

# 04

## A How-To Guide to Levee Setbacks

### Large-Scale Levee Setback Playbook

In March 2019, abnormal weather patterns in Nebraska, Iowa, and South Dakota caused record-setting flooding along the Missouri River, resulting in widespread catastrophic damage throughout the river valley. The Large-Scale Levee Setback Playbook (Playbook) documents how, after this historic flood, a multi-agency team worked together to complete a highly complex \$100M levee setback after floodwaters destroyed most of the left bank of Missouri River Levee Unit 536 (L-536) in northwestern Missouri. The Playbook also serves as a guide for others pursuing similar nature-based solutions that enhance flood resilience. It is organized in four distinct but complementary sections.

#### SECTION 1: The Story

tells the story of the historic flooding in 2019 and provides an overview of the scope and benefits of the setback, the partners involved, and project milestones.

#### SECTION 2: The Challenges

dives deeper into the L-536 setback project, identifying the challenges—big and small—that project partners encountered and overcame through collaborative problem solving.

#### SECTION 3: The Recommendations

provides recommendations from the lessons learned during the L-536 setback regarding legislation, regulation, policies, and practices that can better support levee setback projects.

#### SECTION 4: The How-To Guide

illustrates a process for levee sponsors considering or pursuing a similar project, as well as identifying helpful pre-disaster planning efforts.

The development of the Playbook was supported by The Nature Conservancy with experience-based contributions from project partners involved in the L-536 setback project, a nature-based solution to reduce flood risk to the community by reconnecting more than 1000 acres to the riverward floodplain and restoring more than 400 acres of wetlands.

## Key Takeaways of Section 4

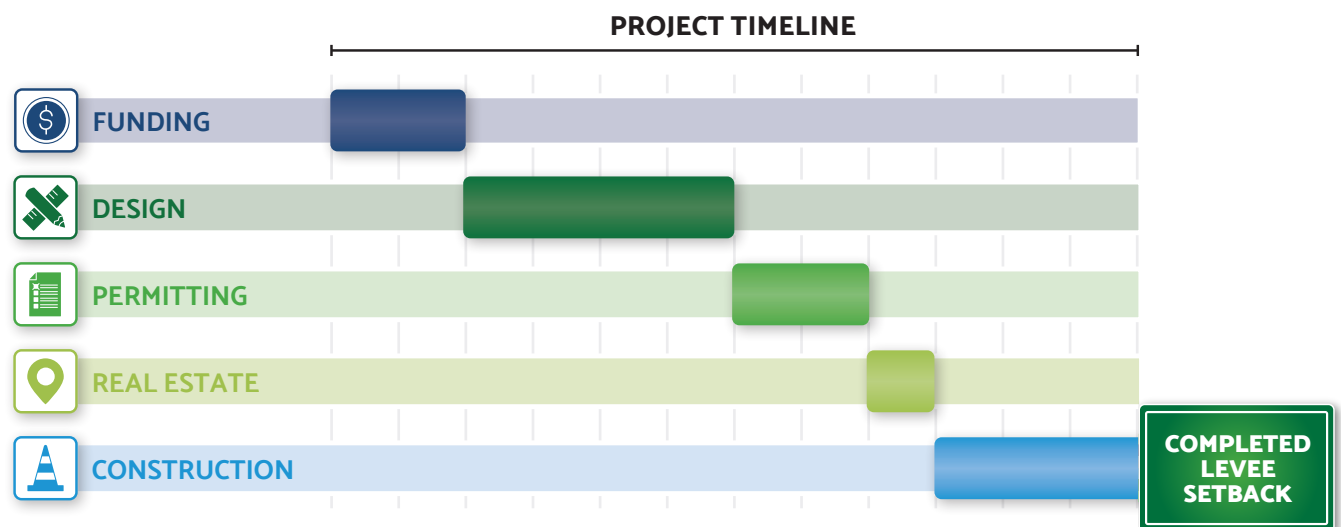
- The how-to guide provided in this section is based on the L-536 experience, documenting the actions taken and providing tips and best practices for those pursuing similar efforts.
- There is tremendous value in pre-disaster planning because any activities that can be done pre-disaster enhance coordination efforts, save time and money post-disaster, and may facilitate securing critical funding resources.
- Post-disaster recovery efforts are not a linear, step-by-step process; rather, things happen simultaneously and seemingly out of order as compared to a traditional USACE civil works project.
- A large-scale levee setback is a complex effort, but it is achievable when project partners work together to pursue a shared goal.

# A Note to Levee Sponsors

Pursuing a large-scale levee setback is a significant but achievable effort, and the levee sponsor is vital to the effort.

The role a levee sponsor plays in a large-scale levee setback can be challenging, especially during and after a disaster, often with a limited budget and volunteer staff. The levee sponsor's actions significantly influence the vision and momentum of a large-scale levee setback. The levee sponsor must develop an understanding of the system-wide impacts of a levee setback, articulate a goal and vision that brings partners to the table, and be a consistent advocate for the benefits a setback offers the community and environment.

Under pre-disaster (proactive) circumstances, a large-scale levee setback is a complex project to implement. In an oversimplification of a typical civil works project, first funding would be in place to trigger the planning and design of the setback, which would inform the permitting process. Real estate would then be secured before the project moved into construction (see Figure 9). This process would occur in as little as five years or over decades, depending on the project's circumstances.



**Figure 9: Pre-disaster (proactive) project timeline example**

In post-disaster rehabilitation circumstances, the process is compressed in order to restore flood protection as soon as possible. Illustrated as an interwoven process (see Figure 10), the accelerated schedule necessitates individual project components be completed concurrently. Ideally, this process would be completed before the next flood season (i.e., one year); however, for large-scale projects, two years is a more likely scenario, as it was for the L-536 setback.



**Figure 10: Post-disaster project timeline example**

Throughout this section, L-536 project partners outline the process and share best practices for navigating the compressed and interwoven levee setback process. The following how-to guide is broken into three sections:

1. **Pre-disaster actions** that lay the groundwork for a smoother post-disaster levee rehabilitation effort (or identify the process for a pre-disaster setback project).
2. **Post-disaster actions** for levee sponsors and project partners to use as a baseline project management plan for a similar effort.
3. **Summary of project components** and corresponding best practices, timeline variables, project resources, and levee sponsor key actions.

While the process of pursuing and achieving a large-scale levee setback is complicated, know that it is possible through collaboration and partnership.

# Pre-Disaster Planning

L-536 setback project partners felt the pressure from the compressed schedule of a post-disaster levee rehabilitation project. This illuminated the significant value pre-disaster planning could have on post-disaster recovery efforts: any activities that can be done pre-disaster save time and coordination efforts when time is of the essence. A levee setback could be planned, designed, and constructed pre-disaster, thereby mitigating potential future damages and eliminating time constraints associated with post-disaster recovery efforts.

## **Incorporate Pre-Flood Assessments into State and Local Hazard Mitigation Planning Efforts**

Hazard mitigation plans (HMPs) developed by local governments, often with assistance from a Regional Council of Government or Regional Planning Commission, are required by the Federal Emergency Management Agency (FEMA) to be eligible to apply for funding for pre- and post-disaster recovery and mitigation.

## **Explore USACE Programs that Could Support Levee Setback Projects Outside of the PL 84-99 Program**

While the L-536 setback was constructed under authority of the PL 84-99 program, there are other USACE programs or authorities that can support a levee setback study, design, and construction.

