NFWF Webinar

Mississippi Department of Environmental Quality

March 1, 2016 | 10:00 am CST

THE MISSISSIPPI GULF COAST RESTORATION PLAN

A Path Toward Sustainable Ecosystem Restoration

AUGUST 31, 2015

MISSISSIPPI DEPARTMENT *of* ENVIRONMENTAL QUALITY

NATIONAL FISH *and* WILDLIFE FOUNDATION

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The Plan

<u>OVERALL GOAL:</u>

*"Create a plan that would result in a **coordinated**, **systematic**, and **transparent** process for **sustainable** ecological restoration in Mississippi, that will direct funds associated with the GEBF, and be applicable to informing ecological restoration funding associated with the RESTORE Act."*

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The Plan

PRIMARY GOALS:

- To meaningfully engage individuals and organizational stakeholders (e.g., government, academia, non-government) in a transparent and inclusive Plan development process;
- To develop the Mississippi Comprehensive Ecosystem Restoration Tool (MCERT), a science-based tool for identifying and examining ecological resources and threats for improved restoration planning and project sustainability; and
- To establish program objectives and a decision-making process for projects based on the above goals to promote the long-term vitality and sustainability of all of Mississippi's coastal habitats and resources.

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Plan Structure

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Chapter 1: Introduction and Public Engagement

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Individual CBO and NGO Meetings

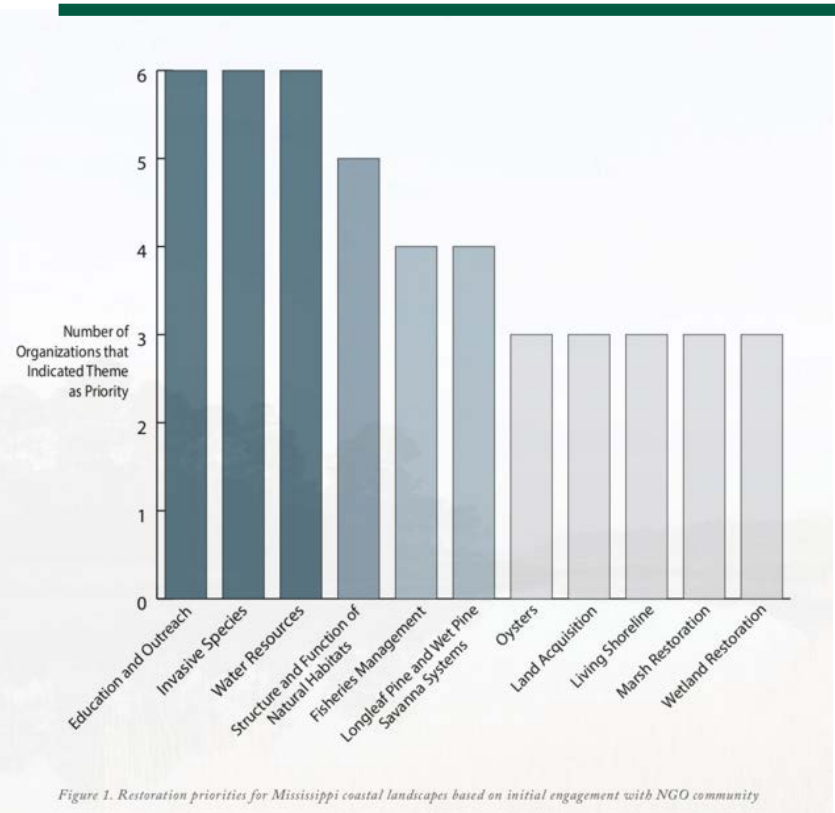

Figure 1. Restoration priorities for Mississippi coastal landscapes based on initial engagement with NGO community

Community Conversations

Themes:

- Water Resources Restoration and Enhancement
- Gulf Environment Conservation and Restoration
- Sustainable Ecological Restoration

Resource Summits

- Restoration should not be limited to public lands
- Oyster reef habitat was ranked the most important marine resource, followed by shrimp, seagrass habitat, and recreational finfish
- Sewer/wastewater and nutrient loading from the urban environment was ranked as the top threat to water quality

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Overall Restoration Vision

- Restore and enhance ecological function and connectivity of habitats
- Restore and stabilize the populations of important species at sustainable levels
- Restore and enhance the ecological and hydrological integrity of our water resources

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Chapter 2: Landscape Change

TERRESTRIAL ENVIRONMENT

ALTERATIONS IN LAND COVER

Land cover change was analyzed using data from NOAA's Coastal Change Analysis Program (C-CAP). This program offers a standardized database of land cover and land change information for the coastal regions of the U.S. The data provide spatial inventories of coastal intertidal areas, wetlands, and adjacent uplands with the goal of monitoring these habitats by updating the land cover maps every five years. Data were aggregated by five HUC-8 watersheds that are included in the restoration plan study area (Figure 4). Land cover change values show different trends depending on watershed characteristics including conversions in land use, habitat loss, and fragmentation. For example, the Lower Pearl watershed shows substantially more forest loss from 1996 – 2010 than any other watershed (Figure 5).

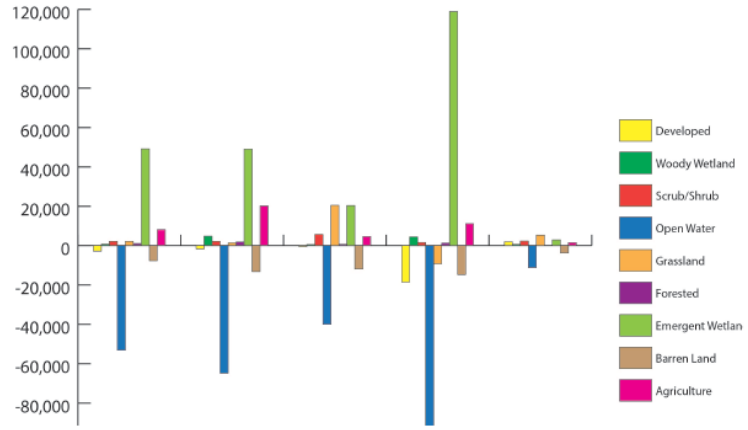

Figure 4.Land Use/Land Cover in the Study Area used by the Mississippi Comprehensive Ecosystem Restoration Tool.

THIS LOSS COULD HAVE BEEN CAUSED BY DRASTIC FOREST LOSS FROM HURRICANE KATRINA[5] AND/OR SYSTEMATIC, SHORT-TERM COMMERCIAL FOREST HARVESTING. Forest loss and fragmentation represented the highest losses in every watershed, followed by woody wetlands and agriculture losses. The large increases in scrub/shrub habitat are likely (1) remnants of Hurricane Katrina that are revegetating or (2), forestry practices in which clear-cuts have occurred and the area have been planted, representing young pine monocultures. These scrub shrub areas are young forest and represent only a temporary change in land cover, but not a change in land use.

FRAGMENTATION AND CORE AREAS

Core habitat (forest not degraded by edge effects) is a key feature that has a large influence on ecosystem functioning and is related to the level of fragmentation. Fragmentation occurs when large, contiguous habitats are divided into smaller isolated patches. This process is typically caused by human activities, such as road and utility corridor construction, agricultural land conversion, and urbanization, all of which can have large impacts on ecological processes. Forest fragmentation in coastal Mississippi is considerable, and the amount of core areas has declined in every watershed over the last 15 years and most dramatically in the Lower Pearl (Figure 6). For more information, see Chapter 3 or the full MCERT report http://www.msrestoreteam.com/NFWF_Plan/NFWF_Plan_Task_2-4_Appendix.pdf.

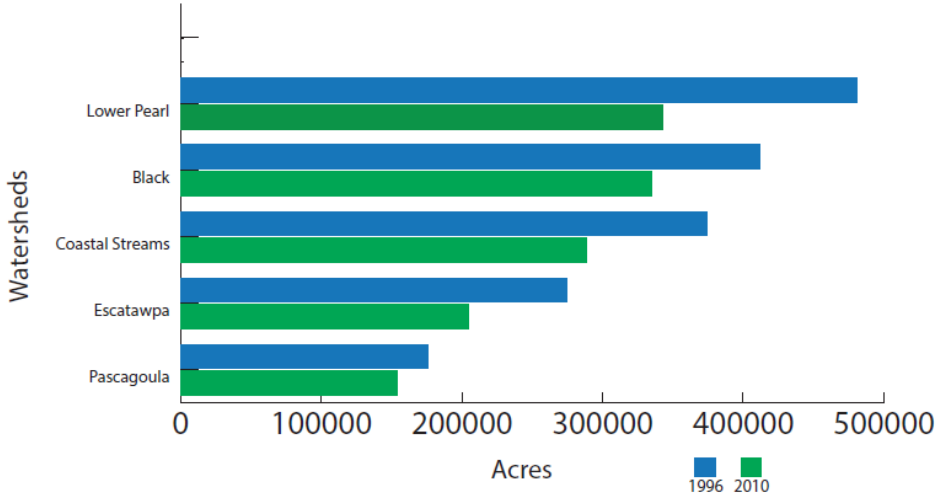

Figure 5. Net change in land cover across watersheds in coastal Mississippi from 1996 – 2010.

