

Companion Planting for Resilient Gardens



SHEPHERDSTOWN

BEE CITY



USA

Presented by:
James Dillon, PCH



Shepherdstown
Public Library





Unknown designer

Today's Landscapes : Based on labor, mulch and chemicals



Unknown designer

Seeded Meadow



Meadow (year #2) by:
Native Havens LLC

Summer



Design by:
Native Havens LLC

Fall



Design by: Native Havens LLC



Spring

Design by: Native Havens LLC



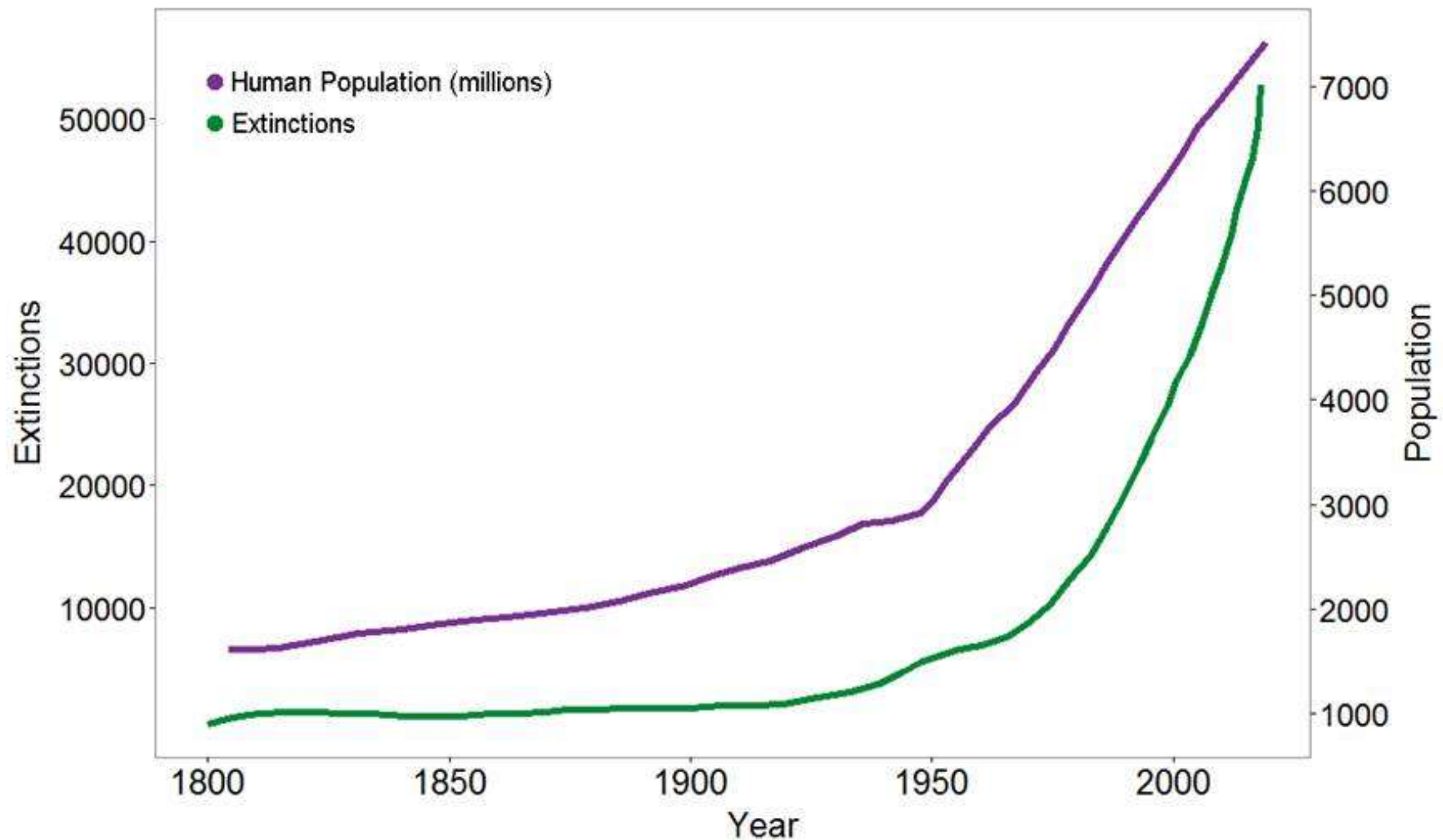
Summer

Design by:
Native Havens LLC

...and, Fall



Humans & The Extinction Crisis



Data source: Scott, J.M. 2008. *Threats to Biological Diversity: Global, Continental, Local*. U.S. Geological Survey, Idaho Cooperative Fish and Wildlife, Research Unit, University Of Idaho.

