BALANCING NATIVE PLANT SELECTION AND DESIGN WITH FLUCTUATING LAKE LEVELS AND AESTHETICS

By Jim Brueck

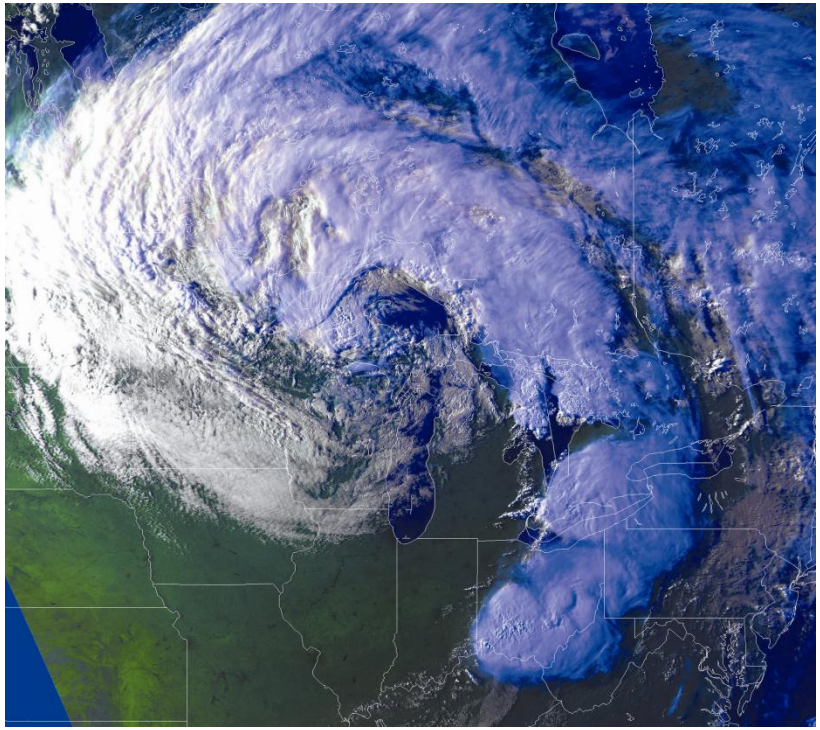
Owner, Native Lakescapes, LLC.

