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Plum Run Stream Restoration

Krista Egolf

West Chester University of Pennsylvania

Brittney Semone

West Chester University of Pennsylvania

Shelby Garner

West Chester University of Pennsylvania

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Plum Run Stream Restoration

By Krista Egolf, Brittney Semone,
Shelby Garner

Overview

- Introduction
- Background
- Plans and design
- Monitoring & costs
- Why invest in this project?

Impermeable surfaces



<http://www.facingthefuture.org/portals/0/Curriculum/Water,%20Science,%20Civics/Stormwater-Diagram.gif>

Impermeable surfaces

- Low absorptive capacity, high water runoff (Johnston *et al.* 2006)
- Low aquifer replenishment
- Dissolved contaminants (Wengrove and Ballesterro 2012)
- Effects on water temperature (Wengrove and Ballesterro 2014)
- Degraded downstream systems

Location

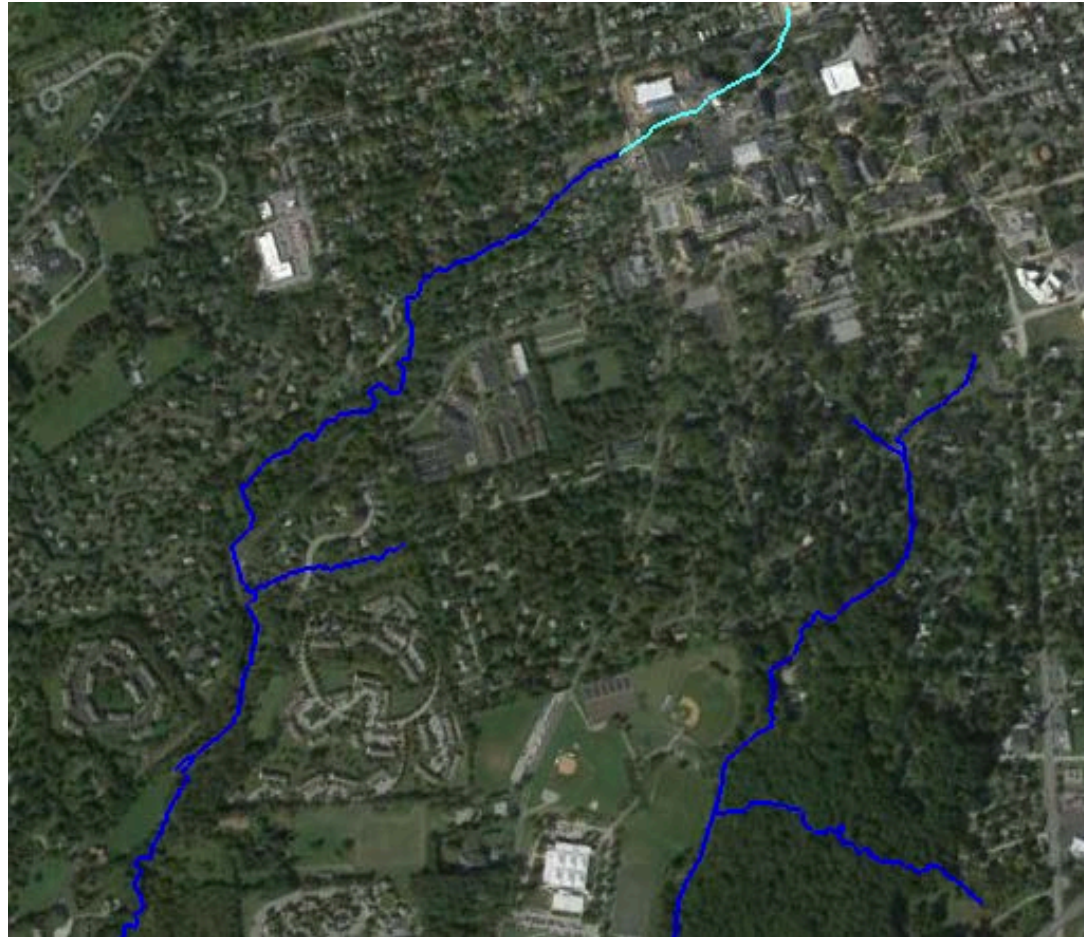








Location

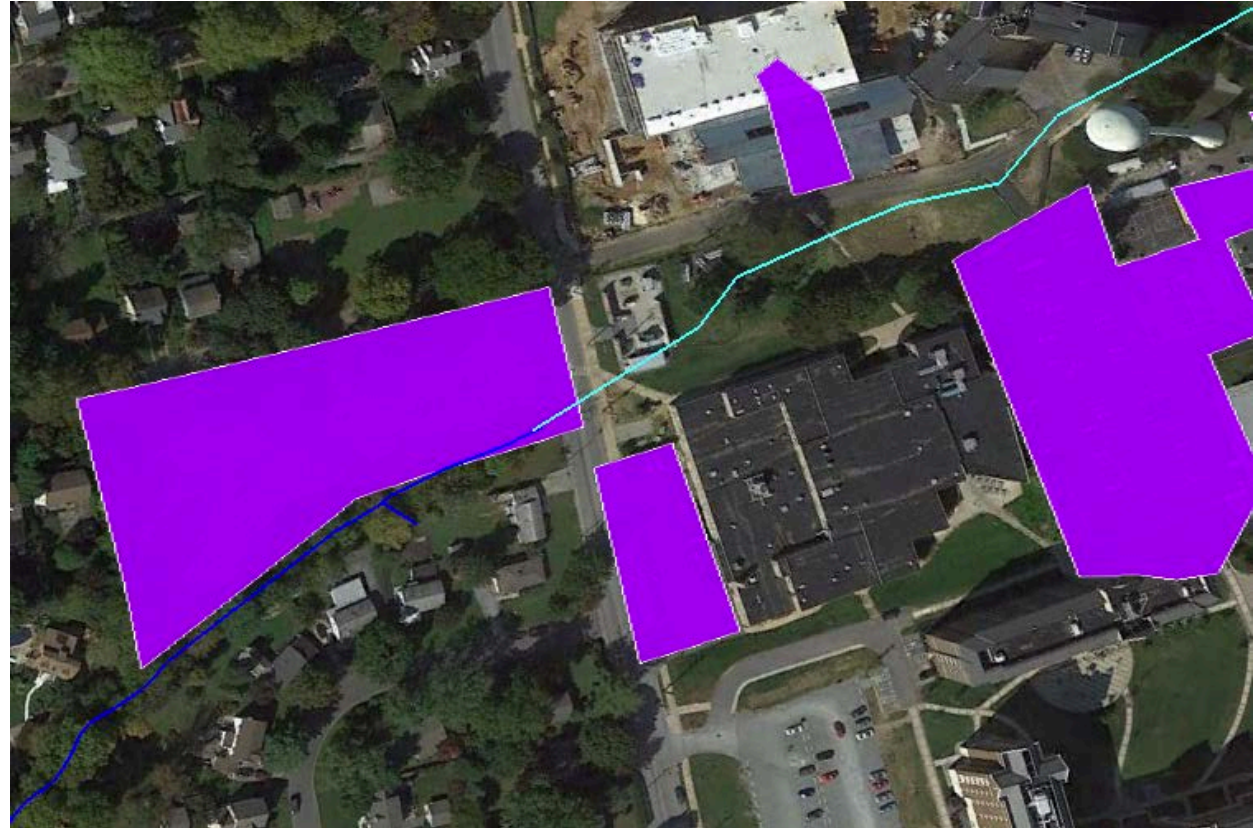


Location

- Upstream
 - Low-order streams susceptibility (Teufel *et al.* 2013)
 - Effects on downstream systems (Chen *et al.* 2013)
 - Cost effective (Zelder *et al.* 2014)
- Suburban area surrounded by impermeable surfaces

The Plan

- Day light the stream
- Create a Retention Basin



Retention Basins

- What is it?
- How does it work?