Section 205 and General Investigations (GI) programs are two potential avenues for pursuing levee setbacks with USACE. These programs require a non-federal cost-share sponsor (e.g., levee sponsor or other partnering entities) to help share the cost of the study, design, and construction phases of the project. The non-federal project sponsor is still responsible for Land, Easements, Rights-of-Way, Relocation, and Disposal Areas (LERRDs). Modifications to an existing federally constructed levee without the participation of the USACE requires a USACE Section 408 review, often a responsibility of a levee sponsor or project proponent to develop.

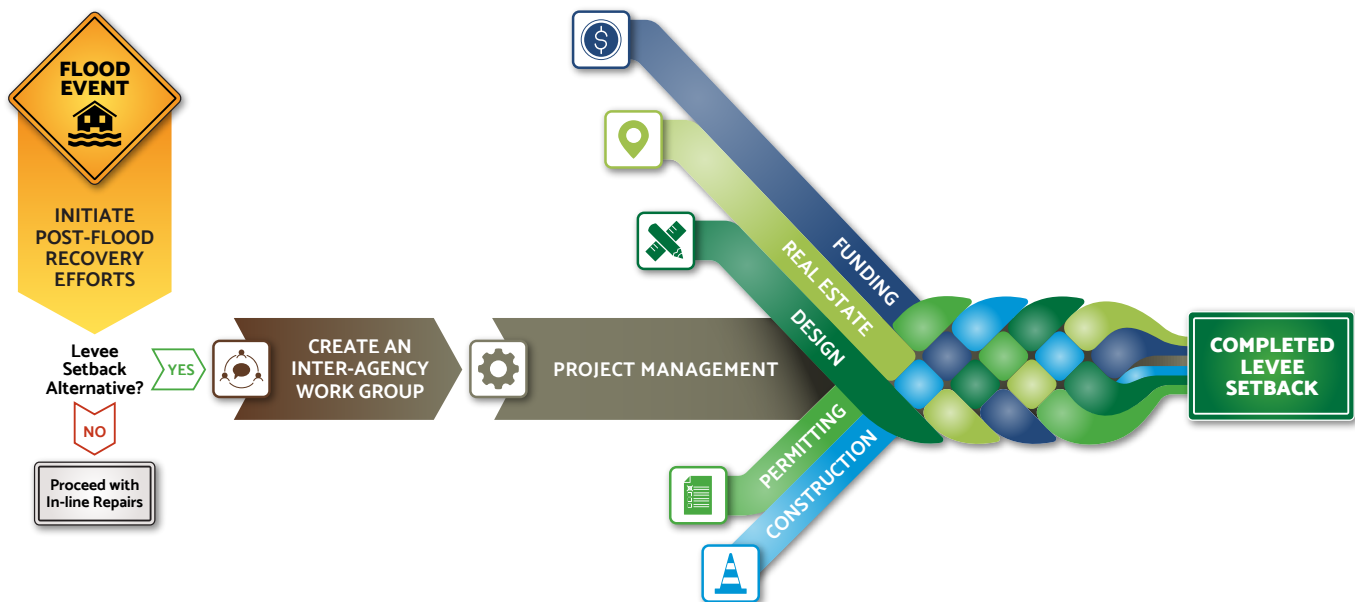
## KEY ACTIONS

- A** Increase collaboration among local, state, and federal partners outside of a disaster.
- B** Conduct tabletop levee damage/failure exercises that simulate disaster response and recovery as a part of levee emergency preparedness planning and hazard mitigation planning. These efforts increase pre-disaster partner collaboration and could identify opportunities for a levee setback project.
- C** Integrate repetitive flood damages into local HMPs. Identify levee segments where pre-disaster mitigation actions might provide long-term benefits.
- D** Identify potential levee setback locations before disasters occur to ensure a setback is an alternative considered in post-disaster evaluations through collaboration between USACE and levee sponsors.
- E** Include conceptual levee realignments in local HMPs to:
  - Secure eligibility for FEMA Hazard Mitigation Grant Program funding for pre- or post-disaster efforts through collaboration with local governments, levee districts, and USACE.
  - Have a “shelf ready” project that could be implemented quickly under the PL 84-99 program if or when a severe flood event occurs and causes significant levee damages.
- F** Determine land ownership, land rights, and easements along the existing levee as well as potential setback alignments prior to a flood event.
- G** Engage landowners and vulnerable entities pre-flood about the impacts of potential levee failure to them and their land. Illustrate the benefits of a setback to identify mutually beneficial setback scenarios if a disaster were to occur, or even proactively pre-disaster.
- H** Develop a “Participation Option” program/tool to help align and orient landowners prior to a flood event as a means to help determine which setback sites align best with landowner interests. While the form of the Participation Option can vary, it is generally an agreement between the landowner and levee sponsor that confirms the landowners’ willingness to consider a levee setback assuming terms and conditions determined at a later time are agreeable. Such an agreement suggests a willingness by both parties that a setback levee on their land is a viable discussion point should the need arise due to disaster or repetitive losses.
- I** Proactively develop conceptual engineering design templates for locations identified for potential setback by the local sponsor and partners.

# Pursuing a Levee Setback Post-Disaster

Figure 11 illustrates the key components of a levee setback pursued under PL 84-99. The interwoven project components highlight that in a post-disaster rehabilitation, many efforts are conducted simultaneously and out of the typical order generally followed in a pre-disaster (proactive) setback effort. This amplifies the need for strong project management and continued communication among project partners.

An overview of the eight project components are described below, with specific action items detailed in the following pages.



**Figure 11: Interwoven project components of post-disaster levee setback**

## INITIATE POST-FLOOD RECOVERY EFFORTS

Following a disaster, levee damage or breach, USACE and levee sponsors initiate post-flood recovery efforts through damage assessments and evaluation of levee rehabilitation alternatives. Under PL 84-99, USACE provides rehabilitation assistance to construct the least cost, technically feasible rehabilitation alternative to restore pre-disaster flood protection. Additional improvements can be made at the levee sponsor's expense.

## CREATE AN INTER-AGENCY WORK GROUP

Upon the decision to pursue a levee setback alternative, establishing an inter-agency work group is critical to the project's success. The inter-agency work group provides all project partners a voice and a shared understanding of the roles and procedures of each agency involved in the project.

## PROJECT MANAGEMENT

Due to the accelerated and interwoven nature of project development, project management is a necessary component of a large-scale levee setback project. Regular coordination and collaboration among project partners has significant positive impacts on the project, including the development of a master project management plan that outlines project goals and milestones and identifies what project elements are contingent on other elements. For example, design informs real estate requirements, which in turn informs sponsor funding needs and influences the construction schedule. Project management, through routine coordination meetings, builds trusted working relationships between project partners and accountability for project action items.

## FUNDING

Closely tied to real estate components of a large-scale levee setback, the funding approach can make or break a project. USACE covers the cost of planning, design, and construction, while levee sponsors are responsible for the real estate requirements (described in the real estate section), borrow material sourcing and utility relocations. These costs are often beyond the means of levee sponsors, making the need to identify and secure adequate funding, in a short time frame, a major hurdle to overcome.

## REAL ESTATE

Real estate can be one of the most critical and time-consuming efforts related to a large-scale levee setback. For PL 84-99 levee rehabilitation efforts, the levee sponsor is responsible for acquiring lands for the new levee footprint, securing borrow material (the material used to construct the new levee), and utility relocations (as applicable). Though not a USACE requirement, levee sponsors may also decide to compensate landowners for the new riverward lands from those who no longer wish to own riverward lands and then develop a plan for the long-term management of these lands. Voluntary participation by affected landowners may determine the feasibility of a levee setback alternative.

