Pennsylvania's Return on Investment in the Keystone Recreation, Park, and Conservation Fund

THE TRUST *for* PUBLIC LAND

CONSERVING LAND FOR PEOPLE

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Right cover photo: Western Pennsylvania Conservancy.

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To learn more about FPW, visit **pennsylvaniawatersheds.org**.

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Executive Summary

The Trust for Public Land conducted an economic analysis of the return on Pennsylvania's investment in land and water conservation through the Keystone Recreation, Park, and Conservation Fund and found that every $1 invested in land conservation returned $7 in natural goods and services to the Pennsylvania economy. Additionally, projects funded through the program to preserve land, improve parks, provide trails, restore historic sites and enhance higher education institutions provide a multitude of economic benefits. A summary of the key findings and benefits of investments made by the Keystone Fund is presented below.

Clyde Hare/Allegheny Land Trust

Land and Water Conservation

Natural Goods and Services: Lands conserved through the Keystone Fund provide valuable natural goods and services such as air pollution removal, water quality protection, and stormwater management. For example, protected open space in southeastern Pennsylvania provides a value of $10.9 million in water quality enhancement services and $318 million in air pollution removal services annually. The Trust for Public Land analyzed lands conserved by the Keystone Fund and found that every $1 invested in land and water conservation returns $7 in economic value of natural goods and services to Pennsylvania.

Tourism and Outdoor Recreation Industry Impact: Land conservation supports a robust tourism industry by creating outdoor recreation destinations and maintaining the scenic beauty of the state's countryside. In Pennsylvania, outdoor recreation generates $21.5 billion in spending, $1.6 billion in tax revenue, 219,000 jobs, and $7.2 billion in wages and salaries. Visitors to state parks spend $859 million annually at local businesses contributing to a total economic impact of $1.15 billion and 12,630 jobs in a variety of industries and businesses in the state.

Enhanced Property Values: Protected open space is viewed as an amenity by homebuyers who are willing to spend more to live near these areas. Publicly owned open space has the greatest positive impact on adjacent property values of all land use types in a recent Berks County study. In southeastern Pennsylvania, protected open space adds $16.3 billion to the value of homes and generates $240 million in additional annual property and transfer tax revenues.

Reduced Local Taxes: By helping communities conserve land, the Keystone Fund saves taxpayers money. Open space and working lands contribute more in taxes than they require in municipal services such as infrastructure, schools, and fire and police protection. Residential land, on the other hand, typically contributes less in taxes than it requires in services. Studies of 15 Pennsylvania communities found that open space and working farms and forest require only $0.18 in services for every $1 generated in tax revenue while residential land requires $1.26 for every $1 generated.

Quality of Life: Conserved lands contribute to a high quality of life by providing opportunities for outdoor recreation, improving air and water quality, and maintaining the character of communities. Quality of life is one of the most important factors skilled workers consider when choosing where to live and work. Therefore places with a high quality of life are where businesses want to locate. Forbes ranked Pennsylvania as the state with the sixth best quality of life in the nation making the category the state's top competitive advantage among states.

Leverages Private and Local Dollars: By attracting support from other sources, the state maximizes its investment in land conservation. From 1995 to 2012, the Keystone Fund leveraged $205 million in matching funds from private sources and $116 from local sources for conservation. That is, every $1 of Keystone funding was matched by $2.16 in additional contributions (i.e., the Keystone Fund paid $0.32 for every $1 worth of land and water conservation).

Parks, Trails, and Recreation

Job Creation: The Keystone Fund creates jobs directly by funding the development and maintenance of state and local parkland and park facilities. One national study found that off-street multi-use trails generate 9.57 total jobs per $1 million invested. Bicycle infrastructure projects create even more jobs – 11.41 per $1 million. The Fund also supports restoration activities in state parks. According to one study forest and watershed restoration creates as many as 23.8 jobs per $1 million invested. By comparison, investments in coal and oil yield only 6.9 and 5.2 jobs per $1 million, respectively.

Visitor Spending: Urban and community parks draw visitors who spend money at businesses nearby. According to one study, approximately 41 percent of tourists to Philadelphia visit a park during their trip spending $115 million annually. Similar benefits provided by trails are highlighted by the Great Allegheny Passage trail system which generates more than $40 million in annual visitor spending and $7.5 million in wages.

Enhanced Property Values: Parks and trails boost neighboring property values. Parks in the New Kensington neighborhood of Philadelphia increase the value of houses within ¼ mile by 10 percent. All of the city's parks together increase the market value of nearby residential properties by a combined $689 million, which generates an additional $18.1 million in annual property tax revenues for the city.

Cultural Institutions

Libraries: Library investments create jobs, save residents money, and inject money into local economies. According to national estimates, Keystone investments in library facilities generate approximately 17 to 19 jobs for every $1 million invested. Without libraries, Pennsylvania library users would have to pay $964 million more to get the same information plus $84 million in costs from not being able to find alternative sources of information. Libraries also contribute to the state economy through $68 million in annual in-state purchases and $180 million in annual wages paid to library employees.

Historic Preservation: Historic preservation projects create new jobs, stimulate investment in local communities, revitalize neighborhoods and downtowns, enhance tax revenue, increase tourism and visitor spending, and contribute to a high quality of life. Over 2,300 historic preservation projects in Pennsylvania spanning over 30 years generated $17.1 billion in economic output and 148,000 jobs. Tourists to heritage sites and areas spend $1 billion each year for a total economic impact of $2.9 billion and 37,000 jobs. Historic sites and areas have also been found to significantly increase the value of nearby properties. While these numbers aren't attributed to projects specifically supported by the Keystone Fund, they highlight the magnitude of the economic impacts associated with historic preservation.

Higher Education: The Keystone Fund provides grants to the 14 state universities of the Pennsylvania State System of Higher Education (PASSHE) contributing to the system's statewide economic impact. The job impact is substantial – all but two of the 14 universities are among the top 15 employers in their respective counties. In 2004, PASSHE was the 15th largest employer in the state with a statewide impact of 51,200 jobs. The total economic impact of the system was estimated to be $4.47 billion, equaling 1 percent of the entire Gross State Product.

Introduction

The Keystone Recreation, Park, and Conservation Fund (Keystone Fund) invests in recreation, parks, land and water conservation, library, historic preservation, and education projects that benefit local residents, businesses, and governments across the state. These projects enhance the quality of life in communities by providing clean water and air, creating safe places to explore and play, and by protecting civic and cultural institutions and landmarks. Keystone Fund investments also have a major economic impact on local economies by increasing tourism and visitor spending, creating and sustaining local jobs and businesses, enhancing property values and municipal revenues, revitalizing neighborhoods, and generating other significant economic benefits. This year, 2013, marks 20 years of Keystone investments and their benefits to the communities, businesses, and residents of Pennsylvania.

Pennsylvania lawmakers recognized the importance of having a dedicated state funding source to provide these critical benefits to local communities year after year. In 1993, the General Assembly, by a combined vote total of 244 to 3, established the Keystone Fund with a dedicated funding source of 15 percent of the state's Realty Transfer Tax.[1] The realty transfer tax is collected at a rate of 2 percent on the value of real estate when a property changes ownership (with some exceptions). The buyer and seller each pay half of the tax with the state government ultimately receiving half of the total tax revenue.[2] Following the General Assembly vote, 67 percent of Pennsylvania citizens voted to supplement the Keystone's permanent funding stream with a one-time infusion of $50 million in bond revenues.[3]

Today the Keystone Fund relies solely on the Realty Transfer Tax. As such, the amount of revenue to the Fund is tied, in part, to fluctuations in the volume of real estate transactions and real estate values. These receipts increased from $53.3 million in 2011-2012 to $58.4 million in 2012-2013. Funds must be approved on an annual basis as part of the budget process. The Keystone Fund has often been targeted for elimination or reductions in the budget. In 2012-2013, the final budget approved by the Legislature and the Governor included over $73 million for Keystone. For 2013-2014, Governor Corbett has proposed $67.3 million for the Keystone Fund.

Funds are allocated to the Pennsylvania Department of Conservation and Natural Resources (DCNR), Pennsylvania Historic and Museum Commission (PHMC), Pennsylvania Department of Education (PDE), and the State System of Higher Education (SSHE). Funds are spent directly by state agencies or distributed through grants. Keystone Fund projects fall into six overarching categories described below.

Conservation[4]

The Fund permanently protects natural lands for residents to enjoy for biking, hiking, camping, fishing, hunting and other recreational pursuits. To support these activities the Fund supports

1 Pennsylvania Land Trust Association and Pennsylvania Recreations and Parks Society. History. http://keystonefund.org/history (last accessed 1-7-2013).
2 Pennsylvania Land Trust Association and Pennsylvania Recreations and Parks Society. Revenue Source. http://keystonefund.org/revenue_source (last accessed 1-7-2013).
3 Pennsylvania Land Trust Association and Pennsylvania Recreations and Parks Society. History. http://keystonefund.org/history (last accessed 1-7-2013).
4 Pennsylvania Land Trust Association and Pennsylvania Recreations and Parks Society. Conservation. http://keystonefund.org/conservation (last accessed 1-7-2013).

trail creation projects on conserved land. Investments are also made to save, create, and expand community green spaces, including county and municipal parks and greenways, for a variety of purposes such as recreation, flood prevention, community character, and others. Since its creation, the Fund has protected 120,000 acres of green space for county and municipal parks, greenways, wildlife habitat, and other open space uses. A total of 25,000 miles of land and water trails have been created with help from the Keystone Fund making Pennsylvania number one in the nation for trails.[5]

Community Recreation[6]

Once green space areas have been acquired, the Keystone Fund supports construction and installation projects that create a variety of recreational facilities. Types of projects include multi-use trails, playgrounds, ballfields, pools, picnic areas, boat launches, and recreation centers. As of the beginning of 2012, the Keystone Fund has supported 2,600 community park development projects and 850 trail projects for walking, bicycling, and other recreation uses.

