

**WPI**

# Phosphorus Coes-ing Some Trouble

Matthew Biondi (EVE),  
Graysen DeLuca (MGE),  
Brooke Pierce (ME),  
Michael Taylor (CS)  
Advisors: Professors  
Derren Rosbach (CEE, SSPS),  
Elizabeth Stoddard (SSPS)

## The Problem: Eutrophication



### Nutrient Runoff

- Sediment
- Animal waste



### Algal Blooms

- Blocks sunlight
- Consumes oxygen

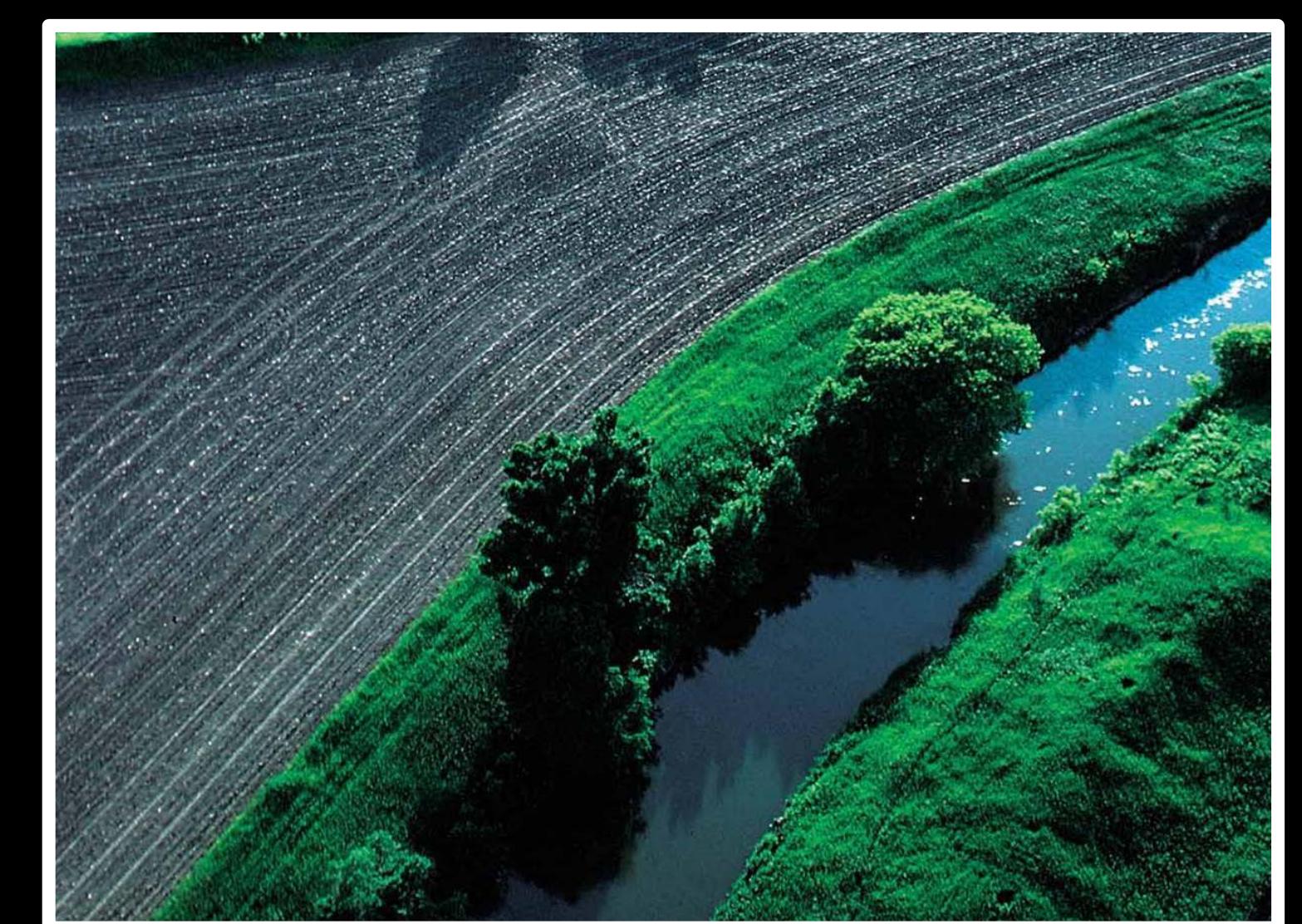


