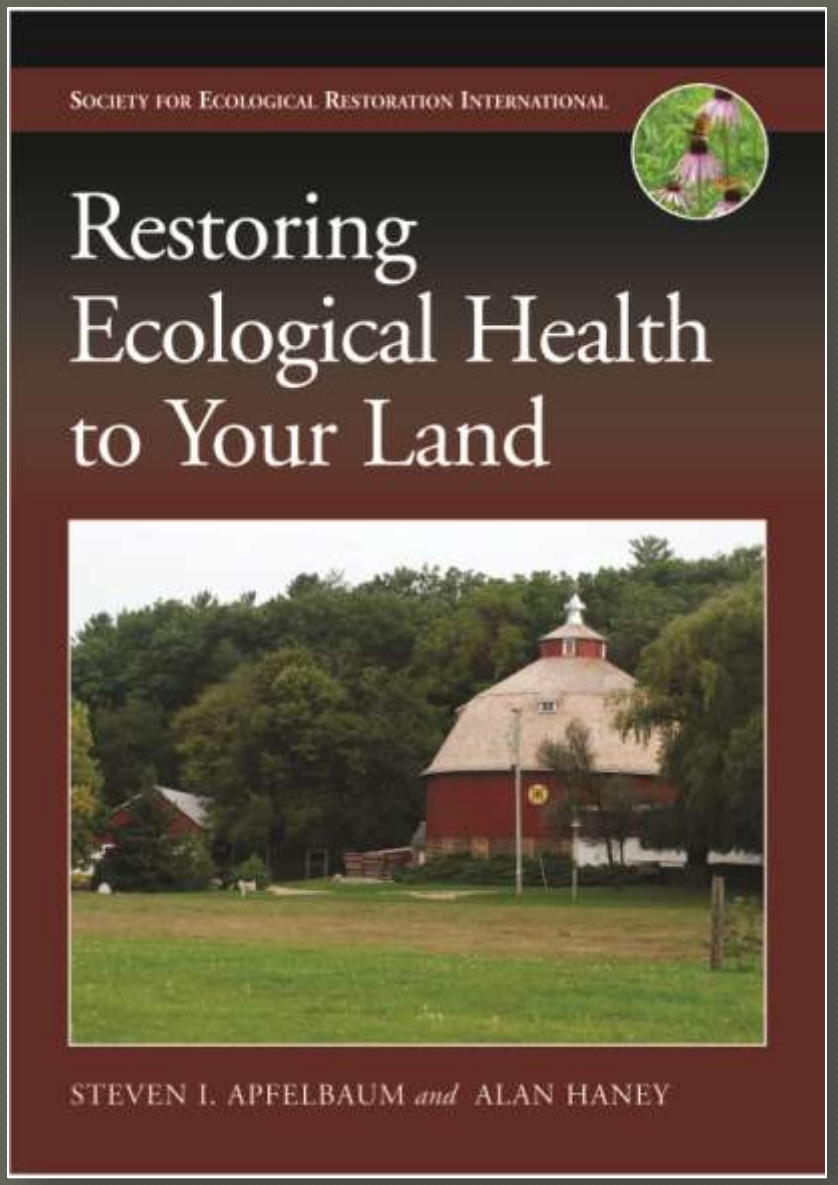
The Ten-step Approach to Ecological Restoration

Steven Apfelbaum
and
Alan Haney



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- generic (concepts underpinning the ten steps are universal)

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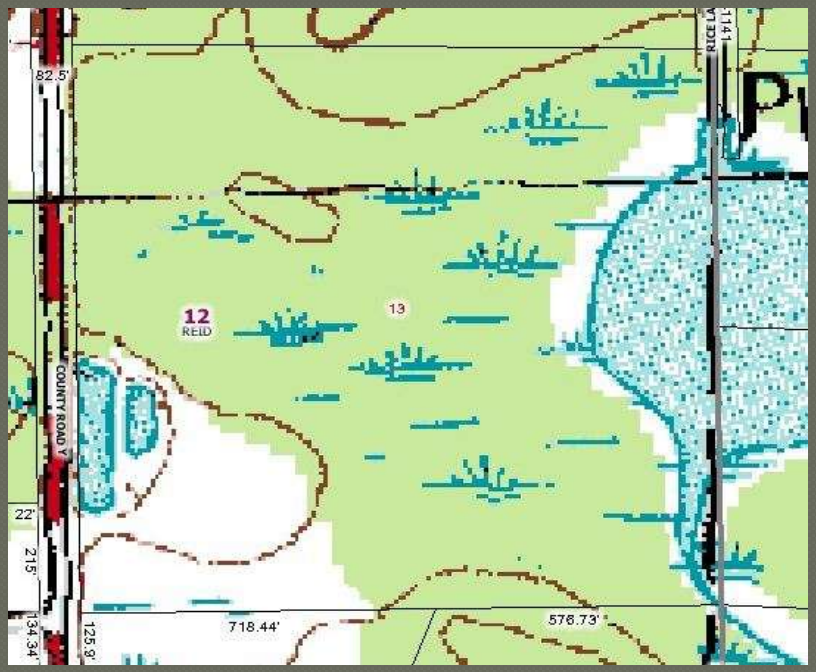
- systematic (each step builds from previous steps)
- continuous (asymptotically approaches complete restoration)
- nature-based (works with the natural ecosystem processes)
- generic (concepts underpinning the ten steps are universal)
- specific (implementation reflects local conditions, genetics, site history, as well as owner objectives and costs

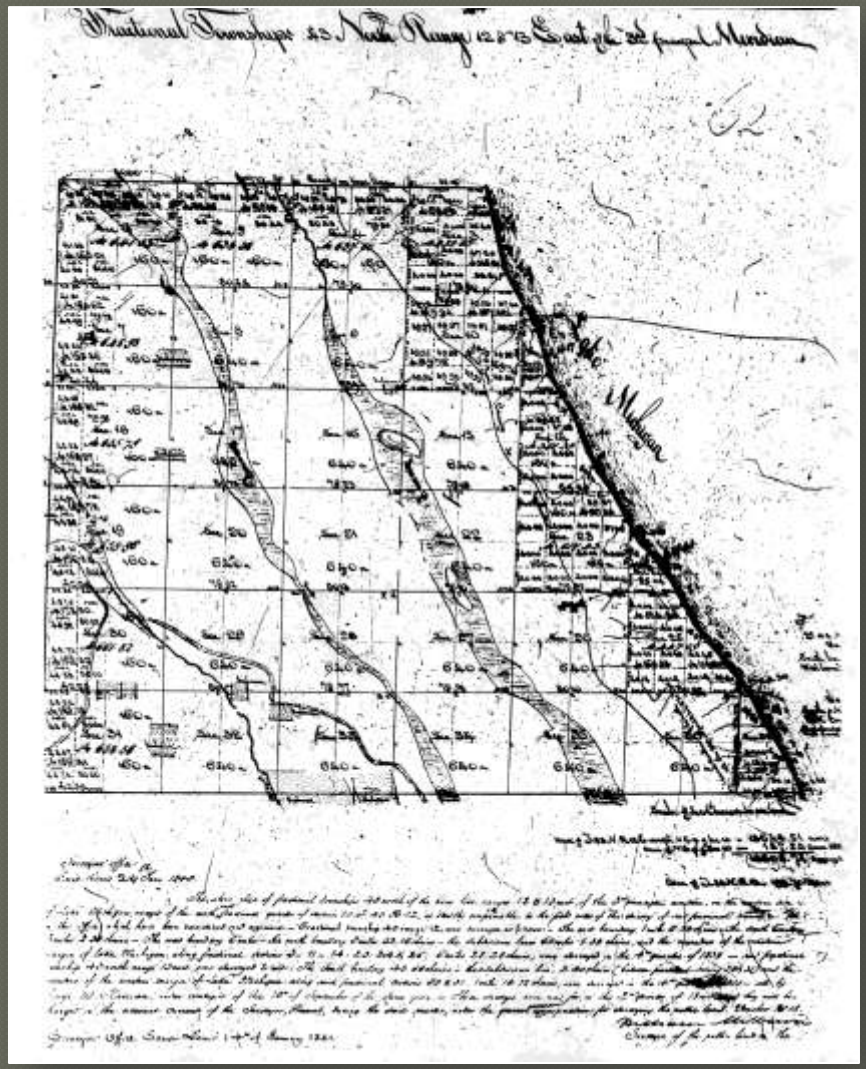
Step 1. Inventory and mapping

Important sources of information include: Google Earth, topographic map, aerial photograph, soils, etc

