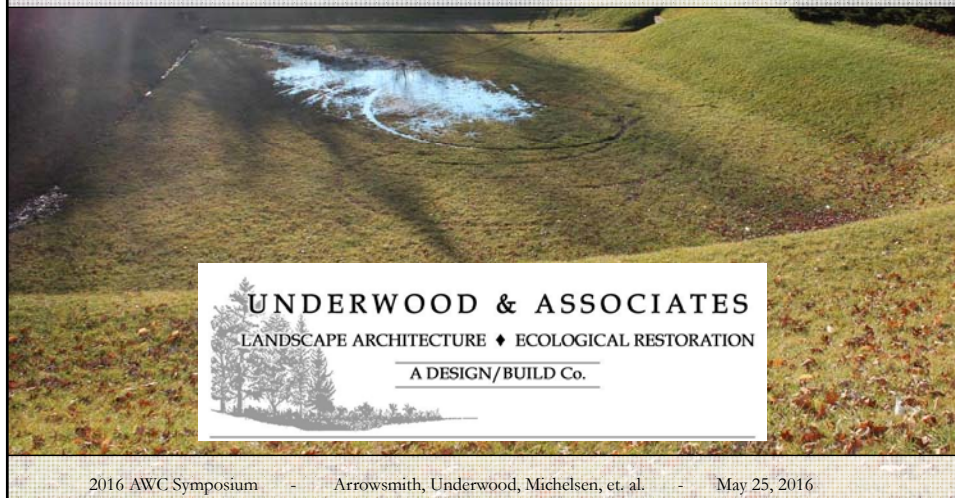


## A functional restoration model- Leveraging existing frameworks