HATCHIE/LOOSAHATCHIE MISSISSIPPI RIVER MILE 775-736, TN AND AR ECOSYSTEM RESTORATION STUDY

Public Meeting

Mike Thron
USACE Biologist and NEPA Coordinator

March 6, 2023

U.S.ARMY

US Army Corps of Engineers®

MISSISSIPPI VALLEY DIVISION
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INTRODUCTION

- Purpose of the Meeting: Discuss findings and solicit comments on the proposed plan
- DIFR-DEA released February 10, 2023
- Comment Period open through March 13, 2023

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NON-FEDERAL SPONSOR

Lower Mississippi River Conservation Committee (LMRCC):

- A coalition of 12 state natural resource, conservation, and environmental quality agencies in Arkansas, Kentucky, Louisiana, Mississippi, Missouri, and Tennessee.

- Since 1994, LMRCC has provided a regional forum dedicated to conserving the natural resources of the Mississippi's floodplain, focusing on habitat restoration, long-term conservation planning and nature-based economic development.

- LMRCC works in cooperation with numerous federal, state and non-governmental organizations for continual improvements to the Lower Mississippi River, recognizing its value as a multi-purpose river.

- https://www.lmrcc.org/

NON-FEDERAL SPONSOR

The LMRCC Member Agencies include:

- AR Department of Energy and Environment
- AR Game and Fish Commission
- KY Department for Environmental Protection
- KY Department of Fish and Wildlife Resources
- LA Department of Environmental Quality
- LA Department of Wildlife and Fisheries
- MS Department of Environmental Quality
- MS Department of Wildlife, Fisheries, and Parks
- MO Department of Conservation
- MO Department of Natural Resources
- TN Department of Environment and Conservation
- TN Wildlife Resources Agency

Additional Stakeholders:

- Gulf Hypoxia Task Force, LMR Sub-basin Committee
- City of Memphis
- Meeman Shelby Forest State Park, TN
- Eagle Lake State WMA, TN
- National Audubon Society-Audubon Delta
- The Nature Conservancy
- 25 Federally recognized Tribes
- 2 State Historic Preservation Officers (TN and AR)
- USFWS
- USGS, MS Cooperative Fish and Wildlife Research Unit, MSU
- EPA
- ERDC

BACKGROUND - LMRRA

Data Science and Communications Program				
	Recommendation	**Lead Organization**	**Cost**	**Value**
DISC 1	Science Technology Information Center	USGS	$2 million/year	Promote interagency cooperation, encourage research, foster public interest, and support other recommendations.
DISC 2	Sediment Study	USACE	$4 million/year	Support management plans, better manage dredging and coastal restoration.
DISC 3	Water Quality Monitoring Program	USGS & EPA	$2 million/ year	Provide clean water for people, industry, and habitat.
DISC 4	Tributary Watershed Studies	USACE	9 @ $1-$5 million each	Develop plans to manage tributaries for habitat, water quality, sediment, water supply, navigation and recreation.
DISC 5	Ecological Inventory	USACE & USFWS	$1.7 million	Provide information to support restoration.
Habitat Restoration and Management Program				
	Recommendation	**Lead Organization**	**Cost**	**Value**
HRMP 1	Conservation Reach Studies	USACE	8 @ $3 million each	Restore aquatic (side channel, oxbow, main channel, islands, and sandbars) and terrestrial (wetlands, bottomland hardwoods, and floodplain) habitats for native species and especially federally listed species.
HRMP 2	Aquatic Habitat Restoration Studies	USACE & USFWS	125 @ $200,000 to $ 15 million (maximum)	Restore individual sites for native species.
HRMP 3	Terrestrial Habitat Program	USDA & LMVJV	$18,000,000	Restore floodplain habitat.
HRMP 4	Invasive Species Program	MICRA & ANSTF	Part of larger effort	Promote and protect native species.
Recreation Program				
	Recommendation	**Lead Organization**	**Cost**	**Value**
RP 1	Boat Ramps	LMRCC and others	$50,000 - $750,000 each	Increase safety and meet recreation demand.
RP 2	Bicycle Trails	NGOs	variable	Increase safety and meet recreation demand.
RP 3	Riverfront Parks	Local Communities	variable	Promote community cohesiveness and meet demand.
RP 4	Riverboat Landings	Local Communities	variable	Provide safe, accessible opportunities and support local economic development.
RP 5	Marketing	NPS, MRPC, NGOs	$2 million	Promote river use and encourage economic development.
RP 6	Lodging and Dining	Private Enterprise	variable	Meet demand and support economic development.
RP 7	Outfitters and Guides	Private Enterprise	variable	Increase safety, meet demand and support economic development.

Eight reaches were identified as priorities:

Wolf Island to Island 8 Reach
RM 946 – 910 (36 mi.)

Hatchie/Loosahatchie Reach
RM 775 – 736 (39 mi) (TN/AR)

Islands 62/63 Reach
RM 650 - 618 (32 mi.)

Arkansas River Reach
RM 599 – 556 (43 mi.)

Possum (Worthington-Pittman) Reach
RM 524 – 490 (34 mi.)

Palmyra River Reach
RM 431 – 398 (33 mi.)

Lake Mary Reach
RM 360 -322 (38 mi.)

Raccourci Cutoff Reach
RM 300 -265 (35 mi.)

BACKGROUND - LMRRA

Habitat Restoration and Management Program				
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First of 8 priority reaches:

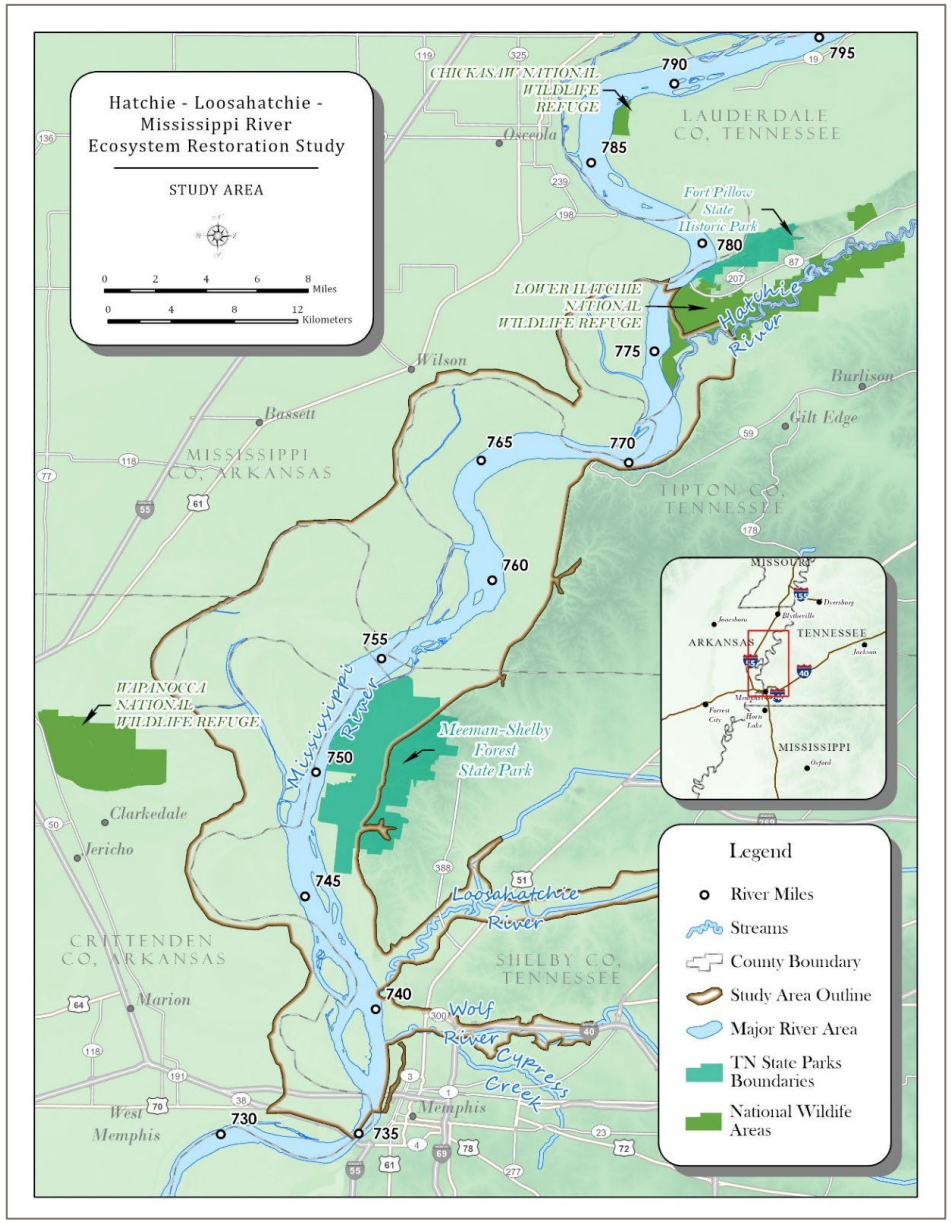
Hatchie/Loosahatchie Reach RM 775 – 736 (39 mi) (TN/AR)

PURPOSE AND NEED

- Historically, navigation and flood risk management has received the most attention in the LMR.

- The purpose and need for the proposed action are to restore habitat and ecosystem function along an approximate 39-mile reach of the LMR and its floodplain without conflicting with the existing USACE mission areas of ensuring navigation and flood risk reduction.

- The goal of restoration in this reach of the LMR is to restore ecological structure and function to the mosaic of habitats along the Mississippi River including secondary channels and other aquatic habitat; floodplain forests; and several scarce vegetative communities such as wetlands, rivercane, riverfront forests, and BLH forests.



