

Native Plant Basics

Connecting to a Sense of Place in Kansas

January 2019

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Education/Concert Series Coordinator

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www.dyckarboretum.org



Session Outline

**Why Native
Plants?**

Native Plant
Adaptive Traits

Native Plant
ID / Families



Geraniums



Impatiens



Marigolds



Petunias



Pansies



Geraniums



Impatiens



Marigolds



Petunias



Pansies



Great Plains Prairie



Great Plains Prairie

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Great Plains Prairie

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I) Connection to Natural History and Sense of Place

- Hydrology
- Geology
- Climate
- Botany
- Biology
- Ecology





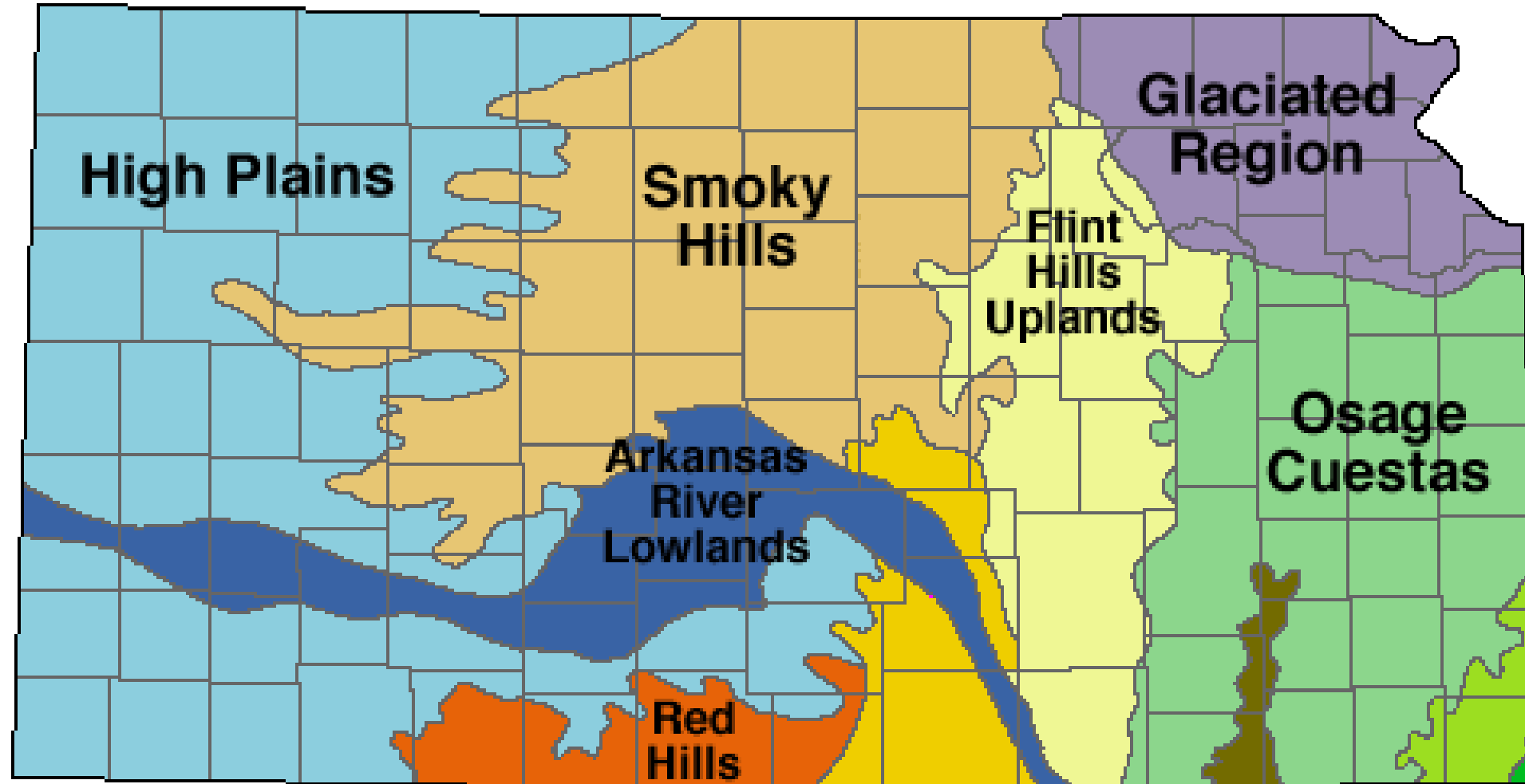
OCEANS OF KANSAS

A Natural History of the Western Interior Sea

MICHAEL J. EVERHART



Generalized Physiographic Map of Kansas

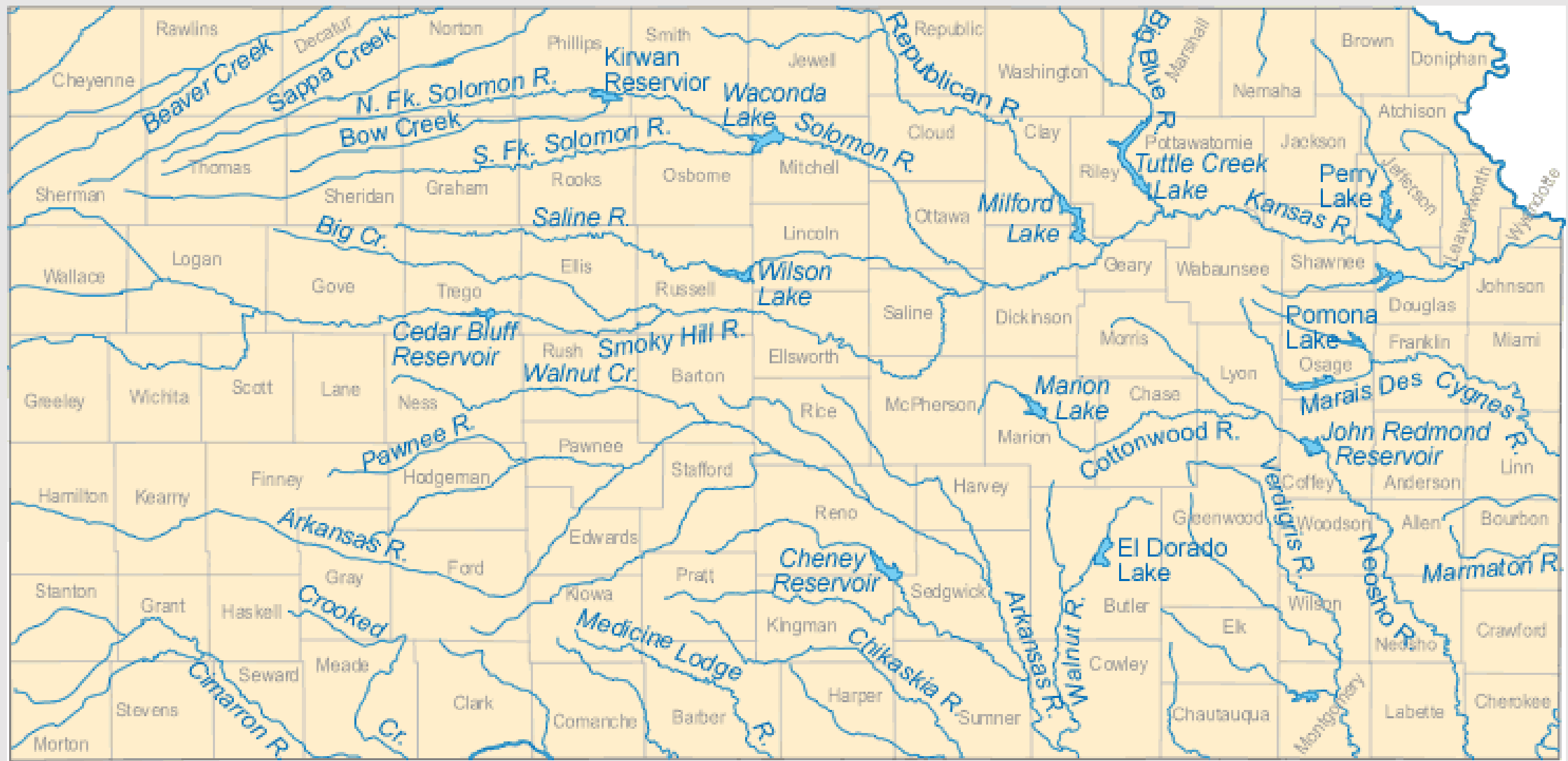


Wellington-McPherson
Lowlands

Chautauqua
Hills

Cherokee
Lowlands

Ozark
Plateau



0 100 KM 100 Miles

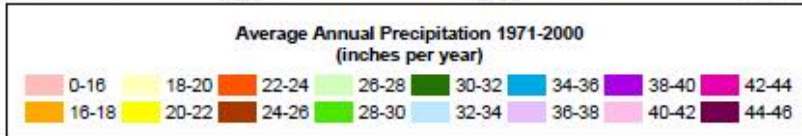
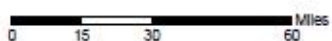
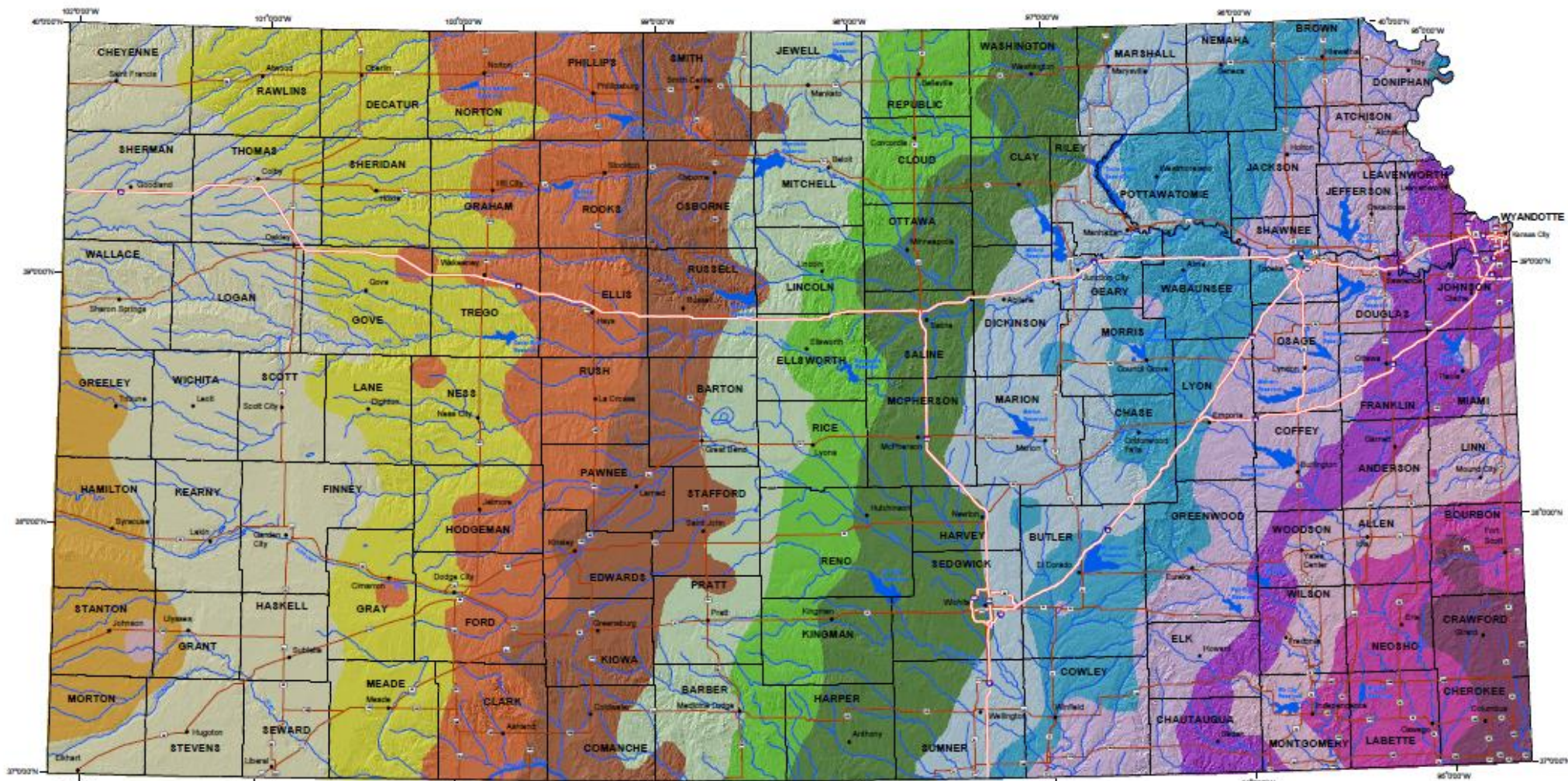
Ogallala Aquifer







