

V. ACTION PLAN

Through recommendations developed and collected throughout the public input process, as presented previously in the document; the action plan was developed to implement the FMP. Possible strategies and tools of the action plan were evaluated for their relationship to the goals and objectives of the FMP (Section III) and the feasibility to complete the action.

Pottawatomie County, Riley County and the City of Manhattan professional staff developed the following detailed action plan for the implementation of the community's selected strategy and/or tools, and the schedule for implementation. A top priority for the FMP and the action plan is to establish a reliable funding source that will allow the communities to pay for the level of effort necessary to manage the floodplains along the Big Blue and Kansas Rivers, as outlined in this document. Following the development of the action plan, discussions of how to fund these items through existing utility funds or through capital improvement must be conducted. Municipal funds could match state and federal grant funds to further the progress of the action plan. Without a sustainable and dedicated funding source, the FMP will fail to achieve the identified goals and reduce the impacts of flooding along the Big Blue and Kansas Rivers.

ACTION ITEMS

Action Item	Goal: Collaborative Approach					Goal: Manage & Reduce Flood Risks		Goal: Improve public understanding of flood risk		Goal: Balance needs of development and environment		Goal: Protect the riparian corridor		Timeline
	City	Pottawatomie County	Riley County											
Adopt the Blue River & Kansas Floodplain Management Plan (FMP)	X						X	X	X				3 months	
Create a Development Coordination Process between the 3 Entities	X	X		X	X	X	X	X	X				3 months	
Hazard Mitigation Plan to include the FMP	X	X		X			X	X	X				6 - 12 months	
Develop Future Conditions model and Flood Insurance Rate Maps		X	X	X	X	X	X	X	X				2+ years	
Research and adopt higher standard floodplain regulations		X		X	X			X	X				2+ years	
Develop Erosion Control and Water Quality Requirements		X		X	X			X	X				1 year	
Develop Stormwater Detention Requirements		X		X	X			X	X				1 year	
Maintain and Expand Existing Flood Warning Systems		X	X				X	X	X				Ongoing	
Develop a Comprehensive Public Outreach Plan		X	X				X	X	X				1 year	
Plan	X	X	X										1 year	
Plan	X	X	X			X	X	X	X				2+ years	
Join the Community Rating System		X	X	X	X			X					12 - 18 months	
Maintain and Expand the Existing Flood Protection Facilities		X				X	X	X	X				On-going	

TABLE 3: SUMMARY OF ACTION ITEMS

Description of Action Items

This section provides the detailed explanation of the FMP action items.

ADOPTION OF THE BIG BLUE AND KANSAS RIVERS FLOODPLAIN MANAGEMENT PLAN

The Big Blue and Kansas Rivers Floodplain Management Plan is the culmination of over a year of participation and work by the Technical Advisory Group, the Public Action Working Group, concerned citizens and City and the Counties professional staff. The FMP documents these efforts and creates an action plan to implement strategies and tools to promote mitigation of flooding along the Big Blue and Kansas Rivers. To strengthen the resolve of this plan, a public approval process shall be conducted. The public participation process will ultimately conclude with the governing bodies of Pottawatomie County, Riley County and the City of Manhattan amending the Manhattan Urban Area Comprehensive Plan, the Pottawatomie County Comprehensive Plan and the Riley County Vision 2025 Comprehensive Plan to reference the document. This process should begin immediately and is anticipated to be completed within three (3) months.

ESTABLISH A CITY AND COUNTY DEVELOPMENT COORDINATION PROCESS

The Big Blue River runs along the border of Pottawatomie County and Riley County. The City of Manhattan lies within these two counties. Development within the watershed can affect City and rural County residents and business owners alike in all three jurisdictions. Professional staff members from the entities, and when applicable, from the U.S. Army Corps of Engineers, should form an informal technical working group to discuss development plans occurring within the watershed and how the development may impact the dynamics of the floodplain. This group is informal in nature and is in no way intended to replace the work of the respective planning boards or governing bodies, but rather have planning and engineering employees who can comment on issues and work in a coordinated effort to address them. Staff members who would be included in these informal discussions would be planners, floodplain managers, emergency managers, city and county engineers, and stormwater engineers. The process to create a system for coordinated review of development within the watershed should begin immediately. This system is anticipated to be completed within three (3) months; however, once created, it should remain as a permanent method for promoting communication and coordination.