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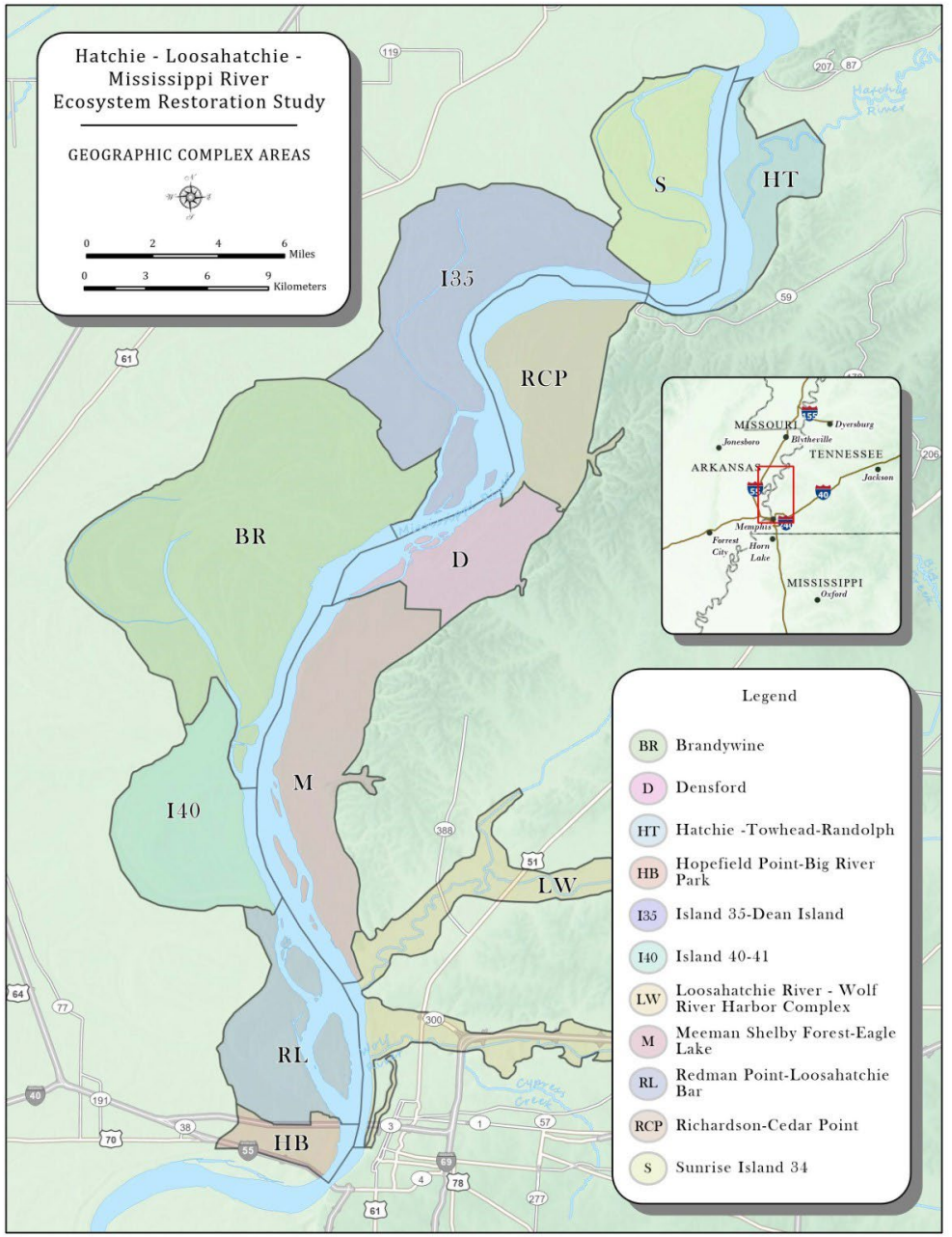
STUDY AREA

- 39-mile reach
- Includes the lands and waters between the levees and high bluffs
- Totals approximately 146,000 acres of the Mississippi River and surrounding riverside acreage
- Includes 11 geographic complexes



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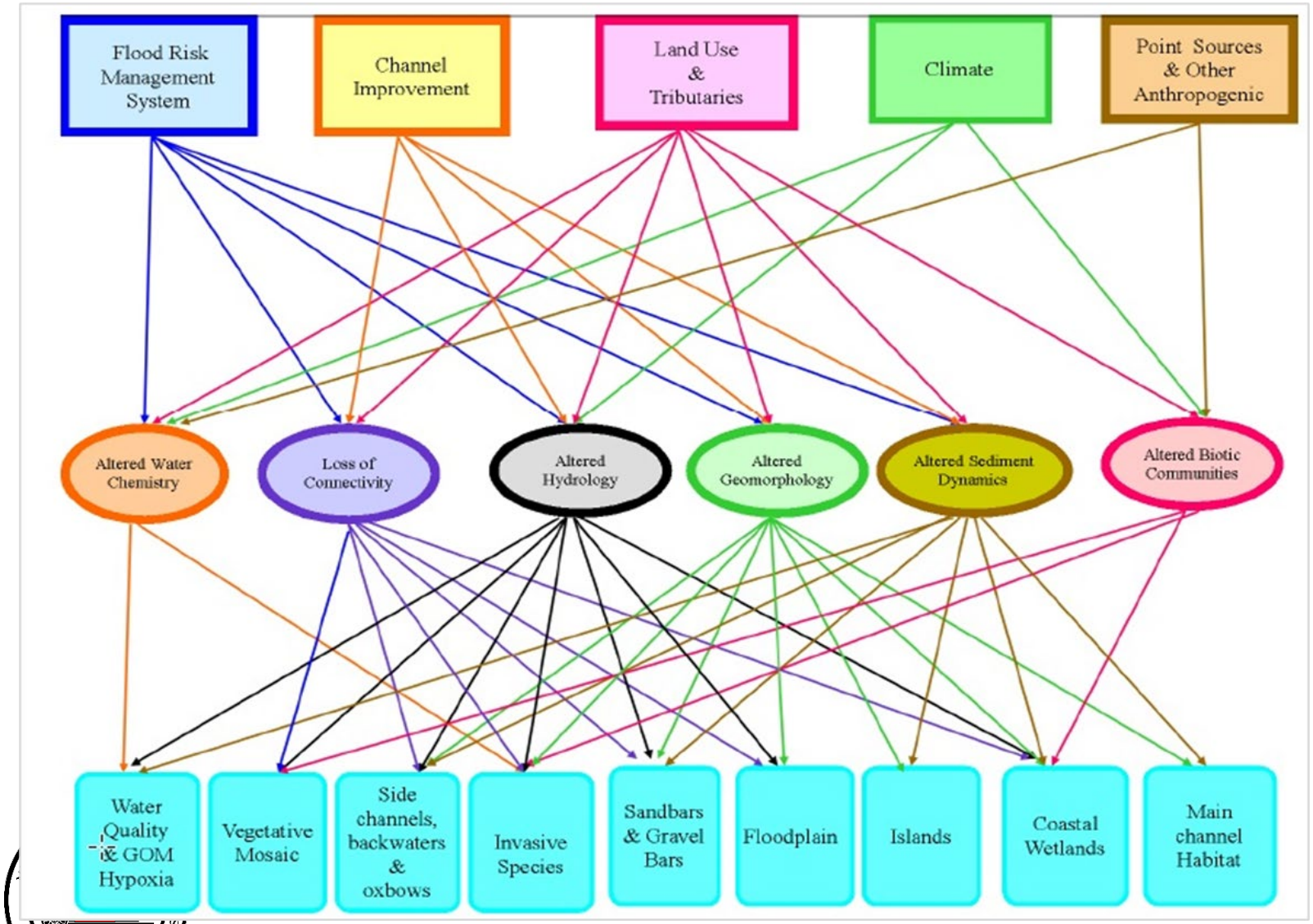
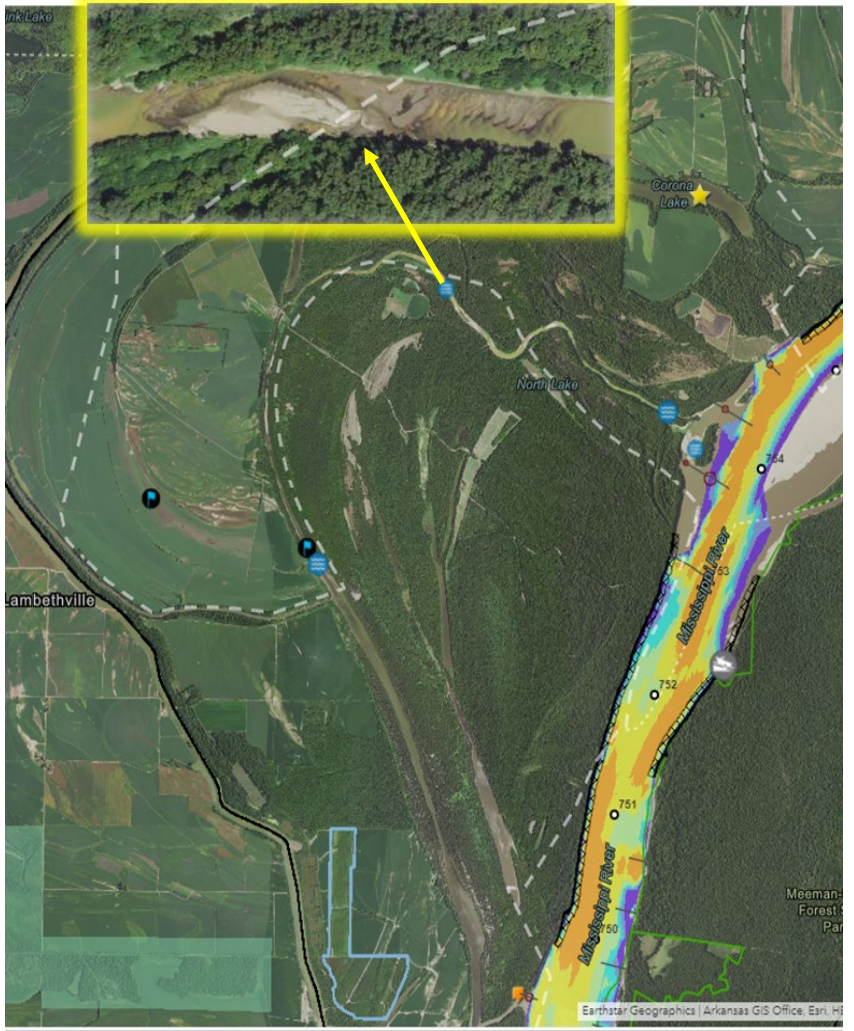
PROBLEMS AND OPPORTUNITIES





GOAL AND OBJECTIVES

GOAL: To restore ecological structure and function to the **mosaic of habitats** along the Mississippi River including secondary channels and other aquatic habitat; floodplain forests; and several scarce vegetative communities such as wetlands, rivercane, riverfront forests, and BLH forests.

OBJECTIVE 1: Increase quantity and/or quality of vegetated habitats and maintain a diverse **vegetative mosaic** in the floodplain to benefit native fish and wildlife resources (e.g., migratory birds and species of conservation concern) focusing on habitat such as: emergent, floating, and submersed aquatic vegetation; rivercane; BLH.