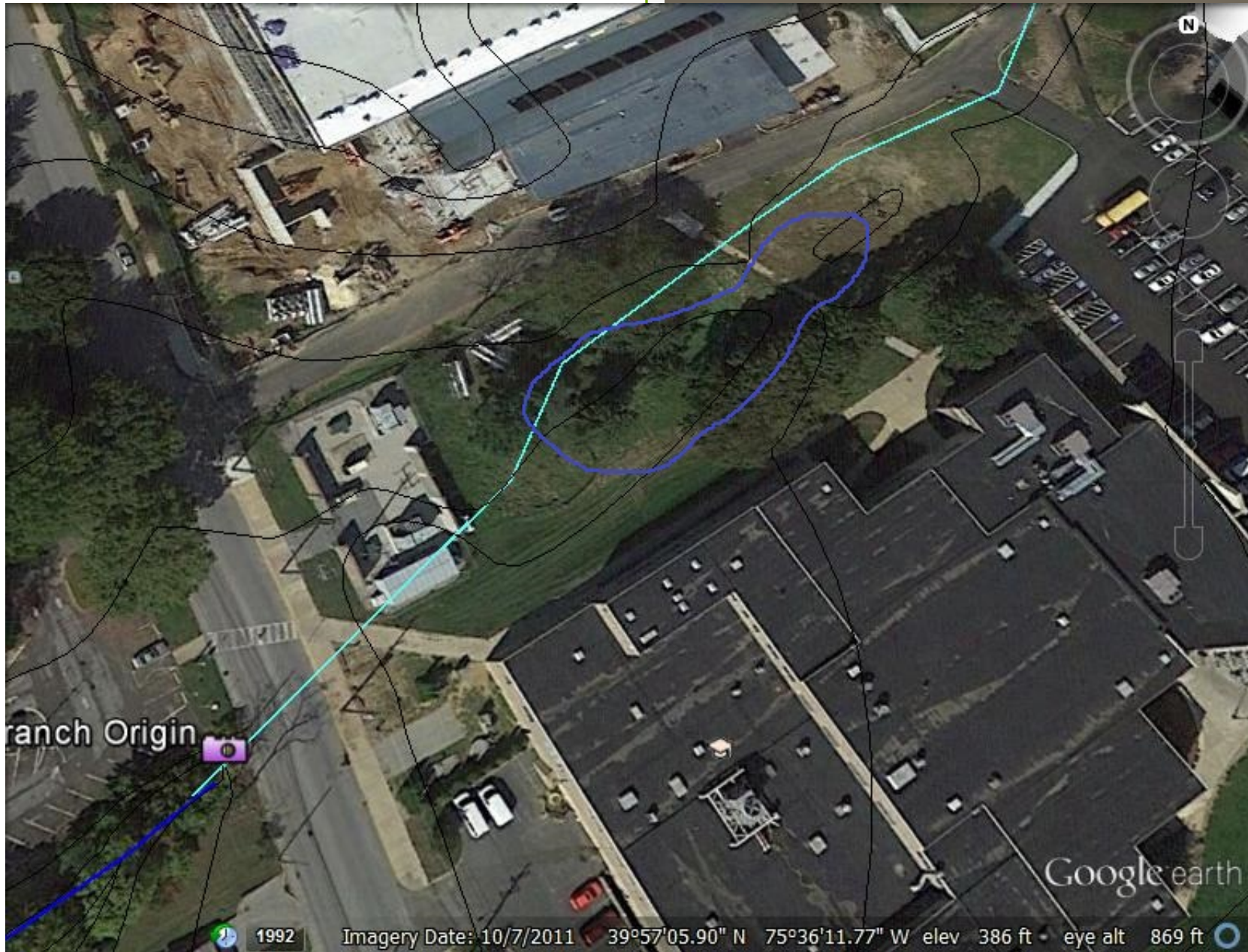


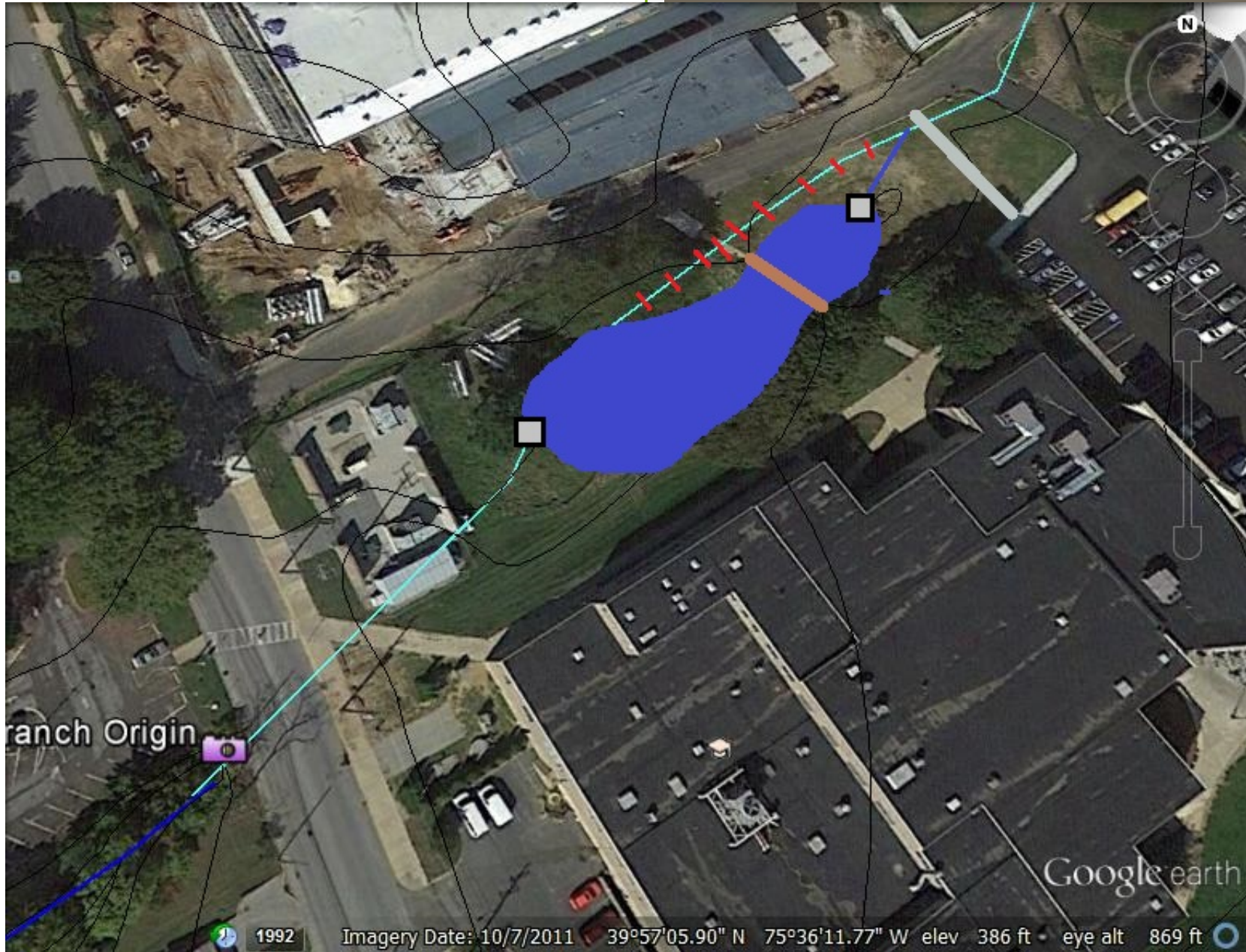
<http://www.panoramio.com/photo/41929563>

Retention Basins

- Aesthetically pleasing
- Allows water to cool (Wengrove and Ballestero 2012)
- Increased infiltration to the groundwater (Wengrove and Ballestero 2012)
- Retain sediments (Zedler *et al.* 2014)
 - Slows water
 - Suspended solids settle (Guo 2002)
 - Reduce phosphorous
 - Increases water quality

