



**A Healthy Watershed:
Magnet for Birds and Butterflies**

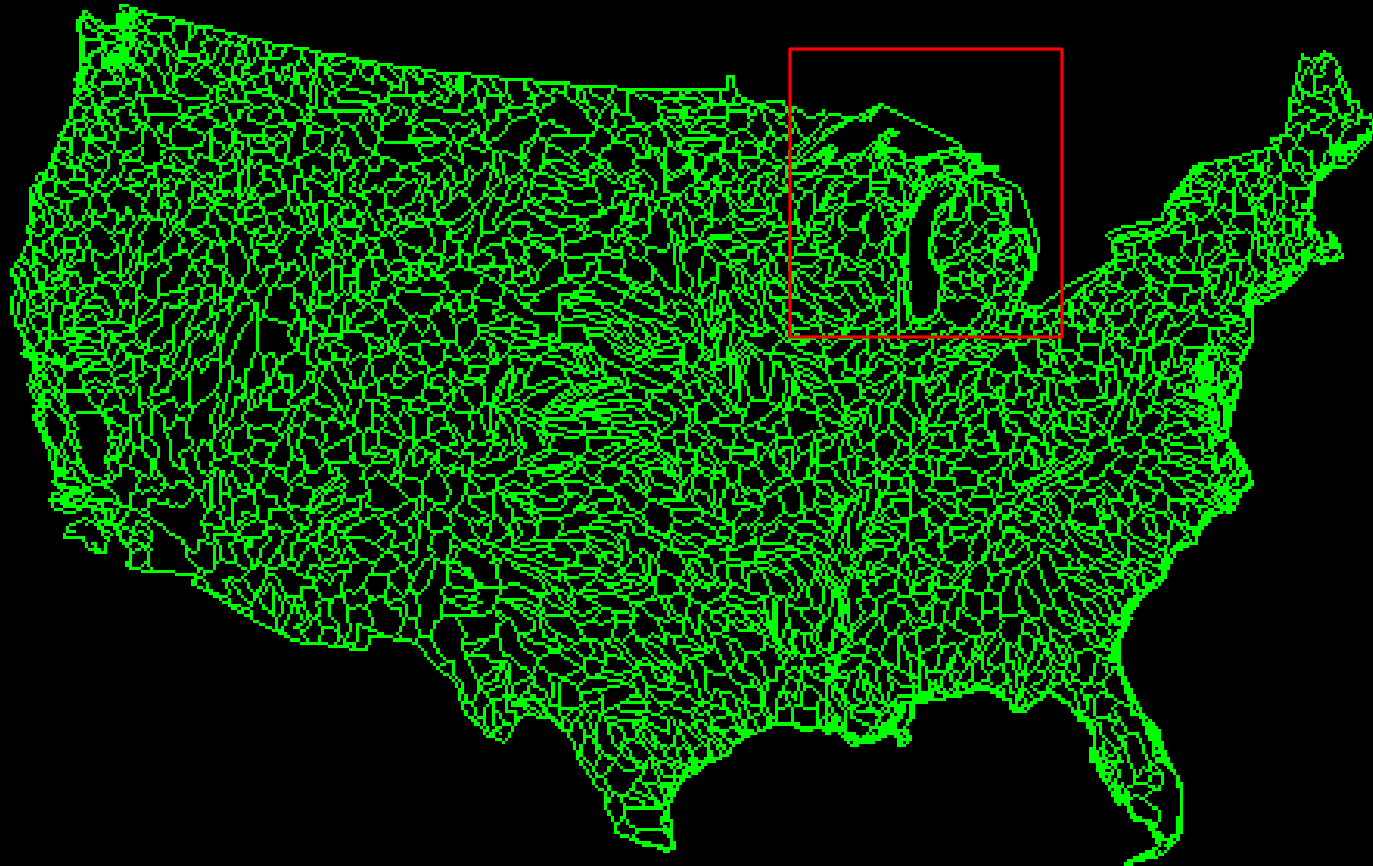
Plaster Creek Stewards

April 26, 2014

Gail Heffner

Dave Warners

Hydrologic Units map



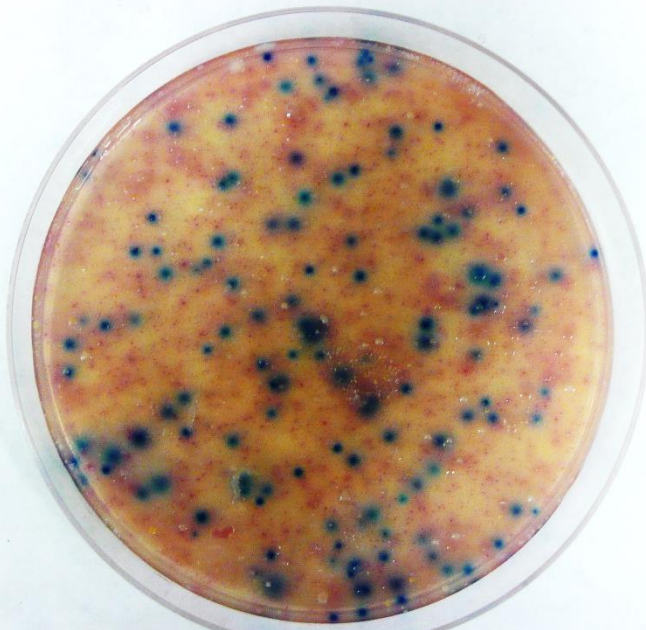
Watersheds are topographical and hydrological units that integrate the landscape into nested sets of drainages. (2,110 major watersheds in the US)

