

The **TOP 10** Lessons Learned in Managing Natural Areas From Design to Sign-Off

IASFM Conference
March 2019

Presented by Eric Japsen, MS, PWS, CPESC
Christopher B. Burke Engineering, Ltd.
March 14, 2019

Native landscape design

Effective installation &
maintenance

Avoid common pitfalls

Successes & sign-offs

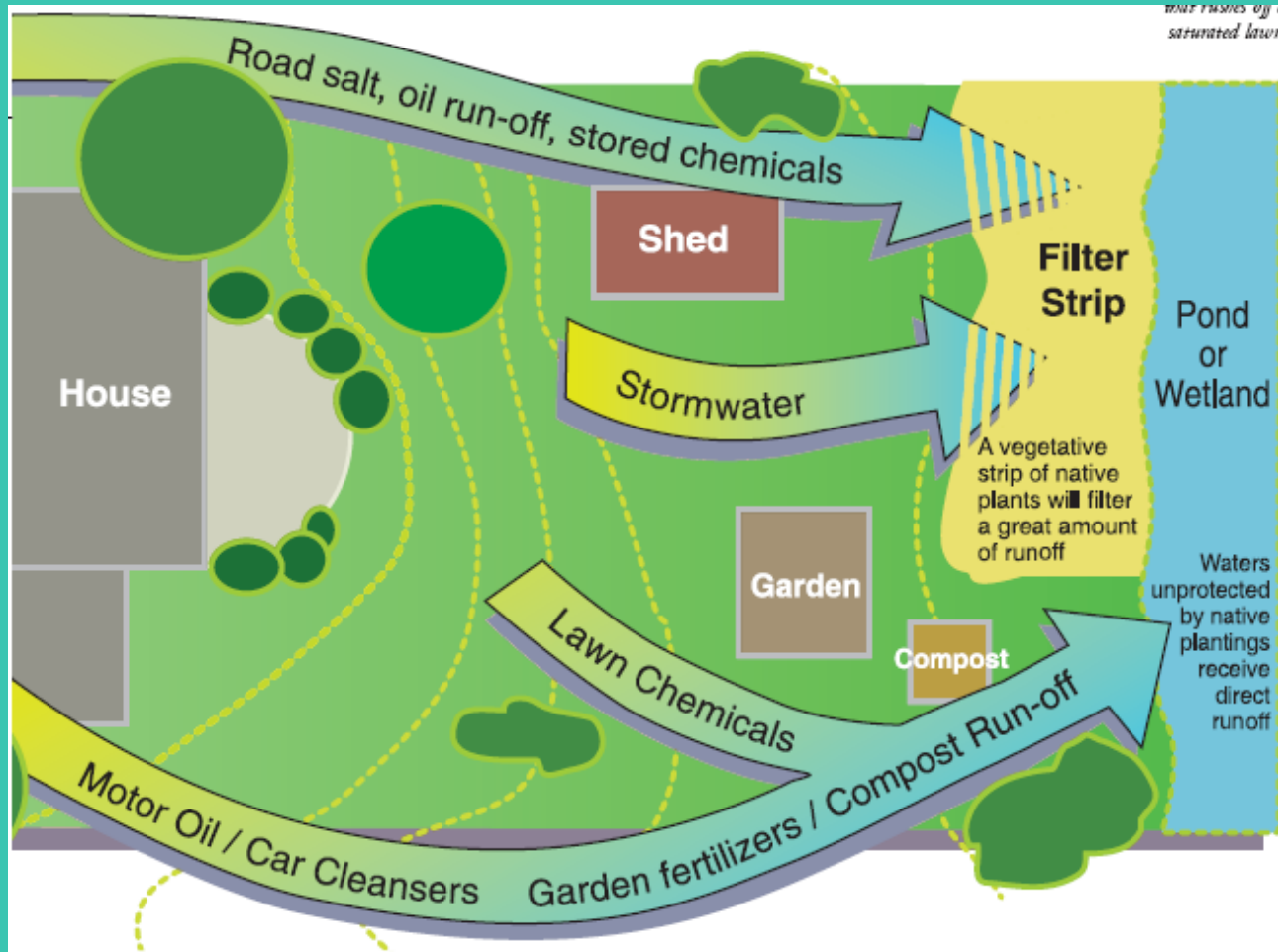
Best Management Practice (BMP)

A BMP is a method, device, or practice for removing, reducing, or preventing pollution in stormwater runoff from reaching receiving waters.

