

Habitats of Columbia County:

Their distribution and interesting features



The
Living
Land
Project



The background of the slide is a photograph of a lush, green forest covering rolling hills. The scene is misty or foggy, with the upper parts of the hills and the sky obscured by a thick, greyish-white haze. The trees in the foreground and middle ground are dense and vibrant green. The overall atmosphere is serene and natural.

The Living Land Project

A multi-year collaborative project of the Hawthorne Valley Farmscape Ecology Program, Hudsonia Ltd. and the Columbia Land Conservancy.



Ultimate Goals:

- To **engage the general public** in exploring the landscape and help them **develop an informed compassion** for its wild inhabitants.
- To **broaden individual ways of seeing the landscape** by sharing the land perspectives of a variety of people through interviews, stories, pictures and activities.
- To **develop tools for land managers** and help guide their actions when they want to take habitat and/or species conservation, as well as cultural perspectives, into consideration.



Immediate Goal:

To compile an “Ecological and Cultural Field Guide to the Habitats of Columbia County”,

which describes

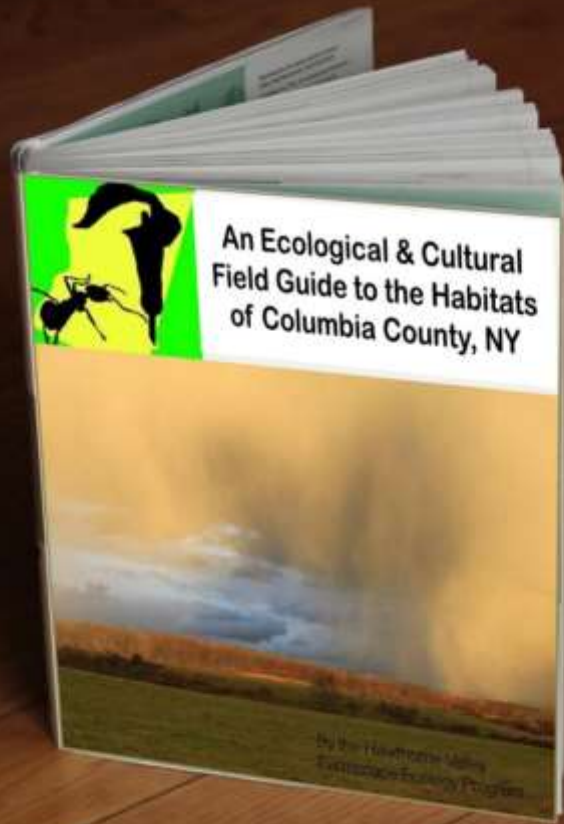
- the physical characteristics of a variety of habitats,
- their history and management,
- their value for plants and animals,
- and how people are perceiving and interacting with them.



The Living Land Project

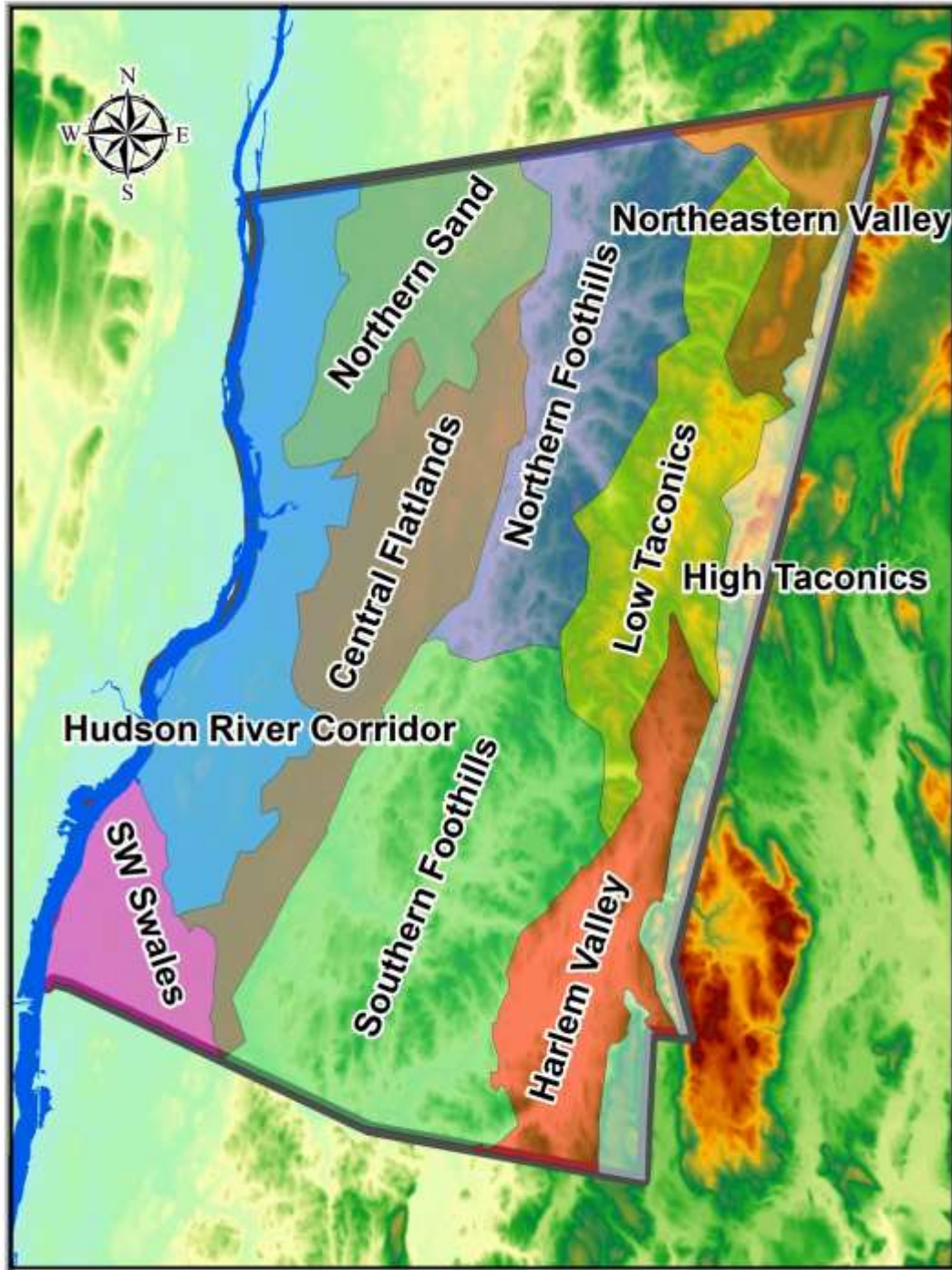
We thank the NOVO Foundation, the Sandy River Charitable Trust, Kalliopeia, the Hudson River Estuary Program, several smaller foundations and many private donors for their support.

This project would not have been possible without the interest and collaboration of many landowners who invited us to include their habitats in this study.



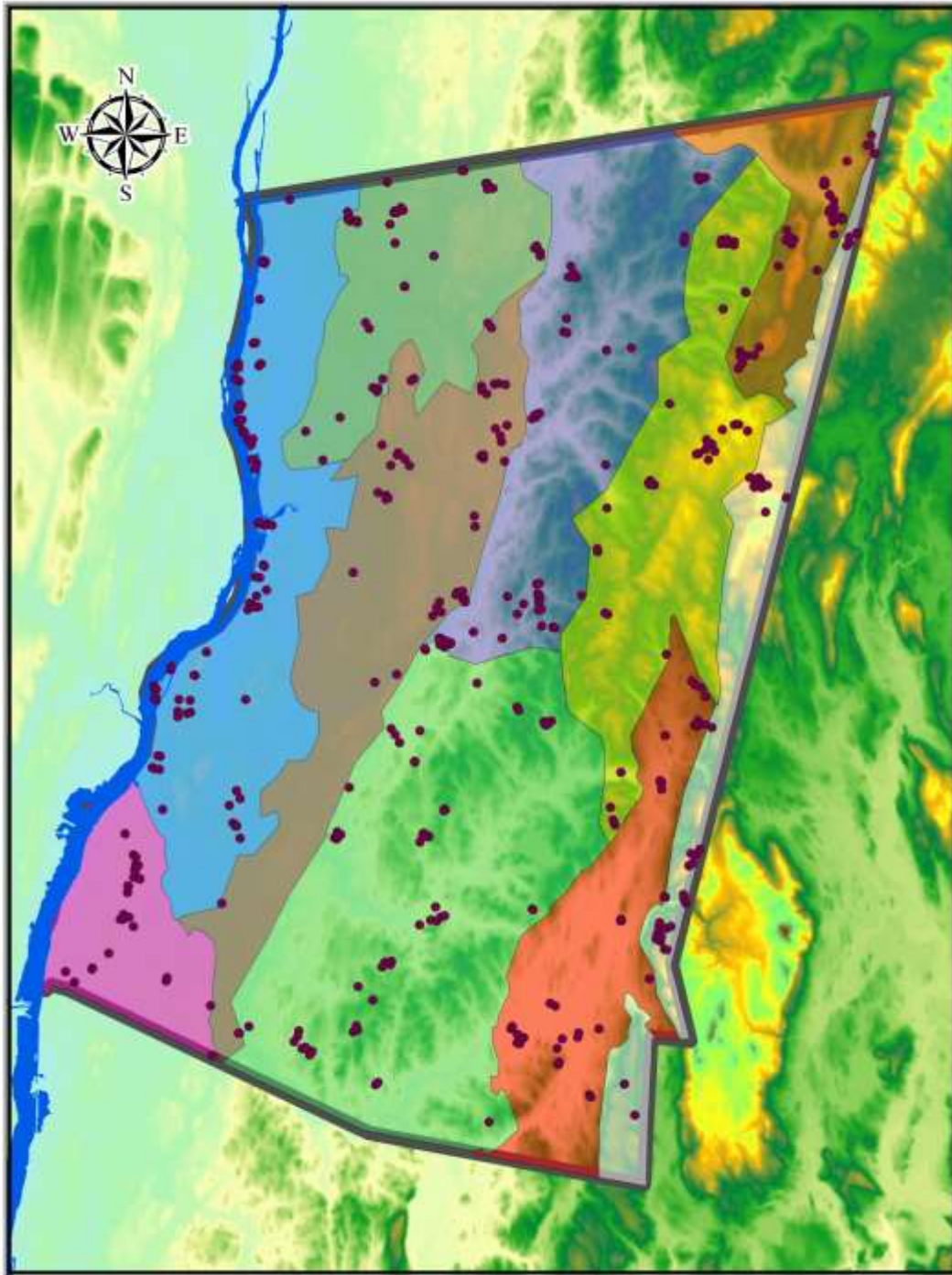
Not only the field guide, but also a suite of events (incl. public presentations and workshops for planning boards and CACs), field activities and other outreach, and accompanying materials





Tentative ecological zones:

- **High Taconics:** >350m, schist etc.
- **Harlem Valley and Northeastern Valley:** <200m, limestone/dolostone/marble
- **Low Taconics, Southern and Northern Foothills:** rocky and hilly areas of mid elevation
- **Central Flatlands:** <100m, till & outwash, good farmland
- **Northern Sand:** sandy glacial and lacustrine deposits, outwash, kames; lots of good farmland
- **Hudson River Corridor:** <50m (except hills S of Hudson); clayey and sandy soils; lots of good farmland
- **SW Swales:** rocky and till-derived soils



For three years (2012-14), we conducted biological inventories in several examples of each habitat type within each ecological zone .

This resulted in a total of 499 inventories (their locations depicted by dots on the map) of 20 mostly terrestrial habitats, representing uplands and wetlands, and a range of management intensities.



**We also tried to look at the land
“through the eyes of many
people from different walks of
life and age groups”.**



Habitats Studied

ROCKY OUTCROPS

Gravel Pit and Quarry
Wooded Outcrops

WOODED UPLANDS

Ancient Forests	Hemlock Forest
	Northern Hardwood(-Hemlock) Forest
Young Forests	Mature Sugar Maple Forest
	Rich Oak Forest
	Oak-Hickory Forest
	Young Sugar Maple Forest
	White Pine Forest
	Black Locust Forest
	Red Cedar Forest
	Conifer Plantation
	Mixed Young Forest

OPEN UPLANDS

Oak Heath Barrens
Blueberry Heath
Successional Shrubland
Old Field
Dry Meadow
Upland Hayfield/Pasture
Cemetery
Utility Corridor
Lawn

FRESHWATER TIDAL HABITATS

Tidal Marsh
Tidal Mudflat
Tidal Shrub Swamp
Tidal Swamp Forest

WOODED WETLAND (non-tidal)

Floodplain Forest
Swamp Forest
Wooded Seep
Intermittent Woodland Pool
Headwater Stream

OPEN WETLANDS (non-tidal)

Shrub Swamp
Marsh
Wet Meadow
Bog
Calcareous Fen
Circumneutral Bog Lake
Beaver Pond
Constructed Pond

UPLANDS

WETLANDS

UPLANDS

ROCKY OUTCROPS

Gravel Pit and Quarry
Wooded Outcrops

WOODED UPLANDS

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Successional Shrubland
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Geographically limited, rare habitat: **Oak Heath Barrens**











Indian Cucumber-root
(*Medeola virginiana*)



Whorled Pogonia
(*Isotria verticillata*)







Management for Habitat Conservation in Oak Heath Barrens:

- Don't develop!
- Minimize trampling
- Burning?



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Wooded Outcrops

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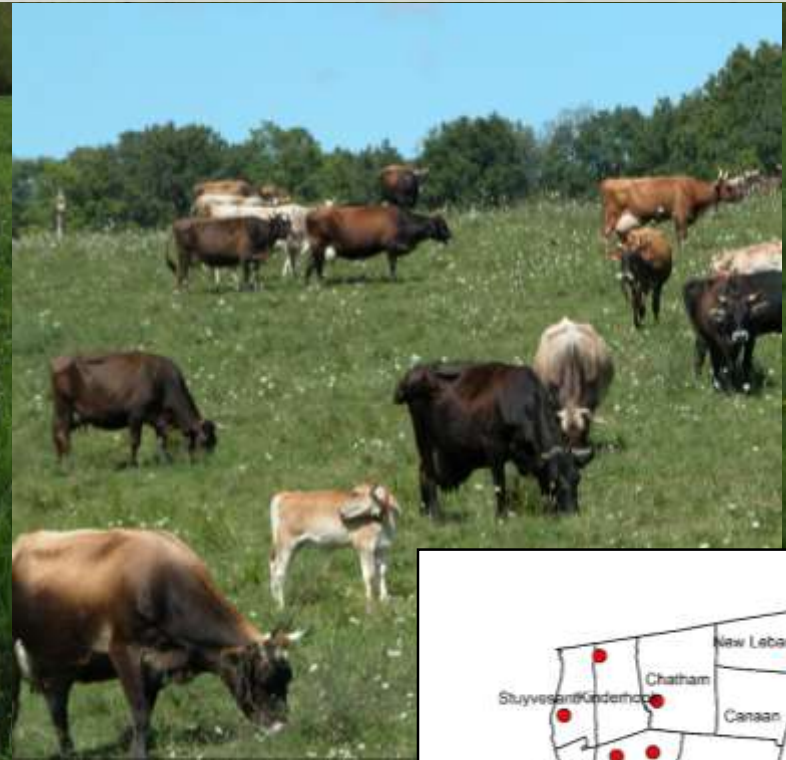
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Upland (and mature) Hayfield...

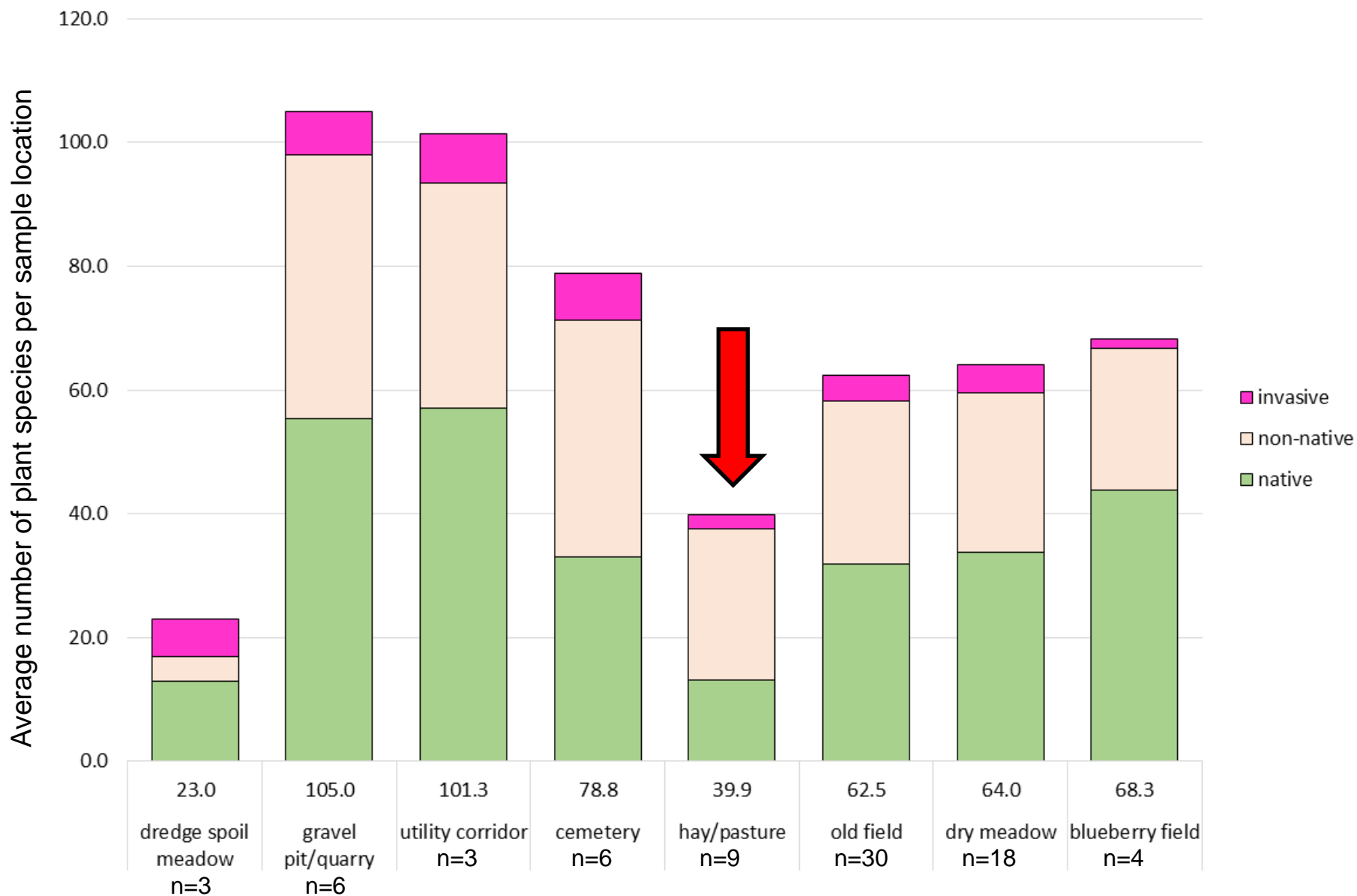


Upland (and mature) Hayfield...

