

The Nature Conservancy's Emiquon Project: restoring and managing functional floodplain for nature and people

by K. Douglas Blodgett

Director of River Conservation

The Nature Conservancy, Illinois Rivers Program

for Illinois Lakes Management Association

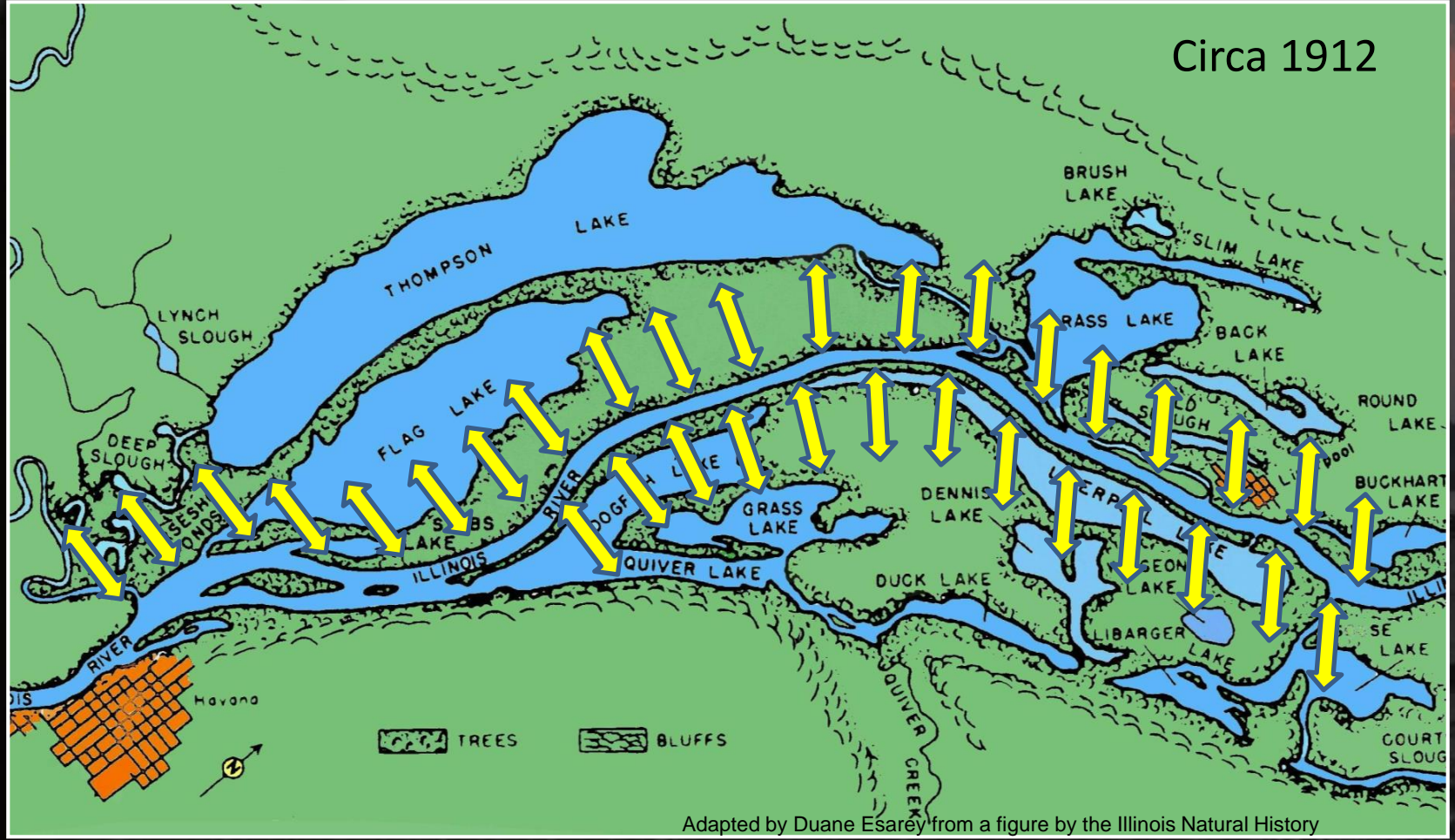


ILMA-LAKES
ILLINOIS LAKES MANAGEMENT ASSOCIATION

12 March 2020, Champaign, IL

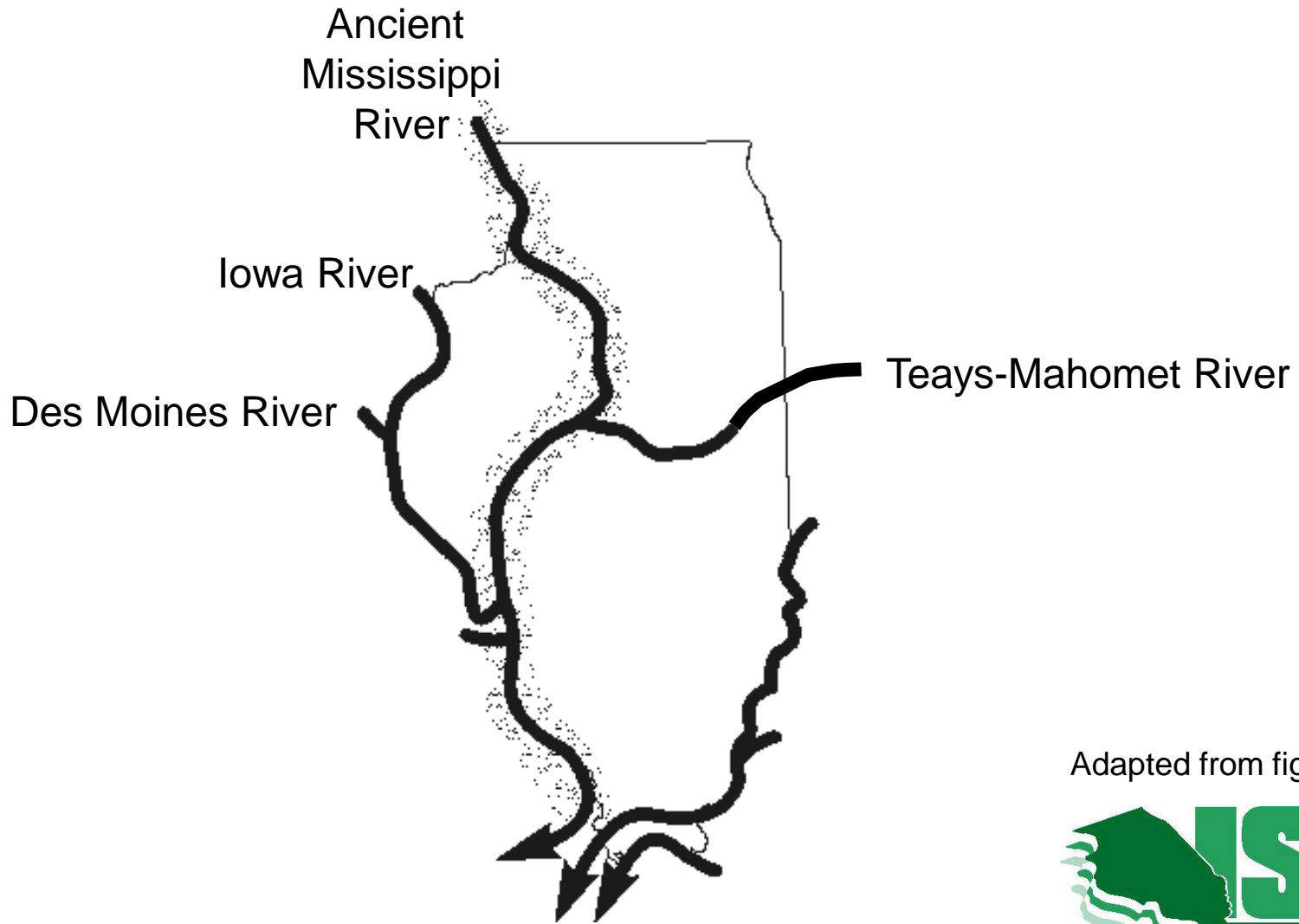


Circa 1912



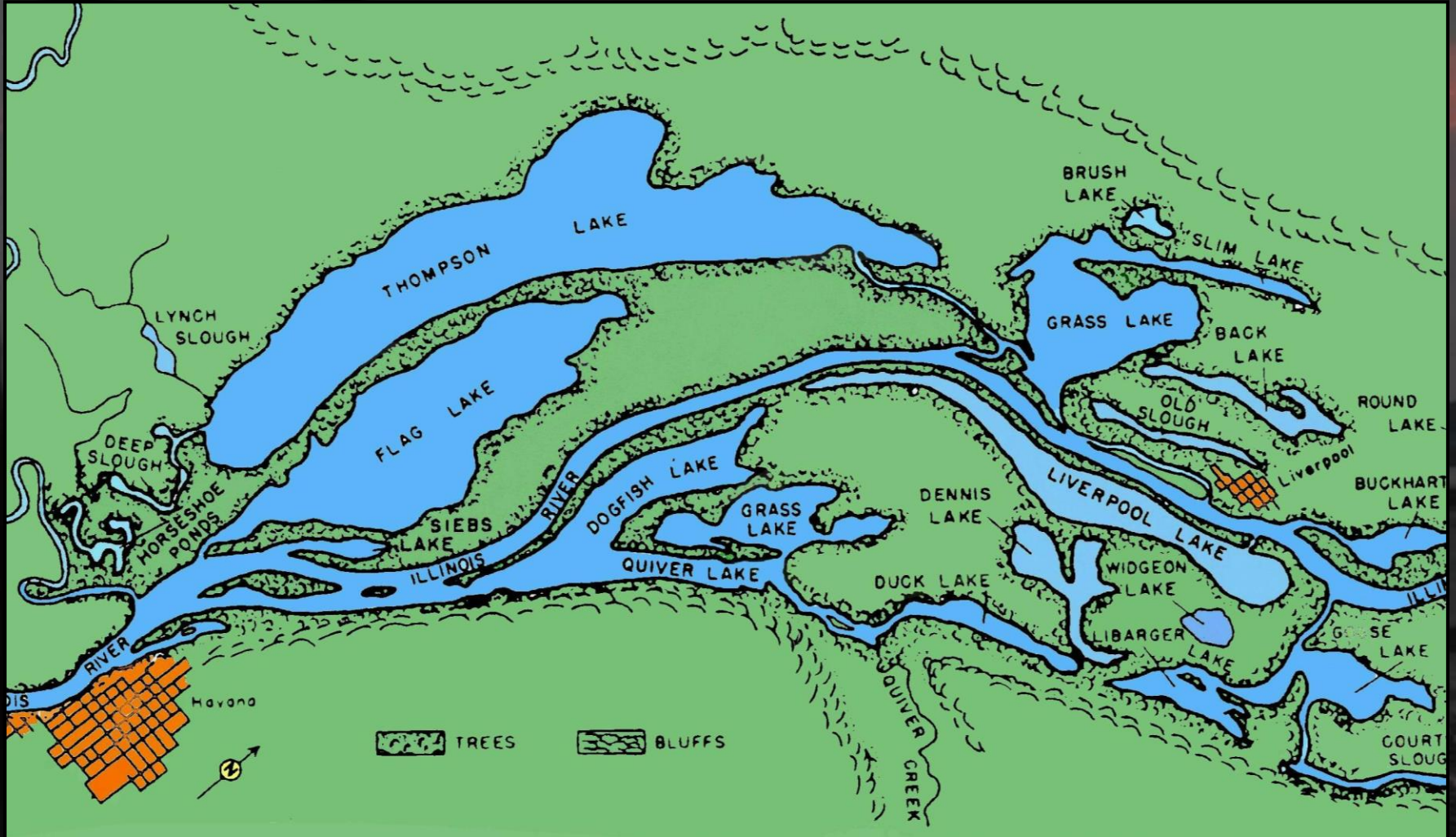
Adapted by Duane Esarey from a figure by the Illinois Natural History Survey

