



Severn River

Restoration Efforts

www.severnriverkeeper.org



Saving the Severn ... One Creek at a Time

◆ Challenged Severn River Creeks...



A snapshot of Current Conditions in the Severn:



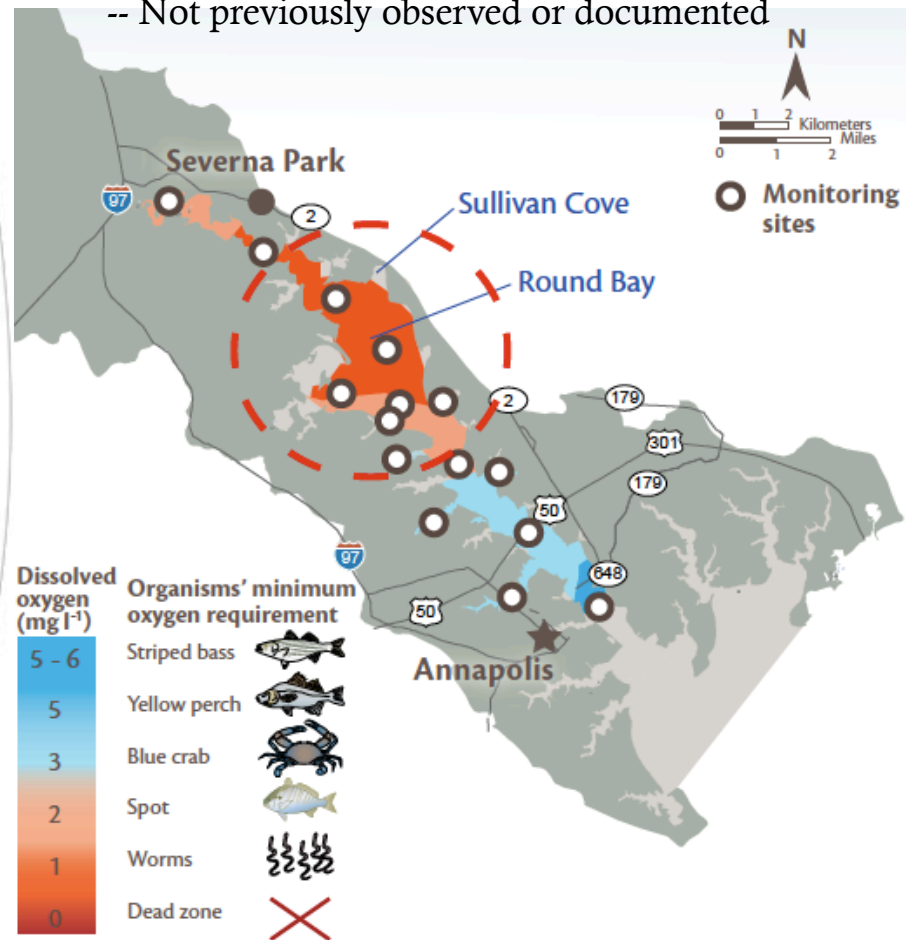


SevernStat Water Quality

The Severn Riverkeeper Program has monitored dissolved oxygen, water clarity and salinity over the past 8 years.

Shallow Water Dead Zones

-- Not previously observed or documented



Chesapeake Bay itself, is showing an oxygen-deprived "dead zone" this summer.

Low-oxygen areas also appearing in rivers

By PAMELA WOOD
Staff Writer

It has happened again. Like clockwork each summer, the waters of the Chesapeake Bay become starved of oxygen, leaving vast stretches of the water inhospitable to fish, crabs, oysters and even tiny worms.

And this summer's oxygen-deprived "dead zone" — which already has appeared — could be one of the worst ever.

"We're going to have one of the worst years," said Bruce Michael, director of the Resource Assessment Service at the Maryland Department of Natural Resources.

Much of the dead zone is our own doing.

People who live in the bay's watershed send nutrients coursing into the water through septic systems, sewage discharge, fertilizer runoff and stormwater runoff.

The nutrients fuel the growth of algae blooms. And when the algae die, the decomposition process sucks oxygen out of the water.

That process is intensified this year due to Mother Nature. Heavy spring rains and strong flow of the Susquehanna River have brought nutrients into the bay and rivers more quickly and in larger amounts.

Scientists at the University of Michigan have crunched the numbers and predict the sixth-worst dead zone in the bay this summer.

At its worst, the dead zone will stretch somewhere between 8.6 cubic kilometers and 11.1 cubic kilometers, according to the University of Michigan prediction by Donald Scavia and Mary Anne Evans.

Michael said the dead zone already is apparent in the deepest part of the bay's main stem — a trench that runs down the middle.

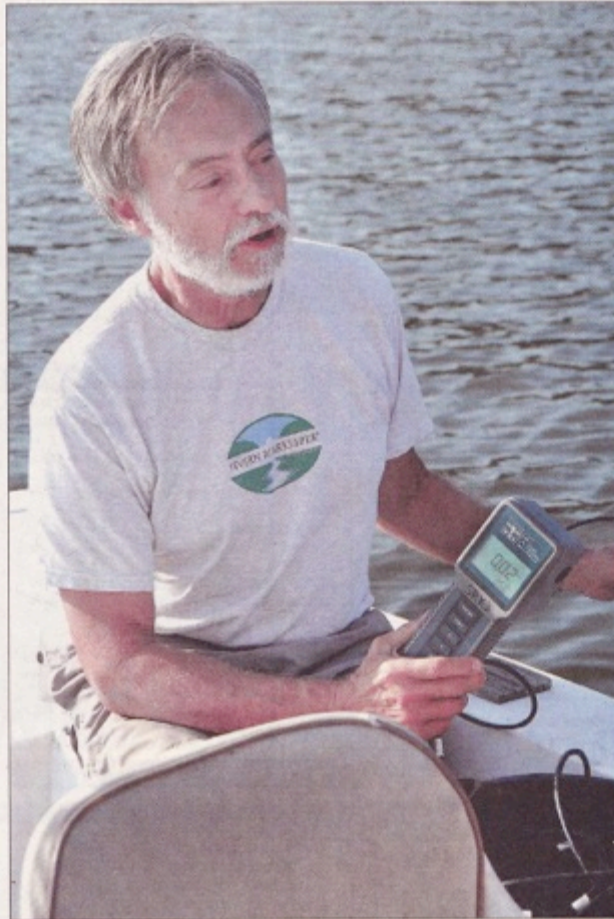
"We are seeing this dead zone from Baltimore Harbor to the Potomac," he said.

While water near the surface generally has plenty of oxygen, by the time you get to the bottom, there's none at all.

River dead zones

The same phenomenon happens in many rivers, too.

On the Severn River this week, volunteers with the Severn Riverkeeper



Pierre Henkart runs a water quality monitoring program for the Severn Riverkeeper Program. On the river this week, he found dangerously low oxygen levels in deep water, such as this reading of 0.02 milligrams of oxygen per liter of water — too low for fish, crabs and shellfish.

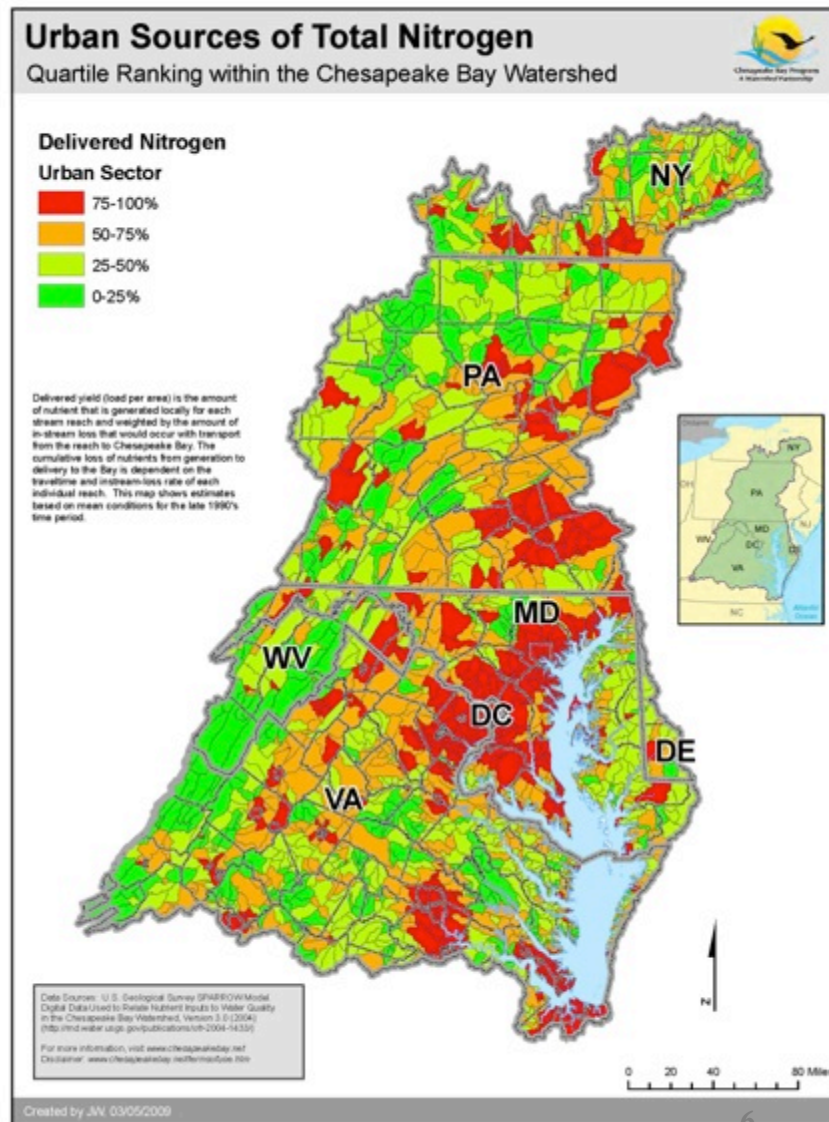
Program came up with painfully low numbers while doing their regular water testing.

