

Illinois River Reach Planning

Navigation and Ecosystem Sustainability Program

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Regional Teams FWWG, FWIC, RRAT, IRWG

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Of the Illinois River System

5 October, 2011

Peoria, Illinois



**US Army Corps
of Engineers**

St. Louis District
Rock Island District
St. Paul District

UMRS Reach Planning: How Did We Get Here?

- Environmental Management Program authorization in water Resources Development Act of 1986
- EMP System Ecological Team (SET) HREP sequencing strategy (i.e., reach-scale objectives to develop requests for projects and structured decision making tools for ranking)
- Illinois River Basin Restoration Comprehensive Plan
- NESP Science Panel review of UMRS restoration planning
- NECC request for Science Panel to develop System Goals and Objectives
- WRDA '07 opportunities
- WRDA '07 guidance to emphasize “ranking system” and “natural river processes” in ER projects

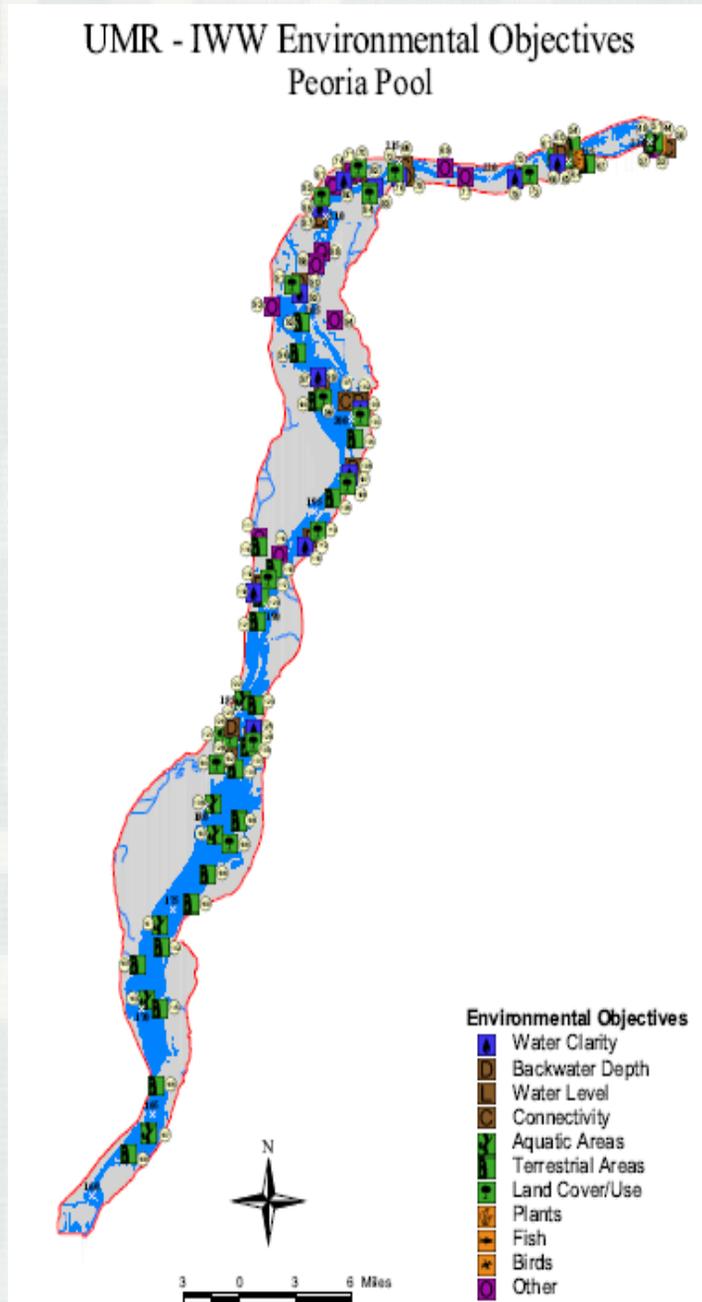
Environmental Management Program

Habitat Rehabilitation and Enhancement Projects

- Late '80s “matrix”
- 1997 Report to Congress – “transparency”
- 1998 Habitat Needs Assessment
- 2000 Sequencing Framework development and coordination
- 2003 EMP HREP Sequencing Framework
- 2004 NESP Sequencing Team merger
- 2005 SET Planning and Sequencing Framework
- 2006 18 New EMP Projects

Habitat needs Assessment

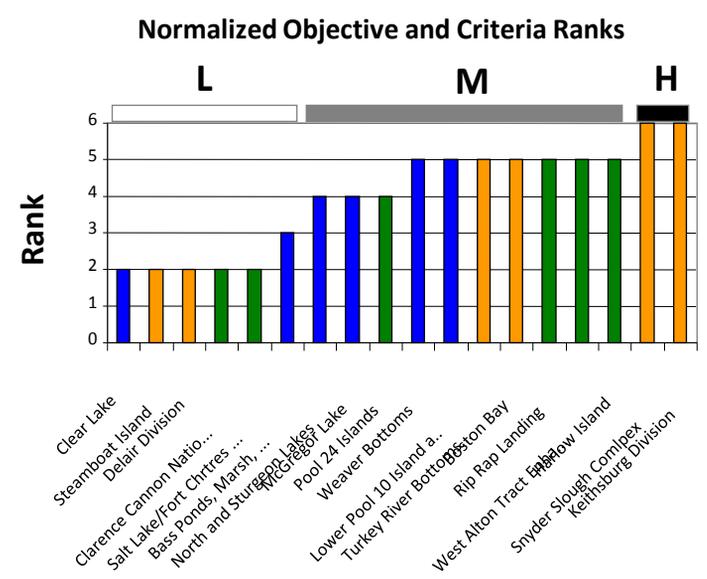
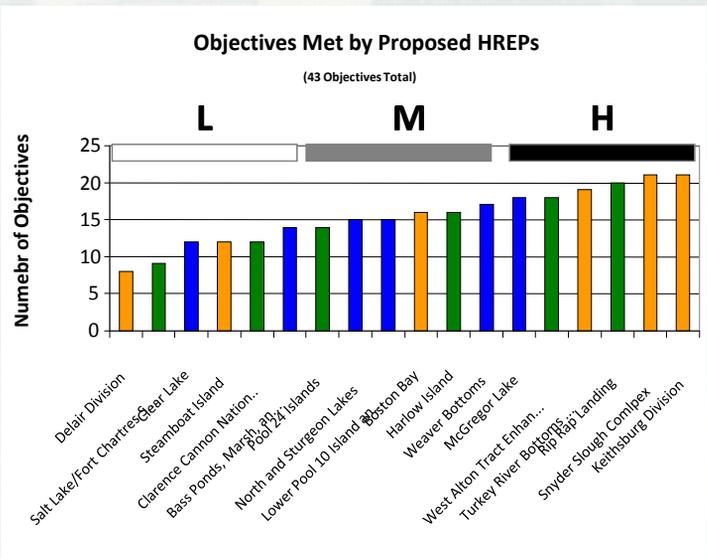
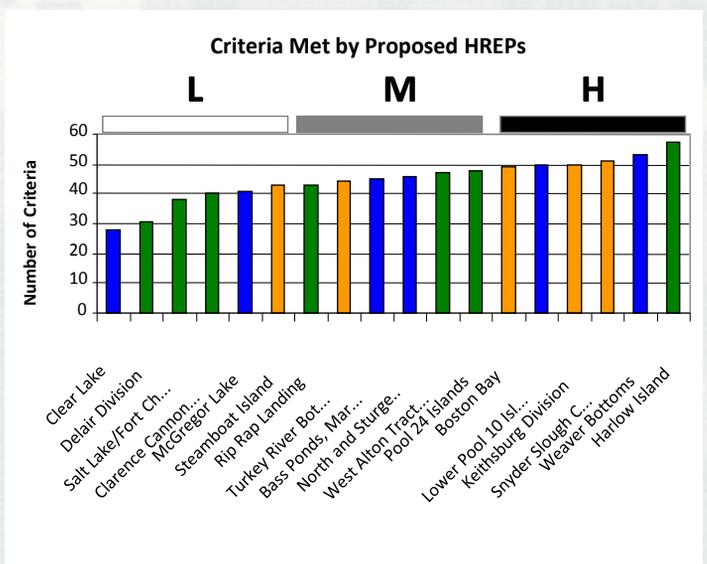
- Water Clarity
- Geomorphology
- Water Levels
- Connectivity
- Pattern of Habitats
- Plants and Animals