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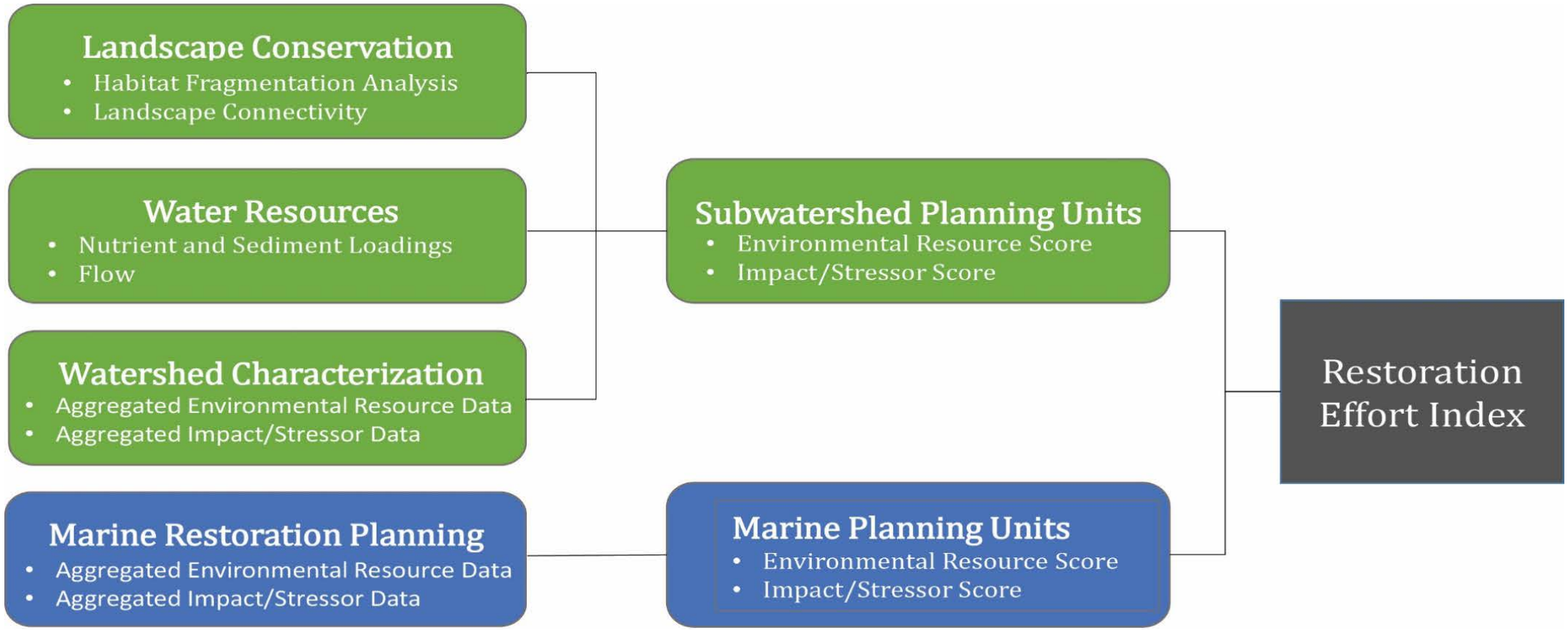
Chapter 3: MCERT Models



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Chapter 3: MCERT Models

ENVIRONMENTAL RESOURCE (ER) VALUE METRICS

ENVIRONMENTAL:

- Hubs
- Corridors
- Threatened and Endangered Species
- Estuarine Wetlands
- Other Wetlands (Palustrine)
- Wildlife Management Areas
- National Wildlife Refuges
- National Forests
- Mississippi Coastal Preserves
- Wilderness Areas
- Camp Shelby Managed Area
- NGO Land
- Conservation Easements
- Department of Defense Land

HUMAN WELFARE:

- Public Waterways
- Source Water Protection Areas
- Water Quality Standards for Recreation (Streams)
- Water Quality Standards for Recreation (Lakes)
- Water Quality Standards for Public Water Supply (Streams)
- Water Quality Standards for Public Water Supply (Lakes)
- Recreational Locations
- State, National, and Local Parks

IMPACT/STRESSOR (I/S) METRICS

ENVIRONMENTAL:

- Non-Riparian Zone
- Subwatershed Nitrogen Yield
- Subwatershed Phosphorus Yield
- Subwatershed Sediment Yield
- Cumulative Nitrogen Input
- Cumulative Phosphorus Input
- Cumulative Sediment Input
- Impervious Surface
- Dam Storage Ratio
- Livestock Index

HUMAN WELFARE:

- Landscape Development Intensity
- Groundwater Permits
- Surface Water Permits
- Erosion Potential Index – National Hydrography Dataset (NHD) Subwatersheds
- Nutrient Potential Index – NHD Subwatersheds
- Beach Closures
- National Pollutant Discharge Elimination System (NPDES) Locations
- Section 303(d) of the Clean Water Act Impaired Water Bodies

Table 3. Subwatershed characterization data inputs.

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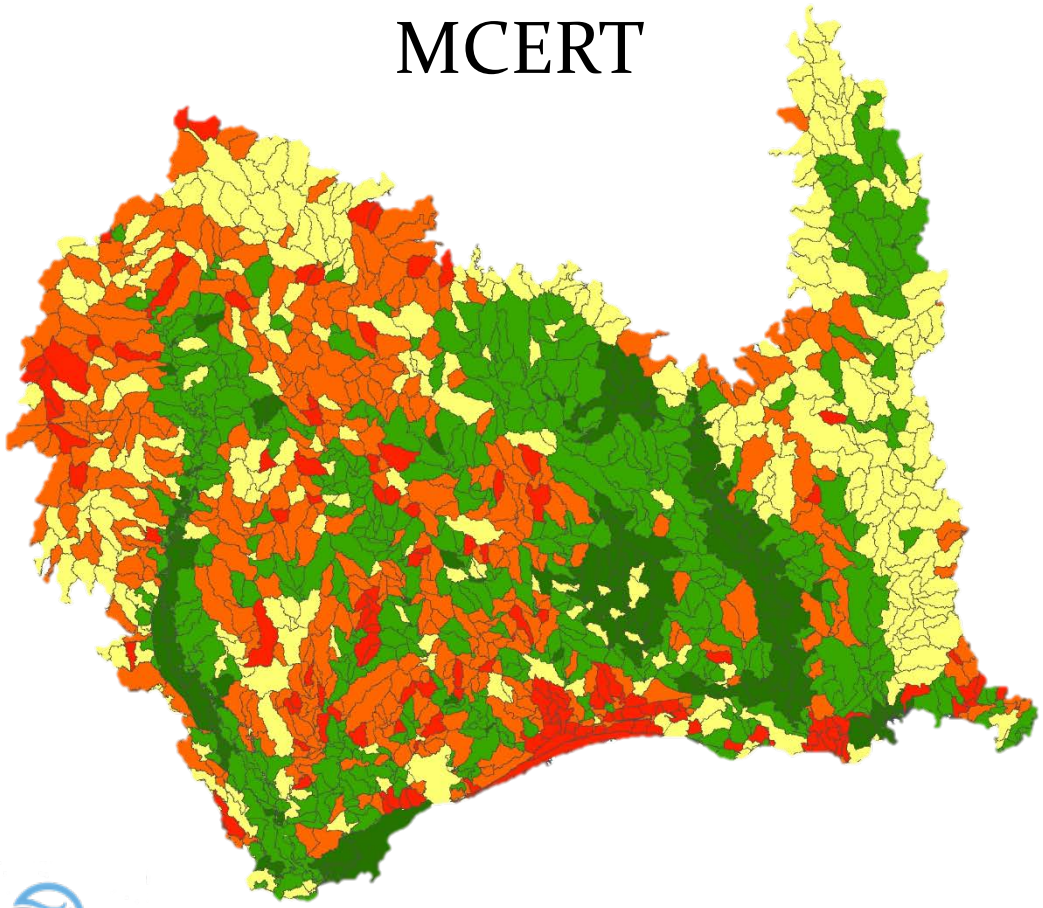
Chapter 4: The Plan