Priority species: Indiana Bat, NLEB, Little Brown Bat, Prothonotary Warbler, Rusty Blackbird, - (BLH); King rail - (herbaceous wetlands), Swainson's Warbler - (rivercane), waterfowl, etc.

OBJECTIVE 2: Improve quantity and/or quality of diverse **large river habitats** (sandbars, gravel bars, secondary channels, etc.) to support critical life history requirements of priority species.

Priority species: Pallid Sturgeon, Blue Sucker, Lake Sturgeon, Sicklefin Chub, Stonecat, American Eel (secondary channels, gravel bars, point bars); Interior Least Tern (sandbars).

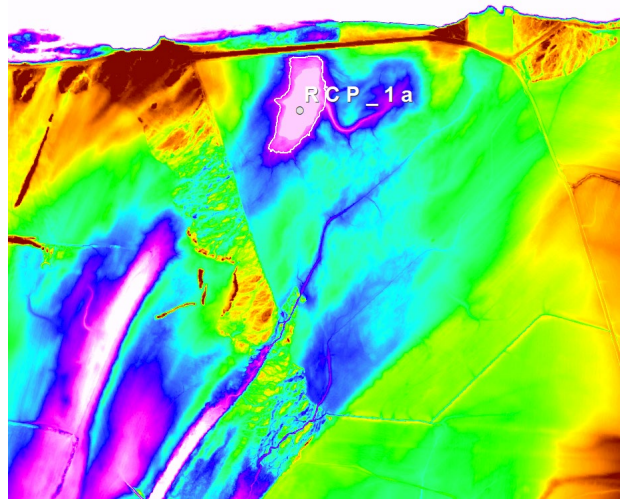
OBJECTIVE 3: Increase quality of the diverse mosaic of **floodplain waterbodies** (including but not limited to meander scarps, sloughs, crevasses, and borrow areas) and optimize their **aquatic connectivity** with the Mississippi River to support critical life history requirements of priority species.

Priority species: Alligator Gar, Paddlefish, Alligator Snapping Turtles (floodplain waterbodies, floodplain spawning habitat, etc.).

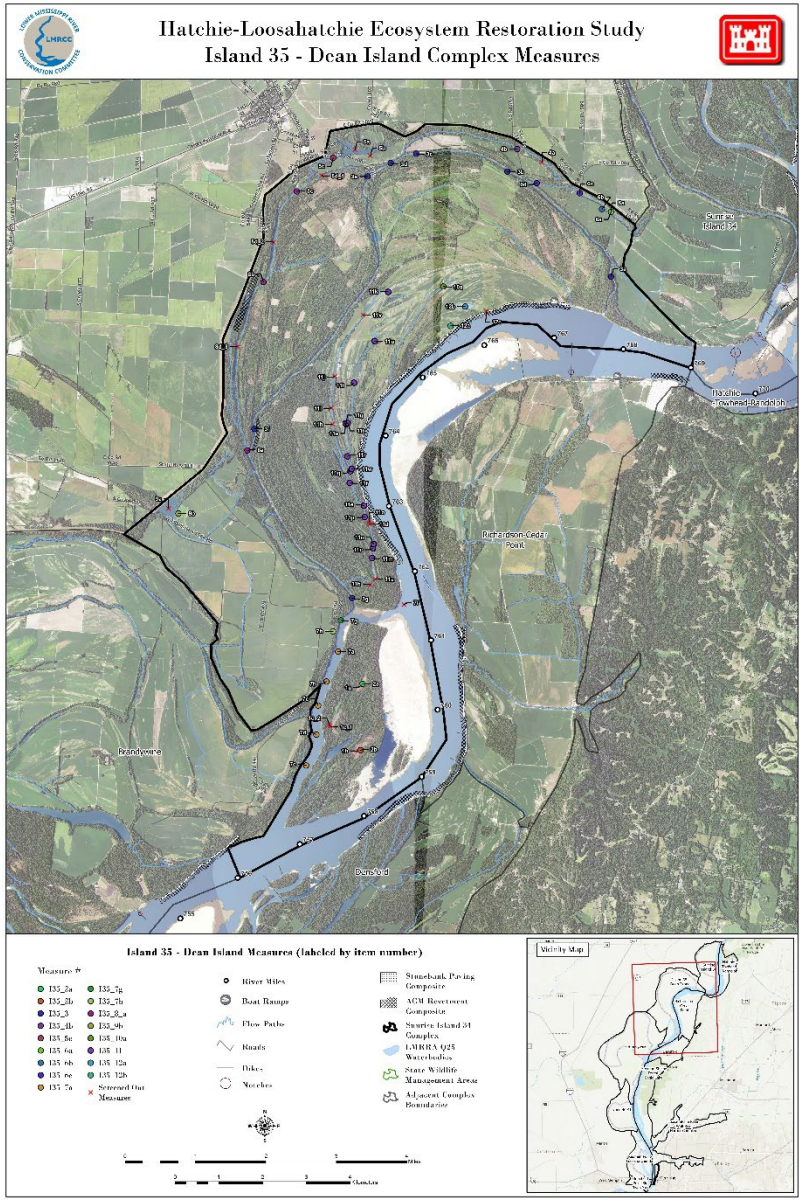
OBJECTIVE 4: Improve **recreational** opportunities and access to public spaces in study area.

EXAMPLE VEGETATIVE MEASURES

- Cypress-Tupelo establishment
- BLH – promotion of Oak/Hard Mast species
- Seasonal herbaceous wetlands
- Riparian buffers
- Rivercane

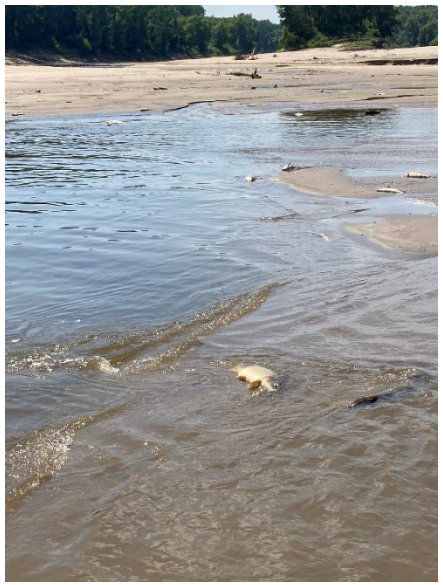


EXAMPLE MEASURE: DIKE NOTCHING



EXAMPLE MEASURE: INCREASE CONNECTIVITY TO MEANDER SCARP

- Install River Training Structure to divert water
- Remove accumulated sediment
- Notch old pile dike
- Lower invert elevation of bridges



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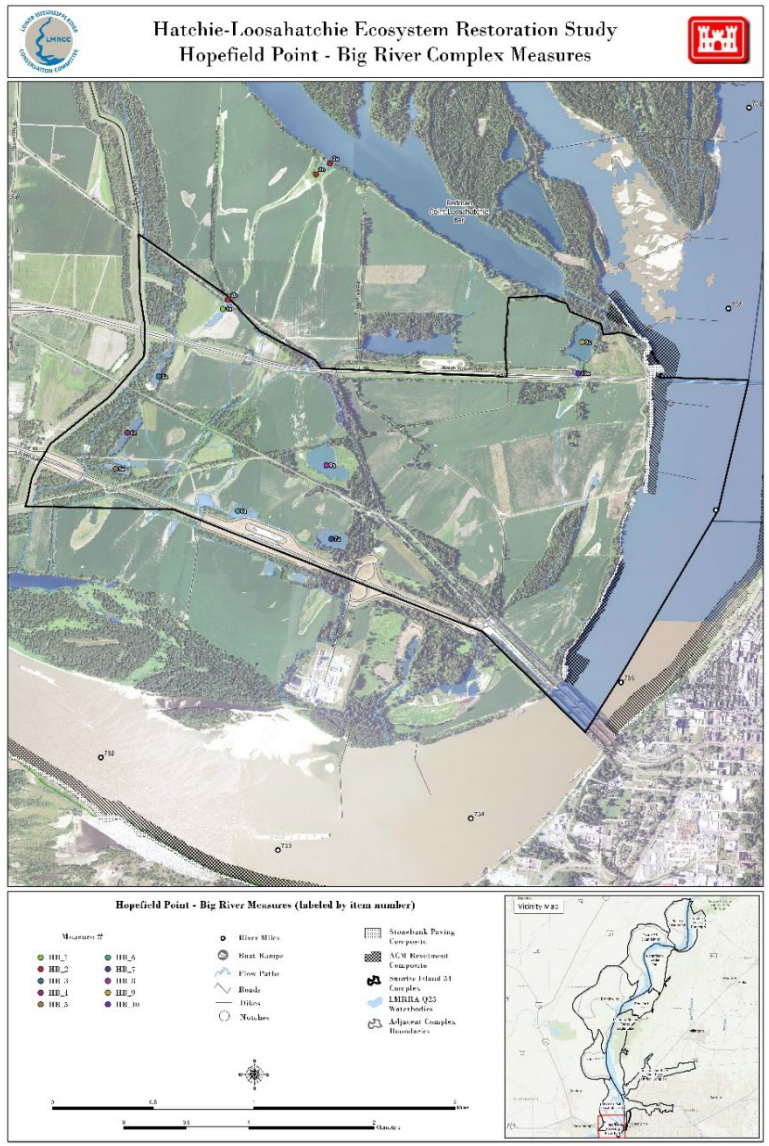
EXAMPLE MEASURE: BORROW AREA/FLOODPLAIN LAKE RESTORATION

- Restoring Habitat Complexity in Borrow Areas (floodplain lakes)



