

Big Blue and Kansas Rivers Floodplain Management Plan

For Communities Along the Confluence of the Big Blue and Kansas Rivers

I. INTRODUCTION

A floodplain management plan (FMP) serves to communicate many important decisions about the use of a floodplain. The FMP includes important historical details, considerations, and an action plan about the activities and features that help to manage flood risks. The *Big Blue and Kansas Rivers Floodplain Management Plan* is sponsored by the U.S. Army Corps of Engineers (USACE), State of Kansas, City of Manhattan, Riley County, and Pottawatomie County. These pages serve as a living document for the local communities to use to manage flood hazards along the Big Blue and Kansas Rivers. Managing these flood risks is a shared responsibility of the local communities, the state and federal agencies.

Description of the Area

The City of Manhattan, Riley County, and Pottawatomie County are at the downstream end of the Big Blue River watershed. This is the largest tributary in the Kansas River Basin. The counties' boundaries are generally defined as the Big Blue River channel. The City and the rural areas of the counties below Tuttle Creek Dam are at the extreme downstream end of the watershed, where the rainfall runoff is eventually concentrated.

Big Blue Watershed Facts

This is the largest tributary in the Kansas Basin. Tuttle Creek Lake was built in 1962 and the Manhattan Levee was built in 1963.

The watershed presents a unique flood risk to the south and eastern side of the City of Manhattan and residents and business owners in the rural areas of the two (2) counties. This presents a noticeable risk to development from flooding. The Big Blue River Watershed is 9,733 square miles in area and reaches into Central Nebraska. In the middle of the 1900s, the country was in the "Big Dam Era," when large structures, including levees, were constructed to help manage flood risks. Tuttle Creek Lake was built in 1962, and not long after, the Manhattan Levee System was built in 1963. Runoff from the watershed is collected in Tuttle Creek Reservoir, just to the north of the City. Tuttle Creek Reservoir is the only man-made reservoir of its size in the Big Blue River Basin. Tuttle Creek Dam has provided flood protection to the area below since its completion.

