Our Mission

STROUD™ WATER RESEARCH CENTER

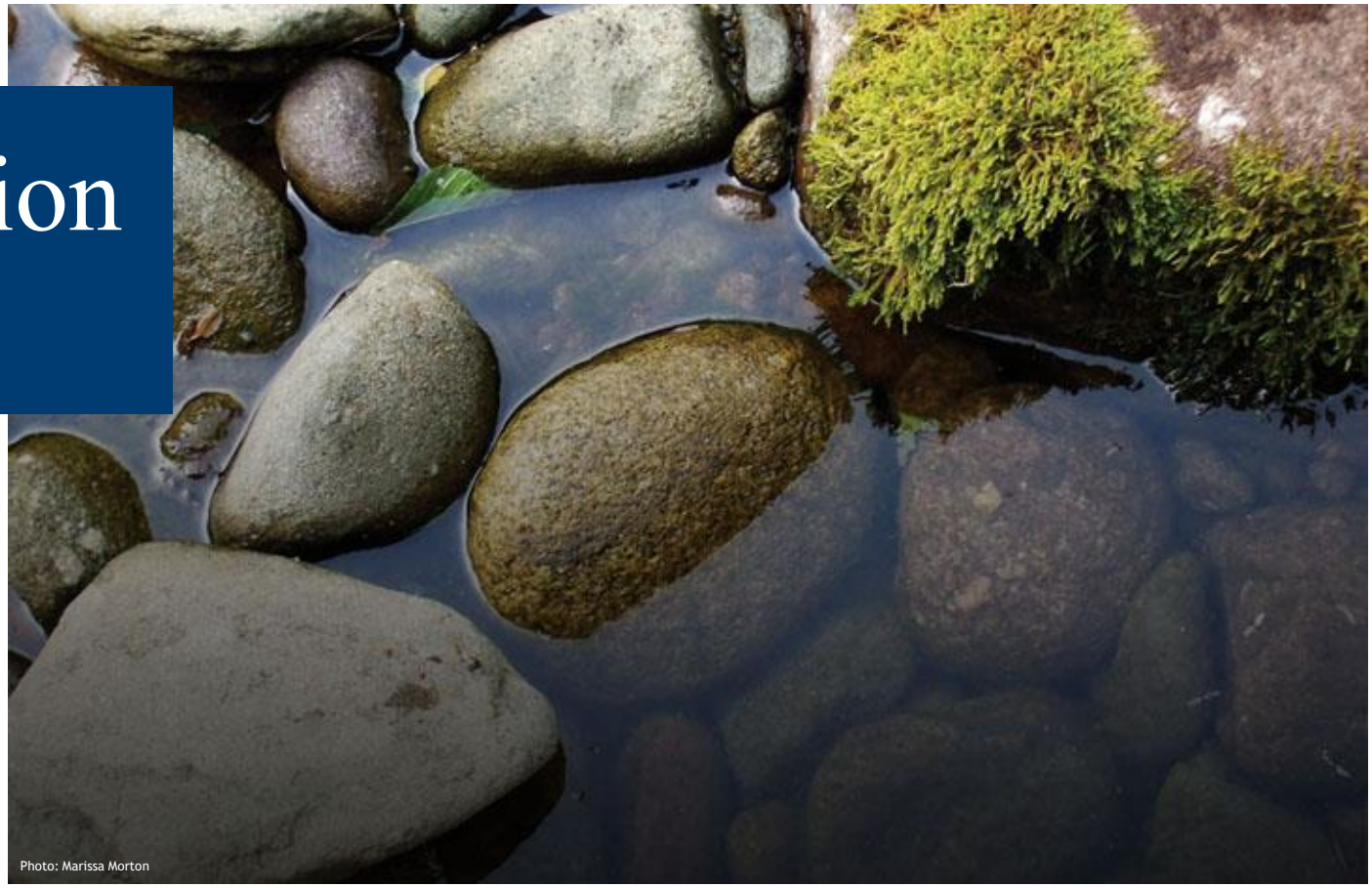

Photo: Marissa Morton

To advance knowledge and stewardship of freshwater systems through global research, education, and watershed restoration

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Buffers-Part of Whole Farm Conservation

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Whole Farm Planning


Soil and Water BMPs for Farm


Forested Buffer


Soil Health Practices

Stewardship

Models for Buffer Care Excellence

Stewardship of *Buffers* only

Stroud Water Research Center

Thanks to:

Colleagues at SWRC

Art Gover, Penn State

Kelsey Schwenk, Berks Co CD

Christine Griesemer, NRCS

Colleen DeLong, Clearwater Conservancy

Our Landowners and Partners

Many others!

