

RETURN ON ENVIRONMENT

Quantifying the Economic Value of Protected Open Space in Southeastern Pennsylvania



Looking at the landscape.

200,000+ Acres Protected in Southeastern Pennsylvania.

50% Public Parks



30% Privately Owned
or Eased Lands



20% Preserved Farmland

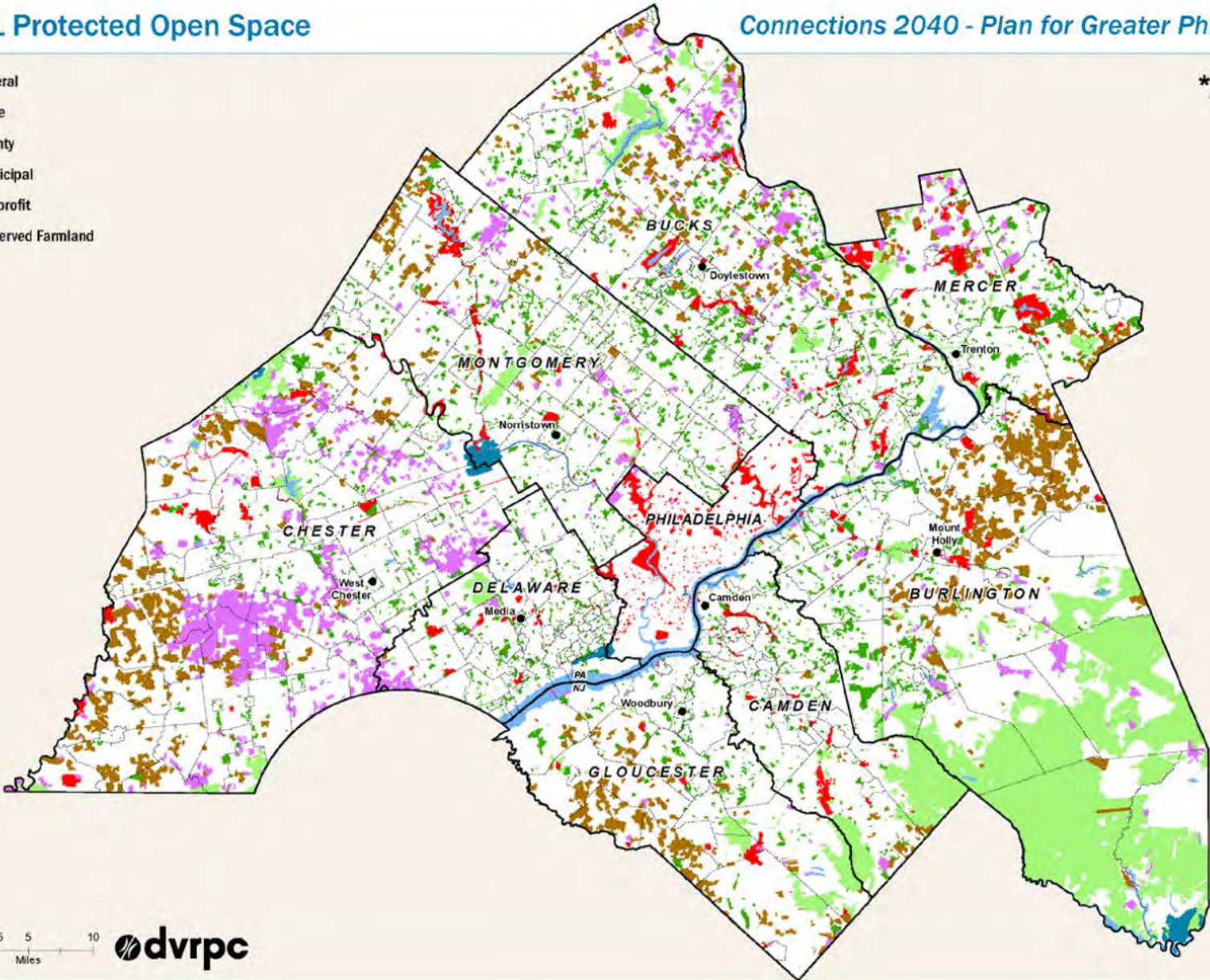


2011 Protected Open Space

Connections 2040 - Plan for Greater Philadelphia

DRAFT

- Federal
- State
- County
- Municipal
- Nonprofit
- Preserved Farmland



The Circuit Regional Multi-Use Trails Network



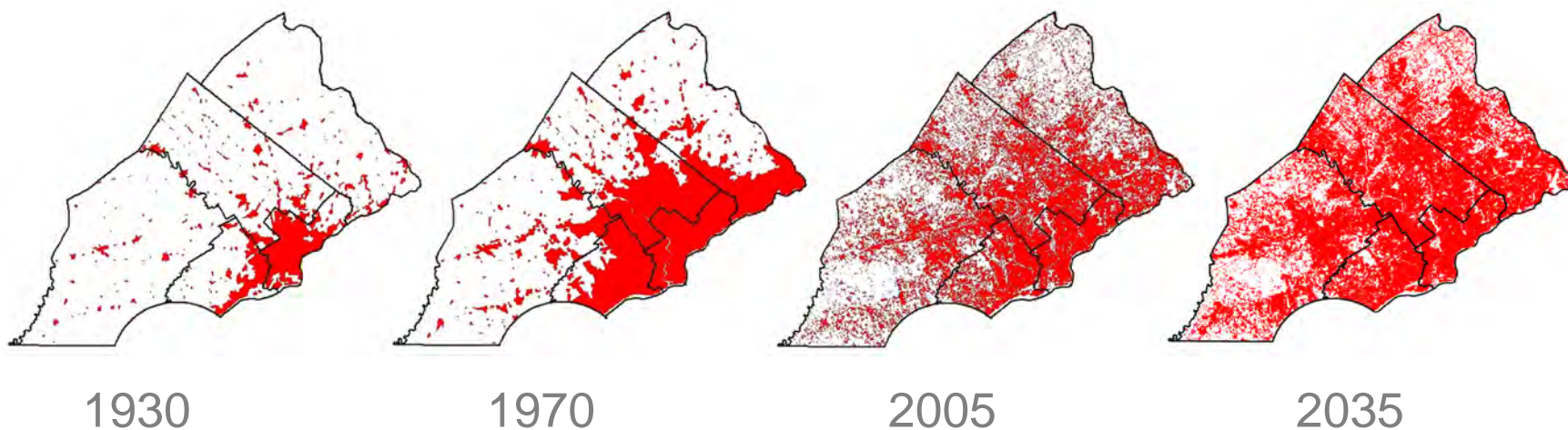
Circuit Trails

- Existing
- - - In Progress
- - - Planned
- East Coast Greenway
- Greenspace Network



Regional development patterns.

Historically our region loses 25 acres per day to development.



How can we support future preservation?

Quantifying the value.

Study Performed by:



ECONOMY LEAGUE
GREATER PHILADELPHIA
Information, Insight, Integrity.
AN AFFILIATE OF THE PENNSYLVANIA ECONOMY LEAGUE, INC.



ECONSULT
CORPORATION



Quantifying the value.

Open space creates economic value in four ways:

- Home and Property Values
- Environmental Services
- Health & Recreation Benefits
- Economic Activity



PROPERTY VALUES

Property Values

For Sale: Three-bedroom colonial. Large yard. Near park.

Open space helps sustain and improve home and property values.

- Adds \$16.3 billion to our region's housing stock
- Increases all property values by \$10,000 on average
- Plays a vital role in preserving regional prosperity



Perkiomen Trail

Property Values

- Average increase of \$4,766 within a quarter mile



Hopewell Big Woods

Property Values

-Average increase of \$8,270 within
a quarter mile

Peace Valley Park

Property Values

- Average increase of \$35,155 within a quarter mile



Clark Park

Property Values

- Average increase of \$45,879 within a square mile





Radnor Trail

Property Values

- Average property increase of \$69,139 within a quarter mile

-

Property Values

Open space is a marketable amenity.

\$449,900

Greythorne Woods Circle
Wayne, PA 19087



This townhouse backs the Radnor Trail with a private entrance for your additional enjoyment.

Find Your Perfect Fit at Claymont

Why is Claymont your perfect fit?
4 bedroom, 2 1/2 bath, full basement, 2-car garage single homes

Successful community now 60% sold out

Community entry to 19-mile Walking trail

Convenient to Routes 29 & 422 with easy access to King of Prussia

Model and Quick Settlement Home now for sale

CLAYMONT AT COLLEGEVILLE

FROM \$379,990

Want more?
 Choose your own Perfect Fit incentive*:
Alter It
Need to sell your home first?
 We'll connect you with an experienced agent, coordinate staging your home, and reimburse for minor repairs with a credit of up to \$5,000 at closing on your Claymont home plus we'll pay up to \$10,000 of your closing costs and \$20,000 toward options.
or Customize It
Don't need to sell your home?
 We'll give you \$25,000 towards options plus a \$10,000 credit towards closing costs on your new Claymont home.
or Secure It
 We'll pay up to \$3,000 per month for 12 months towards the mortgage on your existing home or your new home at Claymont.

SALES CENTER OPEN SATURDAY & SUNDAY 1-3 PM AND



ENVIRONMENTAL SERVICES



Environmental Services

Clean air. Pure water. Dry Basements.

Open space naturally protects property, filters drinking water, and cleans the air.

