Happy Hollow Park

Photo taken January, 2017

EPICS PURDUE

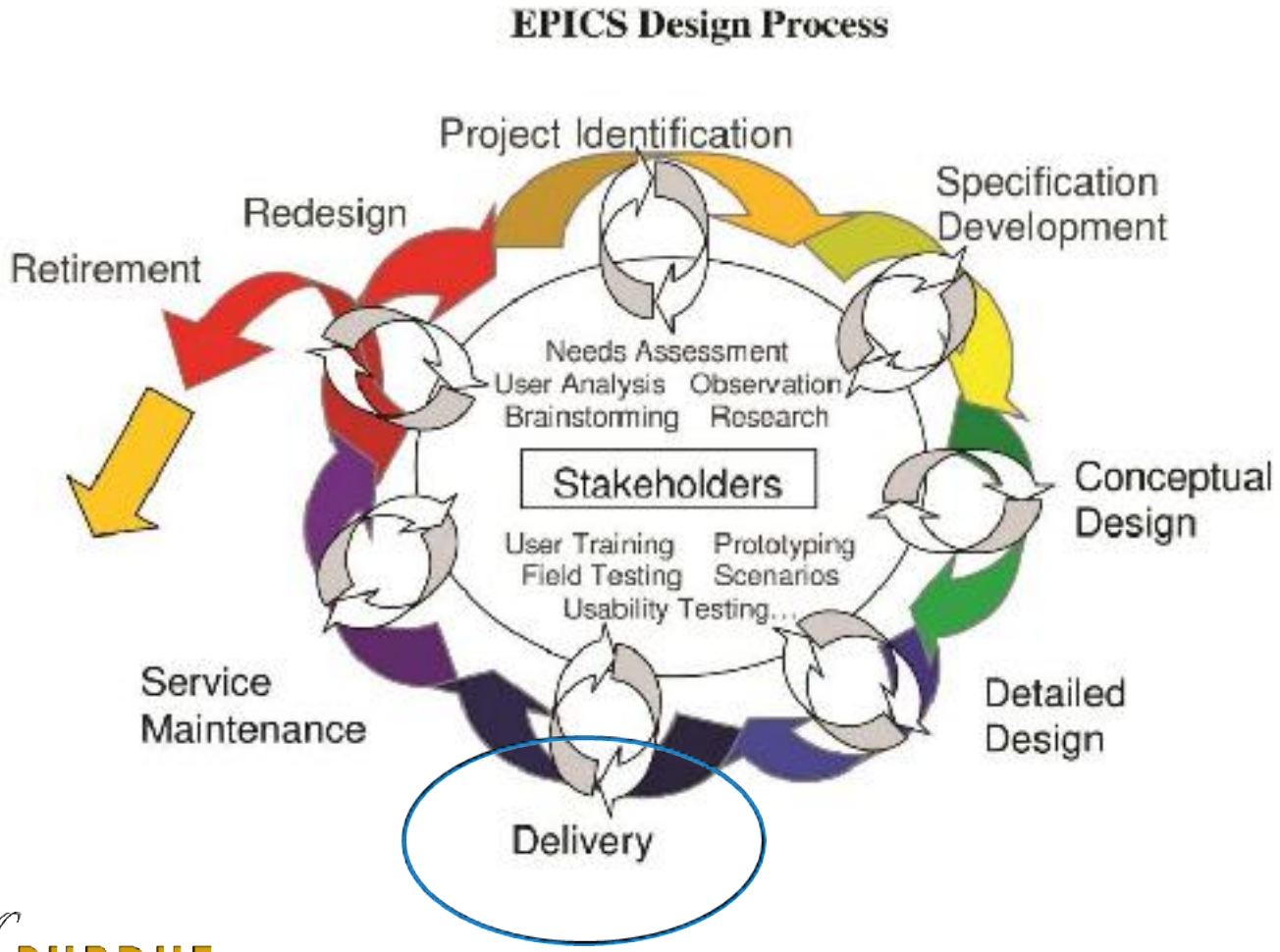
Introduction

- Monica Moran, Design Lead
  - *Sophomore, Environmental and Ecological Engineering*
- Karuna Srivastava, Financial Officer
  - *Freshman, Multidisciplinary Engineering*
- Nolan Miller, Project Partner Liaison
  - *Freshman, Materials Science Engineering*
- Ben Eaton, Archivist
  - *Senior, Natural Resources and Environmental Science*
- Alan Gross
  - *Freshman, Aerospace Engineering*
- Jacob Mickey
  - *Freshman, Civil Engineering*