towards AWC restoration

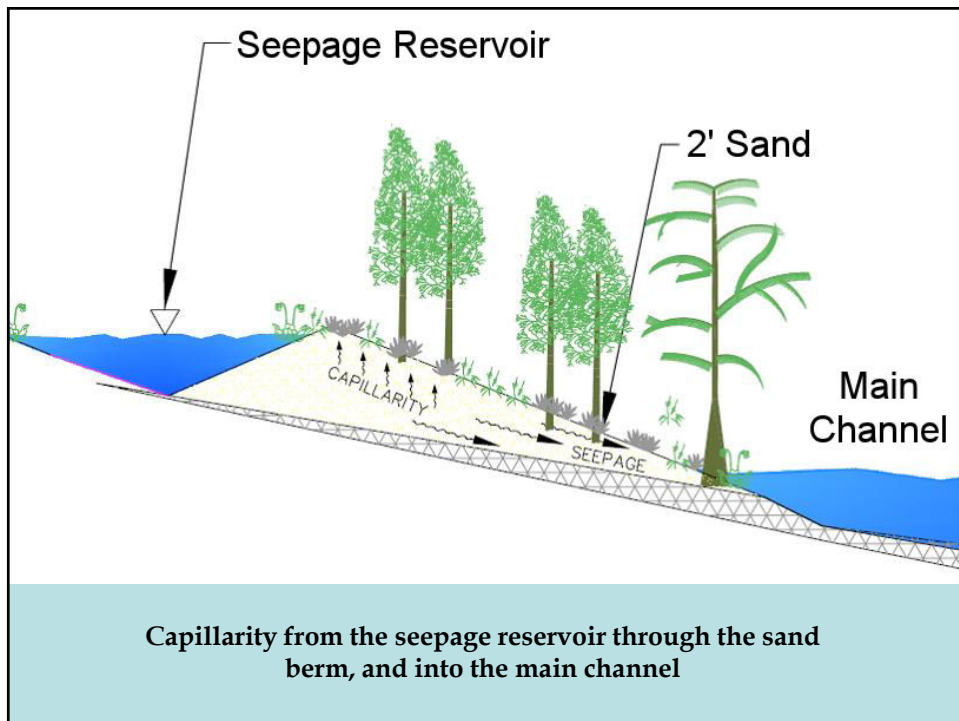
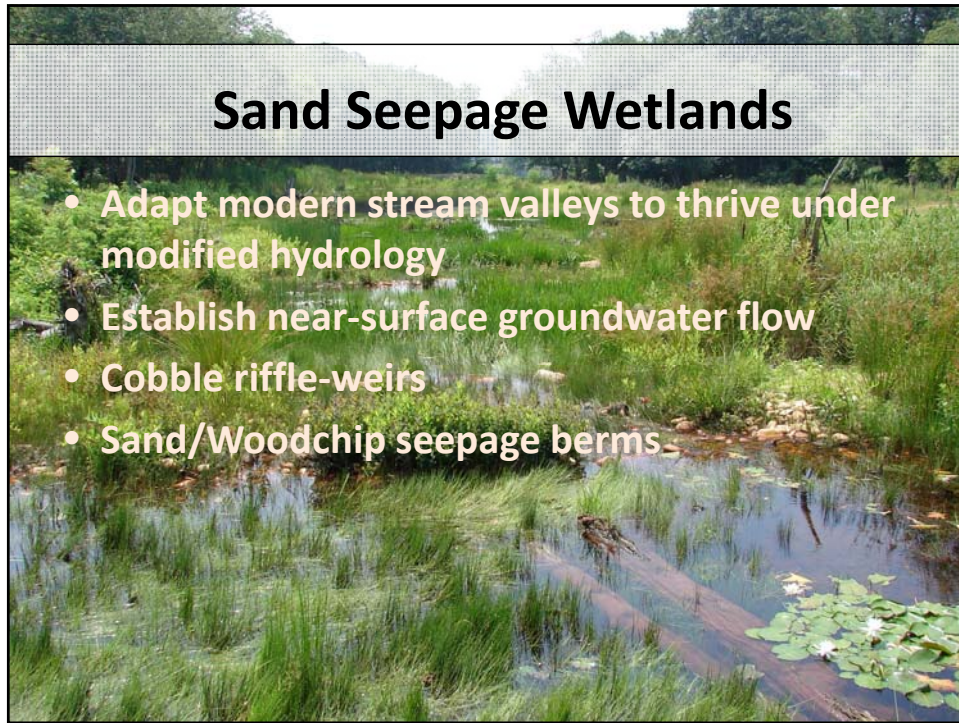


