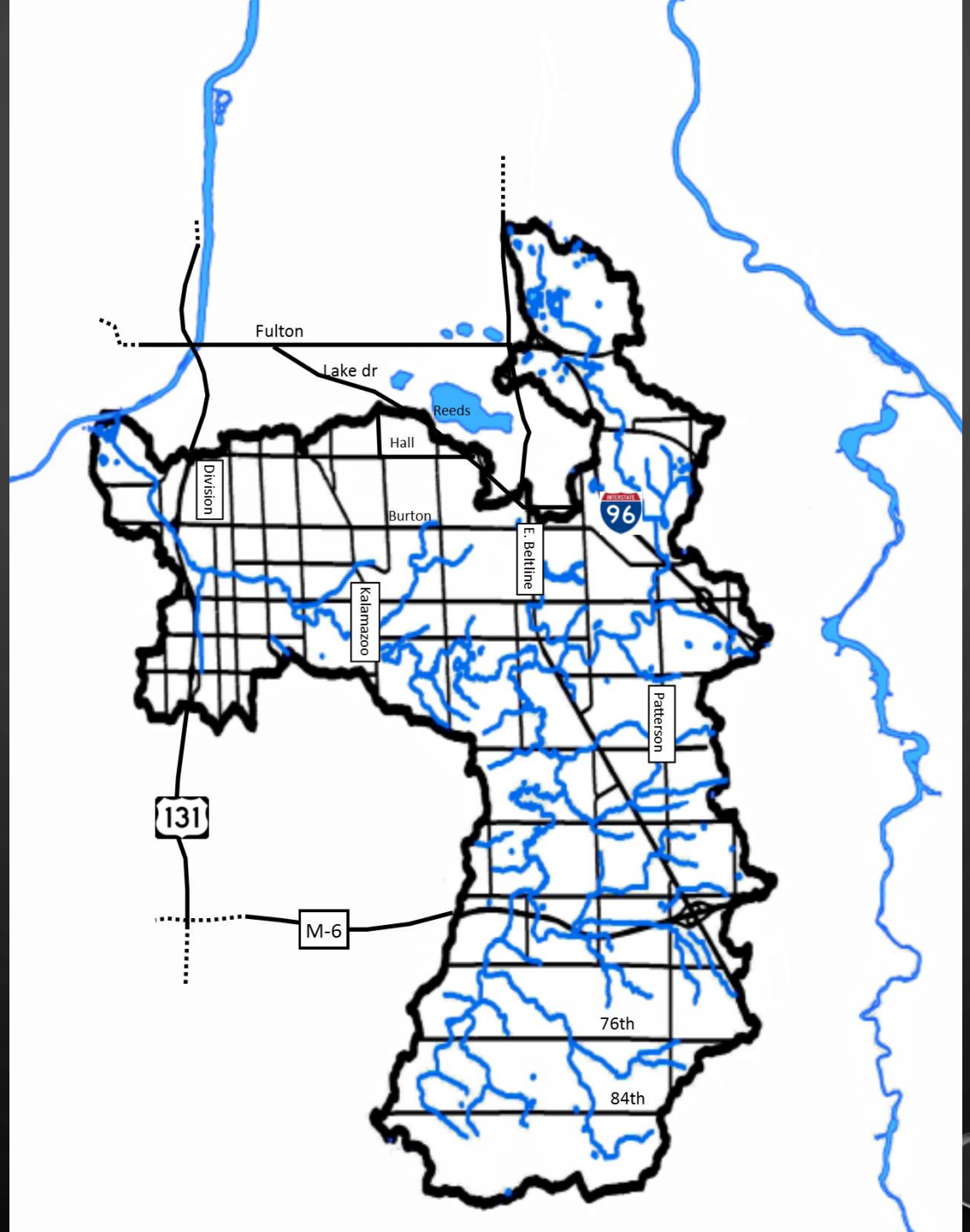
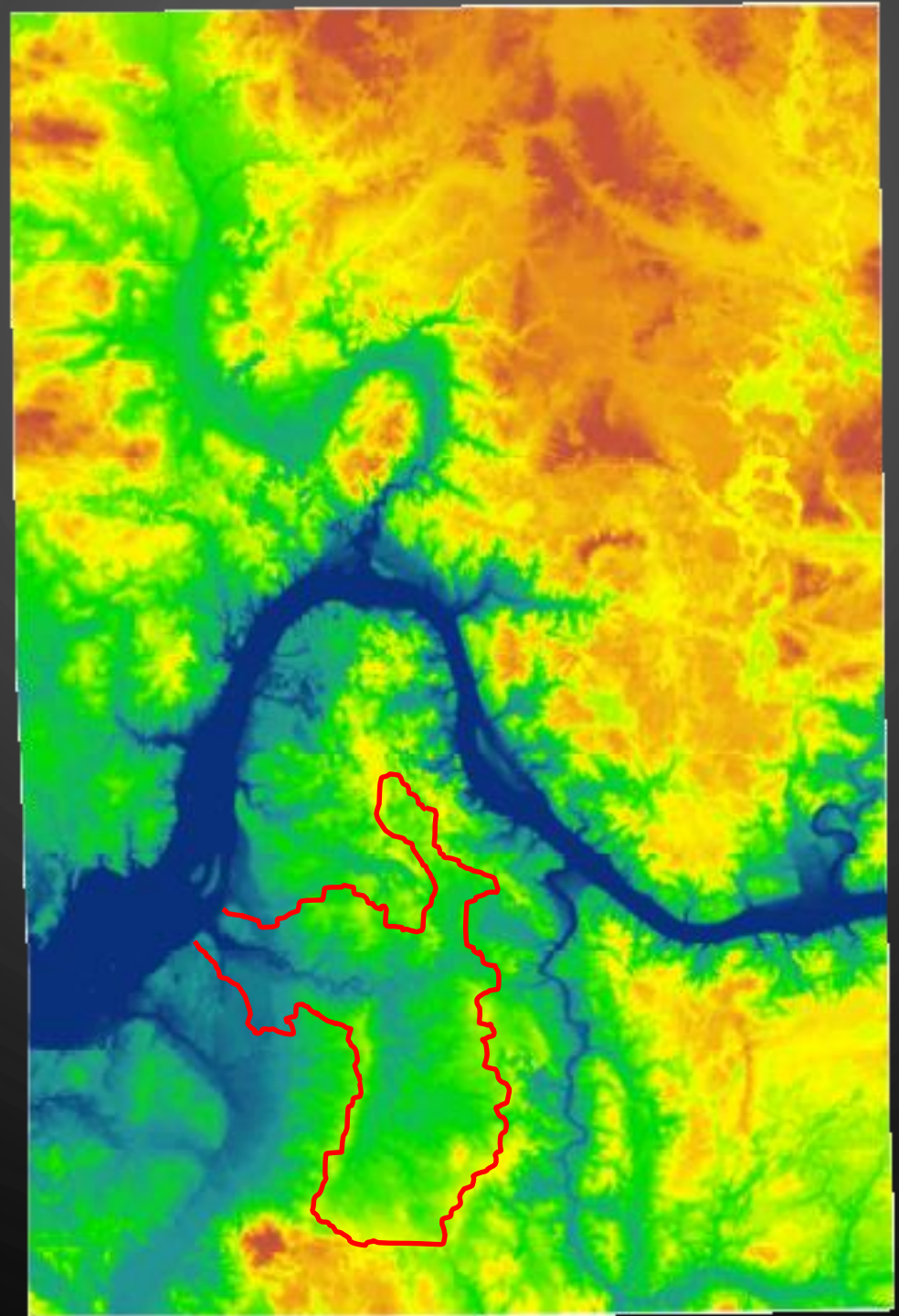