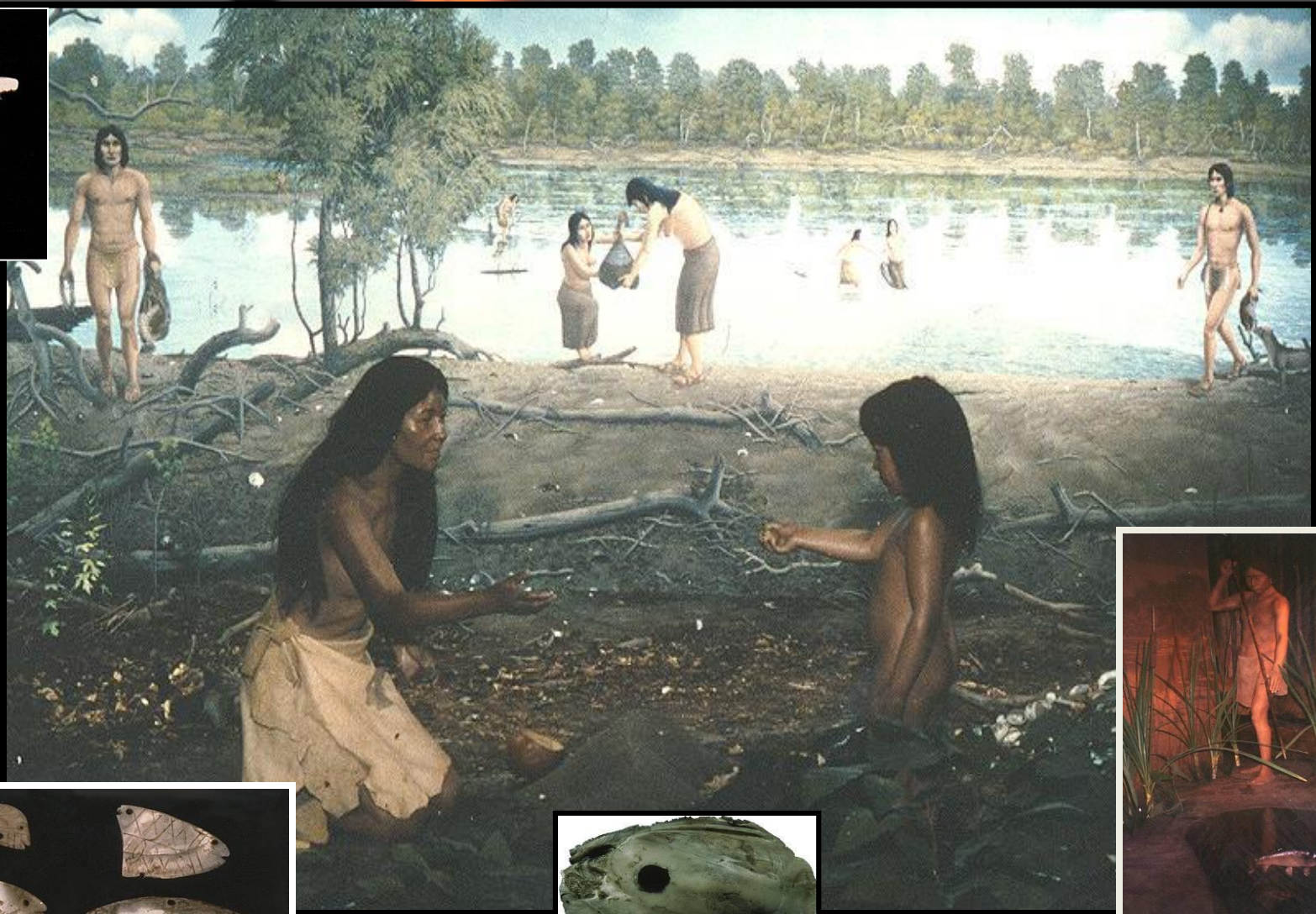




Adapted from figure provided by







August 1673

Pere Marquette journal entry:

*"We have seen nothing like this river that we enter,
as regards its fertility of soil, its prairies and woods; its
cattle (buffalo), elk, deer, wildcats, bustards, swans,
ducks, parroquets, and even beaver..."*





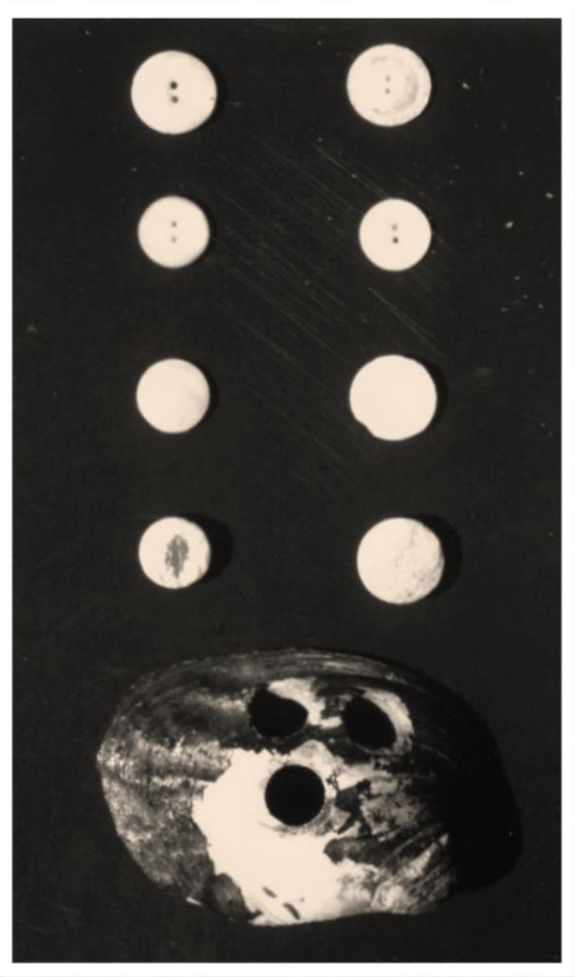
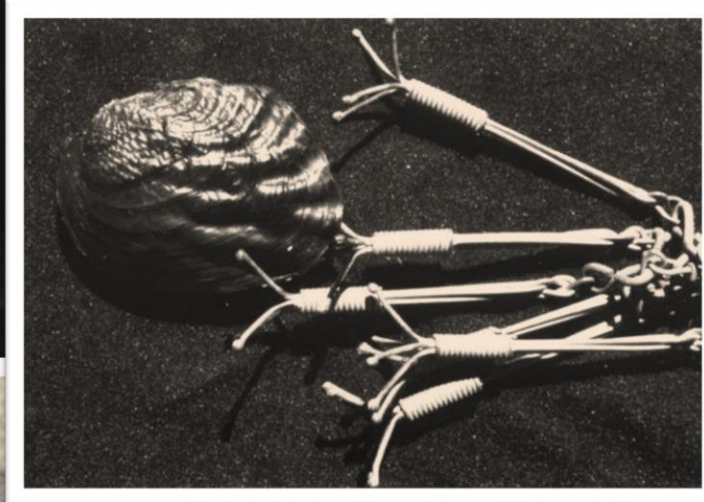
*“... it is made up of little lakes
and little rivers.”*





Once one of the most noted sporting grounds in the Midwest

Once the most productive mussel stream per mile in North America



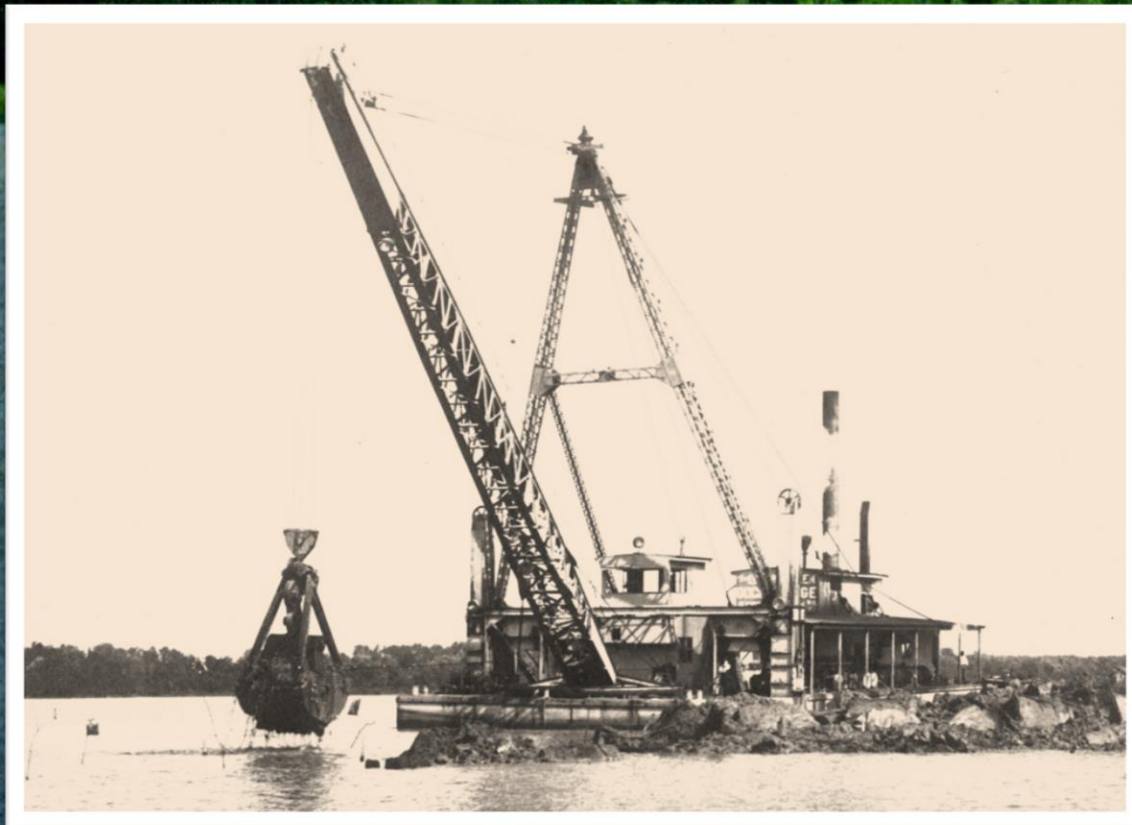


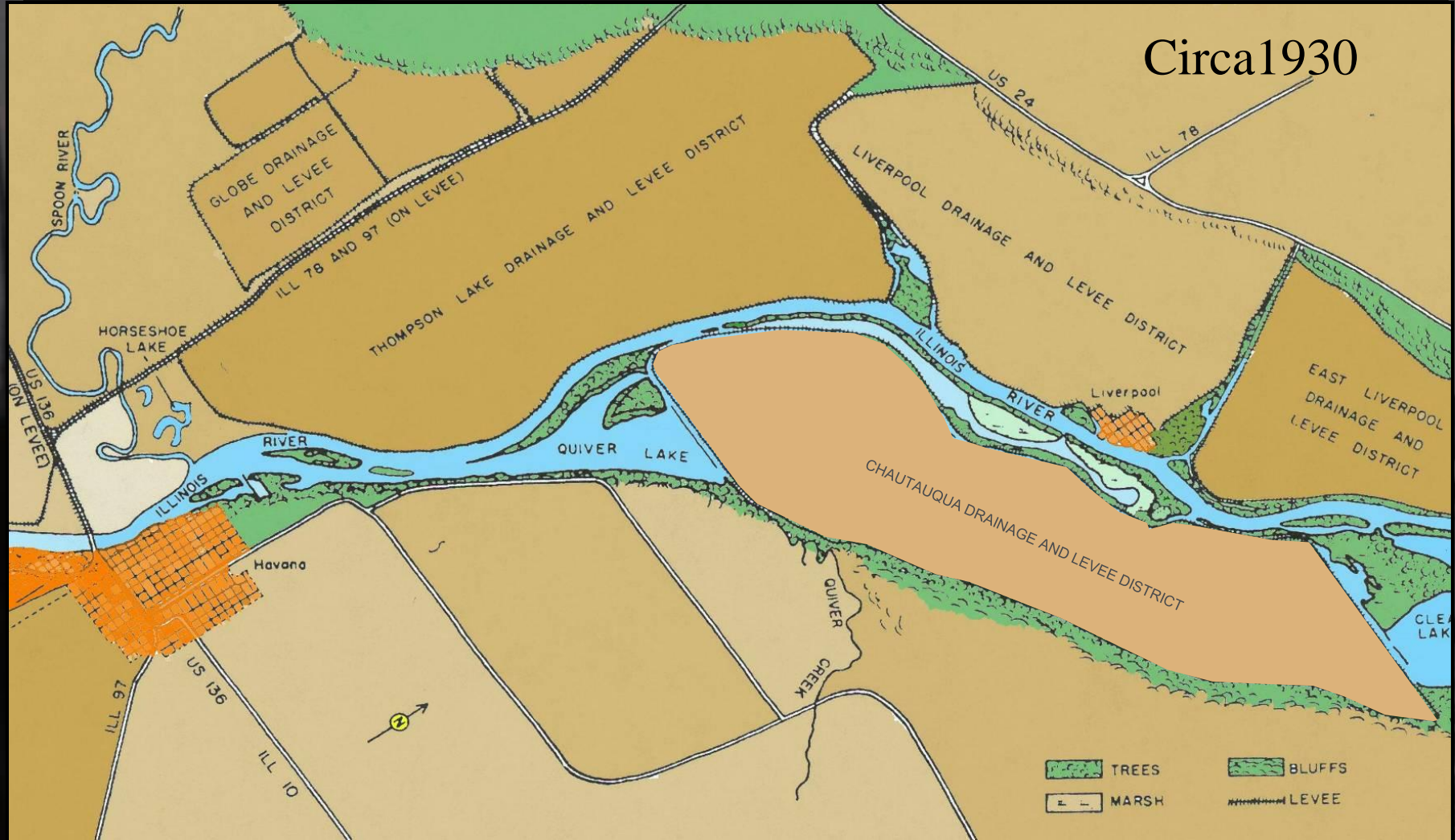
Once the most productive
inland commercial fishery
in North America

MOONLIGHT VIEW on ILLINOIS RIVER at HAVANA, ILL.