### Oxygen Loss

- Promotes Bacteria
- Unsafe for wildlife & people

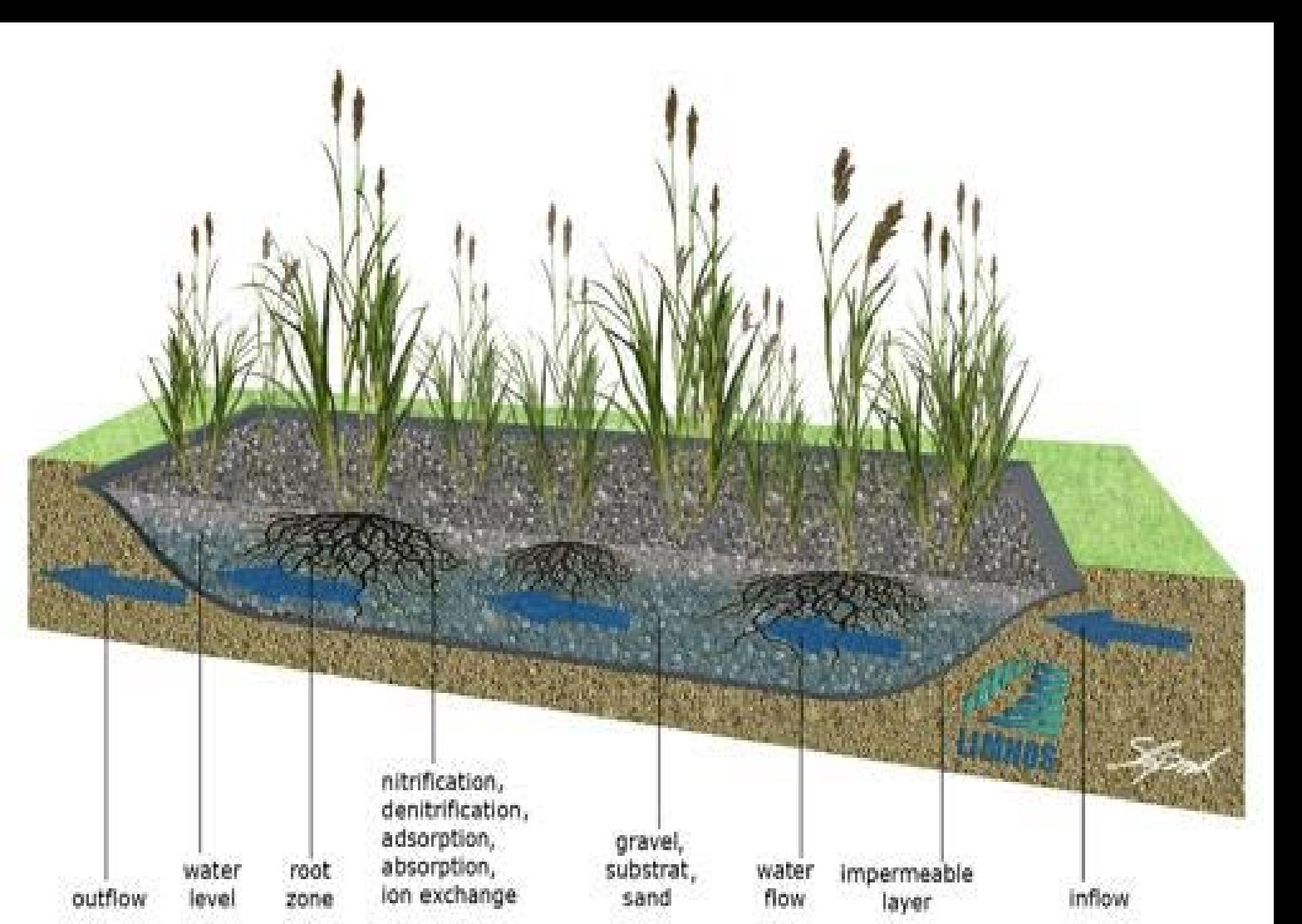
## Vegetative Buffers

- Plants along the perimeter absorb nutrients
- Discourages geese from gathering by the shore



## Constructed Wetlands

- Plants, soils, and substrates absorb phosphorus and other nutrients
- Natural solution, visually appealing



