Chapter 5
Implementation

Introduction

The previous chapters in this plan provided an introduction, a look at the benefits of greenways and open space, an overview of the planning process, the vision statement and goals, an analysis of key trends, the county's existing and expected future conditions, an inventory of county resources and opportunities, and the recommended greenway and open space framework. This chapter presents a series of strategies and actions that, when completed, will implement the greenway and open space framework and the recommendations in this document.

Creating the plan is only an initial step toward the long-range goal of seeing the ideas materialize into real projects that carry forth the vision to preserve, connect, and enjoy greenway and open space resources. A dedicated and concerted effort will be needed among multiple partners over the next several decades to advance the priorities that have been identified.

The implementation structure presented here is a multi-faceted approach that relies on a variety of concurrent approaches, such as voluntary land conservation, land use planning, public policy, and education and outreach among others to preserve agricultural land, protect important open space, and to develop greenways, parks, and trails.

Implementation Strategies

The implementation strategies are organized into tables by category and each table includes a brief description of the recommended action, possible partners, cost range, potential funding, and timing of the priority. The categories are: Conservation Measures; Education and Outreach; Land Preservation; Parks and Recreation and Trails & Non-Motorized Transportation. Under the Partners heading is a list of agencies, organizations and others that could work together to achieve the desired outcome. Although this was a county-led plan, many of the implementation priorities are dependent on the involvement and cooperation of non-county entities including municipalities, private landowners, state agencies, land trusts, and others. In fact, for many actions, the county is not considered a critical lead partner.

Cost estimates for implementation strategies can be wide-ranging and are intended to serve as a starting point for project evaluation. Some strategies have little or no cost beyond the administrative time of the responsible entity while others will require a more substantial infusion of funding. For planning and comparison purposes, a cost range using one ($) to five ($$$$$) dollar signs has been presented in the tables. Using this method, the values are as follows:

$ < $50,000

$$ = $50,000 to $100,000

$$$ = $100,000 to $500,000

$$$$ = $500,000 to $1,000,000

$$$$$ > $1,000,000

More refined costs will be developed through feasibility studies or other pre-design work as a particular project is selected for advancement (which could be a decade or more from now for some tasks). Table 1 presents generalized costs that were used as a basis for estimates in this plan.

Table 1. Generalized Cost of Greenway & Open Space Implementation

Implementation Action	Estimated Cost
Farmland Preservation Easement	$2,500/acre
Conservation Easement	$0 to $1,000/acre
Conservation Land Acquisition	$10,000/acre
Public Park Land Acquisition	$10,000 - $35,000/acre
Riparian Buffer Planting	$2,500/acre
Perpetual Riparian Buffer Easement	$6,500/acre
10' wide trail to PennDOT standards	$400,000/mile
10' wide trail other	$75,000/mile
Trail Engineering Design-PennDOT	$40,000/mile
Trail Engineering Design non-PennDOT	$25,000/mile
Feasibility Studies	$50,000
Park Master Plan	$50,000
Construct canoe/kayak launch area	$75,000
Zoning Ordinance Amendment	$5,000

For additional perspective, the first phase of the Buffalo Valley Rail Trail (BVRT) cost nearly $3,000,000 to construct nine miles to PennDOT standards in 2011. Land for a conservation acquisition in 2015 by the Merrill W. Linn Conservancy was appraised at approximately $12,000 an acre for developable forest land without public utilities and no zoning restrictions; however, real estate costs will vary across the county and are unique to the location and the qualities of each individual property.

Funding is always a moving target and is often dependent upon the economic, fiscal and political climate of the Commonwealth, the region, and county. For greenways, land conservation, open space, parks, and trails there is more state funding available today than at any time in the last 20 years to support these initiatives. In the implementation tables an attempt has been made to identify potential funding sources for the projects listed even though this can change quickly as new initiatives are launched and existing programs are reduced or eliminated. Also the funding opportunities identified do not represent an exhaustive list and other possible resources should be sought.

A funding staple has always been the Department of Conservation and Natural Resources (DCNR) Community Partnerships Grant Program which funds up to 50% of eligible project costs for certain pre-construction (plans, studies, and design) and development activities related to conservation, greenways, trails, and parks. DCNR funding has been obtained by municipalities, the county, and other organizations to support park rehabilitation, playground installation, youth sports fields, feasibility studies, trail development, land acquisition, and engineering design.

A newer program in recent years is the Commonwealth Financing Authority's Greenway and Trail Program, which is administered through the Department of Community and Economic Development (DCED). With this funding source, DCED will cover up to 85% of eligible costs for a maximum total award of $250,000. The Merrill W. Linn Conservancy was successful in accessing this grant to cover a portion of the costs on a recent land acquisition in Union Township.

Also at the state level, the Pennsylvania Department of Transportation (PennDOT) awards nearly $30 million of multi-modal transportation funding annually through Act 89 that can be used for trail projects, but a 30% local match is required. This is in addition to the Federal Transportation Alternatives Program (TAP) which is limited to alternative transportation. The second phase of the BVRT successfully accessed over $500,000 in TAP funding through PennDOT and the SEDA-COG MPO. In addition to PennDOT, another $30 million in multi-modal funding is administered by DCED and also requires a 30% match.

For farmland conservation, the Pennsylvania Department of Agriculture (PDA) has been the primary source of funding for the Agricultural Land Preservation Program, which is currently

matched annually with $125,000 of county funds. The Gregg Township Board of Supervisors also contributes $5,000 a year to the county program and is the only municipality to do so. To date, PDA has contributed millions of dollars towards preserving more than 8,000 acres of farmland in Union County.

Finally, Union County receives a limited amount of Act 13 revenue through the Marcellus Legacy Fund that, by law, must be used for greenway, trails and open space related purposes. To date, the county has reserved the use of these funds to assist partners with taking on projects that do create a lasting legacy in the community, such as new extensions to the BVRT and the protection of Shikellamy Bluffs.

It is anticipated that grants from the agencies listed above and from private foundations will be sought and used to the greatest extent practical for implementing the recommendations in this plan. In limited instances, different funding streams can be aligned to cover 100% of project costs, but this is the exception rather than the norm and more times than not local match must be incurred. There are also some tasks that simply may not be grant eligible or are not competitive enough so the funding responsibility must be completely local.

The last column in the table is the timing of each implementation task presented in terms of whether it is viewed as a short, medium, or long-term endeavor. For the purposes of this plan, a short-term ranking suggests that the strategy be implemented in the first (1st) to fifth (5th) year following adoption of the plan.