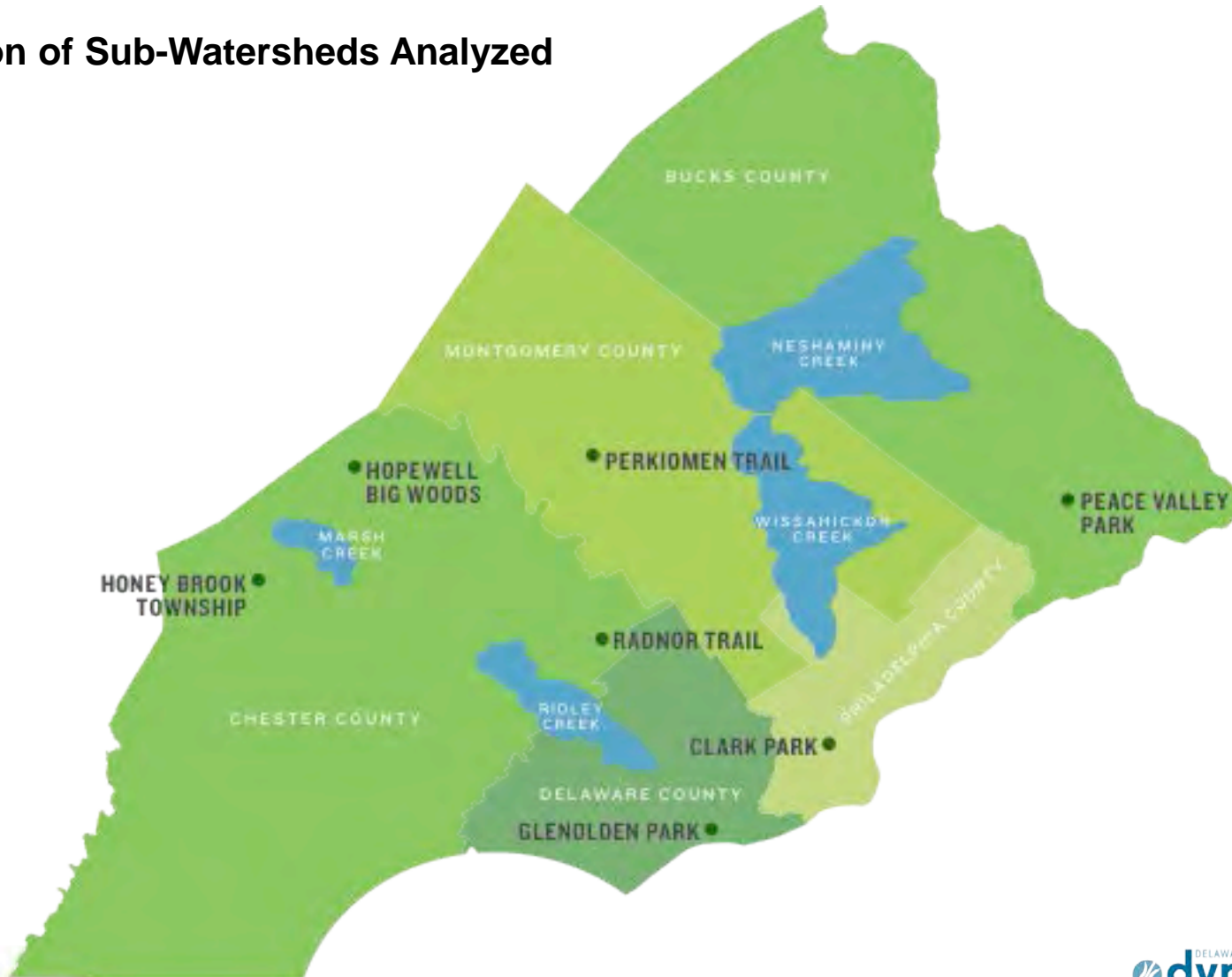
- Saves \$132.5 million annually

Environmental Services

Clean air. Pure water. Dry Basements.

- Water Quality & Supply Services save **\$61 million annually**
- Flood Mitigation Services save **\$37 million annually**
- Air Pollution Services save **\$17 million annually**

Location of Sub-Watersheds Analyzed



Benefits of Protected Open Space for Stormwater Management

If protected open space in 4 sub-watersheds was developed:

- Runoff in sub-watersheds would increase nearly 200 million cubic feet
- Capital costs for new infrastructure = \$87 million
- Plus annual \$2.6 million for maintenance





RECREATION AND HEALTH BENEFITS



Recreation and Health Benefits

Hike. Run. Bike. Camp. Save.

Physical activity on protected open space saves \$1.3 billion annually.

- Saves every household \$392 on average annually
- Avoids \$800 million in healthcare costs
- Saves \$13.8 million in worker's compensation costs
- Avoids \$485.4 million in productivity losses



JOBS AND **REVENUE**



Jobs and Revenue

Places that attract spending and create jobs.

Open spaces attract visitors, support local economies, and help create and sustain jobs.

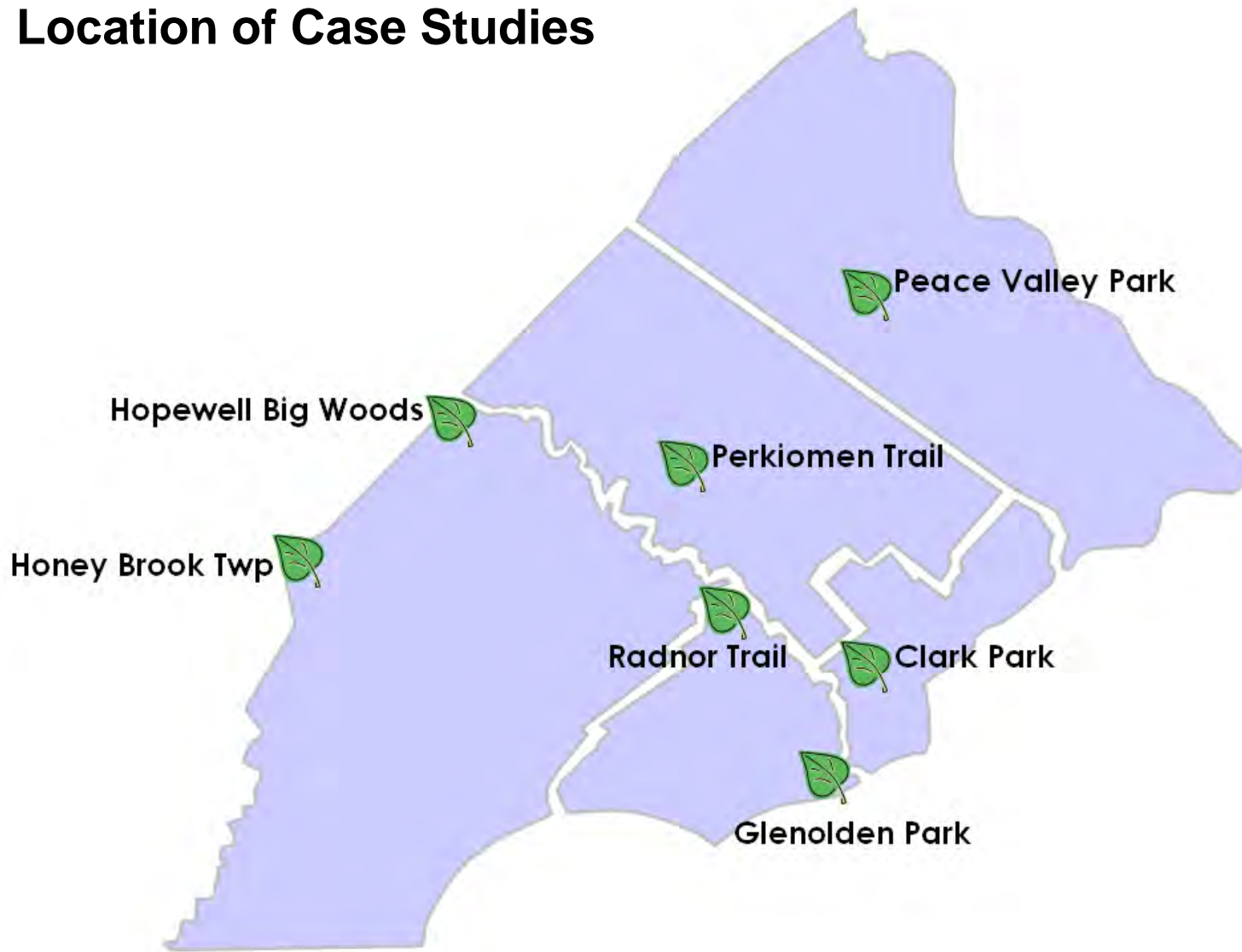
- 7,000 jobs in the public and private sectors
- \$566 million in expenditures
- \$300 million in annual earnings
- \$30.2 million in revenue collections



RETURN ON ENVIRONMENT

Case Studies

Location of Case Studies



A scenic view of a paved trail leading through a grassy field towards a dense forest under a cloudy sky. The trail is paved and curves through a green field. In the background, there is a thick line of green trees. The sky is filled with soft, grey clouds. A white semi-transparent banner is overlaid across the middle of the image, containing the text 'PERKIOMEN TRAIL'.

PERKIOMEN TRAIL



Perkiomen Trail

“Perkiomen Trail makes Montgomery County a better place to live and work.”