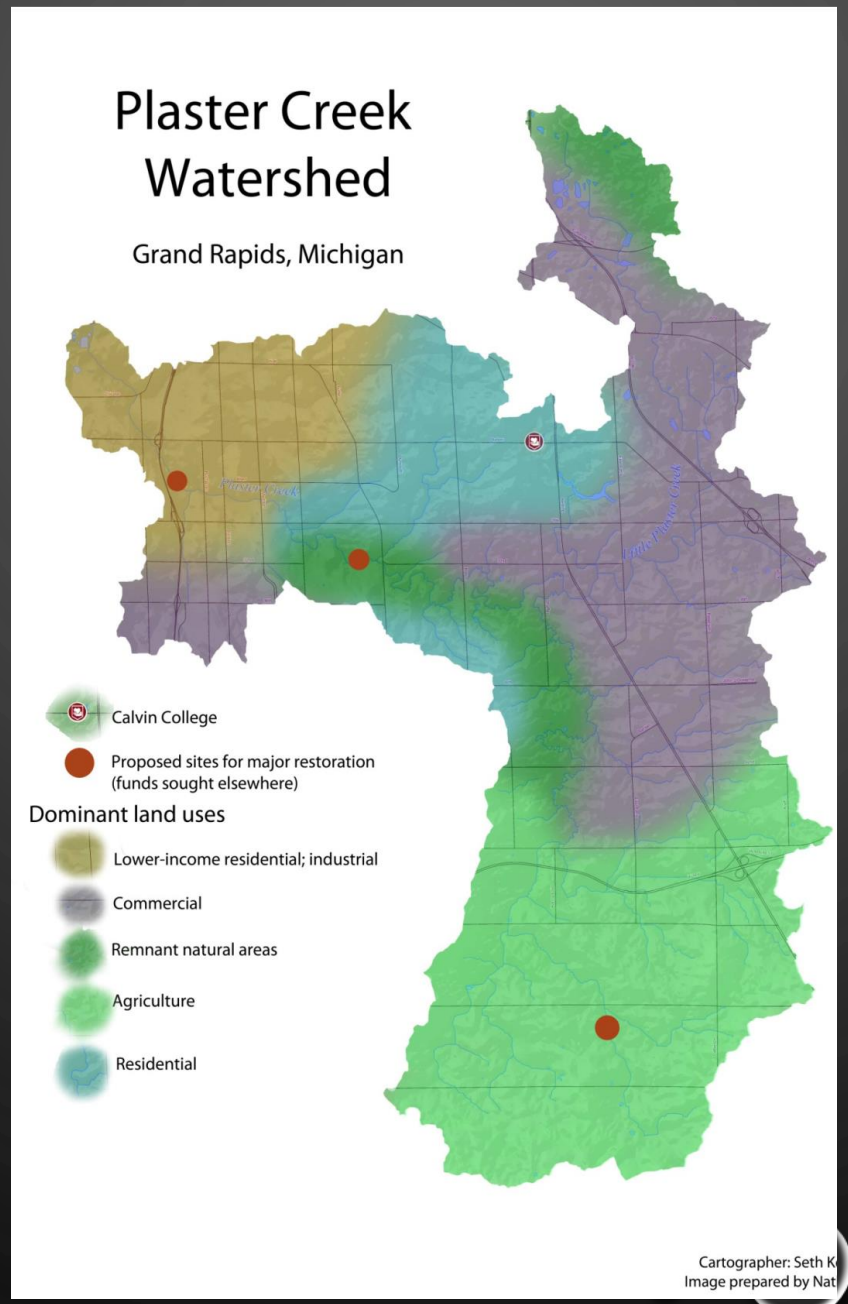

