The Hydro-Geomorphic Method (HGM) for Establishing Landscape Scale Conservation Priorities in Large River Floodplain Corridors

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Thank You to these partners for providing an opportunity to be able to present here today

- **Dr. Mickey Heitmeyer**, (Duck Dr.)
  Greenbrier Wetland Services

- Josh Eash,
  United States Fish and Wildlife Service

- Eastern Tallgrass Prairie and
- Big Rivers Landscape Conservation Cooperative

- Plains and Prairie Potholes Landscape Conservation Cooperative

Landscape Conservation Cooperatives

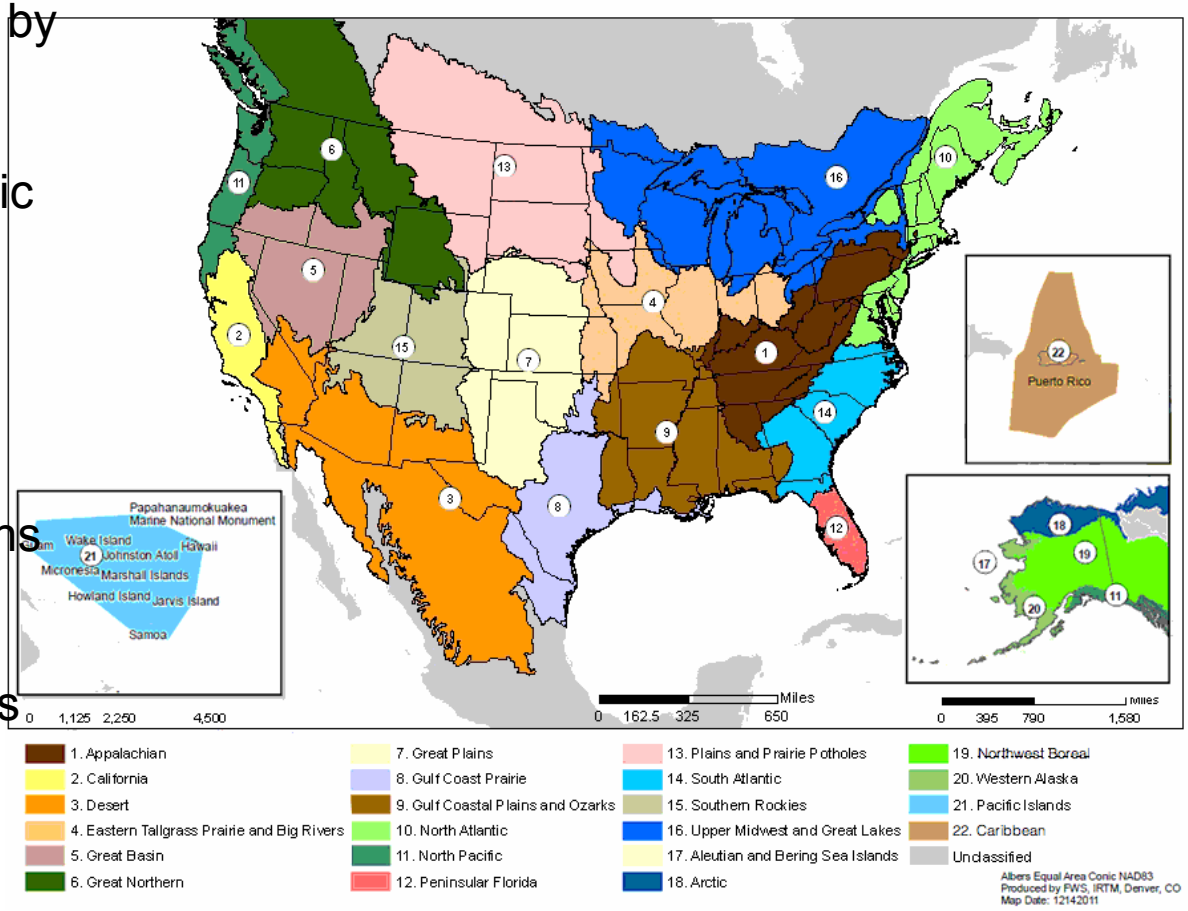
LANDSCAPE CONSERVATION COOPERATIVES

(LCC) -21 LCCs established by Secretarial Order No. 3289

Focus on-the-ground strategic conservation efforts at the landscape level.

Management-science partnerships that carry out resource-management actions

Address“ stressors” within and across landscapes (Climate Change)



HGM = The Hydro-Geomorphic Method

Not part of the USACE wetland classification system

Really a generic terminology that has caught on in recent years

First Developed in 1998 by Chuck Theiling of RI USACE

Conservation planning strategy – GIS analysis "customized" based on what data is actually available in digital format

What are the Primary Steps to the HGM

1) Data collection -Collect and compile available GIS data and non GIS data

2) Assess pre-settlement ecological conditions and functions;

3) Assess what conditions have changed over time;

4) Make recommendations on what communities to restore and where to restore them, based on results from HGM analysis

Analysis – Development of the HGM Matrix

Lots of trial and error-No SOP due to the variability of data sets

Overlay the data and run spatial analysis to create a unique set of polygons

New polygons use to develop the HGM “Matrix” of potential historic habitat community distribution

