Riparian Corridor Management Plan

Costa Property – 44 Stony Clove Lane Chichester, NY 12416

2013

A plan to address the management, restoration and preservation of riparian zones found on the Costa property, Chichester, NY.

Catskill Streams Buffer Initiative

At the Root of Streamside Protection

Ashokan Watershed Stream Management Program
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Contents

Executive Summary

Purpose
This plan aims to enhance awareness and inform the landowner about riparian management issues specific to their particular property.

Riparian Buffer
The land adjacent bodies of water are not only important plant and animal habitat, but also contribute to the health of the waters they surround. A healthy buffer is more resilient and can help protect and maintain the character and function of a stream. The wider the buffer, the more function it provides.

The Ashokan Watershed
Located in the Catskill Region of New York State, the Ashokan Watershed comprises all areas draining to the Ashokan Reservoir. This area remains heavily forested but has seen significant amounts of development along its streams.

Costa Property
The property is located in the high peaks region of the Ashokan Watershed near Chichester, Ulster County, New York. Riparian areas are influenced by the highly dynamic nature of streams on the property. Excessive erosion has resulted in a loss of vegetation along the project site.

Best Management Practices
The following BMP's are recommended:

- Use of native plant species.
- Control of invasive species.
- Toe/bank zone management.
- The three-zone riparian forest buffer.
- Management of bank zone leaning trees.
- Restoration/reconnection of floodplain forest.

Maintenance
By keeping vegetation healthy, landowners can ensure that vegetation functions effectively. Restoration areas are especially vulnerable in the years directly following installation and may require special attention.

Monitoring
Monitoring is an important component of successful projects. Through monitoring, management decisions can be directed more efficiently to address any potential issues that arise.

Costa Property
44 Stony Clove Lane
Chichester, NY 12416

Riparian Corridor Management Plan (RCMP)

Purpose

The purpose of this Riparian Corridor Management Plan (RCMP) is to enhance awareness and inform the landowner about riparian management issues specific to their individual property. Each RCMP is written to encourage individual landowners to actively manage their riparian buffer areas using sustainable Best Management Practices (BMP) and to provide a roadmap to the process of repairing their property, improving riparian function, enhancing habitat, and maintaining it for the future.

This plan will:

- Review the functions and importance of proper management of riparian buffers
- Describe the present character and conditions of the riparian corridor
- Define the nature of problems associated with the landowners specific buffer or streamside elements
- Identify the landowner's issues and concerns, and
- Recommend BMP's to improve riparian buffer conditions, or stabilization efforts to resolve problems along the stream

Streamside landowner stewardship is essential to proper stream corridor management. Efforts by individual streamside landowners to improve and maintain proper stream processes and streamside buffers can be substantial, especially with the control of invasive species and the management of desirable native vegetation. Well informed streamside landowners can also be instrumental in maintaining floodplain function, in addition to stream channel and streambank functions. Many times, streambank erosion and stream channel degradation begin as small problems that could have been minimized or corrected – without public funding assistance – by well-informed streamside landowners.

Improved understanding of the function of floodplains, streamside vegetation, and riparian buffers will help guide stakeholders as they adopt practices to protect streams and improve overall stream stability.

The primary purpose for riparian planting projects conducted by the Catskill Streams Buffer Initiative is to:

- Restore natural streamside vegetation.
- Encourage landowner stewardship of riparian areas

In addition, CSBI stresses the importance of maintaining ecological integrity and facilitating the use of plant materials that are native to the Catskill region. This plan will address floodplain function, stream processes (including riparian buffer maintenance), invasive species control, and the importance of desirable native streamside vegetation and their function.

Riparian Buffer Functions and Benefits

What is a Riparian Buffer? A riparian area is the land adjacent to a body of water, such as a lake, river or wetland. Riparian areas are transitional zones that connect aquatic and terrestrial environments. These areas are not only important plant and animal habitat, but also contribute to the health of the waters they surround.

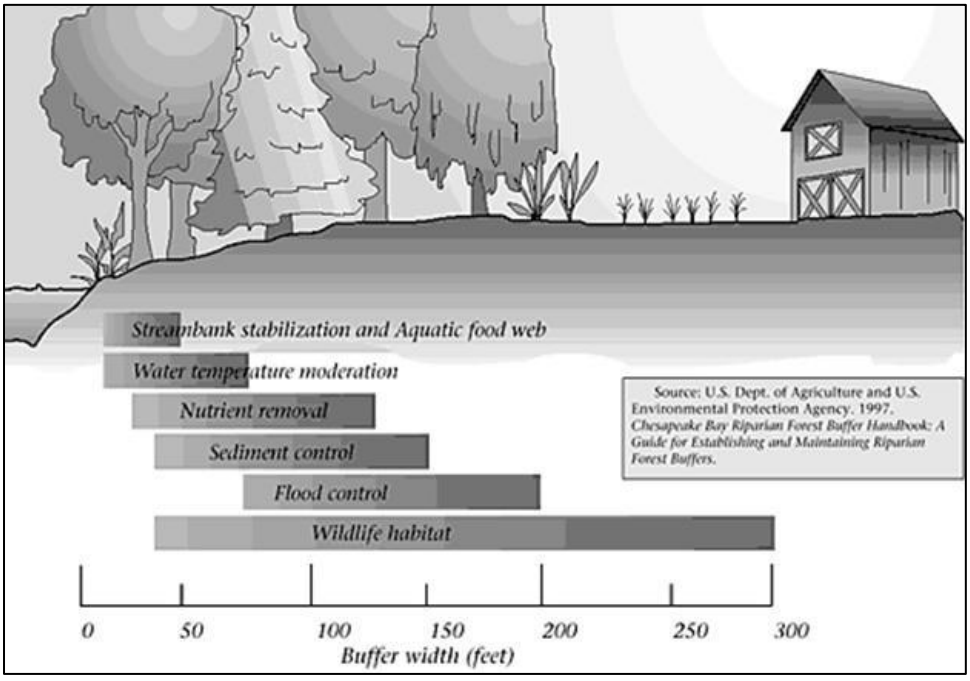
Healthy Riparian Systems: A healthy riparian corridor is a highly diverse assemblage of species and environmental processes. The level of diversity can be attributed to variations in water levels, geomorphic processes[i], elevational shifts, and influences from upland areas.

