Prairie Restoration 101

Chris Schad

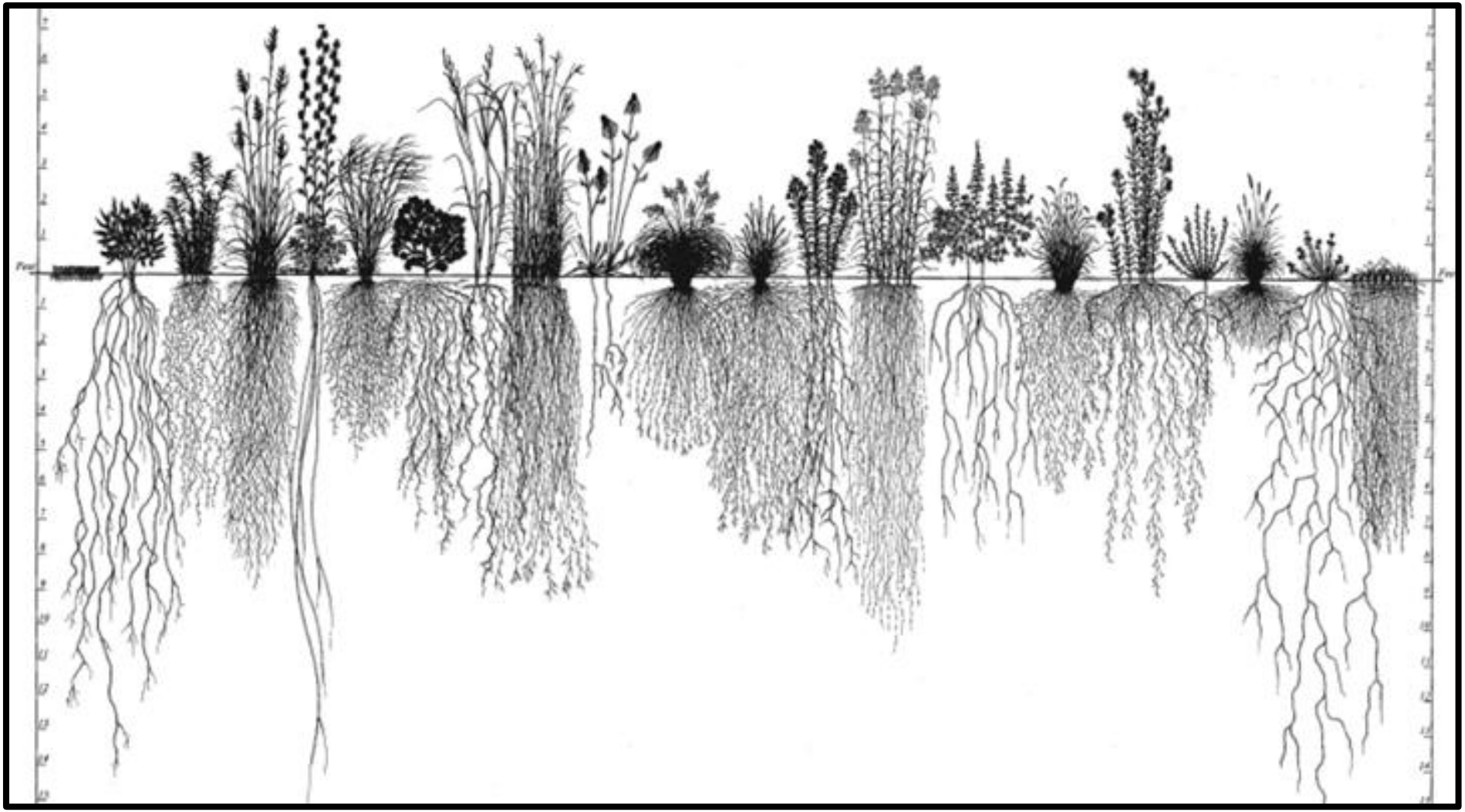
Prairie Restoration

- Natural history
- Prairies then
- Prairies now
- Why restoration
- How to restore
- Our story

What is Prairie

- “Grassy orchard or park with scattered trees”
- Grasses – tall and short grass
- Forbs – wildflowers and legumes
- Woody trees and shrubs
- Characterized by
  - Diversity
  - Deep roots

Going Deep



Natural History

- Parent geologic material of most prairie soil picked up during last glacial advance ~ 110,000 years ago.
- As the glaciers retreated about 10,000 years ago, it deposited this material in the form of till.
- Wind based loess deposits an important parent material for prairie soils.