Fulton
Lake dr
Reeds
Hall
Division
Burton
96
E. Beltline
Kalamazoo
Patterson
131
M-6
76th
84th




Plaster Creek
Watershed
Grand Rapids, Michigan
Calvin College
Proposed sites for major restoration
(funds sought elsewhere)
Dominant land uses
Lower-income residential; industrial
Commercial
Remnant natural areas
Agriculture
Residential
Cartographer: Seth K
Image prepared by Nat

CURB-CUT RAIN GARDEN RESEARCH

PLASTER CREEK STEWARDS 2016 FALL EVENT

PATRICK JONKER

DAVID WARNERS

WHAT IS A RAIN GARDEN?

- BASIC FUNCTION
- LAYOUT
- PARTS OF A RAIN GARDEN:
  - WATER CATCHMENT
  - CHANNEL AND ROCK BASIN
  - NATIVE PLANTS

WHAT IS A CURB-CUT RAIN GARDEN?

BRIEF VIDEO INTERLUDE

WHAT GOOD DO THEY DO?

- (IN)FILTRATION DUE TO DEEP ROOT SYSTEMS
- BIODIVERSITY
- STORM WATER RETENTION









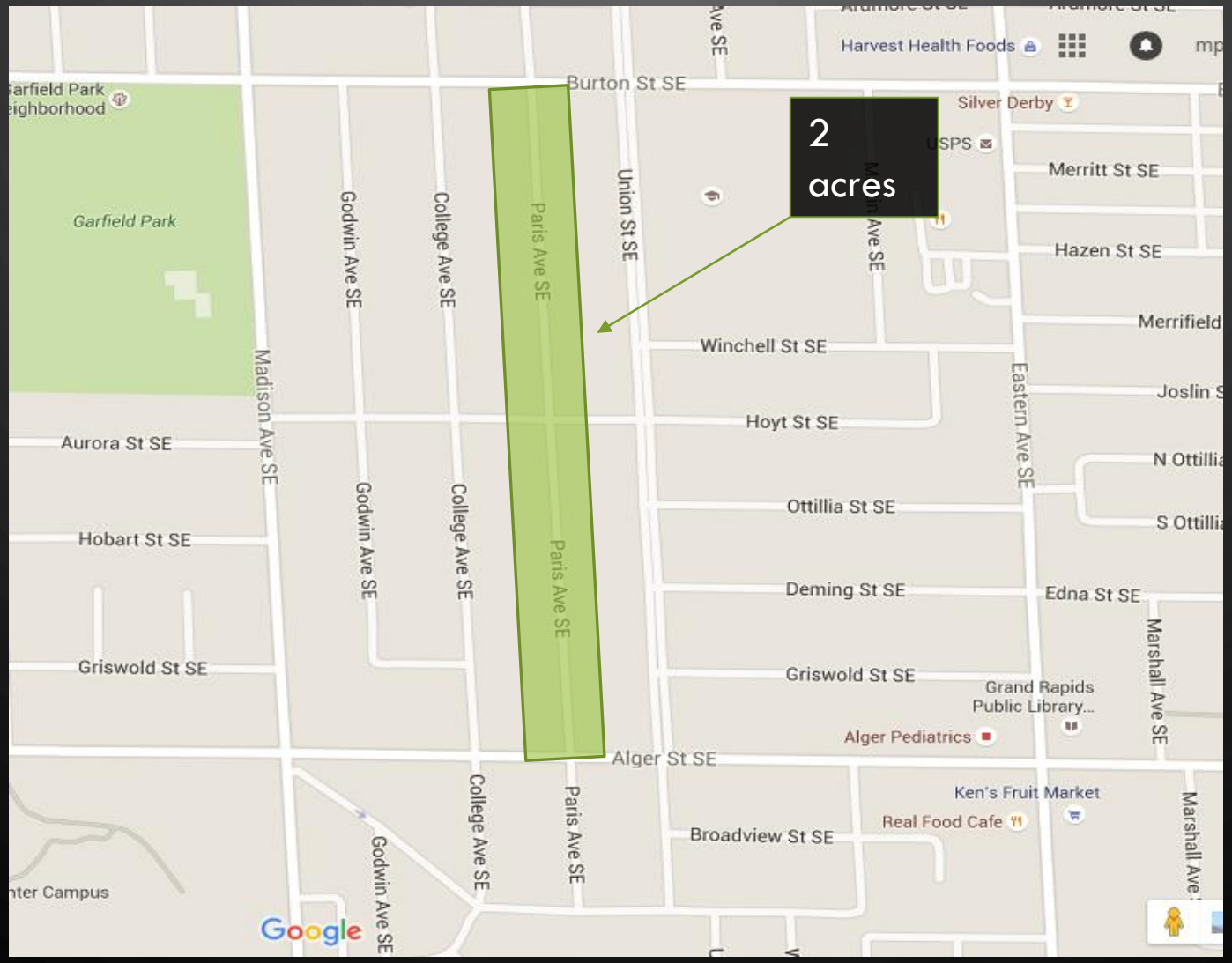



RESEARCH QUESTION

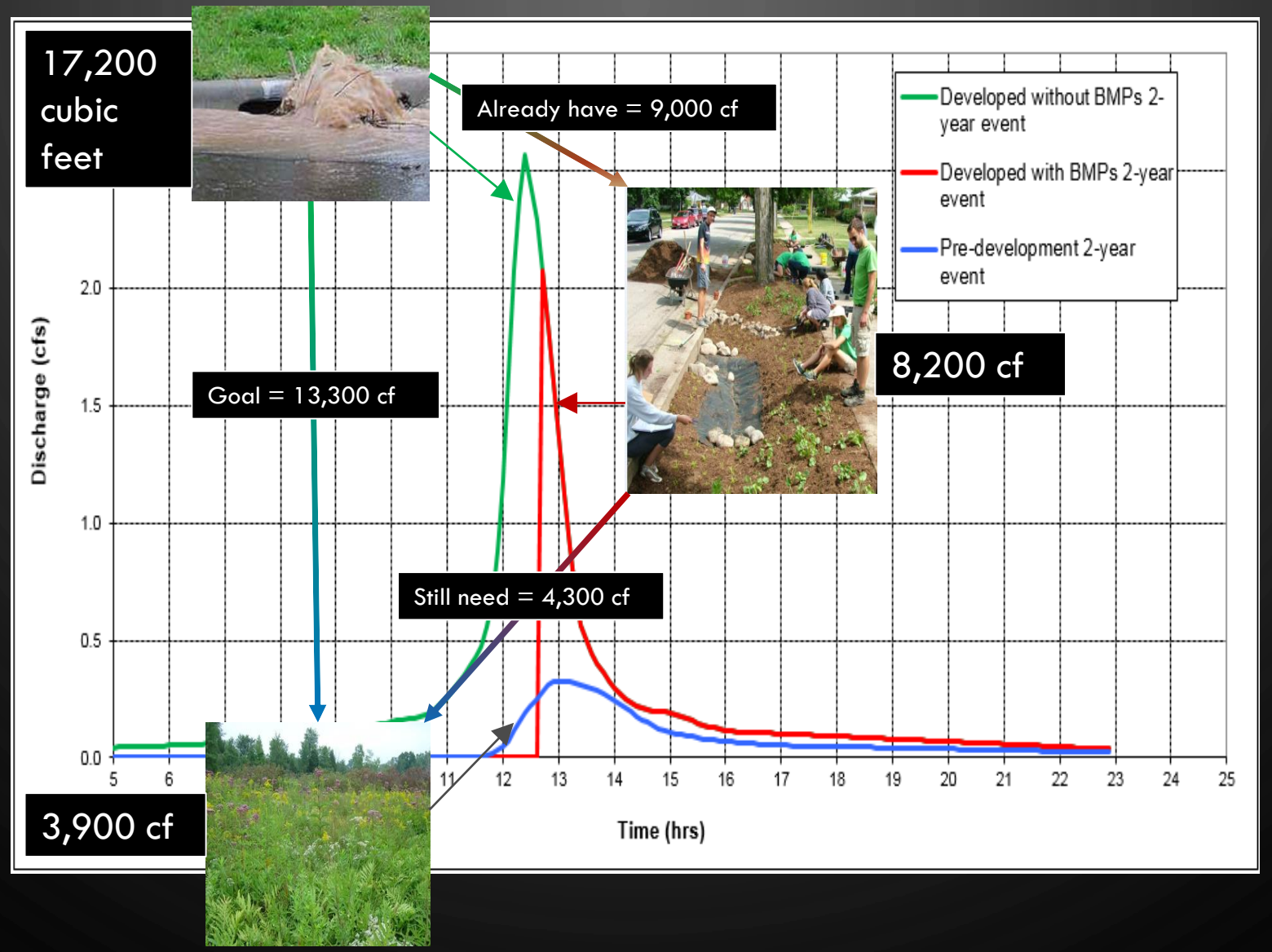
HOW MUCH RAIN FLOWS OFF AN AREA AND HOW MUCH DO OUR PROJECTS (BMPS) HELP?