... and permanent **Pasture**: common habitats distributed throughout the County and amazingly similar to each other



Comparative Plant Diversity and Composition in Upland Meadow Habitats



Mustards

Pasture and Hayfield

Legumes

Lambs Quarters

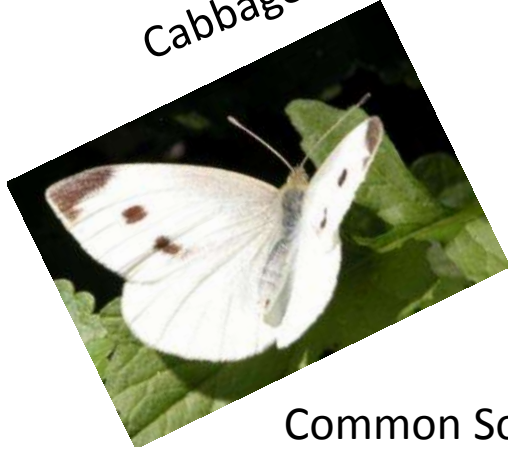
Alfalfa, etc.

Legumes

Vetch

Pasture and Hayfield

Cabbage White



Clouded Sulphur



Common Sootywing



Orange Sulphur



Silver-spotted Skipper



Wild-Indigo Duskywing



Grassland birds who might be nesting in mature hayfields

Grasshopper Sparrow



Meadowlark



Vesper Sparrow



Bobolink



Population Trends of Grassland-breeding Birds

Population Trend in **New York State**

from 1980-85 to 2000-05



Henslow's Sparrow	- 80%
Upland Sandpiper	- 65%
Vesper Sparrow	- 50%
Grasshopper Sparrow	- 42%
Horned Lark	- 37%
Eastern Meadowlark	- 25%
Field Sparrow	- 16%
Bobolink	- 8%
Killdeer	- 4%
Red-winged Blackbird	- 2%
Northern Harrier	- 1%
Song Sparrow	- 1%
Savannah Sparrow	+ 2%

(The Second Atlas of Breeding Birds in New York State 2005)

**Not all hayfields are suitable for grassland birds:
Timing of hay cut is crucial .**

Approximate Fledging Date in New York State*

Species	Start	Stop
Bobolink	18-Jun	18-Jul
Eastern Meadowlark	9-Jun	9-Jul
Field Sparrow	16-Jun	16-Jul
Grasshopper Sparrow	27-Jun	27-Jul
Henslow Sparrow	17-Jun	17-Jul
Horned Lark	28-Mar	28-Apr
Killdeer	ca. 21 May	-
Northern Harrier	ca. 4 July	-
Red-winged Blackbird	26-May	26-Jun
Savannah Sparrow	11-Jun	11-Jul
Song Sparrow	17-May	17-Jun
Upland Sandpiper	ca. 15 June	-
Vesper Sparrow	5-Jun	5-Jul

*-derived from Bull's *Birds of New York*

**Date of first hay cut in
Columbia County:**

1843: ~ 14th of July

Late 1800s: June

Today: May

1853

KETCHUM'S
PATENT MOWING MACHINES.



The greatest Improvement ever made for Simplicity, Durability,
and Ease of Action.

2000



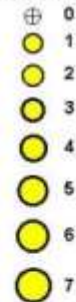
Hay quality and grassland breeding birds



Bobolinks

in Hawthorne Valley
(2005 breeding season)

Birds Observed



Habitats Studied

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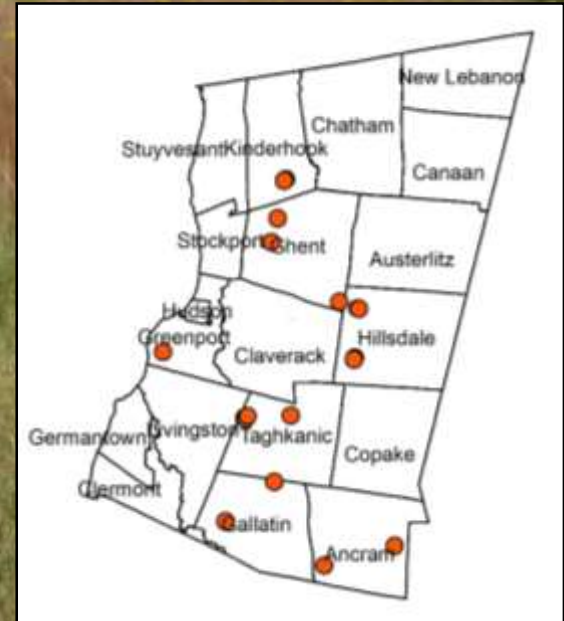
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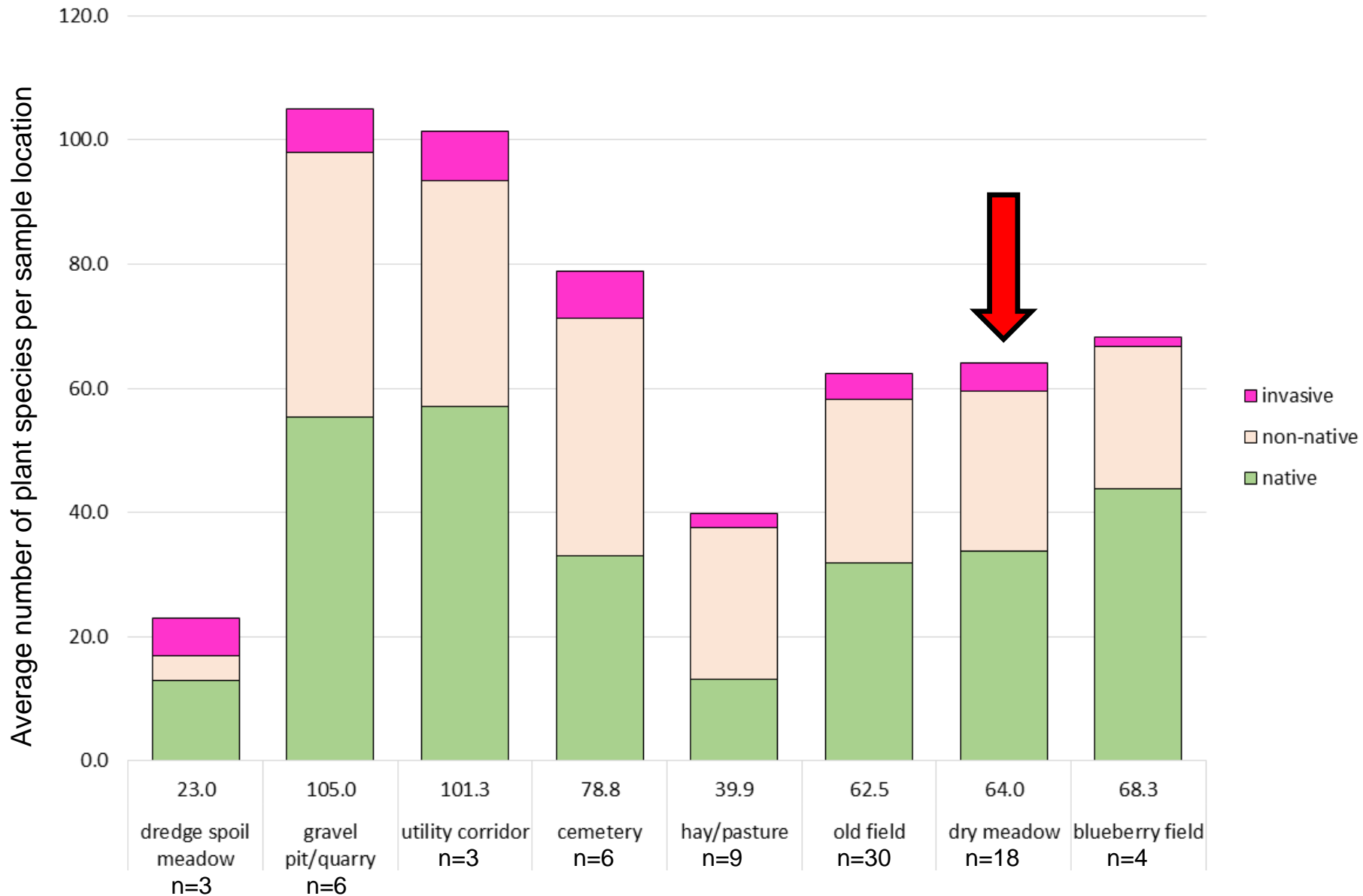
UPLANDS

WETLANDS

Geographically wide-spread, but uncommon and sometimes under-appreciated habitat: **Dry Meadow**



Comparative Plant Diversity and Composition in Upland Meadow Habitats

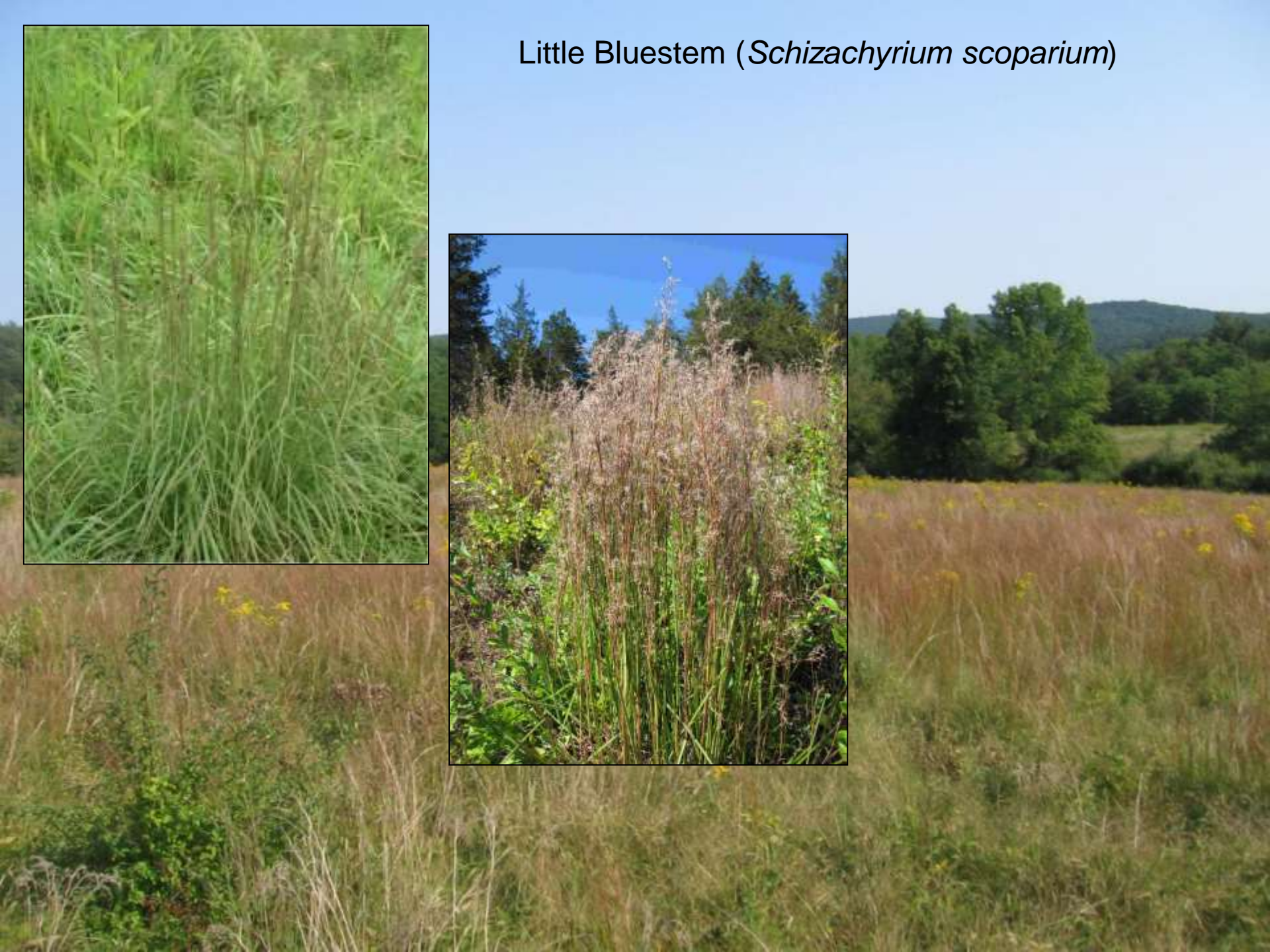




Little Bluestem (*Schizachyrium scoparium*)



Little Bluestem (*Schizachyrium scoparium*)



Little Bluestem (*Schizachyrium scoparium*)



Little Bluestem (*Schizachyrium scoparium*)



Indian Skipper



Little Bluestem
(*Schizachyrium scoparium*)



Cobweb Skipper



Slender Lady's Tresses



Nodding Lady's Tresses



Ragged-fringed Orchis



Yellow Stargrass



Smooth Aster (*Symphyotricum laevis*)



Heath Aster (*Symphyotricum ericoides*)



Sweet Fern
(*Comptonia peregrina*)

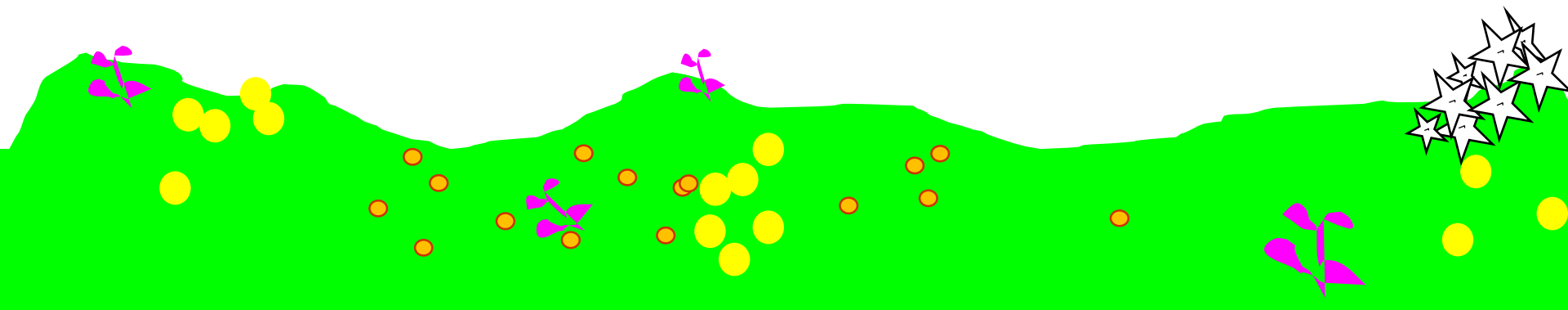


Gray Goldenrod
(*Solidago nemoralis*)



Silverrod
(*Solidago bicolor*)

DRY MEADOW (and OLD FIELD)



DRY MEADOW
(and OLD FIELD)

DOCKS

UMBELS

MILKWEED

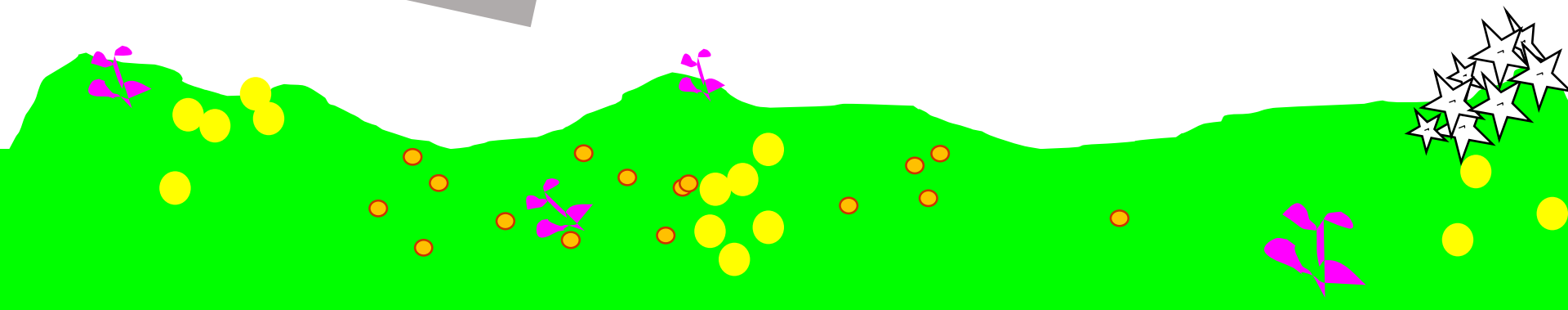
PUSSY TOES

MALLOWS

ASTERS

LITTLE BLUESTEM &
OTHER GRASSES

VIOLETS



**DRY MEADOW
(and OLD FIELD)**

American Copper



Black Swallowtail



Monarch



American Lady



Common Checkered Skipper



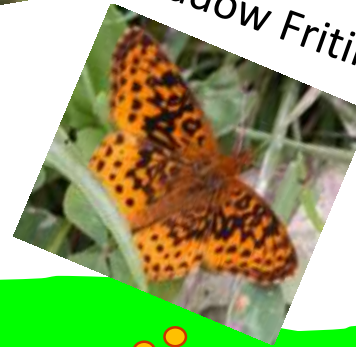
Hobomok Skipper



Pearl Crescent



Meadow Fritillary









Management for Habitat Conservation:

- No fertilizer!
- Rotational mowing/grazing
- Mow after grassland birds have fledged
- Burning?