What is prairie (cont.)

- Pre-settlement, some estimate topsoil accumulated ~1 inch per 100 years
- Shaped by
  - Fire
  - Ruminants
  - Underground dwellers
  - Rain

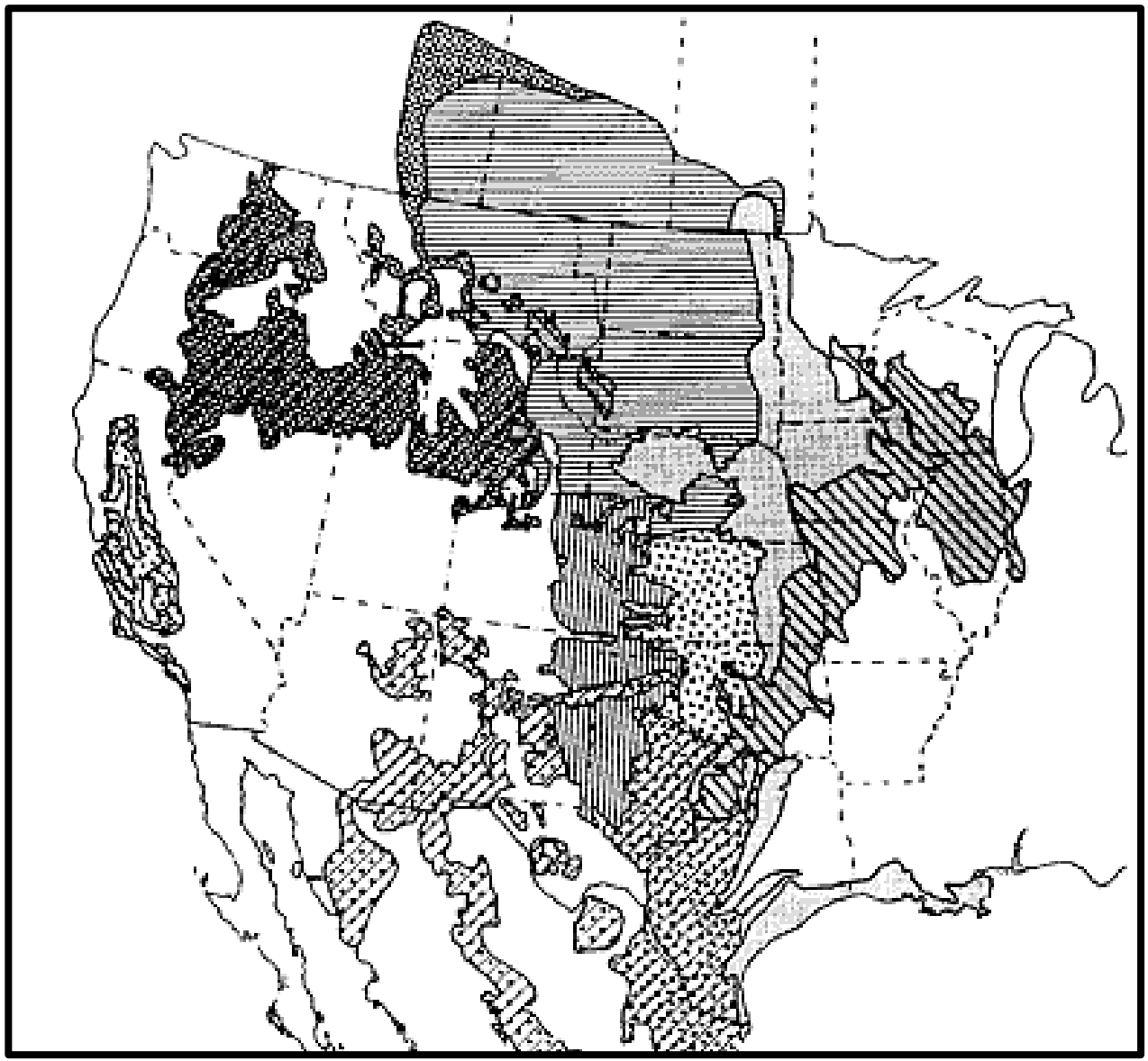
The Impact of Rain

- Upwelling of the Rocky Mountains created a rain shadow that killed most trees
- Near Rockies: short grass prairie, 16in annual rainfall, grasses and forbs > 3ft tall
- Central Kansas: mixed grass prairie, 24in annual rainfall
- St. Louis: tall grass prairie, 30in annual rainfall, grasses and forbs <12ft tall

Where were the prairies

- Most or all of the states of North Dakota, South Dakota, Nebraska, Kansas, and Oklahoma.
- Sizable parts of the states of Montana, Wyoming, Colorado, New Mexico, Texas, Missouri, Iowa, Illinois, Indiana, Wisconsin, and western and southern Minnesota.
- The Central Valley of California.
- Vast areas of Manitoba, Saskatchewan, and Alberta

What prairies were (cont.)



"*I reached some plains so vast, that I did not find their limit anywhere I went, although I traveled over them for more than 300 leagues . . . with no more land marks than if we had been swallowed up by the sea . . . . there was not a stone, nor bit of rising ground, nor a tree, nor a shrub, nor anything to go by.*"

- 1541 Letter from Francisco Vázquez de Coronado to the king of Spain, on what became eastern New Mexico and northwest Texas

"I can sit on the porch before my door and see miles of the most beautiful prairie interwoven with groves of timber, surpassing, in my mind, the beauties of the sea. Think of seeing a tract of land on a slight incline covered with flowers and rich meadow grass for 20 miles"

- 1849, John Brooke, an early settler in the tallgrass prairies of Texas

"To the traveler, who for several days traverses these prairies and barrens, their appearance is quite uninviting and even disagreeable. He may travel from morning to night and make good speed, but on looking around him fancies himself at the very spot he started."

– 1818, C. Atwater, western Ohio prairie

What prairies are today

- Just 1% of original remains today
  - Texas: was 20m acres, now <200,000
  - Illinois: was 35,000 square miles, now 3 square miles of the original exists
- Small scale restoration
- Barriers to restoration
  - Cost
  - Value as cropland
  - Indifference
  - Ignorance

Why restoration

- Drought, disease resistance via diversity
- Fix and release nitrogen
- Conserve topsoil
- Protect water quality
- Pollinator support:
  - Provide habitat
  - Pollen/nectar diversity
- Biodiversity

Biodiversity

Prairie supports a broad swath of insects which in turn provide a base in the food chain for larger fauna.