They put small meters into the water and read out the depressing numbers: oxygen levels as low as 0.01 and 0.02 milligrams per liter of water.

Most fish and hard clams need 5 or 6 milligrams of oxygen per liter of water. Blue crabs need 3 milligrams of oxygen per liter of water and worms need at least 1 milligram per liter of water.

(See ZONE, Page A6)

Severn River is within the “Red Zone” targeted for reduction of Total Nitrogen by the EPA’s Chesapeake Bay Program



First listed on the EPA’s 303(d) list for impaired waters in 1996, the Severn currently has received TMDL (Total Maximum Daily Loads) listings for:

- E. Coli
- Total Suspended Solids (TSS)
- Total Nitrogen (TN)
- Total Phosphorus (TP)

Our broken tributaries...

- Our stream valley floodplains are covered in sediments,

The incised “bed and bank” stream channel form which characterizes our stream valleys today is not an historically “natural” channel form for this region

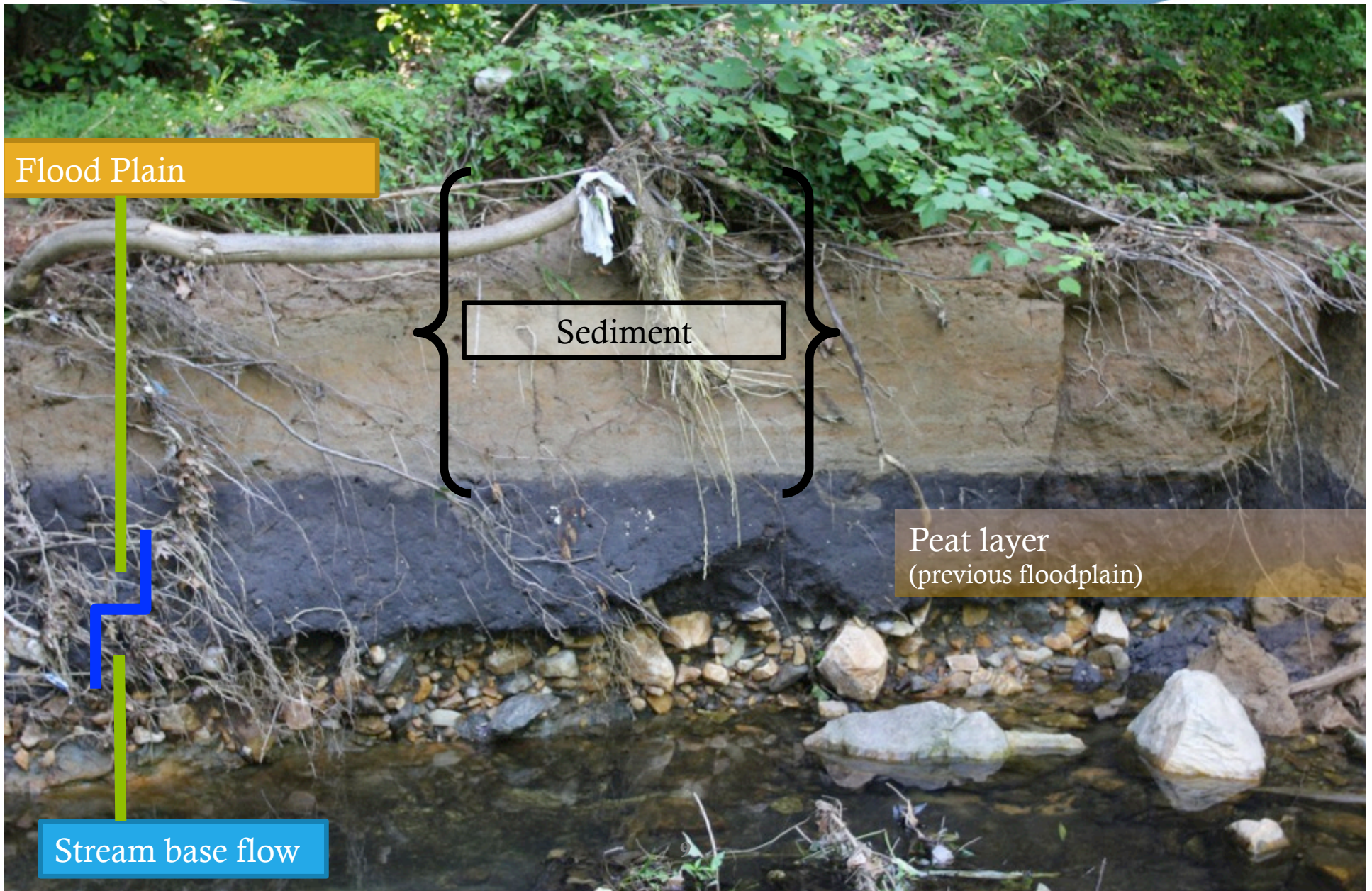


Before pre-colonial land clearing & damming:

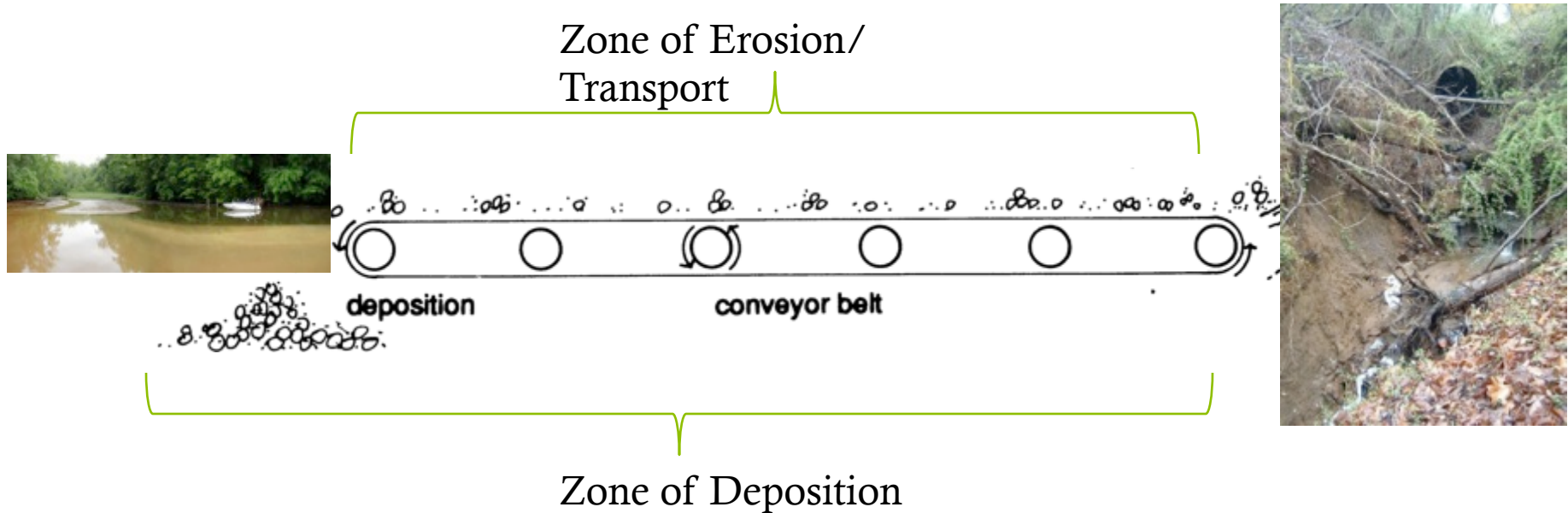
- Stream systems were broad, shallow, and slow-moving watercourses
- Wetland complexes fully integrated into the flood plain




Incised streams with base flow disconnected from the current floodplain



Our Broken Stream Systems Function as Major Sources & Conveyors of Sediment, Phosphorus, Nitrogen



Adapted from Kondolf, M. (1997). *Environmental Management*, 21, 533-551.