Made up of two key components:

MCERT



The DSS

DECISION SUPPORT SYSTEM

The DSS is an analytical framework underpinned by science inputs (MCERT), which guide appropriate decisions on restoration actions. The DSS accounts for scientific gaps and for foundational root causes of stressors that could compromise sustainability. It provides a logical framework to determine project feasibility and location prioritization so that decision makers can make informed, science-based decisions for enhancing, protecting, or restoring the ecological integrity (Figure 22). There are three levels of screening at which decisions points will be addressed:

1. PROGRAM/OBJECTIVE LEVEL
   decisions on programmatic inputs into DSS
2. RESTORATION ACTION LEVEL
   decisions on existence of ecological resources and impacts/ stressors; scientific gaps; and the need to address foundational root causes before restoration action implementation
3. PROJECT LEVEL
   decisions whether project meets specific criterion and proper locations for implementation

MCERT data outputs are used to support decision points at all levels of the DSS. Furthermore, data gathered from scientific gap studies and restoration-monitoring data will be used to implement adaptive management through feedback into MCERT for further refined support in decision making.

This DSS process will help produce groups of projects within programs that result in coordinated science-based restoration at scales that are meaningful to measurably change the condition of our coastal lands, water, and marine resources and habitats.

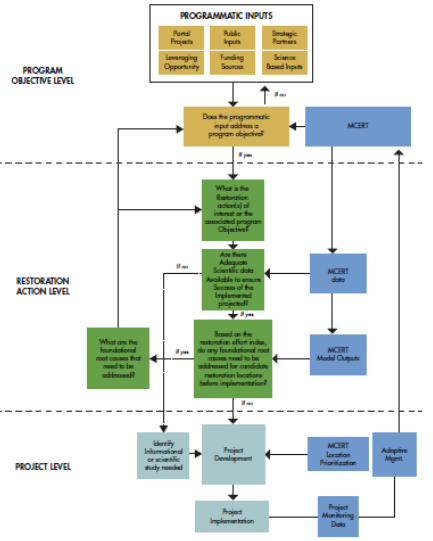


Figure 22. The Decision Support System for coastal restoration in Mississippi, with screening levels and inputs from MCERT.

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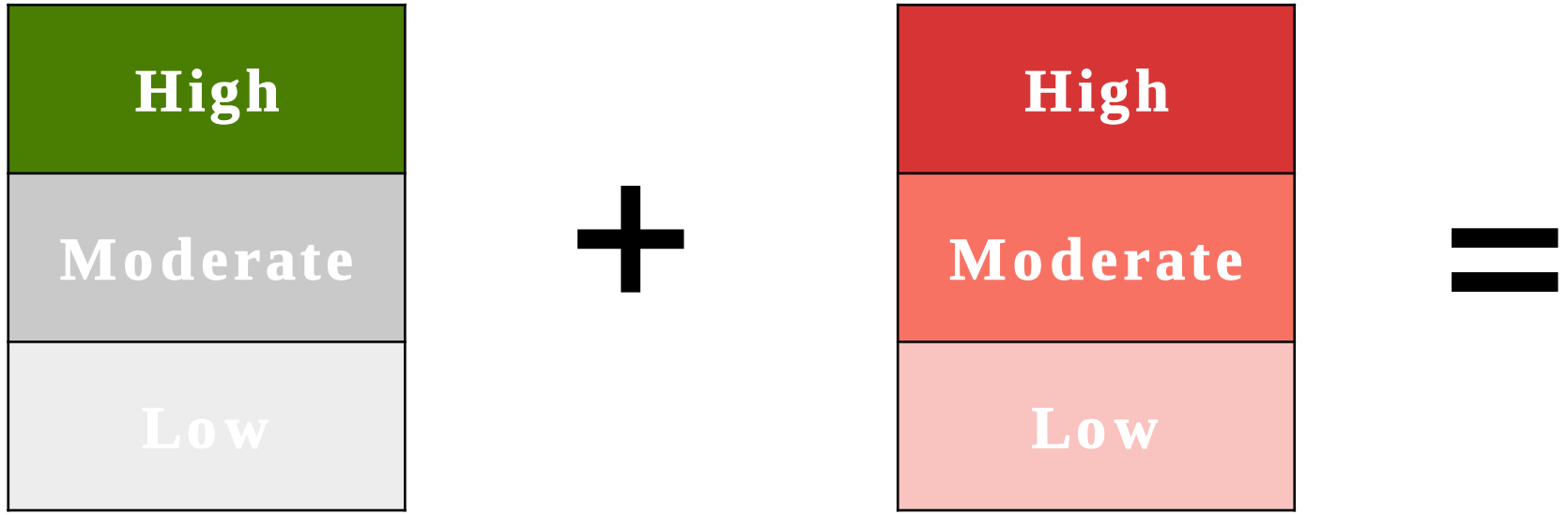
MCERT - Overview

Restoration Effort Index - Theory



"Environmental Resources"

"Environmental Stressors"

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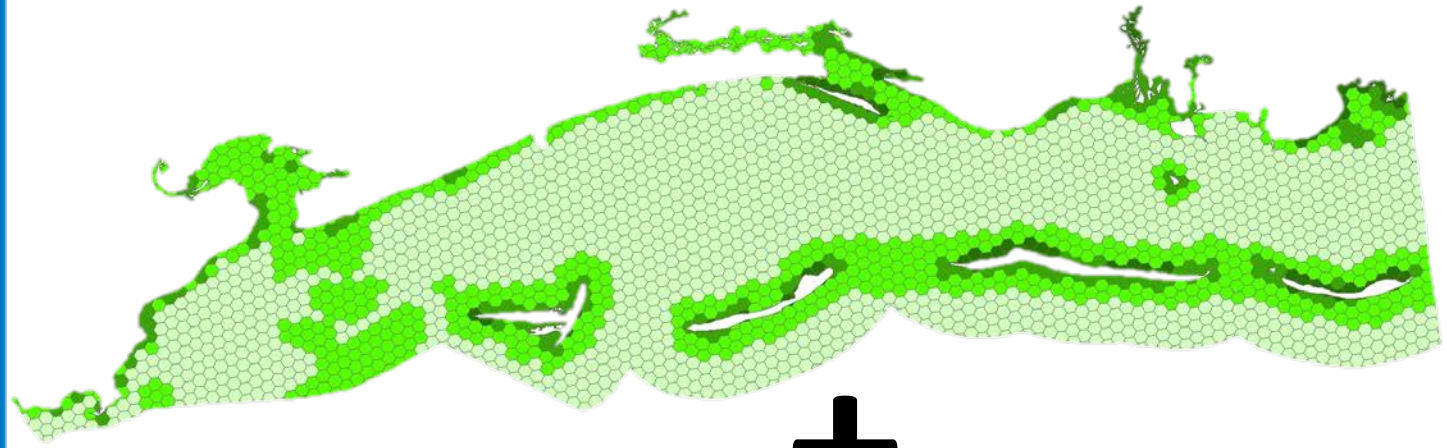
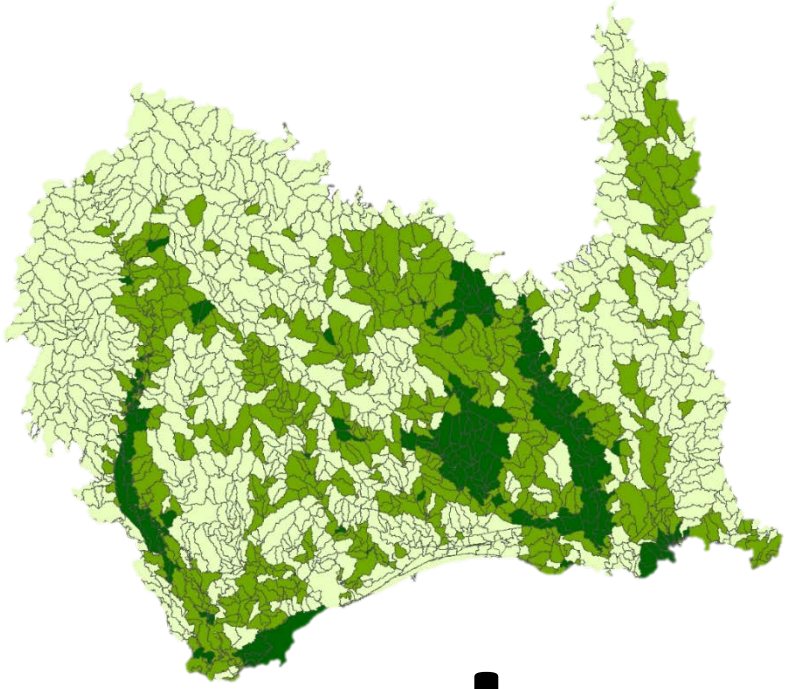
Environmental Resources