Lake Michigan Watershed

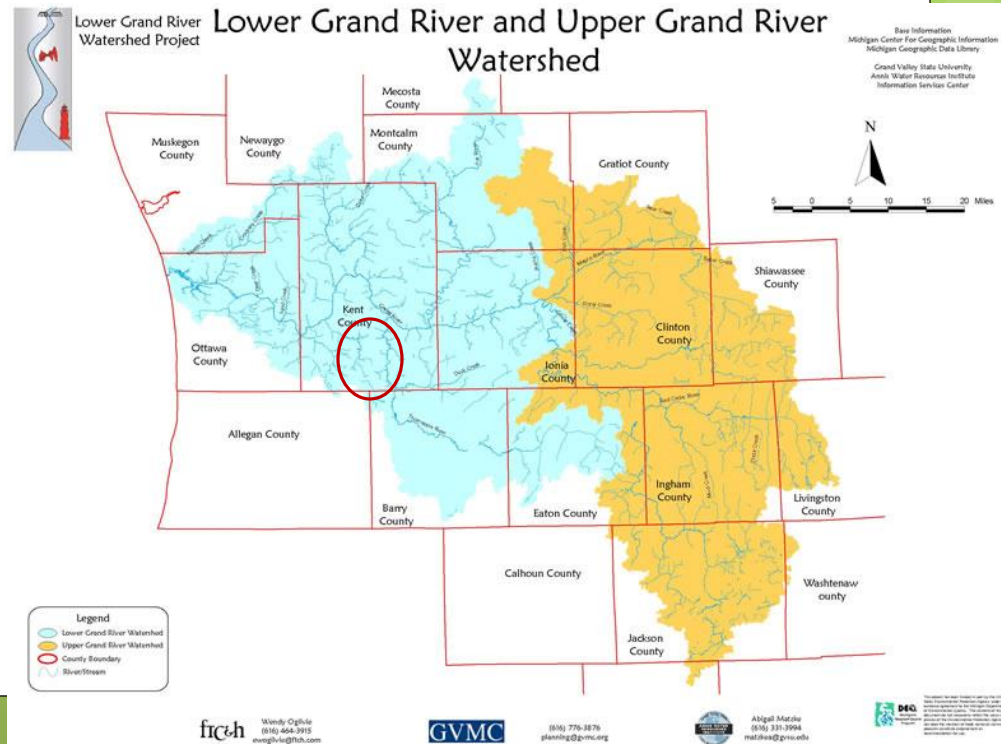


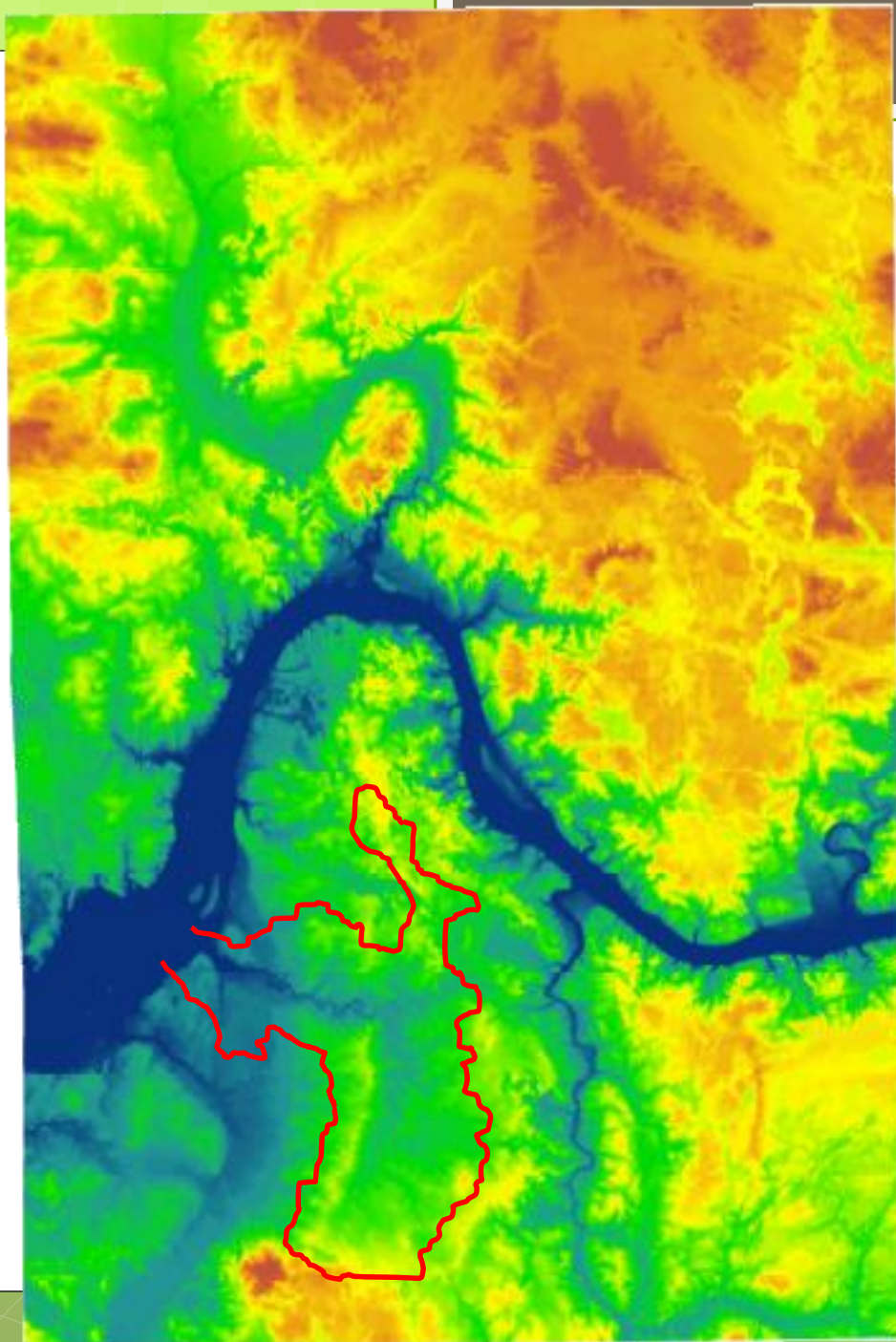
Plaster Creek Watershed and Place-based Reconciliation Ecology

- Watershed: Area of land that drains to a common point
- Watersheds are wonderful integrators
- Plaster Creek Watershed:
 - Most contaminated watershed in West Michigan