CLIMATE TRENDS

AVON LAKE PROJECT

MIDDLE LAKE PROJECT

Historical and Projected Future Climate Changes in the Great Lakes Region



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GLISA
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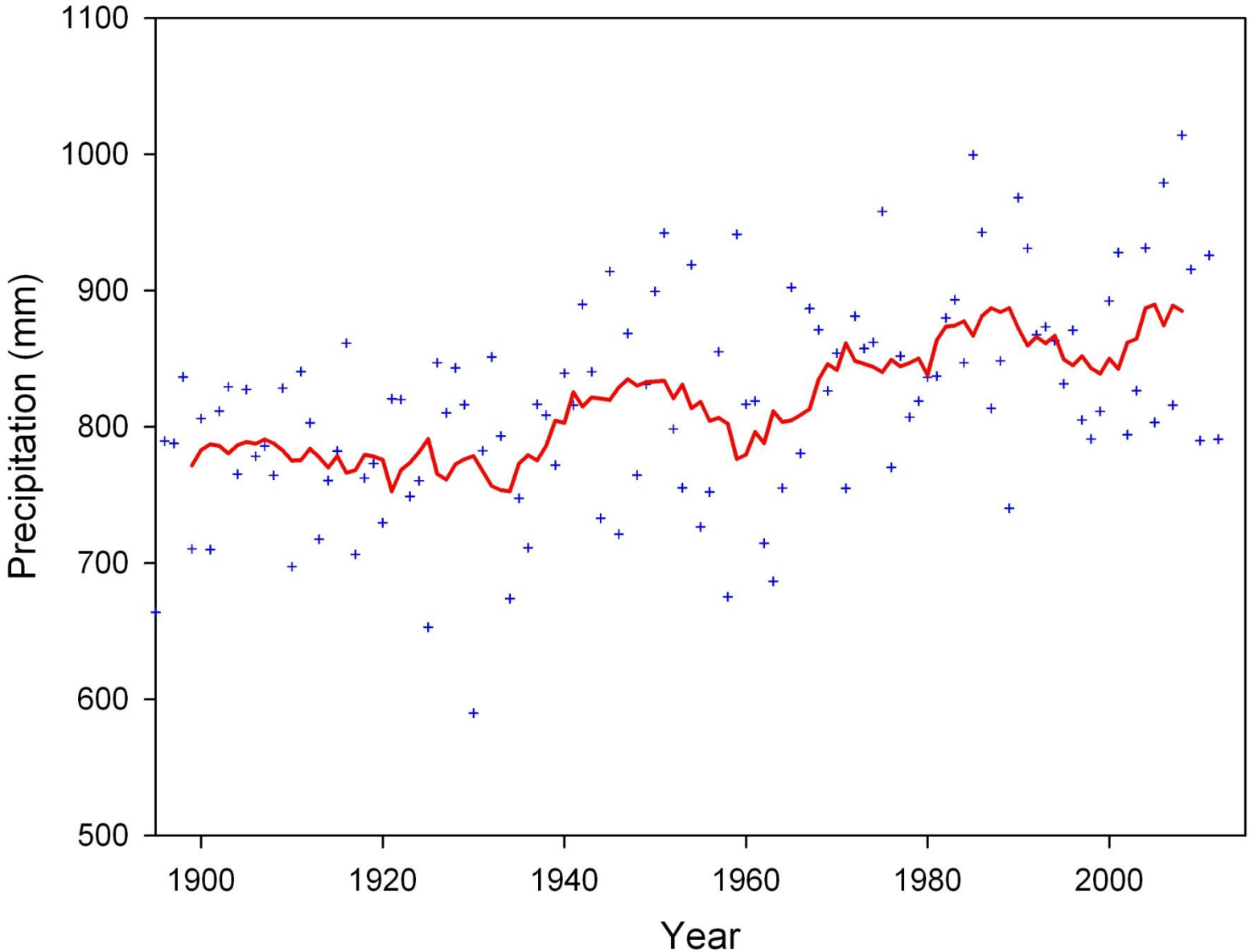
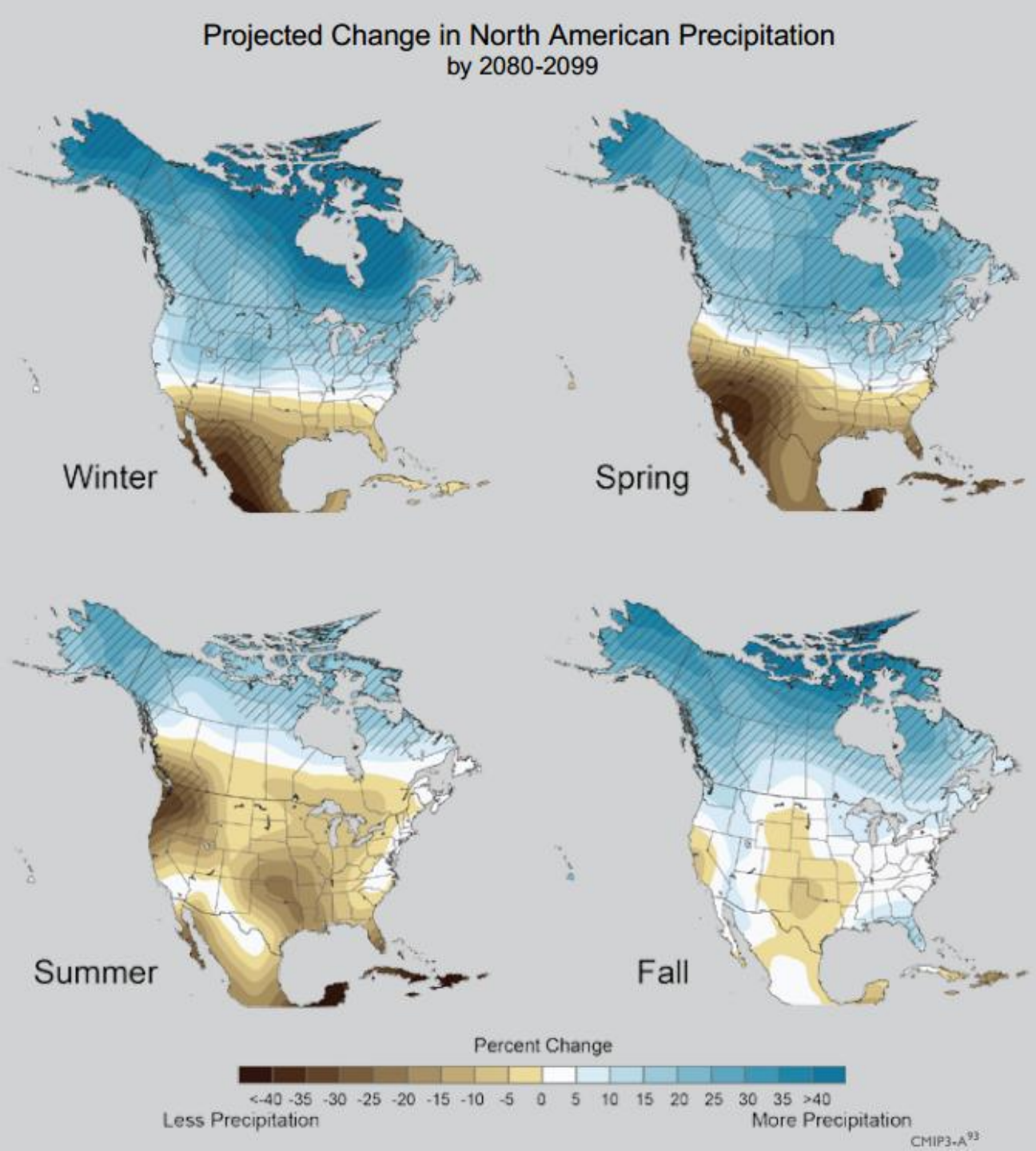
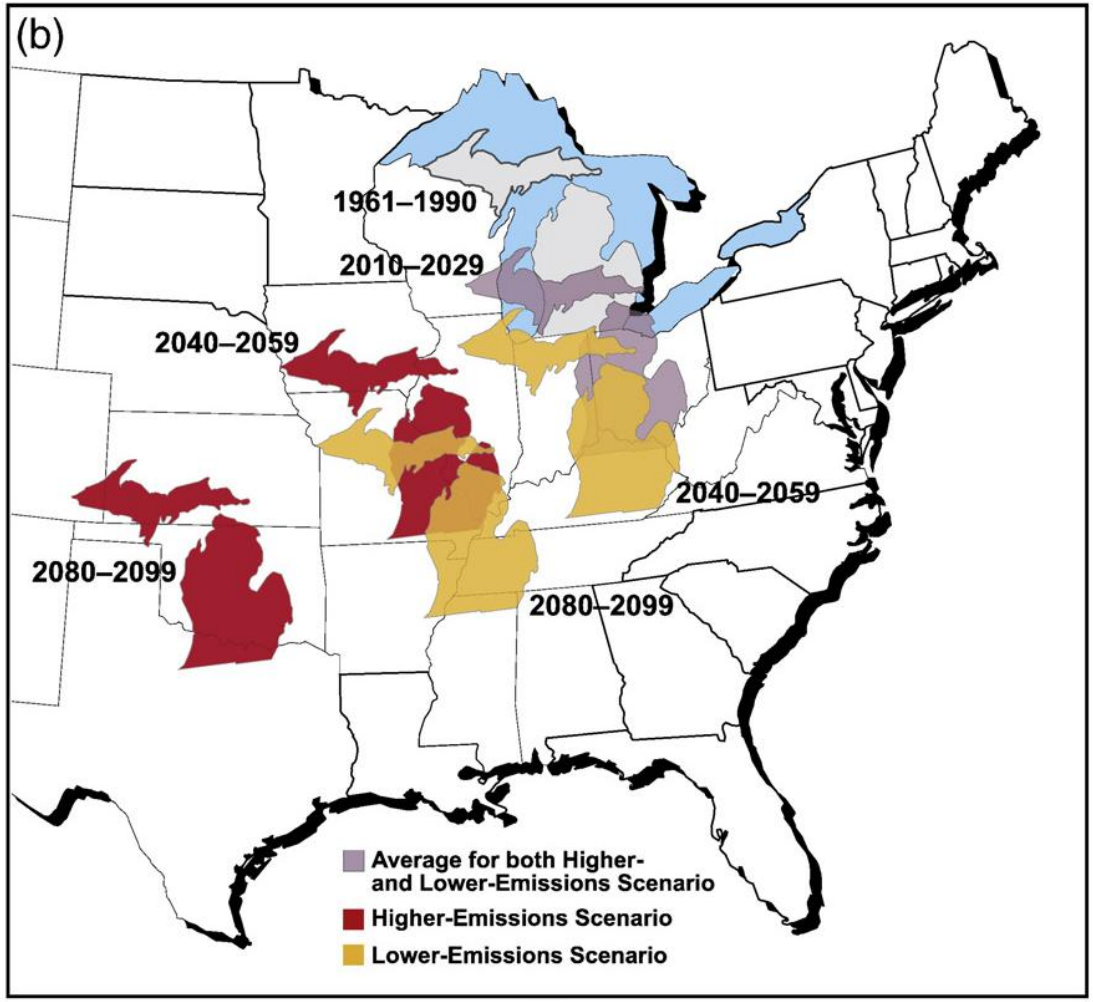
MICHIGAN STATE UNIVERSITY EXTENSION