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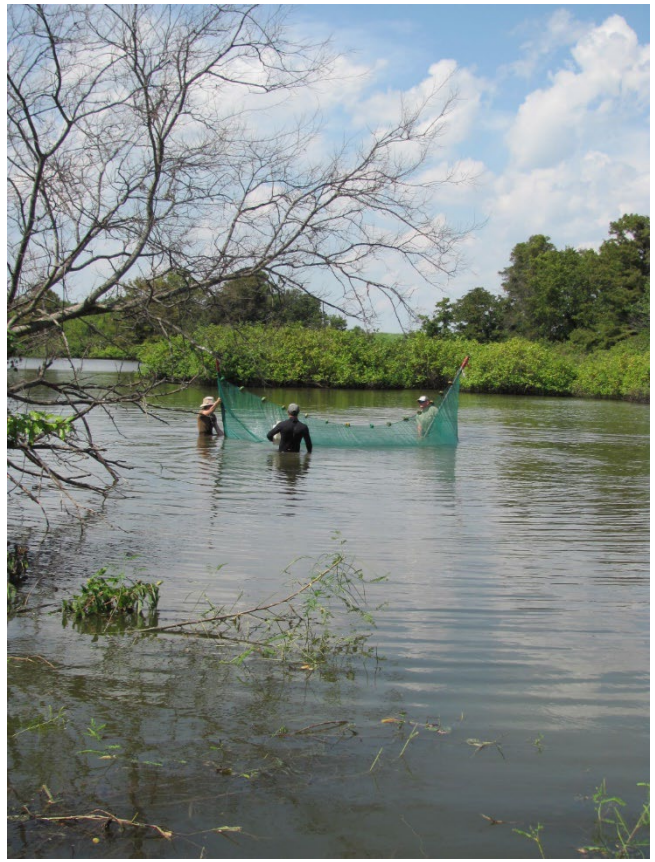
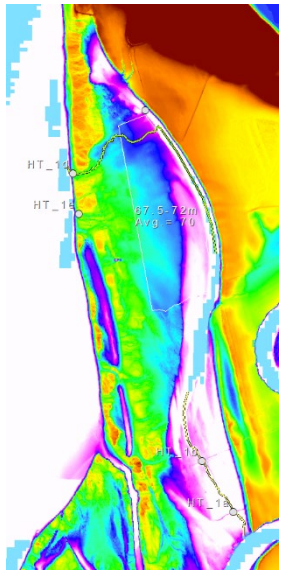
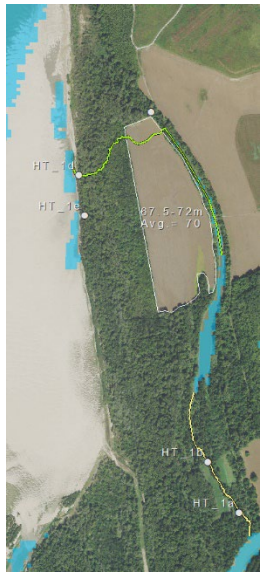
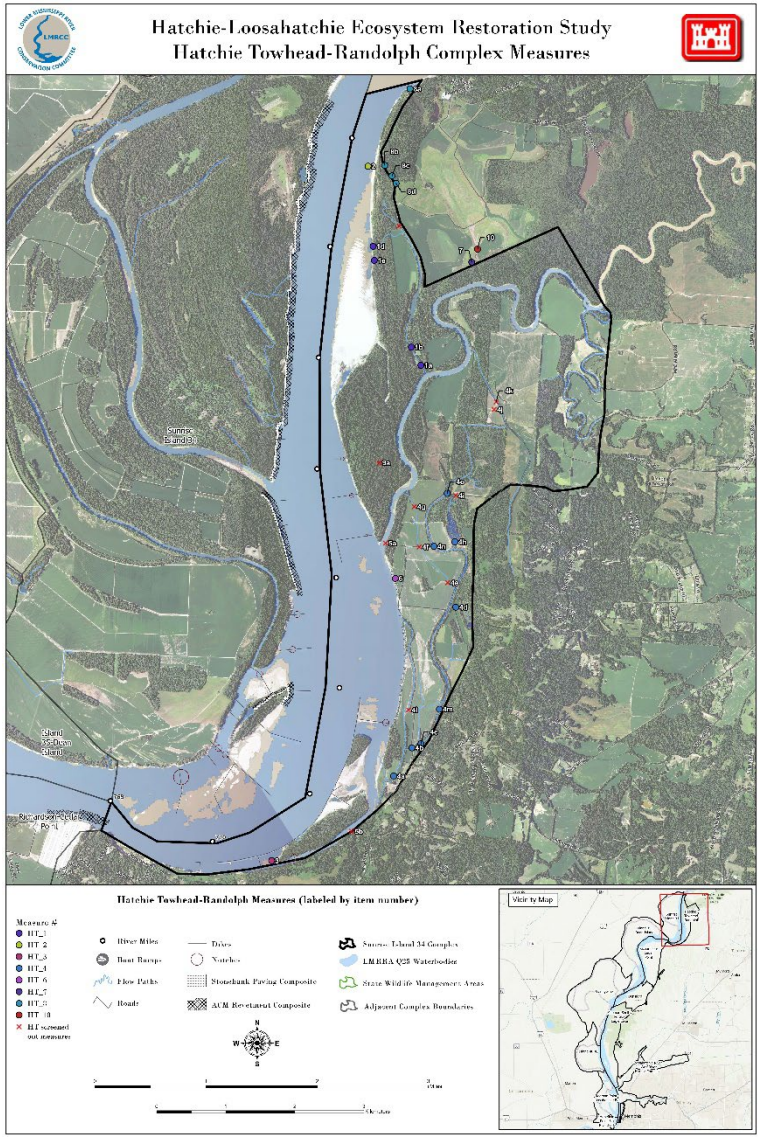


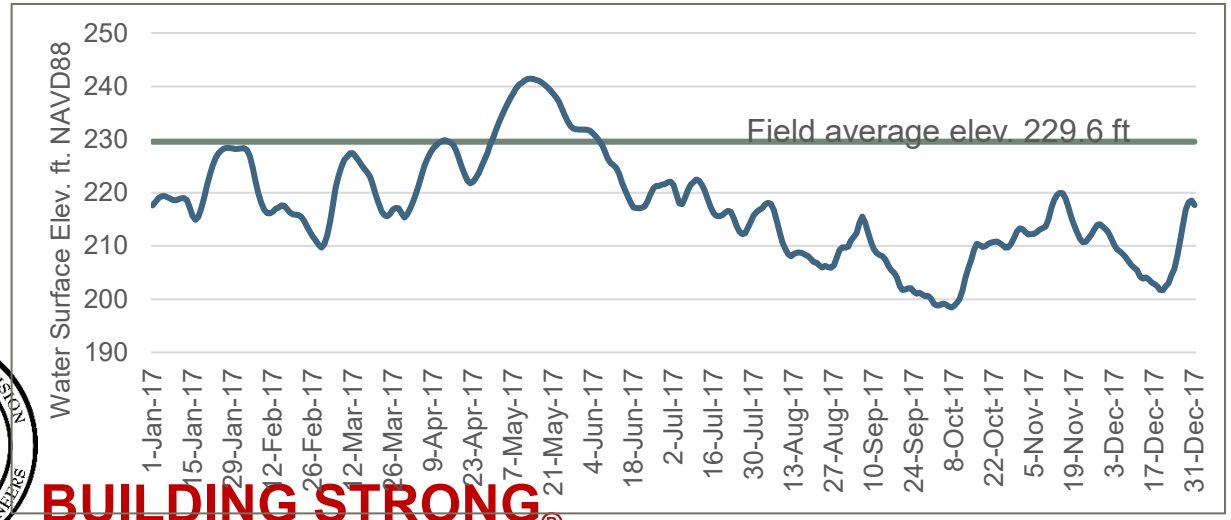
EXAMPLE MEASURE: INCREASE CONNECTIVITY OF FLOODPLAIN WATERBODIES





- Obstruction removals (lowering culvert inverts, etc.)
- Benefits to floodplain fish spawners, waterfowl, etc.





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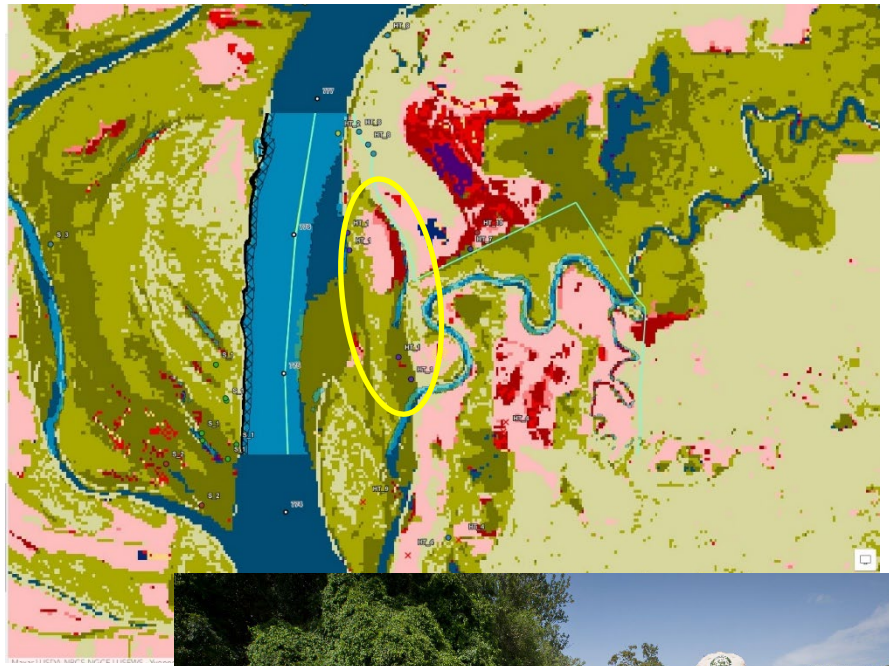

USFWS

Lower Mississippi River Basin

Asian Carp Control Strategy Framework

North American Journal of Fisheries Management 40:580–594, 2020
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SPECIAL SECTION: ALLIGATOR GAR

Using Remote Sensing to Assess Alligator Gar Spawning Habitat Suitability in the Lower Mississippi River

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Abstract
Floodplains are an important part of large-river ecosystems; the frequency, timing, duration, and spatial extent of inundation drive habitat quality and determine the suitability of these habitats for both aquatic and terrestrial organisms. Managers have traditionally had very limited information with which to evaluate and quantify the dynamics of large-river floodplains. Alligator Gar *Atractosteus spatula* use floodplains in the lower Mississippi River for spawning and have experienced declines in historic range that have been partly attributed to declines in spawning habitat availability. The Alligator Gar has therefore been identified by the American Fisheries Society, the U.S. Fish and Wildlife Service, and many state agencies as a species of concern in the lower Mississippi Alluvial Valley. The goal of this study was to develop landscape-level spatial data to determine the extent and quality of floodplain habitat that may be available for Alligator Gar spawning. Multi-temporal analysis of remote sensing imagery was used to develop spatial data products that defined floodplain inundation extent, inundation frequency, and temperature. These products were combined with existing layers of physical habitat structure to define and quantify spawning habitat suitability throughout the entire area subject to direct inundation by the lower Mississippi River. Habitat suitability categories were defined based on meeting unique combinations of inundation, temperature, and physical structure so that the most suitable conservation measures can be applied to improve local conditions.