HREP Sequencing

System Ecological Team

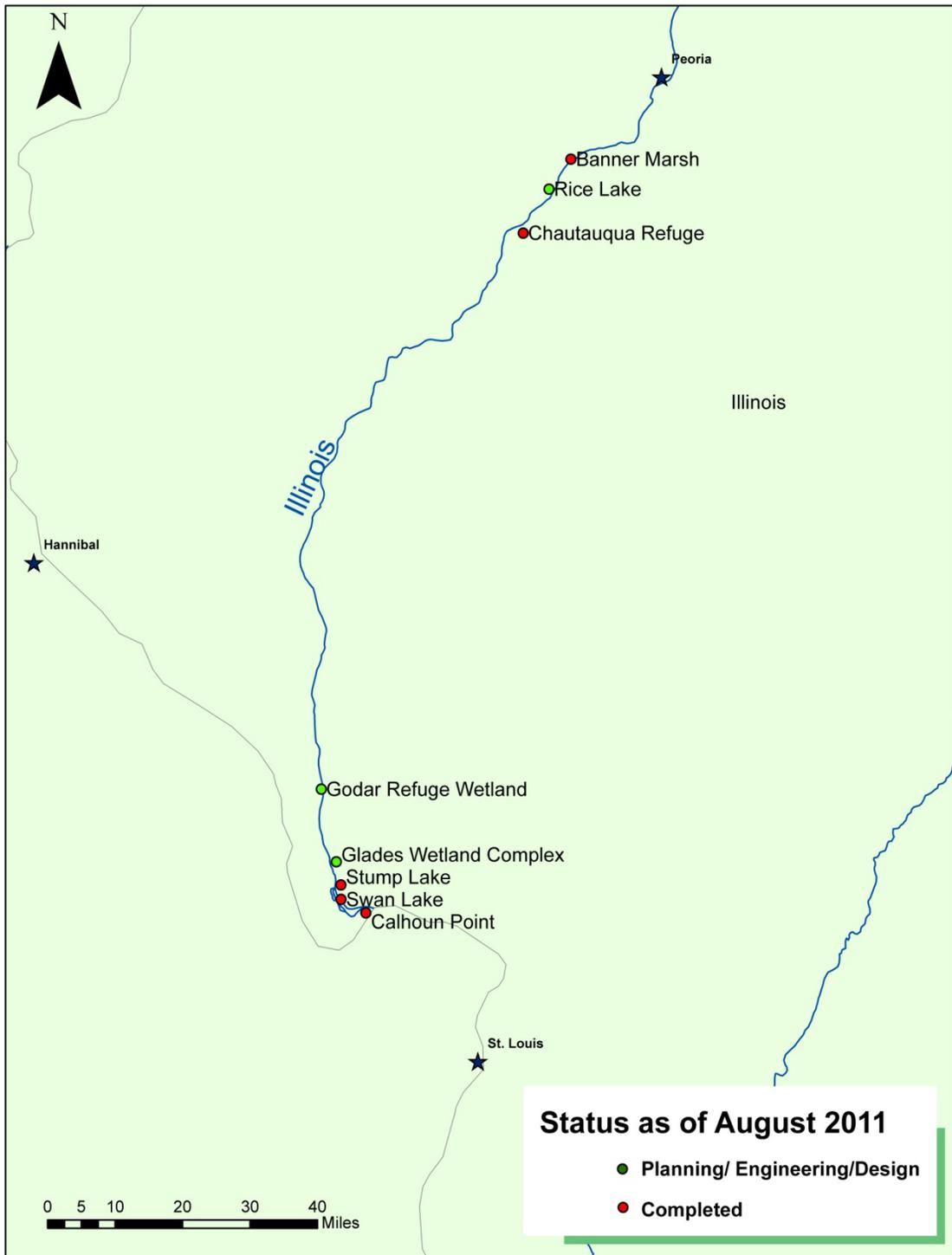
(87 criteria and Objectives)



- St Paul
- Rock Island
- St Louis

Environmental Management Program

Habitat Rehabilitation and Enhancement Projects



Navigation and Ecosystem Sustainability Program: Science Panel Recommendations

Science panel was generally impressed with the sophistication of Ecosystem Restoration planning.

Recommended:

- Top-Down Approach
- Include objectives for function and process

Composition

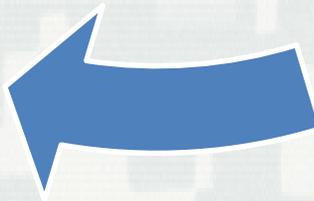


Structure

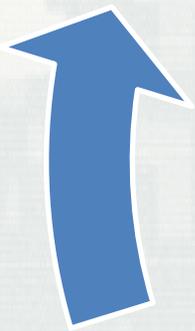
**Sustainable
UMR
Ecosystem**



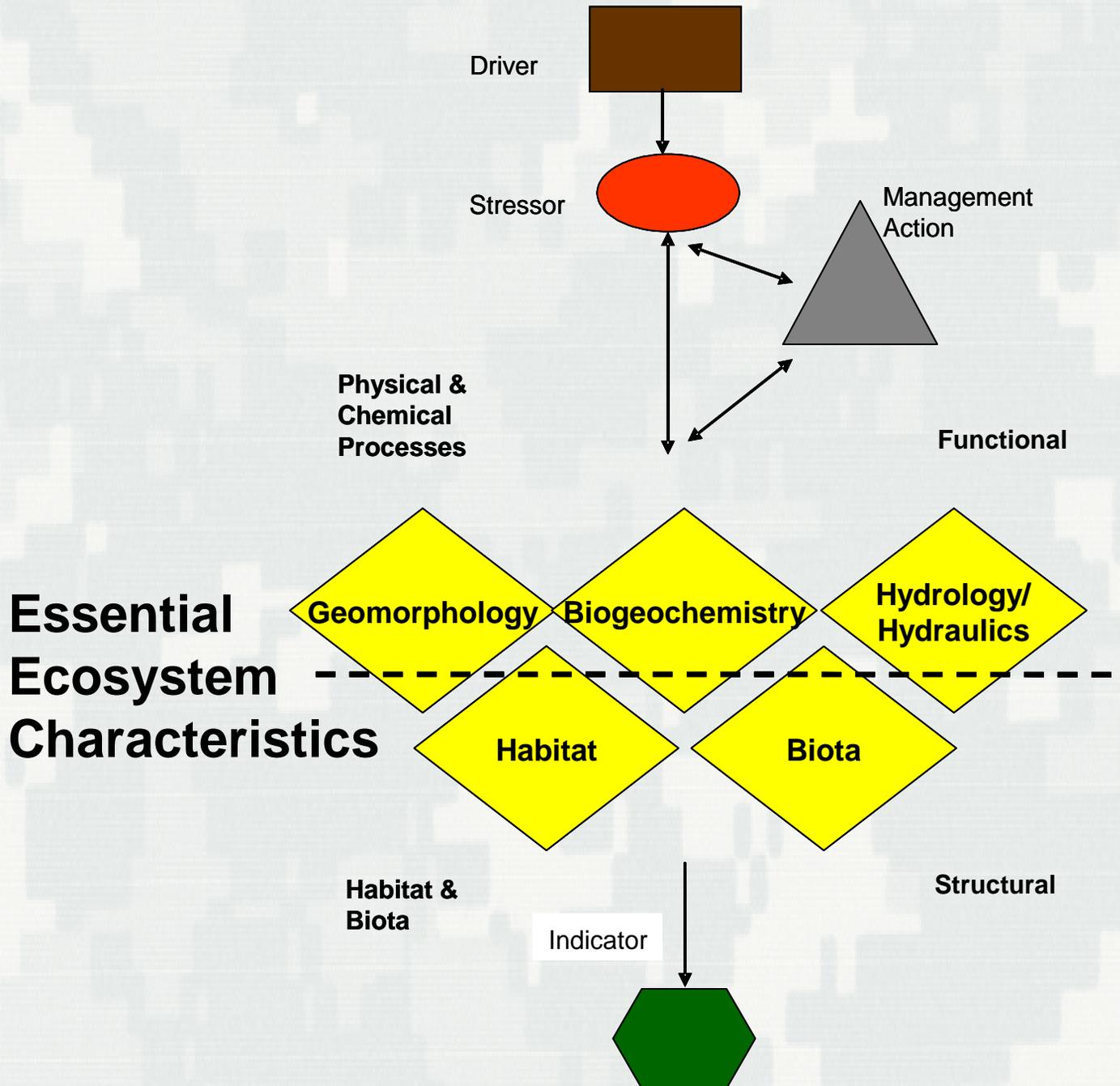
Process



Function



UMRS Conceptual Model

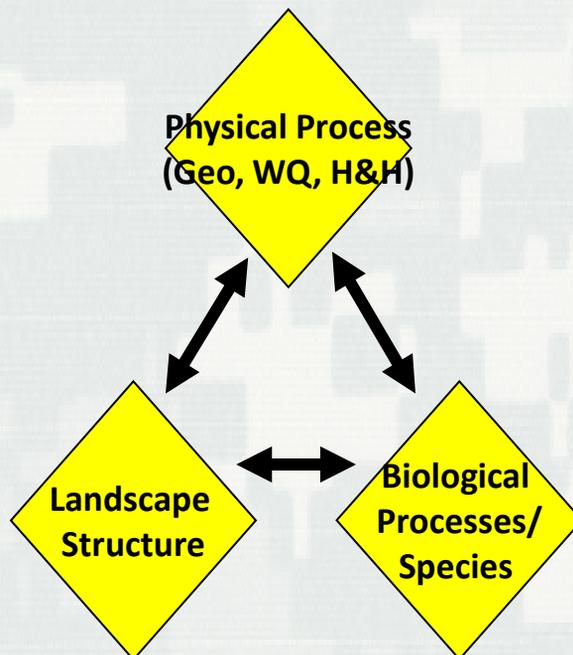


Proposed NESP System-wide Goals

Manage for:

- A more natural hydrologic regime **(hydrology & hydraulics)**;
- Processes that shape a diverse and dynamic river channel **(geomorphology)**;
- Processes that input, transport, assimilate, and output materials within UMR basin river-floodplains: water quality, sediments, and nutrients **(biogeochemistry)**;
- A diverse and dynamic pattern of habitats to support native biota **(habitat)**, and;
- Viable populations of native species and diverse plant and animal communities **(biota)**.