Annual Precipitation vs. Year, Michigan
1895-2012




Projected Change in North American Precipitation
by 2080-2099
Winter
Spring
Summer
Fall
Percent Change
<-40 -35 -30 -25 -20 -15 -10 -5 0 5 10 15 20 25 30 35 >40
Less Precipitation
More Precipitation
CMIP3-A93

Projected Temperature Changes



Hayhoe et al (2010)

Quick Summary of Weather Trends

- Overall warming trends year round
- Dryer summer & fall
- Increased precipitation winter and spring
- More extreme temperature and precipitation variations

Avon Lake Ln, Rochester Hills, MI 48307
Max Fetch .16 mile
Electric motors only
very low wave energy
Avon Lakes Village
Armored shore on
each side of
property
©2010 Google
© 2011 Google
Imagery Date: 5/9/2010
42°38'53.43" N 83°05'54.43" W elev 719 ft
Eye alt 2199 ft

Design Considerations

- Clients requirements & Expectations
  - Height of plants
  - Bloom times
  - Access to water
  - Maintenance requirements
  - Function
    - Erosion control
    - Aesthetics
    - Fowl protection

Design Considerations

- Bio-Engineering required?
- Rip- rap
  - Wave energy
  - Existing shoreline erosion
- Adjacent property considerations
  - Sea walls
  - Natural shoreline
  - Acceptance level

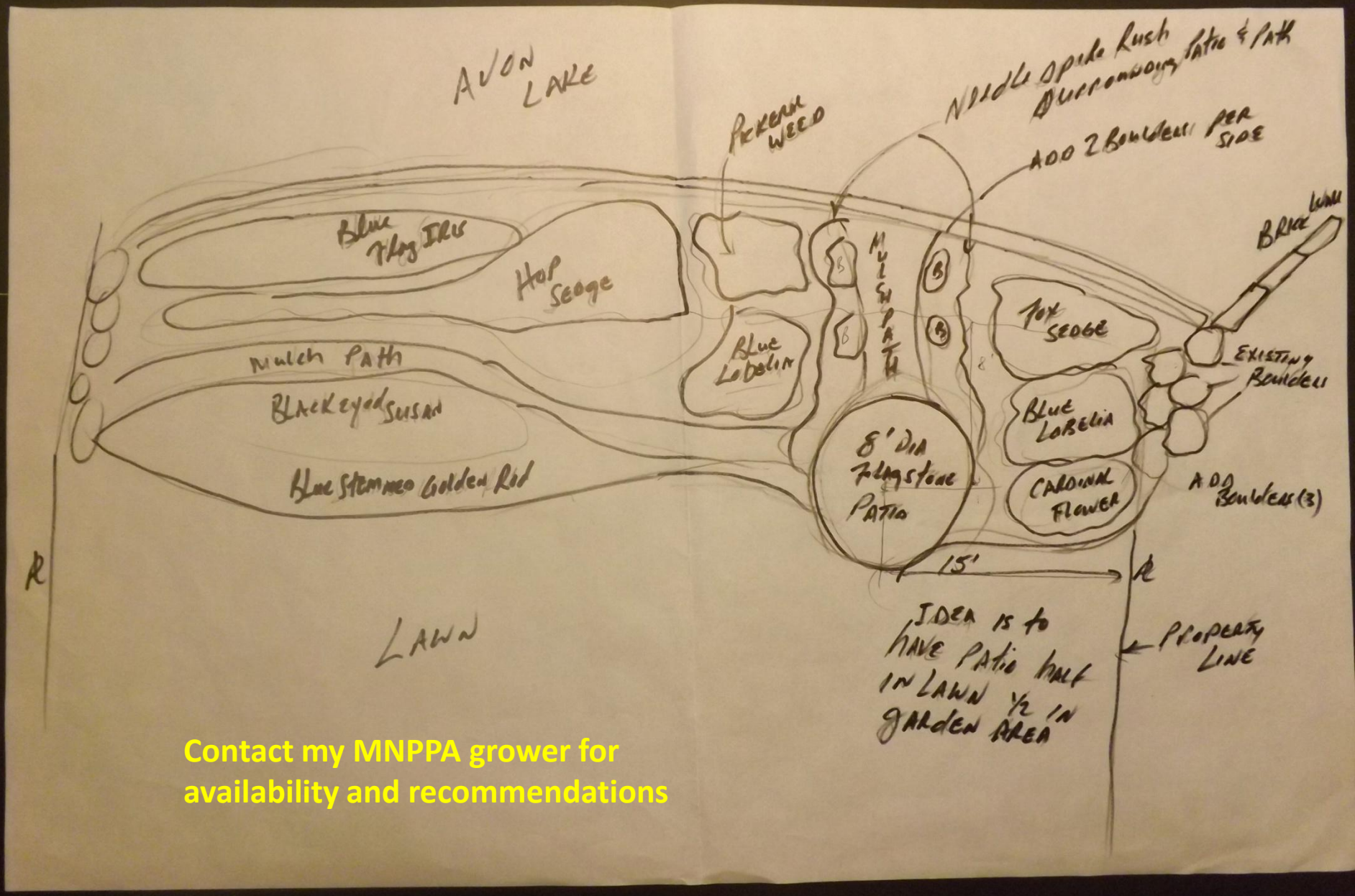
Avon Lake Project 2010

- Met with Client to discuss objectives of the project and end results they were looking for:
-
    - Stop erosion
    - Create a natural habitat
    - Maintain view of Lake
    - Limited access to Lake