Pressures on plant communities and wildlife

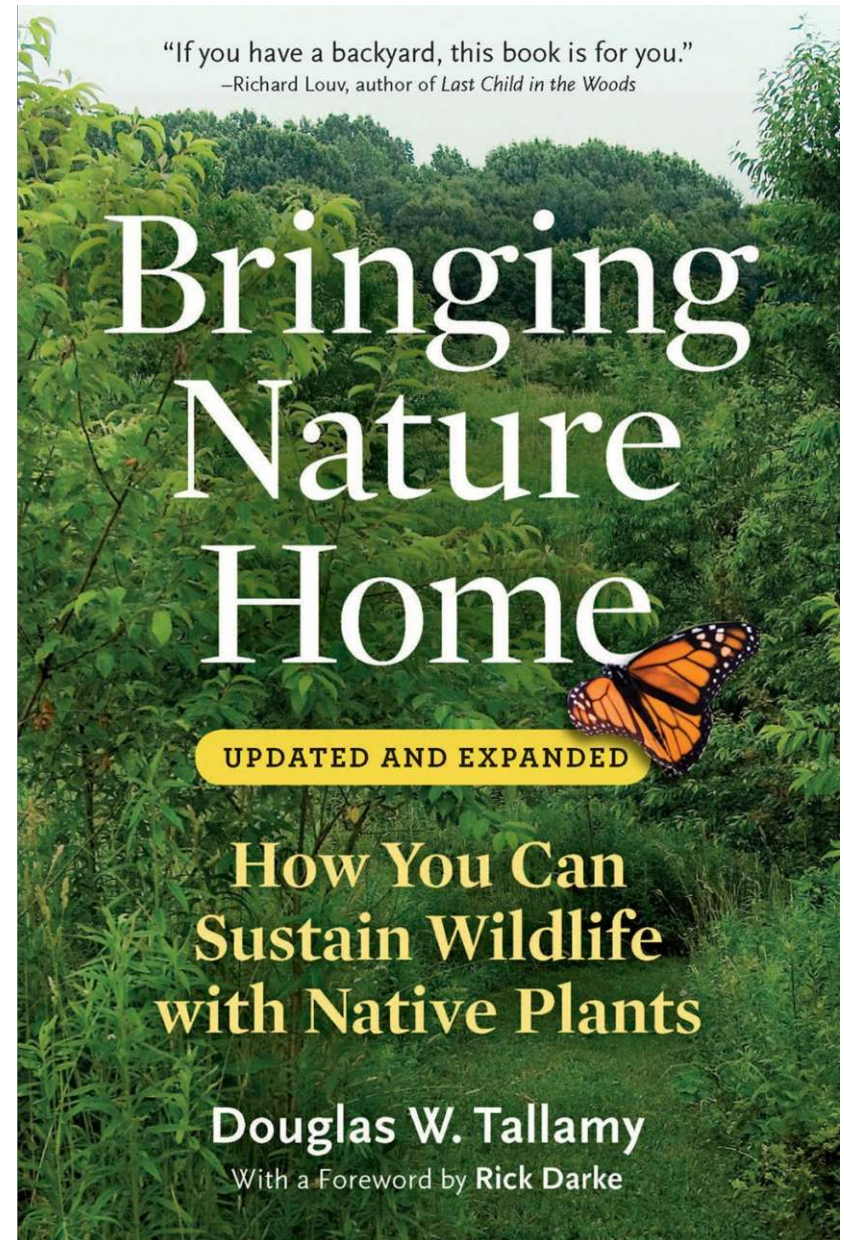
- Habitat loss
- Habitat fragmentation
- Climate change (heat, drought/flooding, etc.)
- Deer herbivory
- Pollution
- Pesticides
- Invasive plants and animals



What to plant?

Listen to the Doctor of insects!

- Limited space in our yards
- Make every inch count
- **Specific plants** are required by certain **caterpillars** (larval stage of Butterflies, Moths, etc.)
- **Super Genera** are plants that feed many insects and **host MORE** butterflies/moths



Caterpillar = Bird Food



Photo credit: Alamy

Doug Tallamy's List, Plant Genera	Ranked In Terms of Number of Caterpillar Species They Support	Common Name		
				
