

RETURN ON ENVIRONMENT

The Economic Impact of Protected Open Space in Delaware County, Pennsylvania

Submitted to: Delaware County Planning Department
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Naylor's Run Park
Photo credit: Sahar Coston-Hardy

PREPARED BY

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economics | strategy | insight



Naylors Run Park
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The Andy Lewis Park
Photo credit: Sahar Coston-Hardy



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DELAWARE COUNTY RETURN ON ENVIRONMENT

EXECUTIVE SUMMARY

Delaware County is home to diverse landscapes and people, containing urban, suburban and rural areas and people of all ages, races and cultures.

The benefits presented in this report provide information for elected leaders, policy makers, and the general public on the value of protected open space. Hopefully, this information will contribute to informed decision-making concerning both preservation and development in the county.

The Key Benefits of Protected Open Space



ECONOMIC ACTIVITY IMPACT

\$52M

annual economic impact associated with protected open space

590 Jobs

supported from open space-related upkeep and open space tourism

\$20M

in annual salaries



ENVIRONMENTAL SERVICES BENEFITS

\$14.1M

annually through the provision of six environmental services

\$39.0M

lifetime cost savings from carbon storage in trees

\$6.2M

avoided annual stormwater system maintenance

\$74.4M

avoided annual stormwater pollutant removal costs



DIRECT USE BENEFITS

\$142.6M

annual recreation benefits to residents

\$153.4M

medical costs avoided annually

\$134.5M

lost productivity costs avoided annually



HOME AND PROPERTY VALUE IMPACT

\$689M

added to the value of housing stock located within a 1/2 mile from protected open space

\$4,500

average increase of the value of homes located within a 1/2 mile from protected open space

\$160M

annual additional property tax revenues generated from homes within a 1/2 mile of open space

The Return on Environment project describes, measures, and provides illustrative examples for estimating the economic value of benefits associated with protected open space in Delaware County. Protected open and green space are used interchangeably in this report and includes open, largely undeveloped natural areas such as woodlands, stream and river corridors, parks, trails, and other natural areas in the County. Trails are an important part of the greenspace network as they help connect open spaces, communities, and people to nature. This study measures the economic benefits of both public and private permanently protected green space lands in Delaware County.

Based on the methodologies from a previous Return on Environment report completed in 2011 by the Greenspace Alliance and the Delaware Valley Regional Planning Commission (DVRPC)—that assessed the economic benefits of protected open space in the five-county region of Southeastern Pennsylvania—this current Return on Environment Study seeks to quantify the economic value of protected open space specific to Delaware County. This economic analysis is critical to understanding the true value and impact of the policies and initiatives that support open space preservation.

Economic Activity Impact

Open space generates jobs and attract people to spend in the region

Protected open space in Delaware County generates economic impacts by creating management and maintenance expenditures and related jobs at public parks. The direct spending, which goes to labor income, is circulated back into an economy when those employees spend some of their earnings on various goods and services, creating a ripple effect in the economy. Beyond management and maintenance, open space attract tourists to visit the county, who, in turn, generate associated expenditures within the county.

▷ **\$52 MILLION IN TOTAL ANNUAL ECONOMIC IMPACT**

It is estimated that open space-related activities generate an estimated total of \$52 million in annual economic impact. Examples of these economic activities include spending from tourism associated with protected open space, and government spending for the management and maintenance of public open space.

▷ **590 JOBS SUPPORTED FROM OPEN SPACE-RELATED UPKEEP AND OPEN SPACE TOURISM**

Protected open space in Delaware County contributes an estimated 590 direct and indirect jobs to the economy. Examples of these jobs include public maintenance workers, municipal, county, and state park administrators, and rangers; and guides and hospitality professionals catering to tourists who visit protected open space.

▷ **\$20 MILLION IN ANNUAL SALARIES**

Salaries paid to individuals working on or in positions related to protected open space in Delaware County total \$20 million per year.



EXECUTIVE SUMMARY

Environmental Services Benefits

Open space reduces pollution and stormwater risks

Protected open space in Delaware County provides environmental benefits for the communities it serves, including air pollution removal, the provision of a water supply, water quality improvement, flood mitigation, wildlife habitat conservation, and carbon sequestration and storage. Combined, these benefits create ecosystem functions that would require costly measures to replicate, if lost. The upkeep of the protected open space will ensure the value of these services, if the ecosystems are retained. If these ecosystems were removed, municipalities would incur additional costs to provide equivalent services.

▷ **\$14.1 MILLION ANNUALLY THROUGH THE PROVISION OF SIX ENVIRONMENTAL SERVICES**

The six environmental services include replenishment of the water supply, water quality improvement, flood mitigation, wildlife habitat conservation, air pollution removal, and carbon sequestration in trees on protected open space. This sum represents value gained and costs avoided by eliminating the need to sacrifice or artificially replace vital ecological services currently provided by protected open space within Delaware County.

▷ **\$39.0 MILLION IN THE LIFETIME COST SAVINGS OF CARBON STORAGE IN TREES**

It is estimated that trees on Delaware County’s protected open space store a tremendous amount of carbon, a benefit that would cost \$39.0 million to replicate.

▷ **\$46.5 MILLION IN AVOIDED TOTAL CAPITAL COSTS, \$6.2 MILLION IN AVOIDED ANNUAL STORMWATER SYSTEM MAINTENANCE AND OPERATIONS**

▷ **\$74.4 MILLION IN AVOIDED ANNUAL STORMWATER POLLUTANT REMOVAL COSTS**

An increase in runoff and pollutant loads would require additional investment in infrastructure to manage the increased stormwater. Protected open space in Delaware County avoids \$46.5 million of capital cost for stormwater infrastructure construction, plus an additional \$6.2 million in

annual operations and maintenance costs, and an additional annual investment of \$74.4 million needed to remove stormwater pollutant loadings.

Protected open space helps mitigate stormwater impacts by reducing the volume of runoff created by storm events and the associated pollutants that stormwater carries. This mitigation reduces the burden placed on community stormwater infrastructure to manage the volume of runoff and pollutant loads, thereby avoiding both capital and long-term community maintenance expenditures, as well as improving ecological habitat, recreational resources, and safeguarding sources of current and future public water supplies.



Naylors Run Park
Photo credit: Sahar Coston-Hardy



Direct Use Benefits

Open space provides free or low-cost recreational opportunities and promotes health

Protected open space in Delaware County provides a multitude of free or low-cost recreational activities to residents. Many of these activities involve strenuous or moderate exercise, which contribute to physical well-being and defray health-care costs. In addition to physically active residents who derive benefits from protected open space, employers realize lower healthcare costs, see fewer workers compensation claims, and have lower rates of absenteeism and presenteeism (i.e., going to work while sick or injured and being less productive).

▷ **\$142.6 MILLION IN ANNUAL RECREATION BENEFITS FOR RESIDENTS**

\$142.6 million in benefits accrue annually to residents who participate in recreational activities on protected open space within Delaware County. This value represents the additional amount of money that residents in the county would be willing to spend in the private market, to participate in the recreational activities, which they currently enjoy on protected open space.

▷ **\$153.4 MILLION IN MEDICAL COSTS AVOIDED ANNUALLY**

Physically active people typically enjoy a variety of health benefits, including lower incidence of cardiovascular disease, diabetes, depression, certain cancers, and obesity. It is estimated that the moderate and strenuous activities that take place on protected open space in the county account for \$153.4 million in avoided medical costs annually.

▷ **\$134.5 MILLION IN LOST PRODUCTIVITY COSTS AVOIDED ANNUALLY**

It is estimated that businesses in Delaware County avoid \$134.5 million in lost productivity costs per year as a result of the physical activities their employees engage in on protected open space in the region. This total represents the amount saved due to less employee absenteeism and presenteeism due to employees engaging in physical activity on protected open space in Delaware County.



Home and Property Value Impact

Open space generates premium for home values

The property value impact from protected open space is reflected in the home value premium that homeowners are willing to pay to live near protected open space. As a result, the existing protected open space in Delaware County adds to the overall value of its housing stock. This increased wealth is captured through higher sales values of homes near protected open space and generates increased government revenues via greater property tax collections. This report analyzes more than 14,000 acres of protected open space and approximately 101,208 single family home sales in Delaware County from 2000-2020 to estimate the effect of protected open space on residential property values and the attendant fiscal impacts. Results indicate that proximity to protected open space contributes a significant positive impact to residential property values.

▷ **\$689 MILLION ADDED TO THE MARKET VALUE OF HOUSING STOCK**

There is an average increase more than \$4,500 in the value of homes in Delaware County that are located up to a ½ mile from protected open space. In total, the approximately 101,000 homes within a ½ mile of protected open space have an added value of \$689 million in market value, due to their proximity to open space.

▷ **\$160 MILLION IN ANNUAL PROPERTY TAX REVENUES**

Protected open space also increases the amount of property taxes that local governments and school districts receive. These increased property tax revenues total \$160 million per year.



Chester Creek Trail
Photo credit: Sahar Coston-Hardy



SECTION 1

INTRODUCTION

Protected open spaces provide substantial economic, environmental, and health benefits to surrounding communities, but these benefits are often overlooked or undervalued in policy debates and investment decisions.

Delaware County. Often portrayed as the unsophisticated younger sibling of Philadelphia, this little suburb is perhaps the most misunderstood and underappreciated of Pennsylvania's 67 counties. What outsiders do not know is that Delaware County, affectionately known as Delco, is rich with diversity: ethnic, social, cultural, architectural, economic, and ecologic. Delaware County reflects a representative cross-section of America's people, places, and ideas. It is the Commonwealth's second-largest county in population density, yet third smallest in area. Its 183 square miles are an urbanized suburb with 566,747 residents boasting industry; walkable downtowns with an active arts and food culture; eclectic scales and styles of homes, waterfront communities; swaths of woodlands, wetlands, parks, and trails; and endless interesting people among the 49 unique municipalities. Along the Delaware River, the County reflects an industrial and maritime based history, its eastern side borders the dynamic and soulful southwest end of Philadelphia, and the County's northeast communities include the long-standing Main Line, altogether, infusing Delco pride with street smart sensibility and humble character.

Niche, Inc, ranks Delaware County as the fourth-best of Pennsylvania's 67 counties in which to live based in part on its schools, diversity, job opportunities, and amenities. With a vision for a healthy future, the County is investing in the things that support and safeguard the places that make life worth living—like

parks, trails, and wildlife habitat. Delaware County is on the precipice of an epic reinvention powered by environmental returns. This County will be a destination and a model for implementing savvy environmental growth strategies while remaining authentic to the County's proud gritty character.

About the Return on Environment Project

The Return on Environment project describes, measures, and provides illustrative examples for estimating the economic value of benefits associated with protected green space in Delaware County. Green space includes open, largely undeveloped natural areas such as woodlands, stream and river corridors, parks, and other natural areas within urban and suburban areas. Green space lands are protected lands, either public or private. In Delaware County, trails are an important part of the green space network as they help connect our open spaces, communities, and people to nature.

Based on the methodology from a previous Return on Environment report completed in 2011 by the Greenspace Alliance and the Delaware Valley Regional Planning Commission that estimated the economic benefits of protected open space in the five-county region of Southeastern Pennsylvania, Delaware County's Return on Environment study seeks to quantify the economic value of protected open space specific to Delaware County. This economic analysis is critical

to understand the true value of the policies and initiatives that support open space preservation.

This report estimates the economic benefits associated with preserved protected open space in Delaware County by measuring impact in four areas, see Figure 1.1, below.

The benefits are applied to Delaware County overall and further presented in six case studies showing the specific benefits of a variety of green space, parks, and trails. In addition, one case study from Rose Tree County Park documents that participants’ spending in public recreation programs contributes to a thriving local economy. The case studies include:

- Don Guanella Property owned by Delaware County and located in Marple Township
- Chester Creek Trail in Aston and Middletown Townships
- Rose Tree County Park Summer Concert Series in Upper Providence Township
- Andy Lewis Community Park (formerly known as the Haverford Reserve) in Haverford Township
- Naylors Run Park in Upper Darby Township
- Veterans Memorial Park in the City of Chester

The case studies demonstrate the economic impact from property value premium, reduced stormwater costs, air pollution mitigation, community cohesion value and health value, visitors, and spending related to direct use.

Figure 1.1:
The Four Key Areas of Impact Measurement



Economic Activity Impact

Jobs and additional economic activity created as a result of activity on and connected to protected open space.



Direct Use Benefits

The recreation value and associated health benefits that accrue to users of public open spaces.



Environmental Services Benefits

The value associated with environmental benefits provided by Delaware County’s protected open space.



Home and Property Value Impact

The effect that protected open space has on residential property values.

Why is the ROE Project Important?

Since tax dollars largely support protected open spaces in Delaware County, elected officials must make decisions regarding funding for green space, parks, recreation, and trails versus all other public services. The challenge for advocates of green space, parks, recreation, and trails is making the case for why it is important to invest tax dollars in these areas. This is not easy. Securing and retaining an adequate level of funding to support these resources is a major challenge. With increasing responsibilities, maintenance of these spaces, and rising public demands, the agencies responsible for green spaces are typically underfunded and understaffed. A large part of the problem is that the value of these public spaces is often invisible to elected and appointed officials. When no value is assigned to our green spaces, they are often discounted as “nice to have—if we can afford it”.

The Delaware County Return on Environment project is a starting point to show the importance of making the case for green space, parks, recreation, and trails. There is an urgent need for the County, municipalities, and non-profit organizations to continue documenting green space values, and testimonials about its importance to the public. If green space advocates, parks and recreation departments and boards, and trail groups fail to make the case on the value of what they provide as an essential public service, they will be at a substantial disadvantage. Other competing services are not hesitant to use such measures to support their cases in budget requests.

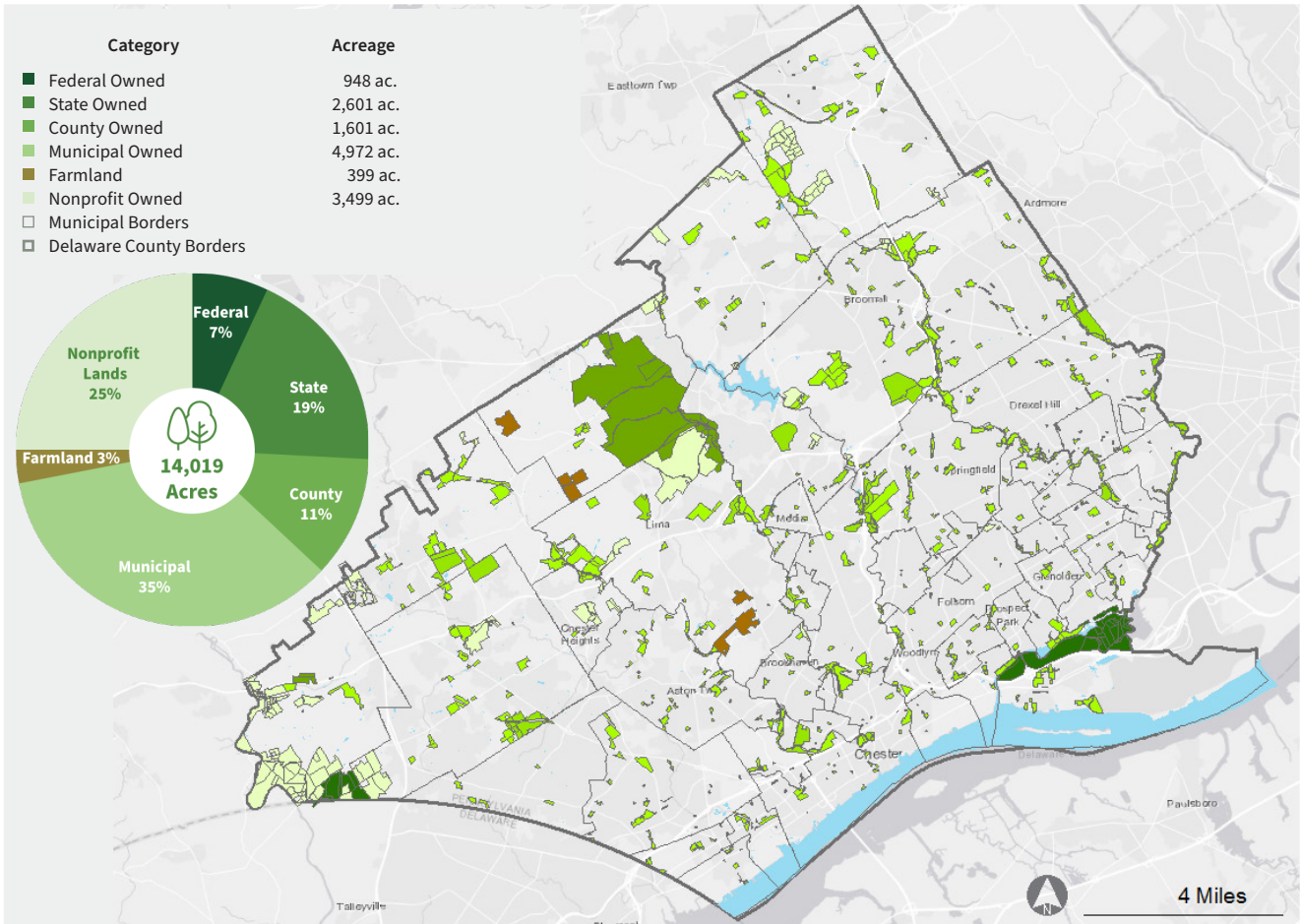
Green Space, Parks, Recreation and Trails: Essential Public Services

The Return on Environment project works to provide elected officials and taxpayers with a starting point on the real economic value of green spaces, parks, recreation, and trails. The goal is to help establish these functions as essential public services. The Constitution of the Commonwealth of Pennsylvania mandates that: *The people have a right to clean air, pure water, and to the preservation of the natural, scenic, historic, and aesthetic values of the environment. Pennsylvania's public natural resources are the common property of all the people, including generations yet to come. As trustee of these resources, the Commonwealth shall conserve and maintain them for the benefit of all the people.*

Open Space in Delaware County

The open space network in Delaware County consists of resources protected at the federal, state, county, and municipal levels and privately protected lands as shown in Figure 1.2 It is important to consider all these lands as part of the countywide open space network because they contribute to the community's character while also providing economic, environmental, social, and recreational benefits. Together, these open spaces create a wide-ranging network that provides diverse recreational opportunities for Delaware County communities while conserving significant natural features.

Figure 1.2: Delaware County Protected Open Space



Source: Delaware County (2021), Econsult Solutions, Inc. (2021), ArcMap (2021). Land includes parks and other open spaces by ownership.

Delaware County's Progress in Protecting Open Space

Delaware County adopted the County Open Space, Recreation, and Greenway Plan in 2015. The Plan has served as a guide and resource for countywide, multi-municipal, and municipal planning efforts for open space, parks, recreation, and trails. Three goals set the framework for action:

- **Conserve** open space and natural features,
- **Enhance** their environmental and recreational uses, and
- **Connect** communities, cultural/historic resources, and natural features.

Important Acquisitions

Don Guanella Property: In 2021, Delaware County Council acquired the 213-acre site of the former Don Guanella School. Located in Marple Township, this property was the largest vulnerable open space in the densely developed county. Largely woodlands with some outdoor recreation facilities, the site will become Delaware County's largest county park. This acquisition was met with great joy by residents who had worked diligently over decades to conserve this site and protect it from development. Plans are underway for the site's conservation and responsible public use. The value of this acquisition is shown in one of the case studies for ROE.

Little Flower Manor: In 2016, the County acquired approximately 37 acres adjacent to Little Flower Manor in Darby Borough and Upper Darby Township. The site was the location of a proposed development until Delaware County Council worked with other elected officials to acquire and preserve the land. The park will be the largest County park in eastern Delaware County. The acquisition of this property created an additional hub on the Darby Creek Trail, which will provide access to the Little Flower Manor site from other parks and communities of eastern Delaware County. The County developed a master site plan for the park in 2018. Grant funding is supporting development of the first phases of the master plan including construction of pedestrian walkways, access

drive and parking areas; installation of park signage and a community garden; ADA access, landscaping, project signs and other related site improvements.

Mineral Hill: In 2010 the County preserved approximately 47 acres of land along Ridley Creek in Middletown Township. Mineral Hill is a scenic, wooded property on Baltimore Pike that is famous among rock collectors worldwide for its wealth of stone specimens and crystals. When combined with adjacent municipal park properties, the Mineral Hill Area is 123 acres. The County subsequently led an effort with Middletown and Upper Providence Townships to develop a master plan for the newly expanded park. The Mineral Hill Area Master Plan was completed and adopted by Council in 2014.

Trails

Delaware County has remarkable potential in terms of trails. Along with the expected county and municipal trails, nationally significant trail routes are in place or planned in Delaware County. These include:

- East Coast Greenway, a nearly 3,000-mile trail extending along the eastern seaboard of the United States, from Maine to Florida.
- September 11th National Memorial Trail aims to link the memorial sites for the World Trade Center, Pentagon, and Flight 93.
- John Heinz National Wildlife Refuge trails and trail connections

Delaware County is a proud member of the Circuit Coalition, a collaboration of nearly 65 non-profit organizations, foundations, and agencies working to advance the completion of a connected network of multi-use trails. The Circuit is a multi-use trail network connecting people to jobs, communities, parks, and waterways in the greater Philadelphia region. It comprises 300 miles of completed trails with a vision of completing 750 miles of trails across the nine-county region in Pennsylvania and New Jersey.

Delaware County established a Primary Trail Network of about 132 miles. Municipalities are aggressively planning and constructing trails. Currently about

40 miles of bike trails have been established in this network, including 2.8 miles of bike trails developed by Delaware County. A major goal of Delaware County is to establish the segment of the East Coast Greenway that traverses Delaware County.