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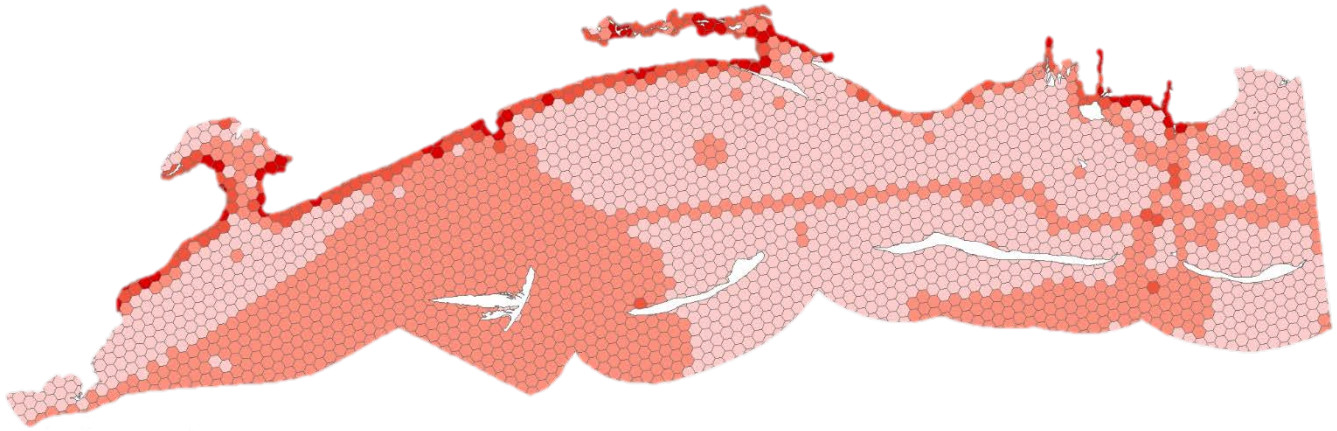
Environmental Stressors



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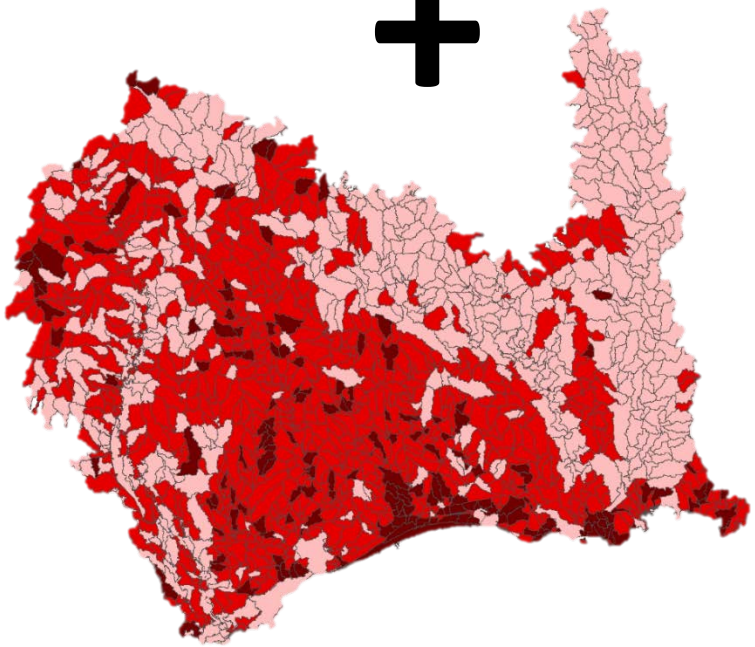

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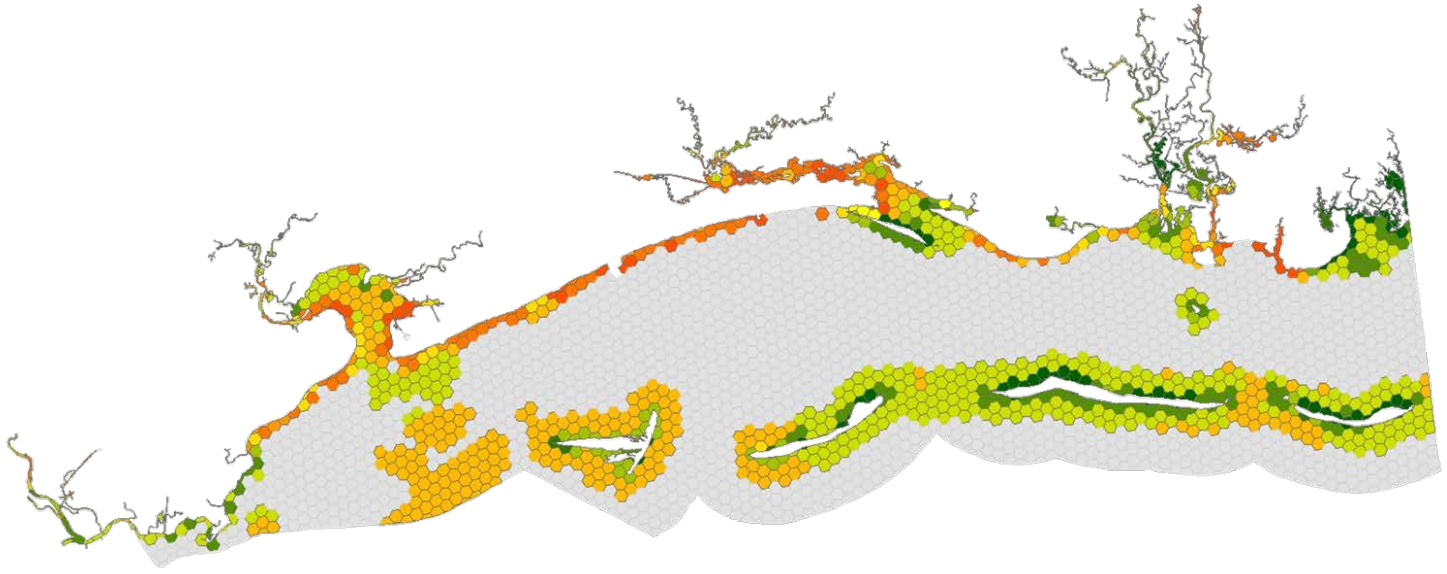
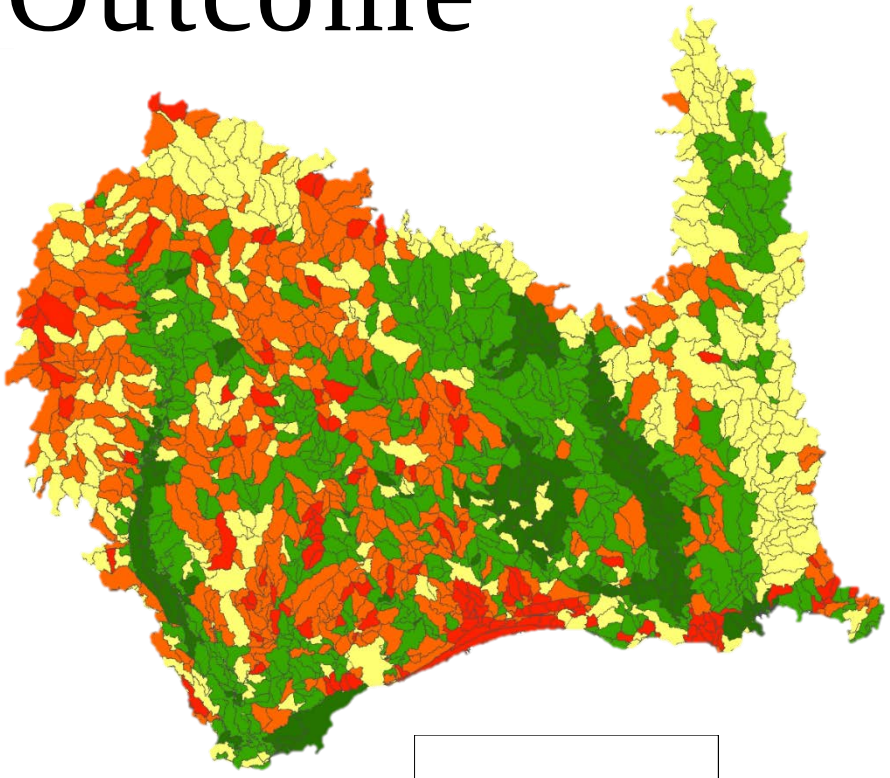
Restoration Effort Outcome