A typical BMP basin is designed as a stormwater detention facility providing flood storage

- Areas of open water, shallow safety shelf, and wetland / shoreline plantings
- Native prairie seeding on basin slopes

Why Require Native Vegetation?



- Storm water and surface water runoff carry pollutants into the waterway, degrading water quality.
- Surface water runoff can cause soil erosion and deposition of sediment and other substances in the surface water downstream.

10 Post-permit Maintenance

POTENTIAL PITFALLS

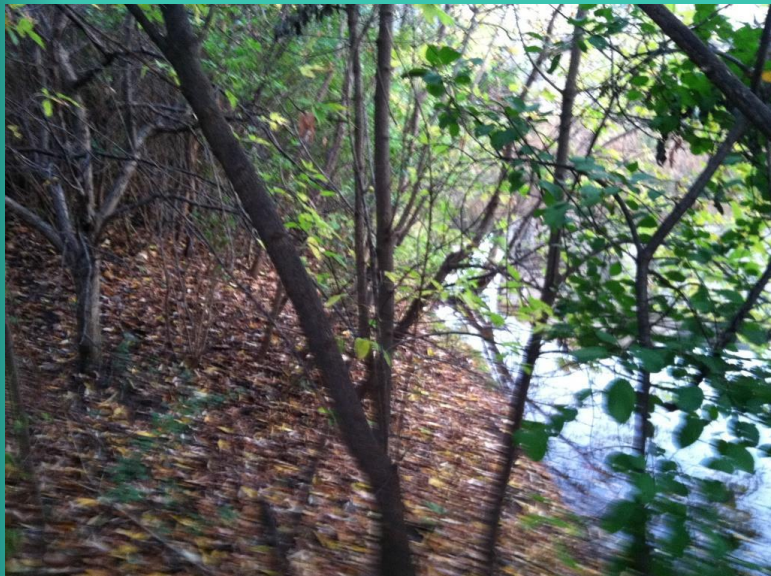
- Weedy / woody infestation over time
- Reduced budget, limited tasks
- Why do it?



9 Preserved Area Restoration

POTENTIAL PITFALLS

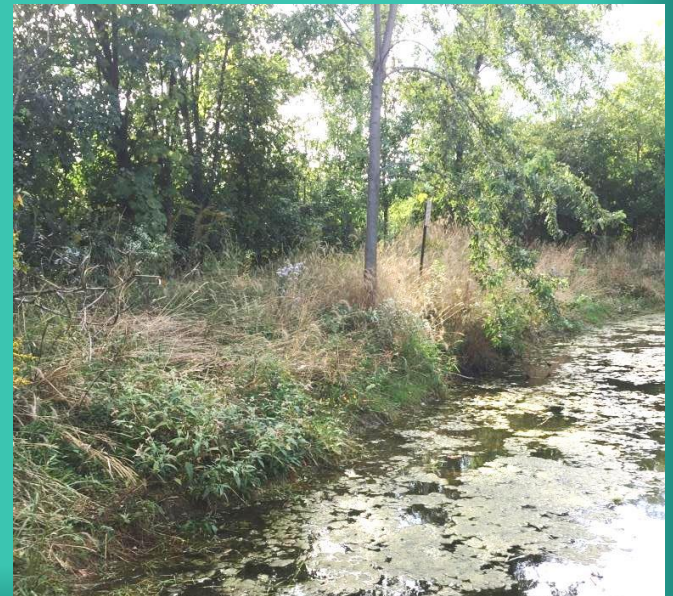
- Weedy area
 - Many generations of seed in seed 'bank'
- Short performance standard period, limited budget



9 Preserved Area Restoration

SOLUTIONS FOR SUCCESS

- Weedy area
 - Eat your Wheaties/weedies
 - Nuke bomb needed
 - Need to exhaust generations of seed over several seasons
- Short performance standard period, limited budget
 - Multiple plantings required
 - Good faith effort recommended
 - Play the game (\$\$ maintain until sign-off)



8 Native Plugs

POTENTIAL PITFALLS

- “Install up to 1’ deep” = low survival
- Species specified at improper depths
- Temp riser, rock check dam, or other BMP = high water and low survival