Streams with a healthy riparian buffer are more stable and resilient than those without and can help protect and maintain the character and function of the stream. Healthy, vegetated riparian buffers provide a number of important ecological functions including:

- Water quality protection - filtering pollution as well as transformation and storage of nutrients
- Stream stabilization – decreased bank/floodplain erosion
- Habitat for aquatic and terrestrial wildlife
- Shade and temperature control for aquatic habitats
- Support for natural communities and adjacent streams and wetlands
- Property protection from flood and ice flow damage

The ecological functions provided by a riparian buffer are related directly to the width of the buffer (Figure 1).

Figure 1: Buffer function is dependent on width.

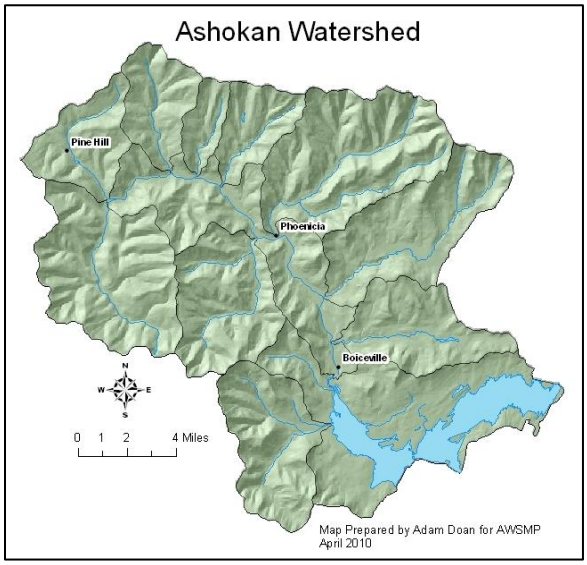


The Ashokan Watershed

The Landscape

The Upper Esopus Creek Watershed (Ashokan Watershed) covers 192 square miles in the South-central Catskill Mountain Region of New York State (Figure 2). This high peaks region of the Catskill Mountains includes 21 peaks higher than 3,000 feet above sea level (ft. asl.). The highest peak in the Catskills, Slide Mountain, can be found within the Ashokan Watershed and is 4,180 ft. asl. The result of this topographic variation is an extensive network of surface drainage systems comprising 330+ miles of stream.

Figure 2: The Ashokan Watershed



Forested lands exceed 95% of the total watershed land cover. However, in the 1800's significant portions of the watershed were cleared of forests by logging and bark peeling activity. Consequently, streams were altered from the increase in eroding sediment from the denuded landscape. Forest cover still tends to dominate the land cover in the valley bottom along most of the stream courses, however, these corridors have been the preferential path for development into the watershed. This fact, coupled with the topographic variation in the watershed has resulted in the concentration of development associated with roads, residence, businesses and town centers along these stream corridors.

Climate and Hydrology

The Catskill Mountains in general and High Peaks Region specifically is a landscape shaped by moving water. Erosional processes began with glacial activity and continue today with the draining of the land through a network of streams and reservoirs. The intensity and frequency with which these streams flood helps contribute to the high amount of diversity found in riparian zones. As such, it is important to consider climate when attempting to understand and manage these crucial areas.

Mean annual precipitation for the Upper Esopus watershed ranges from ~52 inches at the Ashokan Reservoir to ~63.5 inches at Slide Mountain. Typical winters leave a snowpack in the mountains, causing most of the peak floods to occur with the combination of snow melt and spring rains. The region is also in the path of tropical storm events with consequent flooding in late summer and fall.

While local impacts are more difficult to predict, current climate change models indicate that in the Catskills, storm events with rainfall greater than 1" are likely to increase in frequency and magnitude (Frumhoff, 2006). Paradoxically, drought periods are also likely to become more extreme. Snowpack amount and duration are also expected to decrease.

