A Tale of Two Gardens:

Mini-Wetlands That Are Paying It Forward

Carolyn Aita

DNR Healthy Lakes Initiative Grants

Rain Garden (2016-2018) and Lakeshore Native Plantings (2017-2019)

Liaison: Beaver Dam Lake Improvement Association

Beaver Dam Lake is a littoral lake with a mud-silt bottom on the northwest edge of the Upper Rock watershed.

Healthy Lakes Project Goals

- Overarching goal is to plant “mini-wetlands” that collect and filter rain and lawn run-off and return this captured water to the aquifer.
- Collateral goal is provide habitats for indigenous invertebrates, esp. pollinators, butterflies, and moths, at a time when their global habitats are disappearing.

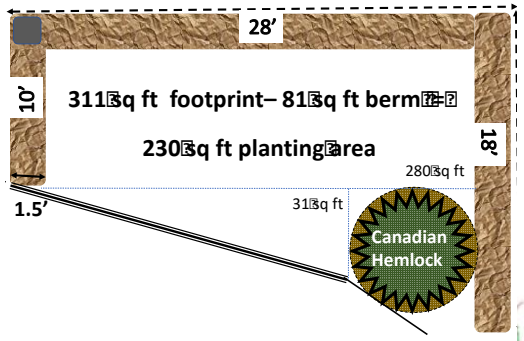
Special Concern: Gardens’ response to the severe non-seasonal flooding in 2018.

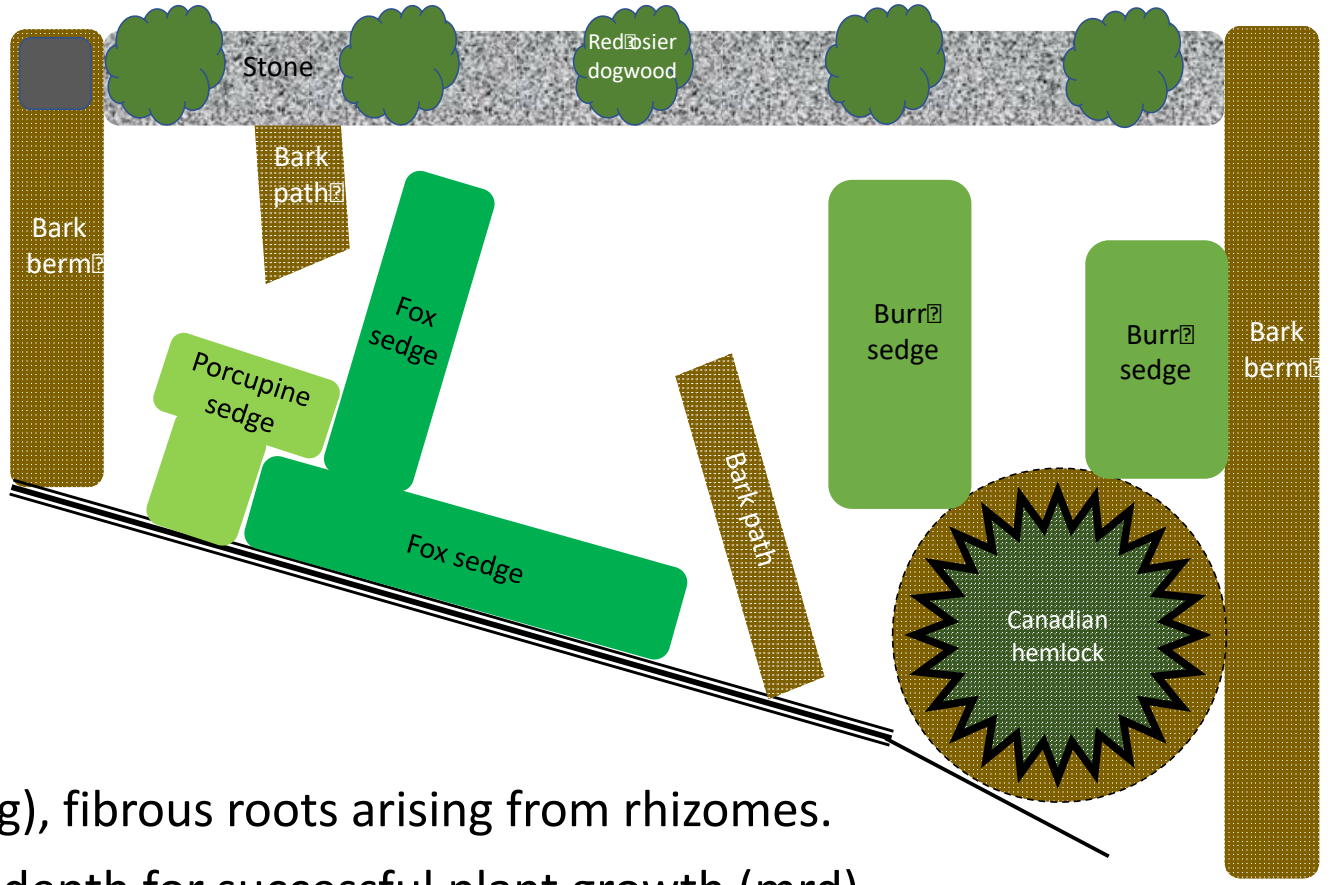
Lay of the Land at W11254 Lake Road, Randolph

[All animal photos taken by Michael Aita]

Rain Garden Real Estate: Sedge Framework

38% non-woody plant area (80 sq ft) is sedge.