Medium-term strategies then would be implemented in the sixth (6th) to tenth (10th) year, and long-term projects are expected to happen ten (10) or more years out. Timing of a strategy should not be confused with the priority status. It is possible that a recommendation is an extremely high priority, but the timing of completion is listed as long-term. Prioritization will be addressed later in this Chapter.

Of the 54 implementation strategies listed, 12 are short term, 18 medium, and 24 long-term. It should also be noted that this is a general guide as certain tasks may move on this continuum, depending on challenges that arise or due to new opportunities that are presented. For example, protection of the Shikellamy Bluffs has long been a high conservation priority of the Merrill W. Linn Conservancy and the county that emerged from the 1993 Natural Areas Inventory. It is also a priority in this plan, but due to new and unexpected circumstances a significant portion of the remaining unprotected bluffs area was conserved while the plan was being developed. The other takeaway message is that long-term can literally be 10 to 20 years or more, as was the case here and also with the BVRT which took 10 years to go from an idea to having the first phase open for public use.

Note that a number of potential partners and funding sources are abbreviated in the implementation tables. These include:

- BCWA (Buffalo Creek Watershed Alliance)
- BVRA (Buffalo Valley Recreation Authority)
- BOF - Bureau of Forestry
- CSWOA Central Susquehanna Woodland Owners Association)
- LASD (Lewisburg Area School District)
- LDP (Lewisburg Downtown Partnership)
- LNC (Lewisburg Neighborhoods Corporation)
- LPCWA (Lower Penns Creek Watershed Association)
- MHRA (Mifflinburg Heritage and Revitalization Association)
- MLC (Merrill Linn Conservancy)
- NCPC (North Central Pennsylvania Conservancy)
- NPS (National Park Service)
- NRCS (Natural Resources Conservation Services)
- PA DCED (PA Department of Community and Economic Development)
- PA DCNR (PA Department of Conservation and Natural Resources)
- PA DEP (PA Department of Environmental Protection)
- PGC (Pennsylvania Game Commission)
- PLTA (Pennsylvania Land Trust Alliance)
- PSE (Penn State Extension)
- SEDA COG MPO (Susquehanna Economic Development Association Council of Governments Metropolitan Planning Organization)
- SGP (Susquehanna Greenway Partnership)
- UCALPB (Union County Agriculture Land Preservation Board)
- UCCD (Union County Conservation District)
- UCHS (Union County Historical Society)
- USFWS (United States Fish and Wildlife Service)
- LOWV - WREN (League of Women Voters - Water Resources Education Network)

No.	Implementation Action	Partners	Cost	Potential Funding	Timing
Conservation Measures					
C-1	Provide incentives for compact development, such as Traditional Neighborhood Development and open space conservation in new developments	Municipalities	$	Municipalities	M
C-2	Permanently protect 250 miles of existing riparian buffers using easements with a priority on headwater areas and impaired streams	Conservation District, Watershed Associations, DEP, Linn Conservancy, NRCS, Farm Bureau, Landowners	$$$$$	DEP	L
C-3	Install 200 miles of riparian forested buffers along the Susquehanna River and county streams, particularly impaired reaches, to improve water quality	Conservation District, Linn Conservancy, DEP, Watershed Associations, Farm Bureau, NRCS, Landowners	$$$$$	DEP, DCNR, NRCS	L
C-4	Permanently protect 200 miles of newly-installed riparian forest buffers through conservation easement	Conservation District, Watershed Associations, DEP, Linn Conservancy, NRCS, Farm Bureau, Landowners	$$$$$	DEP	L
C-5	Protect and enhance wildlife habitat throughout the county for game and non-game species	PA Game Commission, PA Fish Commission, Conservation District, NRCS, Landowners	$$	Game Commission, Fish Commission, NRCS, DEP	M
C-6	Use Official Maps as per the PA Municipal Planning Code to identify conservation priorities and trail routes	Municipalities, Union County, DCNR, Linn Conservancy	$	Municipalities, Union County	M
C-7	Use planters and other measures to green downtown areas and existing developments	Lewisburg Downtown Partnership (LDP), Mifflinburg Heritage & Revitalization Association (MHRA)	$$$	LDP, MHRA, Private Donors	M
C-8	Revise minimum parking standards to reduce impervious coverage and to create more open space within non-residential developments	Municipalities, Union County, Watershed Associations, Conservation District	$	Union County	M
Education and Outreach					
E-1	Educate the public on proper bicycling and walking rules	Media, Local Police Departments, BVRA, School Districts	$	BVRA, Police Departments, Schools	S
E-2	Help landowners better understand best management practices for improved water quality (i.e. chemical application, erosion, vegetation management)	Linn Conservancy, Conservation District, NRCS, Media, Watershed Associations, DEP	$	Conservation District, DEP, League of Women Voters - WREN	S
E-3	Establish an outdoor mentor program for urban residents	Linn Conservancy, Conservation District, Watershed Associations	$	Conservation District, Linn Conservancy	M
E-4	Develop a “Council of Conservation” to act as a clearinghouse/coordinator of greenway, land conservation, and open space efforts	Linn Conservancy, Conservation District, Watershed Associations, NRCS, DEP	$	Conservation District, Linn Conservancy	M

No.	Implementation Action	Partners	Cost	Potential Funding	Timing
Education Outreach (con't)					
E-5	Educate the public on the benefits of greenways and open space	Linn Conservancy, Conservation District, Watershed Associations, Planning Commission, Bucknell	$	Conservation District, DEP, Linn Conservancy	S
E-6	Provide cultural and historic interpretation including the pre-Colonial period	Union County Historical Society (UCHS), Heritage Associations, Museums, Bucknell	$	UCHS, Private Foundations	S
E-7	Publicize resources such as technical and financial resources that are available to landowners and the public for conservation and preservation	Conservation District, NRCS, Linn Conservancy, DEP, DCNR, Service Forester, Watershed Associations, UCHS	$	Conservation District, Linn conservancy, DEP	S
E-8	Improve landowner understanding of private land conservation options, such as conservation easements and other benefits.	Linn Conservancy, Pennsylvania Land Trust Alliance	$	Linn Conservancy	S
Land Preservation					
L-1	Amend local ordinances to establish conservation goals (i.e. sliding scale for forest preservation)	Planning Commissions, Municipalities, Conservation District	$	Municipalities	S
L-2	Protect Shikellamy Bluffs and cliff community from alteration and development	Linn Conservancy, Landowners, Union County, DCNR	$$$$$	DCNR, DCED, Union County, Land Trusts	S
L-3	Permanently protect the 1.5 miles of riverfront land in Great Stream Commons	Union County, Linn Conservancy	$	Union County	S
L-4	Invest in agriculture and viewshed protection in designated priority conservation areas	Union County Agricultural Land Preservation Board, Linn Conservancy	$$$$$	DCED, DCNR, Union County, Land Trusts	L
L-5	Create permanent fund for land preservation and conservation efforts	Union County, Linn Conservancy. Conservation District	$$$$$	Union County, DCED, DCNR	L
L-6	Encourage voluntary land conservation through the use of conservation easements	Linn Conservancy, Union County Agricultural Land Preservation Board	$	Linn Conservancy	S
L-7	Establish a permanent and multi-purpose greenway along the West Branch Susquehanna River	SGP, Union County, Municipalities, DCNR	$$$$$	DCNR, DCED, Union County, Municipalities	S
L-8	Protect priority natural areas identified in the county Natural Heritage Inventory, by Linn Conservancy and this plan to create open space blocks and corridors	Linn Conservancy, DCNR	$$$	DCNR, DCED	L
L-9	Protect 50 acres +/- of floodplain, floodway, and wetlands next to Koons Easement in Mifflinburg	Linn Conservancy, DCNR, Landowners, US Fish and Wildlife Service (USFWS)	$$$	Linn Conservancy, DCNR, USFWS	L