> 5200 *E. coli* colonies/100ml

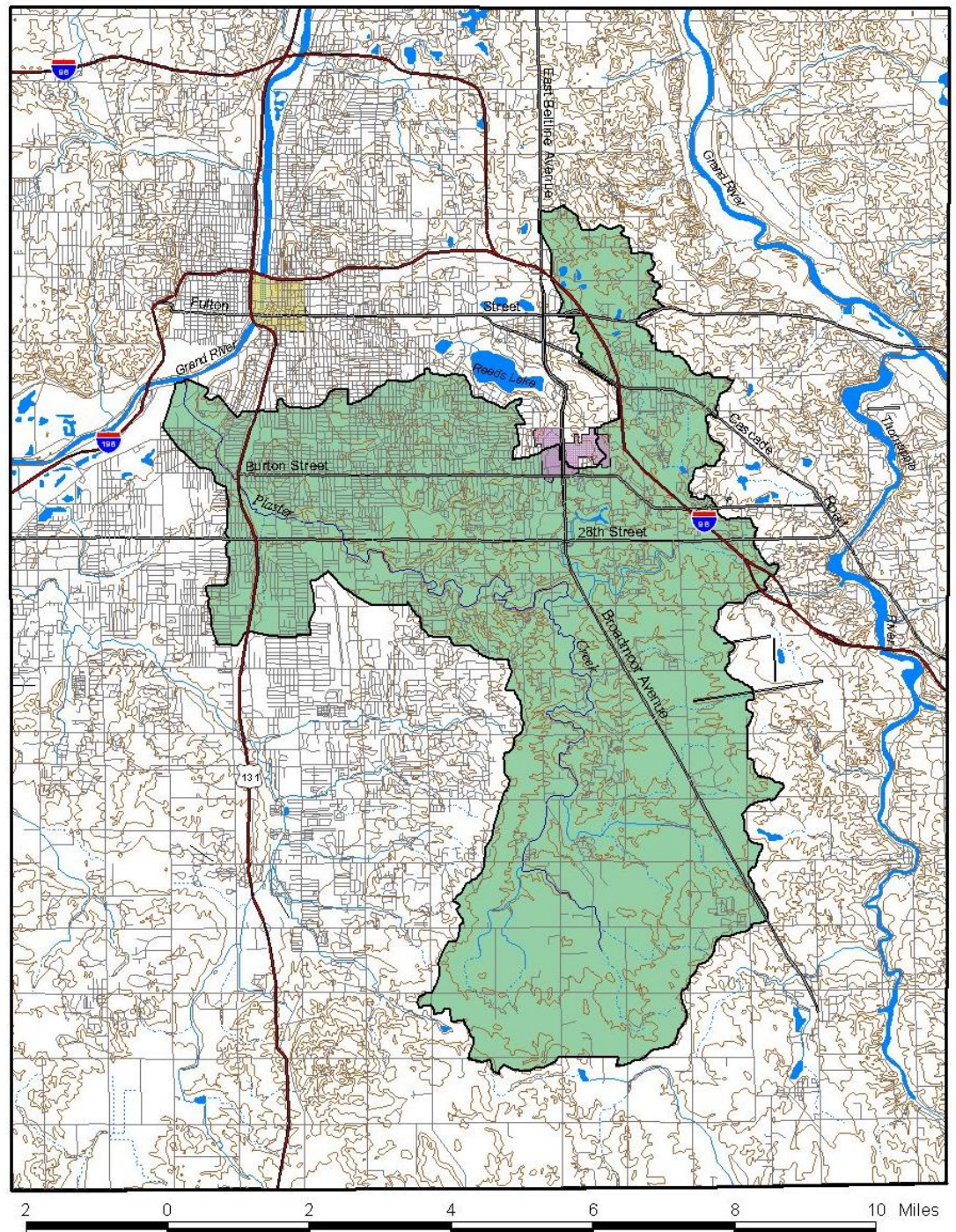




Plaster Creek & Its Watershed

Landscape elements:

- Substrate: deep glacial till, mix of sand, clay, gravel
- Historic land cover: forest ecosystems – oak, maple
- Present land cover: agricultural, suburban, commercial, lower-income urban, industrial
- >50% of Calvin faculty and staff, >3200 alumni









People who live at the lower ends of watersheds cannot be isolationist—or not for long. Pretty soon they will notice that water flows, and that will set them to thinking about the people upstream who either do or do not send down their silt and pollutants and garbage. Thinking about the people upstream ought to cause further thinking about the people downstream. Such pondering on the facts of gravity and the fluidity of water shows us that the golden rule speaks to a condition of absolute interdependency and obligation. People who live on rivers might rephrase the rule in this way: Do unto those downstream as you would have those upstream do unto you.

-From Watershed and Commonwealth
by Wendell Berry

Plaster Creek Stewards



A collaboration of Calvin College faculty, staff, and students working together with local schools, churches, and community partners to restore health and beauty to the Plaster Creek Watershed.



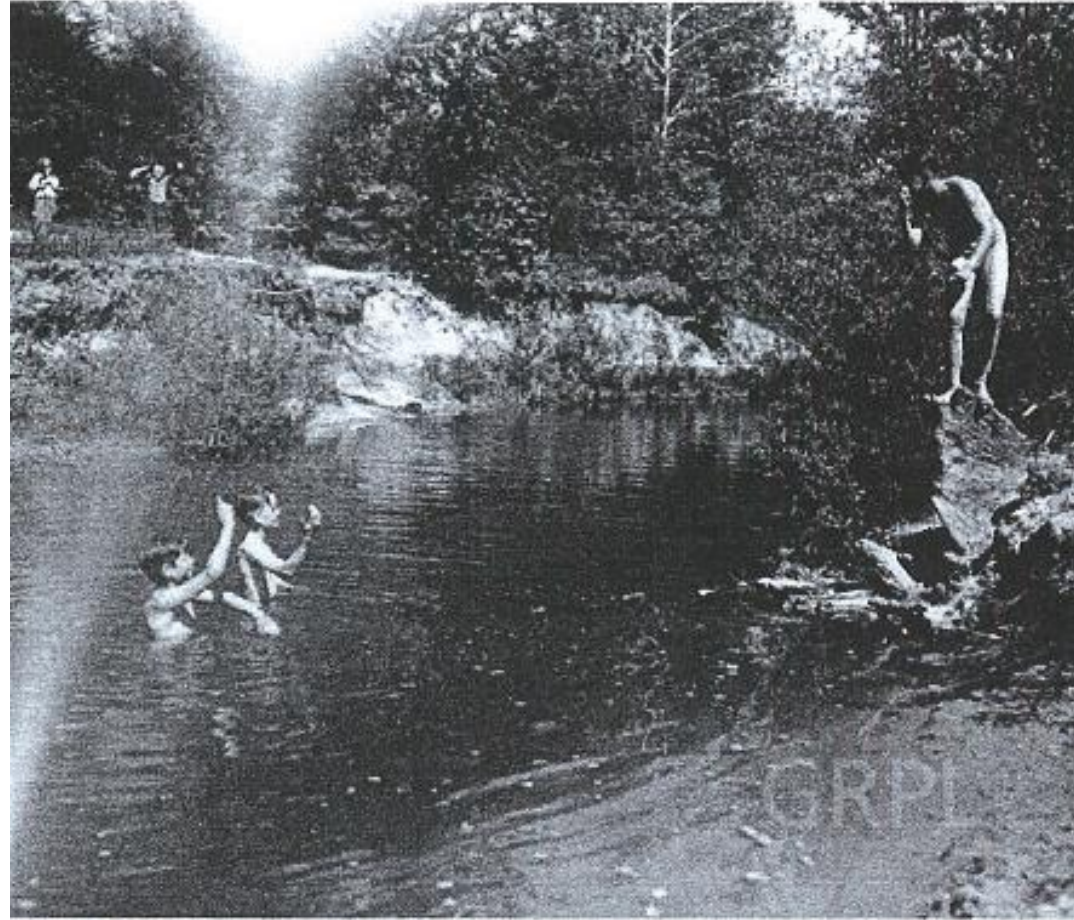
Education and Outreach builds awareness and concern



Biological Research leads to better understanding how best to help the creek

Social Research

- Oral History Project: Remembering and recording stories about the creek
- Documenting oral histories becomes a way to engage people in watershed protection



Restoration

Implementing
healthier
watershed
practices and
improving native
biodiversity







'Re-discover the watershed through listening to the birds'

- "I moved away from Grand Rapids... but when I came back as an adult...it is neat to *rediscover the watershed* and Ken-O-Sha in particular *through the eyes and ears of listening to the birds and seeing the birds*, because there is a lot of diversity of birds in that little wooded patch in this urban environment. And that is one thing that has helped me to engage with urban green space, is the birds, because it's really opened up my eyes to the value that these green spaces have...what happened every spring was that the little woodlot acted like a little island in the middle of the city. And birds migrate at night and when morning comes they've gotta find a patch of habitat to spend the day in, to find their food and shelter and water. And when they are over an urban environment they have less space to go."

‘Urban oasis effect’

- “That’s a really neat way to engage myself with a place that I know well from the past. And rediscover it. And to engage my kids and others that I am with ...I use this story a lot when I teach kids about the outdoors—about the *urban oasis effect* of these small green spaces...To hear that over a hundred species of birds can be seen in just an acre size patch, you know, it is just WOW! And so that’s a really neat way that I’ve rediscovered Ken-O-Sha and Plaster Creek Watershed...that, of course, is applicable to wherever you are, in an urban environment.