Porcupine:
short rhizomes

Burr:
short rhizomes
8”mrd

Fox:
long rhizomes
16”mrd

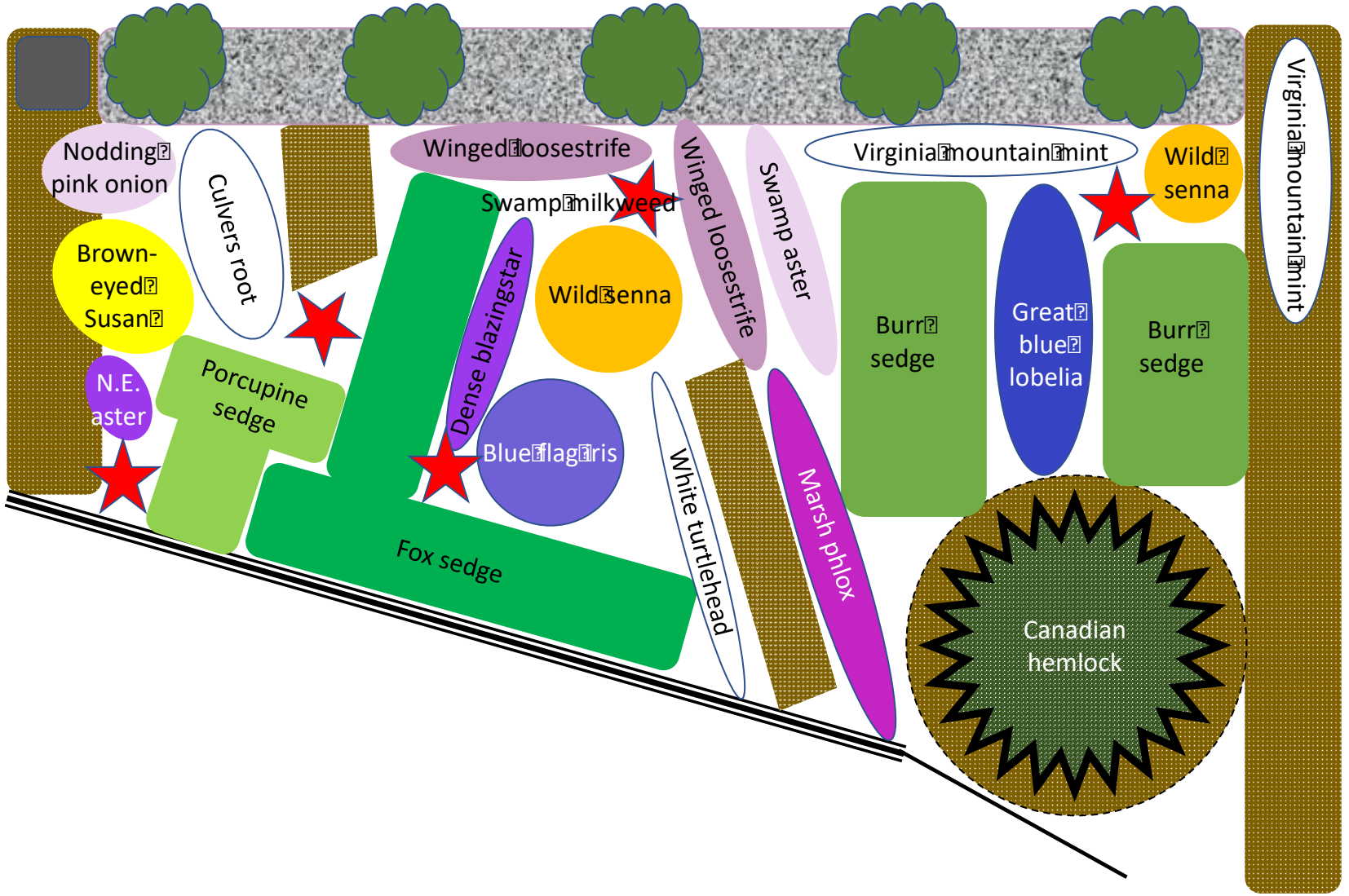
About Wisconsin sedges:

-Cespitose (clump-forming), fibrous roots arising from rhizomes.

- Range of minimum root depth for successful plant growth (mrd).

Root descriptions and photos from Louise Butler Wildflower Garden website. mrd from USDA. Great local resource: “Field Guide To Wisconsin Sedges” Andrew L. Hipp, U. Wisc. Press (2008).