<i>Quercus</i>	557	Oaks	<i>Tsuga</i>	92 Hemlocks
<i>Prunus</i>	456	Cherries	<i>Spiraea</i>	89 Spireas
<i>Salix</i>	455	Willows	<i>Vitis</i>	79 Grapes
<i>Betula</i>	411	Birches	<i>Pseudotsuga</i>	76 Douglas for
<i>Populus</i>	367	Populars	<i>Robinia</i>	72 Locusts
<i>Malus</i>	308	Crabapples	<i>Carpinus</i>	68 Hornbeans
<i>Acer</i>	287	Maples	<i>Sorbus</i>	68 Mountain ashes
<i>Vaccinium</i>	297	Blueberries	<i>Comptonia</i>	64 Sweetfern
<i>Alnus</i>	255	Alders	<i>Hamamelis</i>	63 Witchhazels
<i>Carya</i>	235	Hickories	<i>Rhus</i>	58 Sumacs
<i>Ulmus</i>	215	Elms	<i>Rhododendron</i>	51 Rhododendrons
<i>Pinus</i>	201	Pines	<i>Thuja</i>	50 Arborvitae
<i>Crataegus</i>	168	Hawthorns	<i>Diospyros</i>	46 Persimmons
<i>Rubus</i>	163	Bramble berries	<i>Gleditsia</i>	46 Honey Locusts
<i>Picea</i>	150	Spruces	<i>Ceanothus</i>	45 New Jersey Tea
<i>Fraxinus</i>	149	Ashes	<i>Platanus</i>	45 Sycamores
<i>Tilia</i>	149	Linden	<i>Gaylussacia</i>	44 Huckleberry
<i>Pyrus</i>	138	Pears	<i>Celtis</i>	43 Hackberry
<i>Rosa</i>	135	Roses	<i>Juniperus</i>	42 Junipers
<i>Corylus</i>	131	Filberts	<i>Sambucus</i>	32 Elders
<i>Juglans</i>	129	Walnuts	<i>Physocarpus</i>	41 Ninebark
<i>Castanea</i>	127	Chestnuts	<i>Syringa</i>	40 Lilacs
<i>Fagus</i>	127	Beeches	<i>Ilex</i>	39 Ilex
<i>Amelanchier</i>	124	Serviceberry	<i>Sassafras</i>	38 Sassafras
<i>Larix</i>	121	Larches	<i>Lonicera</i>	37 Honeysuckles
<i>Cornus</i>	118	Dogwoods	<i>Liquidambar</i>	35 Sweetgums
<i>Abies</i>	117	Firs	<i>Kalmia</i>	33 Mountain laurel
<i>Myrica</i>	108	Bayberries	<i>Aesculus</i>	33 Buckeyes
<i>Viburnum</i>	104	Viburnums	<i>Parthenocissus</i>	32 Virginia Creeper
<i>Ribes</i>	99	Currents	<i>Photinia</i>	29 Photinias
<i>Ostrya</i>	94	Hop Hornbeam	<i>Nyssa</i>	26 Black Gums
			<i>Symphoricarpos</i>	25 Snowberries
			<i>Cydonia</i>	24 Quince
			<i>Ligustrum</i>	24 Privats
			<i>Shepherdia</i>	22 Buffaloberries
			<i>Liriodendron</i>	21 Tulip Trees
			<i>Magnolia</i>	21 Magnolias
			<i>Cephalanthus</i>	19 Buttonbush
			<i>Cercis</i>	19 Redbuds
			<i>Smilax</i>	19 Green-brier
			<i>Wisteria</i>	19 Wisterias

Another useful list from Dr. Tallamy

Herbaceous Plants

Common Name	Plant Genus	Butterfly/moth species supported
Goldenrod	Solidago	115
Asters	Aster	112
Sunflower	Helianthus	73
Joe pye, Boneset	Eupatorium	42
Morning glory	Ipomoea	39
Sedges	Carex	36
Honeysuckle	Lonicera	36
Lupine	Lupinus	33
Violets	Viola	29
Geraniums	Geranium	23

Black-eyed susan	Rudbeckia	17
Iris	Iris	17
Evening primrose	Oenothera	16
Milkweed	Asclepias	12
Verbena	Verbena	11
Beardtongue	Penstemon	8
Phlox	Phlox	8
Bee balm	Monarda	7
Veronica	Veronica	6
Little bluestem	Schizachyrium	6
Cardinal flower	Lobelia	4

Native Plants, Butterflies and Moths by Zip Code

nwf.org/NativePlantFinder/Plants/Trees-and-Shrubs

REGISTER LOGIN 25430 Search









Native Plant Finder
[BETA]

FIND NATIVE PLANTS FIND BUTTERFLIES MY LIST

Native Plants (By Category) - Trees and Shrubs

- Discover native plants, ranked by the number of butterfly and moth species that use them as host plants for their caterpillars.
- Save plants to [My List](#).
- Learn more about [why native plants are important and how to choose the best plants for you](#).

TREES AND SHRUBS

 ☆ SAVE 449 🦋	 ☆ SAVE 358 🦋	 ☆ SAVE 299 🦋	 ☆ SAVE 295 🦋
oak Quercus Fagales	beach plum, cherry, chokecherr ... Prunus Rosales	birch Betula Fagales	willow Salix Salicales
			

<https://www.nwf.org/NativePlantFinder/>



LARRY WEANER
THOMAS CHRISTOPHER

GARDEN REVOLUTION

**How our landscapes can be a
source of environmental change**

"This beautiful book shows us that guiding natural processes rather than fighting them is the key to creating healthier landscapes and happier gardeners. An essential addition to our knowledge of sustainable landscapes." —**DOUG TALLAMY**, author of *Bringing Nature Home* and *The Living Landscape*

Limiting factors

-Learn to work with the conditions on a site rather than attempting to alter. Attempts to alter the site (ex. fertilization) can result in more issues dealing with weeds.