State Parks and Forests[7]

State parks and forests require regular maintenance and improvement projects to remain premier recreation destinations for visitors and residents to enjoy. The Keystone Fund is the primary funding source for rehabilitating and upgrading State Park and Forest infrastructure. Between 1999 and 2010, $132.8 million was spent on tens of hundreds of improvement projects in the following nine categories:

Campsites and Cottages	Park and Forest Buildings	Roads and Bridges
Resource Management	Comfort Stations and Shower Houses	Dams
Flood and Emergency	Trails and Outdoor Recreation	Water and Sewer Projects

Libraries[8]

Keystone funds are used to help public libraries build new facilities, renovate older buildings, and make services more accessible. These projects include ramps, automatic doors, and elevators for the disabled as well as vital structural, energy-savings, and safety improvements. Grants are limited to $500,000.

Since the inception of the Keystone Fund, the Office of Commonwealth Libraries has received more than 400 applications from municipalities requesting in excess of $70 million in grant funds. To date, approximately $33.5 million in Keystone Funds has been awarded to support 262 projects in 52 different counties across the state.

5 Pennsylvania Land Trust Association and Pennsylvania Recreations and Parks Society. Conservation. http://keystonefund.org/conservation (last accessed 1-7-2013).
6 Pennsylvania Land Trust Association and Pennsylvania Recreations and Parks Society. Recreation. http://keystonefund.org/recreation (last accessed 1-7-2013).
7 Pennsylvania Land Trust Association and Pennsylvania Recreations and Parks Society. State Parks and Forests. http://keystonefund.org/state_parks_and_forests (last accessed 1-7-2013).
8 Pennsylvania Land Trust Association and Pennsylvania Recreations and Parks Society. Libraries. http://keystonefund.org/keystone_libraries (last accessed 1-7-2013).

Historic Preservation[9]

The Keystone Fund seeks to preserve Pennsylvania's rich cultural heritage by investing in projects that identify, preserve, promote, and protect historic and archaeological resources of the state. Project examples include covered bridges, historic houses, county courthouses, theaters, and museums. The Fund is one of the few dedicated funding sources available to support these types of historic preservation projects. Grantees must guarantee the maintenance and preservation of the historic property and public accessibility for a minimum of 15 years after the grant is awarded. Since the Fund was created it has supported more than 500 projects in 65 counties with investments of $29.5 million to individual grantees. Additionally, over $90 million has been spent at 54 historic sites, museums, and other support facilities administered by the Pennsylvania Historical and Museum Commission in 21 counties.

Higher Education[10]

Currently, 14 state-funded universities receive grants from the Keystone Fund for the maintenance of campus buildings and facilities. The Pennsylvania State Higher Education Agency administers the higher education grant program. In FY 2013-2014, $12.1 million was allocated to the State System of Higher Education in the Governor's Executive Budget.[11]

This report quantifies and characterizes the economic benefits provided by Keystone projects in the above categories. We discuss a variety of benefits including natural goods and services, tourism and visitor spending, job creation, community revitalization, business attraction, property values, fiscal impact, and others. Our findings indicate that the Keystone Fund provides an exceptional economic return on investment to Pennsylvania.

Pennsylvania Land Trust Association

9 Pennsylvania Land Trust Association and Pennsylvania Recreations and Parks Society. Historic Preservation. http://keystonefund.org/historic_preservation (last accessed 1-7-2013).
10 Pennsylvania Land Trust Association and Pennsylvania Recreations and Parks Society. Higher Education. http://keystonefund.org/higher_education (last accessed 1-7-2013).
11 Governor's Executive Budget 2013-2014.

Conservation

Investment in Land and Water Conservation

From 1995 to 2012, The Keystone Fund supported the conservation of 116,000 acres of open space, including both lands protected through conservation easements (i.e., voluntary conservation agreements with willing landowners) and fee simple. During this time an average of 9,680 acres of land were protected annually through the Keystone Fund, with an average of $8.34 million spent annually (this is nominal spending, that is not in today's dollars).[12] The average expenditure per acre conserved during this period was $1,290. Exhibit 1 breaks out the historical spending and acres conserved through the Keystone Fund.

Exhibit 1. Annual Keystone Fund Spending on Land and Water Conservation

Year	Acres	Spending
1995-1997	9,040	$13,000,000
1998	8,440	$4,150,000
1999	7,500	$5,990,000
2000	7,730	$5,840,000
2001	7,750	$10,200,000
2002	9,190	$8,280,000
2003	11,700	$8,260,000
2004	5,430	$7,540,000
2005	7,660	$10,200,000
2006	8,450	$13,300,000
2007	6,300	$19,600,000
2008	12,000	$14,400,000
2009	2,320	$4,850,000
2010	3,500	$8,790,000
2011	5,920	$10,200,000
2012	3,170	$5,600,000
Total	**116,000**	**$150,000,000**
Average Annual Spending (1995-2012): $8,340,000		
Average Annual Acres Conserved (1995-2012): 9,680		
Source: Pennsylvania Department of Conservation and Natural Resources . Note: Numbers rounded to 3 significant digits		

Natural Goods and Services

Some of the key economic benefits of land conservation come in the form of natural goods and services. Natural lands and water bodies provide important functions that have significant economic value. Protected parks and open space remove air pollutants, protect and enhance water quality and supplies, provide fish and game habitat, produce food, manage stormwater, and provide flood control and other necessary functions. The following list qualitatively describes in more detail some of the goods and services provided by different types of ecosystems:

12 This figure includes only spending by the Keystone Fund. See "Leverages Private and Local Funding" for figures on matching funds.

Forests protect water and air quality.

- Forests help purify water by stabilizing soils and filtering contaminants, and regulate the quantity of available water and seasonal flow by capturing and storing water. In fact, forests process nearly two-thirds of the fresh water supply and provide water to about 180 million people across the U.S.[13]
- The soil stability of forests also reduces erosion and stormwater runoff, defraying the costs of erosion-related damage such as repairing damaged roads and structures and treating contaminated water.
- Forests help to improve air quality.[14] Trees store and sequester air particulates and atmospheric carbon, reducing the amount of carbon a community produces and contributing to breathable air.

Shrub lands and grasslands protect water quality and provide pollination services.

- Grasslands and shrub lands capture water minimizing particulate flow to surface water, and filter potential pollutants.[15]
- Grasslands and shrub lands provide habitat for native pollinators.

Wetlands hold floodwaters, improve water quality, and support biodiverse habitats.

- A one-acre wetland can typically store about three-acre feet of water, or one million gallons. Trees and other wetland vegetation help slow the speed of flood waters. Water storage and the work of wetland vegetation can lower flood heights and reduce destructive power of floodwaters.[16]
- Wetlands act as a natural filtration system to improve water quality by absorbing excess nutrients from fertilizers, manure, and sewage. Their role as natural purifiers reduces water treatment and infrastructure costs.[17]
- Wetland habitats support rich food chains and are home to species on microscopic and macroscopic level – from tiny invertebrates to mammals and fish.

Agricultural lands can help to improve water and soil quality.

- Conservation tillage reduces the runoff of soil particles attached to nitrate, phosphorus and herbicides, contributing to improved water quality. Tillage practices can also protect the soil surface from the impact of rain and slow water movement.[18]
- Recent overall declines in soil erosion and improvements in soil quality in the U.S. are partially attributable to increased soil conservation practices such as crop residue management, land retirement, and conservation tillage.[19]

13 National Research Council, 2008. Hydrologic Effects of a Changing Forest Landscape. National Academy of the Sciences: Washington D.C.
14 Ibid.
15 Ducks Unlimited. Wetlands and Grassland Habitat. http://www.ducks.org/conservation/habitat (last accessed 2-11-2011).
16 U.S. Environmental Protection Agency, 2006. Wetlands: Protecting Life and Property from Flooding. EPA843-F-06-001. www.epa.gov/owow/wetlands/pdf/Flooding.pdf.
17 U.S. Environmental Protection Agency, 2006. Economic Benefits of Wetlands. EPA843-F-06-004. www.epa.gov/owow/wetlands/pdf/EconomicBenefits.pdf.
18 American Farmland Trust, 2005. The Environmental Benefits of Well Managed Farmland. Center for Agriculture in the Environment: DeKalb, Illinois.
19 Ibid.

Open Water

- Water bodies provide flood control and clean drinking water by storing runoff from stormwater, retaining sediment, and recharging groundwater.
- Open water resources provide recreation opportunities and support livelihoods through irrigation for agriculture and drinking water for livestock.
- Water bodies assimilate plant nutrients and are rich in plant varieties that support many plant and animal species including migratory birds.

Highlighting the Economic Value of Natural Goods and Services

The following sections describe the economic value of select natural goods and services provided by conserved lands in Pennsylvania.