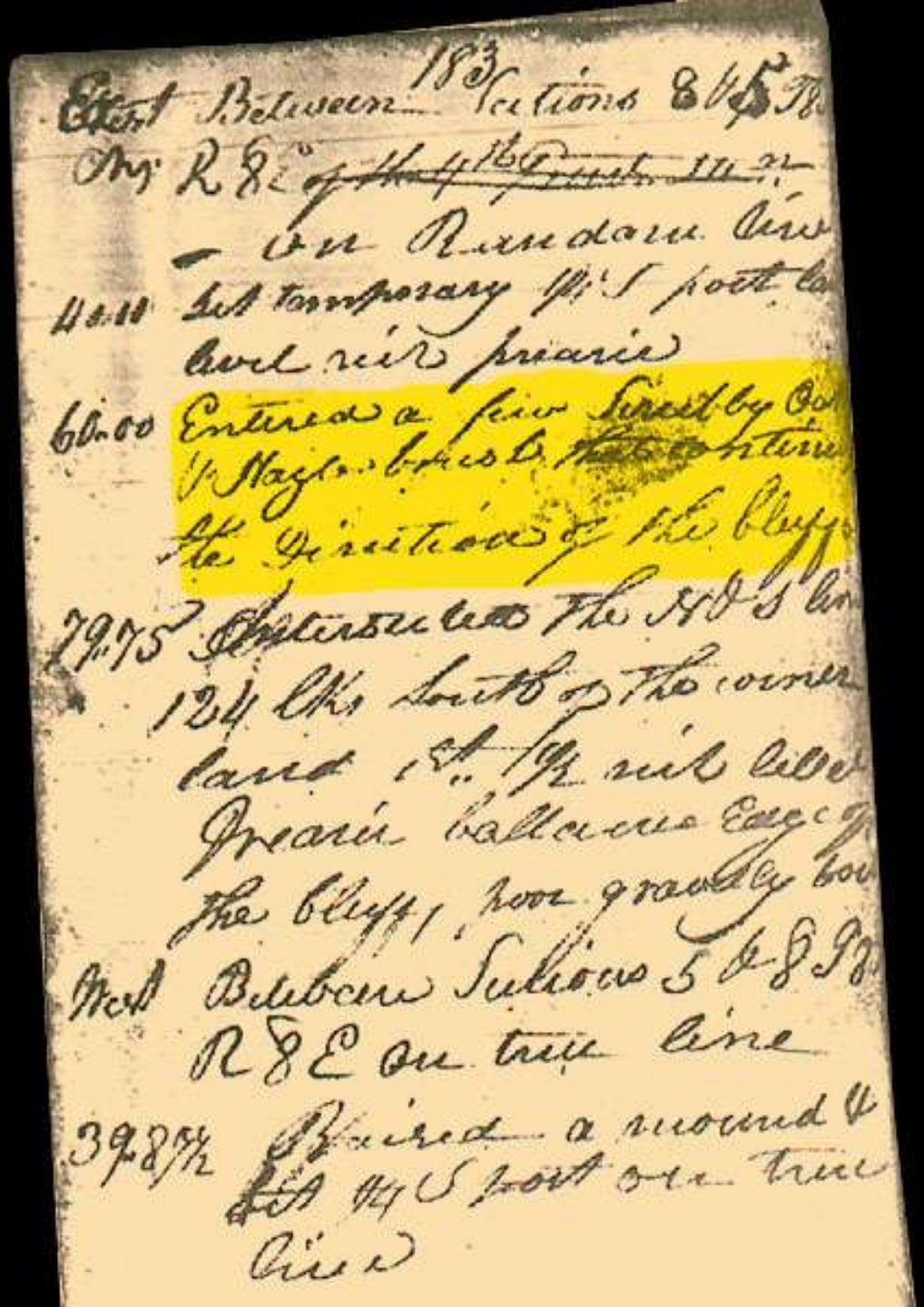


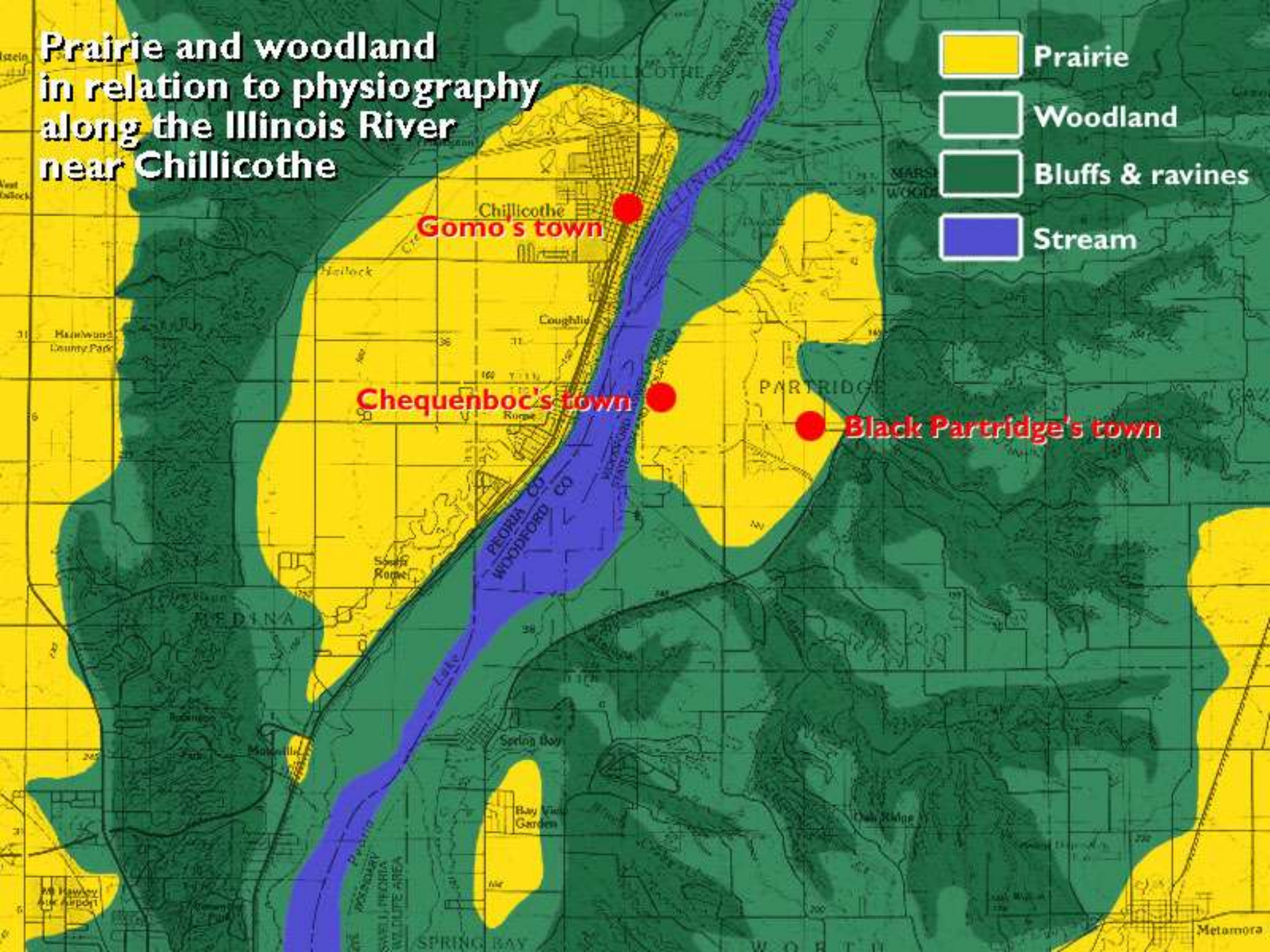
Step 2. Investigate the history of the landscape

Original Land Survey Plat



Public Land Survey field notes, Peoria, March 4, 1817




Prairie and woodland
in relation to physiography
along the Illinois River
near Chillicothe
Prairie
Woodland
Bluffs & ravines
Stream
Gomo's town
Chequenboc's town
Black Partridge's town
Chillicothe
Hallock
Peoria Co
Woodford Co
Spring Bay
Metamora

Set off for Fort Chartres, 18 miles from Keskeskee. We passed through the finest Country in the known world, not a tree to be seen for several miles. Grass grows here to a great height, and such quantities of it that there might be hay made for 100,000 head of Cattle.

— George Butricke, American Bottom, 1768.

At the foot of the Steep Rocks is built the Little Village of Prairie de Rochers. These charming meadows extend from the rocks to the bank of the Missisipi. The length from Kaskaskias to Cahokia is about 60 miles, covered with an immense quantity of Grass in some part as high as a man can reach with his whip when he sits on horseback.

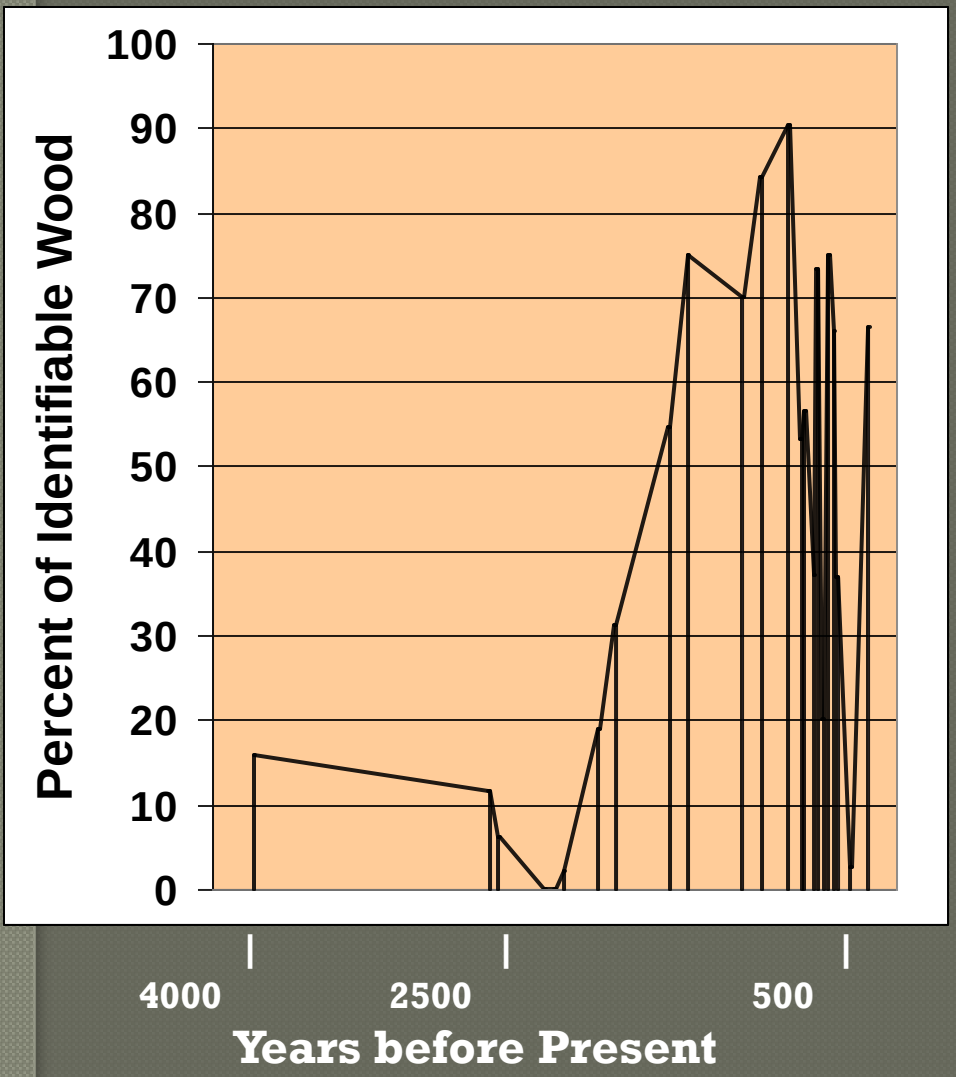
— George Hunter, American Bottom, 1796.