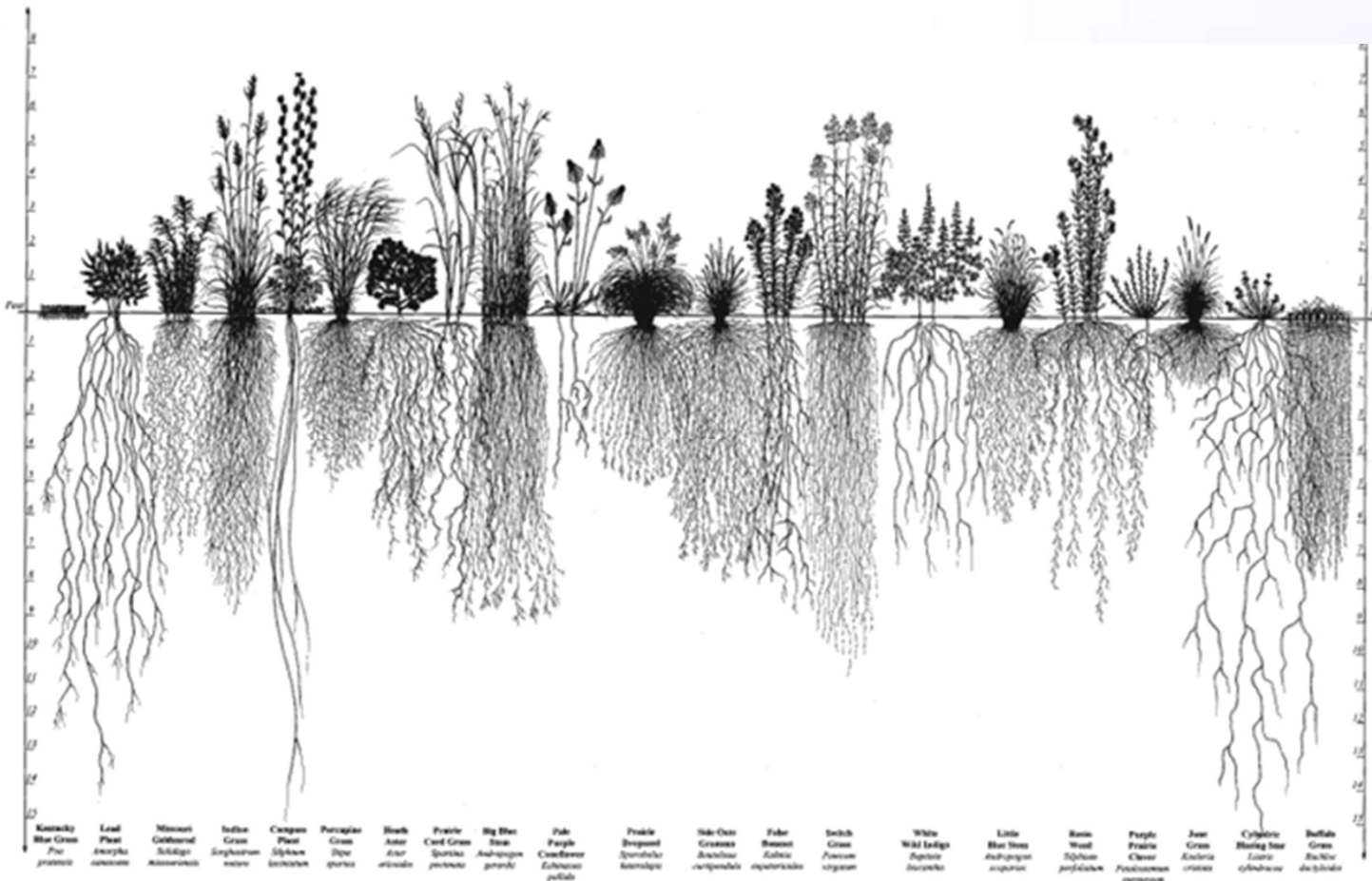
- **Existing vegetation**
- **Sun/Shade**
- **Wet/Dry Soil**
- **Drainage/Texture**
- **Hydrology**
- **Soil pH**
- **Exposed/Windy site**
- **Reflected heat**
- **Aspect (direction slope is facing)**
- **Soil fertility**
- **Engineered soil**
- **Winter/Salt exposure**
- **Deer herbivory**

Monoculture vs. Diverse Planting

A single species leaves a lot of open ground that requires mulch to stabilize:



A diversity chosen carefully can occupy separate niches above and below ground:



Plants with complimentary shapes above and below ground fit more tightly together and tolerate being side by side.