Habitats Studied

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Headwater Stream

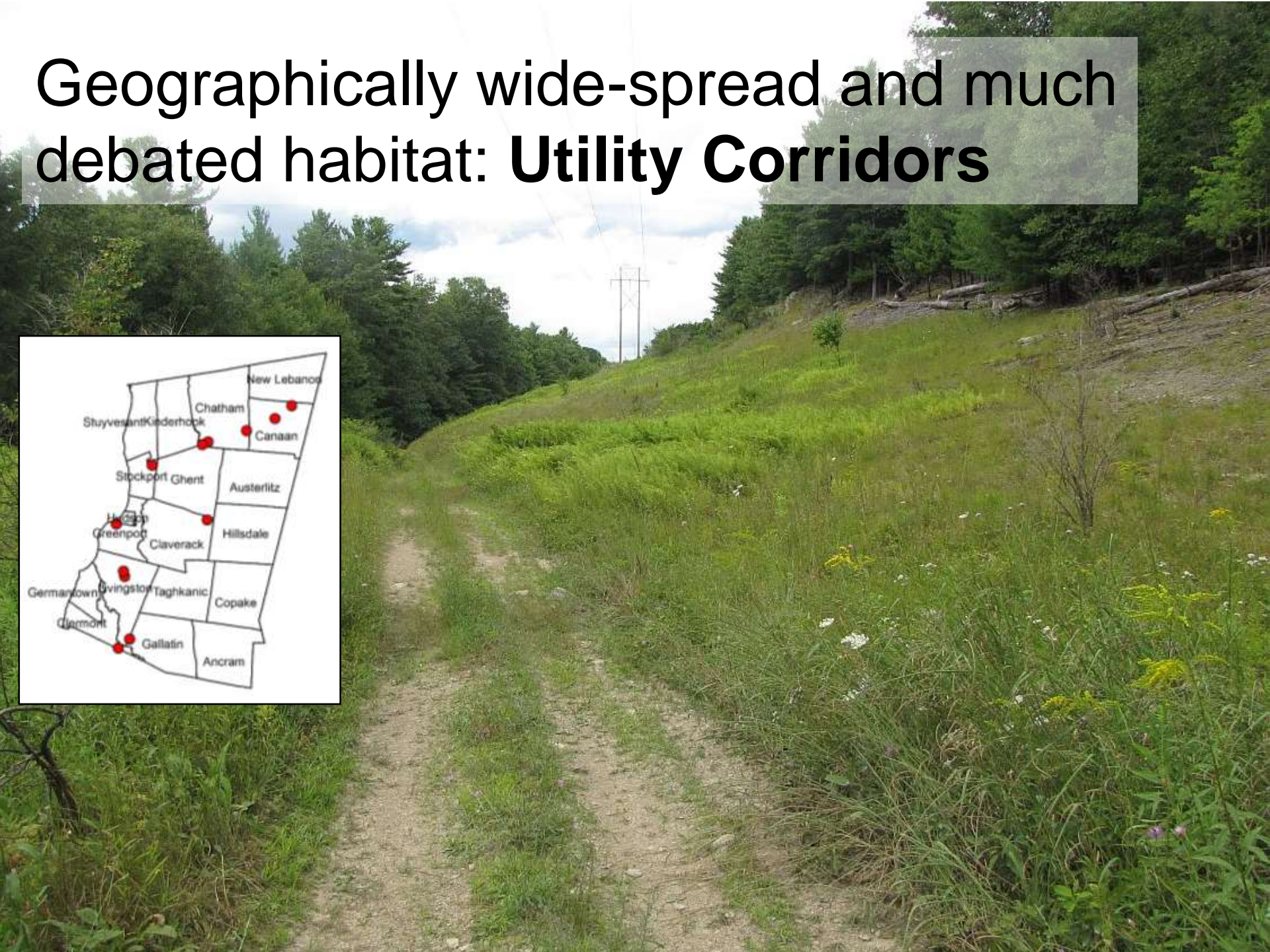
OPEN WETLANDS (non-tidal)

Shrub Swamp
Marsh
Wet Meadow
Bog
Calcareous Fen
Circumneutral Bog Lake
Beaver Pond
Constructed Pond

WETLANDS



Geographically wide-spread and much debated habitat: **Utility Corridors**





Leonard Skipper





Bluecurls



Wand Bush-clover

Habitats Studied

ROCKY OUTCROPS

Gravel Pit and Quarry
Wooded Outcrops

WOODED UPLANDS

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WETLANDS

UPLANDS

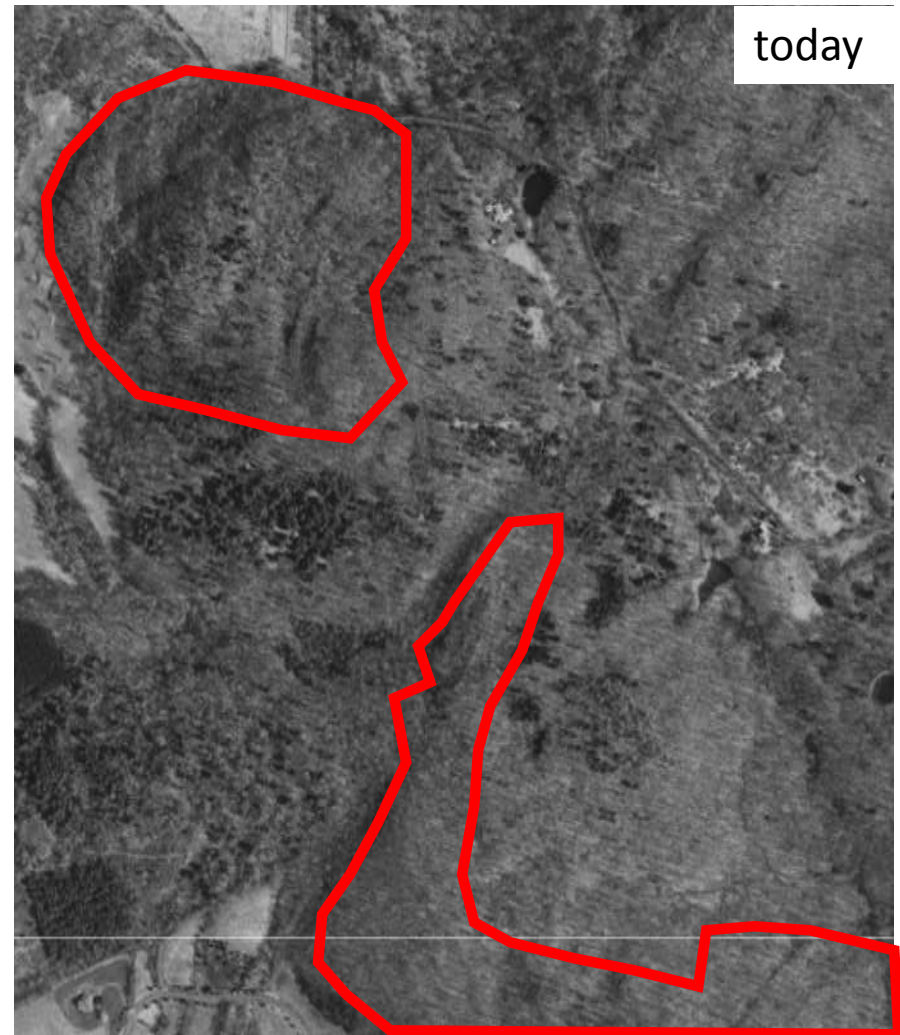
Ancient Forests:

Hidden treasures in a 70% forested county



Ancient Forest = forest that has long been forest, although selective logging, grazing or other use may have occurred. All primary/Old Growth forest is ancient but not vice-versa.

(As far as we can tell, there is no Old Growth forest in Columbia County.)



Difference in Forest Soil between post-agricultural and ancient forest



Uncommon wildflowers associated with ancient forests

Including:

- American Ginseng (*Panax quinquefolius*)
- American Spikenard (*Aralia racemosa*)
- Beechdrops (*Epifagus virginiana*)
- Bush Honeysuckle (*Lonicera canadensis*)
- Canada Violet (*Viola canadensis*)
- Dutchman's Breeches (*Dicentra cucullaria*)
- Gay-wing Milkwort (*Polygala paucifolia*)
- Hobblebush (*Viburnum lantanoides*)
- Lopseed (*Phryma leptostachya*)
- Pink Lady's-Slipper (*Cypripedium acaule*)
- Rattlesnake Plantain Orchid (*Goodyera pubescens*)
- Trailing Arbutus (*Epigaea repens*)
- Upland Boneset (*Eupatorium sessilifolium*)
- Wild Ginger (*Asarum canadense*)



[illegible]

[illegible]

[illegible]

[illegible]



Hemlock Forest: low diversity, low rarity, low invasives



N. Hardwood-Hemlock Forest: high diversity, medium rarity, medium invasives



Oak-Hickory Forest: low diversity, high rarity, low invasives



Mature Sugar Maple Forest: medium diversity, medium rarity, medium invasives

	FOREST TYPES									
	ancient					young				
	Nrthern Hemlock	Nrthern Hemlock	Oak-Hickory	Rich Oak	Mature Sugar Maple	Young Sugar Maple	White Pine	Red Cedar	Dredge Spoil	Black Locust
SHRUBS and TREE SEEDLINGS	n=17	n=28	n=16	n=8	n=15	n=15	n=7	n=8	n=7	n=6
Hemlock	***	?		?	?			?		
Witch-hazel	**	*	**	**	*	?	?	?		
Black Birch	**	*	?	**	?	?	?	?		
Striped Maple	*	*	*	*	?	?	**			?
Hop-hornbeam	*		**	**	*	*	*	*		
Sugar Maple	*	**	?	*	***	**	?	?		?
Beech	?	*	?	?	?	?	**			
Red Maple	?	?	**	***		?	**		?	
Black Cherry	?	?	?	?	?	?	**	?	?	?
Common Buckthorn	?	?	?		?	?	?	***	*	?
Honeysuckle	?	?	?			?	?	*	***	**
Multiflora Rose	?	?	?	?	?	?	?	?	**	***
Japanese Barberry	?	?	?	?	?	?	?	?	*	?
Privet	?					?		?	?	*

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Black Birch	**	*	~	**	~	~	~	~		
Striped Maple	*	*	*	*	~	~	**			~
Hop-hornbeam	*		**	**	*	*	*	*		
Sugar Maple	*	**	~	*	***	**	~	~		~
Beech	~	*	~	~	~	~	**			
Red Maple	~	~	**	***		~	**	INVASIVES!		
Black Cherry	~	~	~	~	~	~	**	~	~	~
Common Buckthorn	~	~	~		~	~	~	***	*	~
Honeysuckle	~	~	~			~	~	*	***	**
Multiflora Rose	~	~	~	~	~	~	~	~	**	***
Japanese Barberry	~	~	~	~	~	~	~	~	*	~
Privet	~					~		~	~	*

Ancient Forests: Management Considerations

- find out if you have any on the land you manage (early aerial photos, speak with old-timers)
- don't clear them; steer development away from them
- treat them with particular care when harvesting timber (avoid disturbance to soil, avoid large openings/logging roads)
- remove invasives, if necessary, but avoid “parkification”





“Parkification”

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Floodplain Forest

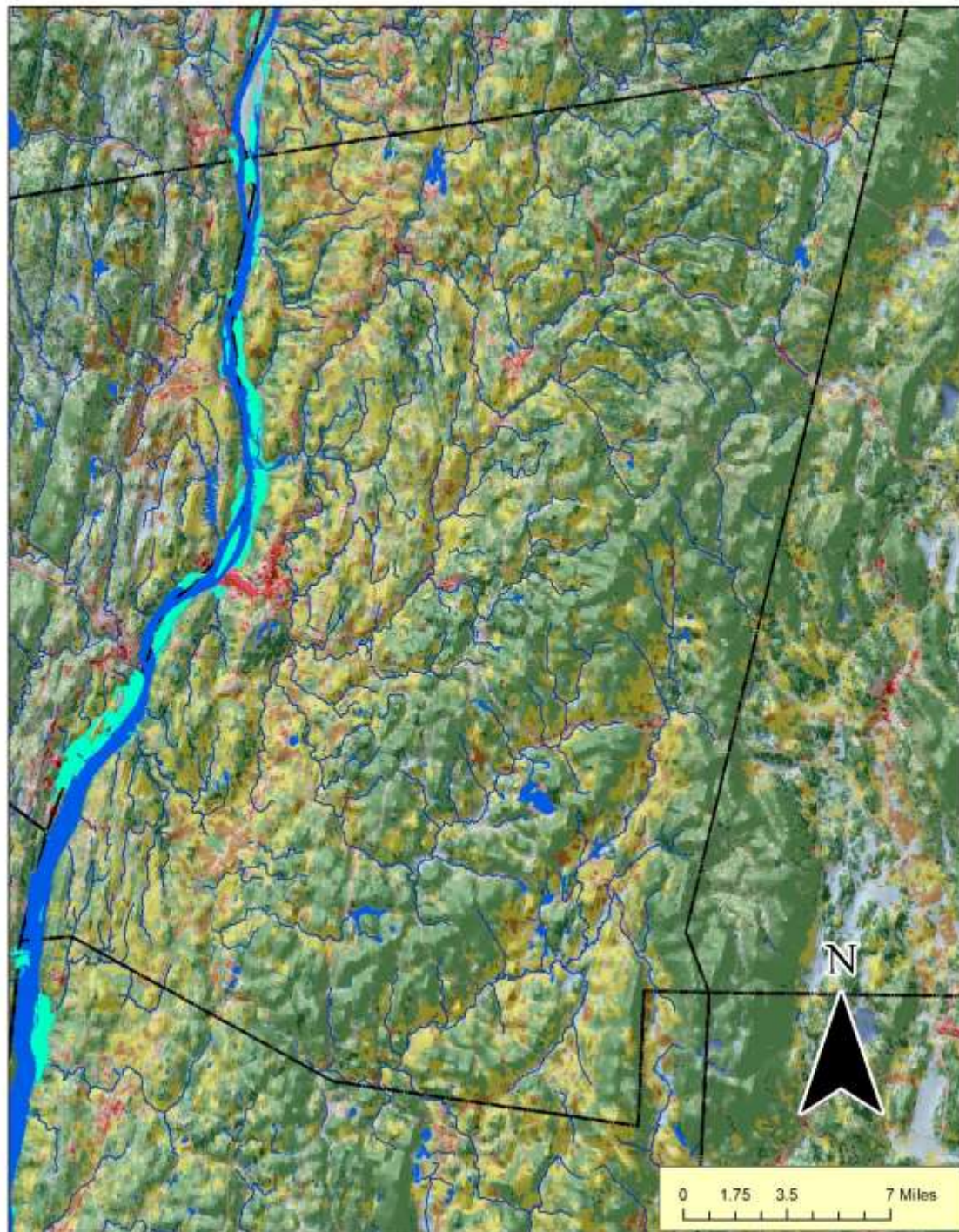
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WETLANDS

**Freshwater
Tidal
Wetlands**









Golden
Club

Photo: NYNHP



Long's Bittercress

Photo: Maine.gov



Spongy
Arrowhead

Photo: NYNHP

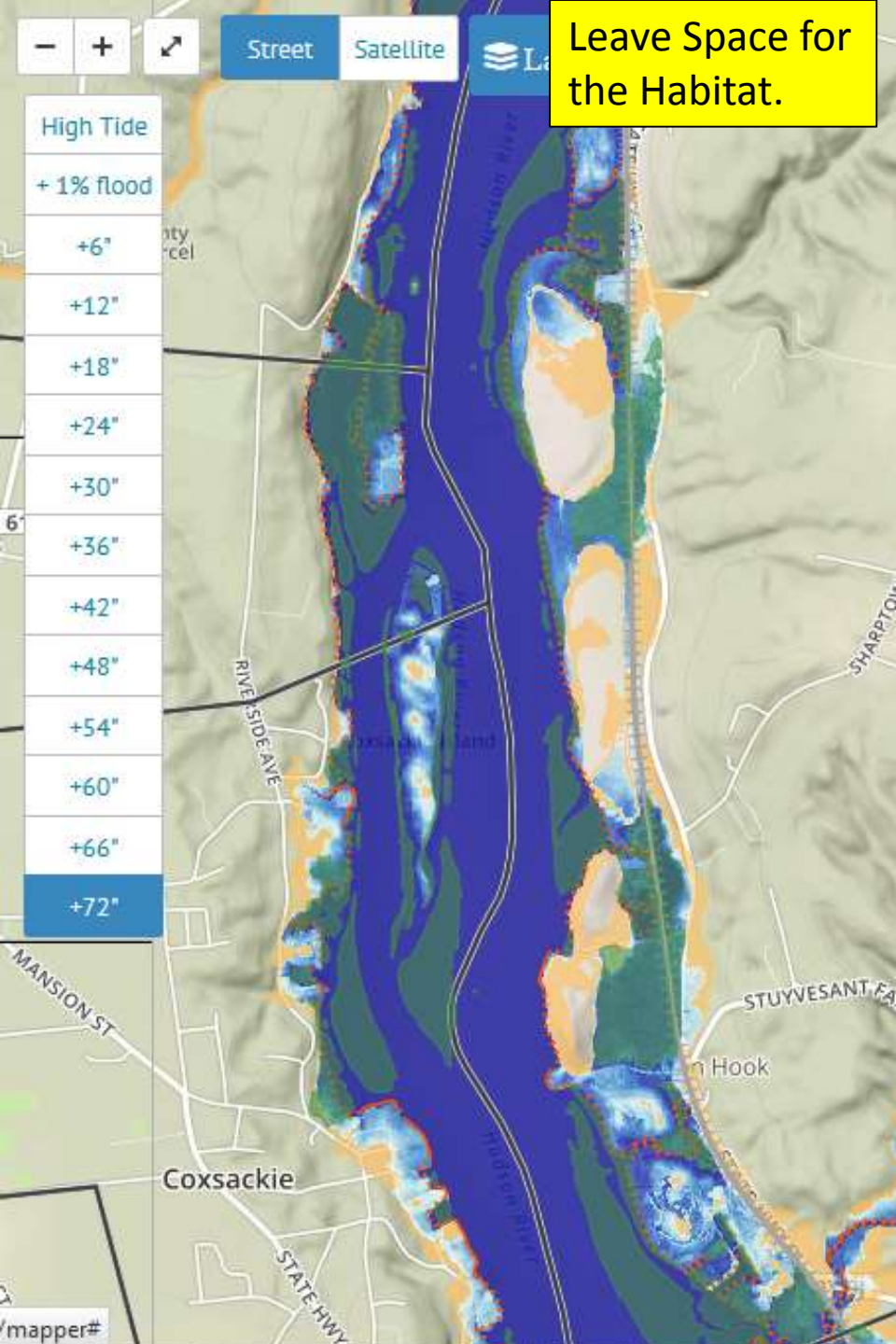
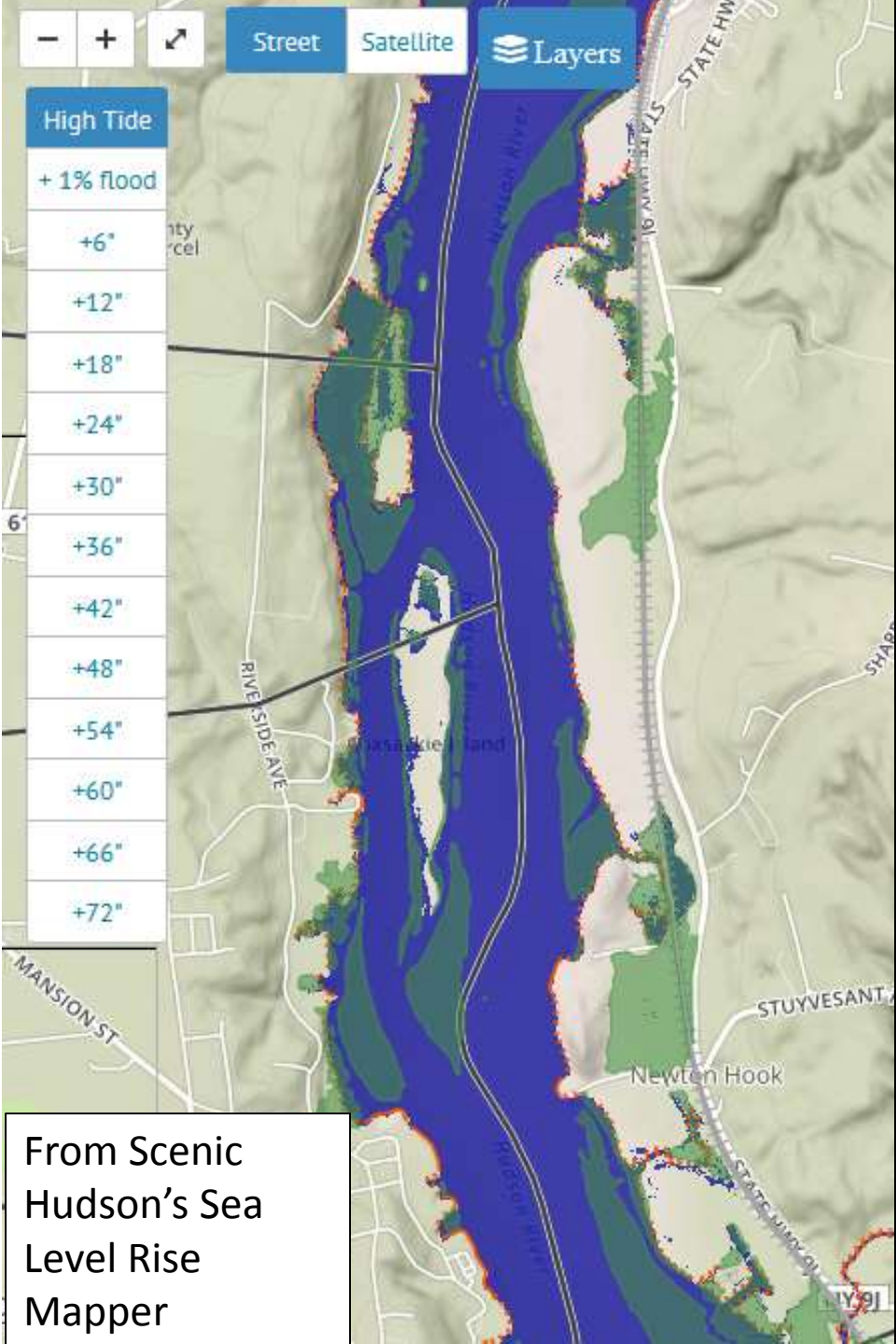