## DESIGN

Under its PL 84-99 authority, USACE will conduct the planning and design for the least cost, technically feasible rehabilitation alternative.

## PERMITTING

Permitting and environmental law compliance should be initiated and coordinated early on in a large-scale levee setback project. Inter-agency coordination is critical to efficient permitting and environmental law compliance activities, as there are opportunities to eliminate redundant efforts among project partners. Under its PL 84-99 authority, USACE serves as the lead agency for permitting and environmental law compliance related to the setback levee. Due to the emergency nature of PL 84-99, the permitting process may not be completed until after the setback levee is constructed.

## CONSTRUCTION

Under its PL 84-99 authority, USACE will construct the least cost, technically feasible rehabilitation alternative. Construction is usually the culmination of many preceding moving parts; however, in a disaster-recovery project, the path to construction is accelerated and can begin before the design, permitting, and land acquisition are complete to restore the system and reduce risk to lives and assets. The levee setback construction process and schedule are most significantly impacted by real estate acquisition, the availability and proximity of suitable borrow materials, and weather conditions.

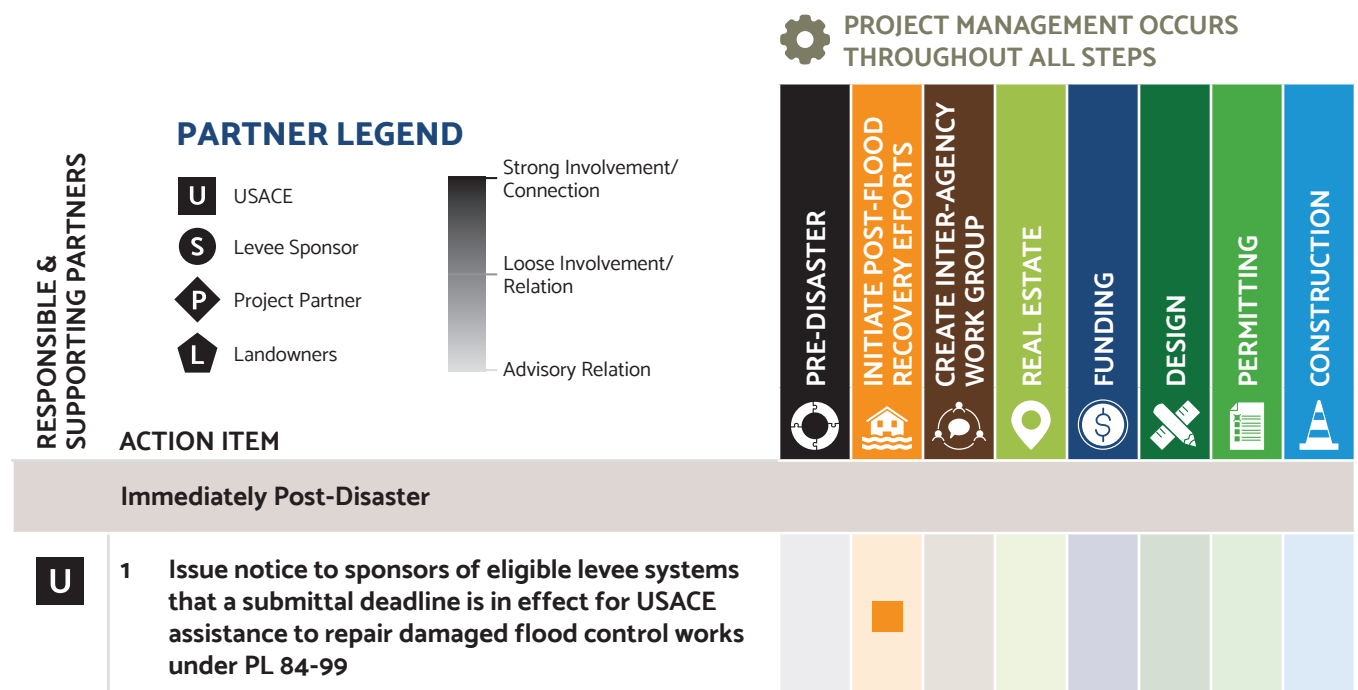


# A Step-by-Step Guide

The following list details the key action items identified in the L-536 setback project process. The action items are listed as chronologically as possible; however, because of the compressed and interwoven project process, many of these action items occur concurrently. In addition, depending on a project’s specific circumstances, they could occur in a different sequence or follow different timelines.

The actions, responsible and supporting partners, and related project components are identified below. These are all items that include lessons learned—actions that would have been helpful to know during the process. While pre-disaster planning is strongly encouraged, the following list assumes that minimal collaboration or work has been completed pre-disaster. Action items that could be initiated (or completed) pre-disaster are identified.

Additional best practices, timeline variables, and project resources for each project component are summarized in the pages following the list.



RESPONSIBLE & SUPPORTING PARTNERS	ACTION ITEM	PRE-DISASTER	INITIATE POST-FLOOD RECOVERY EFFORTS	CREATE INTER-AGENCY WORK GROUP	REAL ESTATE	FUNDING	DESIGN	PERMITTING	CONSTRUCTION
<b>S</b>	<p><b>2 Apply for rehabilitation assistance within 30 calendar days from the date the floodwaters recede fully to back within the bank</b></p> <ul style="list-style-type: none"> <li>» Indicate a setback may be desired, if determined to be technically feasible</li> </ul>								
<b>U</b>	<p><b>3 Conduct damage assessment, develop Project Information Report (PIR), and conduct economic analysis for PL 84-99 emergency assistance in accordance with current regulations</b></p> <ul style="list-style-type: none"> <li>» Evaluate repair alternatives, determining which is the least cost, technically feasible alternative</li> <li>» Inform levee sponsors of real estate acquisition required to support a levee setback</li> </ul>								
<b>U</b>	<p><b>Planning/Design Milestone: PIR Initiated for Least Cost, Technically Feasible Determination</b></p>								
<b>S</b>	<ul style="list-style-type: none"> <li>» Determine preliminary cost of in-line repairs</li> <li>» Determine preliminary least cost, technically feasible alternative</li> </ul>								
<b>U</b>									
<b>S</b>									
<b>L</b>	<p><b>4 Initiate real estate needs assessment</b></p> <ul style="list-style-type: none"> <li>» Determine potential levee setback alignment</li> <li>» Confirm land ownership along existing and potential alignment</li> <li>» If there is a strong likelihood of setback rehabilitation alternative, initiate title search</li> <li>» Reach out to affected or potentially affected landowners to determine willingness to participate in setback (or activate the “Participation Option”)</li> <li>» Consider hiring a landowner outreach consultant</li> </ul>								

