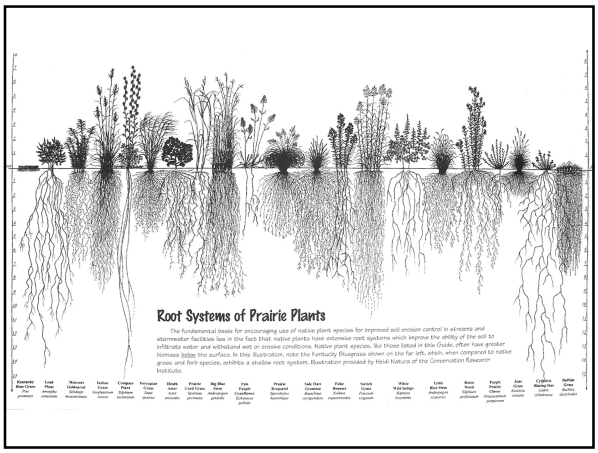
My Business: Leeward Solutions, LLC

- Ecological consulting:
  - Woodland management
  - Regulatory Wetlands Delineation
  - Botanical assessment
  - Ecological functioning
  - Restoration planning & implementation
- Photography
  - Almost all things natural: wildlife, flowers, insects, people in the outdoors, and more
- "Leeward": the protected side, out of the wind

Advantages of Native Plants

- Many perennials, some annuals or biennials
- Deep root structures
  - *Nutrient cycling:* topsoil regeneration from subsoil
  - *Soil aeration* from decayed roots, insect burrows: compacted urban soils with thin topsoil & near-surface clay
  - *Higher water table:* natural water availability
  - Excellent *soil holding* against raindrop impact & sheet erosion
  - Tolerant of wide climate and weather swings



- Varied pollinators, many native insects
  - Colony Collapse Disorder & honeybees
  - The others: butterflies, skippers, flower flies, some beetles, bumblebees, certain wasps, native bees
- Wildlife attractions: berries, cover, nesting, burrows

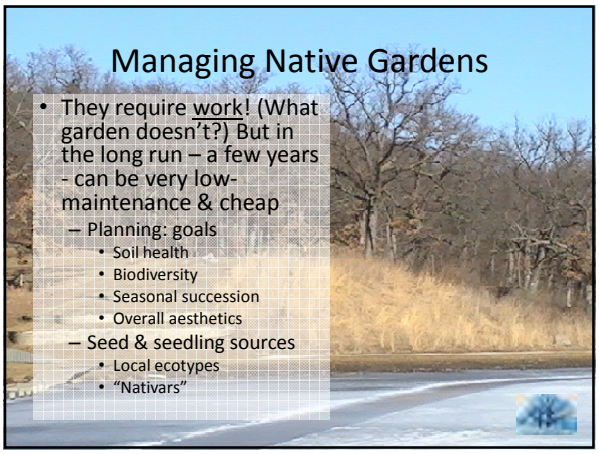
- Seasonal timing of flowers & seeding
  - Cool-season & warm-season adaptions
    - Early versus late flowering & seed maturation
    - Growth begins in autumn versus spring
  - Useful for planning an all-season garden
    - Succession of flower timing & colors
    - Color, height, & texture during late fall through winter

Native-Plant Gardens

- Three general approaches:
  - Restoration area: 50 to 150 species in 1/8th acre or larger
    - Management: invasives removal, planting, burning or mowing
  - Flower bed: one to a dozen or so species
    - Management: weeding, planting, cutting or mowing
  - Single species in a landscaped bed
    - Management: as for a standard flower bed, with weeding, cutting, "deadheading," or root division to prevent unwanted spread

- Mimic natural ecosystems found in the area
  - Woods
    - Oak-hickory, oak-basswood, bottomland hardwoods, riparian
  - Upland prairies: dry, mesic, & wet
  - Savannas: sparse trees, mostly bur oak
  - Shrubby margins: native shrubs, small trees
  - Wetlands: prairie potholes, fens, lakeshores, old oxbows, river bottoms