Agenda

- Overview of team
- Community partner introduction
- Project background
- Semester progress
- Open discussion

EPICS Design Process



West Lafayette Parks and Recreation

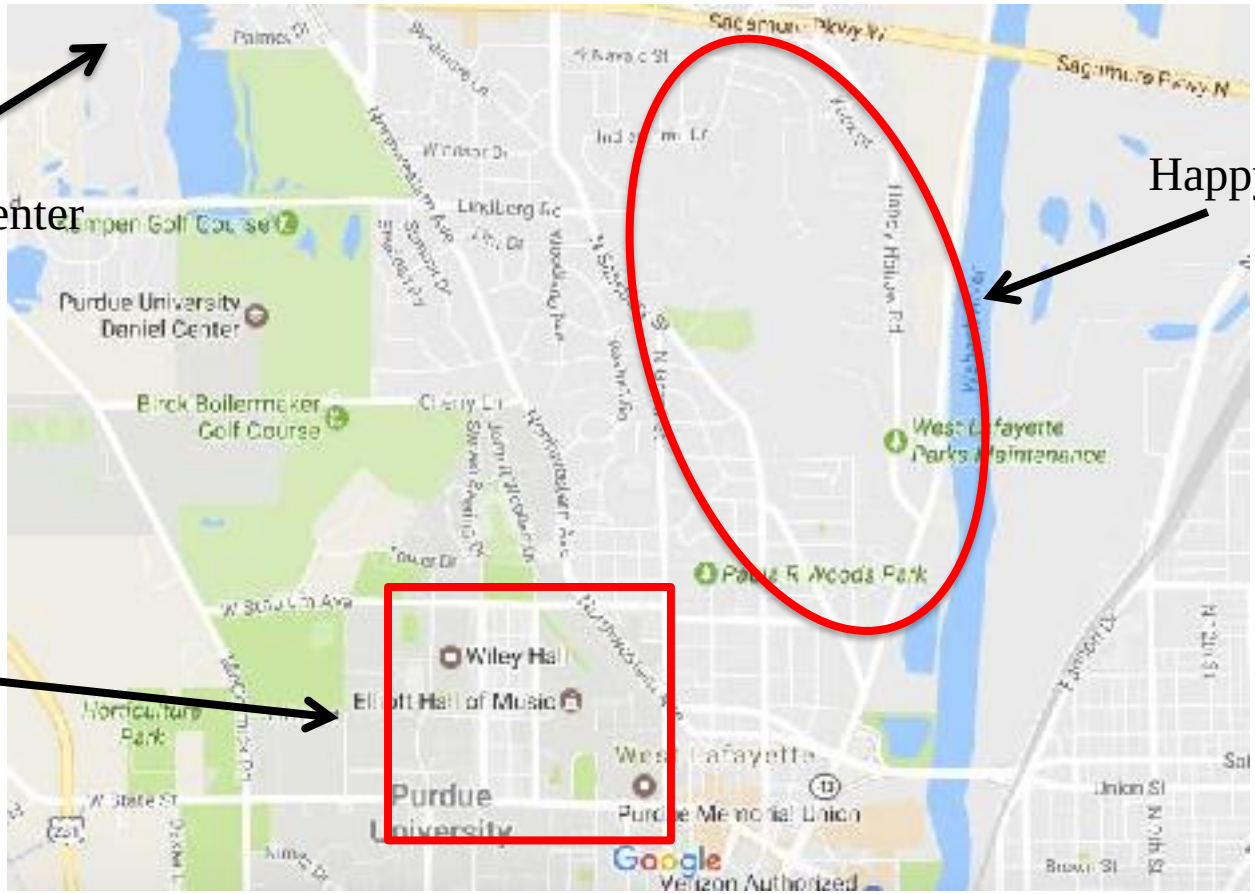
- Serves to:
  - Enhance quality of life
  - Designate trails
  - Maintain the grounds of West Lafayette parks
- Working with Dan Dunten
  - Director of the Lilly Nature Center