INCLUDE THE BIG BLUE AND KANSAS RIVERS FLOODPLAIN MANAGEMENT PLAN IN THE REGIONAL MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN

The region, including Pottawatomie County and Riley County, has an approved Hazard Mitigation Plan. This Floodplain Management Plan and its accompanying details should be referenced in the Hazard Mitigation Plan. Some elements that should be considered for inclusion to enhance the understanding of flood risks are the flood hazard profiles associated with the 2015 Flood Insurance Study update. Having a Hazard Mitigation Plan that specifically addresses flood risks on the Big Blue, Kansas and other rivers, creeks and flood prone areas, will be creditable actions in the FEMA Community Rating System and/or contribute to eligibility for FEMA's Hazard Mitigation Grant Program funding. Because of the timing of updates to the regional plan, this action item is anticipated to be completed in five (5) years.

DEVELOP A COMPREHENSIVE FLOOD HAZARD MITIGATION PLAN

Wide varieties of flood risk adaptive measures are available to Pottawatomie County, Riley County and the City of Manhattan to reduce the risk of flooding along the Big Blue and Kansas Rivers. As discussed in the Strategies and Tools Section, the Floodplain Management Plan process included a public engagement component specifically revolving around this topic for property owners. The Strategies and Tools section provides greater details of this topic.

This action item recommends a comprehensive approach to mitigating the risk of flooding on the Big Blue and Kansas Rivers be created. The comprehensive Flood Hazard Mitigation Plan is envisioned to consist of three (3) parts:

1. Structural solutions. This portion of the Comprehensive Flood Hazard Mitigation Plan would be a collection of the City and the two County's list of stormwater infrastructure projects and should be periodically reviewed and potentially combined into shared projects that resolve flood issues. Such projects could be:
 - Detention basins located in the upper reaches of tributaries to the Big Blue and Kansas Rivers.
 - New or enlarged stormwater infrastructure, such as stormwater sewers, culverts, and swales to divert stormwater runoff.
 - Stream bank improvements to minimize or prevent significant erosion.
 - Stream channel restoration projects to improve stream function of tributaries into the Big Blue and Kansas Rivers.
 - Maintenance of existing stormwater infrastructure.

2. Major Flood Adaptive Measures. This section would be the heart of the plan to outline which private properties would benefit from being elevated or moved away from the floodplain to lessen the flood risk or bought out to eliminate the flood risks. As detailed in the Strategies and Tools Section, all applicable flood adaptive measures will be considered. This section should include a prioritized list of properties that would benefit from a flood adaptive measure, based on risk factors of the structure and characteristics of the flood risk. These factors could be:
 - Probability of being flooded
 - Repetitive flooding
 - Depth of floodwaters
 - Velocity of floodwater

Using a systematic approach to prioritize these properties, a benefit to cost analysis can be created, which would determine not only the most at-risk properties and the ones needing to be mitigated, but also properties that would be the best candidates for state or federal grant dollars that require a benefit-to-cost ratio of 1.0 or greater.

An added benefit of developing such a prioritized list of properties needing flood adaptive measures is the potential exists that clusters of properties, such as sections of streets or entire neighborhoods, could apply for state or federal grants, which would address the risk collectively, instead of having a "Swiss cheese" effect in an area.

3. **Personal Flood Adaptive Measures.** Floods can occur in grand scales where homes are destroyed by violent or prolonged flood events. Floods can also cause minor damage to homes or businesses, such as wet carpets. These minor types of floods can be more of a nuisance and would not generally necessitate spending tens of thousands of dollars to elevate or move the house. The third component of the Comprehensive Flood Mitigation Plan would be to develop a list of best practices or a user guide of tools that would create simple barriers to prevent such minor flooding. These tools could be simple waterproof barriers placed in a doorway or applying waterproofing materials on the foundation walls. These strategies and tools generally would not reduce the premium costs of flood insurance, but it could reduce the need for making small claims to the National Flood Insurance Program

Because of the complexity of the Comprehensive Flood Hazard Mitigation Plan, this action item could take two (2) or more years to complete.