Costa Property Description

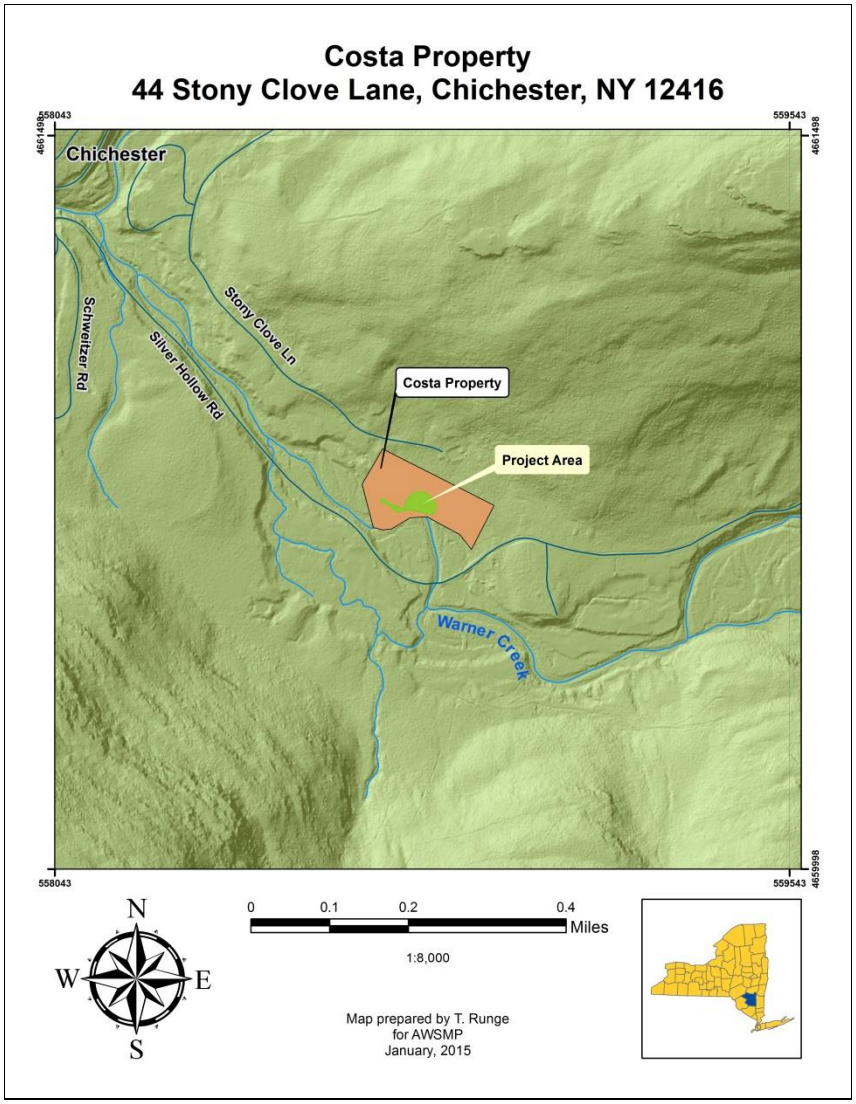
Location and Size

The Costa property is located on Stony Clove Lane in the hamlet of Chichester, Ulster County, NY. The total property size is 6.73 acres and consists of a single parcel. There are no buildings on the property. This property was used as a second home and is currently on the market for sale.

The Costa property is bordered on the southern edge by Warner Creek and includes approximately 500 feet of streambank. The property is adjacent to a large scale stream restoration project. The project was constructed in 2013 and intended to improve stream channel and floodplain stability.

The project site is located near the center of the parcel with a narrow band continuing to the west. The total project area is 25,980 square feet or 0.60 acres and includes approximately 200 feet of streambank.

Figure 3: The Costa property and project location.



Stream Type

The shape of a river at any given point is a function of the water and sediment transported as well as the composition of bed and bank materials including vegetation. Much work has occurred over the years to classify rivers based on their dimension, pattern, profile and material. Classification creates a common, standardized language and method for describing and measuring streams. While a number of classification systems exist, the most effective are based on field measurement that is objective, quantifiable and consistent.

Two of the most commonly used systems are those of Rosgen (Rosgen, 1994) and Montgomery-Buffington (Montgomery & Buffington, 1997). AWSMP uses a combination of these systems during Phase I surveys to determine a reference stream type. This reference stream type describes the natural tendency of channel form and process that would exist in the absence of human-related changes to the channel, floodplain, and/or watershed. It should be noted that the point of a reference stream type is not to predict the actual stream type but to predict its potential.

Considering the history of human-related changes to the Upper Esopus Creek watershed, the reference stream type is based largely on valley, geology and stream climate characteristics.

Reference stream type helps inform management decisions by providing a basis to understanding a streams potential. This potential extends to riparian vegetation which has a significant influence on stability for certain stream types. For more information on the interaction between stream type and vegetation see **Vegetation Potential** on page 12.

Reference Stream Type: For the section of Warner Creek passing through the Costa property, project monitoring classified the stream as a slightly entrenched channel with cobble size bed material and displaying a riffle-pool bed form[ii] (Rosgen C3b/riffle-pool).

Management Implications: The C3b stream type is moderately sensitivity to disturbance and has a good recovery potential. Recovery potential assumes natural recovery once the cause of instability is corrected. The 2013 stream restoration project was intended to correct channel instabilities. Human intervention can help accelerate recovery response.

Figure 4: Rendering of the Rosgen "C" stream type.

Soils

Understanding the soils found at a particular site is an important component to understanding the overall processes influencing riparian vegetation success as well as establishment. Soils, like streams, can be categorized based on distinguishing characteristics. These characteristics can vary greatly between soils and include: erodeability, water holding capacity, nutrient composition and particle size.

Four different soil types were identified on the Costa property (Figure 5 & Figure 7) with Tunkhannock gravelly loam (TkC) comprising 46% of the total area and Barbour loam (Ba) comprising 37%. The majority of riparian vegetation found on the property occupies these soil types. However, top soil was spread across the right bank (facing downstream) hillslope during construction, changing the interaction of soils at that location.

Dominant Soil Type: Tunkhannock gravelly loam is the most common soil found at the property and is associated with valley trains (glacial outwash) and terraces. Slope can range from 5 to 16%. Barbour loam is also common and is associated with floodplains with a nearly level slope of 0-2%. Ba soils often overlay alluvial land and are richer in gravel and sand.

Soil Properties: TkC and Ba are well-drained soils derived from reddish sandstone, siltstone, and shale. TkC has low water storage capacity, while Ba has moderate water storage and is frequently flooded.