Becomes basis for developing potential restoration options

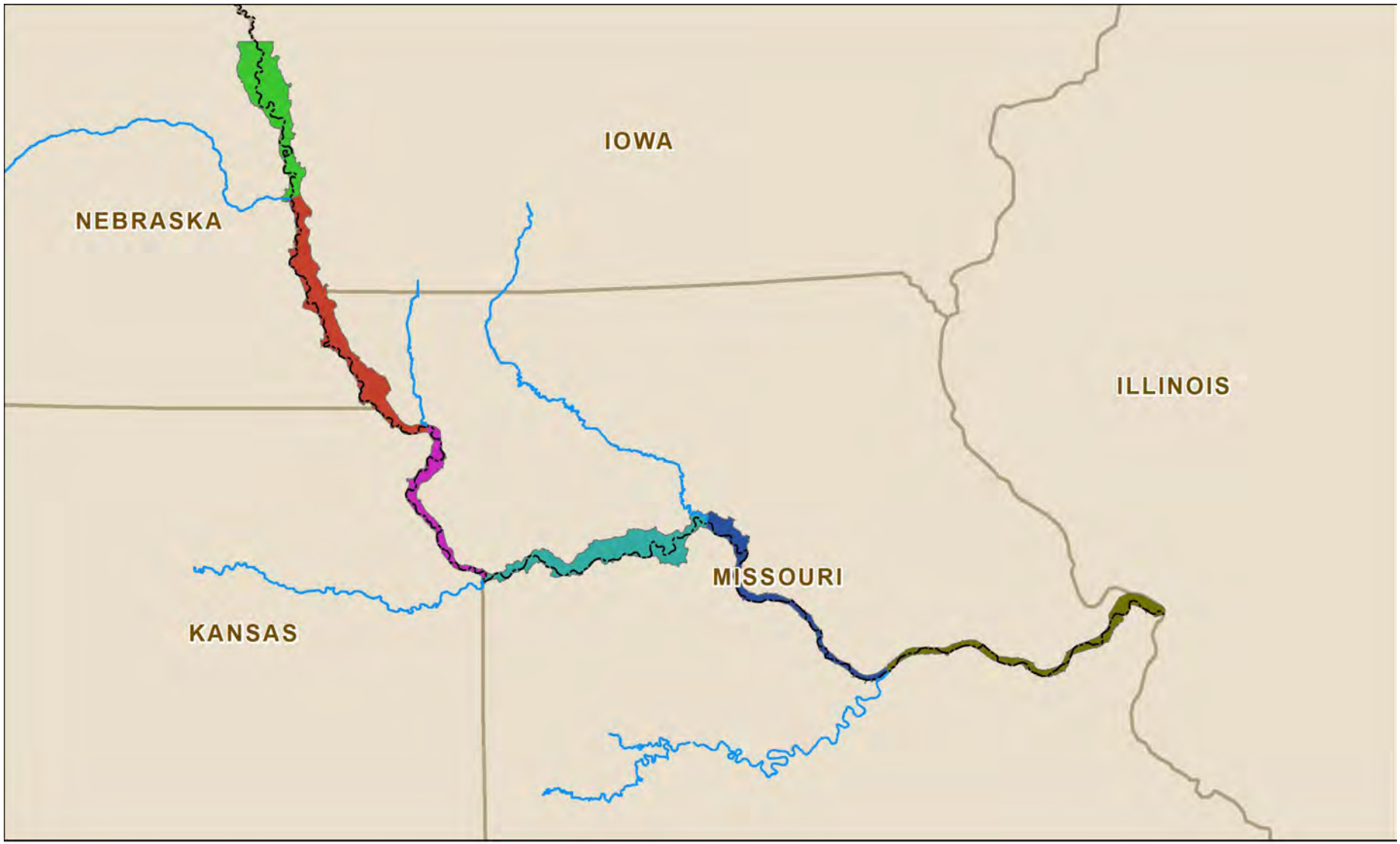
HGM assessment for the lower 670 miles of the Missouri River from Decatur, Nebraska to St. Louis, Missouri.

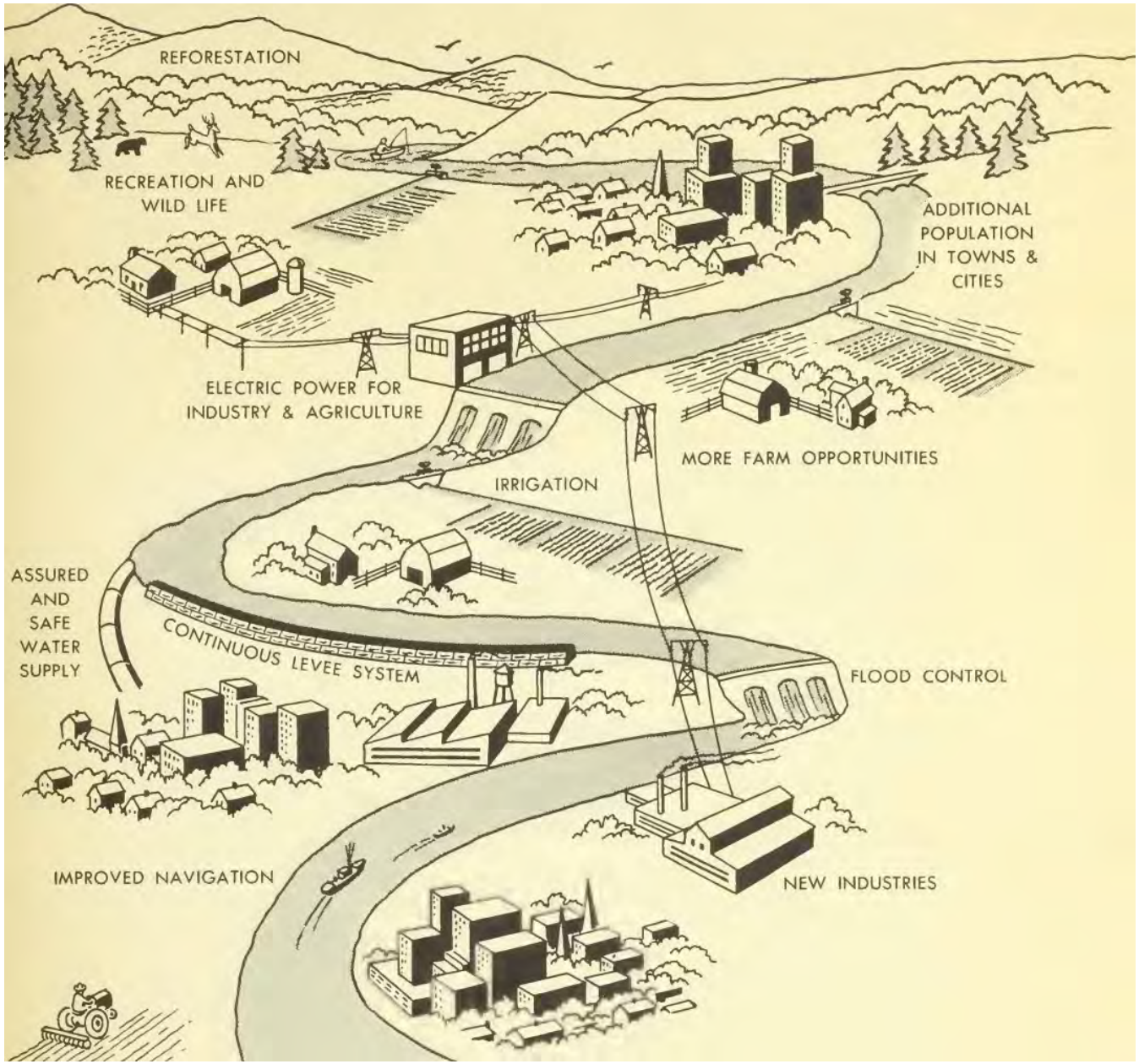
6 Study Reaches – From Downstream (DS) to Upstream (US)