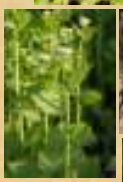
- Those ecosystems are good models for a healthy native garden practice
  - Landscaping decisions
    - Presence & use of water
    - Shade & sunlight
    - Degree of slope & direction of slope face
    - Aesthetic decisions about vegetative height, contrasting colors & textures, placement of lawn furniture
  - Topsoil condition & restoration

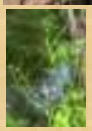


- What is your garden like?
  - Natural soils, relatively undisturbed
    - What native plant communities grew there? Prairie, woodland, wetland, etc.
    - Use county soil surveys, NRCS, county conservation experts, university agronomy & soils people
    - Consultants who have the knowledge base & access to mapping & other resources
  - Highly disturbed
    - Thin topsoil: consider native plants to restore thicker, richer topsoil – longterm outcome
    - Clayey surface: introduce sand and topsoil, mix in with tiller or other implement to create a seed bed
    - Polluted soil: contact county or state agencies for help

- Dirt time
  - Bed preparation
    - Foiling invasive plants: pulling, spraying herbicide
    - Soil amendments: fine wood chips, seed-free mulch
    - Tilling?
    - Water containment & routing for rain gardens
  - Planting methods
    - Cold stratification
    - Autumn sowing
    - Seedling plugs
    - Interseeding

- The first year: managing invasive species
  - If possible, burn the area in the autumn, before planting
  - Remove or inhibit aggressive exotics
    - Garlic mustard: glyphosate; pull plants with flowers or green seedpods & remove from property
    - Poison ivy: glyphosate or Garlon 3A
    - Brome grass: glyphosate on green leaves, mow to prevent seeding

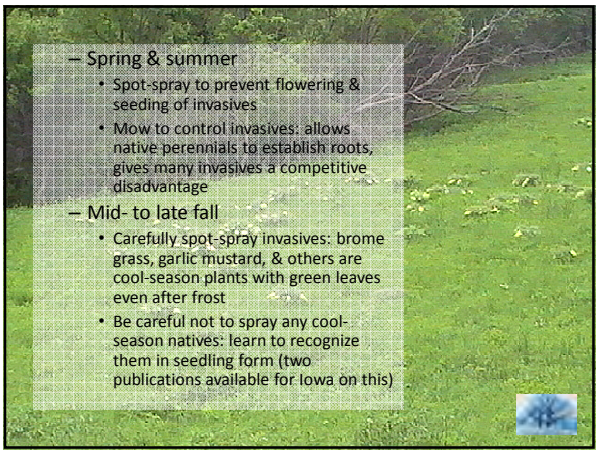





- Honeysuckle: spray green foliage through late fall with glyphosate, or cut & apply glyphosate to the cut within an hour
- Ailanthus: cut & use glyphosate
- Buckthorn: cut, watch for sprouting from roots & seeds, treat with herbicide

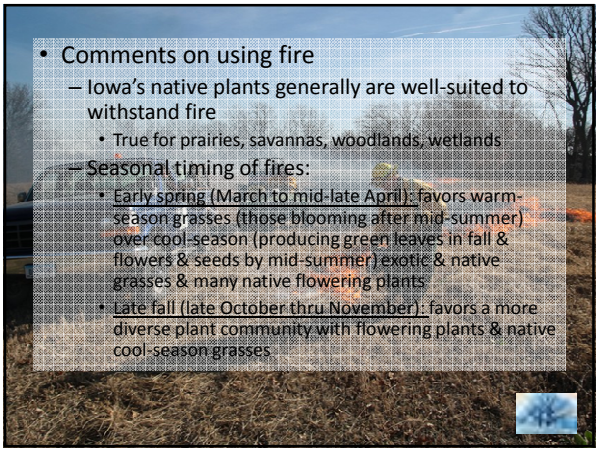


- Seeding
  - Seeds can be spread on thin snow or wet dirt
  - Ideally, sow before a rain or snow: prevents consumption by wildlife, begins natural cold stratification, works seeds into soil
- Germination
  - Don't worry if only one or two native plant species appear the first year, and there is bare ground. Many take two or more winters to germinate.
  - Oat or wheat straw on bare areas to prevent erosion.
  - Black-eyed Susan often dominates in the first growing season
  - Carefully spot-spray areas of brome grass, and individual garlic mustard, honeysuckle, buckthorn, & other invasives