From Kahokia to Kaskaskia is about 50 Miles and the best Body of Land in the world. The Bottom, except immediately on the Bank of the River, is in order for any kind of Farming use, being a Natural Meadow the Whole Way.

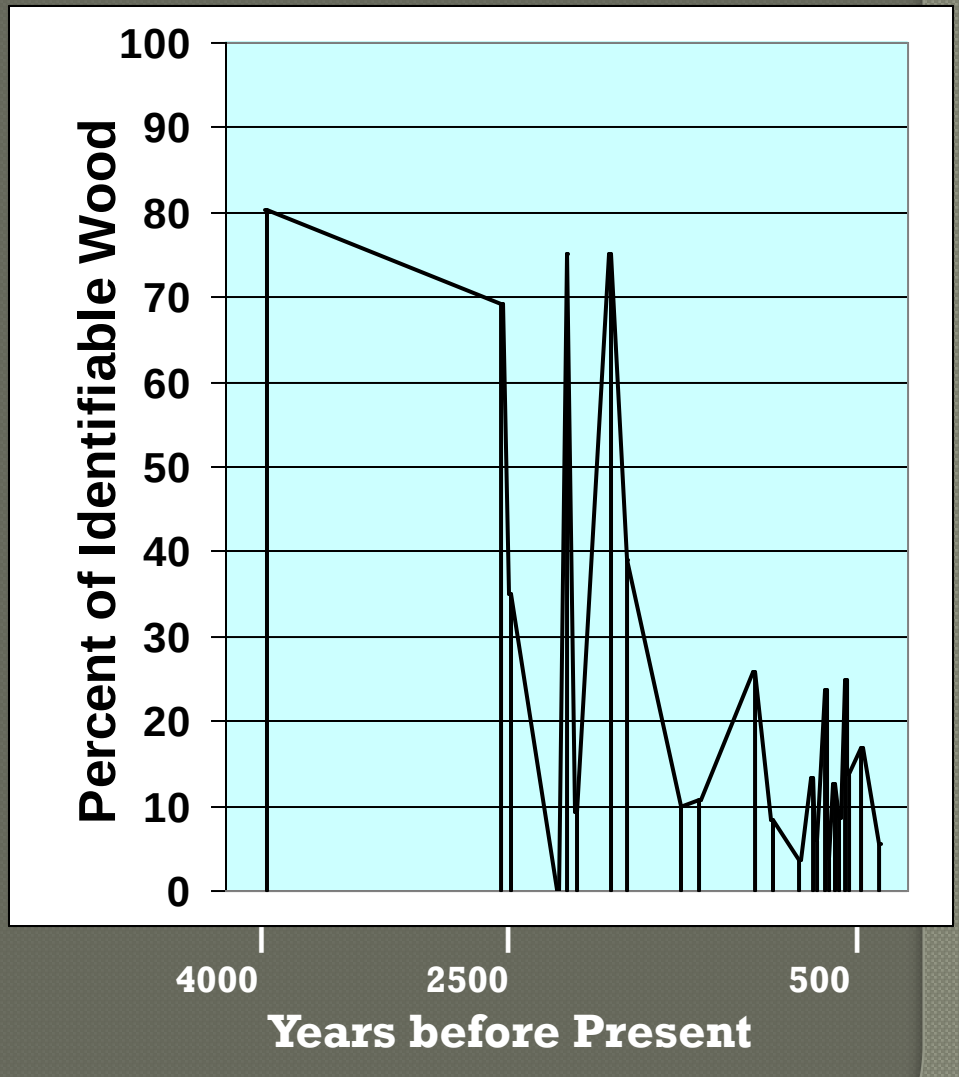
— Moses Austin, American Bottom, 1797.