Plans and design





Riparian Vegetation & Pond Plants



<http://pondsofchestercountypa.net/chestermap.php?content=plantwildlife&classname=intromanag&titlename=Plant%20Wildlife>

Black Willow

(*Salix nigra*)



www.painetworks.com

<http://www.critterzone.com/animal-pictures-nature/tree-black-willow.htm>

Pickerelweed

(*Pontederia chordata*)



<http://plants.ifas.ufl.edu/node/336>

Swamp Sunflower

(*Helianthus angustifolius*)



Jewelweed

(*Impatiens capensis*)



<http://www.discoverlife.org/20/q?search=Impatiens+capensis>

Cattail

(*Typhus latifolia*)



http://www.nwplants.com/business/catalog/typ_lat.html

American White Water Lily

(*Nymphaea odorata*)



http://www.wildflower.org/plants/result.php?id_plant=NYOD

Highbush Blueberry

(*Vaccinium corymbosum*)



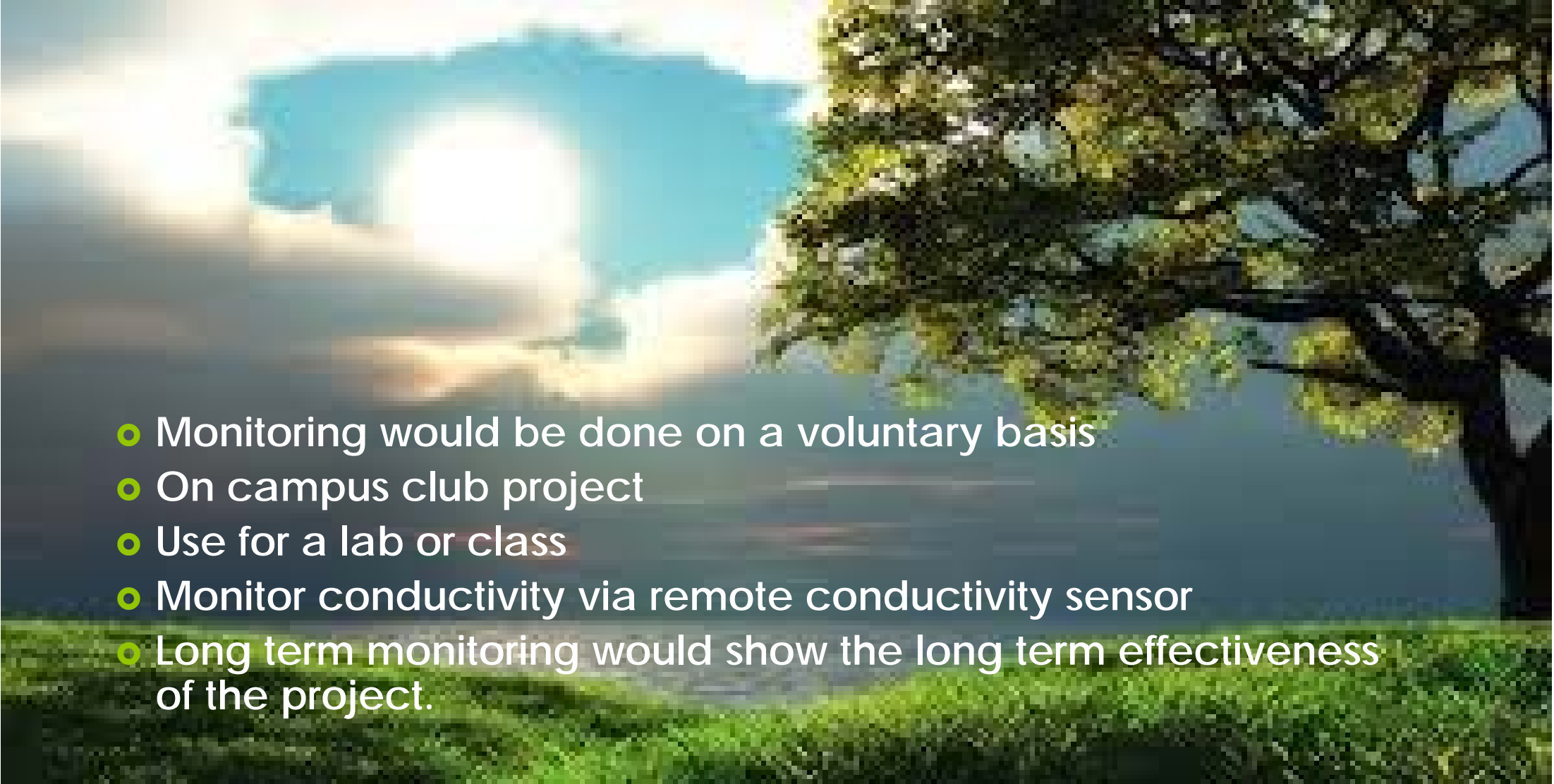
<http://khandrolingcoop.com/?p=858>



<http://www.naturallandscapesnursery.com/vaccinium.html>

Monitoring & Costs

Monitoring

- 
- Monitoring would be done on a voluntary basis
 - On campus club project
 - Use for a lab or class
 - Monitor conductivity via remote conductivity sensor
 - Long term monitoring would show the long term effectiveness of the project.

Community volunteers





<https://encrypted-tbn2.gstatic.com/images?q=tbn:ANd9GcQnkiP0DXa-YwXxCa9C xv9DjgePUFF6wenDdF5>



<https://encrypted-tbn0.gstatic.com/images?q=tbn:ANd9GcSnPSKx7pRaITZh59Ovlu-2hxV2J-PGdMRmdxfpL8FqAGLi0l-Mrg>



Conductivity sensor



<http://www.testtech-elect.com/globalwater/images/cond3150.jpg>

https://encrypted-tbn3.gstatic.com/images?q=tbn:ANd9GcR9kOS5ina3s_t4Wm9zufHBo1NWh8sCqSNwNzX26KPSZCfYmA2dTA