No.	Implementation Action	Partners	Cost	Potential Funding	Timing
Land Preservation (con't)					
L-10	Make strategic additions to the State Forest and other public lands (e.g. PA American Water land near Spruce Run and along White Deer Creek)	Linn Consrvancy, DCNR, PA Game Commission (PGC)	$$$$$	DCNR, DCED, PGC	L
L-11	Protect open space along Penns Creek at New Berlin including outcroppings, George Long property, and spring	Linn Conservancy, New Berlin Borough	$$	Private Donors	M
Parks and Recreation					
P-1	Establish a community park in Allenwood at Columbia Avenue or south of SR 44 river bridge	Gregg Township, DCNR	$$	DCED, DCNR, Gregg Township	L
P-2	Determine feasibility of using existing public open space in East Buffalo Township for new parks	East Buffalo Township, BVRA, DCNR	$	BVRA, DCNR, East Buffalo Township	M
P-3	Develop a park master plan for the riverfront lands at Great Stream Commons	Union County, Gregg Township, DCNR	$$	DCNR, DCED, Union County	L
P-4	Develop park master plans where needed (i.e. Soldiers Park, East Buffalo pond area) and update existing community parks	Municipalities, DCNR, BVRA, Union County	$$$$$	DCNR, DCED	L
P-5	Develop formal river access at Great Stream Commons north of Allenwood	Union County, Warrior Run Community Corporation, Northcentral Conservancy, SCP	$$	DCNR, DCED, Union County	M
P-6	Implement Bull Run Greenway Plan	Lewisburg Borough, Lewisburg Neighborhoods Corp. (LNC), DCNR, Bucknell, USFWS	$$$$$	DCNR, DEP, DCED, USFWS	L
P-7	Develop greenways and trails that connect existing parks with neighborhoods to promote community health	Municipalities, BVRA, Evangelical Community Hospital	$$$$	DCNR, DCED, Municipalities	L
P-8	Establish fishing and strategic canoe/kayak access points on Penns Creek and the Susquehanna River	LPCWA, Landowners, Bureau of Forestry, Muncipalities, SGP	$$$	DCNR, NPS	M
P-9	Convert former New Berlin Elementary School property into a community park	New Berlin Borough, DCNR	$$$	DCNR, DCED, Municipalities, Union County	L
P-10	Add 110 acres of community park land in eastern and central Union County to reduce deficit under minimum national standards	Municipalities, BVRA, DCNR, Union County	$$$$$	DCNR, DCED, Municipalities, Union County	L

No.	Implementation Action	Partners	Cost	Potential Funding	Timing
Trails and Non-Motorized Transportation					
T-1	Buffalo Valley Rail Trail (BVRT) US 15 crossing as per the US 15 corridor study. Engineering design, permitting, and construction	Buffalo Valley Recreation Authority (BVRA), DCNR, PennDOT, Municipalities	$$$	DCNR, BVRA, PennDOT, DCED	M
T-2	Feasibility study of developing a multi-use trail from Allenwood Village to Montgomery Borough along river	Union County, Lycoming County, Susquehanna Greenway Partnership (SGP)	$	DCNR, Union & Lycoming Counties	S
T-3	Engineering, design and construction of Allenwood Village to Montgomery Borough multi-use riverfront trail	Union County, Lycoming County, SGP	$$$$	DCNR, PennDOT, DCED, Counties	L
T-4	Evaluate feasibility of extending BVRT west of Mifflinburg across SR 45 to Swengel Road	BVRA, Bucknell University, Mifflinburg Borough, Landowners	$	BVRA, Bucknell	S
T-5	Explore routes, both on-road and off-road for connecting the BVRT to the Cherry Run Trail	Union County, PennDOT, Municipalities	$	Union County	L
T-6	Engineering, design and construction of BVRT extension from 5th Street to the Susquehanna River in St. John's Street corridor	BVRA, Lewisburg Borough	$$$$$	BVRA, Lewisburg Borough, PennDOT, DCNR, DCED	L
T-7	Rehabilitate BVRT railroad bridge over the Susquehanna River to link with proposed SR 405 greenway and trail in Northumberland County	BVRA, SGP	$$$$$	BVRA, PennDOT, DCNR, DCED	L
T-8	Evaluate feasibility of creating a multi-use trail from Winfield Village to Northumberland Borough	Union County, Bucknell University, SCP	$	Union County, DCNR	L
T-9	Monitor potential for rail with trail or tail trail connecting BVRT in Lewisburg to Winfield Village	Union County, Lewisburg & BUffalo Creek Railroad, Bucknell University, SGP	$	Union County, DCNR, DCED, Private Donors	L
T-10	Plan for wider shoulders on state-designated bike routes	PennDOT, SEDA-COG MPO	$$$$$	PennDOT	M
T-11	Evaluate feasibility of improved pedestrian access on St. Anthony Street bridge as a safer link to Riverwoods and soccer complex along with riverwalk concept	Kelly Township, Lewisburg Borough, Riverwoods, Bucknell University, PennDOT	$	Riverwoods, Municipalities	M
T-12	Explore feasibility of connecting new Lewisburg High School to Linntown, Penn House Commons, BVRT, etc	Lewisburg Area School District (LASD), Kelly, Buffalo, and East Buffalo Townships, PennDOT	$	LASD, Municipalities	L
T-13	Create north/south connections to the BVRT (e.g. link to Koons Trail in Mifflinburg Borough)	BVRA, Municipalities, PennDOT	$$$	DCNR, DCED, PennDOT	L
T-14	Develop and implement a Penns Creek water trail and access plan	Lower Penns Creek Watershed Association (LPCWA), Bureau of Forestry, Landowners, Linn Conservancy	$$$	DCNR, LPCWA	M