Both old trees and old people have a wealth of history to share

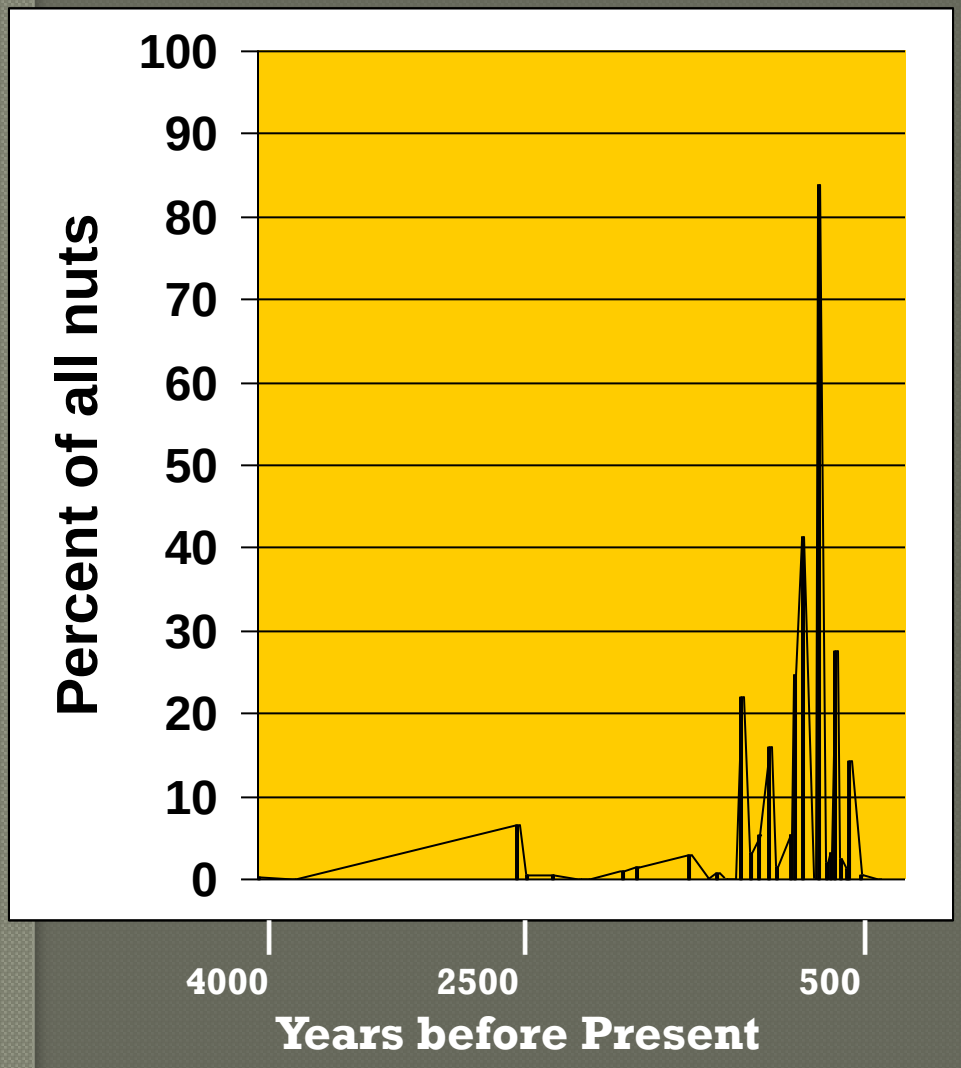
Oak & Hickory Firewood



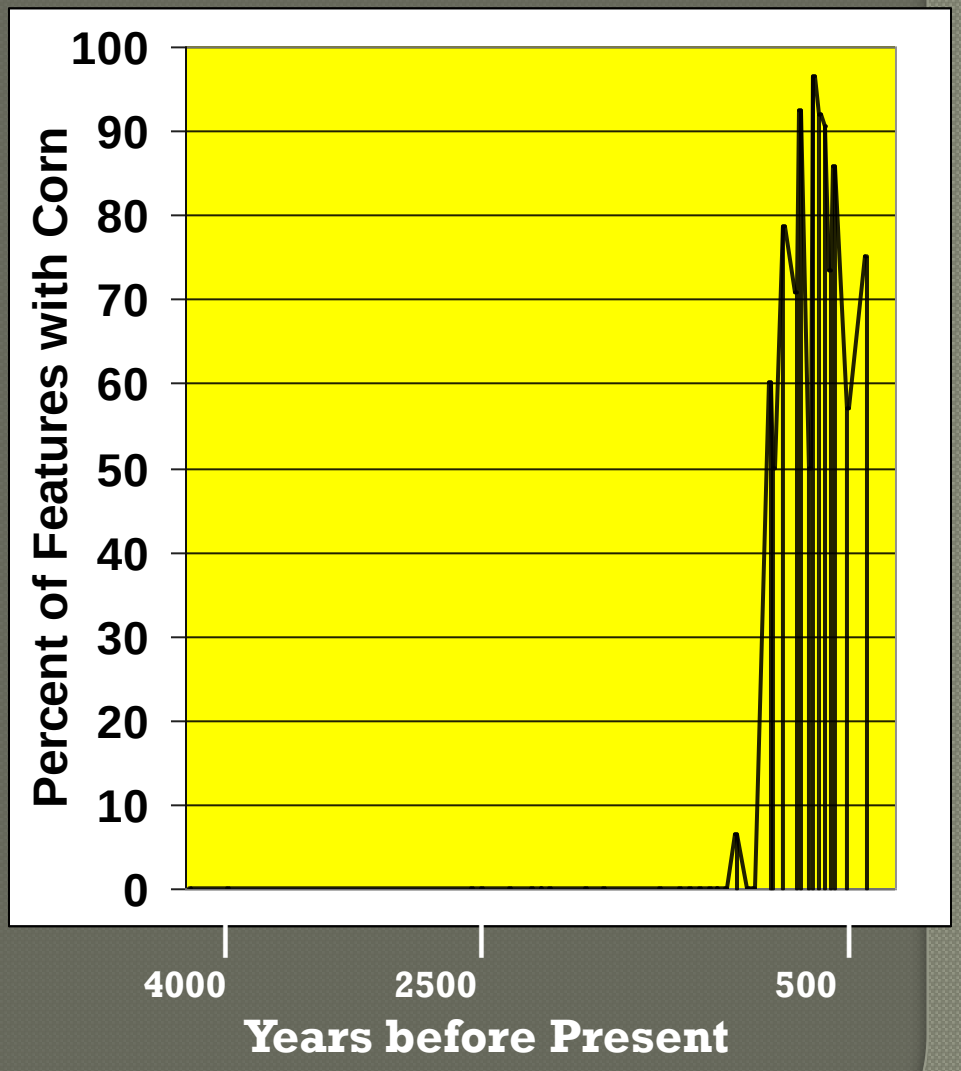
Other Firewood: Elm, hackberry, ash, mulberry, locust & coffeetree



Acorns in Village Debris



Corn in Village Debris



Sources Of Information

1. DEPARTMENTS OF NATURAL RESOURCES:

   - County biological surveys, original vegetation maps, land-use maps and classifications, etc.

2. ARCHEOLOGICAL INVESTIGATIONS

3. TREE RING ANALYSIS

4. SOILS/POLLEN ANALYSIS

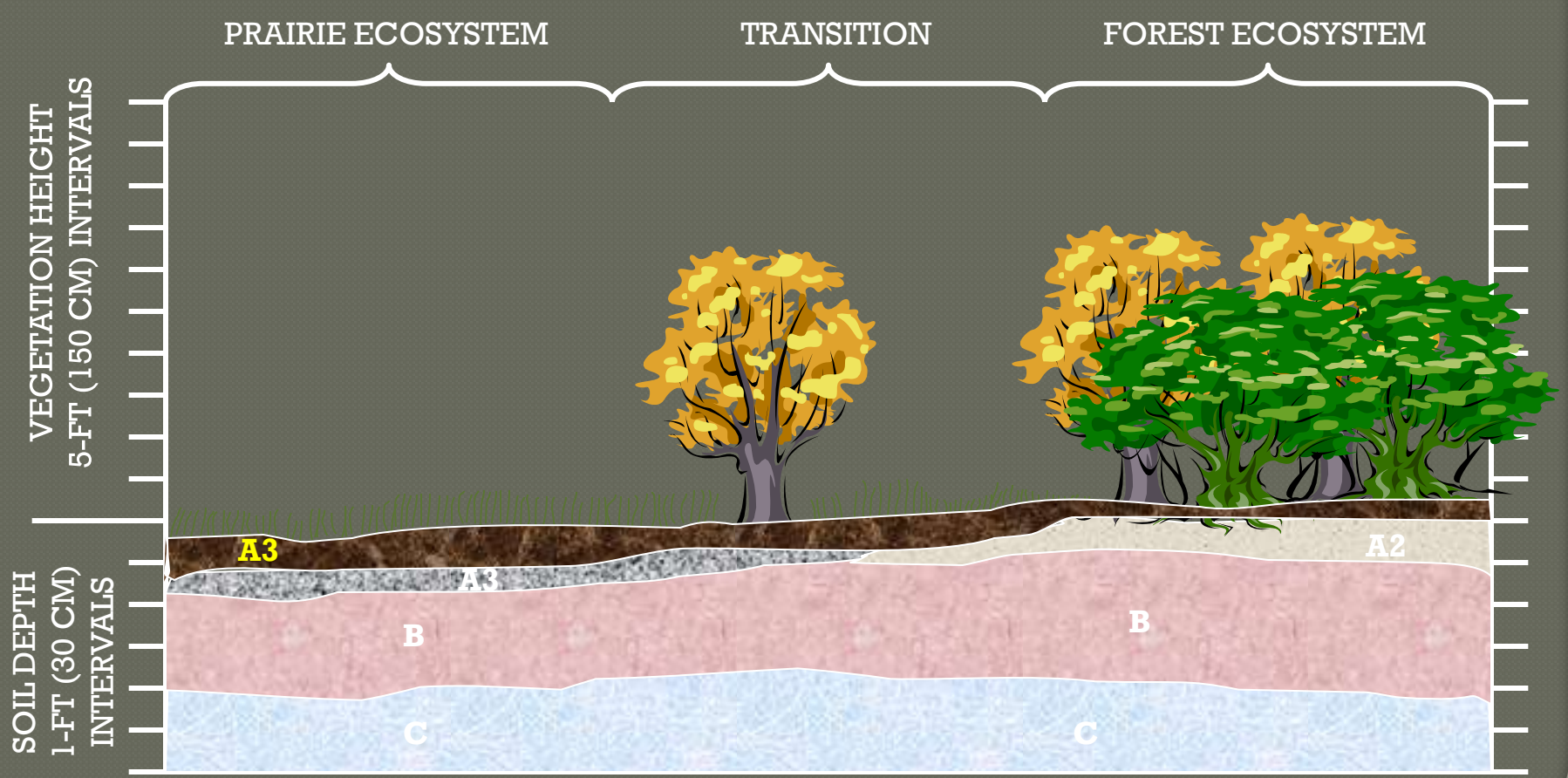
5. GENERAL LAND OFFICE-original plats, notes, etc.

6. USGS-stream gage data, topographic data, etc.

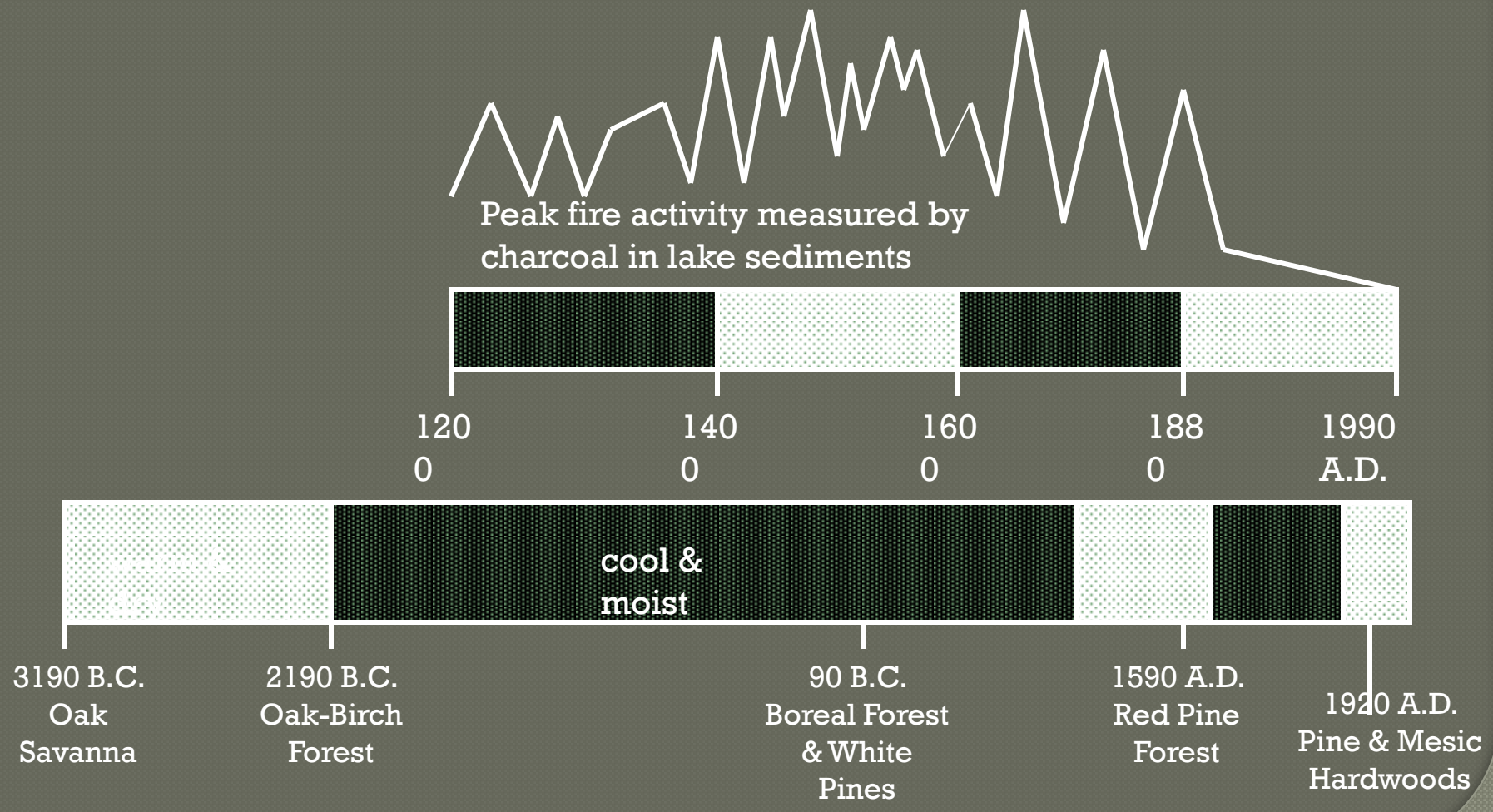
Step 3. Interpretation of landscape changes…

