ten foot box culvert will reduce fish passage. Fish are finicky about where they will go, follow cues that may be based on velocity, light, water depth, cover types, temperature and many other factors. Moving through a narrow concrete culvert is dramatically different than moving over an inundated flood plain into wetlands and streams. It is a certainty that the numbers of fish moving through the culverts will decrease, and that some fish will not move through the culverts at all or in any meaningful numbers. Examples of the latter include the white bass I discussed in my earlier report, which the USACE conceded will not be able to spawn once and if the project is completed.

- Although the effect is unquestionably negative and probably severely so, the precise effects cannot be scientifically predicted. Other USACE districts apparently appreciate this fact, and I have in fact been engaged by the St. Louis District of the USACE to study the willingness and ability of Mississippi River fish to pass through various water control structures. Specifically, I am referring to the Swan Lake (Pool 26) habitat restoration project. We have completed the pre-project studies, and are now waiting for the construction phase to be completed so that the post-project work can be conducted. One of the major goals of the post-project work is to determine fish use of various water closure structures (stop logs, gated culverts, etc.) under various conditions. Based on our pre-project work, we know that fish will wish to move from the river into Swan Lake (a major backwater) to have access to winter and spawning/nursery area habitats. The USACE is currently working with us to design experimental water control structures for the purpose of this evaluation. The reason for the Corps' interest in the project (and funding of it) is because of the general lack of information regarding the use of water control structures by temperate river fishes.

- The EIS treats fish habitat in the New Madrid Floodway after the project (although reduced in acreage) as equivalent to the fish habitat provided before the levee closure. It similarly fails to focus on this question of river-floodplain connectivity (access) as a key

component of mitigation. These assumptions are wholly without scientific justification, and cannot credibly be viewed as representing a reasoned judgment based on science.

II. The fishery analysis unjustifiably excludes thousands of acres of flooded land from the habitat analysis.

For purposes of analyzing acceptable fish mitigation, the EIS first reduces all the impacts on individual fish species to one generic fish measurement. It then examines the habitat value of the floodplain habitat in a number of highly restrictive ways.

- It focuses only on acres flooded on average every second year and ignores the habitat created by larger flood events. According to the EIS economics analysis (Appendix B page 15, Table 10), there are 52,267 acres flooded at least once every three years. But according to the fisheries analysis, Appendix G page 18, only 7,301 acres total in the two basins are identified as providing rearing habitat of relevance for the project, so the mitigation is based only on impacts on these limited acres.

- It focuses only on lands that are flooded between one and three feet in depth for at least eight consecutive days. It therefore ignores habitat flooded to a depth of less than one foot.

- It ultimately bases mitigation only on habitat losses that are "mid-season" – described in the FWS Coordination Act report as April 1 to May 15th.

- It assigns habitat values based entirely on whether land is within a broad category of cover type.

Each of these limitations is scientifically unjustified and wholly unreasonable.

* Ignoring Depths Less than One Foot: The only scientific justifications offered for ignoring water depths of less than one foot is a summary of unpublished data gathered by Killgore and Hoover in the Big Sunflower River System. According to the EIS, this data found "that extremely shallow water, less than one foot) is not extensively used by larval fish." As discussed above, this

assumption results in the exclusion of thousands of acres of habitat from the analysis that are not to one foot for a sufficient time.

This assumption is contrary to the direct data I have gathered for the USACE in the water level manipulation/vegetation study I alluded to earlier. Our evidence, collected using an active sampling gear (seining) as compared to the passive gear type used by Killgore and Hoover (light traps) shows that small fish *prefer* habitats less than one foot in depth (probably to avoid predation by larger fish) as opposed to deeper depths, even when cover type stays the same. Using seining, we collected a total of 2,572 fish in seine samples of the shallowest water (essentially, 1 foot or less of water) along the shore in Mississippi River waters of 1 or less foot, whereas we captured only totals of 407 and 206 fish in comparable sampling done at progressively deeper depths. We have found that 39 Mississippi River species use waters of one (or less) foot deep. Much of our sampling was done in the spring. We find elevated water temperatures in the shallow, near shore areas, perhaps explaining why they are used as much as they are by small fish.

These observations suggest that reduction of shallow flooded areas (1 foot or less) will reduce habitat we have found is heavily used by small fish, perhaps resulting in reduced recruitment due to predation or other effects. Light traps, in my opinion, collect data that are much more biased as compared to seining for small fish. Fish need to "volunteer" to be sampled using light traps, and not all species or life stages will proportionately volunteer. Also, light traps are employed at night, a time when small fish may disperse into deeper waters because vulnerability to sight-feeding predators will be lessened. Since the special value of floodplain habitat is for the production of young, small fish, the USACE is ignoring one of the most important habitats in the floodplain.

I should add that ignoring lands flooded to less than one foot also ignores the fact that such lands, when drying out, create short-lived small ponds that provide valuable reproduction opportunities for amphibians and reptiles, and feeding opportunities for those many animals that eat small fish caught in these ponds. I have seen nowhere in the EIS that accounts for this loss of exceptionally valuable habitat.

* Ignoring Habitat Flooded Less than Once Every Two Years: The EIS offers two rationales in appendix G for ignoring habitat created in flood events greater than once every two years (page G-8).

First it argues that some small fish species live only 2 to 3 years, so these species need habitat flooded every two years to survive. The fact that lands flooded at least every other year are important to these species, however, does not

mean that lands flooded less frequently are not important to other fish species. As the same page notes, many species live "up to 10 years," so these species may benefit greatly from lands flooded much less frequently, and in fact, many Mississippi River fish live for two decades or more. This is true of all three of the commercially valuable species of catfish, as well as sturgeon.