No.	Implementation Action	Partners	Cost	Potential Funding	Timing
Trails and Non-Motorized Transportation (con't)					
T-15	Improve West Branch Susquehanna water trail infrastructure throughout the county	SGP, Land Trusts, DCNR	$$$	DCNR, DCED, National Park Service (NPS)	M
T-16	Determine feasibility with landowners the potential to reopen the Shamokin Mountain Trail	Landowners, Linn Conservancy, Union Township	$	Union County	M
T-17	Develop George Long Trail along Penns Creek frontage in New Berlin and Limestone Township	Landowners, New Berlin Borough, Linn Conservancy, DCNR, LPCWA	$$	Private Donors, New Berlin Borough, DCNR	M

Implementation Priorities

As previously noted, this plan includes 54 implementation strategies that have varying degrees of cost and difficulty of execution. Given the constraints on funding and staff resources at the county and among lead partners, it is beneficial to identify the highest priorities in the plan. Ranking a project as a high priority does not equate to immediate implementation. As part of the planning process, the project Steering Committee, using a ranking tool, was tasked with evaluating the level of priority for each of the 54 implementation strategies. The Steering Committee completed the ranking based on how important they felt the individual projects were, regardless of costs and other challenges that might actually impede implementation. The following list shows the highest priorities in each category of implementation strategies; however, it is worth noting that riparian buffers were the highest priority overall.

Conservation

- Permanently protect 250 miles of existing riparian buffers
- Install and protect 200 miles of additional riparian buffers
- Promote and incentivize TND and conservation development

Education and Outreach

- Help landowners with best management practices for water quality
- Improve landowner understanding of conservation easements
- Publicize technical and financial resources available to property owners for conservation

Land Preservation

- Protect the riverfront at the Great Stream Commons
- Encourage the use of conservation easements
- Agriculture and view shed protection in priority conservation areas

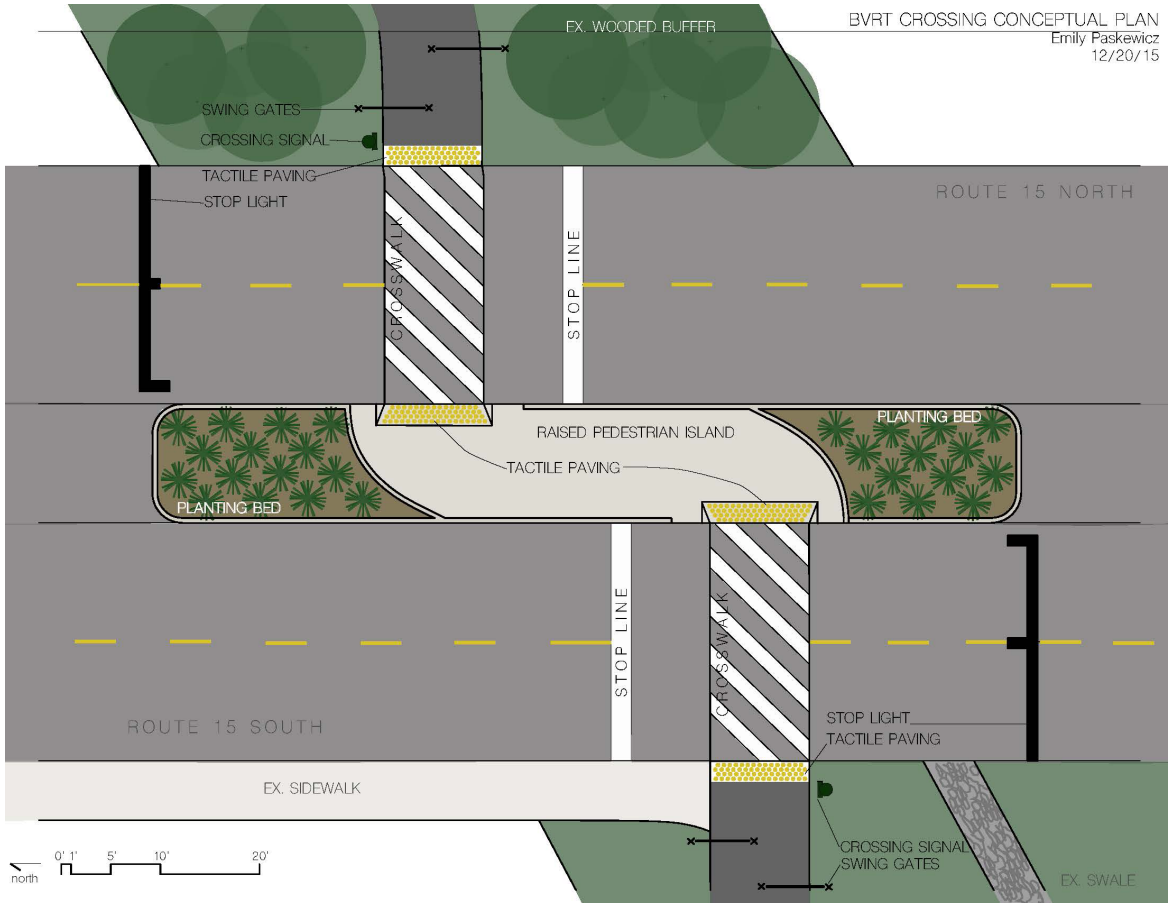
Parks and Recreation

- Develop formalized river access at Great Stream Commons
- Use greenways to connect parks and to promote community health
- Develop a park master plan for the riverfront lands at Great Stream Commons

Trails and Non-Motorized Transportation

- BVRT US 15 crossing (See Figure 1)
- BVRT westerly extension
- Allenwood to Montgomery trail

Figure 1. Schematic of US 15 Crossing of the Rail Trail



Implementation Tools

Given the number and diversity of implementation actions noted in this plan, and the investment needed to achieve them, a variety of tools will be needed by local governments, conservation organizations and landowners to achieve tangible results. Several of these tools have been highlighted in this section including land acquisition, conservation easements, effective zoning, the official map, mandatory dedication of open space, and education.

Land Acquisition

Land acquisition is exactly that; land is acquired through a negotiated sale or donation from a landowner and then is retained as a public park or natural area. It could also have an easement placed on it and be resold, although this is not typically done. Land acquisition is one of the most expensive forms of land conservation and is often reserved for extremely important properties and/or as a last resort when other conservation techniques have been ruled out. In most cases, the land is not donated and has to be purchased. In Union County, this approach is most often used by state agencies like the Pennsylvania Game Commission and the Department of Conservation and Natural Resources to add acreage to their inventory.