The Friends of Haverford Trails offers an annual summit for trail stakeholders to support and advance trails in Delaware County. The Delaware County Trail Alliance is a group of volunteers who are residents, trail planners, and regional organizations passionate about advancing trails. They include representatives of the Delaware Valley Regional Planning Commission, the East Coast Greenway, Pennsylvania Environmental Council, Pennsylvania Department of Conservation and Natural Resources, and trail planning experts.

Chester Creek Trail: Years of planning, oversight, and coordination culminated in 2015 when the County began constructing Phase 1 of the Chester Creek Trail. Phase 1 covers 2.8 miles of the 6.5 mile rail-trail along Chester Creek from Lenni Road to Chester Creek Road in Middletown and Aston Townships.

In addition to several road crossings and trailheads with parking, years of inactivity led to the need for reconstruction or major rehabilitation of four bridges, construction of multiple culverts, and comprehensive streambank stabilization along the length of the trail as a \$6.6 million construction project. The ROE case study for the Chester Creek Trail documents the importance of this trail along with great public support to extend its length.

The extension of this trail will occur as Phase II running approximately 1.5 miles south from the terminus of Phase I at Creek Road to Bridgewater Road in Aston. In 2016, the County received a \$208,000 grant from DVRPC's Regional Trails Program to engineer Phase II and DCNR for an additional \$208,000 for engineering this phase.

Darby Creek Trail: The County is leading the planning and development of a segment of the Darby Creek Trail in Upper Darby Township and Clifton Heights Borough from Kent County Park to the historic Swedish Cabin. This trail segment contributes to the development of the larger Darby Creek Trail, connecting through Upper Darby to the Haverford Reserve and

Radnor Trail to the north and the Gateway Trail (Lansdowne) and Cobbs Creek Trail to the south.

Delaware County Parks

Delaware County has a county park system with 17 parks ranging from five to 213 acres and totaling 989 acres, out of the 1,601 acres of protected open space that the county owns. They offer a wide range of facilities and outdoor recreation opportunities from a dog park to a golf course, from quiet natural areas of solitude to lively performances at Rose Tree and Glen Providence County Parks. Two parks have a strong group of public supporters organized as the Friends of Glen Providence Park and the Friends of Smedley Park. They take care of the parks, provide programs, offer educational activities, and serve as park patrol boosting park safety and security.

Municipal Parks and Open Space

Nearly 5,000 acres of public parks and open space are under municipal ownership throughout Delaware County. Three sub-categories of parks include: Municipal Active Recreation (parkland and ballfields) (1,761 acres), Municipal Passive Parkland (2,341 acres), and Municipal Non-recreational Open Space (552 acres). Non-recreational open space includes areas owned and maintained by the municipality, but not open for public recreation.

Other Open Space in Delaware County

Institutional Lands: Land belonging to private institutions makes up approximately 4,815 acres. Institutional open space includes colleges, private schools, and other institutional open space (including religious institutions, historic societies and friends groups, residential institutions, and retirement communities).

Homeowners Association Land: Developers often set aside portions of a property for open space as part of a residential subdivision. The open space is usually preserved to satisfy an ordinance requirement to dedicate open space or protect environmentally sensitive land. The preserved land is often owned and maintained by a homeowners

association or HOA. There are 4,495 acres of land in Delaware County owned by HOAs.

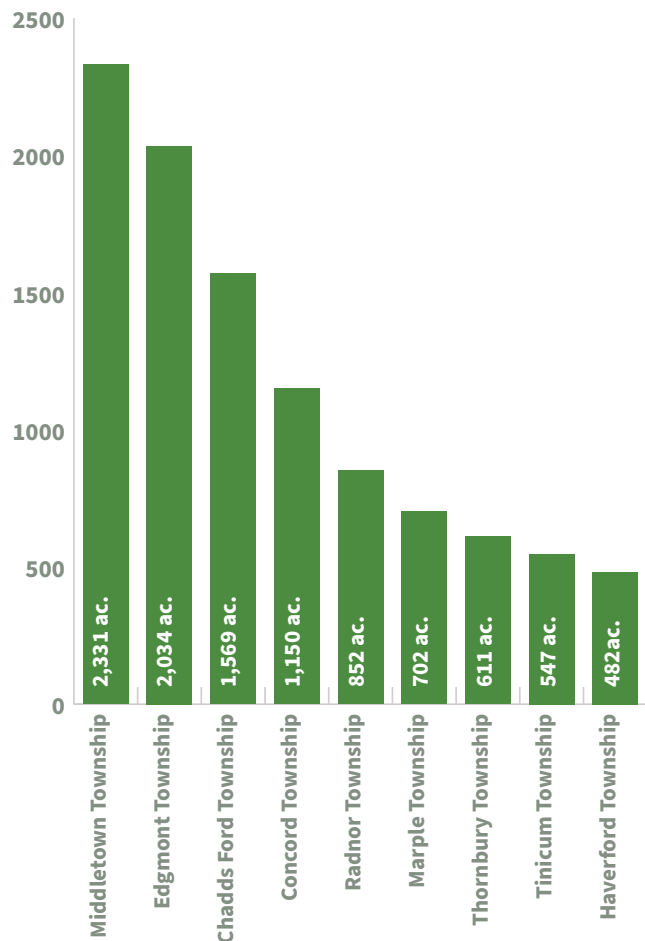
Golf Courses and Clubs: Eighteen golf courses and clubs in Delaware County include 2,638 acres of land. Golf courses are particularly important to monitor for changes in ownership and development potential. COVID-19 had a dramatic effect on increasing play on golf courses. It is too early to identify trends pertaining to golf courses and the security of retaining their lands as open space. Time will tell on golf course trends and security of retaining these lands as open space.

Conservation Organization Land: Land trusts, conservancies, and other organizations with a mission centered on land preservation and conservation have helped protect many valuable lands in Delaware County. While some of these lands are protected in preserves made available for public access as passive recreation, including trails, other preserves may have little to no trail development or provision for public access. They total 1,131 acres of preserved land.

Cemeteries: Cemeteries are by nature gardens of peace that can often serve as green space. Unused land that is not suitable for burial is often used for cemetery-related building construction or left as open space. Several cemeteries in the County contain streams. In most cases, headstones are back from the stream and a natural riparian buffer is allowed to remain. However, streams in some cemeteries could benefit greatly from streambank restoration and buffer replacement as they are mowed to the top of the streambank.

Farmland: According to the USDA, Delaware County farmland totaled 2,365 acres in 2017, down from 4,725 in 2012. The average farm size is 39 acres for the 65 farms shown in 2017. Some of these farms could be in a stage of inactivity or currently existing as unharvested meadow in a large estate. Most of the farmland acreage in Delaware County is used for food production, particularly fruits and vegetables. Farms with livestock, such as cattle, are much more limited throughout the County. Large working farm operations include the Linvilla Orchards in Middletown Township and the Arasapha Farm in Edgemont Township. Lifestyle farms, also known as hobby farms, are typically much

Figure 1.3:
The 10 Delaware County Municipalities with the Most Protected Open Space



Source: Delaware County (2021).

smaller in size (less than 10 acres) but can include a variety of products, including nursery products, food, and livestock. Horse-breeding farms (or ranches) and large estates on former productive family farms fall under this type and exist in places like Concord, Chadds Ford, Thornbury, Bethel, Edgemont, and Middletown Townships, and Chester Height Borough.

Because of the high market value of land, both working farms and lifestyle farms are becoming less common, smaller, and more scattered. There are 399 acres of preserved farmland in the County.

Green Ways Grant Program

Something epic is happening in Delaware County. *That's right, epic.* The Delaware County Green Ways Grant Program is driving the future of green space, trails, and recreation for Delaware County residents while elevating the County's system as a unified whole. Launched in 2019 with a \$10 million bond, the County held its first Green Ways grant round in 2019. A total of about \$4.5 million in projects was approved to acquire land and improve parks and trails. 26 municipalities were awarded a total of 38 projects in 2019.

In the second grant round in 2021, *the County received 74 grant applications totaling \$13 million, which included representation by 46 of the 49 municipalities in Delaware County.* The message was loud and clear: the people of Delaware County are requesting more and better green spaces, trails, parks, and planning. The 2021 grant round was incredibly competitive with all grant-worthy projects. The review team thoroughly reviewed and deliberated over applications using the criteria developed by the Green Space Task Force, a 23-member group representing the diverse citizenry, organizations, and interests of Delaware County.

Council voted to invest \$7.2M to support impactful Green Ways projects throughout Delaware County. That's an allocation of over \$1.7M more than the original reserved \$5.5M for Grant Round 2! There is a huge appetite for funds to make Conserve, Enhance, Connect and Planning & Design investments throughout Delaware County. *The 43 projects awarded funding includes one non-profit and 38 municipalities, totaling \$7,172,521 invested throughout Delaware County.*

The breakdown is:

- \$722,850 for 16 Mini-PROS (Parks, Recreation, Open Space) Plans. These plans focus on the conservation of green space, park improvements, and trails.
- \$848,315 for 9 Planning & Design projects
- \$2,186,477 for 6 Conserve projects
- \$1,990,809 for 6 Connect projects
- \$1,424,070 for 6 Enhance projects

Partnerships are Key

Green Ways is more than funding alone. Delaware County is advancing its vision to create a green and connected county—a destination of choice for residents, businesses, and visitors. While the County is committed to an annual grant round, securing partnerships for collaboration is the grand vision and has already generated enthusiasm and tremendous public support. Committees, boards, talks forces and volunteer groups that have stepped up to participate in green space, parks and trails include the following:

Delco Green Space Task Force: The 14 members representing the diverse community of Delaware County in age, gender, race, ethnicity, interests, expertise, and geographic area comprise the Task Force. In addition, the Task Force has advisors from the Pennsylvania Department of Conservation and Natural Resources, and the Delaware County Conservation District, Delaware County Parks & Recreation Department, the Delaware County Planning Department, and the Delaware County Parks and Recreation Board. Since our green space, parks, trails, and riverfront play a vital role in the social, economic, physical, and mental well-being of Delaware County and our residents, the Task Force is committed to serving the public's best interests and providing the oversight and expertise to ensure that our greenspace is conserved and accessible to all. The opportunities and challenges are greater than ever, but with the focus, dedication, and passion of a committed membership—combined with a unique mixture of expertise—the Green Space Task Force collaborates with County government, municipalities, non-profit organizations, private enterprise, and interested stakeholders to raise the bar for conservation action, education, and funding. Task Force members hold themselves to the highest standards, adhering to core values of respect, accountability and transparency, innovation, diversity and inclusion, collaboration, and integrity. Their mission demands that we do everything in our power to make Delaware County a place where people and nature can thrive.

Delco Trail Alliance: The Trail Alliance is the “make trails happen” small group of volunteers representing Friends of Haverford Trails, Haverford Parks & Recreation Department, PA DCNR, Pennsylvania Environmental Council, East Coast Greenway, Delaware Valley Regional Planning Commission, and trail planning. Purposefully small, this group of experts has the skills and expertise to move trails forward in the County via concentrated efforts of skilled and visionary individuals. As this group builds a track record of success, two other groups could be formed in the future: A Friends of Delco Trails and an Ex-Officio committee of corporate, business, and non-profit organization representatives organized to move trails forward via advocacy and fundraising.

The mission of the Delaware County Trail Alliance is to work together to help advance the completion of a countywide trail network through partnerships and outreach. Members advocate dynamically for increased bicycle and pedestrian funding, interconnected routes, and policies to enable safe cycling and walking. They are always looking forward, working to build a bike-friendly Delaware County. Their actions include the following:

- Advocating for development of Delaware County’s Primary Trail Network and community connections to it and the region beyond.
- Supporting public agencies with trail planning, construction, and maintenance services.
- Keeping a database of trails throughout Delaware County to facilitate planning, increase trail awareness and use, and advance trail connections.
- Collaborating with community organizations to enhance trail-based recreation for everyone.
- Educating the community at large about issues that impact the Delaware County trail network.
- Providing opportunities and a positive environment to support and advance Delaware County’s diverse trail efforts.
- Striving to track funding opportunities and make trail stakeholders aware of funding opportunities to construct and maintain trails through community outreach and philanthropic resources.

- Working to advance county efforts in pursuing grant funding to implement trail plans and advance the Primary Trail Network.

Delaware County Park Board: The Delaware County Parks and Recreation Board is an 11-member body appointed by the County Council. Its mission is to ensure that the county parks and recreation system is a source of pride for all Delaware County residents. The Board helps to guide future development, improvement, operations, and maintenance of the Delaware County Parks, Recreation, and Trail System. Their vision is to:

Establish the Delaware County Parks and Recreation System as a preferred destination that welcomes and captivates residents and visitors. The park system and its beauty will be part of daily life and shape the character of Delaware County. Natural, cultural, artistic, historical, and recreational resources cultivate outstanding experiences, health, enjoyment, fun, and learning for all people. The Park System is sustainable, well maintained, and safe, and meets the needs of individuals, families, and communities. The focus on preserving land continues, with a strong emphasis on connecting people to the land and each other. Aware of its value to their lives, residents are proud stewards and supporters of an extraordinary park and recreation system.

Moving Forward

Delaware County plans to continue the Green Ways program with funding to support countywide efforts to conserve green space; develop and maintain parks; and establish a safe and convenient countywide trail network. To advance these efforts, the County will organize its staff to optimize public outreach and civic engagement to develop, support, and energize partnerships with a host of public and private citizens and organizations. The pathways are leading to an epic Delaware County as a preferred place for people to live, work, own a business, raise a family, and retire. The following documentation on Return on Environment via economic, environmental, health and recreation benefits provide evidence that open space, parks, trails, and recreation are an investment, not a cost.



Chester Veterans Memorial Park
Photo credit: Sahar Coston-Hardy



Rose Tree County Park

Photo credit: Delaware County Parks & Recreation Department

SECTION 2

ECONOMIC ACTIVITY IMPACT

Introduction

This section estimates both the annual economic and fiscal impacts associated with two types of economic impact:

1. Management and maintenance expenditures at public parks (state, county, and municipal)
2. Expenditures associated with protected open space tourism

Economic impact is measured in terms of expenditures, employment, earnings, and tax revenues.

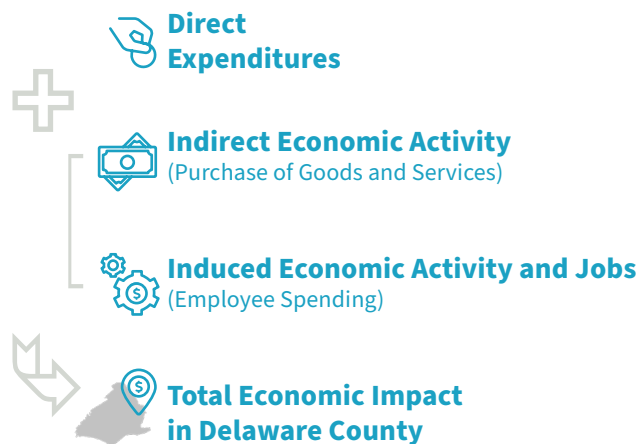
Methodology

The impact of direct expenditures associated with protected open space does not end with direct spending but is recirculated and multiplied through the economy in two ways:

- First, a portion of that direct spending which goes to the purchase of goods and services gets circulated back into an economy when those goods and services are purchased from local vendors. This is the “indirect effect,” and reflects the fact that local purchases of goods and services support local vendors, who in turn require additional purchasing with their own set of vendors.
- Second, a portion of that direct spending which goes to labor income gets circulated back into an economy when those employees spend some of their earnings on various goods and services. This is the “induced effect,” and reflects the fact that some of those goods and services will be purchased from local vendors, further stimulating the local economy.

By determining linkages across industries, input-output models estimate both the magnitude and composition of spillover impacts to all industries associated with a dollar spent in any one industry. Thus, the total economic impact is the sum of the direct investment plus the indirect and induced effects generated by direct expenditures associated with protected open space.¹

Figure 2.1:
Economic Impact Methodology



Source: Econsult Solutions, Inc. (2021)

¹ ESI uses IMPLAN modeling software to estimate indirect and induced impact, and sums them with the direct activity to produce total economic impacts. For more information on the IMPLAN modeling process, visit IMPLAN.com.

Economic Impact of Spending on Park Maintenance and Management

Public parks make up about 65 percent of the protected open space in Delaware County.² Economic activity on this land results from management and maintenance expenditures of these state, county, and municipal owned parks. Using calculated expenditures for state, county, and municipal parks, a combined expenditure number was derived that applied to all public park acres in Delaware County.³

- **State Park Expenditures:** The average expenditures per acre were estimated using the state park budget from the FY2021 Governor’s Detailed Budget. The state park budget is applied to the acreage associated with state-owned open space.

- **County Park Expenditures:** The Delaware County Parks and Recreation budget was obtained from the 2021 Delaware County budget.

- **Municipal Park Expenditures:** For municipal managed parks, ESI obtained the parks and recreation budget for the 11 municipalities with the greatest amount of municipal-owned open space in Delaware County, a total of 3,555 acres with budget expenditures of \$8.16 million. This yields an estimated average expenditure per acre, \$2,295 per acre in operational and maintenance costs. This measure was then applied to the remaining municipalities in Delaware County in order to estimate the remaining operational and maintenance costs (see Figure 2.2).⁴

Figure 2.2:
Top 11 Delaware County Municipalities with the Greatest Amount of Municipal-Owned Open Space

Municipality	Municipal-Owned Open Space Acreage*	Budget Expenditures
Radnor	507	\$1.76
Middletown	415	\$0.11
Haverford	430	\$1.36
Thornbury	319	\$0.92
Concord	263	\$0.11
Upper Darby	241	\$1.60
Springfield	387	\$0.50
Chester City	225	\$0.60
Marple	377	\$0.76
Newtown	197	\$0.17
Aston	194	\$0.26
	3,555	\$8.16
Remaining Municipalities (Acres)	1,416	
Expenditure per Acre (\$)	\$2,295	
Remaining Municipalities Expenditures Estimate (\$M)	\$3.2	

Source: Delaware County (2021), Various Municipality Budgets (2021).

*This is the acreage for municipal-owned open space only. This does not include open space owned by other entities, such as federal-owned or county-owned open space.

2 This includes state, county, and municipal-owned open space.

3 The economic impact analysis does not include the economic activity on preserved farmlands.

4 The budgets used in this model do not include programming budgets.

Annual Expenditures

Direct public expenditures on public parks—money spent for the management and maintenance of these spaces—account for an estimated \$14 million. This economic activity, a government expense, supports an additional \$10 million in indirect and induced expenditures, which results in a total economic impact of \$24 million.

Figure 2.3
Annual Economic Impact Associated with Open Space Park Maintenance and Management

Direct Output (\$M)	\$14
Indirect and Induced Output (\$M)	\$10
Total Output (\$M)	\$24

Source: IMPLAN (2020), Delaware County (2021), Various Municipality Budgets (2021), Econsult Solutions, Inc. (2021)

Annual Employment

The management and maintenance of parks directly and indirectly supports 180 jobs in Delaware County. This estimate includes jobs that take place directly on or because of public parks, including park rangers, groundskeepers, and public administrators. It also includes indirect and induced employment associated with public parks, examples of which includes jobs selling and repairing equipment used for park maintenance, and jobs arising from private concessions run on public parkland.⁵

Figure 2.4
Employment Associated with Open Space Park Maintenance and Management

Direct Employment	120
Indirect and Induced Employment	60
Total Employment	180

Source: IMPLAN (2020), Delaware County (2021), Various Municipality Budgets (2021), Econsult Solutions, Inc. (2021)

Annual Salaries

Earnings for workers with jobs directly and indirectly related to the management and maintenance of local public parks total an estimated \$12 million per year.

Figure 2.5
Salaries Associated with Open Space Park Maintenance and Management

Direct Salaries (\$M)	\$9
Indirect and Induced Salaries (\$M)	\$3
Total Salaries (\$M)	\$12

Source: IMPLAN (2020), Delaware County (2021), Various Municipality Budgets (2021), Econsult Solutions, Inc. (2021)

5 In some municipalities, public works may provide some parks maintenance services. These are not included due to difficulty of separating out functions within departments.

Economic Impact of Spending from Parks Related Tourism Activity

To calculate the economic impacts of tourism spending attributable to protected open space in Delaware County, data from the 2019 Economic Impact of Travel and Tourism in Pennsylvania was used. Traveler spending associated with recreation in Delaware County was used to determine direct economic impacts, through a conservative calculation estimating that two percent of tourism activity was attributable to protected open space. Not all spending with protected open space is for recreation only; for example, a tourist visiting a Delaware County Park may go to a restaurant nearby and the server from that restaurant will spend money in the local economy, accounting for indirect and induced impacts. Using the 2019 Travel and Tourism data for associated spending and a conservative two percent estimate as well, the direct, indirect, and induced economic impacts of protected open space were identified.⁶

Annual Expenditures

Tourist activity associated with protected open space in the form of travel spending generates approximately \$28 million in total economic impact.

Figure 2.6
Annual Economic Impact Associated with Open Space Related Tourism

Direct Output (\$M)	\$14
Indirect and Induced Output (\$M)	\$14
Total Output (\$M)	\$28

Source: IMPLAN (2020), VisitPA (2020), Econsult Solutions, Inc. (2021)

Annual Employment

Open Space Related Tourism directly and indirectly supports 410 jobs in Delaware County. These jobs include employment directly related to tourism on protected open space, such as jobs in lodging, retail, and restaurants.

Figure 2.7
Employment Associated with Open Space Related Tourism

Direct Employment	340
Indirect and Induced Employment	70
Total Employment	410

Source: IMPLAN (2020), VisitPA (2020), Econsult Solutions, Inc. (2021)

Annual Salaries

Employees in the tourism industry and other businesses in the County earn approximately \$8 million annually as a result of the tourist draw of local protected open spaces.