The EIS also argues in one sentence without citation that "more extreme hydrologic events [than once every two years] may result in higher fish abundance, but do not represent flooding regimes that maintain baseline population levels over the life of the project . . . ." I am aware of absolutely no studies to support this analysis and it contradicts common sense. For species that live ten years or longer, there is no reason to believe that flood events that occur every three, four, five years or even less frequently should not affect long-term populations. In fact, some fish may spawn less frequently than once every two years and wait for larger flood events. Most of the sturgeon species are believed to spawn once every 2 or 3 years.

Perhaps most fundamentally, even if this statement were true, it is not necessarily the case that the only ecological concern is long-term baseline population levels. Fish populations rise and fall. When fish are more abundant, they are more abundant for other animals to eat, and these animals, such as birds, may use such years of high fish abundance for reproduction. Periods of high fish reproduction during large flood events may also result in large numbers of small fish available for consumption by animals such as bald eagles in the floodplain as floodwaters recede. There is no scientific justification for focusing only on long-term fish baseline populations and ignoring variations in fish populations from year to year.

Ironically, the Corps of Engineers itself seems to appreciate the ecological significance of flooding that may only occur once every three years because it has proposed alternative 3.1.C described above, which would try to maintain higher water levels once every three years. It is logically inconsistent to claim benefits from such a system and then to ignore the habitat created by flooding at least once every three years that occurs naturally.

This project will eliminate habitat on tens of thousands of acres that flood less frequently once every two years, including tens of thousands that flood roughly once every three years. The EIS analysis of fishery impacts has improperly excluded such lands and has improperly not included any mitigation for such lands.

* Mid-season limitation: The limitation to habitat flooded from April 1st to May 15th is also without scientific justification. Many important river species spawn at other times of the year. For example, the channel catfish spawns in June. Sunfish species (e.g., the bluegill) spawn throughout the spring and summer. According to Table 7 of the Fish & Wildlife Coordination Act report, this limitation excludes more rearing habitat than is included.

* Oversimplification of habitat – The final unjustified attribute of the model is the limited focus on cover type as the only other attribute relevant, in addition to flood duration and frequency. As I explained in my previous report, the Mississippi River used to have access to an extensive floodplain characterized by a range of backwater ponds and wetlands, stream networks, and combinations of cover type. Different fish prefer different kinds of habitats, and the same fish prefer different kinds of habitats at different stages of their life cycle and even during different times of the day. As floodwaters recede, an extensive stream (or even ditch) network provides a valuable resource for fish to recede through. It is the mosaic of habitat types provided in the project area that is ecologically significant.

One of the major features the project will destroy is the connection between the Mississippi River and permanent backwater water bodies. On page 65, the EIS notes that approximately 383 acres of permanent water bodies in the New Madrid Floodway will remain but may not be connected to the Mississippi River during the spawning season. Many will apparently never be connected. As we pointed out in our original description of fish communities in floodplain lakes in the project area, the young of some river species can be found in these water bodies. In these floodplain lakes they perhaps can attain a size where they would be more capable of surviving in the flowing water habitats of the river proper at a later time.

The Mississippi River ecosystem historically involved thousands of these off-channel permanent water bodies that remained connected to the river through periods of flooding. These habitats have been overwhelmingly lost on the Mississippi River. The elimination of these habitats by this project is one of its highly troublesome elements.

The EIS ironically claims that the continued existence of these habitats suggests that impacts on fish have been overestimated. In fact, since the analysis does not consider the benefits of this habitat mosaic, it greatly underestimates fish impacts.

In addition to blocking fish access to the New Madrid Floodway, the proposed project would greatly reduce this habitat mosaic. None of the specifications for fishery mitigation in the EIS specify such complex characteristics. The only way to mitigate these losses would be to recreate this mosaic of areas with open river access in a nearby location.

III. The analysis, based on one overall fish index, ignores effects on species of special concern.

The new draft EIS continues to lump fishery impacts into one generic fish index. This methodology implicitly assumes that it would be acceptable to trade off fishery habitat among different species included in the index. While there may, on occasion, be circumstances that justify such trade-offs, no case is made to justify the particular trade-offs in this case.

For example, colleagues and I just published a paper (*Aquaculture* 202 (2001): 351-357) indicating that white bass from different geographical locations show different performance characteristics, making some populations more and some less suitable for commercial aquaculture. Elimination of the white bass run in the project area may mean the loss of the population with the genetic makeup most suitable for use in commercial aquaculture in Missouri and/or Illinois. If so, it would be difficult to determine the long-term economic impact. The economic analysis has not examined the effects on the long-term value of the recreational fishery supported by this population.

The golden topminnow was thought to be extirpated in Missouri until found by us within the project area. The EIS proposes to avoid direct impacts on this species by not dredging in the immediate area in which specimens were found. I have no reason to believe that the continuation of this population is *solely* based on the resources located at that location. If it was known that all life stages of the species used that site during the entire year, then the contention that this species would not be affected would be more tenable—however, this information is not available at the present time.

Unfortunately, the fish species most likely to be negatively affected by this project (floodplain dependent species) are precisely the fish whose habitats are most lacking in the Mississippi River, because 95% of the Mississippi River floodplain has been cut-off from the river. The USACE acknowledges the particular importance of quiet, off-channel habitat for some species.

IV. The potential mitigation sites would not address fisheries impacts.

The new draft EIS identifies a variety of potential mitigation sites. It does not select any sites or provide any details of the mitigation that would occur on these sites. The overall identification of sites provides additional compelling evidence that mitigation proposed will not address fishery impacts.