Reach Planning Template for Objective Setting



Proposed Planning Template for Objective Setting

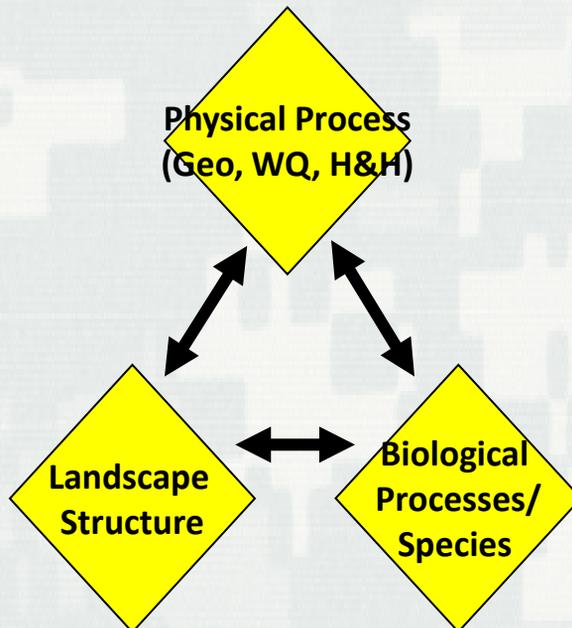
- Geomorphic Reach



- Geomorphic Areas



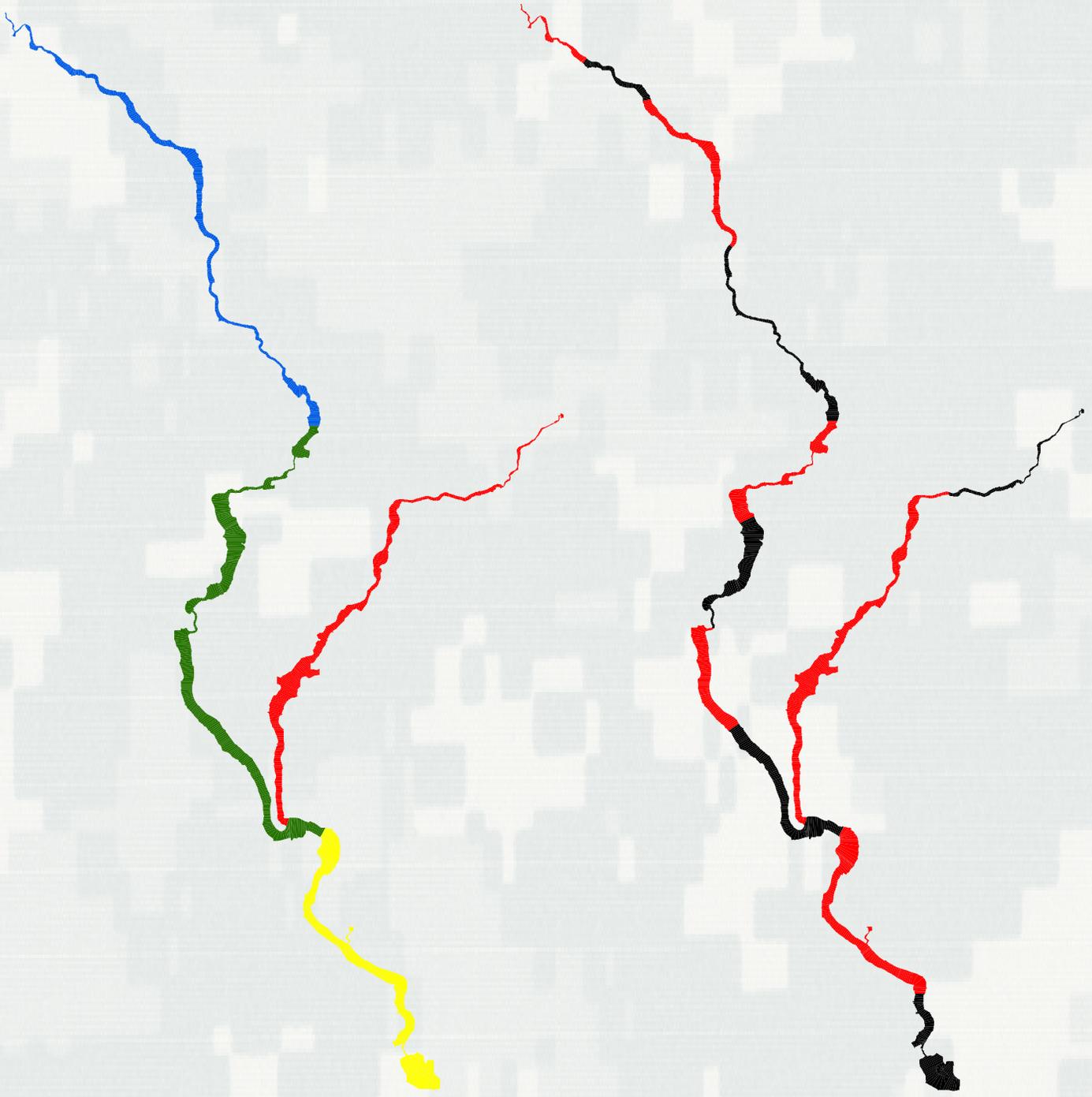
Terrace
High Elev.
Floodplain
Low Elev.
Floodplain
Wetland
Backwater
Side Channel
Main Channel



River Reaches

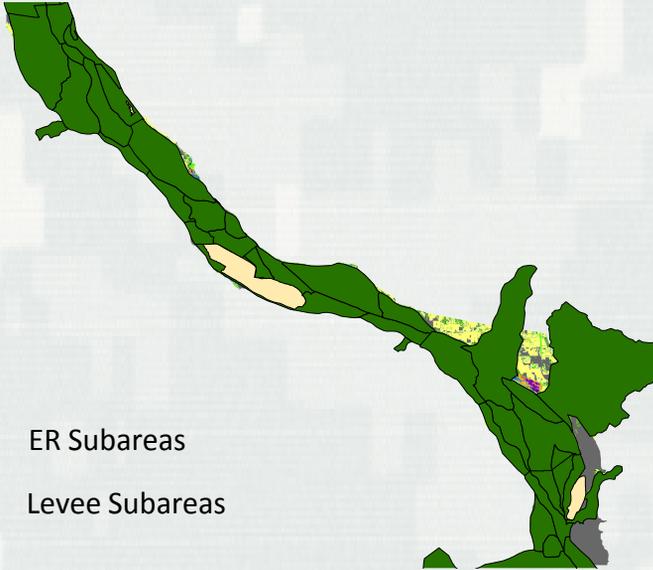
Floodplain Reaches (4)

Geomorphic Reaches (12)

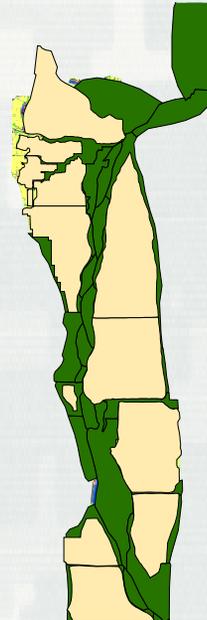


To Subareas where we can meet Ecosystem Restoration objectives

Upper Impounded Reach

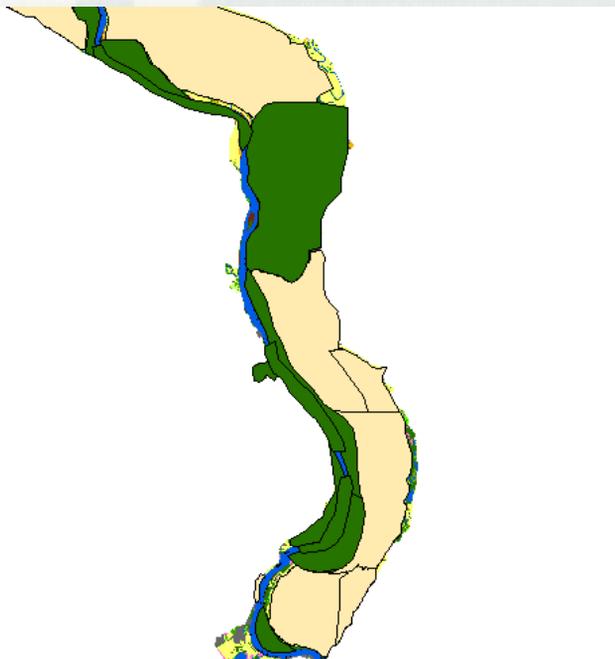


Lower Impounded Reach

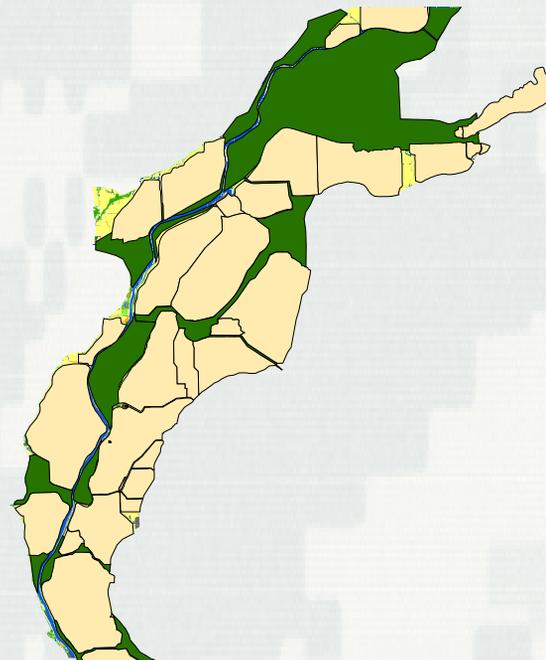


-  ER Subareas
-  Levee Subareas

Unimpounded Reach



Illinois River Reach



Steps to Achieve Ecosystem Restoration Objectives

- Review historic reference conditions, inventory of existing conditions, forecasted future conditions for the reach .
- Identify factors most limiting to biota in the reach.
- Identify the most important ecosystem structure, functions, and processes
- Clearly develop a small number of reach-scale objectives

Objectives >> Spatial Assessment of Stressors/Drivers Affecting Obj. >>> Potential Management Actions >> Potential Areas for Implementation

Upper Mississippi River System system-wide ecosystem restoration objectives sorted by their appropriate planning scale.

