

MEMO

DATE: February 04, 2020

FROM: Joseph B. Gibbs, PE, Board Member, Missouri Levee & Drainage District Assoc. (MLDDA)

TO: Flood Plain Landowners and Levee and Drainage District Boards of Supervisors

SUBJECT: Missouri River bank revetment and dikes

---- The following information is provided by James Rudy, PE, Area Engineer of the US Army Corps of Engineers (USACE) office in Napoleon, Missouri (816)240-8131. He is responsible for managing the maintenance of the rock structures in the Missouri River to stabilize the river banks and channelize the river channel for navigation. The rock structures were authorized in the Bank Stabilization and Navigation Project (BSNP) included in the 1944 Flood Control Act. The effective date of this MEMO is February 15, 2014.

· Stone revetments and dikes were placed as part of the Missouri River Bank Stabilization and Navigation Project to control the flow of the river providing for navigation channel scouring and improved stability to the bank line. Without the revetments and dikes, rivers naturally move and meander causing uncontrolled river erosion and accretion. River levels above the designed height of revetments and dikes still can cause banks to erode away undermining the base of levees to the point of collapse of the levee embankment into the river. As recently as 1986, there were two separate annually appropriated Federal funds for maintaining the stone channelization structures in the river. Neither of these appropriations specifically addressed protection of levees. One fund was for maintaining stone structures in the channel proper for channelization of currents for navigation and the second fund was for maintaining bank stabilization needed for the navigation channel. Both common structures on the Missouri River, dikes and revetment, work in a system to produce the goal of relatively stable banks and navigation channel. With the approval of Congress, since that time the two funds have been combined into one, where the annually appropriated funding is used for both maintenance of the channel and bank stabilization. Congressional appropriation of funds has not kept up with past and present day needs for maintenance of revetment to the initial 'Project' design height. As a consequence, the USACE has had to set priorities for the amount of stone that is maintained in the revetments. The priorities have resulted in the reduction of the height of stone maintained on the river structures. The basis for the amount of stone in a revetment or dike is the height of the rock above a design construction plane (known as the Construction Reference Plane (CRP)). The initial authorized 'Project' design height above the CRP varies from location to location on the river. The ultimate goal is to produce the stability referenced above during normal anticipated flows. To compensate for the reduction in maintenance funds, structures maintenance is prioritized by the value to the public of the items protected by river structures. Additionally, only original BSNP rock structures utilized for bank stabilization that have been recently '*flanked*' are considered for continued maintenance. Those banks that were not initially stabilized by the BSNP are now allowed to be exposed to the natural forces of the river currents. Dikes and revetments that are receiving the greatest maintenance attention are associated with protection high value structures like highways, homes and urban development like factories and vital infrastructure like sewer and portable water facilities. The lowest levels of rock revetment protect only

croplands in levee districts with the very lowest being for privately owned lands with no structures protected by the levee system.

---- The following are my recommendations for districts to adopt for maintenance concerns about river bank stabilization. During periods of high water, dikes and revetments deteriorate.

- With the completion of the 'Project', fewer USACE personnel are assigned to monitoring levee and river bank conditions. With this being the present situation with respect to available personnel and funds, I am advising levee and drainage districts to monitor at their own expense river bank conditions during high and low water river conditions utilizing photography and oral, written or E-mail reports based upon either or both inspections by land or by boat. Design information on dikes and revetment adjacent to a levee district is readily available from the USACE. Contact Mike Chapin at (816) 389-3310 or E-mail Michael.D.Chapman@usace.army.mil to obtain a copy of the BSNP Project Map for the revetments and dikes adjacent to the levee district. Information needed to obtain a map is river mile(s), bank (left or right), and which River Gauge is used for river stages for the district. You will receive a map and a river gauge reading for the Construction Reference Plain (CPR) for the local river gauge reading used by the district. When the forecasted gauge reading matches the one provided, values on the map indicate how many feet the revetment and dikes should be above the water's surface. The dikes and revetment are identified by their reference number on the map. River gauge readings are readily available at <http://www.nwd-mr.usace.army.mil/rcc/reports/pdfs/GRFT.pdf> Conditions of deteriorating river banks and stone works should be reported immediately to the appropriate USACE office for the area for Federal and Non-Federal levee systems. This will get authorized repairs to the stone structures underway as soon as possible and create a record of the levee district's maintenance activities.

- To help with getting higher levels of stone maintained on the revetments, it is recommended that levee and drainage district boards update and annually file with the appropriate USACE area office the 'Protected Area Information' form with the APPENDIX of this form. The 'Protected Area Information' form is a listing of general information about the district. The APPENDIX is a listing of items and their dimensions and lengths protected from flooding. Be sure to include drainage ditches, pump stations, etc. Most of the information needed on the forms is available on County Assessor mapping and the County Clerk's records. The items listed are used to assist with determining the benefit to cost ratio (B:C ratio) for determining eligibility for Title 84-99 USACE flood damage repair funds for levees. Additionally, I recommend that the Board contact the respective USACE offices on an annual basis to affirm that the FORMS have been received and are on file. An accurate and annually updated filing of the form(s) could help with getting stone revetments maintained to a greater height for the district.

- To address bank erosion that is threatening levees in areas not maintained by the USACE, I recommend that appropriate permits be obtained and that respective landowners and levee districts engage in rock placement projects in the subject areas. Many times '*hard points*' are sufficient to stabilize the river banks. They can be constructed via trucking from the land side or via barge from the river side.