Of the sites identified, all but two are located land-side of major levees. Many fall within the lower portions of the St. Johns Bayou or New Madrid areas affected by the project. All these lands will therefore have the same problems with fish access discussed above. Many of the potential mitigation sites (including sites 1, 9, 15 and 5) will never have any connections to the Mississippi River at any time through a culvert or otherwise. Since all of these sites are in the project area, it is fair to conclude that none could have hydrology restored to simulate natural river processes.

Two of the sites are in batture lands, i.e., lands riverside of the levee. Apart from the fact that these sites already offer valuable fish habitat, these lands cannot provide comparably valuable habitat to what is lost. I agree with the Fish & Wildlife Service's discussion of this point on page 14 of its Coordination Act report. Batture lands are much closer to the river and tend to have different temperatures. Recent evidence suggests that temperature is an important component of the value of floodplain habitat. Specifically, the water temperatures found in floodplains appear to be essential for spawning and nursery habitat in some species.

Finally, this identification of potential sites confirms a major flaw in the mitigation analysis. As discussed above, the mitigation analysis assumes that only land flooded eight days consecutively, at least once every two years to a depth of one to three feet provides habitat. It then uses the number of days of flooding of land in the project area that meet this criteria to define the number of fishery habitat units that must be mitigated. The model then assumes (unjustifiably as pointed out above and in my first report) that reforested land that meet these flooding criteria provide a specific quantity of greater habitat than cropland that meets these flooding criteria. It therefore argues that simply reforesting already flooded land by a certain amount so increases the habitat value of that land that it compensates for the loss of a far greater area of other kinds of habitat.

Even if this analysis were correct, the mitigation lands would have to meet the same hydrologic criteria as the lands to be lost for the conclusion to be valid. Moreover, the habitat units created by the mitigation lands would have to be calculated based on a precise analysis of their flooding frequency. No such

analysis has been offered in the EIS. No proof has been offered that any of these lands meet the requisite flood frequency. And, in fact, it is nearly certain that many of these lands will not meet the flood frequency and duration called for by the model. Without this hydrologic analysis, the USACE could not possibly conclude that mitigation could offset fishery impacts otherwise acknowledged to be significant, even if no other flaws existed in the analysis.

I also note that the Corps has suggested other mitigation that partially or fully offset impacts. First, the Corps has proposed to re-establish buffers along 64 miles of streams and channels. While buffers can have beneficial fish impacts, these buffers could not possibly offset the adverse effects of the project. Most importantly they will not compensate in any meaningful way for the losses of reproductive habitat for river fishes that will occur due to the variety of mechanisms discussed above.

Finally, the EIS suggests (in appendix L, page 20) that the creation of permanent water bodies might be used as an alternative to the restoration of floodplain habitat because permanent water bodies have high fish concentrations. By permanent water bodies, I assume the Corps refers to floodplain ponds that would presumably be created in batture lands through excavation. This would be appropriate if one were attempting to mitigate impacts on pond or lake systems, not on a rivers system as in the present case.

V. Alternative levee closures would still mean significant adverse affects on fish.

The EIS presents two alternatives that would move the levee closure up the New Madrid Floodway. Although never presented directly, Table 5-8 suggests that the two alternative levee scenarios would respectively leave a few more hundred acres flooded with access to the river. While leaving these additional acres open to the river is environmentally preferable, the acreage affected is very modest by comparison with the thousands of acres whose habitat would be lost or greatly degraded. These alternatives therefore would modestly reduce but not avoid the bulk of the serious adverse ecological effects of the project.

VI. No meaningful mitigation for impacts on the mussel fauna.

The EIS alludes to the richness of the mussel community in the project area—a relatively rare situation in the Mississippi River under current conditions. The EIA also concludes that dredging will cause some mussels to be eliminated by

the project. This will occur due to the dredging and changes in hydraulic conditions. The EIS infers that recovery of impacted mussel populations will be left to recolonization. Changes in habitat conditions due to the project may not allow recovery under the best of circumstances. This, however, is not the major problem with the "recolonization" theory. The EIS also indicates that the project will have major impacts on fish in the project area. Since mussels *must* reside on specific fish hosts for a time to complete their life cycle, and fish are the major mode of mussel dispersal, impacts on fish will translate into reduced reproduction and recolonization by mussels.

One must question whether mussels will recover from the dredging and other changes due to the project even if these were to be the only impacts on mussels. When one also considers that mussel reproduction as well as dispersal will be affected, it seems unreasonable to believe that mussel populations will "recover". This is another major impact of the proposed project—unionid mussels comprise perhaps the most threatened aquatic faunal group in the U.S.

VII. EIS fails to consider temporal wetland losses.

I pointed out in my last report that it will take some time for a hardwood forest to become established in mitigation lands. Consequently, there will be a net loss of wetlands until the hardwood forest becomes established. The EIS implies that the supposed much greater benefits (as compared to agricultural lands) of hardwood forest lands will come into effect as soon as the trees are planted. There is no evidence to support this contention. It appears there will be a considerable net loss of wetland-years, when the number of acres for which mitigation is to compensate is multiplied times the number of years that will be required before the forest becomes established.

CONCLUSION

In general, I do not believe that the information and opinions I offer in my reports are matters of significant scientific controversy among big river fishery ecologists. I do not believe any reasoned scientific judgment could conclude that the alternatives offered by the USACE would compensate in any meaningful way for the significant adverse affects caused by the proposed project.