Reach Plan	Site Specific, Not Evaluated	Beyond UMRS, System Plan
A more natural stage hydrograph	Reduced sediment loading and sediment resuspension in backwaters	Reduced nutrient loading from tributaries to rivers
Restored hydraulic connectivity	Restored lateral hydraulic connectivity	Reduced contaminants loading and remobilization of in-place pollutants
Increase storage and conveyance of flood water on the floodplain	Water quality conditions sufficient to support native aquatic biota and designated uses	Restored floodplain topographic diversity
Restored backwaters	Restore rapids	Forest Plan, Floodplain Landscape
Restored secondary channels and islands	Restored bathymetric diversity, and flow variability in secondary channels, islands, sand bars, shoals and mudflats	
Restore a sediment transport regime so that transport, deposition, and erosion rates and geomorphic patterns are within acceptable limits		
Improved water clarity		
Naturalize the hydrologic regime of tributaries		
Restored lower tributary valleys		

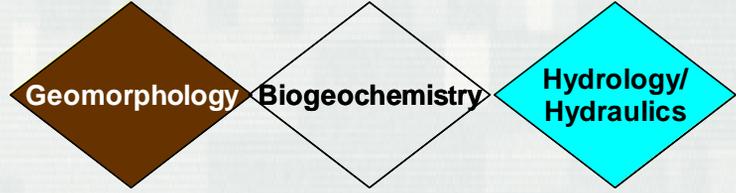
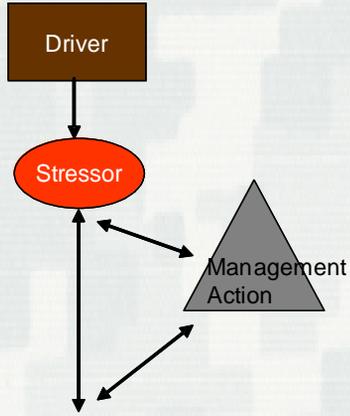
Illinois River Reach Planning Approach

- Unique Characteristics
- Stressors
- Objectives
 - Illinois River Basin Comprehensive Plan

Process and Function



Composition and Structure

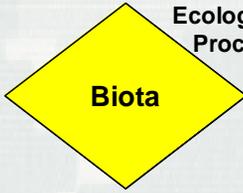


Backwater/Side Channel Connectivity; Sediment Hardness; Restored Watershed Connectivity

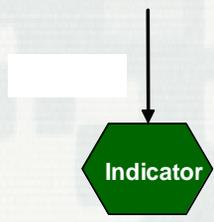
Achieve WQ Stds; Substrate Quality; Reduce Sediment Loading

Naturalized Mainstem, Floodplain, Tributary, Hydrology

Restore and Conserve: Habitat Function; Habitat Connectivity, Natural Communities and Habitats



Restore and Conserve Ecological Integrity and Processes Sustaining Species



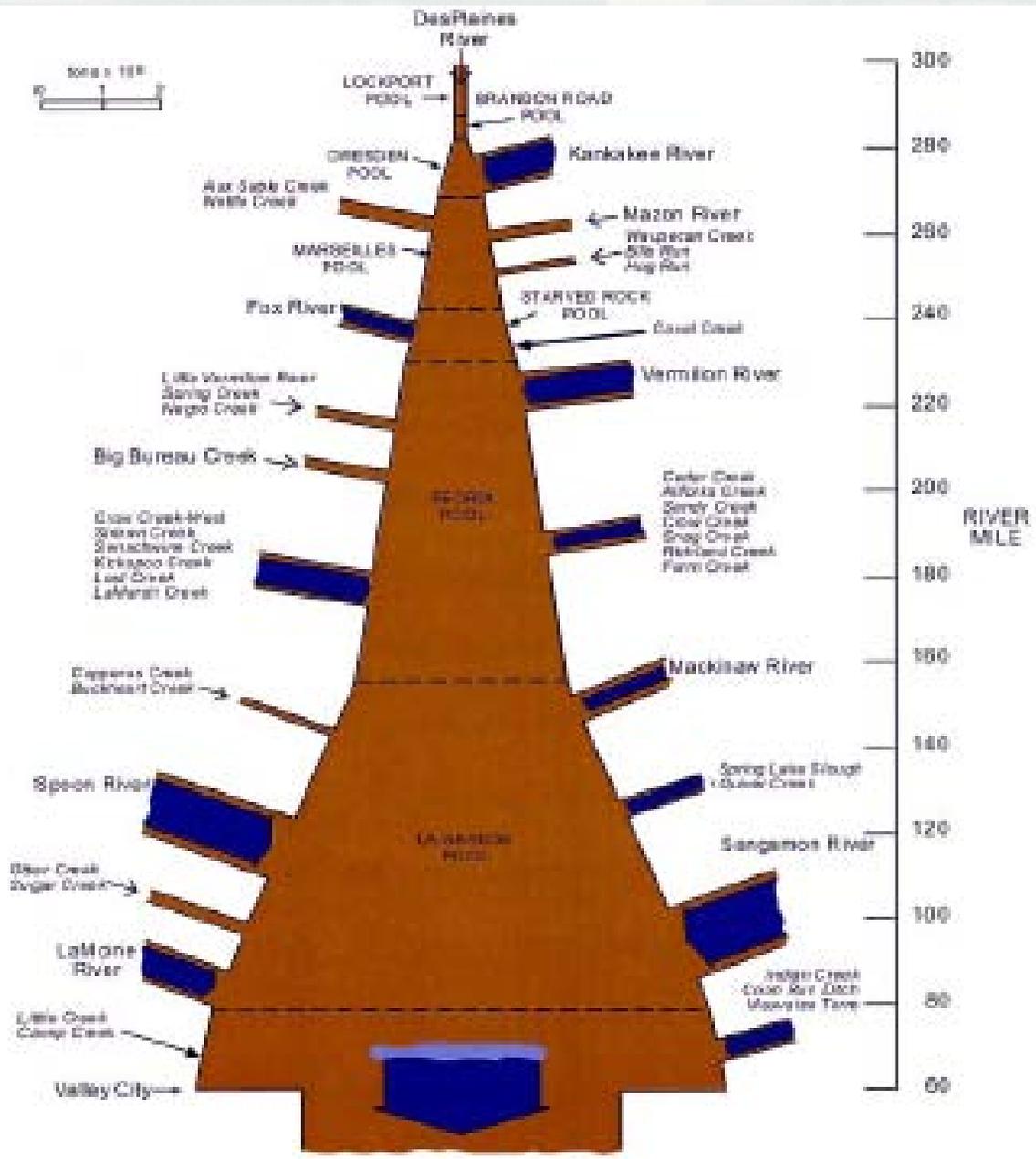
Restored Floodplain, Riparia, Backwaters, and Secondary Channels,

Restore and Conserve Biodiversity

Unique Characteristics:

- Interbasin connection/diversion
- Hydrologic alteration
- Glacial origin – low gradient
- Geomorphic change at Hennepin
- Bottomland lakes
- Tributary deltas
- Alton Pool channelization
- Little public land