- Discussed history of the lake, how it was formed, lake levels, and boat usage.
    - Gravel Pit
    - Two outlet pipes for lake level control
    - Electric motors only

- Client has lived their 20 plus years described typical lake level changes, and nothing seemed out of the ordinary

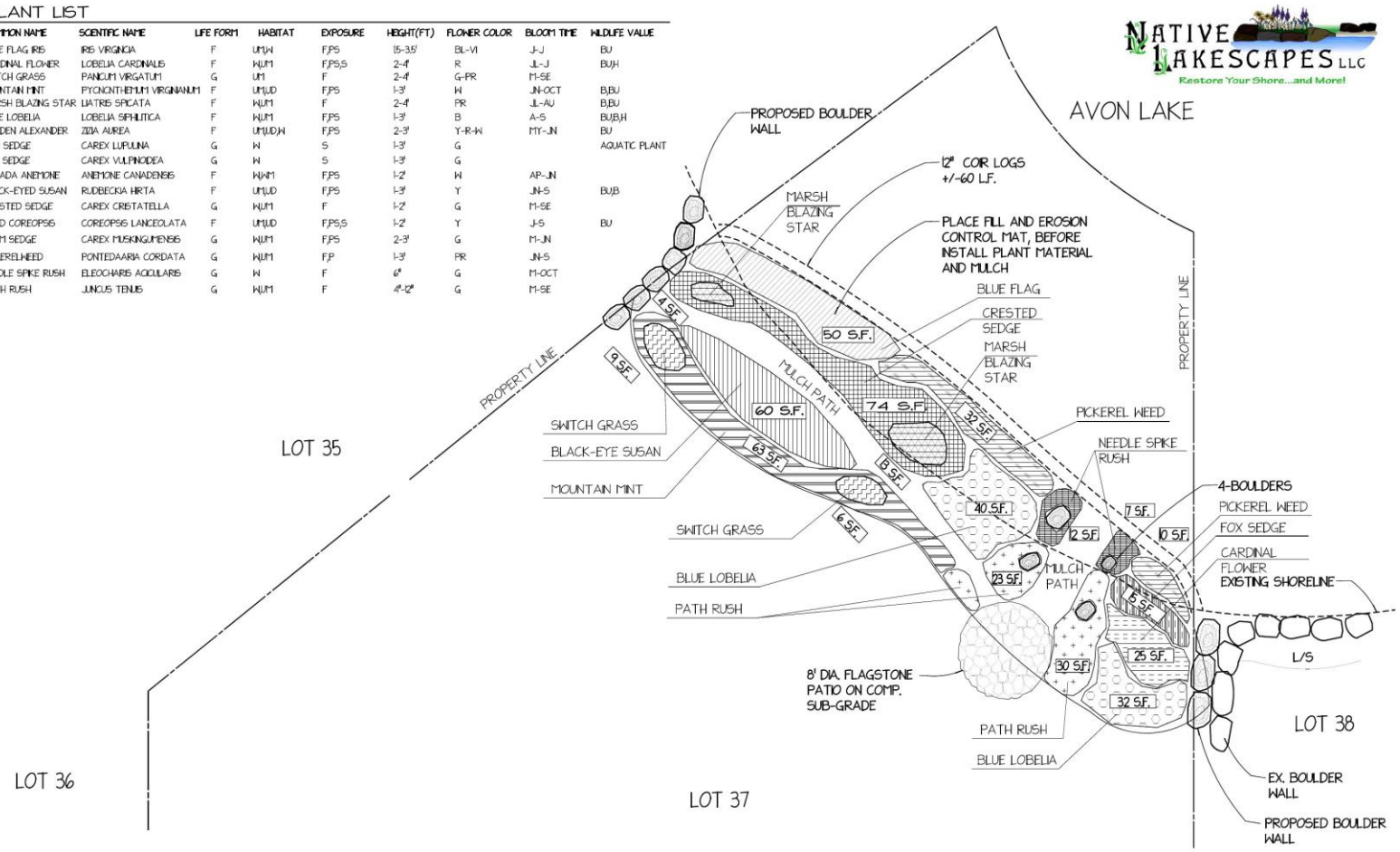
Start with a pretty rough hand sketch



Contact my MNPPA grower for availability and recommendations

PLANT LIST

COMMON NAME	SCIENTIFIC NAME	LIFE FORM	HABITAT	EXPOSURE	HEIGHT(FT)	FLOWER COLOR	BLOOM TIME	WILDLIFE VALUE
BLUE FLAG IRIS	IRIS VIRGINICA	F	UM,W	F,PS	15-3.5'	BL-VI	J-J	BU
CARDINAL FLOWER	LOBELIA CARDINALIS	F	W,UM	F,PS,S	2-4'	R	JL-J	BU,H
SWITCH GRASS	PANICUM VIRGATUM	G	UM	F	2-4'	G-PR	M-SE	
MOUNTAIN MINT	PYCNONTHEMUM VIRGINIANUM	F	UM,UD	F,PS	1-3'	W	JN-OCT	B,BU
MARSH BLAZING STAR	LIATRIS SPICATA	F	W,UM	F	2-4'	PR	JL-AU	B,BU
BLUE LOBELIA	LOBELIA SIPHILITICA	F	W,UM	F,PS	1-3'	B	A-S	BU,B,H
GOLDEN ALEXANDER	ZIZIA AUREA	F	UM,UD,W	F,PS	2-3'	Y-R-W	MY-JN	BU
HOP SEDGE	CAREX LUPULINA	G	W	S	1-3'	G		AQUATIC PLANT
FOX SEDGE	CAREX VULPINOIDEA	G	W	S	1-3'	G		
CANADA ANEMONE	ANEMONE CANADENSIS	F	W,WM	F,PS	1-2'	W	AP-JN	
BLACK-EYED SUSAN	RUDBECKIA HIRTA	F	UM,UD	F,PS	1-3'	Y	JN-S	BU,B
CRESTED SEDGE	CAREX CRISTATELLA	G	W,UM	F	1-2'	G	M-SE	
SAND COREOPSIS	COREOPSIS LANCEOLATA	F	UM,UD	F,PS,S	1-2'	Y	J-S	BU
PALM SEDGE	CAREX MUSKINGUMENSIS	G	W,UM	F,PS	2-3'	G	M-JN	
PICKERELWEED	PONTEDAARIA CORDATA	G	W,UM	F,P	1-3'	PR	JN-S	
NEEDLE SPIKE RUSH	ELEOCHARIS ACICULARIS	G	W	F	6"	G	M-OCT	
PATH RUSH	JUNCUS TENUIS	G	W,UM	F	4"-12"	G	M-SE	



CITY OF ROCHESTER HILLS, OAKLAND COUNTY, MICHIGAN

PRELIMINARY DESIGN

N

SCALE 1 in = 4 ft JUNE 28, 2010
JULY 7, 2010

Initial site….eroded shoreline
SUMMER 2010

Phragmites?
Sea Wall Flanking

Double milled cedar bark mulch
Coir Logs
Weed Barrier under mulch
SUMMER 2010

Crested Sedge
Blue Lobelia
Pickerel Weed
Fowl fence
Blue Flag Iris

Turtlehead
Black-eyed Susan
Switch Grass
SUMMER 2010

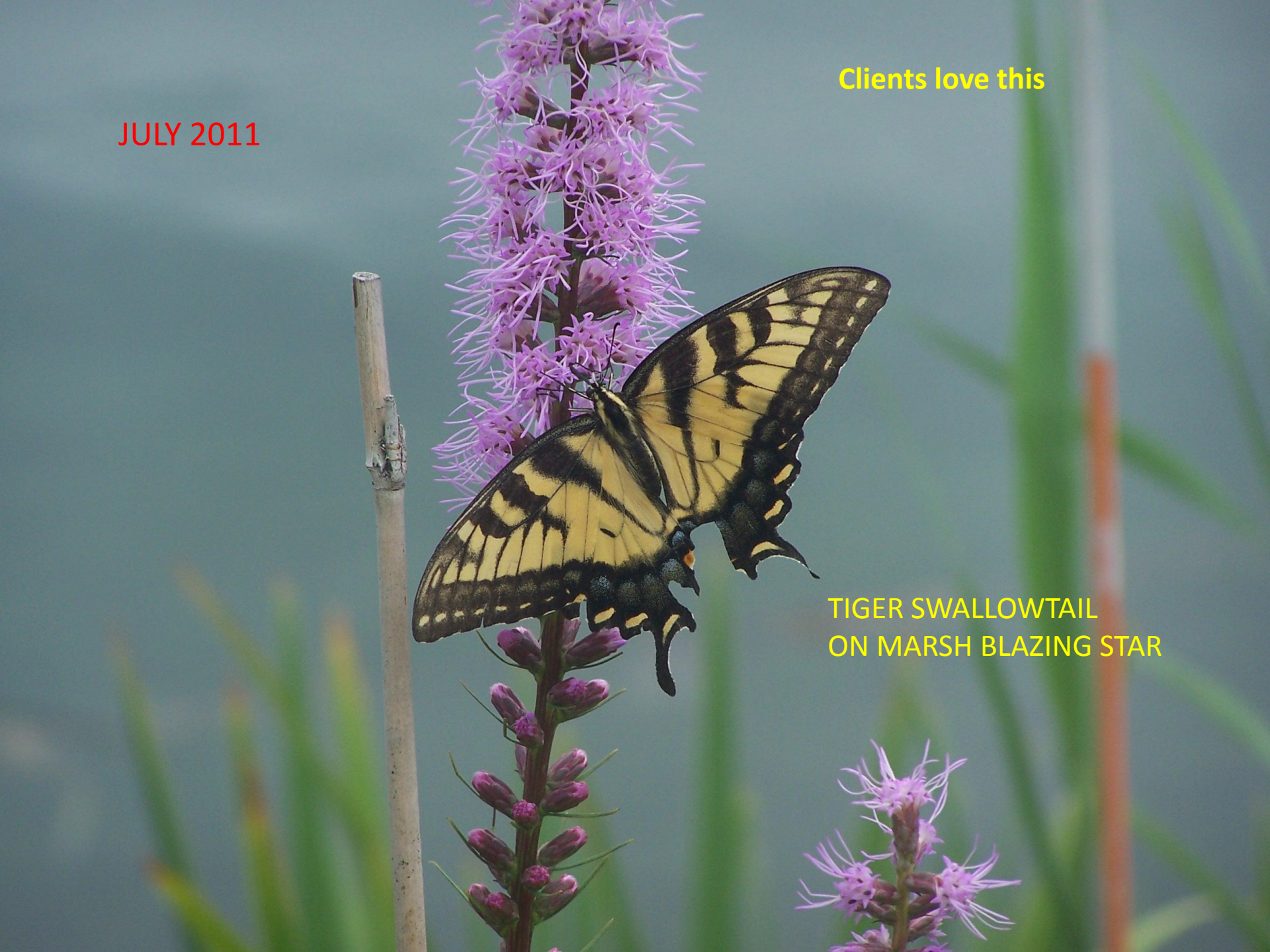
Ohio Bluestone
Path Rush
SUMMER 2010

Blue flag iris
OCTOBER 2010
No Pickerel weed!