Water Quality Protection

Open space lands filter contaminants out of stormwater runoff and prevent contaminated runoff from developed areas from entering waterways and drinking water supplies. As shown in Exhibit 2, nearly eight out of 10 residents get their drinking water from surface water supplies such as reservoirs.[20] These water supplies are fed by rivers and streams, which collect stormwater runoff from large land areas called watersheds. Over a half-million people received water from drinking water supplies with reported violations in 2010.[21] More natural land in watersheds translates into cleaner drinking water and reduced water filtration costs as these lands prevent pathogens, excess nutrients, metals, sediments and other contaminants from entering water supplies.[22] According to a recent report, protected open space lands in southeastern Pennsylvania provide $61 million in water quality and supply benefits each year.[23]

Exhibit 2. Pennsylvania Water System Data FY 2010

	Community	Non-transient, Non-community	Non-transient	Total	Ground	Surface	CWS with reported violations	Pct.
Systems	2,090	1,280	6,280	9,650	9,050	601	156	7%
Population Served	10,800,000	535,000	792,000	12,100,000	2,610,000	9,520,000	523,000	5%
Source: EPA, Factoids–Drinking Water and Ground Water Statistics for 2010								

Flood Control and Prevention

Conserved lands minimize and prevent costly damages associated with flooding in Pennsylvania by absorbing flood waters, intercepting and slowing rainfall runoff, and keeping people and development out of harm's way. From 2000 through 2011 flooding caused $1.9 billion in property damages in the state according to the Hazards and Vulnerability Research Institute. An additional $4.1 million in crop damage was incurred. Flooding was also responsible for the tragic loss of 40 lives during this period.[24]

20 Environmental Protection Agency, 2010. Factoids: Drinking Water and Ground Water Statistics for 2010.
21 Environmental Protection Agency, 2010. Factoids: Drinking Water and Ground Water Statistics for 2010.
22 Greenspace Alliance and Delaware Valley Regional Planning Commission, 2011. The Economic Value of Protected Open Space in Southeastern Pennsylvania.
23 Greenspace Alliance and Delaware Valley Regional Planning Commission, 2011. The Economic Value of Protected Open Space in Southeastern Pennsylvania.
24 Hazards and Vulnerability Research Institute, 2010. The Spatial Hazard Events and Losses Database for the United States, Version 8.0 [Online Database]. Columbia, SC: University of South Carolina. http://www.sheldus.org

In southeast Pennsylvania open space provides flood mitigation services valued at $37 million each year. Expensive infrastructure such as dams and reservoirs would have to be constructed without this natural service.[25] To help avoid flood damages, the state of Pennsylvania has voluntarily "bought out" and demolished approximately 1,400 homes and removed 3,500 people from dangerous flood areas since 1996.[26] By proactively protecting natural flood plains the state can avoid these mitigation expenses in the future.

Air Pollution Removal

Trees naturally remove many harmful air pollutants including carbon dioxide, ozone, sulfur dioxide, and others. Air pollutants represent a serious danger to human health by causing asthma and other respiratory ailments. Soot pollution causes approximately 5,000 premature deaths and contributes to roughly 4,000 hospital admissions for cardiovascular disease in Pennsylvania every year. An additional 7,000 residents are admitted to hospitals for respiratory disease caused by smog pollution. Air pollution also causes about 800,000 missed work days and 900,000 missed school days annually.[27]

The U.S. Forest Service recently studied the state's urban and community forests containing approximately 219 million trees. These trees store nearly 46 million tons of carbon, a service valued at $955.3 million. They also remove approximately 1.5 million tons of carbon and 39,700 tons of air pollution each year providing an additional $318 million in annual value.[28] In the five-county region of southeastern Pennsylvania, $15 million would have to be spent each year to maintain the current level of air quality if all protected open space was developed similarly to the surrounding area.[29]

Natural Goods and Services: Philadelphia's Park System

Parks provide an extraordinary economic value to the city of Philadelphia in the form of stormwater management and air pollution removal. Stormwater is a major issue in urban areas because it causes localized flooding and carries pollutants into local waterways. Severe stormwater can also overwhelm combined water and sewer systems causing untreated water to enter rivers and bays. Parkland reduces stormwater management costs by capturing and slowing runoff. The value of this service by parks in Philadelphia was calculated to be $5.95 million annually.

Trees and vegetation on parkland naturally filter harmful pollutants out of the air. Over half of the city's parks are covered by tree canopy. Based on the concentration of pollutants in the city's air and other factors, it was calculated that Philadelphia's parks save the city $1.53 million each year in air quality services. This is the cost the city would have to pay to prevent the pollutants currently removed by trees from entering the atmosphere.

Source: The Trust for Public Land's Center for City Park Excellence, 2008. How Much Value Does the City of Philadelphia Receive from its Park and Recreation System? Prepared for the Philadelphia Parks Alliance.

25 Greenspace Alliance and Delaware Valley Regional Planning Commission, 2011. The Economic Value of Protected Open Space in Southeastern Pennsylvania.
26 Pennsylvania Emergency Management Agency. What is Hazard Mitigation. http://www.portal.state.pa.us/portal/server.pt?open=512&objID=4547&&PageID=457689&mode=2 (last accessed 1-7-2013).
27 PennEnvironment Research & Policy Center, 2006. Air Pollution and Public Health in Pennsylvania.
28 Nowak, D.J. and E.J. Greenfield, 2009. Urban and Community Forests of the Mid-Atlantic Region. USDA Forest Service General Technical Report NRS-47.
29 Greenspace Alliance and Delaware Valley Regional Planning Commission, 2011. The Economic Value of Protected Open Space in Southeastern Pennsylvania.

Return on Investment

The Trust for Public Land conducted an analysis of the return on Pennsylvania's investment in land conservation through the Keystone Fund by comparing the state's investment to the economic value of the natural goods and services provided by conserved lands. Every $1 invested by the Keystone Fund in land and water conservation returns $7 in economic value of natural goods and services.

Methodology

To determine the natural goods and services provided by conserved lands and waters, The Trust for Public Land analyzed the ecosystem types found within conserved lands using a Geographic Information System (GIS) analysis. We obtained GIS data (i.e., mapped boundaries) of publicly and privately held conservation easements and purchased conservation lands that were protected through the Keystone Fund. We then determined the underlying ecosystem types using the National Land Cover Dataset (NLCD 2006) which features a 16-class land cover classification scheme.[30]

Comprehensive spatial and spending data were not available for all parcels of land conserved by the state through the Keystone Fund because not all protected lands have been mapped. The Trust for Public Land collected the best available information, which was provided by the Pennsylvania Department of Conservation and Natural Resources through the Conservation Almanac.[31] These data represent a subset of total acres protected and spending from 1995 to 2012. We analyzed 113,500 acres protected through $139,670 million in Keystone Fund spending (nominal spending, i.e. not adjusted to present value). These projects are sufficiently representative of Keystone Fund conservation projects (i.e., 98 percent of the acres protected and 93 percent of spending) to estimate the return on investment.

From this analysis we calculated the number of acres of each of the 15 landcover types found within the conserved lands. The most commonly acquired land cover type is Deciduous Forest representing 74 percent of all conserved land. Exhibit 3 breaks out the full results of the land cover analysis.

30 Fry, J., Xian, G., Jin, S., Dewitz, J., Homer, C., Yang, L., Barnes, C., Herold, N., and Wickham, J., 2011. Completion of the 2006 National Land Cover Database for the Conterminous United States, PE&RS, Vol. 77(9):858-864.

31 The Trust for Public Land's Conservation Almanac. Available online at www.ConservationAlmanac.org.

Exhibit 3. Lands Conserved by Land Cover Type

Land Cover Type	Acres	Percentage
Deciduous Forest	84,300	74%
Mixed Forest	6,560	6%
Evergreen Forest	4,310	4%
Developed, Open Space (Parks)	3,590	3%
Cultivated Crops	2,900	3%
Woody Wetland	2,850	3%
Pasture/Hay	2,850	3%
Open Water	2,330	2%
Shrub/Scrub	1,860	2%
Barren (e.g., rock outcrops)	687	1%
Developed, Low Intensity	442	<1%
Grassland	391	<1%
Emergent Herbaceous Wetland	262	<1%
Developed, Medium Intensity	152	<1%
Developed, High Intensity	50	<1%
Total	**113,000**	**100%**

Source: 2006 National Land Cover Data (NLCD 2006)

Results

Based upon the per-acre economic values (see Appendix) 113,490 acres of conserved land provide $1.75 billion (present value, i.e., the value of past investments in today's dollars) in total economic value from date of purchase (i.e., beginning in 1995) to 2022 (i.e., 10 years into the future) in the form of natural goods and services.

The Trust for Public Land used this value to estimate the return on $218 million (present value) invested in 113,490 acres of land conserved through the Keystone Fund from 1995 to 2012. The comparison of this investment to the economic value of natural goods and services generated by these lands in the past (i.e., 1995 to 2012) and into the future (i.e., today through 2022) finds that every $1 invested returns $7 in economic value. These goods and services will continue to be provided well beyond 2022 increasing the total return on investment beyond that calculated in this analysis.

Tourism and Outdoor Recreation

Land conservation investments through the Keystone Fund support a robust tourism industry by creating outdoor recreation destinations and by maintaining the natural beauty of the state's countryside. The primary purpose of 5 percent of all day trips and 6 percent of all overnight trips taken in the state is "the outdoors."[32] Residents and visitors attracted by the recreation opportunities on protected open space spend significant sums of money at local businesses on food, equipment, lodging, and more. The scenic quality of open space also attracts visitors who spend money locally. In 2011, one in five overnight visitors took a scenic drive making the activity the most common overnight trip experience in the state. Visiting a state or national park also ranked high at number six.[33] Visitor spending generates tax revenues for local communities, supports local businesses, and creates new jobs for residents.

Visitor Spending

Pennsylvania's tourism industry is an economic engine with $37.2 billion in visitor spending in 2011. As a result of this spending, the state's travel and tourism economy generated $28.6 billion of the state's gross domestic product (GDP), which measures economic output. That makes the travel and tourism industry responsible for nearly 5 percent of the entire state economy.[34] Investments through the Keystone Fund help maintain and grow this critical economic sector.