EMERGENT PLUGS – WEST WETLAND BOTTOM BASIN

C - Value	Ind. Status	Scientific Name	Common Name	Rate per Acre
4	OBL	<i>Alisma subcordatum</i>	water plantain	300
6	OBL	<i>Carex lacustris</i>	lake sedge	300
6	OBL	<i>Carex bebbii</i>	Bebb's sedge	300
5	OBL	<i>Iris virginica shrevei</i>	wild blue iris	300
7	OBL	<i>Juncus effusus</i>	soft rush	300
10	OBL	<i>Pontederia cordata</i>	pickerel weed	300
4	OBL	<i>Sagittaria latifolia</i>	common arrowhead	300
6	OBL	<i>Scirpus acutus</i>	hardstem bulrush	300
5	OBL	<i>Scirpus pungens</i>	chairmakers rush	300
4	OBL	<i>Scirpus atrovirens</i>	Dark green rush	300
6	OBL	<i>Scirpus cyperinus</i>	wool grass	300
4	OBL	<i>Scirpus fluviatilis</i>	river bulrush	300
5	OBL	<i>Scirpus validus creber</i>	great bulrush	300
6	OBL	<i>Sparganium eurycarpum</i>	giant bur-reed	300
Total Per Acre				4,200

8 Native Plugs

SOLUTIONS FOR SUCCESS

- ✓ Install shallower (at shallow end of spec)
 - Wet Meadow – Saturated soil
 - Emergent – Saturated soil to 3" deep
 - Aquatic – below NWL to 3' deep
- ✓ Temp riser, rock check dam, other BMP = high water
 - Delay plug installation until BMP removed (save some)
 - Move plugs shallower based on 'NWL' with BMP
 - Expect lower survival once design NWL restored

- Deep Emergent / Aquatic Zone (23,350 sf)

<i>Nymphaea tuberosa</i>	400 tuber spuds
<i>Nuphar advena</i>	20 rootstock
<i>Ceratophyllum demersum</i>	300 weighted mesh bags/plugs
<i>Ranunculus longirostris</i>	300 weighted mesh bags/plugs
<i>Potamogeton pectinatus</i>	300 weighted mesh bags/plugs

- Shallow Emergents (0-6" depth)

<i>Pontedaria cordata</i>	38 plugs*
<i>Scirpus fluviatilis</i>	76 plugs*
<i>Sparganium eurycarpum</i>	38 plugs*
<i>Sagittaria latifolia</i>	38 plugs*

***Note: Install shallow emergent species in the shallowest areas, so that at least 50% of foliage is above water surface.**

Wetland/Pond Plants



NATIVE PLANTS IN WETLAND/SHORELINE AREAS



**BLUE FLAG
IRIS**



WHITE WATER LILY



PICKEREL PLANT



BUR REED



ARROWHEAD



YELLOW POND LILY



**SOFT STEM
BULRUSH**

7 Native Seeding

POTENTIAL PITFALLS

- Low rates = slow establishment & weeds
- Is high diversity needed in seed mix?
- Distinct seeding zones or bands

Prairie/Savanna Seeding 780.5 to Limits of Grading

Permanent Grasses

Scientific Name	Common Name	Oz/Acre
Andropogon gerardii	Big Blue Stem	16.00
Bouteloua curtipendula	Side Oats Grama	16.00
Calamagrostis Canadensis	Blue joint grass	6.0
Elymus canadensis	Canada Wild Rye	22.00
Koeleria pyramidata	June grass	2.0
Panicum virgatum	Switch Grass	3.00
Schizachyrium scoparium	Little Blue Stem	32.00
Sorghastrum nutans	Indian Grass	32.00

Forbs

Asclepias tuberosa	Butterfly Weed	2.00
Aster novae-angliae	New England Aster	2.00
Aster laevis	Smooth blue aster	1.0
Cassia fasciculata	Partridge Pea	3.00
Coreopsis palmata	Prairie Coreopsis	2.00
Echinacea purpurea	Purple Coneflower	4.00
Eryngium yuccifolium	Rattlesnake master	3.0
Liatris aspera	Rough Blazing Star	1.00
Monarda fistulosa	Wild Bergamot	4.00
Penstemon candidum	White prairie clover	1.5
Potentilla arguta	Prairie Cinquefoil	1.00
Pycnanthemum vir.	Virginia Mountain Mint	1.00
Ratibida pinnata	Yellow Coneflower	4.00
Rudbeckia hirta	Black-Eyed Susan	4.00
Rudbeckia subtomentosa	Sweet Black-eyed Susan	1.0
Solidago juncea	Early Goldenrod	1.00
Tradescantia ohiensis	Spiderwort	4.0
Vernonia fasciculata	Common Ironweed	2.00