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Robert J. Sheehan
Professor of Fisheries in Zoology
Southern Illinois University

January 2, 2002

REPORT OF DR. THOMAS F. STINSON REGARDING THE 2001 DRAFT ENVIRONMENTAL IMPACT STATEMENT OF THE U.S. ARMY CORPS OF ENGINEERS REGARDING THE ST. JOHNS BAYOU/NEW MADRID FLOODWAY PROJECT

January 2, 2001

My name is Thomas Stinson. This report expands on my report dated June 18, 1999 on the then draft Environmental Impact Statement for the St. Johns Bayou/New Madrid Floodway project. I have reviewed the economic analysis of the October 2001 new draft EIS for this project and other relevant information from the EIS and offer these following updated views.

I find that a number of questionable assumptions and analytic shortcuts have been used in preparing the new draft EIS. In isolation any one of these assumptions or shortcuts probably would not create a serious problem for the analysis. But, given the relatively small difference between benefits and costs for this project as estimated, the sheer number of these questionable assumptions combined with the fact that they affect the most sensitive parameters of the economic analysis raise serious questions about whether when properly evaluated this project could meet the basic test of economic efficiency.

Providing a complete analysis of this project using appropriate parameters and assumptions to obtain a more accurate estimate of the benefit-cost ratio for this project is beyond the scope of this review. Below I list a number of concerns that should be corrected in the draft EIS if it is to properly convey estimates of the true costs and benefits associated with the St. Johns Bayou/New Madrid Floodway project.

1. Interest Rate

The interest rate used in an economic analysis is extremely important. Most project costs occur very early in the project's life while the benefits accrue gradually over time. The annual cost of the project therefore depends heavily on the interest rate used to translate total costs into annual costs (just as the cost of paying for a mortgage depends heavily on the interest rate). The economic analysis in Appendix B states that while the "First Phase" feature of the project was analyzed using an interest rate of 7.375%, a portion of the project, the Mississippi River Levee features, were analyzed using an interest rate of only 2.5%. Even

using that unusually low interest rate, the benefit/cost ratio for that portion of the project is only estimated to be 1.1 to 1.

While I cannot evaluate any legal rationale for using an interest rate of only 2.5 %, that assumed rate obviously makes little economic sense. The alternative interest rate used is more reasonable, although generous since it is based on U.S. Treasury rates which do not reflect the risk premium that would demanded of this kind of project were it to be built by the private sector.

Without information on annual investment costs for the project it is impossible to compute the benefit-cost ratio using the higher alternative interest rate. There is, however, no doubt that it would be well below 1.0. If one assumes the annual investment costs would follow the percentage distribution of Alternative 2, First Phase Features as shown in Table 16, page 21, the annual interest costs for the levee closure portion of the project would be estimated at $3,177,892 with total costs estimated at about $3,300,000 instead of $1,076,000. That would make the total project costs for this feature of the project exceed estimated benefits by more than $2,000,000 by more than three to one, with a benefit-cost ratio of about .33.

2. Estimates of Agricultural Benefits

According to the economic analysis, agricultural benefits represent roughly 90% of total projected project benefits of the economically most advantageous alternative (the NED plan). According to Table 29 agt page 38 of Appendix B, agricultural benefits comprise $4.056 million of the $4.567 total annual project benefits of the pumping stations and channel improvements, and $1.058 million of the annual $1.189 million benefits of the levee closure for the New Madrid Floodway. Moreover, the analysis of this best alternative shows benefits exceeding costs by only 1.1 to 1 for the levee closure, and 1.2 to 1 for the entire project. Since projected excess benefits from this project are extremely modest a correct analysis of agricultural benefits is critical to assessing the economic feasibility of this project.

There are many flaws with this agricultural analysis.

3. Using Unrealistic Prices

The economic analysis published with the earlier draft EIS used 1996 prices of key commodities provided by USDA's Economic Research Service. These are five-year price averages. In my earlier report, I showed that using local 1999 prices available at the time dramatically lowered the projected project benefits. The economic appendix of the new draft argues that such average prices are preferable for this kind of economic analysis.

I agree that using some an estimate of the long term expected average price for the commodities of interest is appropriate, particularly over a period when commodity prices have been extremely volatile. Using corn prices to illustrate the point, chart 1 shows that prices in general were extremely high in 1995 and are currently much lower.

By definition, USDA's normalized price for 2001 is the average of prices for 1995, 1996, 1997, 1998, and 1999. Thus the current 5-year moving average is distorted by the inclusion of the obvious outlier for 1995. The extent of that bias can be seen by the size of the change in the normalized price for 2002. Using current Economic Research Service corn price data the normalized price for 2002 (prices for crop years 1996-2000), will be just $2.17 per bushel, down $0.16 per bushel (7 percent) from the corn price used in the draft EIS. Given that the margin of excess benefit for the project is so small, it cannot be certain that this project's benefit cost ratio will exceed one were 2002 normalized prices used. I also find it troubling that the 1996 normalized prices used in the draft EIS are not consistent with the 1996 normalized prices currently published by ERS.

4. Incorrect Reliance on Large Increase in Future Net Returns to Agriculture

Over the decades, American agriculture has steadily increased crop production yields per acre, including yields per acre for corn, soybeans and cotton, the principal crops grown in the project area. To reflect this trend, the economic analysis projects further increases in yield in the future (not merely increased returns as a result of the project, but increased returns as a result of increasing agricultural productivity) (Appendix B, page 5). Although the documentation does not provide sufficient information about how the increased yield is estimated so that I can judge the reasonableness of the estimate, I agree that it is appropriate to assume that yield per acre will grow over time.