Pennsylvania had 184.7 million domestic and international travelers in 2011. Overnight visitors represented 64.2 million trips, an increase of nearly 4 percent from the previous year. Over 90 percent of those overnight visitors traveled for leisure. Each spent $263 per trip, on average, and accounted for nearly half of the state's total domestic traveler spending. There were an additional 110 million day-trip leisure travelers during the year. Each of these visitors spent $108 per trip, on average.[35] The economic activity generated by visitor spending generates jobs in a variety of industries. On average, every 400 travelers support one Pennsylvania job. In 2011, travel and tourism supported over 461,000 jobs representing 6.4 percent of the state's total employment. This means that one out of every 16 jobs in Pennsylvania is supported by tourism.[36]

In York County, a strong partnership has successfully protected a historic and recreational community asset. Located within three miles of the rapidly expanding city of York, the 116-acre Camp Security property is a refuge of green pastures almost entirely surrounded by single family homes and encroaching development.

32 Pennsylvania Department of Community and Economic Development, 2012. Pennsylvania's Annual Traveler Profile: 2011 Travel Year. Prepared by Longwoods International.
33 Ibid
34 Pennsylvania Department of Community and Economic Development, 2012. The Economic Impact of Travel and Tourism in Pennsylvania: Calendar Year 2011. Prepared by Tourism Economics.
35 Ibid
36 Pennsylvania Department of Conservation and Natural Resources. Economic Impact of Local Parks, Recreation, and Open Space in Pennsylvania.

Outdoor Recreation

Outdoor Recreation provides an enormous boost to the state's economy. It generates $21.5 billion in annual consumer spending in Pennsylvania both by visitors and residents. That spending benefits the state and local municipalities through greater sales tax revenues. The tax revenue attributed to outdoor recreation spending totals $1.6 billion annually. Spending on outdoor recreation also helps local businesses that hire Pennsylvania residents. Approximately 219,000 jobs in the state are supported by this spending accounting for $7.2 billion in wages and salaries.[37] Much of that earned income is then spent in local communities further magnifying the economic impact of outdoor recreation.

Camp Security

Keystone funds were leveraged with private donations, local grants, and county funding to purchase this property and combine it with an adjacent 10-acre Springettsbury Township Park, creating the Camp Security Preservation Area. This tract exemplifies the historic landscape of York County and now provides an oasis of natural beauty to the public. Located less than ten miles from the Susquehanna River, the property is part of the Chesapeake Bay Watershed and its conservation promotes groundwater infiltration and stormwater management.

The property is also believed to be on the site of the nationally significant Camp Security, the last remaining Revolutionary War prison camp in the country. The significance of this historic resource has been recognized by the commonwealth with an interpretive historical marker at the site and an exhibit at the State Museum. Camp Security possesses the unique and irreplaceable ability to tell a story which no other place in the nation can tell, a story which is integral to the founding of this country.

Kyle Shenk/The Conservation Fund

Fundraising is underway for an adjacent 47-acre property on which Camp Security artifacts have been discovered. If remaining funds are raised and this property is protected, it will be added the Camp Security Preservation Area.

"Camp Security is located less than an hour from Gettysburg and about an hour and a half from Valley Forge – two historic sites that draw several million visitors each year," said Todd McNew, Pennsylvania Director of The Conservation Fund. "Once Camp Security is protected, explored and promoted, we believe that thousands will visit annually. This project will be a win for local residents, the environment and the regional economy."

37 Outdoor Industry Association, 2012. The Outdoor Recreation Economy: Pennsylvania.

Hunting, Fishing, and Wildlife Watching

Conserved lands provide essential habitat for fish, game, and other species that attract visitors and sportspersons who spend money on equipment and trip-related expenses. Over 4.56 million people participated in at least one form of wildlife-associated recreation in Pennsylvania in 2011. Approximately 1.4 million people either went hunting, fishing, or did both, while nearly 3.6 million people went wildlife watching. Participants spent significant amounts of money in local communities related to their activity. In 2011, nearly $2.8 billion was spent on wildlife-related recreation. Wildlife observers spent $1.23 billion while hunters and anglers spent a combined $1.56 billion. About a quarter of all spending was on trip-related (travel) expenses. See Exhibit 4 for a detailed breakdown of spending.

Exhibit 4. Participation in Wildlife-Associated Recreation in Pennsylvania – 2011 (Residents and Nonresidents)

Type of Participant	Number of Participants	Expenditures		
		Trip-related	Equipment and Other	Total
Wildlife Watching	3,600,000	$267,000,000	$959,000,000	$1,230,000,000
Sportsperson (hunters and anglers)	1,420,000	$401,000,000	$1,160,000,000	$1,560,000,000
Total	**4,560,000***	**$668,000,000**	**$2,120,000,000**	**$2,790,000,000**

*Note that total is lower than sum of participants because some participants engaged in both activities. Numbers rounded to 3 significant digits. Source: U.S. Fish and Wildlife Service, 2011 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation.

State Parks

State parks are popular attractions that generate economic activity in local communities. In 2010, Nearly 38 million people visited Pennsylvania state parks spending $859 million. Over 23 percent of that spending came from out-of-state visitors. The total economic impact of that spending amounted to $1.15 billion in sales. This means that every $1 invested in the state park system returns $12.41 of income to Pennsylvania. Visitors to state parks directly support 9,440 jobs and $227 million in wages. When the total economic impact is considered, state park visitors are responsible for 12,600 jobs in the state and nearly $398 million in labor income when the total economic impact is considered.[38]

Keystone Fund and the ADA

Some of the most compelling projects undertaken with Keystone Fund dollars have been those that improved accessibility to recreational facilities in state parks. No fewer than 20 projects under the guidelines of the Americans With Disabilities Act have been completed in the parks since 1999, ranging from installation of ramps and improvements, to parking lots, to accessible cabins and yurts, fishing piers and playgrounds.

Come summer, there's nothing to compare to the relief afforded by a dip in the water – be it a stream, a lake or a swimming pool. Thanks to the Keystone Fund, improved beach and pool access for swimmers of all abilities is now possible in locations as diverse as the lakefront at Poe Valley State Park in Centre County and the swimming pool at Mount Pisgah State Park in Bradford County.

Brittany Howell

To cite only one example of the economic benefits of improved public access to parks, a study by Penn State University's Department of Recreation, Park, and Tourism Management (The Economic Significance and Impact of Pennsylvania State Parks: An Assessment of Visitor Spending on the State and Regional Economy, 2010) attributed 14 jobs and over $500,000 in spending by visitors to Mount Pisgah during the study year of 2008. The study made no assumptions on the physical abilities of the visitors to the parks so it's left to us to draw our own conclusions. But it stands to reason that every visitor who is afforded the opportunity to participate in an activity is another visitor afforded the opportunity to spend money.

The work's not done! Our population is aging and the tenets of universal design are taking hold nationwide. There is a place for everyone in Pennsylvania's beautiful outdoors with plenty of opportunities for play and discovery in the state parks and forests. Improved access for park and forest users with limited mobility means improved access for all.

38 Pennsylvania Department of Conservation and Natural Resources, 2012. The Economic Significance and Impact of Pennsylvania State Parks: An Updated Assessment of 2010 Park Visitor Spending on the State and Local Economy.

Enhanced Property Values

People want to live near open space and are willing to pay extra for homes in proximity to these areas. A National Association of REALTORS® survey found half of respondents would pay 10 percent more for a house located near a park or open space.[39] As a result, the state's housing stock is more valuable than it would be without the protection of open space. Homeowners benefit directly from this effect when they sell their properties for higher prices. Local governments benefit through greater property tax revenues.

An analysis conducted by researchers at Penn State found that open space has the greatest positive impact on home prices out of all types of adjacent or nearby land uses in Berks County. The study found that a home's price is 0.28 percent higher for every acre of government-owned forested open space within 400 meters (roughly ¼ mile) of the property. Government-owned forestland had the largest positive amenity impact of all land use types including other open space types.[40]

In southeastern Pennsylvania, protected open space adds $16.3 billion to the value of the region's homes, the equivalent of increasing all property values by $10,000. Properties as far away as one mile experience an increase in value because of their proximity. The increase in home values attributed to open space is responsible for $240 million in annual property and transfer tax revenues in the region. The Hopewell Big Woods, covering 73,000 acres in southeastern Pennsylvania, increases the selling price of nearby homes by up to $8,270 within a quarter-mile of the conservation area.[41]

Reduced Local Taxes

In addition to increasing property tax revenue through increased property values and generating new sales tax revenue from visitors, land conservation saves Pennsylvania communities money through avoided costs on expensive infrastructure and other municipal services such as schools, police and fire protection and others required by residentially developed areas. Studies have consistently shown that open space and working lands contribute more in taxes than they require in municipal services. Residential land, however, contributes less in taxes than it receives in municipal services, representing a net loss to local governments. The national median across 151 communities over 25 years is that for every $1 paid in local taxes, working lands and open space require $0.35 in services compared to $1.16 in services for the average home.[42]

Studies of 15 Pennsylvania communities undertaken by the American Farmland Trust confirm these findings with open space and working farms and forests requiring on average only $0.18 in services for every $1 generated to the community in tax revenues. Residential lands in these communities, meanwhile, require $1.26 in services for every $1 in tax revenues received by the municipality.[43]

39 National Association of Realtors, 2001. Survey conducted by Public Opinion Strategies.
40 Ready, R., and C. Abdalla, 2003. The Impact of Open Space and Potential Local Disamenities on Residential Property Values in Berks County, Pennsylvania. The Pennsylvania State University Department of Agricultural Economics and Rural Sociology Staff Paper 363.
41 Greenspace Alliance and Delaware Valley Regional Planning Commission, 2011. The Economic Value of Protected Open Space in Southeastern Pennsylvania.
42 American Farmland Trust. 2010. Cost of Community Services Fact Sheet. Farmland Information Center, Northampton, Massachusetts.
43 Ibid

Quality of Life

Parks and open space are key ingredients to the state's quality of life. Conserved lands provide opportunities for outdoor recreation, provide clean air and water, and maintain the character of communities and the state's scenic beauty. In today's knowledge-based economy, talented workers prefer to live and work in places with amenities such as parks, open space, and trails. A survey of high-tech workers revealed that a job's "attractiveness" increases by 33 percent in a community with a high quality of life.[44] Businesses, in turn, choose to locate in these places because they will be more successful in recruiting a skilled workforce. Investing in conservation is therefore an effective economic development strategy.