—John Wood

- 20-mile long trail in Montgomery County
- Connects County Parks with Historic Sites
- Estimated 50,000 users monthly





Perkiomen Trail

Extensive Use and Connections
Create Value

Recreation

- Estimated \$19.8 million in savings
- 400,000 unique visits annually

Revenue Generation

- Benefits numerous businesses
- Bike shop, restaurant and ice cream parlor serve trail users

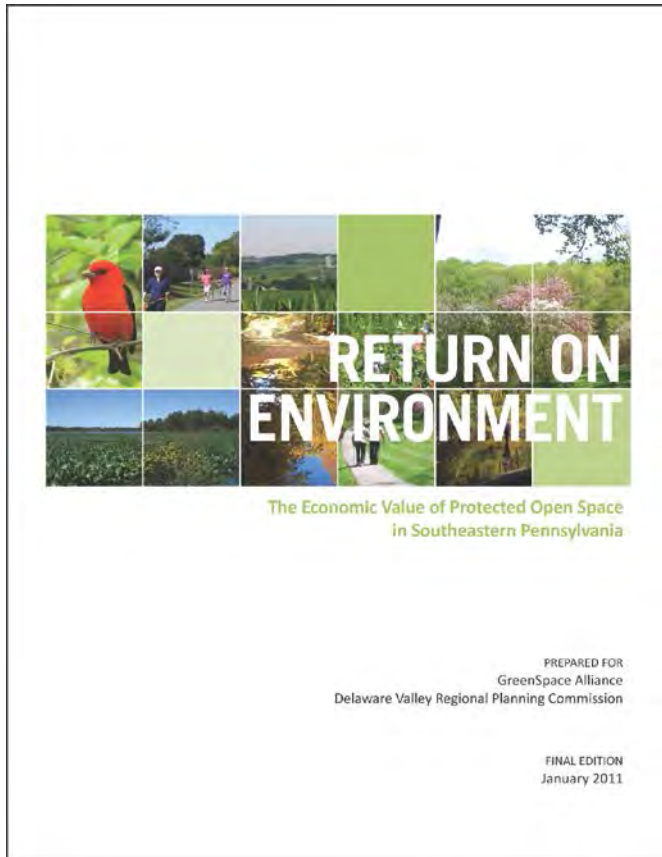




**WHERE DO WE GO
FROM HERE?**



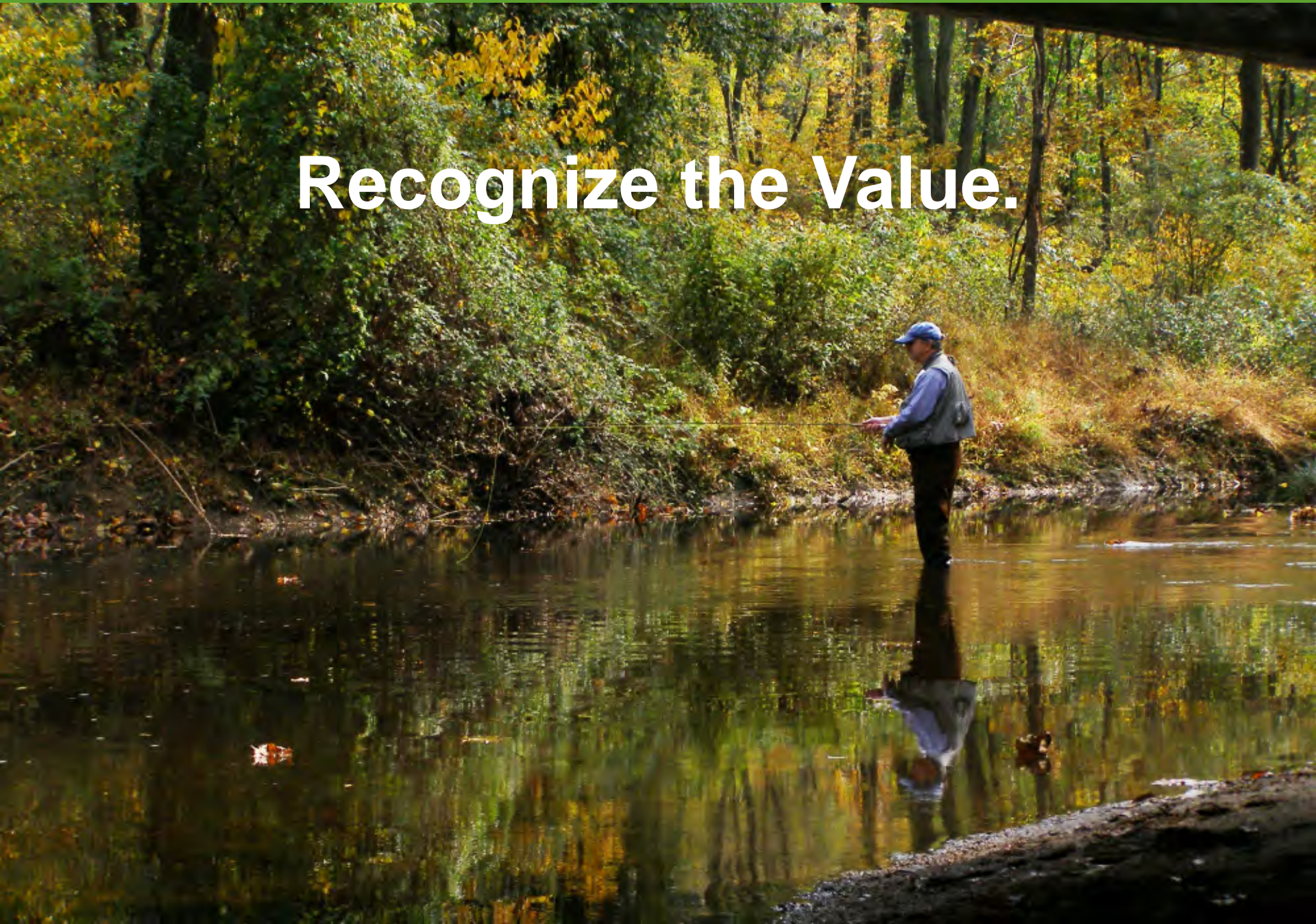
Read the Report.



www.dvrpc.org

www.greenspacealliance.org

Recognize the Value.



Share the Story.

Open space: Financial as well as aesthetic boon

By Diane Mastrull
Business & Finance Writer

When Daniel Trout and his brother-in-law/business partner, Douglas Wiltner, first considered the West Philadelphia property that is now the flagship of their small business, the Cafe coffeehouse chain, it took just a lot of time, just the window of the dilapidated former shop to inspecting across a street, and what eventually came to be a young entrepreneur's property was worth more than \$300,000 in total. It took nine acres of rare urban space in what was, at a University City neighborhood, a vacant lot. It was the site of the three cafes owned by Daniel Trout and Douglas Wiltner in Southeastern Pennsylvania. Open-space preservationists have long cited economic value as one of the advantages of keeping land protected from development. Now comes a first report on the economic benefits of the region's nearly 200,000 acres of greenway. Announce the findings of the re-



Of the three cafes owned by Daniel Trout and Douglas Wiltner in Southeastern Pennsylvania. Open-space preservationists have long cited economic value as one of the advantages of keeping land protected from development. Now comes a first report on the economic benefits of the region's nearly 200,000 acres of greenway. Announce the findings of the re-

The Intelligencer

Study: Open space good for economy, health

By PETER HALL
The Intelligencer

According to a report from the Delaware Valley Regional Planning Commission, open space provides many benefits beyond simply saving pretty places.

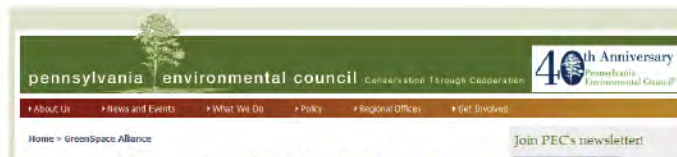
TEXT SIZE

Attention Chester County Taxpayers -- Budget Alert Pay Now, or Pay A Lot More Later

Open Space Preservation significantly saves the County money and does so in perpetuity.

In 2010, the Chester County Commissioners slashed their promised \$20 million/year open space preservation spending by 50%. Now, our Commissioners have proposed the same deep cuts in open space funding for the 2011 budget. The evidence shows that informed voters support restoring spending to the promised 2009 levels and in reality spending on open space conservation makes tremendous fiscal sense.

Voters agree: spending tax dollars preserving open space is a wise investment. That's why whenever there is a township referendum to raise taxes to preserve open space, year after



Study Released

The Delaware Valley Regional Planning Commission released the Economic Value of Protected Open Space Report.

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NEWS

Report: Open spaces have positive financial impact

Show us the money from saving open space

By Evan Brandt
evan@opennews.com

VALLEY FORGE — Forget the bluebirds, the bog turtles and the spotted owls. Don't look for any talk of endangered species, dammit fly larvae or deep discussions of biodiversity. Instead, pick up a report released last week by the GreenSpace Alliance and the Delaware Valley Regional Planning Commission and what you'll find is an in-depth discussion of cash — cold hard cash. That's because the study, as its name suggests, examines "The Economic Value of Protected Open Space." As was the case during the recent debate over an open space referendum narrowly approved Nov. 2 by East Coventry voters, discussion about open space preservation usually revolves around how much it costs to buy or preserve the land and how much property tax revenue might be lost as a result. Supporters of such preservation efforts often point to studies done around the nation that show that the costs that accompany

developed land — schools, fire, water, sewer and police services — vastly outweigh the tax revenue that land generates. Now they can point to a study — written by the Economy League of Greater Philadelphia, Ecomat Corp. and Keystone Conservation Trust — that looks into their own backyard and clearly says out what you get out of preserving open space there. "Put simply, when we preserve open space, we protect our pocketbooks," said Delaware County Councilman Andy Lewis, who is also a member of the DVRPC board. "Now we have proof that by investing in preserving this land, we are also investing in our local economy, supporting jobs and generating revenue," said Chester County Commissioner Carol Ashels, who is also a DVRPC board member. Both were speaking at the news conference, held at one of the region's premier open spaces, Valley Forge National Historical Park, announcing the report's release. The report builds off previous work — including a 2004 Wharton School analysis co-chaired by street trees in Philadelphia's



According to a study, the value of services provided by the Big Woods — 15,000 acres around French Creek State Park, above, is \$10.7 million per year and that its trees are storing \$6.7 million worth of carbon.

RELIEF LOCALS ON A MISSION TO HAITI COUNTY / PAGE A3

TEMPLE U. BUILDING WITH COUNTY'S TALENT SPORTS / PAGE D1

THOMAS CHEVROLET 27 DAYS UNTIL CHRISTMAS! 610-692-5500

www.DailyLocal.com

DAILY LOCAL NEWS

SUNDAY, November 28, 2010

Chester County's Leading Information Source

THE ECONOMICS OF OPEN SPACE

New study calculates monetary advantages of land preservation

By EVAN BRANDT
Special to the Local News

VALLEY FORGE — Forget the bluebirds, the bog turtles and the spotted owls. Don't look for any talk of endangered species, dammit fly larvae or deep discussions of biodiversity. Instead, pick up a report released last week by the GreenSpace Alliance and the Delaware Valley Regional Planning Commission and what you'll find is an in-depth discussion of cash — cold hard cash. That's because the study, as its name suggests, examines "The Economic Value of Protected Open Space." As was the case during the recent debate over an open space referendum narrowly approved Nov. 2 by East Coventry voters, discussion about open space preservation usually revolves around how much it costs to buy or preserve the land and how much property tax revenue might be lost as a result. Supporters of such preservation efforts often point to studies done around the nation that show that the costs that accompany

MORE INSIDE

- A new report shows there's payback in open space. Editorial, Page A6
- A sampling of the study's conclusions about what protecting open space means to you economically. See Page A3

See OPEN, Page A2

THE MERCURY

Serving Pottsville, PA and The Tri County Area

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NEWS

Crunching the





Published: Sunday November 21, 2010

Support Open Space Initiatives.