Events Following a Disturbance



Fast Growing Early Pioneer Species: “R” Selected Species



Eupatorium rugosum



Rudbeckia hirta

Long Lived Perennials: “K” Species



Culver's Root



Blue False Indigo







Design by: Native Havens LLC



Design by: Native Havens LLC

Active Period of Growth

- Cool Season

- Emerge when soil temps are cool (fall/winter/early spring)

- Grows/flowers during cool weather (fall, winter, early spring)

- Examples (Weeds): Garlic Mustard, Lesser Celandine, Chickweed, Henbit, turf grass

- (Desirable): Bulbs, Foamflower, Creeping Phlox, Golden Ragwort, Golden Alexanders, Bluebells, and many spring ephemerals (ex. Trillium, Bloodroot)

Active Period of Growth, cont.

- Warm Season

- Emerge when soil temps rise (mid-late spring)

- Grows/flowers in summer

- Examples (Weeds): Bindweed, Johnson Grass, Crabgrass, Knotweed, Yellow Nutsedge

- (Desirable): Lady Fern, Native Grasses, many North American native perennials (ex. Butterfly Weed, Coneflower, Garden Phlox, Bee Balm, Joe Pye Weed, Sunflowers, Anise Hyssop)

How does this apply?

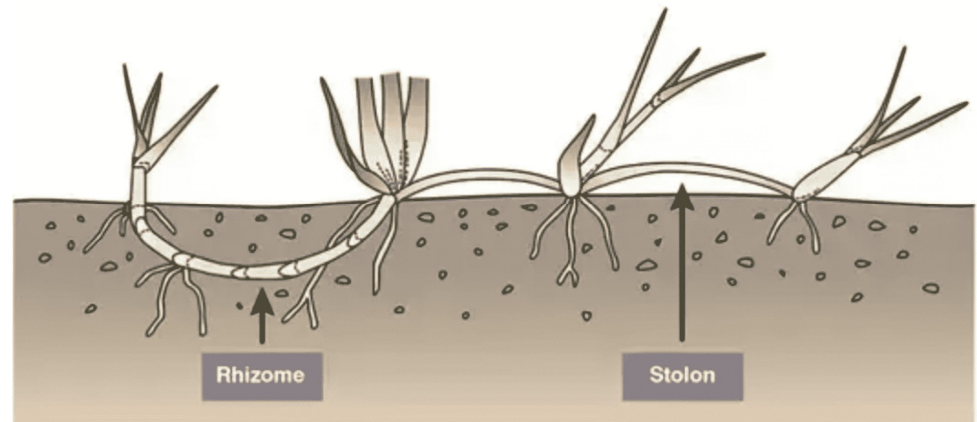
*Understanding a plants “active period of growth” helps us know:

- How to combine plants so they:
 - Make a **visual statement together** (if growing during the same season)
 - Some combinations **tolerate** being planted in the exact **same location**, b/c growing and flowering during different seasons and NOT COMPETING WITH EACH OTHER.

Understanding Roots and Seeds

- What are the plants' root systems like?

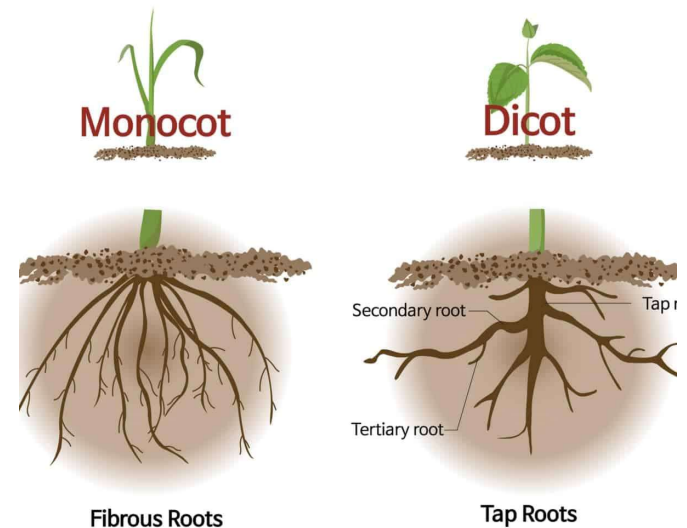
- Rhizome
- Stolon
- Fibrous/clumping
- Tap



- How does the plant spread?

- Clonal (Rhizome/Stolon)
 - How fast? How deep?
- Seeding
 - Seed dispersal (gravity, wind, ejection, animal)