### What we do

- Ecological restoration/engineering
- Developed sand seepage wetland technique

### Who do we work for?

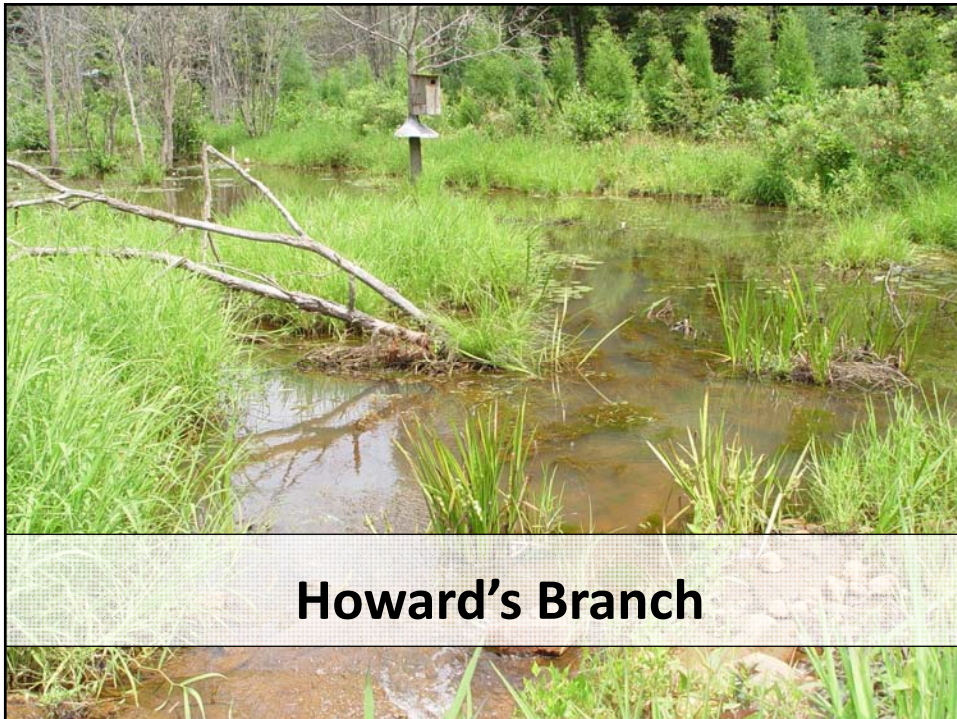
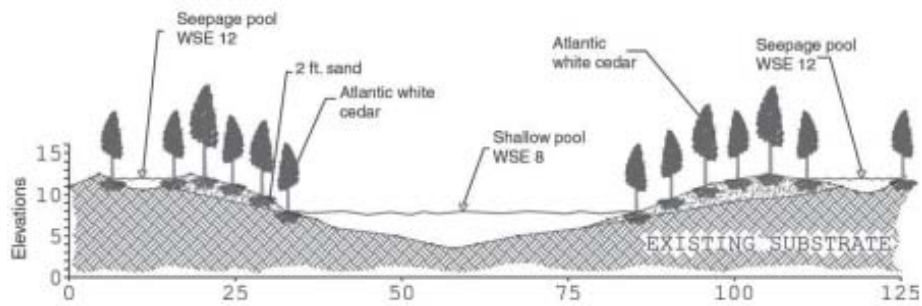
- The resource
- More recently lots of TMDL driven work





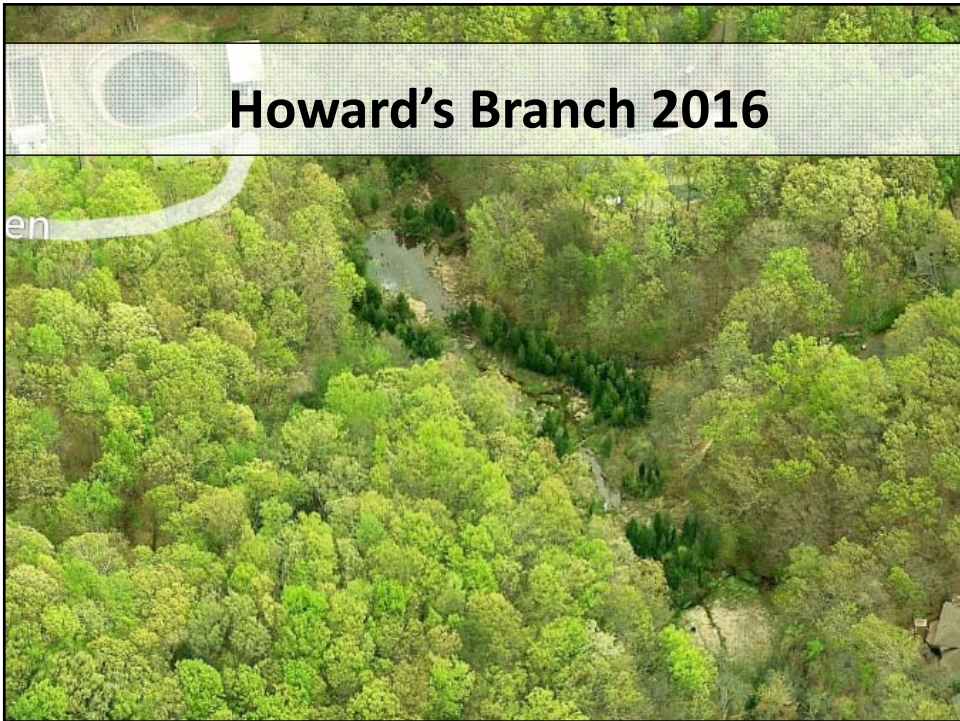
## Howard's Branch

- Originally presented at this conference in 2003
- Conversion of 3 acre dry perennial valley to AWC swamp