Russet-tipped
Clubtail



UPLANDS

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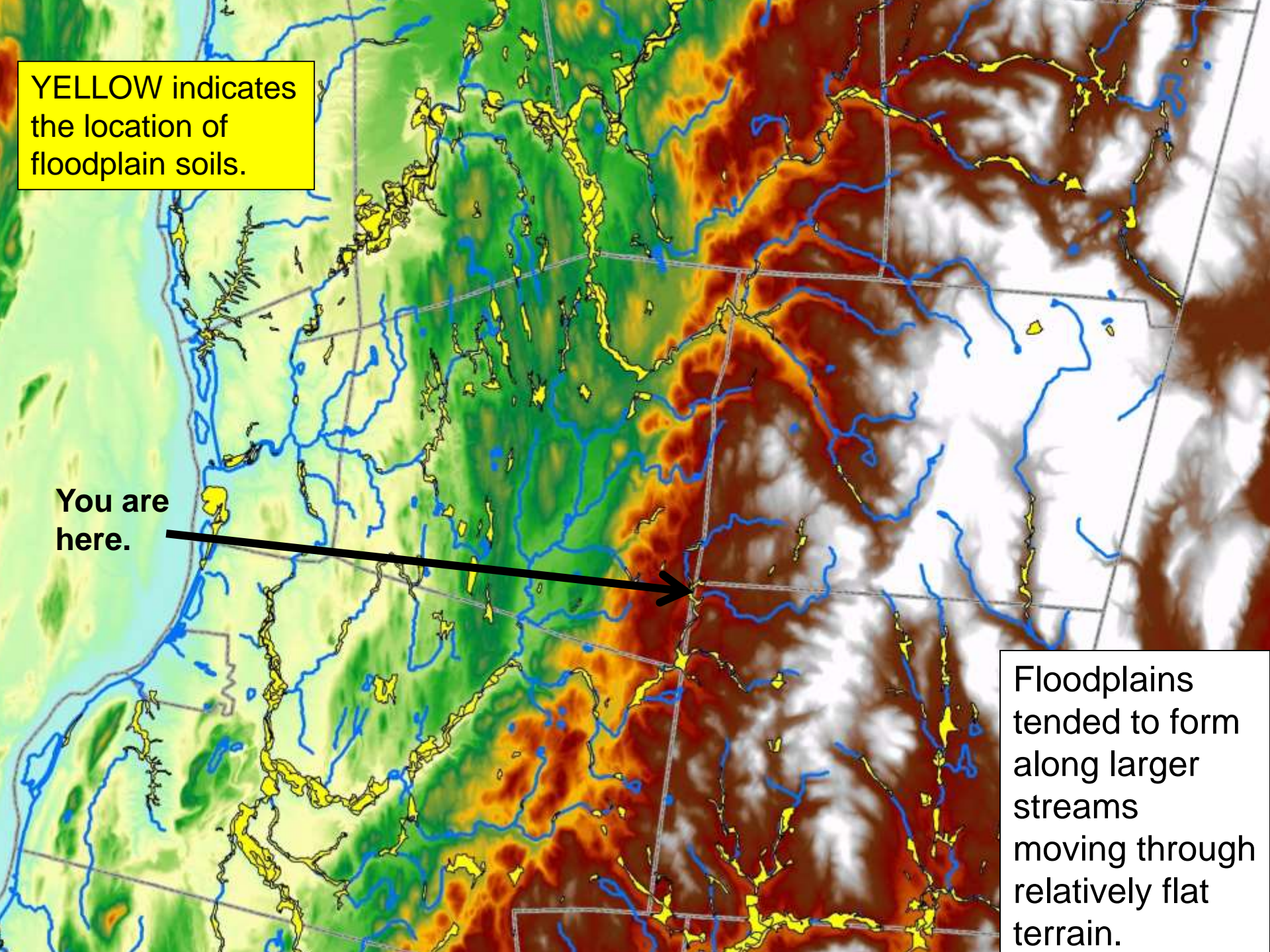
Floodplain Forests



Muddy
Messy
Trashy



Lush
Diverse
Dynamic

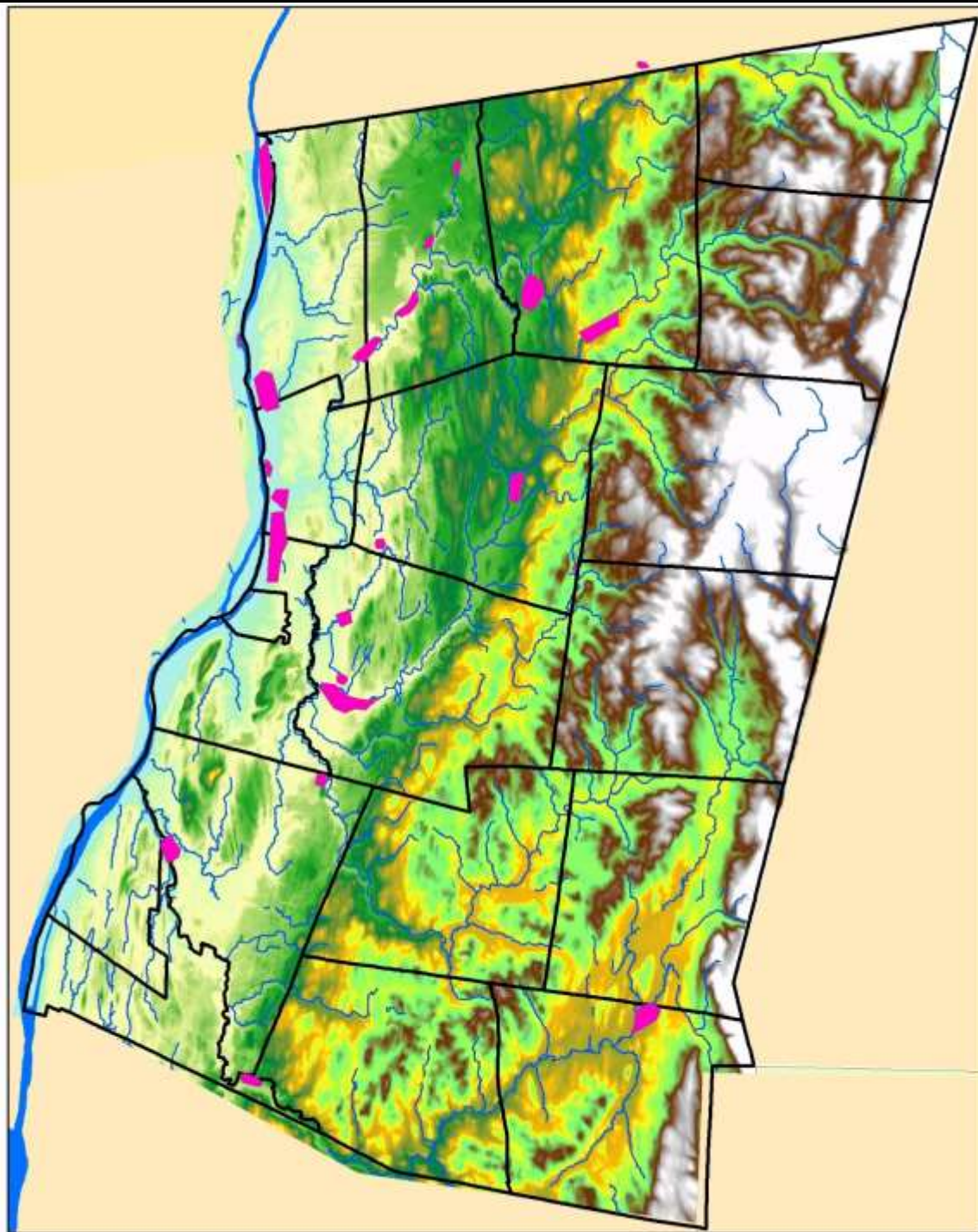
A topographic map of the central United States, including parts of Minnesota, Iowa, Missouri, Arkansas, and Louisiana. The map uses a color gradient to represent elevation: green for lower elevations, yellow and orange for intermediate elevations, and brown and white for higher elevations. A network of blue lines represents rivers and streams. Yellow areas, indicating floodplain soils, are primarily located along these waterways. A black arrow points from the text 'You are here.' to a specific location in central Iowa. A yellow box in the upper left contains the text 'YELLOW indicates the location of floodplain soils.'

YELLOW indicates
the location of
floodplain soils.

**You are
here.**

Floodplains
tended to form
along larger
streams
moving through
relatively flat
terrain.

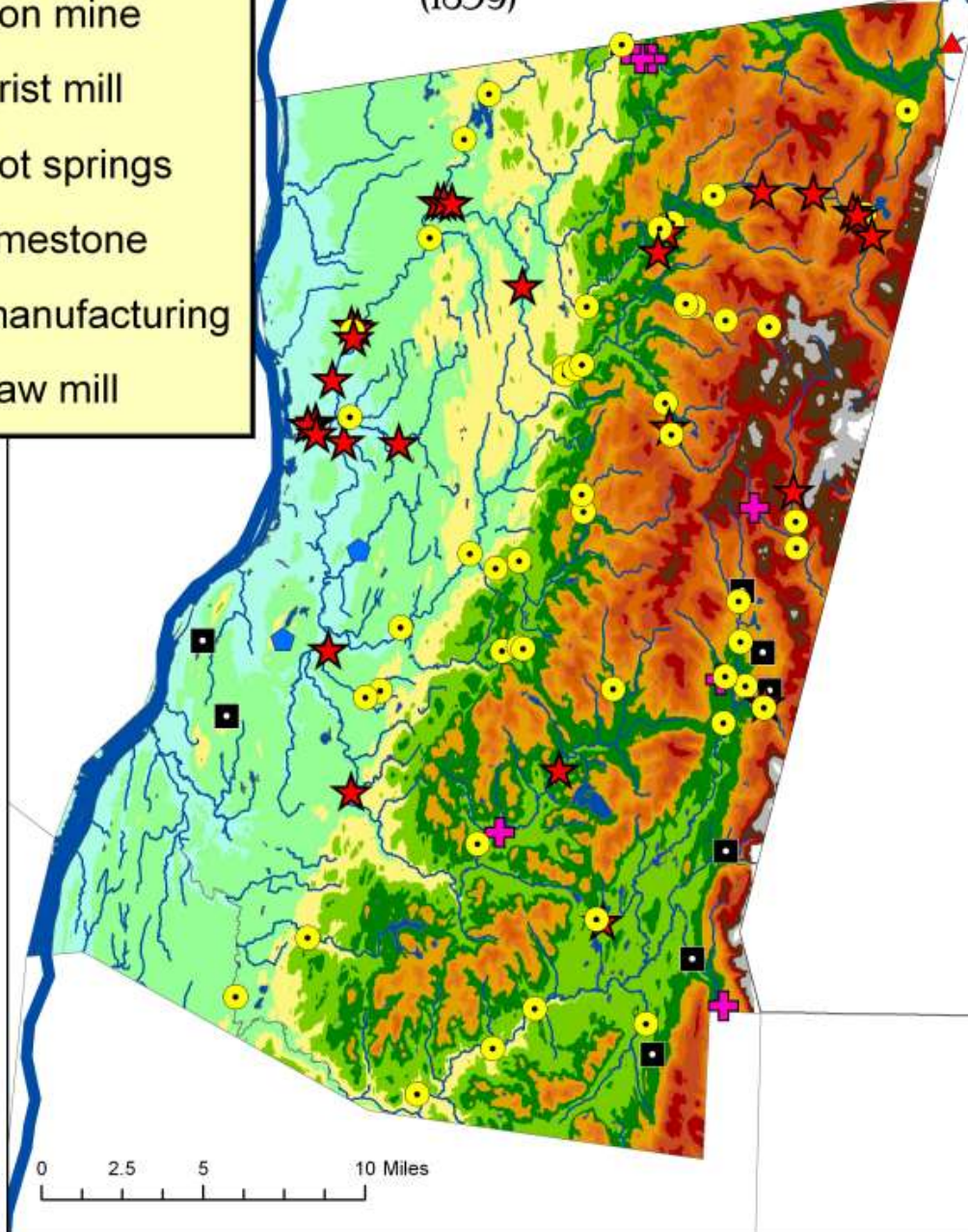
 =
approximate
locations of
native
American
fields at time
of settlement.



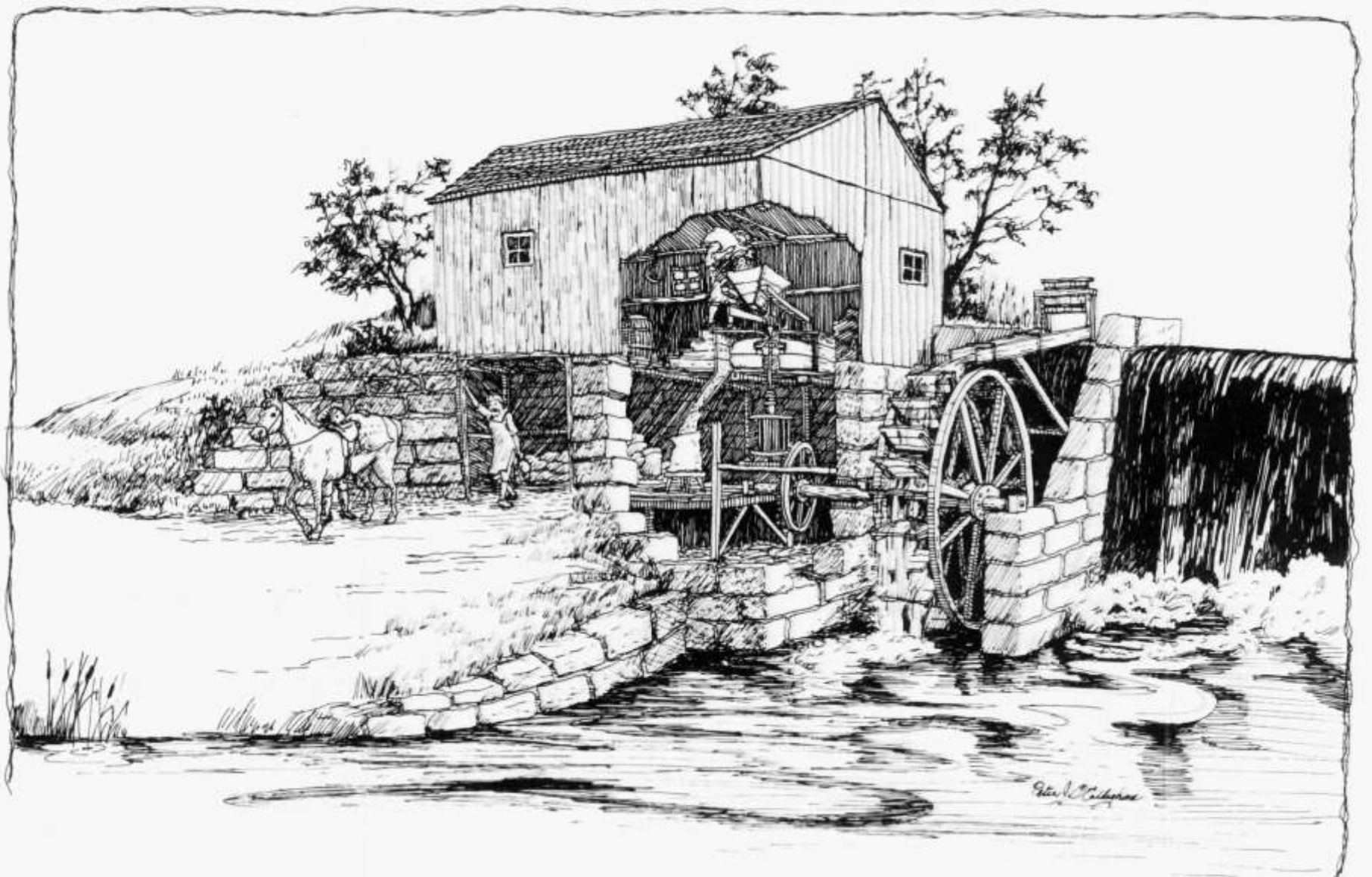
Legend

- iron mine
- grist mill
- ▲ hot springs
- ◆ limestone
- ★ manufacturing
- ✚ saw mill

EARLY INDUSTRY
(1839)



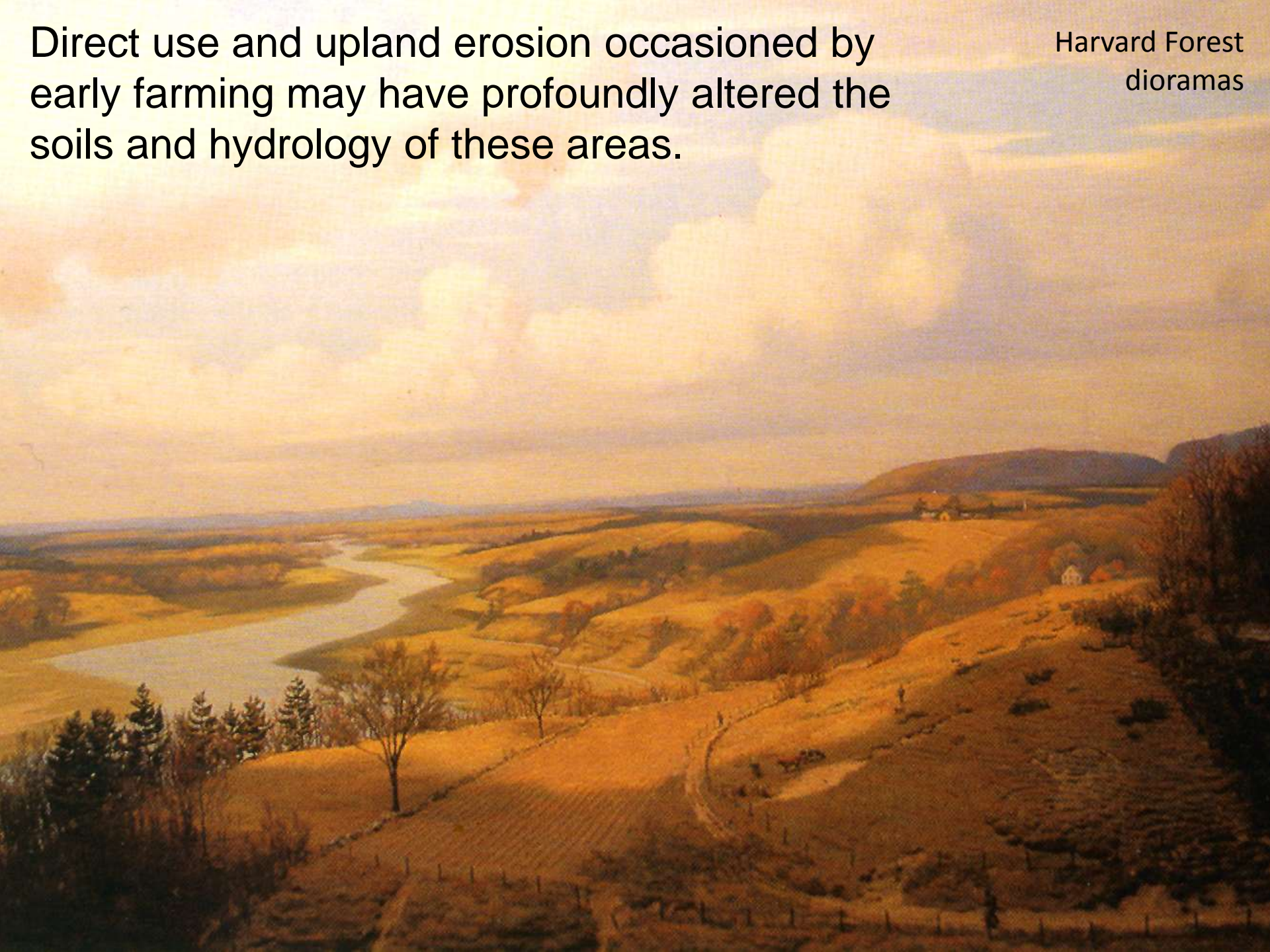
The NYS census of 1825 lists a maximum of about 270 water-powered industries. These created dams and empoundments that re-shaped the floodplain.