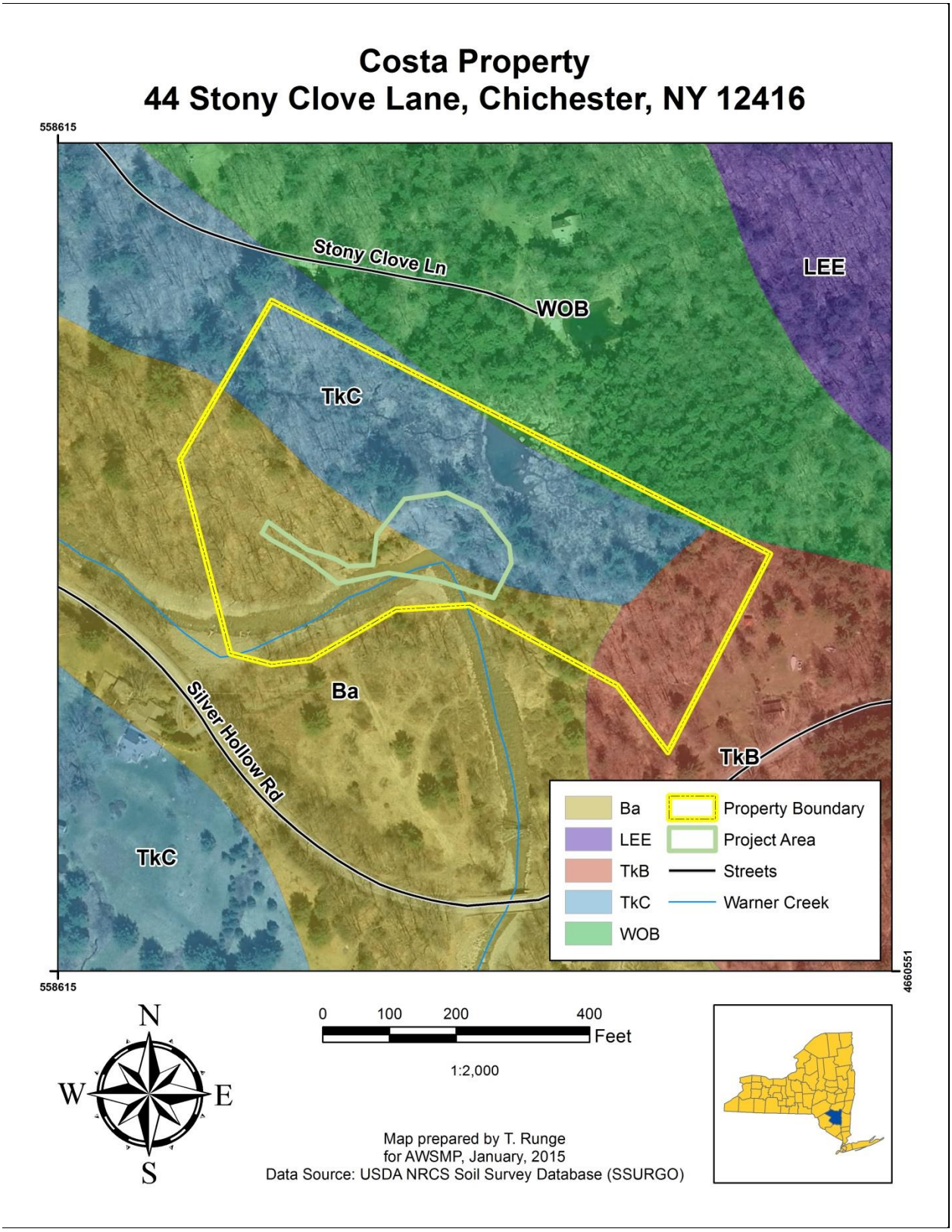
Management Implications: Due to the TkC soils well-drained properties, its ability to retain water is low and watering planted vegetation is recommended, if drainage from the upland wetland isn't sufficient. The Ba soil type is typically not well suited for hand planting due to the presence of alluvial deposits including cobbles and gravel. As such, mechanical planting is recommended.

Figure 5: Soil types with percent cover for the Costa property.

Soil Symbol	Soil Type	Percent Coverage
TkC	Tunkhannock gravelly loam, rolling	46
Ba	Barbour loam	36
TkB	Tunkhannock gravelly loam, 3-8% slopes	15
WOB	Wellsboro and Wurtsboro extremely bouldery soils, gently sloping	3

Figure 6: Prior to planting the hillslope, top soil was imported and spread to allow for improved planting medium. September 2013.

Figure 7: Map of soil types found on the Costa property.



Vegetation

When dramatic changes occur to riparian vegetation, a resulting change in stream stability may be noticed. This can be attributed to the reciprocal nature of stream morphology influencing riparian vegetation and vegetation influencing morphology.

Existing Vegetation: During site visits the following vegetation were identified on the Costa property: sugar maple, red maple, striped maple, hornbeam, paper birch, sycamore, white pine, elderberry, winterberry, and poplar. Additional species identified on the adjacent opposite bank property are: red oak, gray birch, and black cherry.

Vegetation Potential: Unfortunately, no vegetation map exists for Warner Creek at this time. As a result, it is recommended that surrounding vegetation be used as a guide for vegetation establishment, especially the open wetland atop the hillslope.

For the "C" stream type, vegetation has a very high influence on stability. Planting native tree and shrub species that thrive in the Ashokan basin will contribute to stream and bank stability through the development of dense root systems.

Invasive Species[iii]: A number of invasive, non-native species were observed during site visits to the Sammet property. Multiflora rose (*Rosa multiflora*) and Japanese barberry (*Berberis thunbergii*) dominate the understory of the floodplain forest. These species, if left unchecked, have the potential to threaten vegetation restoration activities.

Figure 8: Forested floodplain on right bank west of Costa property. 2014.

Past Intervention and Concerns

Site Visit History

The property owner, John Costa, was approached by the Ashokan Stream Management Program in 2010 in regards to extreme erosion occurring on his property. Since that time, a number of site visits have occurred to document the changing conditions and to evaluate restoration potential.

Immediately following Tropical Storm Irene funding became available to construct a restoration project on the Costa's property. The restoration funding that was available was unable to pay for vegetation improvements. The Catskill Streams Buffer Initiative stepped in and worked with the landowner and project engineer to ensure that the implemented stream restoration project adequately addressed streamside vegetation.