RYAN DEGROOT

JULIE WILDSCHUT



PARIS STREET HYDROGRAPH

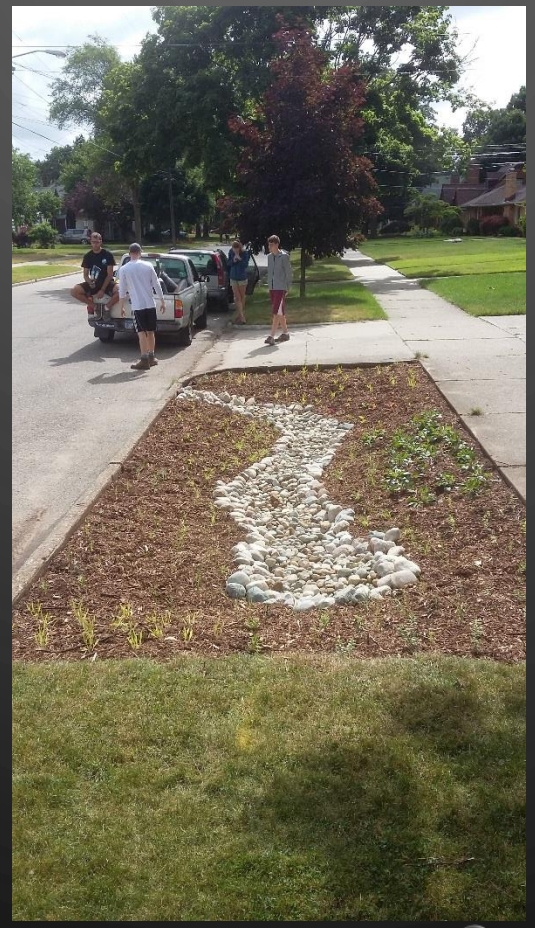


HOW MUCH MAINTENANCE

- WEEDING AND REPLANTING
- CLEANING THE ROCK BASIN
- OTHERWISE… NOT MUCH

PLANTING (2015-2016)

- 14 curb-cut rain gardens 2015
- 12 new curb-cut rain gardens summer of 2016
- Grant for 20 new curb-cut rain gardens in Alger Heights and 20 rain gardens in Oakdale neighborhood
- Today – 8 new gardens!



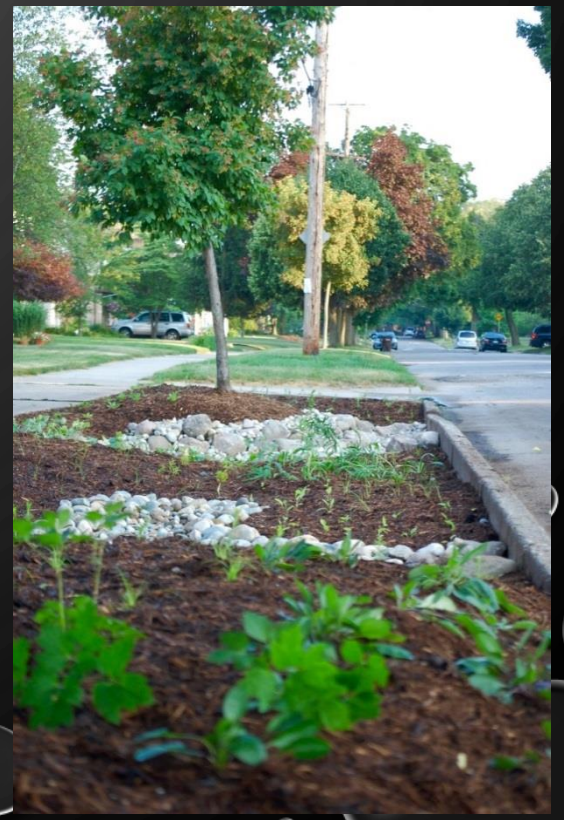
SUMMER 2016 RESEARCH

THE QUESTION:

WHICH NATIVE PLANTS ARE BEST TO USE IN URBAN CURB-CUT RAINGARDENS?