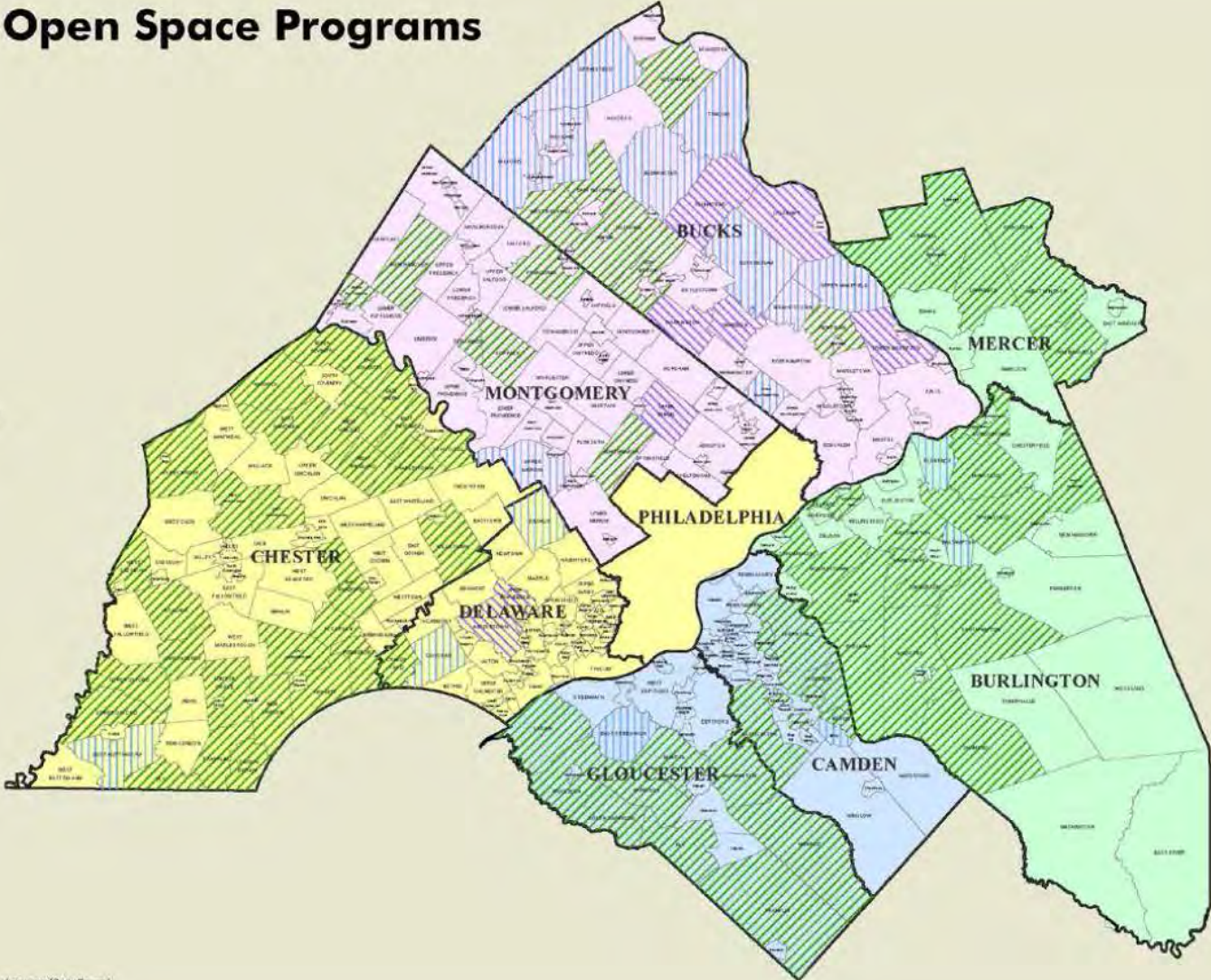


Locally Funded Open Space Programs

2013 Active Programs

-  Municipal Funding - Dedicated Tax
-  Municipal Funding - Bond
-  Municipal Funding - Tax and Bond
-  County Funding - Dedicated Tax
-  County Funding - Bond
-  County Funding - Tax and Bond
-  County Funding - Other

Note: Municipalities that previously issued bonds dedicated for open space and exhausted the funds are not shown.



More than pretty places.

Open spaces generate hundreds of millions of dollars in economic benefits for our region.



RETURN ON ENVIRONMENT

Quantifying the Economic Value of Protected Open Space in Southeastern Pennsylvania

Download the full report at www.dvrpc.org or www.greenspacealliance.org.



Green City, Clean Waters

Five years of green stormwater management in Philadelphia



PHILADELPHIA
WATER

Christopher Anderson
Watersheds Program
Manager
Public Affairs Division

Green City, Clean Waters

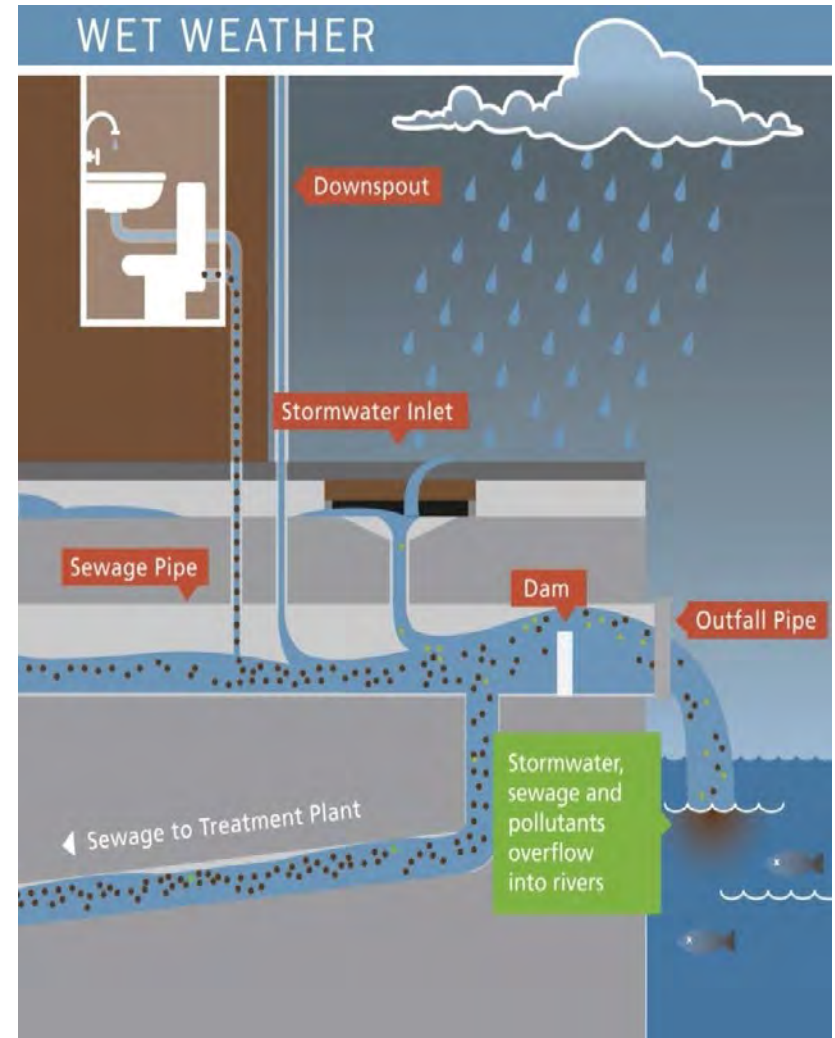
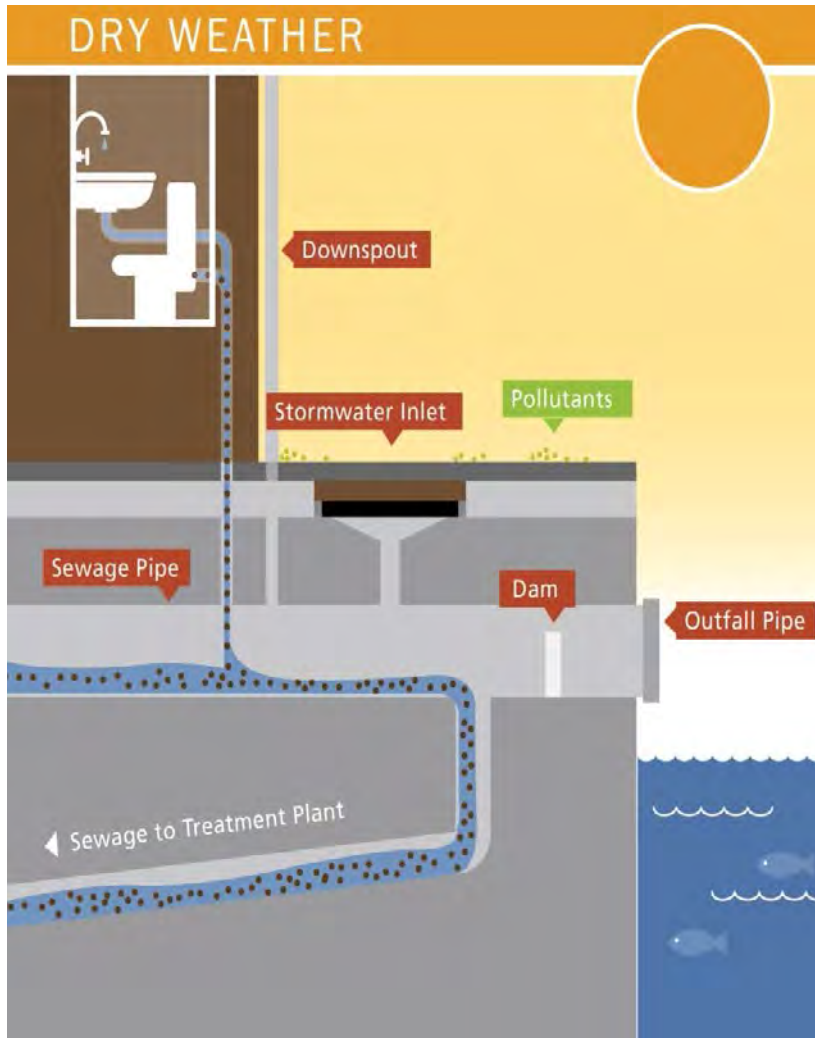
The City of Philadelphia's 25 year, \$2 billion program to manage stormwater primarily through the use of "green infrastructure"