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We Know What Works

Regular Mowing Program

Vegetation Control Program

Shelter and Stake Management

Chester Co Buffer in 2017

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Same Site, Last Week

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What is *Your Measure for Success?*

1: High Tree Survival?

2: High Tree & Shrub Survival?

3: Trees & Shrubs, plus Healthy Plant Community Throughout Buffer?

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Stewardship vs More Projects

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Buffer Stewardship

Different Models for Different Contexts

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Three Models:

1. Volunteer Support
2. Technical Support
3. Contractor Support

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Volunteer-Supported Model

Following slides courtesy of Clearwater Conservancy

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ClearWater Conservancy's Riparian Buffer Site Steward Program

Colleen DeLong
Habitat Stewardship Biologist

Suzy Yetter
Conservation Projects Coordinator

ClearWater conservancy

ClearWater's Riparian Conservation Program

- 56 riparian buffer projects installed since 2004
- 152 acres (102,371 linear feet) planted
- Buffers include:
  - Tens of thousands of trees & shrubs planted & stewarded
  - Many Partnerships
  - Ag BMPs
  - 3 dams removed
  - 500 local native plants grown and planted annually
  - Countless acres of invasive species treated
  - Thousands of community members reached, educated, and involved

Traditional Buffer Establishment Process

Site prep → Install buffer → Landowner maintains buffer

Slide courtesy Clearwater Conservancy

ClearWater's Formula for Buffer Establishment and Long-term Success

Site prep → Install buffer → **ClearWater assists with maintenance for 4-6 years or more** → Landowner maintains buffer

Slide courtesy Clearwater Conservancy

Riparian Site Steward Program

Began in 2013

Slide courtesy Clearwater Conservancy

Riparian Site Stewards Program

Program Objective

- Ensure buffer project success

  "Eyes on the ground"

- Assign a volunteer site steward for each buffer
- Individuals or groups
  - both are excellent
  - depends on buffer size, type of land & the people
  - each situation is unique

Slide courtesy Clearwater Conservancy

Site Steward Responsibilities

- Communicate with landowner (ClearWater Liaison)
- Visit property on a regular basis (monthly)
- Identify maintenance needs
- Perform maintenance
- Ask for help when needed

Slide courtesy Clearwater Conservancy

Site Steward Responsibilities

- Primary maintenance needs

Tree shelter, stake & bird net maintenance

- Straighten shelters, seat shelters into soil
- Check shelters for damage, Evict mice ☹
- Replace or remove bird nets
- Weed inside & around shelters
- Remove dead leaves from inside shelters
- Replace stakes or shelters when needed

Slide courtesy Clearwater Conservancy

Site Steward Responsibilities

- Count and mark dead seedlings
- Replant
- Identify need for herbicide contractors
- Identify tasks for larger work crews
- Communicate additional project needs to staff
  - streambank erosion, damage to fences

Slide courtesy Clearwater Conservancy

Technical Support Model

Following Slides Courtesy of
Berks Co Conservation District

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CREP Technical Assistant

Main Goal: Facilitate the successful establishment of forest stream buffers

- Perform semiannual buffer checks
- Thorough documentation of buffer condition
- Clear communication with buffer owner/operators
- Communication amongst partner agencies
  - BCCD, Stroud, NRCS & FSA
- Compile detailed records of each planted site

Assistant Uses Semi-Annual Buffer Checks to:

- Collect data on tree/shrub survival and presence of invasive species
- Document condition of buffer
- Flag dead trees for replacement
- Replace tubes, stakes, zip-ties, nets
- Remove invasives from within tubes
- Determine replant needs
- Identify issues affecting establishment

Buffer Checks and Trip Reports:

BUFFER CHECK TRIP REPORT

NAME: ———————

DATE: 11/21/2019, 12/02/2019

LOCATION: Buffer Fields 10 & 11 located at: ———————

COMPLETED BY: Kelsey Schwenk

	Field 10	Field 11		Field 10	Field 11
# of trees in plan:	260	132	# of shrubs in plan:	68	36
Live Trees:	239	127	Live Shrubs:	66	34
Dead Trees:	21	5	Dead Shrub:	2	2
% Survival:	91.9%	96.2%	% Survival:	97.1%	94.4%

Maintenance Task Needed by Operator:

Yes	**Invasive Species Management**	**List Species Found:**	Invasives do not appear to be a significant problem in either buffer field. In total, 8 tree tubes contained oriental bittersweet, and 8 tree tubes contained multiflora rose.
< 5	**Tree tubes not in the ground**	**Notes:**	Tree tubes and stakes are well maintained. Leaning tubes were realigned and restaked as necessary.
< 5	**Tree Tubes leaning**	**Notes:**	Tree tubes and stakes are well maintained. Leaning tubes were realigned and restaked as necessary.
Yes	**Bird Net Maintenance**	**Notes:**	Remove bird nets as necessary with tree growth. Nets should be removed before tree emerges from tube protector as nets can cause tree growth deformation.
No	**Herbicide Spray**	**Notes:**	A recent herbicide spray was evidenced by brown spray lines across tree rows.
No	**Mowing**	**Notes:**	It appears buffer fields were mowed in Fall 2019.