April/May
2011
Crested Sedge
Path Rush
Lobelia

June 2011
NEEDLE RUSH Coir Log
Fox Sedge
2 months plants still
inundated w/ H2O

JULY 2011
H2O over coir log
BLACK-EYED-SUSANS
Switch Grass


Clients love this
JULY 2011
TIGER SWALLOWTAIL
ON MARSH BLAZING STAR

AUGUST 2011

AUGUST 2011
BLUE LOBELIA

AUGUST 2011
BLACK-EYED SUSAN WITH
WHITE TURTLEHEAD

SPRING 2012

SPRING 2012
Coir log underwater
Still pretty intact

JUNE 2012

JUNE 2012
Maintenance!!

Material list

- 225 plants.. plugs and 4” pots
- 50 ‘ Coir log 12” Dia 9# density
- 800 sf Erosion Control Blanket
- 5 yds fill dirt
- 4 yds cedar mulch
- 450 sf bio-degradable weed barrier
- 50 sf flagstone patio walk
- 9 18-24” boulders

Plant Selection

• Blue flag Iris	*Iris virginiana*
• Pickerel weed	*Pontederia cordata*
• Cardinal flower	*Lobelia cardinalis*
• Blue lobelia	*Lobelia siphilitica*
• Crested sedge	*Carex cristatella*
• Black-eyed Susan	*Rudbeckia hirta*
• Path rush	*Juncus tenuis*
• Dense blazing star	*Liatris spicata*
• Turtlehead	*Chelone glabra*
• Switch grass	*Panicum virgatum*
• Needle spike rush	Eleocharis obtusa
• Fox Sedge	Carex vulpinoidea

LESSONS LEARNED

- Expect the unexpected
- Planted more sedges, rushes, Iris, etc along coir log
- Don't over sell expectations
- Establish monitor fee in initial contract and follow-up with visits and pictures
- Be aware of invasives
- This is a living habitat…. Things are dynamic

Questions?

Jim's *Laboratory*

- Planting as much diversity as possible
- Learning what the plants looked liked and behaved
- How much maintenance is required
- Invite clients over to look, learn & ask

35 acre lake located in Clarkston

FALL 2008
Shoreline erosion
Typical grass to shoreline
Riprap

Ninebark shrub
Just starting to create a
Riparian Buffer zone
04/11/2009

River Birch
Sedges/Iris along shore
Increased zone
Newspaper with composted mulch
PUMP
04/17/2009

Lake levels
fluctuate
PUMP
04/29/2009

Summer 2009
Sneeze Weed
Blue Flag Iris
Swamp Milkweed
Culvers Root
01/29/2004

Later summer 2009
Cup Plant
Rushes and
Sedges
Rush

Summer 2010
Blue Vervain
Ironweed
Boneset
Swamp Milkweed

Cup Plant
Blue Lobeila

Cardinal Flower
Joe-pye Weed
Blue Flag Iris

View from the property
Doesn’t this look better than all lawn to waters edge??

2009
Wanted to create a buffer zone on this side of beach
04/11/2009

News paper covered
with compost mulch
04/17/2009
Used hose to create shape

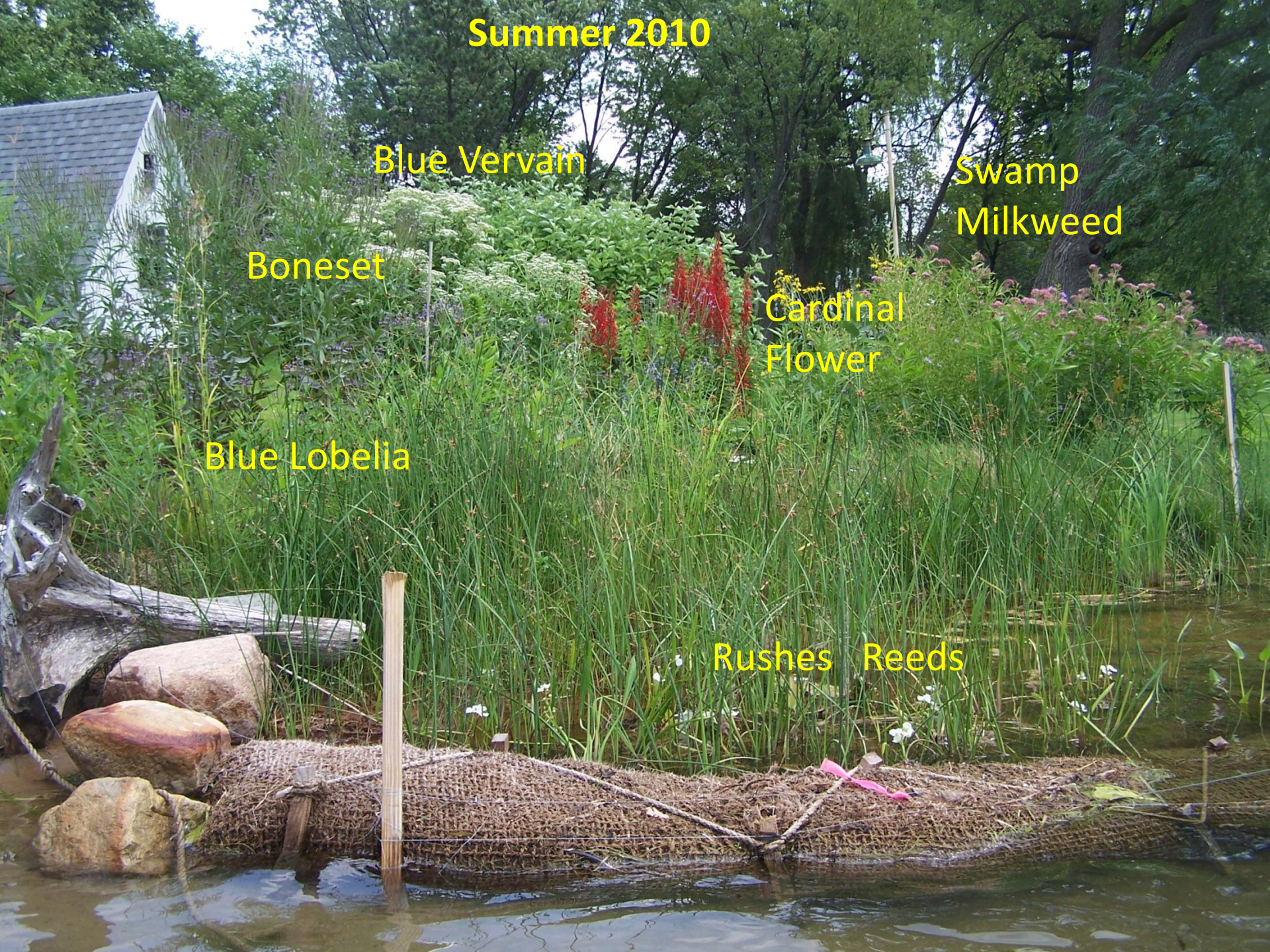
Tried lining
shoreline with logs
Left a strip of grass
along shoreline to
grow wild
01/20/2004