Stressor: Sedimentation



Average Annual Sediment Budget of the Illinois River

Stressor: Sedimentation

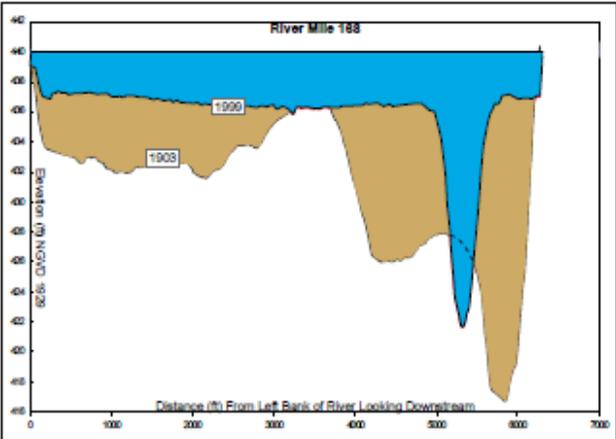
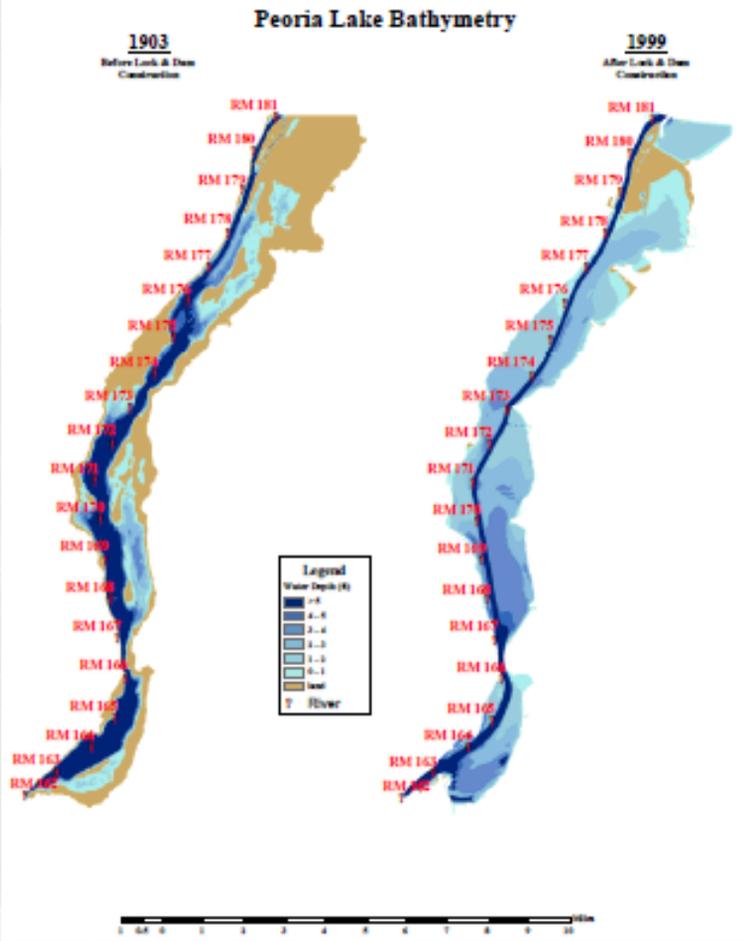
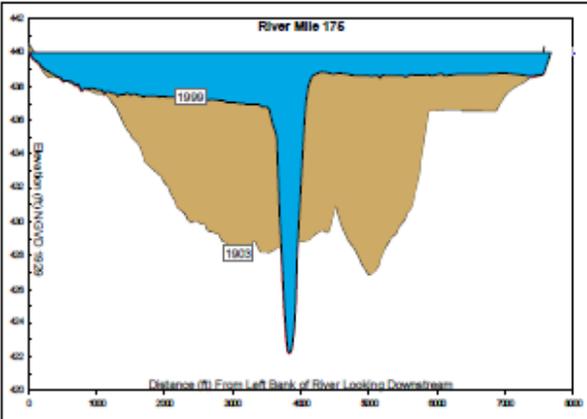
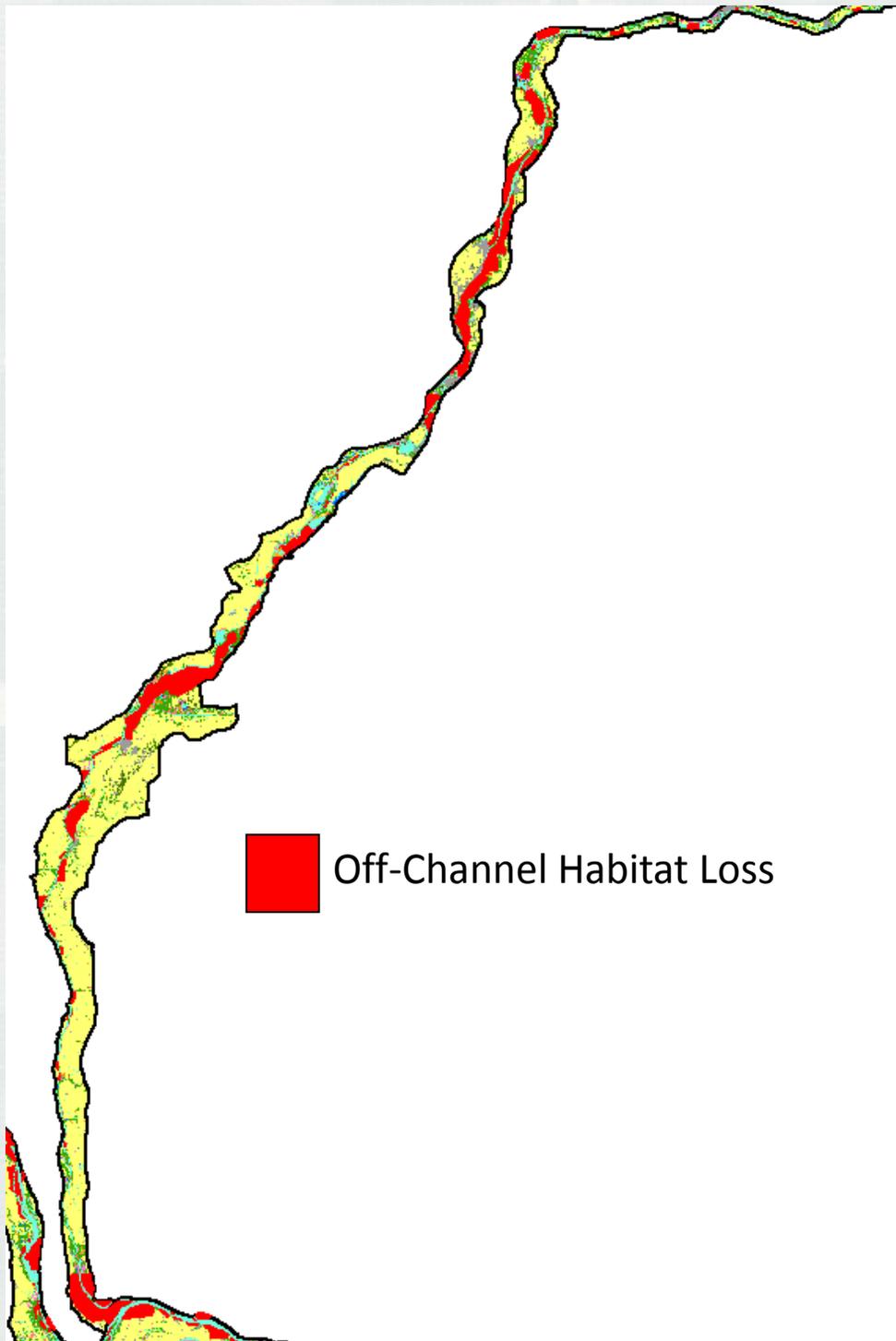


Figure 3-5a. Typical Cross Sections from Peoria Lakes Showing Dramatic Sedimentation Between 1903 and 1999, RM 188

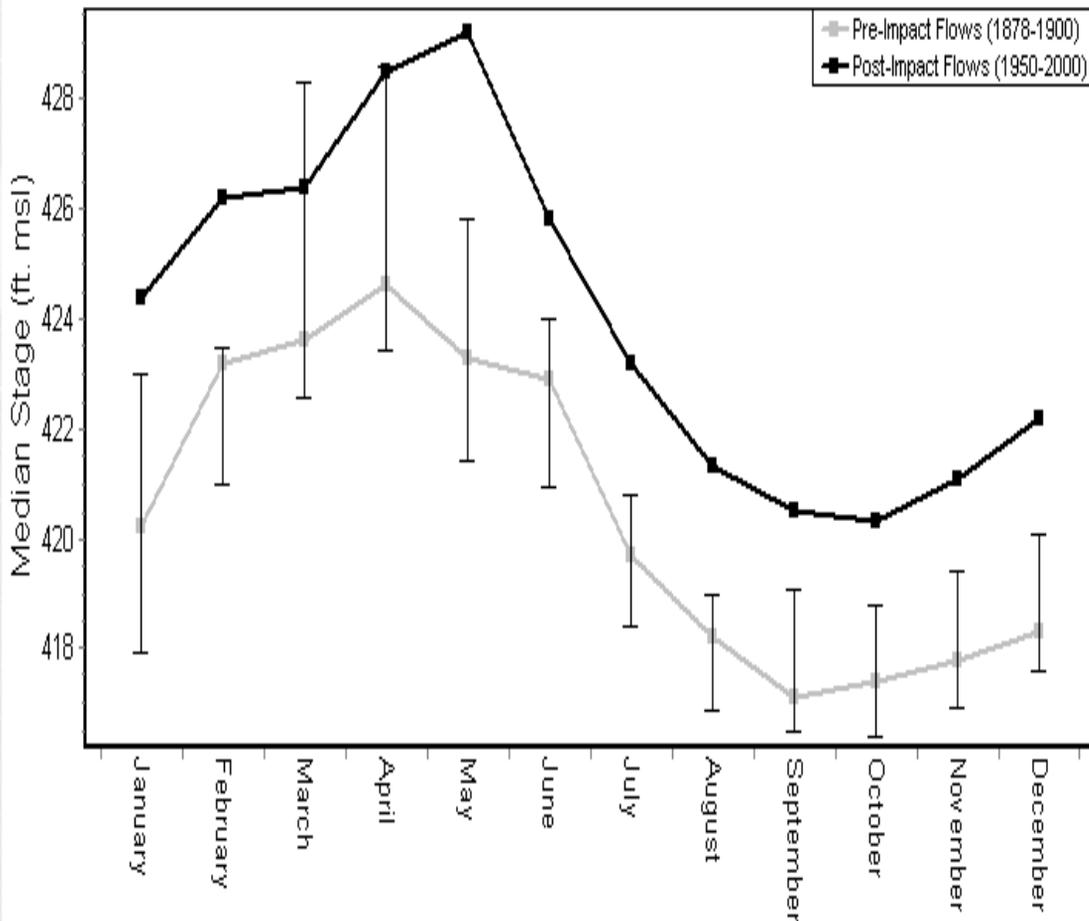


Stressor: Loss of productive backwaters, side channels



Stressor: Altered Hydrology

Valley City - Upper Pool
Monthly Stage Alteration with RVA Boundaries (1878-2000)



Illinois 519 Objectives Cross-Walk

Geomorphology
Restore aquatic habitat diversity of side channels and backwaters, including Peoria Lakes, to provide adequate volume and depth for sustaining native fish and wildlife communities (Goal 2)
Restore and maintain side channel and island habitats (Goal 2b)
Maintain all existing connections between backwaters and the main channel (connections at the 50 percent exceedance flow duration; Goal 2b)
Compact sediments to improve substrate conditions for aquatic plants, fish, and wildlife (Goal 2e)
Hydrology/River Hydraulics
Naturalize Illinois River and tributary hydrologic regimes and conditions to restore aquatic and riparian habitat (Goal 5)
Water Quality
Improve water and sediment quality in the Illinois River and its watershed (Goal 6)
Reduce sediment delivery to the Illinois River from upland areas and tributary channels with the aim of eliminating excessive sediment load (Goal 1)
Eliminate excessive sediment delivery to specific high-value habitat both along the main stem and in tributary areas (Goal 1c)
Habitat
Improve floodplain, riparian, and aquatic habitats and functions (Goal 3)
Restore up to an additional 150,000 acres of isolated and connected floodplains along the Illinois River main stem to promote floodplain functions and habitats (Goal 3a)
Restore up to 150,000 acres of the Illinois River Basin large tributary floodplains (Goal 3a)
Restore and/or protect up to 1,000 additional stream miles of riparian habitats (Goal 3c)
Restore aquatic connectivity (fish passage) on the Illinois River and its tributaries, where appropriate, to restore or maintain healthy populations of native species (Goal 4)
Restore main stem to tributary connectivity, where appropriate, on major tributaries (Goal 4a).
Restore passage for large-river fish at Starved Rock, Marseilles, and Dresden Lock and Dams where appropriate (Goal 4c).
Biota
Restore and maintain ecological integrity, including habitats, communities, and populations of native species, and the processes that sustain them (Overarching Goal)
Restore and conserve natural habitat structure and function (Overarching Goal)