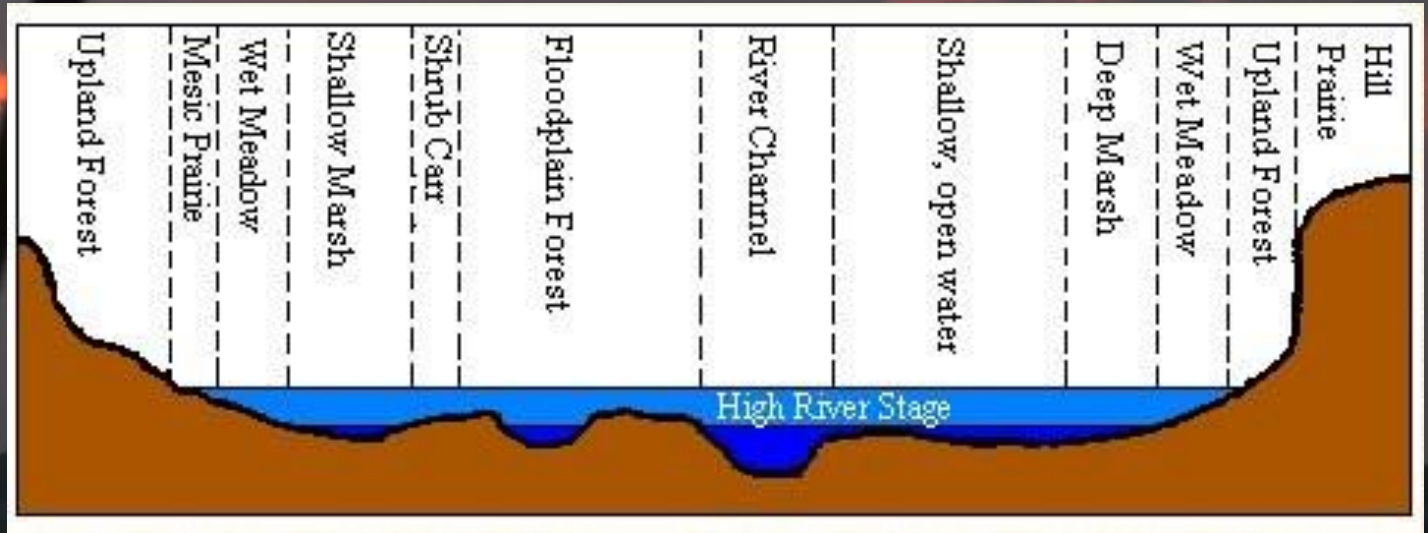
HAVANA — The three dredges that are working on Thompson Lake are throwing up a new levee in ‘Dan Hole’s Field’....



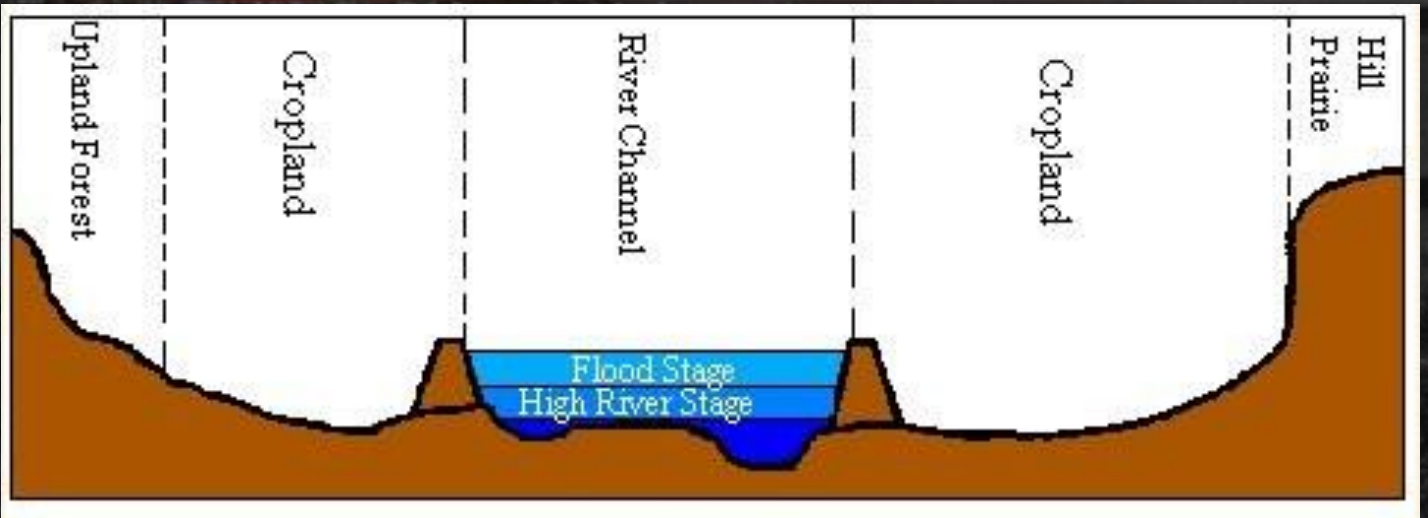


Adapted from a figure by the Illinois Natural History Survey

Pre-1900



Post-1930

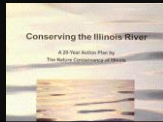


Some benefits of functional floodplain wetlands ...

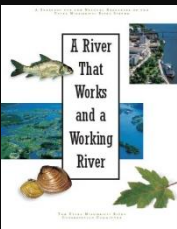
- Provide habitat for native plants and animals (aquatic and terrestrial, resident and migratory)
- Supply materials (food, fiber, biomass for energy production)
- Contribute to a more natural hydrology by storing storm water (moderates unnatural water level fluctuations, reduces flooding and associated damages, and provides base flow)
- Facilitate infiltration and groundwater recharge
- Store and process nutrients (e.g., nitrogen, phosphorous) and sediments
- Improve water quality
- Sequester carbon (helps reduce global climate change)
- Offer opportunities for recreation, education, and economic development



Restoration of Aquatic Ecosystems: Science, Technology, and Public Policy. National Research Council, National Academic Press. Washington, D.C. 1992. 662 pp.



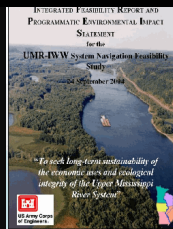
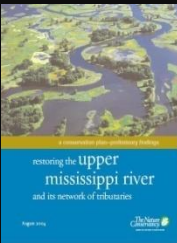
Illinois River Site Conservation Plan. The Nature Conservancy. 1998.



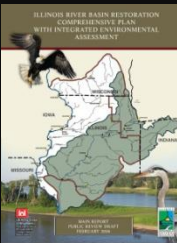
Restoration of functional floodplain is essential for restoring ecosystem health

Upper

Nature



Integrated Feasibility and Programmatic Environmental Impact Statement for the UMR-IWW Navigation Feasibility Study. US Army Corps of Engineers. 2004. 606 pp.



Illinois River Basin Restoration Comprehensive Plan with Integrated Environmental Assessment. Main Report, Public Review Draft. US Army Corps of Engineers. February 2006. 452 pp.

May 3, 2000

Lewistown— The Nature Conservancy announces the purchase of Wilder Farms.

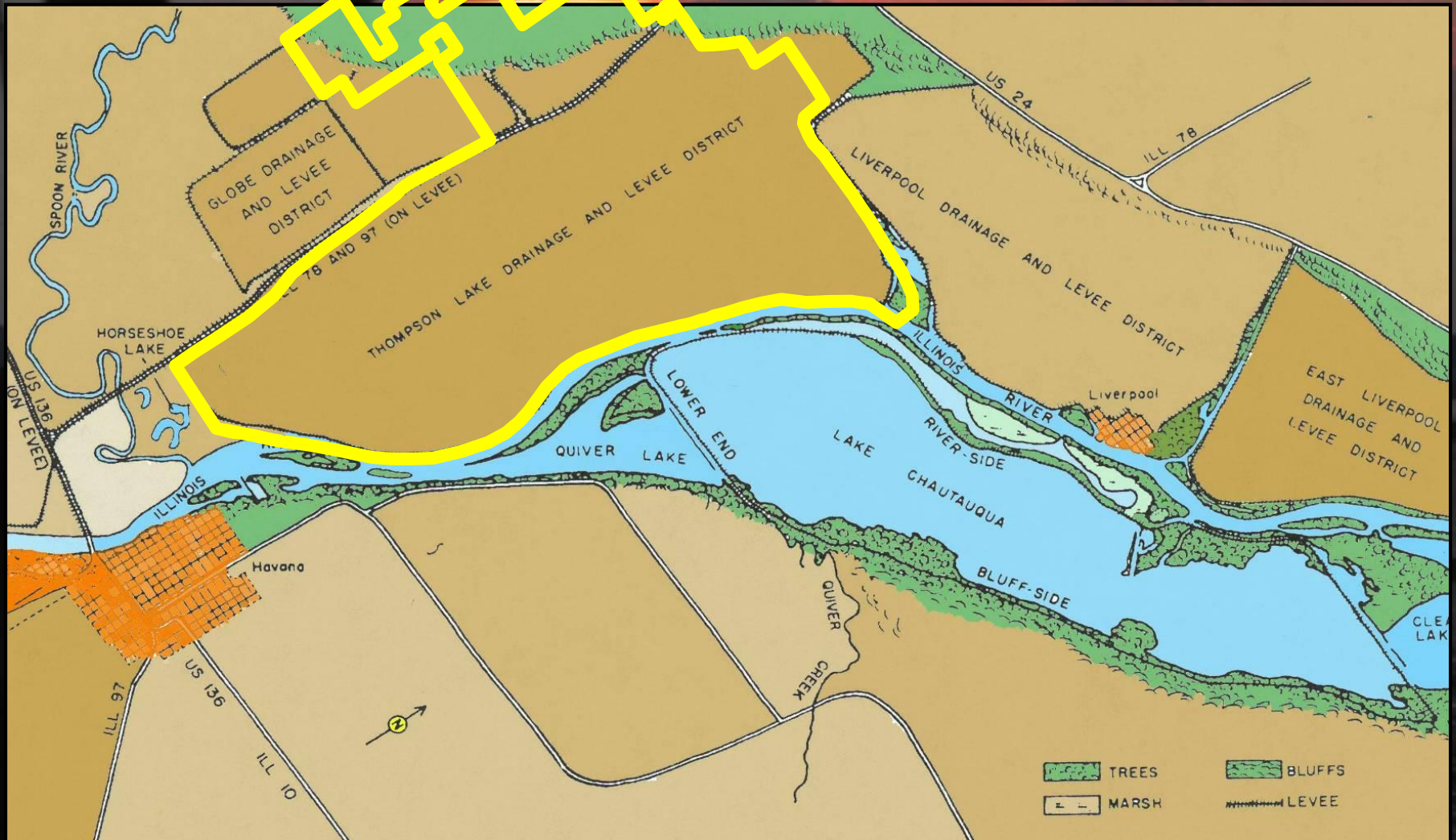
Nearly 7800 acres (3150 hectares)