- The second year
  - Continue use of mowing, but adjust the mow height as the season progresses
    - Allow natives to establish foliage & make nutrients
    - Prevent invasives from storing nutrients or producing seed
  - Use spot spraying to control aggressive exotic seedlings or in patches of exotics where natives don't appear
  - Entirely new dominant natives may appear or take over. Don't worry about this.

- The third year and after
  - For several years, your garden may look different each year as dormant species germinate and dominate species intermingle



Plant Species: Woodlands

- ***Woodlands:*** familiar spring flowers
  - Spring Beauty
  - Bloodroot
  - Hepatica or Liverleaf
  - Dutchman's Breeches
  - Dogtooth Violet or Troutlily
  - Mayapple
  - Violets (white & yellow)

Mayapple

Two somewhat palm-shaped leaves at the top of a shared stem.

Blossoms: April to May in central Iowa

A white flower blooms on a short stem below the leaves, followed by a greenish yellow fruit. Good luck finding a ripe fruit to eat!

The rest of the plant will cause cramping diarrhea and/or vomiting.

Often grows in large colonies in undisturbed woodlands

Virginia Bluebells

12-24 inches tall

Visited by small bees, flower flies, butterflies

Grows readily from seed, but can crowd other plants out

Prefers moist soils

Becomes dormant by midsummer

Arisaema triphyllum

Jack-in-the-Pulpit or
Preacher-in-the-Pulpit

Three leaves arising from the base, with the spathe (Jack in his pulpit) in the center

Blossoms: April to May. In September, the central stalk remains with a long cluster of bright red berries. Don't eat them!

Woods floors with dappled light, good surface moisture, & rich humus

8 to 16 inches tall

Claytonia virginica

Spring Beauty

Leaves in pairs on stem, 5 petals white to pale pink with pink lines

Woods floors with dappled light, good surface moisture, & rich humus

6 to 8 inches tall

Blooms in early to mid-spring, goes dormant by summer.

Collect the tubers a few inches underground & grow from these.

Campanulastrum americanum

Tall Bellflower

4 to 6 ft.

Open woods, edges, preferring moist soils but tolerating semi-dry ones

A winter annual that self-seeds & grows well from seed

Its relatives include a low, spreading plant, Creeping Bellflower

Erythronium albidum

Dogtooth Violet
or **Troutlily**

Two mottled basal leaves & a solitary flower

Woods floors with dappled or partial light, good surface moisture, & rich humus

Blossoms: early to mid-spring, then dormancy

6 to 10 inches tall

Also has a yellow relative not found in most of Iowa

Sanguinaria canadensis

Bloodroot

Unique leaf shape, with white flowers underneath

Broken stems weep a red-orange sap

Woods floors with dappled light, good surface moisture, & rich humus

6 to 12 inches tall

Aquilegia canadensis

Wild Columbine

Five-parted flowers attract hummingbirds, sphinx moths, & other insects

Plant in partial sun. Tolerates various soil conditions. An annual, grown from seed, but self-seeds once established.