Objective: Reduce Sediment Delivery

Upper Reach: Kankakee River

Peoria Reach: Peoria Tribs, Vermilion
River

La Grange Reach: Big watersheds,
Spoon, Sangamon

Alton Reach: Upstream sources,
local tribs

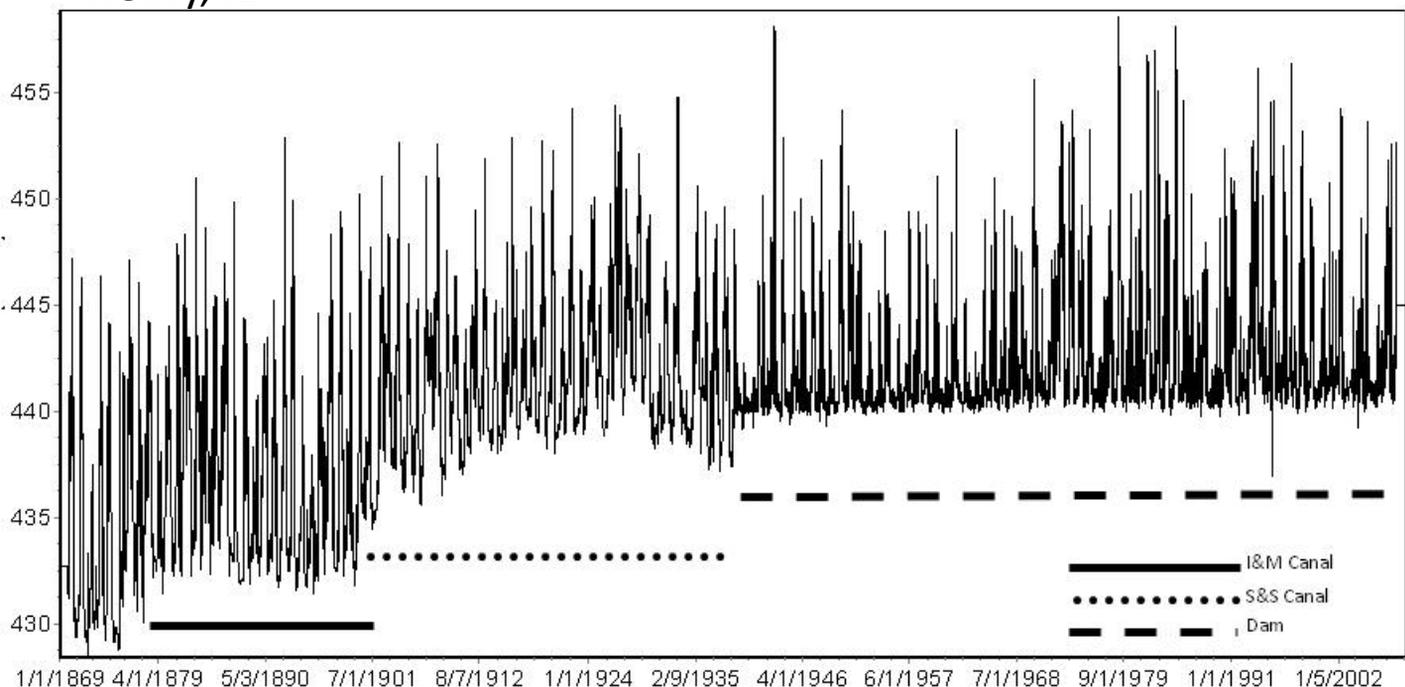
Objective: Restore off-channel aquatic habitat diversity

- Upper Reach: Restore aquatic plants
- Upper Peoria Pool backwaters
- Upper Peoria Lake
- Lower La Grange (Anderson, Bath, Sanganois)
- Alton Pool side channels
- Alton Pool floodplain restoration

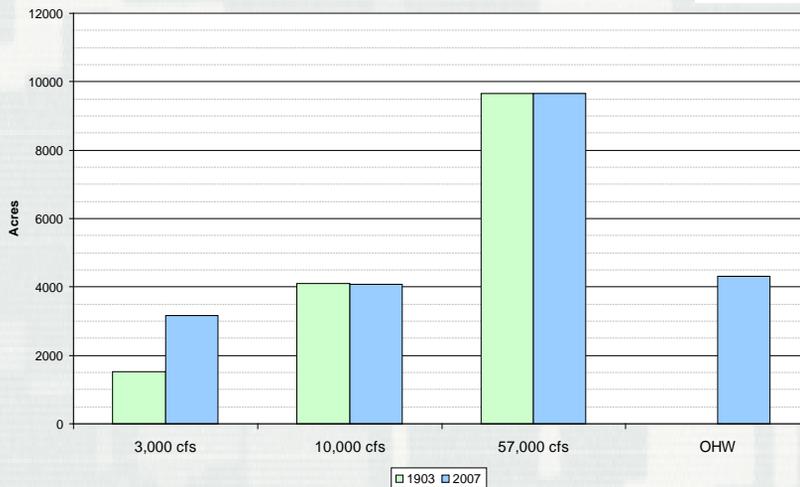
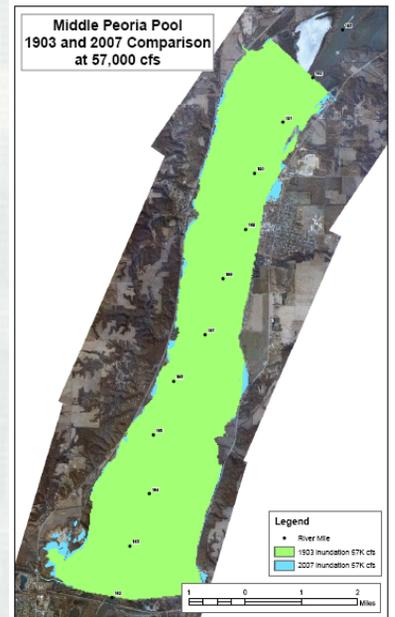
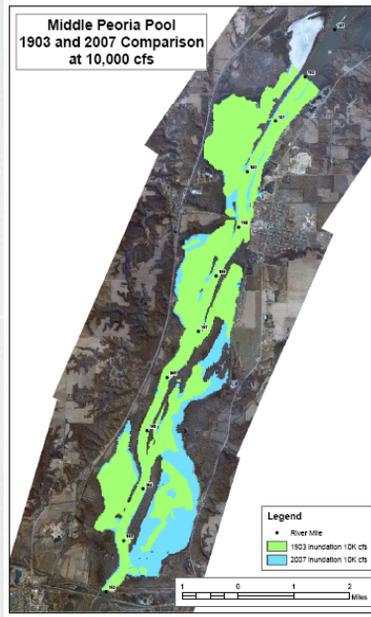
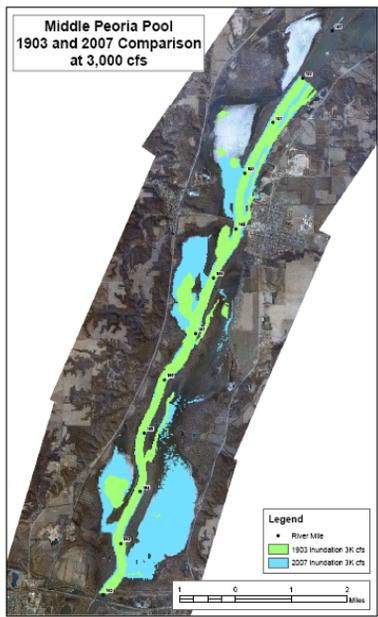
Objective: Naturalize mainstem and tributary hydrology

- Diversion base flow
- Increased stage for navigation
- Watershed issues
- Floodplain management issue