develop hypotheses of how you believe the ecosystem functioned

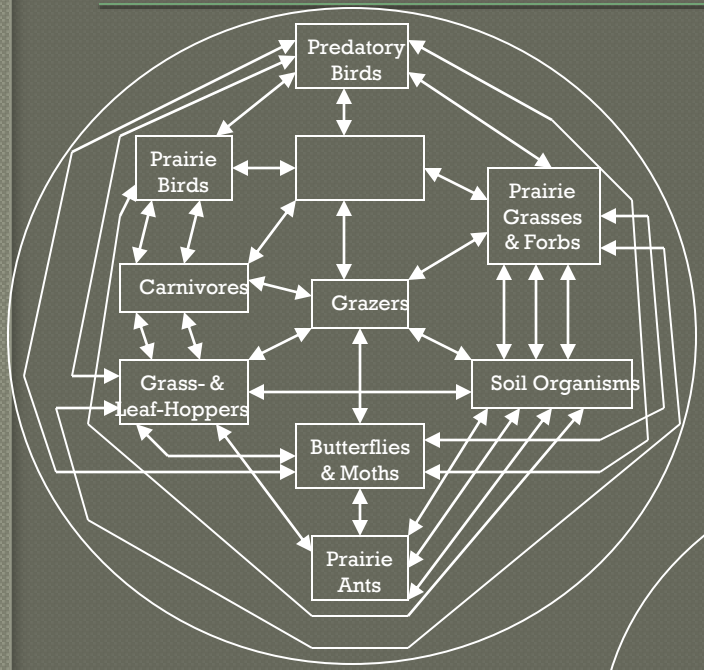
Diagram of organism-soil relationships at a prairie-forest border



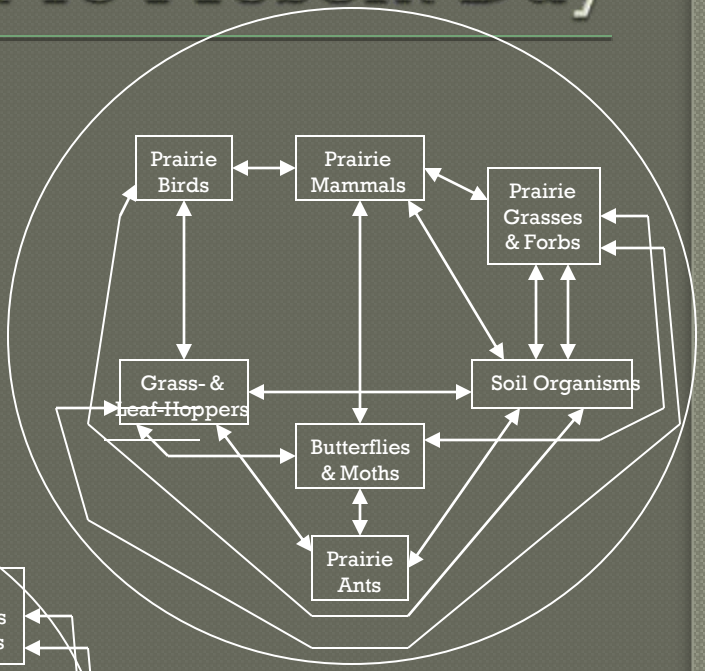
Cycles Of Renewal And Natural Change In Northern Forests, *Itasca Region, Minnesota*



Changes In The Prairie Ecosystem Pre-settlement To Present Day



1790: Average Prairie
1,000,000 acres



1890: Average Prairie
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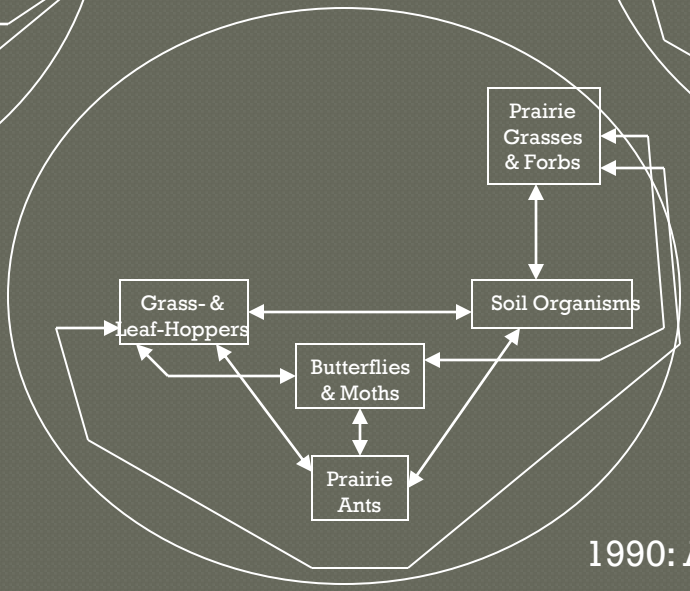


1990: Average Prairie
40 acres

Step 4. Develop goals and objectives

Goals, Objectives and Performance Criteria

GENERAL GOALS:

(e.g. Restore the native plant and animal communities)

SPECIFIC OBJECTIVES:

(e.g. Restore Ecotones between wetland and prairies)

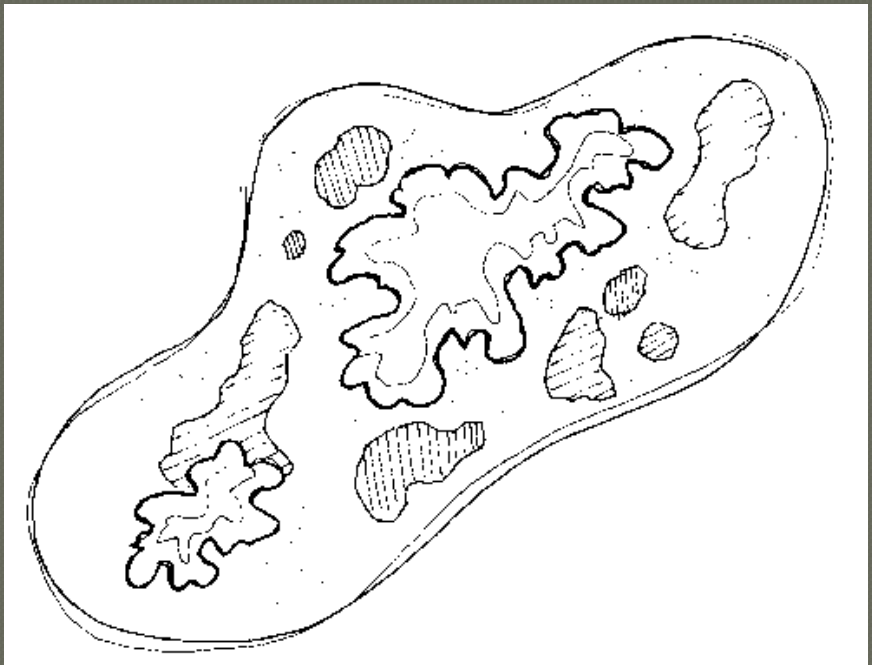
TECHNICAL PERFORMANCE CRITERIA:

(e.g. Achieve specific levels of performance: hydrology, water quality, biodiversity, etc.)