Floodplains are an integral part of large-river ecosystems, where high flows that provide connectivity between the floodplain and the main-stem river (Welcomme 1979) drive ecosystem productivity (Junk et al. 1989). Many aquatic species take advantage of inundated floodplains for spawning and nursery habitat (Welcomme 1979; Bayley 1988; Kwak 1988; Agostinho et al. 2004; Balcombe et al. 2005; Farly et al. 2019), where there may be elevated primary productivity, more moderate environmental conditions, and physical structure of vegetation offering refuge from predation (Schramm and Eggleton 2006; Górski et al. 2010). River regulation and other hydrologic alterations, including levee construction, dam building, channel training, and natural patterns of deposition and accretion, have altered flow magnitude, frequency, duration, timing, and rate of change as well as the connectivity of many rivers with their adjacent floodplains. These engineered changes impact the function of the floodplain and in turn impact main-stem river function (Poff et al. 1997). On the lower Mississippi River, extensive levee construction during the last 150 years has separated over 90% of the historical floodplain from the main river channel (Baker et al. 1991). This reduction in habitat is particularly detrimental for species that have evolved to depend on a much larger Mississippi River floodplain. The floodplain on the St. Catherine Creek National Wildlife Refuge (SCCNWR; Figure 1) is one of the few areas of broad, low-relief floodplain that are still directly connected to the lower Mississippi River. The refuge lies on a narrow corridor between the Mississippi River to the west and high

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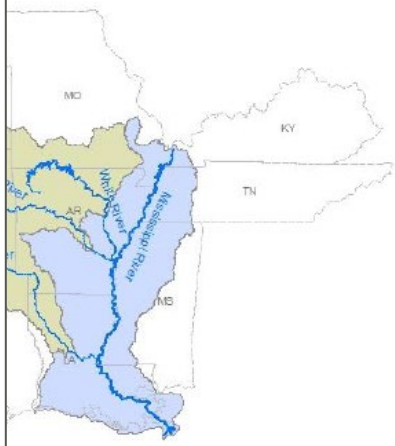
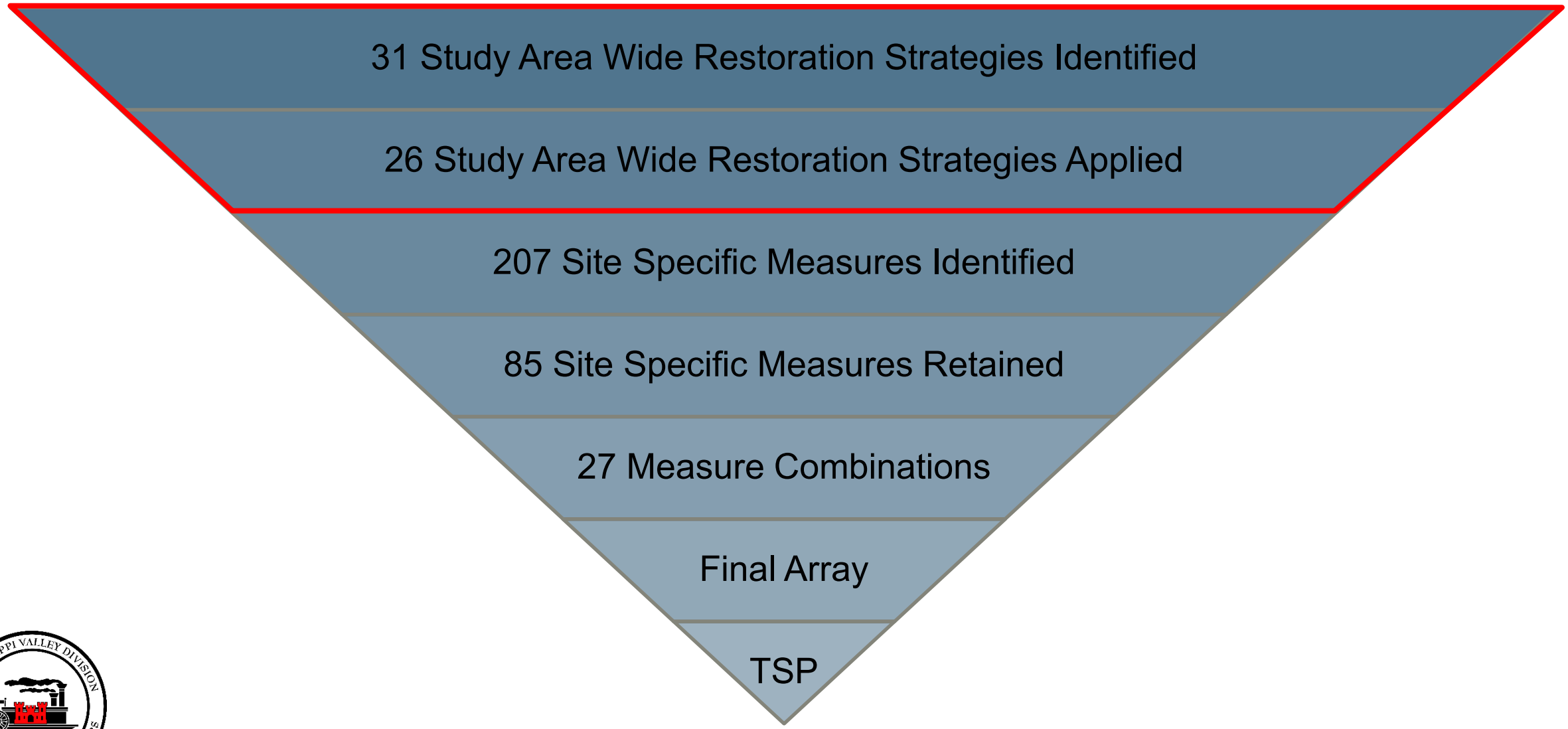


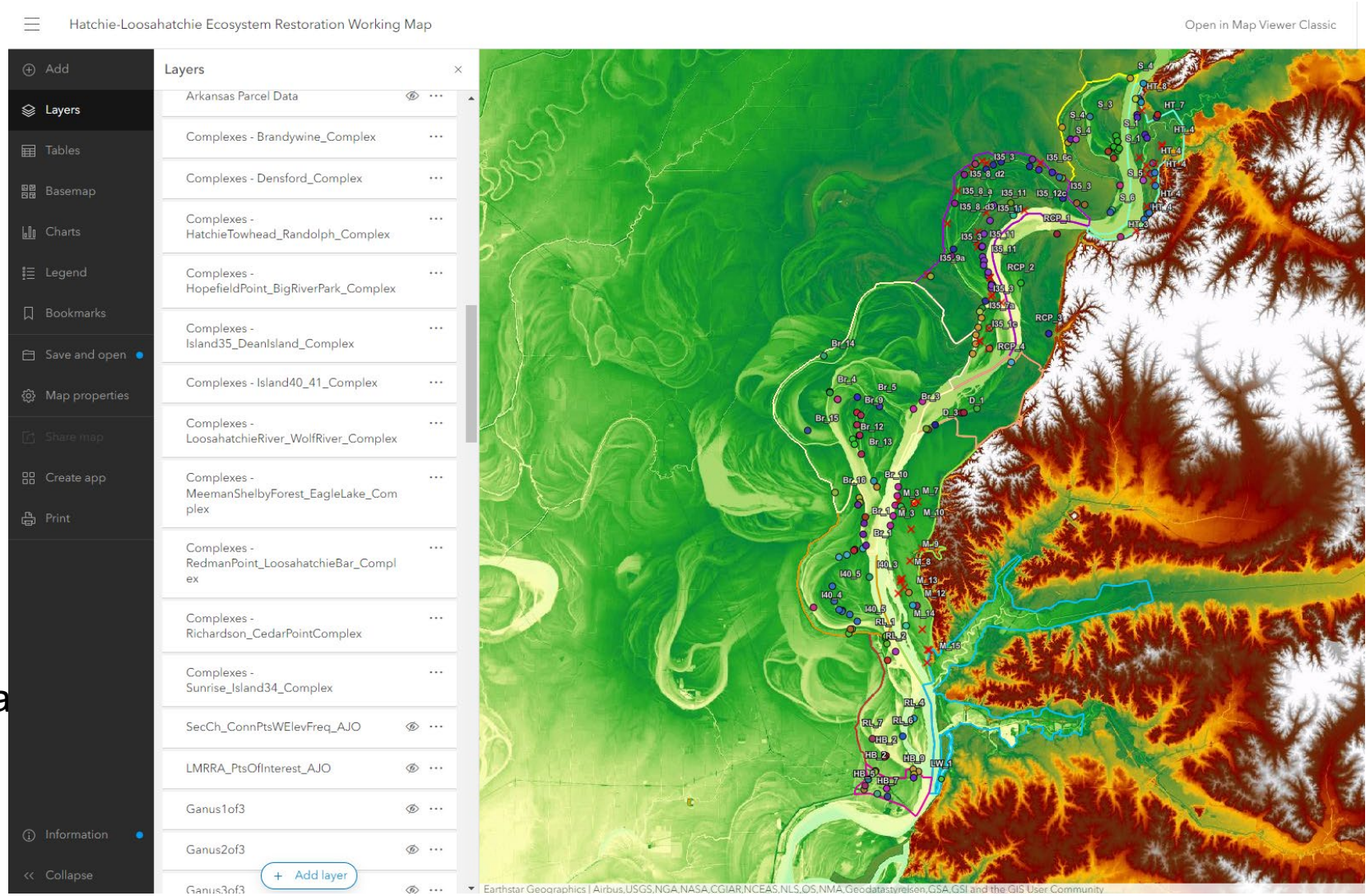
ower Mississippi River Sub-basin
rkansas, White, and Red Rivers Sub-basin

PLAN FORMULATION SUMMARY



ARCGIS ONLINE (AGOL) FOR ALTERNATIVE DEVELOPMENT

- Study Area
- River Miles
- Boat Ramps
- LMRCC RAGR Projects
- Bathymetry
- Dikes
- Notches
- Revetment
- Dredging Locations
- Gravel Bars
- Least Tern Nesting Sites
- Landcover
- Public Lands
- 2yr-5yr Flood Frequency
- USFWS Alligator Gar HSI
- LMVJV Bird Priority Areas
- NRCS Easements
- Hydric Soils
- Low Water Imagery
- Historic River Maps
- Elevation Data
- Floodplain Waterbodies
- Habitat Complexes



