

SECTION I

INTRODUCTION

A. AUTHORITY AND GUIDANCE

The 2011 Mississippi River and Tributaries (MR&T) System Post-Flood Report (PFR) has been prepared in accordance with Engineering Regulation (ER) 1110-2-240 *Water Control Management* and ER 500-1-1 *Civil Emergency Management Program*. It presents the results of a comprehensive internal evaluation of the performance and operation of the MR&T flood risk management (FRM) system during the 2011 Flood. The US Army Corps of Engineers (Corps) Headquarters (HQ) and the Mississippi Valley Division (MVD) provided additional guidance and oversight. Where practical, this effort endeavored to support similar efforts being performed in response to flood events in Northwest Division, Great Lakes and Ohio River Division (LRD) and Southwestern Division (SWD) during 2011 as well as the OPORD 2011-50 Greater Mississippi Basin System Performance Assessment being conducted by HQUSACE .

B. PURPOSE

This PFR was prepared in response to the historic flooding within an extensive portion of the Mississippi River basin in 2011. The 2011 Flood tested the MR&T flood risk management system (FRMS) like no flood before. Stage and flow rates broke records at several locations, and for the first time, three floodways—Birds Point-New Madrid (BPNM) Floodway, the Morganza Floodway, and the Bonnet Carré Spillway—were operated during a single flood event to relieve the enormous and sustained stress on the levee system. Rare and extreme events such as the 2011 Flood can cause significant damage and hardship. However, they also present a unique opportunity to learn about the function, capability, and reliability of FRM systems, and the knowledge and science that guide pre-flood planning, operational decision-making processes and post-event recovery operations. The PFR effort was designed and conducted to capitalize on that opportunity.

The purposes of the overall PFR effort were to: 1) evaluate and document the performance of the MR&T System and how it was managed to reduce flood risks during the 2011 Flood; 2) develop a system-wide approach to sequencing repair efforts to effectively address risks and repair the system to pre-flood conditions; and 3) identify and recommend opportunities to improve the System's future performance.

This PFR has been produced to document information useful for future system management decisions, operations, and improvements, and to serve as a useful reference for future FRM efforts elsewhere. It describes the important preparation and response actions taken and the processes utilized before, during, and after the 2011 Flood. It also provides the contextual information needed to understand how the entire MR&T System was used to mitigate risks, how it performed during the 2011 Flood, and what is needed to prepare the system for future flood events. Although the report provides recommendations, it is not a decision or implementation document. Where a decision document would be needed to implement recommendations, studies to fully evaluate proposed changes and potential improvements will be required.

C. SCOPE

The PFR effort utilized existing information to assess the operation and performance of the system and identify opportunities for improvements. Recommendations for improvements and future studies have been developed and documented to aid MR&T System recovery efforts and future system operation, management, and flood fight activities. Although the effort concentrates on the MR&T System, it incorporates information related to the operation of reservoirs associated with the Ohio, Arkansas, Mississippi, and Missouri Rivers that influenced flows within the MR&T system.

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D. REPORT STRUCTURE

This report is structured to present information related to the MR&T System and the 2011 Flood in a format that meets the needs of a broad range of readers and future uses. Information is presented from both the individual component and system-based perspectives to allow readers to understand how each part of the system performed and was operated during the 2011 Flood and how it contributed to overall MR&T System performance. The main report provides the general information needed to understand the MR&T System and its operation and performance during the 2011 Flood and the post-flood recovery efforts necessary to restore and improve the system's capabilities. The supporting appendices contain detailed technical information to supplement the main report. The general content of each section is summarized as follows:

- **Section I** identifies the authorities and guidance applied to the effort and defines the intended purposes of the report and the technical and geographic scope of the evaluation effort.
- **Section II** provides the information needed to understand the MR&T System, its construction and operations and maintenance status and history, geographic extent, components, design capacity, and operational plan as well as the reasons it was constructed, the resources, and economies and infrastructure it protects.
- **Section III** characterizes the Flood and provides a summary of the meteorological conditions that contributed to the event. It also compares the Flood to other major floods to create the context for interpreting the analysis that is presented in subsequent sections.
- **Section IV** describes the response to the Flood, including pre-flood plans, emergency flood fight activities, operational decisions and communications/collaboration processes that were applied during the flood. It also describes the vulnerabilities in system components, plans, and processes that were revealed by the event.
- **Section V** describes the economic and environmental damages caused by the flood. It identifies the areas that were flooded and flood-related damages and economic damages prevented by the MR&T system and select components.
- **Section VI** describes and provides details on post-flood recovery activities related to the MR&T System. It summarizes damage inspection results including vulnerabilities of MR&T System components. It also summarizes a repair strategy that addresses the needs, prioritization, phasing, and sequencing efforts.
- **Section VII** summarizes the results of the MR&T System performance and operations assessment and the conclusions that can be made based on those results.
- **Section VIII** provides an overview of the creation of the Interagency Recovery Task Force (IRTF) and its participation in the recovery effort.
- **Section IX** presents overarching system recommendations and specific preliminary component team recommendations developed through the MR&T System assessment that should be considered to address potential vulnerabilities and improve structural and operational performance of the MR&T.
- **Plates** include detailed maps referenced in the report.
- **Appendices** provide additional details and technical information to support the analysis, conclusions and recommendations presented in the main report.