Recently the Merrill W. Linn Conservancy purchased 36 acres of forestland on Shikellamy Bluffs bordering the Shikellamy State Park Overlook. The acquisition of this high conservation priority property was made possible through local donations and two state grants. The land will be donated to the Commonwealth as an addition to the State Park. This was the first time the Conservancy has used this approach, which proved to be challenging due to the significant cost of the land and the timing of the grant revenues. An issue with land acquisition can be the sensitivity of elected officials with removing property from the tax rolls. Once the land is transferred into public ownership, it no longer generates property tax for the county, municipality, and school district.

Conservation Easement

The conservation easement, unlike land acquisition, leaves the land in private ownership. Conservation easements fall into two main types: purchased and donated. Historically in Union County, the Agricultural Land Preservation Program has been the only purchaser of

conservation easements through the statewide Purchase of Agricultural Conservation Easement (PACE) program. This program uses local matching funds to leverage state and federal funding to acquire the development rights and place a conservation easement on farmland. It uses a ranking system that gives preference to higher productivity soils and proximity to other protected lands.

The value of the easement is determined by comparing the development potential of the property to the value of the land with an easement in place. Most recently the cost to purchase an easement has been approximately $2,500 an acre.

The Union County Conservation District and Agricultural Land Preservation Board originally set a goal of preserving 40,000 acres in the county. As noted previously, 8,000 acres have been preserved using this technique.

At the current price per acre, it would take an additional $80 million to preserve the remaining 32,000 acres of the goal, not taking into account increasing future prices.

Just to purchase easements on the 17,000 acres of priority agricultural areas identified in this plan that are not under easement now would cost $42.5 million. While the easements are permanent and provide an infusion of cash to the landowner to reinvest into the agricultural operation, they are nonetheless costly from an implementation standpoint. The program has always proved more popular than funds available, leaving many landowners on a growing waiting list to have their easement purchased. The reality is many farms may never rank high enough to be selected.

Another option is the donated conservation easement, which can be granted to a qualified land trust, such as the Merrill W. Linn Conservancy, or to the Agricultural Land Preservation program. The Merrill W. Linn Conservancy has used this tool almost exclusively to permanently protect 1,440 acres of unique ecological habitat and farmland from development in a multi-county region. Since the easement is donated by the landowner, there are fewer upfront costs associated with this tool.

However, the property owner can potentially receive substantial Federal tax deduction benefits. In some cases, this might be worth more than if the landowner was actually paid for the easement. In order to maximize land conservation for greenway corridors and open space blocks, including priority agricultural areas, the donated easement will need to become a more prominent tool due to the value compared to the cost.

Effective Zoning

Effective zoning at the municipal level is another important conservation tool. Zoning is temporary, since it can be changed by a majority vote of the local governing body and is not permanent like an easement. However, agricultural and forest conservation zoning can protect large blocks of land from development while land trusts, landowners, and the farmland preservation program work to establish perpetual land protection. The key here is “effective” conservation zoning. Agricultural or forest preservation zoning district regulations that allow unlimited residential development on 1-acre lots is not considered effective as it will not protect those lands from uncontrolled housing development.

The Pennsylvania Department of Community and Economic Development (DCED) defines effective *agricultural zoning as zoning that limits the number of dwellings and sizes of lots for non-agricultural use to a true rural density, such as one dwelling unit per 20 acres*.[1] Eleven of Union County's 14 municipalities have zoning ordinances and the majority of townships have implemented a sliding scale form of agricultural zoning.

However, not all townships have implemented a "true rural density" in the agricultural and forest zoning districts. Many zoning ordinances permit development at much higher densities on forest land than in the agricultural areas. One exception is Gregg Township, which adopted a sliding scale for the forest conservation zoning district. In addition, some agricultural zones have 10-acre minimum lot sizes, which can result in farm fragmentation and large residential estate lots. It is recommended that townships consider ordinance criteria that result in a "true rural density" for both agricultural and forest conservation areas.

Traditional Neighborhood Development

Other ways municipalities can positively influence land conservation through the use of zoning is by permitting higher densities within designated growth areas and by allowing more compact Traditional Neighborhood Development (TND). By creating walkable and denser mixed-use developments that are attractive and inviting to people where they can enjoy convenient access to homes, shops, offices, schools, parks, and public facilities, there is the opportunity to reduce the demand and pressure to develop prime farmland and important conservation areas.

TND was recommended as a strategy for implementing municipal and the county comprehensive plans, but for the most part, has not been incorporated into municipal zoning ordinances. As a result, developers in the county seeking to be innovative and responsive to growing national trends for this style of community building would not be permitted to plan and construct walkable mixed-use neighborhoods, except, ironically, in the three municipalities that do not have zoning.

The Official Map

The official map is yet another land use tool authorized by Article IV of the Pennsylvania Municipalities Planning Code (PA MPC) that can facilitate greenway and open space implementation. This is perhaps one of the most underutilized and misunderstood of the planning options available, often confused with the zoning map. The official map is separate and distinct from the adopted zoning map and it does not divide a municipality into land use zones. Instead, it identifies geographical locations of future streets, parks, trails and other facilities. It can be used to reserve private land for future public use and to preserve farmland or open space.

The official map is accompanied by an ordinance and is a declaration by the governing body of a county or municipality of areas the community will eventually need for public purposes. By identifying the specific lands on which public projects are envisioned, the municipality is announcing its intent to acquire the land for municipal purposes prior to other development occurring. It should be made clear that an official map is not equal to eminent

domain. The official map serves more as a notice of reservation and intent and acts similarly to a "right of first refusal" to acquire the property. The local government may exercise or decline this right to acquire the property and is not bound to act because of the official map.

Although one might assume a high cost involved with acquiring lands on the official map, this is generally not the case. Typically what happens is the municipality and developer negotiate a mutually-agreed upon solution prior to, or as part of, the land development process. So, for example, the developer might build the street shown on the official map or donate an easement for a trail.

In Pennsylvania, more than 60 municipalities and one county have adopted an official map. In Union County, only New Berlin Borough has utilized this tool to date, but other municipalities and the county should explore the possibility of creating official maps for greenway and open space conservation. For more information on the official map, see PennDOT Publication 703.

Mandatory Dedication of Land

Another seldom used implementation mechanism in rural areas, authorized by Section 503 (11) of the PA MPC, is the mandatory dedication of land for recreation or payment of fees in lieu of which can be enacted through the local subdivision and land development ordinance. This can be used to require developers to set aside land for community parks and/or trails within new developments or alternatively allow them to pay what is essentially an impact fee.