DATA COLLECTION

- FROM JUNE 7-13 OF 2016
- WENT OUT TO ALL OF THE 2015 CURB-CUT RAIN GARDENS AND COLLECTED SURVIVORSHIP AND PERFORMANCE DATA



METHODS

- PLANT INVENTORY
- RANDOM SAMPLING
- VARIABLES TESTED:
  - LEAF NUMBER
  - BUD NUMBER
  - STALK NUMBER
  - CLUMP WIDTH (GRASSES AND SEDGES)
  - HEIGHT

PERFORMANCE RATING

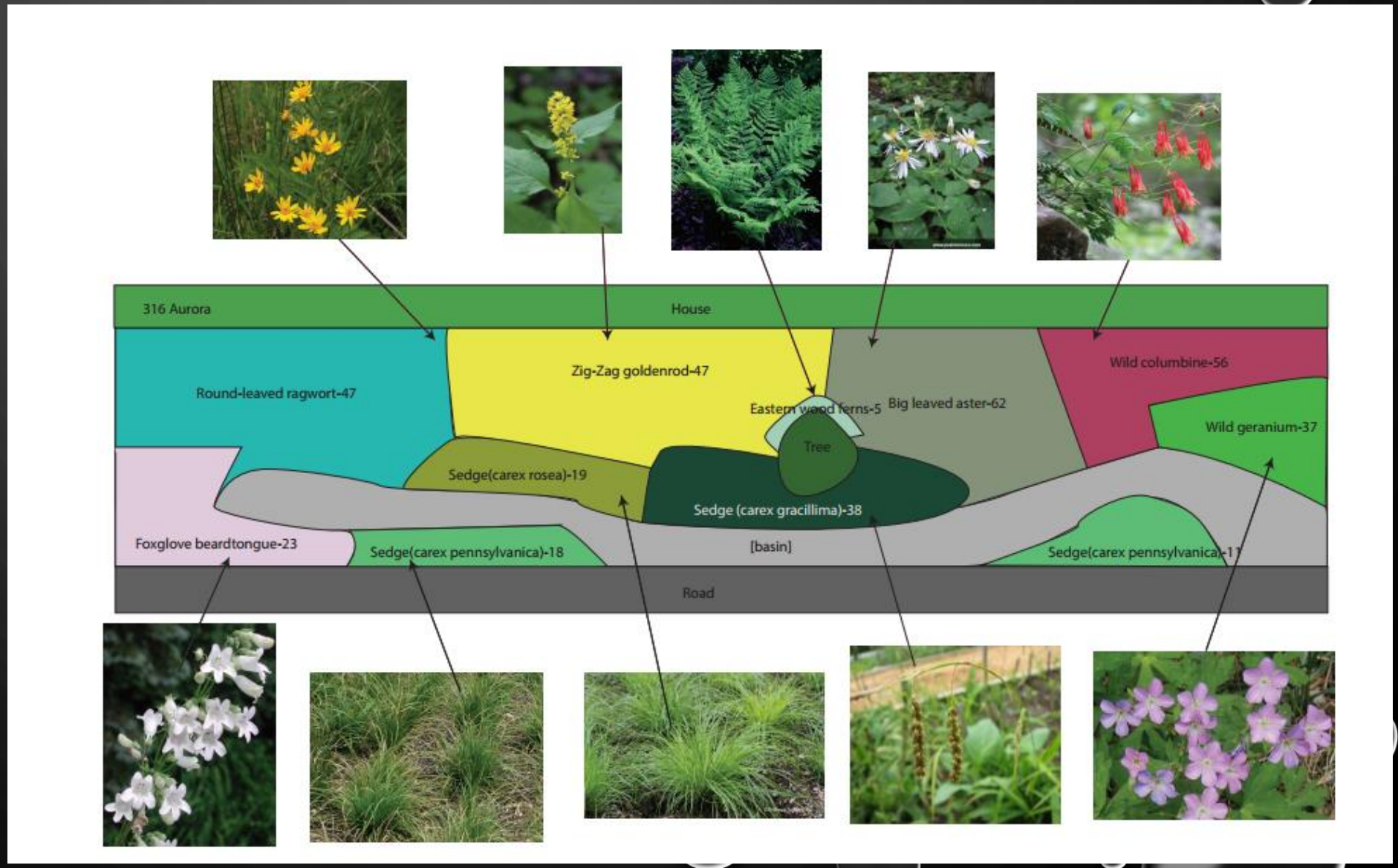
- EACH PLANT GIVEN AN OVERALL RATING OF PERFORMANCE IN THAT GARDEN FROM 1-10
- 10-PLANT WAS SPREADING, GREEN, BUDDING, LOTS OF STALKS, TALL
- 1-PLANT WAS NEAR TO BEING DEAD