In a 2011 ranking of the top states for businesses, Forbes ranked Pennsylvania as the state with the sixth best quality of life in the nation. This makes quality of life the state's top competitive advantage among states as it failed to rank in the top 15 in any of the other five categories.[45] The loss of open space is a threat to this economic advantage. A 2012 quality of life survey of state residents found that 68 percent are concerned with the loss of open space such as forests and farms in Pennsylvania with 38 percent being "very concerned."[46] Investments in parks and open space through the Keystone Fund help maintain and enhance the state's quality of life, which attracts and retains businesses and skilled workers.

Leverages Private and Local Dollars

Pennsylvania's investment in conservation through the Keystone Fund leverages funding from private (e.g., individual donors) and local sources (e.g., local municipalities). By attracting support from other sources, the state does not have to bear the entire cost of a conservation project and therefore maximizes its investment. By leveraging funds, more local projects are able to be sponsored, which translates into additional economic benefits.

From 1995 to 2012 Pennsylvania's Keystone Fund leveraged $324 million in matching funds from other sources including $205 million from private funding sources and $116 million from local sources.[47] That means every $1 of Keystone Fund spending on land conservation was matched by $2.16 in additional contributions (i.e., the Keystone Fund paid $0.32 for every $1 worth of land and water conservation). When all Keystone projects (i.e., looking beyond land and water conservation) between 1994 and 2012 are considered, the Keystone Fund has leveraged $3.13 for every $1 invested.[48]

44 American Planning Association, 2002. How Cities Use Parks for Economic Development.
45 Badenhausen, Kurt, 2011. Forbes. "The Best States for Business and Careers" (November 22, 2011).
46 Muhlenberg College, 2012. Pennsylvania Quality of Life Survey.
47 The Trust for Public Land's Conservation Almanac. Available online at www.conservationalmanac.org
48 Pennsylvania Land Trust Association, 2012. Excludes state parks and state forests.

Parks, Trails, and Recreation

The Keystone Fund helps maximize investments in conservation and land acquisition for parks by creating and maintaining the necessary facilities and infrastructure on public lands as well as improving and maintaining the land itself. By doing it helps generate jobs and creates premier destinations for residents and visitors who spend money locally. As of 2012, the Keystone Fund has supported 2,600 community park development projects and 850 trail projects.

Job Creation

The Keystone Fund helps develop park facilities for both local and state parks. These investments directly impact local economies by putting people to work and supporting businesses that provide goods and services related to these construction and maintenance projects.

The Keystone Fund has helped construct and install a variety of recreational facilities in local parks including trails, playgrounds, ballfields, pools, boat launches, recreation centers, and more. Such projects are significant job creators. One national study found that off-street multi-use trails generate 9.57 total jobs per $1 million invested. Bicycle infrastructure projects create even more jobs – 11.4 per $1 million. By comparison, investments in coal and oil yield only 6.9 and 5.2 jobs per $1 million, respectively. The jobs that are created include more than construction jobs. Many are created in high wage and key state industries including architectural and engineering services, real estate, accounting, and manufacturing. Of the 11.4 jobs created from bicycle infrastructure projects, almost half are created from the secondary effects of spending. That is, they are created from the economic activity generated as dollars spent on materials and labor for projects ripple throughout the economy.[49]

Jobs are also created directly through construction, maintenance, and restoration projects for state parks. The Keystone Fund helps improve state parks through the construction of campsites, park buildings, shower houses, roads and bridges, trails, and more. It also supports land management activities on state park land including reforestation, park rehabilitation, stream bank stabilization, riparian buffers and other restoration activities. Similar to trail and building construction, restoration projects are effective job generators. A recent study looking at forest and watershed restoration found that as many as 23.8 jobs are created per $1 million invested in "labor-intensive" forest and watershed contracting. "Equipment-intensive" contracting, meanwhile, creates 15.7 to 17.2 jobs per $1 million.[50]

49 Garrett-Peltier, H., 2011. Pedestrian and Bicycle Infrastructure: A National Study of Employment Impacts. Political Economy Research Institute.

50 Nielsen-Pincus, M., and C. Moseley, 2010. Economic and Employment Impacts of Forest and Watershed Restoration in Oregon. Ecosystem Workforce Program Working Paper Number 24.

Visitor Spending

Urban and community parks and trails draw visitors, including residents and out-of-towners, who spend money at nearby businesses. A 2008 analysis conducted by The Trust for Public Land estimated that 41 percent of tourists to Philadelphia visited a park while in the city. It also estimated that 20 percent of park visitors came to the city because of the parks. Park tourists in the city spend an estimated $115 million annually, which in 2006 produced city tax revenue of $5.18 million.[51] Several studies looking at the economic impact of visitors to trails throughout the state have

The Pine Creek Rail Trail

Sixty-two miles of trail. Cozy inns, bald eagles, ice cream and rattlesnakes. Clean restrooms and a long meandering stream. These are the things that make a perfect bike ride (or paddle or hike). And because of the completion of the Pine Creek Rail Trail through Pennsylvania's Grand Canyon in the Tioga and Tiadaghton State Forests, that perfect outdoor adventure awaits.

Money provided by the Keystone Fund rehabilitated several beautiful bridges over the Creek and contributed to some of the mundane but nevertheless vitally important features of this long trail – it also paved the parking lots and installed the SSTs ("sweet smelling toilets"). All it takes to understand the importance of this spending is to read comments and reviews on the Rails-to-Trails Conservancy (RTC) website for trails across the country. If these facilities aren't in place, trail users aren't happy. And when it comes to the Pine Creek Rail-Trail, the users are happy!

Pennsylvania Parks and Forests Foundation

A 2006 economic impact study conducted by RTC demonstrated that this happiness has translated into dollars for the businesses along the trail. At that time, even though the trail was not yet complete, the local economy was already beginning to reap the rewards of the estimated $12.7 million construction expenditure. One hundred and twenty-five thousand unique visitors had experienced the trail in 2005, with 57 percent of them indicating that their visit involved staying overnight (an average $70/night for accommodations) and $30/person in meals and other consumables during the stay. Business owners had already begun to attribute between 35% and 49% of their sales to trail users, with expansion of services and goods underway and a revitalization of the area and the people who live there a near certainty. The economic impact study concluded quite succinctly: "With … spending contributing between $3 and $5 million a year to the economy of the Pine Creek Valley, in the words of some of the trail users, 'it's the best investment the state has ever made.'"

Pine Creek Rail Trail 2006 User Survey and Economic Impact Analysis, December 2006, Rails-to-Trails Conservancy Northeast Regional Office

51 The Trust for Public Land's Center for City Park Excellence, 2008. How Much Value Does the City of Philadelphia Receive from its Park and Recreation System. Prepared for Philadelphia Parks Alliance.

shown similar benefits. An analysis of nine trail studies in Pennsylvania between 2006 and 2010 found that on average a trail user spends $14 on "soft goods" such as food, clothing, and fuel.[52] Spending by individual trail users adds up to a major economic impact in local communities. The estimated 125,000 annual users of the trail corridor made up of the 15-mile Lebanon Valley Rail-Trail and the 5.5-mile Conewago recreation Trail spent $875,000 in the local economy in 2011. The total economic impact of this spending added up to over $1.32 million.[53]

The Great Allegheny Passage, a 150-mile system of biking and hiking trails, is especially notable for its economic impact. The trail system has over 800,000 annual users.[54] Approximately 40 percent of trail users stay overnight as part of their trip. On average, overnight visitors spend $98 per day in trail communities and on lodging while day trip users spend $13 per day in local communities. Spending by users of The Great Allegheny Passage has a tremendous impact on local businesses. In 2008 the system generated more than $40 million in visitor spending and $75 million in wages.[55]

The trail network also illustrates the impact parks and trials can have on attracting and supporting local businesses. A survey of businesses revealed that one-quarter of 2007's annual revenue was from trail users and two out of three businesses said they had a gain in revenue because of their proximity to the trail. As a direct result of the trail, one-third of businesses reported they were planning to expand their business operation or the services they offer.[56] In 2007, the Trail Town Program was created to maximize the economic benefit of the trail system to local communities by providing services to local communities and businesses. Since it began, "Trail Towns" have gained 54 new and 13 expanded trail-serving businesses. As a result, 83 jobs in eight communities were created.[57]

Enhanced Property Values

Urban and community parks increase property values reflecting their amenity value to homebuyers. A report from the National Association of REALTORS® found the premium for homes near parks and open space can extend three blocks and start at 20 percent for those homes directly adjacent.[58] A study conducted by researchers at the Wharton School at the University of Pennsylvania found that parks increase the value of houses within ¼ mile by 10 percent in the New Kensington neighborhood of Philadelphia. Vacant lots that were greened and/or turned into parks increased surrounding housing values by up to 30 percent.[59] An analysis of Clark Park in Philadelphia found

52 Pennsylvania Department of Conservation and Natural Resources. Trail User Comparison Chart. http://www.dcnr.state.pa.us/ucmprd2/groups/public/documents/document/dcnr_002135.pdf (last accessed 1-8-2013).
53 Rails-to-Trails Conservancy, 2012. Lebanon Valley Rail-Trail and Conewago Recreation Trail: 2011 User Survey and Economic Impact Analysis.
54 Gallagher, M. and A. Camp, 2011. "Trail Towns" on Great Allegheny Passage benefit from visitor spending. Summer 2011 issue of the American Trails Magazine.
55 Ibid
56 Campos Inc., 2009. The Great Allegheny Passage Economic Impact Study (2007-2008). Prepared for The Progress Fund's Trail Town Program, Laurel Highlands Visitors Bureau, and Allegheny Trail Alliance.
57 Trail Town Program. "Overview." http://www.trailtowns.org/1overview.aspx (last accessed 1-16-2013).
58 National Association of Realtors. On Common Ground. Winter 2009.
59 Wachter, S., 2005. The Determinants of Neighborhood Transformations in Philadelphia Identification and Analysis: The New Kensington Pilot Study.

that on average the park increases property values by $45,900 within a square mile.[60] The entire park system in Philadelphia increases the market value of nearby residential properties by $689 million, generating an additional $18.1 million annually in property taxes.[61]

Trails are also desirable community and neighborhood amenities that enhance property values. According to the National Association of Home Builders, trails are the most desired community amenity that homebuyers seek when buying a home.[62] The property value impacts of several Pennsylvania trails have been studied. On average, the Perkiomen Trail in southeastern Pennsylvania increases the value of properties within a quarter mile by $4,770 while the Radnor Trail increases property values by $69,100 within a quarter mile.[63] Trails throughout the state created with Keystone Funds generate similar enhancements in local property values.