RESPONSIBLE & SUPPORTING PARTNERS

ACTION ITEM		PRE-DISASTER	INITIATE POST-FLOOD RECOVERY EFFORTS	CREATE INTER-AGENCY WORK GROUP	REAL ESTATE	FUNDING	DESIGN	PERMITTING	CONSTRUCTION
<p>U</p> <p>S</p>	<p><b>5 Initiate funding needs assessment</b></p> <ul style="list-style-type: none"> <li>» For levee footprints (old and new)</li> <li>» For borrow material</li> <li>» For utility impacts</li> <li>» For new riverward lands (depending on landowner needs)</li> </ul>								
	<p>U</p> <p>S</p>	<p><b>6 Identify potential project partners</b></p>							
	<p>U</p> <p>S</p> <p>P</p> <p>L</p>	<p><b>7 Decide whether to pursue levee setback alternative</b></p> <ul style="list-style-type: none"> <li>» If not pursuing, proceed with in-line repairs</li> <li>» If pursuing:                             <ul style="list-style-type: none"> <li>- Create inter-agency work group (Steps 8-10)</li> <li>- Complete land title search to determine land ownership along setback alignment and lands to become riverward of the setback levee</li> </ul> </li> </ul>							
<p><b>One Month Post-Disaster</b></p>									
<p>U</p> <p>S</p>	<p><b>8 Organize an inter-agency work group to support project activities that are outside of USACE's authority, including but not limited to land acquisition and easements</b></p> <ul style="list-style-type: none"> <li>» Identify local, state, and federal agency representatives, NGOs, and consultants</li> <li>» Recruit new partners as needs are identified</li> </ul>								

RESPONSIBLE & SUPPORTING PARTNERS	ACTION ITEM	PRE-DISASTER	INITIATE POST-FLOOD RECOVERY EFFORTS	CREATE INTER-AGENCY WORK GROUP	REAL ESTATE	FUNDING	DESIGN	PERMITTING	CONSTRUCTION
U S P	<b>9 Establish group framework and communication protocol</b> <ul style="list-style-type: none"> <li>» Designate lead convener/facilitator for the inter-agency work group</li> <li>» Draft group charter to clarify purpose of group and shared vision</li> <li>» Schedule regular coordination meetings/calls</li> <li>» Identify a lead person for each agency involved that has leadership support to facilitate multiple processes within agencies</li> <li>» Create a shared, cloud-based project folder for file sharing</li> <li>» As possible, meet onsite with work group</li> </ul>			■					
U S P	<b>10 Create and maintain relationships with any established state or federal Inter-agency Levee Flood Task Force</b>			■					
U	<b>Design Milestone: Setback Alignments Identified and Communicated with Levee District</b> <ul style="list-style-type: none"> <li>» Determine support for potential setback</li> <li>» Identify requirements for potential levee setback project</li> <li>» Finalize PIR report</li> </ul>					■			
U S P L	<b>11 Identify quantity of private acres needed for project</b> <ul style="list-style-type: none"> <li>» Levee footprints (old and new)</li> <li>» Riverward lands</li> <li>» Mitigation lands (if applicable)</li> </ul> <p><b>TIP!</b>                      Consider hiring a landowner outreach consultant to support real estate processes.</p>				■	■			

	ACTION ITEM	PRE-DISASTER	INITIATE POST-FLOOD RECOVERY EFFORTS	CREATE INTER-AGENCY WORK GROUP	REAL ESTATE	FUNDING	DESIGN	PERMITTING	CONSTRUCTION
<p><b>U</b></p> <p><b>S</b></p> <p><b>P</b></p> <p><b>L</b></p>	<p><b>12 Identify potential real estate conflicts and determine if they affect setback viability or timeline</b></p> <ul style="list-style-type: none"> <li>» Verify willingness of impacted landowners to participate and ability to acquire necessary LERRDs; decide whether to continue pursuing levee setback</li> <li>» Any required mitigation acres for impacts to conservations easements</li> <li>» Hazardous and toxic waste sites, cultural/historic sites, and environmental concerns</li> <li>» Impacts to utilities, pumps, public services, pipelines, roads, and rights-of-way</li> </ul>	■			■	■	■		
<p><b>U</b></p> <p><b>S</b></p> <p><b>P</b></p>	<p><b>13 Identify funding needs for:</b></p> <ul style="list-style-type: none"> <li>» Levee footprints (old and new)</li> <li>» Riverward lands, if requested by landowners</li> <li>» Mitigation acres (if needed)</li> <li>» Utility impacts (if needed)</li> <li>» Borrow material</li> <li>» Construction (if not under PL 84-99)</li> <li>» Real estate consultant (optional)</li> <li>» Grant writer (optional)</li> </ul> <p><b>TIP!</b>  <b>There are a variety of expenses related to the real estate process that levee sponsors are responsible for, such as boundary surveys, title searches, appraisals, and acquisitions. Project partners may be available to provide financial assistance for such expenses.</b></p>	■			■	■			■

RESPONSIBLE & SUPPORTING PARTNERS

ACTION ITEM

	PRE-DISASTER	INITIATE POST-FLOOD RECOVERY EFFORTS	CREATE INTER-AGENCY WORK GROUP	REAL ESTATE	FUNDING	DESIGN	PERMITTING	CONSTRUCTION
<p><b>U</b></p> <p><b>S</b></p> <p><b>P</b></p> <p><b>14 Develop funding approach (See resources on page 4-18)</b></p> <ul style="list-style-type: none"> <li>» Confirm all local, state, and federal disaster-, mitigation-, and environmental-related funding resources</li> <li>» Investigate and coordinate with any grant programs and NGOs that may support the effort</li> <li>» Evaluate viability of funding strategy, decide whether to continue pursuing levee setback</li> </ul> <p><b>TIP!</b> Consider enlisting a grant writer to provide insight on potential funding sources, how funding sources could be complementary or in conflict, and support grant application development.</p>					■			
<p><b>U</b></p> <p><b>S</b></p> <p><b>P</b></p> <p><b>15 Develop a unified permitting strategy (See step 40)</b></p> <ul style="list-style-type: none"> <li>» Identify the lead permitting agency</li> <li>» Initiate environmental law compliance activities and coordination early (SHPO/Tribes, USFWS, EPA, floodplain administrator, etc.)</li> </ul>							■	
<p><b>U</b></p> <p><b>S</b></p> <p><b>P</b></p> <p><b>16 Establish timelines/schedules</b></p> <ul style="list-style-type: none"> <li>» Create and update project schedule, regularly sharing with inter-agency work group; consider using web-based software for group members to access/view anytime</li> <li>» Identify critical paths for each agency, communicate any slack in schedule</li> </ul>				■	■	■		■
<p><b>U</b></p> <p><b>S</b></p> <p><b>F</b></p> <p><b>17 Develop interim emergency preparedness plans for period without flood protection</b></p>						■		

RESPONSIBLE & SUPPORTING PARTNERS

ACTION ITEM		PRE-DISASTER	INITIATE POST-FLOOD RECOVERY EFFORTS	CREATE INTER-AGENCY WORK GROUP	REAL ESTATE	FUNDING	DESIGN	PERMITTING	CONSTRUCTION
<p><b>U</b></p> <p><b>S</b></p> <p><b>P</b></p>	<p><b>18 Conduct regular outreach and project updates</b></p> <ul style="list-style-type: none"> <li>» Provide regular updates to the inter-agency working group to maintain a transparent and collaborative process</li> <li>» Create a strategy to keep landowners aware of project progress</li> <li>» Inform and provide project updates to local community and political leaders</li> </ul> <p><b>TIP!</b>  <b>Levee sponsor communication with local community and political leaders is critical to project support and success.</b></p>			■					
	<p><b>19 Complete initial metes and bounds survey of impacted lands</b></p> <ul style="list-style-type: none"> <li>» Create maps based on survey data and preliminary alignment</li> <li>» Share results with project partners</li> </ul>	■			■		■		
	<p><b>20 Follow up with affected or potentially affected landowners</b></p> <ul style="list-style-type: none"> <li>» Discuss participation options (if in place)</li> <li>» Verify if landowners want to own or sell all or parts of impacted property</li> <li>» Confirm participation of impacted landowners; decide whether to continue pursuing levee setback</li> </ul>	■			■		■		
	<p><b>21 Gather legal descriptions and confirm legal ownerships</b></p>	■			■				