Landowner Issues/Concerns

The Landowner's primary concern was stabilization of their eroding bank through the use of vegetation native to the Catskill region of New York State. Secondary, the landowner wished to return the property to pre-construction levels of vegetation and appearance. The engineer's main concern was to install and use vegetation throughout the project that would work with the stream process that is occurring at the project site.

Past Property Maintenance

Mowing and Cutting: No mowing had occurred adjacent to the creek prior to the restoration project in 2013. A two-track road was apparent on satellite imagery prior to construction but had little influence on vegetation.

Plantings: There was no evidence of previous plantings on the site. The portion of this parcel where project activities took place were largely undeveloped.

Figure 9: Aerial image of Silver Hollow Road and Costa property post Irene, September 2011.

BMP Recommendations and Implementation

The Best Management Practices (BMP's) identified in this plan are tools, techniques and practices to improve riparian buffer management and help mitigate the potentially damaging effects of periodic flooding and negative upland influences on the stream and its banks. Implementation and use of these BMP's will help achieve the goals identified by the landowner as well as contribute to the overall health of the natural environment found on the property. Proper riparian management can have a lasting effect. Streams with a healthy riparian buffer are more stable and resilient than those without.

The Best Management Practices identified in this plan can be implemented individually or in any combination depending on time and funding. The Ashokan Watershed Stream Management Program strongly encourages the implementation of **ALL** recommended BMP's.

General BMP's

Use of Native Plant Species: A central theme of the CSBI program is the use of native plant species for restoration projects. Native plants are adapted to the regional climate and physical conditions and offer a more natural habitat for wildlife species. Once established, native plants typically require less maintenance.

Control of Invasive Species: Invasive plants can threaten the success of restoration efforts and as such care must be taken in their control. Control can be achieved through manual, mechanical and/or chemical means and should include the establishment of native species once the invasive plant is controlled.

Toe/Bank Zone Management: As a result of regular disturbance associated with flooding, the toe (or bottom of streambank) and bank zones (Figure 10) are especially susceptible to erosion from vegetation loss. It is important to protect these areas by limiting human disturbance to these zones. The toe and bank zone should be protected from vegetation removal, livestock access, improper access paths, etc.

The Three-Zone Riparian Forest Buffer: The diagram (Figure 11) on the following page provides good general guidelines for how to effectively manage for a healthy riparian buffer that provides a number of benefits to not only the landowner but also the stream itself.

Management of Bank Zone Leaning Trees: As trees become undercut through bank erosion they begin to cantilever out over the stream. At some point, the tree will dislodge from the bank and potentially take a large section of streambank with it. Trees that pose a threat to bank stability should be cut near ground level with their roots left intact to help provide structure and stability to the streambank.

Figure 10: Stylized drawing of vegetation zones relative to water levels.

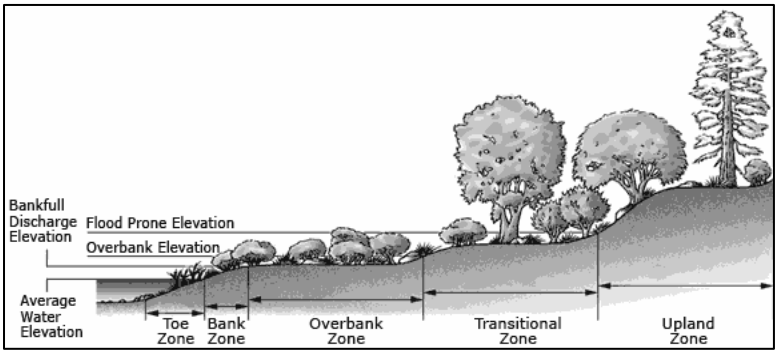
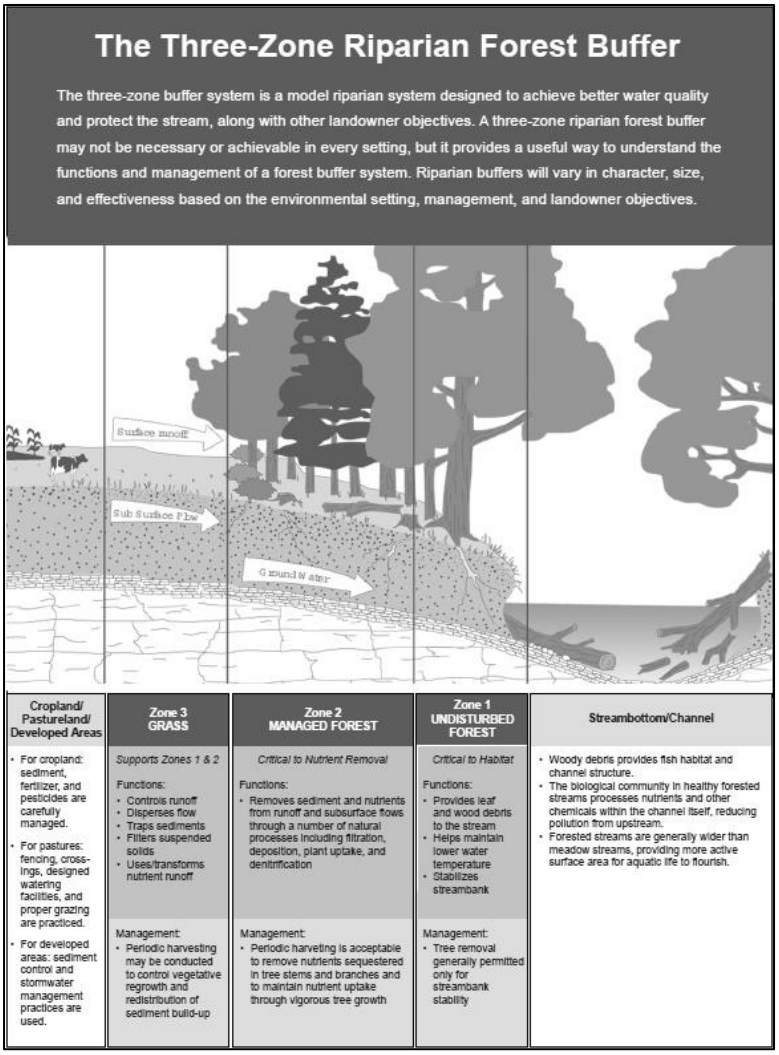