Our Guiding

Principles:

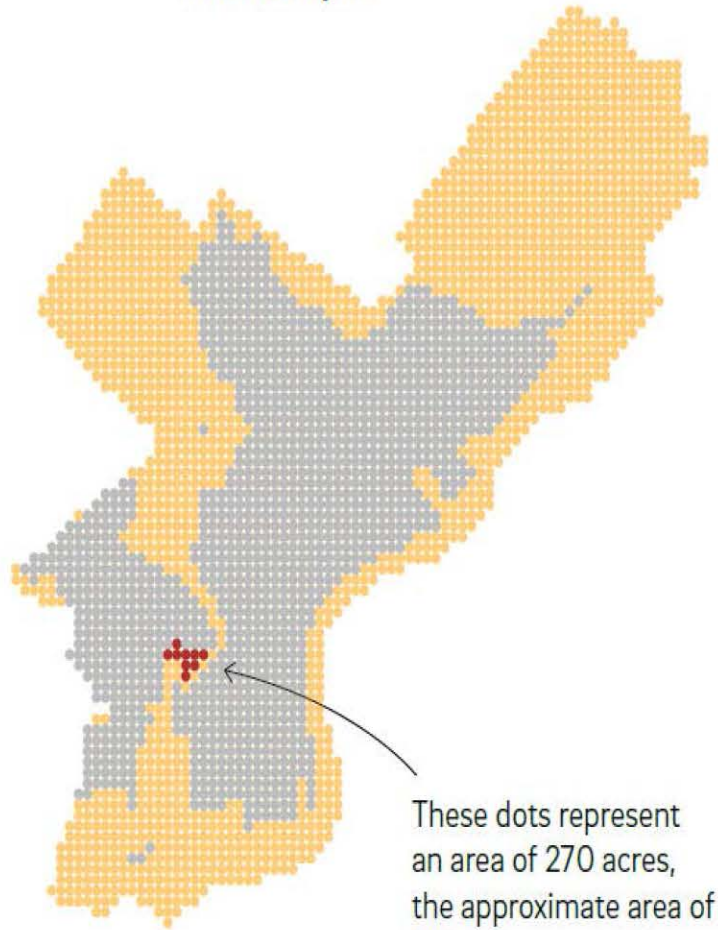
1. Thinking of rainwater as a resource to be used where it falls, rather than a problem to be dealt with by collecting and treating it elsewhere.
2. Being strategic and cost-effective in the maintenance and upgrading of one of the nation's oldest water and wastewater infrastructure systems.
3. Activating citizens, advocacy groups, the business community, public sector and regulatory partners to come together on strategies that simultaneously achieve environmental, economic, and regulatory objectives.

One Pipe for All – A Combined Sewer



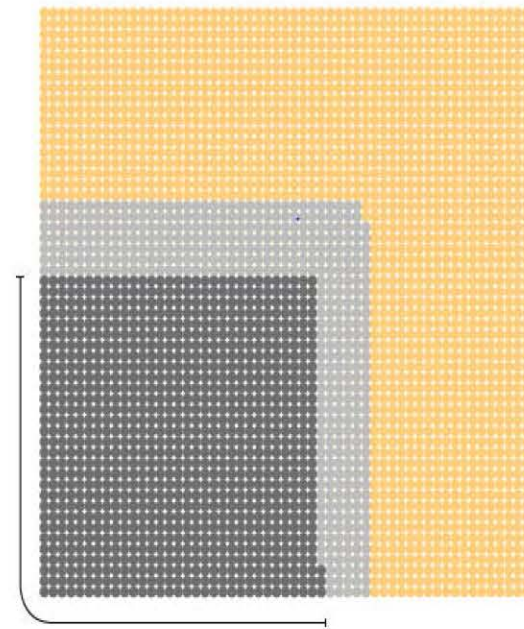
The Scope of Philadelphia's Stormwater Needs

**Combined Sewer Service Area
in Philadelphia**






These dots represent an area of 270 acres, the approximate area of UPenn's campus in University City.

**Impervious Area within
Combined Sewer Service Area**



Impervious area
within
CSO area

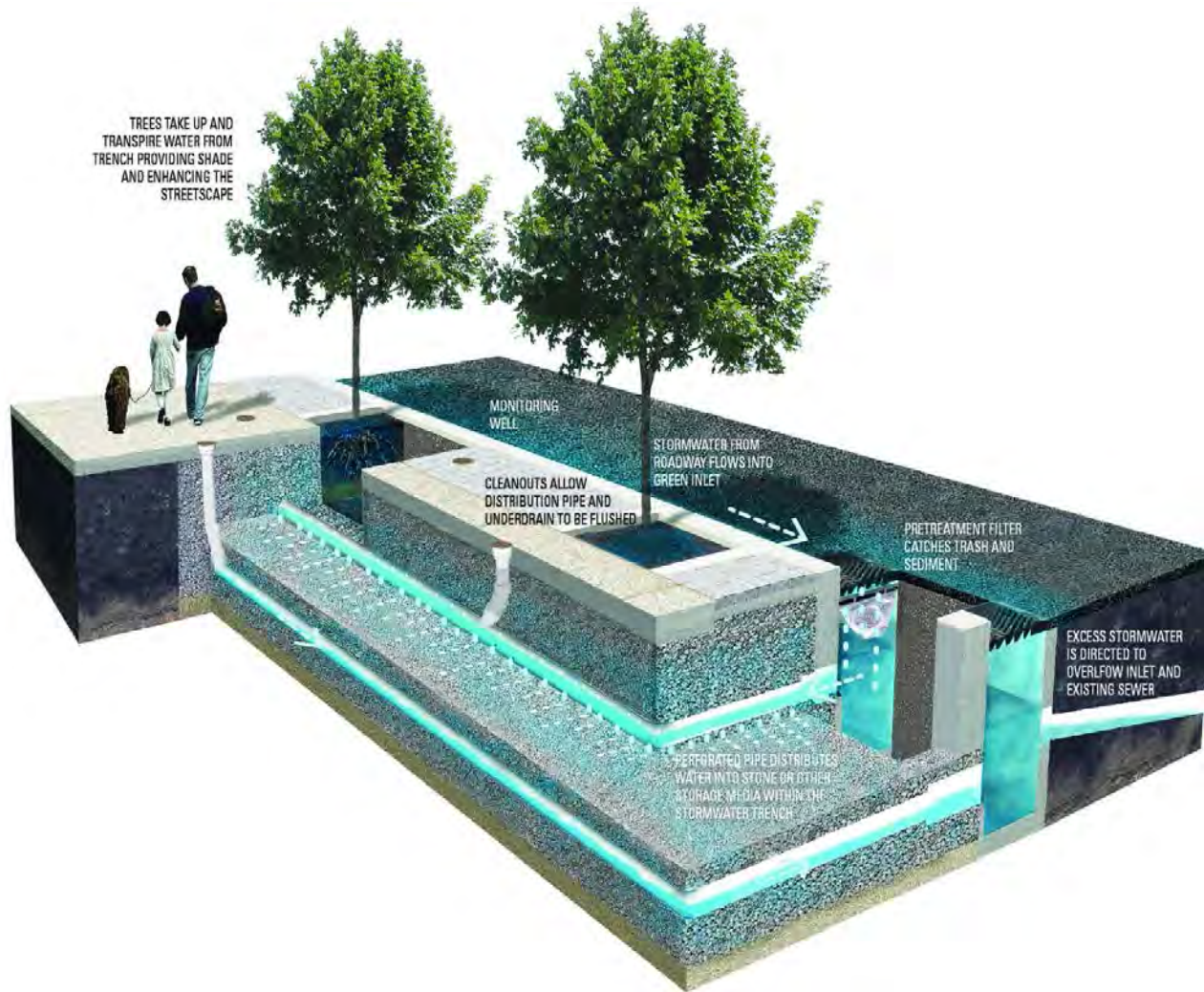
Key

-  = Approximate area of Philadelphia
-  = Combined Sewer Service Area
-  = Impervious Area

Each dot represents about 30 acres.