Use of Landscape Plants by Native Butterfly and Moth Caterpillars

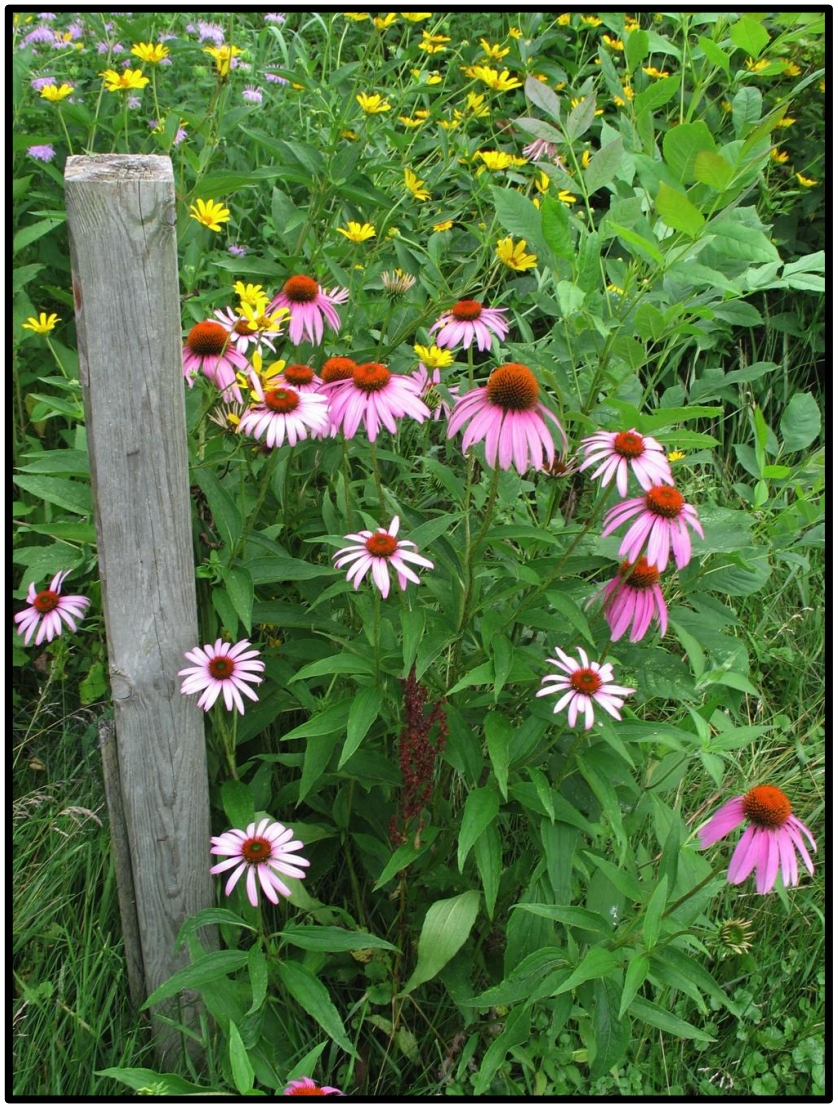
EXOTIC PLANTS	NUMBER OF LEPIDOPTERA SPECIES	NATIVE PLANTS	NUMBER OF LEPIDOPTERA SPECIES
PRIVET	19	OAKS	518
CANNA LILIES	8	CHERRIES/PLUMS	429
ZINNIAS	6	HICKORIES/PECANS	233
PEONIES	3	HAWTHORNS	150
MARIGOLDS	3	DOGWOODS	115
PETUNIAS	3	GOLDENRODS	112
COTONEASTER	2	ASTERS	105
BOXWOOD	1	VIBURNUMS	97
FORSYTHIA	1	SUNFLOWERS	73
GOLDEN RAINTREE	1	SUMACS	54
BUTTERFLY BUSH	1	NEW JERSEY TEA	43
DAY LILIES	0	VIOLETS	27
HOSTAS	0	BUTTONBUSH	19
LILYTURF (MONKEY GRASS)	0	PRIMROSE	16
		RUDBECKIAS	16

USED WITH PERMISSION FROM D. TALLAMY

Dr. Doug Tallamy and K. HJ. Shropshire.

How to restore

- Site selection
- Site preparation
- Seed selection
- Seeding
- Maintenance



Site Selection

- Consider soil type
  - Clay, Sand
- Consider sun exposure
  - Full, Partial, Minimal
- Consider soil moisture
  - Dry, Mesic, Wet Mesic, Wet
- Expect a spectrum of these across your site and plan accordingly

Site Preparation

- Clear out the legacy vegetation
  - Fire
  - Chemical*
  - Mechanical – chop or till
- Seeds will persist – so must you

* If your development plan includes chemical treatments

Seed Selection

- Determine your goals – soil stabilization, pollinator support, aesthetics, etc.
- Align these goals with soil type, sun exposure, and soil moisture to select your seed mix.