From: Abandoned New England

Direct use and upland erosion occasioned by early farming may have profoundly altered the soils and hydrology of these areas.

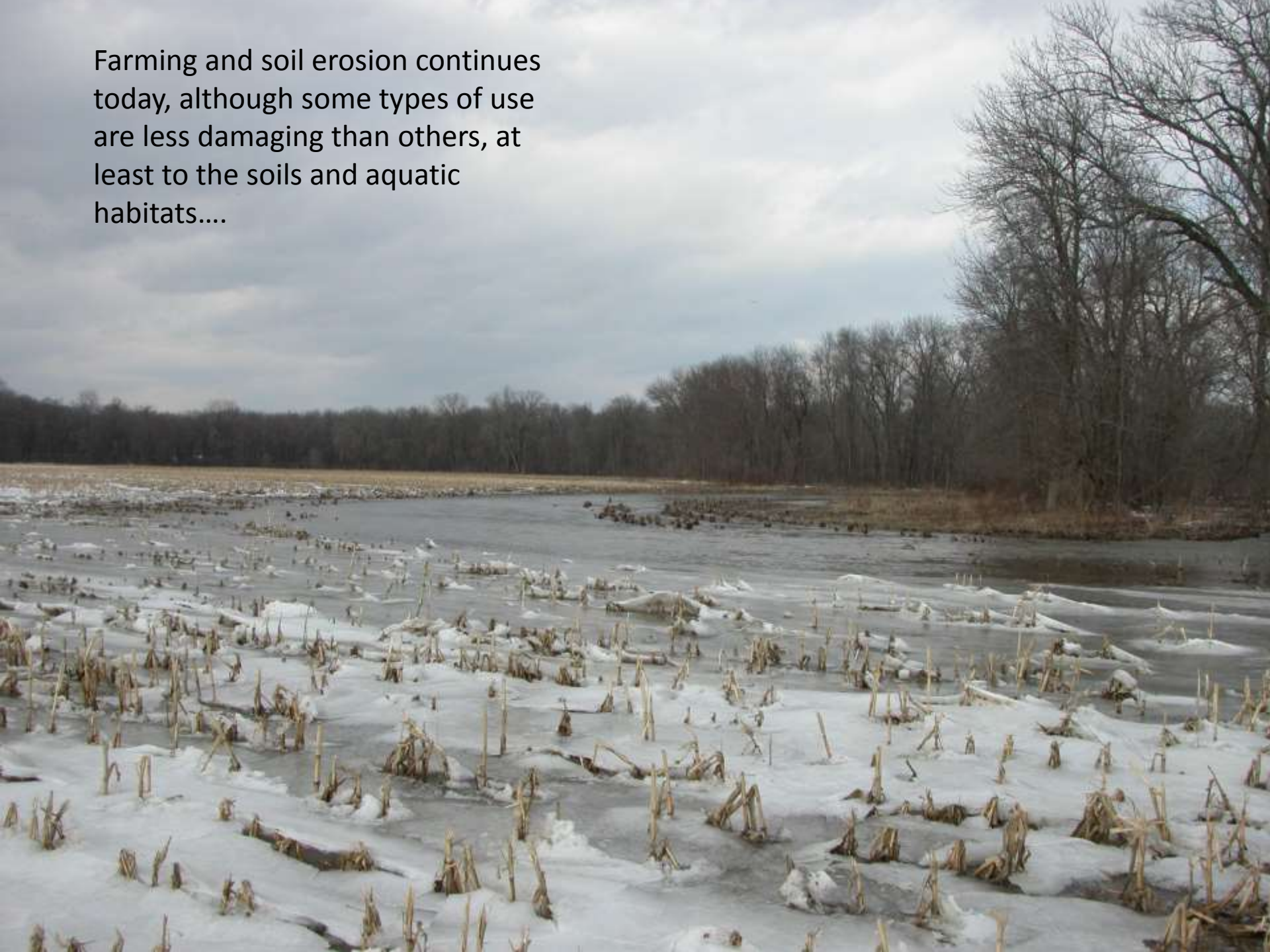
Harvard Forest
dioramas



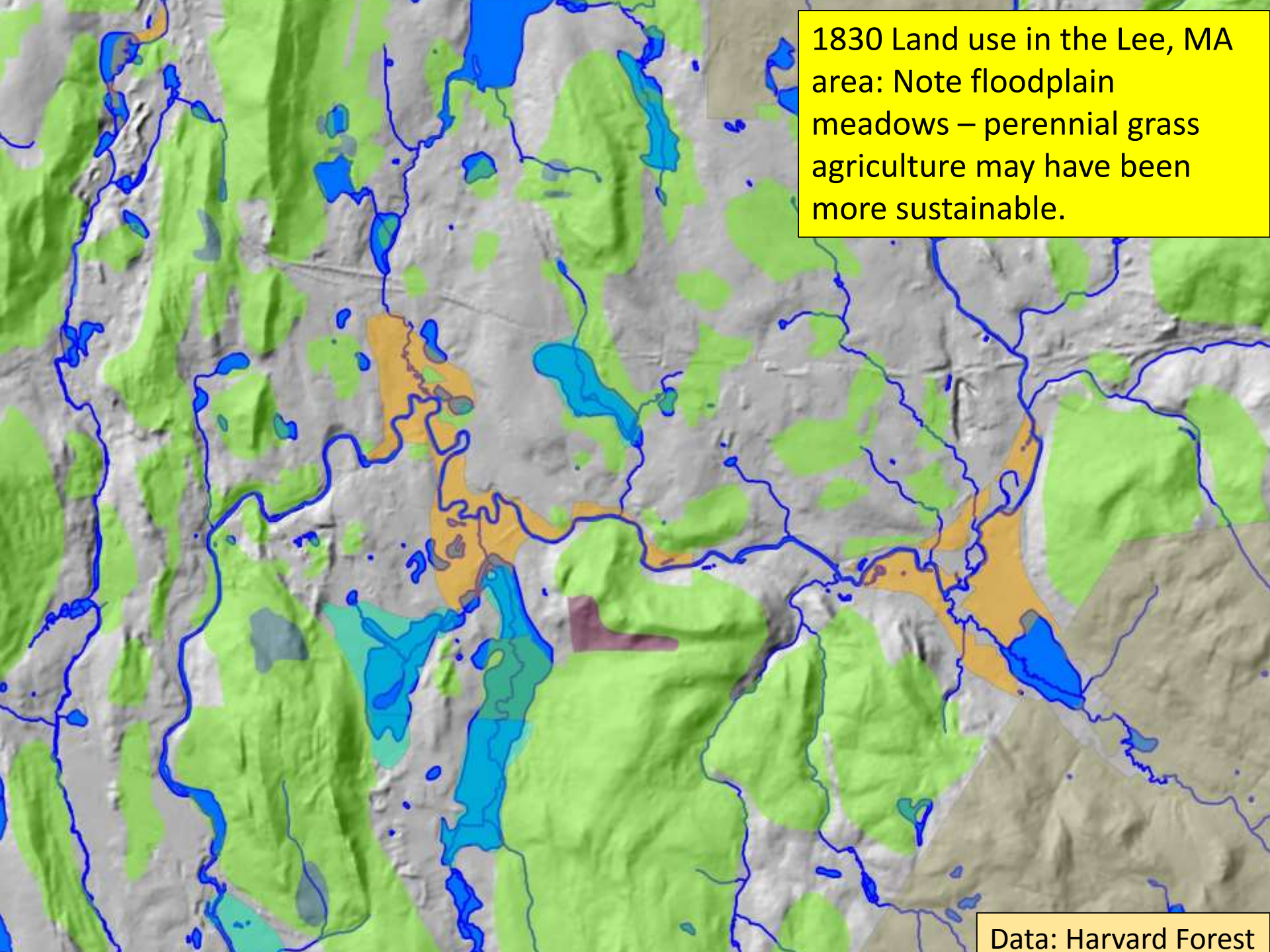
“I have observed that ... rich low lands before they was cleared: produced abundance of hasels, weeds & vines, which entangled ye trash which ye floods brought there: & in time rotting kept it very rich. but when cleared & plowed they had A contrary effect upon it & instead of bringing a rich supply & leaving it they often bore away some of ye best of ye soil which was a fine black sandy Loam”

John Bartram, ca. 1755

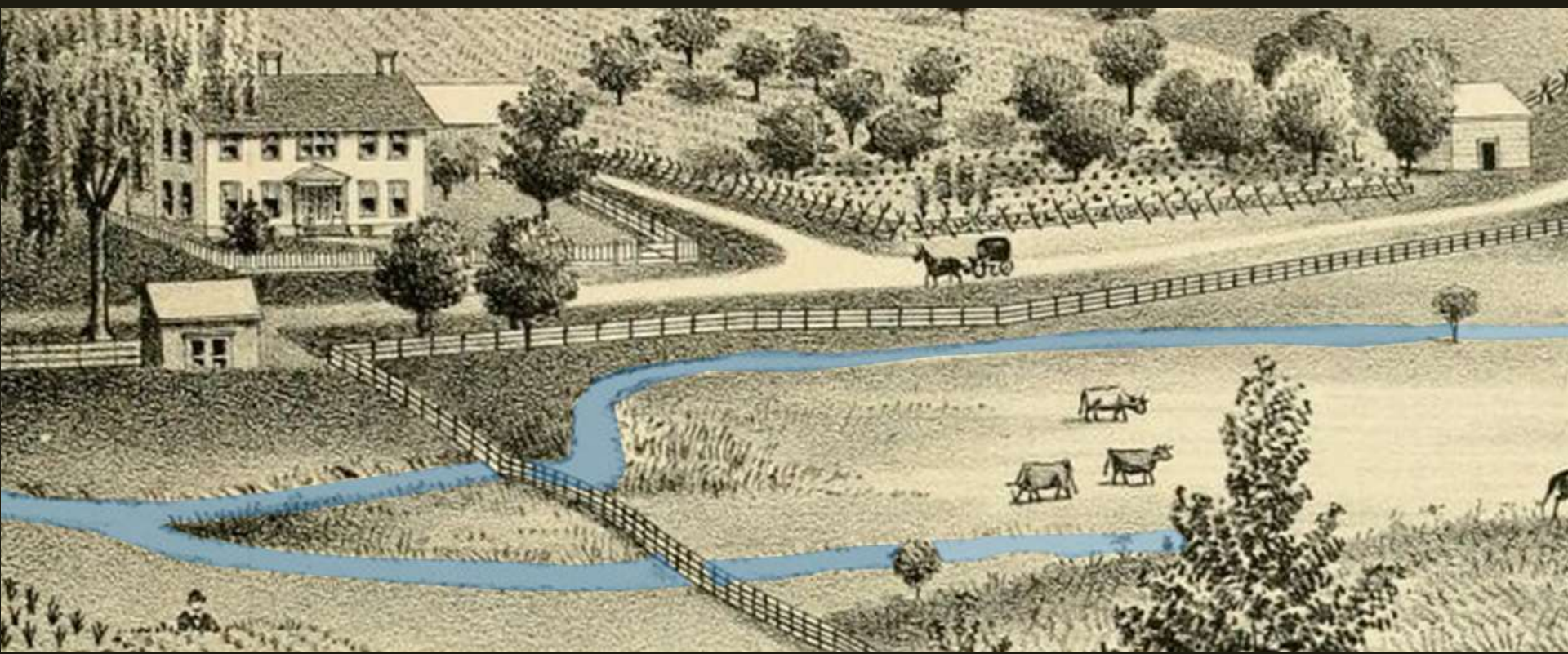
Farming and soil erosion continues today, although some types of use are less damaging than others, at least to the soils and aquatic habitats....



1830 Land use in the Lee, MA area: Note floodplain meadows – perennial grass agriculture may have been more sustainable.



Data: Harvard Forest



**A Spring-time
Land of
Ephemerals.**





False Mermaid Weed
(*Floerkea
proserpinacoides*)



Green Dragon
(*Arisaema dracontium*)



Spicebush
Swallowtail



BUTTERFLIES

20 species of butterflies,
including the rare Hackberry
Emperor and American Snout
and the uncommon Question
Mark and Spicebush Swallowtail

American Snout



Hackberry
Emperor



Illinois River Cruiser



Brook Snaketail

DRAGON- AND DAMSELFLIES

45 species,
10 of these were new county
records, including

- Brook Snaketail
- Spine-Crowned Clubtail
- Arrow Clubtail
- and Blue-tipped Dancer

(all species of greatest conservation
need)



Arrow Clubtail

BEES

59 species of native bees
(most of which were new
county records)



GROUND BEETLES

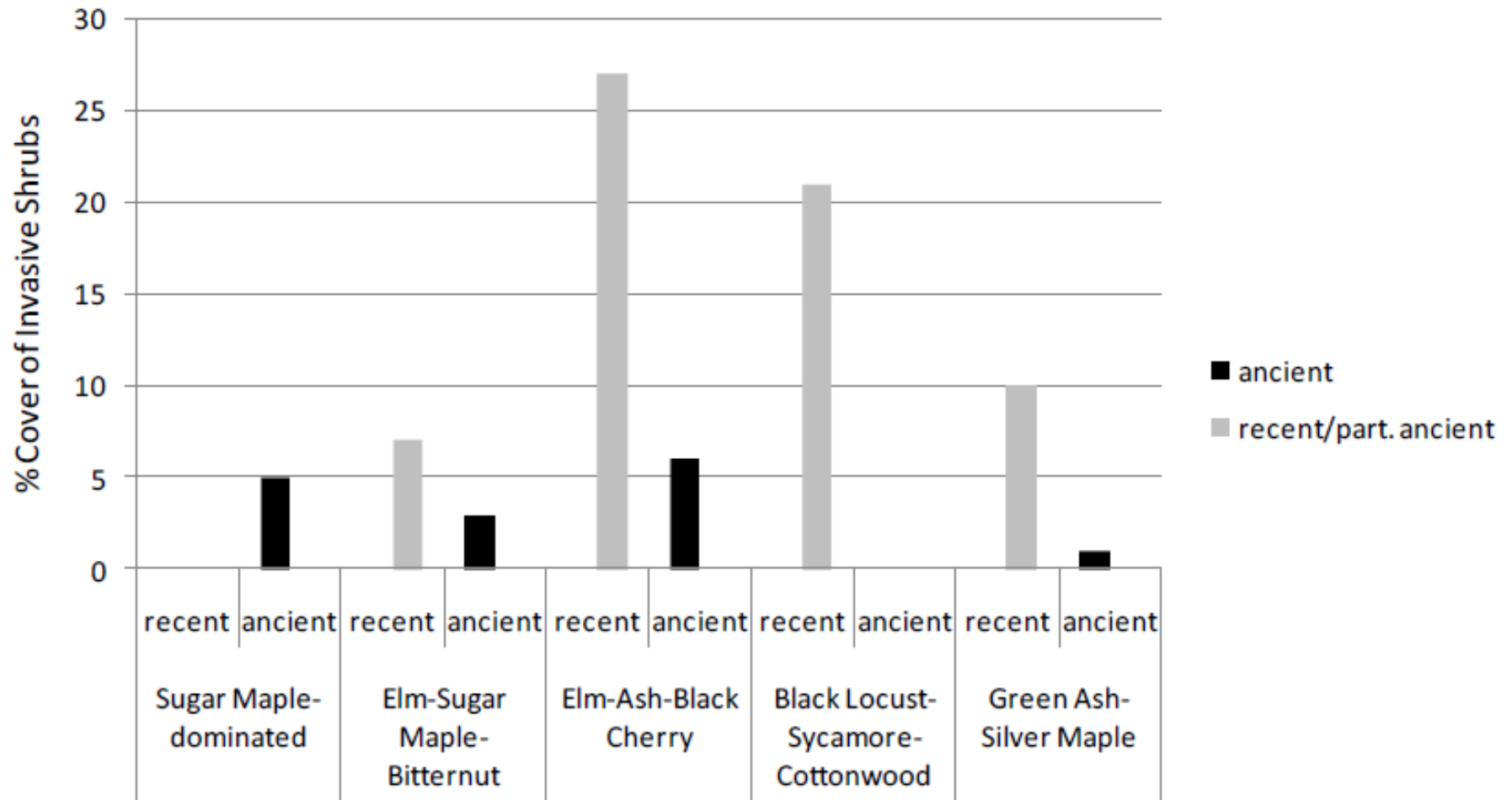
85 species,
35 of which might be rare or
uncommon in our region