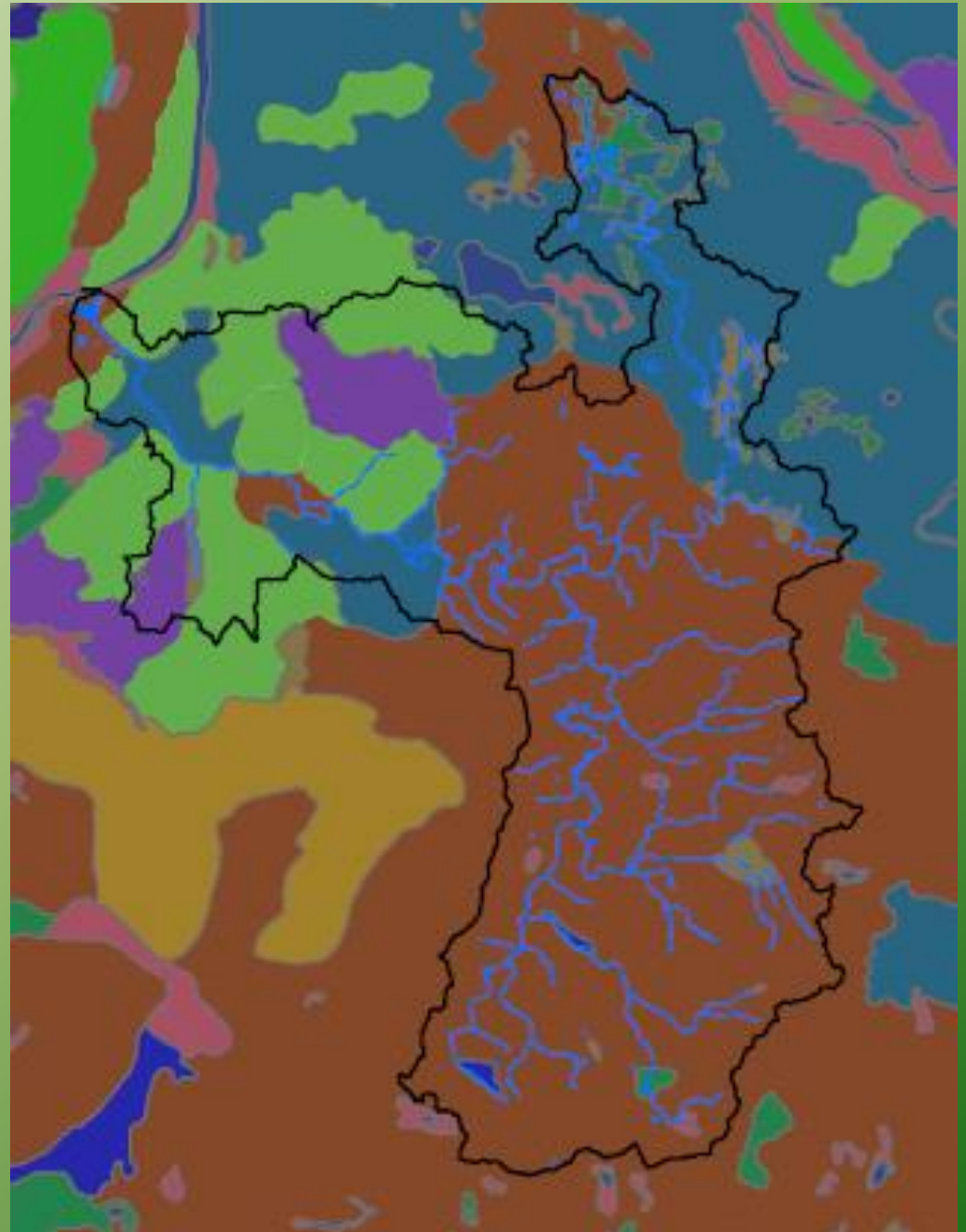
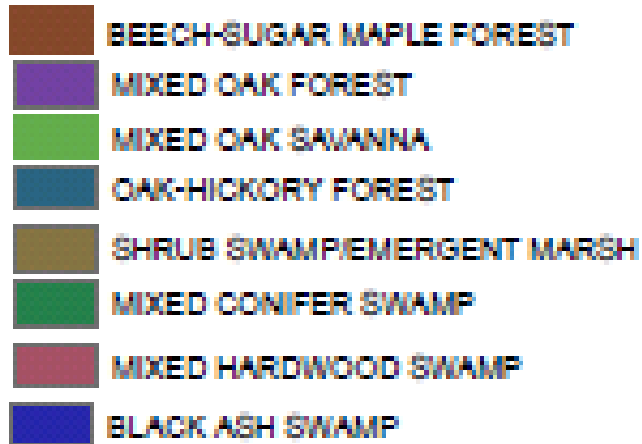
'Waterways as corridors for wildlife'

- R: “[Birds] will even follow along those real thin, thin spots where there’s not much habitat and use those as a corridor to find their way to the Grand River where they might find more habitat as they head west...they use these *waterways as corridors* finding what they need. So it is important piece of habitat for wildlife.
- I: Wow that is kind of fascinating to think about. It’s like a little road map for the birds.
- R: Yep, right. They don’t follow the streets, they follow the habitat and that is typically along the wet areas, along creeks and streams and things.”

The natural landscaping used here is native to this geographic region. It requires no irrigation, chemical inputs or fossil fuels in its care and keeping. These plants reduce stormwater runoff, absorb carbon and celebrate the biodiversity of God's good creation.