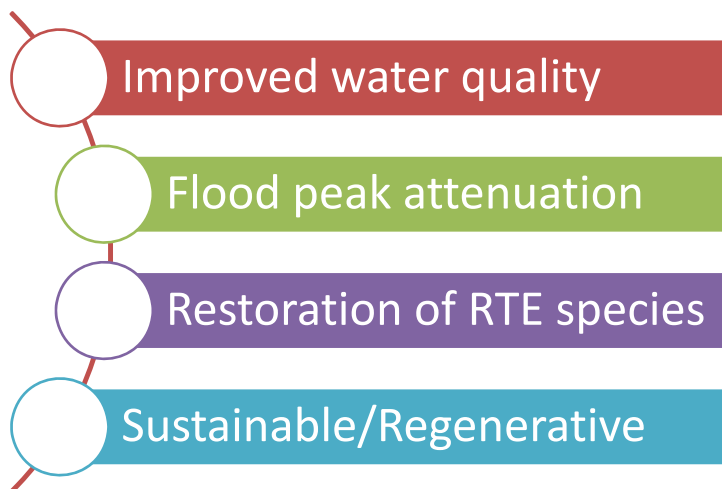


## Howard's Branch





## The benefits



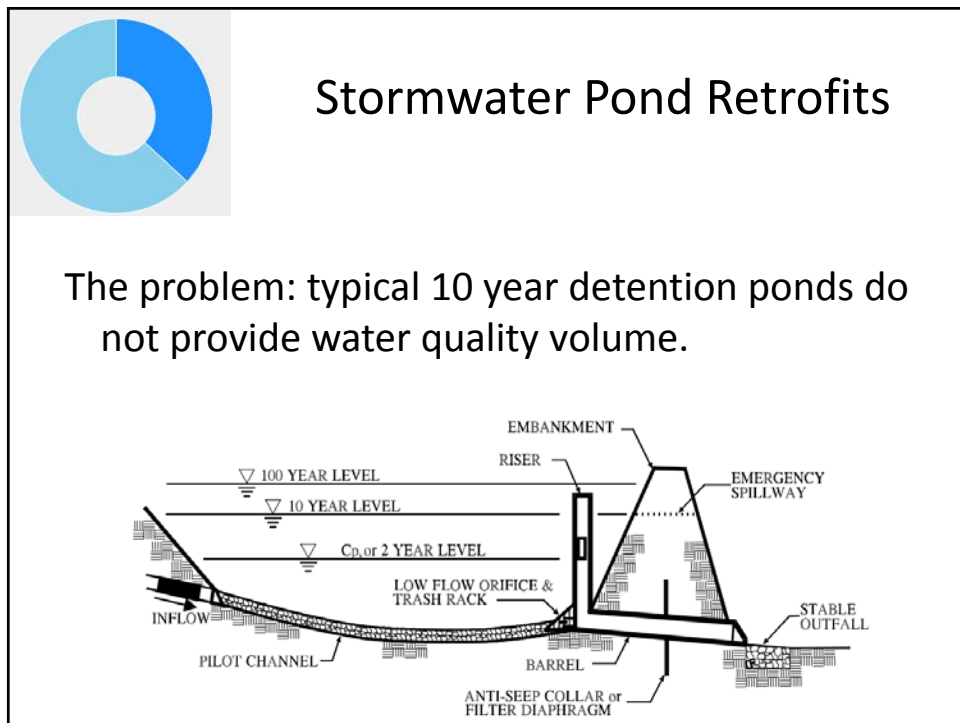
## We are continuing this work

- Lizard Hill – conversion of 30 acre sand mine to cedar swamp











## Stormwater Pond Retrofits

### The solution:

Water quality storage can be provided in multiple cells. Performance is enhanced when multiple treatment pathways are provided by using multiple cells, longer flowpaths, high surface area to volume ratios, complex microtopography, and/or redundant treatment methods (combinations of pool, ED, and wetland).