Seeding

- Fall/Winter: Good for forbs requiring cold stratification (can ‘force’ stratification before seeding)
- Spring – good for grasses, not for some forbs
- Mechanical seeding – drill planter
- Manual seeding - Mix with filler and distribute by hand
- Consider a cover crop

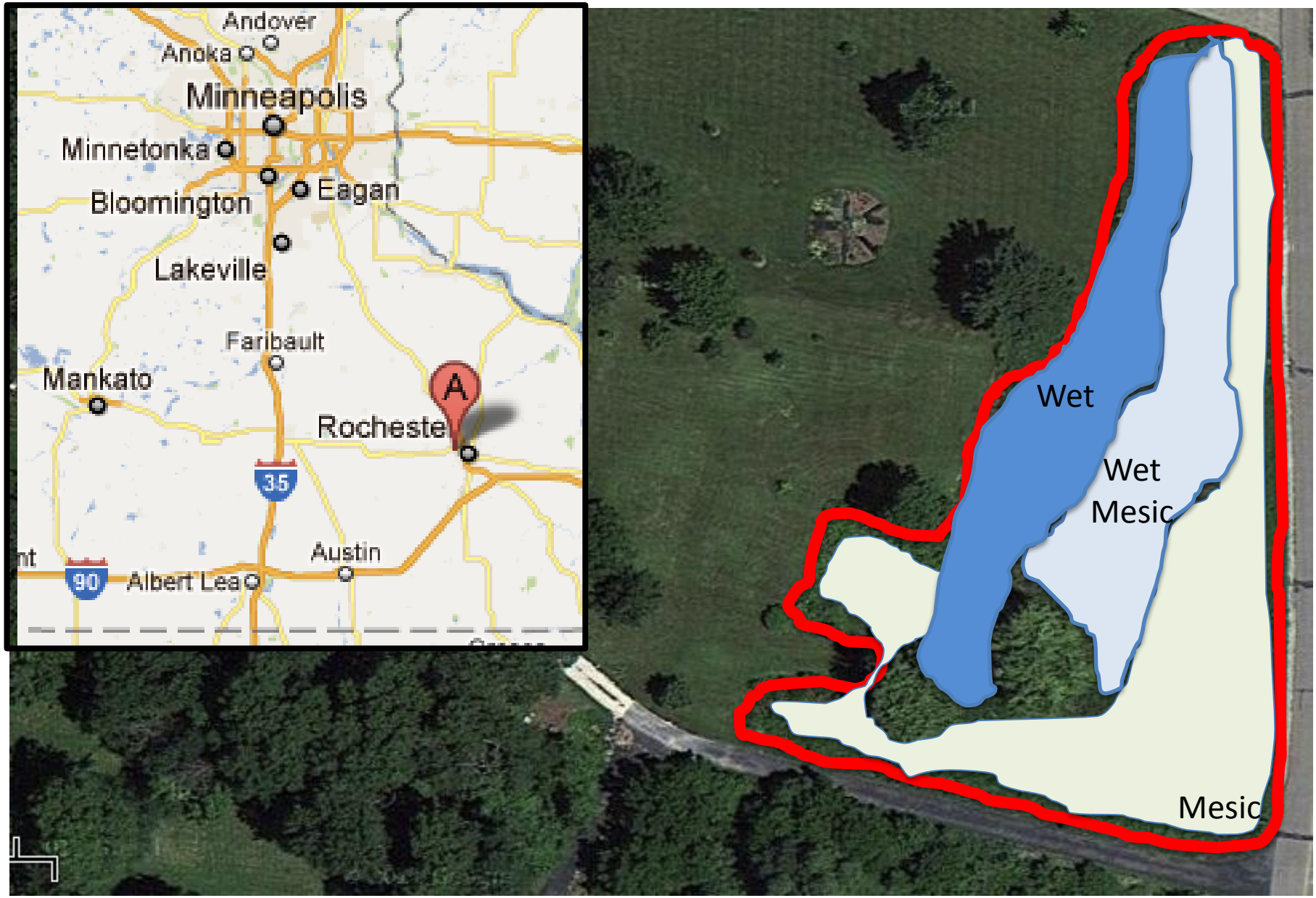
Maintenance

- Early years
  - Year 1: Mow to 8” if feasible
  - Avoid uprooting undesirables
  - Shear undesirables
  - Spot treat with herbicide* – with care
- Out years
  - Low Maintenance, not No Maintenance
  - Uproot or sheer invasives
  - Periodic re-seeding with new species to add variety
  - Periodic spring burns