Figure 2.8
Salaries Associated with Open Space Related Tourism

Direct Salaries (\$M)	\$5
Indirect and Induced Salaries (\$M)	\$3
Total Salaries (\$M)	\$8

Source: IMPLAN (2020), VisitPA (2020), Econsult Solutions, Inc. (2021)

6 VisitPA, "Economic Impact of Tourism in Pennsylvania," 2019, https://www.visitpa.com/sites/default/files/pdfs/Economic%20Impact%20of%20Tourism%20in%20PA%202019_FINAL-min.pdf.

Tax Revenues Generated by Economic Activity Related to Protected Open Space

The economic activity discussed above generates tax revenues via income, sales, and business taxes. All economic activity associated with protected open space in Delaware County generates an estimated \$730,000 annually in state taxes.

Figure 2.9
Estimated Annual State Tax Revenue Impact Generated by Economic Activity Related to Protected Open Space to the Commonwealth of Pennsylvania (\$M)

Tax Type	Open Space Maintenance and Management	Open Space Related Tourism	Total
Income Tax	\$0.21	\$0.14	\$0.35
Sales Tax	\$0.09	\$0.20	\$0.29
Business Tax	\$0.03	\$0.06	\$0.09
Total State Tax Revenues	\$0.33	\$0.40	\$0.73

Source: IMPLAN (2020), PA Comprehensive Annual Financial Report (2019), Econsult Solutions, Inc. (2021)



CASE STUDY

ROSE TREE COUNTY PARK

UPPER PROVIDENCE TOWNSHIP

PUBLIC RECREATION ... AN INVESTMENT, NOT A COST

Location: Providence Road (Route 252) and Rose Tree Road, Upper Providence Township

Acreage: 117.9 acres

Owner/Operator: Delaware County

Typical Summer Festival Schedule: 45-48 shows during nine weeks from Mid-June through late-August

The Delaware County Summer Festival in Rose Tree County Park is undoubtedly the County's number one most popular public service. People from Delaware County and beyond look forward to this uniquely Delaware County tradition year after year for the opportunity to enjoy free cultural entertainment in a beautiful park among a wonderful community. The untold piece of this story is that the concert series is also a boon to the local economy.

Using findings from a survey of concert goers, ESI determined the financial return to local restaurants and food markets. Delaware County residents should be proud to learn that for every \$1 in public funds the Delaware County Parks and Recreation Department spent to host the concert series, \$8 in private funds went back to local businesses, which supports jobs and stimulates our economy.

When weighing funding allocations, public officials must ask, "Is the cost worthwhile?" The Rose Tree Summer Festival clearly demonstrates that spending on public programming in parks is a vital investment, not a cost.

Rose Tree County Park: Delaware County's Crown Jewel

Rose Tree County Park is a place where memories are made. It's beloved by residents and visitors for its bucolic rolling hills, impressive mature tree covered woodlands and wide-open fields for play, picnicking and flying kites. Originally the site of America's oldest fox hunting club and a tavern (c. 1737), it has been the crown jewel of Delaware County's park system since Delaware County acquired the park in the late 1960's. In addition to its showpiece amphitheater, the park includes a plaza used for festivals and events, community gardens, trails,

The 2021 concert series yielded \$793,000 in local economic impact from concert goers spending money on food during concert nights.

historic buildings, and memorials. A new playground is underway. Rose Tree County Park offers a wide range of recreation opportunities including special events like the Festival of Lights during the month of December, cross country meets, bird-watching tours, fitness and relaxation, outdoor play, enjoyment of nature and the outdoors, and of course, Instagram-worthy moments with a stunning park backdrop.

Advancing Delaware County's High Quality of Life, Diversity, and Economy

Open space, recreational, and cultural amenities are an integral part of establishing and sustaining a high quality of life. Rose Tree County Park provides all this and more. The park's fascinating history and Delaware County's heritage comes to life in the grounds and historical buildings. Cultural amenities such as Delaware County's Summer Festival Concert Series cross many societal interests including performances that celebrate art, dance, heritage, history, music, and theater. Delaware County derives significant economic benefit from the arts through its support of public performances, educational programs, special events, and spectator activities. Communities that support strong and diverse arts programs additionally benefit from tourism, employment, new businesses, and trade. Regional

Figure 2.10:
Rose Tree County Park



Source: ESRI Basemap (2021).

cultural attractions can further enhance Delaware County as a cultural tourism destination. Rose Tree County Park is the perfect spot to host such attractions as evidenced by the much-loved, raved about concert series, the Festival of Lights, and the new Delco Holiday Village. The Holiday Village supports small businesses owned and operated by local culturally diverse artisans. A waiting list for a vendor space in the Holiday Village is testimony to its popularity from inception.

Building a Sense of Community Through the Concert Series

The Delaware County Summer Festival at Rose Tree County Park has been going strong since 1975. The Parks and Recreation Department curates a mix of musical performances to reach all ages and interests from instrumental orchestras, Motown, Broadway, Doo Wop, rock and pop tribute bands, Military bands, children's performances, and much more. The series typically runs from June through August at 7:30 p.m. on Wednesday through Sunday evenings, plus two morning children's shows at 10:00 a.m.

Popularity of the Concerts
“Why, every mother of a toddler in Delaware County is here!”

Overheard from a concert goer at a morning concert for children in Rose Tree County Park (2016)

People love to come early and adorn the arc of the state-of-the-art amphitheater with lawn chairs and blankets—staking the best spots to enjoy the shows. Traditionally, the County hosted 48 concerts per season with typical concert attendance ranging from several hundred to 4,600 per concert for the more popular performers. Due to COVID, the series was reduced to 40 concerts in 2021. Even with fewer concerts, and in the face of a global pandemic, approximately 26,000 people attended during the 2021 season. This is a phenomenal testament to the recreational, social, and cultural needs the concerts series fulfills for people of all ages. The draw goes beyond an individual performer—people flock to these events seeking the welcoming community atmosphere and sense of tradition embedded in the location. It's a place and an event where everyone belongs.

Supporting Our Local Businesses

To project the local economic impact of the concert series, the Delaware County Parks and Recreation Department reached out to concert patrons with a quick and easy online questionnaire asking respondents if they spent money on food in a local restaurant or food market related to their attendance at a concert in Rose Tree County Park. The Department advertised the questionnaire by installing banners with the survey link and QR code in the park, promoting the survey on its website, and via concert staff urging patrons to take a few minutes to complete the survey right there on their mobile phones. Of those who purchased food at a market or restaurant, 75 percent spent \$15 or more.

The type of spending on food related to the Rose Tree County Park concerts has a ripple effect throughout the economy by increasing the demand for supply chain products and services and increasing spending from employer and employee households who directly benefit from recreation program related products and services.

ESI determined the estimated ancillary spending from visitors from inside and outside of Delaware County for the 2021 Rose Tree Concert Series. It is estimated that the total economic impact from ancillary spending on food produces a total economic impact of \$793,000 to Delaware County, which is economic impact that would not have occurred without the presence of the concert series.

Figure 2.11
Economic Impact in Delaware County from Ancillary Spending from the 2021 Rose Tree County Park Concert Series

Direct Output (\$M)	\$489,300
Indirect and Induced Outputs (\$M)	\$303,700
Total Output (\$M)	\$793,000
Total Employment	8
Total Earnings (\$M)	\$270,300

Source: Econsult Solutions, Inc. (2021), IMPLAN (2019)

“We definitely see an increase in dining in or takeout before a show.”

The restaurant specifically associates the additional business with the Summer Festival. The restaurant stays on top of projecting their business upticks related to the concert series for food shopping and preparation by printing the concert schedule to be ready for concert night.

DiFabio’s Market & Tap Restaurant

It Pays to Sponsor

Businesses know the Delaware County Concert Series at Rose Tree County Park is the place to be. A large audience with a wide range of ages and interests show up week after week at the ready to see and hear about local businesses. With widespread visibility and recognition, sponsoring companies build good will in supporting the arts and the community. Sponsors have ranged from PECO (promoting home energy programs), Acme Markets, Tavola Restaurant and Bar, and White Horse Village (local retirement community) to banking, staffing, and communications firms. They contribute \$20,000 to \$25,000 toward the concert series in a typical year. At a basic level, sponsors get to place their logo on promotional materials. Some send representatives to the concert to give out promotions (prizes, contests, and giveaway items). They also get sponsor tables to put out promotional materials and invite dialogue with potential customers. Businesses have enormous potential for attracting new customers while retaining and upgrading existing customers by personally interacting or showing shared passion for the Delaware County Concert Series.

More Benefits from Rose Tree County Park: Higher Property Values

Rose Tree County Park is surrounded by dense, medium to high income residential development. Property value impacts for Rose Tree County Park were estimated within a one-half mile radius of the park (512 houses). It is calculated that the park adds an average of \$5,644 to the value of each house, for an overall added residential real estate value increase of about \$2.8 million within this half-mile radius. The estimated total property tax value from this benefit is \$55,415 annually in payment to local taxing jurisdictions. This is impressive considering Rose Tree County Park is land locked by a system of highways and congested roads—features that typically negatively impact property value.

Figure 2.12
Property Value Impact for Rose Tree County Park

	½ Mile Total
Total Number of Houses within 1/2 mi.	512
Total Property Value (\$M)	\$217.3
Total \$ Value of Open Space (\$M)	\$2.8
Total % Value of Open Space	1.33%
Total \$Value/House	\$5,644
Total Tax Value	\$55,415
Total Tax/House	\$108

Source: Econsult Solutions, Inc. (2021)

Conclusion

The popularity of the Summer Festival at Rose Tree County Park has brought joy to the residents of Delaware County for decades as well as advanced the positive public image of County services. Visitors to the Summer Festival have enjoyed the amphitheater and been exposed to the surrounding open space and amenities in the park. Local businesses, especially restaurants and food markets, have benefited from the concerts on event days. The popularity of the Summer Festival has influenced other similar programs. Glen Providence County Park in nearby Media Borough has had a regular concert series, albeit a much smaller schedule, in recent years, thanks to the Friends of Glen Providence Park organization. Inspired by the success of the Summer Festival, there is some desire recently to find ways to bring concert type events to additional County-owned parks facilities in other parts of the County, thereby bringing the enjoyment to citizens who would have easier access there, and by extension bringing the revenue generating benefits to other locations.

While “parks are priceless” is a popular understanding, the purpose of this project was to show that just one program of the Delaware County Parks and Recreation Department has an actual numeric value. The value of \$793,000 in local economic benefit of the concert series solidifies the Department’s position as a contributor to economic development in Delaware County. Generating an annual economic value report for parks and recreation would help to support budget and staffing decisions. When we combine property value with the economic value of the Summer Festival and other programs held in the park, the economic impact of Rose Tree County Park is highly significant.



MEADOW
TRAIL



SECTION 3

ENVIRONMENTAL SERVICES BENEFITS

Introduction

Protected open space in Delaware County provides visible environmental benefits for the communities it serves. This section draws upon established research to evaluate the economic benefits in monetary terms of several types of ecosystem services provided by the County's open space network, including air pollution removal, the provision of water supply, water quality improvement, flood mitigation, wildlife habitat conservation, and carbon sequestration and storage. Combined, these benefits create ecosystem functions that would require costly measures to replicate if lost. The upkeep of the protected open space will ensure the value of the services if the ecosystems are retained. If these ecosystems were removed, municipalities would incur additional costs to recoup their value.

Methodology

ESI calculated the land cover variation for the protected open space in Delaware County and applied the values associated with each of the ecosystem services to produce total value of the environmental impact of protected open space. Dollar values approximating the economic value of each of these services are based on peer-reviewed estimates of value on a per-acre basis. These total value estimates represent the costs avoided by not having to artificially replicate the ecosystem services currently provided by the protected open space in Delaware County.⁷

First, acreage of ecosystems within the protected open space was determined using the land cover imagery from the Multi-Resolution Land Characteristics (MRLC) 2019 National Land Use Land Cover file. The acreage of each ecosystem type is used to calculate environmental services benefits using values from a 2006 study conducted by Costanza, which estimated the average value of various ecosystem services. The estimated

benefits were derived by determining the acreage type for the ecosystem services and multiplying the acreage by the ecosystem service benefit. Each ecosystem provides different ecosystem services and has associated value per acre, determined by the Costanza study, and applied to protected open space in Delaware County.

The i-Tree model developed by the U.S. Forest Service is used to estimate the air pollution removal and carbon sequestration and storage benefits of protected open space in Delaware County. The resulting values for air pollution benefits reflect the amount society would have to pay in areas such as healthcare if trees did not remove these pollutants. The model uses National Land Cover Datasets (NLCD) to first estimate the amount of tree canopy and then uses pollution removal rates to estimate the total amount of pollutant removal that results from this canopy coverage. It also estimates the lifetime amount of carbon stored within trees and how much carbon is sequestered by trees on an annual basis. The i-Tree model has the advantage of allowing for the adjustment of the per-acre pollution removal values.⁸

Ecosystem Services Impact

The ecosystem services include benefits such as air pollution removal, replenishing water supply, water quality improvement, preservation of wildlife habitat, and carbon sequestration and storage. It should be noted that some types of landscapes are more valuable than others for a particular type of benefit: air pollution removal and carbon sequestration are primarily a function of tree coverage, and wetlands and riparian forests are major drivers of water supply, water quality, and flood mitigation benefits.

The ecosystem services provided by the approximately 14,000 acres of protected open space generate significant economic benefits, including the nearly 6,600 acres of tree cover to the County.

⁷ Costanza, Wilson, Tory, Voinov, Liu, and D'Agostino (2006), *The Value of New Jersey's Ecosystem Services and Natural Capital*. New Jersey Department of Environmental Protection, Division of Science, Research, and Technology.

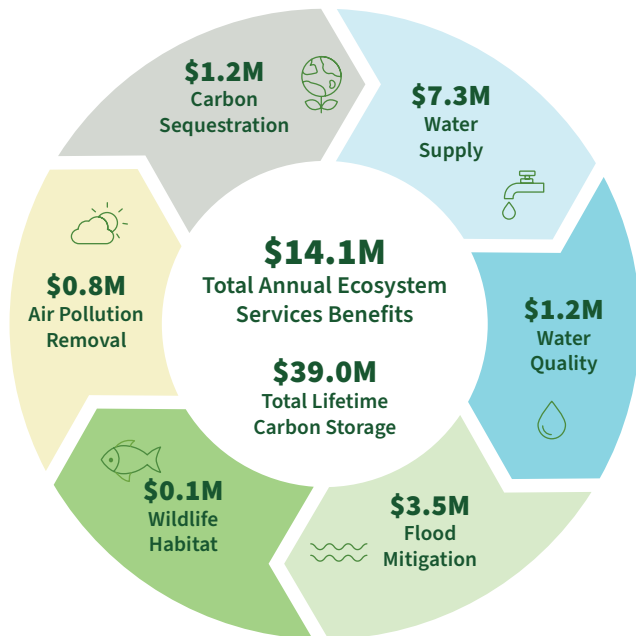
⁸ i-Tree, USDA Forest Service, <https://www.itreetools.org/>.

ENVIRONMENTAL SERVICES BENEFITS

In sum, the ecosystem services and environmental benefits are \$14.1 million in annual benefits from a variety of sources (see Figure 3.1) and \$39 million in the lifetime cost savings of carbon storage from tree coverage.

The following subsections provide additional detail on the calculations of these ecosystem services, how they were calculated, and their total cost savings impact on Delaware County.

Figure 3.1:
Environmental Benefits of Protected Open Space in Delaware County (\$M per Year)



Source: Costanza (2006), Multi-Resolution Land Characteristics Land Cover (2019), Delaware County (2021), Econsult Solutions, Inc. (2021).

Water Supply

The soil of undeveloped land stores water and replenishes streams, reservoirs, and aquifers. This natural system provides the continuous recharge of groundwater and streams. Forests and wetlands are particularly productive land covers for water provision. The larger the land cover, the greater the benefits derived. Were this ecosystem to fail, water would have to be imported from elsewhere or local water would need to be more extensively treated, both of which are costly. Protected open space in Delaware County generates \$7.3 million in annual cost savings from natural water supply services.

Water Quality

Forests and wetlands provide a natural protective buffer between human activities and water supplies. This service is driven largely by the proportion of forest, wetland, and riparian buffer located within the protected open space. This riparian buffer filters and stops several types of waste, including pathogens, excess nutrients, metals, and sediments, from entering the water supply. Without the riparian buffer, residents would be forced to pay for alternative groundwater filtration or water treatment methods. In sum, this generates approximately \$1.2 million annually in water quality benefits from the ability to naturally maintain water quality in Delaware County.

Flood Mitigation

Many natural landscapes serve as a buffer protecting people and properties from destructive natural events. The absorptive capacity of protected open space helps to mitigate the risk of flood during storm events by trapping and containing stormwater. If the County were to be deprived of this natural service, residents and local governments would be forced to undertake costly measures to protect the built environment from further damage caused by flooding, such as constructing dams or reservoirs. In sum, buffers from protected open space in Delaware County generate approximately \$3.5 million annually from natural flood mitigation services.

Wildlife Habitat

Protected open space serves as habitats for a diverse array of plants and animals. Intact forests and wetlands harbor species that people value for both aesthetic and functional purposes. Values for this ecosystem service estimate the amount of money that people would be willing to pay to preserve wildlife. It is important to note that the value associated with wildlife habitat is of a different nature than the values associated with the other ecosystem services included in this section—it does not represent an avoided cost. To ensure a conservative valuation of the benefit derived from the preservation of wildlife habitat on protected open space, the estimates in this section are based on minimum willingness-to-pay values from the research literature.⁹ In sum, the wildlife habitats located within Delaware County's protected open space has an estimated annual value of \$0.1 million.

Air Pollution Removal

Poor air quality is common in many urban and suburban areas and can lead to a variety of human health problems, including asthma and other respiratory ailments. The pollutants that affect air quality also can damage buildings and plants, give rise to smog, and contribute to climate change. Trees mitigate significant amounts of air pollution through botanic respiration processes that remove pollutants from the air. This naturally occurring air pollution removal process contributes to environmental quality and health.

Protected open space in Delaware County provides approximately 6,600 acres of tree canopy. Using this total tree canopy acreage and established estimates of the per-ton benefits of removing various airborne pollutants, it is estimated that trees on protected open space in Delaware County annually provide \$0.8 million in air pollution removal services.

This analysis includes benefits derived from the removal of five different pollutants: carbon monoxide (CO), nitrogen dioxide (NO₂), ozone (O₃), particulate matter (PM10), and sulfur dioxide (SO₂). Figure 3.2 shows the value generated for the removal of each pollutant.

Figure 3.2:
Estimated Annual Air Pollution Removal Benefits from Protected Open Space in Delaware County

Pollutant	Tons	Cost Savings (\$)
O ₃	147	\$554,000
PM-10	48	\$261,500
NO ₂	27	\$13,000
CO	3	\$3,400
SO ₂	20	\$3,000
Total	245	\$834,900

Source: i-Tree (2021), Multi-Resolution Land Characteristics Land Cover (2019), Delaware County (2021), Econsult Solutions, Inc. (2021).

Carbon Sequestration and Storage

Trees mitigate the impacts of climate change by sequestering and storing atmospheric carbon from carbon dioxide. Carbon storage is an estimate of the total amount of carbon stored in the existing biomass of trees, both above and below ground. In other words, if the carbon currently stored in trees on protected open space were released into the air, it would cause damages that would require a significant cost to mitigate, such as damages to agricultural productivity, human health, and property damages. It is important to note that the estimate of the value of stored carbon is not annual. The storage of carbon in a tree represents a one-time benefit—the carbon is kept out of the atmosphere until the tree dies and/or decomposes.

The social cost of carbon, which is the value of carbon sequestration and storage, is \$171 per ton.¹⁰ Using this social cost of carbon, it is estimated that trees within the protected open space in Delaware County store 228,400 tons of carbon, equating to \$39 million within existing biomass. In other words, if carbon currently stored in trees within the protected open space were released into the air, it would cause climate change damages that would cost \$39 million to mitigate.


9 Costanza, Wilson, Tory, Voinov, Liu, and D'Agostino (2006), *The Value of New Jersey's Ecosystem Services and Natural Capital*. New Jersey Department of Environmental Protection, Division of Science, Research, and Technology.

10 I-Tree, USDA Forest Service, <https://www.itreetools.org/>.

As a tree grows, it pulls carbon from the air. New growth on trees is responsible for carbon sequestration, which is measured on an annual basis. This estimate controls for the yearly release of stored carbon through the death and decay of trees. Like the carbon storage estimate, this estimate measures the monetary damages associated with each ton of carbon that is sequestered. Because this carbon is taken out of the air by trees within the protected open space, these damages are avoided, representing savings for communities across the County. Every year, new growth on the trees within the protected open space sequesters \$1.2 million in carbon.

Figure 3.3 shows estimates of the tons of carbon stored by trees for their lifetime and carbon annually sequestered within the protected open space, along with the benefits derived from the storage and sequestration of carbon by these trees.

Figure 3.3:
Estimated Amounts of Annual Carbon Sequestration and Lifetime Carbon Storage and Associated Benefits from Protected Open Space in Delaware County

	Carbon Storage	
	228,400 tons x \$171/ton	\$39M Cost Savings
	Carbon Sequestration	
	7,200 tons x \$171/ton	\$1.2M Cost Savings

Source: i-Tree (2021), Multi-Resolution Land Characteristics Land Cover (2016), Delaware County (2021), Econsult Solutions, Inc. (2021).

*Estimates of inputs (social cost of carbon and carbon tons) were rounded and therefore the product of total cost savings may not square due to rounding.