Develop Future Conditions model and Flood Insurance Rate Maps

As explained in Section II, the City of Manhattan contracted with AMEC Environment & Infrastructure (AMEC) to develop a flood model based on the Wildcat Creek watershed and the Marlatt Ditch Drainage Area being completely built out, in conformance with the Manhattan Urban Area Comprehensive Plan's Future Land Use Map. This information has been valuable to residents, developers, lenders, and public officials by more accurately depicting what flooding could occur in the future (10 – 15 years) and how new development and redeveloped areas should be designed to protect against flood dangers and to reduce future risks.

The "Future Conditions Model" has been incorporated into the City's floodplain regulations, which uses the future 1% annual chance flood as the basis for regulating new and redeveloped properties. Regulating properties located in the future conditions floodplain and to future 1% annual flood elevation will decrease the level of risk of flooding the property owners will face. The description of adopting higher standard floodplain regulations is further discussed in the sub-section of Strategy 1, under Development Policies and Land Use Regulations.

Limited funds at the time resulted in the future conditions flood model being limited to the two (2) watersheds: the Wildcat Creek Watershed and the Marlatt Ditch Drainage Area. Both areas were growth areas in the City and the Wildcat Creek Watershed had experienced significant and repetitive flooding in the past. The flood model would provide the needed information to determine where residential and business growth should safely occur and to address the flood risks in the areas.

The future conditions model should be expanded to the rest of the Big Blue River Watershed from the face of the reservoir to at least the confluence with the Kansas River and its major tributaries. This will provide the City and the two Counties additional information that can guide future developments, redevelopments and how to mitigate existing properties to a safer extent. Due to funding and the time it takes to develop this complete flood model, this action item will take over two (2) years to complete.

Research and adopt higher standard floodplain regulations

The sub-section Strategy1: Modifying Human Susceptibility to Flood Hazards lists a number of broad, higher standard floodplain regulation concepts that can be considered and adopted. This would allow development within floodplains under certain conditions, while providing for lower risk of

flooding and reduction or elimination of impacts on adjacent properties up or downstream of the development.

The City of Manhattan has developed and adopted a set of higher standard regulations that uses the boundary of the future conditions flood model and the elevation associated with that model. The City's higher standard of floodplain regulations also has compensatory storage requirements for fill in the floodplain and has adjusted substantial damage and improvement requirements. The higher standard regulations are designed to protect new developments, as well as existing homes and businesses.

Pottawatomie County and Riley County should consider creating and adopting similar regulations to establish a uniform development pattern with seamless regulations in the floodplains. This would reduce confusion for property owners and developers and would avoid nonconforming issues for any structures on property being annexed into the City of Manhattan. The City's new regulations were adopted along with the new Flood Insurance Rate Maps (FIRMs) in March, 2015. Developing the new future conditions maps and/or new FIRMs will take several years. However, other regulations such as compensatory storage and lowering the substantial improvement/damage thresholds may be completed in less time. This action item should be considered within the next two (2) years.

Develop Erosion Control and Water Quality Requirements

Erosion control is an ongoing problem along the banks of the Big Blue and Kansas Rivers. Erosion control efforts by the City, Counties and property owners should work to prevent or repair eroded stream banks to restore and stabilize the bank. Assistance can be in the form of sponsoring state and federal grants and projects.

There are many plans, policies and regulations available to ensure water quality. These include pre- and post-construction BMPs and riparian buffer regulations. However, more can and should be done where feasible. A variety of local groups and organizations can be partnered with to address both water quality issues and other environmental concerns. These groups include classes and organizations at Kansas State University and local environmental groups.