1. Confluence of MO/Miss to the entry of the Osage River
2. Osage to entry of Grand River
3. Grand to entry of Kansas River
4. Kansas to entry of the Nodaway River
5. Nodaway to entry Platte River (River mile 670
6. Platte River to (River mile 670)

Covers Three National Wildlife Refuges and hundreds of other state federal and local conservation holdings

Longest NA River coined the “Big Muddy”


IOWA
NEBRASKA
ILLINOIS
MISSOURI
KANSAS
N
0
50
100
Miles
Legend
Major Tributaries
Missouri River
River Mile 670 to Platte River
Platte River to Nodaway River
Nodaway River to Kansas River
Kansas River to Grand River
Grand River to Osage River
Osage River to Mississippi River



Historically the River has been viewed as something to be "controlled"

Productively at **work** for the "benefit of Man"

Very arrogant views –led to massive "taming efforts begining in 1930s

Summary of major changes to River

- Prior to 1930 – river natural uncontrolled state
- 1941 -1952 first major construction period “current design channel”
- Historic flood of 1952
- 1952 – construction of a 9 foot design channel
- 1940-1964 – Construction of 6 earthen dams
- 1000s of river training structures installed to “lock the design channel and stop the shifting sands that defined the complex system

The primary goals of the Missouri River HGM project

1.) develop a **common set of restoration targets** for the entire 670 river miles; (Too many cooks in the Kitchen)

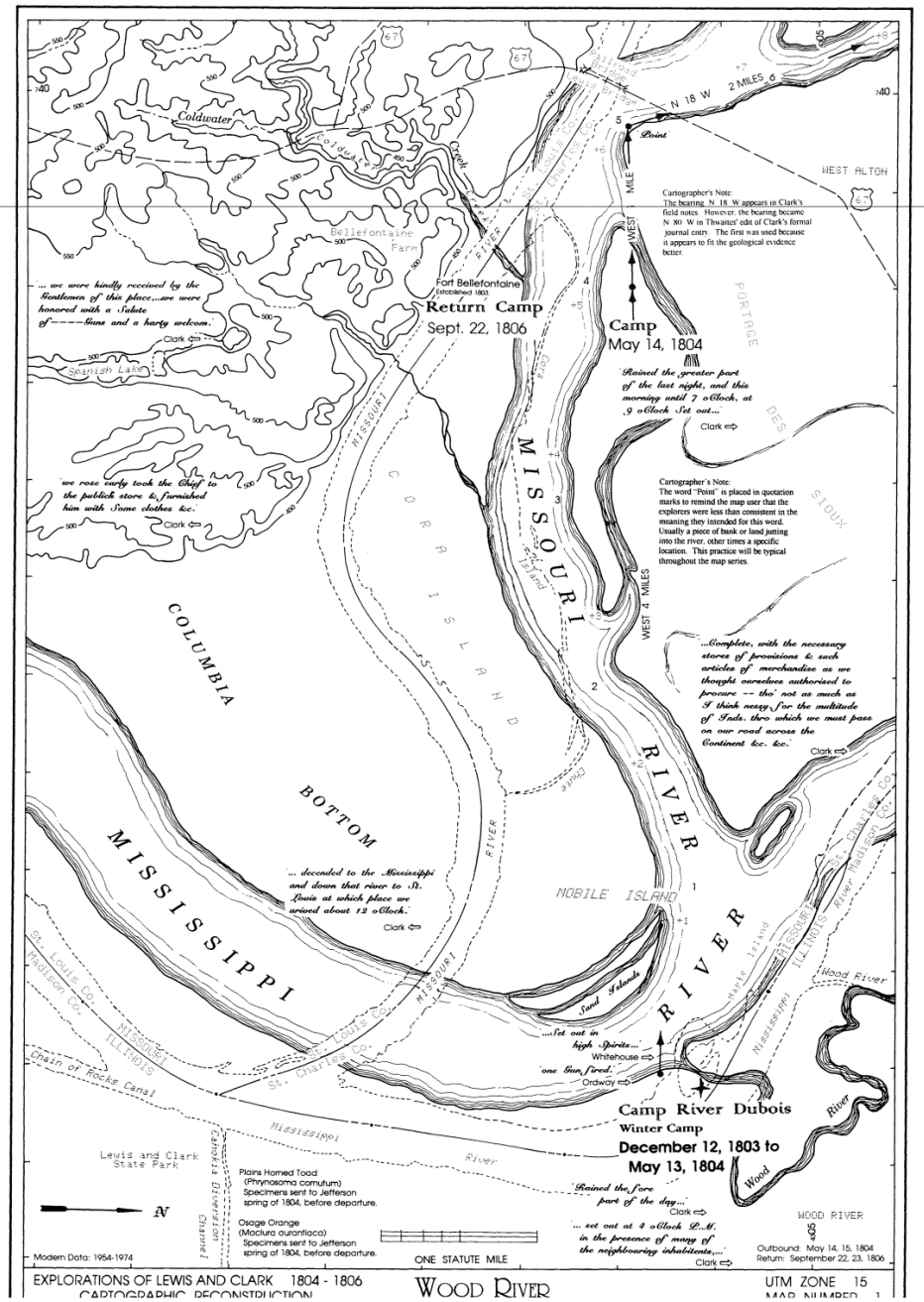
2) Guide public and private land managers to make more objective **scientifically based management decisions** (eliminate reactive gut based restoration)