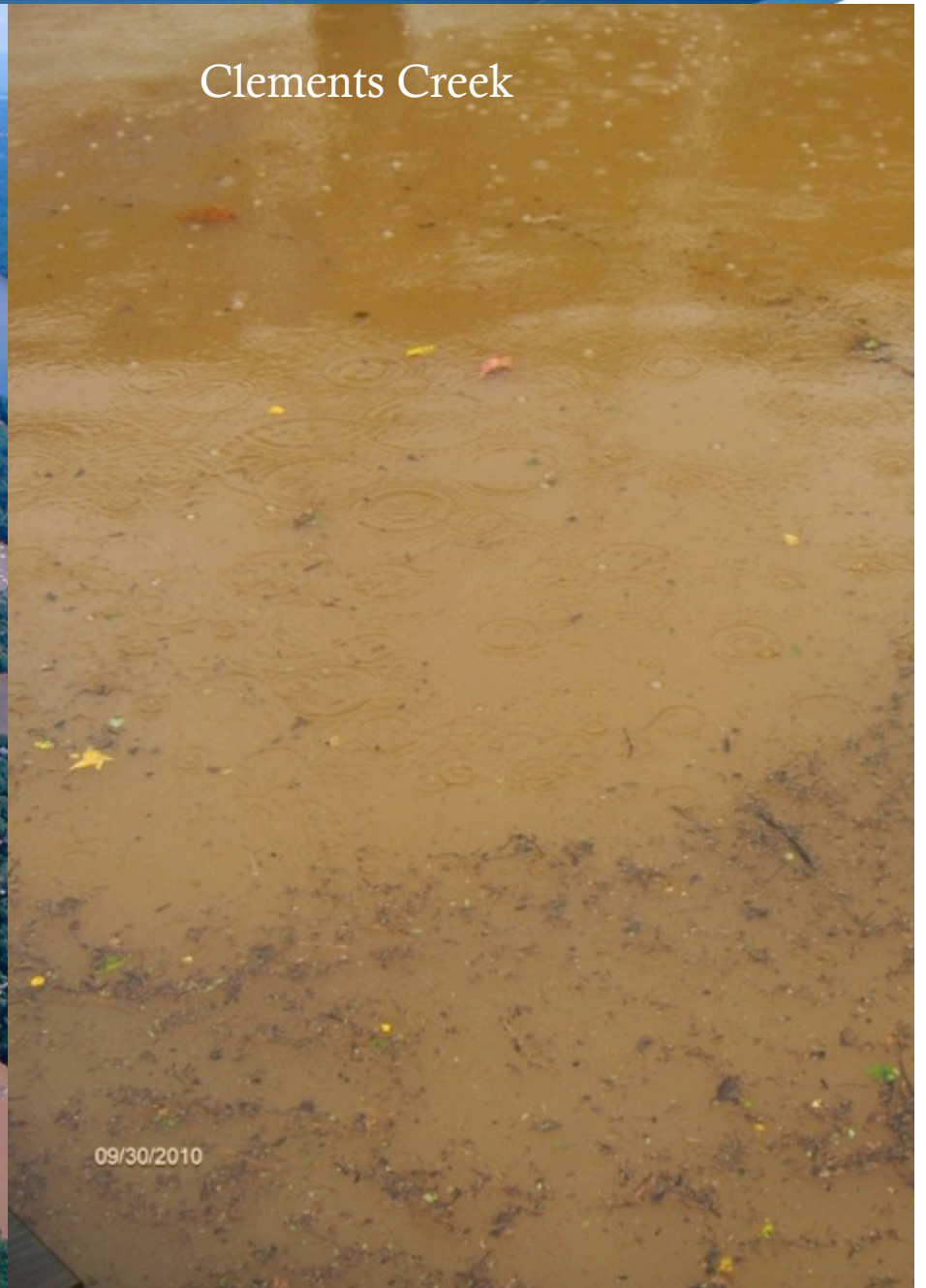


Downstream Effect of Channel
Erosion in Severn Streams

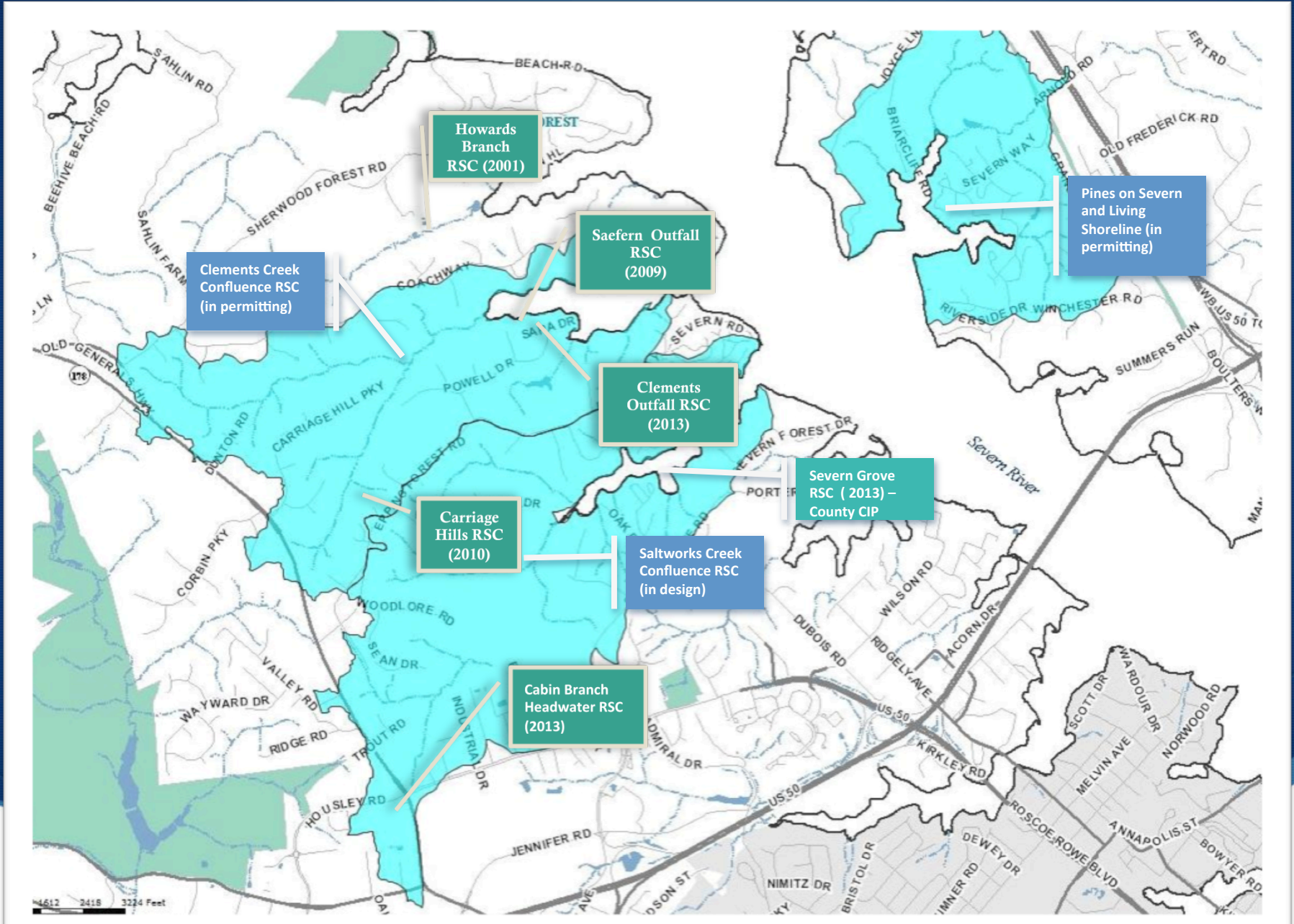
We live on this
river and see
what is
happening