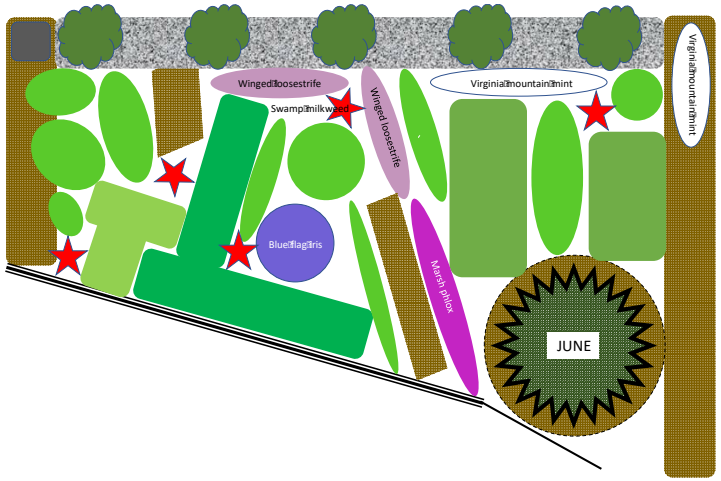
Rain Garden 2018

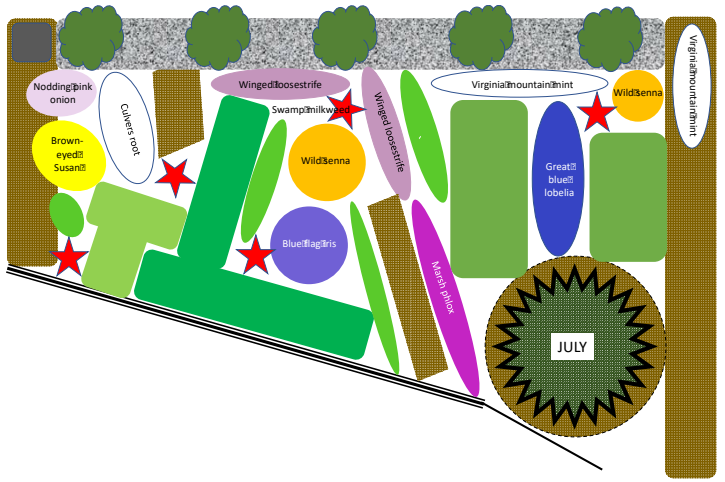


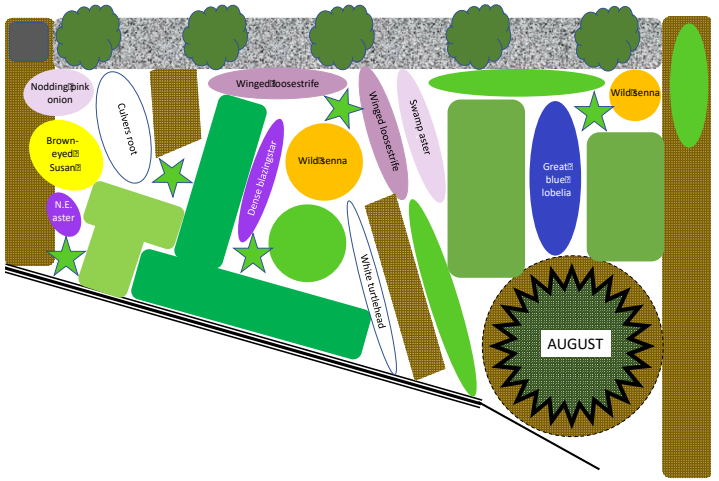
Species	mrd*
N.P. onion	3”
Burr sedge	8”
Marsh phlox	8”
Swamp aster	10”
Dense blazingstar	14”
Fox sedge	16”
Swamp milkweed	18”

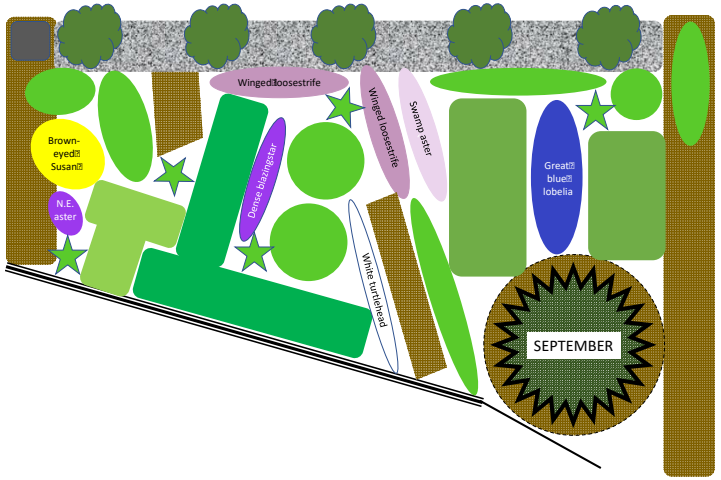
(*Minimum root depth)