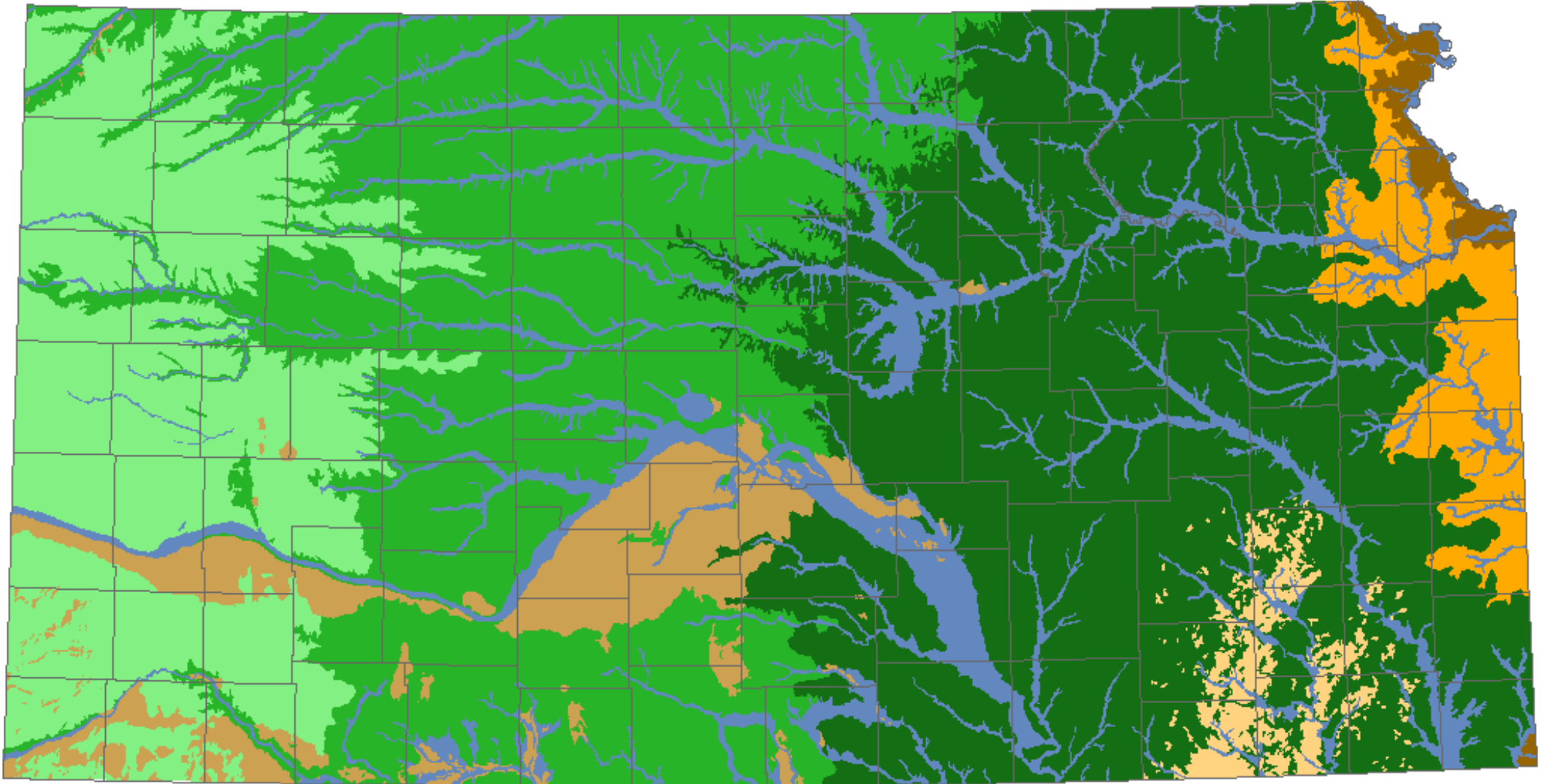
KANSAS ANNUAL PRECIPITATION











Data Source: NOAA Cooperative Station Network (1971-2000) County Interpolation, NCRS, NRCS, Station Network, and equipment data provided by regional weather climatologists and regional weather Digital Elevation Model. The Digital Elevation Model is derived from the 3D water feature Digital Elevation Dataset. October 18, 2007. Resource Conservation Staff, Belle, KS

Küchler's Map of The Potential Vegetation of Kansas - Generalized

Courtesy University of Kansas Applied Remote Sensing (KARS) Program



- | | | | |
|---|---|---|--|
|  Floodplain Vegetation |  Mixed Prairie |  Sand and Sandsage Prairie |  Cross Timbers |
|  Shortgrass Prairie |  Tallgrass Prairie |  Oak-Hickory Forest |  Mixed Tallgrass/Oak-Hickory Forest |

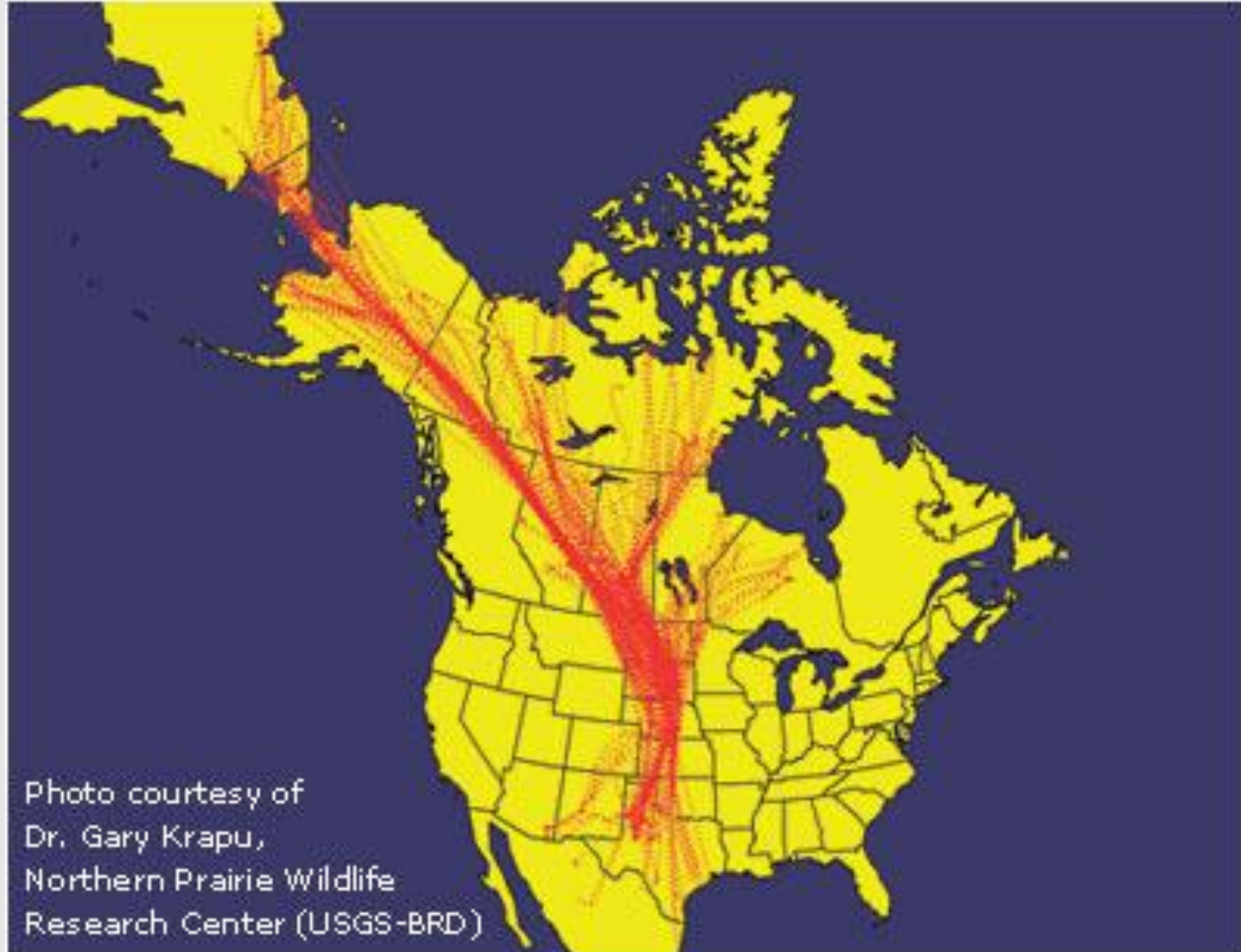


Photo courtesy of
Dr. Gary Krapu,
Northern Prairie Wildlife
Research Center (USGS-BRD)



