2023 COASTAL MASTER PLAN

METRICS/SPECIAL INTERESTS

ATTACHMENT G2

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COASTAL PROTECTION AND
RESTORATION AUTHORITY
150 TERRACE AVENUE
BATON ROUGE, LA 70802
WWW.COASTAL.LA.GOV

COASTAL PROTECTION AND RESTORATION AUTHORITY

This document was developed in support of the 2023 Coastal Master Plan being prepared by the Coastal Protection and Restoration Authority (CPRA). CPRA was established by the Louisiana Legislature in response to Hurricanes Katrina and Rita through Act 8 of the First Extraordinary Session of 2005. Act 8 of the First Extraordinary Session of 2005 expanded the membership, duties, and responsibilities of CPRA and charged the new authority to develop and implement a comprehensive coastal protection plan, consisting of a master plan (revised every six years) and annual plans. CPRA's mandate is to develop, implement, and enforce a comprehensive coastal protection and restoration master plan.

CITATION

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This document was developed in support of the 2023 Coastal Master Plan under the guidance of the Master Plan Delivery Team:

- Coastal Protection and Restoration Authority (CPRA) of Louisiana – Stuart Brown, Ashley Cobb, Madeline LeBlanc Hatfield, Valencia Henderson, Krista Jankowski, David Lindquist, Sam Martin, and Eric White
- University of New Orleans – Denise Reed

EXECUTIVE SUMMARY

This report describes a set of metrics to address additional potential outcomes that can be used to evaluate the effects of the of the 2023 Coastal Master Plan. The 2023 Coastal Master Plan metrics diverge from those developed for the 2017 Coastal Master Plan. The 2017 Coastal Master Plan metrics combined many disparate factors and outputs into a single metric for evaluation. This often led to challenges in interpretation because it was not clear which component part of a particular metric was driving observed outcomes in the metric. It was also observed that the 2017 metrics were underutilized. More information on the 2017 metrics can be found in the 2017 Coastal Master Plan Attachment C4-11: Metrics. The reporting of metrics for the 2023 Coastal Master Plan is intended to support easier interpretation and accessibility for a broader user base.

Based on input from stakeholders and focus groups, the 2023 Coastal Master Plan metrics address evaluating the component parts of the 2017 Coastal Master Plan metrics. This approach utilized updated data sources for community boundaries and important resource areas and capitalized on model improvements that allowed for the extraction of additional parameters. The 2023 Coastal Master Plan metrics utilize available outputs from the Integrated Compartment Model (ICM) and the Coastal Louisiana Risk Assessment (CLARA) model at varying temporal frequencies and spatial scales.

Additionally, new metrics were added to address input from stakeholders and focus groups. This included expected annual structural damage (EASD) which removes the dollar value from damage estimates to provide a more equitable measure of equivalent structural damage.

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LIST OF ABBREVIATIONS

ACS ..... AMERICAN COMMUNITY SURVEY
AEP ..... ANNUAL EXCEEDANCE PROBABILITY
CLARA ..... COASTAL LOUISIANA RISK ASSESSMENT (MODEL)
CPRA ..... COASTAL PROTECTION AND RESTORATION AUTHORITY
EADD ..... EXPECTED ANNUAL DAMAGE IN DOLLARS
EASD ..... EXPECTED ANNUAL STRUCTURAL DAMAGE
FWA ..... FUTURE WITH ACTION
FWOA ..... FUTURE WITHOUT ACTION
HSI ..... HABITAT SUITABILITY INDEX
ICM ..... INTEGRATED COMPARTMENT MODEL
NAIP ..... NATIONAL AGRICULTURE IMAGERY PROGRAM
NLCD ..... NATIONAL LAND COVER DATABASE
PPSM ..... PEOPLE PER SQUARE MILE

1.0 INTRODUCTION

1.1 BACKGROUND AND PURPOSE

Many of the ways in which protection and restoration projects influence the landscape, ecosystems, and risk outcomes are derived directly from Coastal Master Plan modeling. These model outputs can be assessed within the context of the Master Plan Objectives to evaluate the potential impacts of different courses of decision-making on those objectives.

The objectives for the 2023 Coastal Master Plan are:

- Flood Protection. Reduce economic losses from storm surge-based flooding to residential, public, industrial, and commercial infrastructure.
- Natural Processes. Promote a sustainable coastal ecosystem by harnessing the natural processes of the system.
- Coastal Habitats. Provide habitats suitable to support an array of commercial and recreational activities coastwide.
- Cultural Heritage. Sustain the unique cultural heritage of coastal Louisiana by protecting historic properties and traditional living cultures and their ties and relationships to the natural environment.
- Working Coast. Promote a viable working coast to support regionally and nationally important businesses and industries.

Some metrics reflect individual project effects and can be used to rank projects or formulate alternatives (i.e., to select groups of protection and restoration projects using a computer-based decision support software system, called the Planning Tool). Some metrics that assess individual project effects are tailored to either restoration or protection projects as they are based on aspects or outputs from ICM or CLARA modeling. Others, which use information from both the ICM and CLARA models, can only be used to compare alternatives. Metrics are calculated at different scales according to the nature of the input data and the aspect of the system they address. In many cases, even if a single coastwide value is reported in the Planning Tool, more detailed information (e.g., at the community scale) can be used to understand the patterns of change that are combined in the single value.

Because of the varied scales and timelines of metrics available for reporting, specific metric outputs are being made available through the 2023 Master Plan Data Viewer (https://mpdv.coastal.la.gov/) and the Data Access Portal (in development).

1.2 DETERMINING COMMUNITY BOUNDARIES

The 2023 Coastal Master Plan metrics use improved community boundaries as the basis of its analysis. Prior master plans used both risk regions for risk reporting and communities for other metric reporting.