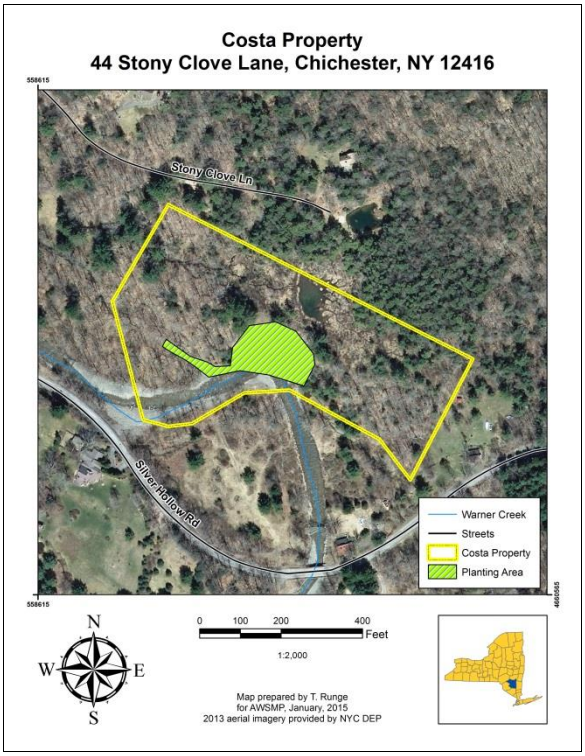
Figure 11: The three-zone riparian buffer.



Restoration Planting

Project Site Overview: The project site is located near the center of the property. The site involved 200 feet of streambank and ranged from 15 to 130 feet wide. Total area is approximately 0.60 acres or 25,980 square feet.

Figure 12: Costa project site.



Project Soil Type: The project site soil type is identified as Tunkhannock gravelly loam, rolling (TkC) and Barbour loam (Ba) and is described and discussed on page 10 under the Soils heading.

Planting Plan: The main goal of the planting plan, presented in the appendix, is to re-establish vegetation along the post-restoration work area. The vegetation, once established should help to stabilize the area and provide additional riparian functions to Warner Creek.

The closed floodplain forest adjacent the project site can and should be used as a reference when determining what species to plant. This will help to insure the visual integrity of the site as the planted material matures. Also, it provides a good indicator of what species are successful given the sites climatic and physical characteristics.

Vegetative community succession is also an important consideration, with the overall goal of establishing a closed floodplain forest that has a healthy over- and under-story. Overtime we suspect the hill-slope to be dominated by a pine forest based on the seed source at the top of the slope in the existing and mature white pines.

Bioengineering: To address bank erosion and unstable soils along your streambank a number of live stakes of willow were installed in your section. Willow provides excellent rooting strength and prefers growing lower on the bank where it can remain wet throughout the growing season. This area, known as the toe of a bank is the most susceptible to erosion and so willow stakes should provide additional protection, if they can become established.

Riparian Buffer Maintenance

This section is intended to help the landowner maintain the vigor of riparian areas as well as the restoration planting. By keeping vegetation healthy, the landowner is ensuring that the vegetation functions effectively to keep streambanks stable and enhance the quality of habitat.

As a participant in the Catskill Streams Buffer Initiative, the Ashokan Watershed Stream Management Program requests that landowners take responsibility in monitoring the general condition of the vegetation and to report any problems to the AWSMP office at (845) 688-3047. This will allow us to quickly

identify and repair any unforeseen problems and address any other potential issues.

Mowing: No mowing should be conducted within the project site.

A key of a healthy riparian buffer is the establishment of healthy and robust root systems. Mowing can cause stunted root development or potentially kill vegetation.

Mulching: Mulching is encouraged and can increase the success of planted vegetation.

Mulching around seedlings helps to maintain soil moisture as well as decrease competition from surrounding weedy species. Bark mulch should be spread around all trees and shrubs and replaced as necessary.

Fertilizer: Fertilization is not required.

It is not necessary to fertilize planted materials. The potted planting materials that were used as part of the planting plan were fertilized at the nursery. Landowner applications of fertilizers could complicate monitoring efforts and potentially damage vegetation. There is also the potential for fertilizers to leach into waterways which can have a negative impact on water quality.

Yard Waste: Debris should not be dumped in the project site.

Yard waste and other debris dumped along streambanks could kill vegetation and lead to bank instability. Care should be taken to properly dispose of yard waste, including grass clippings outside the riparian area.

Future Activities and Monitoring

The Ashokan Watershed Stream Management Program (AWSMP) is committed to ensuring the success of this project. To that end, AWSMP will continue to monitor the success of the restoration planting in the project area for 5 years after installation. These monitoring efforts are an important component of an adaptive management plan and will be used to guide future management decisions.

AWSMP employees will continue to survey both vegetation condition and physical site characteristics. They will also replace vegetation as needed. The project site will also be reviewed on an ongoing basis to identify if additional planting needs and/or other stabilization techniques are necessary or beneficial.

In August 2014 staff from the AWSMP visited the project site to evaluate vegetation growth and vigor along the site. Results are presented in the appendix. Overall most trees and shrubs that were installed were growing.