Example of a 1

Example of a 10

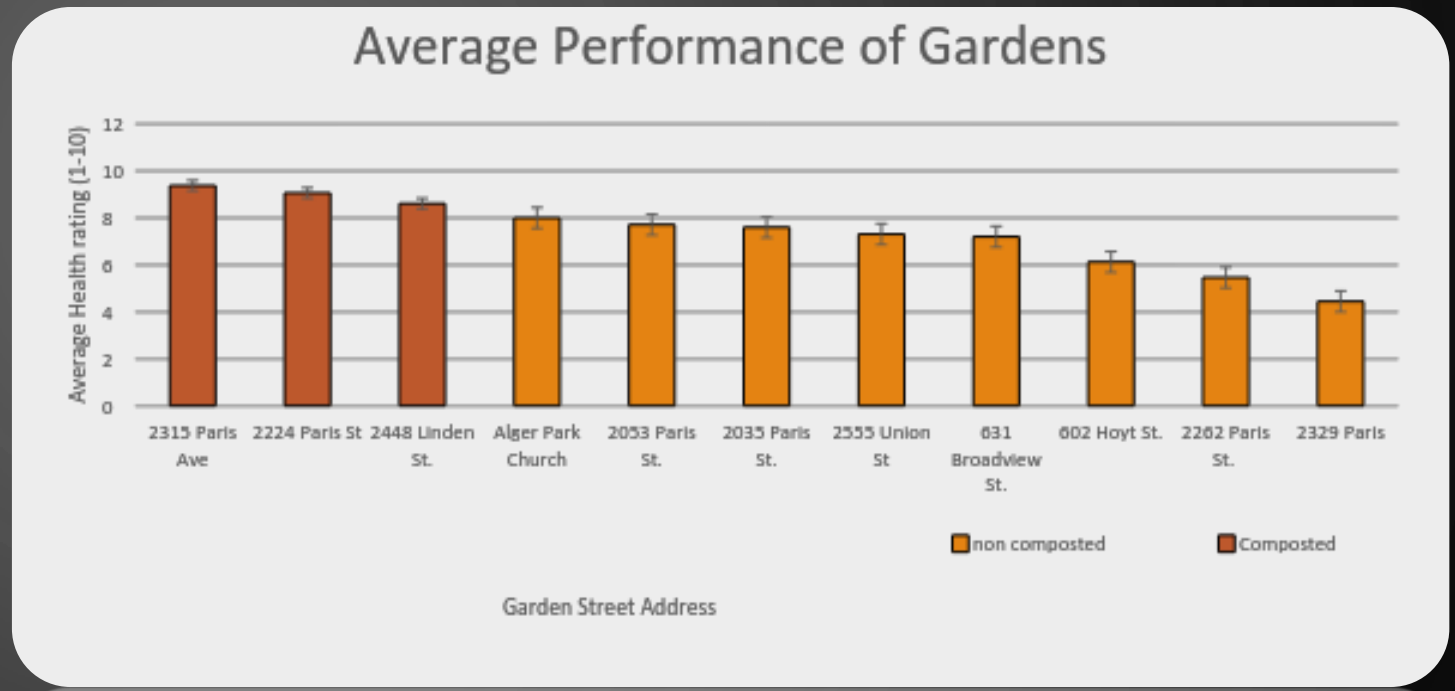
MAPPING AND REPLANTING

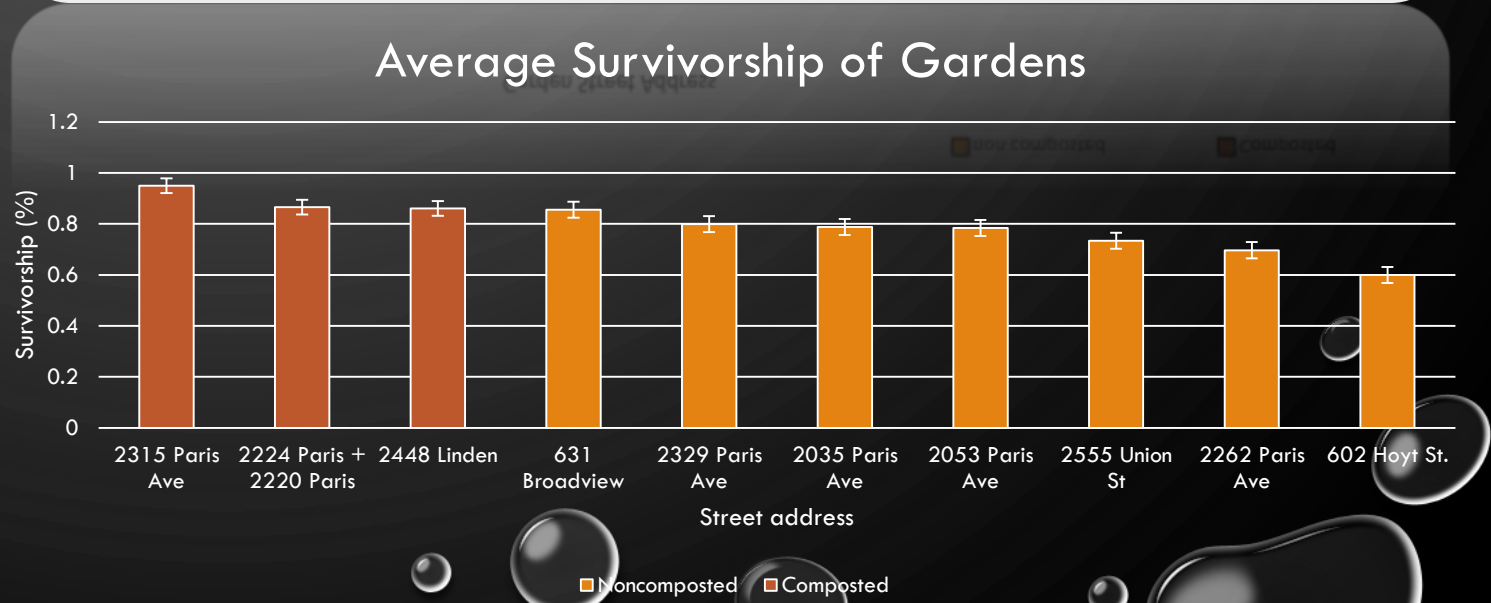
- RECORDED NUMBER PLANTED
- OUTLINED EACH PLANTS AREA COVERED
- REPLANTING/ REPLENISHING (2016)



GARDEN RESULTS

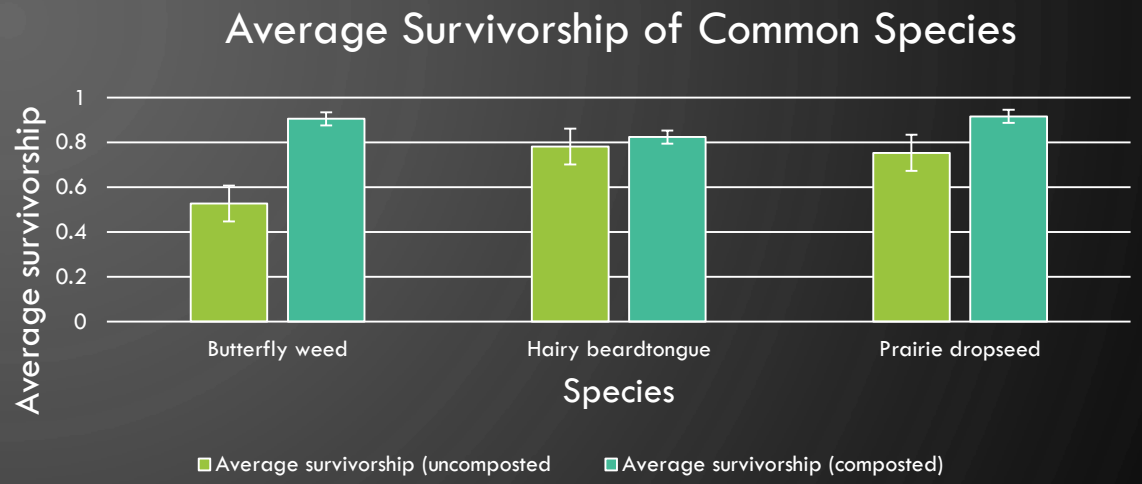
- Performance results by garden
- Survivorship results by garden
- Important variable: compost