CITY OF
WEST LAFAYETTE
INDIANA

Taken from: www.westlafayette.in.gov

Location

Lilly Nature Center



Happy Hollow Park

Campus

Happy Hollow Park

- Approximately 81 acres
  - Playground
  - Hiking/exercising trail
  - Shelters and other areas for entertaining
  - History of erosion
    - Progressively worsening for 30+ years

Taken at Happy Hollow Park, January, 2015
Information from: www.westlafayette.in.gov

Stakeholders

- West Lafayette Parks and Recreation Department
  - Utilizes solution
- Park Goers
  - Residents
  - Hikers
  - Bikers
  - Students

Project Background

- Motivation for project:
- Severe erosion throughout Happy Hollow Park
  - Types of erosion
    - **Hill-slope erosion**
    - Gullies
    - Stream bank erosion
  - Contributing sediment to the Wabash River
  - Largely natural, exacerbated due to manmade development
  - Affecting use of park (aesthetics and purpose)

Taken January, 2017

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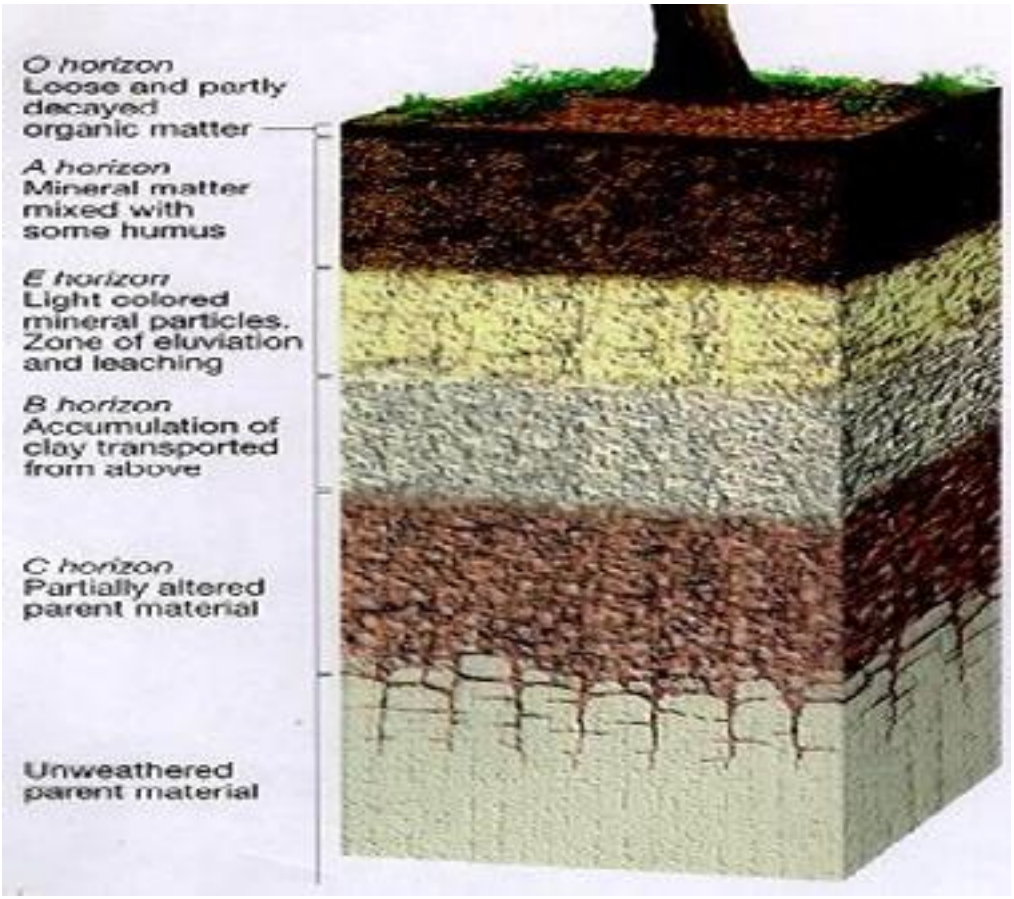
Main Problem: Erosion