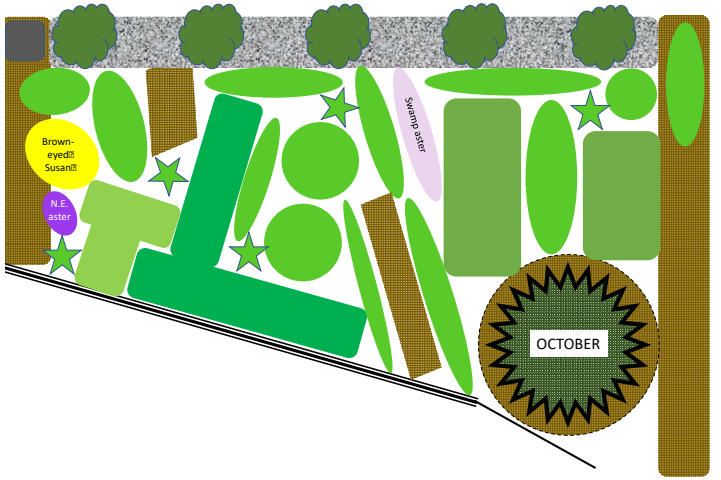
Rain Garden Blooming Forbs Through the Native Bee Flight Season

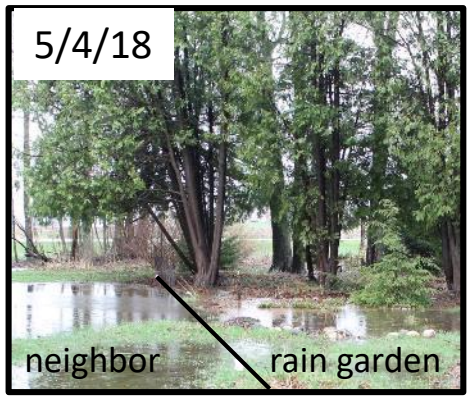












Late April to mid June brought significant flooding, but the RG "greened up" by the end of June and thrived in the early and mid July sun.