Sustainability is a beautiful thing

Plaster Creek Watershed Land cover ca. 1800

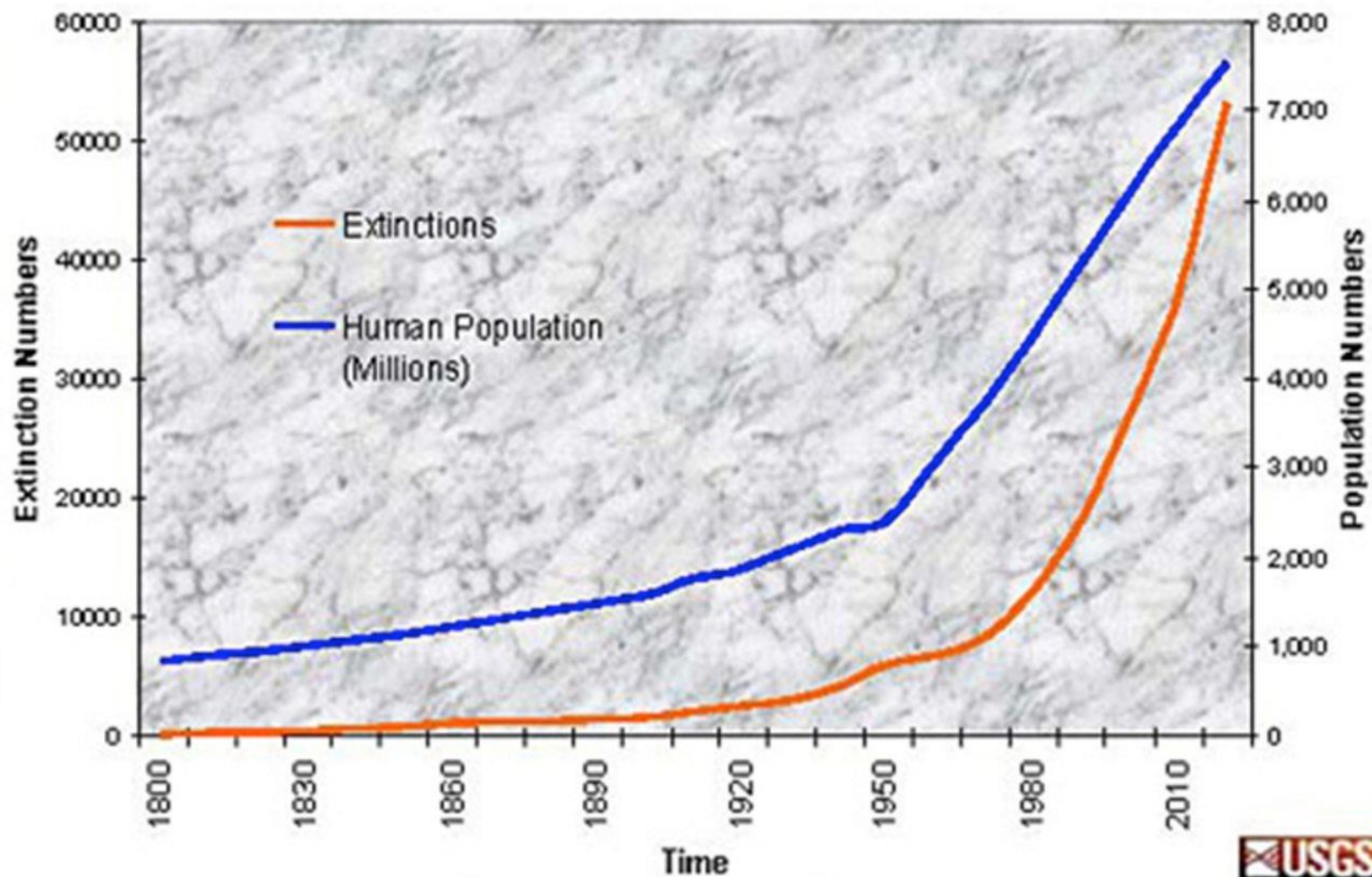








Species Extinction and Human Population



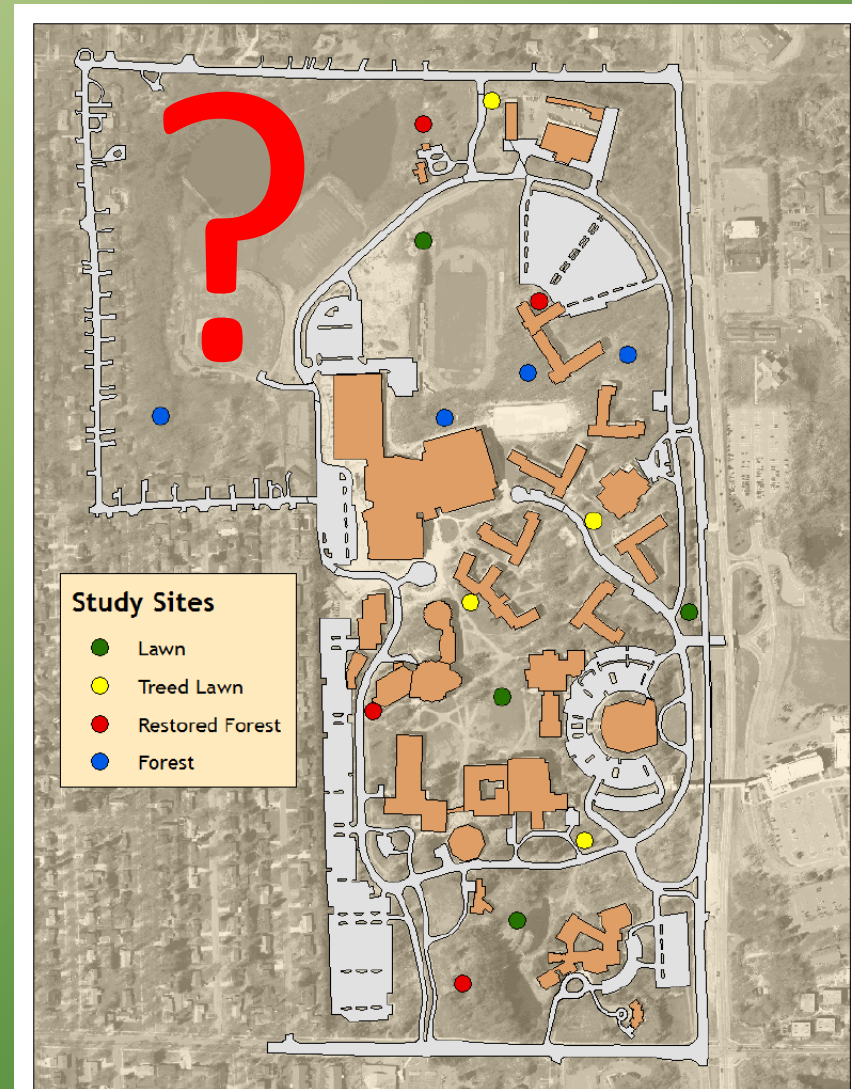
Context

- Declining native biodiversity.
 - +/- 85% of habitable land surface has become dominated by 1 species
 - Extinction today = 100-1000x above background rate
 - Invasive species cost \$120 billion a year in the US alone
- Reconciliation Ecology
 - The science of restoring, creating and maintaining habitats, and conserving biodiversity in the places where people live, work, or play. Re-inventing the human presence to **better accommodate, affirm, and fit into** the context of biodiversity in which we exist.
- Opportunities for reconciliation include
 - Agriculture/Food Systems
 - Transportation
 - Energy
 - Architecture
 - **Urban Planning/Landscaping**

Research Question

(Emily Huizenga and Chris Bouma – 2011)

- How is biodiversity distributed among four different campus landscapes?