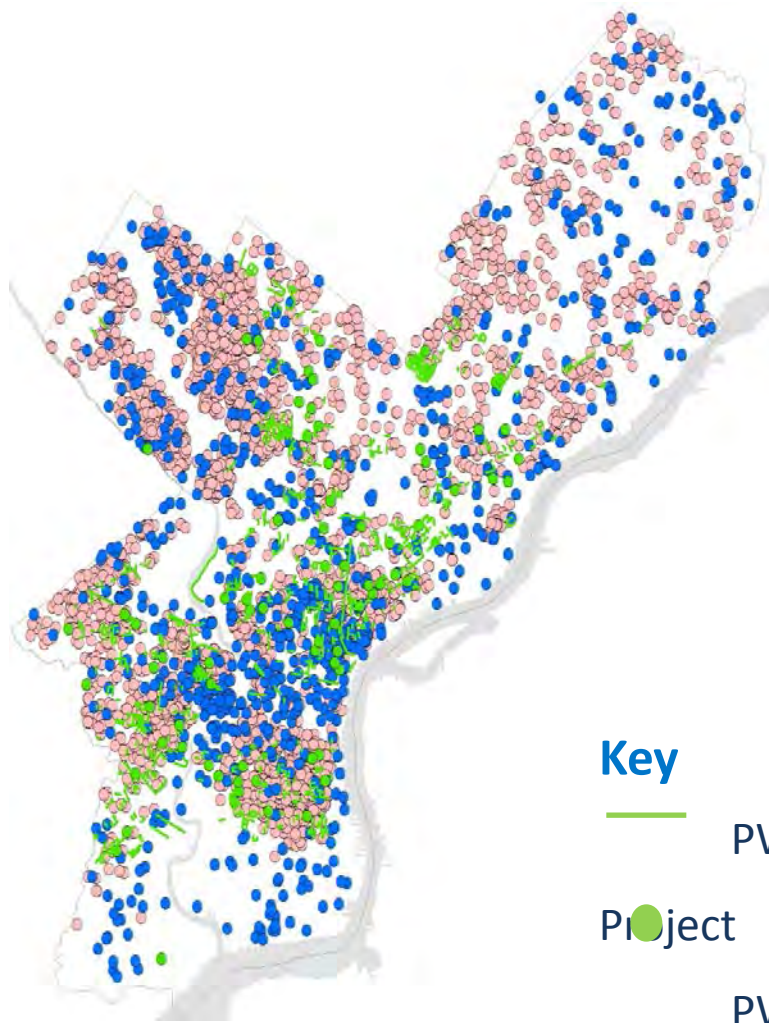
Green Stormwater Infrastructure

uncovering the green beneath our feet



Our First Five Years

a collaborative approach to managing Philadelphia's stormwater



- 141 Public Stormwater Projects

- 266 Private Development Projects

- 38 Stormwater Grant

Projects

- PWD Street Projects (Blue dot)
- Private Development (Red dot)

- **Total of 445 completed**

PWD Parcel Projects (Green dot) Rain Check, Rain (Purple dot)

Our First Five Years

a collaborative approach to managing Philadelphia's stormwater



1.5 Billion Gallons

Reduction in Combined Sewer discharge volume



10.3 %

Estimated property value gain from proximity to GSI investment



6,000 Tons of Trash & Debris

Removed from Philadelphia's waterways through skimming & clean up events



308,759 Citizens Engaged

Approximate since 2011



\$51 Million

Grant funds from public and private sources invested in our parks, streets, schools and communities as a result of leveraged GSI investments



430 New Jobs & 14% Growth

In Greater Philadelphia green stormwater infrastructure industry

The Triple Bottom Line

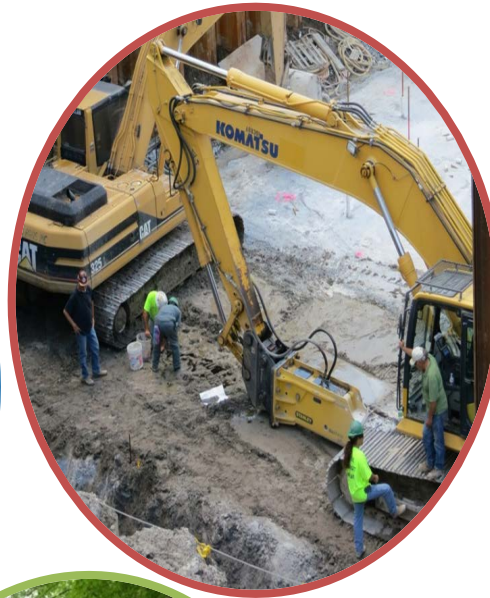
Social Benefits

- Recreation
- Aesthetics
- Public Health
- Equity



Economic Benefits

- Property Values
- Job Creation
- Competitive City



Environmental Benefits

- Fishable & Swimmable
- Habitat Enhancement
- Air Quality
- Energy Savings



Advantages of the
Green
Approach

Investment in Community



GSI Impacts on Neighborhood Health & Safety

Our study indicates that Philadelphia's GSI program has had an effect on safety in nearby areas. Our models found significant reductions in certain crimes over an average 4-year follow-up period, indicating that a relatively long-term impact might be expected. We found that construction of GSI projects was associated most strongly and consistently with reductions in occurrence of narcotics possession. Possession indicates the buying as opposed to the selling of narcotics. We did not test the specific mechanisms underlying this association; however, previous theories and empirical studies provide excellent insight into these mechanisms as well as hypotheses to test in future studies.

TABLE 2—Adjusted Difference-in-Differences Estimates of the Impact of Green Stormwater Infrastructure Construction on Health and Safety Outcomes at 5 Scales: Philadelphia, PA, 2000–2011

Outcome	1/16-Mile Buffer		1/8-Mile Buffer		1/4-Mile Buffer		1/2-Mile Buffer		Census Block Group		Census Tract	
	Coefficient (SE)	R ²	Coefficient (SE)	R ²	Coefficient (SE)	R ²	Coefficient (SE)	R ²	Coefficient (SE)	R ²	Coefficient (SE)	R ²
Crimes, no.												
Assaults	0.01 (0.07)	0.40	0.02 (0.06)	0.67	-0.05* (0.04)	0.86	-0.03 (0.04)	0.94	0.09 (0.10)	0.50	0.04 (0.06)	0.82
Assaults with guns	0.00 (0.12)	0.30	0.1 (0.09)	0.45	0.00 (0.05)	0.74	-0.04 (0.04)	0.88	-0.18 (0.09)	0.38	0.02 (0.06)	0.74
Assaults without guns	-0.02 (0.06)	0.26	-0.06 (0.07)	0.55	-0.11* (0.05)	0.69	-0.07 (0.05)	0.72	0.00 (0.09)	0.38	0.03 (0.07)	0.66
Thefts	0.11 (0.08)	0.66	0.07 (0.04)	0.82	0.06 (0.03)	0.91	0.05 (0.03)	0.95	0.17* (0.08)	0.68	0.04 (0.06)	0.80
Burglaries	0.03 (0.06)	0.32	-0.09 (0.06)	0.52	-0.05* (0.03)	0.77	-0.06** (0.02)	0.89	0.11 (0.08)	0.40	-0.03 (0.06)	0.73
Disorderly conducts	0.04 (0.06)	0.47	-0.13 (0.13)	0.47	-0.10 (0.11)	0.62	-0.04 (0.07)	0.79	-0.17 (0.11)	0.43	0.01 (0.10)	0.53
Homicides	0.09* (0.04)	0.57	0.07 (0.06)	0.29	0.07 (0.06)	0.32	-0.04 (0.05)	0.57	-0.05 (0.06)	0.39	-0.14 (0.08)	0.33
Illegal dumping	0.01 (0.03)	0.37	0.03 (0.06)	0.33	0.00 (0.07)	0.44	-0.12 (0.06)	0.60	-0.04 (0.10)	0.35	-0.07 (0.07)	0.34
Public drunkenness	0.05 (0.04)	0.64	0.05 (0.10)	0.44	0.15 (0.15)	0.44	0.19* (0.09)	0.50	-0.06 (0.11)	0.41	0.17 (0.12)	0.36
Robberies	-0.02 (0.08)	0.46	0.02 (0.10)	0.17	-0.02 (0.03)	0.85	-0.02 (0.02)	0.94	-0.04 (0.09)	0.55	0.00 (0.04)	0.80
Robberies with guns	-0.01 (0.06)	0.30	-0.08 (0.06)	0.47	-0.05 (0.04)	0.71	-0.03 (0.02)	0.87	-0.07 (0.07)	0.37	-0.06 (0.05)	0.70
Robberies without guns	-0.11 (0.07)	0.33	-0.05 (0.07)	0.52	-0.01 (0.05)	0.67	-0.04 (0.03)	0.73	-0.04 (0.08)	0.45	0.03 (0.05)	0.65
Vandalism	0.01 (0.07)	0.48	0.04 (0.10)	0.25	-0.04 (0.03)	0.90	0.00 (0.02)	0.95	0.06 (0.07)	0.52	0.02 (0.04)	0.79
Narcotic manufacture	0.09 (0.09)	0.44	-0.06 (0.11)	0.49	-0.21*** (0.06)	0.67	-0.15** (0.05)	0.84	-0.17 (0.10)	0.39	-0.20* (0.08)	0.68
Narcotic possession	-0.26*** (0.08)	0.43	-0.27** (0.09)	0.61	-0.27*** (0.07)	0.77	-0.18*** (0.05)	0.87	-0.18 (0.11)	0.54	-0.19** (0.07)	0.74
Narcotic sales	-0.13 (0.09)	0.48	0.06 (0.10)	0.60	-0.15* (0.07)	0.74	-0.10 (0.06)	0.86	-0.04 (0.14)	0.50	-0.12 (0.10)	0.74
Health outcomes, %												
High cholesterol											0.03 (0.02)	0.95
High blood pressure											0.02 (0.02)	0.91
High stress ^a											-0.01 (0.05)	0.58

Note. Coefficients indicate relative change.

^aWe defined high stress to be an answer at or above 7 to the question "Using a scale from 1 to 10, where 1 means 'no stress' and 10 means 'an extreme amount of stress,' how much stress would you say you have experienced during the past year?"

*P < .05; **P < .01; ***P < .001.

Title: "The Impact of Green Stormwater Infrastructure on Surrounding Health & Safety"

American Journal of Public Health, January 2015

Green Infrastructure as a Private Amenity

Philadelphia Water offers grant funding to non-residential PWD customers

for the design and construction of stormwater projects

- **Stormwater Management Incentives Program (SMIP):**
 - Supports the design and construction of stormwater mitigation measures projects on a single property.
- **Greened Acre Retrofit Program (GARP):**
 - Supports the design and construction of stormwater mitigation measures projects across multiple properties. (minimum size of 10 acres)

For more information about the SMIP Grant go to:

www.phila.gov/swgrant



Stormwater Planter, Navy Yard

Green Infrastructure in Private Development

Every time property is developed in Philadelphia we can improve the water quality in our rivers and streams. Federal and State law require PWD to regulate stormwater runoff from private development.