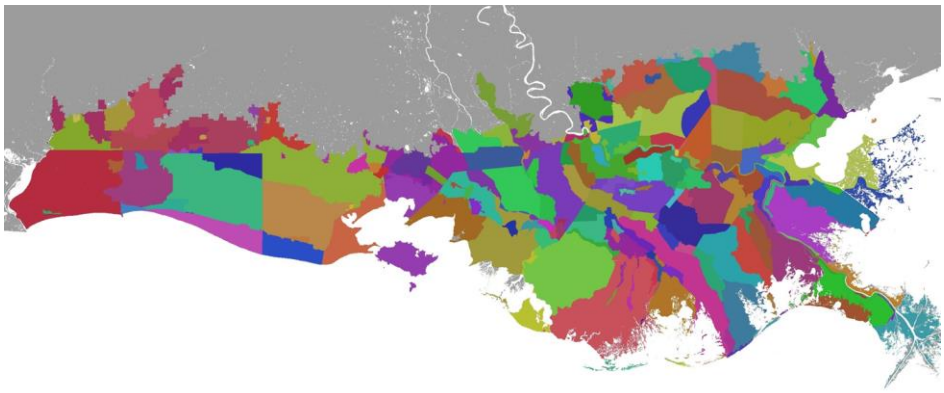

Figure 1: The 2023 Coastal Master Plan evaluated communities coastwide.

The community boundaries were determined based upon three factors. First, the geographical population center for each community was established. If that community was either legally incorporated with defined boundaries or determined by the U.S. Census Bureau to be a census designated place (an unincorporated, locally recognized, and named population center), the official U.S. Census Bureau boundary was used to determine the core portion of the community. In some cases, small rural settlements do not meet either of these criteria. In these instances, land use and land cover data as well as aerial photography was examined to determine the spatial extent of community development.

Secondly, population density data were used to extend the community boundaries where necessary. For the 2012 and 2017 Coastal Master Plans, a density of 1,000 people per square mile (ppsm) was used to establish the spatial extent of community development. Contiguous census blocks meeting this population density requirement were grouped together into population clusters. Population clusters connected by census blocks with at least 500 ppsm were also considered to be contiguous, provided the overall population cluster maintained the 1,000 ppsm requirement. In several cases, the extent of the population clusters extended beyond the official community boundaries. In these instances, the two datasets were merged to establish a more accurate, inclusive community boundary. To preserve continuity with the 2012 and 2017 Coastal Master Plans, these merged files were used as the base data layer for the 2023 community boundaries, which were updated using the 2010 census block and 2015-2019 American Community Survey (ACS) census block group population estimates. Block level data is only available with each decennial census release and was used here to refine the population clusters developed for previous master plans and reduce the level of

discontiguity found in previous delineation efforts.

Finally, a rigorous quality assurance and quality control process was used to review each of the updated community boundaries to assure that all contiguous developed land was incorporated into the updated community boundaries. The U.S. Department of Agriculture's National Agriculture Imagery Program (NAIP) imagery and the National Land Cover Database (NLCD) were used to identify locations within or contiguous to these communities with high, medium, and low density-developed land surface. These impervious layers include commercial and industrial areas, as well as public buildings within the communities, which may not have been included based solely on population count. These layers also included residential areas build after the ACS data was collected. These developed land layers were delineated and merged with the population center layer to establish the final community boundary.

RURAL NONSTRUCTURAL BOUNDARY DELINEATION

For nonstructural project definition, it is necessary to classify all locations within the 2023 Coastal Master Plan study area. To this end, the community boundary files were merged with the updated CLARA grid cells, the official parish boundary files, and ecoregion boundaries to assure that all locations within the study area are delineated and assigned a project definition. All CLARA grid cells that fell within a community boundary were assigned to that community. Those CLARA grid cells that fell outside of the community boundaries were assigned to a unique rural nonstructural project identifier based on both the parish and the 2023 Coastal Master Plan ecoregion. Each CLARA grid cell in these locations was assigned the respective nonstructural project identifier.

2.0 MASTER PLAN GOALS

The primary decision drivers for the project selection process in the master plan's Planning Tool are the goals of land loss reduction and storm surge-based flooding risk reduction.

2.1 LAND LOSS REDUCTION

Candidate restoration projects are evaluated based upon how much land they create and maintain over 50 years compared to a future without the master plan. The amount of land created and maintained under various scenarios when implementing different projects is an important discriminator in determining which restoration projects are worthwhile. Changes in land area can be observed through the 2023 Master Plan Data Viewer (https://mpdv.coastal.la.gov/). Details will be available for viewing and download at the ICM-Hydro compartment level in the Data Access Portal (in development).

2.2 STORM SURGE RISK REDUCTION

Candidate risk reduction projects are evaluated based on how well they reduce expected annual damage by storm surge-based flooding compared to a future without the master plan. The primary metric that can be used to evaluate the effectiveness of master plan projects at providing flood protection is the estimated risk of damages due to storm surge-based flooding. Risk of damages is reported as expected annual damage in dollars (EADD) as well as expected annual structural damage (EASD). Detailed discussions of the development and use of these metrics can be found in Attachment C11: 2023 Risk Model. The Master Plan Data Viewer (https://mpdv.coastal.la.gov/) reports out EADD and EASD by community areas coastwide and shows how the estimates of damage change through time both with and without the plan. For example, Figure 2 shows that, for the Bayou Cane area in Terrebonne Parish, under the lower scenario, at Year 50, 468 fewer equivalent structures would be damaged with the plan than without.