Natural Areas Management Program Objectives

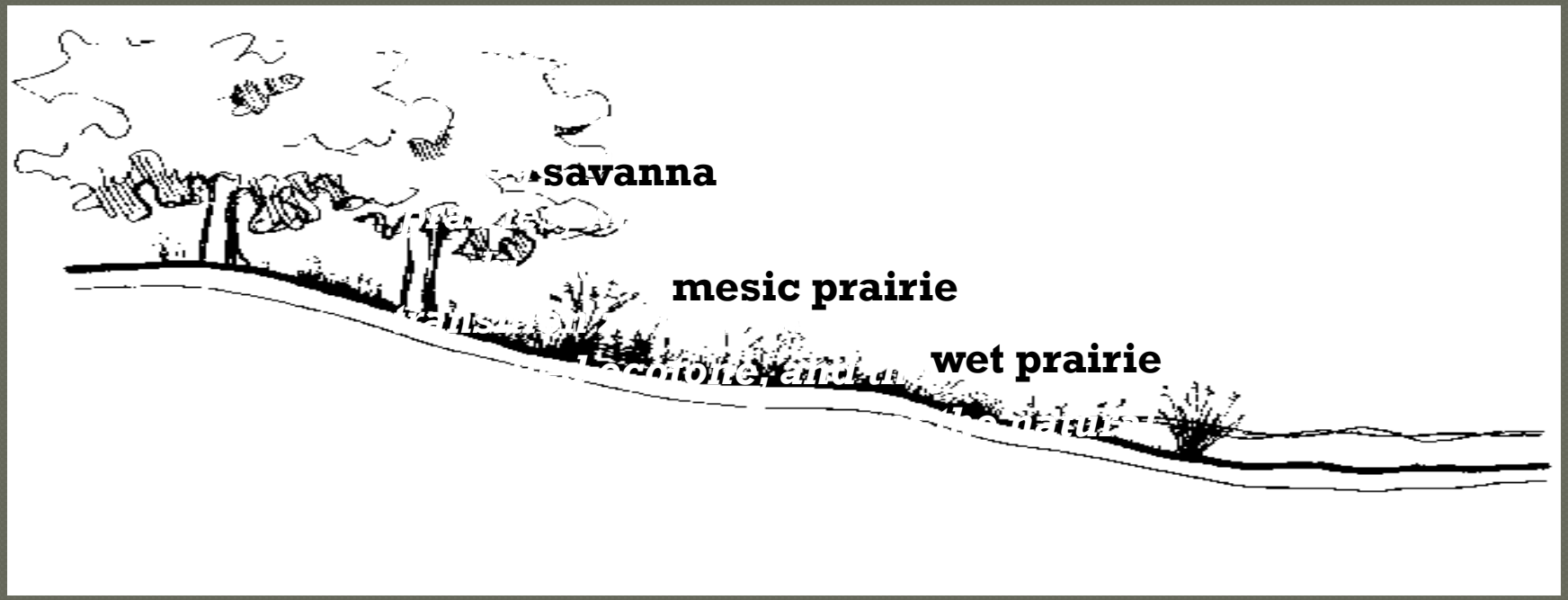
Stimulate existing native seed bank
Stimulate native ground cover
Reduce non-native vegetation
Reduce soil erosion and sedimentation
Promote gradients of size and age structure
Promote vertical structure gradients
Restore surface and subsurface hydrology
Restore population dynamics
Restore population dynamics
Restore continuity between systems
Create opportunities for humans use and appreciation
Create educational programs to increase awareness
Create participatory programs to build proprietary interest
Create opportunities for dispersal of species
Reduce fragmentation

Create habitat heterogeneity.



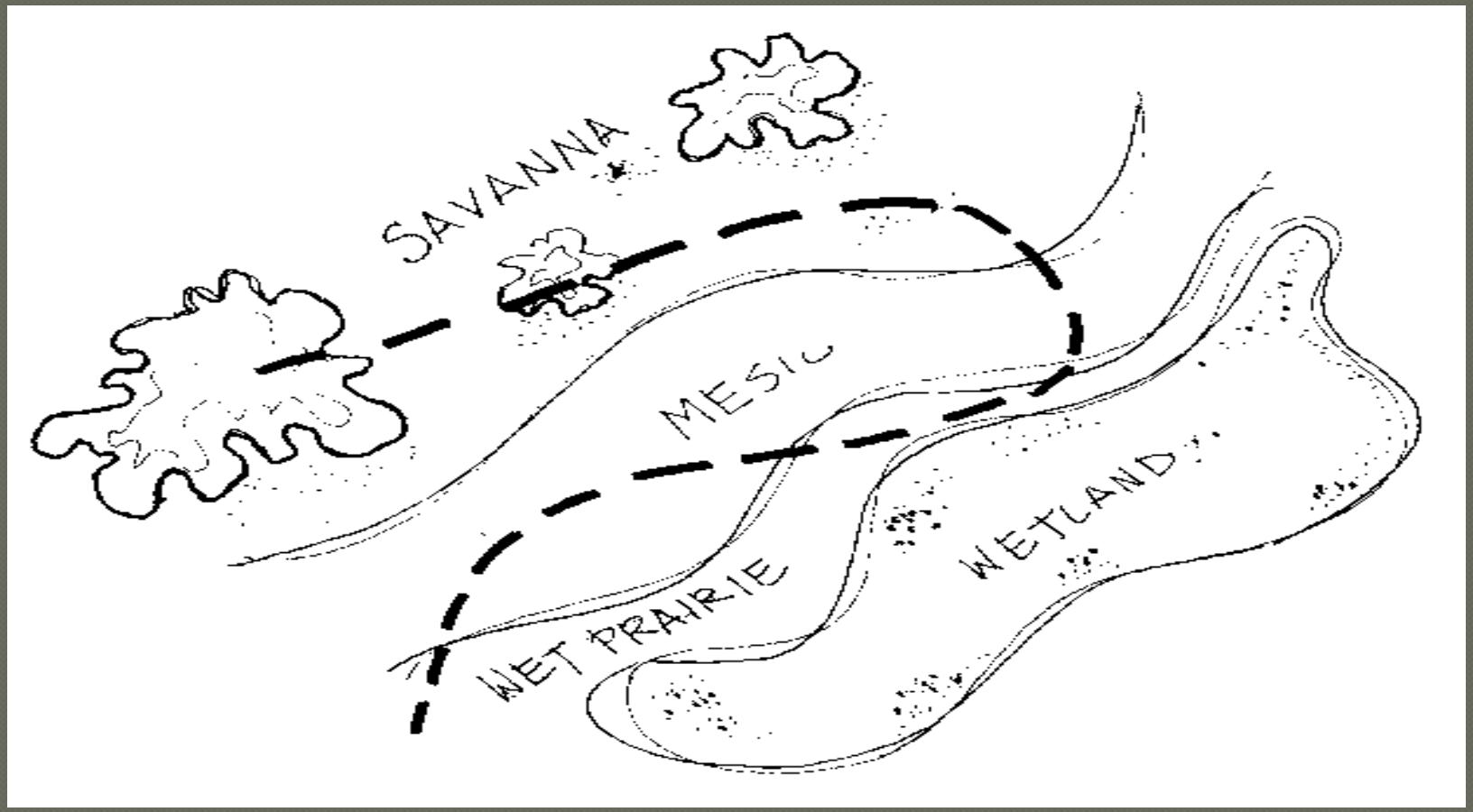
In other words, design <u>patches</u> of habitat that will benefit a variety of wildlife species. Patchiness is the pattern of nature which allows the highest degree of biodiversity possible.

Create natural vegetation gradients and transitions between plant communities and hydrologic zones.

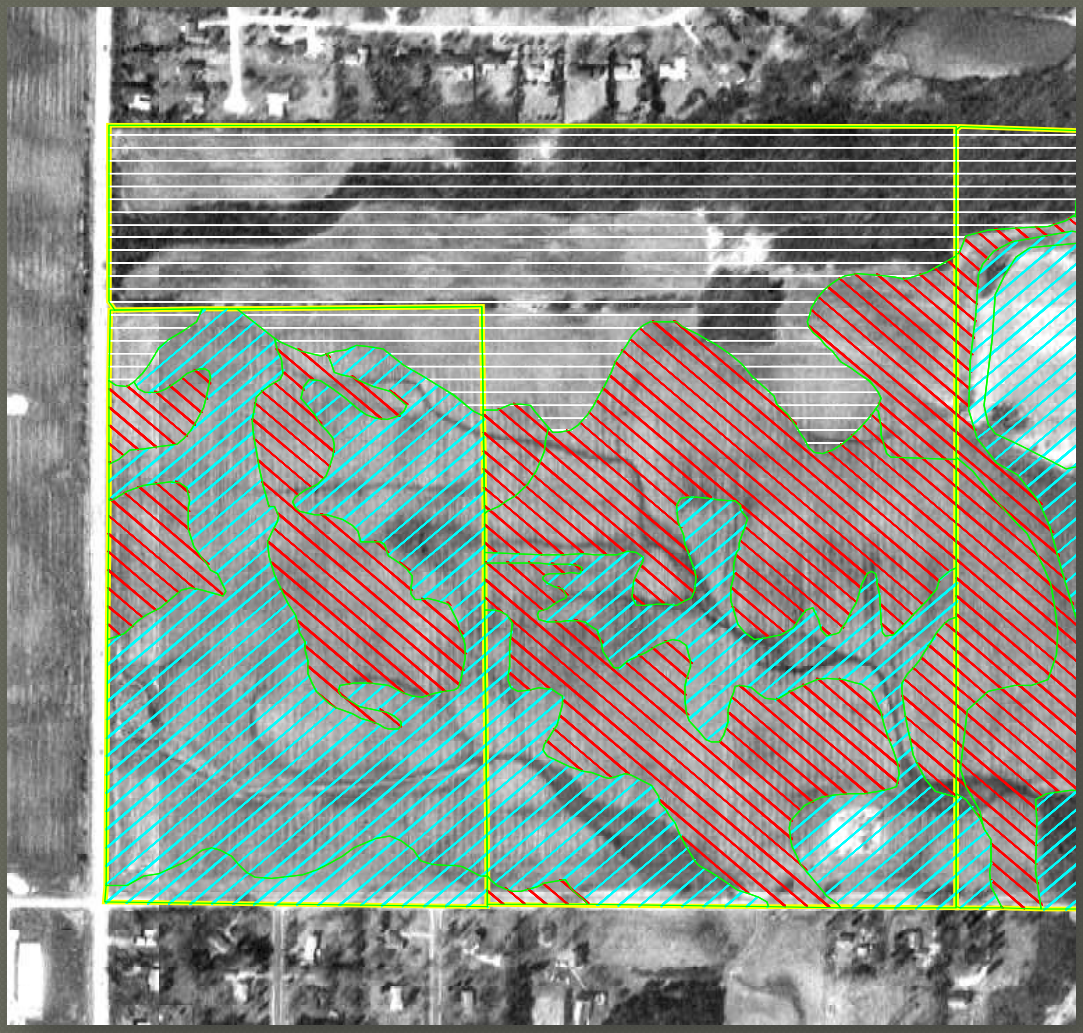


In nature, a wetland community doesn't change to an upland prairie at a distinct edge. Wetlands overlap into wet prairies, which overlap into mesic prairies. Woodlands overlap into savannas, which overlap into prairies. These transition zones between communities are called ecotones, and they are among the most diverse areas of the natural world.