A blue-&-white western relative isn't native in Iowa & doesn't draw hummingbirds

Several cultivars or "nativars" exist

- Other woodland plants to consider:
  - Gray's Sedge: wet soils
  - Sweet Cicely: dry to moist
  - Rue Anemone: moist, well-drained soil
  - Wild Ginger: rich woods with leaf litter
  - White Wood Aster
  - Smooth *or* Giant Solomon's-Seal
  - *Ferns, including:*
    - Cinnamon Fern
    - Maidenhair Fern
    - Wood Ferns (*Dryopteris*)
    - Ostrich Fern
  - Grasses:
    - Virginia Wild Rye
    - Bottlebrush Grass

- Shrubs & small trees for a wooded area
  - Viburnums
  - Redbud
  - Bladdernut
  - Witchhazel
  - Hazelnut (edges & clearings)
  - Eastern Wahoo (*Euonymus atropurpureus*), but easily confused by professionals with an aggressive introduced shrub, *E. alatus*)

Plant Species: Wetlands & Wet Prairies

- Permanent water supply
  - Most are able to withstand a drought year by dormancy or seed
- Rain gardens & well-watered waterways
  - Brief to extended standing water of a few inches' depth
- Wet prairies & wetland edges
  - Moist to saturated soils, but without standing water

Iris virginica

Blue Flag

Wet soils on wetland edges, especially with constant water levels

To about 3 ft. tall

Blossoms: late spring to midsummer

Flower parts are narrower than most cultivated iris, with showy veins & lighter colors

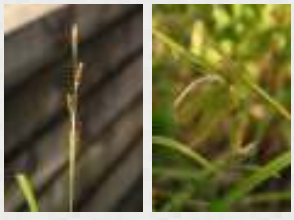
Asclepias incarnata

Swamp Milkweed

Wet to moist soils, tolerates some standing water

Attracts large pollinators: bees, butterflies

Easily grown from seed or plugs



C. blanda, C. hystericina
C. vulpinoides

Sedges (*Carex*)

125 or so in Iowa. Difficult to identify many. Not all grow in wet or moist soils.

Many are good ground covers & background greenery; only some have large, attention-getting seed-heads.

Readily grown from seed.


Lobelia cardinalis

Cardinalflower

A lobelia, does well in wet soils & tolerates temporary shallow water

Single stem to 4 ft. tall


Chelone glabra
C. obliqua

Pink Turtlehead, White Turtlehead

Canada Anemone

Wet prairies & higher areas around wetlands

12 to 15 inches tall, sometimes to 24 in.

Attracts bees & flies

Related species: Thimbleweed (*A. virginiana*) prefer moist, not wet, soils

Anemone canadensis

Sambucus nigra

Common Elderberry

Semi-woody, to about 10 ft. tall

Rain gardens, moist waterways, partial sun

Wildlife habitat in growing season

Attracts pollinating insects

Edible fruit in late summer: birds, humans

Jams & jellies

"Drunk all the time, feelin' fine on elderberry wine" – Elton John

- Other wetland & wet prairie species:
  - Bulrushes (*Cyperus*, but not *C. esculenta* or Chufa or Yellow Nutsedge) (medium height)
  - Softstem Bulrush, *Schoenoplectrum* (tall)
  - Marsh Marigold (yellow, short to medium)
  - Giant Goldenrod
  - *Small & large trees:*
    - Serviceberry or Shadbush: understory
    - Kentucky Coffee-Tree: canopy height
- The lowly cattail: don't plant it
  - Tends to spread rapidly & choke out other species, except in deeper water or if the topsoil dries out for one full season in most years

Plant Species: Mesic Prairies

- Mesic (somewhat moist, well-drained prairies): these often are found
  - On slopes where groundwater travels horizontally to the surface, forming seeps
  - In swales & shallow pockets with surface or subsurface drainage

Symphiotrichum novae-angliae

New England Aster

To 6 ft., branching

Blossoms late summer to autumn

Easily grown from seed

Wet areas; mesic to wet prairies

There are many aster species in Iowa that grow in every possible habitat, except standing water. A few include: Heath Aster, Willow Aster, Calico Aster, and Silky Aster. Also, the False Aster (*Boltonia asteroides*) is a very bushy plant with many small white flowers, found in wet soils.