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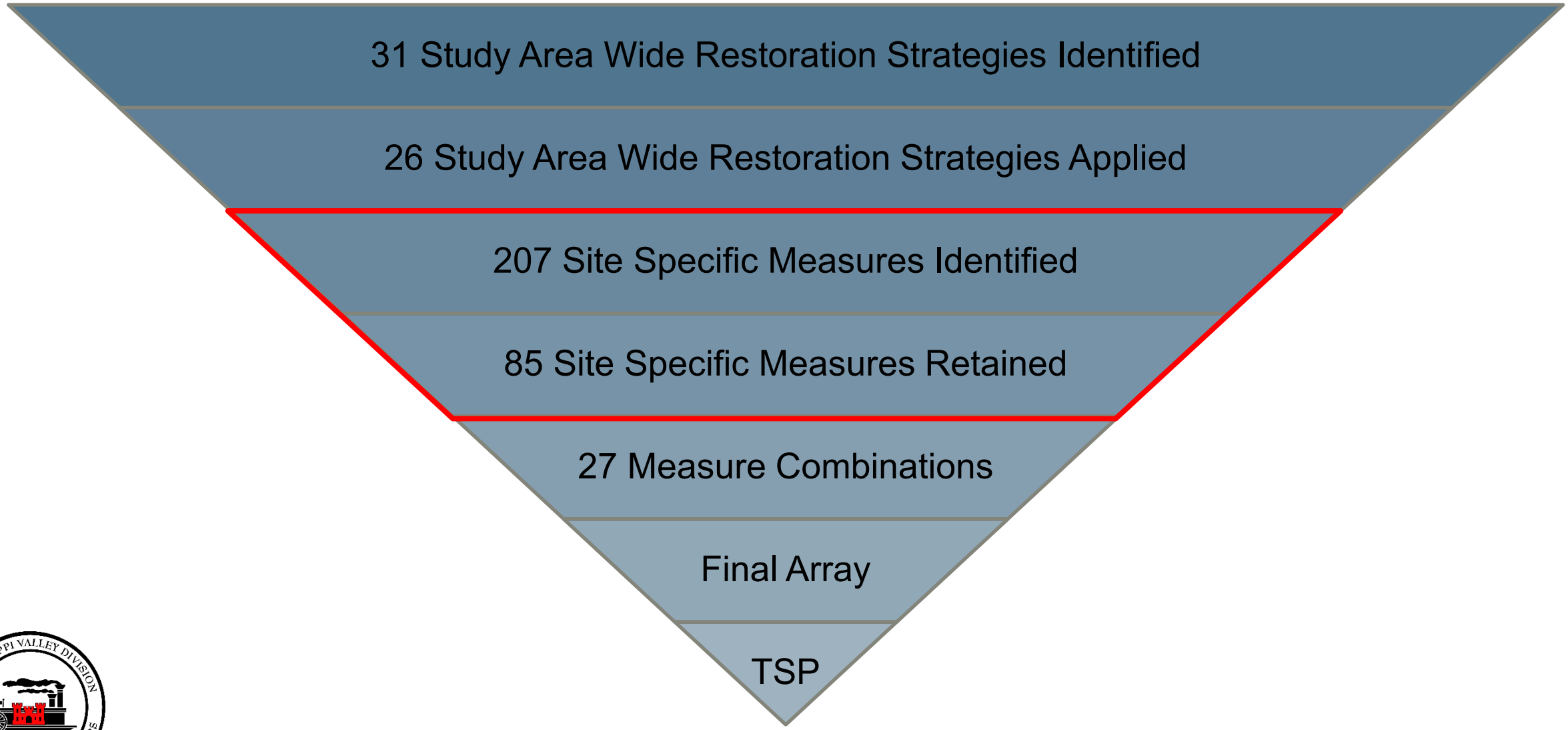
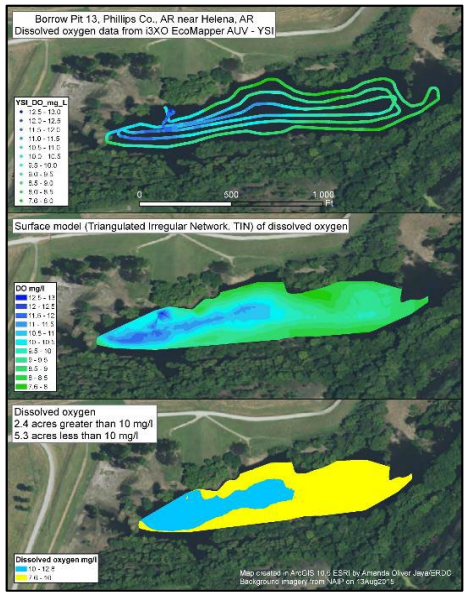
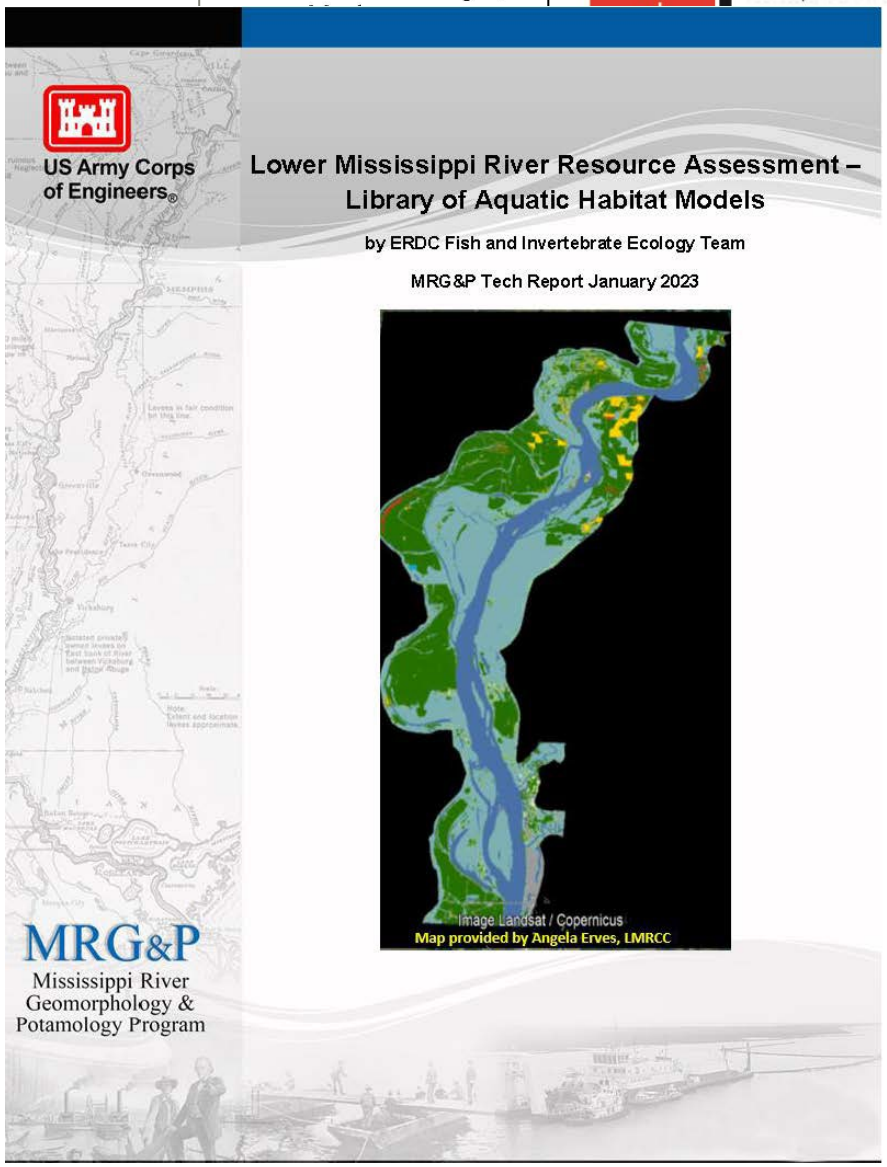
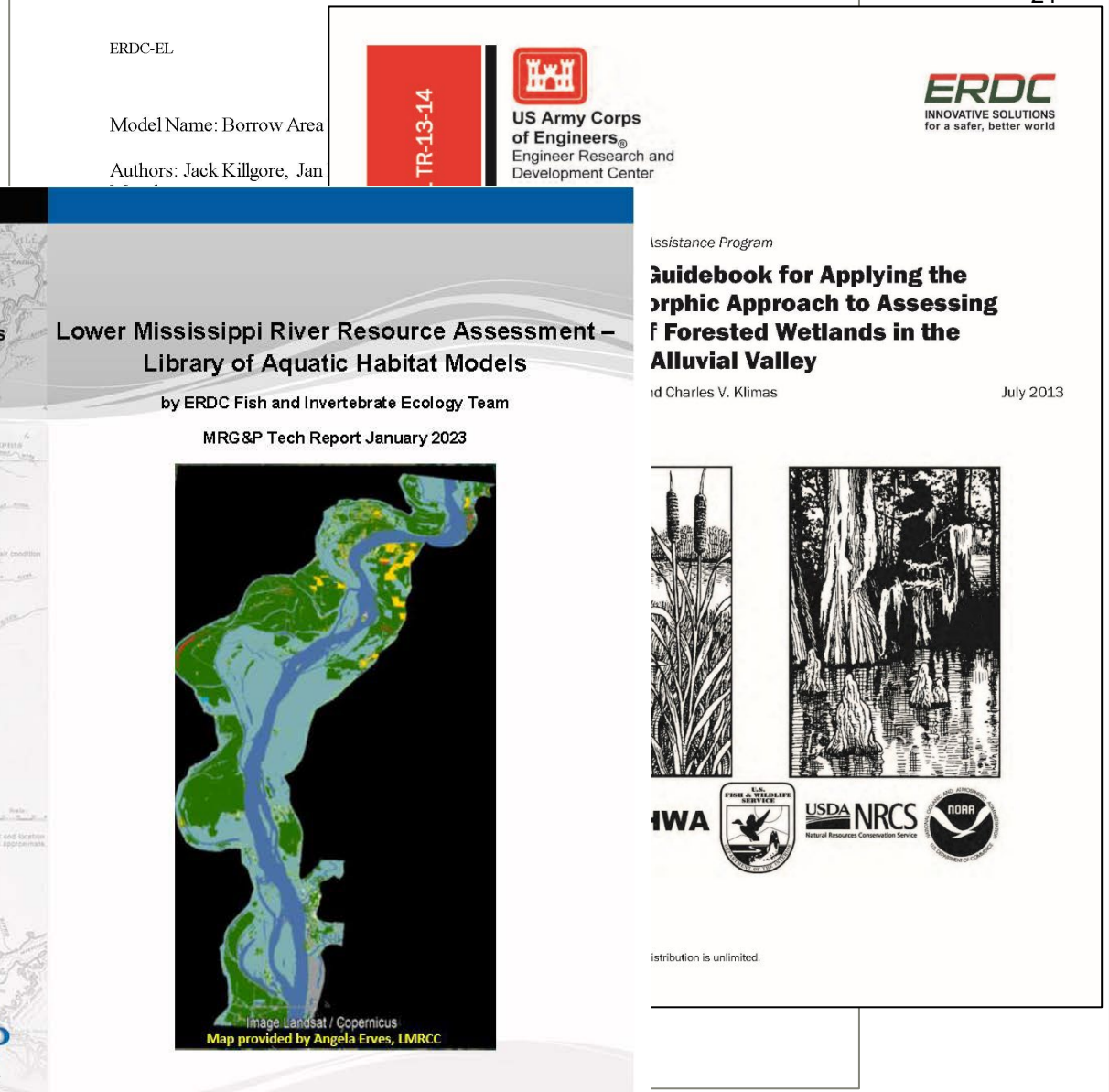
PLAN FORMULATION SUMMARY