-Chapter 3, MDE Stormwater Manual





## Cedar in Stormwater Ponds?

**YOU CAN'T DO THAT?!**



We've been modifying these things for years!

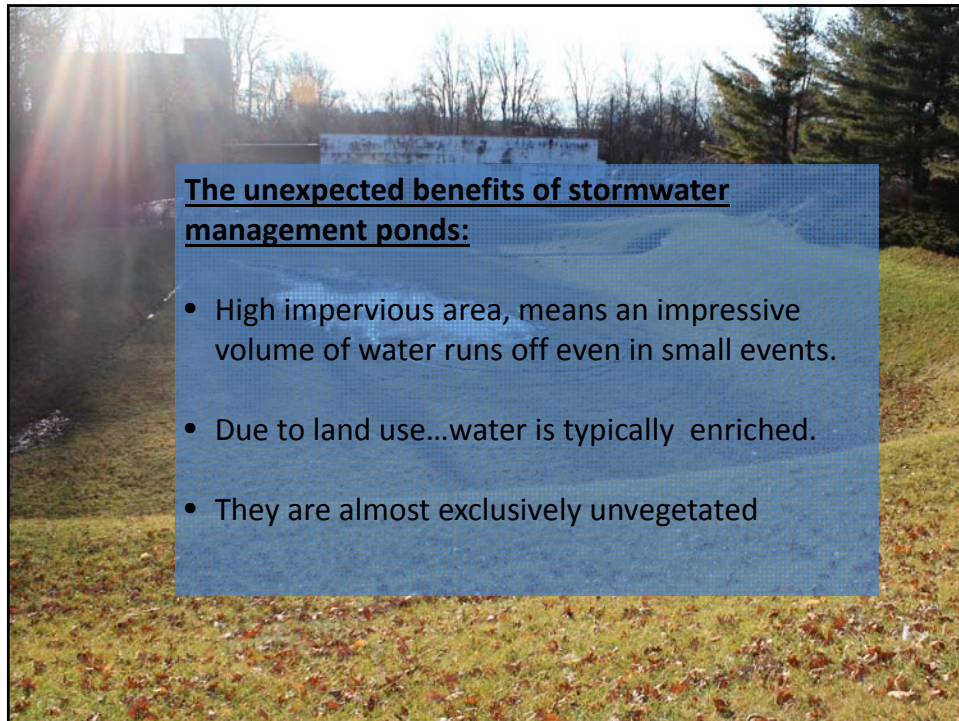


Unfortunately, typically for the worse :-)



What do we need to create AWC habitat?

- We need stable hydrology
- We need groundwater seepage
- We need nutrients
- We need sunlight