But, while the draft EIS allows yield per acre to increase, it ignores the effect of the additional production on the real price of the commodities produced,

by assuming that unit prices for crops and prices for production inputs will remain at 1996 levels. As can be seen from chart 2, the increased yields have been accompanied by lower real (inflation adjusted) prices for the basic commodities. This decline reflects fundamental economic forces – in competitive markets other things equal, an increase in the amount produced of any good will be sold at a lower price. In other words, yields will not increase just on the fields in the project area, they will increase on farmland elsewhere in the United States (and indeed throughout the world), and the benefits of this increased productivity will be passed on to consumers in the form of lower prices. As chart 3 shows, the real price declines for corn, soybeans, and wheat over the past three decades have been significant. Real prices for corn and soybeans both fell by roughly 65 percent, and wheat by 55 percent. Clearly, while it is reasonable to assume that fields in the project area will produce more bushels of crops in the future, the real price received for each bushel is likely to be less.

In addition, the increased yields do not come freed of charge. Gaining access to the technology that generates those higher yields increases the costs of inputs for farmers. Yields have grown in part due to more sophisticated varieties of seeds and those improvements have caused the price of seeds to increase. ERS studies indicate that between 1975 and 1995 seed costs for corn growers rose by more than 150 percent. Similarly, the cost of chemical inputs grew by more than 125 percent. ERS data on historic costs for corn growers shows variable cash expenses growing at a compound annual rate of more than 3.3 percent, from $81.33 per acre in 1975 to $158.00 per acre in 1995. Clearly the assumption that it is appropriate to assume that production costs remain constant over the 50 year project horizon is questionable.

Much of the farmer's benefit from higher yields has been offset by increased production costs and declining real prices. The result has been that net per acre return to farming has not skyrocketed, but remained relatively stable. In contrast, the economic assumptions used in the analysis for this project result in large projected increases in the net returns, i.e., the profitability, of farming over the project's life.

This omission of future increases in the cost of production results in inflated estimates of project benefits. The benefits of the project come in two forms: reductions in crop damages from floods and shifts to more profitable farming methods ("agricultural intensification") made possible by the reduction in flooding on some lands. In either case, benefits depend on the total value of the future crops per acre. By projecting large increases in the value of future crops, the economic analysis projects large future increases in the economic benefits of the

flood reductions caused by the project. That is, even if benefits from reducing flooding in the project area are small in the project's early years, these assumptions cause those net benefits to grow unrealistically over time.

The economic analysis does not present all the details of this future growth, but it does present sufficient information to show that these errors have a huge effect on projects of economic benefits. Table 12 on page 16 shows projected agricultural intensification benefits over time. According to the chart, while the project creates intensification benefits of $1,091,551 per year in 2012, these benefits rise to $1.45 million in 2052. Since the future benefits appear to have already been discounted for the time value of money in the chart (and benefits 50 years away would normally have an extremely low discounted present value), the projected increases in production value over the next 50 years must be substantial. The analysis of reductions in crop damages summarized in Table 8 also presumably reflects this flaw (although the growth each year is not presented).

This error is a fundamental flaw in the economic analysis that raises serious doubt about the appropriateness of its results. I note that other respected economists have offered the same critique of these assumptions when used by the Army Corps of Engineers in the evaluation of a similar project in the lower Mississippi Valley called the Yazoo Pump. That project, which also involves construction of a pump station to evacuate water from the lower portion of a Mississippi River drainage district, produces primarily agricultural benefits. To comment on this project, the U.S. Environmental Protection Agency engaged Dr. Leonard Shabman of the Department of Agricultural and Applied Economics at Virginia Tech, and his comments of September 24, 2000 offered a similar critique. A copy of this paper is attached.

I also note that Appendix B of this DSEIS states that "the methodology used to project crop yields and levels of production inputs is consistent with that used for other Memphis District flood control studies." Page 5. I assume therefore that the analysis is the same as that performed by the District in its analysis of the Yazoo Pump. A detailed review of the problems of this analysis is presented on pages 84 through 89 of Dr. Shabman's "An Approach for Evaluating Nonstructural Actions with Application to the Yazoo River (Mississippi Backwater Area) (February 7, 2000). It shows how the Corps methodology projects large increases in net present value because of these incorrect assumptions. I concur with his analysis.

Four economists at the U.S. Department of Agriculture Economic Research Service also reviewed Dr. Shabman's comments and the Corps of

Engineers' underlying analysis for the Yazoo project. As they stated, "this approach is not structurally sound." Copies of the comments of Dr. Shabman and of the economists at USDA on the Yazoo project are also attached.

5. Failure to update cropping practice data

Under normal circumstances cropping practices change little in a region from year to year. However, the 1996 Federal Agriculture Improvement and Reform (FAIR) Act made important changes in the institutional setting in which America's feed grain, wheat, cotton and rice growers operate. By decoupling farm program payments from current commodity price levels and eliminating the required participation in acreage diversion programs the 1996 farm bill gave farmers the flexibility to shift production to the most profitable crop mixes, freeing them from the need to tailor planting decisions to preserve eligibility for future farm program payments.

Assuming that today's cropping patterns are the same as those under the prior farm bill is inappropriate since 1996 cropping patterns on the land in question may well have been dictated by the need to retain base acres to remain eligible for federal deficiency payments and the commodity loan program. Since passage of the 1996 act farmers in the region have been able to adjust their cropping practices to those that would produce the greatest return without losing farm program benefits. Other things equal using current cropping practice data would likely increase the project's inundation benefits but reduce its intensification benefits. Without more current data it is impossible to determine whether it would increase or decrease the projected benefit-cost ratio for the project. Given the very narrow margin between projected benefits and costs when estimated using 1996 cropping patterns, benefit estimates based on current cropping patterns could show the proposed project with a benefit cost ratio of less than 1.