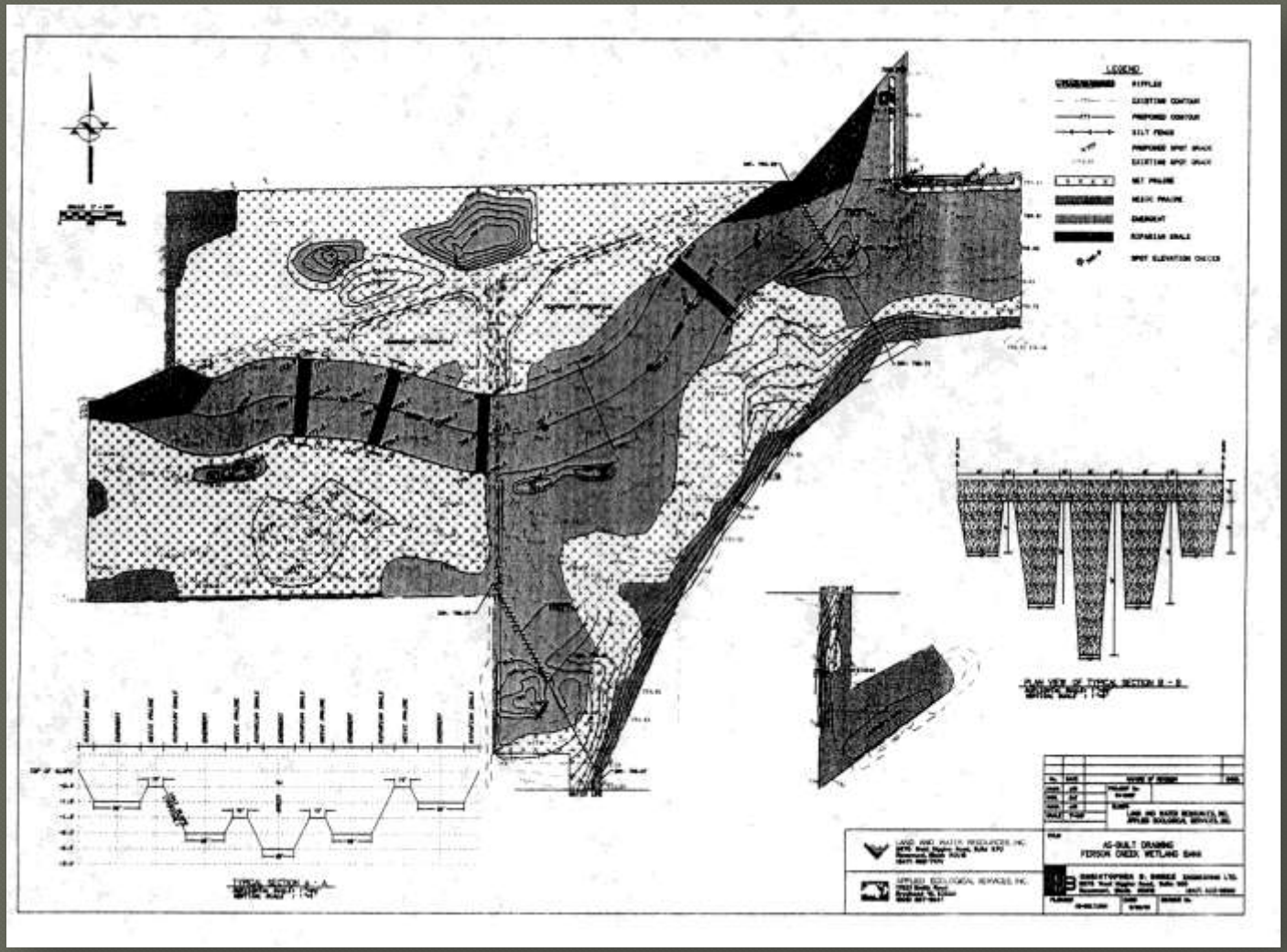
Create trails perpendicular to ecotones, rather than always running them parallel to the edge of plant communities.



