September 19, 2011

Mr. Steven Stockton
Director of Civil Works
Headquarters, US Army Corps of Engineers
441 G Street NW
Washington, DC 20314-1000

Dear Mr. Stockton,

Dr. Denise Reed (University of New Orleans), Dr. Rich Ambrose (UCLA), Dr. Will Graff (University of South Carolina), Dr. Chris Goddard (Great Lakes Fisheries Commission), and I (University of Georgia) toured parts of the US Army Corps of Engineers flood management complex on the Lower Mississippi River on 16-17 August, 2011. We were impressed with the systems approach used by USACE to address flooding events in the Lower Mississippi River and we concluded, based on the preliminary information available, that the structures worked effectively as planned during the 2011 flood. We considered both the short-term and potential long-term environmental/ecosystem implications of Lower Mississippi River flooding and any implications for Corps long-term ecosystem restoration program. We also considered things that could have been done differently in managing the recent historic flood from an environmental perspective.

Periodic flooding is normal and beneficial to ecosystems that have evolved over eons in flood prone areas, such as the Lower Mississippi River. Periodic flooding may provide and sustain breeding habitat/conditions for plant and animal species, alter salinity levels in saline/brackish waters, and contribute sediments and nutrients to the floodplains and, in this case, the deltaic ecosystem. The design and particularly the management of the flood management system may increase or decrease these benefits, while still protecting life and property from flood damage. We think, as a general principle, the USACE should operate its flood management system to increase ecosystem benefits to the maximum extent possible, consistent with its flood risk management mandate. We noted the following as examples where ecosystem benefits might be improved through altered management activities without impairing any current flood operations of these facilities.

1. Congress mandated the USACE operate the Old River control structures so as to maintain the distribution of flow and sediments between the Lower Mississippi River and the Atchafalaya River in *approximately* the same proportions that occurred in the 1950s. That distribution was determined to be approximately 30% of the combined flow into the Red River and Mississippi River above the control structure passing down the Atchafalaya River on an annual basis, with the remaining 70% to be passed down the Mississippi River channel. This congressional directive has been incorporated in the operating rules for the control structures and the associated hydroelectric plant in their combined operation. Prior to modification of the Low Sill structure after the 1973 flood, the directive could only be approximated on an annual basis as the gates did not allow

minor adjustments in flow. Current operation of the facilities works to meet this flow regime on a daily basis. By using a daily accounting framework, opportunities to provide floodplain and deltaic ecosystem benefits by fluctuating flow levels is greatly reduced. If the 30/70 accounting were done on a longer time-frame, operators would have much greater flexibility to provide periodic flows for ecosystem purposes. The USACE could reexamine the method of application for the 30/70 flow rule and could explore the possibility of distributing flows on a monthly or annual accounting rather than the present daily approach. The resulting operations are likely to generate ecosystem benefits while at the same time meeting the basic mission of maintaining the division of flows. A longer term assessment and balancing of flows also would probably not reduce the effectiveness of hydropower generation at the Sidney A. Murray Jr. Hydroelectric Station which is part of the Old River Control Complex.

2. The 30/70 division of water flows is also applied to sediment moving through the Old River Control Complex, but we believe that such a division of sediment flows is impossible to approximate given the quality of data available, and unwise in any case. The distribution of sediment should be managed as well as possible to direct it to those parts of the system where there exists the greatest possibility to build coastal marshes and extend subdeltas. These optimal targets may change from time to time, so the distribution of sediment should not be too severely constrained by an arbitrary 30/70 division. Given the challenges of a) measuring river sediment load on a daily basis, especially during floods, b) allocating it through the hydroelectric plant, the low sill and auxiliary structures, and c) the key role that sediment plays in ecosystem dynamics within the river channel and the delta, separate annual operating plans for water and sediment could result in opportunistic ecosystem benefits to be realized while potentially minimizing sedimentation impacts to other river uses.

3. The Bonnet Carré Spillway allows water to be diverted from the Mississippi River to Lake Pontchartrain. The spillway is used only during flood events. Prior to the installation of control works, however, regular flooding and spillage of the river into the lake was more common, and the lake's ecosystem was tuned to these fresh water infusions. Allowing the spillway to carry water to the lake on a more regular basis, mimicking the natural flows from the river to the estuary, could provide ecosystem benefits along the spillway and in the lake, particularly relating to water quality, and make the lake and estuary more resilient to periodic flood flows. Revisiting previous studies of this issue, including the results of experimental openings conducted in the 1990s, would help determine the potential ecosystem benefits of alternative operational regimes.

4. Analysis of nutrient data from the 2011 flood event was not complete when we toured the complex, but certainly nutrients, particularly nitrogen levels, are a significant factor relating to hypoxia in the Gulf. When available, a review of the completed data may indicate the flood control operations of these structures can divert nutrients to floodplains during extreme floods and, by so doing, reduce levels reaching the Gulf. This may provide an additional ecosystem benefit to those described above.

We recognize that the control structures are authorized for flood risk management and this must remain the highest priority. However, it is apparent that some changes in system operation could result in increased ecosystem benefits. There may be some relatively simple operational changes to integrate ecosystem benefits into the operational plans for the Corps' flood management structures that could maximize ecosystem benefits while maintaining or possibly improving current levels of flood risk management.

Sincerely,

James E. Kundell
Georgia Power Professor of
Water Resources Emeritus
University of Georgia