60 Greenspace Alliance and Delaware Valley Regional Planning Commission, 2011. The Economic Value of Protected Open Space in Southeastern Pennsylvania.
61 The Trust for Public Land. 2008. How Much Value Does the City of Philadelphia Receive from its Park and Recreation System? For the Philadelphia Parks Alliance.
62 National Association of Homebuilders, 2008.
63 Greenspace Alliance and Delaware Valley Regional Planning Commission, 2011. The Economic Value of Protected Open Space in Southeastern Pennsylvania.

Cultural Institutions

The Keystone Fund provides funding support to library, historic preservation, and higher education projects that create significant economic benefits while contributing to the quality of life and vitality of communities around the state.

Libraries

The Keystone Fund provides critical support for library construction and renovation projects including projects that make library services more accessible for the disabled. These types of projects are among the highest job creating investments. Furthermore, by helping keep facilities open and operational, the Keystone Fund supports the many economic benefits of local libraries. The Keystone Fund has invested $33.5 million in libraries to support 262 projects in 52 different counties across the state.[64]

Job Creation

Spending on construction and similar activities such as retrofits has a large "multiplier effect" meaning that the dollars invested multiply throughout the entire economy because of the supplies, materials, and labor needed for these projects. One national study found that investing in school buildings, which serve as a close proxy for libraries, generates 19.3 jobs for every $1 million invested.[65] Building retrofits were found to generate 17.4 jobs for every $1 million invested. By comparison, investments in coal and oil yield only 6.9 and 5.2 jobs per $1 million investment, respectively.[66]

Additional Economic Benefits

Libraries have significant economic value that is often overlooked. Without libraries, citizens and organizations would have to spend more time and money to locate needed information. One study calculated how much it would cost library users if every public library in Pennsylvania were to shut their doors. It found that it would cost users $964 million more to get the same information from an alternative source.[67]

The value of libraries can also be measured by the money saved from gaining knowledge to complete projects and activities that otherwise would have required hiring outside help. Libraries have volumes of material that helps users save time and money on a variety of things such as making household repairs. Researchers have found that if libraries as a source of this information are taken away, users will not be able to find alternative sources for all of these needs. The economic value of this loss in Pennsylvania would be $84 million.[68] Communities also benefit when library staff spend their wages and salaries locally. Each year public library employees earn $180 million. Libraries themselves also spend money. In-state library purchases inject $68 million annually into Pennsylvania's economy.[69]

64 Pennsylvania Land Trust Association, Pennsylvania Recreations and Parks Society, and Pennsylvania Department of Conservation and Natural Resources. Libraries. http://keystonefund.org/keystone_libraries (last accessed 1-7-2013).
65 Heintz, Pollin, Garrett-Peltier, 2009. How Infrastructure Investments Support the U.S. Economy: Employment, Productivity and Growth. Political Economy Research Institute.
66 Polin, Heintz, Garrett-Peltier, 2009. Economic Benefits of Investing in Clean Energy. Political Economy Research Institute.
67 Griffiths, J., D.W. King, and S.E. Aerni, 2007. Taxpayer Return-on-Investment in Pennsylvania Public Libraries. University of North Carolina School of Information and Library Science.
68 Ibid
69 Ibid

Community Library Expansion: Carnegie Library of Pittsburgh – South Side

Carnegie Library of Pittsburgh South Side Branch Library was constructed in 1909 as one of the city's first neighborhood libraries. It is an integral component of the revitalization of East Carson Street, the heart of Pittsburgh's steel working South Side.

In 2012, the Library completed a $2.7 million dollar renovation made possible through strong public-private partnerships including a $575,000 Keystone Park, Recreation and Conservation Fund Grant – the largest Keystone grant available to libraries.

The Library is located on East Carson Street at the foot of the Birmingham Bridge that connects downtown Pittsburgh and the South Side by crossing the Monongahela River. It is conveniently located on a bus stop and a community park with playground, swimming pool, basketball courts and baseball field in back. South Side Branch Library's neighborhood is the third-largest employment center in Pittsburgh after Downtown and Oakland.

The design and renovation challenge was to integrate modern technology essential to a contemporary library while preserving and enhancing the historic character of the building. The front entrance stairs now mimic the original plans of the Library's main entrance. There is a welcoming sky-lit Reading Lounge, more accessible self-service areas and a Children's Room with dedicated computers. Renovations included the reconditioning of existing windows, insulation and a new slate roof. The addition of an elevator makes all three library levels ADA compliant and opens floor space for large community meeting rooms that accommodate up to 100 people. A state-of-the-art new geothermal heating and cooling system – the first of its kind in a Pittsburgh library – keeps the building cool in the summer and eliminates the need for natural gas to heat the facility in the winter

Community Response to the Library Renovation
21,000 people visited since reopening
27,000 books and other materials were borrowed
22% increase over annual pre-renovation visits
33% increase in annual pre-renovation circulation of materials

The renovation of Carnegie Library of Pittsburgh's South Side Library Branch is representative of the success of the Keystone Recreation, Park, and Conservation Fund because it enabled Carnegie Library of Pittsburgh to modernize an inefficient, uninviting 100+ year old historic landmark into a vibrant, welcoming 21st Century library that is now truly accessible to all.

soraccophoto.com

Projects supported by the Keystone Fund ensure that libraries are safe places where people of all ages and abilities can come to learn and access a range of services that may otherwise be unaffordable or irreplaceable. At the same time, investments contribute to the economic well-being of communities across the state by creating local jobs, saving residents money, injecting money into local economies through purchases and wages, and reducing the cost burden for local communities and taxpayers.

The Ambler Theatre, Montgomery County

The Ambler Theater, built in 1928, was a magnificent movie theater with great architectural distinction. Designed by Solomon Kaplan, it had state-of-the-art equipment and 1,250 seats. "The Ambler" was the center of its Montgomery County community for over four decades, being run by Warner Brothers and then Budco, a local exhibition chain. After some decline, the theater was sold to the Reverend Harry Bristow who ran the theater as a "Christian Cinema" for twenty years until his death in 1997. In 1998, a group of concerned citizens, led by the Ambler Main Street Manager and the director of the nonprofit County Theater in Doylestown, banded together to secure the future of this ailing building.

After much effort and a great deal of planning, the Ambler Theater was purchased by Ambler Theater, Inc., a nonprofit 501 (c)(3) corporation, in December, 2001. Immediately, work started on the fundraising, restoration and renovation of the theater. The theatre secured two Keystone grants from the PHMC to restore the Neon Tower (2005) and to complete the façade restoration (2007) including reconstructing the original upper and lower marquees above the entranceway to the Theater, repairing the terra-cotta stonework and replacing the front doors to match the existing storefronts on either side of the Theater.

CCallaghan

The Ambler Theatre enjoys a successful operation with over 85,000 admissions per year and membership support, that all anchor the shopping district in downtown Ambler, Montgomery County. The theatre is the region's premier cinema destination, offering a variety of special events ranging from Saturday Kid's Matinee to classic Hollywood films, film screenings by local filmmakers, and discussion groups and lectures on cinema.

Economic consultant Donovan Rypkema noted that, "today historic preservation is the common denominator in virtually every sustained success story in downtown revitalization." A theatre can have a significant economic impact by spurring downtown revitalization. When a city spends money on its downtown, it signals to private investors that it's safe for them to do the same, that their investment will be more secure.

Visitors to the theater spend money at other local businesses during their trip. According to one estimate, Ambler theatre visitors spend $4.3 million annually supporting 112 jobs. The total economic impact of the theatre when operating expenses are factored in is $5.9 million and 165 jobs. Local government revenue attributed to Ambler visitors tops $337,000 each year.

Historic Preservation

The Keystone Fund supports historic preservation by funding projects that "identify, preserve, promote and protect historic and archaeological resources of Pennsylvania for both the benefit of the public and the revitalization of communities." Historic preservation projects create new jobs, stimulate investment in local communities, revitalize neighborhoods and downtowns, enhance tax revenue, increase tourism and visitor spending, and contribute to a high quality of life. Since the Keystone Fund was created it has supported more than 500 projects in 65 counties with investments of $29.5 million to individual grantees. That amount is in addition to the over $90 million that has been spent at 54 historic sites, museums, and other support facilities administered by the Pennsylvania Historical and Museum Commission in 21 counties

Direct Economic Impact

A study examining over 2,300 historic preservation projects in Pennsylvania that leveraged federal resources through the Historic Rehabilitation Tax Credit Program from 1978 to 2010 found a major economic impact to the state. Projects generated $17.1 billion in economic output supporting 148,000 jobs and $5.5 billion in earnings in the state. Many jobs were in high wage sectors outside of construction. About 65 percent of all jobs created by these projects were outside of construction in industries such as manufacturing, professional services, and real estate. The state government benefitted as well receiving $380 million in new tax revenue.[70] While the study didn't examine the specific impacts of Keystone Fund projects, its results show clearly that historic preservation projects have significant economic impacts to communities across the state.