Wild Senna

Hemlock

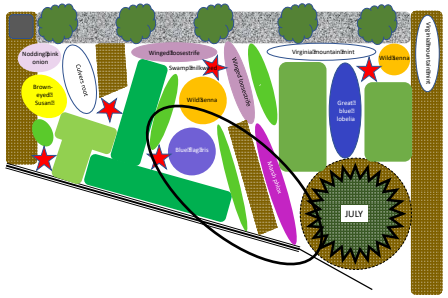
Marsh phlox

Fox sedge

Swamp Milkweed

7/14/18

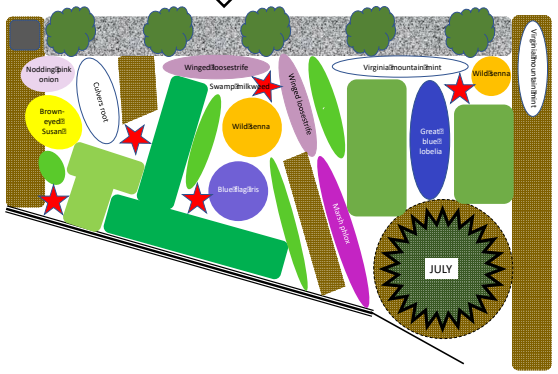
7/6/18



July 1, 2018

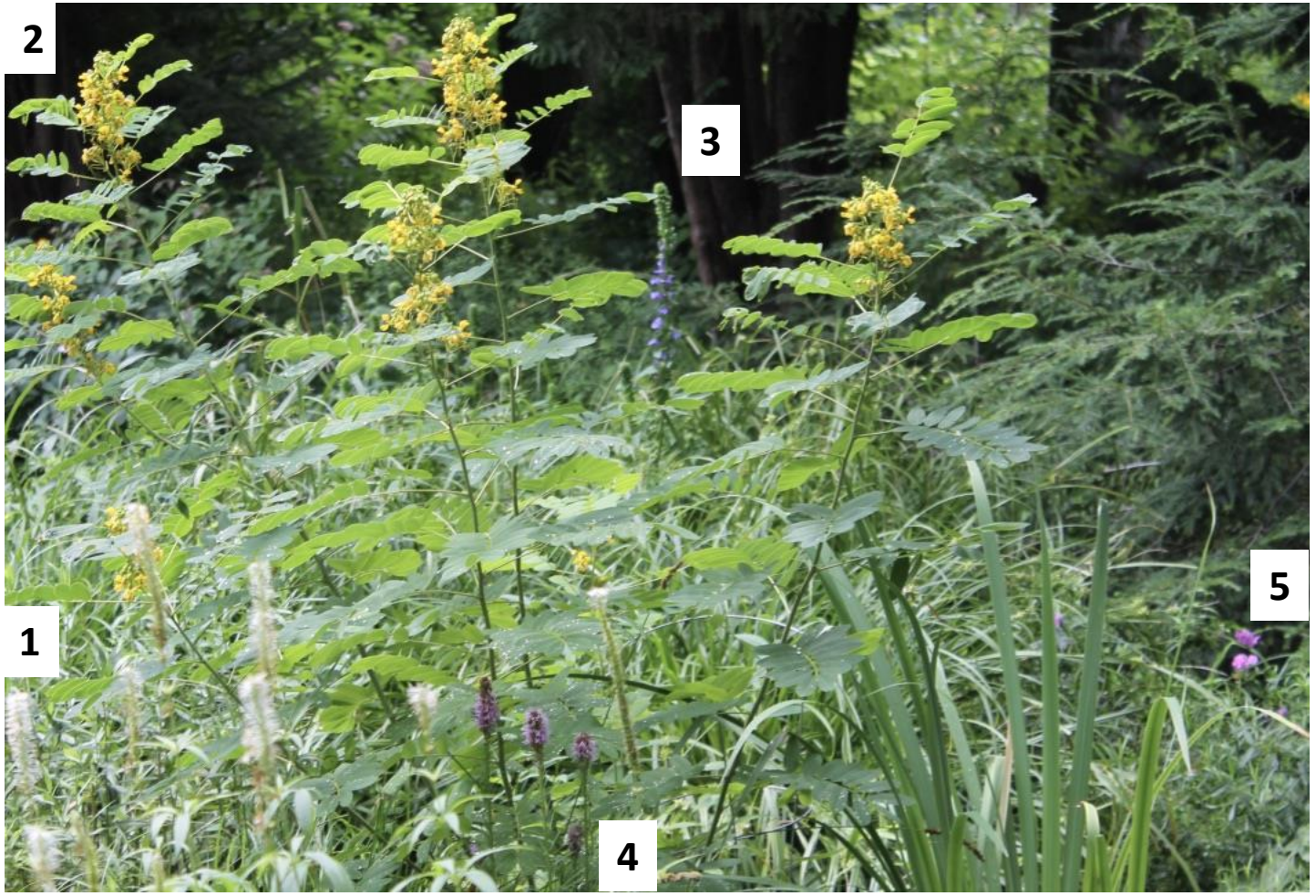
Blue flag iris

H_2O flow



July 20, 2018: RAIN! 5.5” in 12 h! Winged loosestrife in standing water immediately after rainstorm and influx of water from flooded lawn on neighboring property.

After doing hard infiltration work in late July, the rain garden dries and thrives in early August.



August 6, 2018

Flowering forbs:

1. Culver's root
2. Wild senna
3. Great blue lobelia
4. Dense Blazingstar
5. Marsh phlox

Bumble bee on Culver's root

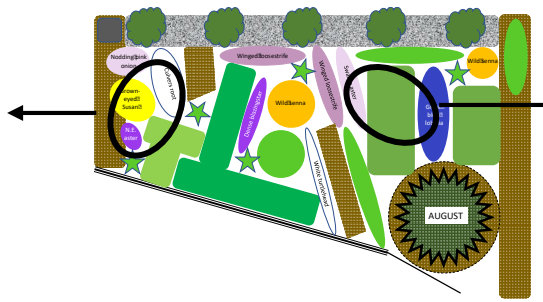
Late August-early September 2018 brought record-breaking rain. 14” of rain fell between August 26-29 and an additional 2” rainfall on September 2. Two vignettes after 9” rainfall on August 28.