Clements Creek



09/30/2010

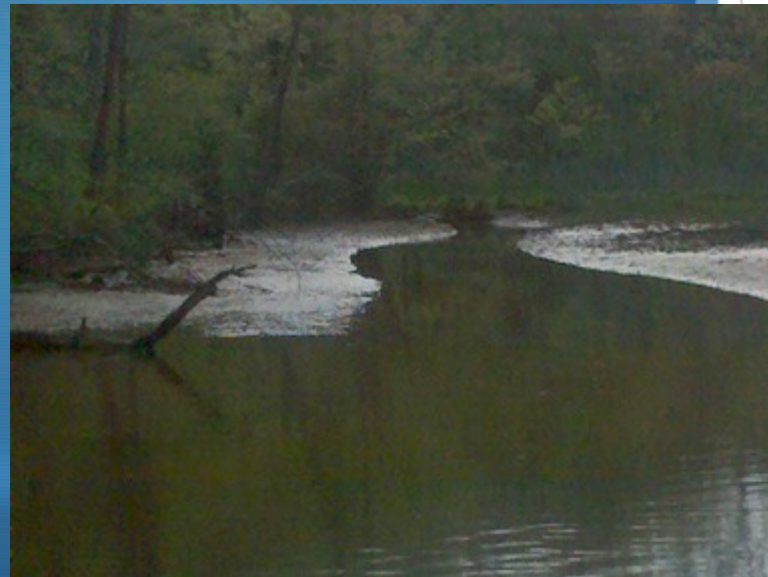


SRK clusters Restoration Projects in 4 watersheds located mid-river

Clements Creek Challenges

Serious siltation and sediment runoff in the past few years.

Dredged in 2006 and again in 2009 at significant expense @ \$250,000 -- \$80,000 of which came from the community of Saefern

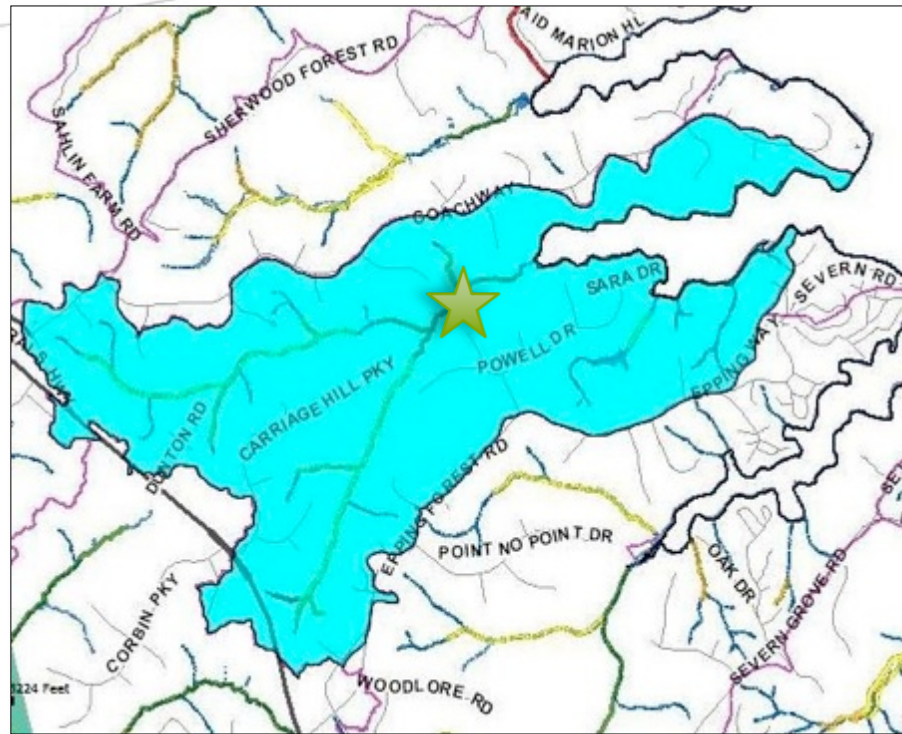


The headwaters are continuing to fill with sediment ,due to the erosive quality of the soils and legacy sediments throughout the tributary system.

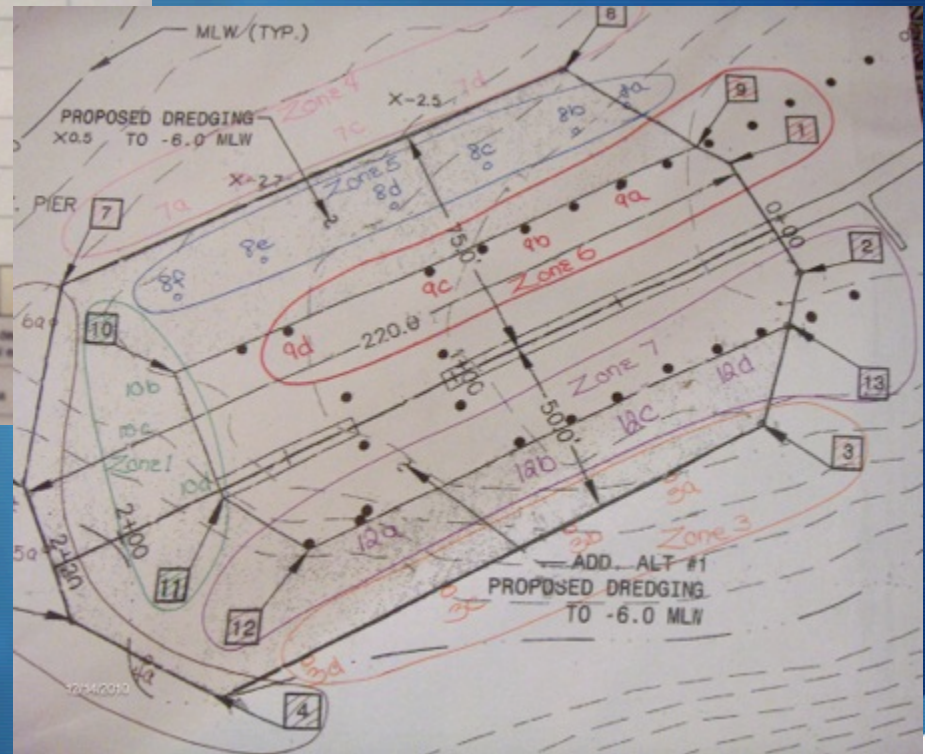
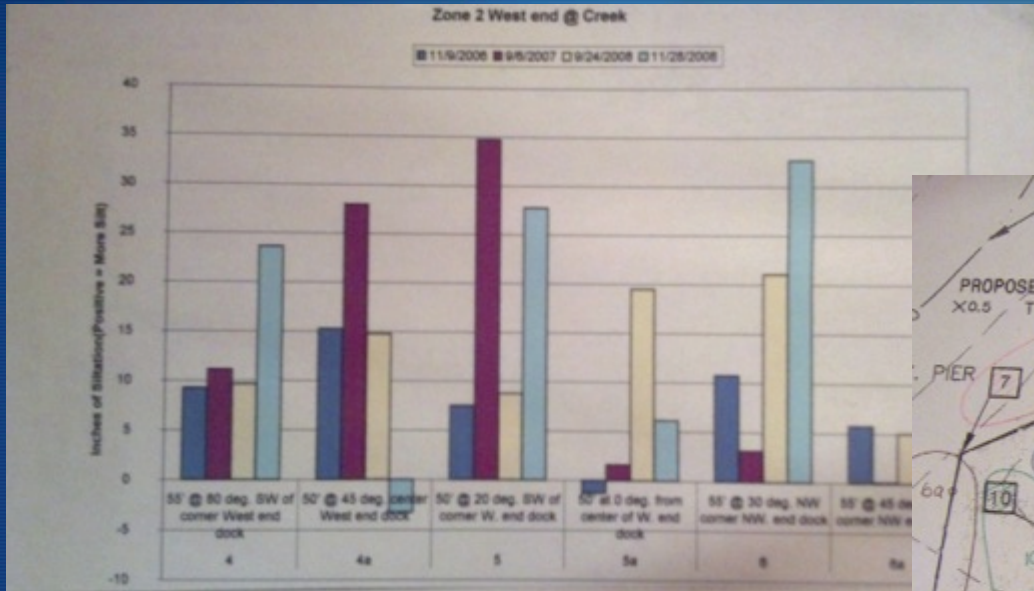


A Few Facts ...