RESPONSIBLE & SUPPORTING PARTNERS	ACTION ITEM	PRE-DISASTER	INITIATE POST-FLOOD RECOVERY EFFORTS	CREATE INTER-AGENCY WORK GROUP	REAL ESTATE	FUNDING	DESIGN	PERMITTING	CONSTRUCTION
<b>U</b> <b>S</b> <b>P</b> <b>L</b>	<b>22 Confirm real estate to be acquired</b> » Categorize real estate: old levee footprint, new levee footprint, new riverward land, new landward land, and mitigation acres » Identify who will purchase each real estate category » Identify short- and long-term ownership and management » Identify needed access points (as applicable)	■			■	■			
	<b>23 If unsure of the value of lands to be acquired or need a third party assessment to address fairness concerns for landowners, contract a comparative market analysis to determine purchase price pending final appraisal</b> » Otherwise, if a baseline generic price isn't needed, initiate preliminary appraisals of real estate to be acquired	■			■	■			
	<b>24 Draft options to purchase real estate, present to landowners, collect signed options</b> » If applicable, landowners submit NRCS applications » If using an NRCS conservation easement, have landowners sign NRCS documentation to allow sharing of information with levee sponsor and project partners	■			■	■			
	<b>25 Work to secure funding for new levee footprint</b>	■			■	■			
	<b>26 Work to secure funding for riverward and/or landward lands, as requested by landowners</b>	■			■	■			



RESPONSIBLE & SUPPORTING PARTNERS	ACTION ITEM	PRE-DISASTER	INITIATE POST-FLOOD RECOVERY EFFORTS	CREATE INTER-AGENCY WORK GROUP	REAL ESTATE	FUNDING	DESIGN	PERMITTING	CONSTRUCTION
 	27 Work to secure funding for mitigation acres (if needed)								
 	28 Work to secure funding for utility impacts								
 	29 Work to secure funding for borrow material								
 	30 Work to secure funding for construction (if not under PL 84-99)								
 	31 Negotiate with title company for shared research, separate insurance								
<b>3-4 Months Post-Disaster</b>									
 	32 Initiate title work that can be shared among project partners » Order title search on new footprint, old footprint, and new riverward and landward lands								
  	33 Negotiate and secure necessary real estate » Determine if an agreeable land acquisition deal can be made; decide whether to continue pursuing levee setback								
	Planning/Design Milestone: Initial Cost Estimate Developed for Setback and In-Line Repairs Submitted for USACE Div/HQ Approval								
	Planning/Design Milestone: Setback Design								

RESPONSIBLE & SUPPORTING PARTNERS

ACTION ITEM

	PRE-DISASTER	INITIATE POST-FLOOD RECOVERY EFFORTS	CREATE INTER-AGENCY WORK GROUP	REAL ESTATE	FUNDING	DESIGN	PERMITTING	CONSTRUCTION
<p><b>U</b></p> <p><b>S</b></p> <p><b>34 Setback design</b></p> <ul style="list-style-type: none"> <li>» Create project area maps, include parcel ownership, public and conservation-owned lands, easements, utilities, rights-of-way, public services</li> <li>» Design milestones can include concept, 30%, 60%, 90%, and final designs, which can be coordinated with the sponsor</li> <li>» Assess interior drainage needs</li> <li>» Identify rights-of-way access needs</li> <li>» Identify building material quantities required for setback construction</li> </ul>								
<p><b>U</b></p> <p><b>S</b></p> <p><b>P</b></p> <p><b>L</b></p> <p><b>35 Borrow material identification and coordination</b></p> <ul style="list-style-type: none"> <li>» Utilize conservation lands through agreement with NRCS for dredge and borrow to limit cost to levee sponsor</li> <li>» Consider how to increase incidental environmental benefits</li> <li>» Consider post-construction rehabilitation requirements and permitting clearances, for borrow sites</li> <li>» Map and create a property owner database of available borrow sites</li> <li>» Propose using landowner ground for borrow and obtain clearance with NRCS (if applicable) or other agencies with agreements in place</li> <li>» Put agreements in place with private landowners to ensure borrow locations are available as a permitting mitigation strategy</li> </ul> <p><b>Tip!</b>  <b>Have contingency borrow areas identified in case current borrow sites do not contain enough suitable material.</b></p>								

RESPONSIBLE & SUPPORTING PARTNERS

ACTION ITEM		PRE-DISASTER	INITIATE POST-FLOOD RECOVERY EFFORTS	CREATE INTER-AGENCY WORK GROUP	REAL ESTATE	FUNDING	DESIGN	PERMITTING	CONSTRUCTION
<p><b>U</b></p> <p><b>S</b></p> <p><b>P</b></p>	<p><b>36 Utility coordination</b></p> <ul style="list-style-type: none"> <li>» Identify all utilities to be removed/relocated, or avoided, early in the process</li> <li>» Estimate the levee sponsor costs related to utilities</li> <li>» Share information and involve a wide variety of local interest, such as county commissioners, electrical co-ops, rural water systems, floodplain administrators, etc. of the design to avoid utility and infrastructure issues</li> </ul> <p><b>Tip!</b> Have a funding strategy to ensure impacts to utilities do not hinder the construction schedule.</p>	■			■	■	■	■	
<p><b>U</b></p> <p><b>S</b></p> <p><b>P</b></p>	<p><b>37 Infrastructure coordination</b></p> <ul style="list-style-type: none"> <li>» Identify vehicular and rail infrastructure required for replacement, relocation, and/or avoidance, early in the process</li> <li>» Identify levee sponsor costs associated with infrastructure</li> <li>» Establish an infrastructure task force, consisting of local, regional, state, and federal officials for assessing, coordinating, and funding infrastructure requirements</li> <li>» Identify access points over and back on the new levee to all landowners and interest-holders on riverward lands</li> </ul>	■				■			
<p><b>U</b></p> <p><b>S</b></p> <p><b>P</b></p>	<p><b>38 NRCS Administrative Action process if NRCS easements are impacted and mitigation is needed (as applicable)</b></p>	■			■	■		■	
<p><b>S</b></p> <p><b>L</b></p>	<p><b>39 Other impacted easements negotiated</b></p>	■			■				


