Wilder Corporation, Florida

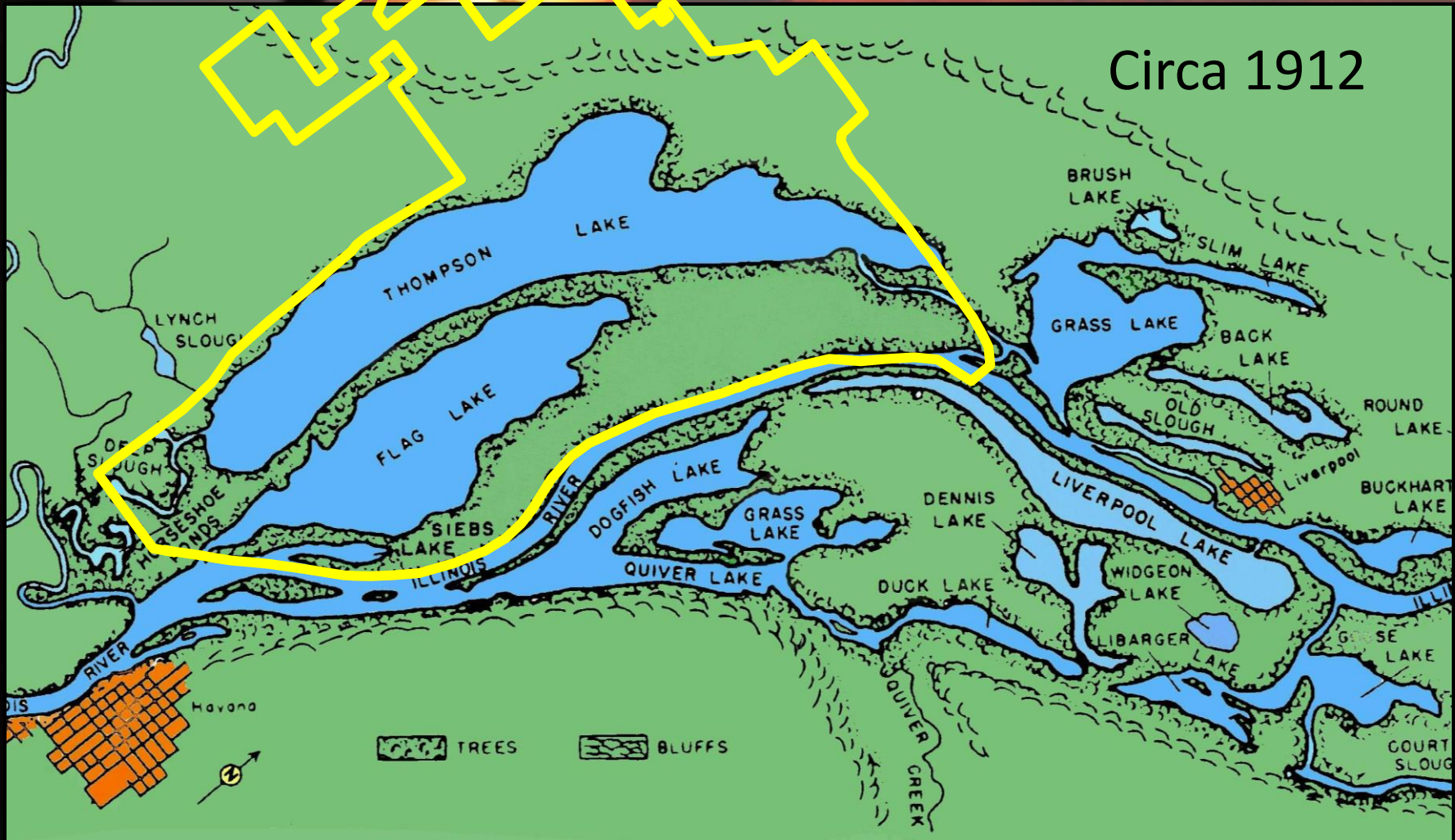
\$18.45 million



The Conservancy's Emiquon Preserve



The Conservancy's Emiquon Preserve



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Emiquon Science Advisory Council

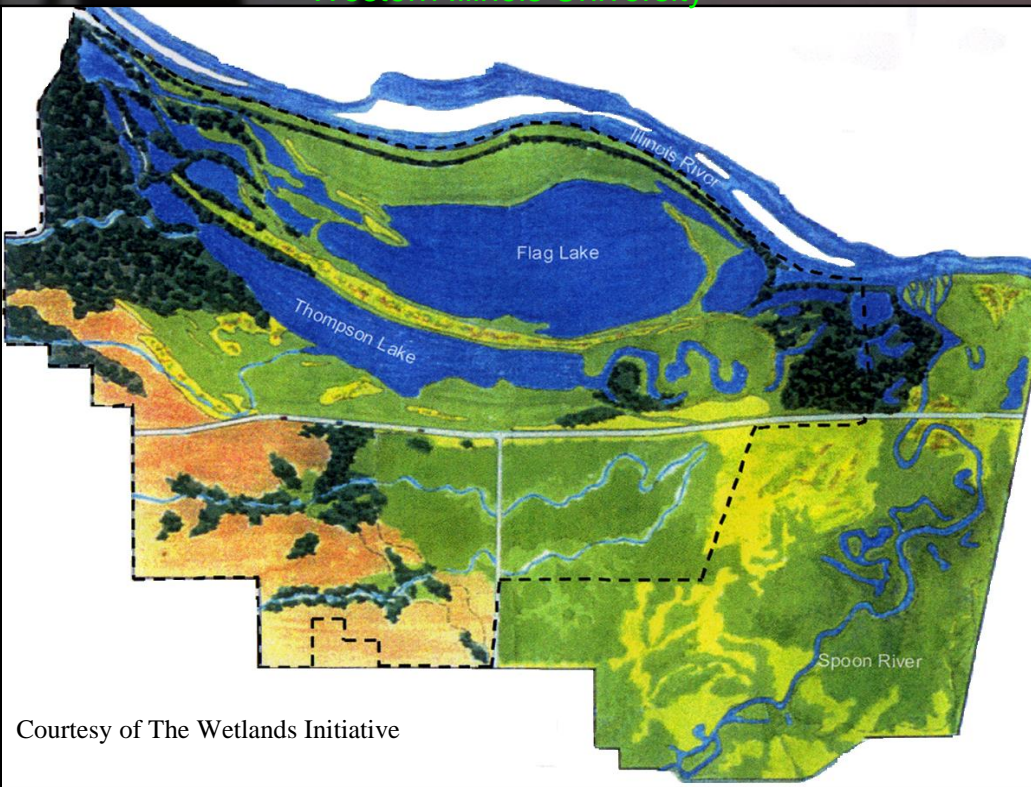
Bradley University
Southern Illinois University-Carbondale
Southern Illinois University-Edwardsville
University of Illinois at Urbana-Champaign
University of Illinois at Springfield
Western Illinois University

Michigan State University
Texas A&M University-College Station
University of Georgia-Athens
University of Michigan-Ann Arbor
University of Missouri-Columbia
University of Wisconsin-Madison
Winona State University

Illinois Department of Natural Resources
Illinois Natural History Survey
Illinois State Museum-Dickson Mounds
Illinois State Water Survey
Illinois Water Resources Center
National Great Rivers Research and Ed Center

Missouri Coop Fish and Wildlife Unit
Natural Resources Conservation Service
US Army Corps of Engineers, Rock Island Dist.
US Army Corps of Engineers, Environmental
Modeling, Simulation and Assessment Center
US Army Corps of Engineers, Water Quality and
Aquatic Plant Res. and Technology Center
US Fish and Wildlife Service Refuges
USGS Columbia Env. Res. Center
USGS Upper Midwest Env. Science Center
USGS National Wetlands Research Center

Applied Ecological Services
Ducks Unlimited
Field Museum of Natural History
Smithsonian Environmental Research Center
The Nature Conservancy
The Wetlands Initiative

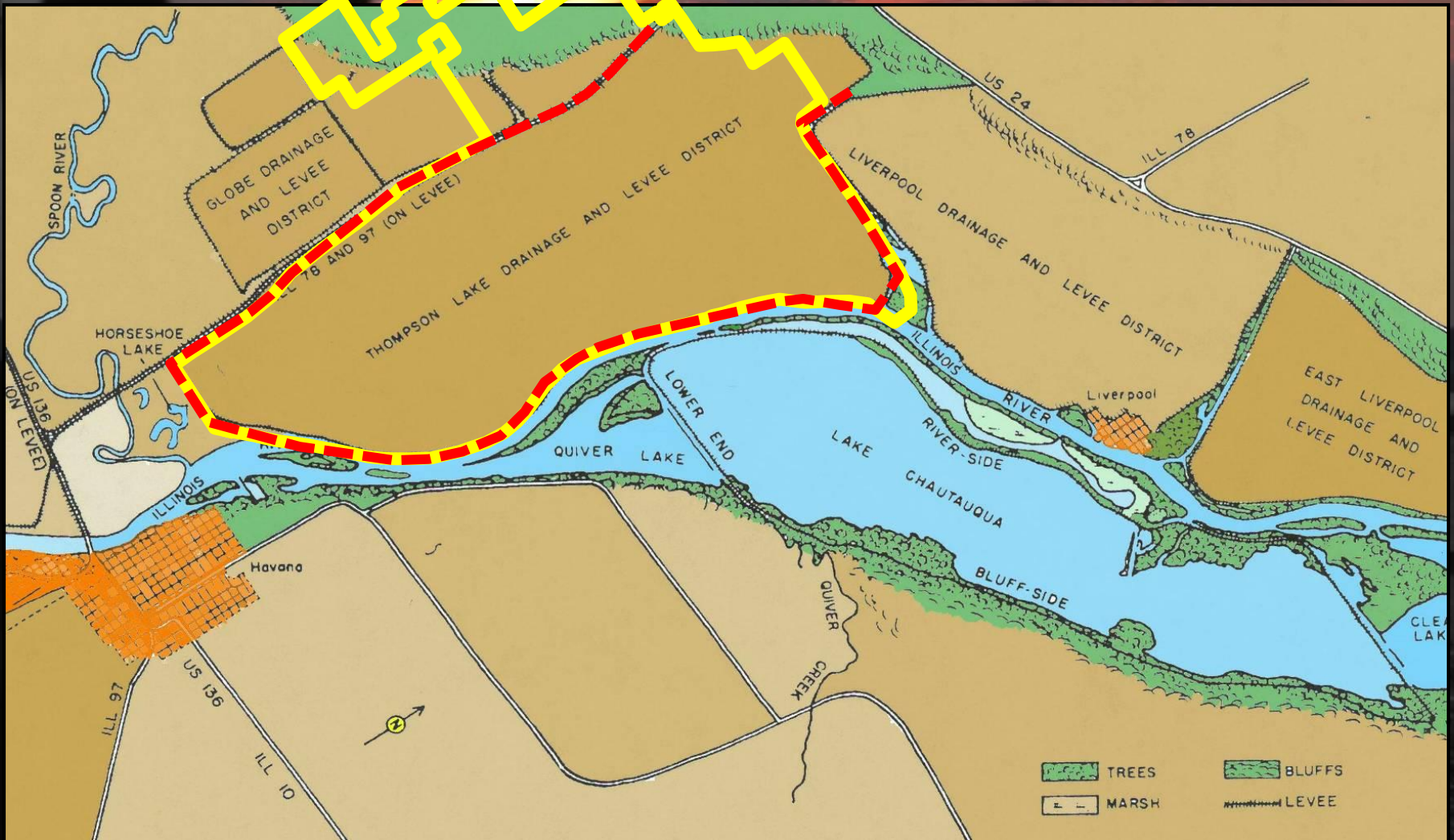


Hydrology

is probably the single most important determinant
of the establishment and maintenance
of specific types of wetlands and wetland processes.

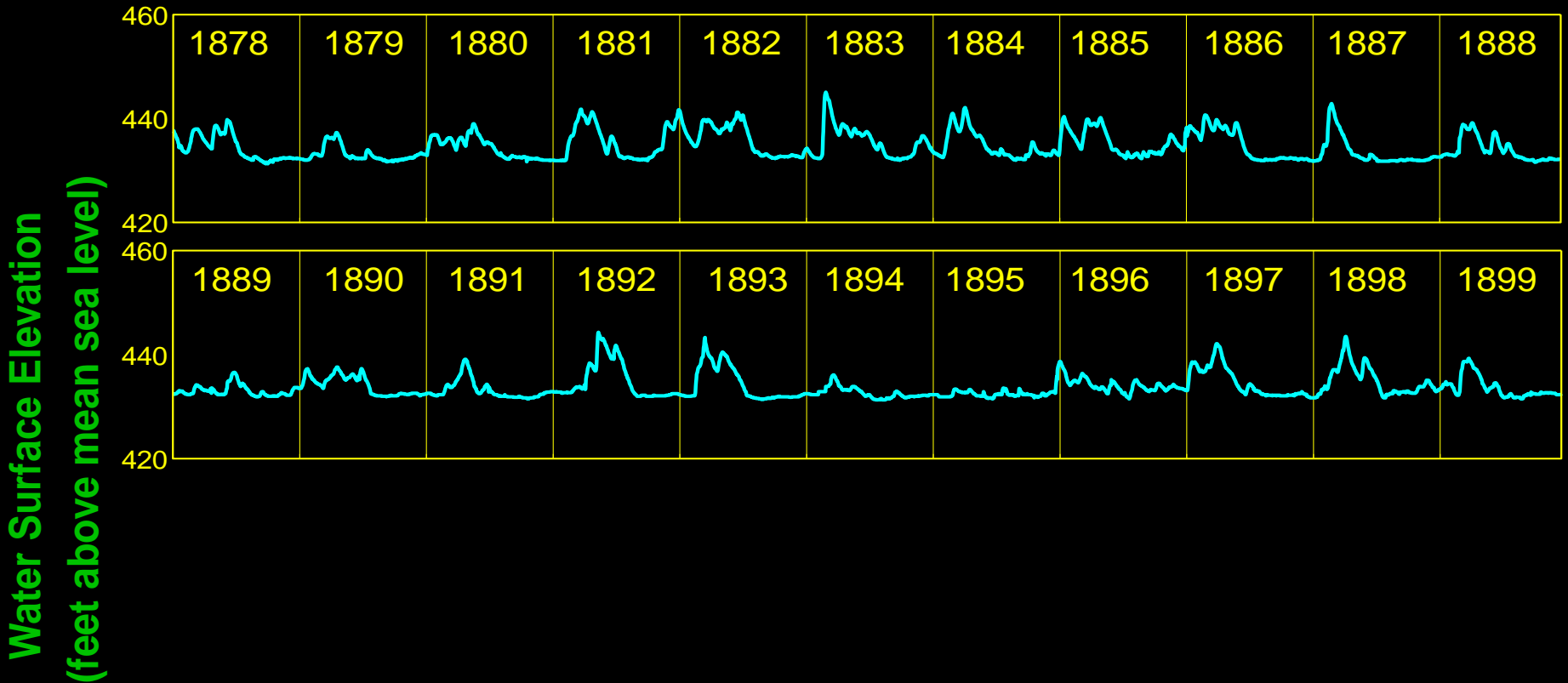
Mitsch and Gosselink (1993)