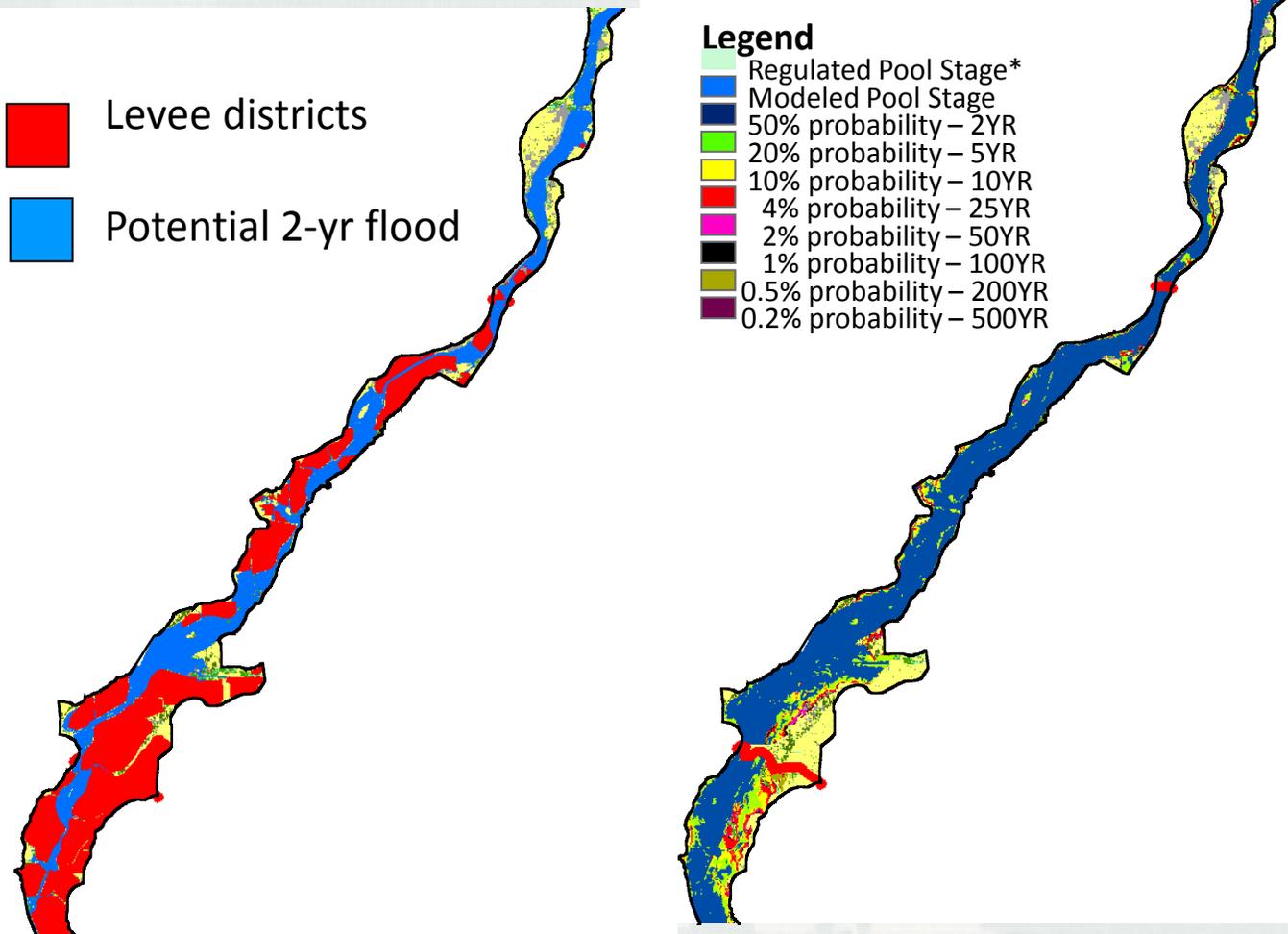
Henry, IL



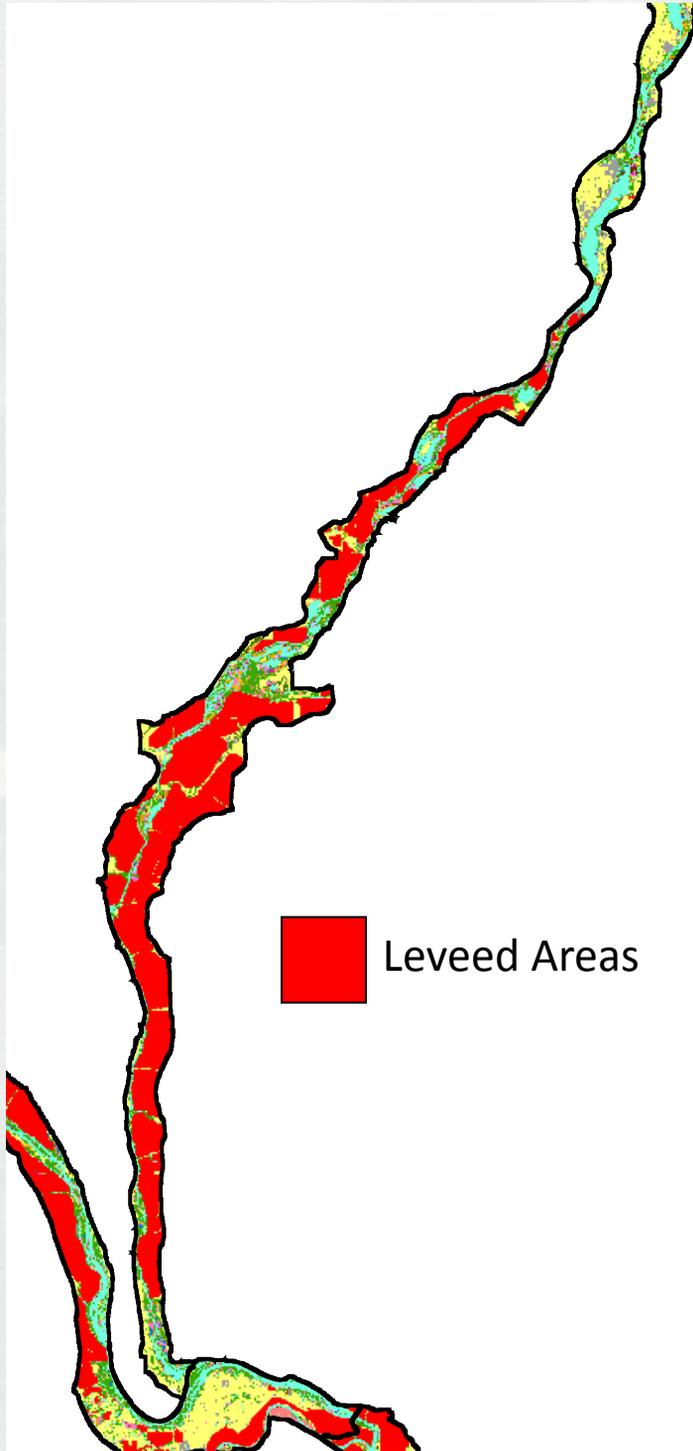
Historic Floodplain Hydrology



Floodplain Hydrology

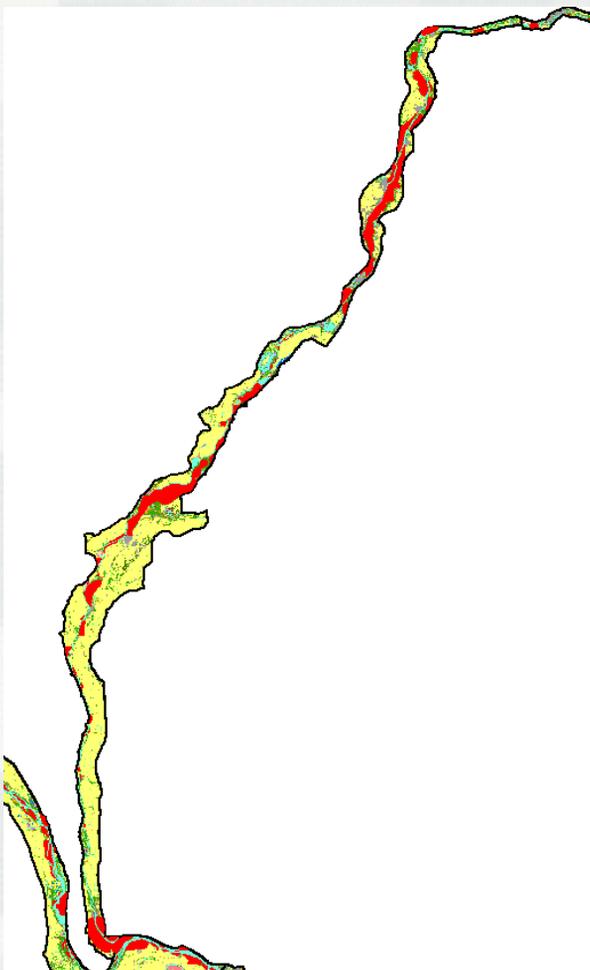


Objective: Improve floodplain, riparian, and aquatic habitat

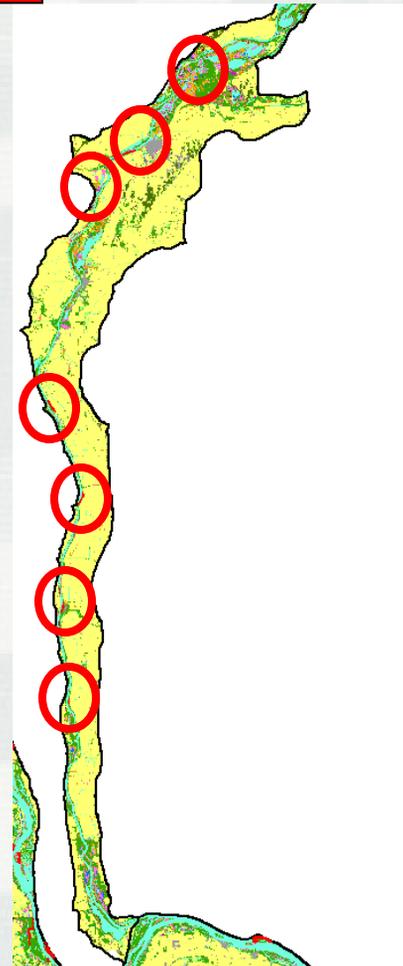


Objective: Improve floodplain, riparian, and aquatic habitat

 Backwater Loss



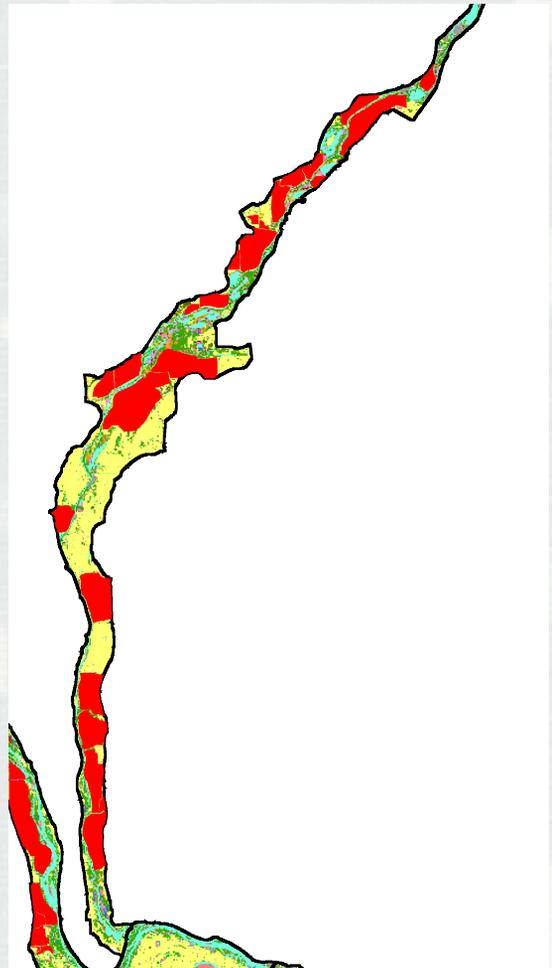
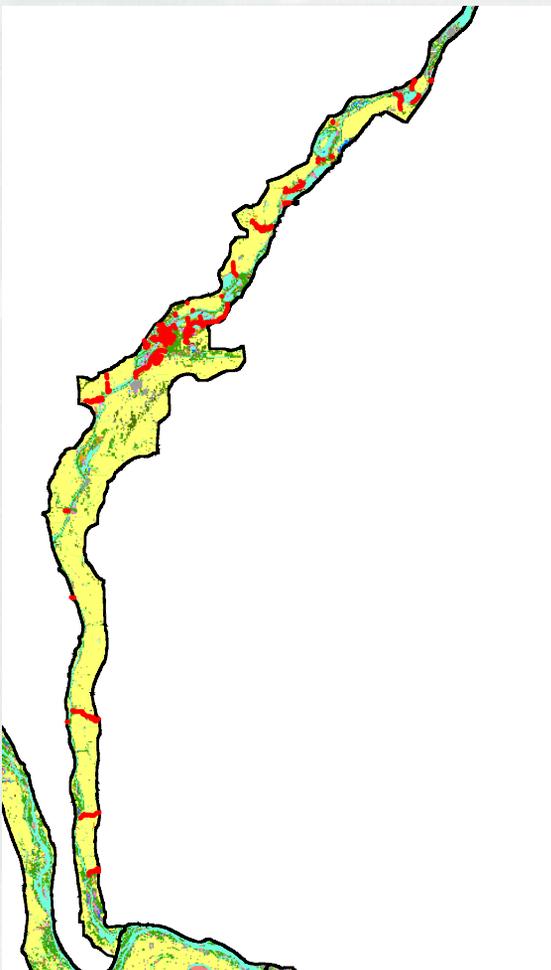
 Side Channel Loss



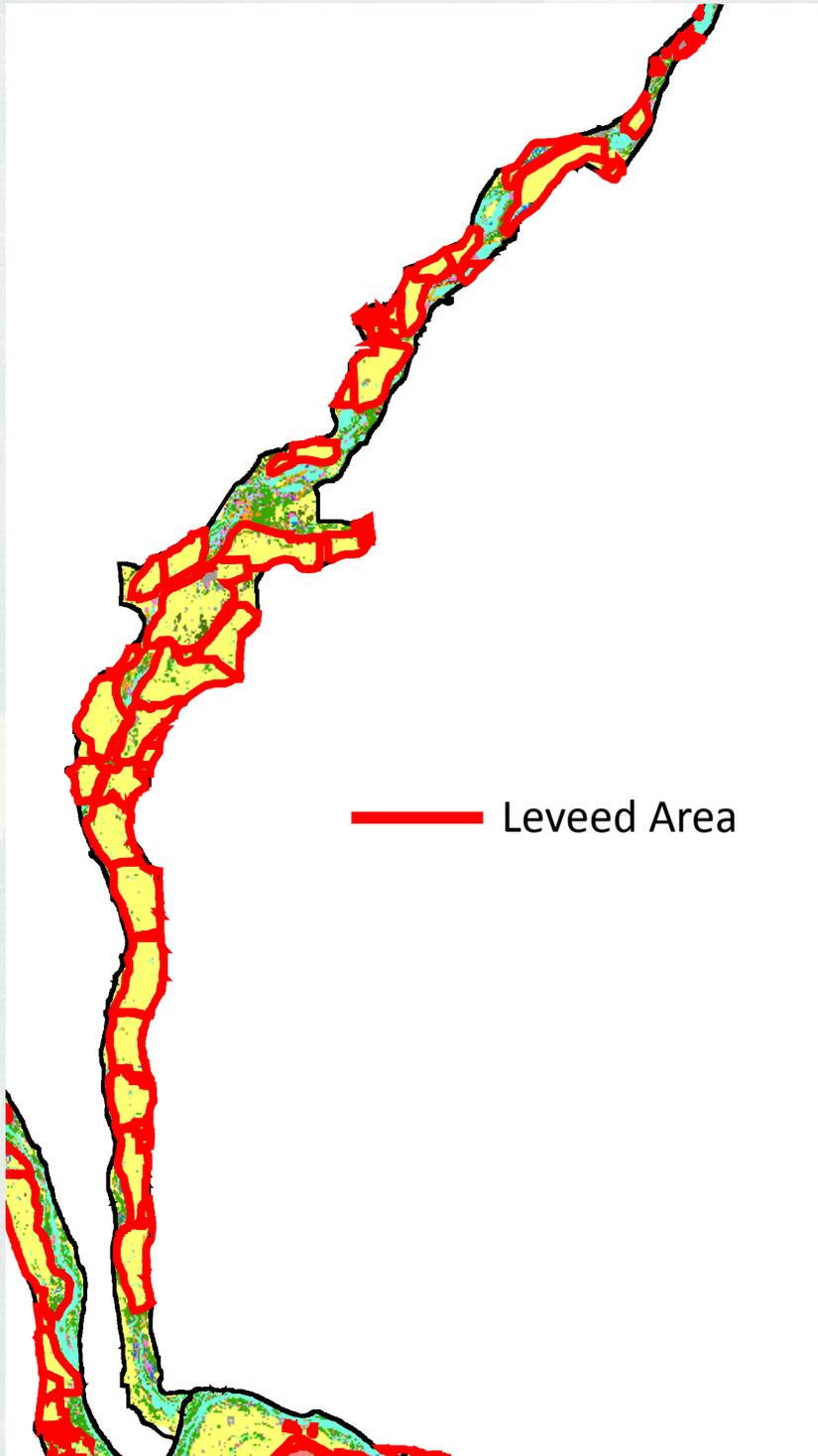
Objective: Improve water quality

 Tributaries

 Levee districts
Adjacent to tribs



Objective: Restore habitat connectivity



	Physical Parameters				Connected (C), Partially Connected (P), or Isolated (I)
	Location in Illinois River Basin				
	Direct Peoria Pool Trib.	Upstream of Peoria Pool	LaGrange Pool Trib.	Alton Pool Trib.	
Main Stem - Aquatic & Floodplain Projects	5	3	4	4	
Value	5	3	4	4	
Dresden Pool - Brandon Road Tailwater RM 286		x			C
Dresden Pool - Treats Island RM 280		x			C
Marseilles Pool - Mazon River Confluence RM 264		x			C
Marseilles Pool - Ballards Island RM 248		x			C
Peoria Pool - Spring, Depue, Turner Lakes RM 210-216		x			P
Peoria Pool - Billsbach and Weis Lakes, Big Sand Creek Confluence RM 192-195		x			P
Peoria Pool - Upper Peoria Lake RM 177-182	x				C
LaGrange Pool - Kelly Lake Drainage & Levee District Water Control RM 102			x		I
LaGrange Pool - Matanzas and Anderson Lakes RM 110-116			x		P
LaGrange Pool - Bath Chute and Snicarte Slough RM 107			x		P
LaGrange Pool - Sanganois and Sangamon Confluence RM 90-99			x		C
LaGrange Pool - Spoon River Confluence RM 84			x		
Alton Pool - Meredosia F&W Refuge RM 71-77				x	P
Alton Pool - Smith Lake RM 67-69				x	P
Alton Pool - McCoe Lake RM 61-63				x	I
Alton Pool - Godar Refuge RM 23-29				x	