3) Identify **Best new areas** for acquisition, restoration and protection

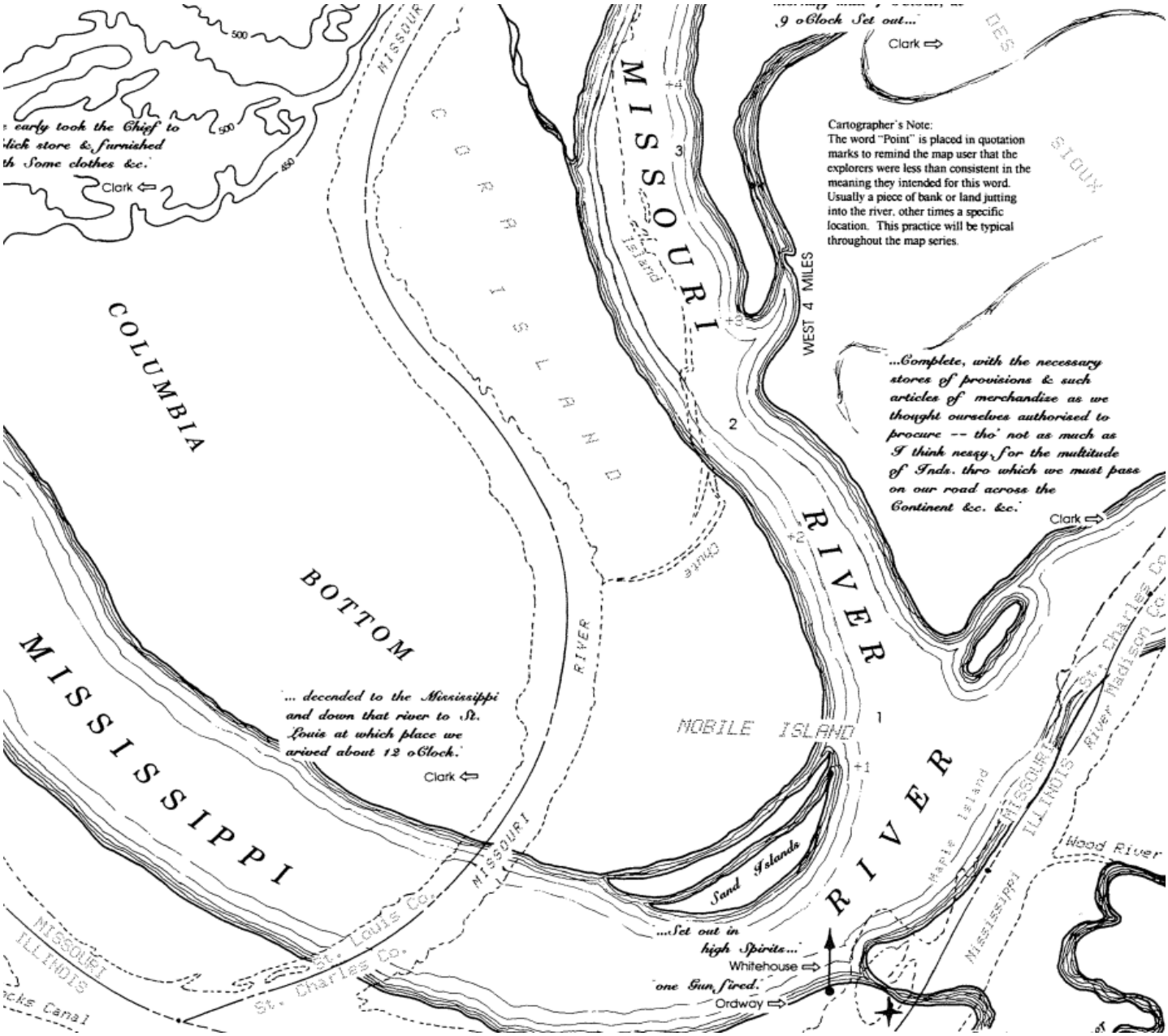
HGM Data – Unique to Missouri River Many Historically Significant Data Sets to be used for this project

1. Lewis and Clark Survey data
2. Missouri River Commission (MRC)
3. Witness Tree Data
4. Geomorpholgy

Other datasets used include, USGS topographic maps, lidar data, hydrology data sets, land cover, SSURGO soils, etc.



Following in the footsteps of Lewis and Clark!