Connections in a tallgrass prairie food web

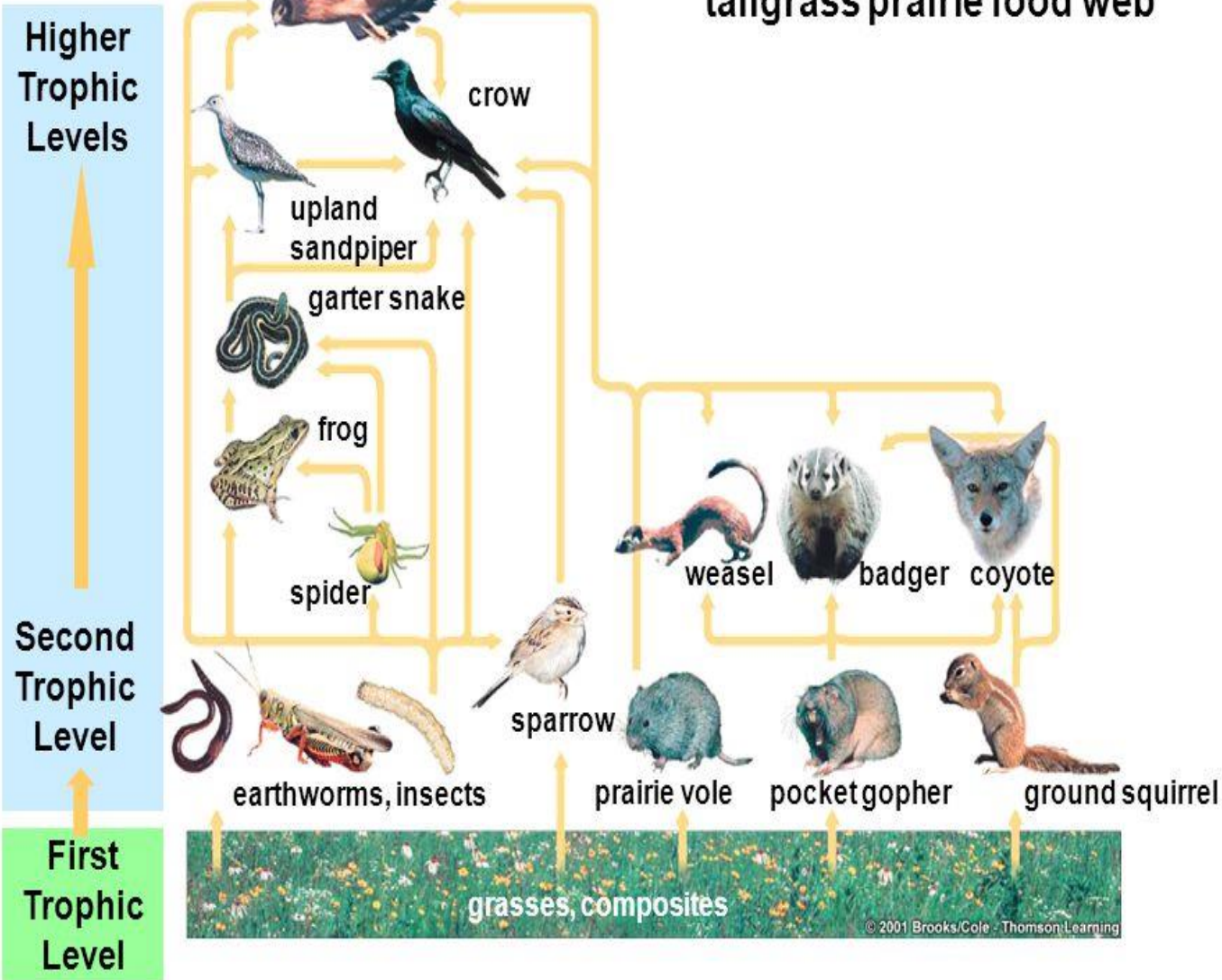


Fig. 30-4, p.529



Great Plains Prairie

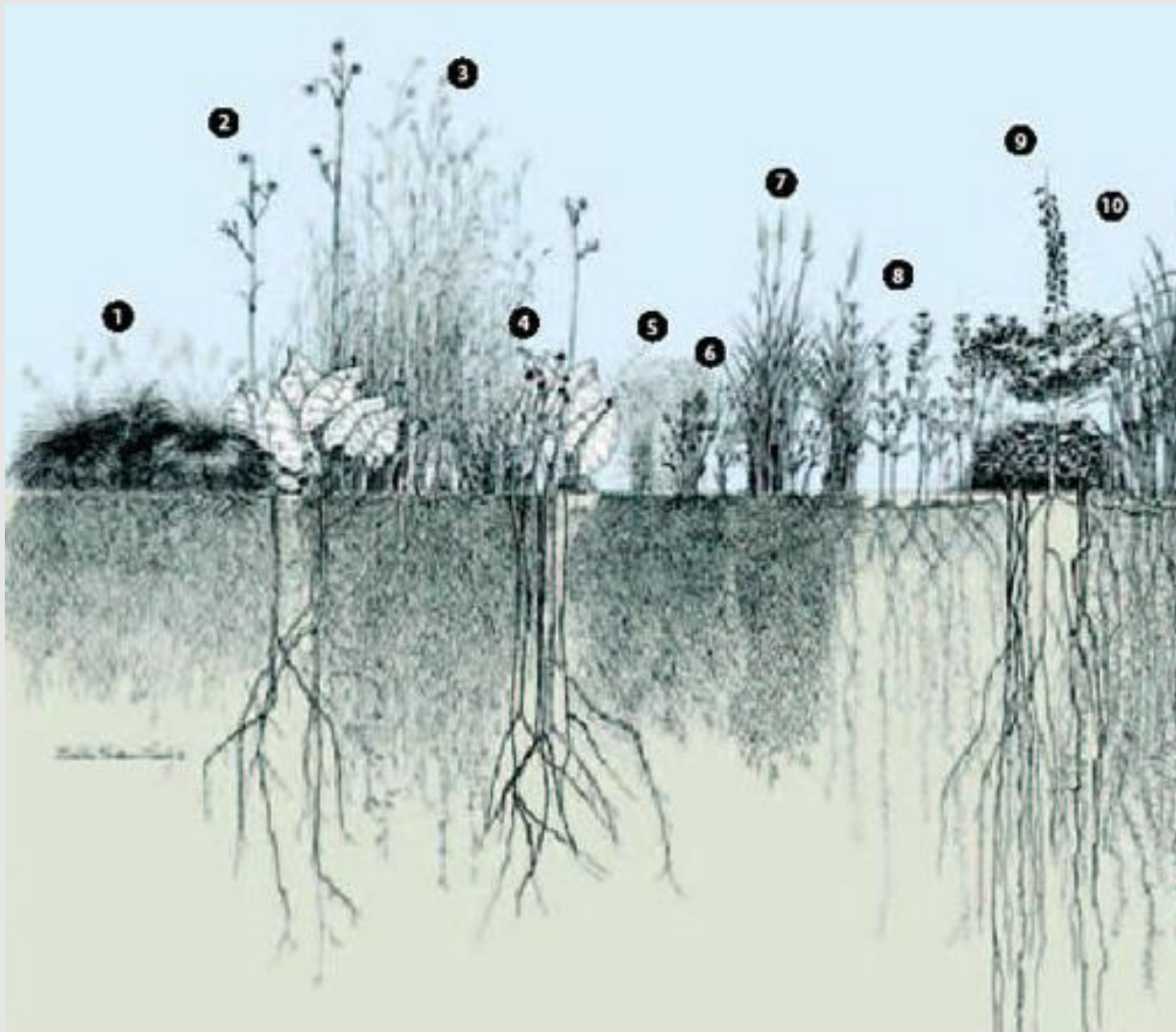
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1) Connection
to Natural
History and
Sense of
Place

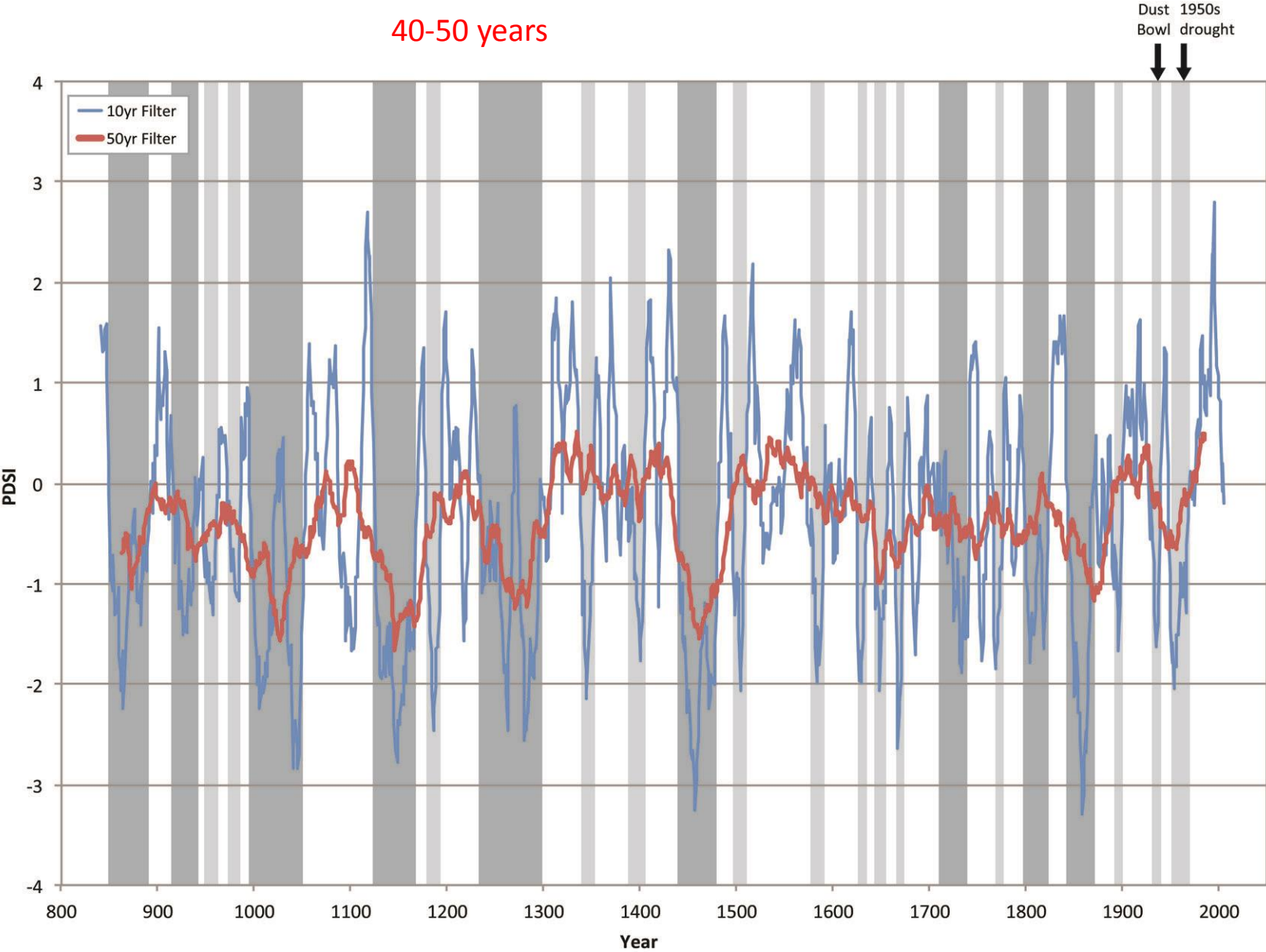
2) Climate-
adapted
Drought-
tolerant Plants

NO SOIL AMENDMENTS OR CHEMICALS NEEDED





Drought duration – SW Kansas





Great Plains Prairie

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1) Connection
to Natural
History and
Sense of
Place

2) Climate-
adapted
Drought-
tolerant Plants

3) Year-round
Visual
Interest

- a. *Baptisia australis* var. *major* blue false indigo
- b. *Callirhoe involucrata* purple poppy mallow
- c. *Clematis fremontii* Fremont's clematis
- d. *Geum triflorum* prairie smoke
- e. *Koeleria cristata* Junegrass
- f. *Oenothera macrocarpa* Missouri evening primrose
- g. *Penstemon cobaea* penstemon cobaea
- h. *Penstemon digitalis* foxglove beardtongue
- i. *Pulsatilla patens* pasque flower
- j. *Tradescantia tharpia* spiderwort
- k. *Verbena canadensis* rose verbena
- l. *Amsonia tabernaemontana* blue star
- m. *Aquilegia canadensis* columbine
- n. *Heuchera richardsonii* coral bells
- o. *Senecio plattensis* golden ragwort
- p. *Zizia aurea* golden alexander







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PLANT SELECTION

SPRING BLOOMING



Ohio spiderwort
(*Tradescatia ohioensis*)



Blue stars (*Amsonia* sp.)