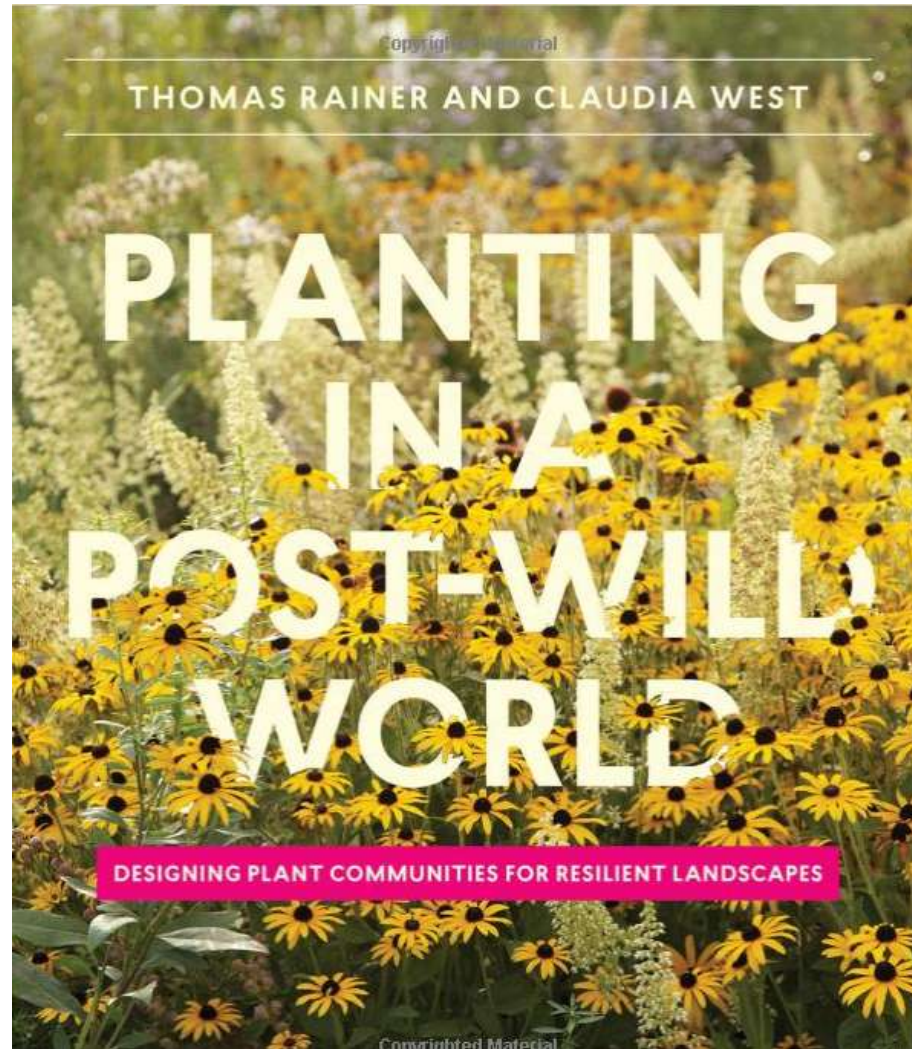
Monocot and Dicot Roots



Butterfly Milkweed growing with Grass



The “How-to”



Courtesy of Timber Press

Novel Plant Communities



Olympic Gardens Stratford, England

Design by: James Hitchmough

Lessons in Layered Planting from “Planting in a Post-Wild World”

Plants that occupy various niches in a stable garden:

Ground Cover Plants (50%)!!!

Seasonal Theme Plants (25-40%)

Structural Plants (10-15%)

Filler Plants (5-10%)

Groundcovers with Semi-Evergreen to Evergreen Basal Foliage (50% of planting)



Carex eburnea (Ivory Sedge)



'Eastern Star' White Wood Aster



Chrysogonum
virginianum
(Gold Star)

More Groundcovers



Robin's Plantain



Appalachian Barren Strawberry

More Groundcovers



Plantain Leaf Pussytoes



'Golden Fleece' Goldenrod

Groundcovers, cont.



'Brandywine' Foamflower

Design by:
Native Havens LLC

Seasonal Theme Plants (25-40% of planting)



Black Eyed Susan



Aster 'October Skies'



Zigzag Goldenrod

Structural Plants (10-15% of planting)



'Jacob Cline' Bee Balm



'Gateway' Joe Pye Weed



Switchgrass

Filler Plants (5-10% of planting)