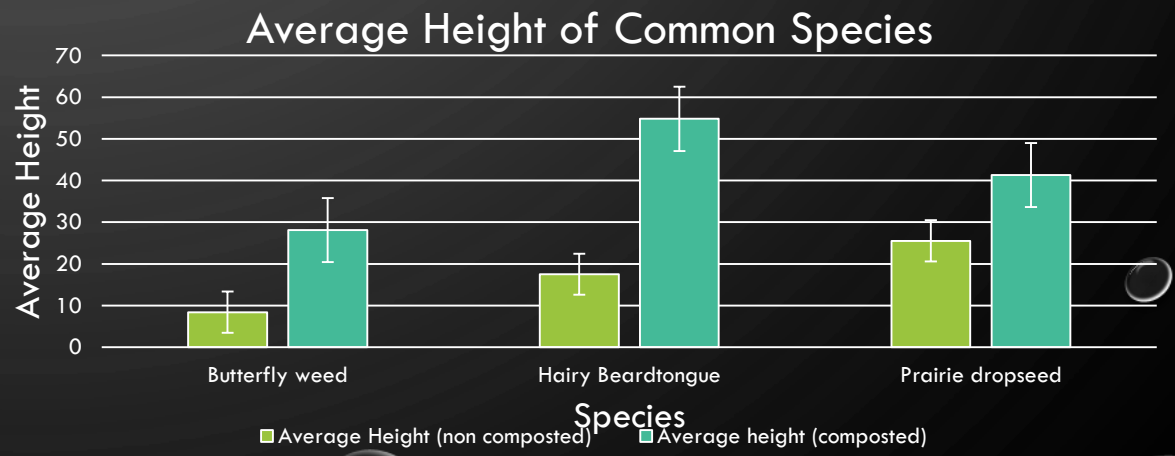




COMMON SPECIES TEST

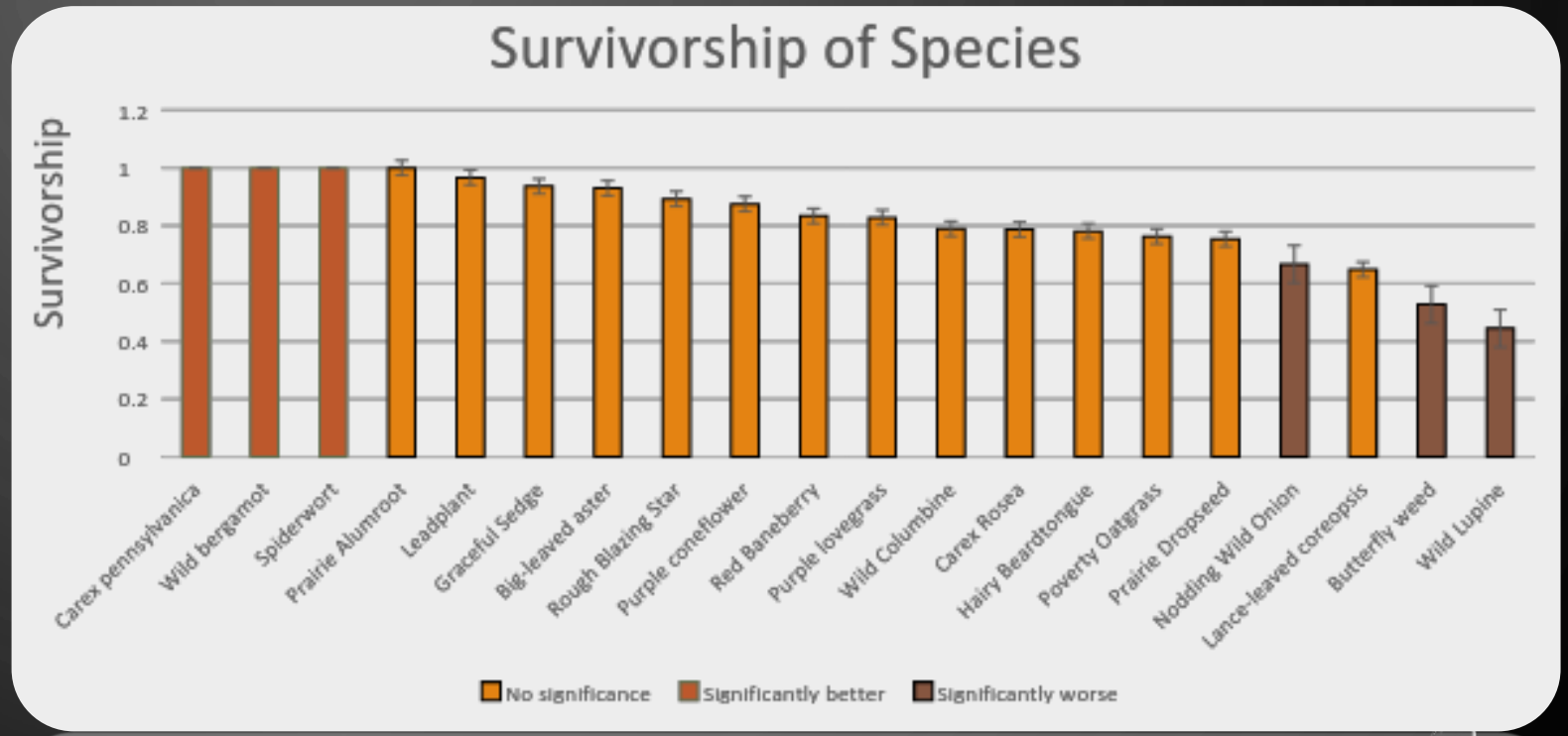
- BUTTERFLY WEED, HAIRY BEARDTONGUE, AND PRAIRIE DROPSEED WERE COMMON TO ALL GARDENS
- HEIGHT OF PLANTS IN COMPOST SIGNIFICANTLY GREATER WITH AN ALPHA OF .01
- SURVIVORSHIP SIGNIFICANT FOR BUTTERFLY WEED, AND PRAIRIE DROPSEED WITH HAIRY BEARDTONGUE BEING VERY CLOSE TO SIGNIFICANT





SPECIES RESULTS

- PENNSYLVANIA SEDGE, OHIO SPIDERWORT, AND WILD BERGAMOT HAD SIGNIFICANTLY HIGHER SURVIVORSHIP THAN THE MEAN
- NODDING WILD ONION, BUTTERFLY WEED, AND WILD LUPINE HAD SIGNIFICANTLY LOWER SURVIVORSHIP THAN THE MEAN



FURTHER QUESTIONS

- HOW DOES WATER VOLUME AFFECT THE PRODUCTION OF A RAIN GARDEN?
- WHICH NATIVE PLANTS TRANSPIRE WATER THE MOST EFFECTIVELY?
- HOW WILL LESS SUCCESSFUL GARDENS DO IN THEIR SECOND YEAR OF GROWTH?
- WILL CERTAIN PLANTS DO SIGNIFICANTLY BETTER IN A SECOND YEAR OF GROWTH?
- WHICH SPECIES WILL SPREAD? WILL THIS BECOME PROBLEMATIC?
- WHAT HIGHER LEVELS OF BIODIVERSITY WILL BENEFIT FROM PLANTING OF RAIN GARDENS?