Smooth Penstemon
(*Penstemon digitalis*)



SUMMER BLOOMING



Pale Purple coneflower
(*Echinacea pallida*)



Missouri black-eyed susan
(*Rudbeckia missouriensis*)



Button blazing star
(*Liatris aspera*)



Purple prairie clover
(*Dalea purpurea*)

FALL BLOOMING



Prairie Dropseed
(*Sporobolus heterolepis*)



Indian grass
(*Sorghastrum nutans*)



Aromatic aster (*Aster oblongifolius* 'October Skies')



Blue Sage
(*Salvia azurea*)

Rattlesnake Master
(*Eryngium yuccafolium*)







Great Plains Prairie

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1) Connection
to Natural
History and
Sense of
Place

2) Climate-
adapted
Drought-
tolerant Plants

3) Year-round
Visual
Interest

4) Attracting
Wildlife

Host Plants for Caterpillars



Attract Pollinators with Nectar




Attract Insect Predators



"If you have a backyard, this book is for you."

—Richard Louv, author of *Last Child in the Woods*

Bringing Nature Home



UPDATED AND EXPANDED

**How You Can
Sustain Wildlife
with Native Plants**

Douglas W. Tallamy

With a Foreword by Rick Darke



A Carolina chickadee carries a caterpillar to feed its nestlings. Ninety-six percent of terrestrial birds rear their young on insects, and caterpillars are a particularly important food source. Photo by Doug Tallamy.

During the breeding season, Carolina chickadees and other birds need *a lot* of insects—in the case of chickadees, more than 5,000 per clutch of hatchlings. Contrary to popular belief, “most birds do not reproduce on berries and seeds,” explains [Doug Tallamy](#), an entomologist at the University of Delaware and one of Narango’s advisors. **“Ninety-six percent of terrestrial birds rear their young on insects.”**

Because native insects did not evolve with nonnative plants, most of them lack the ability to overcome the plants’ chemical defenses so cannot eat them. Caterpillars, a particularly important food source for birds, are especially picky about what they feed on. Like the famous monarch butterfly larva, which must have milkweed to survive, **more than 90 percent of moth and butterfly caterpillars eat only particular native plants or groups of plants.**

Seeds Attract Seed-eaters...



... and so on...



Cooper's hawk



Sharp-shinned hawk



Eastern screech owl



Great Plains Prairie

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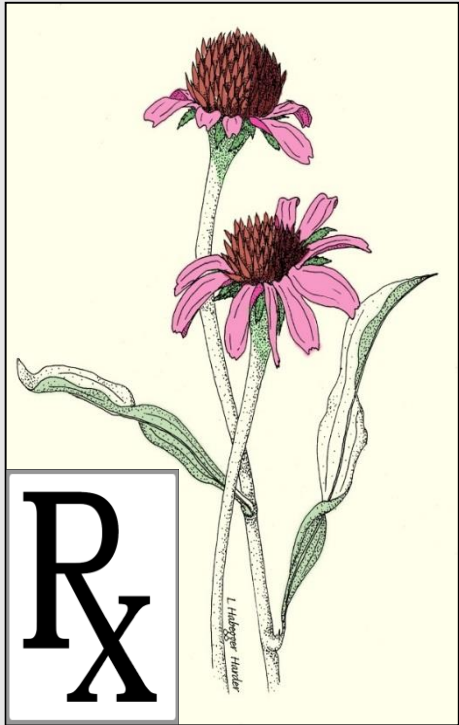
1) Connection to Natural History and Sense of Place

2) Climate-adapted Drought-tolerant Plants

3) Year-round Visual Interest

4) Attracting Wildlife

5) Connecting to Cultural History and Sense of Place







Session Outline

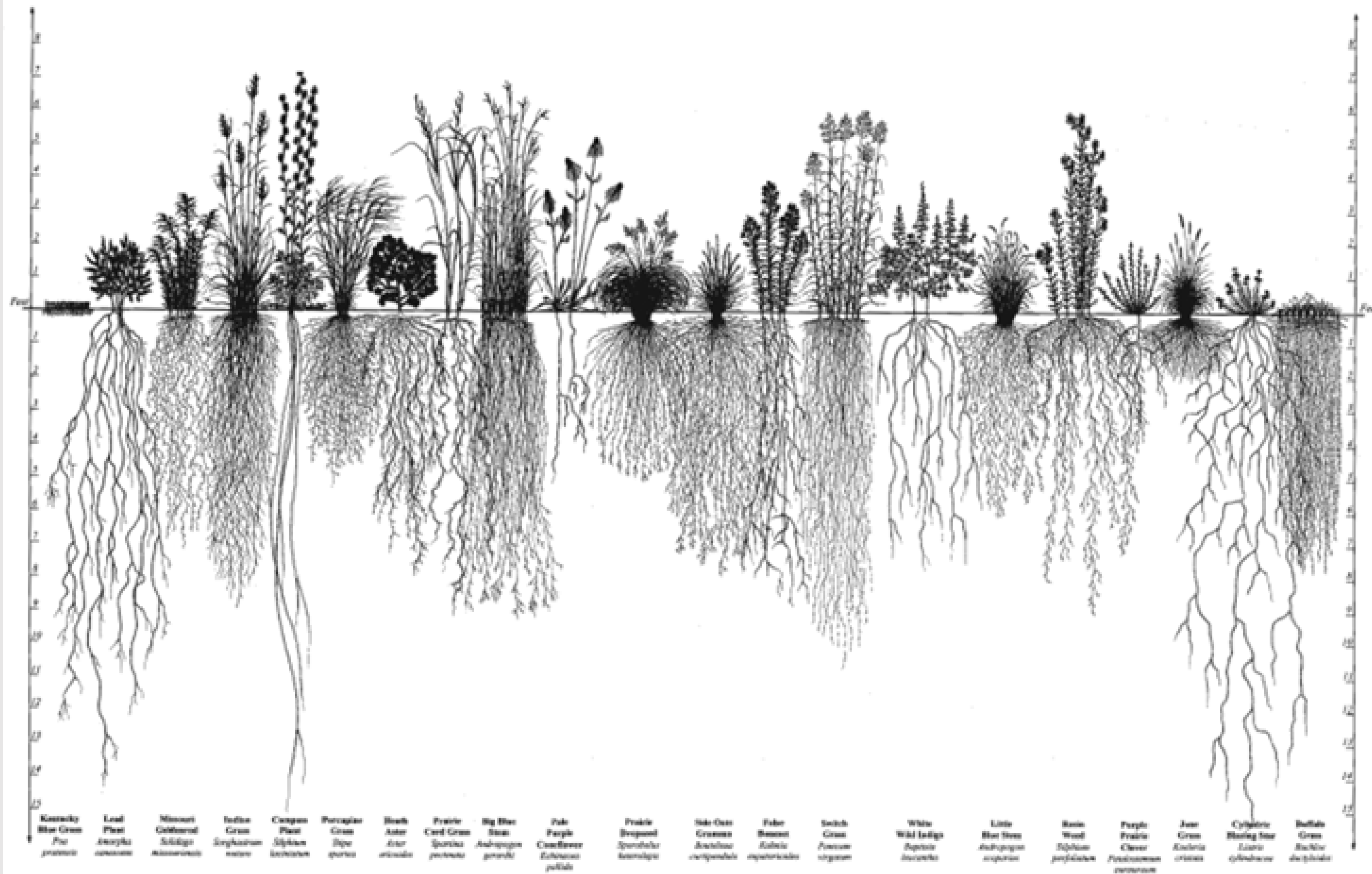
Why Native
Plants?

**Native Plant
Adaptive
Traits**

Native Plant
ID / Families

**NATIVE
PLANT
ADAPTIVE
TRAITS**

DEEP ROOTS



LEAF ORIENTATION



LEAF COLOR



C3 “Cool
Season” Grasses

Virginia wild rye

08



Tall fescue



C4 “Warm Season”
Grasses

Little bluestem



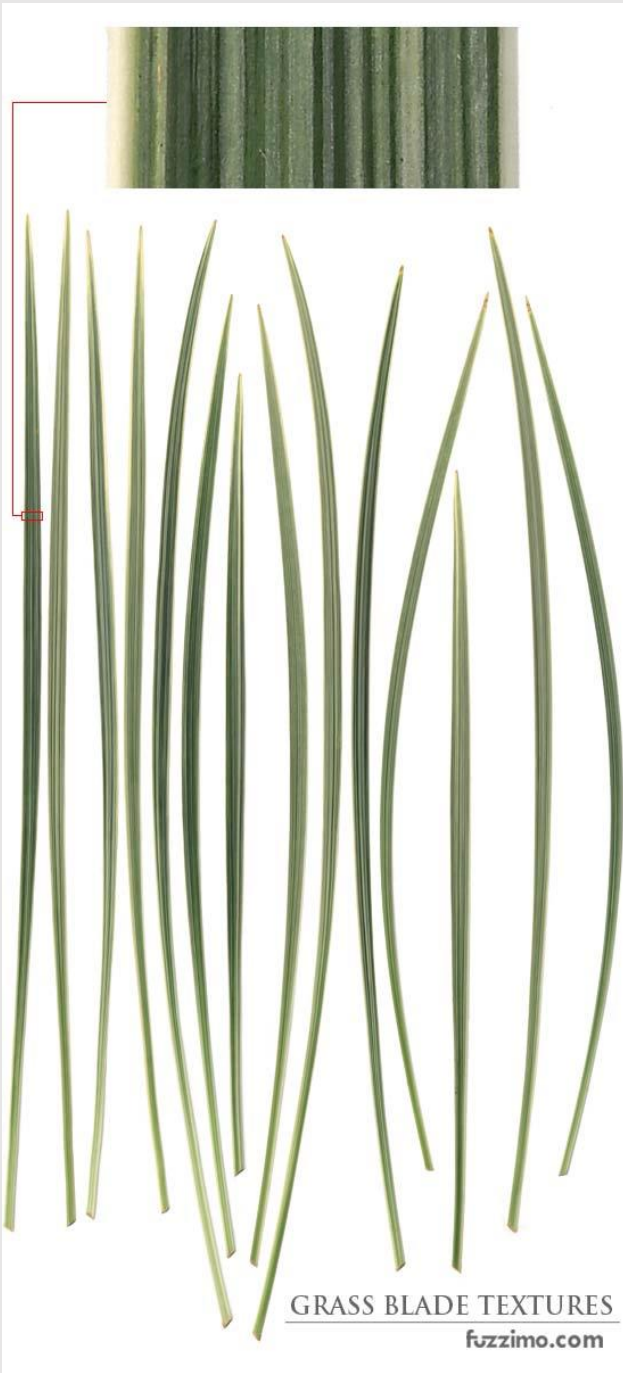
Buffalo grass

	C ₃ plants	C ₄ plants
1.	Photosynthesis occurs in mesophyll tissues.	Photosynthesis occurs both in mesophyll and bundle sheath cells.
2.	The carbon dioxide acceptor is RuBisco.	The carbon dioxide acceptor is PEP carboxylase.
3.	Krantz anatomy is absent.	Krantz anatomy is present
4.	The 1 st stable compound formed is 3C compound called 3-Phospho Glyceric Acid (PGA).	The 1 st stable compound is <u>4</u> -carbon Oxaloacetic acid (OAA).
5.	The optimum temperature is 20-25oC	The optimum temp is 35 – 44oC.
6.	Photorespiratory loss is high.	Photorespiration does not take place.