Tourism

Pennsylvania has a rich cultural heritage and the preservation of its unique historic buildings, landmarks, and areas attracts throngs of visitors and supports the state's $14 billion tourism industry.[71] In 2011, 3.1 million "marketable" travelers (i.e., those not traveling for business or to visit friends and family) visited a historical house museum representing 14 percent of all trips in this category. This was the fourth most common activity of these travelers. Civil War sites and other historical sites were each visited by 1.5 million marketable travelers, while over 650,000 took a historic house tour.[72]

An analysis looking at the economic impact from heritage tourism in the state found a combined 32 million people annually visit the state's 50 heritage sites, 12 Heritage Areas, and the historic district in Philadelphia encompassing the Independence Mall. These visitors spend $1 billion each year. When operating expenses of these destinations is factored in, the total annual economic impact to the economy is $2.9 billion and 37,000 jobs. The state directly gains $90 million in annual tax revenues as a result.[73]

70 The Economic Benefits of Historic Preservation Activities in Pennsylvania, 2011. Prepared for Pennsylvania Historical and Museum Commission and Preservation Pennsylvania by Econsult Corporation and Urban Partners.
71 Pennsylvania Department of Community and Economic Development, 2012. The Economic Impact of Travel and Tourism in Pennsylvania: Calendar Year 2011. Prepared by Tourism Economics.
72 Pennsylvania Department of Community and Economic Development, 2012. Pennsylvania's Annual Traveler Profile: 2011 Travel Year. Prepared by Longwoods International.
73 The Economic Benefits of Historic Preservation Activities in Pennsylvania, 2011. Prepared for Pennsylvania Historical and Museum Commission and Preservation Pennsylvania by Econsult Corporation and Urban Partners.

Gruber Wagon Works

The Gruber Wagon Works, located in Bern Township, Pennsylvania, is recognized as the most complete surviving example of a rare late nineteenth/early twentieth century wagon manufacturing facility of its kind in the nation. It was recognized as a National Historic Landmark in 1977. The initial wood frame building with slate roof was built by Franklin H. Gruber between 1882-1884. It was continuously operated by the Gruber family until 1972 and was then relocated to its current site in 1976 by the US Army Corps of Engineers as part of the Blue Marsh Lake Project with restoration beginning in 1978. It was opened as a public museum in May 1982. The building stands today with over 19,000 original artifacts consisting of wood and metalworking machines and tools, including one of three known surviving cold press hydraulic tire setters. The shop was never modernized, and remains as it was circa 1910.

Berks County Parks and Recreation District

During an inspection of the building in August 2006 with members of the original relocation/ restoration team and National Park Service representatives, it was found that in addition to the need for paint and window repairs as anticipated, there existed severe interior structural framing distress with the possibility of major concealed decay, which was contributing to wracking of the frame of the wood building. Noticeable damage from animals and water infiltration from lack of or improperly placed gutters and downspouts was evident as well. The Gruber Wagon Works was placed on the Preservation Pennsylvania "At Risk" list in 2006 and was listed as a Threatened or Endangered National Historic Landmark by the National Park Service in 2004.

A grant from the Pennsylvania Historical and Museum Commission (PHMC) in 2007 provided funds for a condition assessment of the wood frame building, to update the Historic Structures Report (HSR) and to determine the appropriate solution to save the historic fabric of the building and prevent further deterioration. Utilizing the reports and documentation provided, a PHMC Keystone Historic Preservation Grant was applied for in 2008 to begin the necessary restoration to save this historic building.

Thanks to the support of the Berks County Commissioners and the reallocation of funding from another Department of Conservation and Natural Resources (DCNR) Growing Greener project within the Berks County Parks and Recreation system, Community Development Block Grant funding and the support of the Society for the Preservation of the Gruber Wagon Works, all the necessary funding was made available to address the entire rehabilitation project at one time. Rather than the project being done in phases covering a period of time that might have allowed for further deterioration, all the needs of the building were addressed in one complete project.

The ribbon cutting and reopening of the Gruber Wagon Works was celebrated on September 16, 2011 with local and state politicians, dedicated volunteers and representatives from PHMC, DCNR, and project team members.

Each year, there are 1,545 paid tours taken at the museum while total attendance to the park is approximately 150,000. These visitors walk, bike, and participate in other programs and events. Spending by visitors contributes to a strong tourism industry in Berks County. Visitors to the county spent $688 million in 2012 according to the Greater Reading Convention and Visitors Bureau.

Property Values

Historic properties and districts raise property values because they create areas that are desirable to live and work in. A 2010 survey of over 2,200 state residents from every county representing nearly 1,000 municipalities found that "historic buildings, sites, and districts" ranked as the fifth most important trait for enhancing community character.[74]

The Keystone Fund supports projects to create new historic districts, which have been shown to increase the value of homes within their designated boundaries. Properties in Powelton Village in Philadelphia appreciated 3 percent more than the citywide average after the historic designation. There was a 15 percent increase in house prices the year after the Mexican War streets district in Pittsburgh expanded, and in downtown West Chester, houses within a newly expanded district have a price premium of 36 percent over other West Chester houses.[75] While these specific impacts were not the result of Keystone Fund investments, they highlight how investing in historic preservation through the Keystone Fund will continue to generate these types of economic benefits to local communities while protecting the unique historic assets of the state.

Higher Education

The Keystone Fund provides grants to the 14 state universities that compose the Pennsylvania State System of Higher Education to maintain campus buildings and facilities. These funds go to hire workers and purchase materials. These investments have an especially significant impact because eight of the universities that receive Keystone Funds are in rural communities. All except two of the 14 universities are among the top 15 employers in their counties. Columbia, Clarion, and Indiana are number one employer in their respective counties. Lock Haven in Clinton County and Mansfield in Tioga County are the second and third top employers in their respective counties.[76]

National studies have shown that construction and retrofit projects are some of the highest job creating investments. As discussed earlier, investing in school buildings generates 19.3 jobs for every $1 million invested.[77] Building retrofits were found to generate 17.4 jobs for every $1 million invested. By comparison, investments in coal and oil yield only 6.9 and 5.2 jobs per $1 million investment, respectively.[78]

Outside of the immediate job impact of Keystone Fund projects, the Fund supports the array of economic benefits the system provides. The total economic impact of the entire system is $4.47 billion equaling 1 percent of the Gross State Product. For every dollar invested by Pennsylvania in PASSHE, $10.27 is returned in total economic impact to the state. In 2004, PASSHE was the 15th largest employer in the state with a statewide impact of 51,200 jobs. Compared to the state's employment data for that year, the system provided 0.9 percent of all jobs.[79]

74 Pennsylvania Historical and Museum Commission, 2012. Pennsylvania's Statewide Historic Preservation Plan: 2012-2017.
75 The Economic Benefits of Historic Preservation Activities in Pennsylvania, 2011. Prepared for Pennsylvania Historical and Museum Commission and Preservation Pennsylvania by Econsult Corporation and Urban Partners.
76 Armstrong, T., 2006. Returning Value to Pennsylvania: The Pennsylvania State System of Higher Education's Economic Impact. Pennsylvania State System of Higher Education.
77 Heintz, Pollin, Garrett-Peltier, 2009. How Infrastructure Investments Support the U.S. Economy: Employment, Productivity and Growth. Political Economy Research Institute.
78 Polin, Heintz, Garrett-Peltier, 2009. Economic Benefits of Investing in Clean Energy. Political Economy Research Institute.
79 Armstrong, T., 2006. Returning Value to Pennsylvania: The Pennsylvania State System of Higher Education's Economic Impact. System Research Office, Pennsylvania State System of Higher Education.

Conclusion

The Keystone Fund is a critical funding source for creating and protecting the places, amenities, and institutions that make Pennsylvania a great place to live and work. Open space, parks, trails, and important cultural assets contribute to a stellar quality of life while stimulating economic activity across the state. This study found that for every $1 invested in land and water conservation through the Keystone Fund, the State of Pennsylvania will receive a return of $7 in economic value of natural goods and services. In addition to that return on investment, residents, communities, and local governments benefit from new jobs and businesses, increased tourism, enhanced property values, revitalized neighborhoods, improved community fiscal health, natural goods and services, and more. By supporting the Keystone Fund, the state will continue to generate substantial economic benefits for the people of Pennsylvania.

West Chester Borough

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Appendix: Methodology

The natural goods and services provided by the distinct ecosystem types found within Keystone Fund conserved lands, and their monetary values, were determined using the benefits transfer methodology. That is, The Trust for Public Land conducted a thorough literature review of the types of goods and services provided by the 15 ecosystem types identified in conserved lands using recent, relevant, and scientifically sound sources. We then used the economic values of the different ecosystem types identified in that literature to estimate a per-acre economic value of the goods and services provided. Benefits transfer methodology is a common approach in environmental economics because it is a practical alternative to time-intensive and data-intensive original research.

We followed the steps below in conducting the benefits transfer:[80]

- Step 1. Define the policy context. This definition should include various characteristics of the policy site, what information is needed, and in what units.
- Step 2. Locate and gather original research outcomes. Conduct a thorough literature review, and obtain copies of potentially relevant studies.
- Step 3. Screen the original research studies for relevance. How well does the original research context correspond to the policy context? What is the quality of the original research?
- Step 4. Select a point estimate or average of a range of point estimates. Convert each to dollars per acre.
- Step 5. Transfer the point estimate or average value estimate. Aggregate the point estimate or average value estimate by multiplying it by the total number of acres, providing a total value for the good or service at the policy site.