Alton Pool - Side Channels and Island				x	

	Physical Parameters			
	Location in Illinois River Basin			
	Direct Peoria Pool Trib.	Upstream of Peoria Pool	LaGrange Pool Trib.	Alton Pool Trib.
Main Stem - Aquatic Projects	5	3	4	4
Value	5	3	4	4
Main Stem - Backwaters, Side Channels, & Islands				
Peoria Riverfront - Upper Island		3		
Pekin Lake - Southern Unit		3		
Middle Peoria Pool - Backwaters		3		
Starved Rock Pool - Side Channels/Islands		3		
Starved Rock Pool - Backwaters		3		
Peoria Pool - Side Channels/Islands		3		
Peoria Pool - Backwaters above Lacon	5			
LaGrange Pool - Side Channels/Islands			4	
LaGrange Pool - Backwaters			4	
Alton Pool - Side Channels/Islands			4	
Meredosia Lake (RM 77.0-71.0 LDB)			4	
Smith Lake (RM 69.5-67 LDB)			4	
McCoe Lake (RM 63-62 RDB),				4
Main Stem - Floodplain				
Pekin Lake - Northern Unit				4
Anderson Lake (rm 109-112)				4
Chain Lake (rm 99-105)				4
Stewart Lake (rm 99-105)				4

Illinois River Priority Subareas (17)

Main Stem - Backwaters, Side Channels, & Islands
Dresden Pool - Brandon Road Tailwater RM 286
Dresden Pool - Treats Island RM 280
Marseilles Pool - Mazon River Confluence RM 264
Marseilles Pool - Ballards Island RM 248
Peoria Pool - Spring, Depue, Turner Lakes RM 210-216
Peoria Pool - Billsbach and Weis Lakes, Big Sand Creek
Peoria Pool - Upper Peoria Lake RM 177-182
LaGrange Pool - Kelly Lake Drainage & Levee District Water
LaGrange Pool - Matanzas and Anderson Lakes RM 110-116
LaGrange Pool - Bath Chute and Snicarte Slough RM 107
LaGrange Pool - Sanganois and Sangamon Confluence RM 90-
LaGrange Pool - Spoon River Confluence RM 84
Alton Pool - Meredosia F&W Refuge RM 71-77
Alton Pool - Smith Lake RM 67-69
Alton Pool - McCoe Lake RM 61-63
Alton Pool - Godar Refuge RM 23-29
Alton Pool - Side Channels and Island