6. Implausible Overall Estimates

Overall, the project counts economic benefits on 52,267 acres, the areas subject to the three-year flood. Of these, according to the EIS, only 13,036 acres flood at least once every two years (Draft EIS, page 39). Moreover, average mean flooding levels in a month are only 947 acres in April (the highest flood month), and a mere 29 acres in May and even fewer throughout the summer. This means that flooding overwhelmingly occurs in the early spring. Given the length of the

growing season in the region, farmers have sufficient time to plant corn or soybeans after the flood recedes.

Yet total projected project benefits (EIS, page iv) are estimated at $40,241,300 for the levee closure and $49,414,800 for the remainder of the project, a total of $89, 656,100. (This is based on multiplying total project costs in Table 29, page 38 by the benefit/cost ratio). Of these benefits, 89% (see Table 29 on page 38 of Appendix B), or $79.79 million, are based on agricultural benefits. This means that the average benefit per acre that is affected in any way by the project (even through the reduction of occasional early spring flooding) is $1,715. I find this increase implausible based on the fact that ERS estimates that the average value of all cropland in Missouri in 2001 is $1,380.

One way to verify the correctness of these estimates is to compare the price difference between land with the flood frequency in the project area and land with the flood frequency that will result under project conditions. This, in fact, is a methodology employed by the economic analysis for purposes of evaluating alternative 9 (Appendix B, page 34), which compares the value of frequently flooded farmland to woodland. According to this separate analysis, frequently flooded farmland has an average value of $1,600 per acre. This means that all 52,267 would have to increase in value from an average of $1,600 per acre to $3,315 per acre as a result of the project.

The Army Corps of Engineers should engage in this comparison as a check on the plausibility of its analysis.

7. Inconsistency with Federal Agricultural Policy

In my earlier report I discussed trends in federal agriculture and agricultural policy and explained why efforts to drain agricultural lands for increased agricultural production were inconsistent with the goals of this policy. Developments since this report have only strengthened this inconsistency. As shown earlier key commodity prices have continued to decline and for the 2001 crop year USDA currently estimates carry-forward stocks of 1.574 billion bushels of corn and 330 million bushels of soybeans, or about 16 percent of annual corn production and 11 percent of soybean production.

Congress passes a new farm bill once every five to seven years, which sets the rules for new programs. The new farm bill is still being negotiated, but a version passed by the House increased programs designed to take cropland out of

production by a total of 4.35 million acres (1.15 through the Wetland Reserve Program and 3.2 million acres through the Conservation Reserve Program.) The Senate has yet to act on its version, but the bill on the floor of the Senate would increase land retirement even more.

In light of these policies, it is difficult to understand why it is in the public interest to spend $77.7 million almost entirely to increase agricultural production of commodities in surplus. That is particularly true, since even according to the economic analysis, only around $1.20 of benefit exists for each $1 of expenditure.

8. Failure to Properly Estimate Mitigation Costs to Account for the Effect of Mitigation on Estimates of Agricultural Benefits

The draft EIS presents no summary of project costs, so it is impossible to evaluate their reasonableness. This is an overall problem at least with the document itself. In addition, the failure to specify a clear mitigation project makes it impossible to complete a benefit/cost analysis because the mitigation costs will affect the costs of the overall project.

Perhaps more fundamentally, the mitigation analysis is based on removing 9,957 acres of seasonally inundated cropland from crop production by planting it in trees. This would mean a large decrease in agricultural production. Nowhere in the economic analysis is the reduction in agricultural benefits on this land incorporated.

Highlighting this problem is that the new mitigation analysis shows that most of the potential mitigation sites, by both number of sites and size of acreage, are in the project area. These include sites identified as numbers 1, 5, 7, 9, 10, 11, 12, 13, 14 and 15. All or nearly of all of this acreage is acreage that is supposed to show economic benefits from the project in the form of increased agricultural benefits. If this acreage is chosen as the mitigation site, it cannot in fact produce increased agricultural benefits.

Until actual mitigation sites are selected, a proper benefit/cost analysis cannot be performed. Not only is it not possible to estimate mitigation costs reasonably, it is not possible to estimate agricultural benefits of the project.

9. Improper Estimates of Non-Structural Benefits

The economic analysis of the non-structural options is done only in a cursory manner. The changes in land use analyzed involved reforesting the frequently flooded land. In doing so, the analysis simply compared the economic benefit of timber production to the landowner to the economic benefit of agricultural production based on land values. There are several problems with this analysis.

While the methodology employed may estimate potential private benefits from the conversion, the analysis ignores all potential public benefits to the conversion. For the Yazoo project discussed above, Dr. Shabman for the Environmental Protection Agency also prepared an economic analysis of a nonstructural alternative that involved reforestation. Benefits estimated included not merely the benefits of timber production, but benefits associated with improved water quality, carbon sequestration, and the sale of hunting leases. The first two are public benefits that are not reflected in the price of timberland in the area, and the last may not be reflected unless sufficient timberlands are recreated in an area to create an ideal hunting unit. The review of this study by the four USDA economists discussed above generally concurred, and suggested that additional nonstructural benefits should be estimated and included, including wildlife benefits and other wetland benefits. Indeed, although I have not reviewed it, the USDA analysis suggests that the Corps analysis of nonstructural options for the Yazoo pump at least attempted this kind of nonstructural analysis (albeit in a manner criticized by Dr. Shbaman and USDA). A copy of Dr. Shabman's analysis is enclosed.