68-77 F

95-111 F

**NARROW
LEAF**



GRASS BLADE TEXTURES

fuzzimo.com

**WAXY
LEAF
SURFACE**



**HAIRS ON
LEAF
SURFACE**



**FINELY
DIVIDED
LEAVES**





Session Outline

Why Native
Plants?

Native Plant
Adaptive Traits

**Native Plant
ID / Families**

PLANT FAMILIES

- Sunflower Family – Asteraceae
- Rose Family – Rosaceae
- Mint Family – Labiatae
- Pea Family – Fabaceae
- Grass Family – Poaceae
- Milkweed Family – Asclepiadaceae
- Sedge Family – Cyperaceae

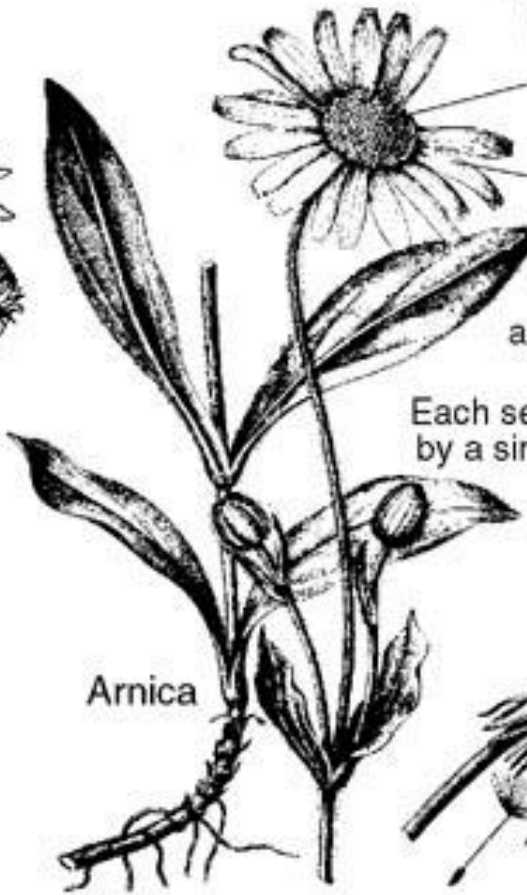
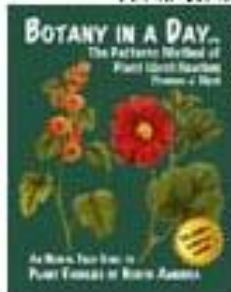
Helpful plant family traits to think about

- Floral Formula: petals-stamens-pistils
- Floral Arrangement: often consistent symmetry
- Fruit Characteristics: type and dispersal mechanism

Patterns of the Aster or Sunflower Family

Plants of the Aster family are "composites" of many small flowers in a disk-like flowerhead.

Asters are often easy to recognize from a distance.



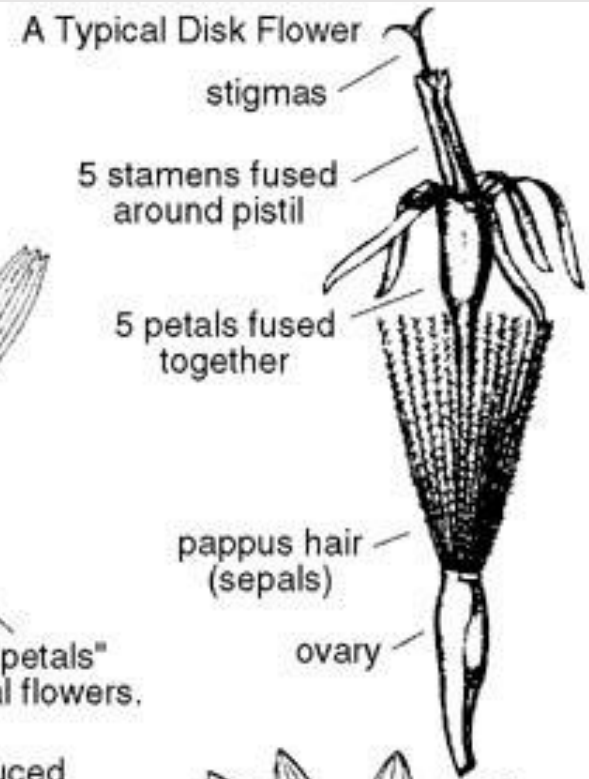
Arnica



Dandelion

Even the "petals" are individual flowers.

Each seed is produced by a single tiny flower.



A Typical Disk Flower

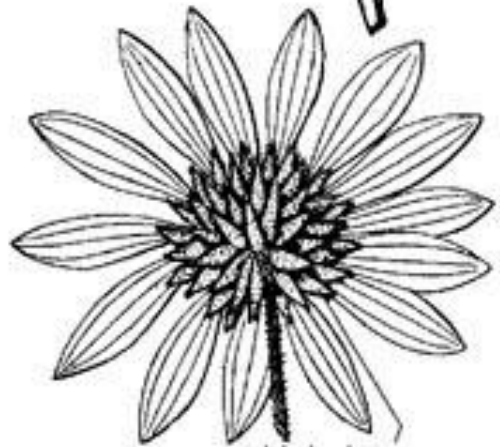
stigmas

5 stamens fused around pistil

5 petals fused together

pappus hair (sepals)

ovary



multiple layers of bracts are common

- Largest # of species in the prairie, 25% of prairie species
- Species often aggressive w/ short rhizomes and lots of seeds
- Petals-stamens-pistils, 5,5,1
- Small, hard seeds, often wind-dispersed in prairie or burr-like or bristles in the shade









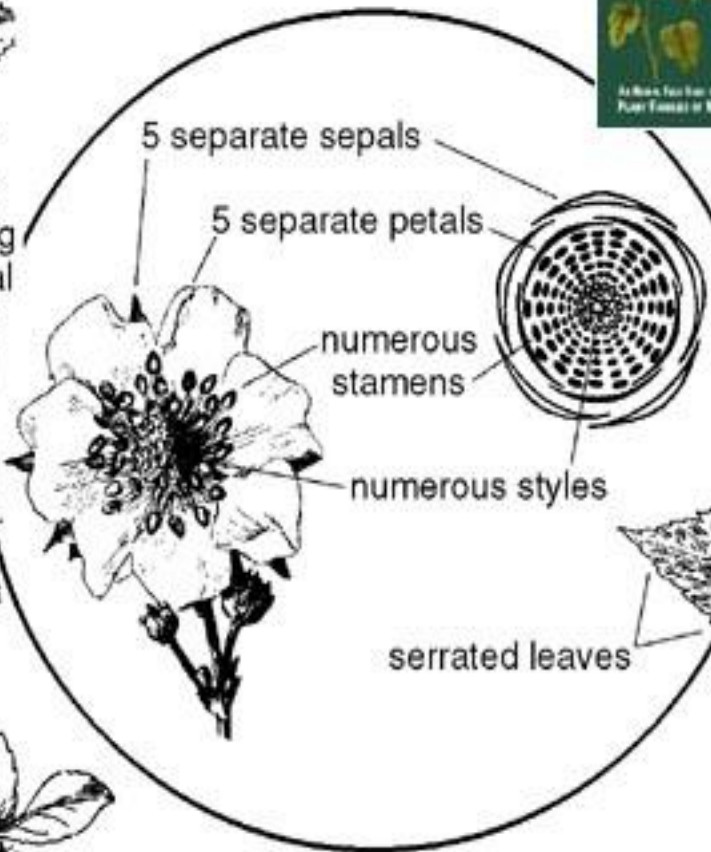
Virginia Wild Rose
Rosa virginiana



one leaf consisting of several leaflets

leaves with stipules are common

Patterns of the Rose Family Rose Subfamily



serrated leaves

Spiny rose galls caused by the Cynipid Wasp (*Diptolepis spp.*)

palmate leaf



Purple-Flowering Raspberry
Rubus odoratus

- Inferior floral cup grows beneath the flower (fruit is a hip, pome, drupe, capsule or follicle)
- Petals-stamens-pistils, 5, many 5s, 1
- Often dispersed by animals



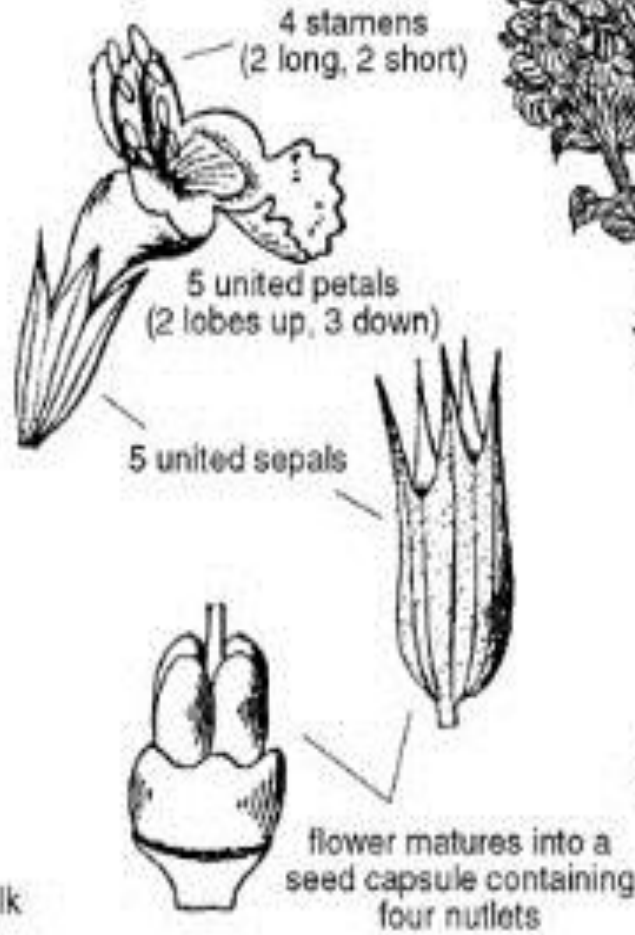
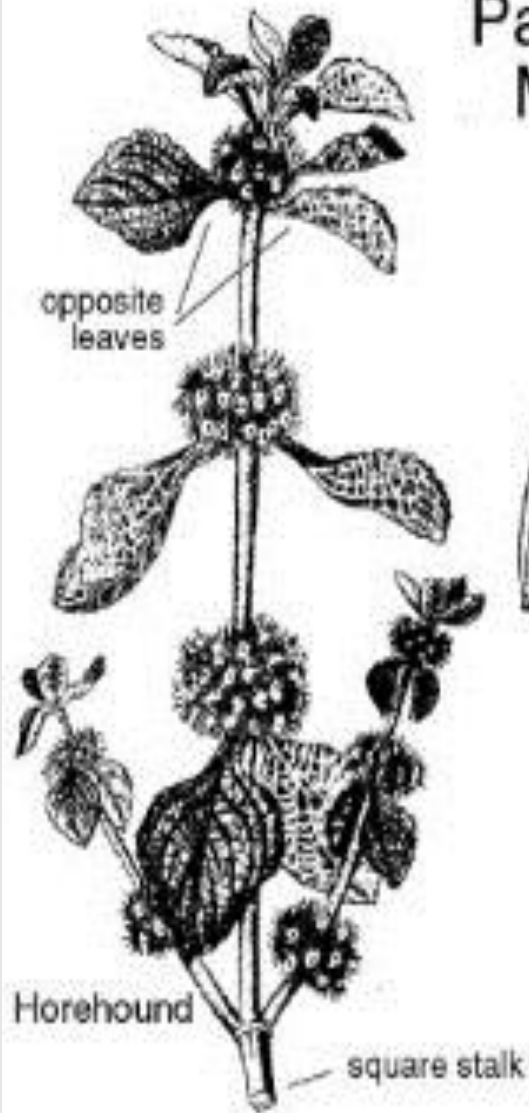