Stormwater Management

Protected open space helps mitigate stormwater impacts by reducing the volume of runoff created by storm events, and the associated pollutants that stormwater carries. This reduces the burden placed on communities and their stormwater infrastructure to manage the volume of runoff and pollutant loads, thereby avoiding both capital and long-term maintenance expenditures, as well as improving ecological habitats, recreational resources, and sources of current and future public water supplies. The analyses in this section estimate the value of these ecosystem functions and avoided stormwater impacts.

Delaware Valley Regional Planning Commission commissioned Stroud Water Research Center to examine the potential water quantity and quality benefits of open space preservation in Delaware County.

Methodology

Potential water quantity and quality benefits of protected open space in Delaware County was assessed using two different models under two different land-use scenarios. The two models used were:

- the Site Storm Model (SSM), implemented in Python (programming language);¹¹
- the Watershed Multi-Year Model (WMYM), implemented within the Model My Watershed® web application.¹²

Both models provide estimates of infiltration, runoff, and evapotranspiration and nitrogen, phosphorus, and sediment loads derived from landscapes as precipitation moves through a watershed. However, the SSM estimates these loads from a single 24-hr storm event defined by the user (in this case a 3.2-inch rain event; approximately a 2-year return interval storm) and the WMYM predicts average annual loadings derived from daily precipitation and temperature data from a thirty-year time period that is automatically utilized in the modeling routine.

11 WikiWatershed Site Storm Model, <https://github.com/WikiWatershed/tr-55>.

12 Model My Watershed, <https://modelmywatershed.org/>.

For the SSM, two different land-use scenarios were used:

- Land cover conditions as reported by the National Land Cover Database (NLCD) for 2016 ("2016 Land Use");
- Assumed land cover conditions if the level of development within the open spaces matched that of un-preserved portions of the county ("No Preservation").

For the WMYM an additional scenario was included in addition to the above:

- 2016 NLCD conditions with both urban and agricultural best management practices (BMPs) applied on preserved lands ("2016 Land Use with BMP's").

Before any models were applied a Geographic Information System (GIS; ArcGIS Desktop version 10.6.1; ESRI, Redlands, CA) software was used to overlay the 2016 NLCD data with the boundaries of the preserved open spaces in Delaware County. This overlay was used to calculate the total area of each land use category within the preserved open spaces and within the county as a whole.

The "No-Preservation" scenario assumes that without open-space preservation, the land-use distribution within the applicable parcels would match that of the areas of the county without separate protections. Specifically, forest, row crop, and pasture categories were replaced with the various developed land cover types. To generate this scenario, the percent of potentially developable land that is developed was calculated for the county excluding the preserved open spaces. The resulting land use distribution was then multiplied by the total amount of developable land in the preserved open spaces to get new land use areas without preservation.

Stormwater Runoff and Pollution Mitigation

Protected open space generates much less stormwater volume than unprotected lands and allows much less rainfall to reach streams as stormwater runoff, which helps to mitigate erosion and flooding. On average, parcels of protected open space have more tree canopy and vegetation and less impervious cover than unprotected lands. This additional vegetative and pervious cover enables these protected acres to better absorb rainfall for transpiration, evaporation, and infiltration into the ground, collectively leaving much less rainfall to become stormwater runoff. The vegetative cover also has few sources of pollutants, resulting in relatively small volumes of pollutant loads being carried to streams by stormwater runoff. These stormwater mitigation services result in much less overland flow of storm runoff, much smaller pollutant loads, and much less erosive energy than is generated by unprotected lands.

Storm runoff from unprotected lands contains pollutants, such as excess nitrogen (N), phosphorus (P) and sediment (among others), which degrade water quality for humans for drinking and recreational uses, as well as degrading habitat for aquatic species. These pollutants are predominantly generated by human activities associated with developed and agricultural lands.

By generating less runoff and sources of pollutants, protected open space generates less N, P, and sediment than would be generated from these lands if they were unprotected from development. The modeling effort for watersheds in Delaware County demonstrated that if all of the county's protected open space in the watershed were developed at the same extent and density as nearby unprotected (developed) lands, and there were no protection requirements for implementation of conservation plans on the protected agricultural lands, the pollutant loadings of nitrogen, phosphorus and sediment would increase significantly, as shown in Figure 3.4. These additional pollutant loadings would require additional stormwater treatment infrastructure to be installed and maintained to reduce the pollutant loads to levels that would not impair the receiving streams.

ENVIRONMENTAL SERVICES BENEFITS

In terms of runoff volumes, if all the county’s protected open space were developed at the same extent and density as nearby unprotected (developed) lands, along with no protection requirements for conservation plan implementation on protected agricultural lands, the annual volume of surface runoff would increase by 978 million gallons per year. This is an increase in runoff of 7.2 percent.

If Delaware County protected open space was developed to the extent and density typical of nearby unprotected (developed) lands, each 2-year storm would generate an additional 178 million gallons of stormwater runoff, an increase of 4.0 percent. This represents the volume of water not absorbed by transpiration, evaporation or groundwater recharge and instead running off the property and contributing to erosion and flooding.

Figure 3.4:
Avoided Increase in Annual Pollutant Loadings Due to Protected Open Space in Delaware County

Pollutant	Total Increase in Annual Pollutant Loading (lbs/year)	Total Increase in Annual Pollutant Loading per Acre of Protected Open Space (lbs/year per acre)
Total Nitrogen	41,050	3
Total Phosphorus	10,750	1
Sediment	48,557,286	3,464

Source: Stroud Water Resource Center (2021).

Figure 3.5:
Avoided Increase in Stormwater Runoff due to Protected Open Space in Delaware County

Storm Level Runoff	Total Avoided Stormwater Volume	Percent Increase in Stormwater Volume: Protected Open Space vs. Unprotected Lands
Average Annual	978M gal./yr.	7.2%
2-Year Storm Event (3.2"/24 hrs)	178M gal./event	4.0%

Source: Stroud Water Resource Center (2021).



Chester Creek Trail
 Photo credit: Sahar Coston-Hardy

Economic Benefits of Stormwater Mitigation

An increase in runoff and pollutant loads would require additional investment in infrastructure to manage the increased stormwater. Estimates of capital costs and accompanying annual operation and maintenance costs for the construction of the additional infrastructure required to manage the increased runoff of 2-year storm events, as well as annual cost for removal of stormwater pollutant loadings were developed based on existing research publications. The results concluded that protected open space avoids \$46.5 million of capital

cost for stormwater infrastructure construction, plus an additional annual investment of \$6.2 million to operate and maintain this additional infrastructure, and an additional annual investment of \$74.4 million needed to remove annual pollutant loadings. Thus, protected open space, on average, avoids \$3,300 per acre of stormwater infrastructure construction costs, \$400 per acre per year of annual operations and maintenance costs, and \$5,310 per acre per year of annual pollutant load reduction costs, the latter two costs often being the responsibility of the municipality.

Figure 3.6:
Avoided Costs of Construction and Annual Operations and Management to Manage 2-Year Storm Runoff Due to Protected Open Space in Delaware County

Avoided Capital Costs for Construction of Infrastructure for 2-Year Storm Runoff	Avoided Annual Costs for O&M of Infrastructure for 2-Year Storm Runoff
\$0.26/gal .runoff	\$0.03/gal. runoff
\$46.5M total capital cost	\$6.2M/yr. O&M cost
\$3,300/ ac. of protected open space	\$400 per year per acre of protected open space

Source: Econsult Solutions, Inc. (2021).

*Estimates of inputs (stormwater gallons and cost per gallon) were rounded and therefore the product of total capital costs may not square due to rounding.

Figure 3.7:
Avoided Costs of Removal of Annual Stormwater Pollution Loads due to Protected Open Space in Delaware County

Pollutant	Total Avoided Annual Pollutant Load (lb/year)	Total Avoided Annual Pollution Reduction Cost (\$/yr)	Average Annual Avoided Cost per Year per Acre of Protected Space (\$)
Total Nitrogen	41,050	\$186,600	\$10
Total Phosphorus	10,750	\$3.6M	\$260
Sediment	48,557,286	\$70.6M	\$5,040
Totals		\$74.4M	\$5,310

Source: Stroud Water Resource Center (2021); Econsult Solutions, Inc. (2021).

*Estimates of inputs (reduction costs) were rounded and therefore the average annual costs per acre may not square due to rounding.

CASE STUDY

COUNTY PROPERTY FORMERLY KNOWN AS DON GUANELLA

MARPLE TOWNSHIP

DELAWARE COUNTY'S FOREST FOR ALL: TREES ARE GREEN GOLD

Location: Sproul Road and Reed Road

Acreage: 213 acres

Owner/Operator: Delaware County

The property formerly known as Don Guanella generates \$105,400 in environmental benefits per year.



The Property Formerly Known as Don Guanella
Photo credit: Google Earth

Don Guanella School Acquisition: A Win for Delaware County

In 2021, Delaware County Council moved to acquire the property through eminent domain to protect the former Don Guanella School from development. It will become the largest park in the Delaware County county park system. The community has treasured the woods on this property for more than half a century. The site has been under tremendous pressure for development since the closing of the Don Guanella school. Multiple plans to develop the site for residential and retail, including one that would have clear cut the site, were proposed over several decades and rejected. The community galvanized to protect the woods. Volunteers have created almost 10 miles of trails throughout the woods where two streams meet.

Located in the densely developed center of Delaware County, the 213-acre property is the last tract of undisturbed old-growth forest in the area with approximately 170 acres of woodlands. As a cherished recreational amenity for the community, it also provides significant economic returns in environmental services. The old-growth forest preserved in central Delaware County offers large returns in recreational value, stormwater management savings, air and stream quality improvements, and wildlife habitat.

Environmental Benefits

In addition to the enormous recreational value the site brings to the community, the economic benefits of the environmental services that the woods offer are significant. The land serves as a sponge that soaks up stormwater runoff, which both improves stream quality and mitigates damaging flood impacts downstream.

Figure 3.8
Property formerly known as Don Guanella



Source: ESRI Basemap (2021) .

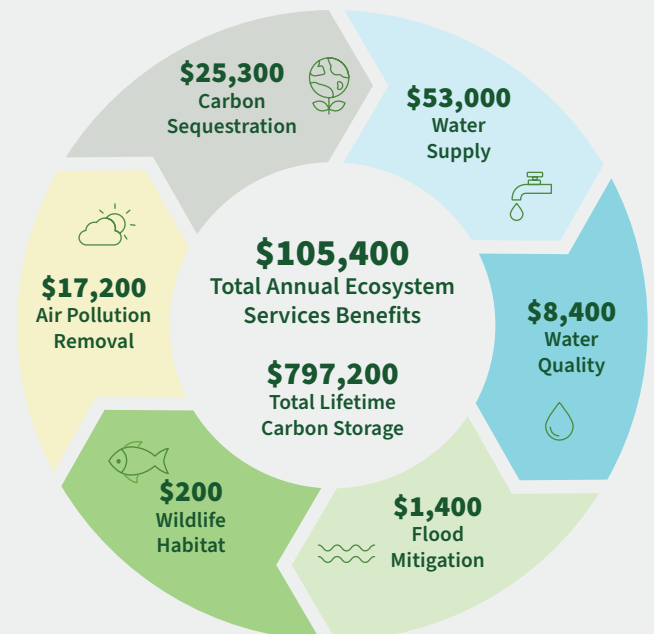
Preserving the property avoids 7.1 million gallons of stormwater runoff every year. The estimated cost to construct infrastructure that would manage the 7.1 million gallons of additional runoff if the property were developed would be \$411,700 plus an additional \$54,900 every year for maintenance. The added stormwater runoff would also pollute the streams, most notable with 13,085 pounds per year of sediment, which ruins stream habitat. The cost to treat the sediment load would be \$21,700 per year (Figures 3.12 to 3.14).

The soon-to-be County Park also provides air quality and carbon sequestration returns. The trees remove air pollutants at a cost savings of \$17,200 per year (Figure 3.10). Ozone and particulate matter are two pollutants that the forest removes from the air. These pollutants are hazardous to human health and negatively impact the lungs and respiratory system. It is also estimated that the lifetime carbon storage cost savings are \$797,200 (Figure 3.11). The total environmental services from a variety of sources are estimated to be \$105,400 per year (Figure 3.9).

“The new park will protect the site’s extraordinary old growth forest and benefit all County residents.”

Press Release, June 15, 2021

Figure 3.9:
Environmental Benefits of Protected Open Space
Associated with Don Guanella (\$ per Year)



Source: Costanza (2006), Multi-Resolution Land Characteristics Land Cover (2019), Delaware County (2021), Econsult Solutions, Inc. (2021).

“It’s a win for every Delaware County resident. We’re going to get the best park in the system with miles and miles of trails.”

Ken Hemphill, Communications Coordinator, Save Marple Greenspace

Figure 3.10:
Estimated Annual Air Pollution Removal Benefits from Protected Open Space Associated with Don Guanella

Pollutant	Pounds	Cost Savings (\$)
O ₃	6,000	\$11,300
PM-10	1,900	\$5,400
NO ₂	1,100	\$300
CO	100	\$100
SO ₂	800	\$100
Total	9,900	\$17,200

Source: i-Tree (2021), Multi-Resolution Land Characteristics Land Cover (2019), Delaware County (2021), Econsult Solutions, Inc. (2021)

Figure 3.11:
Estimated Amounts of Annual Carbon Sequestration and Lifetime Carbon Storage and Associated Benefits from Protected Open Space Associated with Don Guanella



Carbon Storage 4,675 tons x \$171/ton	\$797,200 Cost Savings
Carbon Sequestration 150 tons x \$171/ton	\$25,300 Cost Savings

Source: i-Tree (2021), Multi-Resolution Land Characteristics Land Cover (2016), Delaware County (2021), Econsult Solutions, Inc. (2021)

*Estimates of inputs (social cost of carbon and carbon tons) were rounded and therefore the product of total cost savings may not square due to rounding.

Figure 3.12:
Avoided Increase in Annual Pollutant Loadings Associated with Don Guanella

Pollutant	Total Increase in Annual Pollutant Loading (lbs/year)	Total Increase in Annual Pollutant Loading per Acre of Protected Open Space (lbs/year per acre)
Total Nitrogen	92	0.54
Total Phosphorus	7	0.04
Sediment	13,085	76.97

Source: Stroud Water Resource Center (2021)

Figure 3.13:
Avoided Increase in Stormwater Runoff Associated with Don Guanella

Storm Level Runoff	Total Avoided Stormwater Volume	Percent Increase in Stormwater Volume: Protected Open Space vs. Unprotected Lands
Average Annual	7.1M gal./yr.	185%
2-Year Storm Event (3.2"/24 hrs)	1.6M gal./event	178%

Source: Stroud Water Resource Center (2021)

Figure 3.14:
Avoided Costs of Construction and Annual Operations and Management to Manage 2-Year Storm Runoff Associated with Don Guanella

Avoided Capital Costs for Construction of Infrastructure for 2-Year Storm Runoff	Avoided Annual Costs for O&M of Infrastructure for 2-Year Storm Runoff
\$0.26/gal .runoff	\$0.03/gal. runoff
\$411,700 total capital cost	\$54,900/yr. O&M cost
\$2,400/ ac. of protected open space	\$300 per year per acre of protected open space

Source: Econsult Solutions, Inc. (2021).

*Estimates of inputs (stormwater gallons and cost per gallon) were rounded and therefore the product of total capital costs may not square due to rounding.

Benefits Far into the Future

"Even prior to the COVID pandemic, we knew that open space—including parks, trails and bike paths—bring real economic and environmental benefit to our community and this park will dramatically improve our county's quality of life," according to Delaware County Council. This park will benefit many generations of people in Delaware County far into the future through recreational and economic benefits as well as the benefits of clean air and clean water—all without having to bear the costs required to support residential and commercial development. Public space does not just protect our environment and create economic value, it builds stronger communities that will help Delaware County remain a place where people want to live, work, and raise a family.

Figure 3.15:
 Avoided Costs of Removal of Annual Stormwater Pollution Loads Associated with Don Guanella

Pollutant	Total Avoided Annual Pollutant Load (lb/year)	Total Avoided Annual Pollution Reduction Cost (\$/yr)	Average Annual Avoided Cost per Year per Acre of Protected Space (\$)
Total Nitrogen	92	\$400	\$2
Total Phosphorus	7	\$2,300	\$14
Sediment	13,085	\$19,000	\$112
Totals		\$21,700	\$128

Source: Stroud Water Resource Center (2021); Econsult Solutions, Inc. (2021).

*Estimates of inputs (reduction costs) were rounded and therefore the average annual costs per acre may not square due to rounding.



CASE STUDY

THE ANDY LEWIS COMMUNITY PARK

HAVERFORD TOWNSHIP

THE ANDY LEWIS COMMUNITY PARK: GREEN, CLEAN, AND FUN

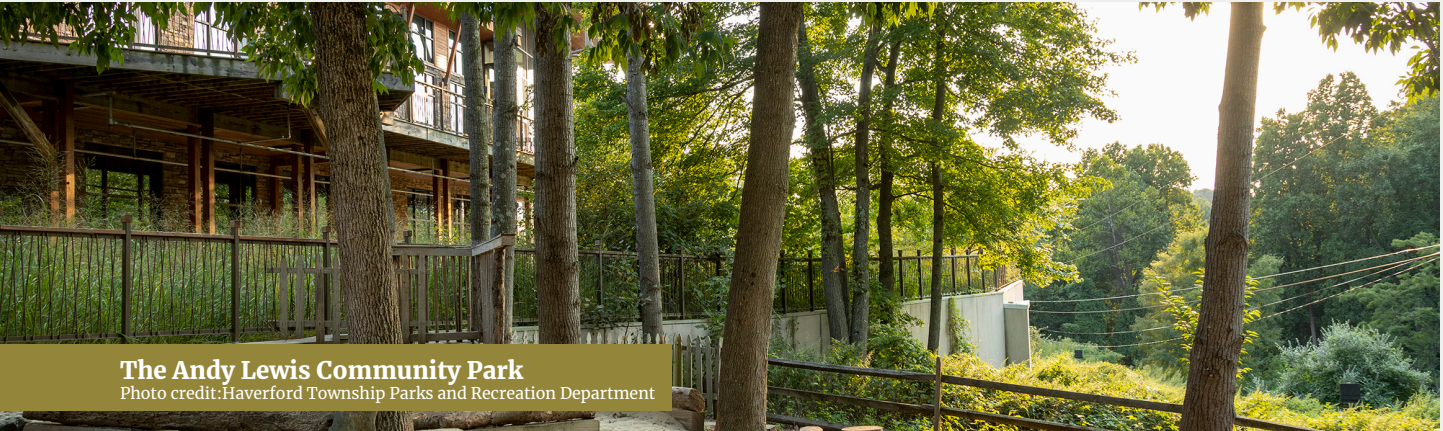
Location: Haverford Township, along Darby Creek

Acreage: 169 acres

Owner/Operator: Haverford Township

“What an incredible addition to the Haverford area.”

Andy Lewis Community Park visitor comment



The Andy Lewis Community Park

Photo credit: Haverford Township Parks and Recreation Department

Whether you're dreaming of an afternoon spent in the sun or working out in a first-class recreation center, Andy Lewis Community Park in Haverford Township is the place to be year-round. Offering 209 acres of green space and top-notch recreation facilities, both indoors and outdoors, Andy Lewis Community Park offers the perfect setting to run, bike, walk the dog, disc golf, play ball, enjoy a great playground, or just enjoy a good book under the shade of a tree.

Andy Lewis Community Park, formally known as the Haverford Reserve, was once owned, and operated by the Commonwealth of Pennsylvania as the Haverford State Hospital from 1962 to 1998. Haverford Township acquired the property in 2002 to develop the state-of-the-art park over the next ten years with partnerships, sustainability, creative financing, and strategic operational planning designed for cost recovery. Today, Andy Lewis Community Park stands as a model for other communities in demonstrating how green space and parks generate a significant “Return on Environment” to the community in both cost savings and enhanced public recreation opportunities.

First Agency of the Year awarded by the Pennsylvania Department of Conservation and Natural Resources and Pennsylvania Recreation and Park Society in 2016

Haverford Township Parks and Recreation Department

This award inspires and recognizes exemplary accomplishments in positioning parks and recreation as an essential public service with meaningful community impact. Winning agencies provide fresh perspectives on significant parks and recreation issues, demonstrating innovation, collaboration, and a high level of resourcefulness.

Figure 3.16
The Andy Lewis Community Park



Source: ESRI Basemap (2021)

About the Park Acquisition, Planning, Development, and Operation

Closure of the hospital was due to the general deinstitutionalization of the state hospital system and a lawsuit. In 2002, the Commonwealth of Pennsylvania transferred the property to Haverford Township for \$3.5 million with a deed restriction. The deed restriction required the preservation of 120 acres as passive open space and the designation of 15 acres for active recreation for a total of 135 acres of the original 209-acre site. Haverford Township fought hard to create a sustainable park for all, taking on legal battles despite significant pressure for residential and commercial development in this most desirable community. In 2006, the Haverford Township Board of Commissioners sold a portion of the property to a developer for \$17.5 million, with a strictly limited land development plan that included housing on 40 acres and active recreation on 40 acres. Within the Andy Lewis Community Park, Haverford Township surpassed the deed restrictions by establishing 169 acres of protected open space and community facilities while housing development was limited to 19 percent (40 acres) of the total 209 acres.

An Oasis

It's stunning to think, wow, we're in the middle of Haverford Township. It feels more like the Poconos but it's only five miles from the Blue Route, Darby Road and Eagle Road. It's like having the best of both worlds.

"A terrific park with spacious facilities."