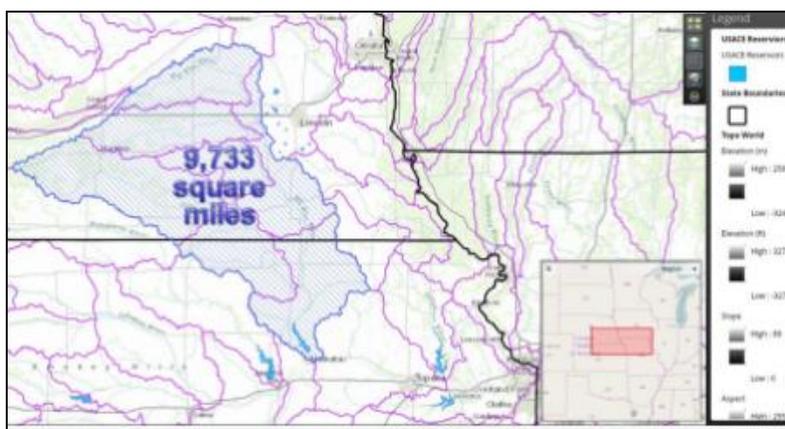


FIGURE 1: THE BIG BLUE BASIN

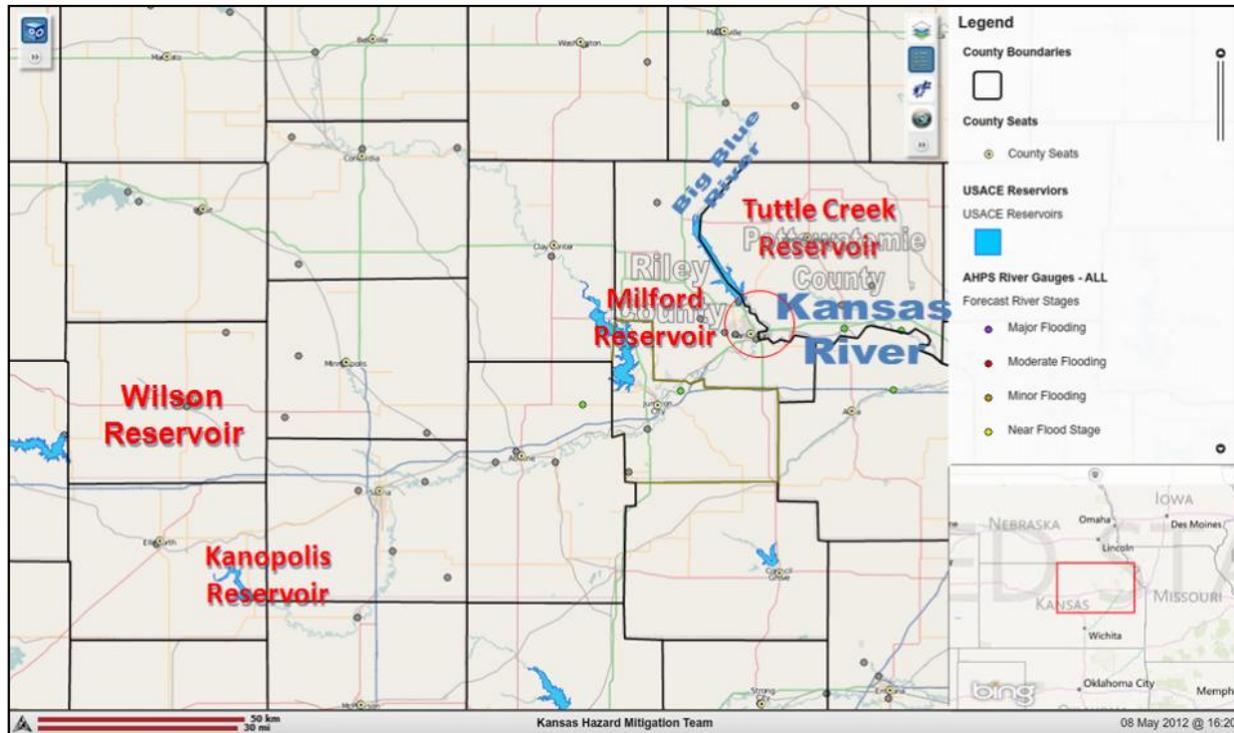


FIGURE 2: REGIONAL MAP, WHICH REFLECTS THE FOCAL POINT OF FLOOD RISK FOR THE STAKEHOLDERS AT THE CONFLUENCE OF THE BIG BLUE RIVER AND KANSAS RIVER

In addition, the flood stage and the associated flood risk on the Kansas River is directly related to the flooding on the Big Blue River. The Big Blue River has its confluence with the Kansas River to the east of Manhattan, near the U.S. Highway 24 Bridge. Upstream of the Big Blue River/Kansas River confluence, additional dams were built on the Kansas River. The next USACE lake upstream of Manhattan on the Kansas River is Milford Lake, which was impounded in 1967. Kanopolis, Wilson, and Harlan County (Nebraska) lakes were impounded in 1948, 1964, and 1952, respectively. Figure 2 shows these USACE reservoirs in the region. The system is operated in coordination with the Bureau of Reclamation dams, such as Cedar Bluff, Glen Elder (Figure 2), Keth Sebelius, Kirwin, Lovewell, Salt, Waconda, and Webster (although some are not visible in the Figure 2). This system of reservoirs can directly impact flooding in the area of concern of this floodplain management plan. Area floodplain managers should be familiar with this reservoir system.

The areas susceptible to flooding discussed under this plan are in the Big Blue River and the Kansas River floodplains. This includes an approximate six mile stretch of the Big Blue between the confluence with the Kansas River and the Tuttle Creek Dam. Specifically, the area studied in the floodplain management plan includes the protected and unprotected areas surrounding the Manhattan Levee; the residential areas along Casement Road and Marlatt Avenue; the commercial corridor along U.S. Highway 24 in Pottawatomie County; and the residential, commercial, industrial and agricultural areas within the rural areas of both counties.