Culver’s root

Porcupine sedge

Brown-eyed susan

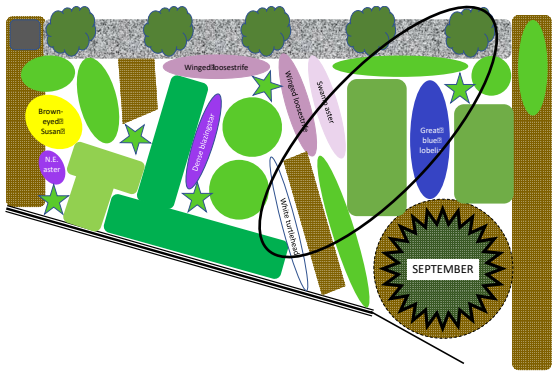
New England aster

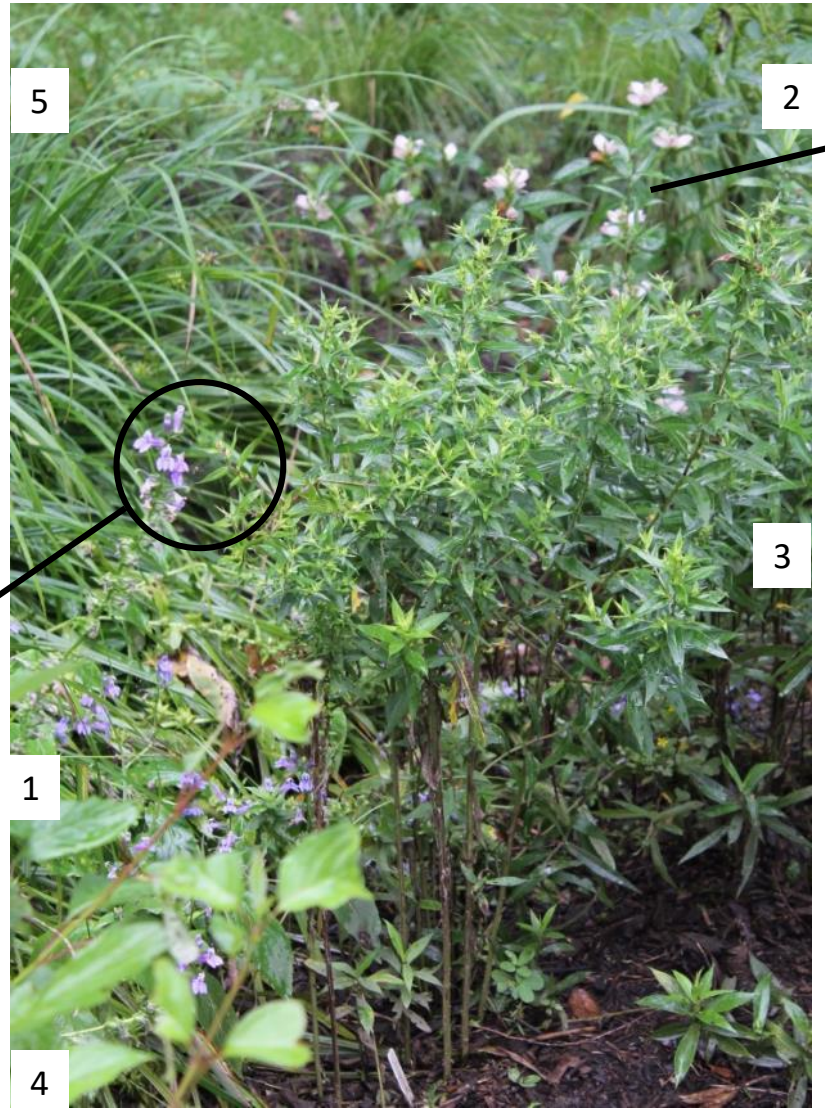


Saturated soil but robust plants

Burr sedge and great blue lobelia

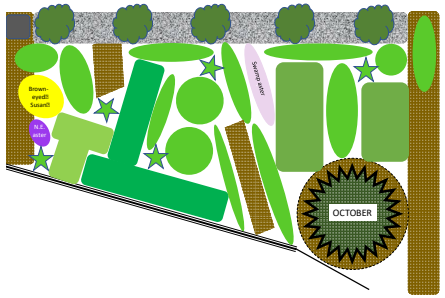
September 3, 2018





Undefeated RG after record 16” rainfall since August 26.

1. Great blue lobelia
2. Turtlehead
3. Swamp (red-stemmed) aster
4. Red osier dogwood
5. Burr sedge



October 21, 2018

Last blooms of the season and dried seed pods in the RG.

Brown-eyed susan

Swamp aster

New England aster

Burr sedge

Dense blazingstar

Wild senna

The Rain Garden Works!

The rain garden we created is a palustrine wetland with a persistent emergent habitat.* It is seasonally flooded (in the spring) and temporarily flooded throughout the growing season. The RG is successful in water infiltration (flooding typically empties within 24 h) and erosion control (plants do not float around when the garden is flooded).

*See Classification of Wetlands and Deepwater Habitats" Federal Geographic Data Committee-STD004-2013. "Persistent emergent"

means "the stems and leaves of the RG sedges and forbs are typically visible throughout the year.

Consider our goals, **rainwater infiltration** and **soil erosion control**, in terms of three plant growth characteristics:*

(1) Shoot biomass.

(2) Root biomass.

(3) Deep/shallow** root biomass.

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*See: UW Aboretum Leaflet 15 (research by students in UW-Madison, Adaptive Restoration Lab, Botany 670 Class 2007) and references within.

**Shallow root is <6” below soil surface.

How The Rain Garden Plants Do Their Jobs*

Rainwater infiltration.

- Large deep rhizomatous and/or fibrous root biomass provides water access to deep soil:

  Fox sedge, porcupine sedge, swamp aster (a). **Dense blazingstar, swamp milkweed** (b).

- Deep taproot (live or dead) provides conduit:

  Culver's root, wild senna (c).

Soil erosion control on flat ground, e.g. rain garden.

- Large shallow root biomass anchors soil in first 6" below surface.

  Culver's root, great blue lobelia (a).**Burr sedge, marsh phlox, nodding pink onion** (b).

  Note: On slight slope, e.g. lakeshore garden, occasional deep root "anchor" species are necessary.

- Large shoot biomass near soil surface diffuses flowing water movement, reduces drag on plants.

  Fox sedge, porcupine sedge, swamp milkweed (a).

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*Published data for 11 of 14 rain garden species.