The report states that few landowners in the area have availed themselves of the Wetland Reserve Program and this suggests that nonstructural options are not viable. However, at a minimum, all this implies is that additional incentives might need to be provided to the price offered by the Wetland Reserve Program.

In addition, there may be many variables involved in the uses of the WRP in the project area. WRP land valuations in fact are based on the agricultural use value of the land today. Since landowners in the area can anticipate a potential windfall if this project goes forward, they would have little reason to enroll land in the WRP so long as the project is possible. At a minimum, they could wait for the project to go through and then enroll in the WRP at a higher price (or sell the land to another landowner for a higher price).

10. Additional Problems

In my earlier report, I also presented a number of other flaws with the analysis, including the implausible claims of economic development benefits and the failure to analyze economic development potential for East Prairie and the remainder of the community appropriately. The new draft EIS does not remedy these problems.

I swear that the foregoing represents my opinions to the best of my knowledge, information and belief.

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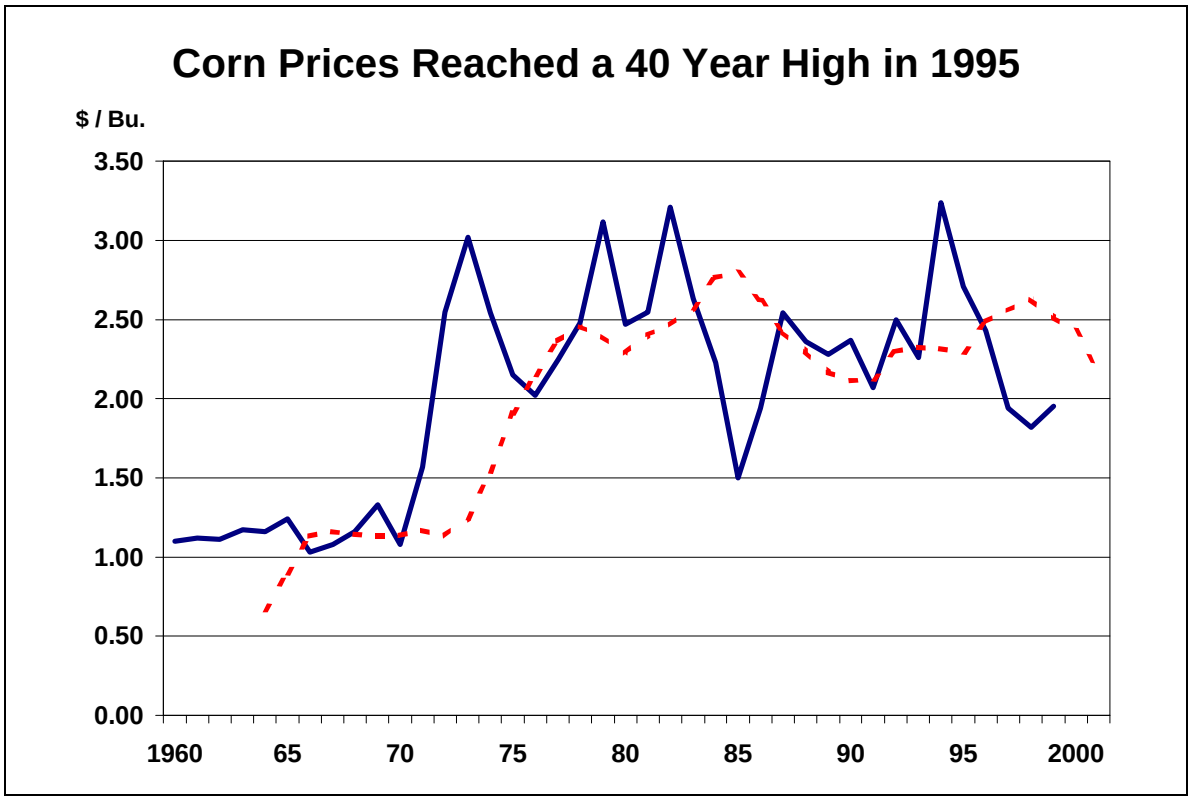
Dr. Thomas Stinson