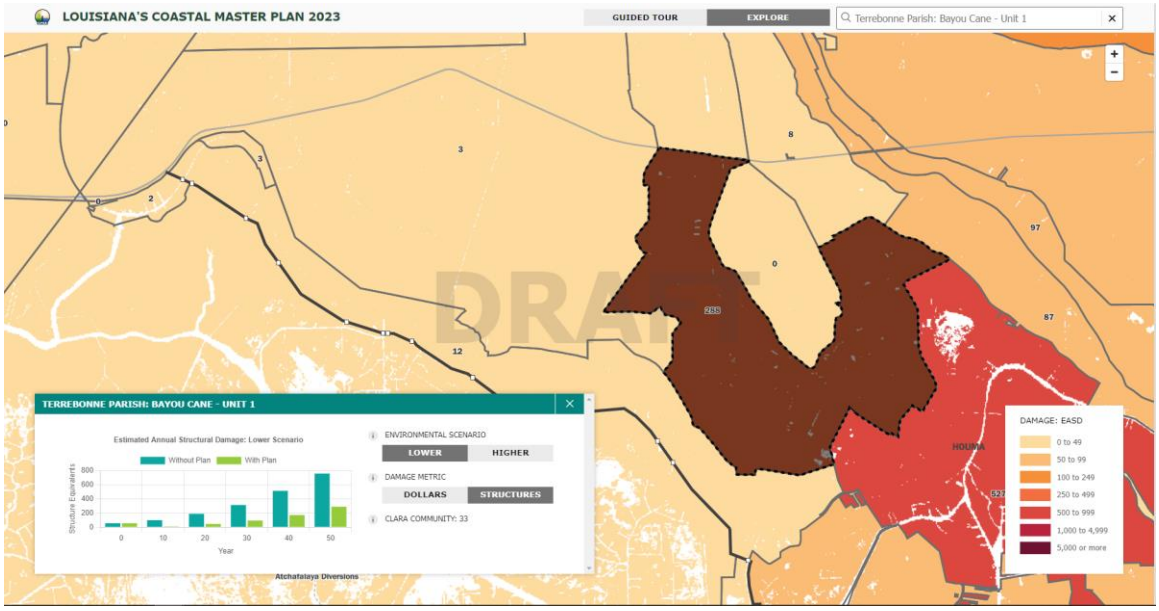

Figure 2: 2023 Master Plan Data Viewer can show estimated annual damages in terms of dollars and structures under the higher and lower scenarios both with and without the plan.

3.0 PLANNING TOOL METRICS

The predictive models generate outputs describing different aspects of changing risk and landscape/ecosystem character. These outputs are used in the form of metrics within the Planning Tool for three purposes:

- As decision drivers or constraints in the robust project selection process (land loss reduction and storm surge risk reduction),
- To check whether alternatives, i.e., robust groups of projects, are meeting the five master plan objectives,
- To report out on the effects of future coastal change both with and without the master plan projects in place.

These metrics can be broadly categorized into either restoration metrics or risk metrics as described in the following two tables.

Table 1: Restoration Metrics

2023 Metrics - Restoration	Description	Main Objective Addressed	Units
Land Area	The Net Effect Of A Project On Coastal Land Area Modeled By The ICM		Land Area (M2)
Sustainability Of Land	A Measure Of The Long-Term Change In Land Area In Relation To Land Change Throughout The 50 Years		Index
Use Of Natural Processes	Categorical Assessment Of The Ways In Which A Project Makes Use Of Natural Processes	Natural Processes	High, Medium, Or Low
Navigation - Inland Protection	Reflects How Projects Create Or Sustain Land Adjacent To Inland Navigation Channels (To Reduce Expose To Open Water)	Working Coast	Land Area
Navigation - River Steerage	A Measure Of How River Diversion Inflows Cause Cross Currents That Impact Navigation	Working Coast	Scaled Index
Navigation - Inland Shoaling	Reflects How Projects Increase Shoaling In Inland Navigable Channels, Through Sediment Deposition	Working Coast	Index Of Elevation Change

2023 Metrics - Restoration	Description	Main Objective Addressed	Units
Traditional Fishing - Resources	Reflects The Degree To Which Traditional Fishing Communities Still Have Access To Quality Habitat For The Species They Currently Harvest	Cultural Heritage	Index For All Relevant Species
Oil And Gas - Activities	Reflects The Degree To Which Projects Retain Wetlands In The Same Configuration As Currently Re: Oil And Gas Infrastructure	Working Coast	Index Of Land Change
Eastern Oyster HSI	Habitat Quality/Quantity	Coastal Habitats	Habitat Units
White Shrimp HSI (Small/Juvenile)	Habitat Quality/Quantity	Coastal Habitats	Habitat Units
Forested Wetlands	Extent Of Forested Wetlands	Coastal Habitats	Area (M2)
Agriculture - Sustainability	Reflects How Salinity Incursion Can Impact Key Crops, e.g., Sugar Cane, Soybeans	Working Coast	Salinity Index
Brown Shrimp Large HSI	Habitat Quality/Quantity	Coastal Habitats	Habitat Units
Brown Shrimp Small HSI	Habitat Quality/Quantity	Coastal Habitats	Habitat Units
White Shrimp Large His	Habitat Quality/Quantity	Coastal Habitats	Habitat Units
Crayfish HSI	Habitat Quality/Quantity	Coastal Habitats	Habitat Units
Gulf Menhaden Adult HSI	Habitat Quality/Quantity	Coastal Habitats	Habitat Units
Gulf Menhaden Juvenile HSI	Habitat Quality/Quantity	Coastal Habitats	Habitat Units
Spotted Seatrout Adult HSI	Habitat Quality/Quantity	Coastal Habitats	Habitat Units
Spotted Seatrout Juvenile HSI	Habitat Quality/Quantity	Coastal Habitats	Habitat Units
Largemouth Bass HSI	Habitat Quality/Quantity	Coastal Habitats	Habitat Units
American Alligator HSI	Habitat Quality/Quantity	Coastal Habitats	Habitat Units
Gadwall HSI	Habitat Quality/Quantity	Coastal Habitats	Habitat Units