The Conservancy's Emiquon Preserve



Altered hydrology

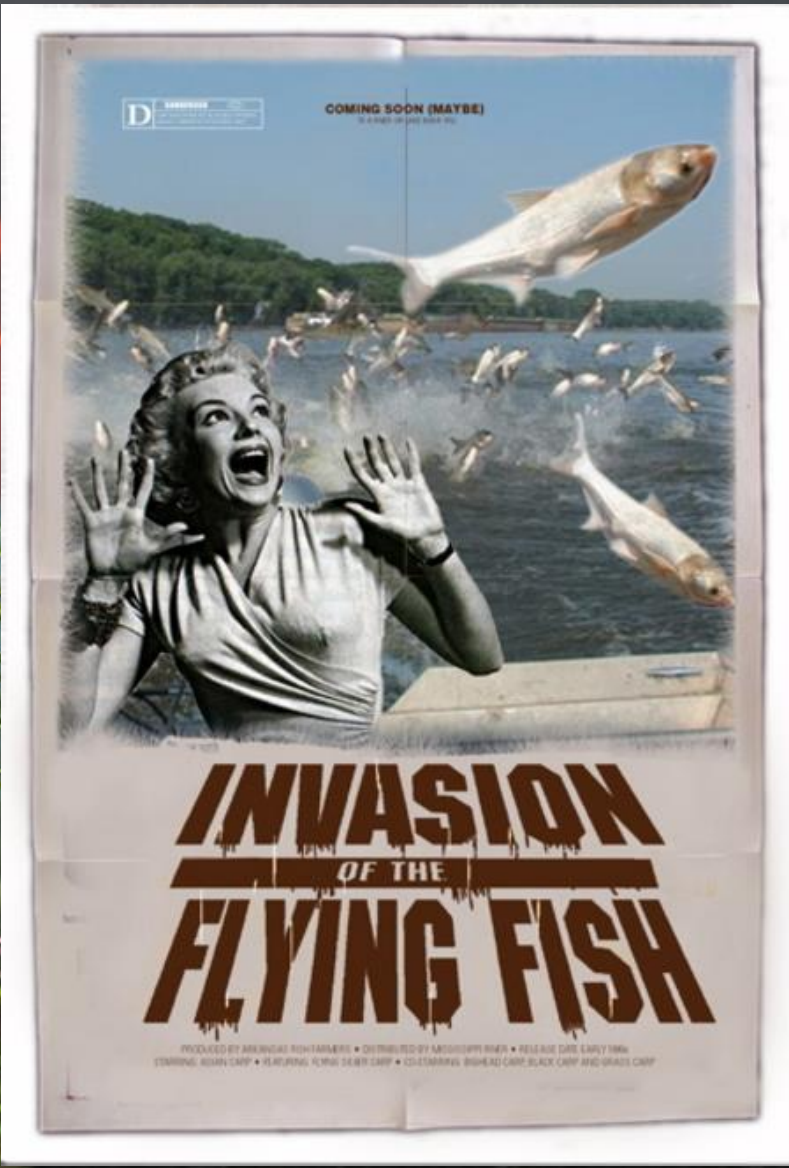
River Levels at Copperas Creek 1879-1899



Excessive sediment

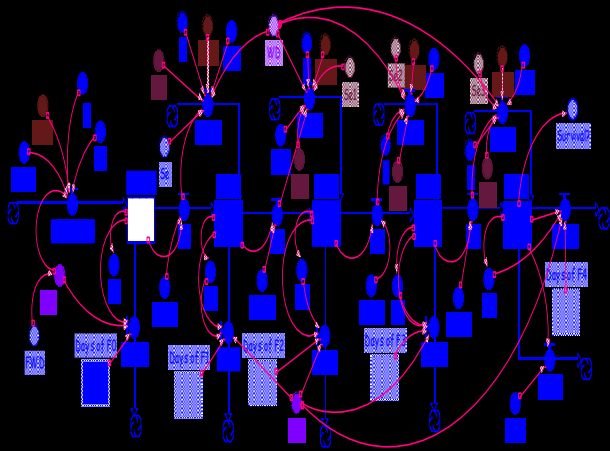


Invasive species

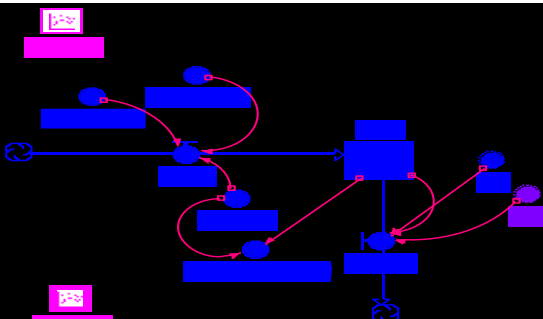


Emiquon computer simulation models

Moist soil plant growth



Moist soil plant seed production



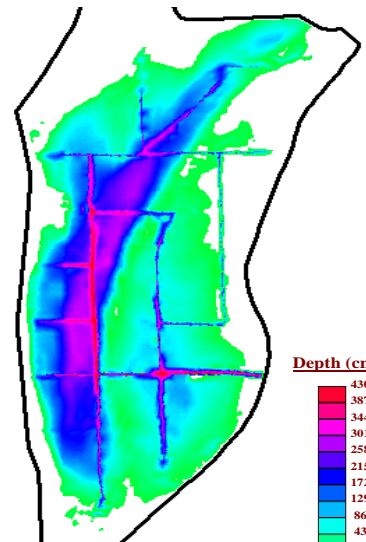
Topography



Hydraulics & sedimentation



Hydrology

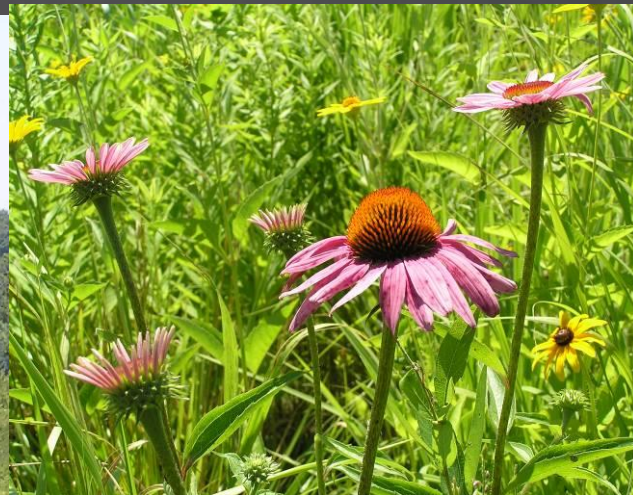


A sunset over a body of water with reeds in the foreground. The sky is filled with vibrant orange, red, and purple clouds, with the sun low on the horizon. The water reflects the colors of the sky, and the reeds in the foreground are silhouetted against the water.

Major acquisition in 2000
Restoration planning 2001-2006

Spring 2007:
a new day dawns at Emiquon

Prairie restoration



Upland and bottomland forest restoration



Pin oak



Pecan

Emiquon fishery rehabilitation – Phase 1

Spring 2007

Pumping to reduce volume
and concentrate fish in 22
miles of ditches

From 2-4 April 2007, 21 IDNR
and 6 Conservancy staff

Drip stations (13), motorized
sprayers, backpack sprayers
and boat bailer

Applied 40 gals Rotenone
Synprentfish at 9-12 PPM

Biomass predominantly
common carp, grass carp,
buffalo and freshwater drum

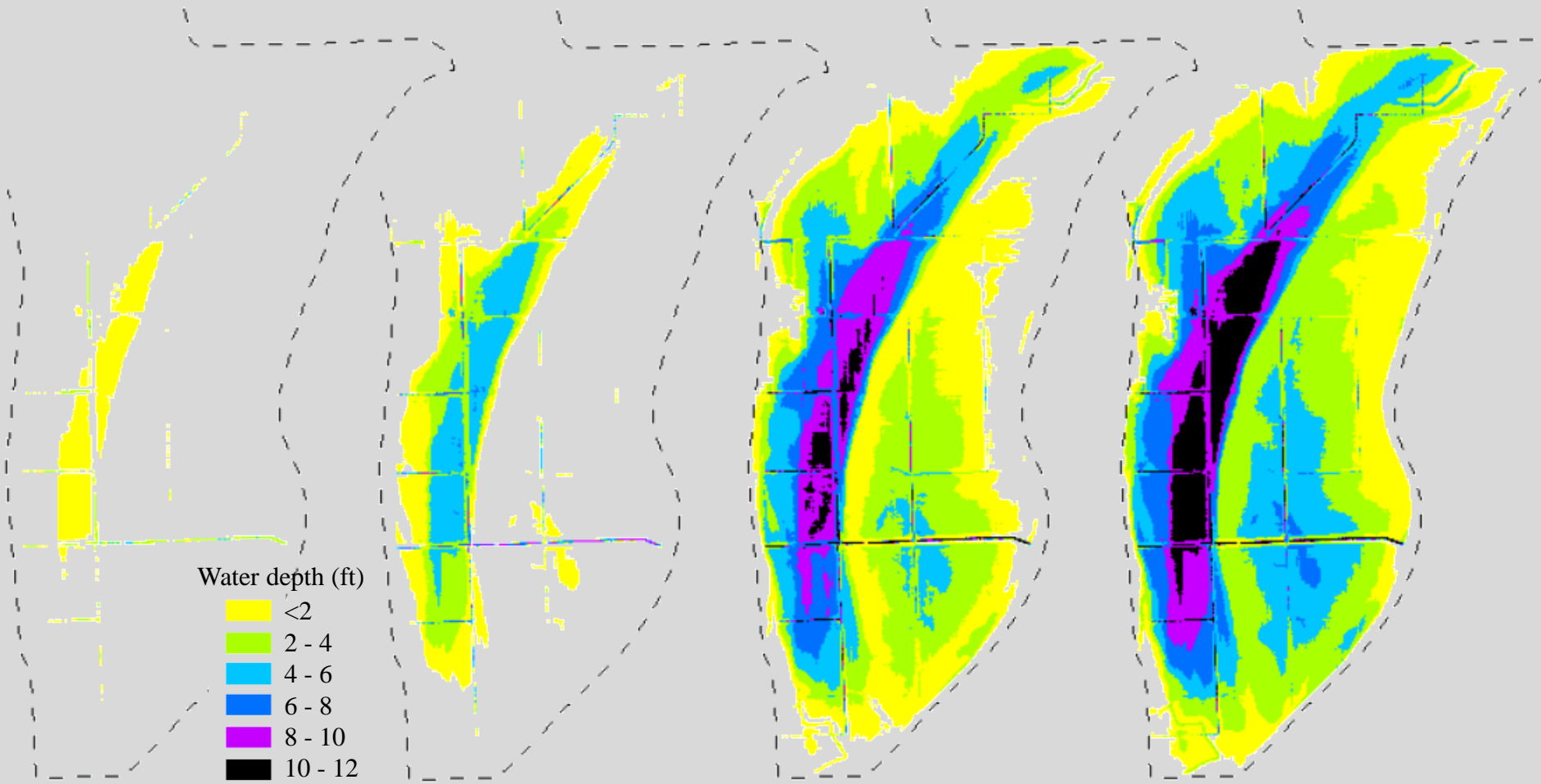


Emiquon fishery rehabilitation – Phase 2



Native fish stocked 2007-2011

Longnose gar	14	Brook silverside	600
Spotted gar	56	Black crappie	4,326
Bowfin	41	Bluegill	2,222
Grass pickerel	213	Orangespotted sunfish	822
Central mudminnow	146	Largemouth bass	1,238,161
Emerald shiner	150	Pumpkinseed sunfish	300
Golden shiner	110	Redspotted sunfish	6,847
Spottail shiner	8	Warmouth	79
Lake chubsucker	278	White crappie	151
Brown bullhead	128	Sauger	23
Channel catfish	106	Walleye	410,000
Flathead catfish	126	Blackside darter	5
Tadpole madtom	47	Johnny darter	25
Pirate perch	109	Logperch	85
Blackstripe topminnow	368	Mud darter	55
Starhead topminnow	5,049	Slenderhead darter	4
Mosquitofish	?		
		Total (33 species)	1,670,654