'9 oClock Set out...'
Clark
Cartographer's Note:
The word "Point" is placed in quotation marks to remind the map user that the explorers were less than consistent in the meaning they intended for this word. Usually a piece of bank or land jutting into the river, other times a specific location. This practice will be typical throughout the map series.
'...Complete, with the necessary stores of provisions & such articles of merchandize as we thought ourselves authorised to procure -- tho' not as much as I think nessy, for the multitude of Inds. thro which we must pass on our road across the Continent &c. &c.'
Clark
'early took the Chief to dick store & furnished th Some clothes &c.'
Clark
MISSOURI
CORA ISLAND
COLUMBIA
BOTTOM
MISSISSIPPI
MISSOURI RIVER
MOBILE ISLAND
WEST 4 MILES
'... decended to the Mississippi and down that river to St. Louis at which place we arived about 12 oClock.'
Clark
Sand Islands
'...Set out in high Spirits...'
Whitehouse
'one Gun fired.'
Ordway
MISSOURI RIVER
ILLINOIS
St. Charles Co.
St. Louis Co.
Maple Island
Wood River
SIOUX
DES

Whats the big deal about Meriwether Lewis and William Clark **and their observations?**

Their maps and notes are incredible sources of presettlement data on river processes geomorphology, vegetation, and wildlife species.

Lewis wrote this description of flood plains and terraces before any descri[illegible]ns of thes[illegible]ypes of geomorphic features were p[illegible]d

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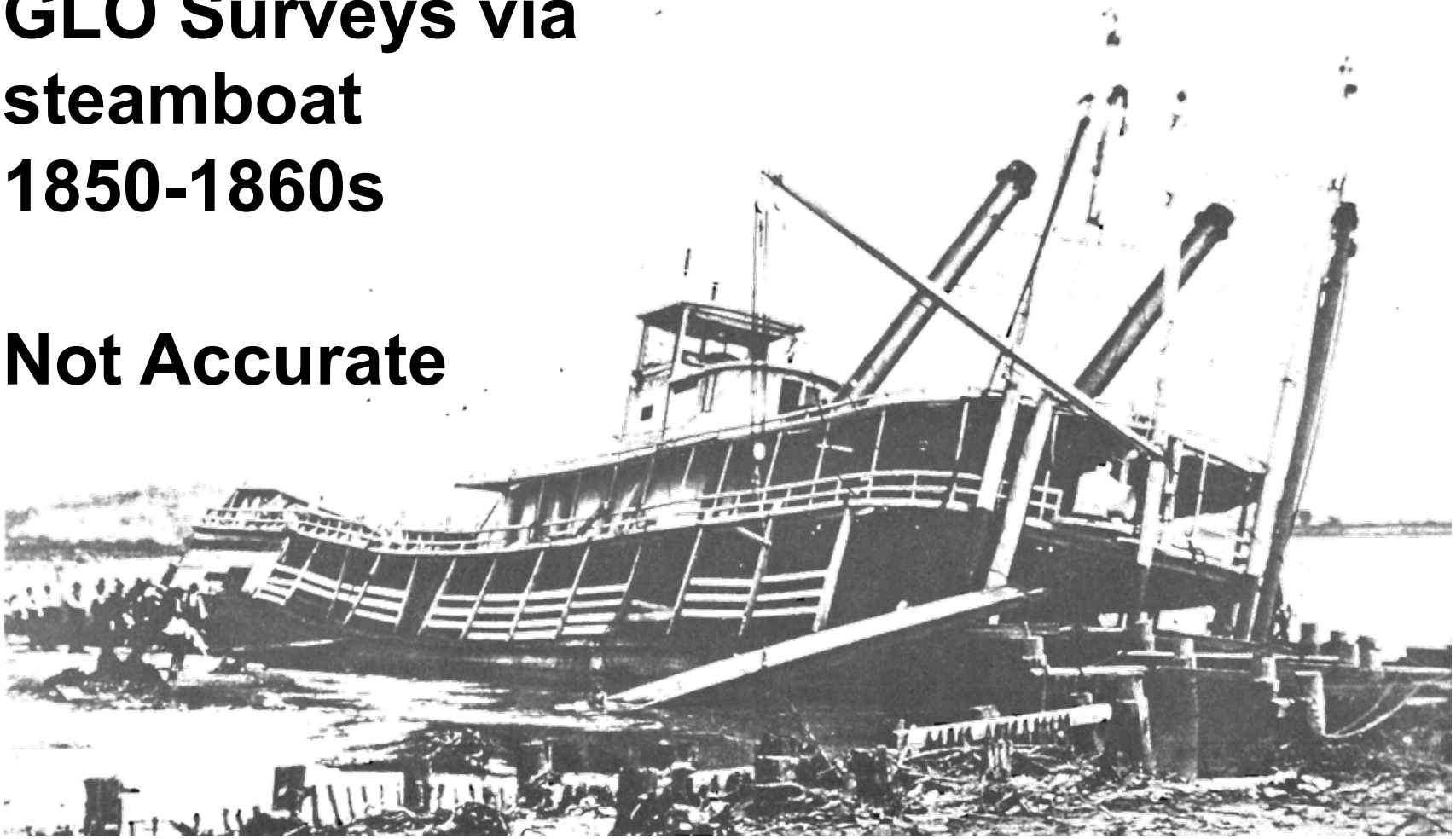
GLO Surveys via steamboat 1850-1860s