2023 Metrics - Restoration	Description	Main Objective Addressed	Units
Mottled Duck HSI	Habitat Quality/Quantity	Coastal Habitats	Habitat Units
Seaside Sparrow HSI	Habitat Quality/Quantity	Coastal Habitats	Habitat Units
Brown Pelican HSI	Habitat Quality/Quantity	Coastal Habitats	Habitat Units
Bald Eagle HSI	Habitat Quality/Quantity	Coastal Habitats	Habitat Units
Habitat Diversity	Overall Reflection Of The Diversity Of Coastal Habitats Based On Vegetation Outputs	Coastal Habitats	E.G., Shannon Diversity Index
Land Loss Around Archeological Sites	Reflects Changing Land Area Around Sites Within The Coastal Wetlands, e.g., Shell Middens	Cultural Heritage	Land Area (M2) Or % Change

Table 2: Risk Metrics

2023 Metrics - Risk	Description	Main Objective Addressed	Units
Expected Annual Damage $	Expense that would occur in any given year if monetary damages from all flood probabilities and magnitudes were spread out equally over time	Flood Protection	$
Expected Annual Structural Damage	Reflects the % damage to individual structures accumulated across a community	Flood Protection	# damaged equivalent structures
Exposure to Flooding	Flooded structure counts for selected flood depths/Annual Exceedance Probability (AEP)	Flood Protection	# Structures by depth/ frequency
Navigation Channel Access	Reflects the construction of new gates, barriers etc. on navigable channels	Working Coast	Score
Traditional Fishing - Risk Reduction	Change in risk reduction with/without projects for selected fishing communities	Cultural Heritage	Index
Oil and Gas -	Change in risk reduction	Working	Index

2023 Metrics - Risk	Description	Main Objective Addressed	Units
Risk Reduction	with/without projects for selected oil and gas communities	Coast	
Demographics (age, sex, race, income)	Projected by census block group		# People
Agriculture - Risk Reduction	Change in risk reduction with/without projects for selected agricultural communities	Working Coast	Index
LMI	% Population with Low-Moderate Income		%
Current vs. Future Flood Risk	Changing in flood risk over time (expressed as $ or structures)	Flood Protection	Ratio
Historic Properties Inundated	Number of properties subject to 30 cm flooding for 2% AEP at Year 50	Cultural Heritage	# Properties
Flood Protection of Strategic Assets	Number of properties subject to 30 cm flooding for 1% AEP at Year 50, by asset class	Flood Protection	# Strategic assets by category

4.0 MASTER PLAN OBJECTIVES

Various outputs from the 2023 Coastal Master Plan models can be used individually or in concert with each other to evaluate the impacts of the master plan on its objectives. Details of previously developed metrics which combine outputs across various models can be found in the 2017 Coastal Master Plan Attachment C4-11: Metrics.

These combined many disparate factors and outputs into a single metric for evaluation. This often led to challenges in interpretation because it was not clear which component part of a particular metric was driving observed outcomes in the metric. It was also observed that the 2017 metrics were underutilized. The reporting of metrics for the 2023 Coastal Master Plan is intended to support easier interpretation and accessibility for a broader user base. Based on input from stakeholders and focus groups, the 2023 Coastal Master Plan metrics address evaluating the component parts of the 2017 Coastal Master Plan metrics.

4.1 FLOOD PROTECTION

Reduce economic losses from storm surge-based flooding to residential, public, industrial, and commercial infrastructure.

Evaluating effectiveness of the master plan in providing flood protection involves the comparison of risk as described in Section 2.0: Master Plan Goals. However, the estimated exposure to flood depths with varying Annual Exceedance Probabilities (AEP) is also an important metric that can show the extent and degree of flooding and the ability to reduce flood depths. The Master Plan Data Viewer can show these changes. For example, Figure 3 and Figure 4 show 0.2 AEP flood depths in Terrebonne Parish near the Morganza to the Gulf project. Comparing the depths both with and without the project indicates a reduction in flood depths of ten or more feet in some areas behind the project, indicating that the project does provide flood protection to those areas.

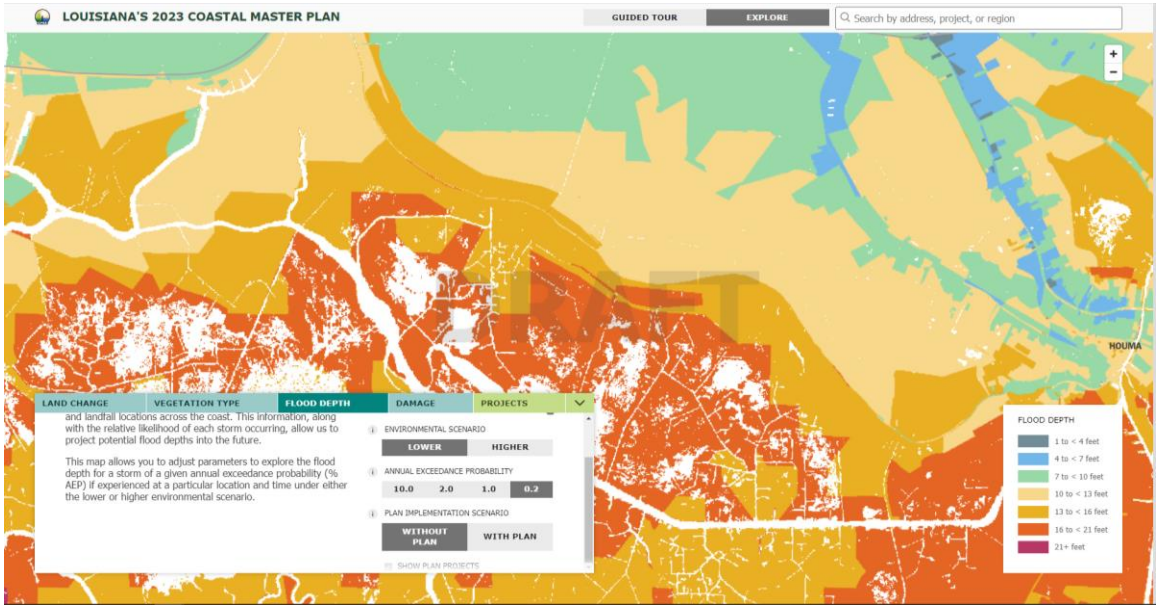

Figure 3: Year 50 Future Without Action (FWOA) 0.2 AEP Flood Depths.