- Raspberry, blackberry, rose, potentilla, hawthorn, plum, apple, cherry, strawberry,





Patterns of the Mint Family



- Square stem, opposite leaves, "all mints have square stems, but not all square stems are mints"
- Leaves may be toothed or lobed but not divided
- 2 upper petals, 3 lower petals
- Petals-stamens-pistils, 5, 4 stamens-variable, 4 pistils
- Aromatic phenols in oils, flavoring for mint, insect deterrant
- Basil, thyme, oregano, mint, marjoram, henbit

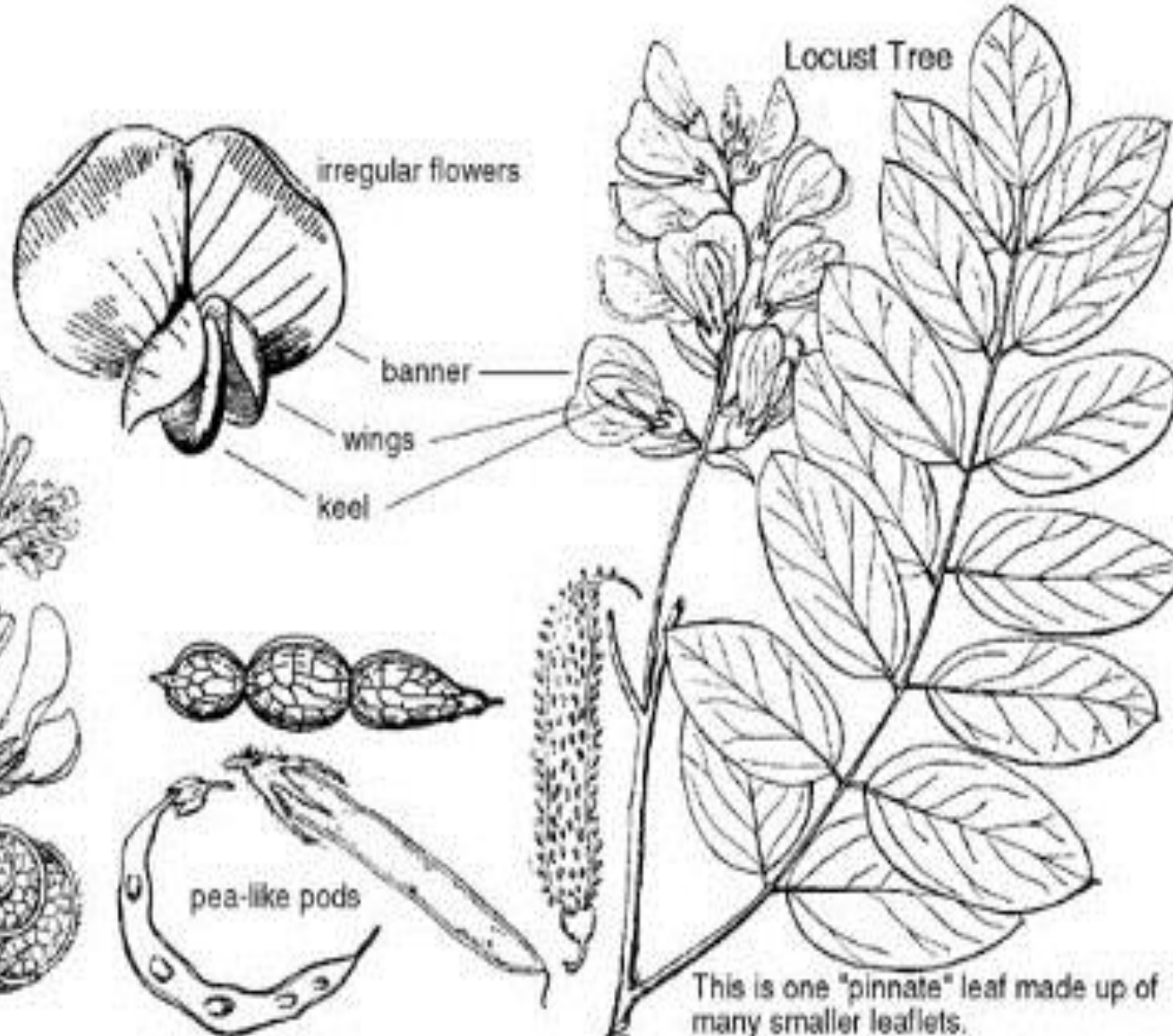






© Leslie L. Beck

Patterns of the Pea Family (Pea Subfamily)



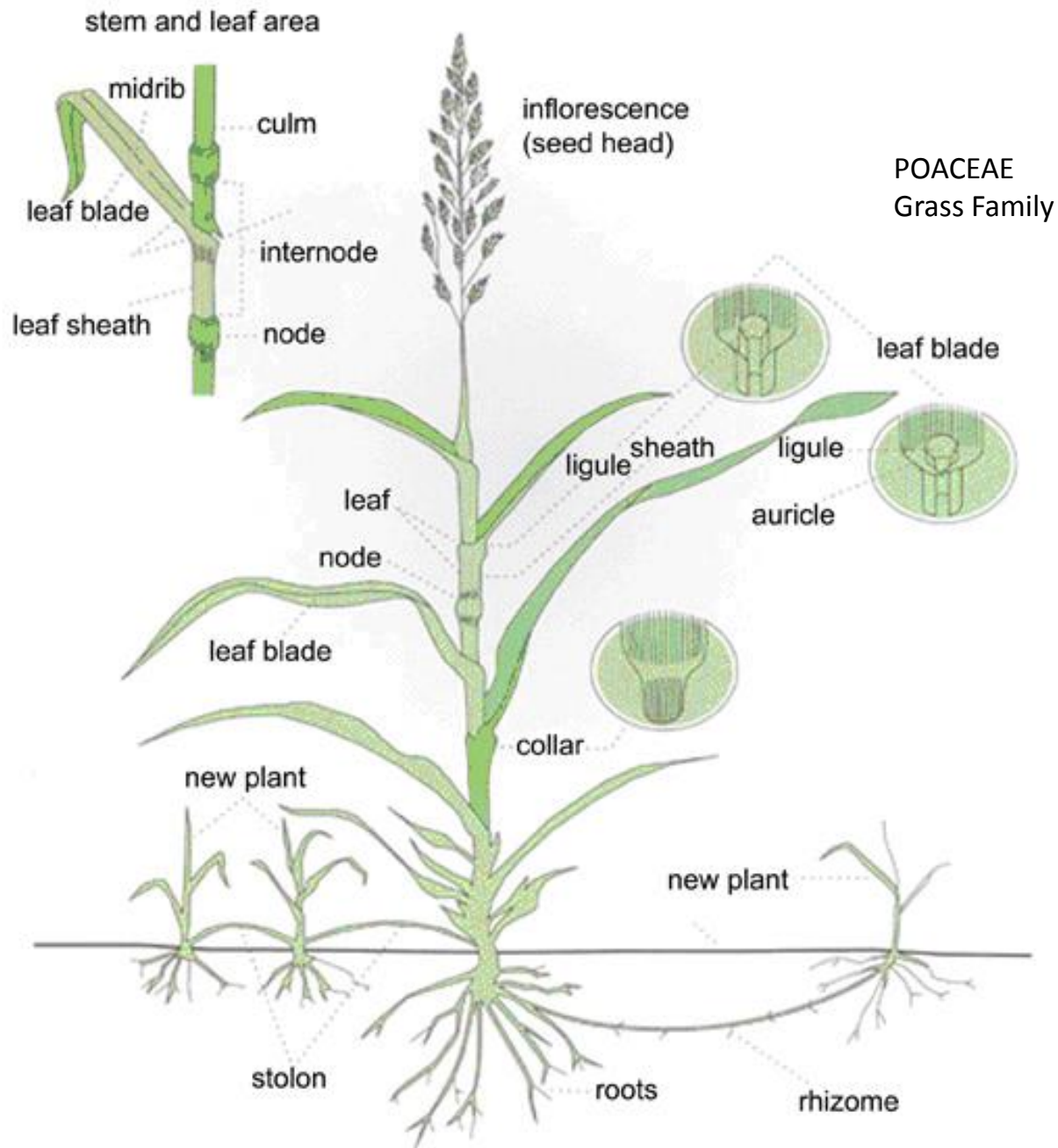
- 1 top petal, 2 wing petals, 2 keel petals
- Legumes, nitrogen fixers, bacteria, rhizobium, attached to roots in nodules, acquire food from the plant and in turn produce nitrogen
- Petals-stamens-pistils, 5, 10, 1
- Redbud, locust, alfalfa, Basil, thyme, oregano, mint, marjoram, henbit