<https://encrypted-tbn3.gstatic.com/images?q=tbn:ANd9GcQzF1ByZ9Rkm8lfDMRPzwYyU5O4FglSVMdJdtsXbcqhfA59rjUTtA>

HOW WOULD THE CHANGES IMPROVE THE STREAM?

- Lower nutrients
- Lower sediments
- Improve overall water quality
- Better habitat for invertebrates
- Lower the amount of downstream erosion



<http://www.skianything.com/2010/07/yosemite-national-park-day-5-hiking-the-upper-yosemite-falls-trail-continuing-up-to-yosemite-point-%E2%80%93-july-19-2010/>

Maintenance



<http://www.sedimentremovalsolutions.com/clean.html>



<https://encrypted-tbn0.gstatic.com/images?q=tbn:ANd9GcTVJhQN3ax9U4D66XTgQmqSCWRcoQfh4pvHVfSsHIKcJLqP4K3zIQ>



<https://encrypted-tbn0.gstatic.com/images?q=tbn:ANd9GcQO Abyln6SXJxIshPqbUSRfD30hhRk4c206Vy1pnyteP8ZT5Ezgw>



<https://encrypted-tbn0.gstatic.com/images?q=tbn:ANd9GcQcu1MIsOsr0u1Qpl41IEv-UCStJ1XdLDjZ8RNqF-GP1SmnhxzQg>

Costs

- Tree removal: \$3,000-\$4,000
- Excavation & daylighting the stream: ~\$50,000
- Costs of plants: \$2,000
- Costs of trees: \$37 each (before shipping)
- Benches: \$400-\$2,000
- Tables: \$100- \$2,000
- Nest boxes: \$10 - \$40
- Sensor: \$160 - \$4,000
- Bridge: \$15,000
- Total: ~\$80,000



<http://www.dec.ny.gov/lands/78388.html>



<http://www.mooseycountrygarden.com/botanical-gardens/christchurch-botanic-gardens-3.html>

A scenic landscape featuring a river flowing through a lush green valley. The river is surrounded by rocky banks and flows towards the foreground. In the background, there are rolling green hills and mountains under a clear blue sky. The overall scene is vibrant and natural.

So why invest in
this project?

References

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