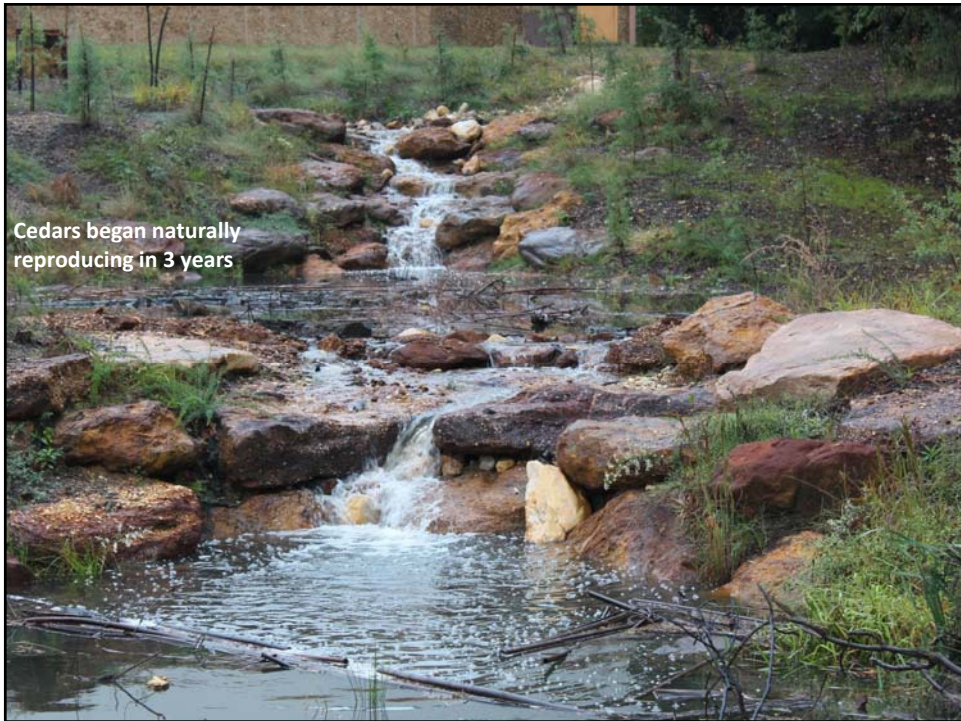
## Our proposal

1. Utilize principles of sand seepage wetlands to secure pollutant reduction credit
  1. Stage water, utilizing infiltration/exfiltration berms to establish hydraulic gradient and cycle surface water.
  2. Construct berms of nutrient deficient clean sand (supplement with organics).
  3. Maintain cobble riffles to pass surface flow once subsurface fills up slowly
  4. Plant!









Cedars began naturally reproducing in 3 years

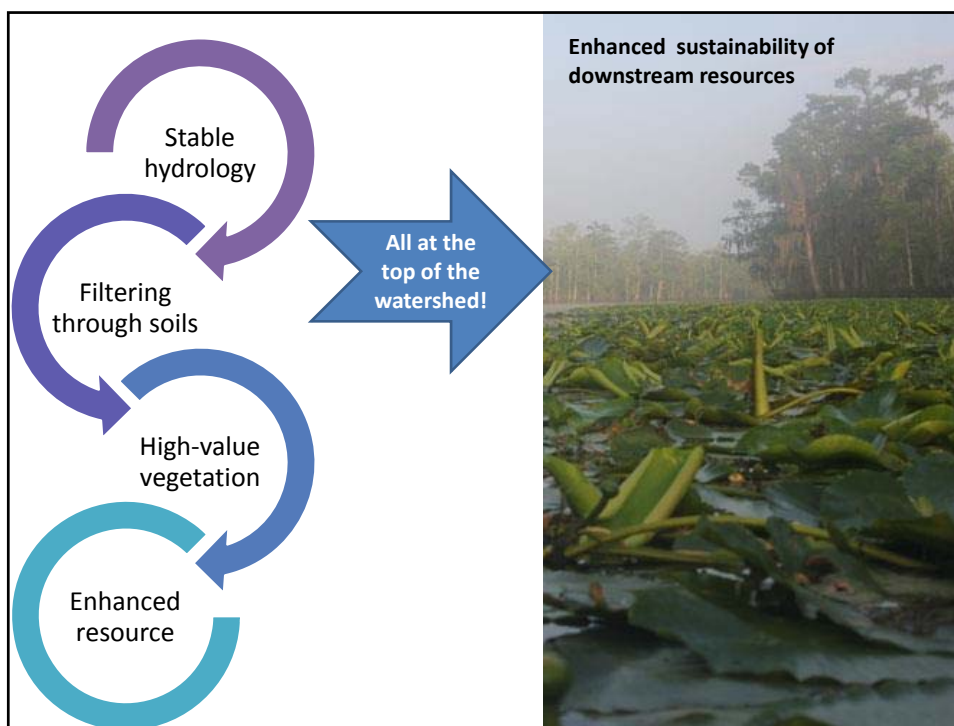






## Why would you want to?

- Pollutant loads go beyond the Chesapeake
- Sustainable funding!
- Support a diverse and resilient gene pool!



If you've got Atlantic white cedar growing 100 feet from a bowling alley....

...your downstream resources are probably well served.

## Questions/Discussion?

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