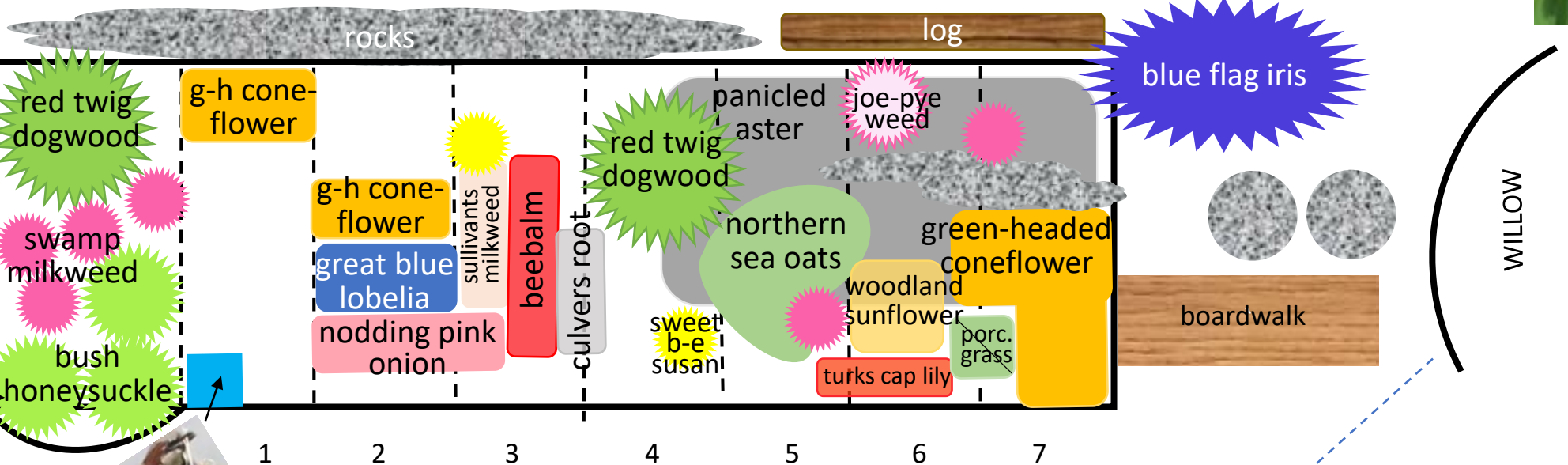
(a) UW Arboretum Leaflet 15; (b) minimum root depth, USDA; (c) USDA fact sheet.

Lakeshore Plantings In Progress (2017-2019)

Beaver Dam Lake

Garden area:
15 ft x 50 ft = 750 sq ft

6/9/18



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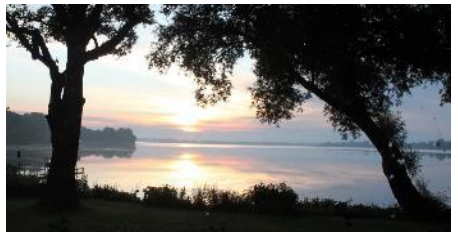
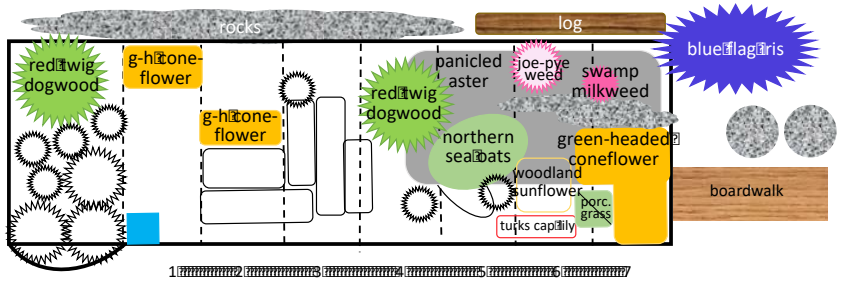