RESPONSIBLE & SUPPORTING PARTNERS

- U
- S
- P

ACTION ITEM

	PRE-DISASTER	INITIATE POST-FLOOD RECOVERY EFFORTS	CREATE INTER-AGENCY WORK GROUP	REAL ESTATE	FUNDING	DESIGN	PERMITTING	CONSTRUCTION
<p><b>40 Develop unified permitting strategy</b></p> <ul style="list-style-type: none"> <li>» Identify all water quality permitting needs based on design and potential construction methods</li> <li>» If other partner agencies (including potential granting agencies) need to complete the same coordination, align steps so all agencies' coordination is combined into one process</li> <li>» Determine if the project needs to initiate a new NEPA effort, or if the planned emergency actions can be tiered from an existing or programmatic NEPA document; the lead agency may have NEPA implementation regulations that allow for NEPA documentation to be developed concurrently with or after completing emergency actions; establish Cooperating Agencies as needed to streamline agency coordination</li> <li>» Identify project partner members with solid understanding or strong relationships with other agencies to lead permitting and agency coordination efforts</li> </ul>								
<p><b>41 Complete all needed permits/environmental law compliance activities</b></p> <ul style="list-style-type: none"> <li>» Revisit and update permitting strategy as needed</li> <li>» Complete all permitting required for construction, wetland fill, etc. prior to action.</li> </ul>								
<p><b>U Planning/Design Milestone: Project Goes to Bid, Construction Contractor Selected</b></p>								
<p><b>42 Construction contracting</b></p> <ul style="list-style-type: none"> <li>» Establish construction contracts with flexibility                             <ul style="list-style-type: none"> <li>- Prioritize cost-reimbursable contract model - flexibility in design to execution</li> </ul> </li> <li>» Consider contract allowing different courses of action, enabling construction to continue before all real estate issues are sorted out</li> </ul>								

RESPONSIBLE & SUPPORTING PARTNERS	ACTION ITEM	PRE-DISASTER	INITIATE POST-FLOOD RECOVERY EFFORTS	CREATE INTER-AGENCY WORK GROUP	REAL ESTATE	FUNDING	DESIGN	PERMITTING	CONSTRUCTION
<b>U</b> <b>S</b>	<b>43 Construction schedule</b> » Develop and maintain construction schedule; identify construction milestones, connecting them with overall project milestones (permitting, easements, etc.) » Continue regular project team coordination meetings » Consider weather-related construction contingencies (cold weather, heavy rains, etc.)								
	<b>44 Construct setback levee</b>								
<b>Project Milestone: Construction Substantially Complete</b>									
<b>U</b>	<b>45 Finalize permitting</b>								
<b>U</b> <b>S</b> <b>P</b>	<b>46 Conduct final land surveying for real estate</b>								
<b>S</b> <b>P</b>	<b>47 Complete due diligence, which includes but is not limited to final title search, final appraisals, amended options to purchase</b>								
<b>U</b> <b>S</b> <b>P</b>	<b>48 Finalize NRCS Administrative Action (if applicable)</b>								
<b>S</b> <b>P</b>	<b>49 NRCS shares anticipated closing dates on easements 30 days in advance and coordinates closing with Residual Interest Buyers</b>								
<b>S</b> <b>P</b>	<b>50 NRCS closes on easements, Residual Interest Buyer closes on the remaining interest on the land post-easement</b>								

RESPONSIBLE & SUPPORTING PARTNERS	ACTION ITEM	PRE-DISASTER	INITIATE POST-FLOOD RECOVERY EFFORTS	CREATE INTER-AGENCY WORK GROUP	REAL ESTATE	FUNDING	DESIGN	PERMITTING	CONSTRUCTION
									
 	51 Levee sponsor releases easement on old footprint (as applicable)								
 	52 Close mitigation acres with NRCS or other easement holders (if applicable)								
 	53 Update operation and maintenance (O&M) manuals to reflect changes to levee system								

# Summary of Project Components









## INITIATE POST-FLOOD RECOVERY EFFORTS

Following a disaster involving levee damage or a breach, USACE and levee sponsors initiate post-flood recovery efforts through damage assessments and evaluation of levee rehabilitation alternatives. Under PL 84-99, USACE provides rehabilitation assistance to construct the least cost, technically feasible rehabilitation alternative to restore pre-disaster flood protection. Additional improvements can be made at the levee sponsor's expense.

### **Recommended Best Practices**

There is tremendous value in pre-disaster planning because any activities that can be done pre-disaster save time and coordination efforts when time is of the essence post-disaster.

### **Timeline Variables**

The estimated 0-30 day time frame may be prolonged if high water conditions persist, limiting USACE's ability to access and assess damage.

### **Levee Sponsor Key Action Items**

- 1** Request rehabilitation assistance from USACE (Action Item 2)
- 2** Determine existing land ownership in potential realignments (Action Item 4)
- 3** Determine real estate needs (Action Item 11)

## Opportunities for Pre-Disaster Planning

Pre-disaster planning has the potential to significantly impact post-flood recovery efforts. The forethought of potential levee setback locations, documentation of potential benefits and system-wide impacts, and awareness of associated real estate and funding needs will provide a levee sponsor the information needed to advocate for a large-scale levee setback as an alternative, as well as enable USACE to give due consideration to levee setback rehabilitation alternatives.

- Document repetitive damages in a local HMP. (Pre-Disaster Action Item C)
- Identify and include conceptual levee setback alignments in a local HMP. (Pre-Disaster Action Items C, E)
- Verify land ownership along existing levee and potential setback alignments. (Pre-Disaster Action Item F)
- Understand real estate and funding needs associated with levee setback alignments. (Action Items 4, 5)
- Develop relationships with potential project partners. (Pre-Disaster Action Item A, Action Item 8)
- Develop relationships with potentially impacted landowners. (Pre-Disaster Action Item G)
- Develop a “Participation Option” program/tool to support landowner outreach post-flood. (Pre-Disaster Action Item H)

## Determining if a Large-Scale Levee Setback is a Viable Alternative

- Significant foundational and levee section damage preclude in-line repairs of the levee (least-cost alternative)
- Real estate is available for construction of a setback levee
- Adequate funding can be secured to acquire needed real estate
- Potentially supported by a history of repetitive damages
- Ancillary benefits, not limited to hydraulic, environment, and resilience



## CREATE AN INTER-AGENCY WORK GROUP

After deciding to pursue a levee setback alternative, establishing an inter-agency work group is critical to the project's success. The inter-agency work group provides all project partners a voice and a shared understanding of the roles and procedures of each agency involved in the project.

### **The composition of this group may include, but is not limited to:**

- Levee Sponsors
- USACE Division/District
- Local governments, municipalities, and counties
- State Emergency Management Agency
- State Conservation Department
- State Department of Natural Resources
- Federally-Directed Recovery Programs, such as the MRRP
- Non-governmental organizations (NGOs) with shared interests
- State or Tribal Historic Preservation Offices
- Regional Council of Governments or Planning Commissions
- US Department of Agriculture NRCS
- US Department of Commerce Economic Development Administration
- US Fish and Wildlife Service
- Federal Emergency Management Agency
- Consultants (as applicable)

## Levee Sponsor Key Action Items

- 1 Pursue inter-agency partnerships to support identified real estate and funding needs. (Action Item 8)

## Timeline Variables

Pre-disaster coordination with potential project partners will expedite the development of the inter-agency work group; however, as project needs evolve, the composition of this group may change through the course of the project.

## Opportunities for Pre-Disaster Planning

- Conduct levee damage/failure tabletop exercises that simulate disaster response and recovery as a part of levee emergency preparedness planning and hazard mitigation planning. These efforts increase pre-disaster partner collaboration and could identify opportunities for a levee setback project. (Pre-Disaster Action Item B)

“The biggest thing I would tell a levee sponsor post-flood if I had the opportunity is, to get as many other agencies at the table as you can and get an understanding where those agencies can and can’t help you. Start filling up your toolbox with different authorities, different people, different capabilities.”