Not Accurate

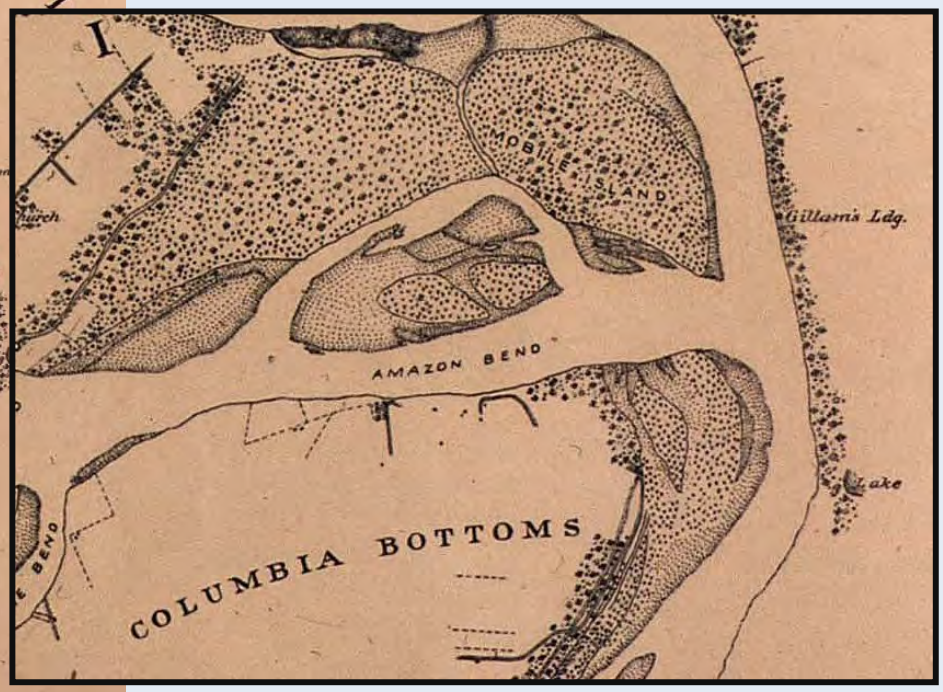


Survey of 1879-published 1881

First detailed study of entire river

1891 resurvey-(Suter Mapping) numerous changes to channel in just over 10 years

1879 MRC Map



83 individual plates that are organized within 9 indexes.

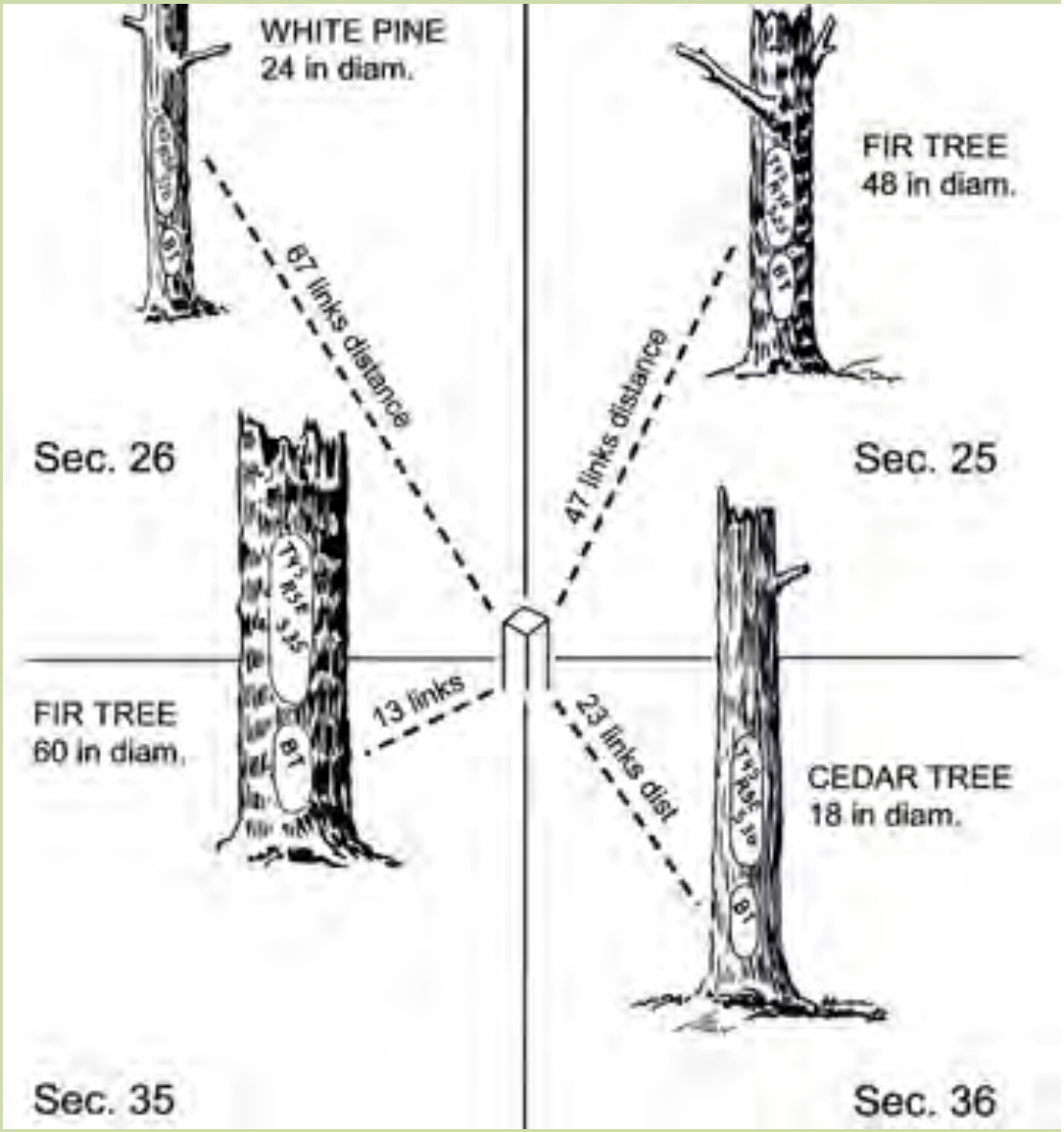
Witness Trees

The GLO surveys created a dataset spanning 200 years and covering nearly 1.5 billion acres.

Trees noted and marked in field notes by the original General Land Office surveyors.

Withstand the test of time used for the reestablishment of property lines in their original locations.