## Analysis

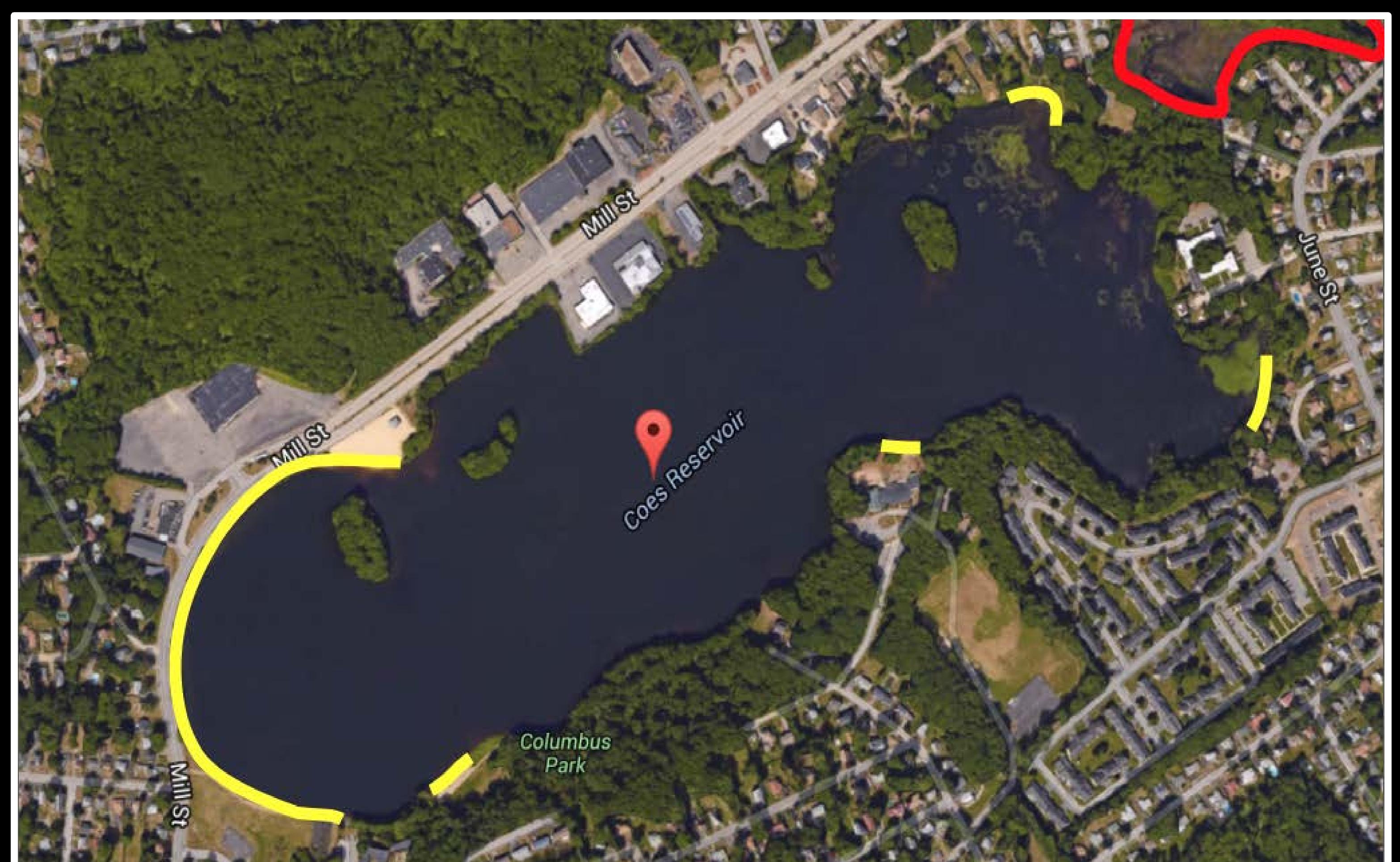
Possible Solutions	Vegetative Buffers	Constructed Wetlands
<b>Strengths</b>	<ul style="list-style-type: none"> <li>Preventative</li> <li>Low maintenance</li> <li>Natural method</li> </ul>	<ul style="list-style-type: none"> <li>60-90% removal rate</li> <li>Low maintenance</li> <li>Long-lasting</li> <li>Natural method</li> </ul>
<b>Weaknesses</b>	<ul style="list-style-type: none"> <li>Does not remove phosphorus currently in sediment</li> <li>Slow water flow rate</li> </ul>	<ul style="list-style-type: none"> <li>Requires large area</li> <li>Slow water flow rate</li> </ul>
<b>Opportunities</b>	<ul style="list-style-type: none"> <li>Deter geese from area</li> </ul>	<ul style="list-style-type: none"> <li>Aesthetically pleasing</li> </ul>
<b>Threats</b>	<ul style="list-style-type: none"> <li>Possible invasive species</li> </ul>	<ul style="list-style-type: none"> <li>Disrupts natural flow of water</li> <li>Possible invasive species</li> </ul>

## Next Steps

Site investigation & Design planning

Federal Grants & Excavation

Construction & Management



Vegetative Buffers      Constructed Wetlands

Image References  
[http://www.limnos.si/eng/images/precz\\_rastliny\\_cistinne\\_naprave\\_grede\\_eng.jpg](http://www.limnos.si/eng/images/precz_rastliny_cistinne_naprave_grede_eng.jpg)  
[http://www.lakegeorgiasociety.org/publications/images/2012\\_Oct\\_HagueSedimentPond.jpg](http://www.lakegeorgiasociety.org/publications/images/2012_Oct_HagueSedimentPond.jpg)  
<https://commons.wikimedia.org/wk/File:TerracesBuffers.JPG>  
[https://commons.wikimedia.org/wk/File:Runoff\\_of\\_soil\\_%26\\_fertilizer.jpg](https://commons.wikimedia.org/wk/File:Runoff_of_soil_%26_fertilizer.jpg)  
<https://commons.wikimedia.org/wk/File:Badwaterbowl.jpg>  
<https://www.google.com/search?hl=en&q=Coes+Reservoir+Worcester,+MA/@42.2545734,-71.8460571,16z/dia=3m15bt14m21sm11s&vpsig=06677d909180330x7733401da3076a0>  
[http://dailymail.co.uk/pix/2009/08/20/article-1207817-06106D2D000005DC-783\\_964x638.jpg](http://dailymail.co.uk/pix/2009/08/20/article-1207817-06106D2D000005DC-783_964x638.jpg)