Stream Restoration Symposium 2019

Lessons Learned from Stream Restoration in Other Jurisdictions

Thank you to our sponsors









Hosts



Silver Sponsors

















Regenerative Stream Design

Joe Berg (and many others) Biohabitats jberg@Biohabitats.com

The Origin of the RSC Approach

Bankfull flow

Incised channels at baseflow function like ag ditches



Legacy Sediments

Figure from Walter, R., & Merritts, D. (2008). Natural streams and the legacy of water-powered mills. Science, *vol.* 319



The modern, incised, meandering stream is an artifact of the rise and fall of mid-Atlantic streams in response to human manipulation of stream valleys for water power.

(Walter, R., & Merritts, D. (2008). Natural streams and the legacy of water-powered mills. Science, vol. 319.)

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

	Zone of Erosion/Transpor	rt	
o 80	$\frac{1}{10} = 0 + \frac{1}{10} + \frac{1}{$	<u>Be.o</u> 040 .00 % 0, 80	
. 8. Sol Cooler			(Felle
	γ		
	Zone of Deposition		

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



What is the Alternative?

- Understand historical landscape ecology
 - Don't ignore hundreds of years of anthropogenic influence
- Temporal reference system
 - Not turning the clock back to restore historic conditions, that isn't possible
 - Use understanding of historic conditions to identify restoration elements that help us meet restoration goals
- Conveyance of Sediment not my goal-turning off sediment and nutrient transport is the goal





Beaver dams very common on landscape-Useful Analog?







"The" RSC

(regenerative stormwater conveyance)





Ephemeral Gully Restoration Approach



Regenerative Stormwater Conveyance



Riffle Grade Controls









8% stream gradient

Runoff during a large precipitation event (7-in/24 hr)



















Back to Stream Restoration

Baseflow Channel Approach in a Perennial Stream



Incised Channel Bottom

Conveyance Channel

2

Mizzenmast-Gir-

-Foremast-Alley

Gardamonul

-Gassia-Or

Wilelinor Dr, Edgewater, leake Shore Or

Willow Spring + Ds-

Wijelinord

Peyunian.

Granbyrch

Mome Material Processing Channel

Hydrographs during individual storms WILELINOR



Source: Solange Filoso, University of Maryland



Tributary to Rock Creek Washington, DC

Pre Restoration

~10 ft Incised







Tributary to Rock Creek Washington, DC

October 2011

Connected to Riparian Zone











- ~4,100-If stream restoration using
 - ~70 wood structures
- 1st and 2nd order stream channels













BACON RIDGE BRANCH Groundwater Monitoring: November 7, 2018 - March 6, 2019

Rainfall — Ground Elevation at Well 7 — Stream Bank — Stream Bed — Well 5 — Well 6 — Well 7

BACON RIDGE BRANCH Groundwater Monitoring: November 7, 2018 - March 6, 2019

Progression of Methods for Surface Water Conveyance

Next?

Integrated Stream and Floodplain Techniques

Bankfull Channel Design

Rip-rap, gabion, Concrete channels

Pipe

Time

Questions?

Novel Use of Constructed 'Streams' for Stormwater Management

Holladay Park and Jabez Branch

ROAD / REGENERATIVE STORMWATER CONVEYANCE BOULDER PORTION OF WEIR CROSS SECTION

STORMWATER MANAGEMENT SUMMARY TABLE PHASE 1				
Criteria		Volume Required (cubic-feet)	Volume Provided (cubic-feet)	Net Difference (cubic-feet)
Water Quality Volume	(WQv)	8053	31032	22979
Reccharge Volume	(Rev)	2336	24673	22337
Channel Protection Storage Volume	(Cpv)	18295	47652	29357

Existing Runoff versus RSC Outflow during 100-year Event

Event	Existing	RSC Outflow	RSC Outflow
			Minus Exfiltration
	(cfs)	(cfs)	(cfs)
1-yr	0.81	0	0.35
5-yr	10.1	1.87	6.06
10-yr	18.35	8.73	13.94
25-yr	33.4	22.86	29.85
100-yr	66.14	55.14	64.24

Holladay Park- Cost Comparison

Phase 1-Original Design

Pipe	LF
15"	1453
18"	408
21"	48
24"	517
27"	470
30"	523
12" x14"	50
Total LF	3469

	Costs
S WM Pond	\$ 216,710.00
RCP	\$ 592,158.75
SWM Access Rd	\$ 8,900.00
Fences for SWM Pond	\$ 10,700.00
Total	\$ 828,468.75

Layout	\$44,934.00
Sediment Controls	\$21,971.00

Current Costs

Grading/Excess	\$248,750.00
S W M P ond	\$80,131.00
Pipe	\$23,194.00
R is ers /s truc tures /headwalls	\$30,000.00
24" P ipe	\$8,420.00
Sandstone Weirs	\$14,360.00
Total	\$404,855.00

Stream Restoration Symposium 2019

Lessons Learned from Stream Restoration in Other Jurisdictions

Thank you to our sponsors

Hosts

Silver Sponsors