ECOLOGICAL MODELS







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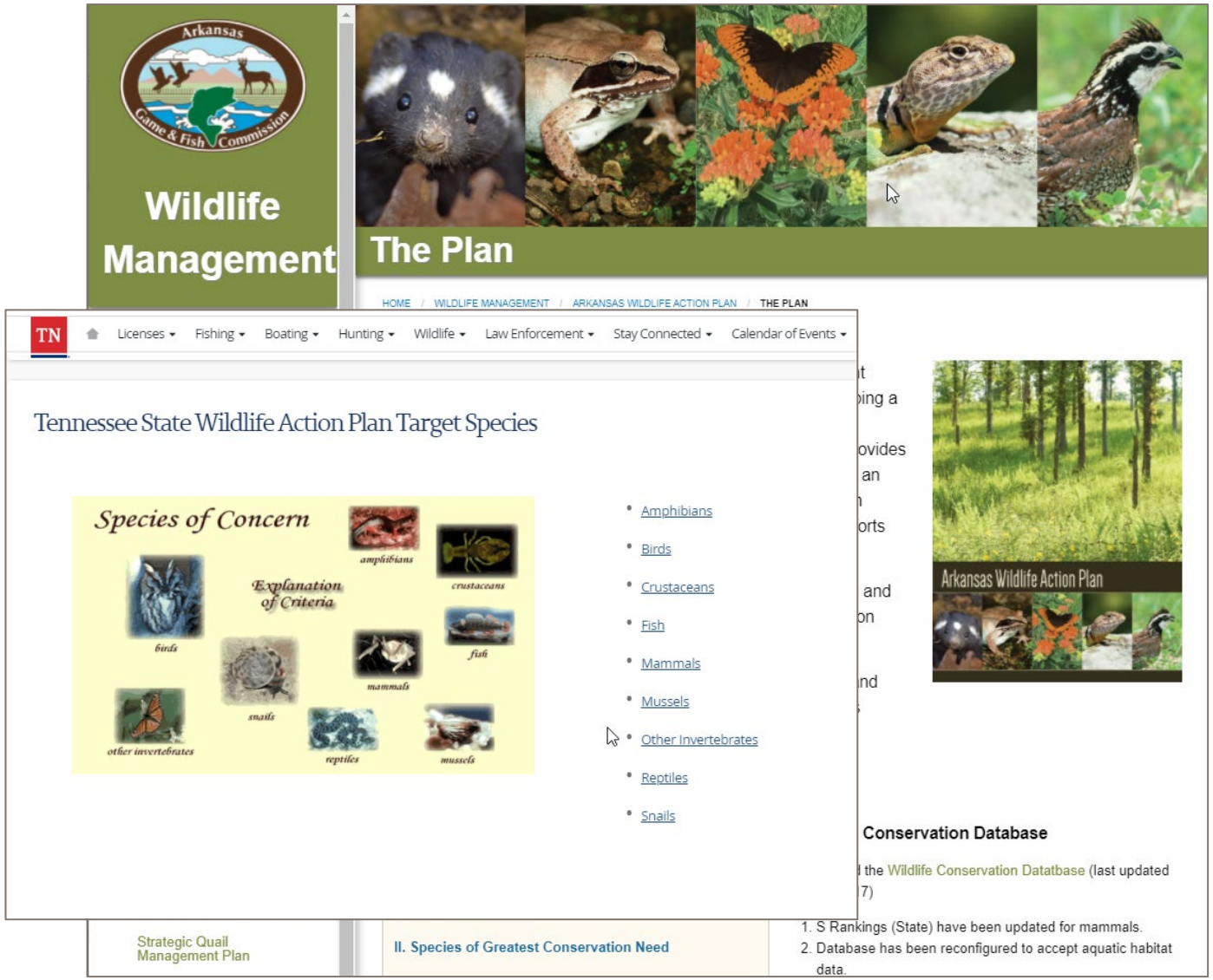
SIGNIFICANCE OF ECOSYSTEM OUTPUTS

- Institutional Recognition: importance is recognized in laws, plans, policy, etc.
- Public Recognition: importance is recognized by some segment of general public
- Technical Recognition
  - Scarcity (relative abundance)
  - Representativeness (ability to exemplify the natural habitat or ecosystem)
  - Status and Trends (declining trends, imperiled status)
  - Connectivity
  - Limiting Habitat
  - Biodiversity (e.g., species richness and evenness)



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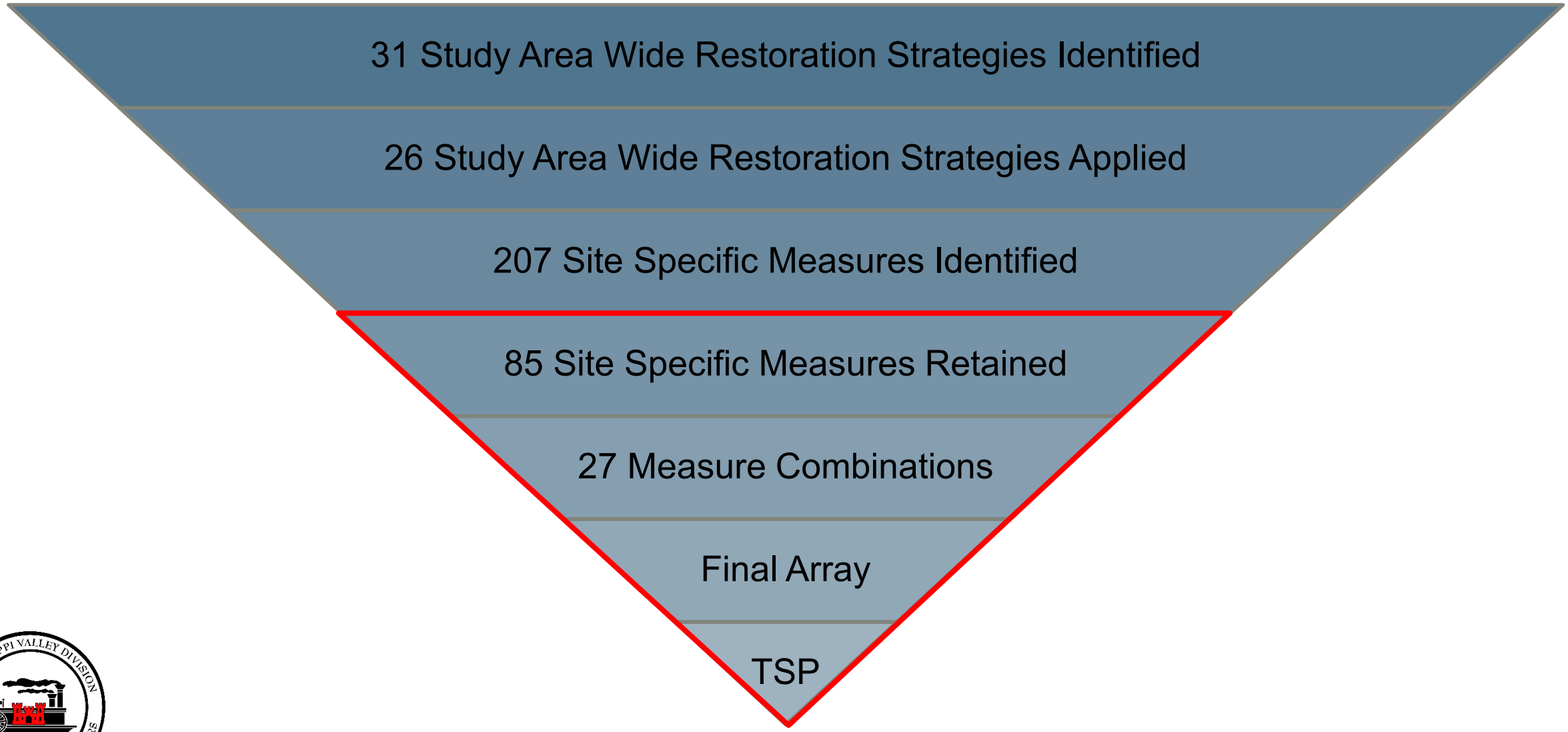


FINAL ARRAY OF ALTERNATIVES

- 10 Alternatives: No action alternative and 9 Action Alternatives (Alternatives A through C7). (in addition to ecological measures shown there are 2 recreation focused measures to improve public access and education that can be added to any alternative)
  - No Action Alternative: future without project condition that all alternatives are compared to
  - Study team developed alternatives:
    - Alternative A: 32 ecological measures focused on those measures the study team felt maximized habitat diversity across all objectives and ecological model runs; provides 3,110 AAHUs across 4,256 acres
    - Alternative B: 23 ecological measures focused on existing public lands and publicly accessible open water; provides 2,205 AAHUs across 3,564 acres
  - Alternative C: Cost Effectiveness/Incremental Cost Analysis (CE/ICA) developed alternatives: 7 sub-alternatives formulated from combinable groupings of 58 measures informed by average annual costs and benefit outputs in the CE/ICA software.
    - C1 – 31 ecological measures; provides 4,180 AAHUs across 5,494 acres
    - C2 – 32 ecological measures; provides 4,481 AAHUs across 6,199 acres
    - C3 – 38 ecological measures; provides 4,673 AAHUs across 6,282 acres (Tentatively Selected Plan - TSP)
    - C4 – 55 ecological measures; provides 4,722 AAHUs across 6,735 acres (largest benefits)
    - C5 – 37 ecological measures; provides 4,551 AAHUs across 6,274 acres
    - C6 – 24 ecological measures; provides 3,232 AAHUs across 4,163 acres
    - C7 – 27 ecological measures; provides 4,346 AAHUs across 5,917 acres