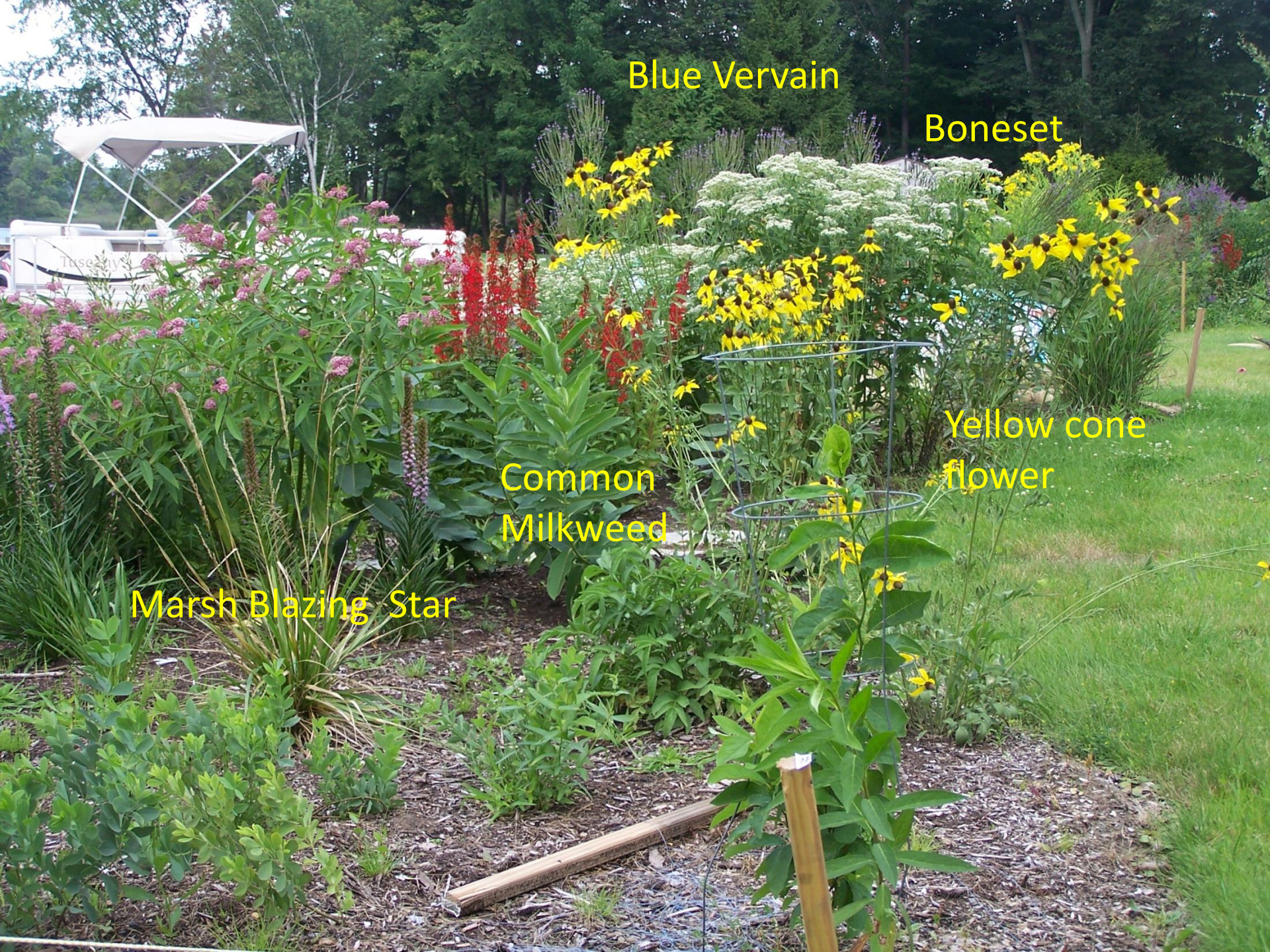
Weed barrier—bio paper rolls
Spring 2011

Ninebark
We had a lot of rain that spring.....lesson learned!
04/29/2009

Later in summer of 09
Blue Vervain
Marsh blazing star
Marsh Marigolds
Ninebark Bush
Tuscany

Trying to create a quiet pool to allow aquatic plants to take hold
Naturalized shoreline
Arrowhead
Sweet Flag Grass
Coir Logs


Summer 2010
Blue Vervain
Swamp
Milkweed
Boneset
Cardinal
Flower
Blue Lobelia
Rushes
Reeds


Blue Vervain
Boneset
Yellow cone flower
Common Milkweed
Marsh Blazing Star

Quite a change in one year!!

Buffer zones on each side of the dock and beach
Enjoy the lake.....but also protect it!!

Autumn Interest
Create a Path
10/27/2009

Winter scene
interesting structure

April 2011
Marsh Marigolds

Marsh Marigold

Right Plant—Right Place

April 2011
LOG
Blue Flag Iris

LOG
Blue Flag Iris
Right plant Right place

What am I?

What am I?