BUFFER Species List		BASIN 1 East		BASIN 2 NE		BASIN 3 Central		BASIN 4 NW		BASIN 5 SW		SOUTH BUFFE	
COMMON NAME	SCIENTIFIC NAME												
Big bluestem grass	<i>Andropogon gerardii</i>	X		X		X		X		X		X	
Pointed broom sedge	<i>Carex scoparia</i>												
Narrow-leaved oval sedge	<i>Carex tenera</i>												
Fox sedge	<i>Carex vulpinoidea</i>			X									
Virginia wild rye	<i>Elymus virginicus</i>									X			
Dudley's rush	<i>Juncus dudleyi</i>	X						X					
Switch grass	<i>Panicum virgatum</i>	X		X		X		X		X		X	
Little bluestem	<i>Schizachyrium scoparium</i>	X				X		X		X		X	
Indian grass	<i>Sorghastrum nutans</i>	X		X		X		X		X		X	
Wingstem	<i>Actinomeris alternifolia</i>												
Meadow anemone	<i>Anemone canadensis</i>												
Swamp milkweed	<i>Asclepias incarnata</i>												
New England aster	<i>Aster novae-angliae</i>	X		X		X		X		X		X	
Swamp aster	<i>Aster puniceus</i>			X						X			
White wild indigo	<i>Baptisia leucantha</i>	X				X		X		X		X	
Nodding beggars ticks	<i>Bidens cernua</i>												
Tall coreopsis	<i>Coreopsis tripteris</i>							X		X		X	
Showy tick trefoil	<i>Desmodium canadense</i>	X		X		X		X					
Joe pye weed	<i>Eupatorium maculatum</i>			X									
Common boneset	<i>Eupatorium perfoliatum</i>												
Sneezeweed	<i>Helenium autumnale</i>			X				X					
Prairie blazing star	<i>Liatris pycnostachya</i>	X				X		X		X			
Round-headed bush clover	<i>Lespedeza capitata</i>	X										X	
Water horehound	<i>Lycopus americanus</i>									X			
Wild bergamot	<i>Monarda fistulosa</i>	X		X		X		X		X		X	
Beard tongue	<i>Penstemon digitalis</i>	X		X		X		X		X		X	
Common mountain mint	<i>Pycnanthemum virginianum</i>	X		X		X		X		X		X	
Yellow coneflower	<i>Ratibida pinnata</i>	X		X		X		X		X		X	
Black-eyed susan	<i>Rudbeckia hirta</i>			X		X				X			
Prairie dock	<i>Silphium terebinthinaceum</i>												
Late goldenrod	<i>Solidago gigantea</i>	X		X		X				X		X	
Stiff goldenrod	<i>Solidago rigida</i>	X		X		X		X		X		X	
Woundwort	<i>Stachys palustris</i>												
Common spiderwort	<i>Tradescantia ohioensis</i>												
Blue vervain	<i>Verbena hastata</i>					X							
Ironweed	<i>Vernonia fasciculata</i>	X		X				X					
Golden alexanders	<i>Zizia aurea</i>	X		X		X		X		X			
Oats/ Annual rye	<i>Avena sativa/ Lolium multiflorum</i>												
PERCENT PRESENCE OF 37 SPECIES		46%		49%		46%		47%		51%		38%	

7 Native Seeding

SOLUTIONS FOR SUCCESS

- ✓ Install >1.5 or 2 times specified rate
 - ✓ Prairie grasses, then wildflowers (maintenance)
- ✓ Propose a less diverse, hardy seed mix per site conditions/soils
- ✓ Overlap seed mixes on basin slopes, NWL to HWL
 - Will actual conditions/water levels be higher or lower than design?
 - Temp riser, rock check dam, flood, drought
 - = Stabilization