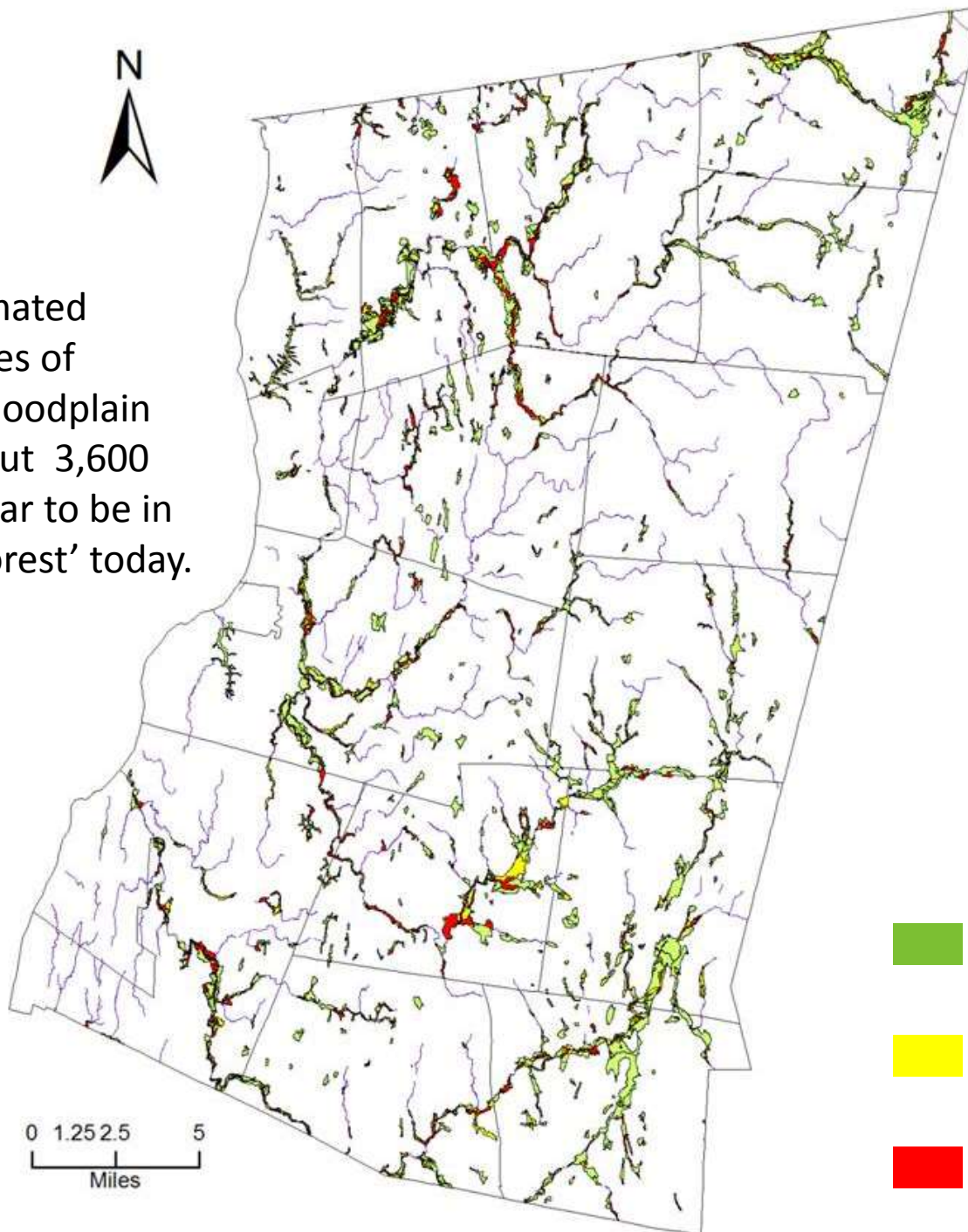
Wood Turtle Shell

Ancient Forest = Fewer Invasives.

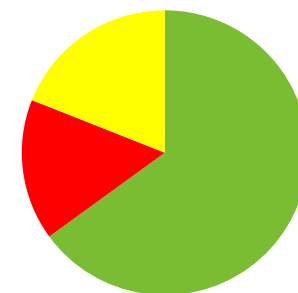




Of an estimated 25,000 acres of historical floodplain forest, about 3,600 acres appear to be in 'Ancient Forest' today.



0 1.25 2.5 5
Miles

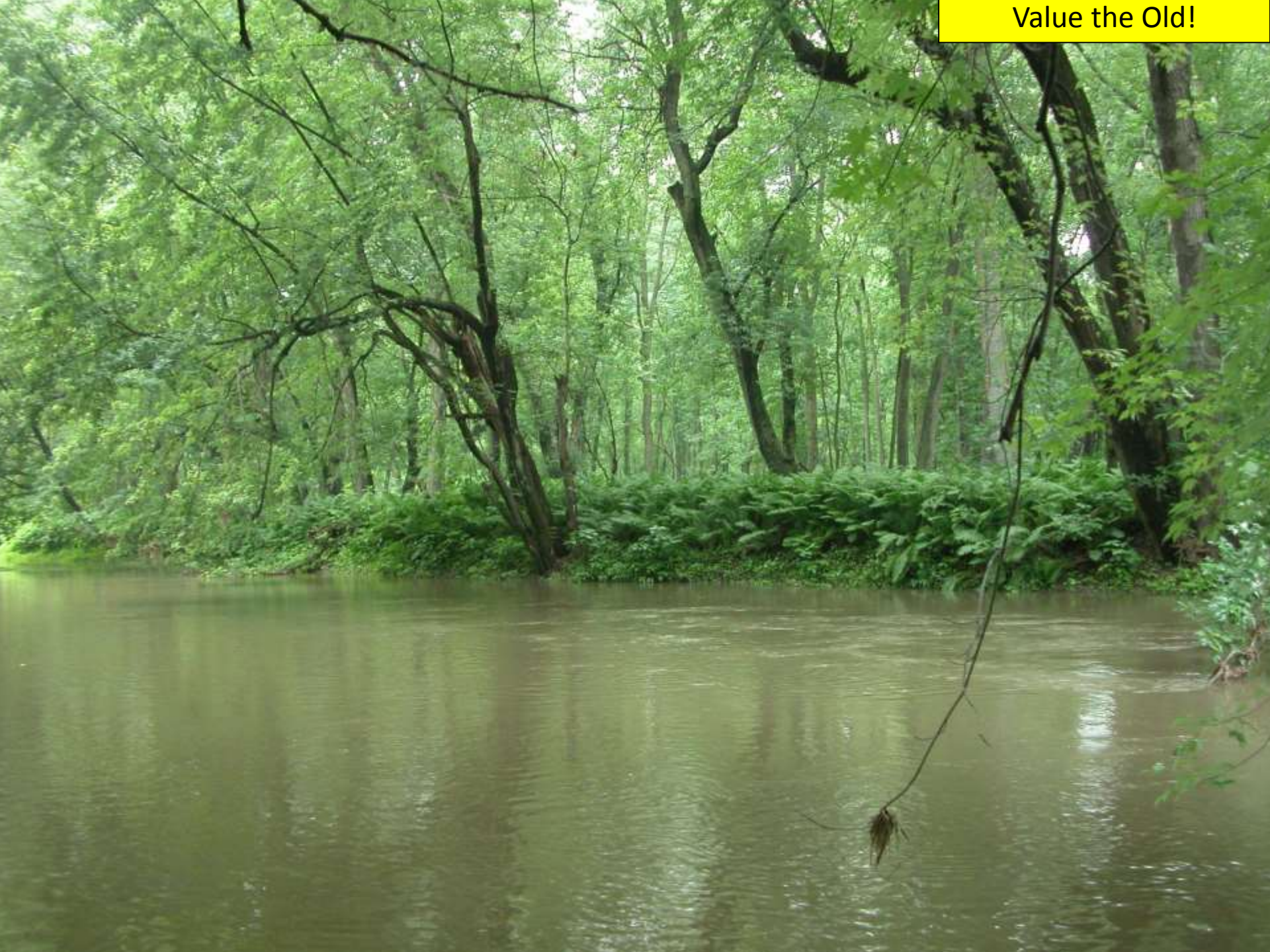


- Unforested Alluvial Soil
- Recently Reforested Floodplain
- Ancient Floodplain Forest

Preserve the Mess!



Value the Old!



2008

2015



At least, Go to Grass!

UPLANDS

ROCKY OUTCROPS

Gravel Pit and Quarry
Wooded Outcrops

WOODED UPLANDS

Ancient Forests

Hemlock Forest
Northern Hardwood(-Hemlock) Forest
Mature Sugar Maple Forest
Rich Oak Forest
Oak-Hickory Forest

Young Forests

Young Sugar Maple Forest
White Pine Forest
Black Locust Forest
Red Cedar Forest
Conifer Plantation
Mixed Young Forest

OPEN UPLANDS

Oak Heath Barrens
Blueberry Heath
Successional Shrubland
Old Field
Dry Meadow
Upland Hayfield/Pasture
Cemetery
Utility Corridor
Lawn

Habitats Studied

FRESHWATER TIDAL HABITATS

Tidal Marsh
Tidal Mudflat
Tidal Shrub Swamp
Tidal Swamp Forest

WOODED WETLAND (non-tidal)

Floodplain Forest

Swamp Forest
Wooded Seep
Intermittent Woodland Pool
Headwater Stream

OPEN WETLANDS (non-tidal)

Shrub Swamp
Marsh
Wet Meadow
Bog
Calcareous Fen
Circumneutral Bog Lake
Beaver Pond
Constructed Pond

WETLANDS

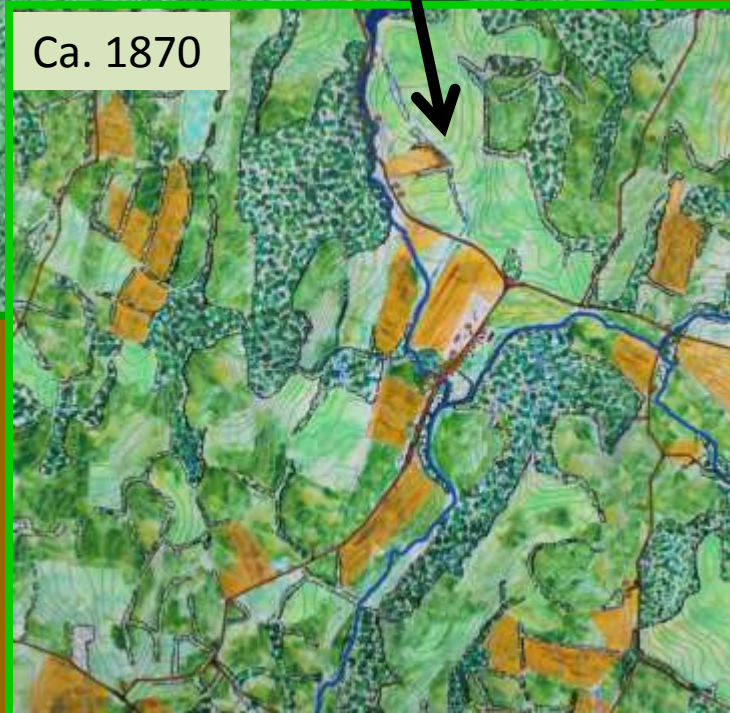
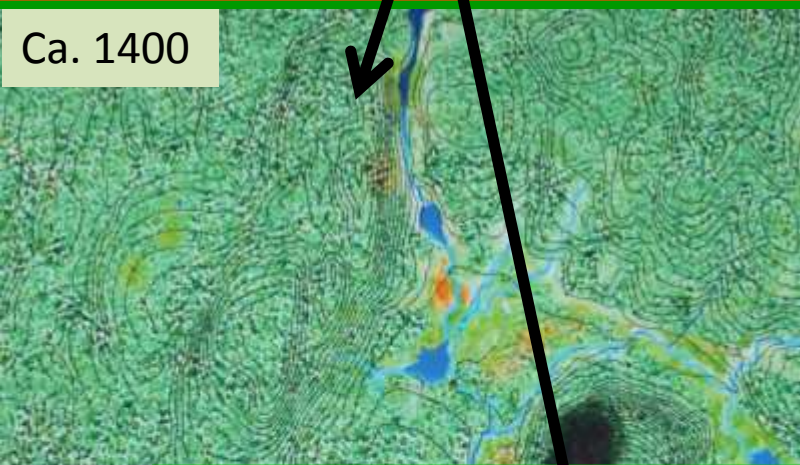
Wet Meadows



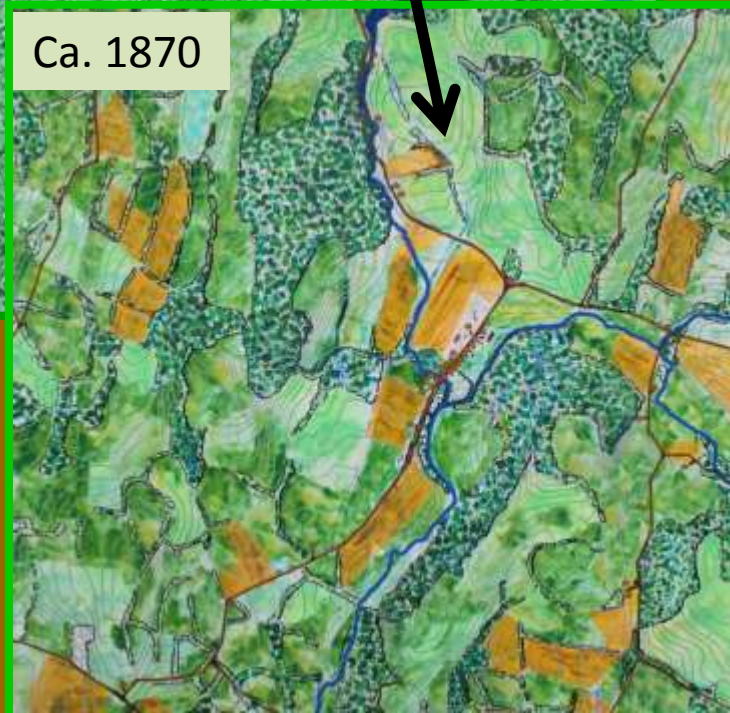
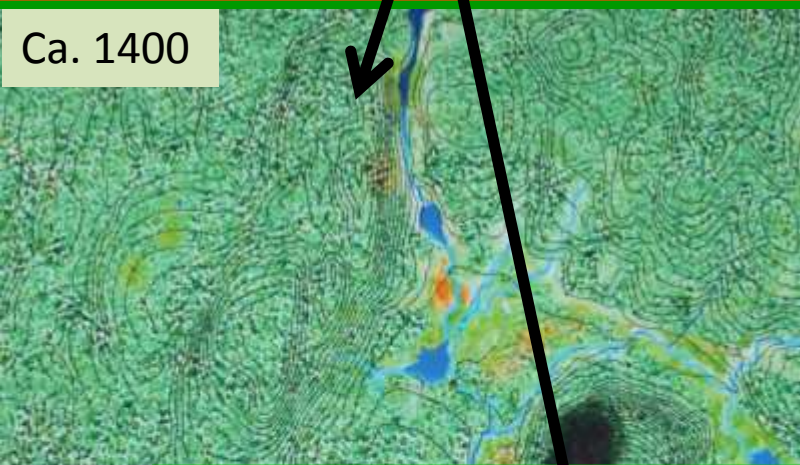
We consider the question of what farms can provide to nature conservation from the perspective of *Ecological Analogies*.

Ecological analogies refer to human-shaped habitats which, while not the ones that the given organism co-evolved with, offer enough similarities or analogies to be ecologically functional *for that species*.

Where do native organisms which used to live in
these landscapes now find a home in **this landscape?**



Where do native organisms which used to live in
these landscapes now find a home in **this landscape?**



*Where they find working
ecological analogies!*



Photo from Parks Canada

For example, some shrubland birds, who might have evolved to take advantage of **post-fire shrubland...**

might find a suitable ecological analogy in a **shrubby pasture**



(photo from http://virtual.parkland.edu/lstelle1/len/biface_guide/chert/documents/glacial_till.html)

Grassland birds,
who had evolved to
breed in Midwestern
Tallgrass Prairie

sometimes find a
suitable ecological
analogy in a **mature
hayfield**



Wetland butterflies, who
had evolved to live in
and around **beaver
meadows**,...



might find a suitable
ecological analogy in an
**occasionally-grazed
wet pasture**.

Beaver Pond



Beaver Meadow





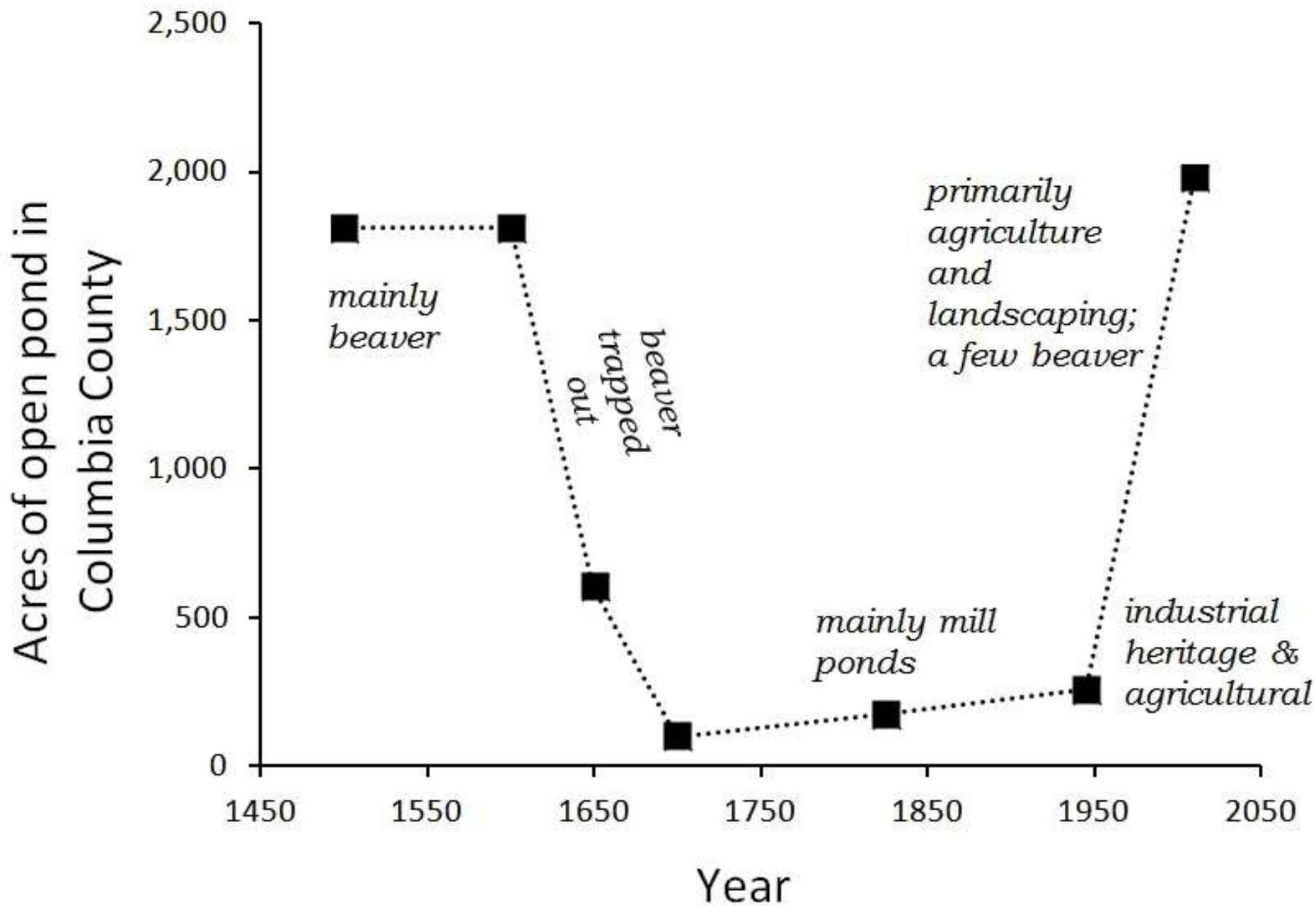
1940
(no beaver)