- Erosion is:
  - "The process whereby materials of the earth's crust are loosened, dissolved, or worn away and simultaneously moved from one place to another" –United States Geological Survey

Taken at Happy Hollow Park, January 2014

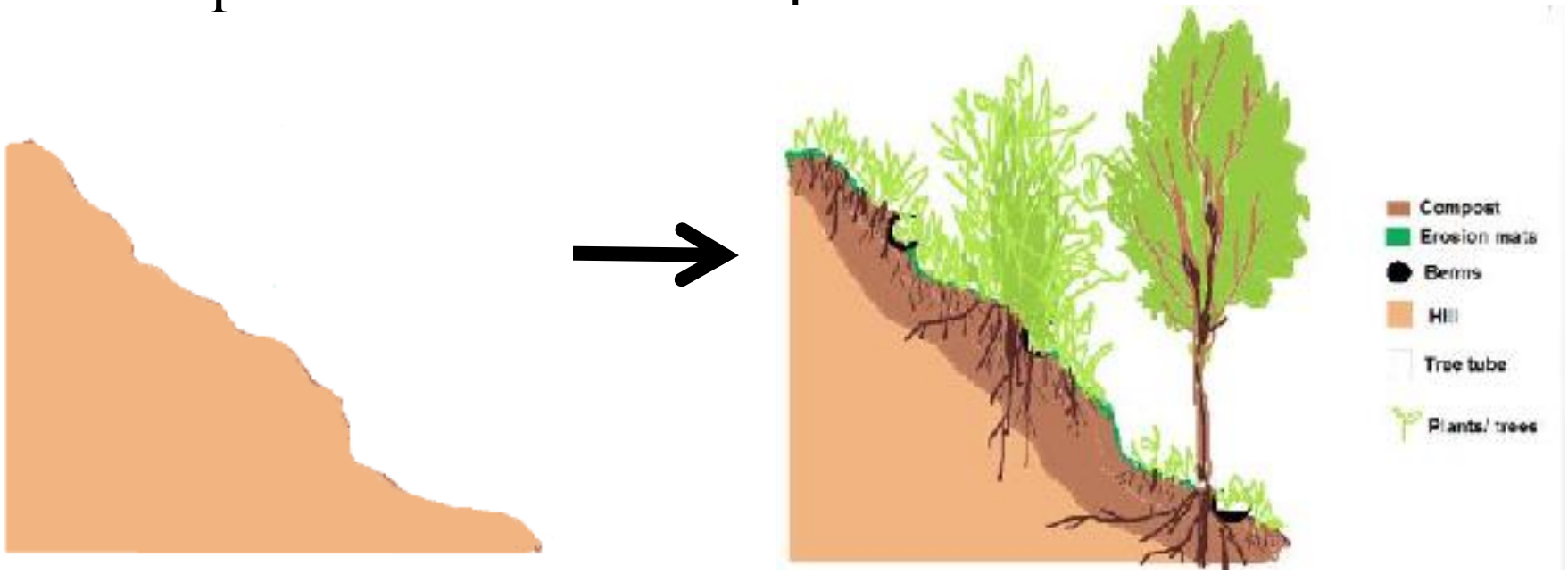
Severity Level of Erosion



Taken from: http://www.ctahr.hawaii.edu/mauisoil/images/a_profile_clip_image002_0000.jpg

Vision for Project

- Mitigate erosion on hill slopes
- Allow reestablishment of topsoil and vegetation on the park's hill sides to trap sediment