Cautionary

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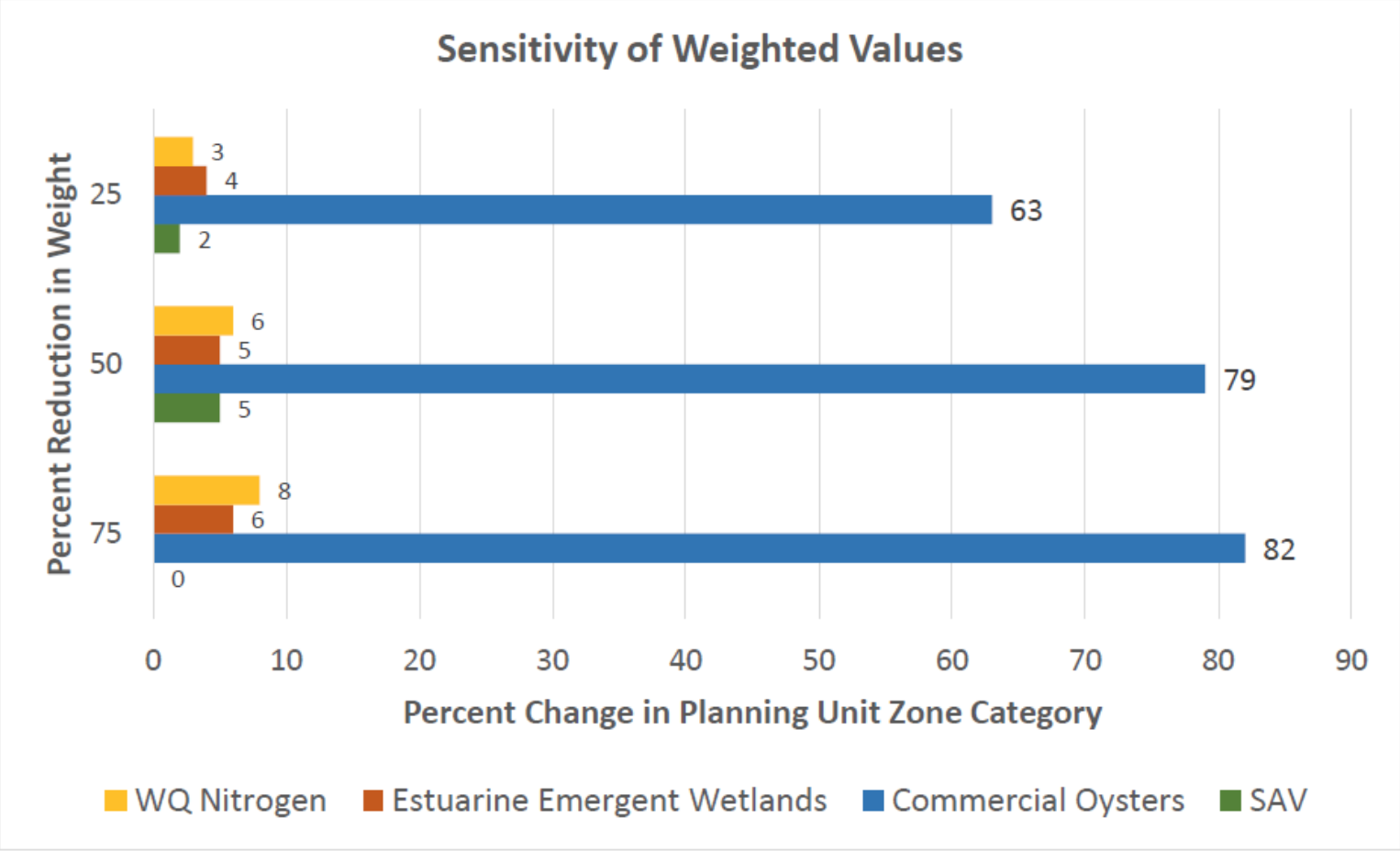
Sensitivity Analysis



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Decision Support System (DSS)

THIS PLAN IS A COMMUNITY-DRIVEN PRODUCT, BUILD UPON A SCIENCE-BASED FOUNDATION. BY INCORPORATING COMMON TRENDS THAT EMERGED FROM INDIVIDUAL AND ORGANIZATIONAL STAKEHOLDER INTERESTS and the creation and application of the science-based MCERT as a screening level mechanism for restoration actions, the Plan allows decision-makers to better understand, identify, and spatially correlate potential restoration actions across the Mississippi coastal landscape and marine environment.

This Plan presents and describes a decision support system (DSS) and how it is underpinned by MCERT at each screening level. This system has been developed to provide clarity on the process for which MDEQ will make decisions on actions (Figure 22).

Each of the restoration programs is described, and the threats and stressors associated with each program areas are discussed. The programs area each have two overarching objectives with multiple examples of restoration actions. This Plan does not include an exhaustive list of all possible restoration actions, but rather it represents suggested examples from public comments and utilization of existing vetted and approved resource plans. Examples are provided for each program to demonstrate how the DSS will be used and where MCERT supports decision-making at all screening levels including identification of programmatic inputs, program objectives, review of restoration actions, assessment of available data, review of the REI, and project development for location prioritization.

THREE GENERAL RESTORATION PROGRAM AREAS EMERGED AS COMMON THREADS FROM SUBSTANTIAL STAKEHOLDER ENGAGEMENT AND FROM THE MCERT DEVELOPMENT:

LAND RESOURCES

COASTAL AND LIVING MARINE RESOURCES

WATER RESOURCES

DECISION SUPPORT SYSTEM

The DSS is an analytical framework underpinned by science inputs (MCERT), which guide appropriate decisions on restoration actions. The DSS accounts for scientific gaps and for foundational root causes of stressors that could compromise sustainability. It provides a logical framework to determine project feasibility and location prioritization so that decision makers can make informed, science-based decisions for enhancing, protecting, or restoring the ecological integrity (Figure 22). There are three levels of screening at which decisions points will be addressed:

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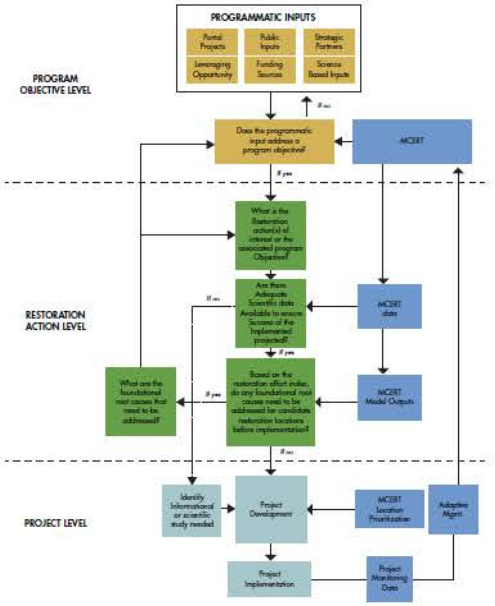

Figure 22. The Decision Support System for coastal restoration in Mississippi, with screening levels and inputs from MCERT.