1 Sept '07
 423.8 ft msl
 268 acres
 < 0.1 B gal

1 Sept '08
 427.0 ft msl
 1104 acres
 1.0 B gal

1 Sept '09
 431.4 ft msl
 3811 acres
 4.4 B gal

24 Feb '10
 433.2 ft msl
 4688 acres
 7.0 B gal

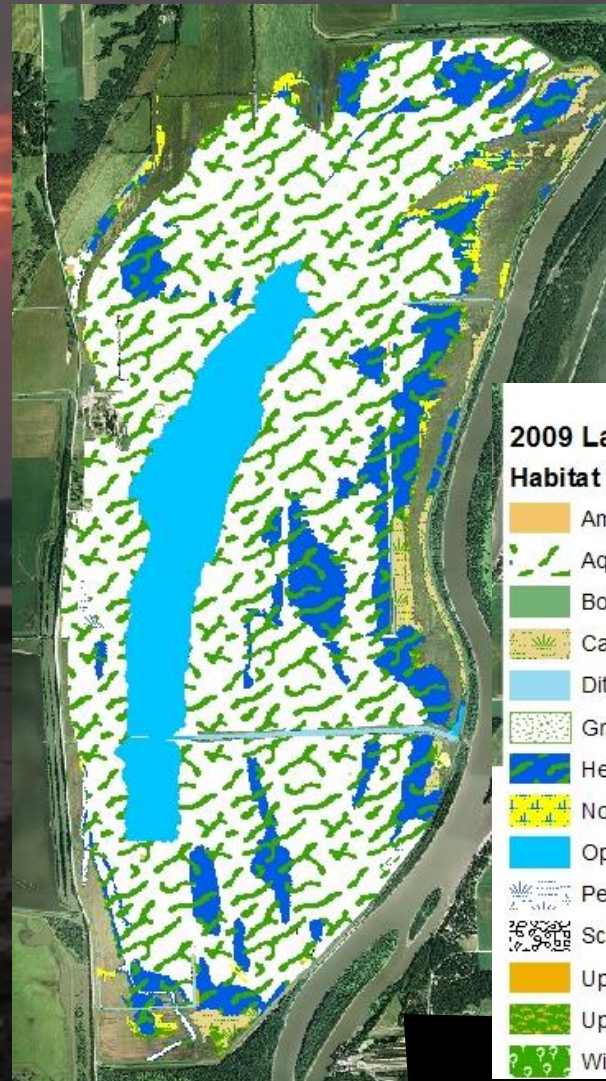
Wetland natural regeneration



Rob Hilsabeck



Nerissa Michaels



2009 Landcover
Habitat Type

	American Lotus
	Aquatic Bed
	Bottomland Forest
	Cattail
	Ditch
	Gravel Pit
	Hemi-marsh
	Non-persistent Emergent
	Open Water
	Persistent Emergent
	Scrub-shrub
	Upland
	Upland - wet
	Willow

More than 100 wetland plant species from the seed bank and/or natural dispersal including ...



- American Lotus^a
- Creeping Water Primrose
- Watershield
- Watermeal
- Coontail
- Elodea^b
- Naiad
- Leafy Pondweed
- Lesser Duckweed



- Arrowhead^c
- Mud Plantain
- Narrow-leaved Cattail



- Common Beggar-ticks^d
- Ammannia
- Teal Grass
- Nodding Bur Marigold



- Bristly Sedge^e
- Spike Rush
- Hardstem Bulrush
- River Bulrush
- Roundstem Bulrush
- Burr Sedge
- Pale Sedge
- Common Bur Reed^f



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		Total (33 species)	1,670,654

~~Not collected since stocking (11 species)~~

Collected fish NOT stocked (22 species)

Paddlefish

Shortnose gar

Gizzard shad

River shiner

Red shiner

Common carp

Bighead carp

Grass carp

Silver carp

Goldfish

*Common carp x Goldfish

Silver chub

Smallmouth buffalo

Bigmouth buffalo

Black buffalo

unidentified Redhorse

Black bullhead

Yellow bullhead

White bass

Yellow bass

Green sunfish

Redear sunfish

*Bluegill x Pumpkinseed

Freshwater drum

Peak waterfowl densities of 200,000 annually



290 bird species observed to date
with many relatively rare species ...



>93% of Illinois wetland-associated T&E bird species

CONSERVATION

Wetlands internationally important



The Sue and Wes Dixon Waterfowl Refuge at Hennepin and Hopper Lakes in Putnam County



Yellow-headed blackbird

Photograph by L. B. Zimmerman



Black scudnowhawk dragonfly

Illinois wetlands get international designation


Peoria sits on the Illinois River about 45 miles between two wetland complexes that have been recently designated as having international importance.

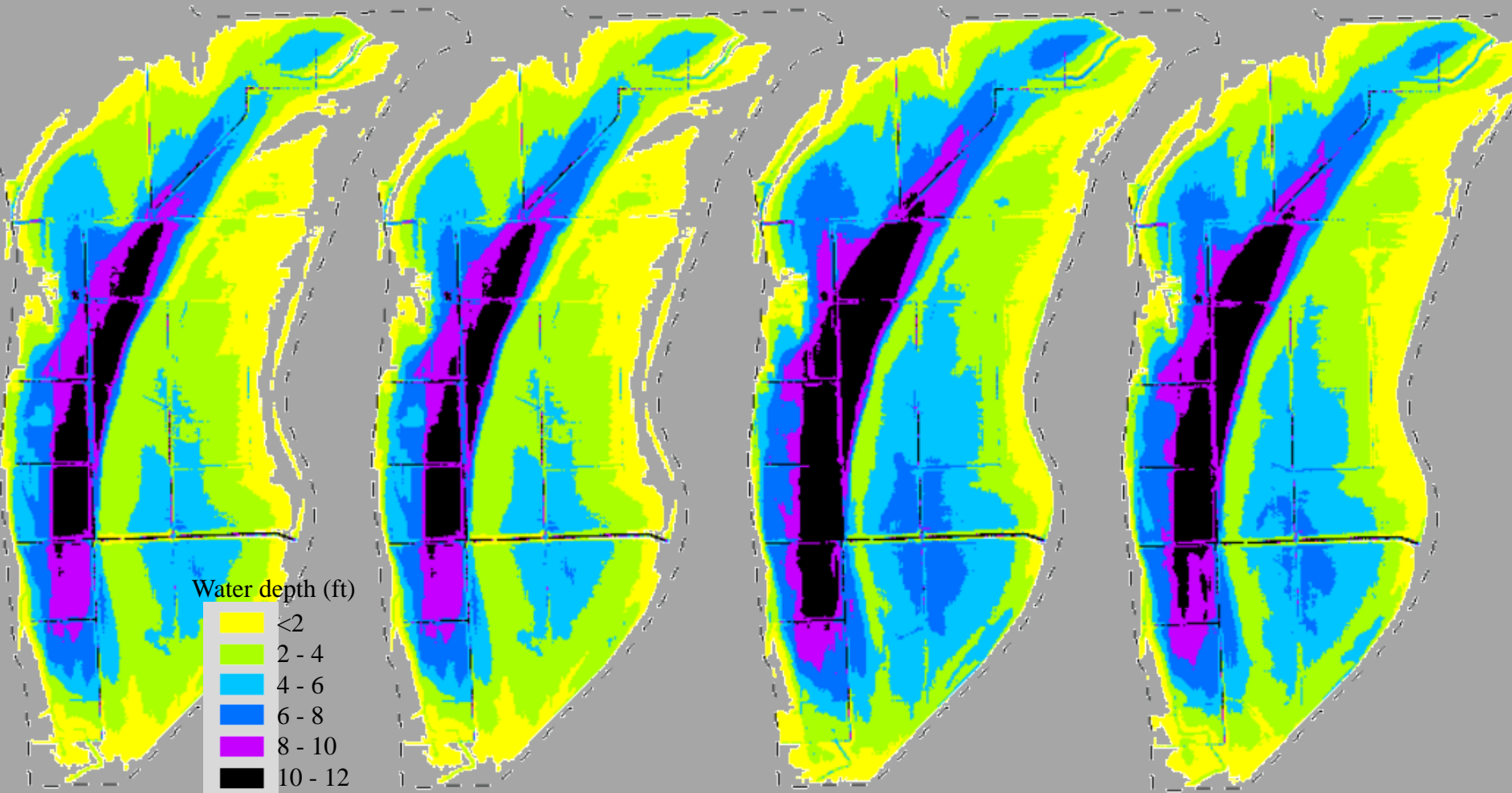
"What this adds up to is, this is a great day for the Illinois River. That, to me, is the summary message. We hope that this recognition will bring to some people's attention who aren't aware of all the good and exciting stuff that's happening in the central Illinois river valley." Boits says.




CONVENTION ON WETLANDS
CONVENTION SUR LES ZONES HUMIDES
CONVENCIÓN SOBRE LOS HUMEDALES
(Ramsar, Iran, 1971)

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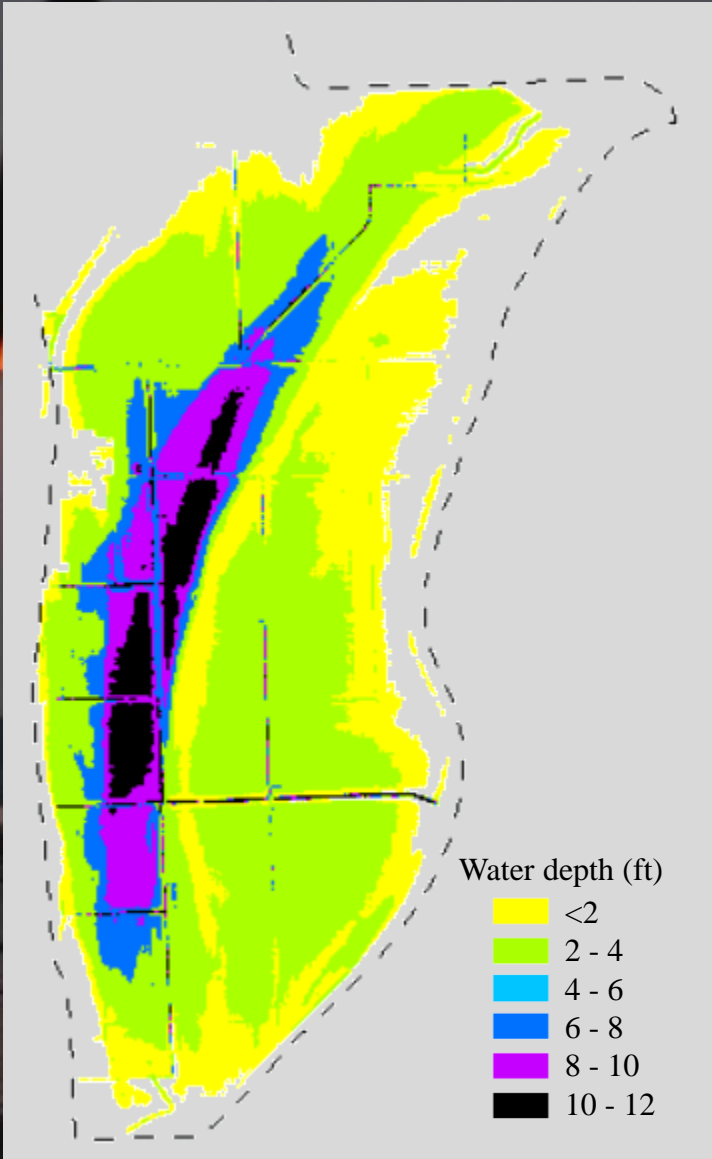