* If your development plan includes chemical treatments

Our Story

- Property: About 1/2 acre of a 3 acre lot just west of Rochester, MN
- Replaced thistle, ragweed, wild parsnip with native grasses and forbs
- Attract pollinators
- Restore landscape to native state
- Improve aesthetics
- Site preparation in ’06 & ‘07, seeded Nov ‘07


Andover
Anoka
Minneapolis
Minnetonka
Bloomington
Eagan
Lakeville
Faribault
Mankato
A
Rochester
35
Austin
90
Albert Lea
Wet
Wet
Mesic
Mesic

Site Preparation

Burn in spring ‘06

Treat w chemicals in ‘06 & ‘07

Seed Selection and Seeding

- Full sun
- Clay soil
- Mesic/wet mesic/wet

- 60:40 forbs:grass
- Hand broadcast
- Late fall 2007
- Oats cover crop

Year 1 – Hope Deferred

- Mowing preferable but not possible due to terrain
- Sheared undesirables – did not uproot them (may accidentally uproot desired plants)
- Virtually none of the seeded plants evident in Year 1

Year 2 – Hope Rises

- Early adaptors proliferate
- Undesirables persist

Year 4 – Hope Realized

Current State (Year 5)

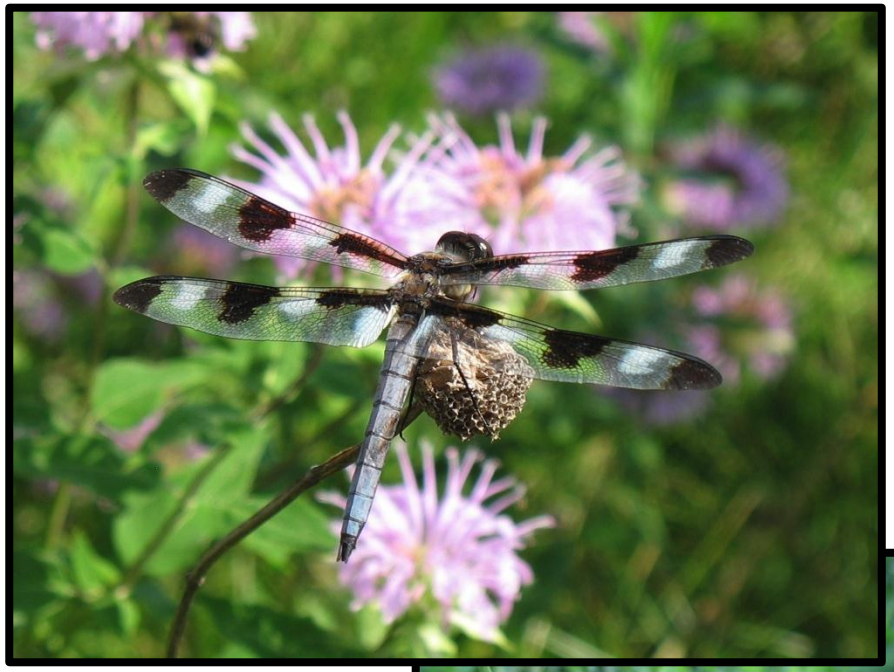
45+ species established

Forbs blooming from April to November.

Favorites of Pollinators – our land

- Yellow and Purple Coneflower
- St. Johns Wort*
- Bergamot*
- Lobelia
- Blazing Star*
- Compass Plant
- Ironweed*
- Joe Pye Weed*
- Prairie Phlox*
- Cup plant*
- Giant Hyssop*
- New England Aster*
- Beardtongue*
- Goldenrod*
- Brown- and Black-eyed Susan
- Swamp Milkweed
- Wild rose*
- Wild cucumber*