Foundationally built on ensuring sound scientific and sustainable projects

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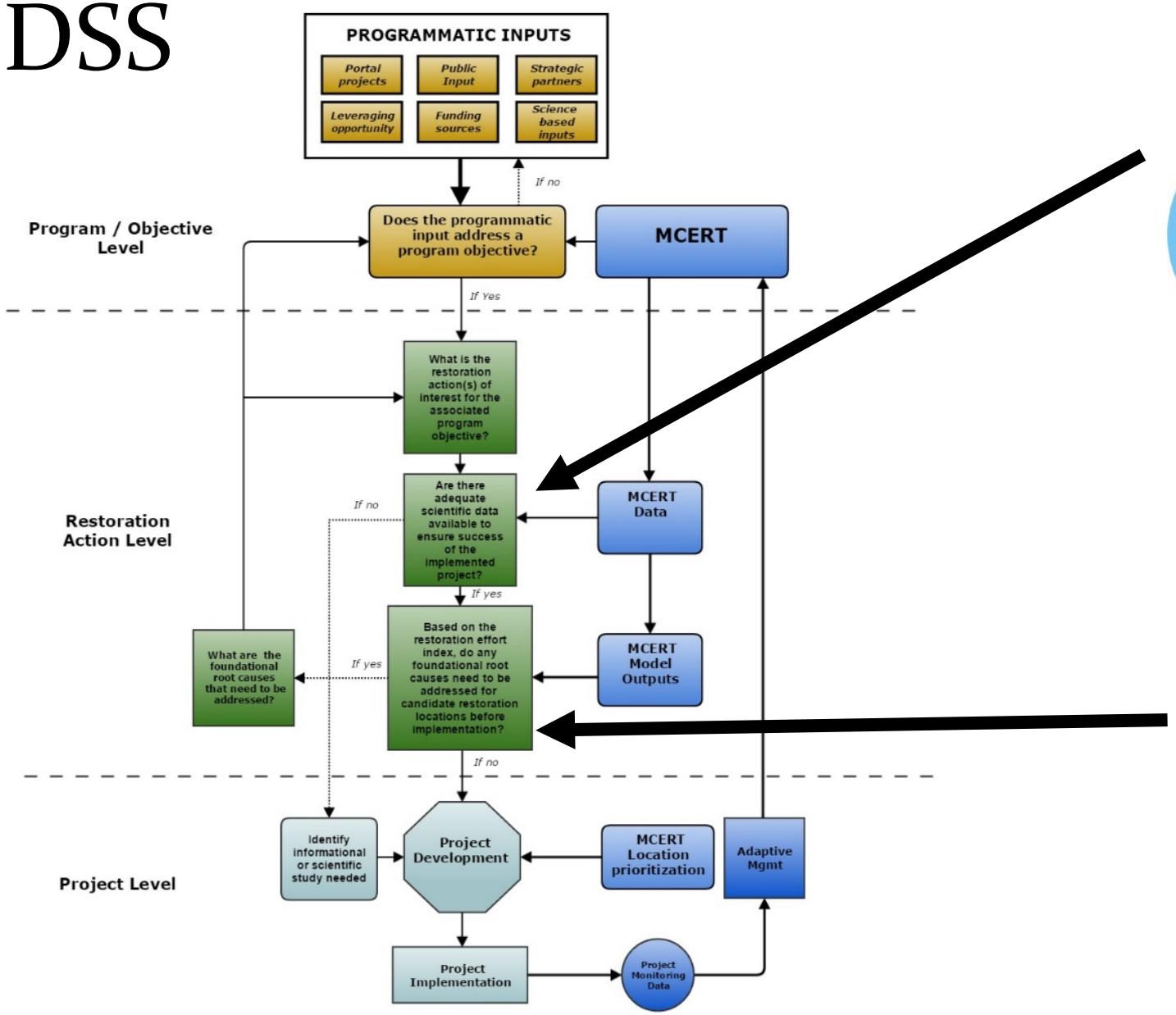
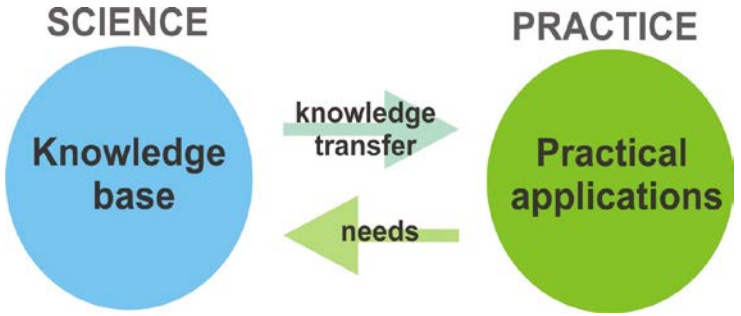
The DSS



Ensuring Success with Science



Ensuring Sustainability by being Foundational

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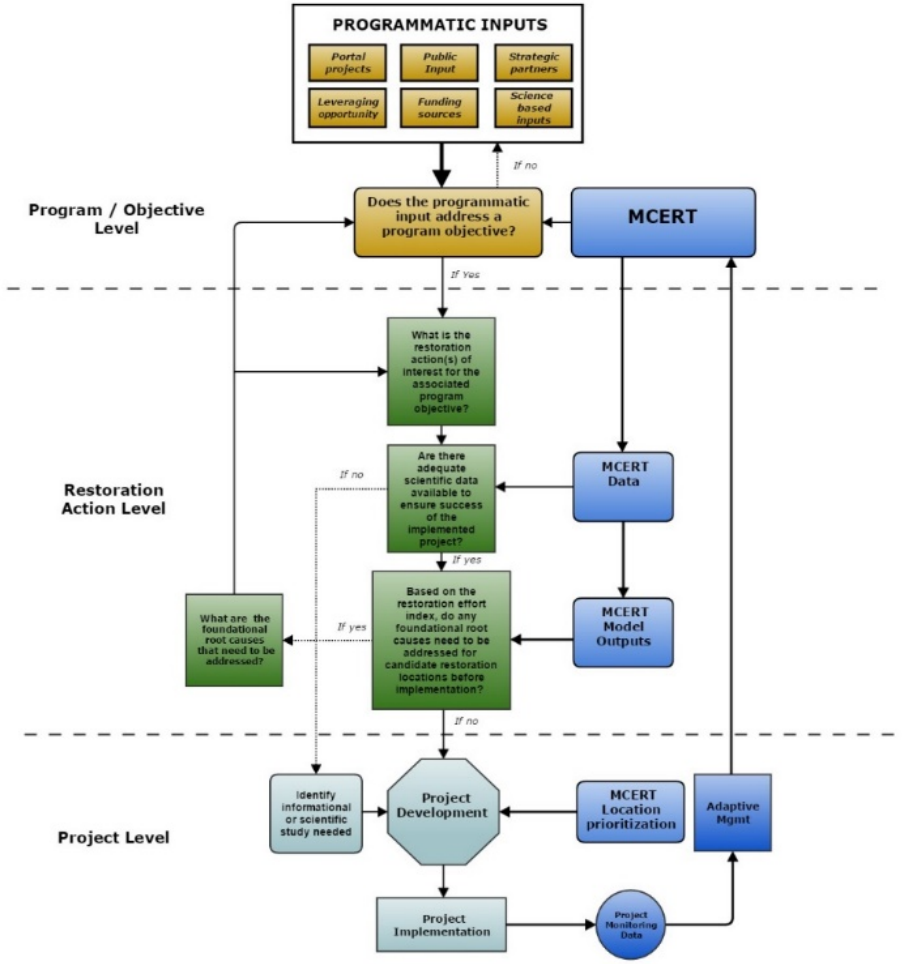
Project Lists vs. DSS



VS.

Water Resources	Land Resources	Living Marine Resources
A	A	A
B	B	B
C	C	C
D	D	D
	E	

VS.

Water Resources	Land Resources	Living Marine Resources
C	A	A
B	D	E
E	C	C
A	B	D
	E	

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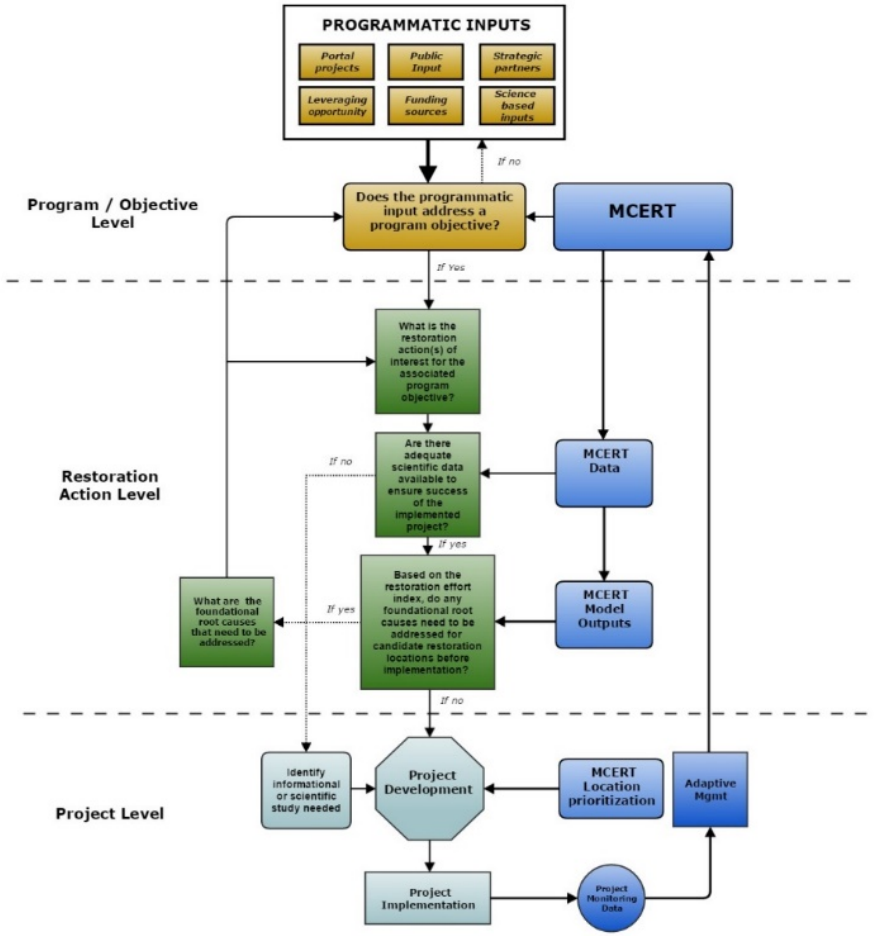
DSS vs. Random List of Projects