Criteria

- Withstand water flow and prevent soil detachment
- “Natural” and camouflaged
- Long lifespan (plant re-establishment)
- Safe around people/pets/wildlife
- Easy to install
- Does not leave harmful residue/pollutants

Constraints

- Must trap (average) 2 inches of soil
- Must allow for plant re-establishment on site

Hill Locations

North Hill

Taken at Happy Hollow Park, April 2016

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Middle Hill

Taken September 2013

Taken October 2016

South Hill

Taken January, 2017

Taken October, 2016

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Prototype 1 – Spring 2015 (Page)

Taken June 2015

Taken August 2015

Prototype 2 – Spring 2016 (Page)

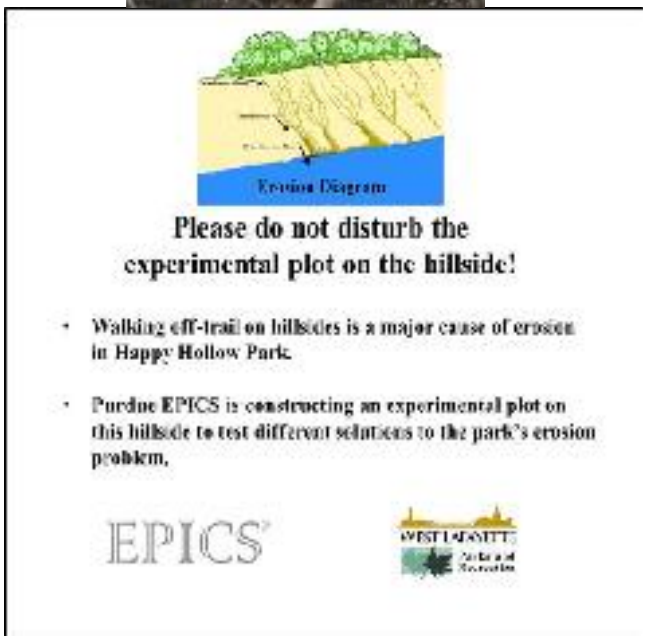
April 2016

September 2016

Semester's Progress

- Estimated amounts of each material needed
- New Plant Weighted Decision Matrix (WDM) because of soil pH
- Ordered all materials
- Completed final drafts for educational component
- Pamphlets and door hangers delivered
- Outreach for volunteers and media coverage
- Volunteer days to install materials and plant

Signage

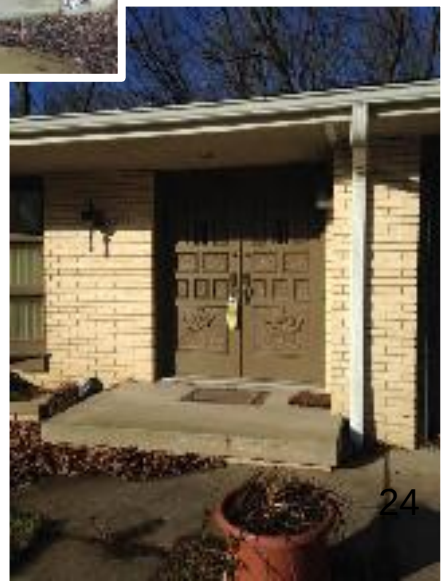

Please do not disturb the
experimental plot on the hillside!
Walking off-trail on hillsides is a major cause of erosion in Happy Hollow Park.
Purdue EPICS is constructing an experimental plot on this hillside to test different solutions to the park's erosion problem.
EPICS


Area Closed
To Protect
Sensitive
Resources


Area Closed
To Protect
Sensitive
Resources

Pamphlet Design (Page)

Door hangers (Page)



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Materials

- 8” x 5’ Filtrexx berms
- Erosion mats
- Stakes
- Compost
- Plants, trees, and shrubs
- Miracle Tubes

Budget

Item	Number needed	Cost
Door hangers	500	103.47
Pamphlets	50	37.50
Erosion mats	3	190.00
Berms	37	1,543.44
Trees: wildlife packet	1	101.03
Tree tubes and rebar	115	437.02
Compost	14	69.58
Plants	980	1,649.40
Miscellaneous		315.64
	Total	4,447.08