Images from our Prairie

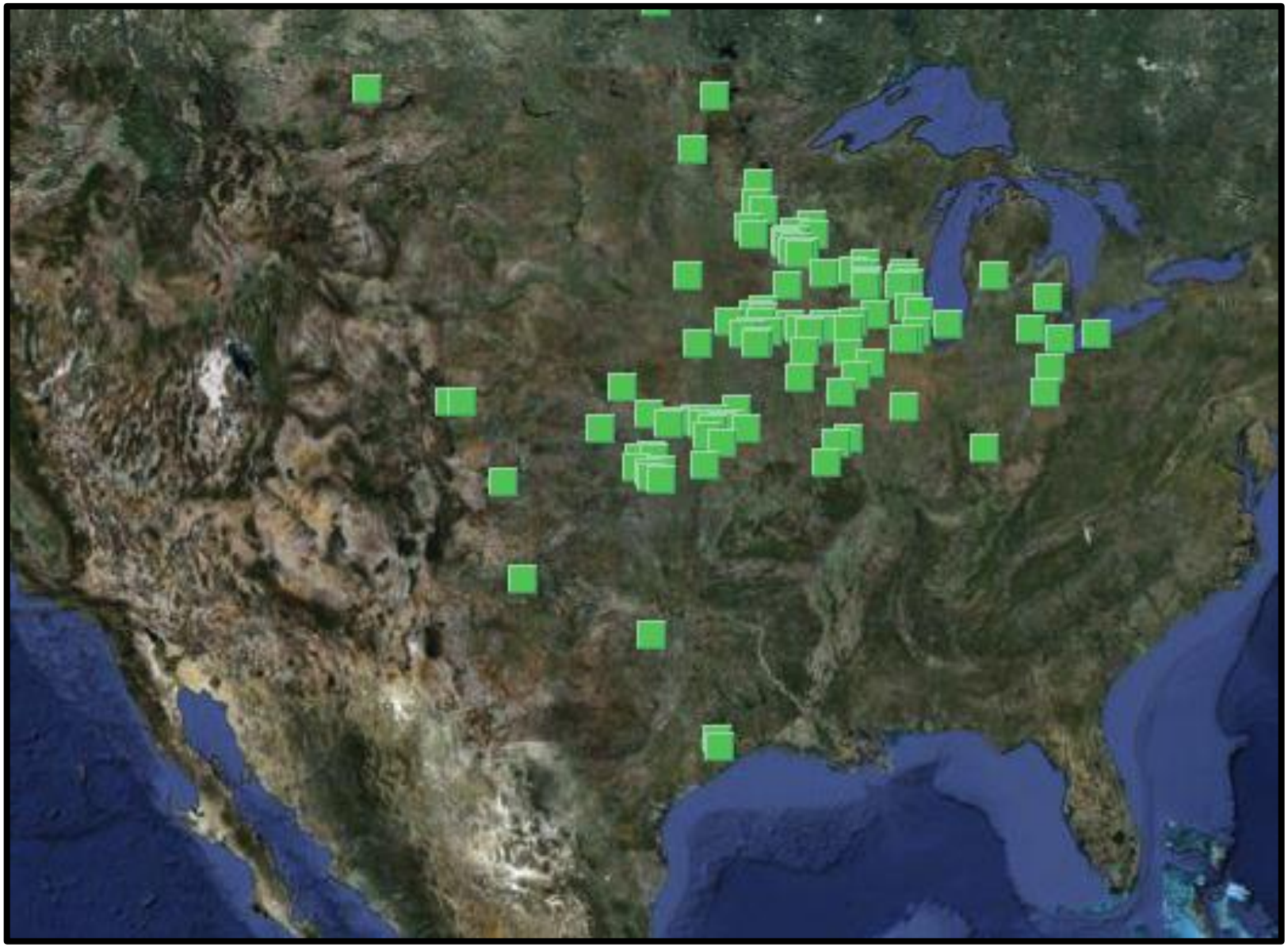


Resources

- Organizations
  - The Prairie Enthusiasts (www.theprairieenthusiasts.com)
  - Minnesota Wildflowers (www.minnesotawildflowers.info)
  - The Prairie Map (http://prairiemap.com/)
- Businesses
  - List from the Zumbro Valley Audubon Society: www.zumbrovalleyaudubon.org/prairie.html

Insert URL for the Prairie Map

Fill this map…



One site at a time

Thank you