Staff will visit the site every two years to measure the plants and ensure that the project is performing as intended and meeting the original goals and objectives.

Changes/Modifications to this RCMP

This guide contains recommendations to be followed by current and future owners of the parcels identified in the landowner agreement. The recommendations are made in an effort to protect property from the hazards that accompany unstable stream conditions. Should you, as the landowner, or AWSMP find that conditions warrant an alteration to the vegetation plan or the management strategy of this document, AWSMP will work with the landowner to correct the conditions.

Bibliography

Frumhoff, P. e. (2006). *Climate Change in the U.S. Northeast: A Report of the Northeast Climate Impacts Assessment.* Cambridge, MA: Union of Concerned Scientists.

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Rosgen, D. L. (1994). *A classification of natural rivers.* Elsevier Science B. V.

End Notes

[i] **Geomorphic processes:** The physical and chemical interactions between the Earth's surface and the natural forces acting upon it to produce landforms. The processes are determined by natural environmental variables such as geology, climate and vegetation.

[ii] **Bed Form:** Arrangement of sediment by flowing water into discernable features.

[iii] **Invasive species:** A plant that has populations that are increasing in density or spatial extent beyond their natural range.

Appendix

Final Planting Plan – Costa, John (Installed November 7-15, 2013)

Right Bank Planting – Total Installed

Shrubs	
Button Bush	55
Elderberry	37
Silky Dogwood	40
Meadowsweet	20
Witch-Hazel	40
Eastern Ninebark	40
Sand Cherry	40
Pussy Willow	37
Winterberry	57

Trees	
Chokeberry	10
Red Maple	25
Hornbeam	40
Yellow Birch	30
Sycamore	15
Poplar	10
White Pine	5
Red Oak	5

Right Bank Planting

Existing Species: Sugar Maple, Red Maple, Ironwood, Paper Birch, White Pine, Sycamore, Striped Maple, Poplar, Hornbeam, Elderberry, Winterberry, Hemlock

Planting Plan: *7 foot spacing*
506 plants (72% shrubs & 28% trees)
366 shrubs
140 trees

Proposed Species:

Shrubs: Button Bush, American Elderberry, Silky Dogwood, Meadowsweet, Witch-Hazel, Eastern Ninebark, Sand Cherry, pussy willow, winterberry

Trees: Choke Berry, Red Maple, American Hornbeam, Yellow Birch, Sycamore, Poplar, Gray Birch, Paper Birch, White Pine, Red Oak

Drought Tolerance

Of nursery plants, medium tolerance:

- Button Bush (medium to high)
- Gray Dogwood
- American Elderberry
- Red Maple
- Sweet Birch
- Gray Birch
- Eastern Cottonwood
- White Oak

Of nursery plants, low tolerance:

- Silky Dogwood
- Common Winterberry
- White Meadowsweet
- Silver Maple
- Speckled Alder
- Hazel Alder
- Paper Birch
- American Hornbeam
- Red Oak
- Cedar
- Hemlock

Of nursery plants, no drought tolerance:

- White Pine

Shade Tolerance

Of nursery plants, most tolerant of shade:

- Button Bush
- Gray Dogwood
- Hornbeam
- Hemlock

Of nursery plants, intermediate tolerance of shade:

- Silky Dogwood
- Winterberry
- Meadowsweet
- Red Maple
- Silver Maple
- Speckled Alder
- Gray Birch
- White Pine
- Sycamore
- White Oak
- Red Oak
- Cedar

Of nursery plants, not tolerant of shade:

- Elderberry
- Hazel Alder
- Sweet Birch
- Paper Birch
- Cottonwood

CSBI

Monitoring

Date: 08/14/2014 → Should have been plot #3

Site: WARNER 5 - PLOT 2 (Hillslope)

Photos: Cam #1: 5(N), 6(E), 7(S), 8(W) START N° readings = 26.3 ft

Condition: *1 = very poor, 2 = poor, 3 = fair, 4 = good, 5 = very good, 6 = excellent*

Predation: *1 = mild, 2 = moderate, 3 = severe*

Natural Regeneration:

Page: 1/2

clover grass, Jewlweed

Plant #/Species	Dead	Height	Diameter	Condition	Predation	Notes
1- PLOT		1.3 ft	1.9 ft	~~6~~	1	Browse
2- ILVE		1.5	0.9	6	1/NA	Minor insect
3- COAM2		1.3	0.6	3	2	Browse / All stems
4- ILVE		2.1 ft	0.6 ft	~~6~~ 4	2	Browse deer all stems
5- COSE16		2.8	1.7	4	2	deer Browse
6- CEOC2		1.8	1.6	6	1	Insect damage on Few leaves
~~7- CEOC2~~		0	0.6			
7- SANIC4		1.9	1.2	4	2	heavy ~~browse~~
8- CEOC2		1.6	0.6	6	1/NA	Awesome !!
9- SPAL2		2.1	0.8	5	1	Browse
10- HAVI4		0.7	0.6	5	1	Insect, leaf damage
11- PHAP		1.4	1.1	5	1	Insect damage / minor Browse
12- COAM2		3.5	1.7	3	2	Browse
13- COSE16		2.2	0.1	3	2	Heavy Browse
14- SADI		6.4	2.7	5	1	Leafs Missing
15- HAVI4		1.5	1.0	3	1	Browning leaves / insect
16- COSE16		1.7	0.4	4	1	Browse
17- SADI		7.3	1.6	6	1	Missing some leaves
18- SADI		8.5	1.9	6	1	Insect damage
19- PLOC		2.3	0.3	5	1	Yellow leaves
20- SADI		6.3	2.8	6	1	Browse
21- COAM2		1.7	1.0	3	2	Heavy Browse / Insect
22- PODE3	X					
23- SADI		6.5	0.9	6	1/NA	Looking good

buttonbush	CEOC2
silky dogwood	COAM2
gray dogwood	CORA6
redosier dogw	COSE16
winterberry	ILVE
elderberry	SANIC4
meadowsweet	SPAL2
red maple	ACRU
silver maple	ACSA2
sugar maple	ACSA3
speckled alder	ALINR
hazel alder	ALSE2
sweet birch	BELE
paper birch	BEPA
gray birch	BEPO
hornbeam	CACA18
white pine	PIST
sycamore	PLOC
cottonwood	PODE3
white oak	QUAL
red oak	QURU
cedar arborvita	THOC2
hemlock	TSCA