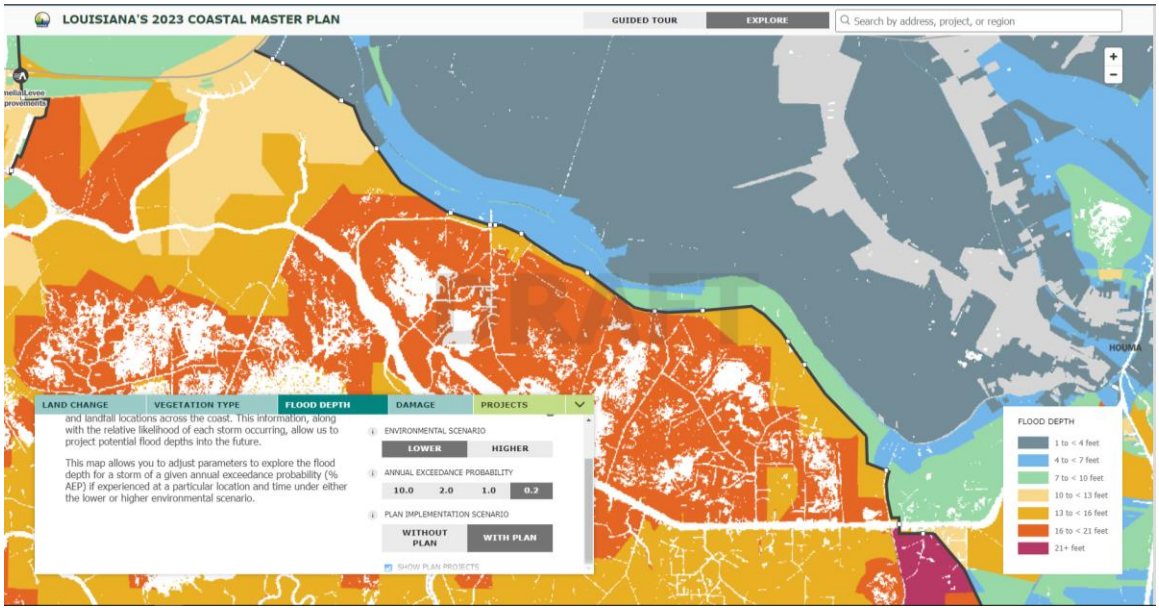

Figure 4: Year 50 Future With Action (FWA) 0.2 AEP Flood Depths.

4.2 NATURAL PROCESSES

Promote a sustainable coastal ecosystem by harnessing the natural processes of the system.

The second objective of the master plan is to promote a sustainable coastal ecosystem by harnessing the natural processes of the system. The use of natural processes has long been recognized as key to a sustainable system and for some decades this has been an important consideration in planning restoration and protection projects. In the mid-20th century several 'restoration' approaches sought to control hydrology, and the creation of drained polders, e.g., the Larose to Golden Meadow levee system, was a featured approach to coastal flood risk management. As the role of subsidence and sea level rise in changing the coastal landscape and increasing flood risk became clear there was a move away from 'management' or 'control'. This is illustrated in the Coast 2050 plan for restoration (released in 1998) and the planning of the Morganza to the Gulf project, also in the 1990s, with its use of environmental structures and closure only during high water. While few projects today work directly against natural processes, the inclusion of this objective in the master plan demonstrates Louisiana's overall approach to the coast.

In order to ensure that this objective is met in the project selection process, a Use of Natural Processes metric was developed for the 2017 Coastal Master Plan. This metric considered three aspects of how a project could influence natural processes:

- Degree to which a project type establishes natural process connections within the coast;
- Use of sediment from outside the coastal system; and
- Degree to which a project impedes existing natural process connections.

A single metric was produced that reflected the scale of the project as well as the natural process components of the project attributes and this was derived for both restoration and risk reduction projects. However, the overall index provided little insight into how the projects were influencing natural processes.

For the 2023 Coastal Master Plan, no 'polder-type' risk reduction projects are under consideration and any impairment to natural processes by risk reduction projects is considered essential to achieving their objectives. A simplified approach has been developed to allow the Planning Tool to assess the extent to which restoration alternatives, i.e., groups of projects, use natural processes.

How well different alternatives meet the natural processes objective will be assessed on the basis of the types of projects that are included in the alternatives. The process for identifying candidate projects for the master plan already rules out a lot of projects that hinder or impair natural processes. However, while few negatively impact natural processes, the degree to which natural processes are used or harnessed to achieve the project's goals varies.

There are several ways in which the effect of the dominant project characteristics on natural processes can be considered:

- Projects may directly influence natural processes to achieve restoration outcomes.

These include river diversion, hydrologic restoration projects, and 'landbridge' projects that seek to modulate tidal exchange within the estuary.

- Projects also vary in how sediment is moved within the system. River diversions use natural processes while many other project types use mechanical means to move sediment.
- The importance of sediment within the estuary as a limiting resource has long been recognized and some projects bring in new sediment from outside the estuary, thus mimicking the effect of natural process exchanges, while others use in-system borrow sources.
- Some projects achieve their goals by recreating natural landscape features which have deteriorated over time, e.g., ridge restoration, while others result in landscape structures which would not have been generated naturally, e.g., landbridge projects in the Delta Plain which cross the basins, or may 'harden' shorelines.

Projects will be categorized based on their dominant characteristics or approaches, recognizing that some projects have many attributes that work together to achieve project goals. The table below describes three categories of support for natural processes.