Andy Lewis Community Park
visitor comment

Creative financing produced \$2.1 million in grants and \$17.5 million in the sale of a portion of the property to a developer. The proceeds of the sale were used to develop the park with its large passive area, state-of-the-art Community Recreation and Environmental Center (CREC), dog park, playground, sports fields, interpretive signage, and five miles of walking trails.

Park Development Funds

It is important to note that the funds to develop the park and CREC were based on creative township funding and grants based upon sustainability and economic development. The Pennsylvania Department of Community and Economic Development provided \$1.5 million to develop the park and CREC on the basis that this public facility would result in the creation of four full-time jobs. **The Parks and Recreation Department reported that it took 12 to 18 months to reach the goal of establishing the four new positions now in place.** The Department added two Programmers, an Operations Manager, and a Rental Coordinator. The Pennsylvania Environmental Council (PEC) provided a grant of \$600,000 for the geothermal heating and cooling system for CREC. The sale of the property resulted not

ENVIRONMENTAL SERVICES BENEFITS

only in the preservation of open space and creation of the Township’s signature recreation facility but also the long-term heating and cooling of the community’s indoor recreation facility in a sustainable and low-cost way. This funding was also used to leverage grants by serving as the grant matches required.

Operations, Management and Financing

Since operational costs over the lifetime of a park typically exceed acquisition and development costs, Haverford Township focused on establishing a sound business plan for park operation, maintenance, financing, and programming. Of particular concern was the operation of CREC as a program-based facility for recreation and environmental education. In the business plan for the first year of operation, the Parks and Recreation Department developed a budget for staffing and facility operational costs such as utilities, equipment, and supplies of \$200,000 above the Parks and Recreation Department budget prior to Andy Lewis Community Park. The Department also budgeted for \$170,000 in new revenues through non-tax sources to offset the additional expenses. Since the Haverford Township Parks and Recreation Department is well-known for its success and expertise in public recreation programming, their business plan is strongly rooted in programming rather than membership-based fitness and pool facilities. Based on their successful history of recreation programming, the Department established a recreation and environmental education programming plan with a pricing structure to capture a minimum of 85 percent of the operating costs. **This business plan has led to a remarkably consistent 85 percent cost recovery rate and Township support of 15 percent.**

“So many fun things for kids to do.”

“Really nice park. I enjoyed my time there and got some work done on my laptop too.”

“A great place!
Folks of all ages are using it.”

Andy Lewis Community Park visitor comments

Benefits of Andy Lewis Community Park

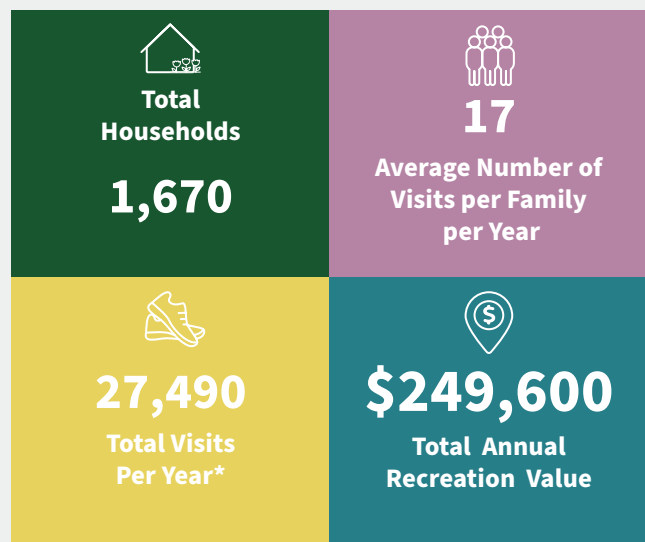
Andy Lewis Community Park personifies the concept that recreation is an investment not a cost by **generating nearly \$2 million annually in health care and workplace savings for those who live within a half mile of the park; \$104,000 in environmental benefits; and a lifetime cost saving of \$504,900 in carbon storage.** Over the park’s lifetime, the benefits will outweigh the cost of development and a significant portion of operating costs.

Community Cohesion, Recreation, Health, and Wellness Benefits

A key ingredient for the success of Andy Lewis Community Park is the activism and volunteerism of the local community. A diverse collection of recreation-enthusiasts, from trail-users to pickle-ball players to dog walkers, supported the development of the park and its many facilities. In fact, the community helped to plan and build the Freedom Playground.

In addition to volunteerism for recreation, the park has inspired environmental volunteers. A Bryn Mawr

Figure 3.17:
Recreational Benefits to Local Households from The Andy Lewis Community Park within a 1/2 Mile of the Park



Sources: Econsult Solutions (2021), ACS 2019 5-Year Estimates, PA DCNR (2014, 2019), U.S. Army Corps of Engineers (2021)

*Estimates of households and total visits are rounded and therefore the product of total visits may not square due to rounding.

College student donated a weather station. Volunteers from the Friends of Haverford Trails recently rejuvenated the weather station from Darby Creek. It now stands near the entrance to the CREC building parking lot, sited more optimally for weather factors such as rainfall and wind. Additionally, the first rain garden was installed by Boy Scout Troops along the soccer field which lead to the establishment of Haverford Environmental Advisory Committee’s (EAC) “100 Rain Gardens in 10 Years” Initiative. **This initiative was designed to promote green stormwater management and help reduce flooding in local waterways such as Darby Creek with an annual benefit \$3,700.**

Andy Lewis Community Park is estimated to provide an annual recreation value of **\$249,600 directly to households within a half mile of the park.** The value of protected recreational open space is estimated by the amount an average consumer would be willing to pay for a recreational service if the service were not publicly available. The diverse outdoor recreation facilities includes five miles of trails with a trail head, lighted sports facilities, Freedom Playground, the Dog Park, the Disc Golf Course, and nature areas. Trails and greenways create healthy recreation and transportation opportunities by connecting the community with safe places to walk, cycle and use other forms of non-motorized transportation. The park also hosts the Community Recreation and Environmental Center. CREC offers state-of-the-art fitness facilities, basketball, pickle ball, a walking track, group fitness classes, and both drop-in and scheduled recreation opportunities.

Research has shown that physically active people typically enjoy a variety of health benefits including lower incidence of cardiovascular diseases, diabetes, depression, certain cancers, and obesity. The physical activity that residents enjoy in Andy Lewis Community Park results in aggregated health care costs of almost **\$2 million a year** in avoided medical costs, workers compensation costs, and costs related to lost productivity. The activity of park visitors translates to lower insurance costs and higher productivity. Because Andy Lewis Community Park draws users from across the township, the recreational value numbers and the avoided healthcare related costs are conservative estimates, with likely values even higher.



CREC Mission

The CREC is a visible symbol of Haverford township's commitment to our residents' health and wellness. The mission of the CREC is to create a healthier environment and healthier individuals through education and programs. We believe the health of our community is directly related to the quality of our air, water, and open spaces as well as the food we eat, the condition of our bodies and how we think. Through the variety of programs offered, we hope to create a community living room where people of different ages, means and backgrounds blend together.

Figure 3.18:
Healthcare and Workplace Savings Associated with The Andy Lewis Community Park within a 1/2 Mile of the Park

Savings Type	Value
Direct Medical Cost Savings	\$234,900
Indirect Medical Cost Savings	\$704,600
Direct Workers' Comp Savings	\$3,100
Indirect Workers' Comp Savings	\$12,200
Lost Productivity	\$1,011,700
Total	\$1,966,400

Source: Econsult Solutions (2021), PA DCNR (2014); ACS 2019 5-Year Estimates, Graefe et al. (2009), Carlson et al. (2014), Chenoweth & Bortz (2005); Econsult Solutions (2021).

ENVIRONMENTAL SERVICES BENEFITS

Environmental Benefits

Climate change has emerged as one of the most pressing environmental, social, economic and health challenges of the 21st century. While it is a global issue, its impacts are felt most intensely at the local level. While the impacts of climate change are daunting, recognition that parks can be part of the climate solution is growing. Parks reduce harmful carbon pollution that is driving climate change; they protect people and infrastructure from increasingly severe storms, flooding, heat waves and droughts; and they also directly reduce some of the primary public health challenges that are exacerbated by climate change. While parks inherently provide climate and health benefits, Andy Lewis Community Park was designed to ensure the provision of such benefits. **The total annual environmental benefits derived from the Andy Lewis Community Park is \$74,700 per year.**

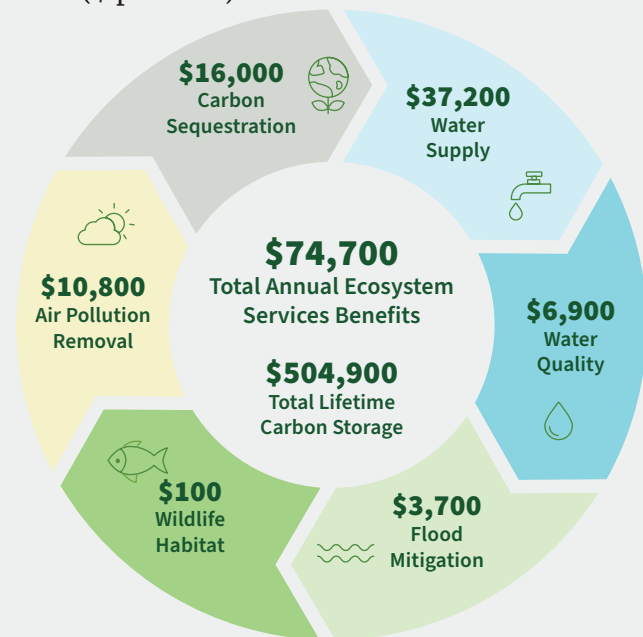
Andy Lewis Community Park is unmatched when compared to the former state hospital's past practices related to operating with coal. This benefit is also crucial due to the extensive transportation network in the surrounding area. Trees and vegetation in parks can help **reduce air pollution** both by directly removing pollutants and by reducing air temperatures. Andy Lewis Community Park helps improve air quality. **As much as 6,270 pounds of air pollutants are estimated to be removed annually** by the 169 acres of protected open space. Carbon Storage and Sequestration has an **estimated lifetime cost saving of \$504,900 in carbon storage along with annual savings of \$16,000 in carbon sequestration.**

In addition to the expected environmental benefits in park and green spaces, Andy Lewis Community Park is unique in generating environmental benefits from the CREC, a LEED certified structure. The building is constructed on the footprint of the state hospital's previous coal power plant and the terrace off the rear side also re-uses a former wall from the previous power plant. In 2013, the Pennsylvania Department of Conservation and Natural Resources (DCNR) and the Pennsylvania Recreation & Park Society (PRPS) awarded Haverford Township its prestigious Green Park Award. Each year, DCNR and PRPS recognize excellence in the public park community for sites that demonstrate the integration of green and sustainable park practices through the Green Park Award.

The annual value of the estimated total ecosystem benefits from the Andy Lewis Community Park equals

roughly **\$74,700**. The total value is calculated based on ecosystem services ranging from water supply and quality, flood mitigation, wildlife habitats, air pollution removal, to carbon sequestration. **The largest annual environmental savings value to come from ecosystem services are water supply (\$37,200) and carbon sequestration (\$16,000).**

Figure 3.19:
Environmental Benefits of Protected Open Space Associated with The Andy Lewis Community Park (\$ per Year)



Source: Costanza (2006), Multi-Resolution Land Characteristics Land Cover (2019), Delaware County (2021), Econsult Solutions, Inc. (2021).

Andy Lewis Community Park Visitor Comments
 “It’s an amazing park.”

Figure 3.20:
Estimated Annual Air Pollution Removal Benefits from Protected Open Space Associated with the Andy Lewis Community Park

Pollutant	Pounds	Cost Savings (\$)
O ₃	3,800	\$7,200
PM-10	1,200	\$3,400
NO ₂	700	\$200
CO	70	\$40
SO ₂	500	\$40
Total	6,270	\$10,800

Source: i-Tree (2021), Multi-Resolution Land Characteristics Land Cover (2019), Delaware County (2021), Econsult Solutions, Inc. (2021).

Conclusion

Building a community park of this scale takes perseverance, commitment, expertise, innovation, and teamwork. Haverford Township did that in spades through the collective energies of community members, elected and appointed officials, and their staff of parks and recreation professionals. Recognized regionally and statewide as an award-winning sustainable facility, the 169-acre park has surpassed its goals of conservation of open space and natural resources, providing a strong sense of community, and recreation opportunities for people of all ages year-round. Andy Lewis Community Park has demonstrated that investment in open space produces valuable returns in economic, social, health and recreational benefits for residents now as well as for many generations yet to come.

Figure 3.21:
Estimated Amounts of Annual Carbon Sequestration and Lifetime Carbon Storage and Associated Benefits from Protected Open Space Associated with The Andy Lewis Community Park



Carbon Storage
 3,000 tons x \$171/ton \$504,900 Cost Savings

Carbon Sequestration
 100 tons x \$171/ton \$16,000 Cost Savings

Source: i-Tree (2021), Multi-Resolution Land Characteristics Land Cover (2016), Delaware County (2021), Econsult Solutions, Inc. (2021).
 *Estimates of inputs (social cost of carbon and carbon tons) were rounded and therefore the product of total cost savings may not square due to rounding.



The Andy Lewis Community Park
 Photo credit: Haverford Township Parks and Recreation Department



Chester Veterans Memorial Park
Photo credit: Sahar Coston-Hardy

SECTION 4

DIRECT USE BENEFITS

Introduction

Protected open space in Delaware County provides a multitude of free and low-cost recreational activities to residents. Many of these activities consist of strenuous or moderate exercise, which contributes to physical well-being and defrays health-care costs. Those who are physically active are not the only ones who derive benefits from protected open space—employers whose employees are healthier have lower healthcare costs, see fewer workers' compensation claims, and have lower rates of absenteeism and presenteeism (coming to work while sick or injured).

This section estimates the economic value that residents capture from the use of protected open space, analyzing both the value users would be willing to pay to participate in recreational activities on protected open space as well as the economic value of avoided health-care costs as a result of users' participation in strenuous and moderate exercise.

Willingness to Pay

The estimates in this section are based on research evaluating the average consumer's willingness to pay for a service or activity. These willingness-to-pay values are not based on actual transactions—they estimate the amount of money the average consumer would be willing to pay for a service or activity if it were not provided by protected open space. As such, the values in this section should not be understood as income, but as a benefit enjoyed as a result of the free or low-cost recreational opportunities provided by protected open space.

Methodology

Recreational Benefit

The value of recreational protected open space in Delaware County is estimated by using a willingness to pay method. This estimation seeks to quantify the amount an average consumer would be willing to pay for a service (using protected open space in Delaware County for recreation) if the service were not publicly available.

The analysis uses 2019 survey data from the Pennsylvania Department of Conservation and Natural Resources (PA DCNR) to estimate the average number of outdoor recreation visits by a typical Pennsylvania household each year.¹³ More comprehensive survey data tracked by PA DCNR in 2014 is then used to estimate the portion of these visits that occur on protected open space.¹⁴ The resulting estimate is applied to the number of households in Delaware County to determine the total number of times residents participate in outdoor activities on protected open space.¹⁵ This estimate is then applied to the average monetary amount people reported being willing to pay to participate in a typical open space visit, producing an estimate of the economic value of protected open space in Delaware County.¹⁶

It is important to note that the total values presented in this section estimate the value that residents derive from recreational activity on Delaware County's public parks. If all these spaces were to be developed, it is likely that residents would go elsewhere to recreate and thereby replace some of the value they currently derive from recreational activity on public parks.

13 Center for Survey Research at Penn State Harrisburg (2019), *Lion Poll Report of Results Submitted to: Pennsylvania Department of Conservation and Natural Resources*.

14 Pennsylvania Department of Conservation and Natural Resources and Penn State (2014), *A Resident Survey—Results*.

15 The number of Delaware County households is drawn from the U.S. Census Bureau's American Community Survey (ACS) 2019 Estimates.

16 The monetary value associated with a typical open space visit is developed through a series of steps. Estimates of a visitor's willingness to pay to participate in a range of outdoor recreation activities are drawn from the US Department of Agriculture (2017), *Recreation Economic Values for Estimating Outdoor Recreation Economic Benefits* and the US Army Corps of Engineers (2021), *Unit Day Values for Recreation for Fiscal Year 2021*. Detailed usage data from the PA DCNR (2014) tracking participation in different types of outdoor recreation activities is matched to the corresponding median willingness to pay values reported in the literature. To develop an estimate for a typical PA household on a typical visit, the weighted average willingness to pay is calculated (weighted by the relative share of outdoor recreation visits that involve that activity).

DIRECT USE BENEFITS

Health Benefit

Recent research has established the link between physical inactivity and demand for health care and has demonstrated that there is a positive relationship between the number of recreational opportunities available to an individual and the frequency of their participation in physical activity. This section seeks to quantify those benefits derived from engaging in physical activity on Delaware County's protected open spaces.

First, the number of working age adults in Delaware County was drawn from the U.S. Census Bureau's American Community Survey 2019 Estimates. This number was then adjusted proportionally based on 2014 survey data from the Pennsylvania Department of Conservation and Natural Resources to estimate the share of working age people in Delaware County who meet physical activity guidelines by exercising at parks or trails in the county.¹⁷ Physically active, in this case, is defined as engaging in moderate to strenuous exercise at least two times per week.

Next, the benefits were divided into five categories of cost savings:

- Direct medical savings: Costs saved on the treatment of illness or medical conditions caused or exacerbated by physical inactivity
- Indirect medical savings: Costs saved on adverse health conditions and poor quality of life resulting from physical inactivity
- Direct workers' compensation savings: The amount employers save in compensation costs due to physically active employees having fewer accidents at work
- Indirect workers compensation savings: The amount employers save in reduced administrative costs due to their physically active employees submitting fewer compensation claims
- Lost productivity savings: The amount saved due to less employee absenteeism (employees

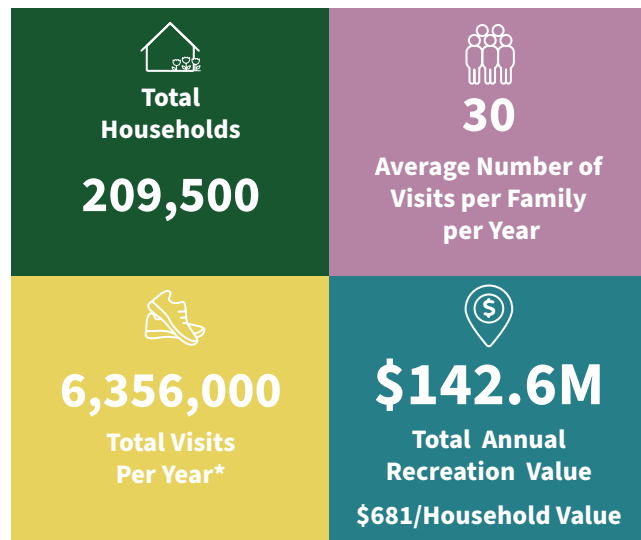
not coming to work because they are sick) and presenteeism (employees coming to work sick or tired, making them less productive)

Economic Value of Recreational Activity

An estimated \$142.6 million in benefits accrue annually to residents who participate in recreational activities on protected open space in Delaware County. This value represents the additional amount of money that residents would be willing to spend to participate in the recreational activities they currently enjoy on protected open space.

The \$142.6 million annual value of recreational activity on protected open space is equivalent to \$681 per household, per year. This value represents how much the average household would be willing to pay (in excess of what it costs them now) to participate in the recreational activities they now enjoy on protected open space.

Figure 4.1:
Annual Recreational Benefits from
Delaware County Open Space



Sources: Econsult Solutions (2021), ACS 2019 1-Year Estimates, PA DCNR (2014, 2019), USDA (2017), USACE (2021).

*Estimates of households and total visits are rounded and therefore the product of total visits may not square due to rounding.

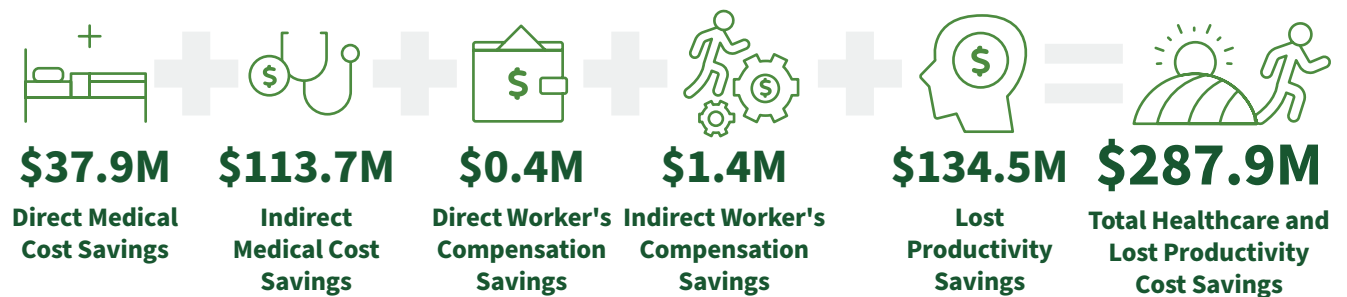
¹⁷ Pennsylvania Department of Conservation and Natural Resources and Penn State (2014), *A Resident Survey—Results*.

Healthcare and Workplace Cost Savings

Research has shown that physically active people typically enjoy a variety of health benefits, including lower incidence of cardiovascular diseases, diabetes, depression, certain cancers, and obesity. This section estimates the health-related cost savings that result from the physical activity that residents engage in on Delaware County’s protected open space. In total, this physical activity results in avoided costs totaling \$287.9 million per year. This figure includes avoided medical costs, workers’ compensation costs, and costs related to lost productivity (see Figure 4.2). These impacts, in turn, translate to lower insurance costs and improved productivity.