Discussion with operator: Brief discussion with ——————— concerning his buffer. Overall, the buffer has been well maintained through regular herbicide applications and mowing practices (when possible, due to the standing water in both fields).

Problems: Overall, both fields have excellent survival. Most mortality was due to inundated planting areas where trees were unable to establish.

Completed Task: Removed select bird nets, restaked/realigned tree tubes as necessary, documented the condition of the buffer through photographs and marked all dead trees with yellow flagging.

Next Steps: Perform semiannual buffer check in Winter 2020..

Notes: Continue to monitor growth of invasive tree of heaven around buffer edge—some dead spotted lanternflies were observed during the most recent check. If possible, provide replant trees that are OBL and FACW for best establishment in inundated planting areas.






Clear Communication with Buffer Owner/Operators:

- ID problems & offer practical solutions through trip reports & photos
- Identify their successes!
- Regular emails and phone call reminders about seasonal tasks
- Build relationship with owner/operator and cater to each of their and their buffer's needs

Fall 2019 Quarterly Buffer Summary:

Buffer Owner / Operator	Planting Month & Year	Most Recent Buffer Check Date	# Dead Trees	#Dead Shrubs	Total Trees in Plan	Total Shrubs in Plan	Tree Survival %	Shrub Survival %	# tubes w/ Oriental Bittersweet	# tubes w/ Multiflora Rose	% Tubes w/ Oriental Bittersweet	% Tubes w/ Multiflora Rose	Site Conditions: Wet, Dry, Wet/Dry	
A	Apr 2018	11/20/19	0	0	353	88	100.0%	100.0%	2	0	0.5%	0.0%	Wet/Dry	*post replant #s
B	Dec 2016	12/02/19	26	4	392	104	93.4%	96.2%	8	8	1.6%	1.6%	Wet/Dry	
C	May 2016	12/05/19	25	8	445	111	94.4%	92.8%	0	8	0.0%	1.4%	Wet	
D	May 2018	12/09/19	127	29	452	113	71.9%	74.3%	23	54	4.1%	9.6%	Wet/Dry	
E	Oct 2018	10/23/19	10	0	220	60	95.5%	100.0%	0	0	0.0%	0.0%	Dry	
F	Apr 2018	12/13/19	1	0	81	21	98.8%	100.0%	1	1	1.0%	1.0%	Dry	
G	May 2017	09/16/19	236	68	836	209	71.8%	67.5%	24	0	2.3%	0.0%	Wet	
H	Nov 2017	12/12/19	0	5	64	19	100.0%	73.7%	0	7	0.0%	8.4%	Wet/Dry	
I	Dec 2015	12/17/19	17	4	640	160	97.3%	97.5%	4	11	0.5%	1.4%	Wet/Dry	
J	Nov 2017	12/03/19	0	0	156	32	100.0%	100.0%	1	1	0.5%	0.5%	Wet	
K	Nov 2016	11/13/19	0	0	1125	300	100.0%	100.0%	14	10	1.0%	0.7%	Dry	*post replant #s
L	Oct 2016	11/19/19	24	0	700	175	96.6%	100.0%	40	22	4.6%	2.5%	Dry	
M	Nov 2017	12/03/19	1	0	248	63	99.6%	100.0%	1	3	0.3%	1.0%	Dry	
O	Nov 2018	10/04/19	117	21	1111	477	89.5%	95.6%	-	-	-	-	Dry	
P	Oct 2016	12/11/19	2	1	450	100	99.6%	99.0%	2	1	0.4%	0.2%	Wet	
Q	Mar 2016	01/13/20	20	0	185	0	89.2%	-	0	0	0.0%	0.0%	Wet/Dry	*post replant #s
R	Mar 2016	11/04/19	22	0	256	64	91.4%	100.0%	8	5	2.5%	1.6%	Wet/Dry	
		AVERAGES					**93.5%**	**88.0%**			**1.2%**	**1.9%**		