Table 3: Scoring Projects' Support for Natural Processes

Support for Natural Processes	**Rationale**	**Example Projects/Characteristics**
High	Projects rely heavily on natural processes to influence hydrology and sediment distribution	River diversions (without pumps) Hydrologic restoration projects using gravity drainage/tidal flows
Medium	Projects use out of system borrow sources and recreate natural features	Ridge restoration and marsh creation projects that use out of system borrow
Low	Projects recreate natural features but use in-system borrow sources, or rely heavily on pumps to influence hydrology, or create new features which would not have been naturally built	Hydrologic restoration using pumps; landbridges, ridge restoration and marsh creation using in-system borrow

For the 2023 Coastal Master Plan, projects were developed and designed to maximize their use of natural processes. Projects were assessed on their use of natural processes and assigned categorical variable of high, medium, or low.

4.3 COASTAL HABITATS

Provide habitats suitable to support an array of commercial and recreational activities coastwide.

The impacts of the master plan on coastal habitats can be evaluated by comparing the estimated vegetation type and habitat suitability for species of interest through time for a coast with and without the master plan. Figure 5 and Figure 6 show vegetation type differences across the coast at Year 50 both with and without the plan.

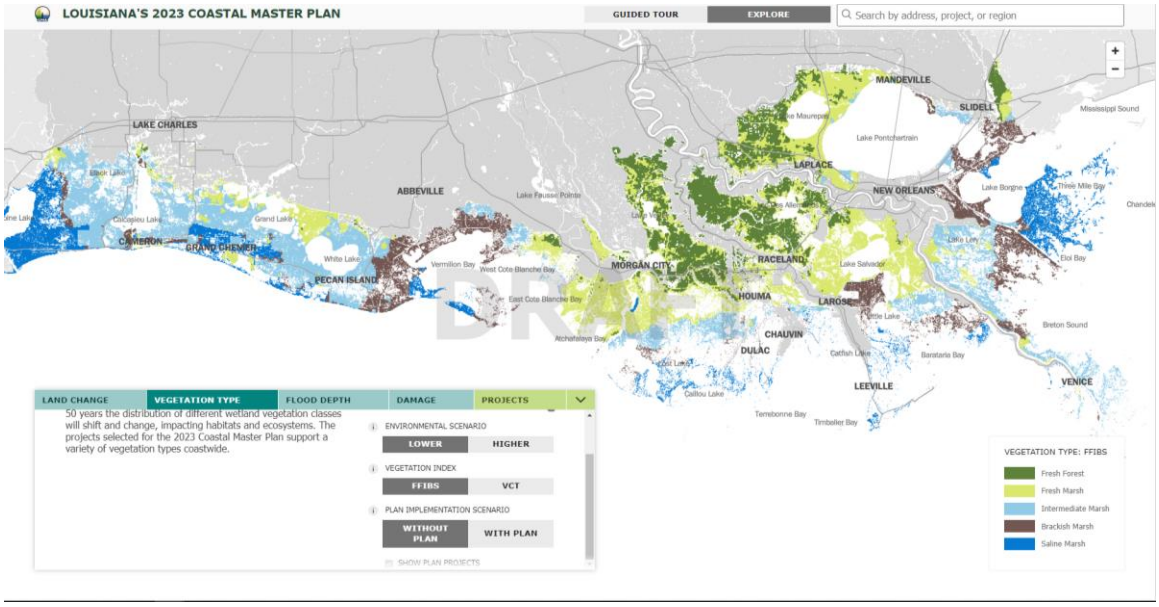

Figure 5: Coastwide Vegetation Types for Year 50 FWOA.

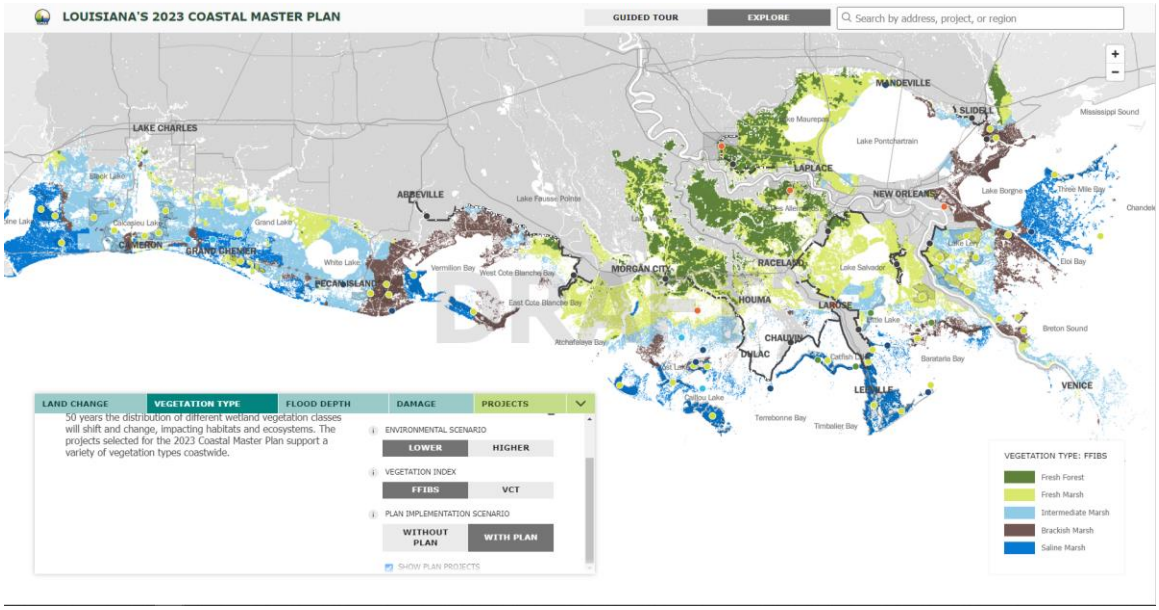

Figure 6: Coastwide Vegetation types for Year 50 with Master Plan.

Details on vegetation modeling can be found in Attachment C8: 2023 Modeling Wetland Vegetation and Morphology: ICM-LAVegMod and ICM-Morph. Also, data at the ICM-Hydro compartment level will be available for download from the Data Access Portal.