100% ground cover

Lots of Clover, Sedge, ~~Kentucky~~ Crown Vetch

ruler in tenths (ft)

CSBI

Monitoring

Date: 08/14/2014

Site: Warner Creek - Site 5 - Plot # 2 (hillslope) → Should have been plot #3

Photos:

Condition: *1 = very poor, 2 = poor, 3 = fair, 4 = good, 5 = very good, 6 = excellent*

Predation: *1 = mild, 2 = moderate, 3 = severe*

Natural Regeneration:

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Plant #/Species	Dead	Height	Diameter	Condition	Predation	Notes
24/SADI		7.3 ft	1.6 ft	6	1/N/A	Insect damage
25 SADI		5.1	2.6	5	1/NA	leaning out of hole
26-HAVI4		2.7	0.6	4	1	Leaf Scorch
27-HAVI4		1.6 ft	1.6 ft	5	1	little browse, little insect damage
28-COAM2		1.7 ft	2.7 ft	5	1	some red/brown spotting, browse, lots of short stems with dense leaves
29-HAVI4		1.7 ft	0.9 ft	4	1	Insect damage, minor discoloration minor browse
30-HAVI4		2.7 ft	1.8 ft	4	1	some yellowed leaves insect damage
31-HAVI4		1.1 ft	1.1 ft	5	1	brown spotting, browse, minor insect damage
32-HAVI4		1.35 ft	1.3 ft	5	1	minor insect damage, minor browning, browse
33-HAVI4		1.4 ft	1.0 ft	5	1	browse, minor discoloration
34-CEOC2		1.3 ft	0.9 ft	4	1	insect damage, dead on end of 1 stem
35-HAVI4		1.3 ft	1.1 ft	5	1	insect damage, minor browse, some leaf discoloration
36-HAVI4		1.5 ft	1.2 ft	4	1	some leaf spotting, heavy browse, minor insect damage
37-BEAL2		7.2 ft	0.5"	4	1	insect damage, browse on lower stems
38-CEOC2		2.1 ft	0.9 ft	5	1/N/A	very minor spotting
39-CEOC2		1.8 ft	1.5 ft	6	1/N/A	very minor discoloration, very minor browse
40-ILVE		1.9 ft	0.9 ft	4	1	green berries, some discoloration of leaves, browse

buttonbush	CEOC2
silky dogwood	COAM2
gray dogwood	CORA6
redosier dogw	COSE16
winterberry	ILVE
elderberry	SANIC4
meadowsweet	SPAL2
red maple	ACRU
silver maple	ACSA2
sugar maple	ACSA3
speckled alder	ALINR
hazel alder	ALSE2
sweet birch	BELE
paper birch	BEPA
gray birch	BEPO
hornbeam	CACA18
white pine	PIST
sycamore	PLOC
cottonwood	PODE3
white oak	QUAL
red oak	QURU
cedar arborvita	THOC2
hemlock	TSCA

CSBI

Monitoring

radius = 11.8 ft

Date: Aug 15

Site: WARNER 5 - PLOT 4 (DS RB) FT

Photos: 844(W) 843(S) 842(E) 841(N)

Condition: *1 = very poor, 2 = poor, 3 = fair, 4 = good, 5 = very good, 6 = excellent* 90% ground cover

Predation: *1 = mild, 2 = moderate, 3 = severe*

Natural Regeneration: Birch / Red Maple;

ground cover, clover, contractor grass, rye, orchard grass, sour orange, golden rod

11.8' PLOT SIZE

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Plant #/Species	Dead	Height	Diameter	Condition	Predation	Notes
1- SANIC4		2.1ft	1.5ft	3	2	BROWSE / Dead orig stem
2- PLOC		1.5ft	0.2in	4	1	dead top
3- CACA18		0.5ft	0.2"	2	1	Browse - dead main stem
4- ILVE		2.1ft	0.8ft	4	1	Browse
5- CACA18		2.25ft	0.4"	3	1	Insect / Browse
6- PLOC		3.6	0.6"	6	1/NA	Excellent Growth
7- BEAL2		6.0	0.4"	4	2	Browse / insect
8- ACRU		2.4	0.6"	2	1	dead Trunk - some New growth
9- ACRU	X					
10- ILVE		2.3	1.1ft	3	2	Browse
11- PIST		2.0	0.5"	4	1/NA	SMALL Tree
12- ACRU		1.4	0.4"	3	2	Browse
13- CACA18		1.8	0.4"	4	2	TOP Browse / Insect damage

buttonbush	CEOC2
silky dogwood	COAM2
gray dogwood	CORA6
redosier dogwo	COSE16
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elderberry	SANIC4
meadowsweet	SPAL2
red maple	ACRU
silver maple	ACSA2
sugar maple	ACSA3
speckled alder	ALINR
hazel alder	ALSE2
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gray birch	BEPO
hornbeam	CACA18
white pine	PIST
sycamore	PLOC
cottonwood	PODE3
white oak	QUAL
red oak	QURU
cedar arborvita	THOC2
hemlock	TSCA

colts foot