- Expectation: Sets a unfair expectation that a project will be funded eventually
- Limitless List: List could be continuously expanded and increased as new projects materialize
- Transparency: Difficult to justify why a project got selected over another
- Ensuring Sustainability: Projects are not built whereby they drive at the sustainability of the project

VS.

Water Resources	Land Resources	Living Marine Resources
C	A	A
B	D	E
E	C	C
A	B	D
	E	

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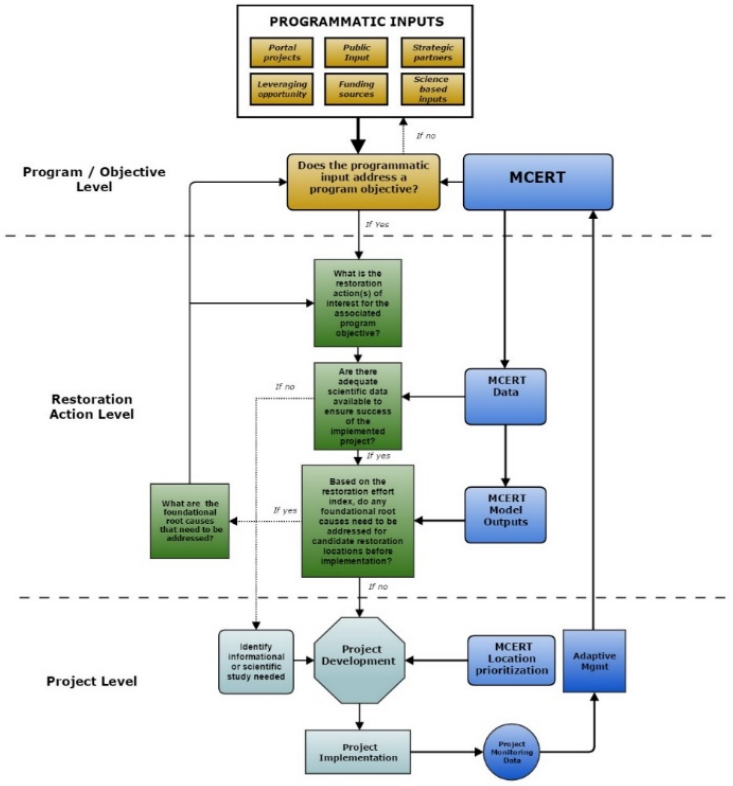
DSS vs. Prioritized List of Projects



VS.

Water Resources	Land Resources	Living Marine Resources
A	A	A
B	B	B
C	C	C
D	D	D
	E	

- <u>Lack of science to prioritize:</u> There are no plans currently that have a prioritization of projects to be funded
- <u>Inflexible to change:</u> If they have been prioritized then there was a justification to that prioritization

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Meeting NFWF's Standards

- NFWF invested in the Planning Process for a reason
- The DSS is an approach that will help provide the NFWF Board the opportunity to know that projects are being situated in the State of Mississippi in such a way to:
    1. Maximize the success of any project
    2. No matter the starting point – be that a given area (i.e., Hancock County Marshes), a given project in a given area (i.e., Oyster reef rebuilding in Back bay of Biloxi), or an overarching theme to fund a certain type of restoration action (i.e., land acquisition) – that the most sustainable route forward will be prioritized.

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Principal Tenets

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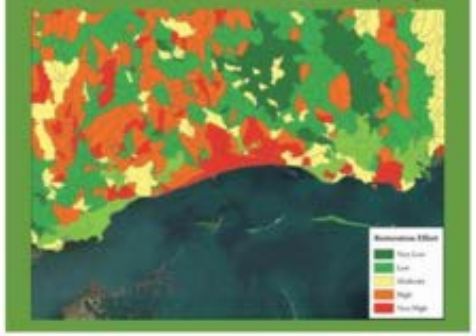
Advantage #1: Prioritized Decision Making

EXAMPLE 1

PROGRAMMATIC INPUT: ACQUISITION OF LAND ADJACENT TO SALT MARSH FOR BUFFER.	In this example, the input is actually a restoration action. This action type can be found in many different conservation plans. It is specifically a priority in the Grand Bay NERR Management Plan and for DMR Coastal Preserves Program. Data have and continue to be collected on this concept.
DOES THE PROGRAMMATIC INPUT ADDRESS A PROGRAM OBJECTIVE? **YES**	• Program - Land Resources • Objective - Conserve Priority Habitats
WHAT IS THE RESTORATION ACTION OF INTEREST FOR THE ASSOCIATED PROGRAM OBJECTIVE?	Restoration Action - Conservation of buffers to facilitate the natural migration of coastal marsh habitat inland in response to sea-level rise
ARE THERE ADEQUATE SCIENTIFIC DATA AVAILABLE TO ENSURE SUCCESS OF THE IMPLEMENTED PROJECT? **YES**	Some data are available on this concept and there are clear locations in Mississippi which are facing high erosion rates with no buffer
BASED ON THE RESTORATION EFFORT INDEX (REI), DO ANY FOUNDATIONAL, ROOT CAUSES NEED TO BE ADDRESSED FOR CANDIDATE RESTORATION LOCATIONS BEFORE IMPLEMENTATION? **NO**	• In case of land acquisition, there are no foundational root causes to be addressed • By scoping out the data associated with the REI (MCERT), identify a few candidate locations for such a project (MAP). The ecological data show locations that still contain large stands of healthy salt marsh and the impact/stressor data show those areas that are highly erosive. "Low" and "very low" index scores are desirable because of less impediments/stressors to migration. • Candidate locations include: Hancock County, St. Louis Bay, Graveline Bay, Grand Bay
PROJECT SITE-SPECIFIC CRITERIA/CONDITIONS (MCERT LOCATION PRIORITIZATION)	• Adjacent to marsh • Willing to sell • Adjacent to other protected land • Hub/corridor size • Low development pressure

MCERT Restoration Effort Index (REI)



Planning Units in estuaries with "low" and "very low" index scores

Planning units vetted through project site-specific criteria using MCERT tools

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Advantage #2:
Ability to coordinate restoration with RESTORE and NRDA