Plants Used Spring and Fall 2016

- Creeping red fescue
- Annual ryegrass
- Columbine
- Jacob's ladder
- Blue wood aster

Taken from:
http://m5.i.pbase.com/g6/26/411626/2/78880705.9YK57Ybu.jpg

- Flowering dogwood
- Allegheny serviceberry
- Spicebush

Taken from:
http://www.mtcubacenter.org/images/plant-finder/Cornus_florida_2.jpg

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Plants (Page)

- Beak Grass
- Bur-reed Sedge
- Red Columbine
- Short's Aster
- Downy Skullcap

http://www.midwestgroundcovers.com/_ccLib/image/plants/DETA-2159.jpg

http://www.easywildflowers.com/quality/aqu.ca4.jpg

http://www.wildflower.org/image_archive/320x240/SAW/SAW_00430.JPG

http://www.easywildflowers.com/quality/scllariaincana.jpg

Trees and Shrubs

Jasper-Pulaski State Nursery: wildlife packet

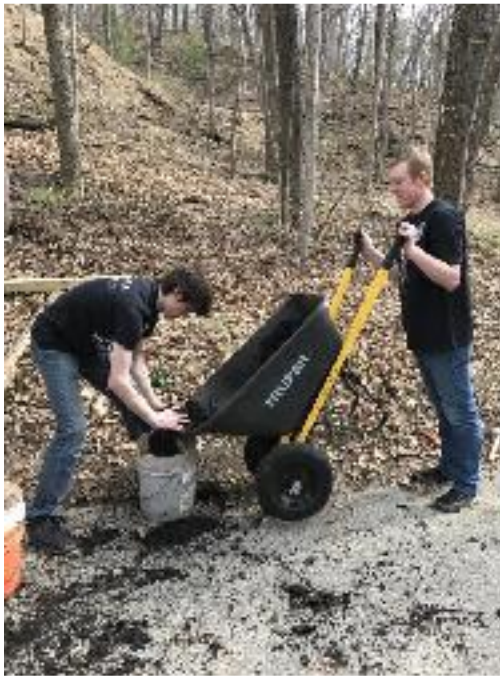
- American plum
- Common chokeberry
- Elderberry
- Black chokeberry
- Hazelnut
- Washington hawthorn
- Hackberry
- Black cherry
- Gray dogwood
- Pawpaw
- Persimmon
- Shagbark hickory

http://cdn.mommypotamus.com/wp-content/uploads/2014/09/elderberry-syrup-recipe.jpg

http://www.carolinanature.com/trees/caov0280s.jpg

Volunteer Days – March 31 & April 1






Volunteer Days – April 8

Volunteer Days – April 8

Before & After

March 31,2017

April 8,2017

April 16,2017

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Media Coverage

- Volunteer day
  - 1 minute news story
  - Transcript
  - Aired on Television, posted on website and Twitter

News Story

http://www.wlfi.com/story/35103489/students-volunteers-help-prevent-soil-erosion-at-happy-hollow-park

Final Report

- Includes:
  - Background
  - Past semesters' progress
  - Bill of materials
  - Educational component
  - Progress on test site and new test sites
  - Plan for future
  - Financial Statements

Maintenance

- Water plants once a week if there has been no rain
  - For first growing season (through September)
- After one year if trees have established well enough to survive without protection, remove Tree Pro Miracle Tubes

Follow Up

- EPICS
  - Leave documentation for future teams on SharePoint
  - Give park plant totals for each hill
  - Remind park about follow up and maintenance once a month for the first year
- West Lafayette Parks and Recreation Department
  - Count plant survival rate
    - Survival rate on a per hill basis (not overall)
    - If less than 70% consider replanting

Neighborhood Best Management Practices Tour

- Over the Summer
- Andrew will be there to explain the problem
- Continue to educate community members about the project

Questions and Feedback?

Taken at Happy Hollow Park, October 2013