One obstacle is that a municipality must have a formally adopted recreation plan in order for this to be done legally. Additionally, there has to be enough development occurring to make it worthwhile; in communities seeing very little growth it is often not worth it. As it stands now, only East Buffalo Township, Kelly Township and Lewisburg Borough could do this if they officially adopted their multi-municipal recreation plan that was done in 2008 and incorporated standards into their subdivision ordinances. Of these three, East Buffalo Township would likely benefit the most, given the potential for future residential growth. Therefore this does not appear to be a viable implementation tool at this time for the majority of the county municipalities.

Education in Conservation

Finally education has to play a role given its potential long-term value compared to delivery costs. However, if the past is any predictor of the future, education efforts alone will not be the answer. Education and voluntary participation in conservation programs have long been a major emphasis of state and county agencies and non-profit conservation organizations.

Unfortunately the results have been mixed. While some landowners have been willing to place properties under restrictive conservation easements, especially if compensated, the same cannot be said in terms of best management practices like riparian buffers to improve water quality. If future education and outreach efforts are to be successful, they will need to involve a diverse array of partners and be carefully calculated and tailored in order to deliver an effective and action inspiring message to intended audiences.

Long-Term Costs and Benefits

Plain and simple, a lot of money will be needed over the life of this plan and beyond to implement it. It is estimated that it could require over $50,000,000 for completing the majority of the 54 implementation strategies for land preservation, parks and recreation, trails, conservation measures, and education.[2] This after careful selection from a much larger list of potential projects that was considered based on the public input received.

Such a staggering figure in today's dollars, which will only increase with time and inflationary forces seems overwhelming considering all the non-open space and greenways needs that exist in our communities for roads, water and sewer infrastructure, and a variety of public services. Even over a 30-year period, this would equate to more than $1.6 million dollars per year in a county where the annual local contribution to these causes is typically less than 10% of that figure.

Is this fiscally responsible and balanced, given limitations on private and public funding available? There is also the cost of inaction, which is difficult to quantify, but can be equally or even more burdensome. By doing nothing, or not enough to make a difference, goals are not met and the proverbial can is kicked down the road for future generations to grapple with. This funding question and others will need to be answered by the citizenry and public officials in the years ahead.

The other cost factor not included above or in the list of strategies is that of long-term maintenance. Some actions, like conservation easements, which have monitoring requirements, have little to no ongoing maintenance costs. Others, like trails and new parks, require both annual routine maintenance and eventual major capital replacement at the end of the life cycle. A 2015 report by the Rails to Trails Conservancy on annual rail trail maintenance notes an average cost of $1,000 to $2,000 per mile, which mirrors the local experience with the BVRT where maintenance costs are averaging close to $2,000 per mile per year.[3]

Therefore, in addition to installation costs, every new mile of trail will carry an approximate cost of $2,000 per mile for ongoing maintenance. This means if 11 miles of a new Susquehanna Greenway trail are developed in Union County, with the balance in Northumberland County, $22,000 of additional maintenance needs would be created. This is just one example. Similarly-developed open space, like community parks, require an estimated $6,000 per acre each year for proper maintenance.[4] A new 10-acre community park could necessitate $60,000 in annual maintenance, although there are ways to design parks to be less maintenance intensive, which could reduce this amount by 75%. It should also be noted that there is no current entity established for managing and maintaining an expanded trail network though there have been suggestions that a county or regional organization be created to address these needs.

Overall on the surface, looking only at the costs, this paints a fairly bleak picture for issues that so many people get excited about and have a passion for. Fortunately grants and funding allocations will most likely soften the financial impact considerably to the point where the local dollars required to implement the non-recurring costs in the plan, while still significant, won't be quite as overwhelming. A million plus dollars a year is definitely not fiscally or politically sustainable at the local level today. However, this does raise an important question. What is realistic in terms of an annual local contribution to conservation, community parks, greenways and trails? Would $500,000 or $250,000 annually be acceptable to the taxpayers since $125,000 is already allocated for

agricultural land preservation? Would the citizenry support higher levels of investment?

Historically, in the United States, when local conservation ballot measures have gone to the voters to decide, nearly 75% have passed and 79% of measures have passed in Pennsylvania since 1988.[5] Yes, voters have typically chosen to impose higher fees and taxes on themselves for these initiatives. In response to the on-line survey that was posted for this plan, which was a limited sample size and self-selected, 75% of respondents supported paying $20 a year, while nearly 60% indicated they would pay $50 or more a year in support of greenways, open space, parks, trails, and related conservation. Using $20 per person per year would generate approximately $500,000 annually assuming there are 25,000 contributing adults in the county. This number excludes Bucknell University students, United States correctional inmates, nursing home residents, and children.

If $500,000 per year of local funds (county and municipal) were allocated to implementing this plan, and assuming grants could be secured for 50% of all the costs that have been identified, it would take 50 years to complete the majority of implementation actions.

If $250,000 of local annual funding is considered more reasonable, then full implementation would take a century. Neither of these two scenarios account for new projects and priorities emerging in the future or increased costs.

It is evident that moving forward with implementation will necessitate funding beyond current local levels, keeping in mind the strategies proposed are seen as the middle ground between doing nothing and an even more robust approach. In light of the projected dollar amount, are there ways to implement the plan at a reduced cost or should certain priorities be eliminated due to unaffordability? Looking at the implementation recommendations more closely, the higher cost items are agricultural land preservation, conservation measures like securing and installing riparian buffers, and community parks. Education and outreach is the lowest cost item, followed by trails.

One way to significantly reduce implementation costs is by more volunteerism on the part of property owners through the donation of conservation easements. If more people would participate because they believed it was the right thing to do, the savings to taxpayers would be tremendous since purchasing easements on farms is the highest implementation cost of this plan.

Similarly, if landowners were to allow riparian areas to revert to a more natural state, this would reduce the need for buffer planting. Riparian areas are resilient if given the space and time to recover. Alternatively, since targets for nutrient and sediment reductions within the Chesapeake Bay Watershed are not being met, perhaps water quality issues and buffer implementation could be more effectively and efficiently addressed by the Commonwealth of Pennsylvania through incentives and regulatory measures. Local governments and non-profit organizations simply do not have the staff, volunteer, or financial resources to address these widespread environmental concerns in a comprehensive manner.

On the other side of the balance sheet, the benefits of greenway and open space resources cannot be ignored in terms of ecosystem, com-

The Survey Says....