Methods – Four campus habitats

Lawn



Treed Lawn



Restored



Woods

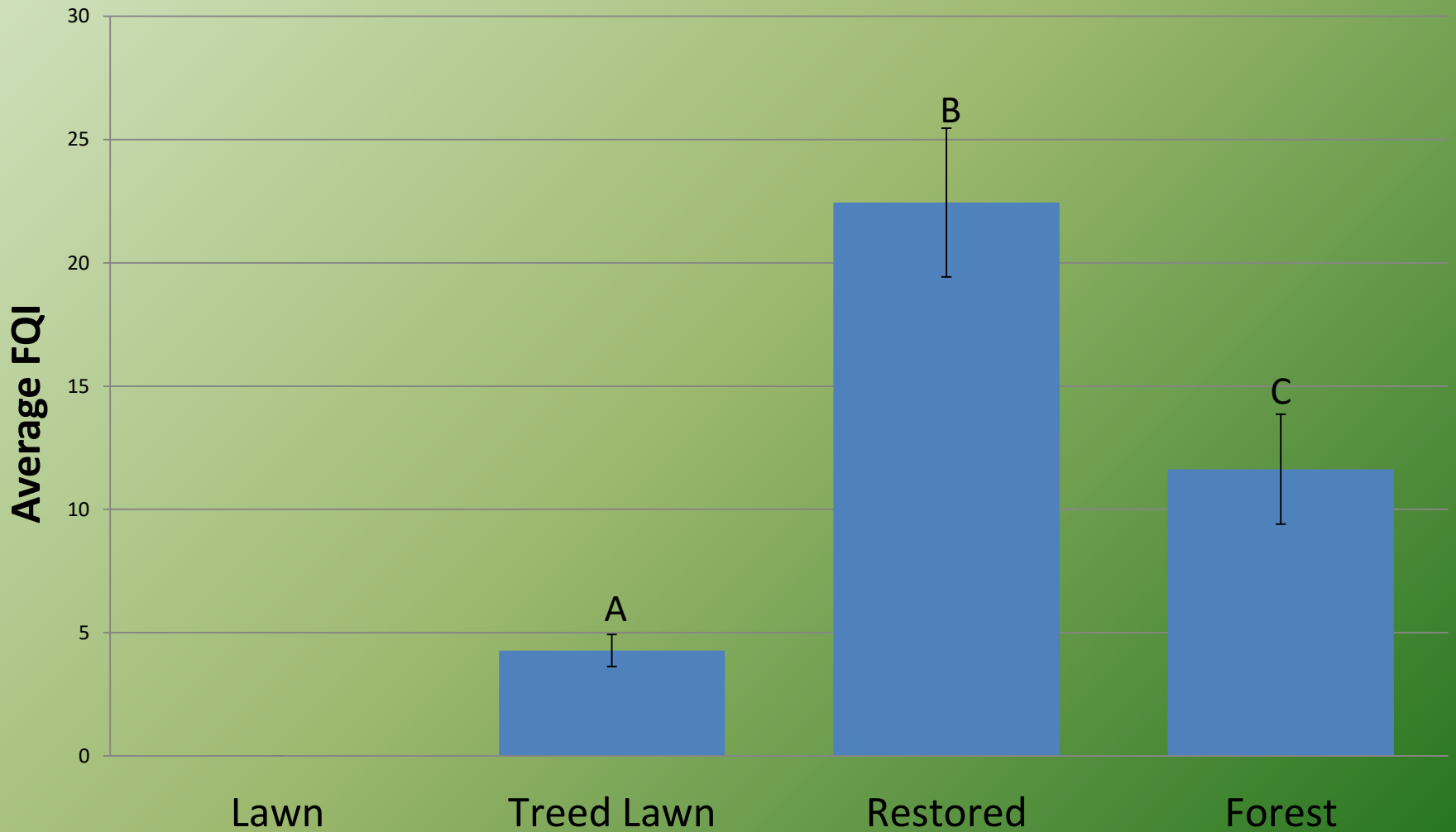


Methods - Data Collection

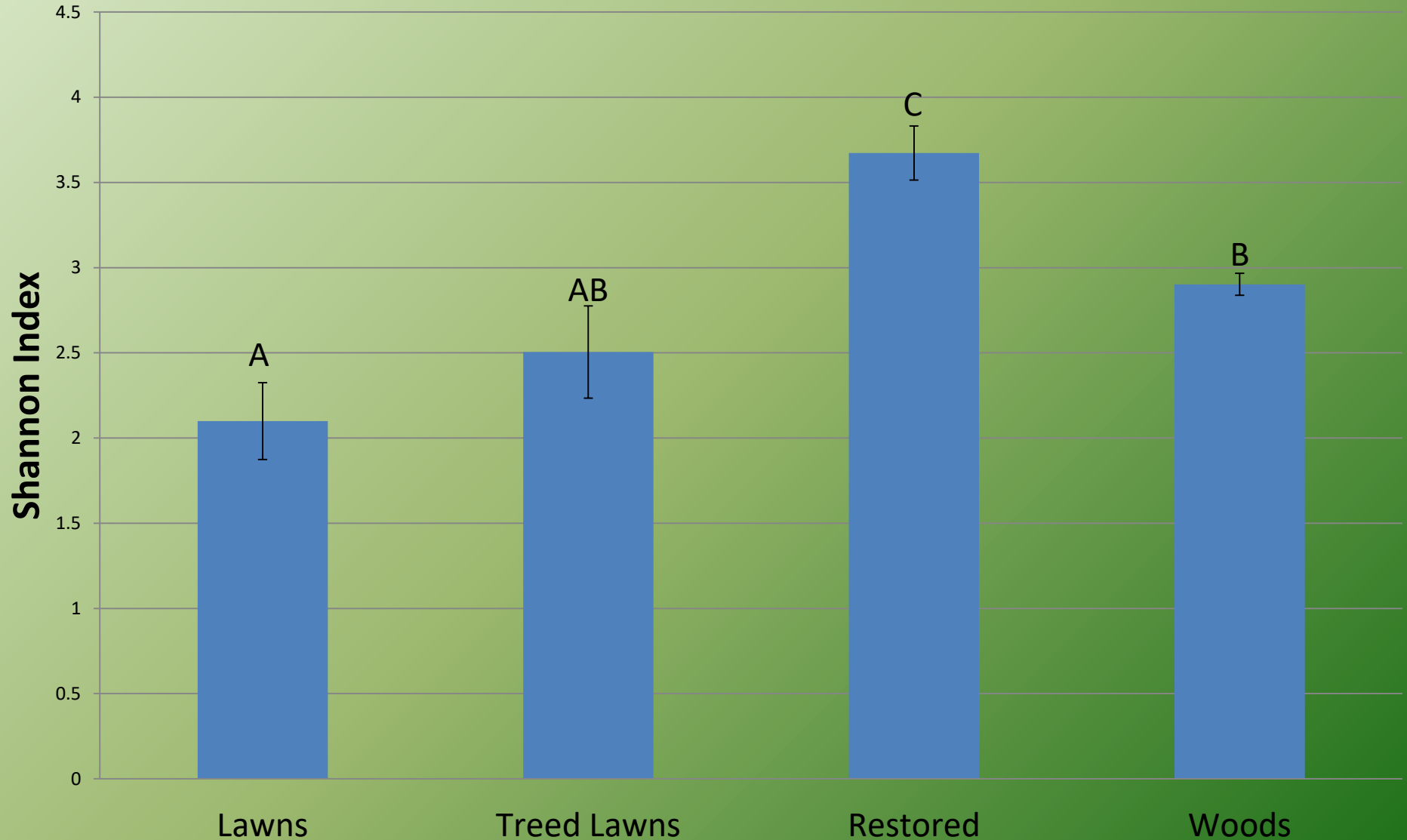
- At each site we did a:
 - Plant Inventory
 - Floristic Quality Index at each site
 - Insect Inventory
 - Sweep netting
 - Bird Inventory
 - On each of 4 days we visited all 16 sites
 - Small Mammal Inventory
 - 4 nights of live trapping