Genista broom moth

Baptisia australis in bloom Wild Blue Indigo

Plant Selection

Blue flag Iris	*Iris virginiana*
Cup Plant	*Silphium perfoliatum*
Cardinal flower	*Lobelia cardinalis*
Blue lobelia	*Lobelia siphilitica*
Canada anemone	*Anemone canadensis*
Iron Weed	*Veronica missurica*
Joe Pye Weed	*Eupatorium macalatum*
Dense blazing star	*Liatris spicata*
Sneeze Weed	*Helenium autumnale*
Switch grass	*Panicum virgatum*
Swamp Rose	*Rosa palustris*
Fox Sedge	*Carex vulpinoidea*
Culvers Root	*Veronicastrum virginicum*
Arrowhead	*Sagittaria latifolia*
Tussock Sedge	*Carex stricta*
Wild Blue Indigo	*Baptisia australis*
Common Milkweed	*Asclepias syrica*
Swamp Milkweed	*Asclepias incarnata*
Yellow Cone flower	*Ratibida pinnata*
Pickerel Weed	*Pontederia cordata*
Boneset	*Eupatorium perfoliatum*
Blue Vervain	*Verbena hastata*

Lessons learned

- Warmer springs is very tempting to start planting early…..we are getting wetter springs!
- Establishing aquatic plants is more demanding
  - Protect from wildlife….fencing?
  - Getting plants to stay in place long enough to take root
    - Maybe long garden staples and plant through an ECB?
- Plants chosen love this wet/moist environment and grow quickly and tall.
  - I started cutting back plants in June to control some level of height

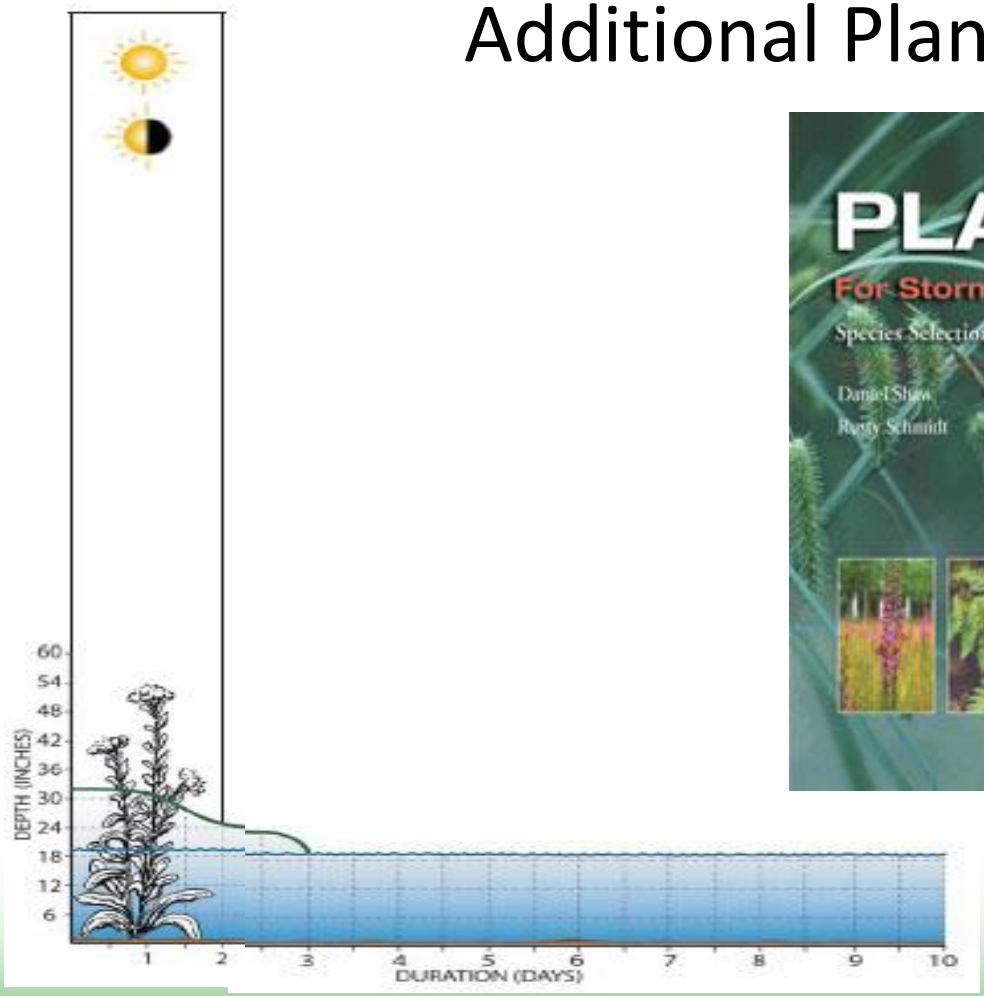
References

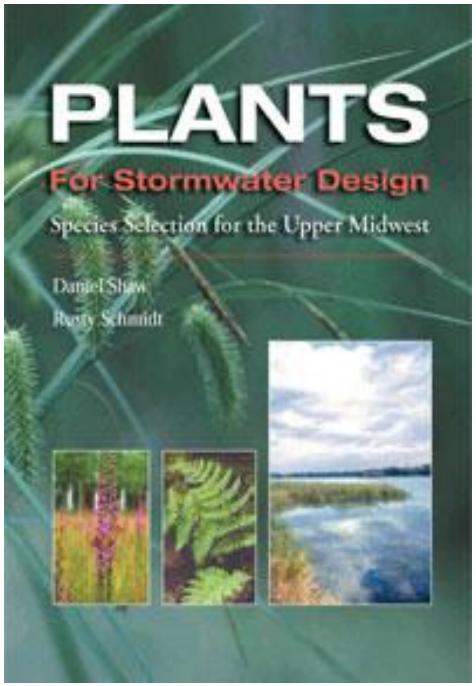
- Plants for Stormwater Design
  - Daniel Shaw & Rusty Schmidt
- Landscaping for Wildlife and Water Quality
  - Minnesota Dept. of Natural Resource
- Certified Natural Shoreline Professional Training
  - MSU extension

Climate data

- Associate Professor Jeffrey Andresen, Ph.D

Additional Plant Information





Sweet Flag graph of water depth and duration.
(Plants for Stormwater Design)

MICHIGAN NATURAL SHORELINE PARTNERSHIP

Questions?