Wild Columbine



Blue-Eyed Grass



Cardinal Flower

Plants Organized According to Function in the Garden or Plant Community

Botanic Name	Common Name	Type	Function	Ecological Value Notes	green Basal Foliage	Deer Resistance	Additional Comments
Allium cernuum	Nodding Onion	perennial	Filler Plant	Nectar source, attracts hummingbirds and butterflies	yes	high	12-18", fills in bare soil areas (deadhead if reseeding not desired), very drought tolerant and adaptable
Aquilegia canadensis	Eastern Red Columbine	perennial	Filler Plant	Larval host plant, Nectar source, attractive to Hummingbirds	yes	high	1-3', drought and tolerand, best with some shade, requires good drainage,
Coreopsis tinctoria	Plains Coreopsis	perennial	Filler Plant	Nectar source, attracts birds and butterflies	no	high	1-2', full sun to part shade, moist soil, short-lived perennial that can naturalize by seeding
Geranium maculatum	Spotted Geranium	perennial	Filler Plant	Nectar source	no	low	1-2', moist to dry soil, part shade to shade
Lobelia cardinalis	Cardinal Flower	perennial	Filler Plant	Nectar plant, attracts birds, butterflies, hummingbirds	yes	moderate	2-5', Red flowers for weeks during summer, best in moist soil, short-lived but can seed into scarified soil (e.g. creek bank)
Penstemon digitalis	Beardtongue	perennial	Filler Plant	Larval host plant, nectar plant	yes	high	special value to native bees
Penstemon smallii	Small's Beardtongue	perennial	Filler Plant	Larval host plant, nectar plant	yes	high	special value to native bees
Rudbeckia hirta	Brown-eyed Susan	perennial	Filler Plant	Larval host plant, nectar plant, attracts birds and bees	no	high	1-2', short-lived, but good temporary cover with flowers
Sisyrinchium angustifolium 'Lucerne'	Lucerne' Blue Eyed Grass	perennial	Filler Plant	Nectar plant, other wildlife value	yes	high	12", short-lived perennial with small Iris-like foliage, can perpetuate by seeding, prefers moist to average soil
Arctostaphylos uva-ursa	Bearberry	perennial	Ground Cover	Larval host plant, nectar plant	yes	high	4" tall, sun to part shade, requires good drainage (not clay)
Asarum canadensis	Wild ginger	perennial	Ground Cover	Larval host plant, other wildlife value	no	high	6-12", Inconspicuous flower, thick g/c for shade and drought tolerant
Aster divaricatus 'Eastern Star'	Eastern Star' White Wood Aster	perennial	Ground Cover	Larval host plant, nectar plant	yes	moderate	18-24", tolerates dry shade under other plants, hosts Pearl Cresnet and Checkerspot
Carex amphibola	Creek Sedge	sedge/grass/rush	Ground Cover	Larval host plant, nectar plant, seeds for birds	yes	high	12-18" tall, moist soil, sun to shade, wet to dry, adaptable
Carex appalachica	Appalachian Sedge	sedge/grass/rush	Ground Cover	Larval host plant, nectar plant, seeds for birds	yes	high	12", tolerates dry shade, tidy clumping habit
Carex cherokeensis	Cherokee Sedge	sedge/grass/rush	Ground Cover	Larval host plant, nectar plant, seeds for birds	yes	high	12-18" tall, moist to dry, sun to shade
Carex eburnia	Bristleleaf Sedge	sedge/grass/rush	Ground Cover	Larval host plant, nectar plant, seeds for birds	yes	high	6-8" tall, sun to shade, tolerates limestone soil and drought
Carex pennsylvanica	Pennsylvania Sedge	sedge/grass/rush	Ground Cover	Larval host plant, nectar plant, seeds for birds	yes	high	6-12" tall, dry shade, rhizomatous
Carex plantaginea	Seersucker Sedge	sedge/grass/rush	Ground Cover	Larval host plant, nectar plant, seeds for birds	yes	high	6-12" tall, moist shade to part shade, wider blade than most
Chorizanthe virginiana	Gold Star	perennial	Ground Cover	Nectar plant, other ecological value	yes	high	4-6" tall, part sun to part shade, moist/well-drained soil

<u>Botanic Name</u>	<u>Common Name</u>	<u>Type</u>	<u>Function</u>	<u>Ecological Value (not comprehensive)</u>	<u>Semi/Evergreen Basal Foliage</u>	<u>Deer Resistance</u>	<u>Additional Comments</u>
Antennaria plantaginifolia	Plantain-leaved Pussytoes	perennial	Ground Cover	Larval host plant, nectar plant	yes	high	3-6" tall, spreads by rhizomes, requires sun and well drained sites, tolerates dry gritty soil, inhibits weed growth, a must try!

More Lessons from “Planting in a Post-Wild World”

Plant Sociability Scale: how well do they play with others?

- Level 1: Single plants sporadically intermixed with other species (ex. Butterfly Weed)
- Level 2: Small groups of same plant where competition is excluded (ex. Black Eyed Susan)
- Level 3: Same plant growing in small patches where competition is excluded (ex. Purple Coneflower)
- Level 4: Same plant growing in extensive patches where competition is excluded in larger areas (Bee Balm, Short-tooth Mtn Mint)
- Level 5: Same plant growing in pure stands, excluding competition from intermingling (ex. Autumn Olive, Japanese Knotweed)

Aesthetics

- For my plantings to be successful, they need to be aesthetically pleasing, having a beneficial effect on people and wildlife alike.