Asclepias tuberosa

Butterflyweed

Prefers moist areas: ditches, waterways, mesic prairies

To 3 ft. tall

Lives up to its name, plus beneficial insects

Plant from seeds or rootstocks, although the stocks may be too deep to dig

Lobelia siphilitica

Great Lobelia

2 to 3 ft. tall

Blossoms midsummer to autumn

Damp swales, mesic to wet prairies, stream banks, seeps

Easily crowded out by other plants

Once thought to cure syphilis

Rudbeckia hirta

Black-Eyed Susan

Low, with dark brown centers & coarse leaves, 1 to 2 ft. tall

Easily established from seed, grows in dry to wet areas, including poor soil

Perennial, but short-lived

Attracts many kinds of insects

Tends to dominate first- & second-year plantings

Two taller relatives, Cut-Leaved Coneflower & Brown-Eyed Susan, favor open woods & more most soils

- In addition, other mesic species to consider:
  - Prairie False Indigo: *top right*
  - Cream-Colored False Indigo
  - Great St.-John'swort (yellow, med. ht.)
  - Blazing Stars, several species: *bottom rt.*
  - Illinois Bundleflower (white, med. ht.)
  - Compass Plant (yellow, tall)
  - Jerusalem Artichoke (yellow, med. to tall)
  - Mountain-Mints, two kinds (white, med.)

Plant Species: Dry Prairies

- On convex slopes with good surface & subsurface drainage, "droughty" soils with overall thick topsoil & high organic matter
- "The" tallgrass prairie, but wetlands & wet & mesic prairies are part of the "Prairie Peninsula," too
- Life forms in the topsoil are crucial, but poorly understood & easily overlooked

Bouteloua curtipendula

Side-Oats Grama

Bunchgrass

Mesic to dry, well-drained prairies & savannas

Topsoil-forming, deep-rooted (3-6 ft.)

Little Bluestem

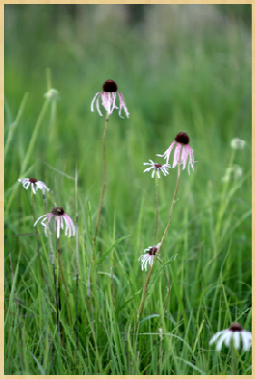
Bunchgrass with deep roots to 6 feet

Prefers dry to somewhat moist prairies

Excellent topsoil builder

Late autumn color

Schizachyrium scoparium



Echinacea pallida

Pale Purple Coneflower

First year: basal rosette of leaves

Second year: pale ray flowers around central dark cone of disk flowers, with rays drooping

Blossoms: late spring to midsummer

2 to 4 ft.

Dry to moist prairies

A relative, Purple Coneflower, is planted commonly, but is native to SE Iowa & not the central & western prairies.

Eryngium yuccifolium

Rattlesnake-Master

Full sun, moist to dry prairies

First year: blue-green, yucca-like basal leaves only, with prickly edges

Second year: stalks with round, thorny balls of seeds

Self-seeds, or harvest seed with gloves

2 to 6 ft.

Adds interest to native prairie gardens

Big Bluestem

Andropogon gerardi

Bunchgrass with deep roots 6 to 12 feet !! And 5 to 10 feet tall

Helps restore topsoil

Likes open prairies, dry to wet but well-drained

Like other warm-season native grasses, responds very well to fire

Indiangrass

Bunchgrass with deep roots 6 to 10 feet !! And 5 to 8 feet tall

Helps restore topsoil

Likes open prairies, dry to wet but well-drained

Like other warm-season native grasses, responds very well to fire

Sorghastrum nutans

Wild Bergamot or **Horsemint**

Strong minty odor when brushed against or bruised.

Known medicinal properties.