– **Tony Krause, Chief of the US-ACE-Omaha Flood Risk and Floodplain Management Office**



## PROJECT MANAGEMENT

Regular coordination and collaboration among project partners has significant positive impacts on the project, including the development of a master project management plan that outlines project goals and milestones and identifies what project elements are contingent on other elements. For example, design informs real estate requirements, which in turn informs sponsor funding needs and influences the construction schedule. Project management, through routine coordination meetings, builds trusted working relationships between project partners and accountability for project action items.

### **Recommended Best Practices**

Building from the action item list provided on pages 4-05 - 4-12, develop a Project Management Plan (PMP) that compiles the requirements, schedules, and milestones of all project partners, specifically those associated with USACE and NRCS.

### **Timeline Variables**

Project management is an ongoing activity that can proactively identify project milestones and action items that are contingent on the progression or completion of other tasks.

## Levee Sponsor Key Action Items

Decide whether to continue pursuing levee setback after:

- 1** Verifying willingness of impacted landowners to participate (Action Items 12, 20)
- 2** Confirming ability to acquire necessary LERRDs (Action Item 12)
- 3** Evaluating viability of funding strategy (Action Item 14)

## Opportunities for Pre-Disaster Planning

- Identify real estate consultant to support real estate process. (Action Item 11)
- Identify grant expert to support funding pursuits and grant applications. (Action Item 14)
- Identify quantity of private acres needed for project. (Action Item 11)
- Identify potential real estate conflicts. (Action Item 12)
- Outline potential funding needs. (Action Item 13)
- Identify potential funding sources. (Action Item 14)

“The benefit of collaborative work, especially between government and non-governmental teams, is reducing the risk of boxing ideas in and not offering a variety of solutions that may be outside of the box. I think that this project was especially exciting or different because people were willing to voice opinions and not be afraid if they didn’t work out or if they sounded ridiculous, because of the strong gubernatorial and legislative support, that we knew the end product was possible, likely, and valued.”

– Jessica Catron, SEMA



## REAL ESTATE REQUIREMENTS

Real estate can be one of the most critical and time-consuming efforts related to a large-scale levee setback. For PL 84-99 levee rehabilitation efforts, the levee sponsor is responsible for acquiring lands for the new levee footprint, securing borrow material (the material used to construct the new levee), and utility relocations (as applicable). Though not a USACE requirement, levee sponsors may also decide to compensate landowners for the new riverward lands. Voluntary participation by affected landowners may determine the feasibility of a levee setback alternative.

### **Recommended Best Practices**

Determine impacted landowner needs early on, asking:

#### **What is motivating the landowners; money or time?**

- » Do landowners want pre-flood, levee-protected farmland values? If yes, NRCS and FHWA (and possibly FEMA if buyouts for home or business are needed) are likely the only viable funding sources.
- » Do landowners want to close sooner than 12-18 months on real estate interest sold? If so, values would be “as is” and would likely not include NRCS or FHWA.

#### **Do landowners want to continue owning lands?**

- » Regardless of whether an easement is purchased on their landward land, do landowners want to keep or sell their landward land?
- » Regardless of whether an easement is purchased on their riverward land, do landowners want to keep or sell their riverward land?

### **Timeline Variables**

Real estate is a sequence of events. While most steps fit within a fixed timeline, certain actions can and should be taken early. Acres to be purchased will be dependent on final survey but once the initial metes and bounds survey is done, start title searches. Many title issues can be resolved simultaneously with other more-sequentially based real estate activities.

## Levee Sponsor Key Action Items

- 1** Determine potential real estate conflicts and if they affect setback viability or timeline (Action Item 12)
- 2** Establish and maintain communication with impacted landowners (Action Items 4, 8, 12, 20, 33, 35, 50)
- 3** Work with USACE to conduct initial metes and bound surveys of impacted lands, share results with project partners (Action Item 19)
- 4** Confirm real estate to be acquired (Action Item 22)
- 5** Initiate title work that can be shared with project partners (Action Item 36)
- 6** Identify and coordinate borrow material (Action Item 35)

NRCS conservation easement purchases typically take between 12-18 months to complete. If an entity is going to purchase the residual interest, they typically have to wait until the NRCS finishes their easement acquisition.

## Opportunities for Pre-Disaster Planning

- Confirm ownership along existing alignment and potential setback alignments. (Action Item 4)
- Identify real estate consultant to support landowner outreach and real estate process. (Action Item 11) Ideally, the purchaser of any residual interest conducts the real estate process in concert with partners.
- Identify quantity of private acres needed for project. (Action Item 11)
- Identify potential real estate conflicts. (Action Item 12)

## Other Considerations

- The land that was beneath the old footprint has limited use because it is narrow in shape. Although it is not a requirement to purchase this land, having a ribbon of land with multiple ownerships creates access and management issues.
- Access to new riverward land needs to be determined. Working from pre-existing public rights-of-way is best, and requires communication with the local road commissioners.
- If NRCS is used to purchase an easement, access to each easement (regardless of riverward or landward) must also be identified prior to final surveys.





## FUNDING APPROACH

Closely tied to the real estate components of a large-scale levee setback, the funding approach can make or break a project. USACE covers the cost of planning, design, and construction, while levee sponsors are responsible for the real estate requirements (described in the real estate section), borrow material sourcing, and utility relocations. These costs are often beyond the means of levee sponsors, making the need to identify and secure adequate funding, in a short time frame, a major hurdle to overcome.

### Recommended Best Practices

- Cast every hook you can for potential funding sources and be prepared to hear “no.” Keep trying.
- Consider enlisting the help of a grant writer who can provide insight on potential funding sources, how they can be complementary or in conflict with one another, and could support grant application development.
- Have a funding strategy for contingencies, like unforeseen utility expenses.

### Timeline Variables

Grant programs have their own timelines. Be cognizant of grant application due dates and anticipated award dates.

### Levee Sponsor Key Action Items

- 1** Identify funding needs and develop a funding strategy  
(Action Items 5, 13, 14)
- 2** Secure necessary funding (Action Items 25-30)

## Opportunities for Pre-Disaster Planning

- Outline potential funding needs. (Action Item 13)
- Identify potential funding sources. (Action Item 14)

LEGEND		WHAT THE FUNDS CAN BE USED FOR					
		NEW LEVEL FOOTPRINT	LANDOWNER COMPENSATION	MISCELLANEOUS NEEDS*	POTENTIAL MATCH DOLLARS		
<b>F</b>	Federal	<b>S</b>	State	<b>L</b>	Local	<b>N</b>	NGO
FUNDING TYPE	POTENTIAL FUNDING SOURCE						
<b>F</b>	USACE MRRP (or similar program)		■				
<b>F</b>	USACE General Investigations program			■			
<b>F</b>	FEMA Hazard Mitigation Grant Program (HMGP)		■				
<b>F</b>	FEMA Public Assistance		■				
<b>F</b>	US EDA Emergency Disaster Recovery Funds	■	■				
<b>F</b>	US HUD Community Development Block Grant - Disaster Recovery				■		
<b>F</b>	USDA Risk Management Agency		■				
<b>F</b>	USFWS		■		■		
<b>F</b>	Federal Highway Administration	■	■		■		
<b>F</b>	NRCS EWPP-FPE (if landowner wants pre-flood land valuation)		■				
<b>F</b>	NRCS ACEP		■				
<b>S</b>	State Emergency Management Agency	■	■	■	■		
<b>S</b>	Department of Transportation	■	■		■		
<b>S</b>	Department of Natural Resources or Conservation		■	■	■		
<b>L</b>	Regional Council of Governments			■			
<b>L N</b>	Conservation organizations and local land trusts (examples: The Nature Conservancy, Ducks Unlimited, Izaak Walton League, Theodore Roosevelt Conservation Partnership)		■	■	■		

\* Flood risk mitigation studies, real estate due diligence (title work, appraisals, surveys, environmental assessments), utility removal/relocation, construction, grant writing.