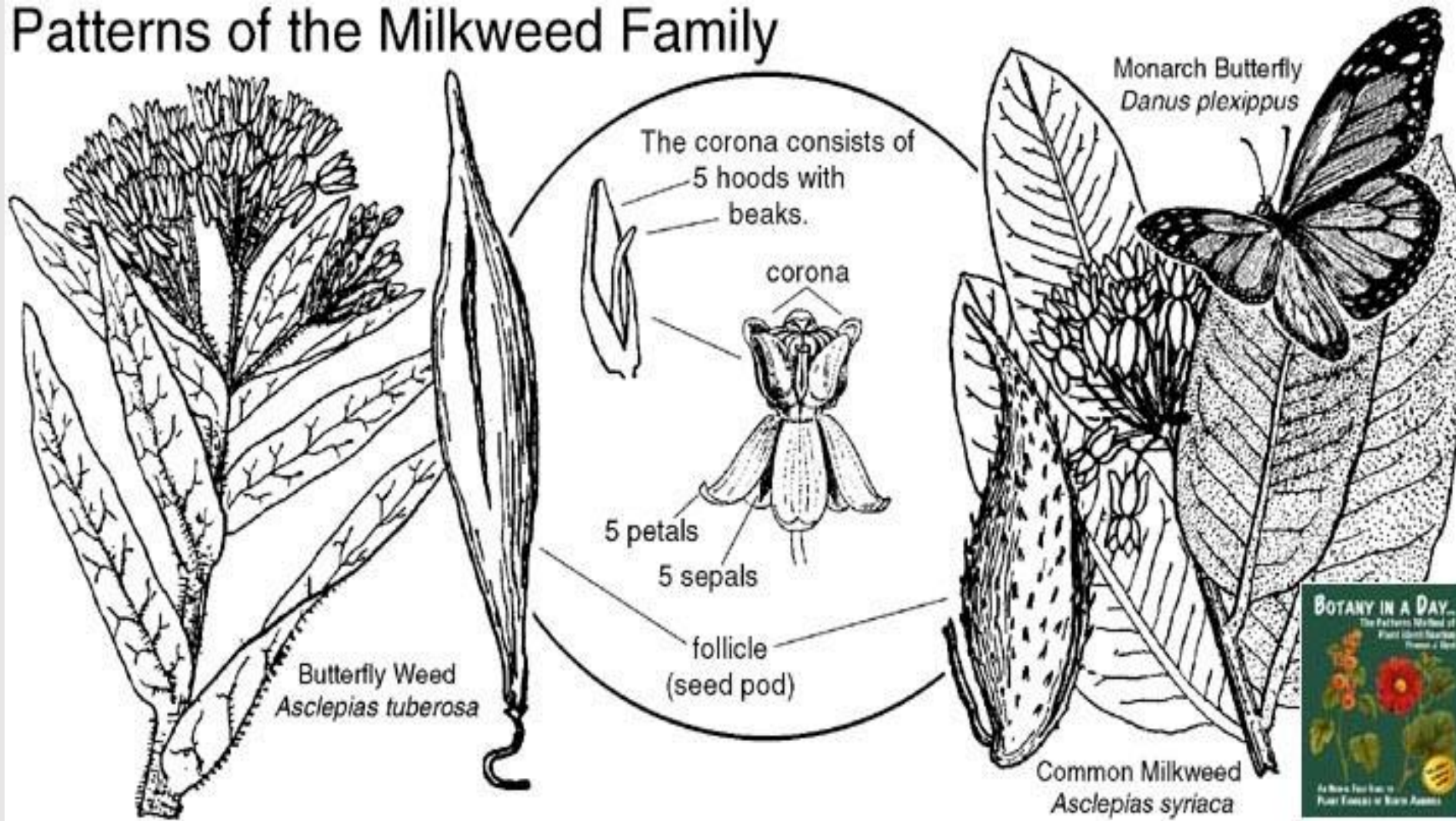
- 10% of prairie species, but most biomass
- Wind pollinated flowers
- Cool vs. warm season
- Corn, wheat, rice, oats, rye, barley, milo, sugar cane







Patterns of the Milkweed Family



- Simple leaves, milky juice
- Bitter compound with cardiac glycosides
- Petals-stamens-pistils, 5,5,1





©Christine Hanrahan

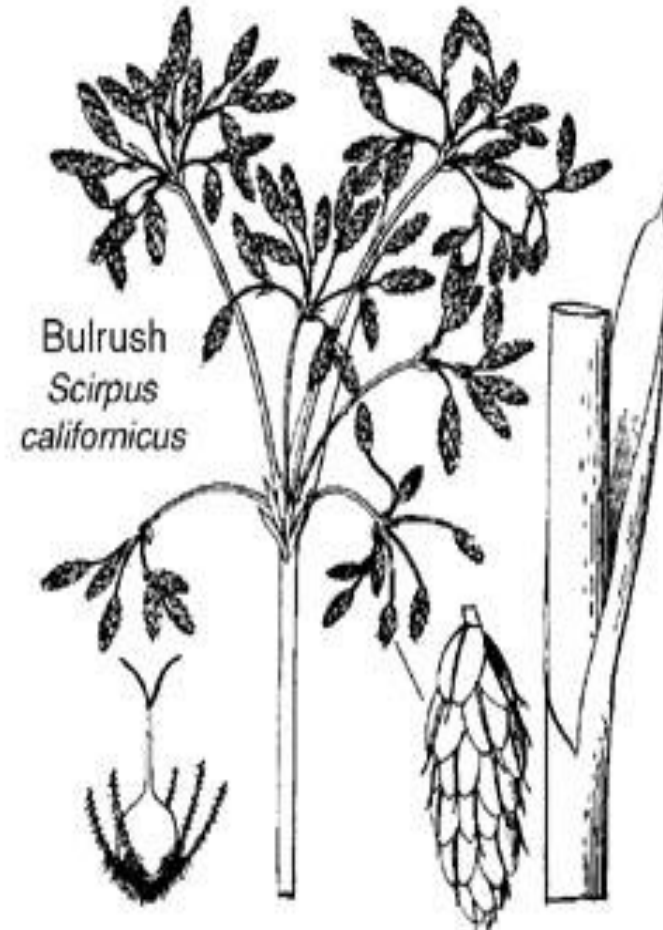
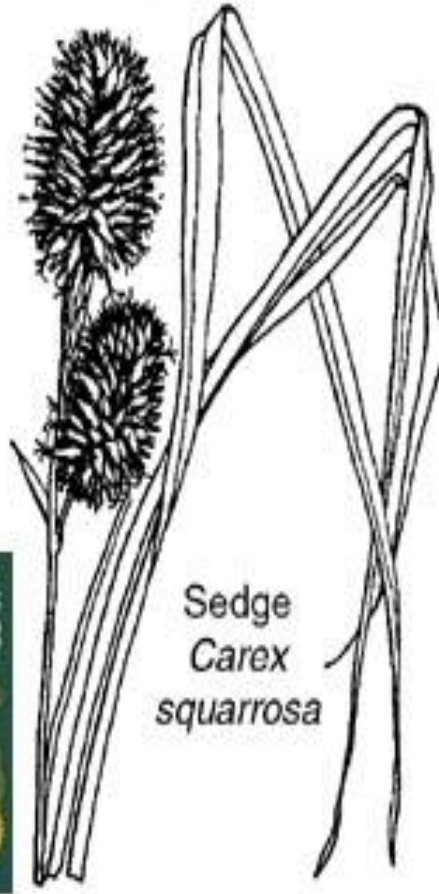
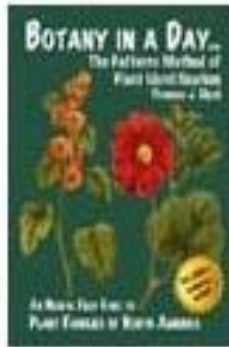
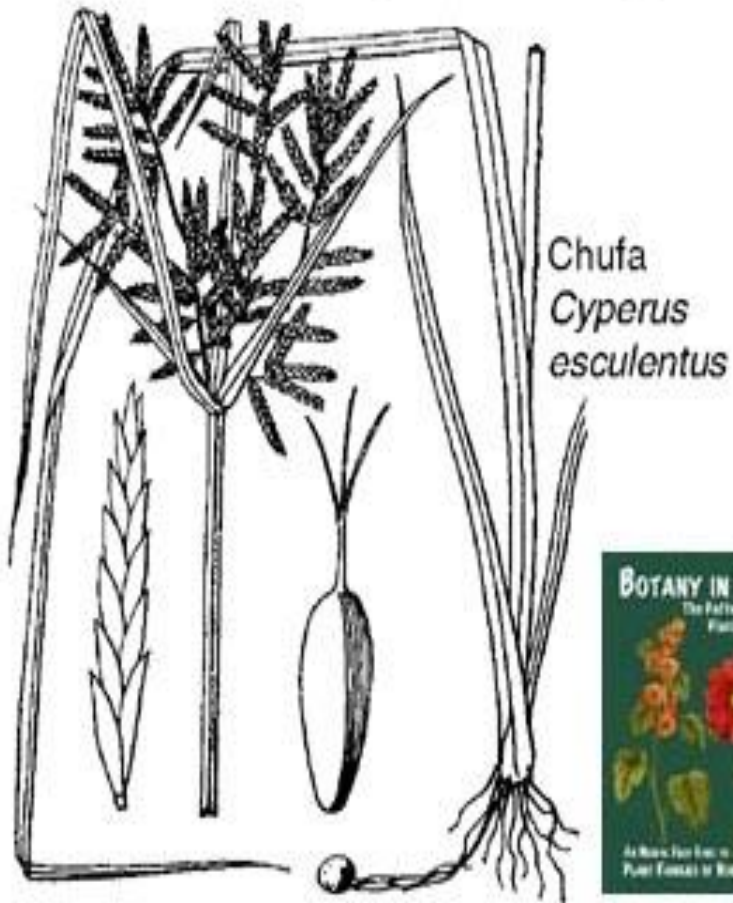






Patterns of the Sedge Family

Sedges look similar to grasses, but they usually have triangular flower stems.



- Similar look to grasses
- Angular, triangle-shaped stems
- Identification is difficult, more than 4,000 species worldwide
- Most species like their feet wet.