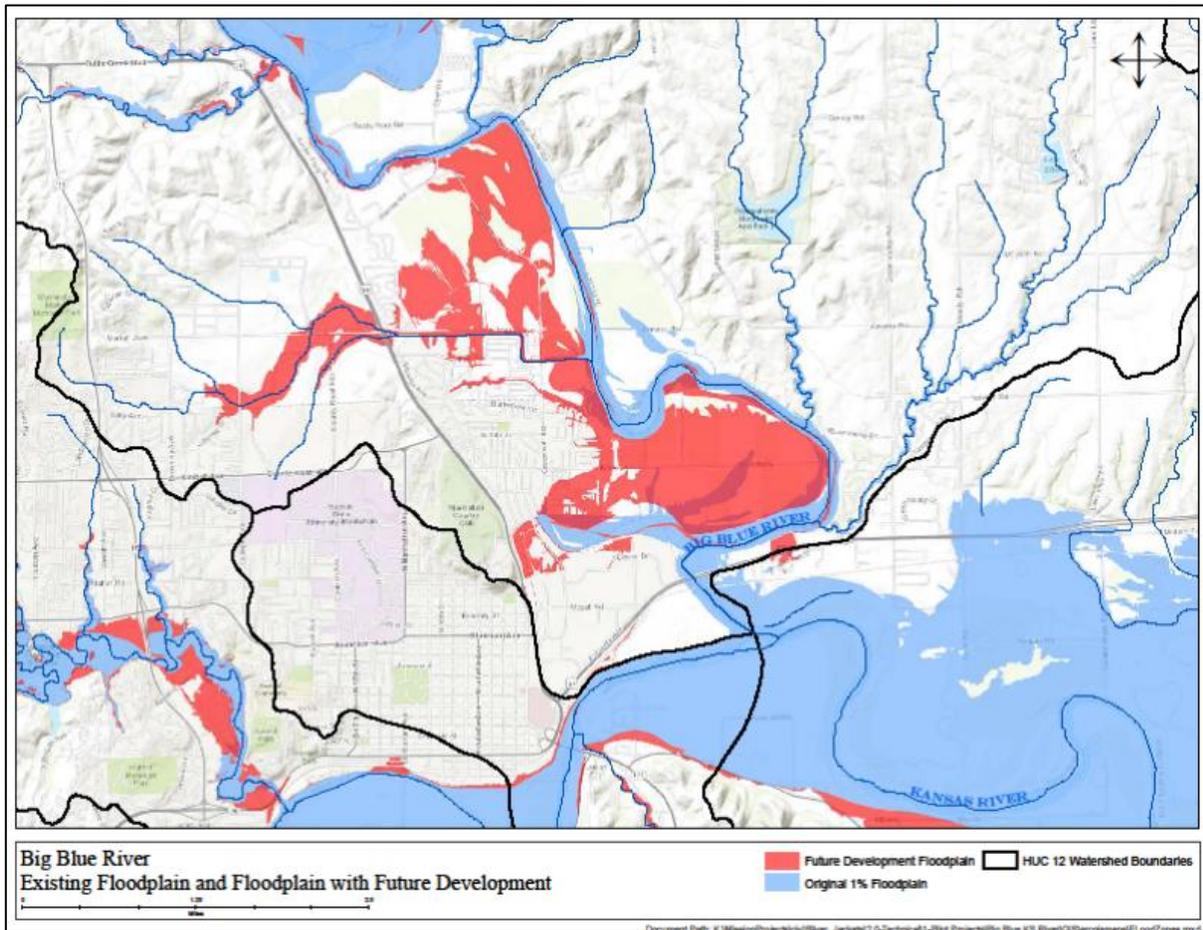


FIGURE 3: FLOODPLAIN MANAGEMENT PLAN AREA OF CONCERN

Purpose of the Floodplain Management Plan

The purpose of a Floodplain Management Plan (FMP) is to make a community or a coalition of communities improve its resiliency to flooding. “Resiliency” refers to addressing the cumulative effects of development within the floodplain and impacts on areas adjacent to the floodplain. Resiliency also means the community, as a whole, can quickly recover from the natural occurrence of floods, because the community is able to lessen or avoid the impacts of flooding to their economy and to the lives of those living there. The FMP attempts to lessen the damaging effects of floods, maintain and enhance natural floodplain values, and assist in making effective use of water and related land resources within the floodplain. An effective FMP should result in continuing consideration of the flood hazard in the use of land and water resources in the floodplain and provide benefits to all government levels and the public, including:

1. Reducing loss of life, injury and hardship due to floods;
2. Reducing flood damages;

3. Reducing public expenditures for construction of additional flood damage reduction measures, emergency response actions, and post-disaster assistance; and,
4. Preserving and enhancing natural floodplain values for fish and wildlife habitat along with their attendant benefits of groundwater recharge, moderation of floods, water quality improvement, and reduced erosion and sedimentation.

A FMP also attempts to balance benefits obtainable from the use of the floodplain with the potential losses arising from such use. The comprehensive nature of such a plan stresses consideration of the full range of large and small measures potentially useful in achieving its objectives. The concepts contained in this FMP were developed to closely follow the 1994 Unified National Program for Floodplain Management and to ensure compatibility with the National Flood Insurance Program's Community Rating System.