Piet Oudolf



designing with plants

piet oudolf with noël kingsbury

Physical Traits: Form and Flower Shape from Piet Oudolf's- "Designing with Plants"

Iris



'Karmina' Geranium



Switchgrass



'Jelena' Phlox



Purple Coneflower



'Little Joe' Joe Pye Weed

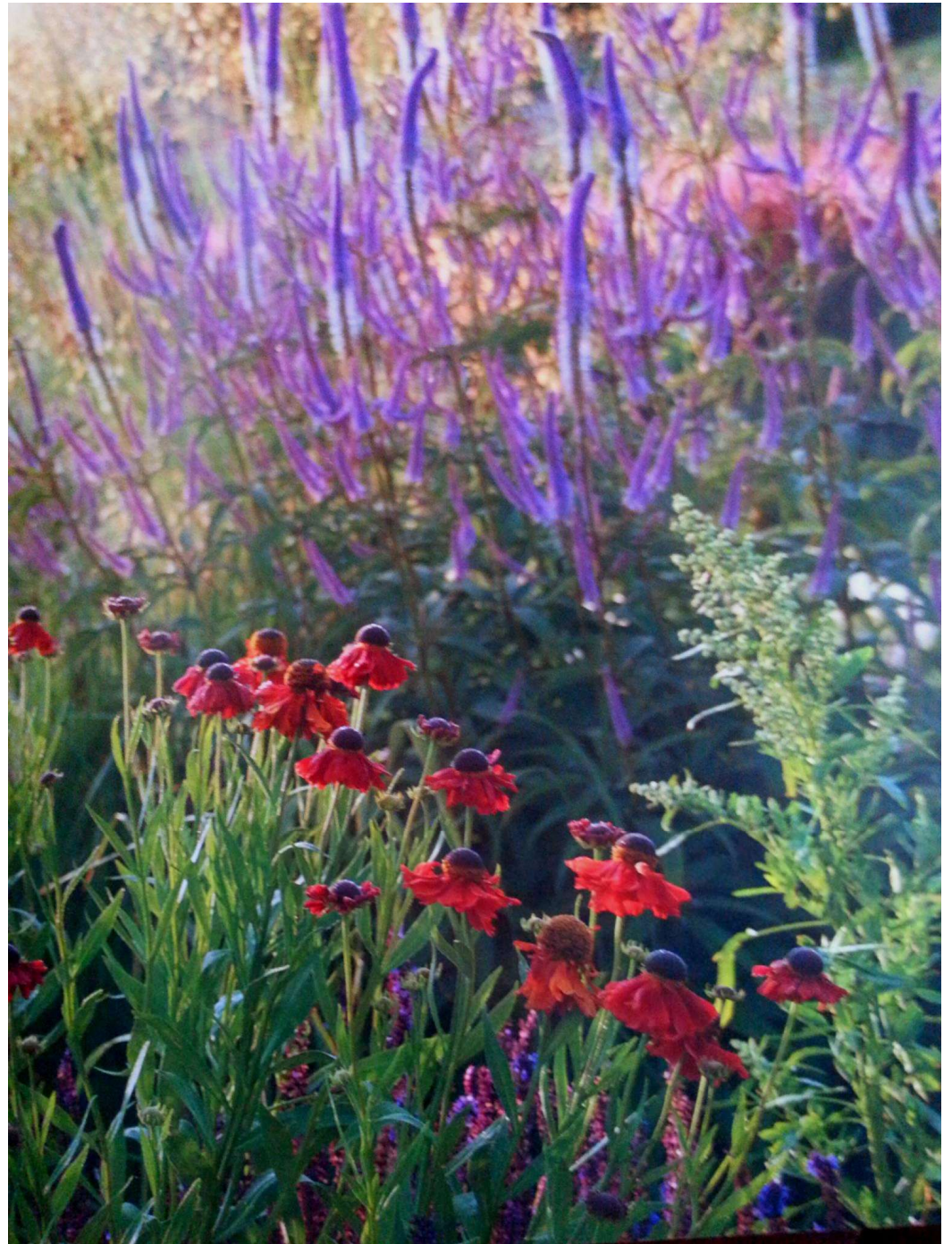


Agastache



Swamp Milkweed

An amplified
depiction of
nature



Piet Oudolf

Plant Companion Examples

- Butterfly Weed, Prairie Dropseed Grass
- Butterfly Weed, Side Oats Grass
- Butterfly Weed, *Coreopsis verticillata*
- Threadleaf Bluestar, Eastern Bee Balm, Robin's Plantain
- Threadleaf Bluestar, *Liatris spicata*
- PA Sedge w/ Columbine, Blue-stemmed Goldenrod
- Prairie Dropseed, Blazingstar, Pussytoes
- Sweetbay Magnolia, Gold Star (Green and Gold)
- VA Bluebell, Lady Fern
- Gold Star, Wild Bleeding Heart, Christmas Fern
- Gold Star, Mayapple
- Gold Star, Zigzag Goldenrod
- White Wood Aster, w/ Early Meadow Rue, or Columbine, or Solomon's Seal



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Doesn't Require Much Space!



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**Design by:
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Multi-functional Garden Spaces



Design by:
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Early Fall



Design by:
Native Havens LLC

Late Fall



Design by:
Native Havens LLC



Design by:
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Thank you!



My yard




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