1 July '13
 432.5 ft msl
 4404 acres
 5.9 B gal

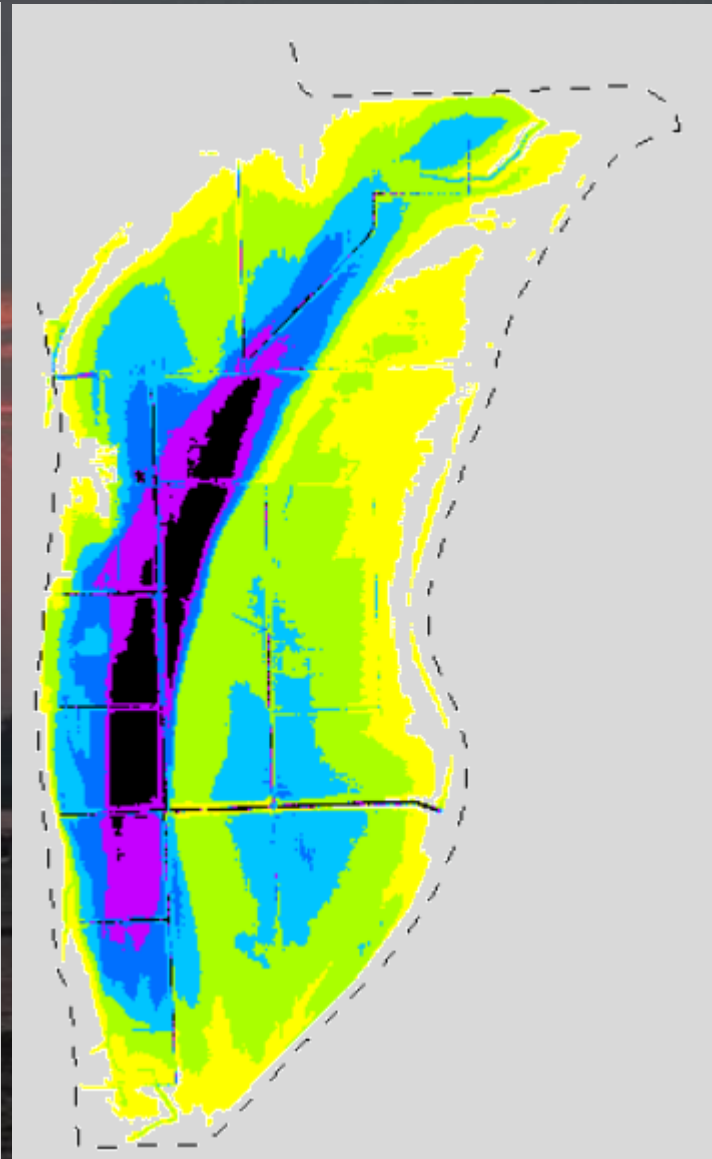
2 Sep '14
 432.3 ft msl
 4327 acres
 5.7 B gal

1 Sep '15
 433.9 ft msl
 4902 acres
 8.1 B gal

1 Sep '16
 433.7 ft msl
 4864 acres
 7.9 B gal



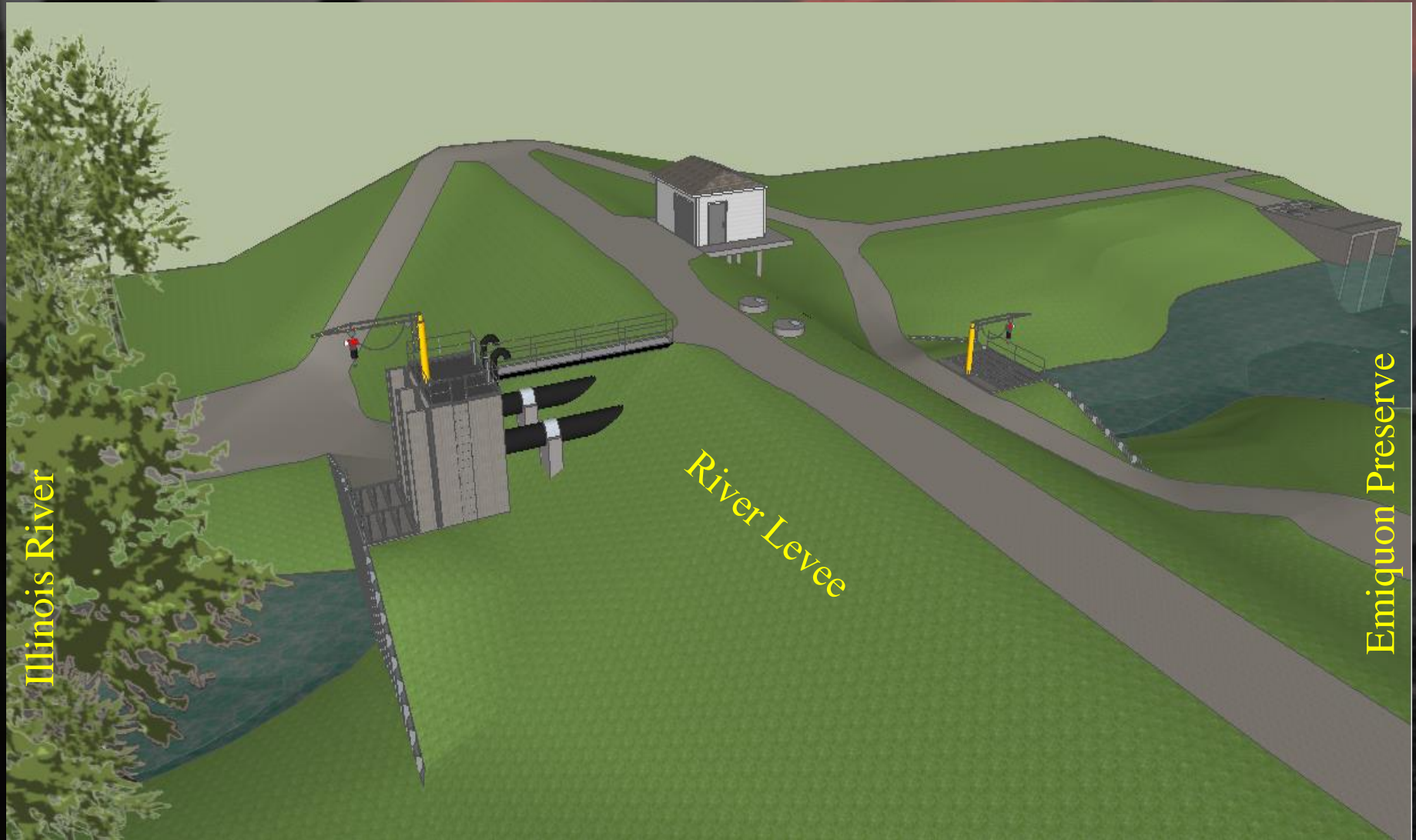
7 Jan '14
431.9 ft msl
4128 acres
5.2 B gal



15 Oct '14
432.7 ft msl
4513 acres (+9%)
6.3 B gal (+21%)

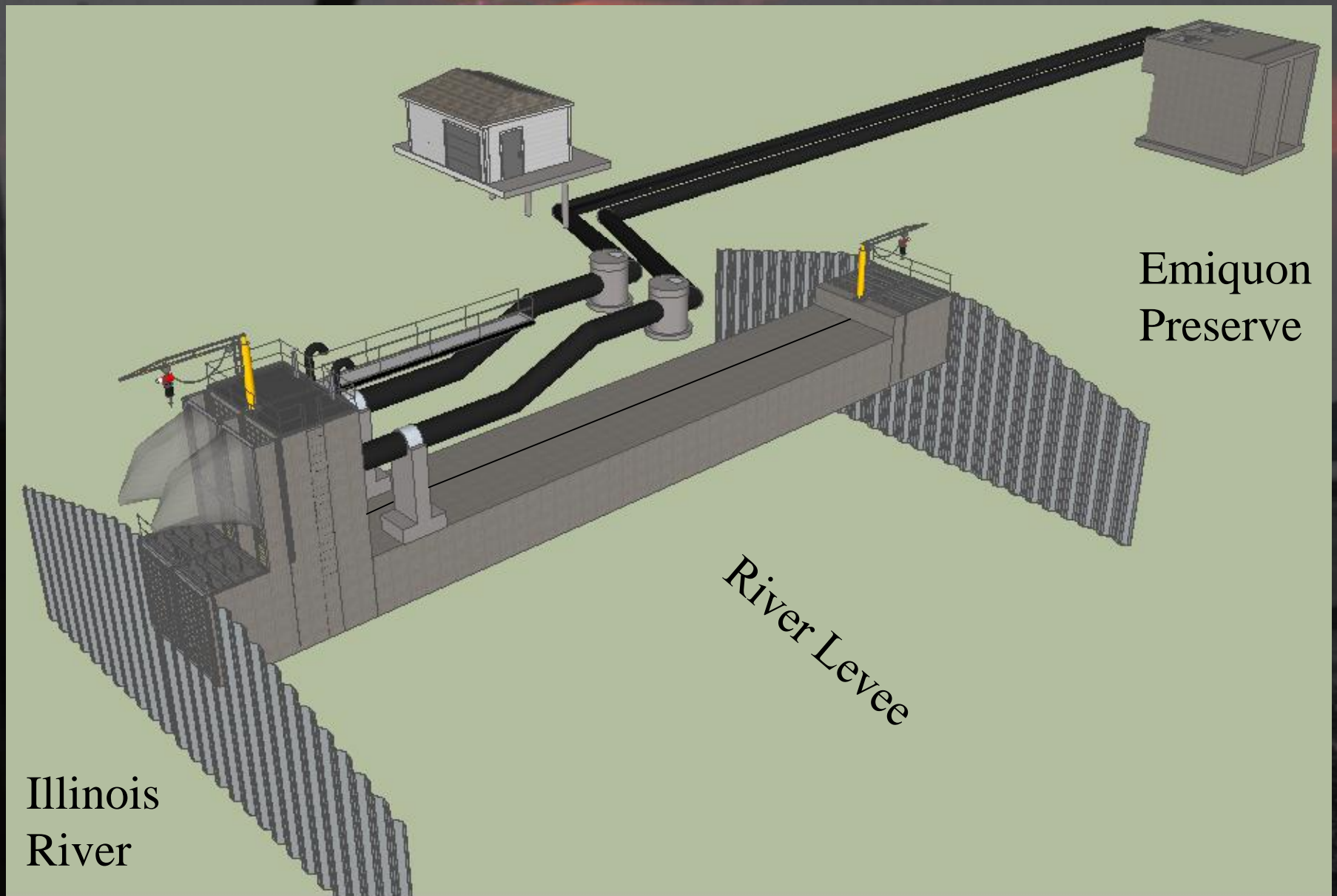


A Science-Friendly Water Control Structure for The Nature Conservancy's Emiquon Preserve





A Science-Friendly Water Control Structure for The Nature Conservancy's Emiquon Preserve