LAWNS VS RAIN GARDENS

- ENVIRONMENTAL COSTS:
  - IRRIGATION AND CHEMICAL INPUTS
  - CARBON SEQUESTRATION VS EMISSIONS
  - LOW BIODIVERSITY
  - FRISBEE, SOCCER, CROQUET, JARTS

- RAIN GARDENS:
  - NATURAL IRRIGATION AND DRUG FREE
  - CARBON SPONGES
  - BIODIVERSITY MAGNETS
  - PASSIVE RECREATION

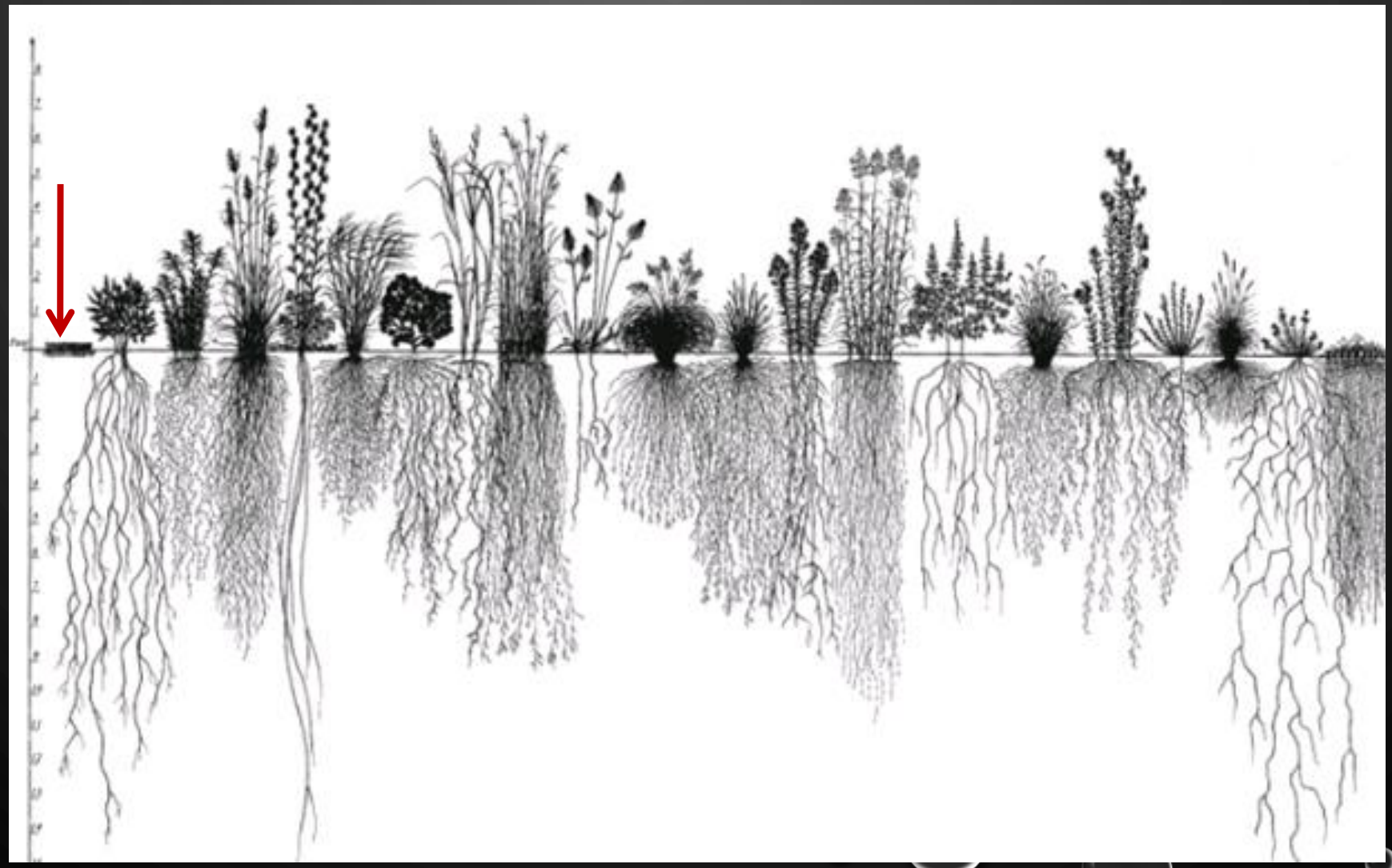
CONCLUSIONS

- CURB-CUT RAIN GARDENS (CCRGS) ARE GREAT WAYS TO CAPTURE STORM WATER AND ENHANCE BIODIVERSITY.
- CCRGS PROVIDE RESEARCH OPPORTUNITIES FOR COLLEGE STUDENTS (HYDROLOGY, ECOLOGY, AESTHETICS, ECONOMIC, ETC.)
- CCRGS OFFER A NEW, SUSTAINABLE AESTHETIC FOR URBAN NEIGHBORHOODS
- MOST NATIVE PLANTS USED IN THE CCRGS HAVE SURVIVED AND PERFORMED WELL (ONGOING RESEARCH)
- OUR WATERSHED NEEDS MORE RAINGARDENS!!

SUMMARY

- EVERYONE LIVES IN A WATERSHED
- MOST URBAN WATERWAYS ARE DEGRADED
- CLEAN WATER IS ESSENTIAL FOR HEALTHY LIVING
- NEED TO DEVELOP BETTER WATERSHED PRACTICES
- MANY RES

Why Native Plants?



CHALLENGE . . .

- FOR THE CREATION WAITS IN EAGER EXPECTATION FOR THE CHILDREN OF GOD TO BE REVEALED . . .

(ROM 8:19)

Endnote . . .

". . . reconciliation with creation must occur for us to resolve our gravest environmental challenges. Faith leaders-- clergy and lay people alike-- have an essential role to play in awakening a new reverence for creation."

Pope Francis, Encyclical (2015)