- One of the larger Severn sub-watersheds with 766 acres
- 6% impervious surface
- Hockley Branch is the main tributary with 4.2 miles of stream emptying into the tidal headwaters
- The proposed project is located at the confluence of the two major reaches of Hockley Branch



Saefern Dredging Committee members have kept a careful record of the siltation problem since it seriously impacts community docks located at the previously stable harbor basin at the headwaters



Their long term meticulous monitoring revealed a loss in depth that is equivalent to 3.3 feet per decade since 2000. It has required two dredgings to maintain access to docks built 40 years ago.

...We pay for repeated dredging



Dredging photos by Fran Zarkowsky.



More photos on pages 6, 8, and 19.





[New Search](#)
[Search Tips](#)
[About the MBSS](#)
[Fish Distributions](#)



[Your Feedback](#)

SEVE-110-R-2008 is located on **ut to clements creek** in the Severn River watershed, 8-digit code: (02131002). This stream was visited in the spring on 3-10-2008 and again in the summer on 6-20-2008.

Fish IBI	2.00	Poor
Benthic IBI	2.71	Poor

Catchment area	260.6 acres	Instream Habitat	3.0 (Poor)
Urban	9.3 %	Epifaunal Substrate	4.0 (Poor)
Agricultural	13.4 %	Velocity/Depth Diversity	3.0 (Poor)
Forest	75.3 %	Pool Quality	8.0 (Marginal)
Amphibians and Reptiles		Riffle Quality	10.0 (Marginal)
COMMON FIVE-LINED SKINK		Shading	85.0 %
NORTHERN GREEN FROG			
NORTHERN SPRING PEEPER			

Fish Index of Biotic Integrity: **Poor**
 Strong deviation from reference conditions, with most aspects of biological integrity not resembling the qualities of these minimally impacted streams, indicating severe degradation.

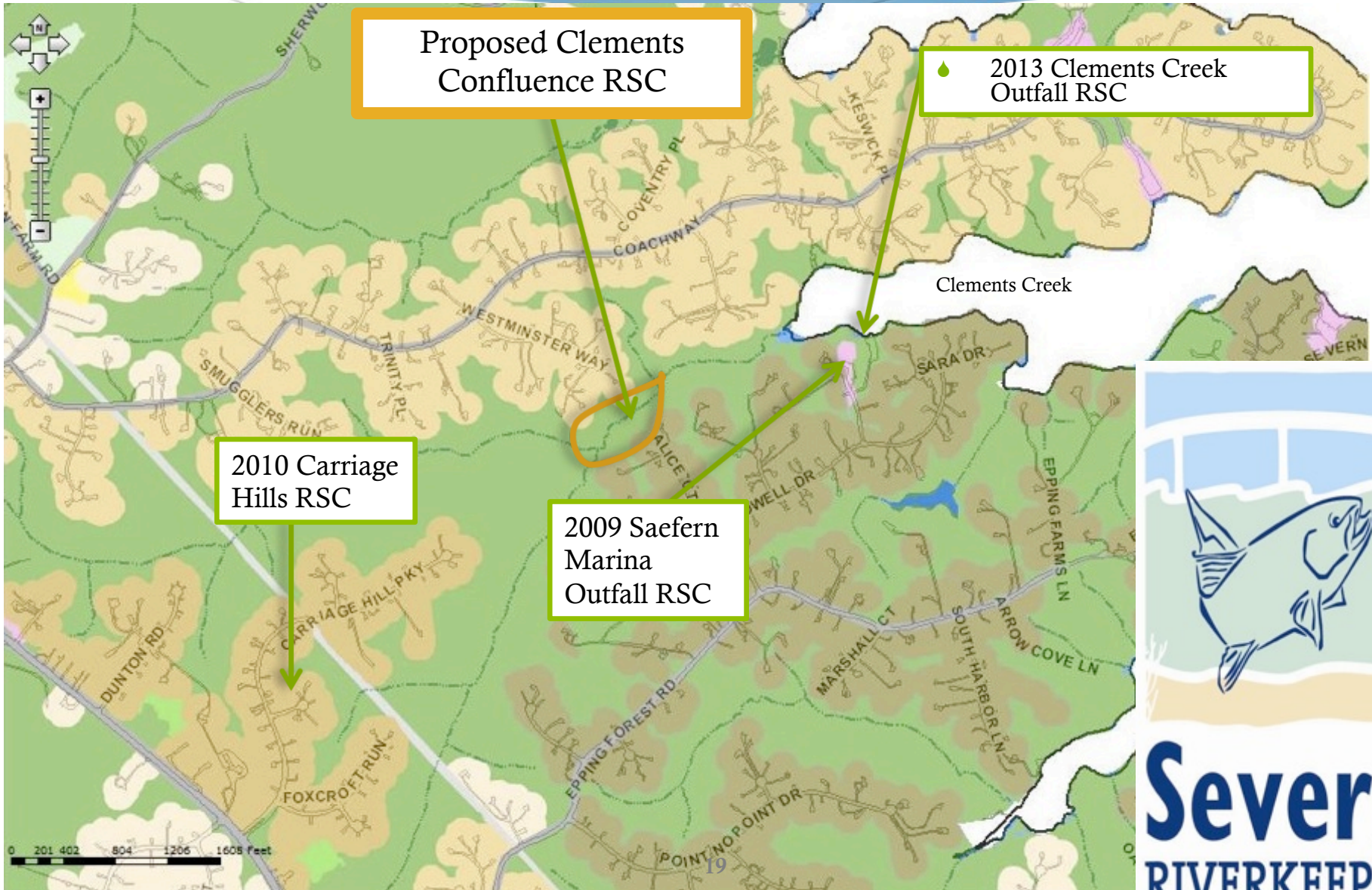
Instream Habitat Structure: **Poor**
 Less than 10% stable habitat. Lack of habitat is obvious

Epifaunal Substrate **Poor**
 Stable substrate lacking; or particles are over 75% surrounded by fine sediment or flocculent material

Velocity/depth diversity: **Poor**
 Dominated by one velocity/depth category

Clements Creek Watershed Restoration

Regenerative Stream Channel (RSC) Projects



Saefern Marina RSC-- 2009



RSC's Convert Stormwater to Groundwater



- ◆ During a big rainstorm, the “time of concentration (TC) is now on the order of 20-30 minutes (delay in water hitting the asphalt below) from what was once a pipe that was discharging storm water directly from the parking lot above (a TC of 0 minutes). **All of this hot polluted storm water is now being filtered into the earth where it becomes clean cold groundwater.**



- ◆ - Bill Fritz, Saefern Stewardship Chair



Severn
RIVERKEEPER

www.severnriverkeeper.org

Regenerative Stream Channel

December 2009

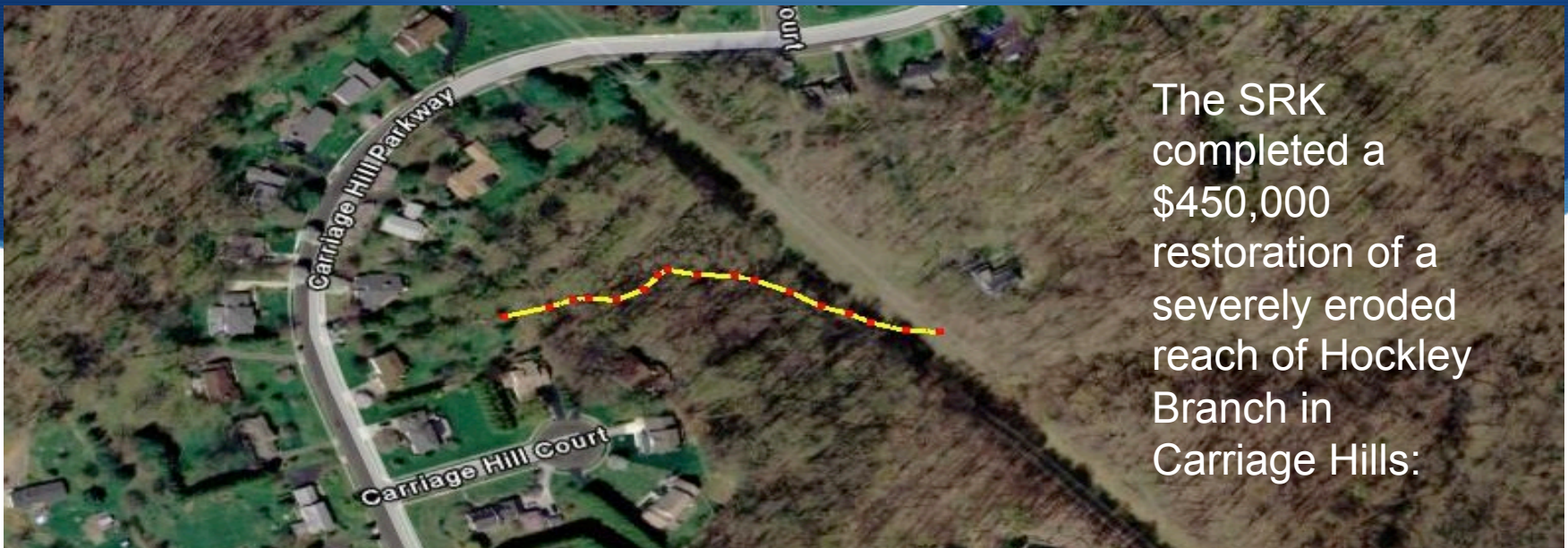
...seven weeks later



Built in the Community of Carriage Hills on a
Clements Creek tributary



www.severnriverkeeper.org



The SRK completed a \$450,000 restoration of a severely eroded reach of Hockley Branch in Carriage Hills:



Construction:
Winter
2009-2010

**Regenerative
Stream
Channel**

(RSC) offers an alternative to piping and culverts for more effective and ecofriendly way to handle storm flows

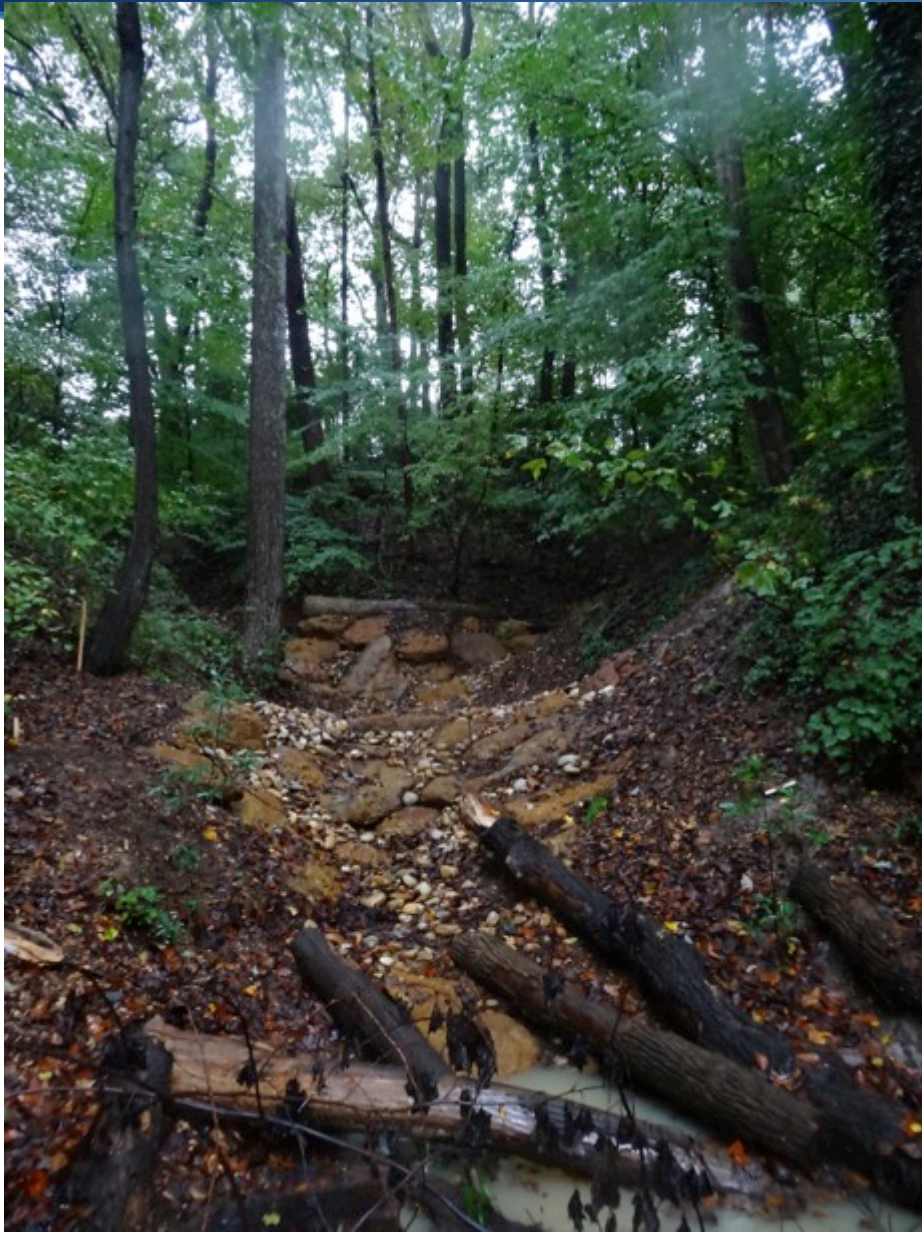


2010 winner of the
Smart Green and Growing Award for Sustainable Infrastructure and Innovation in Stormwater Management

from the Maryland Department of the Environment (MDE)