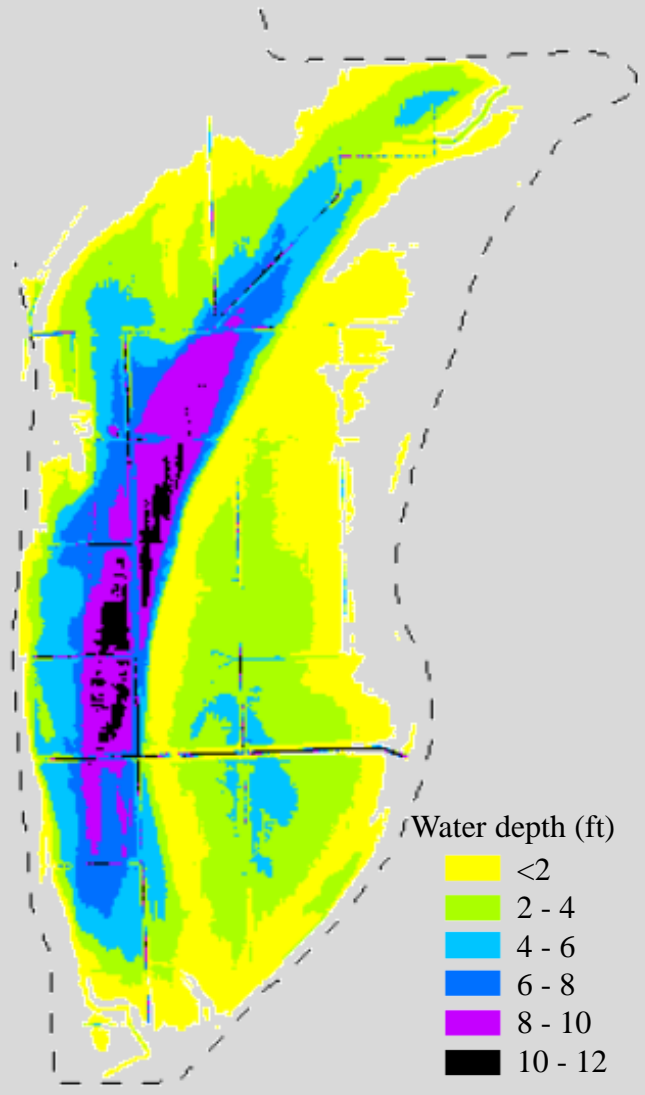
Emiquon Preserve

River Levee

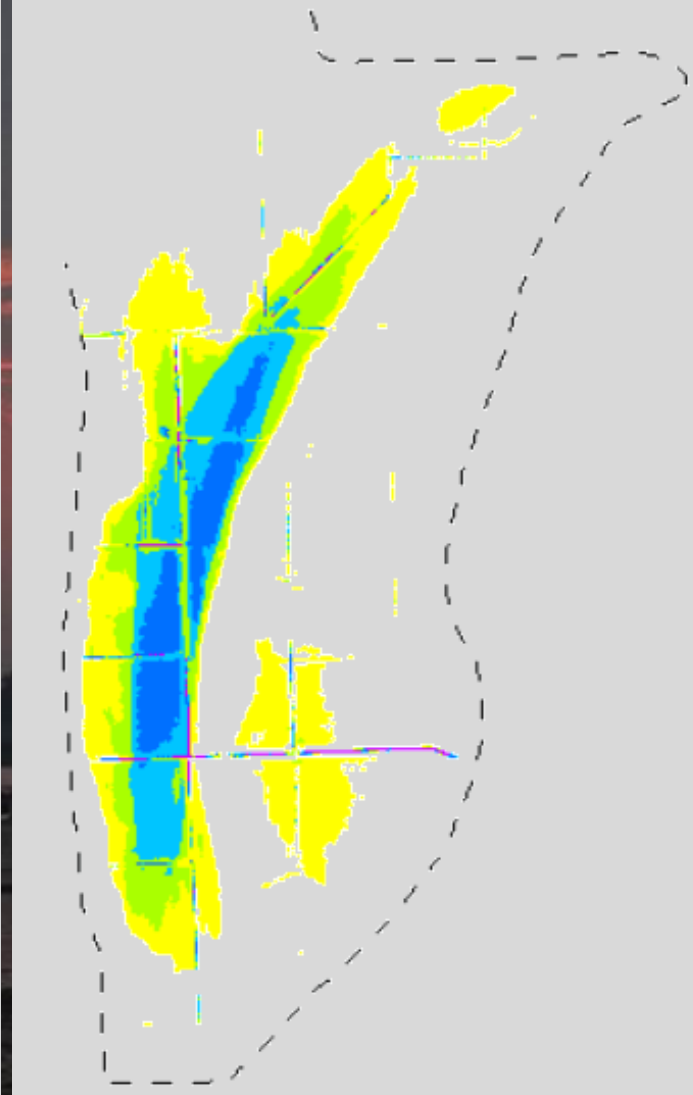
Illinois River







21 Apr '18
431.6 ft msl
3976 acres
4.8 B gal



14 Aug '18
428.0 ft msl (-3.6 ft)
1587 acres (-60%)
1.4 B gal (-71%)



Response of moist soil plants to a drawdown

24 July 2018



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Image courtesy of Renee Mullen

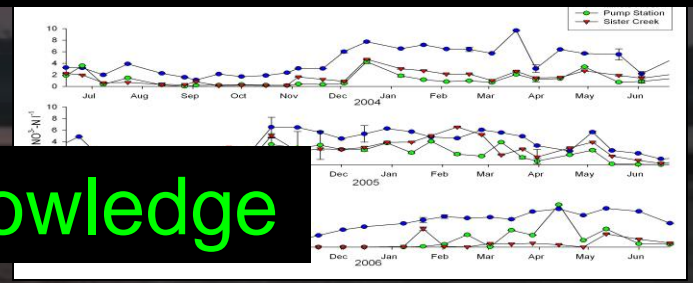
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Science at Emiquon



Guide restoration and management at Emiquon
... and other projects (e.g. IDNR, USFWS, USACOE)



Add to the body of scientific knowledge



Train scientists



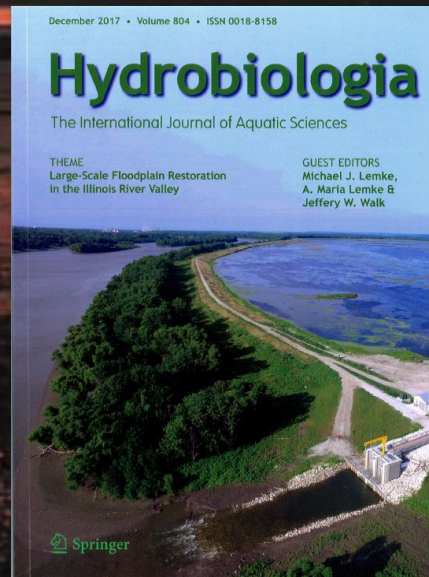


Tours




Presentations



Publications



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Public boating and fishing



Public waterfowl hunting



A good morning in the marsh

Public education



Dickson Mounds Museum, IDNR



Therkildsen Field Station at Emiquon
University of Illinois Springfield
Opened 26 April 2008



Public use amenities

roadways

vehicle parking

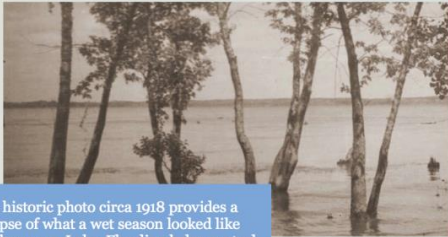
walkways

boat/canoe launches

wetland and lakeside observatories

interpretive displays

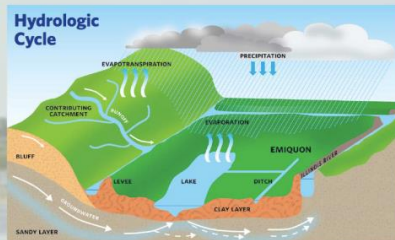




This historic photo circa 1918 provides a glimpse of what a wet season looked like on Thompson Lake. Flooding helps control aggressive native species such as cattails, willows and cottonwoods that prefer wet but not completely flooded conditions.

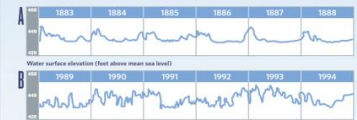
Ebb and Flow

Wetlands act as sponges, absorbing excess water from streams, rivers and the soil. In drier periods, floodplain wetlands release water to the river, stabilizing base flows. They also recharge the groundwater. Wetlands improve water quality by filtering excess sediments, nutrients and other pollutants. This helps keep our nation's rivers clearer and cleaner, providing a renewable source of freshwater.



Rivers, wetlands and floodplains play important roles in the hydrologic cycle, the continuous movement of water above, on and below the earth's surface.

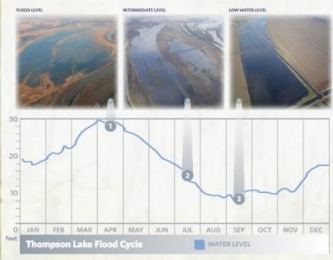
Illinois River Water Levels 1883 to 1888 & 1989 to 1994



A major difference between graph A (1883-88) and graph B (1989-94) is the increase in fluctuating water levels indicating an abnormal hydrology. This resulted from increased drainage throughout the Illinois River basin that quickly moved more water to the river, levee construction that isolated floodplains and reduced water storage and diversion of water from Lake Michigan via the Chicago River. These changes also contribute to the severity of flooding. Fluctuating water during the growing season is bad for plant communities and animals that depend on them. Restoring connections between rivers and floodplains can help reduce unnatural water level fluctuations in the rivers.

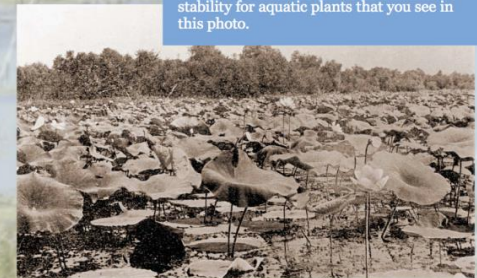
Emiquon may look different each time you visit due to annual and seasonal fluctuations in water levels.

These fluctuations play an important role in maintaining biological diversity. View the graph below to determine if you are visiting during the normal high or low water season. Look at marker to determine if water levels are high or low.







As greenhouse gases increase in the atmosphere, weather patterns are expected to become increasingly erratic and extreme. Wetlands help moderate floods and droughts by storing water.

This image of the original Thompson Lake was taken in 1894 during the late summer-early fall dry season when water loss through transpiration and evaporation is great. This slowly falling water level provides enough stability for aquatic plants that you see in this photo.



Wetland ecosystems such as Emiquon play an important role in the hydrologic cycle.

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The Nature Conservancy
Protecting nature. Preserving life.

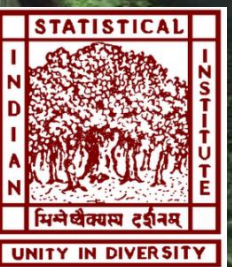


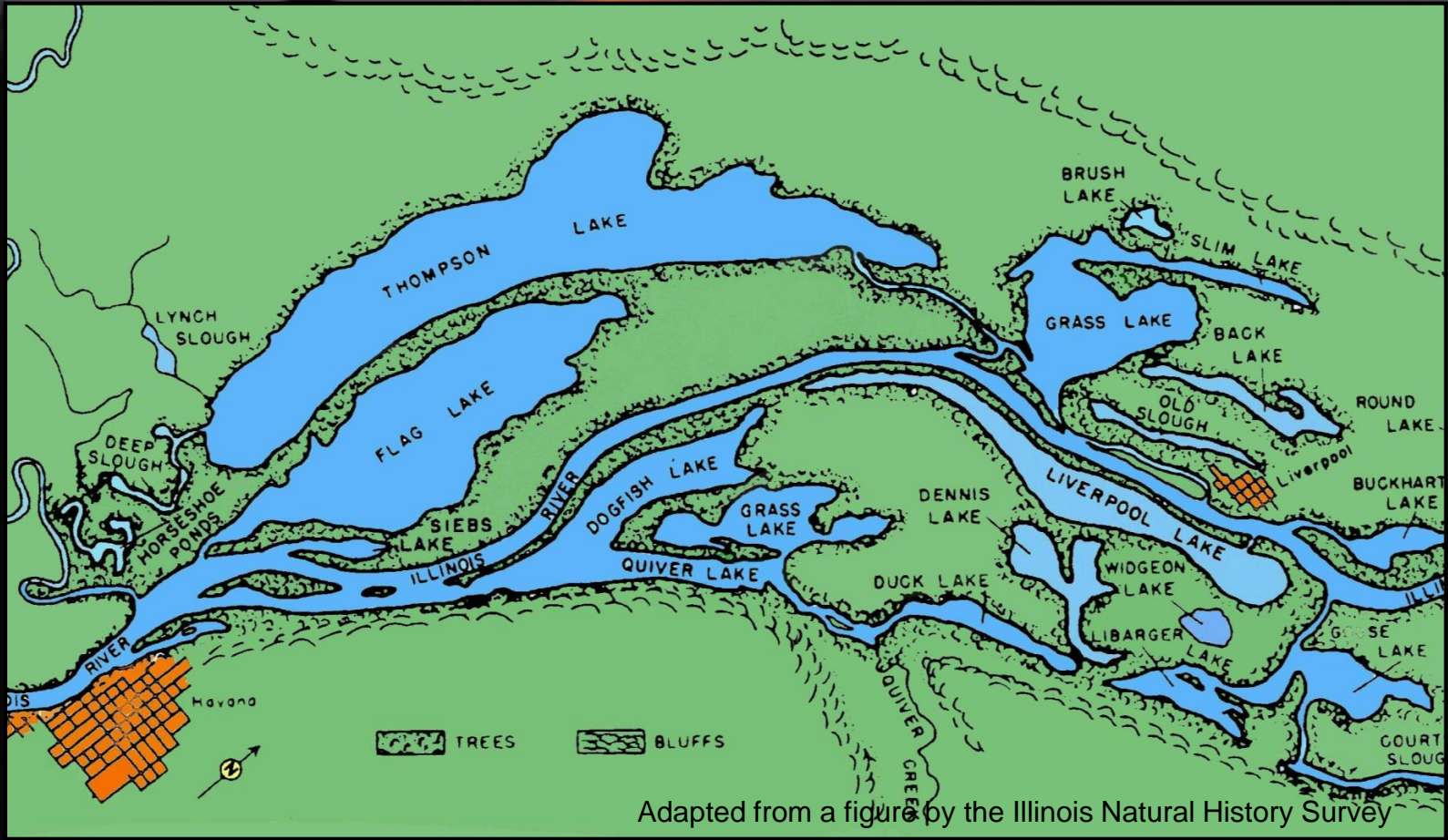
The National Great Rivers
Research & Education Center



Thompson Drainage
and Levee District

LINDENWOOD





“Eventually, all things merge into one,
and a river runs through it.”

Norman Maclean