Individuals who engage in strenuous exercise two or more times a week are considered to be physically active. According to survey data from PA DCNR, around 35 percent of Pennsylvanians participate in exercise outdoors two more times a week and approximately 41 percent of moderate to strenuous outdoor exercise takes place at protected open space sites like parks and trails.¹⁸ According to 2019 estimates from the U.S. Census Bureau’s American Community Survey, there are approximately 329,660 working age (20 to 64 years old) residents in Delaware County. These statistics are used as the basis for estimating the number of county residents who meet physical activity guidelines on open space and the associated medical costs, workers’ compensation costs, and lost productivity costs that are avoided as a result.

Figure 4.2:
Annual Healthcare and Workplace Savings from Delaware County Open Space



Source: Econsult Solutions (2021), PA DCNR (2014); ACS 2019 1-Year Estimates, Graefe et al. (2009), Carlson et al. (2014), Chenoweth & Bortz (2005); Econsult Solutions (2021).

¹⁸ Share who participate in exercise outdoors two or more times a week based on ESI analysis of: Pennsylvania Department of Conservation and Natural Resources and Penn State (2014), *A Resident Survey—Results*. Share of moderate to strenuous exercise by Pennsylvanians that occurs on open space like parks or trails based on ESI analysis of raw survey data from Graefe et al. (2009), *Outdoor Recreation in Pennsylvania Resident Survey*.

CASE STUDY

CHESTER VETERANS MEMORIAL PARK

CITY OF CHESTER

VETERANS MEMORIAL PARK: CHESTER'S OASIS

Location: 2401 West 9th Street

Acreage: 21 acres

Owner/Operator: City of Chester



Chester Veterans Memorial Park

Photo credit: Sahar Coston-Hardy

About the Park

Veterans Memorial Park is one of the City of Chester's five major parks. The park has great assets: the public pool, actively used football field, two baseball diamonds, two basketball courts, two tennis courts, the library, a public restroom, and lots of open space. The on-site amenities provide many reasons for people of all ages to use the park. The park also serves as the focus of the City's green stormwater management initiatives.

Memorial Park is an oasis in Delaware County's only City, population: 33,972. It is the center piece of Resilience Through Recreation, the City's plan

to help revitalize the community through a ten-year action program to improve parks, recreation, open space, and trails. Memorial Park is the perfect park to start making moves toward forming a more resilient Chester. Of all the parks in Chester, Memorial Park has the greatest potential to spearhead a community-wide parks engagement strategy.

The facilities are fertile ground for exceptional multi-generational recreation programming to inspire wellness for life. The park is one of the best maintained in the City. It has a family atmosphere that feels safe during the day, so people are more inclined to use it.

Figure:4.3
Chester Veterans Memorial Park



Source: ESRI Basemap (2021).

The existing football program is a stellar example of the Resilience through Recreation model because of the partnership between volunteers and the City. By investing further in this asset and this partnership, the City will be building important momentum towards trust in the plan and faith in the system because the results will be seen and felt by the community served by Memorial Park.

Memorial Park is being established as the model for building community-wide resilience through recreation programming because of City investment, partnerships, and service.

The vital ingredients are the committed volunteers, community leaders, City officials, and the support of Delaware County. They work collaboratively toward prioritization, organization, and programming. When all these parties can work together to achieve a cohesive vision based on the priorities of residents, the City will grow stronger for the people, the environment, and the economy.

National Champions

On a cold day in November of 2021, the Chester Panthers loaded four cars with players, coaches, and parents on a 1500-mile road trip to Florida. Two teams from the Panthers competed in the national football championship and scored rankings of third and fourth best in the USA. Their goal is to compete again—and maybe even fly there next time!



Chester Veterans Memorial Park
 Photo credit: Sahar Coston - Hardy

Vision for Chester Veterans Memorial Park

Chester Veterans Memorial Park will be a first-rate 21st Century community park, providing multi-generational sport engagement, recreation, and activities to galvanize a stronger, healthier, more connected City of Chester. Camaraderie, volunteerism, city pride and revenue will grow deep with new stadium seating for 1,000 fans, a concession stand, new welcoming lighting throughout, public water fountains, and public restrooms open for use during park hours of operations, including seasonal evening programming.

An additional basketball court will provide the opportunity for three games to take place at once, and with a new chillout lounge area transitioning the activity between the basketball courts and the pool, fans and families can hang out comfortably during tournaments, practices, or just for fun at any time of day. The pool will be upgraded with a patio extension for picnicking and parties, while the existing pool house will provide year-round programming for kids and families.

Accommodating to all areas of athletic interest, Memorial Park will indulge the large contingent of BMX bikers in Chester with a designated and safe space to practice tricks and compete on a new pump track. Those seeking outdoor exercise equipment will find an adjustable multi-generational fitness circuit in the revamped playground zone.

Stormwater will be harnessed for ecological benefit, and a new nature walking-jogging trail will circulate throughout the park, making a key connection to nature, to the library, and MLK Park, which will be modified to include community garden plots.

Lively educational programming partnerships with the library will use the park as an outdoor classroom and engagement opportunity. A new 60-80-person pavilion will provide ample space for cookouts and community gatherings, while a 20-person gazebo will offer a quieter setting for smaller groups or individuals to relax and enjoy the surrounding

Source: Viridian Landscape Studio, Toole Recreation Planning, and Natural Lands. 2018. Resilience Through Recreation: Parks, Trails, and Open Space Plan Update 2018 – 2027. p.40.; https://www.chestercity.com/wp-content/uploads/2018/11/Resilience_Through_Recreation_Plan_111218.pdf.

“Veterans Memorial Park saves lives.
It makes our kids safe and healthy.
It’s the best part of Chester.”

– Charles Thompson, President
Chester Panthers youth football team

MEMORIAL PARK



CHESTER CITY PARKS, TRAILS, & OPEN SPACE MASTER PLAN UPDATE: RESILIENCE THROUGH RECREATION
VIRIDIAN LANDSCAPE STUDIO | PAUL TOOLE ARCHITECTS | NATURAL LANDS | PROFESSIONAL DEVELOPMENTAL CONSULTANTS



MEMORIAL PARK



CHESTER CITY PARKS, TRAILS, & OPEN SPACE MASTER PLAN UPDATE: RESILIENCE THROUGH RECREATION
VIRIDIAN LANDSCAPE STUDIO | PAUL TOOLE ARCHITECTS | NATURAL LANDS | PROFESSIONAL DEVELOPMENTAL CONSULTANTS



DIRECT USE BENEFITS

Recreational, Community Cohesion, and Health Benefits

Recreation is crime prevention. The Panthers Football organization has built their successful program in Memorial Park based upon a purpose in which each participant must “do the right thing” in all aspects of their lives: school, community, home, and sports. To stay in the program and keep coming to the park, the players have expressed adhering to this purpose as the guiding principle in their lives. Recreation and sports offer an important opportunity for building life skills in at-risk youth. Strengthening the life skills of youth is a key objective to minimize risk factors and maximize protective factors related to crime, violence, and drug use. By enhancing knowledge of the consequences of crime and substance abuse and developing life skills, recreation and sports positively influence behavior and attitudes of at-risk youth and prevent anti-social and risky behavior.

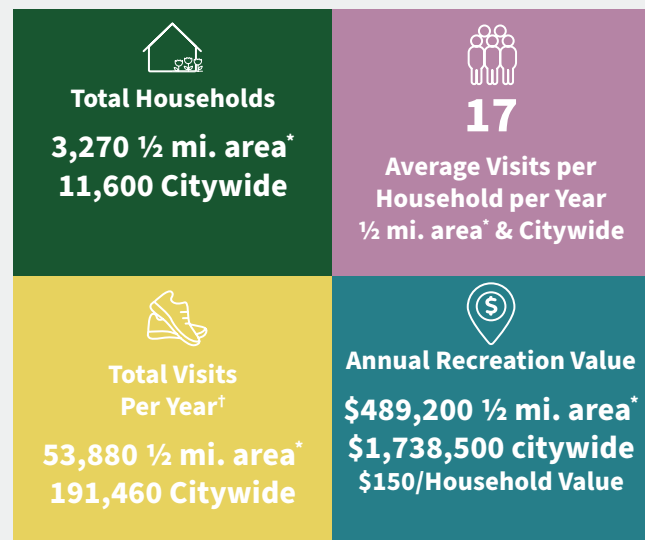
More than 700 families use the Chester Memorial Park Pool. Even on 95-degree days, Aika Robles and her six children walk several blocks to the City of Chester Memorial Park Pool. The children, between the ages of 1 and 15, are not allowed to play outside at the public-housing complex where they live, Ms. Robles says it is too dangerous. The pool is their summertime oasis. "The kids have been having a ball," said Robles. "Every time they come, it's something different for them." "This is the safe haven for everybody in Chester," Duane Lee, Chester's Recreation and Pool Manager said. "All these kids know in the summertime is they want to go swimming."

The Park serves a hot lunch with a program weekdays throughout the summer. For many children, it is their main meal. Addressing summer hunger can have clear health, education, and economic benefits. In the short-term, the program can help mitigate summer weight gain, cognitive decline, and summer learning loss among children. In the long-term, it may help increase high school graduation rates and reduce susceptibility to chronic disease.

The recreational benefits of Veterans Memorial Park are estimated at \$489,200 for the park's closest residents living within a half-mile radius. For that same group, the Healthcare and Workplace Savings associated with

the park tally \$2.9 million annually. However, because the park attracts visitors from the whole city, the total recreational and healthcare benefits could be higher; the citywide estimates could be as high as \$1.7 million in annual recreational benefits, and \$12.4 million in Healthcare and Workplace Savings.

Figure 4.4:
Annual Recreational Benefits to Local Households from Chester Veterans Memorial Park



*Local households are defined as those residing within a half mile distance of the park. This methodology is applied to other case studies that calculate healthcare and recreational benefits. The distance of the buffer is based on the size of the open space considered, its accessibility by different modes of transportation, and the density of the surrounding area. However, due to the nature of this park, ESI calculated a full citywide estimate. †Estimates of households and total visits are rounded and therefore the product of total visits may not square due to rounding.

Figure 4.5:
Annual Healthcare and Workplace Savings Associated with Chester Veterans Memorial Park

Savings Type	1/2 Mile Area	Citywide
Direct Medical Cost Savings	\$550,900	\$2,303,000
Indirect Medical Cost Savings	\$1,652,700	\$6,909,000
Direct Workers' Comp Savings	\$5,100	\$21,000
Indirect Workers' Comp Savings	\$20,500	\$83,800
Lost Productivity	\$756,300	\$3,095,700
Total	\$2,985,500	\$12,412,400

Source: Econsult Solutions (2021), PA DCNR (2014); ACS 2019 5-Year Estimates, Graefe et al. (2009), Carlson et al. (2014), Chenoweth & Bortz (2005); Econsult Solutions (2021).

Environmental Benefits

Veterans Memorial Park serves a vital function from an environmental perspective. The City's Green Stormwater Infrastructure project in Veterans Memorial Park project captures and manages stormwater runoff from roughly 1.56 acres of impervious surfaces associated with the local street, parking areas and walking paths. Proper management of stormwater runoff is one of the most effective and cost-efficient ways municipalities can fight water pollution.

As part of the project, three bioretention basins were added to the park to help slow and treat stormwater runoff. Trees and planting areas added along the walking path and grass beautify the area while helping to naturally manage stormwater.¹⁹

Trees are important to the quality of life in the City of Chester. The Tree Equity Score metric assesses how well tree canopy cover is distributed to all residents in an area. The score is developed based on measures of tree canopy cover need (weighted to prioritize the need for trees in urban neighborhoods, defined by Census Block Groups), existing tree canopy cover, as well as climate, demographic, and socioeconomic data. These measures are combined into a single score from 0 to 100, with a score of 0 indicating the highest need for closing the tree canopy gap and a score of 100 indicating that an area has achieved Tree Equity.²⁰ Areas of protected open space like Veterans Memorial Park in Chester City help support the critical tree infrastructure that neighborhoods need. This is particularly relevant in urbanized areas, where the need for trees is even greater. While Chester's overall Tree Equity Score is 80, areas of the city, including Census Block Groups near Veterans Memorial Park in South Chester have scores as low as 53, indicating a priority need for additional tree canopy and highlighting the importance of protecting existing open space.²¹ Trees help to control climate by moderating the effects of the sun, rain and wind. Leaves absorb and filter the sun's radiant energy, keeping things cool in summer. This is especially important in

cities where parks are often the best place to cool off away from heat islands. Trees also preserve warmth by providing a screen from harsh wind.

Conclusion

Veterans Memorial Park is now recognized as a powerful tool for the City of Chester in fostering active healthy living, reducing crime, creating strong family bonds, and providing solutions to climate change through increased sustainability. As Chester's Oasis, the Veterans Memorial Park demonstrates that parks and recreation is an investment not a cost. Veterans Memorial Park makes life better!

Solving Nature's Challenges

“A few years ago, no one thought about stormwater and how you manage it. We simply watched our communities deteriorated and damaged by stormwater. I'm proud to say the City of Chester is one of the first to step up to the plate to not only manage stormwater, but study it to make sure there is a future for Chester and our young people.”

– Thaddeus Kirkland, Mayor
City of Chester

19 AP News. 2019. Corvias and Stormwater Authority of Chester Showcase Progress of Green Infrastructure at Veterans Memorial Park. <https://ap-news.com/press-release/business-wire/thaddeus-kirkland-51de001d6d9e44c9a5e10aa309a92f8d>; Accessed 1-9-22.

20 Tree Equity Score National Explorer (2021), Tree Equity Score Methodology. <https://treeequityscore.org/methodology/#impact-measures>.

21 Tree Equity Score National Explorer (2021), Chester, PA. <https://treeequityscore.org/reports/place/chester-pa/>.

CASE STUDY

CHESTER CREEK TRAIL

MIDDLETOWN TOWNSHIP AND ASTON TOWNSHIP

TRAILS: CONNECTING OUR COMMUNITIES

Location: Along Chester Creek through Middletown Township and Aston Township

Acreeage: 2.8 miles (existing phase 1 trail)

Owner/Operator: Delaware County

About 30,000 people per year use the trail. This number will climb as the trail is extended.

– Delaware County Chester Creek Trail Survey, 2021



Chester Creek Trail

Photo Credit: Sahar Coston-Hardy

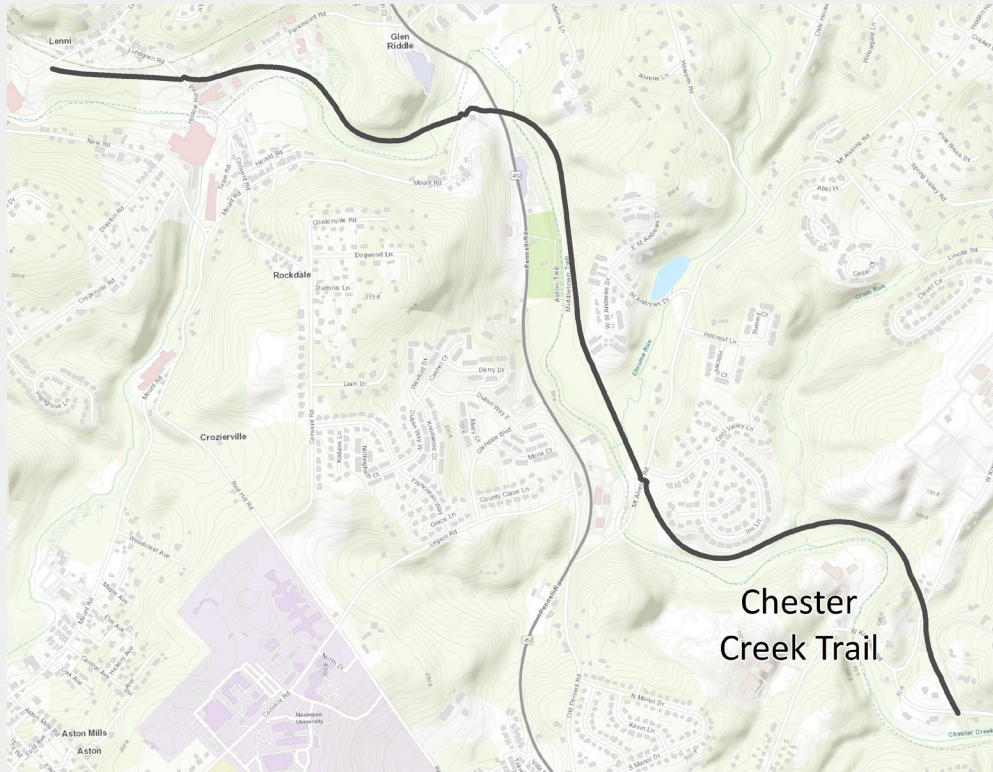
The popularity of the Chester Creek Trail soared as high as the treetops during the pandemic with no evidence of use slowing anytime soon. In fact, a recent survey of users found that they plan on using the trail even more in the future and advocated for the County to extend its length.

Creating a connected trail network throughout Delaware County is a major goal for the County. The Chester Creek Trail is a priority in Delaware County's Primary Trail Network. The Primary Trail Network is a countywide system of multi-use trails identified to connect recreational and cultural hubs across the County.

About the Chester Creek Trail

The Chester Creek Rail Trail is a paved multi-use trail in central Delaware County. The trail follows along the Chester Creek and over the former Chester Creek Branch line of the Pennsylvania Railroad, which was taken out of service in the early 1970's. Volunteers from the Friends of the Chester Creek Branch commissioned a 2002 feasibility study for the trail's approximately 6.5 miles that span from Chester Heights Borough to Upland Borough. Construction of phase I of the trail, which is a 2.8-mile segment located in Middletown and Aston Townships, was completed in late 2016, and

Figure 4.6
Chester Creek Trail



Source: ESRI Basemap (2021)

the trail opened to an enthusiastic public. Delaware County owns the trail via a lease of the right-of-way from its owner, SEPTA, and the County has undertaken engineering and design work for the next phase which will bring the trail farther south into Aston Township. A future phase to the north will connect to Middletown Township's trail network and link to Middletown's new SEPTA Regional Rail Station.

Ultimately, the Chester Creek Trail will connect directly to the Circuit, one of America's largest trail networks right in Delaware County's backyard. The Circuit is a vast regional network of 350 miles of multi-use trails that is growing each year toward its ultimate configuration of 800 miles. The Circuit connects local communities, providing endless opportunities for recreating and commuting. Once connected, the Circuit Trails will be one of the nation's premier urban trail networks, and it will provide multiple benefits to neighborhoods, communities, and the Greater Philadelphia region.

"The Chester Creek Trail is a sanctuary away from the stress of today's troubled times. I feel better going, using, and returning from the trail every time I go."

– Chester Creek Trail User March 2021

The Chester Creek Trail serves as a linear park for residents of many existing housing developments in the areas around Chester Creek. It provides bicycle and pedestrian access to the Aston-Middletown Little League Fields and to Linvilla Orchards with its surrounding hiking paths, swim clubs, and farm market.

Tapping into Our Heritage

In preserving Delaware County's heritage, the trail offers a way for visitors to associate personally with the history of the stream valley. The Chester Creek Branch Rail Line was a vital economic link serving many mills, factories, and warehouses. It also provided passenger rail service. Land uses surrounding the trail today include some light industrial uses, but mostly wooded open space, much of it associated with residential developments atop adjacent slopes. Several old mill buildings in the area have been repurposed for productive uses today.

DIRECT USE BENEFITS

Recreation and Health Benefits

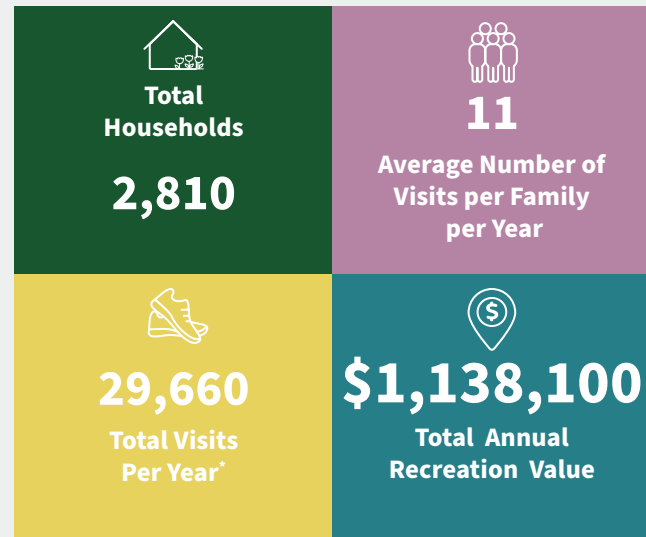
The Chester Creek trail enjoys immense popularity as a recreational resource. The trail has been so popular that the trail’s two parking areas are filled, even on weekdays. Responses from a 2021 trail user survey indicate that health and fitness (87 percent) and recreation (66 percent) are the top two reasons that people use the trail. Residents and visitors enjoy the relatively flat trail with several bridges and nice views of the creek, rock outcroppings, and foliage. The recreational benefits to the 2,810 households within one-half mile of the Chester Creek Trail were calculated to be **\$1,138,100**. These are dollars that the residents do not have to spend elsewhere for recreation (in travel or user fees) thus adding to the benefit of living close to the Trail. **The Healthcare and Workplace Savings associated with the park tally \$3.9 million annually.**

One trail user surveyed responded, “Outdoor space is extremely important. We do not have many options for flat distance to run or bike. Hope the trail is extended. There is a large running community—look at the Healthy Kids Running Series. The second largest in the country is in Media. Most of those kids have parents who run.”