Additionally, Habitat Suitability Indices (HSI) were developed for species of interest listed in Table 1 These HSIs indicate how favorable conditions would be to support the species. For details see Attachment C10: 2023 Habitat Suitability Index (HSI) Model. Data at the ICM-Hydro compartment level will also be available for download from the Data Access Portal.

4.4 CULTURAL HERITAGE

Sustain the unique cultural heritage of coastal Louisiana by protecting historic properties and traditional living cultures and their ties and relationships to the natural environment.

Various outputs of the 2023 Coastal Master Plan modeling can be used to evaluate the plan's ability to support the preservation of Louisiana's unique cultural heritage. The impacts of coastal change on specific cultural and natural resources of concern for particular communities can tell how coastal change could affect that community. The 2017 Coastal Master Plan developed indices and scores that combined multiple outputs into single metrics for evaluation (see 2017's Attachment C4-11: Metrics). These were often found to be difficult to interpret and it was recommended that the 2023 Coastal Mater Plan focus on the component parts of these metrics for each community. These include: Support for Traditional Fishing Communities, Flood Protection of Historic Properties, and Land Loss

Around Archaeological Sites.

SUPPORT FOR TRADITIONAL FISHING COMMUNITIES

The ability of the master plan to Support Traditional Fishing Communities can be assessed by evaluating the impact of the master plan on resources used by each community as well as the exposure to storm risk experienced by each community. Table 4 shows specific resources used by various coastal Louisiana communities. The impact of the 2023 Coastal Master Plan can be assessed by evaluating HSIs for the resource use areas for these species of interest for each community under future without action (FWOA) and future with action (FWA).

Table 4: Resource use of Louisiana Communities[1]

Community	Resource Use Area (ecoregions)	Resource
Baldwin/Charenton	Teche/Vermilion/Bays, Atchafalaya Delta	Shrimp, Fish, and Blue Crab
Belle Chase	Lower Barataria - northeast, Lower Barataria - southeast, Lower Barataria - northeast barrier islands, Lower Barataria - southeast barrier islands, Lower Breton, Bird's Foot Delta	Shrimp, Fish, Oysters, and Blue Crab
Buras	Lower Barataria - northeast, Lower Barataria - southeast, Lower Barataria - northeast barrier islands, Lower Barataria - southeast barrier islands, Lower Breton, Bird's Foot Delta	Shrimp, Fish, Oysters, and Blue Crab
Cameron	Calcasieu, Sabine	Shrimp, Fish, Oysters, and Blue Crab
Chalmette/Arabi/ Meraux	Lake Pontchartrain, Lake Borgne, Chandeleur Sound	Shrimp, Oysters, and Blue Crab
Chauvin	Eastern Terrebonne, Western Terrebonne, Eastern Terrebonne - barrier islands, Western Terrebonne - barrier islands	Shrimp, Fish, Oysters, and Blue Crab
Cocodrie	Eastern Terrebonne, Western Terrebonne, Eastern Terrebonne - barrier islands, Western Terrebonne - barrier islands	Shrimp, Fish, Oysters, and Blue Crab
Delacroix	Upper Breton, Lower Breton, Chandeleur Sound	Shrimp, Fish, Oysters, and Blue Crab
Delcambre	Teche/Vermilion/Bays, Atchafalaya Delta	Shrimp, Fish, and Blue Crab

[1] Connection to the Coast: Linking Commercial Fishing Activity to Coastal Communities https://cims.coastal.louisiana.gov/RecordDetail.aspx?Root=0&sid=18351

Community	Resource Use Area (ecoregions)	Resource
Dulac	Eastern Terrebonne, Western Terrebonne, Eastern Terrebonne - barrier islands, Western Terrebonne - barrier islands	Shrimp, Fish, Oysters, and Blue Crab
Empire	Lower Barataria - northeast, Lower Barataria - southeast, Lower Barataria - northeast barrier islands, Lower Barataria - southeast barrier islands, Lower Breton, Bird's Foot Delta	Shrimp, Fish, Oysters, and Blue Crab
Gibson	Atchafalaya Basin, Upper Verret Basin, Verret	Wild Caught Crawfish
Grand Isle	Lower Barataria - northeast, Lower Barataria - southeast, Lower Barataria - northeast barrier islands, Lower Barataria - southeast barrier islands, Lower Barataria - northwest, Lower Barataria - southwest, Lower Barataria - southwest barrier islands	Shrimp, Fish, and Blue Crab
Grand Lake	Calcasieu, Sabine	Shrimp and Fish
Hackberry	Calcasieu, Sabine	Shrimp, Fish, Oysters, and Blue Crab
Isle de Jean Charles	Eastern Terrebonne, Western Terrebonne, Eastern Terrebonne - barrier islands, Western Terrebonne - barrier islands	Shrimp, Fish, Oysters, and Blue Crab
Lafitte/Jean Lafitte/Barataria	Mid-Barataria, Lower Barataria - northeast, Lower Barataria - southeast, Lower Barataria - northeast barrier islands, Lower Barataria - southeast barrier islands, Lower Barataria - northwest, Lower Barataria - southwest, Lower Barataria - southwest barrier islands	Shrimp, Fish, and Blue Crab
Larose/Cut Off/Galliano/Golden Meadow	Mid Barataria, Lower Barataria - northwest, Lower Barataria - southwest, Lower Barataria - southwest barrier islands, Eastern Terrebonne, Eastern Terrebonne - barrier islands	Shrimp, Fish, Oysters, and Blue Crab
Leeville	Lower Barataria - northwest, Lower Barataria - southwest, Lower Barataria - southwest barrier islands, Eastern Terrebonne, Eastern Terrebonne - barrier islands	Shrimp, Fish, Oysters, and Blue Crab