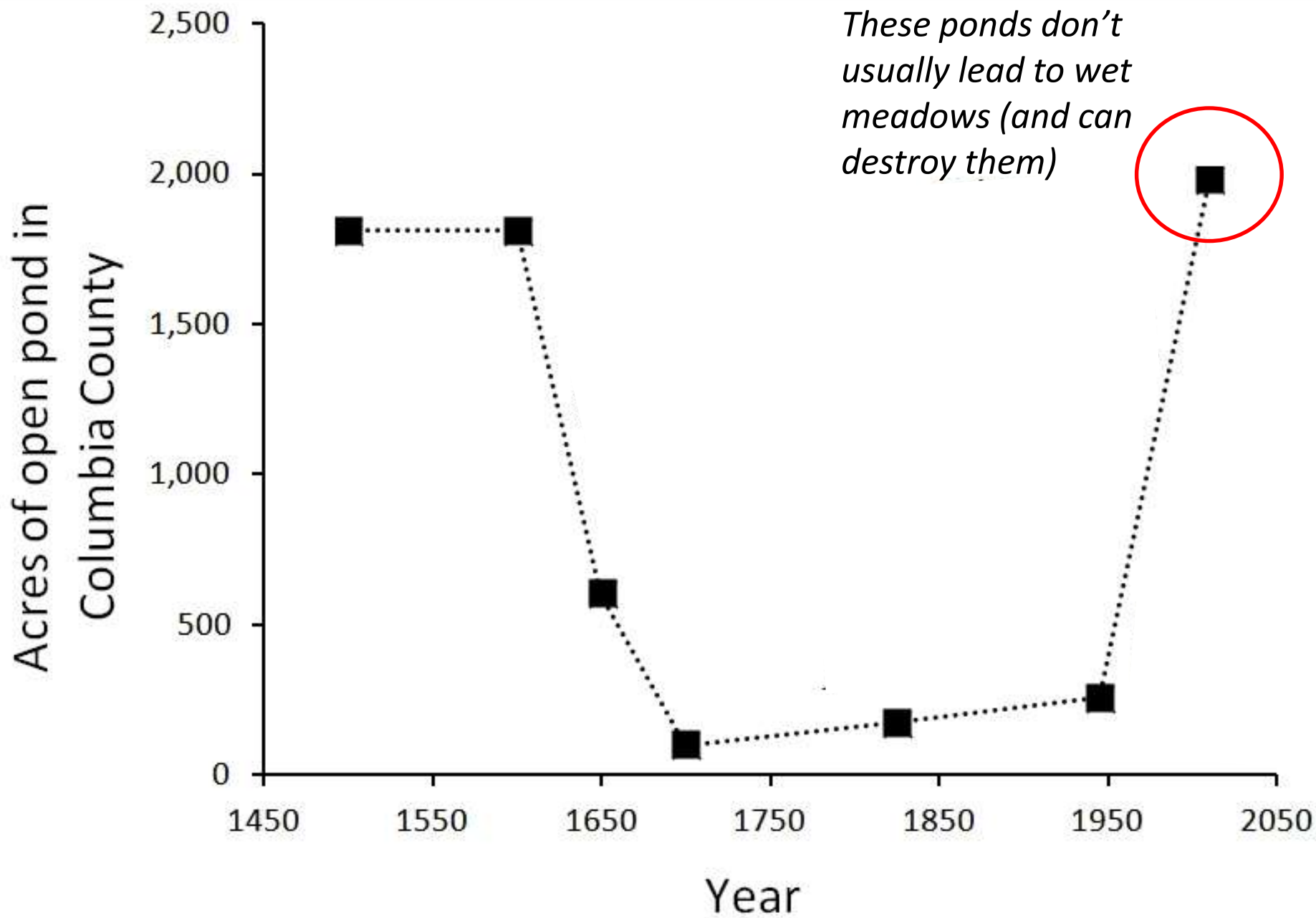


1986
(beaver back)

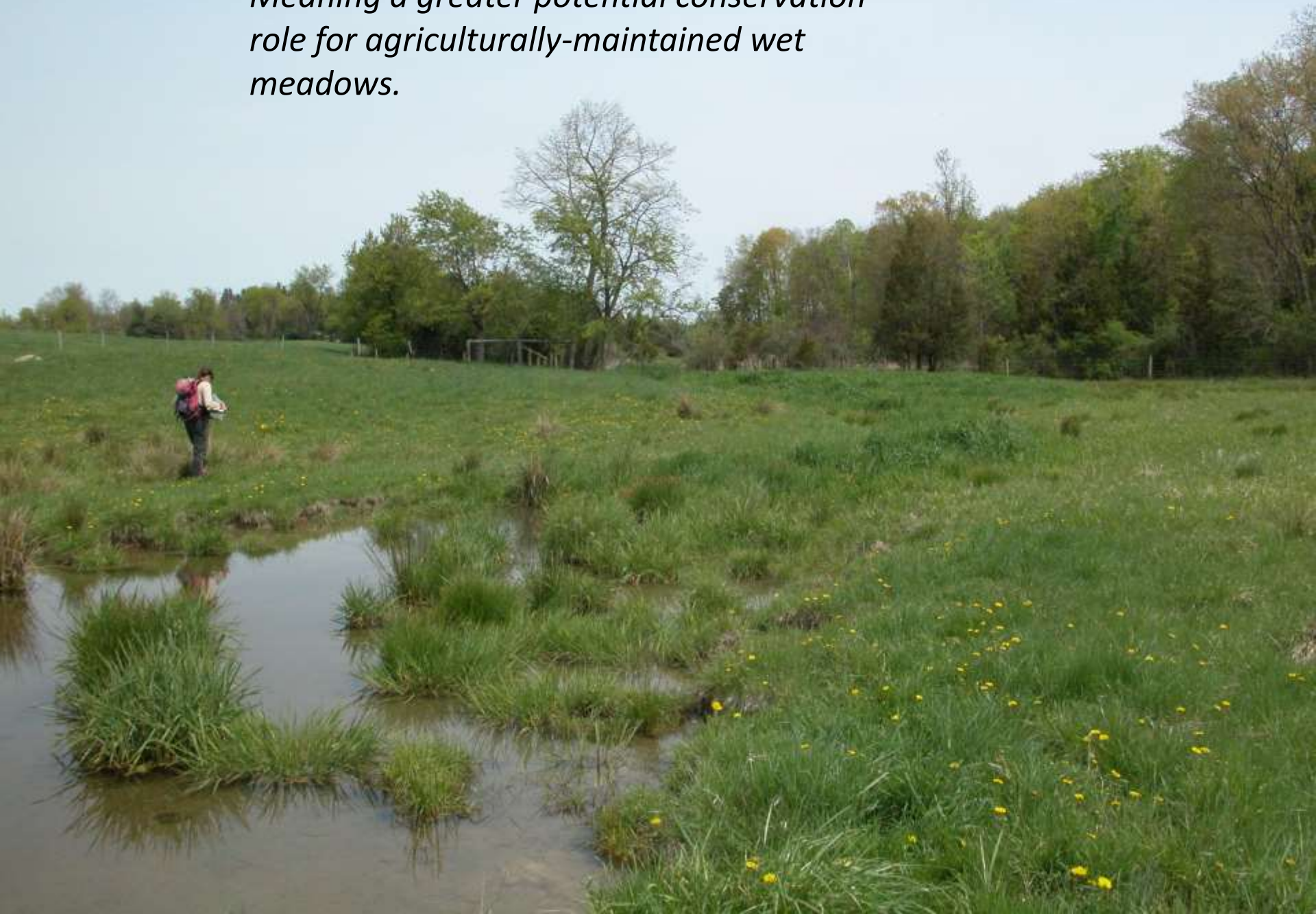
Beaver ponds and their associated wet meadows did and do take up a large area in landscapes where beaver are allowed to thrive.

MN aerial photos from: Naiman, Johnston, & Kelley. 1988. Alteration of North American Streams by Beaver. *Bioscience* 38:753-762.





*Meaning a greater potential conservation
role for agriculturally-maintained wet
meadows.*



An un-grazed wet meadow....
back to swamp forest or
floodplain forest.





Wet Meadows have a high number and high proportion of native plant species compared to other ***on-farm*** habitats

Total Spp. (194) 95 194 158 109 159 31 68 97 45



Examples of uncommon native plants from **wet meadows**



Nodding Lady's
Tresses (*Spiranthes
cernua*)



Swamp Candle (*Lysimachia
terrestris*)



Cardinal Flower (*Lobelia
cardinalis*)



Yellow Stargrass (*Hypoxis
hirsuta*)



Ragged-Fringed Orchid
(*Platanthera lacera*)



Allegheny Monkeyflower
(*Mimulus ringens*)

Examples of native
late summer-
flowering plants
from **wet
meadows**



Bur-marigold (*Bidens cernua*)



New England Aster

(*Symphyotrichum* [=Aster] *novae-angliae*)



Spotted Joe-Pye-Weed (*Eutrochium*
[=*Eupatorium*] *maculatum*)



Common Boneset (*Eupatorium perfoliatum*)

Butterfly host plants of **Wet
Meadows:**
e.g. **Sedges** (*Carex* sp.)



Mulberrywing



Black Dash



Dion Skipper



Hop Sedge (*Carex lupulina*)



Appalachian Brown

Butterfly host plants of **Wet Meadows**:
e.g. **Docks** (*Rumex* sp.)



Bronze Copper caterpillars
feed on docks



Water Dock (*Rumex*
britannica [=orbiculatus])

Butterfly host plants of **Wet Meadows**:
e.g. **Turtlehead** (*Chelone glabra*)



Turtlehead (*Chelone glabra*)



Photo by John
Piwowarski

Baltimore Checkerspot
caterpillars feed on Turtlehead

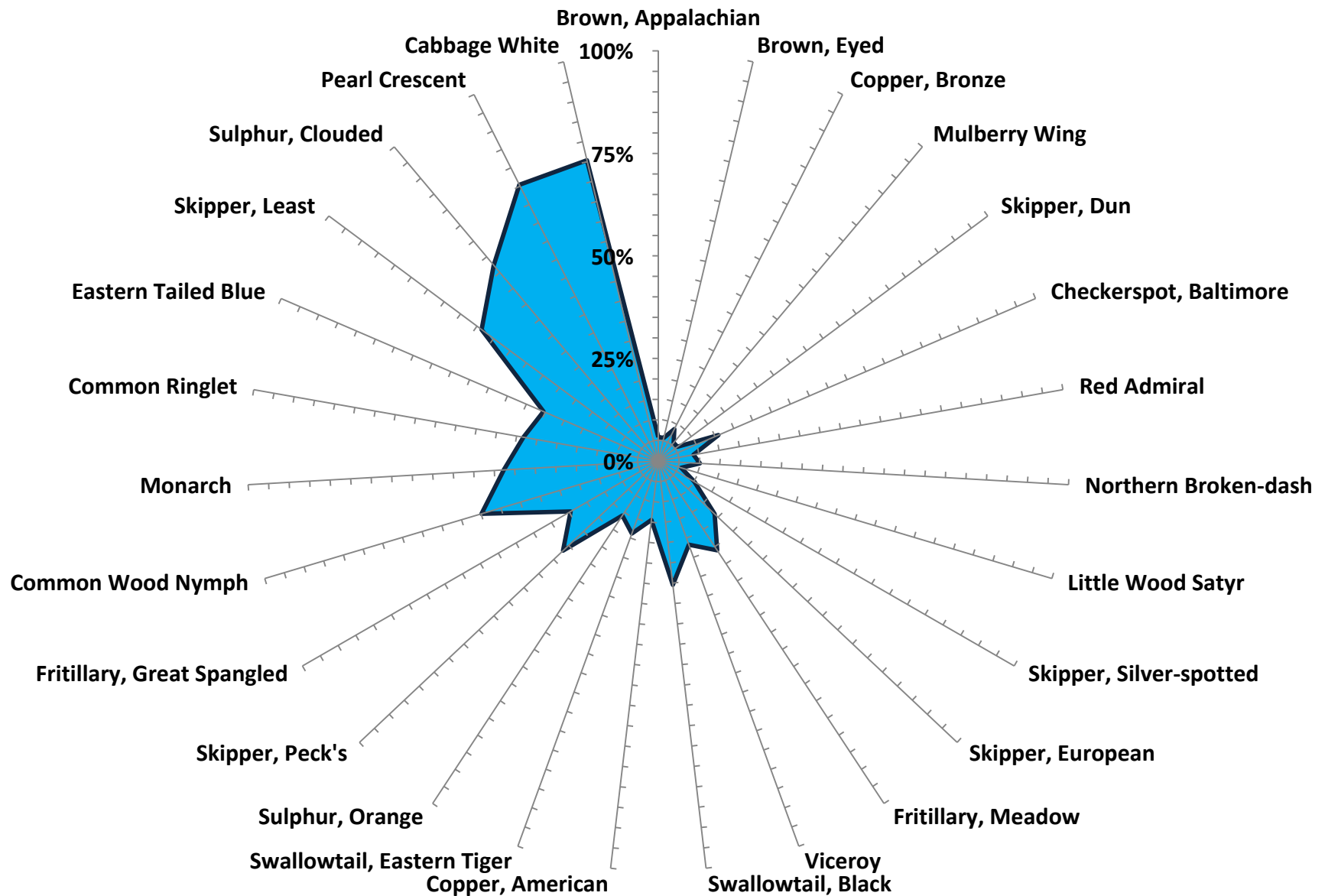
Butterfly host plants of **Wet Meadows**: e.g. **Swamp Milkweed**
(*Asclepias incana*)



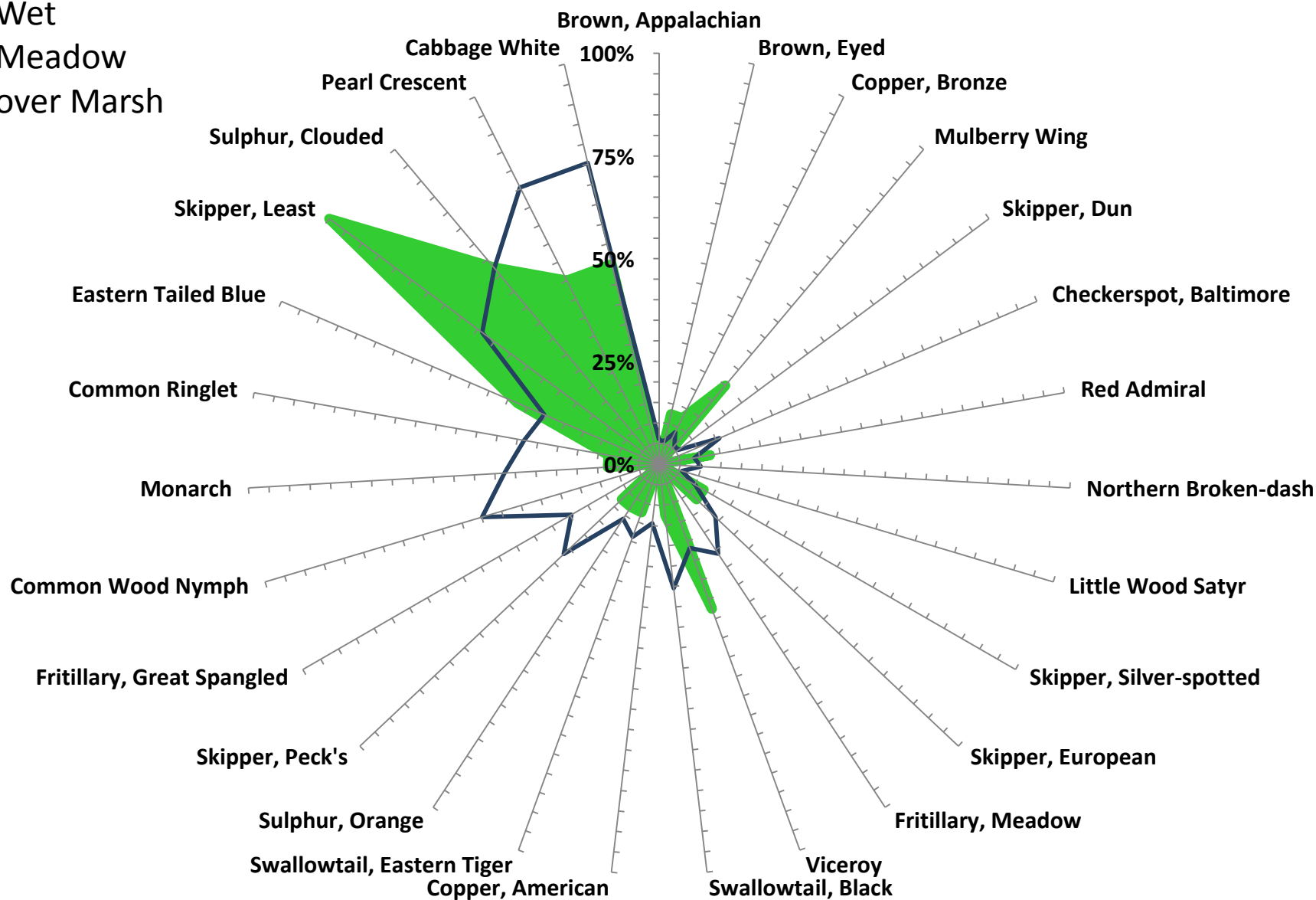
Swamp Milkweed (*Asclepias incana*)

Monarch
caterpillars feed
on milkweeds
(*Asclepias* sp.)