Develop Stormwater Detention Requirements

On March 1, 2009, an update to the City of Manhattan's Design and Construction Standard Specifications and Policies was adopted that made changes to the Stormwater Detention Requirements. The updated requirements are summarized as follows:

The stormwater detention requirement has changed for the post development condition for new subdivision and infill projects that are 0.5 acres or larger. Previously the Stormwater Management Master Plan (SWMMP) established maximum allowable release rates on Page 19 for the 2-year, 10-year and 100-year storm events on a per acreage basis. The new criteria for both new subdivisions and infill developments shall provide stormwater detention on site and the post-development condition shall have stormwater release rates equal to or less than the pre-developed condition. Developers should continue to have licensed professional engineers prepare drainage studies on all new developments and infill projects to determine the impact and mitigating methods to keep post developed conditions for the 2-year, 10-year, and 100-year storm events equal to or less than the pre-developed condition.

The requirement has been implemented in new developments and redevelopment areas where it is appropriate, such as the upper reaches of a watershed. A detention structure would typically be inappropriate near a stream and/or in the floodplain. In addition to requiring detention basins where they are appropriate, the City of Manhattan has also implemented the practice of requiring restrictive covenants on the property identifying who will own and maintain the basins and what measures will be taken by the City in the event a detention basin is not maintained. These measures can include the City doing the required maintenance of the detention basin and assessing the property for the cost of the work. A similar policy is encouraged to be adopted in Pottawatomie County and Riley County to reduce the rate of runoff from new developments.

Detention basins are best used in the middle to upper reaches of a watershed where they can slow the rate of runoff from an area before it reaches a stream. If designed properly, these basins should lessen the impacts of a flood by reducing the amount of peak flows in a flood. A detention basin located in a floodplain or close to the receiving body in the watershed is typically not appropriate because it can hold back floodwaters and release the water at a time when floodwaters from upstream reach the area. This can worsen a flood event by “stacking” the water released from a detention basin onto the peak floodwaters, making the flood event deeper, longer lasting and more significant.

Maintain and Expand Existing Flood Warning Systems

The U.S. Army Corps of Engineers (USACE), Pottawatomie County, Riley County and the City of Manhattan established an extensive system of tone and voice modulated sirens throughout the Big Blue River Valley while the Tuttle Creek Reservoir Dam was being reinforced and retrofitted. This siren system was originally developed in the rare case of a structural failure of the dam before the retrofit and reinforcement project could be completed.

The project was completed by the USACE, in 2010 and the need for this siren system for a structure failure is minimal. However, the equipment still is present and is operated by Riley County, Pottawatomie County and the City of Manhattan to provide notifications to the public, including flooding for the area. This existing system should be maintained and its use continued to warn residents of flood threats and other disasters.

Pottawatomie County, Riley County and the City of Manhattan are using the Northeast Kansas Notification system, a mass notification system that allows the emergency management officials to alert residents of emergency and non-emergency situations. The system is an “opt-in” system, where residents sign up to the service to get email, text or phone call notices of emergencies and other public awareness announcements. Wireless Emergency Alerts (WEA) and Integrated Public Alert and Warning System (IPAWS) may also be used to notify all cellular telephones during a disaster.

The region’s emergency notice system should also be expanded to include areas where it currently does not reach to provide complete coverage of the Big Blue Valley and Kansas River Valley. The system should also be expanded to include new technologies that do not currently exist in the mainstream of warning systems.

Develop a Comprehensive Public Outreach Plan

There is an extensive amount of information property owners and tenants in or near a floodplain should know before, during and after a flood event. The City and Counties can be a valuable clearinghouse for this information. Through traditional public information channels and newer channels, such as social media and mobile applications, the following information should be disseminated:

- National Floodplain Insurance Program (NFIP) information and requirements
- Local Floodplain Regulations
- Information and guidelines for developing in the floodplain
- General flood risks for the community
- Specific flood risks for areas of the City
- Emergency preparedness information
- Emergency evacuation information
- Post-flood disaster recovery information

Through a comprehensive public outreach plan, these topics can be better disseminated to the public. A comprehensive public outreach plan can also earn Community Rating System credits, which may decrease NFIP premiums for property owners. The action item should be created within twelve (12) months, then continually maintained, reviewed and refined to provide residents and property owners with information about flood risks.