Effective Flood Risk Management.

Effective management of both floodplains and floodwaters can break the cycle of damage and rebuild.

Effective management of both floodplains and floodwaters can break the cycle of damage, rebuild and repeat. A dedicated effort allows the government to break this cycle and create a sustainable flood risk management cycle (see Figure 4) and a resilient community.

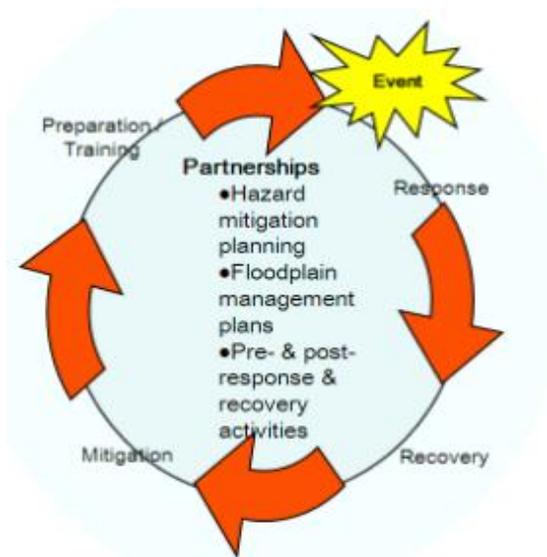


FIGURE 4: SUSTAINABLE FLOOD RISK MANAGEMENT CYCLE

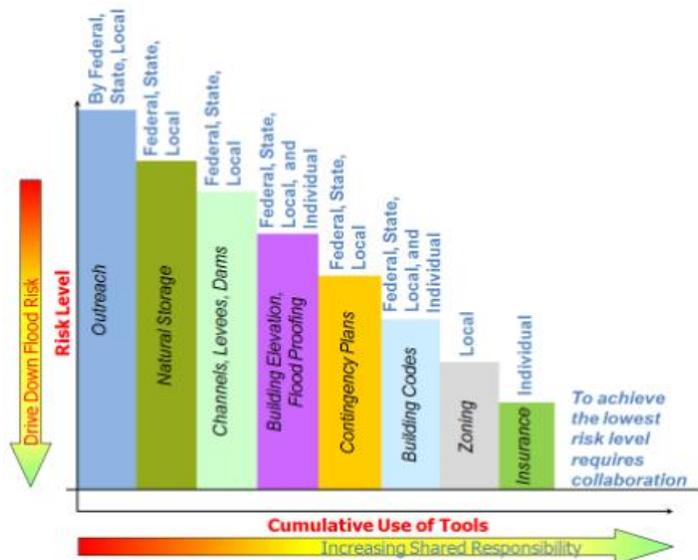


FIGURE 5: VARIOUS TOOLS MUST BE ACCEPTED AT THE STATE, LOCAL, AND THE INDIVIDUAL LEVELS TO DRIVE DOWN FLOOD RISKS

The most difficult challenge is determining which of the strategies and tools for reducing flood risks are most appropriate. Figure 5 illustrates lower levels of risk require increasing involvement from the community. Flood risk management is a shared responsibility, therefore, a variety of stakeholders must be involved in the decision making process.

Flood risk management is a constant effort and requires staff dedicated to the work. The work includes building features that manage floodwaters and also conducting a variety of floodplain

management activities. Floodplain management plans are a shared planning methodology that documents a community's approach to reduce flood risks. This plan serves to show flood management decisions reached over long periods. These long periods often overlap the careers of many different people in the communities, including professional staff. The floodplain management plan serves to operationalize flood risk management for the long term benefit of a community.

Driving Down Flood Risks.

Floodplain management plans are a shared planning methodology that can drive down flood risks.

Local, state, and federal planners have prepared this FMP in accordance with Federal standards originating from Executive Order 11988, which began unified floodplain management in 1977. The standards are consistent with Public Law 104-303 of the Water Resources Development Act (WRDA) of 1996, which amends Section 402 of the WRDA of 1986 (also see 33 U.S.C. 701b-12; 100 Stat. 4133). Below is an excerpt from the Federal requirement.

SECTION 202(c) OF WRDA 1996

FLOODPLAIN MANAGEMENT PLANS

c) Floodplain Management Plans.