NATIVE PRAIRIE PLANTS



**WHITE PRAIRIE
CLOVER**



LITTLE BLUESTEM



BLACK EYED SUSAN



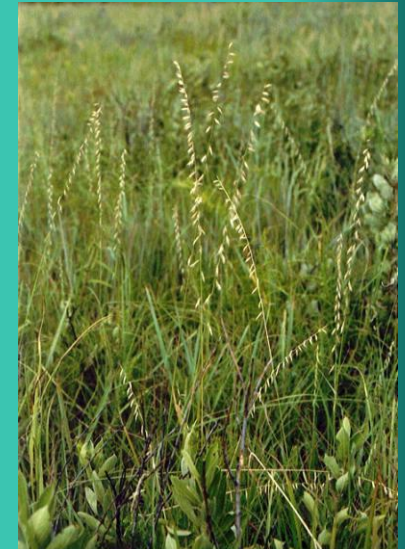
**SIDE OATS
GRAMA**



**PURPLE CONE
FLOWER**



WILD BERGAMOT, BEE BALM



**SIDE OATS
GRAMA**

6 Native Maintenance

Potential Pitfall

Stormwater Structures

- Temp riser, rock check dam = high water
 - Can kill plugs and seedings
 - Sediment / debris accumulation
- Clogged outfall inlet = high water
 - Can kill plugs and seedings
 - Sediment / debris accumulation

6 Native Maintenance

SOLUTIONS FOR SUCCESS

Stormwater Structures

- ✓ Temp riser, rock check dam = high water
 - ✓ Delay plug installation (save some)
 - ✓ Move plugs shallower

- ✓ Clear outfall inlets
 - ✓ Periodically
 - ✓ After heavy rains
 - ✓ After weed control



5 Native Maintenance

POTENTIAL PITFALL

Restoration

- It's installed – forget about it!
 - A tale of cattails, Phragmites, and willows; teasel, thistle, and buckthorn
- Misidentification
 - Bad or good, weed or native?



5 Native Maintenance

SOLUTIONS FOR SUCCESS

Restoration

- ✓ The sooner the better!

Sequel to a tale of cattails & Phragmites – then there's plugs.

- ✓ No Miss - identification

Learn it, know it, manage it (or hire staff that does)



4 Native Maintenance

POTENTIAL PITFALL

Algae / Aquatic Plants

- Basin plugs and algae don't mix
 - Dense algae canopy vs aquatic plants
 - Shades / drowns plugs in the early establishment period



✓ Algaecide doesn't kill plugs;
algae does

Remove canopy, allow sunlight
Proactively apply and when 10%
basin/perimeter coverage

3 Controlled Burning

POTENTIAL PITFALL

- Human health risk
 - Burn crew, residents nearby, traffic
- Property damage possible
 - siding, utility lines, etc.
- Disturbance can result in weed infestation
- Requires Neighbor Notifications (w/in +/-500 feet)
- Requires IL Open Burn Permit, possible local permit
 - Fire, Police notice/coordination





#2 NO ENCROACHMENT ALLOWED **(It's All About Good PR)**

- **DO NOT DUMP GARDEN OR LAWN WASTE IN NATURAL AREAS**

Native vegetation is smothered and killed by lawn waste.

- **DO NOT INSTALL LANDSCAPING**

Non-native trees, flowers, and grasses can spread just like weeds

- **DO NOT PLACE PLAY EQUIPMENT IN NATURAL AREAS**

Native vegetation will be trampled by heavy foot traffic.

- **DO NOT WEED, RE-SEED, OR SOD THE BUFFER**

Buffers are required to consist of native vegetation, not lawn grass. Professionals are needed to manage these areas.

- **DO NOT MOW THE BUFFER**

After the initial establishment period when limited mowing may be useful.

Balance water quality, ecology & aesthetics



Challenge – convince John & Jane Q. Public that vegetation growth in water is a good thing!

WILDLIFE SPECIES COMMON TO NATURAL AREAS



**SCREECH
OWL**



BULL FROG



TURTLE



BLACKSTRIPE TOPMINNOW



REDWING BLACKBIRD



DAMSEL FLY



EGRET



BLUE HERON



MONARCH BUTTERFLY

1 Agency Sign-off

SOLUTIONS FOR SUCCESS

- On-site meeting with PM
 - ✓ Review permit requirements before
 - ✓ M&M visit prior to meeting (trash, weed control, etc.)
 - ✓ Site condition speaks for itself
 - ✓ Give 'em a bouquet of flowers
 - ✓ Schedule meeting accordingly



QUESTIONS?

ejapsen@cbbel.com