Data-Distances to selected witness trees, species and diameters of the trees



Ecologists, historians, and others have used GLO records as a source of information on landscape condition prior to settlement

2 witness trees at quarter corners and at river crossings

4 witness trees at section corners.

Scribed with the appropriate township and range number.


Witness Trees
Common Name
AX-Ash, Gray ash
BI-Birch
BJ-Black Jack
BO-Black Oak
BR-Bur oak
BW-Black Walnut
BX-Boxelder
CH-Black cherry
CO-Cottonwood
CR-Crab apple
EL-Elm
FQ-Blue Ash
HA-Hackberry
HI-Hickory
HW-Hawthorn
KL, TT-Locust
KY-Kentucky Coffe Tree
LI-Linden
LK, TT-Locust
MA-Maple
MR-Mulberry
OA-Oak
OH-Ohio Buckeye
OV-Overcup Oak
PC-Pecan
PQ-Pin Oak
PX-Post Oak
QE-Spanish Oak
RB-Red Bud
St Charles Co, MO
St Charles Co, MO
CALHOUN Co, IL
Pool Alton

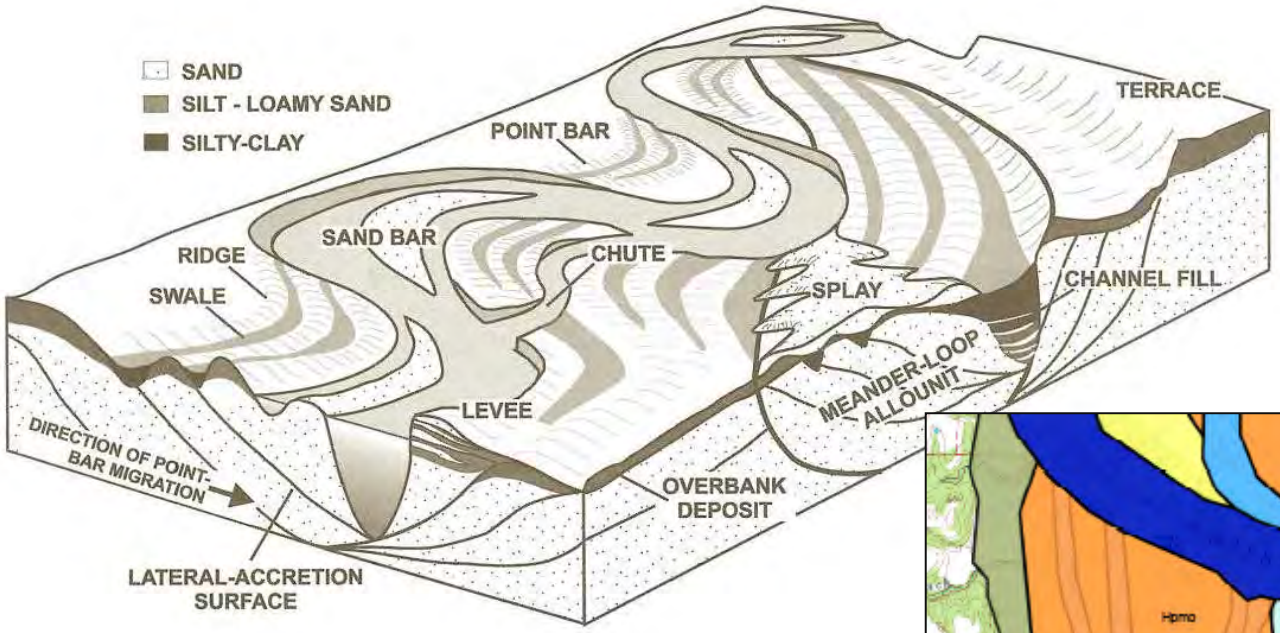
Geomorphology
Very Important and often overlooked feature in restoration

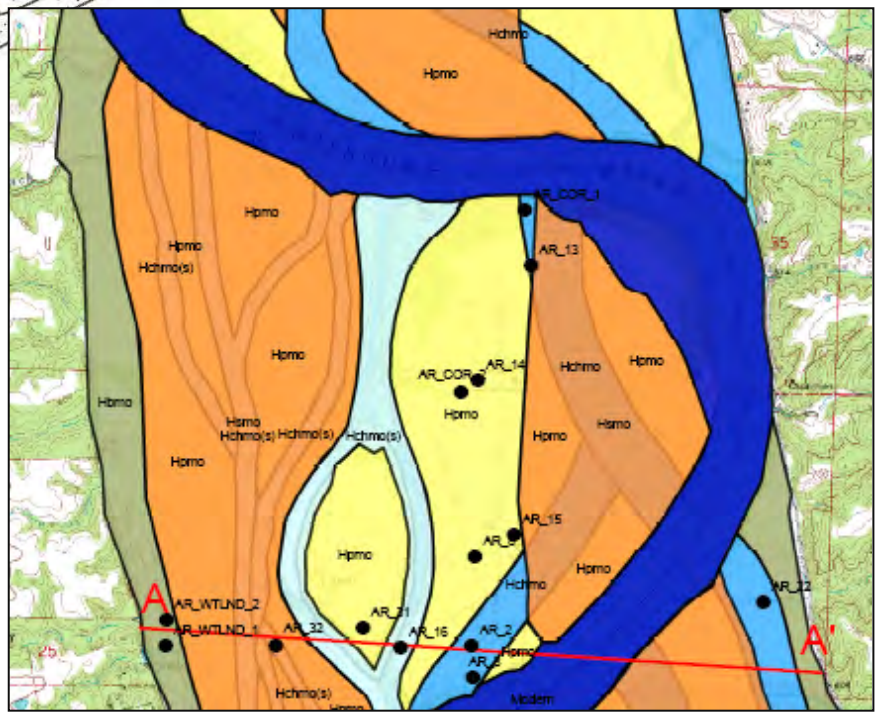
The parent material within which soils form

Effects on surface habitat drastic
-moisture retention and infiltration capacity surface soil,
-potential and rate of surface- and ground-water interaction,
-medium through which shallow ground water flows.