GOAL: Establishing Successful Riparian Forested Buffers

Ensuring Shrub Survival:

- Competitive growth around shrubs appears to cause most mortality/failure
- Gauge which shrub protection performs best
  - Need to collect quantitative data on success
  - Some qualitative observations below

Protection Device	PROS	CONS
Shrub shelter	• Ease of herbicide application	• Not wide enough for shrub growth
Wire cage	• Complete tree protection	• Uneven management, becomes overgrown • Can damage shrub during removal
Shrub shelter + wire cage	• Ease of herbicide application	• Not wide enough for shrub growth • Can damage shrub during removal

Berks County Farm Stewardship Program 2016-2020:

- 17 participating landowners
  - 16 in partnership with CREP
- 8,993 trees and shrubs planted
- 78.7 acres converted to riparian buffers
- 36,123 feet of stream bank protection
- Records show changes in site condition and survival

Owner/ Operator	Program	Planted	Acres	Stream Bank Length (ft)	Stream Length (ft)	Avg. Width Side 1	Avg. Width Side 2	# Trees	# Shrubs	Notes:
Buffer Owner A	DRRF15	Apr-18	5.93	2650	3300	60	0	105	26	Field 7
						50	0	29	7	Field 9
						35	125	146	36	Field 10
						0	35	73	19	Field 18
Buffer Owner B	DRRF13	Dec-16	1.95	863	863	108	0	260	68	Site 2 - Tract 629
	DRRF13	Dec-16	1.64	660	660	113	0	132	36	Site 1 - Tract 662
Buffer Owner C	DRRF15	May-16	2.9	2530	1480	50	50	190	50	
Buffer Owner D	GG13	Apr-18	5.2	2262	1131	50	50	252	63	Field 4, M. rose issues
						75	110	200	50	Field 5
Buffer Owner E	GG13	Oct-18	2.54	600	600	180	0	220	60	Bittersweet in surrounding woods
Buffer Owner F	DRRF13	May-17	9.65	3382	1691	80	100	836	209	Consistent inundation
Buffer Owner G	GG13	Nov-17	1.62	392	300	88	50	64	19	Ailanthus in surrounding woods
Buffer Owner H	GG13	Dec-15	5.79	2651	1761	100	100	640	160	Ailanthus in surrounding woods
Buffer Owner I	GG13	Nov-17	1.48	698	349	72	85	185	32	
Buffer Owner J	DRRF13	Nov-16	11.25	2200	1100	180	180	1125	300	SLF
Buffer Owner K	DRRF13	Oct-16	5.87	4600	2300	50	50	700	175	Bittersweet issues
Buffer Owner L	DRRF15	Nov-17	0.2	2700	1350	35	0	24	6	Field 1
			1.24			50	50	99	25	Field 12
			0.13			35	0	13	4	Field 13
			1.12			35	55	112	28	Field 14
Buffer Owner M	GG13	May-16	4.45	1750	1350	150	0	445	111	
Buffer Owner N	GG13	Fall-18	8.31	4488	4488	125	0	1111	477	
Buffer Owner O	GG13	Apr-18	0.9	721	661	75	66	81	21	SLF
Buffer Owner P	DRRF13	Oct-16	4.97	2436	1424	110	80	402	88	Field 5
						50	0	48	12	Field 6
Buffer Owner Q	DRRF13	Mar-16	1.6	540	540	150	0	256	64	

	Total Farms	Acres	Stream Bank Length (ft)	Stream Length (ft)	Avg. Width Side 1	Avg. Width Side 2	# Trees	# Shrubs
STROUD AVERAGES		4.6	2408.2	1689.9	118.4	54.1	468.5	131.0
TOTALS IMPLEMENTED	17	78.74	36123	25348			7028	1965

Contractor-Based Model

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All Stroud Buffers Covered by Landowner Agreement With Maintenance Expectations

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Contractors hired* for:

- Site Prep and Installation
- Mowing
- Shelters/Stakes/Nets
- Herbicide Application
- Lifting/Weeding Shelters
- Replanting
- Spot Spraying Invasives
- Special tasks: Snapshot, Gravel, etc

**Rates are typically cost/acre for each task*

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Plenty of advantages

No public engagement

How to cover costs?

Some funders are beginning to respond to the need

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Funders *ARE* responding to maintenance need

- e.g. PA DCNR maintenance
- Private foundations

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Why we use contractors

Experience and equipment

Predictable for budgeting

Quality control

One stop shop

Scaleable

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Disadvantages (beyond cost)

Less landowner investment?

Unforseen problems not in budget

Limted visits to buffer

What happens beyond year 3?