3 to 6 ft. tall

Blossoms: late spring to early autumn, lavender color

Attracts many good insects, but is unpleasant to deer (as are any aromatic mints)

Prairie/woodland edges, old pastures

Monarda fistulosa

- Other dry prairie species to consider:
  - Common Sunflower (yellow, tall)
  - Prairie Larkspur (white, medium ht.)
  - Gray-Headed Coneflower (yellow, med. to tall)
  - Ohio Spiderwort: *top right*
  - Foxglove Penstemon (whitish, med. ht.)
  - Wild Quinine (white, med. ht.)
  - Prairie Ragweed (yellow, short)
  - Hoary Puccoon: *bottom right*
  - Purple & White Prairie Clovers: short
  - Canada Wild Rye (green, med. ht.)
  - Goldenrods: Tall, Canada, Missouri, Stiff

The Future of Our Trees

- Onslaught of diseases & pests
  - Bur, red, white oaks:
    - Oak blight
    - Oak wilt
    - Hypoxalon: southern & central Iowa
  - Green & white ashes
    - Emerald ash borer: Allamakee County
  - Black walnut: thousand cankers, in the West
  - Pines: pine bark beetle, currently in the West

- Two-pronged approach:
  - Plant the dominant native tree species in hope that younger trees will survive bacterial & fungus infections & pests
    - Many trees in Iowa are of very similar age due to clearcutting about 150-170 years ago
  - Introduce lesser native species that are (or are likely to be) resistant
    - Swamp White Oak in wetter areas
- Try to avoid cultivars because low genetic diversity could reduce resistance to future diseases & pests

  - Talk with extension & DNR foresters, arborists
    - Experimental work on EAB in MI, MN, WI
    - Fungicides & pesticides
    - State quarantines on transport of wood from affected states
    - Introduction of natural microbial & insect enemies?? My skepticism: Asian lady beetle

Sources of Plants & Seeds

- If you are comfortable with identifying plants while in seed, collect your own seed from roadsides & wild areas
  - Respect laws & rules:
    - Collecting on public lands is forbidden, with some exceptions for certain purposes
    - Private landowners may cooperate
    - DO NOT collect any threatened or endangered species, but obtain these from a reliable commercial source

- Bulk seed by species & in mixes
- Native shrubs & trees
- Be careful about commercial sources: Earl May, Home Depot, Lowe's, Burpee, etc.
  - The great *Celastrus* debacle:
    - Employees & suppliers may not differentiate between native & exotic species
    - A plant sold as a native may be a "nativar," a cultivated variety chosen for a specific feature

For More Information

- Field guides to identification
  - Runkel, Sylvan, & Dean Roosa, *Wildflowers of the Tallgrass Prairie*, 2nd edition (Bur Oak/Univ. of Iowa)
  - Dave Williams, *The Tallgrass Prairie Center Guide to Seed and Seedling Identification in the Upper Midwest* (Univ. of Iowa/UNI)
  - Steve Holland & others, *Iowa Wetland Seedling Guide* (IA Dept. of Transportation)
- Books on gardening with native plants
  - Rick Darke, *The American Woodland Garden: Capturing the Spirit of the Deciduous Forest* (Timber Press)
  - Ann Lovejoy, *Naturalistic Gardening* (Sasquatch Books)
- Iowa's native ecosystems
  - Cornelia Mutel, *The Emerald Horizon* (Bur Oak/Univ. of Iowa)

- Restoration guides
  - Jeannette Thompson, *Prairies, Forests, and Wetlands* (Bur Oak/Univ. of Iowa)
  - Packard, Stephen, & Cornelia Mutel, *The Tallgrass Restoration Handbook* (Island Press)
  - Daryl Smith & others, *The Tallgrass Prairie Center Guide to Prairie Restoration in the Upper Midwest* (Univ. of Iowa/UNI)
- Web sites
  - Iowa Native Plant Society: http://www.herbarium.iastate.edu/inps/index.php
  - Iowa Prairie Network: http://www.iowaprairienetwork.org/
  - USDA Plants Database: http://plants.usda.gov/java/
  - Tallgrass Prairie and Oak Savanna Fire Science Consortium: http://www.tposfirescience.org/
  - Webster County prairie plants: http://uipress.lib.uiowa.edu/ppl/map.php

- Iowa DNR Forestry: http://www.iowadnr.gov/Environment/Forestry.aspx
- Iowa DNR Prairie Resource Center: http://www.iowadnr.gov/Environment/LandStewardship/PrairieResourceCenter.aspx