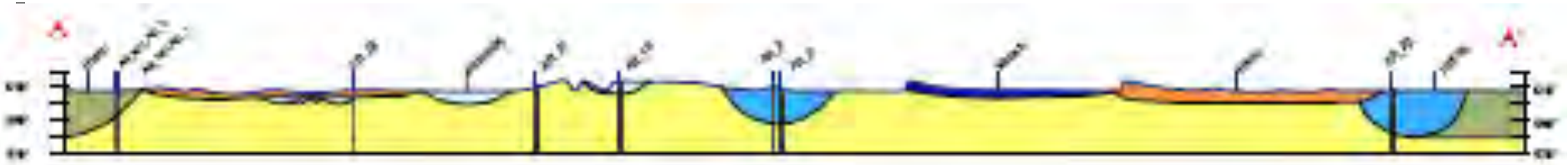
Foundation materials are physical controls

Surface alluvium serves as an important control on habitat distributions.





As the river shifted it left clues to its past conditions examples include: former channels, point bars, terraces, and natural

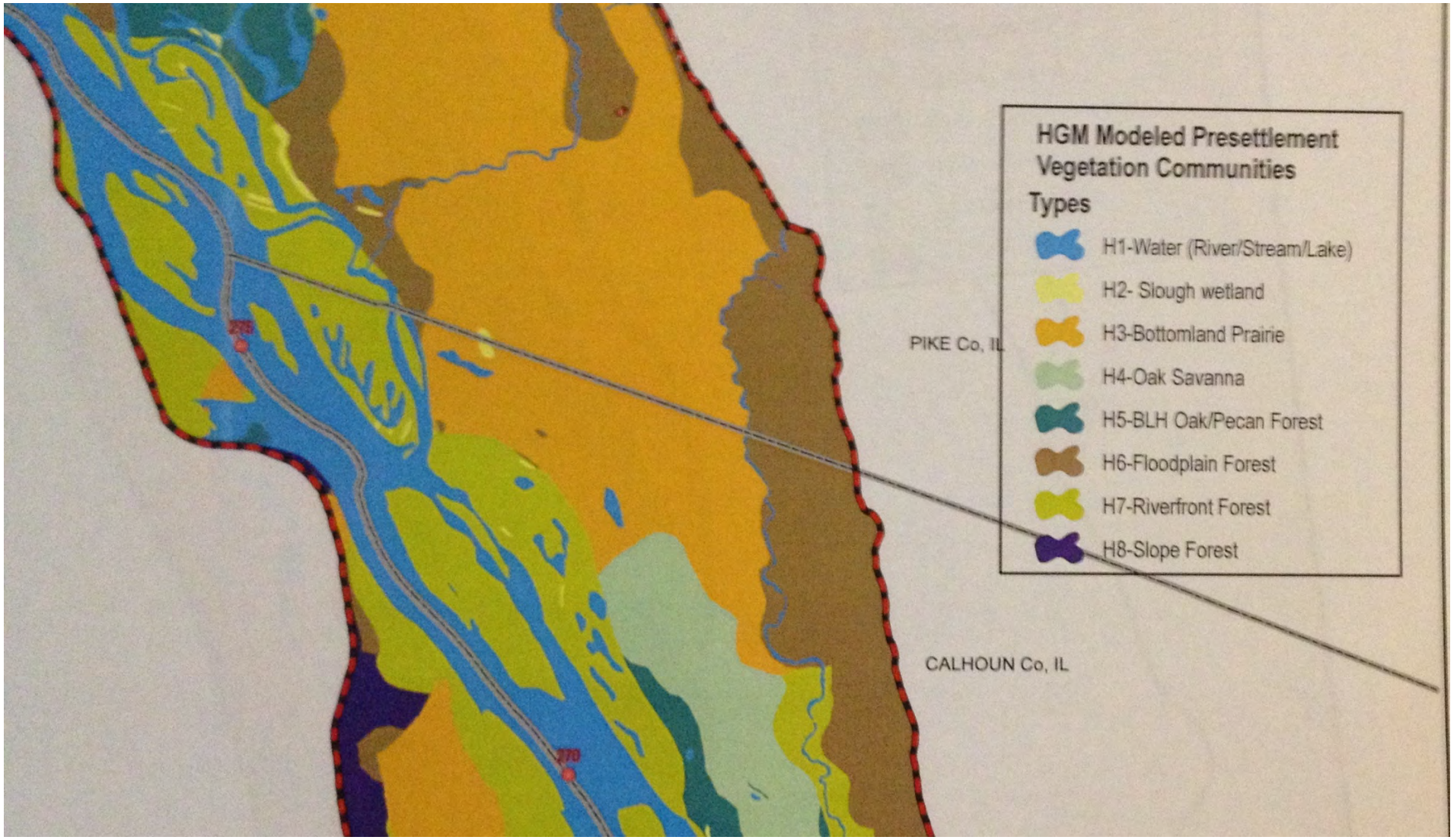


HGM Analysis Interpretations and Utilization

Interpretation of the HGM analysis ultimately yields a set of mapping that identify **common restoration targets** for major habitat types.

Land managers can use these “32,000 ft” maps to make **scientifically based management decisions** on restoration and management
The HGM can then be focused on smaller units for more refining

The HGM tells us where acquisition should focus.
It identifies what we are currently protecting and what habitats are underrepresented in our conservation holdings



Example of Final Mapping Generated-
Locations where restoration of each community can occur and likely be successful


Thank you for your time
QUESTIONS ……Anyone……
Anyone……