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A Bare Bones Budget:

3 years maintenance:

Spray + Shelter Maintenance = $150 per Acre x 6 times	$900
Mowing (3x per year) = $150 per Acre x 9 times	$1350
Total for basic maintenance	$2,250

This budget would not cover additional services;
Spray/shelter budget would not be sufficient if extensive shelter work was needed

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Conclusions:

Many legitimate strategies

All have common goals

Different Pros/Cons

Landowners still critical

Final Note: Hybrids Can Work!

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Thank You!

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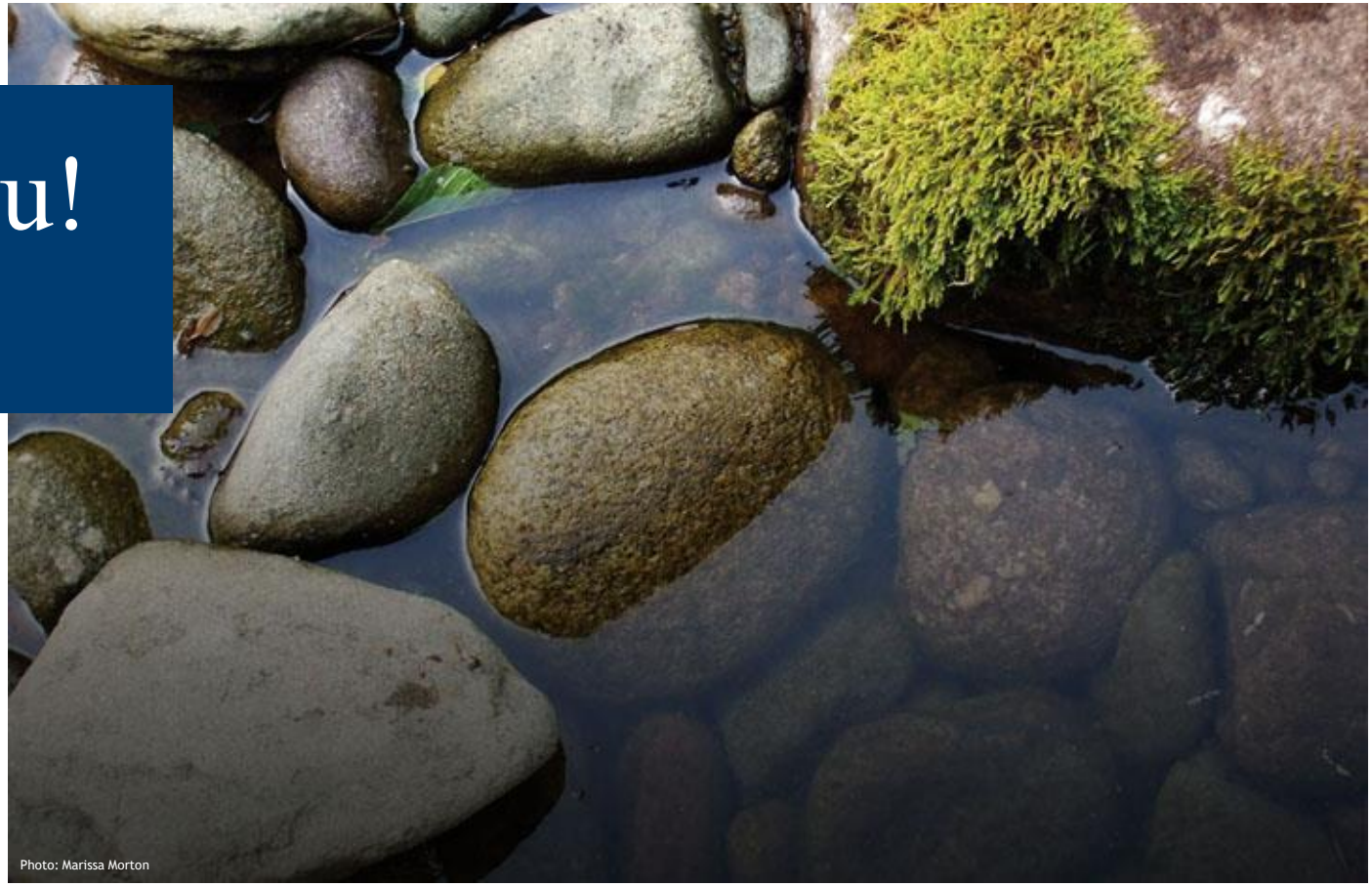

Lamonte Garber
Watershed Restoration Coordinator
lgarber@stroudcenter.org
Cell: 717-576-3287

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