## PERMITTING

Permitting and environmental law compliance should be initiated and coordinated early on in a large-scale levee setback project. Inter-agency coordination is critical to efficient permitting and environmental law compliance activities, as there are opportunities to eliminate redundant efforts among project partners. Under its PL 84-99 authority, USACE serves as the lead agency for permitting and environmental law compliance related to the setback levee. Due to the emergency nature of PL 84-99, the permitting process may not be completed until after the setback levee is constructed.

### **Environmental Law Compliance and Coordination for Levee Setback**

#### **National Environmental Policy Act (NEPA)**

- Establish partners as Cooperating Agencies, as applicable
- Tier from programmatic NEPA documents, if possible

#### **Clean Water Act**

- Prepare 404 permit application and begin USACE Regulatory coordination (not necessary if USACE is doing the construction) and prepare 404(b)(1) report
- Obtain 401 water quality certification from applicable state agency ASAP
- A project with self-mitigating features (e.g., borrow pit wetlands) results in easier paperwork and analysis

#### **Endangered Species Act (ESA)**

- Engage USFWS immediately for consultation at the beginning of the effort
- Endangered Species Act emergency consultation may be initiated immediately after an emergency
- Prepare Biological Assessment, follow USFWS conservation measures during construction

### **Migratory Bird Treaty Act**

- Coordinate with USFWS before any tree removal
- May need to conduct nesting surveys, establish tree removal avoidance time frames and/or nesting tree distance buffers prior to/during construction

### **Fish and Wildlife Coordination Act (FWCA)**

- Ensure close coordination with applicable state natural resource agencies
- Ensure close coordination between USFWS and state natural resource agencies

### **National Historic Preservation Act Section 106 (NHPA):**

- Immediately initiate coordination with SHPO and tribes
- Immediately initiate coordination for NHPA Section 106
- Initiate 106 emergency coordination within 30 days following flood event, if necessary

### **NRCS Easement Coordination**

- Immediately initiate coordination with NRCS if there are any easements in the project area or if any surrounding landowners are considering submitting an NRCS easement application
- Different coordination will be required for easement impacts vs easement

enhancement through actions like wetland creation from borrow pits

- If USACE is doing the work, verify if Regional MOU applies

### **Federal/state conservation land**

- Immediately initiate coordination with any federal or state conservation entities that own land within/adjacent to the project area
- Different coordination will be required for conservation land impacts vs conservation land enhancement through actions like wetland creation from borrow pits

### **Contractor obtains needed construction permits prior to work**

- National Pollutant Discharge Elimination System (NPDES) Permit
- Depending on design or construction methods, check with state water quality regulatory agency for any additional permits that may be required

### **Other environmental laws**

- Specific environmental laws not listed here may apply to other projects across the country
- The lead federal agency involved in the project should have the list of laws to ensure compliance



## PERMITTING (CONTINUED)

### Recommended Best Practices

- Initiate permitting collaboration early to prevent redundant efforts of multiple agencies. (Action Item 15)
- Identify project partner members with solid understanding or strong relationships with other agencies to lead permitting and agency coordination effort. (Action Item 40)

### Timeline Variables

Regulatory agencies have their own processes and procedures. For example, USFWS and SHPO offices may need at least 30 days for review while state permit applications can take 60 days to review. Coordinate with these agencies early on to establish timeline expectations.

### Levee Sponsor Key Action Items

**1**

**USACE staff and/or the contractor will conduct the necessary permitting for levee setback construction; however, levee sponsors are responsible for any permitting requirements associated with utilities and infrastructure (Action Item 36)**

## Opportunities for Pre-Disaster Planning

- Inventory programmatic NEPA documents that could streamline new NEPA requirements.
- Inventory existing Clean Water Act General Permits, Regional General Permits, and/ or Nationwide Permits that may be applicable to future work.
- Understand various environmental law emergency provisions, be ready to invoke and take advantage if possible.
- Establish regulatory agency points of contact for future communication needs.
- Leverage USACE knowledge, documents, and points of contact for these and any other pre-disaster planning efforts.





## DESIGN

Under its PL 84-99 authority, USACE will conduct the planning and design for the least cost, technically feasible rehabilitation alternative.

### **Recommended Best Practices**

- Use existing topographic data (LiDAR) to review land topography and identify optimal alignments for setback.
- Develop flexible contract options to ensure flood protection is restored, regardless of whether real estate is secured for the setback footprint.
- Conduct geotechnical investigation prior to construction to proactively identify borrow material sites.

### **Timeline Variables**

Determining potential and optimal alignments for a levee setback requires time to complete geotechnical assessments and determine borrow material needs. The ability to complete geotechnical assessments post-disaster may be impacted by weather, ground conditions to accommodate mobilization of equipment (i.e., extended high water conditions), ground conditions for drilling (i.e., frozen ground creates challenges), presence of actively growing crops at locations of proposed borings, and private landowner coordination for access. Pre-disaster planning could expedite the initial design stages. Lack of early utility coordination can also lead to schedule delays in later stages of the design process and through construction.

## Levee Sponsor Key Action Items

- 1** Work with USACE to determine potential levee setback alignment(s) (Action Items 4, 5)
- 2** Initiate utility coordination as soon as preliminary alignments are identified (Action Item 15)
- 3** Work with USACE to develop interim emergency preparedness plans for the period of time the area will be without flood protection (Action Item 17)



## Opportunities for Pre-Disaster Planning

- Identify levee segments where pre-disaster mitigation actions might provide long-term benefits. (Pre-Disaster Action Item D)
- Identify potential levee setback locations before disasters occur and include conceptual levee alignments in local HMPs. (Pre-Disaster Action Items D, E)
- Develop draft engineering design templates for locations identified for potential setback. (Pre-Disaster Action Item I)





## CONSTRUCTION

Under its PL 84-99 authority, USACE will construct the least cost, technically feasible rehabilitation alternative. Construction is usually the culmination of many preceding moving parts; however, in a disaster-recovery project, the path to construction is accelerated and can begin before the design, permitting, and land acquisition are complete to restore the system and reduce risk to lives and assets. The levee setback construction process and schedule are most significantly impacted by real estate acquisition, the availability and proximity of suitable borrow materials, and weather conditions.

### **Recommended Best Practices**

- Have contingency borrow areas identified in case current borrow sites do not contain enough suitable material.
- Be prepared to shift equipment to contingency borrow areas as needed.
- Consider weather-related construction contingencies (cold weather, heavy rains, etc.).

### **Timeline Variables**

Weather and availability of construction materials, including borrow, significantly influence construction timelines. Adaptability and problem-solving will be instrumental in keeping the project on schedule.

## Levee Sponsor Key Action Items

- 1 Following substantial completion of construction, complete real estate acquisition process (Action Item 50)
- 2 Update operation and maintenance (O&M) manuals to reflect changes to levee system (Action Item 51)

## Opportunities for Pre-Disaster Planning

- Develop potential setback alignments (Pre-Disaster Action F) and begin coordinating with any utility that could be impacted by future setback. There may be an opportunity to resolve potential utility conflicts prior to disaster.
- Identify borrow material quantity and quality. (Action Item 35)