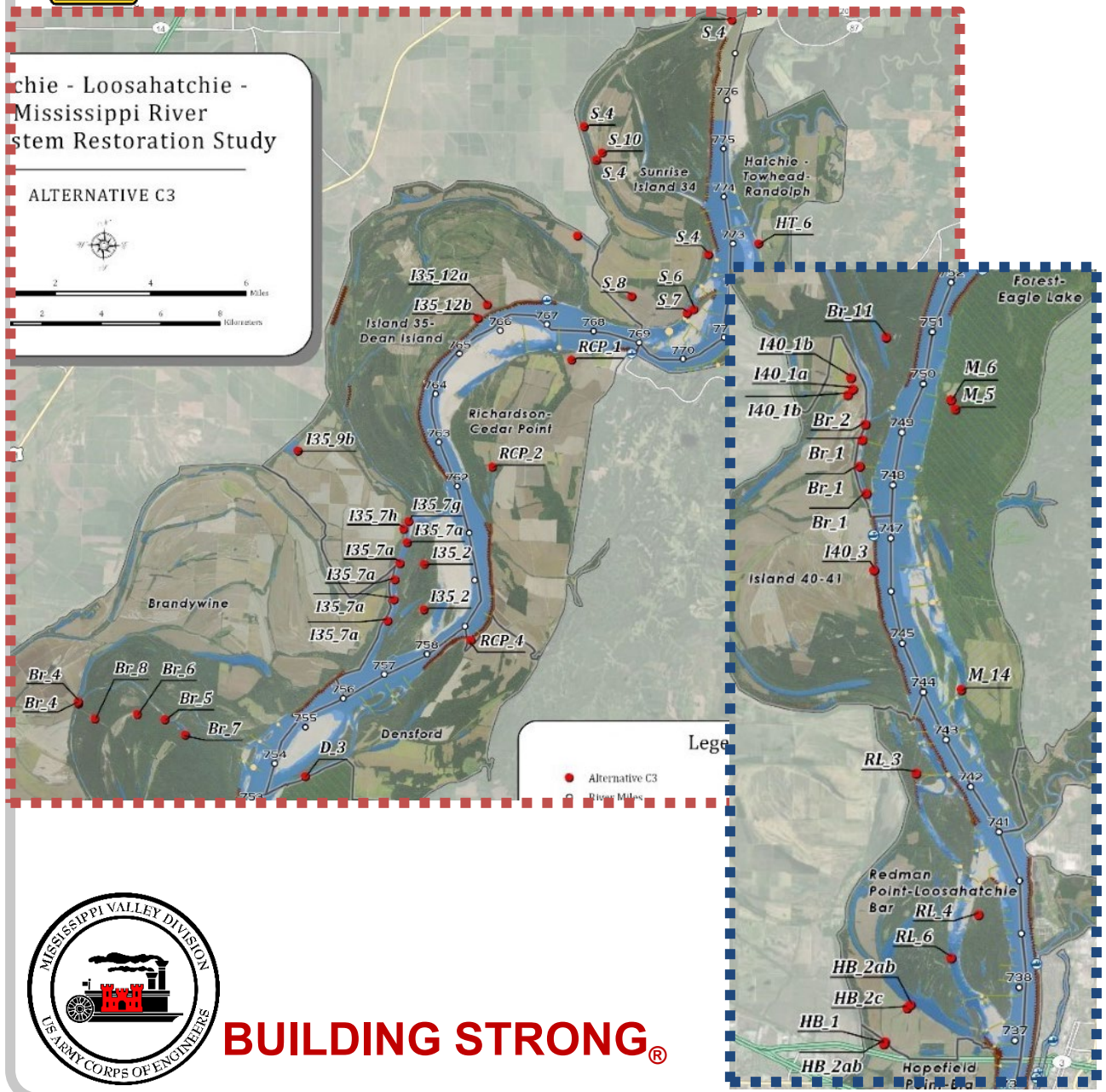
TENATIVELY SELECTED PLAN

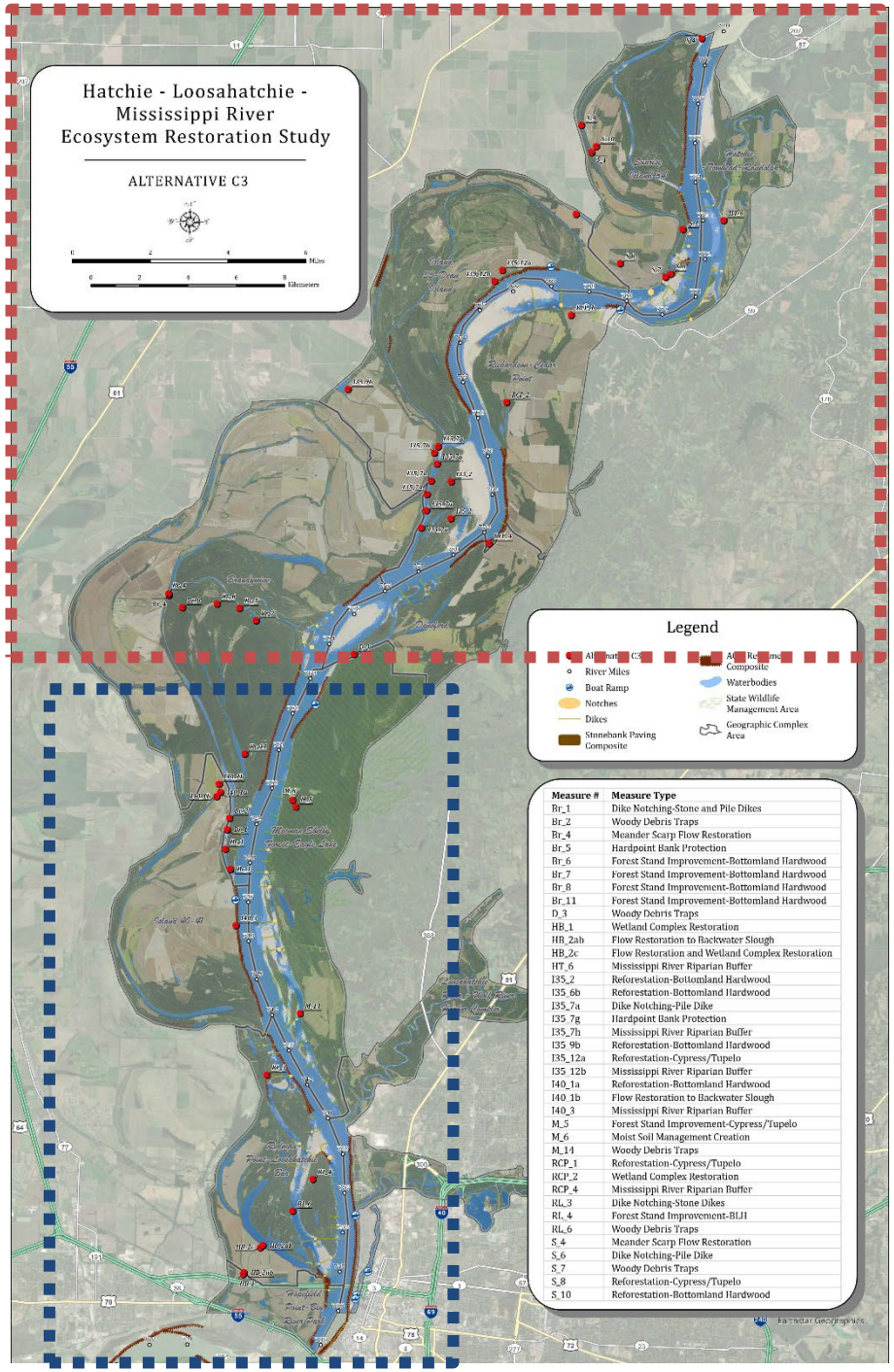
BLUF: We have identified an effective, efficient, complete and acceptable recommended Ecosystem Restoration Plan which maximizes benefits over multiple accounts.

Recommended TSP (Alternative C3):

- Best Buy Plan – 38 Ecological Measures; 2 Recreational Measures
  - Provides restoration to over 6,000 acres of habitat
  - Includes 2 Meander Scarps, rare geomorphological feature no longer being created due to river control; preferred habitat for T&E species breeding and refugia (e.g., fat pocketbook mussel, young of the year pallid sturgeon)
  - Technically significant habitat for alligator gar and cypress-tupelo
  - OSE Benefits – accessibility for recreation and benefits to those that live near or use the river. Over 95% of benefits are located within areas mapped as disadvantaged communities using the recently developed Climate and Economic Justice Screening Tool (CEJST)

MAP OF TSP





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SIGNIFICANT RESOURCES

- Land Use
- Wetlands
- Wildlife
- Aquatic Resources
- Special Status Species
  - Federally Threatened and Endangered
  - State Species of Conservation Concern
- Invasive Species
- Recreation
- Greenhouse Gases
- Geology and Soils
- Water Quality
- Cultural Resources
- Air Quality
- Hazardous, Toxic and Radioactive Waste (HTRW)
- Socioeconomics
- Environmental Justice

SUBMITTING COMMENTS

1) Send E-mail to: LMRRA-Hatchie-Loosahatchie@usace.army.mil

2) Mail to:
ATTN: CEMVN-PDC-UDC
U.S. Army Corps of Engineers
Memphis District
167 North Main St., RM B-202
Memphis, TN 38103-1894

Comment closing date is March 13, 2023.

For copies of the Integrated Draft Feasibility Report and Draft Environmental Assessment and additional information about the project, please visit the project website: https://www.mvm.usace.army.mil/Missions/Environmental-Stewardship/Hatchie-Loosahatchie-Mississippi-River-Ecosystem-Restoration-Study