Walking is by far the most popular activity people partake in among those surveyed. Running, cycling, and dog walking are other popular activities. According to calculations based on the 2021 Chester Creek Trail Survey, it is estimated that the trail has 29,660 visits by local residents equating to 11 average visits per household per year.

The Chester Creek Trail has empowered more active lifestyles with 74 percent of users reporting that they are indeed more active now as a direct influence of the presence of the trail. About 72 percent of survey response say the average length of their outing on the trail is 30 minutes to an hour. About 26 percent are on the trail for “about two hours.” Those surveyed indicate that most trail users get on the trail weekly (34 percent) or seasonally (32 percent). Lower amounts frequent the trail daily (16 percent) or “a couple times a year” (17 percent). The total healthcare and workplace savings associated with Chester Creek Trail for residents living within a ½ mile of the Trail is calculated to be \$3,910,300. This reflects cost savings from medical bills, worker’s compensation savings, and increased productivity from the health benefits of nearby residents’ usage of the trail.

Figure 4.7: Annual Recreational Benefits to Local Households from Chester Creek Trail for those Residing within a ½ Mile of the Trail



Sources: Econsult Solutions (2021), ACS 2019 5-Year Estimates, PA DCNR (2014, 2019), USDA (2017), Chester Creek Trail Survey (2021). *Estimates of households and total visits are rounded and therefore the product of total visits may not square due to rounding.

Figure 4.8: Annual Healthcare and Workplace Savings Associated with Chester Creek Trail for Users Residing within ½ Mile of the Trail

Savings Type	Value
Direct Medical Cost Savings	\$470,100
Indirect Medical Cost Savings	\$1,410,200
Direct Workers' Comp Savings	\$6,400
Indirect Workers' Comp Savings	\$25,600
Lost Productivity	\$1,998,100
Total	\$3,910,300

Source: Econsult Solutions (2021), PA DCNR (2014); ACS 2019 5-Year Estimates, Graefe et al. (2009), Carlson et al. (2014), Chenoweth & Bortz (2005); Econsult Solutions (2021).

The Chester Creek Trail from a Trail User's Perspective

- The trail is invaluable and adding to it will only benefit the community and county more!!!
- These trails are important to the well-being of the community. As our community grows with new houses, it is necessary for recreation areas, like these trails, to also grow and expand Thank you for this great resource! It enhances the reputation and value of the areas where the trail passes through.
- The Trail is a wonderful amenity in this community. Long overdue!
- Please keep working to extend our trail as far as we can go and perhaps connect with other municipalities in our area.
- I'm excited for it to be expanded into neighboring areas.
- Glad it's happening.
- I support development of more trails for transportation.

Community Cohesion and Partnerships

The Chester Creek Trail brings off-road connectivity within the communities that directly surround it, and with future expansion will give greater access to transit, commercial and other destinations. After recreation and health and fitness, the next most popular reasons for people to use the trail are to “get away from it all” (49 percent) and to “spend time with family and friends” (47 percent).

Since their 2002 trail feasibility study, the Friends of the Chester-Creek have sparked a model of collaboration regarding planning, funding, technical support, construction, and maintenance. For the last 20 years, the following organizations have supported advancing this trail:

- Delaware County Planning Department
- Buck Ridge Ski Club
- Pennsylvania Department of Conservation and Natural Resources
- Delaware County Field & Stream Association
- William Penn Foundation
- Delaware Valley Bicycle Club
- Delaware Valley Regional Planning Commission
- High Meadow Civic Association
- Chester Ridley Crum Watersheds Association
- Middletown Township Land Conservancy
- Boy Scouts of America Troop 292
- Townships of Aston, Chester, and Middletown

Conclusion

The Chester Creek Trail has improved the quality of life in nearby communities including Middletown and Aston Townships. When asked how important the Chester Creek Trail is to the quality of life in the community, 85 percent said important or very important. Within months of its opening, realtors began including the Chester Creek Trail in their advertisements for home sales.

Phase 1 of the Trail is currently the longest rail-trail in the County and demonstrates the value of multi-use trails as an important community amenity. As it gains popularity and support, Delaware County, the Friends of the Chester Creek Trail, and surrounding municipalities are working to extend the trail and connect it with other local trails. A countywide system of trails will make Delaware County stronger by providing safe pathways for healthy transportation and recreation, connecting our communities to green space, and making our neighborhoods more attractive places to live and work.

A Chester Creek Trail visitor best captured the value of the trail to the community: “The trail has been an amazing asset to this community, particularly during the pandemic. It has allowed people to be outside in nature, exercise, talk with others, get away from devices and just take in the beauty. My husband and I go there daily and it allows us to actually talk, away from all of the distractions. Expanding the trail would be amazing! It has added so much value to the area.”

“The trail is a slice of heaven.”

– Chester Creek Trail Survey Respondent, 2021

CASE STUDY

NAYLORS RUN PARK

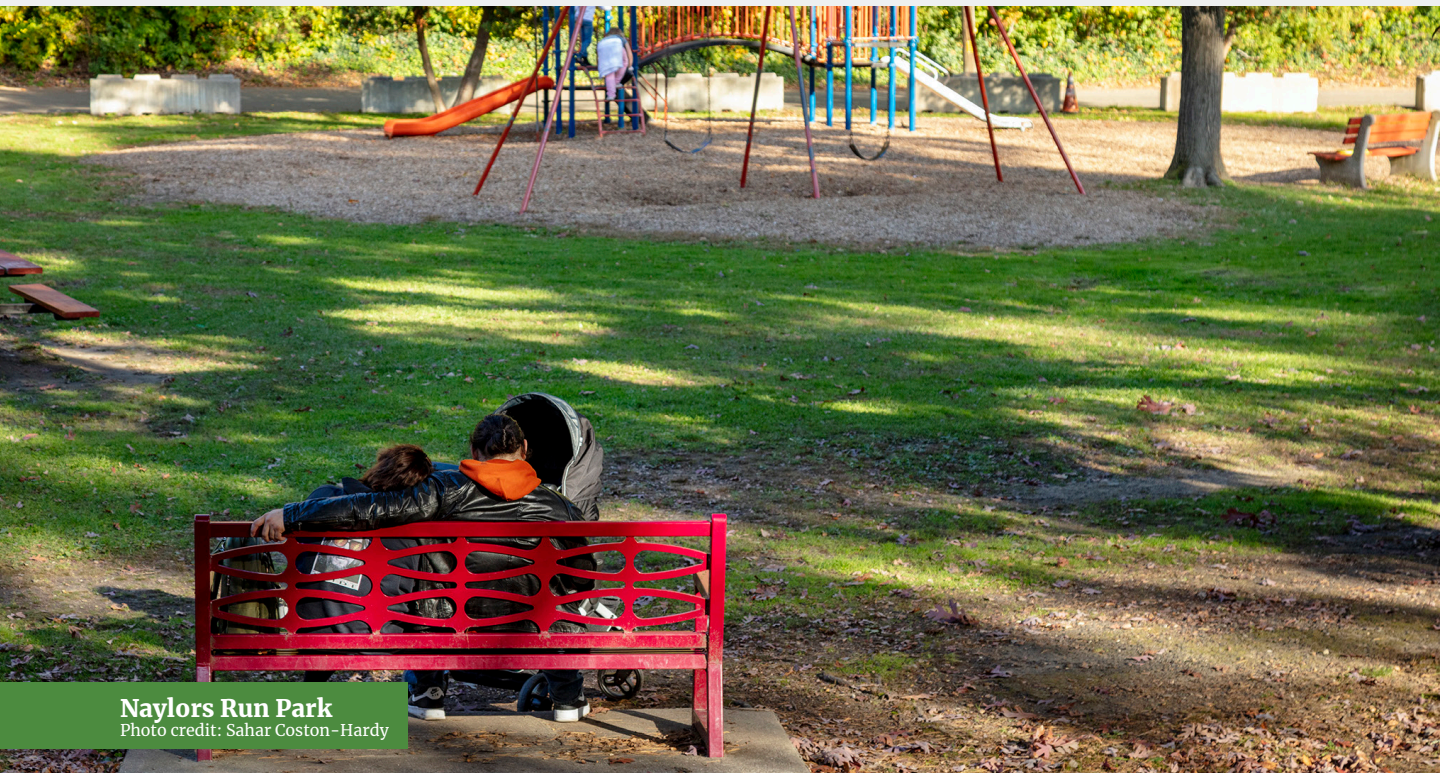
UPPER DARBY TOWNSHIP

UPPER DARBY'S HIDDEN GEM

Location: Upper Darby Township, near Naylor's Run, north of Garrett Road

Acreage: 17 acres

Owner/Operator: Upper Darby Township



Naylor's Run Park

Photo credit: Sahar Coston-Hardy

About the Park

Naylor's Run Park is a beautiful creekside park with a wonderful mix of wild natural areas and facilities for sports and community gatherings. It is connected with plenty of trails through the woods and along the creek, and features a playground, ballfields for soccer and baseball, and tennis courts.

The community loves this park! It is where the residents make fond memories. For generations, Naylor's Run Park has been the place to go for dates, marriage

proposals, and celebrations of life's big moments.

Affectionately known as "The Run," the park is a hub of the community. It plays a central role in the everyday lives of residents who use the park to get away from it all, exercise, enjoy tennis, play and watch sports, read, birdwatch, fish, connect with nature—and get to school or work by walking through the park. They report "growing up here"—and they keep coming back bringing their children and grandchildren.

Figure:4.9
Naylor's Run Park



Source: ESRI Basemap (2021)

Recreational, Community Cohesion, and Health Benefits

Naylor's Run Park has been an attractive and busy park for many residing in eastern Delaware County ever since it was acquired by Upper Darby Township in 1954. Urban green spaces, including forests, encourage active and healthy lifestyles, improve mental health, prevent disease, and provide a place for people to socialize and connect. The varied recreational facilities, including scenic trails, sports fields, a playground, tennis and basketball courts, picnic tables, and benches have drawn the community to this hidden gem for decades.

Many groups gather at Naylor's Run Park. The Lansdowne YMCA will use the park for overflow, Upper Darby High School uses the soccer fields, and a private tennis club meets regularly to play on the tennis courts. The welcoming atmosphere of the park is evident in the diversity of the many park visitors using the park at any time. Several groups join up at the park for pop-up types of activities at the park. **The high number of visitors to this park result in an annual recreation value of**

About Upper Darby Township

Upper Darby Township has the sixth largest population among Pennsylvania's 2,560 municipalities. With 10,559 people per square mile, every open space is precious. The Township borders the City of Philadelphia.

\$926,900. The Healthcare and Workplace Savings associated with the park tally \$8.3 million annually.

In addition to welcoming active recreation communities, Naylor's Run Park welcomes community gathering. In 2021, 50 permitted events served 2,027 community members. Four season-long permits for sports served 220 youths ages five through 18 for organized sports for nine months of the year. The park is home to high school cross country meets, church picnics, tennis matches, and family gatherings.

The park connects neighborhoods and has two main entrances. One entrance is located on Garrett Road beneath the trolley overpass while the other entrance with signage is from Beverly Boulevard. This entry is just off Garrett Road close to the Beverly Boulevard SEPTA Trolley station and is easily accessible for public transit users.

The scenic trails through this beautiful creekside park are traversed by daily walkers who are seeking fitness activities as well as commuters. The trails provide a safe, non-motorized route connecting residential areas

DIRECT USE BENEFITS

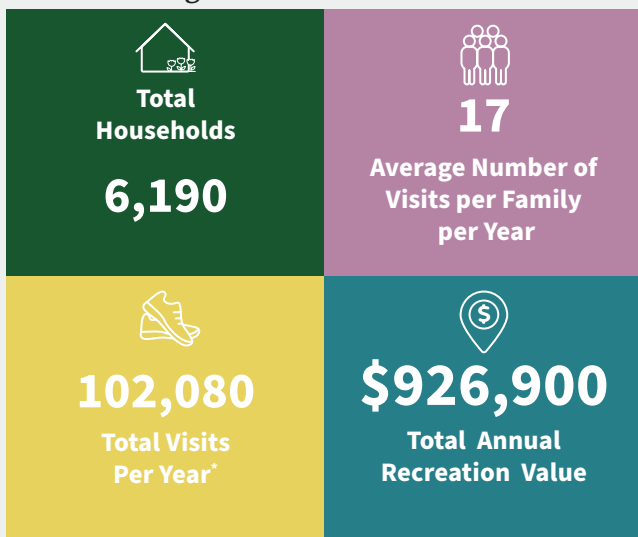
with public transportation, Upper Darby High School, Monsignor Bonner & Archbishop Prendergast Catholic High School, and Delaware County Memorial Hospital. One trail serves as a bicycle path as well. Upper Darby Township is currently looking into ways to further connectivity throughout the park and the feasibility of connecting to Beverly Hills Recreation Area and Park just downstream of below Naylor's Run Park.

In addition to students using the trails to connect to their destinations, the High School runs a Preschool Lab Program where the students watch children as a learning experience. This also includes the high school students taking the preschoolers to the park and playground.

\$8,300,000

Annual Healthcare and Workplace Savings associated with Naylor's Run Park for residents living within a 1/2 Mile of the Park

Figure 4.10: Annual Recreational Benefits to Local Households from Naylor's Run Park for those Residing within 1/2 Mile of the Park



Sources: Econsult Solutions (2021), ACS 2019 5-Year Estimates, PA DCNR (2014, 2019), U.S. Army Corps of Engineers (2021).
 *Estimates of households and total visits are rounded and therefore the product of total visits may not square due to rounding.

Environmental Benefits

Trees are important parts of the Township's infrastructure. Naylor's Run Park has significant tree coverage with its canopy shielding 60 percent of the park or roughly 10 acres of park land. The trees serve as effective air filters by removing approximately 620 pounds of harmful pollutants from the air every year. Ozone and particulate matter have the highest rate of removal at 400 and 100 pounds per year respectively. The economic value of removing these pollutants is estimated at approximately \$1,000 per year. Naylor's Run Park's trees also alleviate the urban heat island effect, which is hazardous to human health, and store carbon, which helps mitigate the impacts of climate change. Green spaces within a community as densely developed as Upper Darby, can cool the air by 2–9°F (1–5°C) during peak summer heat. The Township is saving an estimated \$56,400 in lifetime carbon storage along with \$1,800 in carbon sequestration annually.

Figure 4.11: Annual Healthcare and Workplace Savings Associated with Naylor's Run Park for those Residing within a 1/2 Mile of the Park

Savings Type	Value
Direct Medical Cost Savings	\$1,205,800
Indirect Medical Cost Savings	\$3,617,400
Direct Workers' Comp Savings	\$14,700
Indirect Workers' Comp Savings	\$58,900
Lost Productivity	\$3,437,200
Total	\$8,334,000


Source: Econsult Solutions (2021), PA DCNR (2014); ACS 2019 5-Year Estimates, Graefe et al. (2009), Carlson et al. (2014), Chenoweth & Bortz (2005); Econsult Solutions (2021).

Figure 4.12:
Estimated Annual Air Pollution Removal Benefits from Protected Open Space Associated with Naylor's Run Park

Pollutant	Pounds	Cost Savings (\$)
O ₃	400	\$800
PM-10	100	\$380
NO ₂	80	\$19
CO	30	\$4
SO ₂	10	\$5
Total	620	\$1,200

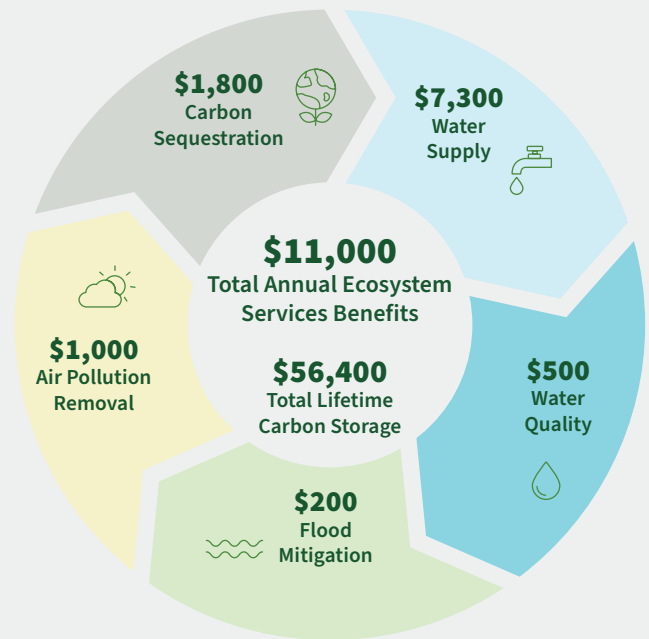
Source: i-Tree (2021), Multi-Resolution Land Characteristics Land Cover (2019), Delaware County (2021), Econsult Solutions, Inc. (2021).

Figure 4.13:
Estimated Amounts of Annual Carbon Sequestration and Lifetime Carbon Storage and Associated Benefits from Protected Open Space Associated with Naylor's Run Park

	Carbon Storage 330 tons x \$171/ton	\$56,400 Cost Savings
	Carbon Sequestration 10 tons x \$171/ton	\$1,800 Cost Savings

Source: i-Tree (2021), Multi-Resolution Land Characteristics Land Cover (2016), Delaware County (2021), Econsult Solutions, Inc. (2021).
*Estimates of inputs (social cost of carbon and carbon tons) were rounded and therefore the product of total cost savings may not square due to rounding.

Figure 4.14:
Environmental Benefits of Protected Open Space Associated with Naylor's Run Park (\$ per Year)



Source: Costanza (2006), Multi-Resolution Land Characteristics Land Cover (2019), Delaware County (2021), Econsult Solutions, Inc. (2021).



Conclusion

In addition to high use of the park for nearly 70 years, Naylor's Run Park serves as a recreational and educational venue for community-based organizations. They provide programs and services close-to-home in Upper Darby, helping to build a sense of community. The park enjoys a level of continual use that speaks to its value to the community. The park's significant environmental features, including woodlands and the stream, continue mightily in keeping our air and water clean. As Upper Darby's population continues to grow, becoming more densely populated, and concern about the impact of climate change increases, taking a fresh look at parks and their potential to help address critical infrastructure and public health issues is a major opportunity. Parks are now recognized as powerful tools for urban communities and local economies. The review of the important environmental, social, recreational and health benefits generated by Naylor's Run Park for this Return on Environment project demonstrates that the Township's parks play an important role in creating a sustainable community and a thriving economy: a place where people want to live, work, operate a business, raise a family, and retire.



“One of my favorite places on earth”

– Jorge Jr. Barberan



Naylor's Run Park
Photo credit: Sahar Coston-Hardy



Chester Creek Trail
Photo Credit: Sahar Coston-Hardy

SECTION 5

HOME AND PROPERTY VALUE IMPACT

Introduction

This section quantifies the impact of protected open space on home values in Delaware County relative to the proximity and size of the protected open space and the environment in which the home and protected open space are located. The analysis estimates the percent and dollar premiums on house prices realized from proximity to protected open space and the increase in property tax revenues for the county, municipalities, and school districts due to that increased value in homes.

Homes in Delaware County capture a measurable increase in value as a result of proximate protected open space. In addition to homes having an increase in value due to its proximity to open space, this section also discusses how the size of the protected open space and how development patterns can affect the value of homes.

Methodology

Hedonic regression analysis was used to isolate the differences in home sale price attributable to protected open space, holding all other housing features constant (see sidebar). The analysis used more than 101,208, arms-length transactions, of single-family homes in Delaware County from 2000 to 2020. Control variables were included to account for differences in housing characteristics as well as neighborhood characteristics. The analysis isolates the effect on home values of proximity to protected open space from the effect of other variables that influence home value. Specifically, the three primary variables that determine whether protected open space adds value to a home are: 1) the house's proximity to protected open space, 2) the size of the nearest protected open space, and 3) whether the total area of all protected open space within a half mile radius is greater than 150 acres.

The analysis includes more than 1,250 protected open space parcels including federally owned parks, state parks, county parks, municipal parks, nonprofit lands, and preserved farms.

Hedonic Regression Analysis

The property value analysis presented in this section relies upon hedonic regression analysis, a standard technique used by economists to analyze demand and pricing for an item.

Hedonic regression analysis seeks to isolate the explanatory power of a single variable of interest (like proximity to protected open space) by holding constant other relevant housing characteristics (like square footage, number of bedrooms, year built, etc.). This technique is commonly applied to housing market transaction data to evaluate the value premium associated with various amenities.

Property Value Impact

As a home is closer to protected open space, part of its value can be directly attributed to its proximity to open space. Homes that are within a half-mile distance to protected open space receive a 1.77 percent increase in total home value, which equates to \$689 million in total added home value across the County. This value share increases when a home is even closer to protected open space. For those homes that are located within a quarter-mile of protected open space, the proximity of open space is responsible for a 2.16 percent increase of home value. For homes that are located between a ¼ mile to ½ mile distance from open space, protected open space is responsible for a 0.50 percent increase of home value.

In other words, if all the protected open space in Delaware County was eliminated, the total assessed value of the housing stock would decrease by \$689 million. For homes within a ½ mile of protected open space, this represents an average property value increase of \$4,561 and \$5,158 for homes within a ¼ mile of protected open space.

By increasing the value of homes within a half-mile radius, protected open space also increases the amount of property taxes that the owners of these homes pay to county and municipal governments and to school districts. County-wide, these additional property tax revenues amount to \$160 million dollars per year for homes within a half-mile of protected open space.

Impact of Size of Open Space

The amount that nearby protected open space will add to a home's value is largely dependent on the aggregate amount of open space available nearby. Figure 5.3 shows if the total acreage of open space within ¼ mile from a property is greater than 50 acres, the aggregate property value premium from all nearby open space on the property value is 3.16 percent; if the total acreage of all nearby open space within ¼ mile to ½ mile distance band from a property is greater than 50, the property will receive an additional 2.43 percent value premium.