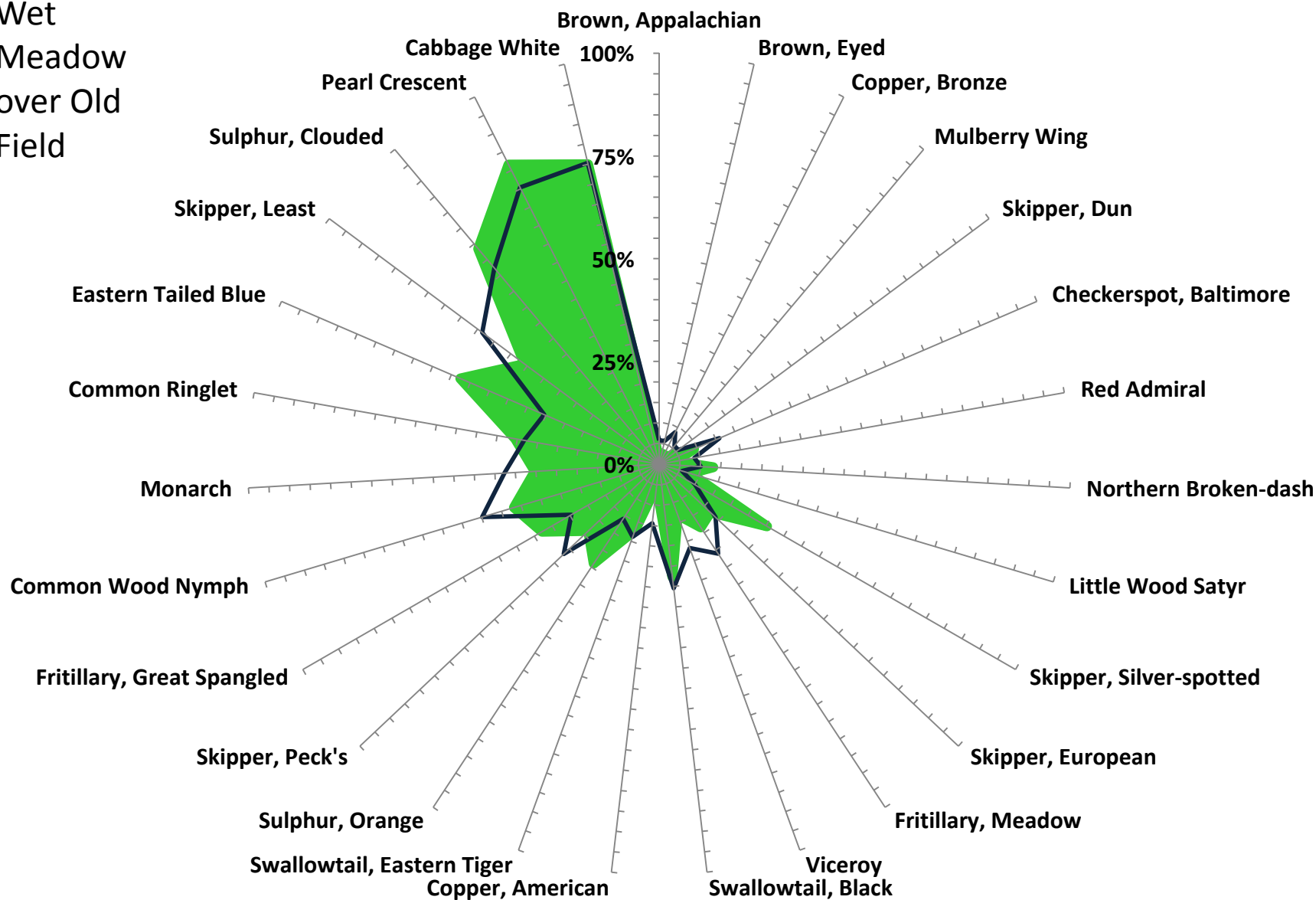
A Rorschach Approximation of a Wet Meadow Butterfly Community



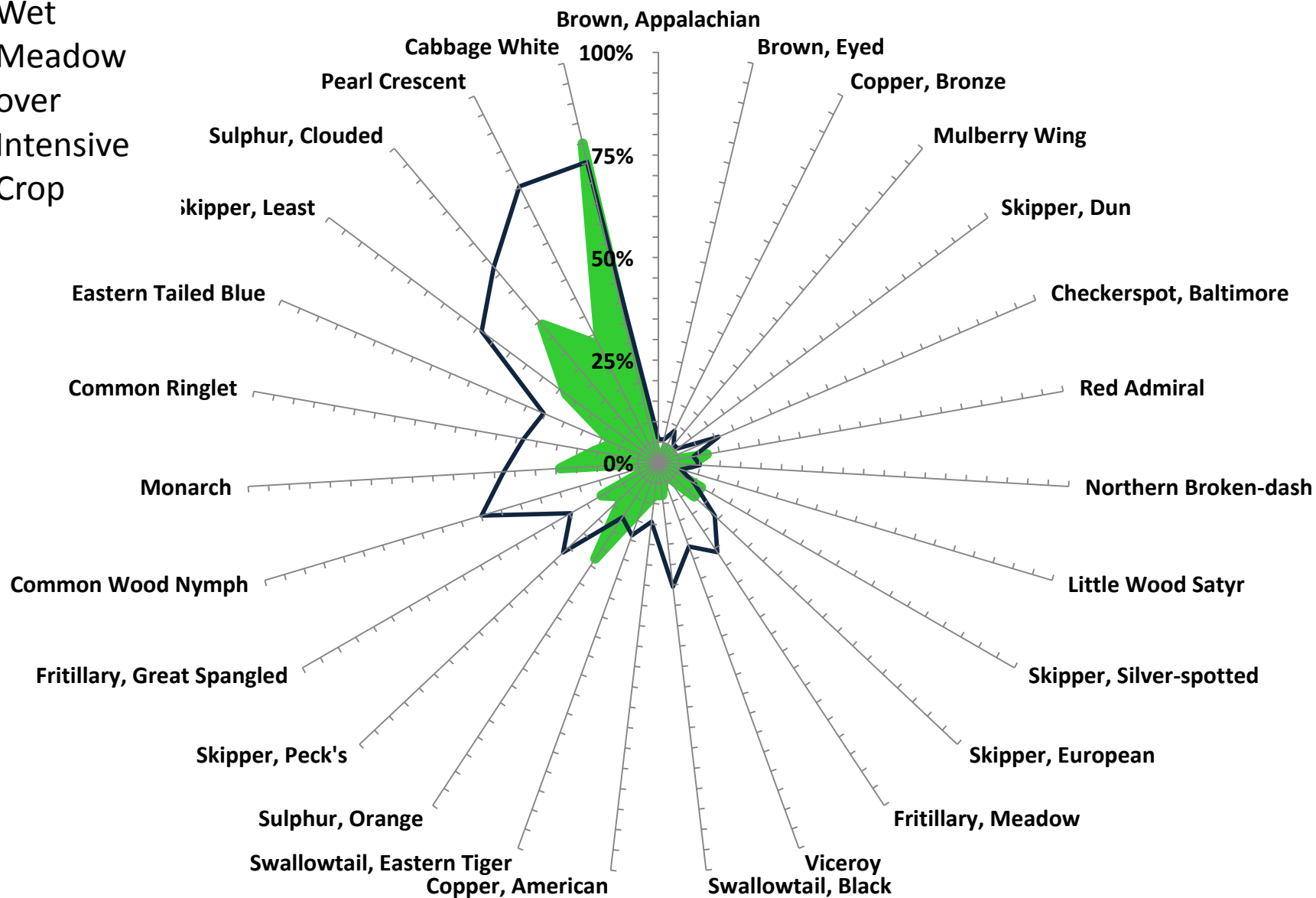
Wet Meadow over Marsh



Wet Meadow over Old Field



Wet
Meadow
over
Intensive
Crop



Wet Meadows: Amphibians and reptiles of conservation interest



Ribbon snake



Leopard frog



Spotted turtle

Wet Meadows as Landscaping



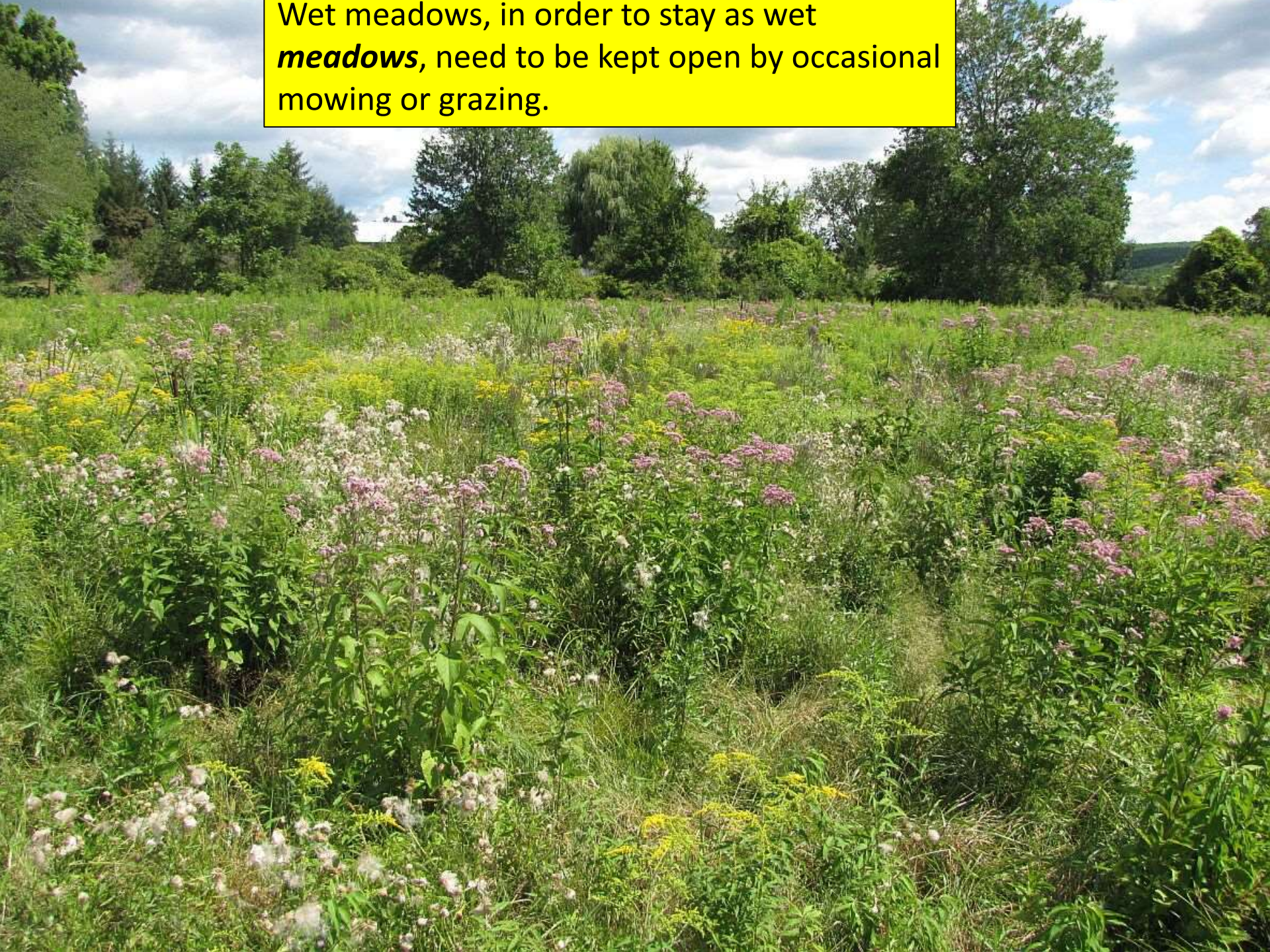
Large scale enrichment of a wet meadow with native wetland plants...



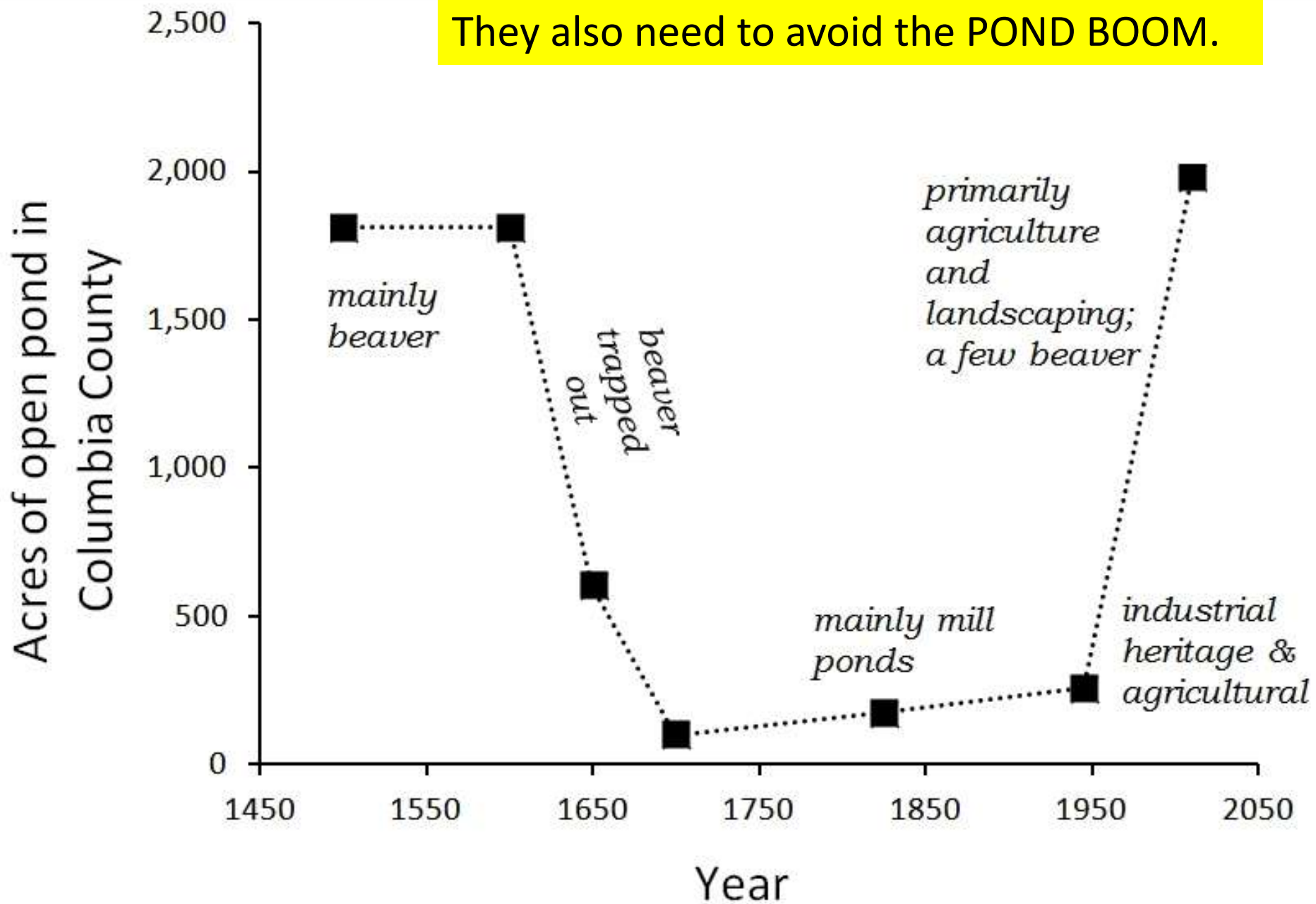
... smaller scale
creation of a
rain garden
“from scratch”,
assembling the
native plant
community of a
wet meadow ...



Wet meadows, in order to stay as wet
meadows, need to be kept open by occasional
mowing or grazing.



They also need to avoid the POND BOOM.



Where are ponds being dug & which habitats are they replacing?



2011



2015

Wet
Meadow

Construction Context

% of 84 ponds

Replaced Wetlands	23
Empounded Streams	20
Created in Upland	36
Unknown	21

UPLANDS

ROCKY OUTCROPS

Gravel Pit and Quarry
Wooded Outcrops

WOODED UPLANDS

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Tidal Mudflat
Tidal Shrub Swamp
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WOODED WETLAND (non-tidal)

Floodplain Forest

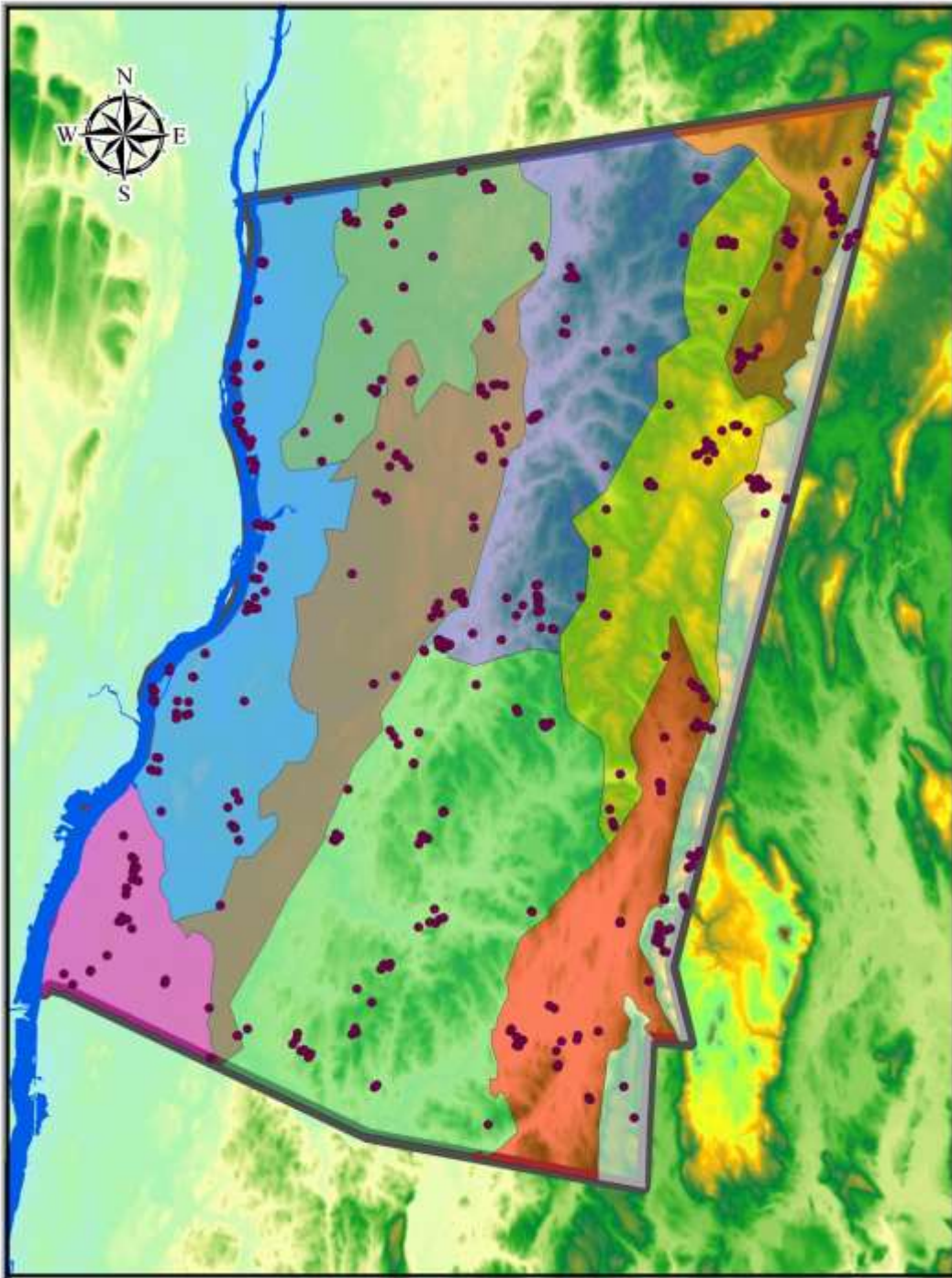
Swamp Forest
Wooded Seep
Intermittent Woodland Pool
Headwater Stream

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Shrub Swamp
Marsh
Wet Meadow
Bog
Calcareous Fen
Circumneutral Bog Lake
Beaver Pond
Constructed Pond

WETLANDS

We hope this gives you a little feel for the 'color' behind this 'dry' table...



and for the plants and animals we came across while trying to describe this County.

How much of it seems familiar to you?