(1) In general. --Section 402 of such Act (33 U.S.C. 701b-12; 100 Stat. 4133) is amended to read as follows:

SEC. 402. FLOODPLAIN MANAGEMENT REQUIREMENTS.

a) Compliance With Floodplain Management and Insurance Programs. --Before construction of any project for local flood protection, or any project for hurricane or storm damage reduction, that involves Federal assistance from the Secretary, the non-Federal interest shall agree to participate in and comply with applicable Federal floodplain management and flood insurance programs.

b) Floodplain Management Plans. --Within 1 year after the date of signing a project cooperation agreement for construction of a project to which subsection a) applies, the non-Federal interest shall prepare a floodplain management plan designed to reduce the impacts of future flood events in the project area. Such plan shall be implemented by the non-Federal interest not later than 1 year after completion of construction of the project.

c) Guidelines. --

(1) In general. --Within 6 months after the date of the enactment of this subsection, the Secretary shall develop guidelines for preparation of floodplain management plans by non-Federal interests under subsection b). Such guidelines shall address potential measures, practices, and policies to reduce loss of life, injuries, damages to property and facilities, public expenditures, and other adverse impacts associated with flooding and to preserve and enhance natural floodplain values.

(2) Limitation on statutory construction. --Nothing on this subsection shall be construed to confer any regulatory authority upon the Secretary or the Director of the Federal Emergency Management Agency.

d) Technical Support. --The Secretary may provide technical support to a non-Federal interest for a project to which subsection a) applies for the development and implementation of plans prepared under subsection b).

(2) Applicability. --The amendment made by paragraph (1) shall apply to any project or separable element thereof with respect to which the Secretary and the non-Federal interest have not entered into a project cooperation agreement on or before the date of the enactment of this Act.

Minimum standards of the FMP has components that comply with the U. S. Army Corps of Engineers (USACE) planning guidance for floodplain management plans (USACE 2), as required when a cost share construction project using USACE funding is proposed for flood risk management projects. In this case, the project is the Manhattan Levee project site. A recently completed USACE feasibility study, called the *Manhattan, Kansas Local Protection Project Section 216 Feasibility Study* (2015), documents a federal interest in assisting Manhattan with improving its existing levee system. This FMP also meets the minimum standards for two Federal Emergency Management Agency's (FEMA) programs. The first is Section 510 of the Community Rating System (CRS), as described in the CRS coordinator's manual (FEMA 1), and secondly, the FMP complements the local hazard mitigation plan for Region I of Kansas.

II. DEVELOPMENT PROCESS OF THE FLOODPLAIN MANAGEMENT PLAN

This section includes the documentation of the process used to develop the floodplain management plan (FMP). The process begins with a thorough assessment of flood hazards, whether for loss of life or property damage. Additional steps include the detailing of records of meetings and public involvement activities, which appears below in this FMP.

Future Conditions Flows

The flood hazard area will be altered over time as changes occur in impervious areas in the basin, in the location and "morphology" of river channels or with stormwater infrastructure and flood protection measures, such as stormwater sewers, detention basins and levee systems. The creation of future condition flood models and stream flow models are designed to account for these changes. The USACE Manhattan Levee feasibility study (*Manhattan, Kansas Local Protection Project Section 216 Feasibility Study*, 2015), has selected final alternatives that could be funded by Federal dollars to improve the flood protection functions of the Manhattan Levee System. These proposed levee improvements can affect flows on the Big Blue and Kansas Rivers for less frequent events or higher flood elevations, which may affect more upstream land owners. During the USACE study, analysis indicated effects were minimal, less than 0.4-foot of a rise of the flood waters, for these less frequent events would possibly occur (2015).

Floodplain Hazard Assessment

Numerous reports and studies exist that describe the problems associated with flooding along the Big Blue and Kansas Rivers. The References section presents a bibliography of these resources. The following sub-sections describe the flood hazards for different reaches along the Big Blue River. The reaches begin at the downstream end and work sequentially toward upstream. The left bank (looking upstream) floodplains are listed first, then the right bank floodplains.

HISTORY

AMEC's Levee Certification Report for the Manhattan Levee System (January 4, 2013) states 43 flood events occurred between 1904 and 1951. The most historic flood occurred in 1951, which led to the decision to build the Tuttle Creek Reservoir for flood control of the area and the Kansas River Basin. The Manhattan Levee System was also built to protect the City of Manhattan and surrounding areas. The dam was completed in 1962 and the levee was completed in 1963.