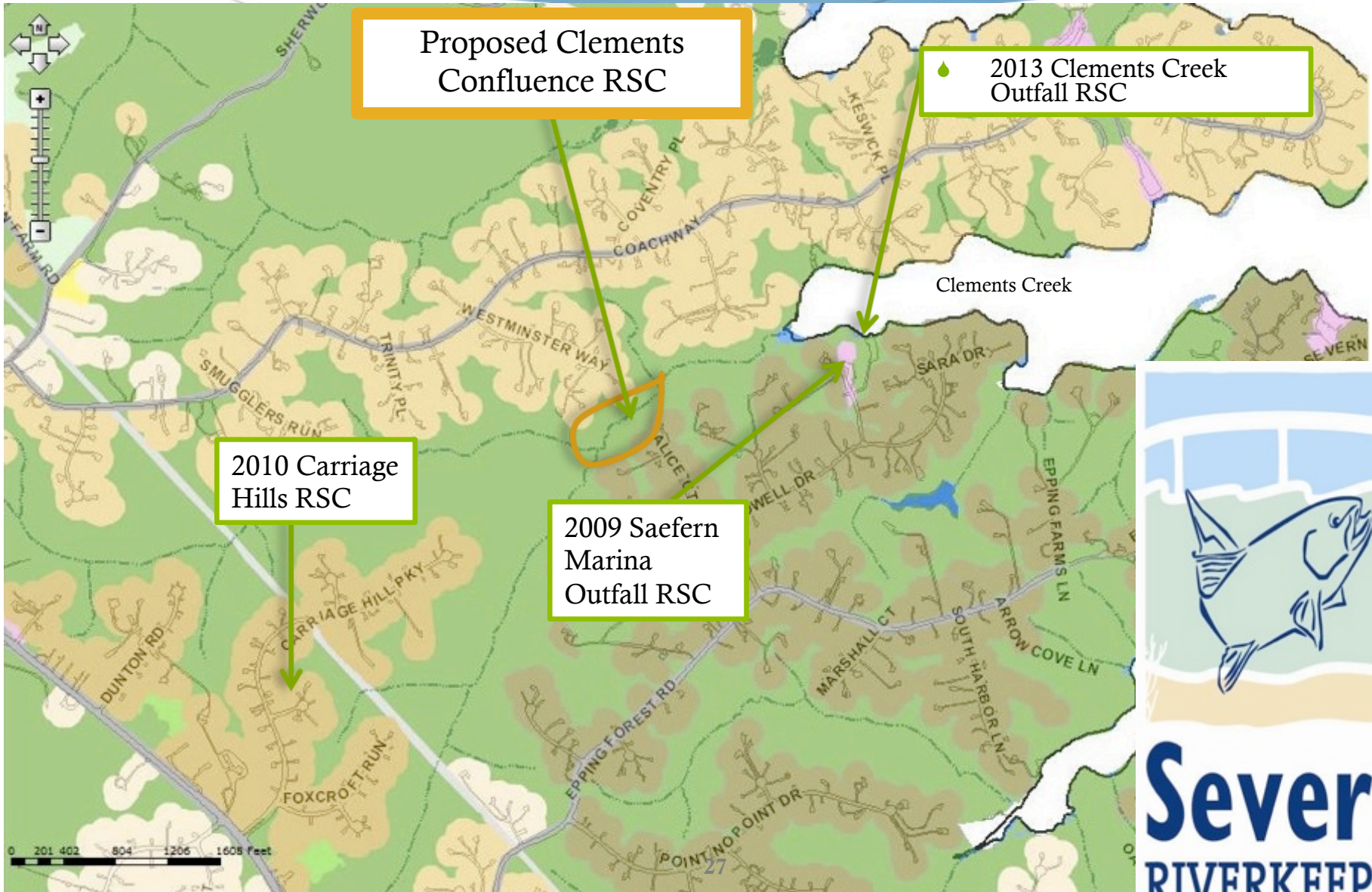
2013 Clements Outfall RSC

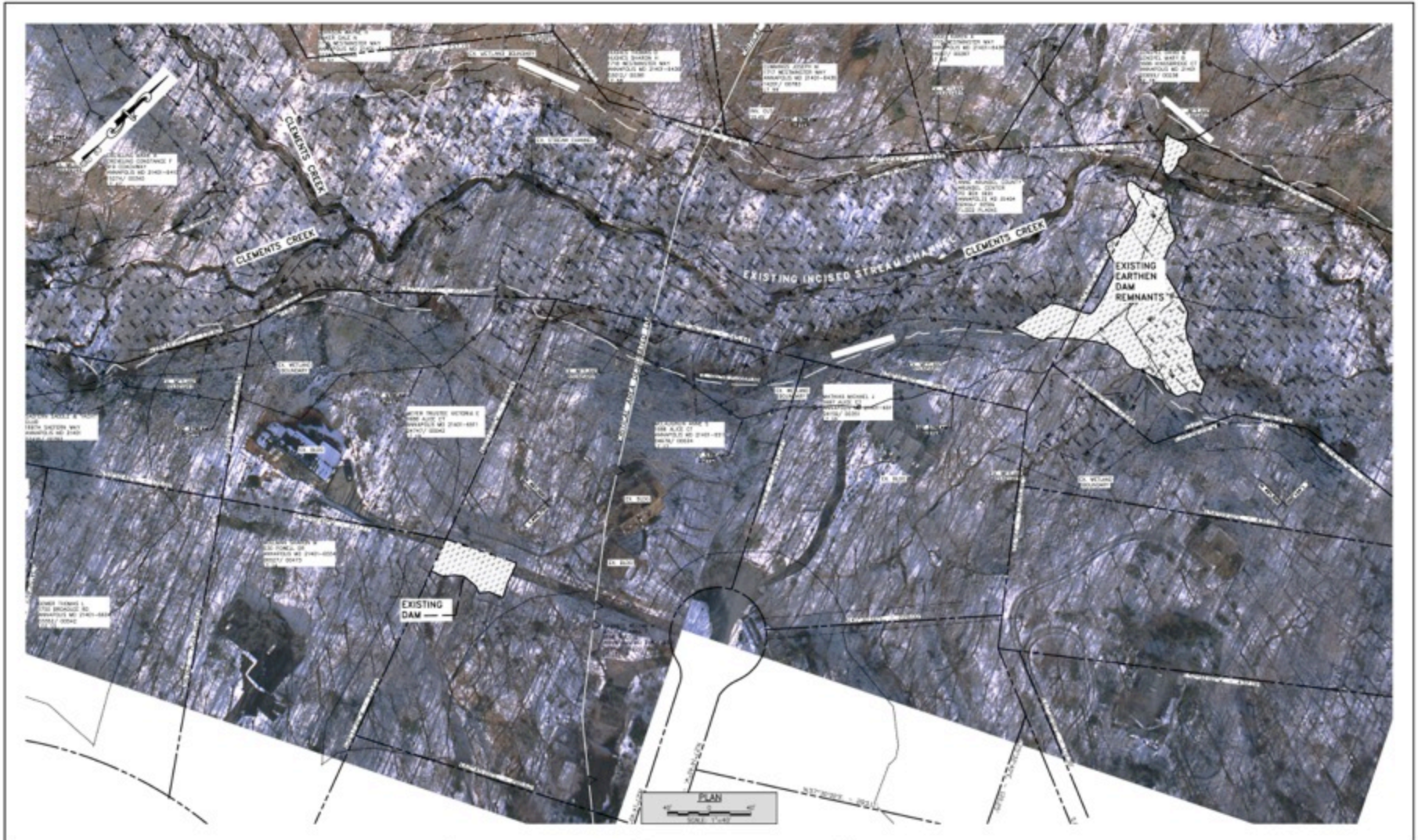




Clements Creek Watershed Restoration

Regenerative Stream Channel (RSC) Projects



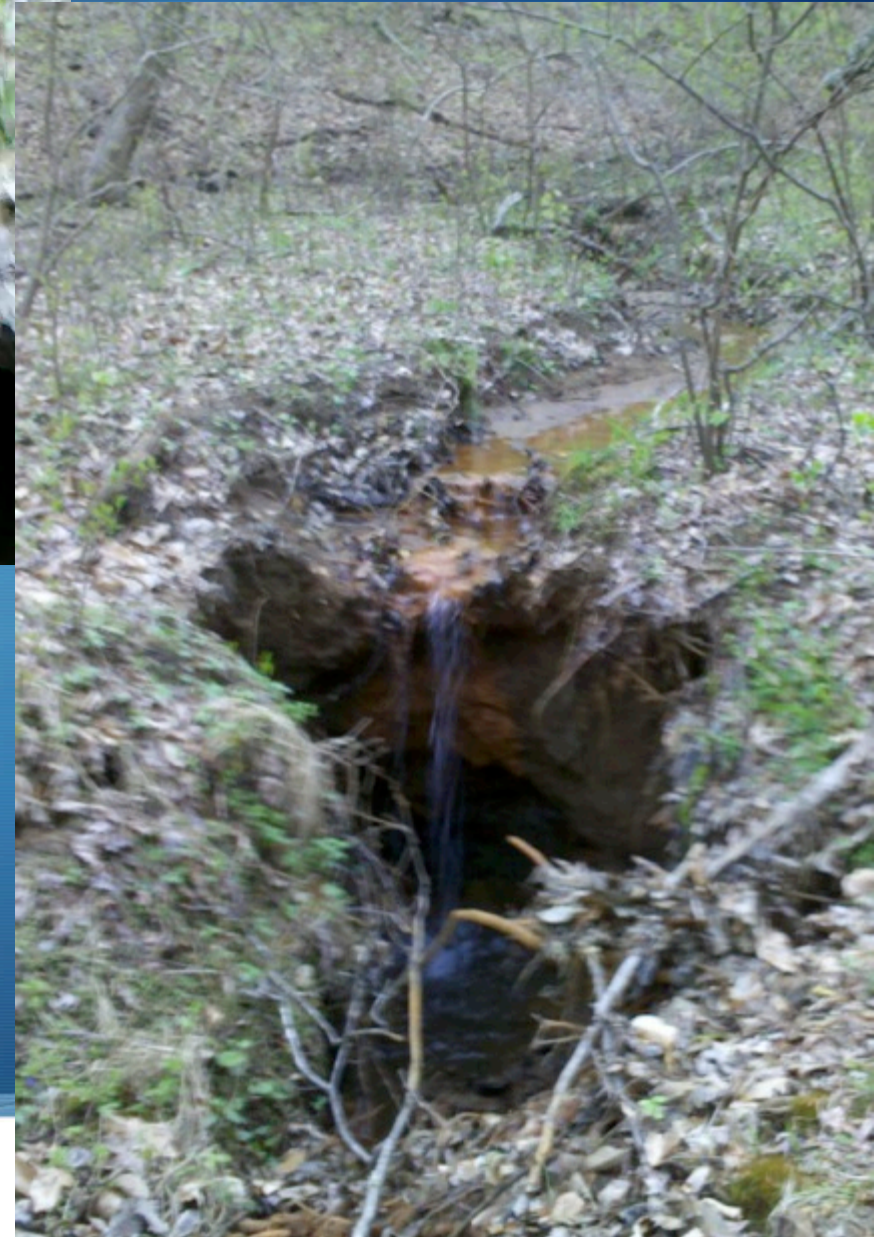


 <p>329 Riverview Trail Annapolis, MD 21401 Phone: 410 849-8540</p>	<p>PROFESSIONAL CORPORATION LAWRENCE W. HALL, P.E. & COMPANY, INC. REGISTERED PROFESSIONAL ENGINEER STATE OF MARYLAND LICENSE NO. 11186 EXPIRES 04/01/2015</p>  <p>5/22/2013 0000</p>	SEVERN RIVERKEEPER		May 8, 2013																																												
		<table border="1"> <thead> <tr> <th>NO.</th> <th>DATE</th> <th>BY</th> </tr> </thead> <tbody> <tr> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table>	NO.	DATE	BY													<table border="1"> <thead> <tr> <th>APPROVED</th> <th>DATE</th> <th>APPROVED</th> <th>DATE</th> </tr> </thead> <tbody> <tr> <td> </td> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table>	APPROVED	DATE	APPROVED	DATE																	<table border="1"> <thead> <tr> <th>SCALE</th> <th>AS SHOWN</th> </tr> </thead> <tbody> <tr> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> </tr> </tbody> </table>	SCALE	AS SHOWN							
NO.	DATE	BY																																														
APPROVED	DATE	APPROVED	DATE																																													
SCALE	AS SHOWN																																															