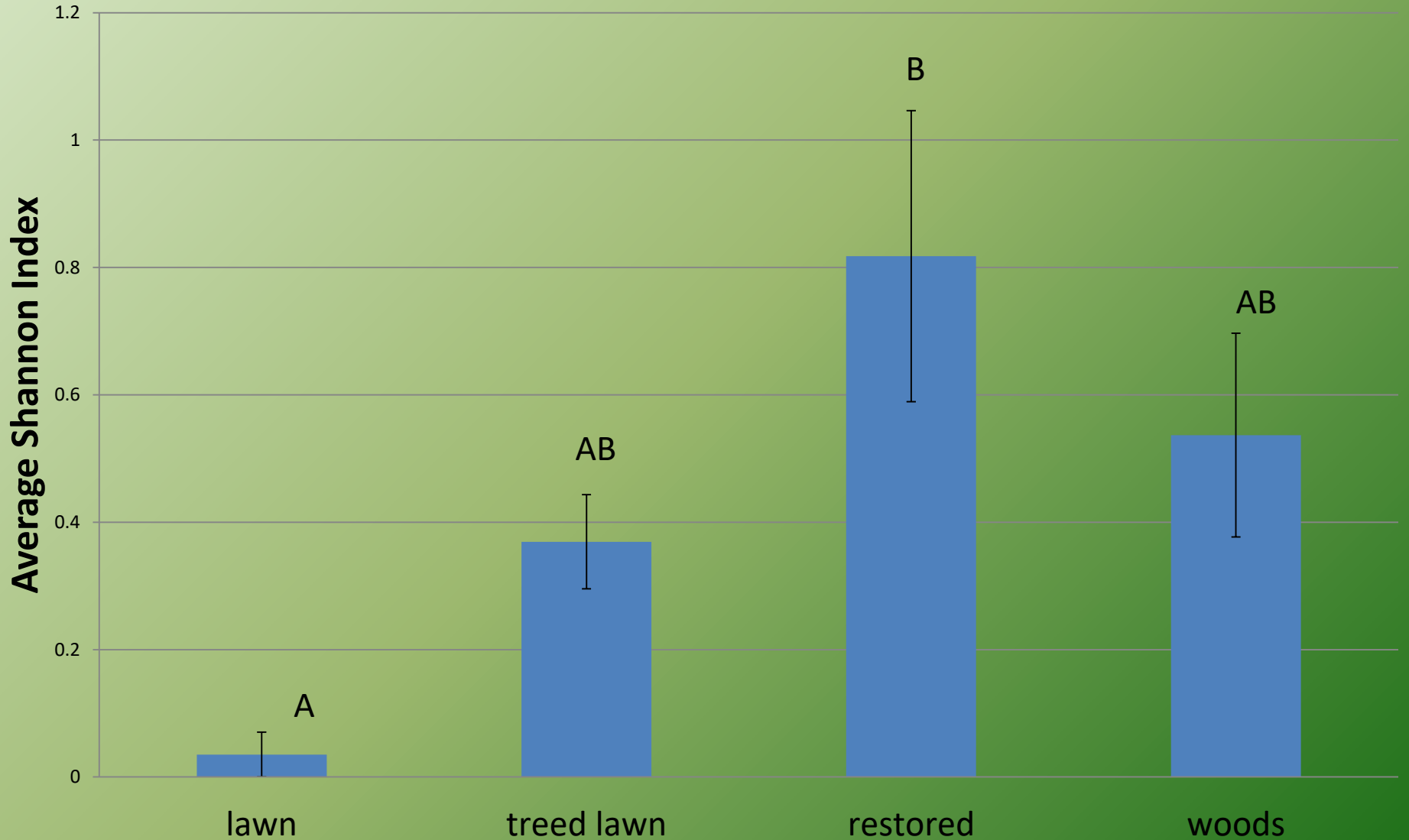
Results-Vegetation FQI



Results – Insect Diversity



Results-Bird Biodiversity



Results: Small Mammals

Location	W.F. Mouse	Deer Mouse	Mouse #3	Meadow Vole	Masked Shrew
BV Lawn					
Seminary Pond Lawn					
Commons Lawn					
North Field Lawn					
Chapel Tree Lawn					
North Hall Tree Lawn					
Knollcrest Tree Lawn					
Physical Plant Tree Lawn					
DeVries Hall Restored	XX	XXXX			
Burton Street Restored	X	XX			
Van Reken Restored				XX	
Ravenswood Restored		XX		X	X
Fieldhouse Woods			XXXXX		X
KH Woods					
Baseball field woods	X				
BB Woods	X	XXX			

Summary

- Even small islands of restored habitat have high:
 - Plant biodiversity
 - Insect biodiversity
 - Bird biodiversity
 - Mammal biodiversity
- Do native plantings support more biodiversity?
 - Yes!
 - Islands are better than ‘no-lands’
- Reconciliation ecology revisited
 - Developing a ‘Sustainability Aesthetic’



How do Native Plants Promote Biodiversity?

Pollination

Rewards: nectar, pollen, etc.

Host Plants

Egg laying sites, larval food

Herbivory – direct food (leaves, fruits, seeds, etc.)

