Mississippi Valley Division,
Regional Planning and Environment Division South

St. Tammany Parish, Louisiana Feasibility Study

Appendix E, Annex 1 – Adaptation

February 2024

CONTENTS

SECTION 1
ADAPTATION TRIGGERS, TRACKING, AND STRATEGIES

The main report and associated appendices detail how the Recommended Plan will effectively reduce flood and coastal storm risks to the study area, but the Recommended Plan's effectiveness may change over time given sea level changes (SLC) and/or varying storm season intensities with a warming climate. While EP 1100-2-1 (USACE, 2019) is used to understand a project's overall hazard exposure by

SLC scenarios, it also shows how displaying terrain and expected future water level cross sections at critical transects across the study area can help understand the project's inundation exposure and potential trigger points. Trigger points can be thought of in two ways for this study: either a vertical (which applies to nonstructural and structural features) or horizontal (limited to nonstructural features) threshold exceedance or a point in time where action should be considered.

1.1 ADAPATION TRIGGERS

The predominant coastal flood risk defined in this study is from coastal storm surge, as detailed in Appendix E, Hydrology and Hydrologic. Coastal storm surge is the total water level from sources such as a coastal storm's surge, wave setup/runup, tides, and projected SLC. The latter is especially important for St. Tammany Parish and surrounding communities, which are relatively low lying along the most southern portions of the Parish.

This means small changes in elevated water levels could exponentially increase the inundation exposure area but would likely be limited to the most southern portion of the study area. The exponential increase in coastal inundation risk, where the extreme SLC (high rate) in this study's analysis – 1% annual exceedance probability (AEP) still water level (SWL) – coupled with the mean higher water tide (MHHW) is shown for the 100 years from the base year (2032). The difference is roughly two feet of total water level (from 6.5 to 8.5 feet NAD88).

In Tables 1 and 2 the locations and threshold have been identified based on current gauge locations that are actively monitored using the trigger threshold of SLC greater than the intermediate rate based on calendar year which would mean the Recommended Plan may be less effective in reducing coastal storm risk. Additional gauge locations may be added during construction activities and O&M.

Table 1

Lake Pontchartrain at Mandeville Gauge (ID: 85575) Trigger (Western Portion of the Study Area)	
Years	Elevation NAVD 88 feet
2025	0.8
2026	0.8
2027	0.9
2032	1.0

Table 2

Rigolets at Hwy 90 at Slidell Gauge Trigger (Eastern Portion of the Study Area)	
Years	Elevation NAVD 88 feet
2025	0.6
2026	0.6
2027	0.6
2032	0.8

1.2 ADAPATION TRACKING AND STRATEGY

If the triggers are met, the NFS will contact USACE for notification. USACE would determine if significantly changed conditions have been identified and reevaluation of the Recommended Plan is required.

1.3 SUMMARY

Based on the guidance from USACE and data from the available tools, the STPFS can identify climate change risks based on specific project features. Table E:11-1 summarizes how a specific project feature may be triggered by a climate change variable, which then produces a hazardous and harmful impact to the community.

Table E:11-1. Climate Risks Features and Outcomes

Feature or Measure	Trigger	Hazard	Harm	Qualitative Likelihood
Levee	-Increased precipitation -Land subsidence	-Areas subject to induced flooding may change with sea level rise. The recommended plan and induced flooding analysis are based on 2.7 feet of relative sea level rise. -Future flood volumes may be larger than present -Large flood volumes may occur more frequently -Extent and duration of coastal inundation may be greater than present -Land loss rates in southern Louisiana may increase	-Flood waters (caused by riverine flooding and surge) may load the levee for longer durations, and more frequently, potentially compromising integrity of the flood control feature -With increasing land loss rates and coastlines receding, location of the flood control feature may be more exposed to coastal surge and wave events	High Likelihood
Floodwall	-Increased precipitation	-Areas subject to induced flooding may change with	-Flood waters (caused by riverine flooding and surge)	High Likelihood

	-Land subsidence	sea level rise. The recommended plan and induced flooding analysis are based on 2.7 feet of relative sea level rise. -Future flood volumes may be larger than present -Large flood volumes may occur more frequently -Extent and duration of coastal inundation may be greater than present -Land loss rates in southern Louisiana may increase	may load the levee for longer durations, and more frequently, potentially compromising integrity of the flood control feature -With increasing land loss rates and coastlines receding, location of the flood control feature may be more exposed to coastal surge and wave events	
Pump Stations	-Increased precipitation	-Future flood volumes and durations may be larger than present	-Designed pumping capacities may not be sufficient to accommodate increased volumetric runoff along with longer flood durations caused by larger precipitation event; this may in turn cause increased flooding to the protected side of flood control structures -Pump stations may be utilized more frequently requiring additional maintenance	Likely
Flood Control Gates	-Increased precipitation	-Future flood volumes and durations may be larger than present	-Designed pumping capacities may not be sufficient to accommodate	Likely

			increased volumetric runoff along with longer flood durations caused by larger precipitation events; this may in turn cause increased flooding to the protected side of flood control structures -Flood control gates may be utilized more frequently requiring additional maintenance	
Channel Excavation	-Increased precipitation -Land subsidence	-Surge may travel further inland as land loss rates in southern Louisiana increase	-With increasing land loss rates and coastlines receding, surge may travel further inland and impact the proposed excavated channel	-Low Likelihood
Channel Clearing and Snagging	-Increased precipitation -Land subsidence	-Surge may travel further inland as land loss rates in southern Louisiana increase	-With increasing land loss rates and coastlines receding, surge may travel further inland and impact the proposed cleared and snagged channel; a cleared and snagged channel may support sustaining surge height because surge and wave energy will not be dampened by the once present vegetative growth	-Low Likelihood
Diversion	-Increased precipitation	-Future flood volumes may be larger than present -Large flood volumes may occur more	-With increased flood volumes, and higher frequency of larger flood volumes, diversions would be loaded more	-Low Likelihood

		frequently	than anticipated in design. This may lead to unintentional flooding of structures near locations of diversions	
Nonstructural Plan Riverine	-Increased precipitation -Land subsidence -Relative sea level rise	Compound flooding	-With increased flood volume, current day projections of the necessary height to raise structures may not be adequate. -The flood plain will migrate upland above the 2.7 feet of relative sea level rise used for the recommended plan, and in some areas the level of risk reduction cannot be maintained.	-Likely
Nonstructural Plan Coastal	-Land subsidence -Relative sea level rise	-Land loss rates in southern Louisiana may increase -Risk increases with RSLR	-The level of risk reduction cannot be maintained above the 2.7 feet of sea level rise used for the recommended plan. -With increasing land loss rates and coastlines receding, surge may travel further inland and impact structures further inland than initially identified in the Non-Structural Plan.	-Likely

It should be noted two features in Table E:11-1, which summarizes the climate risk features and outcomes, will warrant an adaptive management (AM) plan to be formulated during PED. These features have been designated a High Likelihood qualitative rating and include

the levee and floodwall features encompassed in this study. With an AM plan in place, the uncertainty of how these project features will perform following construction regarding climate resiliency can be reduced.

1.4 CONCLUSION

The study seeks to improve flood risk in the parish. However, based on climate shifts, aspects of the study area are at risk of experiencing climate change impacts. USACE requires projects to evaluate and consider climate change impacts early in the project development process. The information gathered in this assessment produced a summary of climate risk identifiers that may be impacted by climate change to varying degrees, thus impacting communities.