January 2, 2002


Corn Prices Reached a 40 Year High in 1995
$ / Bu.
3.50
3.00
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1960
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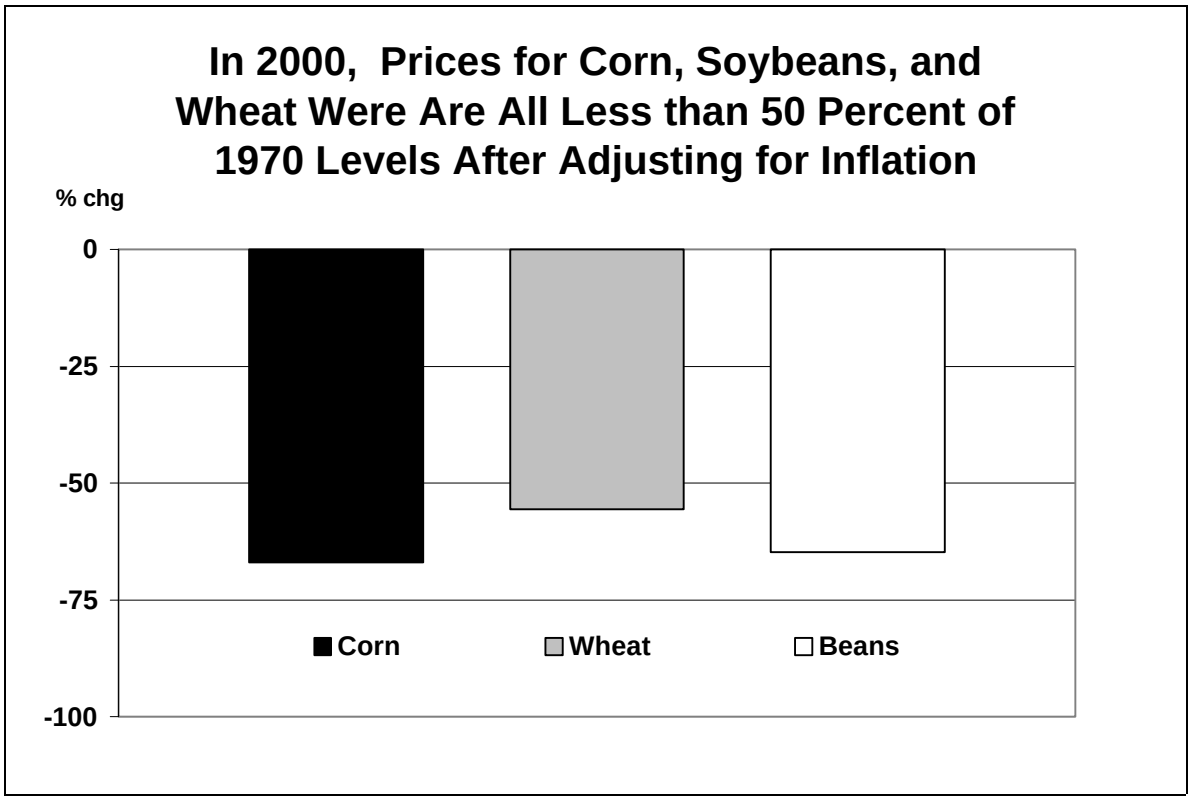
In 2000, Prices for Corn, Soybeans, and Wheat Were Are All Less than 50 Percent of 1970 Levels After Adjusting for Inflation
% chg
0
-25
-50
-75
-100
Corn
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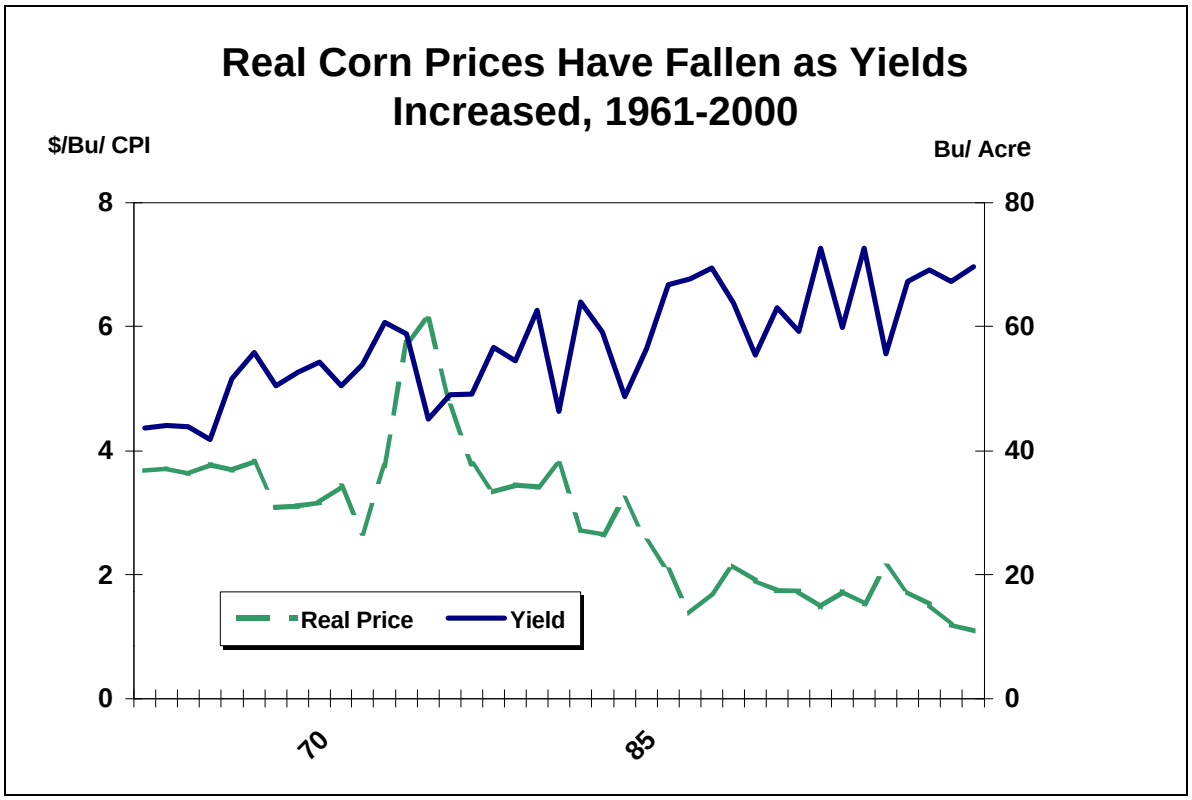
Beans


Real Corn Prices Have Fallen as Yields Increased, 1961-2000
$/Bu/ CPI
Bu/ Acre
8
6
4
2
0
80
60
40
20
0
Real Price
Yield
70
85