- Three-quarters of survey responders support paying $20 annually to maintain greenways, open space, and related conservation.
- Over half of the responders support paying $50 annually.

munity health, and positive economic impact. There are annual and long-term benefits that accrue from these resources that, at best, are difficult to quantify, but must be recognized.

The Trust for Public Land has conducted analysis and estimated a dollar figure for the annual per acre value of land by cover type. For example, they show forest lands as having an annual $790 per acre value derived from stormwater management, carbon storage and sequestration, erosion control, water quality protection, and air pollution removal benefits.[6]In Union County, public and private forests would have an annual value of $96 million.

Wetlands had the most annual value at $1,252 per year while developed lands had no value and farmland was on the lower end of the scale at $66 per acre for cultivated crops and $46 per acre for pasture. However agricultural land brings considerable economic value to the region. According to the most recent United States Census of Agriculture, the market value for agricultural products sold in Union County was $135,970,000.[7]

In addition, greenways, open space, parks, and trails attract visitors, other investment and increase property values. In the first year the Buffalo Valley Rail Trail was open, it was estimated to have had a $478,000 economic impact to the region.[8] More established and longer trails, like the Pine Creek Rail Trail in Lycoming County, generate an estimated $3 to $5 million per year in financial benefits.[9] A study by Colorado State University found that where permanently protected open space had been incorporated into neighborhoods, homes commanded prices 20 to 29 percent higher than those without open space.[10] This is consistent with prior research documenting that property values increase based on proximity to greenways and open space.[11]

Demonstration Projects

The 54 recommended implementation actions were reviewed, including those identified as being high priorities, to determine which could be highlighted as early implementation or demonstration projects. Demonstration projects typically should meet the following criteria:

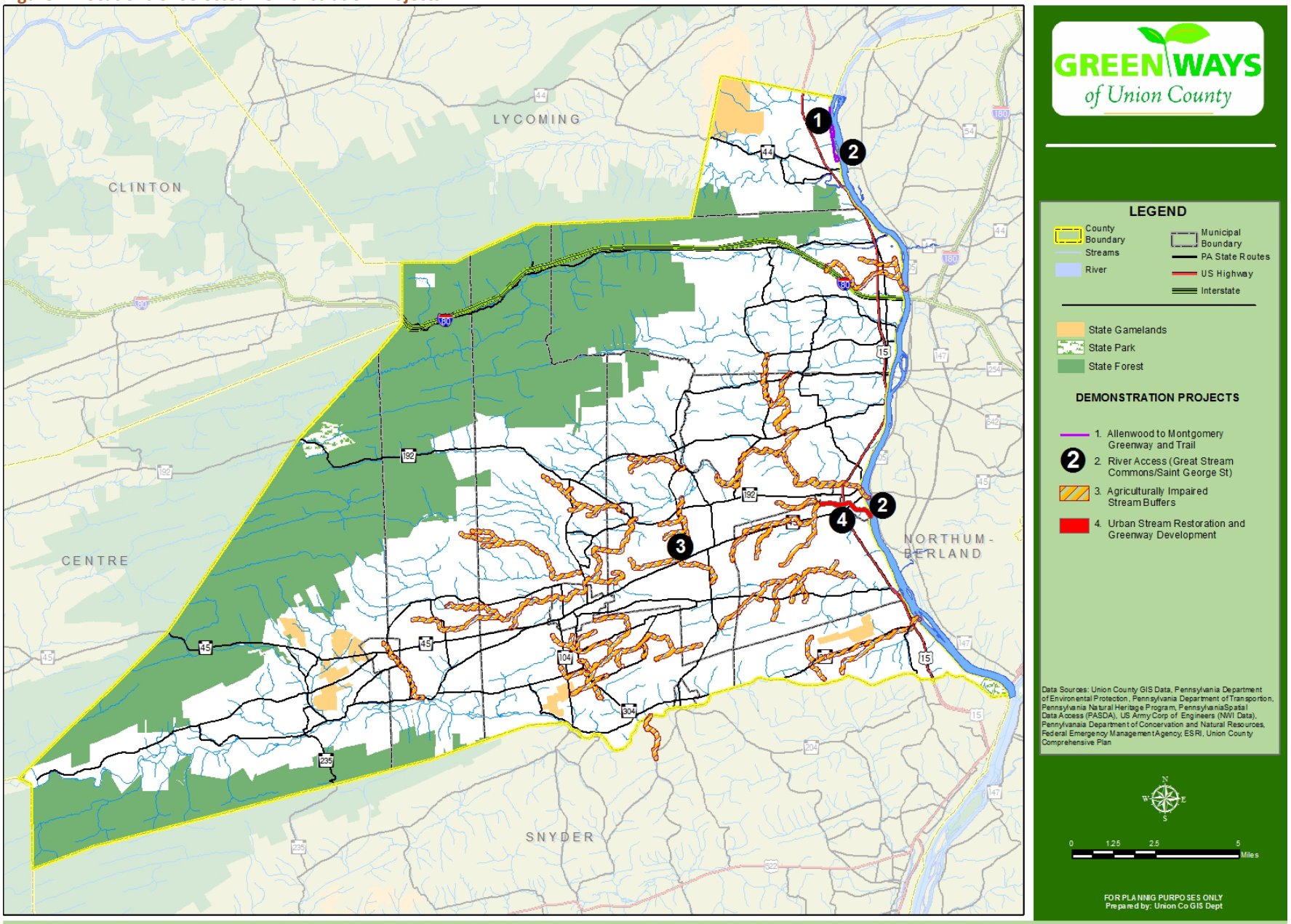
1. Create momentum for future expansion of the greenway and open space system;
2. Be visible and increase awareness of the presence and benefits of local natural resources;
3. Attract both local and regional use and attention; and
4. Have a high probability of implementation success and condensed project delivery.

Potential demonstration projects ideally would be more readily achievable with fewer challenges to overcome for implementation. For example, a greenway and trail that would need to be routed across multiple private properties where there is known landowner opposition would not be a good candidate as a demonstration project. On the other hand, installing a canoe and kayak access within an existing greenway on publicly controlled lands would qualify.

Listed below are the demonstration projects selected by the project Steering Committee with the general locations presented on the map in Figure 2.

1. Allenwood to Montgomery Greenway and Trail (See Figure 3)
2. River accesses at Great Stream Commons and St. George Street
3. Riparian Buffer Installation on Select Impaired Stream Segments
4. Urban stream restoration and greenway development
5. Develop conservation marketing materials

Figure 2. Locations of Selected Demonstration Projects



Demonstration Projects

Allenwood to Montgomery Greenway and Trail

Project: In collaboration with Lycoming County create a four (4) mile rail trail linking Allenwood Village to Montgomery Borough with the potential for an additional loop trail on Great Stream Commons open space areas.