Develop a Post Disaster Recovery Plan

Due to the dynamics of the flood risk along the Big Blue and Kansas Rivers and the public utility services present in the river valleys, a post disaster recovery plan should be considered. The flood protection offered by Tuttle Creek Reservoir significantly reduces the potential for flash flooding along the Big Blue and Kansas Rivers. Because of the integrated flood protection structures in the Kansas River Watershed, the most likely type of flood event would be a prolonged inundation of floodwaters, spanning over several days or weeks. This type of flooding can devastate the physical and social infrastructure of neighborhoods and communities.

In addition to the prolonged flood risk from the Big Blue and Kansas Rivers, the region's potable water and sanitary sewer systems are located in these river valleys. A significant number of the region's business centers, including Manhattan's Central Business District and several major industrial parks are located in the Big Blue and Kansas River Valley. Restricted access to these areas because of floodwaters, or complete inundation of these regionally important utilities and economic centers, would risk the health and well-being of the region.

Examples of how this type of flooding impacts a city or region are numerous. The examples include the 1993 flood events in the Midwest, flooding on the Red River in North and South Dakota and Minnesota in 1997 and the effects of Hurricane Katrina in 2005. Lessons should be garnered from these past events to develop plans on how the City would recover from such a devastating flood event and other disasters. This plan should include repairing of the impacted utility systems, what steps should be taken while these systems are being repaired and a housing and economic recovery plan.

The complexity of such a plan requires this action item to take two (2) years or more to complete.

Develop a Big Blue River Recreation Plan

As described in *Tool: Enhancement of Recreation and Educational Opportunities*, by expanding upon existing facilities, opportunities are available to develop a recreation corridor along the Big Blue River that could protect the riparian corridor, help maintain the floodway and floodplain as open space, improve quality of life in the City, Pottawatomie County and Riley County and possibly create educational programs and products.

The three (3) entities should jointly develop a recreation plan to create such a corridor. With the complexity of such a master plan, the anticipated time line is at least two (2) or more years.

Join the Community Rating System

The Community Rating System (CRS) is outlined in Strategy 2: Modifying the Impact of Flooding. The City of Manhattan was accepted into CRS in May 2013, with a Class 8, a 10% reduction in flood insurance premiums for property owners located in the floodplain. The City should continue its participation in the program and work to earn more activity credits through higher regulatory standards, more public outreach and expanding the flood warning system.

Riley County has also been accepted into the CRS program as a Class 9 Community, which means policy holders are receiving a 5% discount on their flood insurance premiums. Riley County should also continue its participation in the program and work to expand the activity credits to achieve a higher community rating and provide a larger insurance premium discount to NFIP policy holders.

Pottawatomie County should consider joining the CRS Program. Pottawatomie County should earn enough credit points to enter the program and provide at least a 5% reduction in flood insurance premiums to policy holders. The typical application process takes twelve (12) – eighteen (18) months.

Maintain and Expand the Existing Flood Protection Facilities

The City of Manhattan maintains the levee system along the Big Blue and Kansas Rivers. All three entities maintain an extensive system of stormwater infrastructure in their jurisdiction. The adequate maintenance of these existing systems is important to residents, businesses and the environment to reduce widespread flood issues and address erosion concerns.

Where feasible, the City and the two counties should look to expand these flood protection facilities to further protect those in harm's way. For any large civic projects, such as constructing a new levee or dam structure, partnerships with state and federal agencies will most likely be required. For instance, the City has partnered with the USACE to study the feasibility of raising the levee system for added flood protection and to rehabilitate existing pumps and gates associated with the structure.

The continued maintenance of these structures should be ongoing. The study, design and construction of any new stormwater infrastructure improvements can be complicated and may require two (2) or more years to complete. This action item will be ongoing.