We considered a broad set of natural goods and services based on the availability of high quality sources. We did not examine each and every natural good and service. We expect that an analysis of additional natural goods and services would reveal further positive benefits, and therefore our numbers are likely to underestimate the "true" economic value and return on investment examined in this study.

Based on existing research we determined the natural goods and services provided and estimated their values for each land cover type as shown in Exhibit A-1.

80 Rosenberger, R. and Loomis J, 2003. Benefit Transfer. In P. Champ, K. Boyle, and T. Brown (Eds.), A Primer on Nonmarket Valuation. (445-482). Norwell, Massachusetts: Kluwer Academic Publishers.

Exhibit A-1. Estimated Annual Per Acre Value of Natural Goods and Services by Land Cover Type

Land Cover Type*	Ecosystem Services	Annual Value Per Acre**
Deciduous Forest	Stormwater management; carbon storage and sequestration; erosion control (water quality protection); air pollution removal	$790
Mixed Forest	Stormwater management; carbon storage and sequestration; erosion control (water quality protection); air pollution removal	$790
Evergreen Forest	Stormwater management; carbon storage and sequestration; erosion control (water quality protection); air pollution removal	$790
Developed, Open Space (e.g., Parks)	Carbon sequestration; stormwater management; air pollution removal	$476
Cultivated Crops	Provision of agricultural goods; carbon sequestration; pollination services	$66
Woody Wetland	All	$1,252
Pasture/Hay	Provision of agricultural (livestock) goods; wildlife habitat; carbon sequestration	$46
Open Water	All	$227
Shrub/Scrub	Carbon sequestration; wildlife habitat	$29
Barren (e.g., rock outcrops)	None	--
Developed, Low Intensity	None	--
Grassland	Carbon sequestration; wildlife habitat	$17
Emergent Herbaceous Wetland	All	$1,252
Developed, Medium Intensity	None	--
Developed, High Intensity	None	--

* In order from most commonly conserved to least
** All values reported in 2011 dollars

Forest (deciduous, evergreen, and mixed)

We analyzed five natural services provided by Pennsylvania's forests: stormwater management, carbon storage, carbon sequestration, erosion control (water quality protection), and air pollution removal. The annual value of these services is $790 per acre.

Forests decrease the amount of stormwater runoff that reaches local waters by capturing and storing rainfall and infiltrating rainwater into the soil. It also slows the rate of runoff which helps reduce flooding. We used two studies to estimate the value of this service in Pennsylvania based on the avoided cost of stormwater infrastructure.[81,82] This represents the savings to Pennsylvania because of the water storage capacity of forests across the state.

81 GreenSpace Alliance and Delaware Valley Regional Planning Commission, 2010. The Economic Value of Protected Open Space in Southeastern Pennsylvania.
82 New Jersey Department of Environmental Protection. 2004. The Economic Value of New Jersey State Parks and Forests.

Forest trees also store and sequester carbon. Storage refers to how much carbon is present or "stored" in trees at present while sequestration is how much carbon is removed from the atmosphere each year. We determined the average carbon stored and the average carbon sequestration rate for Pennsylvania's forests. The 2011 average global market price of carbon was used as the dollar value of carbon to calculate an annual per-acre value for carbon storage and sequestration by forests.

Soil retention is another key service provided by the state's forests. Forest land keeps soil from being eroded away. The USDA-supported Conservation Reserve Enhancement Program (CREP), an incentive program for farmers seeking to maintain the ecological functions of streams, provides an implicit measure of the value of soil erosion control because forests perform the same function as farmland enrolled in CREP.[83] We used 2012 Pennsylvania CREP rates to calculate the value of erosion control.

Forests provide clean air by naturally removing harmful air pollutants. We considered the removal value of four major air pollutants: ozone, nitrogen dioxide, particulate matter, and sulfur dioxide. The volume of pollutants removed from the air on an annual per-acre basis was derived from a U.S. Forest Service analysis of "community" forests in Pennsylvania. Pollution-removal dollar values on a per-volume basis were obtained for each of the air pollutants from the U.S. Forest Service's UFORE computer model. These dollar amounts represent the national median externality value of each air pollutant (the estimated costs of pollution to society that is not reflected in the market price of goods and services that produced the pollution).[84]

Developed, Open Space (e.g., parks)

We analyzed the value of air pollution removal, carbon sequestration, and stormwater management provided by parks in Pennsylvania. Open space near developed areas is typically parkland or characteristically similar to parks. The annual per acre value of these services is $476.

The per-acre value of air pollution and carbon sequestration by park trees was derived from a U.S. Forest Service analysis of urban and community forests.[85] The value of stormwater management was adapted from a recent analysis of open space in southeastern Pennsylvania.[86]

Cultivated Crops

Pennsylvania receives $66 in value per acre of cropland each year in carbon sequestration, agricultural products, and pollination services.

The rent paid by farm operators for cropland in 2011 was used as the value of cropland for food production. Rent represents the most accurate value of land compared to values associated with production and income, which reflect a variety of other forces and inputs. Annual per-acre rent data was obtained from the 2011 U.S. Department of Agriculture's National Agricultural Statistics Service Pennsylvania Survey.

83 New Jersey Department of Environmental Protection. 2004. The Economic Value of New Jersey State Parks and Forests.
84 Nowak, D.J. and E. Greenfield. 2009. Urban and Community Forests of the Mid-Atlantic Region. USDA Forest Service General Technical Report NRS-47.
85 Ibid
86 GreenSpace Alliance and Delaware Valley Regional Planning Commission, 2010. The Economic Value of Protected Open Space in Southeastern Pennsylvania.

The rate of carbon sequestration for cropland was obtained from a published journal article that provided an estimate for regional sequestration rates.[87] This rate was converted to the volume of carbon sequestered per-acre each year. We then applied the 2011 global market price of carbon to calculate the dollar value of carbon sequestered by cropland.

The value of pollination services on cropland was estimated based on the expected loss of select Pennsylvania crops without honey bee pollination.[88] We determined the average per-acre value based on the loss of production per acre and the 2011 market value of that loss.

Wetlands (woody and emergent herbaceous)

The annual per-acre value of wetlands was calculated to be $1,252 for the entire package of natural goods and services they provide.

We took an average of five wetland values, three of which are based on wetland mitigation costs and fees in Pennsylvania. Mitigation costs represent the value placed by the state on wetlands and therefore serve as a proxy value for the goods and services provided by wetlands. We incorporated per acre dollar values for constructing a wetland bank, the replacement cost of wetlands, and the state's in-lieu mitigation fee schedule for wetlands.

We also considered the Wetlands Reserve Program (WRP) through the U.S. Department of Agriculture's National Resources Conservation Service (NRCS) which provides an approximation of the value of wetlands through its funding of wetland conservation. It provides financial support to landowners to protect wetlands in order to achieve the greatest wetland functions and values. We incorporated FY2013 WRP rates into the per-acre wetland value calculation.

A published academic journal article provided an additional wetland value for our analysis.[89] It provides a per-acre value based on a comprehensive analysis of wetland valuation studies that is consistent with the sources above.

Pasture/Hay

We estimated the annual value of the production of food and goods from livestock, wildlife habitat, and carbon sequestration to be $46 per acre of pasture. We used the rental rate paid for pasture land in Pennsylvania as an implicit value for the production of food and goods from livestock.[90] The carbon sequestration rate was adapted from a regional study and the 2011 global market price of carbon was applied to determine an annual per-acre value. The NRCS Grassland Reserve Program (GRP) provides a proxy measure of the value of pastureland for wildlife habitat. The program provides landowners financial incentives to conserve their land for wildlife habitat. We used 2012 GRP rates to calculate an annual per-acre value.

87 Jarecki, M. & L. Rattan. 2005. Soil Organic Carbon Sequestration Rates in Two Long-Term No-Till Experiments in Ohio. Soil Science 170(4):280-291.
88 Southwick, E.S., and L Southwick, Jr. 1992. Estimating the Economic Value of Honey Bees (hymenoptera: Apidae) as Agricultural Pollinators in the United States. Journal of Economic Entomology 85 (3):621-633.
89 Brander, L.M., J.G. Raymond, and J.E. Vermaat. 2006. The Empirics of Wetland Valuation: A Comprehensive Summary and a Meta-Analysis of the Literature. Environmental & Resource Economics 33:223-250.
90 USDA National Agricultural Statistics Service, 2011 Pennsylvania Survey.

Open Water

The annual value of open (surface) water of $227 per acre for all ecosystem services was obtained from a published study that calculated a region-specific ecosystem service value for a variety of ecosystem types found on U.S. National Wildlife Refuges.[91]

Grassland

Grassland provides an annual economic value of $17 in carbon sequestration and wildlife habitat services each year in Pennsylvania. The carbon sequestration and wildlife habitat value was transferred from the pasture/hay calculation (see above) because of the similar services provided by each.

Shrub/Scrub

The annual value of carbon sequestration and wildlife habitat services provided by shrub/scrub land is estimated to be $29 per acre. The value of carbon sequestration was derived from an average of the carbon sequestration value for grassland and forests because of the characteristics of shrub/scrub vegetation in Pennsylvania. Shrub/scrub also provides similar wildlife habitat services as grassland and pasture/hay so that value was transferred and added to the annual per-acre carbon sequestration value.

91 Ingraham, Molly and Shonda Gilliland Foster. 2008. The value of ecosystem services provided by the U.S. National Wildlife Refuge System in the contiguous U.S. Ecological Economics. 67:608-618.

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