One Trustee

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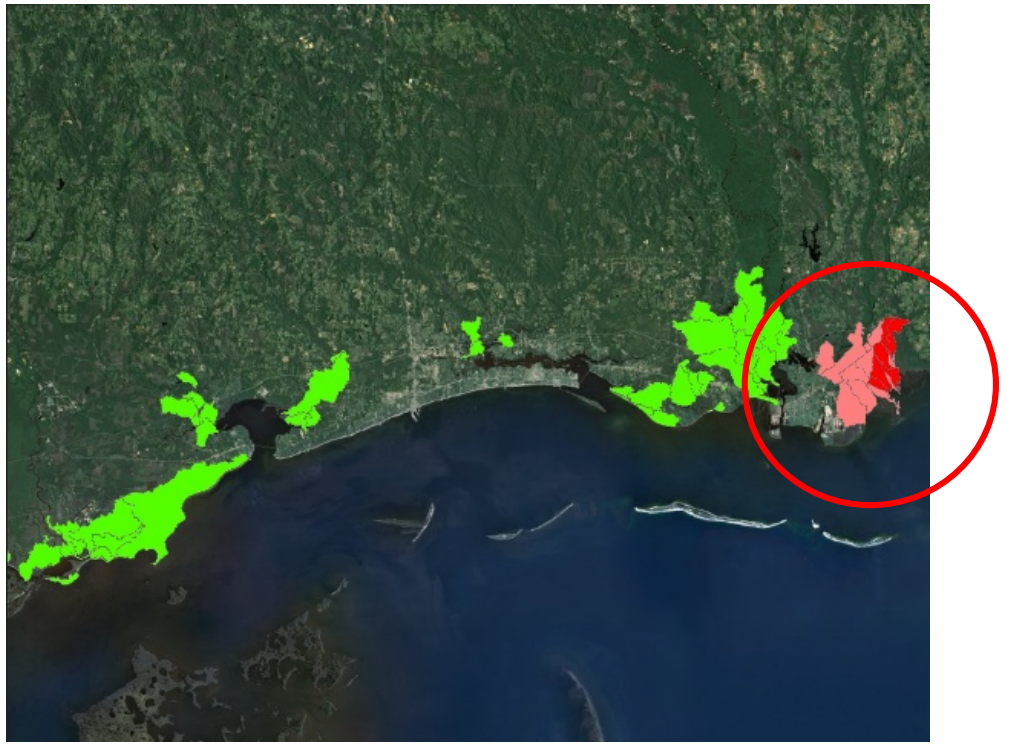
NRDA RESTORE NFWF



Grand Bay Example

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Advantage #3: Use of "learning by doing" to inform decision making and expenditures

Current Oyster Proposal – Project Component:
Benthic Habitat Mapping of Oyster Reefs

↓

Provide information on areas of missing reef

↓

Confident cultch deployment estimate and location

Next project framed out based on information

VS.

Water Resources	Land Resources	Living Marine Resources
A	A	A = $60M
B	B	B
C	C	C
D	D	D
	E	

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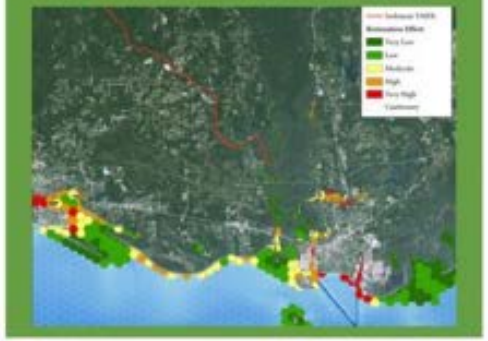
EXAMPLE 2

PROGRAMMATIC INPUT: OYSTER HABITAT RESTORATION IN PASCAGOULA RIVER MOUTH	Restoration of historic oyster habitat in Mississippi estuaries has been an important priority for many strategic partners (TNC, DMR) and is cited in numerous planning documents and as a project type in the MS project portal. This area historically had most oyster habitat removed in the first half of the century and once supported productive oyster reefs.
DOES THE PROGRAMMATIC INPUT ADDRESS A PROGRAM OBJECTIVE? **YES**	• Program – Coastal and marine living resources • Objective – Protect and restore marine habitats
WHAT IS THE RESTORATION ACTION OF INTEREST FOR THE ASSOCIATED PROGRAM?	Restoration Action – Restore and/or create non-commercial oyster reef habitat
ARE THERE ADEQUATE SCIENTIFIC DATA AVAILABLE TO ENSURE SUCCESS OF THE IMPLEMENTED PROJECT? **NO**	Benthic habitat mapping is needed to better understand the best locations for oyster habitat restoration. In this scenario, a benthic habitat project would need to be conducted first. Once completed we can continue to the next step of the DSS.
BASED ON THE RESTORATION EFFORT INDEX (REI), DO ANY FOUNDATIONAL, ROOT CAUSES NEED TO BE ADDRESSED FOR CANDIDATE RESTORATION LOCATIONS BEFORE IMPLEMENTATION? **YES**	• By scoping the data associated with the REI (MCERT), the impact data indicate a sedimentation issue for the area. This issue would first need to be explored and addressed (MAP). The ecological data show locations where oyster reefs historically existed and other current features that could benefit oyster reefs. • In this scenario, assume the WQ project to reduce sedimentation was addressed (see Example 3) appropriately and move to project development.
PROJECT SITE-SPECIFIC CRITERIA/CONDITIONS (MCERT LOCATION PRIORITIZATION)	• Salinity; Bathymetry • Historic reefs • Potential conflicts with user groups

MCERT Restoration Effort Index (REI)



Planning Units in areas with "low" and "very low" index scores

Suitable locations vetted through project site-specific criteria using MCERT

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"Principal Tenet: flexibility to create momentum"

Advantage #4: Flexible to unexpected environmental circumstances and conservation opportunities

Example 1

Example 2

110,000 acre acquisition

Water Resources	Land Resources	Living Marine Resources
A	A	A
B	B	B
C	C	C
D	D	D
	E	

VS.

Water Resources	Land Resources	Living Marine Resources
C	A	A
B	D	E
E	C	C
A	B	D
	E	

Hurricane and other natural disasters
Being flexible to respond to change

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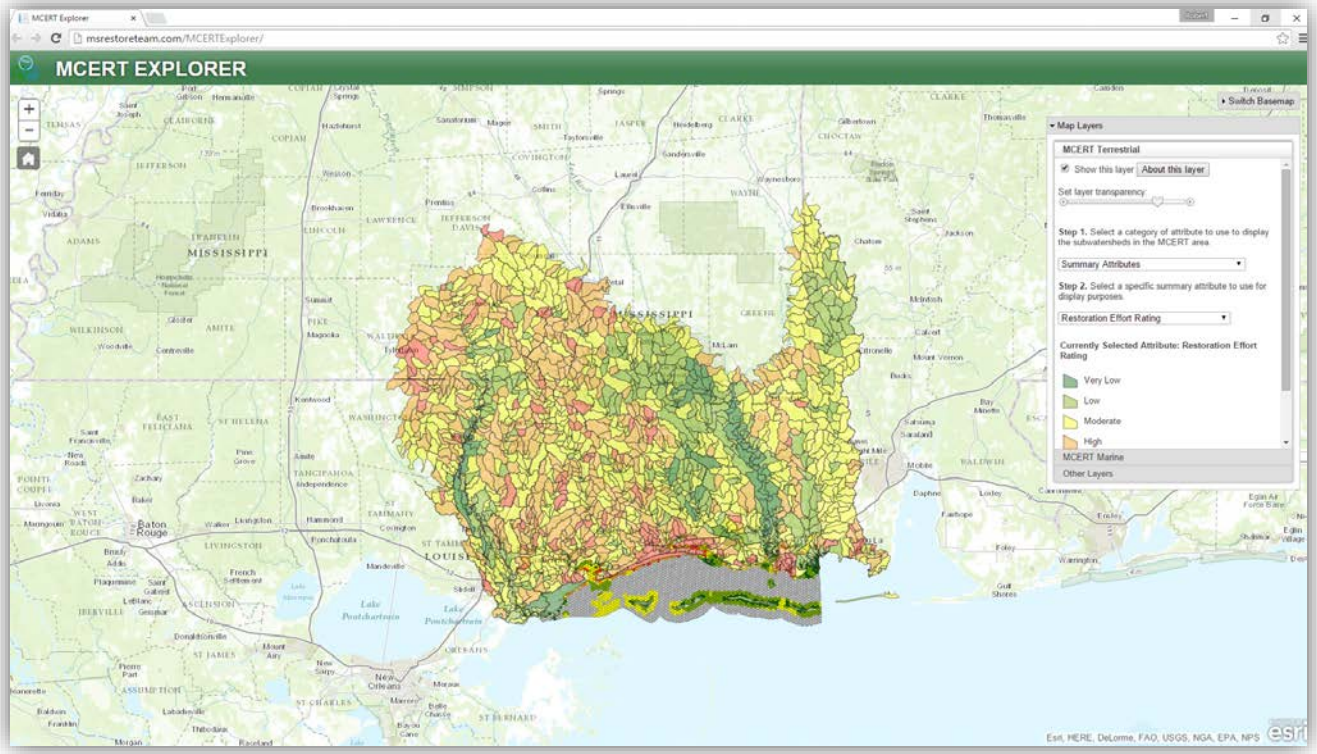
Transparency of Plan



- Online MCERT viewer with option to provide feedback
- Translated Plan into Vietnamese
- Online version of Plan
- Technical Q&A document to highlight changes from V1 to V2

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NFWF Webinar

The Mississippi Department of Environmental Quality

March 1, 2016 | 10:00 am CST

Questions?

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The webinar will be posted on www.restore.ms

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