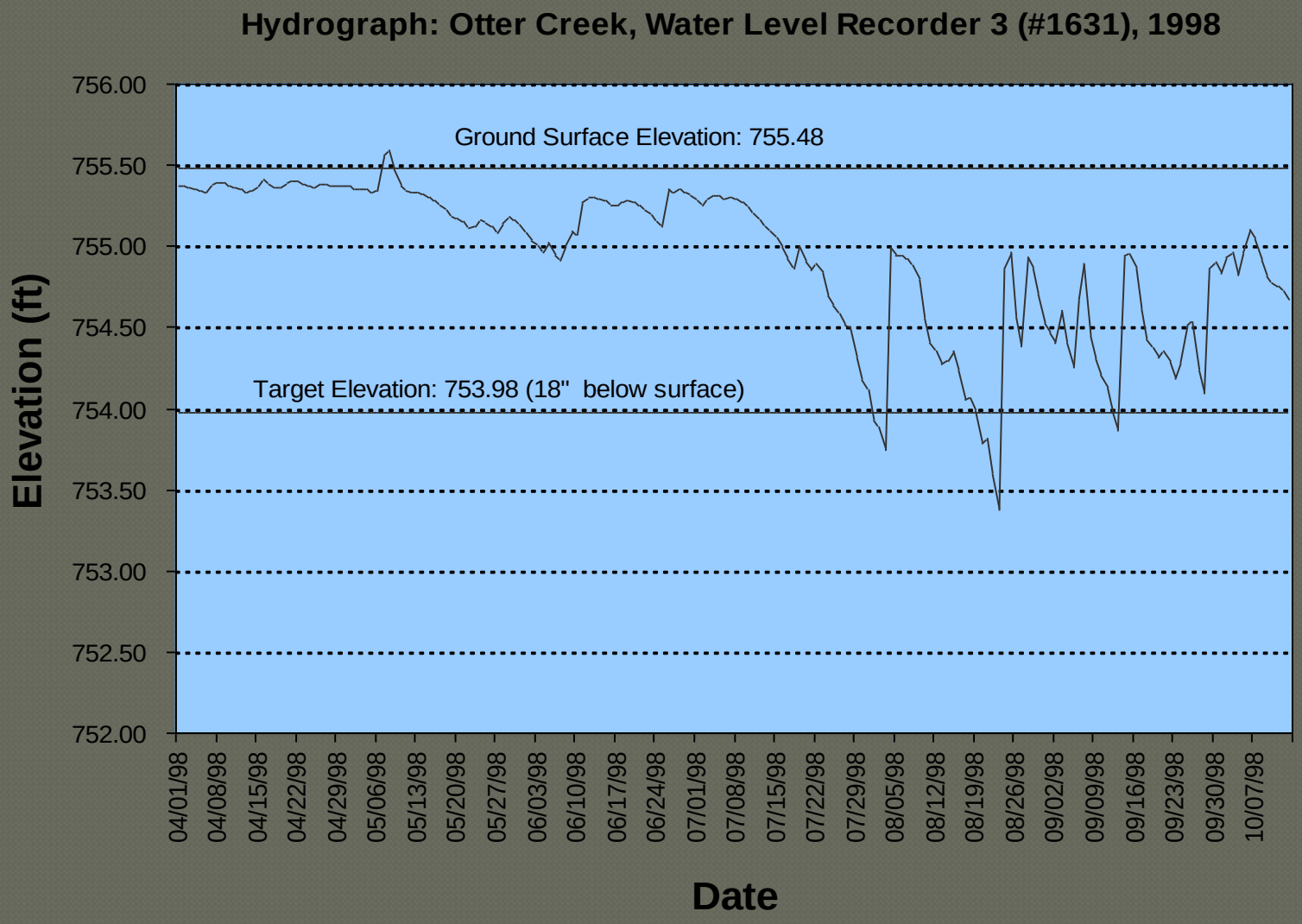
Step 5. Prepare a plan



Ferson Creek Wetland Bank



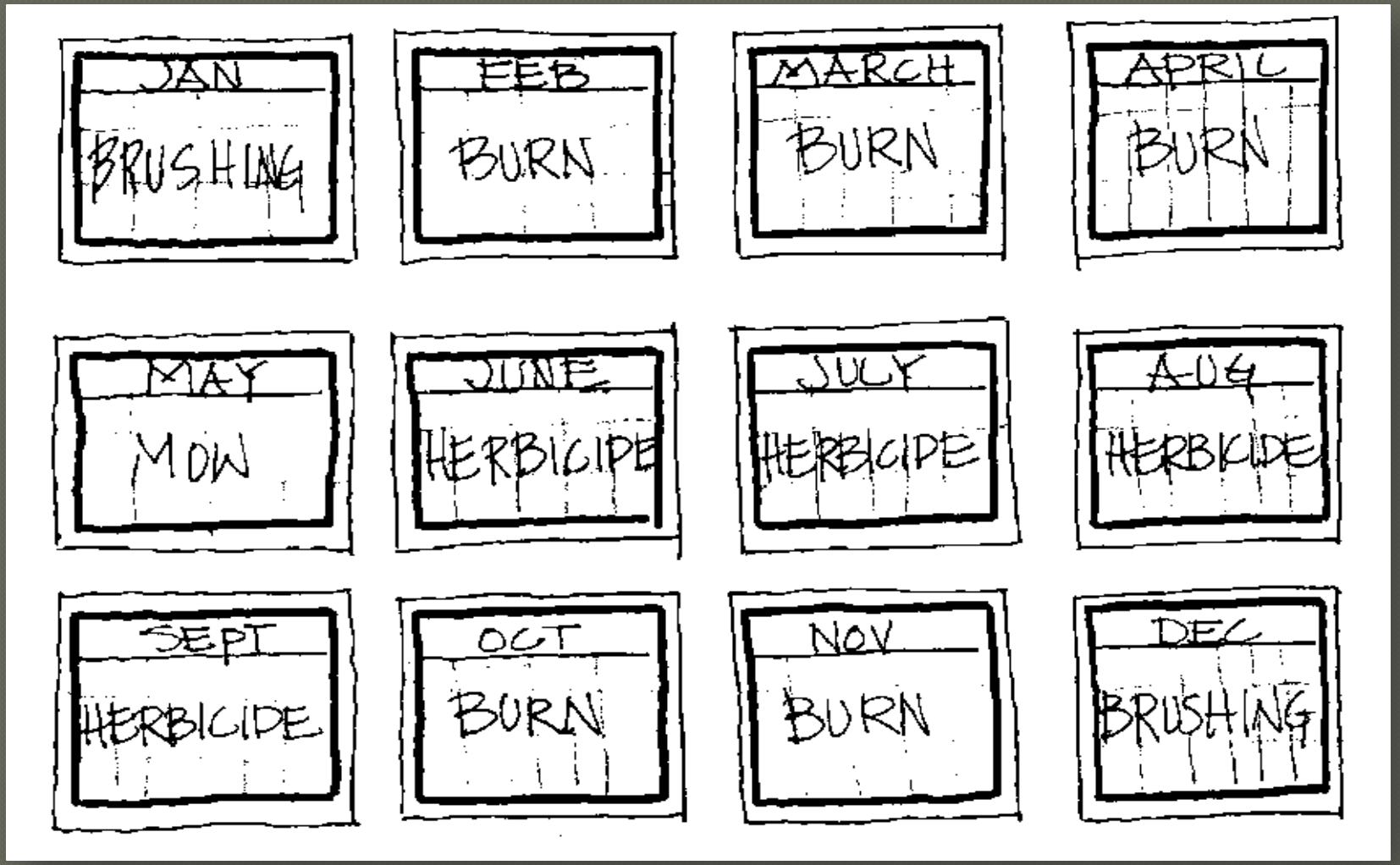
Step 6. Develop monitoring program



Absolute frequency (AF), relative frequency (RF), absolute cover (AC), relative cover (RC), and importance values (IV) for plant species encountered in 31 1m2 quadrats along study Transect 4 at the Otter Creek Wetland Bank, St. Charles, Illinois. Based on sampling August 14, 1995.

	AF	RF	AC	RC	IV
Abutilon theophrasti	1	0.44	0.06	0.06	0.50
Acalypha rhomboidea	3	1.31	0.32	0.32	1.63
Agrostis alba	1	0.44	0.06	0.06	0.50
Alisma plantago-aquatica	1	0.44	0.16	0.16	0.60
Ambrosia artemisfolia	12	5.24	10.61	10.65	15.89
Ambrosia trifida	3	1.31	0.65	0.65	1.96
Arctium minus	1	0.44	0.32	0.32	0.76
Aster pilosus	5	2.18	0.39	0.39	2.57
Aster simplex	2	0.87	0.97	0.97	1.84
Bidens cernua	17	7.42	10.77	10.81	18.24
Bidens frondosa	12	5.24	2.23	2.23	7.47
Cirsium arvense	6	2.62	1.35	1.36	3.98
Convolvulus sepium	1	0.44	0.16	0.16	0.60
Conyza canadensis	4	1.75	0.32	0.32	2.07

Step 7. Implement the plan



RESTORATION LEGEND

1. Existing Upper Old Field
   Proposed Dry Prairie
2. Existing Lower Old Field
   Proposed Mesic Prairie

3A. Existing Drainage Ways
   Proposed Mesic Prairie

3B. Existing Degraded Brushy Area
   Proposed Mesic Prairie with Oak Savanna

4. Existing Degraded Brushy Woodland
   Proposed Savanna Copse
5. Existing Mowed Lawn Easement
   Proposed Prairie Garden

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Pulliam Property

East Troy, Wisconsin

Village of East Troy

Restoration Concept

DRAWN BY: H.L.V.	AES NO. 99-322	SHEET 1 OF 1
CHECKED:	FILE: Concept.dwg	
APPROVED:	DATE: 7/19/99	

REVISIONS:

NO.	DATE	BY	DESC.

0 25' 50' 125' 250

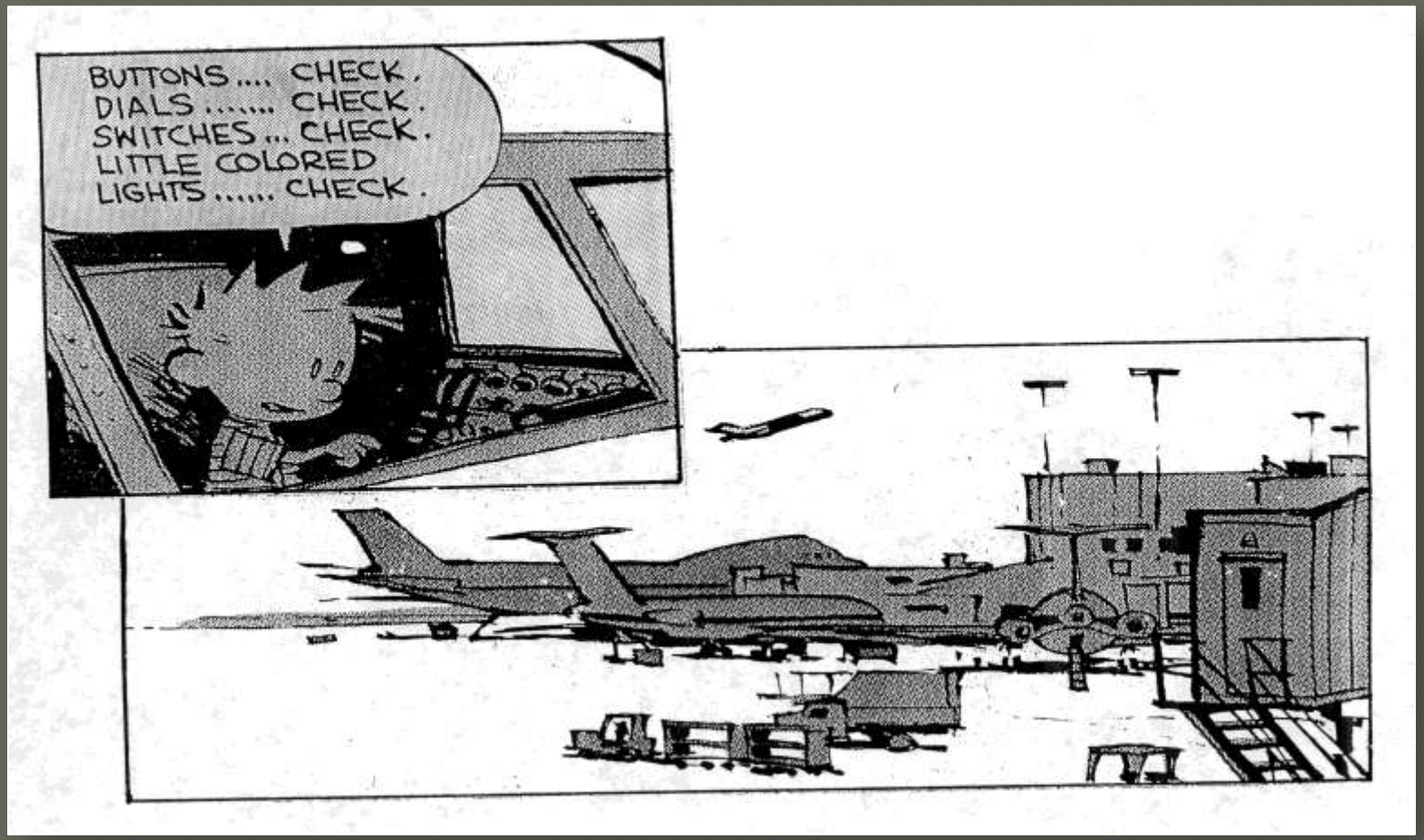
Prescribed fire is one of the most important tools

Seeding and mulching

Herbicides are sometimes the best way to control unwanted species

Step 8. Document changes and maintain records

Step 9. Periodically reevaluate the program



Step 10. Share what you learn with others

Ecological restoration has many benefits:

- Nature is restored
- You learn a lot of ecology in the process
- It can and should be an opportunity to network and share with family, friends, and neighbors
- It is a very healthy hobby/past-time
- It is a focal point for community education
- It is contagious, with rippling benefits
- It contributes to the sustainability of the Earth