Stormwater Management Regulation Components:

Water Quality: Remove pollutants from stormwater and reduce the volume of water entering sewers. This is achieved by letting the water soak into the ground or through a stormwater management practice. (First 1.5” of runoff)

Flood Control: Manage the rate of runoff from a property to prevent localized flooding. (Reduce peak rate of runoff)

Channel Protection: Protect stream banks by minimizing the rate of erosion from stormwater runoff. (Slow release of stormwater ~ 1 yr. storm)

All development projects that disturb more than 15,000 square feet of earth must meet PWD’s Stormwater Management Regulations.

www.pwdplanreview.org

Green Jobs

- PowerCorpsPHL
 - Designed to provide at-risk Philadelphia youth with short-term work opportunities within city government.
 - 87 Corps members have participated with PWD
 - Total investment by PWD of \$600,000
 - 15 Corps members hired by PWD to date with more finding work with private firms.



Green Homes

connecting on a personal level

Why Green Homes?

- Recommendation of the public advocate during 2008 rate hearing process
- About 80% of PWD's customers are residential
- Provides a way for residents to participate in stormwater management



Rain Check

Two Program Tracks

Cost Share



Rain Garden



Masonry
(De-paving & Porous
Paving)



Downspout Planter

Rain Barrel



Over 4,000 barrels distributed since 2006!





Where are we now?

aggregating our progress over the last five years

A recent study by the Sustainable Business Network of Philadelphia projected that our City's GSI industry represents:

- \$146.8 Million in annual revenue
- 430 Jobs supported annually
- \$860,000 in tax revenue generated for the City of



Learn More

connecting with *Green City, Clean Waters*



Sustainable Business Network of Philadelphia

Green Stormwater Infrastructure Partners
Program

<http://gsipartners.sbnphiladelphia.org/resources/>

Learn More

connecting with *Green City, Clean Waters*

PWD on Social Media:



@Phillyh2o or @Green City, Clean Waters



@Phillyh2o



@Phillyh2o



<http://vimeo.com/phillywatersheds>



www.flickr.com/photos/philadelphiawater

Visit our Websites:

www.phila.gov/water

www.phillywatersheds.org

Questions?

Christopher Anderson
Watersheds Program
Manager

215-683-3238

christopher.anderson@phila.gov



Paseo Verde – Lower North Philadelphia



**PHILADELPHIA
WATER**

Return on Environment

The Economic Benefits of Protecting and Restoring Natural Systems



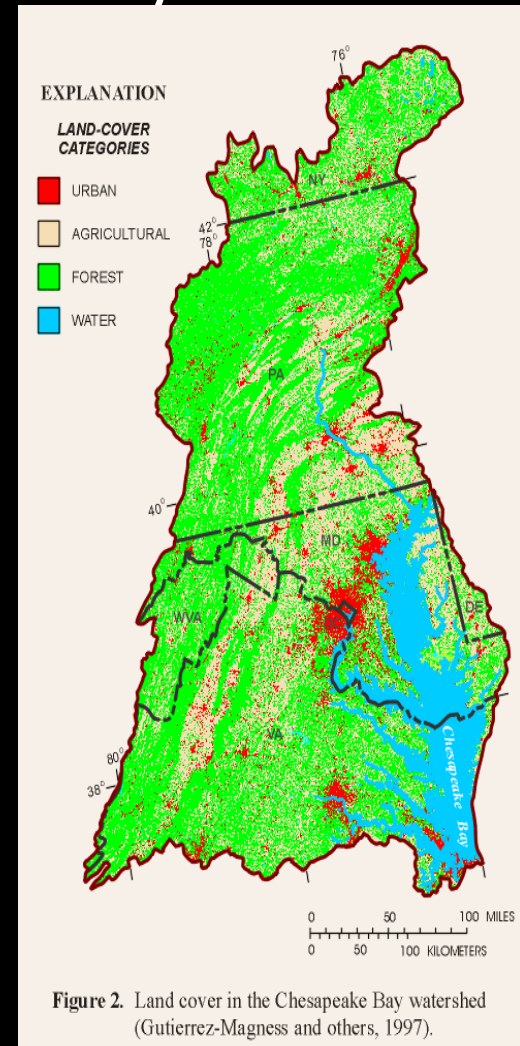
John Rogers
Keystone Conservation Trust

The Chesapeake Bay Watershed loses 100 acres of forest every day.

Business as usual is not working

- Water to supply for over 500 homes with clean filtered water is lost each day
- Offset of CO₂ for 100 homes is lost each day

Conservation Fund 2006, The State of Chesapeake Bay Forests



Mother Nature doesn't
write receipts





The Pennsylvania state Constitution imposes a duty to conserve and to maintain public natural resources for this generation and generations yet to come.

Are nature's contributions to our welfare being adequately and accurately reflected in political, business and personal decisions?

ROE can serve the interest of :

Conservation

Economy

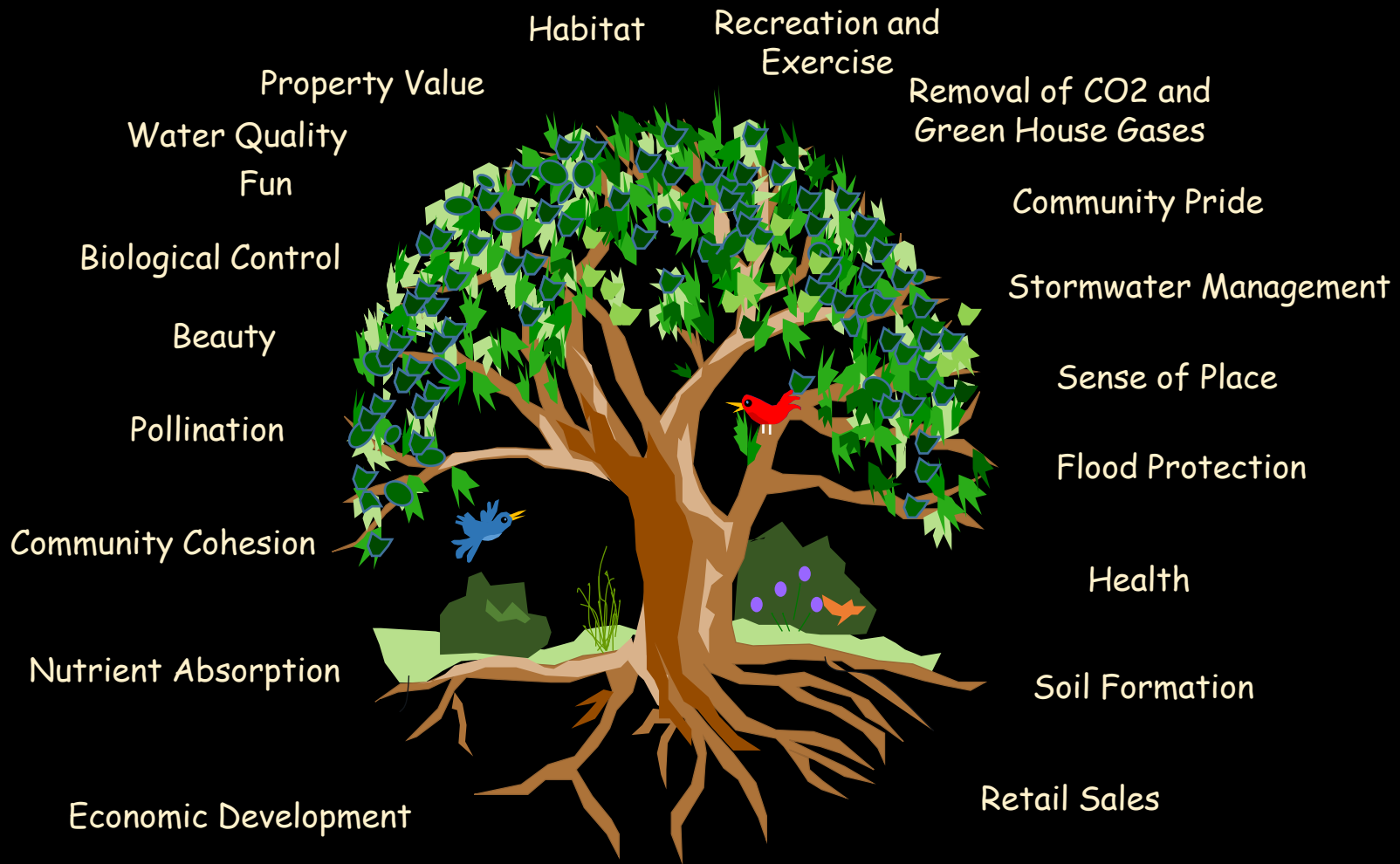
Society as a whole

Return on Environment Studies



Portfolio of Financial
Assets

Habitat Provides Many Natural, Social and Economic Services



The first rule of ecology is everything is connected to everything else.

Benefits of Return on Environment Studies (ROE)

1. Nature's complex system is conveyed in a simple, bottom line understandable to a broad audience.
2. Dollars, as a financial measure, underscore nature's connection to our quality of life, health, cost of living, economy and sense of place.
3. Dollars also convey a level of significance or priority.
4. Monetary estimates of the value of natural system services can be applied within decision frameworks related to land use, tourism and economic development.
5. Discussion of natural system cover types and natural system values engages key stakeholders in an educational process that can help other organizations in their missions.
6. While any numeric model will engender healthy skeptics, the discussion about nature's value finally puts this issue on the table in full view so policy makers and citizens are aware of its relative importance.

Natural Systems

Economics Natural systems provide these benefits free of charge. Once lost, they are expensive and very difficult to replace. It can take 50-100 years to replace this capacity.