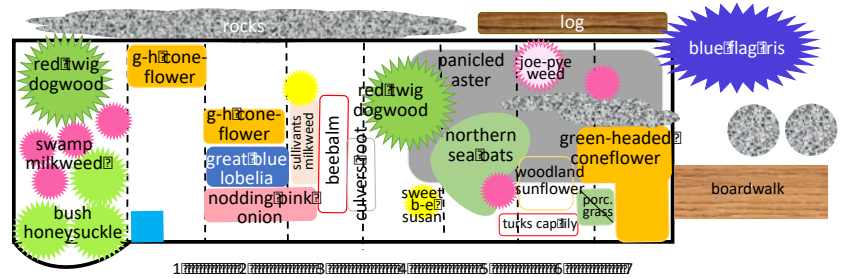
sunrise, summer solstice

Restoration and New Lakeshore Native Plantings

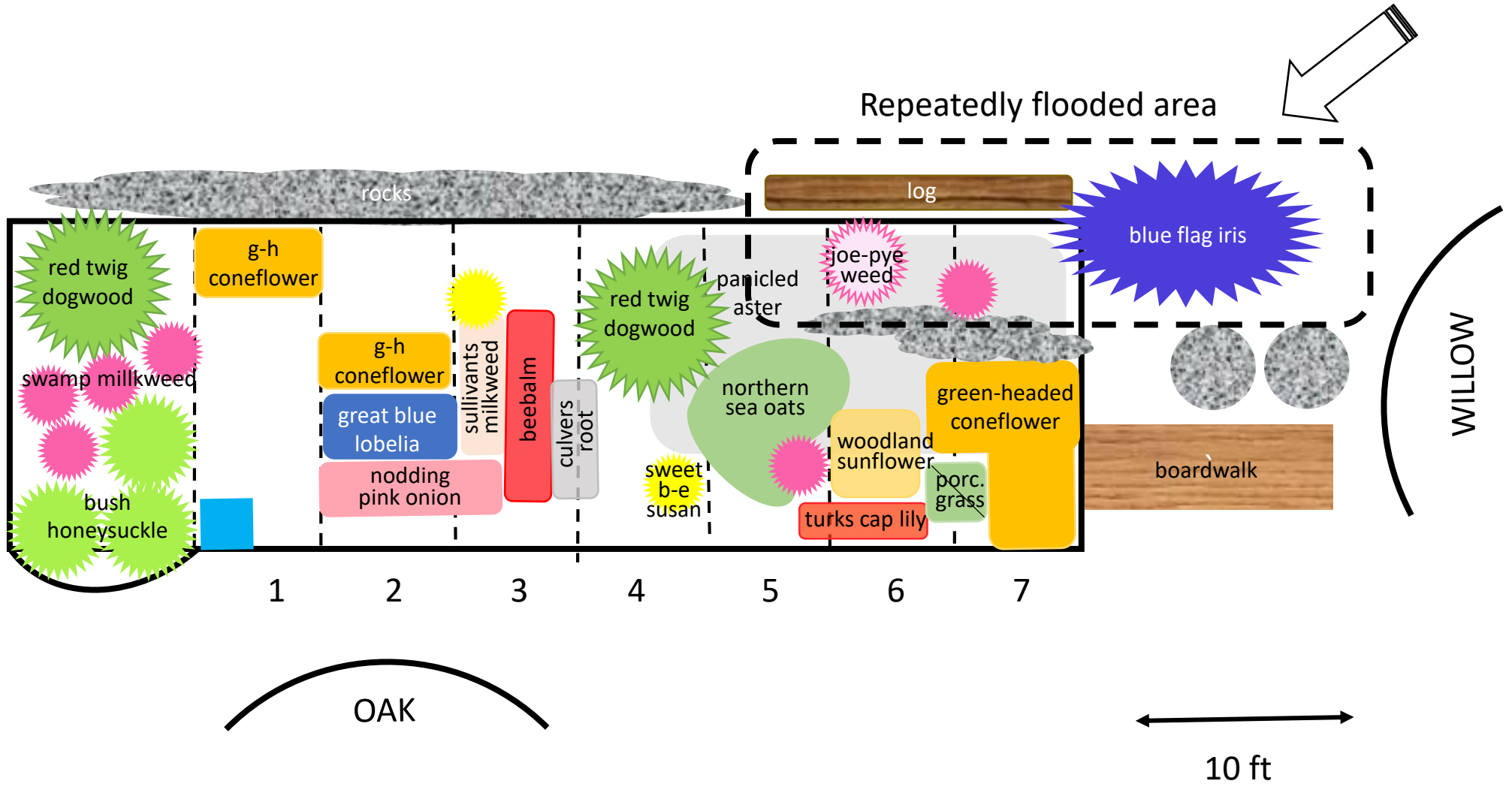
A. Colored shapes indicate plantings retained after removing exotics and undesirable volunteers. Black-outlined white shapes indicate position of new plantings that were added during first two growing seasons, 2017, 2018. Photos show retained plantings thriving in late **July 2017**.



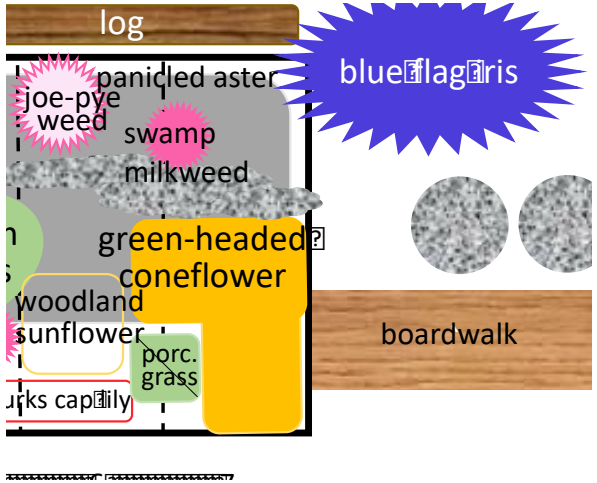
B. Retained and new plantings in early **August 2018**.



Lakeshore Native Plantings: Major Flooding in Late August – Early September 2018



SEPT. 3, 2018: 16” of rainfall since 8/26 + influx of water from Beaver Creek caused major flooding of part of the lakeshore garden.



Take heart! Every "surprise" presents an opportunity.

(1) Acknowledge changing habitat of flooded region.

(2) After assessing damage, take cue from Mother Nature. Replace plants that disappeared with species related to survivors.

April 7, 2019: Oh joy! Blue flag iris in flooded area has begun to send up shoots and again, as the season begins, has started **PAYING IT FORWARD.**

THANK YOU FOR YOUR ATTENTION

[All animal photos taken by Michael Aita]