Municipalities: Gregg Township, Brady Township and Montgomery Borough

Potential Partners: Brady Township, Gregg Township, Lycoming County, Lycoming County Resource Management Services, Montgomery Borough, PA Department of Conservation and Natural Resources, Susquehanna Greenway Partnership, Union County and West Branch Regional Authority

Delivery Steps:

(1) Conduct a feasibility study for the Union County portion to determine the preferable routing through Great Stream Commons and into Allenwood Village and update the Lycoming County feasibility study.

(2) Once feasibility is determined, work with partners to secure funding for engineering design work and create framework for trail maintenance and management.

(3) Complete final engineering.

(4) Secure funding for construction.

(5) Construct trail.

Cost Estimate:

Feasibility Study (Union County portion): $12,500

Engineering Design: $100,000

Construction: $250,000 (Union County segment)

Figure 3. Allenwood to Montgomery Greenway and Trail

Great Stream Commons River Access

Project: Develop a formalized canoe and kayak access to the West Branch Susquehanna River at Great Stream Commons. See Figure 4.

Municipalities: Gregg Township

Potential Partners: Northcentral Pennsylvania Conservancy, PA Department of Conservation and Natural Resources, Union County, and Warrior Run Community Corporation

Delivery Steps:

(1) Reopen discussions with Northcentral Pennsylvania Conservancy and Warrior Run Community Corporation.

(2) Determine final location for the access point.

(3) Finalize the ownership, management, and maintenance arrangement and execute it accordingly.

(4) Complete site design and engineering.

(5) Construct the river access and amenities (i.e. parking).

Cost Estimate:

Site Design: $10,000

Construction: $50,000

Figure 4. Artist's Rendering of Access to Susquehanna River at Great Stream Commons

Riparian Buffer Installation on Agriculturally Impaired Stream

Project: Install ¼ mile riparian buffer on an agriculturally impaired stream segment in a visible location. See Figures 5 and 6

Municipalities: Multiple

Potential Partners: Buffalo Creek Watershed Alliance, Lower Penns Creek Watershed Association, landowners, Natural Resource Conservation Service, Merrill W. Linn Conservancy, Northcentral Pennsylvania Conservancy, PA Department of Environmental Protection, PA Fish and Boat Commission, PA Game Commission, Union County Conservation District and US Fish and Wildlife Service.

Delivery Steps:

(1) Partner organizations identify cooperating landowner on agriculturally impaired stream segment

(2) Negotiate terms and execute riparian buffer agreement, easement, etc.

(3) Design riparian buffer including livestock exclusionary fencing, stream crossings, and other treatments.

(4) Secure project funding.

(5) Install riparian buffer and monitor.

Cost Estimate:

Buffer Permanent Easement: $19,500

Buffer Planting: $7,500

Miscellaneous: $2,500

Figure 5. Before Riparian Buffer

Figure 6. Artist's Rendering After Riparian Buffer

Urban Stream Restoration and Greenway Development

Project: Restore urban stream segment to natural conditions with a riparian buffer

Municipalities: East Buffalo Township and Lewisburg Borough

Potential Partners: Buffalo Valley Recreation Authority, East Buffalo Township, Lewisburg Borough, Northcentral Pennsylvania Conservancy, PA Department of Conservation and Natural Resources, PA Department of Environmental Protection, PA Fish and Boat Commission, PA Game Commission, Union County Conservation District, and US Fish and Wildlife Service.

Delivery Steps:

(1) Identify and select candidate stream segment(s).

(2) Conduct restoration planning, design and permitting.

(3) Secure project funding.

(4) Construct stream restoration project and monitor.

Cost Estimate:

Planning & Design: $10,000

Construction: $100,000

Develop Conservation Marketing Materials

Project: Implement a comprehensive and effective conservation marketing program of multi-media materials and messaging for distribution to attorneys, agricultural landowners, general public, homeowners, local governments, and schools about the value and benefits of conservation measures such as easements, riparian buffers, habitat improvement, and other best management practices.

Municipalities: All

Potential Partners: Bucknell University Center for Sustainability and the Environment, Conservation Union, Buffalo Creek Watershed Alliance, Merrill W. Linn Conservancy, Lower Penns Creek Watershed Association, public and private schools, and Union County Conservation District.

Delivery Steps:

(1) Organize a core group of partners to oversee development of the marketing initiative.

(2) Identify target audiences, key focus areas, and desired outcomes.

(3) Engage a team of marketing and outreach professionals to assist with developing conservation education and marketing options.

(4) Select a preferred marketing approach.

(5) Work with marketing consultants to finalize materials, production, and distribution.

(6) Monitor and measure effectiveness of messaging.

Cost Estimate:

Consultant: $5,000

Marketing Materials: $20,000

Notes

[1] PA DCED Governor's Center for Local Government Services. https://palocalgovtraining.org/retained/factsheets/AgZoning-LandUse_2013.pdf

[2] The $50 million cost estimate includes $12 million for preserving 5,000 acres of the 17,000 acres of priority agricultural land. Another $30 million would be required to protect the 12,000 acre balance. Similarly riparian buffer installation is included only for priority impaired stream reaches. To completely implement riparian buffer goals would necessitate an additional $15 million.

[3] Knoch, Carl and Tom Sexton. *Maintenance Practices and Costs of Rail Trails*. 2015 Rail to Trails Conservancy.

[4] National Recreation and Parks Association 2015 Field Report. http://www.nrpa.org/uploadedFiles/PageBuilder_Proragis/Content/common_elelments/FieldReport.pdf

[5] LandVote. Trust for Public Land. https://tpl.quickbase.com/db/bbqna2qct?a=dbpage&pageID=8

[6] Trust for Public Land. Pennsylvania's Return on Investment in the Keystone Recreation, Park, and Conservation Fund. 2013. http://cloud.tpl.org/pubs/benefits-pa-keystone-roi-report.pdf

[7] 2012 United States Census of Agriculture. USDA National Agricultual Statistics Service. http://www.agcensus.usda.gov/Publications/2012/Full_Report/Volume_1,_Chapter_2_County_Level/Pennsylvania/st42_2_001_001.pdf

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[9] Colorado State University. 2013. http://www.parjustlisted.com/neighborhoods-with-protected-open-space-bringing-higher-sale-prices-study-finds/ Nichols, Sarah & Compton, John. Michigan State University and Texas A&M University. The Impact of Greenways on Property Values: Evidence from Austin Texas. 2005. http://agrilifecdn.tamu.edu/cromptonrpts/files/2011/06/4_2_7.pdf

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