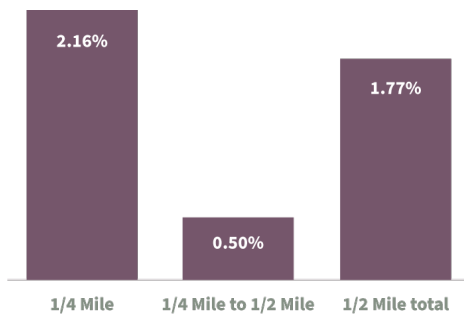


Figure 5.1:
Delaware County Open Space Property Value Impact

	¼ Mile Total	¼ Mile to ½ Mile	½ Mile Total
Total Number of Houses by Distance Band	124,681	26,282	150,963
Total Property Value (\$M)	\$29,815	\$9,050	\$38,865
Total \$ Value of Open Space (\$M)	\$643	\$46	\$689
Total % Value of Open Space	2.16%	0.50%	1.77%
Total \$Value/House	\$5,158	\$1,731	\$4,561
Total Tax Value	\$150	\$10	\$160
Total Tax/House	\$1,207	\$345	\$1,057

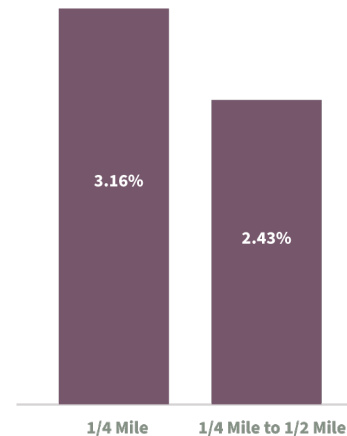
Source: Econsult Solutions, Inc. (2021)

Figure 5.2:
Percent Premium from Proximity to Delaware County Protected Open Space



Source: Econsult Solutions, Inc. (2021)

Figure 5.3:
Percent Premium in House Value for Each 50 acres of Open Space within ¼ mile and ½ Mile



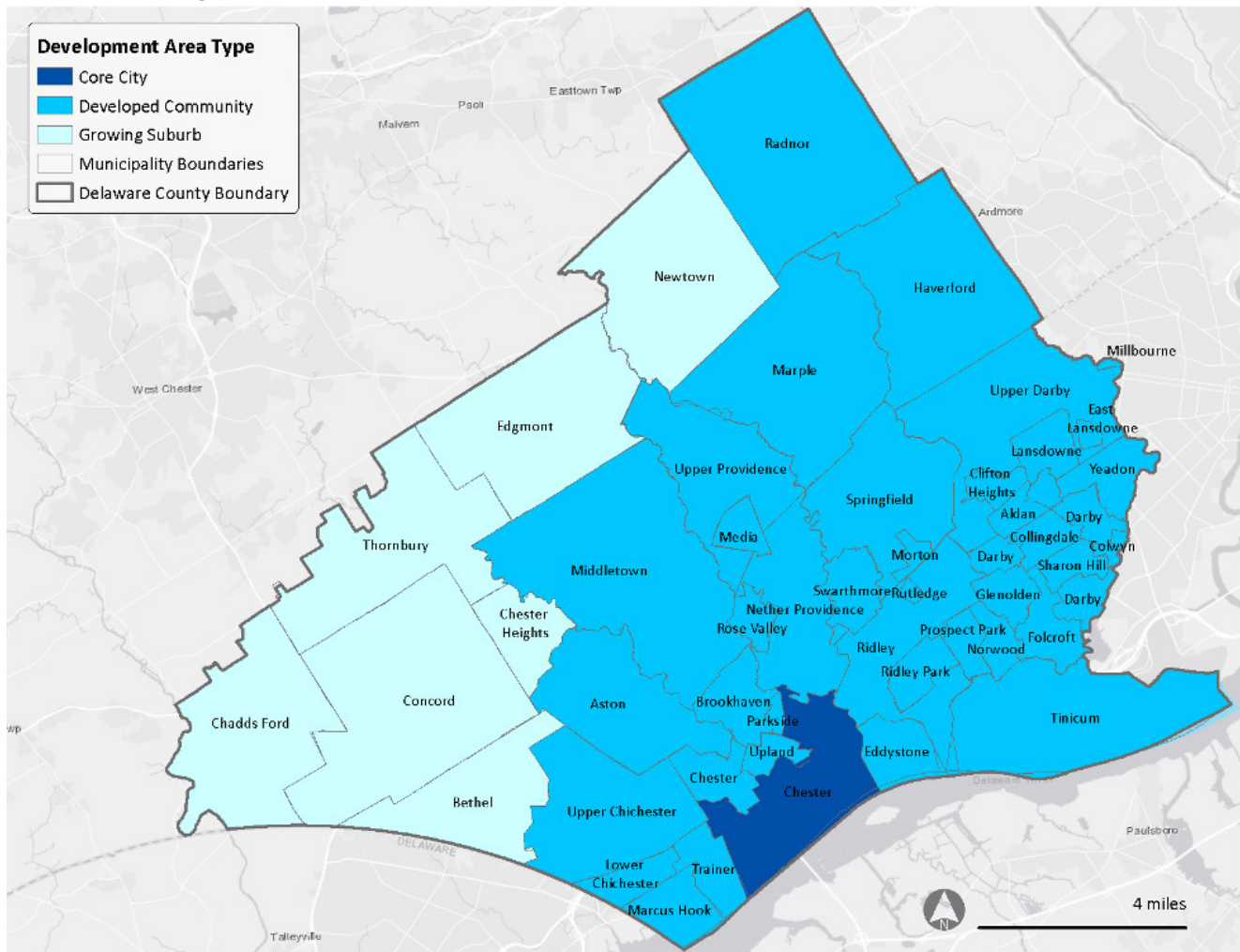
Source: Econsult Solutions, Inc. (2021)

Impact by Different Development Patterns

The Delaware Valley Regional Planning Commission categorizes the region’s municipalities as belonging to one of four planning areas—“Core City”, which in Delaware County includes the City of Chester;

“Developed Community”, which includes inner-ring, older suburbs; “Growing Suburb”, including outer-ring, younger suburbs; and, “Rural Area”, which does not apply to any of the municipalities in the county. Figure 5.4 presents a geographic breakdown of these planning areas in Delaware County.

Figure 5.4:
DVRPC Planning Areas in Delaware County

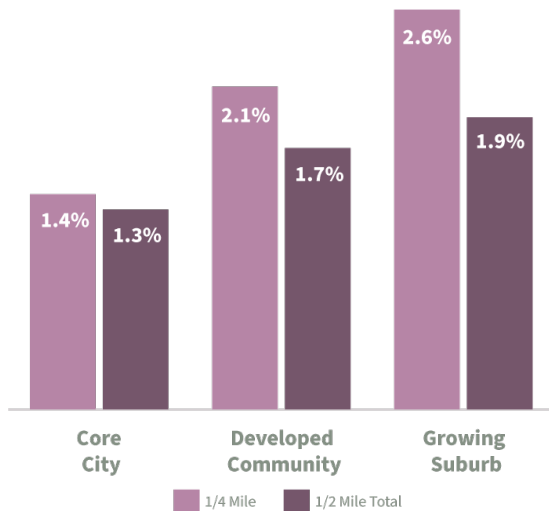


Source: DVRPC (2021); Econsult Solutions, Inc. (2021)

This section analyzed the additional housing value generated by protected open space within these four categories of development. The analysis reveals that a home's value is more impacted by proximity to protected open space in growing suburbs than in developed communities or core cities (see Figure 5.5). An average house in growing suburban municipalities in Delaware County receive a 2.6 percent premium in

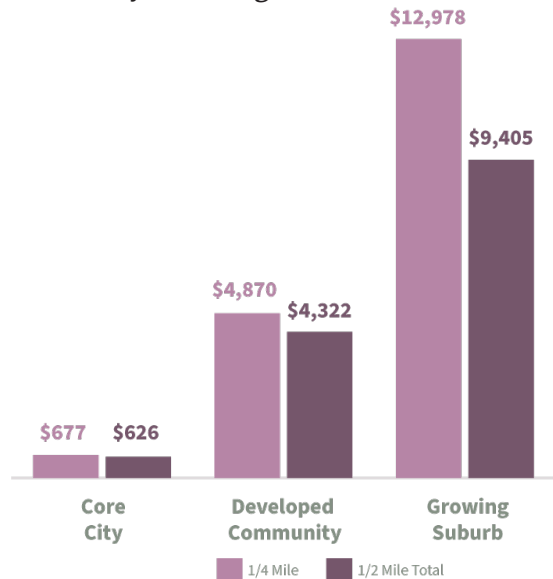
house price from proximity to open space if it is within ¼ mile from open space, which equates to about \$13,000 per house. Many people choose to live in these types of municipalities because of access to abundant open space and natural areas. This has become more evident since the COVID-19 pandemic started, when stay-at-home orders and social distancing made open space an even more desirable amenity for homes.

Figure 5.5:
Percent Premium of Protected Open Space by Planning Area



Source: Econsult Solutions, Inc. (2021)

Figure 5.6:
Added Market Value from Protected Open Space per House by Planning Area



Source: Econsult Solutions, Inc. (2021)



Rose Tree County Park

Photo credit: Delaware County Parks & Recreation Department

SECTION 6

CONCLUSIONS & NEXT STEPS

Green Space, Parks, Recreation, and Trails: An Investment not a Cost

Money talks. Delaware County's Return on Environment Study shows that funding for green space, parks, recreation, and trails is an investment, not a cost. For every dollar spent, far greater than a dollar value is returned to the public. Cost savings and revenues generated return to the public in the form of clean air and water, health and wellness, crime prevention, support of local business, increased housing values, and overall quality of life for our diverse community. Green space, parks, recreation, and trails improve life in Delaware County!

Just as water, sewer, and public safety are considered essential public services, green spaces are vitally important to establishing and maintaining the quality of life in Delaware County. The case studies for the Return on Environment project show economic benefits in the form of:

- Increased tax receipts,
- Spurred local economy,
- Better ability to attract businesses and residents, and
- Reduced costs for environmental services.

The many positive green space outcomes benefit all members of our Delaware County community – residents, neighbors, taxpayers, business owners, health service consumers, parents – whether they use the green spaces and parks themselves or not. The benefits of conservation and parks in this study are intended to help make the case for green space as a long-term economic investment. The greatest benefits result from well-managed and well-maintained parks and open spaces, where best stewardship practices are implemented and clean, safe public access and amenities are provided for our diverse citizenry. When it comes to planning and budget decisions, too often green spaces and parks are regarded only as “nice to have if we can afford them”.

The findings of this report support Delaware County's Green Ways Program. Green Ways is designed to advance the County's goals of conserving green spaces, connecting the County with safe places to bike and walk, and enhancing public parks for people of all ages, interests, and abilities. These goals represent the County's epic vision to be a preferred destination of choice for residents, business, and visitors. The Green Ways program includes a grant component supported by a \$10 million bond and an annual allocation of \$5 million. A goal of the grant program is to help municipalities and private non-profit land conservation organizations leverage these county funds with grants from federal, state, and private support.

Next Steps

A goal of the Return on Environment project is to provide a starting point for making the case for green space, parks, recreation, and trails in Delaware County. The estimates and benefits provided in this study give taxpayers and elected officials a feel for the magnitude of green space, park, recreation, and trail systems' economic value. The following action plan can provide a solid direction for carrying out the steps needed to advance the concept that funding for green space, parks, recreation, and trails is an investment not a cost. As Delaware County expands its workforce in the Departments of Planning and Parks and Recreation, more staff time and expertise could be available for these efforts. The roles of key stakeholders such as the Green Space Task Force along with its sub-committees, the Parks and Recreation Boards, Delaware County Visitors Bureau, Delaware County Commerce Center, park, and trail friends groups can all play an important role in advancing the concept that green space, parks, recreation, and trails are essential to the quality of life and a thriving economy in Delaware County.

Strategic Action Plan

1. **Develop a Communication Program to promote the Return on Environment findings. Think of the ROE project as a “tool” to be used to advance goals rather than merely a study.**

- ▷ Coordinate with the Green Space Task Force and the Sub-Committees on branding and outreach.
- ▷ Develop materials for outreach. These should include a PowerPoint presentation, a fact sheet, an infographic, and website materials and postings. Ideally a video would be created as well.
- ▷ Establish the action steps for promoting the ROE findings. Identify the target audiences, method of communication, schedule, and identification of strong and ROE-informed presenters. Include provisions for feedback, evaluation and input to the ROE study and presentations.
- ▷ Develop a simple one page “talking points” sheet for elected and appointed officials, conservation organizations, trail groups, friends groups, parks and recreation boards and committees, parks and recreation directors and staff. Encourage organizations to use this information in budget presentations. If green space, park, and trails advocates fail to come forward with information documenting their value and benefits, then the work on green space in Delaware County will be substantially disadvantaged since other competing services are not hesitant to use such measures to support their cases when it comes to getting capital and operating funding.

2. **Explore ways to advance the findings of the ROE study. It is a starting point, not an end point.**

- ▷ All stakeholders play a part and green space, park and trail stewardship must become part of Delaware County’s everyday culture. Strong alignment between residents, planners, nonprofits, land trusts, businesses, and policy makers is essential for Delaware County to continue to thrive. Using the ROE process can help ensure this commitment to collective responsibility. Include ROE data in planning and decision-making.

- ▷ Allocate additional funds to explore further work. Studies can be done at the municipal or multi-municipal level.
- ▷ In the county’s Community Engagement efforts, work to generate partnerships with the colleges and universities to advance ROE planning on identified projects on the economic value and benefits of green space, parks, recreation, and trails.
- ▷ Encourage Delaware County municipalities to include this in their planning projects, especially those that are receiving county or state grant support.
- ▷ Invent some simple ways to generate benefits on economic value in-house. Use the survey method from the Rose Tree County Park Concert Series and Chester Creek Trail for other venues like the golf course, sports tournaments, trails, and other programs.
- ▷ Involve the Visitors Bureau and Chamber of Commerce in relating green spaces, parks, recreation, and trails to their work and tourism economic benefits.
- ▷ Work with the Chamber of Commerce to develop a “Welcome Pack” for new businesses and residents moving into Delaware County that includes a very brief questionnaire on why they chose to move to Delaware County that includes green space related reasons including parks, trails, and recreation opportunities. Use those findings to translate to economic values.

3. **Apply and use the ROE findings.**

- ▷ Assemble a small group of five to seven individuals from the Return on Environment Committee to work on advancing the concept of green space being an investment with a return in benefits. This small group will use the publication to guide discussions and formulate a strategy on continuing to undertake the study and promotion of economic, social, environmental, and recreational and health benefits of green space.

- ▷ Develop a promotional program about the benefits of green space, parks, recreation, and trails.
 - ▷ Use this information in grant applications.
 - ▷ Use the information to generate, advance and sustain partnerships and sponsorships. A ready example from this ROE project is food purveyors and restaurants for the Concert Series.
 - ▷ Use these findings to support maintenance of facilities. The economic value generated by tourism is strongly associated with the quality of facilities. Visitors Bureaus in other locales with highly developed trail systems have reported that they cannot advertise trails unless they are in premier condition with a high level of maintenance. The green spaces that have the most benefit are those that are well-maintained and managed.
 - ▷ Provide training on stewardship and natural resource management to park maintenance and public works staff responsible for green spaces and parks. Involve schools as part of their environmental education programs with multidisciplinary applications that will help students appreciate the value of green space and parks.
- 4. Continue the Green Ways Program.**
- ▷ Continue to provide grants to municipalities and non-profit organizations for green space, parks, and trails. Explore ways of sustained or expanded county support.
 - ▷ Continue the partnership with the Pennsylvania Department of Conservation and Natural Resources to help municipalities apply for and secure grant funding that leverages county grant support.
 - ▷ Explore retaining outside expertise for grant writing to secure additional funding that will result in economic gains through green space, parks, recreation, and trails.
 - ▷ Recognize and move forward with the concept that the Green Ways Program is more than only a grants program. The County’s open space
- ▷ program can be so much more than grants alone. The Green Space Task Force can help to define this and already has proposed concepts such as a Vacant Lot Program and Riverfront access and opportunities (e.g., Delaware County as a Riverfront Community). Efforts such as these have major economic benefit implications.
 - ▷ Update the Delaware county Open Space Plan to include ROE and the efforts and ideas of the Green Space Task Force.
- 5. Coordinate the ROE approach with the Delaware County Office of Sustainability goals, initiatives, and action plans.**
- ▷ Use the ROE process to support sustainability goals.
 - ▷ Develop measures that help to show cost savings and benefits on environmental investment like the examples provided in the Don Guanella case study.

Moving Forward

As Pennsylvania’s second most densely populated county, remaining green space is limited. There is great public desire to conserve what is remaining and maintain what is protected. Municipalities and land conservation organizations are working hard to conserve land, develop and improve parks, and connect them with safe places to walk and cycle. Delaware County led the charge in 2021 by preserving the largest forested vulnerable property left, the 216-acre former Don Guanella School. The Return on Environment Study can help advance the County’s vision to conserve, connect, and enhance our green spaces by providing strong and informed arguments on the Return on Environment. The hope is that solid information and effective communication about these findings would help to reposition greenspace, parks, recreation, and trails in the eyes of the public and elected officials from “nice to have if we can afford it” toward “a central economic role in our community”. Public investment in Delaware County in green space conservation, parks and trails is critical to creating and protecting the places and amenities that make Delaware County a great place to live and work.



ABOUT ECONSULT SOLUTIONS, INC.

This report was produced by Econsult Solutions, Inc. (“ESI”). ESI is a Philadelphia-based economic consulting firm that provides businesses and public policy makers with economic consulting services in urban economics, real estate economics, transportation, public infrastructure, development, public policy and finance, community and neighborhood development, planning, as well as expert witness services for litigation support. Its principals are nationally recognized experts in urban development, real estate, government and public policy, planning, transportation, non-profit management, business strategy and administration, as well as litigation and commercial damages. Staff members have outstanding professional and academic credentials, including active positions at the university level, wide experience at the highest levels of the public policy process and extensive consulting experience.

GLOSSARY

Agricultural activity: Activities that occur on protected farmland in direct support of the production of an agricultural product.

Best Management Practice (BMP): A technique to most appropriately conserve natural resources and manage surface runoff on a site based on unique site conditions, planning, and engineering requirements. A BMP involves site development design that incorporates the most suitable technique or combination of techniques to best manage the resource and/or to prevent or reduce surface runoff and water pollution.

Easement, agricultural: An interest in land, less than fee simple, which represents the right to prevent the development or improvement of a parcel for a purpose other than agricultural production. This voluntary easement may be granted by the owner of the land to a third party or to the Commonwealth, to a county governing body, or to a unit of local government. The easement is granted in perpetuity, as the equivalent of covenants running with the land.

Easement, conservation: An interest in land, less than fee simple, that is a voluntary and legally binding agreement between a landowner and a land trust or government that limits certain uses on a property to achieve conservation objectives while keeping the property in the landowner's ownership and control. The holder of the conservation easement has the right to block inappropriate uses while the owner may continue to use the land within the constraints set in the easement. Conservation easements do not create a right for the public to access a property, unless specifically established, and bind present and future landowners.

Economic value: This report measures economic value in relation to three aspects: wealth generation, tax revenues and avoided costs. It does not attempt to measure other important but difficult to quantify measures of economic value such as cultural, spiritual, aesthetic and stress reduction benefits.

Ecosystem services: Any positive benefit that wildlife or ecosystems provide to people as a result of their natural functions. This report estimates the economic benefits associated with the ecosystem services of provision of water supply, water quality improvement, flood mitigation, wildlife habitat, air pollution removal, and carbon sequestration and storage that results from the natural environments on protected open space.

Environmental benefits: The economic benefits derived from ecosystem services.

Hedonic regression: Hedonic regression analysis seeks to isolate the explanatory power of a single variable of interest (like proximity to protected open space) by holding constant other relevant housing characteristics (like square footage, number of bedrooms, year built, etc.). This technique is commonly applied to housing market transaction data to evaluate the value premium associated with various amenities.

Input-output modeling: This economic modeling technique is used to represent the flow of money in an economy. In an inter-connected economy, every dollar spent generates two spill-over impacts: First, some proportion of spending on locally-purchased goods and services is circulated back into an economy. This represents an "indirect effect" and reflects the fact that local purchases of goods and services support local vendors, who in turn create business-to-business transactions when they purchase from their own set of vendors. Second, some proportion of that expenditure that goes toward employee salaries is circulated back into an economy when those employees spend some of their earnings on goods and services. This represents what is called the "induced effect" and reflects that fact that some of those goods and services will be purchase from local vendors, further stimulating a local economy.

Land cover: Patterns of vegetation or man-made features that occur on the earth's surface. Examples of land cover include forest, pasture, wetland and developed area.

Protected open space: Land or water areas that have little or no development; are used for working lands, recreation or preserving cultural or natural resources; and are either permanently protected from development by an easement, owned by a governmental agency, or protected through a municipality's zoning ordinance. In some instances only a portion of a property is subject to a conservation or agricultural easement.

Value transfer: An estimation method that assigns a monetary value to something non-monetary to gauge how much people value the asset/service and would be willing to pay for it if they had to. This method is used where data collection proves too costly or time consuming. An example of value transfer is asking someone how much they would be willing to pay to remove a ton of carbon from the atmosphere.

Willingness to Pay (WTP): The maximum price a customer is willing to pay for a product or service. It is typically represented by a dollar figure or, in some cases, a price range. While potential customers are likely willing to pay less than this threshold, it's important to understand that, in most cases, they won't pay a higher price.



Naylor's Run Park
Photo credit: Sahar Coston-Hardy

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