CITY HALL

2601



Police
Department

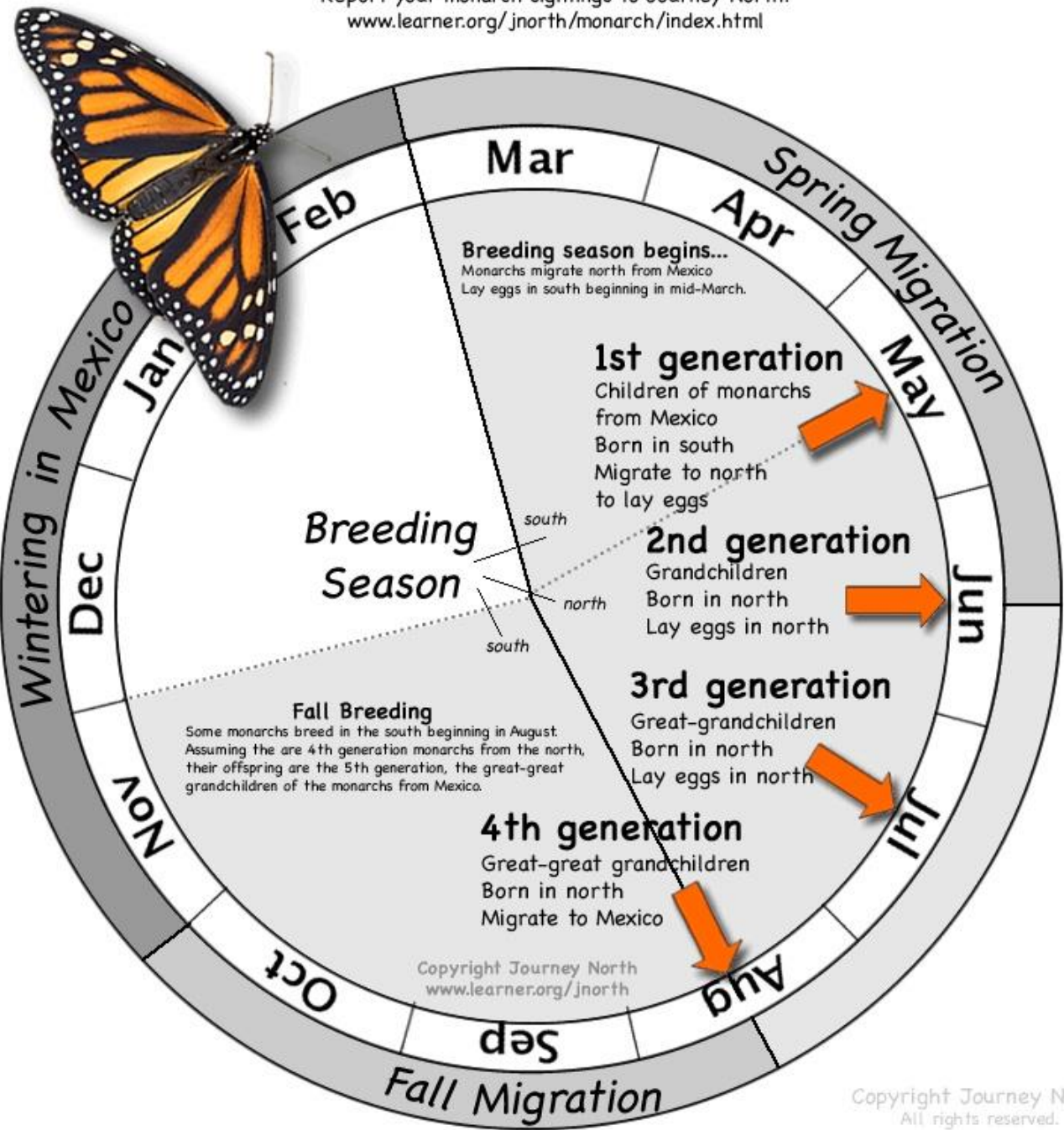
NORTH NEWTON



The Monarch Butterfly Annual Cycle

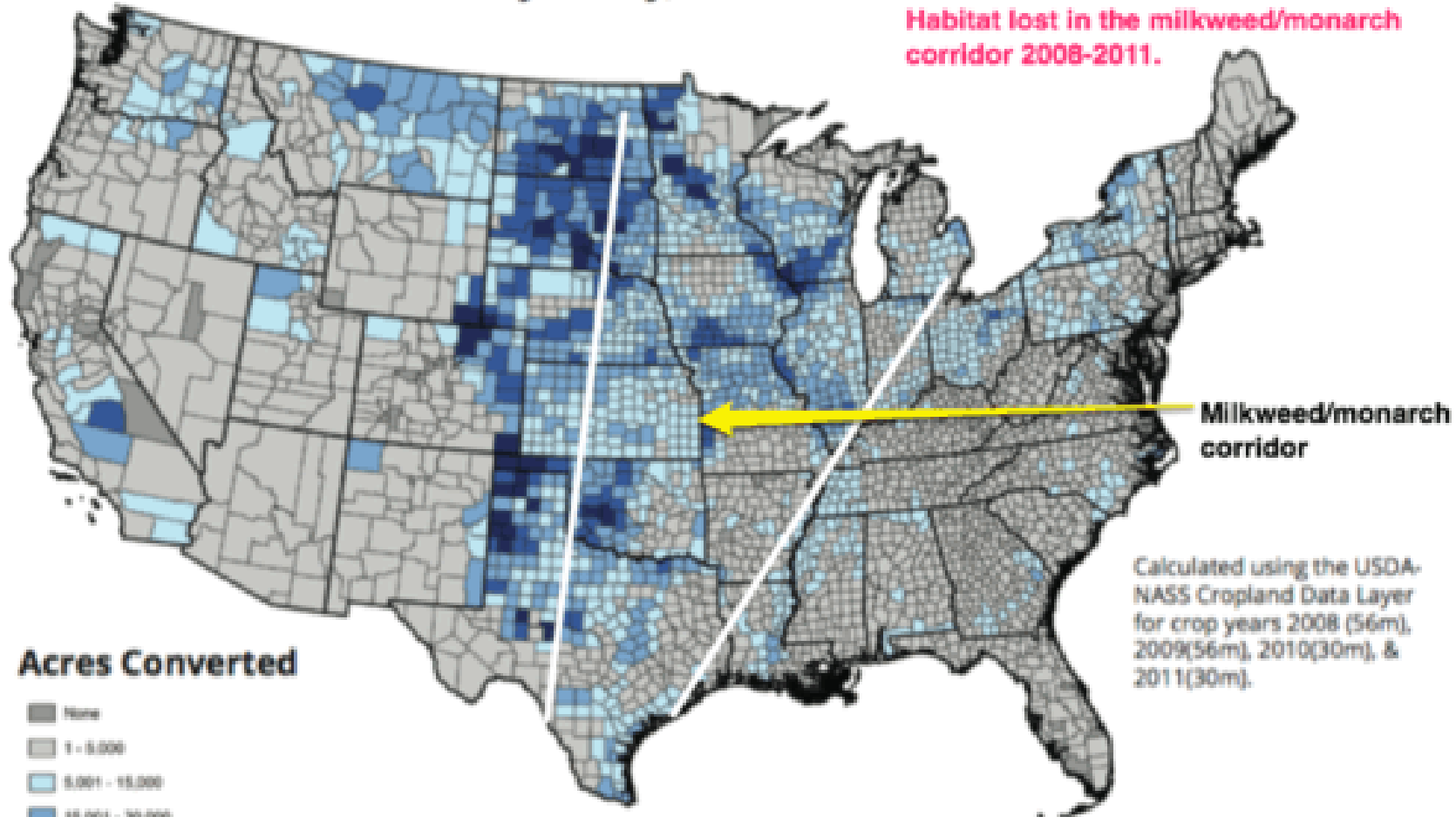
Report your monarch sightings to Journey North!

www.learner.org/jnorth/monarch/index.html



Acres of Grassland/Wetlands/Shrub Land Converted to All Crops By county, 2008-2011

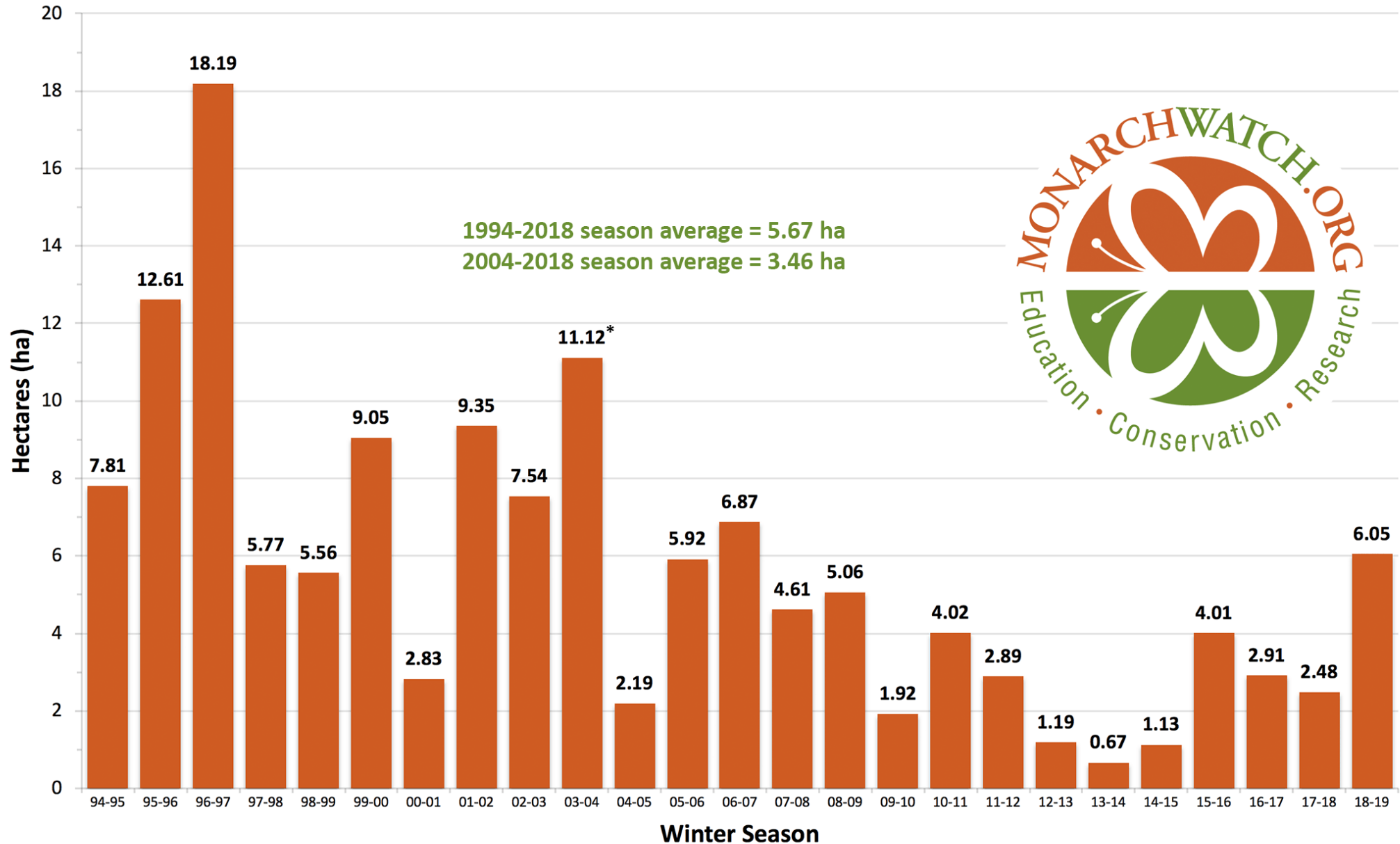
Habitat lost in the milkweed/monarch
corridor 2008-2011.



Total Acres: 23,681,611

Increased acreage - 8.4 corn, 5.6 soybeans, 5.2 winter wheat

Total Area Occupied by Monarch Colonies at Overwintering Sites in Mexico



Data for 1994-2003 collected by personnel of the Monarch Butterfly Biosphere Reserve (MBBR) of the National Commission of Natural Protected Areas (CONANP) in Mexico. Data for 2004-2017 collected by World Wildlife Fund Mexico in coordination with the Directorate of the MBBR.

* Represents colony sizes measured in November of 2003 before the colonies consolidated. Measures obtained in January 2004 indicated the population was much smaller, possibly 8-9 hectares. CT







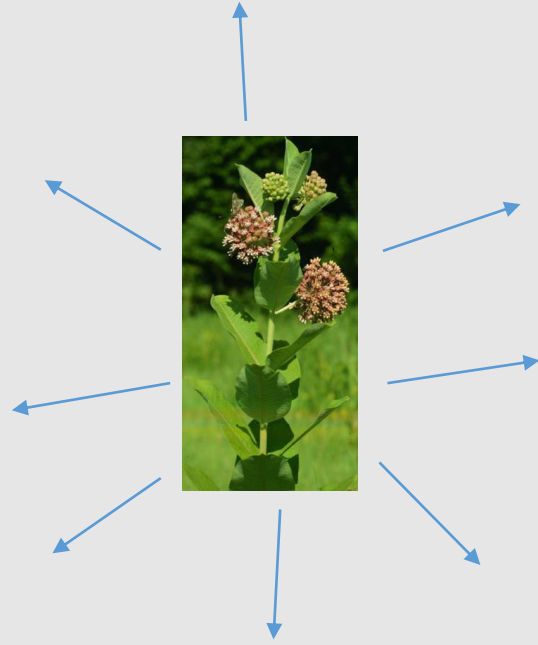
sue dingwell

















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