Shelter

nest materials

cover/overwintering

Attract Beneficial Insects/Birds

parasites, predators

Welcoming Biodiversity back to your Yard



Flowering
Cran
Trees




Lawn

Bird bath

Driveway

Lawn

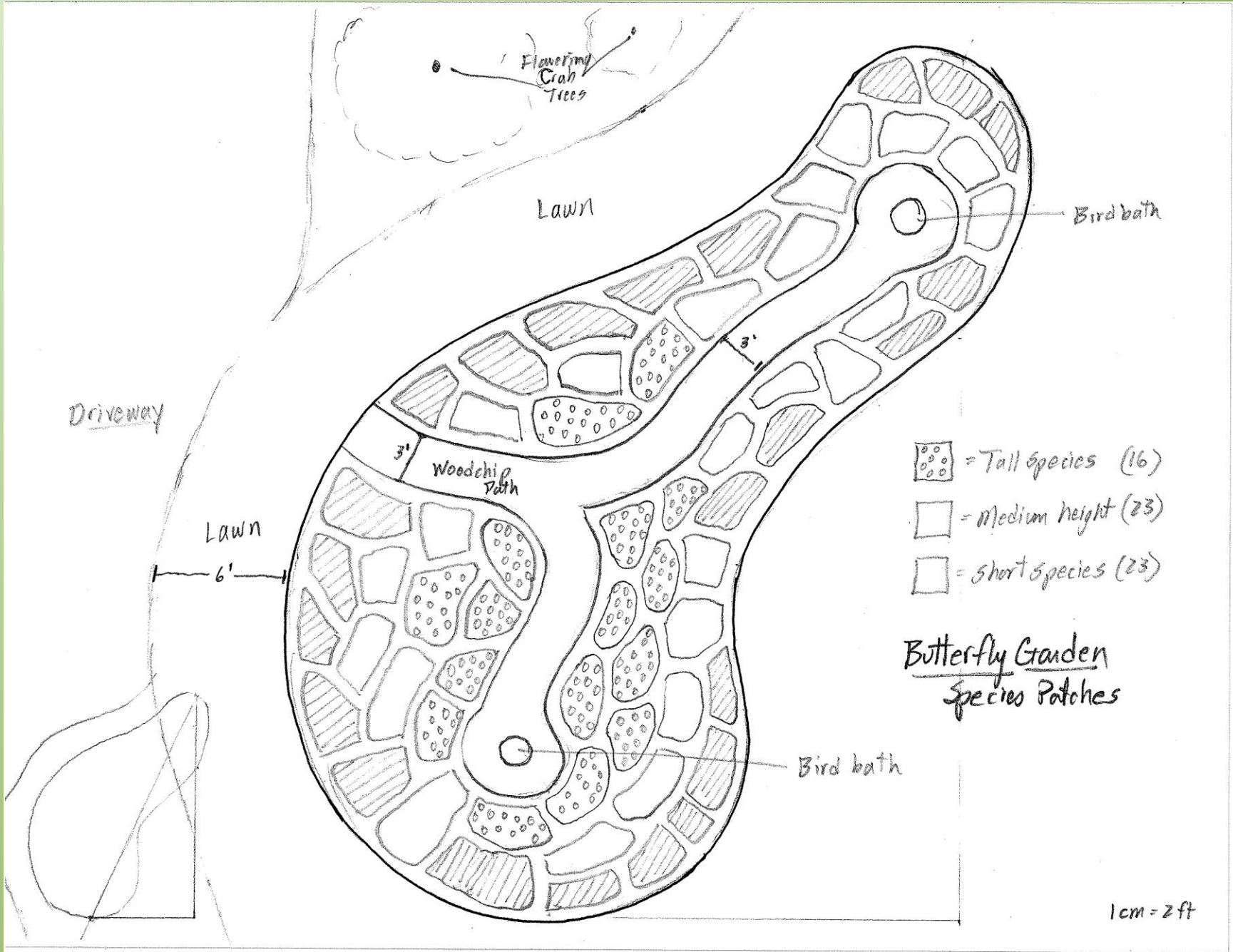
Woodchip
Path

-  = Tall species (16)
-  = Medium height (23)
-  = Short species (23)

Butterfly Garden
Species Patches

Bird bath

1 cm = 2 ft



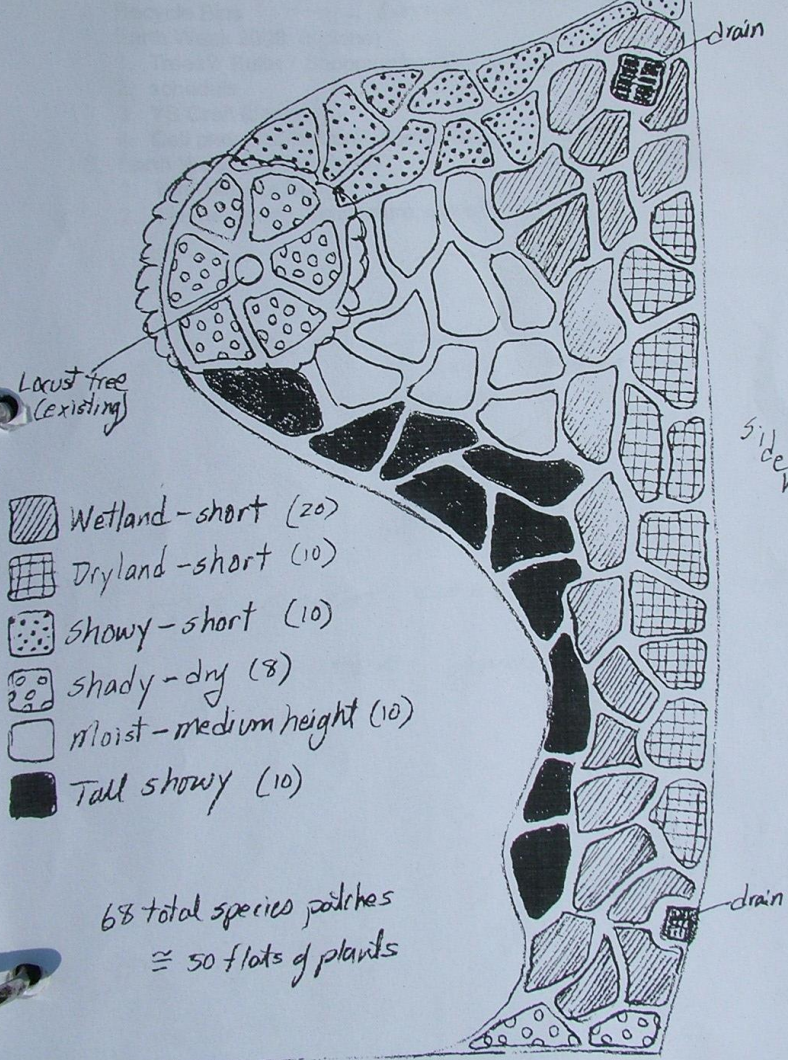


Oakdale Christian School





Grand Rapids Public Library (Downtown) Proposed Rain Garden Design









DeVries Hall Site







Rainscaping at Calvin College







Warners Front Yard





What Native Plants are Best for Promoting Biodiversity?

Depends on Objectives

- Design questions
- Plant stature
- What do you want to attract?

Depends on Site Conditions

- Soil type
- Sun/shade
- Moisture
- Aspect

Some Plants that we've noticed work well . . .



- Swamp Milkweed
(*Asclepias incarnata*)





• Common Milkweed
(*Asclepias syriaca*)



Butterflyweed
(*Asclepias tuberosa*)

- Hairy Beardtongue
(*Penstemon hirsutus*)







- Sky Blue Aster
(*Aster laevis*)



New England Aster
(*Aster novae-angliae*)



- Wild lupine
(*Lupinus perennis*)



- Culver's Root
(*Veronicastrum virginianum*)



- Cup Plant
(*Silphium perfoliatum*)



- Rosinweed
(*Silphium integrifolium*)



Wild Columbine
(*Aquilegia canadensis*)





Cardinal Flower
(*Lobelia cardinalis*)

Black-eyed Susan
(*Rudbeckia hirta*)

Cardinal Flower
(*Lobelia cardinalis*)

Great Blue Lobelia
(*Lobelia siphilitica*)





- Wild Bergamot
(*Monarda bergamot*)





- Meadowsweet
(*Spiraea alba*)

- Northern Blazing Star
(*Liatris scariosa*)





One place
One plant
One half hour:
Solidago rigida
(Stiff goldenrod)





Thank you!

Helpful References

- List of Michigan butterflies and their primary nectar and host plants:
<http://www.calvin.edu/academic/eco-preserve/whattosee/pdfs/ButterflySprdsht.pdf>
- Holm, Heather. 2014. Pollinators of Native Plants. Pollinator Press:
<http://cleangreennatives.blogspot.com/2014/02/book-review-pollinators-of-native-13.html>
- Nielsen, Mogens C. 1999. Michigan Butterflies and Skippers. Michigan State University Extension: <http://www.amazon.com/Michigan-Butterflies-Skippers-Field-Reference/dp/1565250125>
- Tallamy, Doug. 2008. Bringing nature Home. Timber Press:
http://www.nytimes.com/2008/03/06/garden/06garden.html?_r=0
- Xerces Society. 2011. Attracting Native Pollinators, Storey Publishing:
<http://www.xerces.org/announcing-the-publication-of-attracting-native-pollinators/>

Announcements

- CEAP Poster Session—May 8 at 3:30 PM in CFAC Recital Hall (findings from Bio 250 research)
- Plaster Creek Stewards Summer Workshop – June 9: ‘State of the Watershed: The Stormwater Trigger’
- Opportunities for volunteering—Thursdays during the summer; installing 2 large bio-swales for our 319 project