Existing Conditions

Clements Creek Watershed



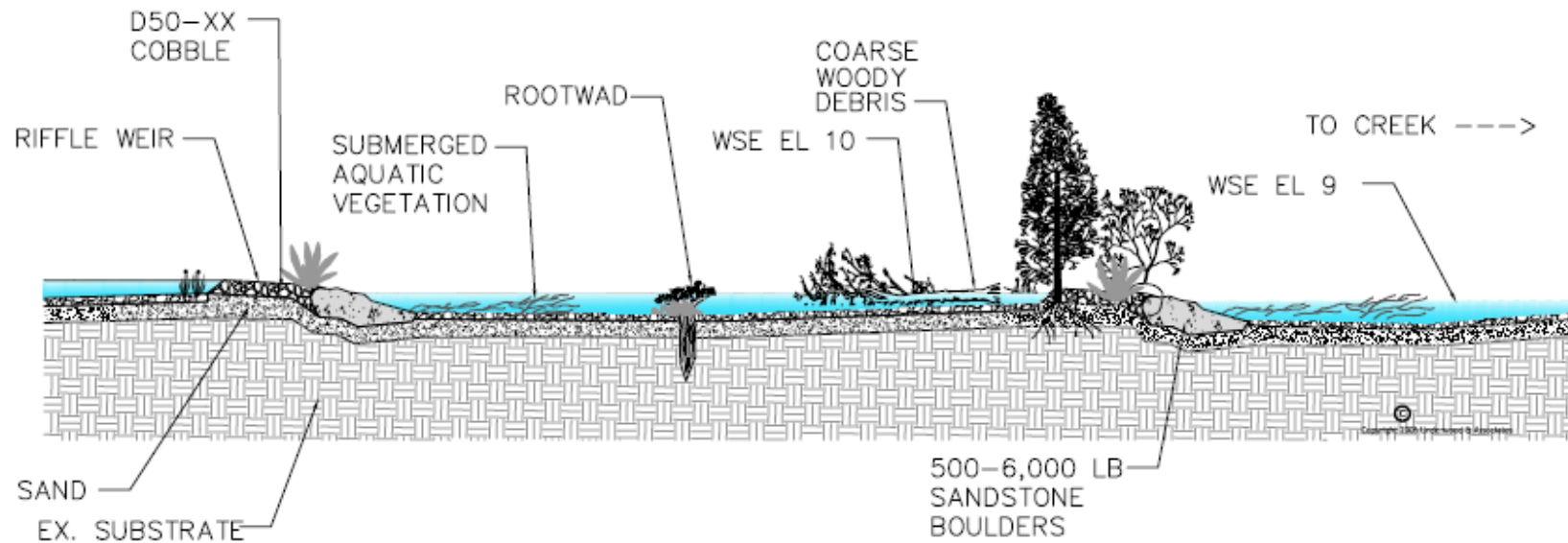


Eroding tributary reach dumping directly into Hockley Branch



The Restoration Plan

Create a series of shallow aquatic beds—envisioned as less than 6” of water. We do this with the placement of riffle grade structures (like a low head beaver dam). There is no excavation of these areas – there is no pond.



The Restoration Plan

Construction methodology calls for gentle placement of sand in the incised stream channel and install a series of cobble riffles in the existing stream to raise the surface water elevation causing the base flow to spill out over the valley flat, slightly inundating the existing valley floor in some areas.



Habitat Restoration



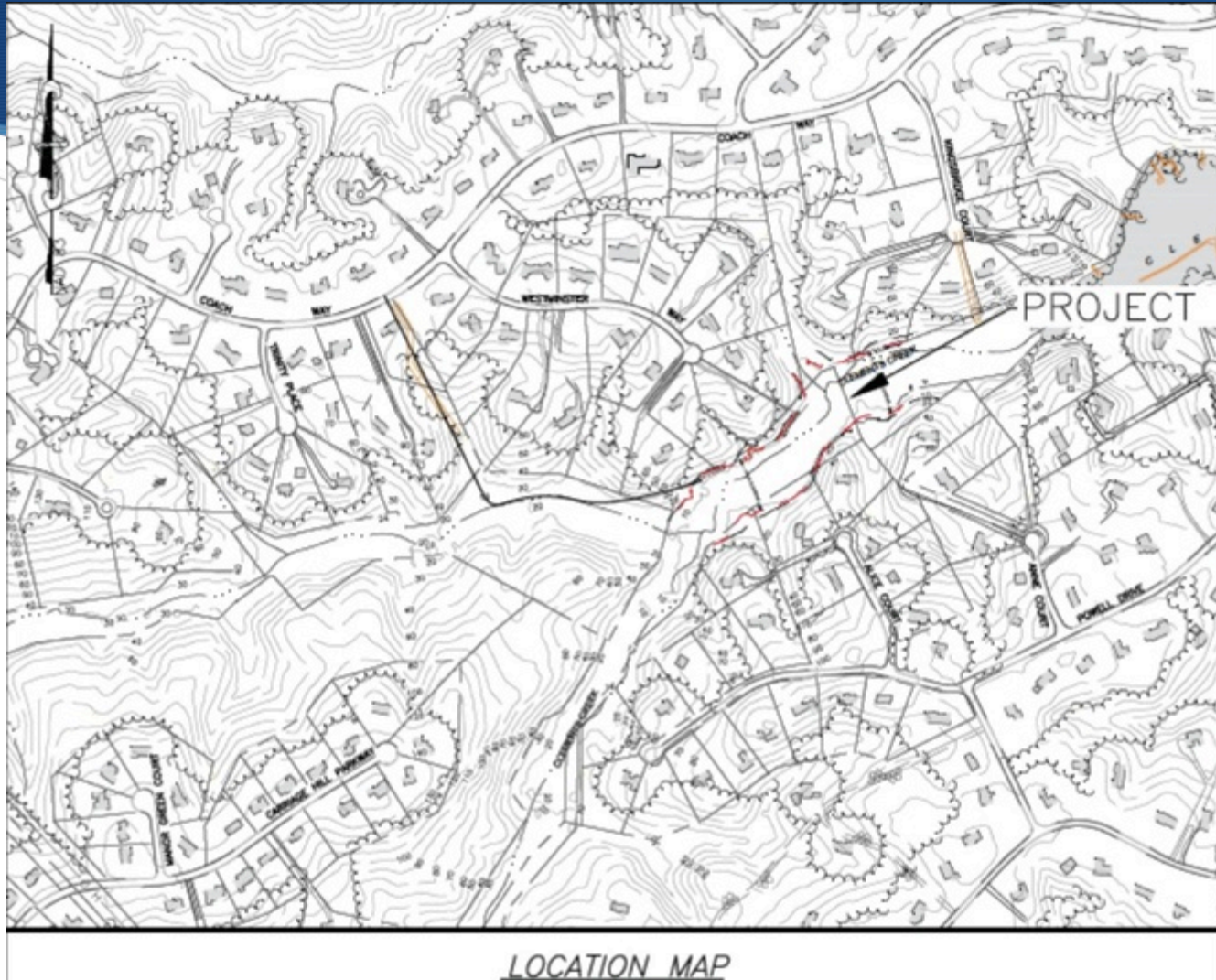
Planting typically includes Atlantic White Cedar, Spagnum mosses, rushes and sedges, water lilies, sun dews, ferns, magnolias, blueberry, American cranberry – all of which produce a fibric rooted sponge.



- Sand/woodchip berms provide a growing medium for the native acidiphiles and wetland evergreen plant material that are the peat forming species that was the historic configuration







Will need easements from 4 property owners (including SSYC)

Would like to meet individually (or in a small group) with everyone adjacent to project

Have secured funding for construction \$920,000

Are continuing to pursue permits –