Community	Resource Use Area (ecoregions)	Resource
Manchac	Maurepas, Lake Pontchartrain	Fish and Blue Crab
Mandeville/Covington/Madisonville/Abita Springs	Maurepas, Lake Pontchartrain	Fish and Blue Crab
Morgan City/Berwick/Siracusaville	Teche/Vermilion/Bays, Atchafalaya Delta, Penchant	Shrimp, Fish, and Blue Crab
New Orleans East	Lake Pontchartrain, Lake Borgne, Chandeleur Sound	Shrimp, Fish, Oysters, and Blue Crab
Patterson	Atchafalaya Basin, Upper Verret Basin, Verret	Wild Caught Crawfish
Phoenix	Upper Breton, Lower Breton	Shrimp, Fish, Oysters, and Blue Crab
Pierre Part	Atchafalaya Basin, Upper Verret Basin, Verret	Wild Caught Crawfish
Point aux Chene	Eastern Terrebonne, Western Terrebonne, Eastern Terrebonne - barrier islands, Western Terrebonne - barrier islands	Shrimp, Fish, Oysters, and Blue Crab
Port Sulphur	Lower Barataria - northeast, Lower Barataria - southeast, Lower Barataria - northeast barrier islands, Lower Barataria - southeast barrier islands, Lower Breton, Bird's Foot Delta	Shrimp, Fish, Oysters, and Blue Crab
Poydras/Violet/St. Bernard	Lake Pontchartrain, Lake Borgne, Chandeleur Sound	Shrimp, Oysters, and Blue Crab
Slidell/Eden Isle/Pearl River	Lake Pontchartrain, Lake Borgne, Chandeleur Sound	Shrimp, Fish, and Blue Crab
Venice	Lower Barataria - northeast, Lower Barataria - southeast, Lower Barataria - northeast barrier islands, Lower Barataria - southeast barrier islands, Lower Breton, Bird's Foot Delta	Shrimp, Fish, Oysters, and Blue Crab
Yscloskey	Lake Pontchartrain, Lake Borgne, Chandeleur Sound	Shrimp, Fish, Oysters, and Blue Crab

The ratio of the change in HSI under FWA to the change under FWOA allows the change over time *and* between FWA and FWOA to be compared. A positive metric value is preferable to a negative one, but there are multiple combinations that can result in a positive value (see Figure 7).

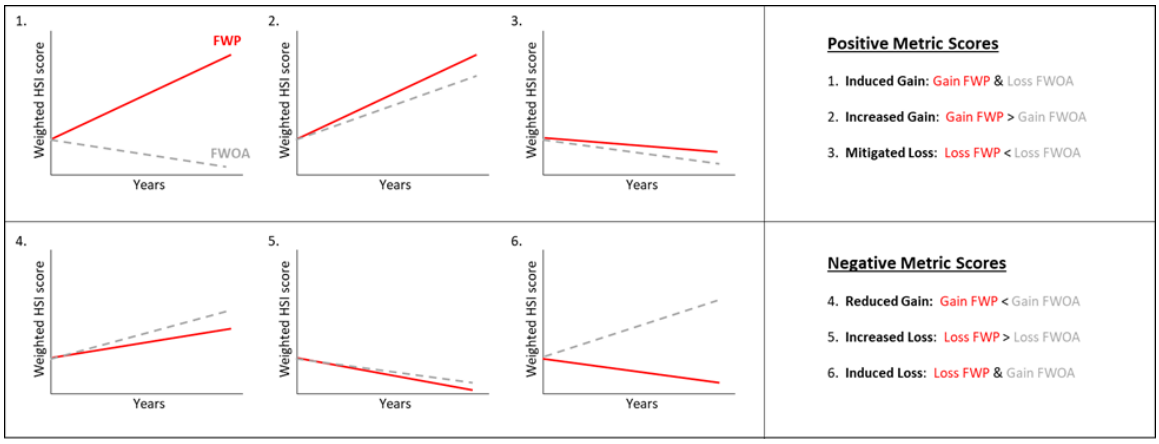

Figure 7: Effect of Projects on Traditional Fishing Community HSIs.

Additionally, the storm surge-based flood risk reduction in terms of both EADD and EASD can be evaluated to assess the master plan's support to these traditional fishing communities.

HISTORIC PROPERTIES INUNDATED

In order to evaluate the master plan's ability to mitigate damages to properties listed on the National Register of Historic Places, the number of properties subject to flooding at Year 50 in communities of interest can be compared across scenarios and alternatives.

LAND LOSS AROUND ARCHEOLOGICAL SITES

Based on feedback from master plan stakeholders, land change area near cultural resource archaeological sites will be available in the Data Access Portal. Comparing the losses under different alternatives allows the evaluation of master plan effectiveness in supporting the preservation of these culturally significant sites.

4.5 WORKING COAST

Promote a viable working coast to support regionally and nationally important businesses and industries.

There are three major areas can be used to assess the master plans' ability to promote a viable working coast. These include: Navigation, Oil and Gas, and Agriculture. The 2017 Coastal Master Plan developed indices that combined multiple outputs into a single metric for evaluation (see 2017's Attachment C4-11: Metrics) for each of these three areas. These were often found to be difficult to interpret and it was recommended that the 2023 Coastal Mater Plan focus on the component parts of these metrics for evaluation.

NAVIGATION

Support for Navigation can be evaluated by examining the change in land area adjacent to navigational channels in the 2023 Coastal Master Plan.

OIL AND GAS ACTIVITIES

Support for Oil and Gas Activities can be evaluated by reviewing the change to the landscape and the ability of the master plan to reduce storm surge-based flood risk. The 2023 Coastal Master Plan added stability of landscape to the available metrics. The 2023 Coastal Master Plan considers any change to the landscape as a negative consequence.

AGRICULTURAL COMMUNITIES

Support for Agricultural Communities can be assessed by evaluating the effect on projected salinity changes on the primary crops grown in the vicinity of the community. The projected risk reduction provided to the communities by the master plan is also important to understand the ability of the master plan to support this objective.