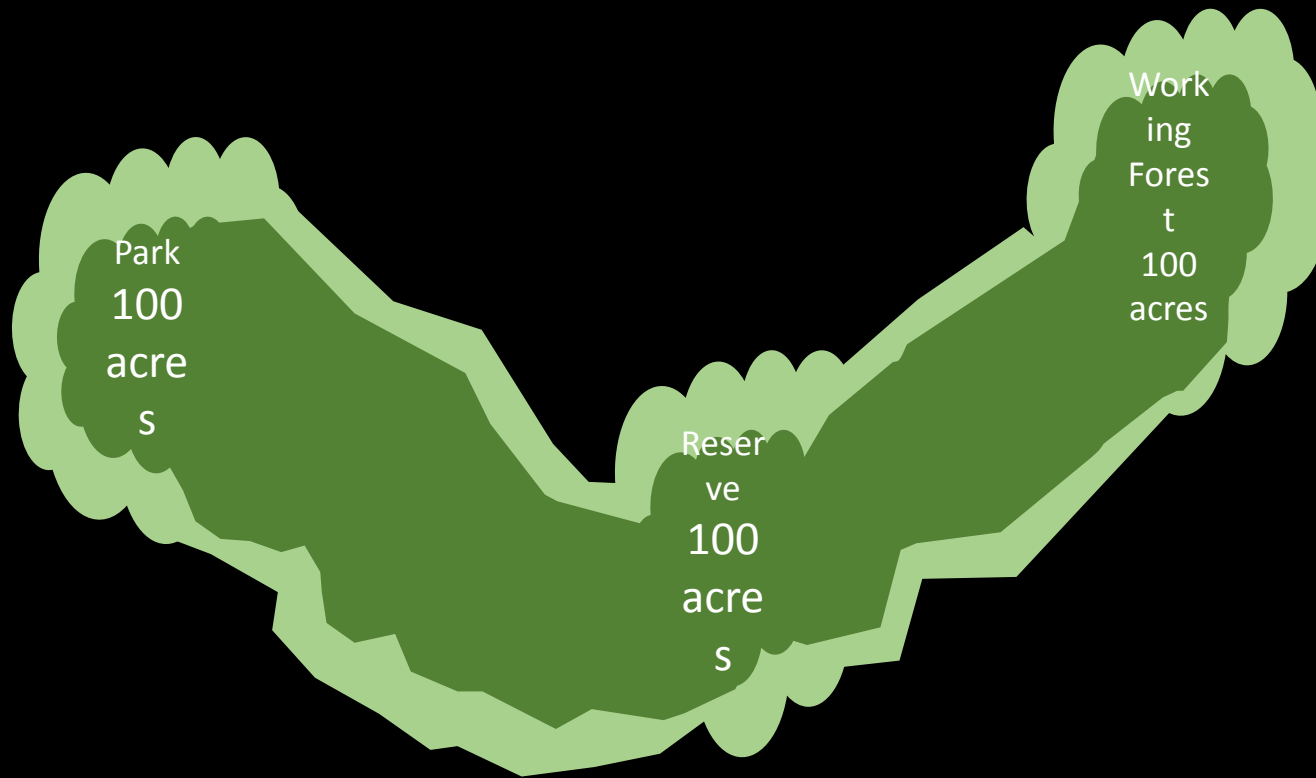
***Natural Systems Provide
a Form of Insurance or Risk
Management***

Natural Systems work 24 hours a day, 365 days a year and have been doing so for over 10,000 years.

Many of these natural system services are more reliable and effective than engineered solutions.

EPA, Healthy Watershed Program, 2012

Our job is not just to protect, but expand natural system services



Nature Operates Like Options

Green Corridors



Without connected habitats and corridors, the full value of open space and natural system services may not be realized, and these precious benefits may be significantly diminished or lost

*Protecting Natural Areas Can be a
Good Business Strategy*



*Nature is Serious
Business!*

Value versus Price

Eco-pricing

The Economic Benefits of Natural Systems (in \$ millions)

PA County	Natural System Services (annual avoided costs in \$millions)
Berks County	\$804
Cumberland County	\$739.13
Lehigh County	\$388.8
Northampton County	\$460.8

^[1] The Business of Nature. 2011, Berks Conservancy, Keystone Conservation Trust, ECONSULT and 4WARD PLANNING.

^[2] Cumberland County's *Return on Environment Study*, 2015 Keystone Conservation Trust, ECONSULT and 4WARD PLANNING.

^[3] Lehigh Valley's *Return on Environment Study*, 2014. Lehigh Valley Planning Commission. Keystone Conservation Trust, ECONSULT and 4WARD PLANNING.

It is very difficult to have a strong economy without a healthy environment, plenty of open space and quality habitat.

Most people would agree that losing millions of dollars year after year is poor asset management.



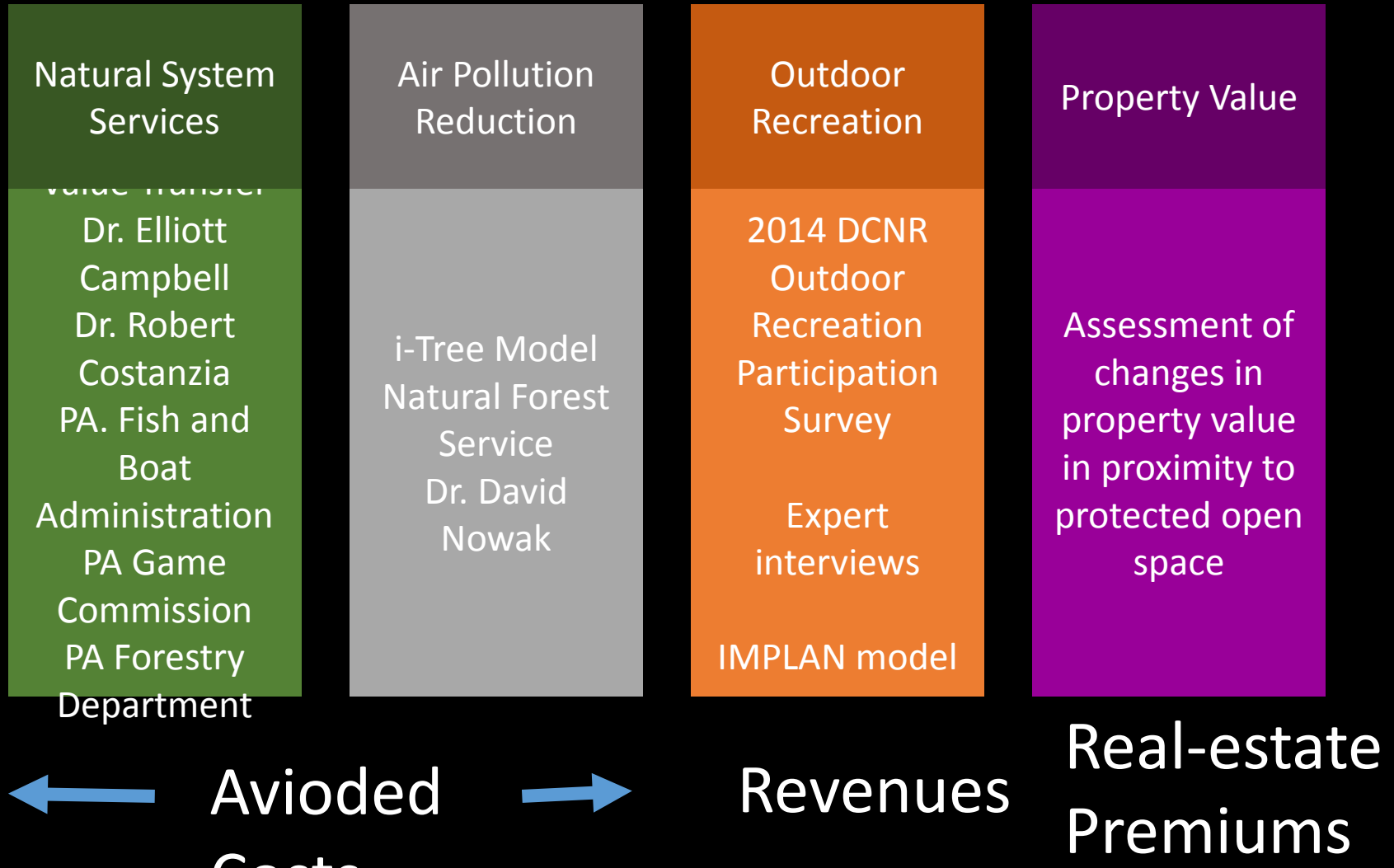
The CEO of any business would never overlook a revenue stream, miss an avoided cost or allow anyone to tarnish their brand.

Northampton County
Commissioners
replaced \$2.2 million in their
open space budget in 2015.

How do we Measure Nature's Value?



ROE Methodology



Green Infrastructure

Reduces
cost of
stormwater
management
Reduces
waste water
fees by 22%-
44%



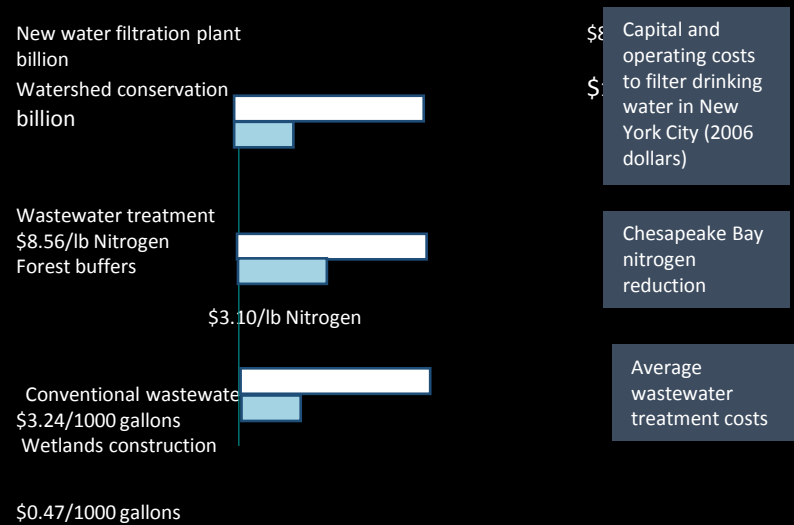
Drought
protection

For every 10%
increase in
forest, water
treatment
costs go down
by 20%

Water quality
and sediment
reduction

Reduces cost of
flooding

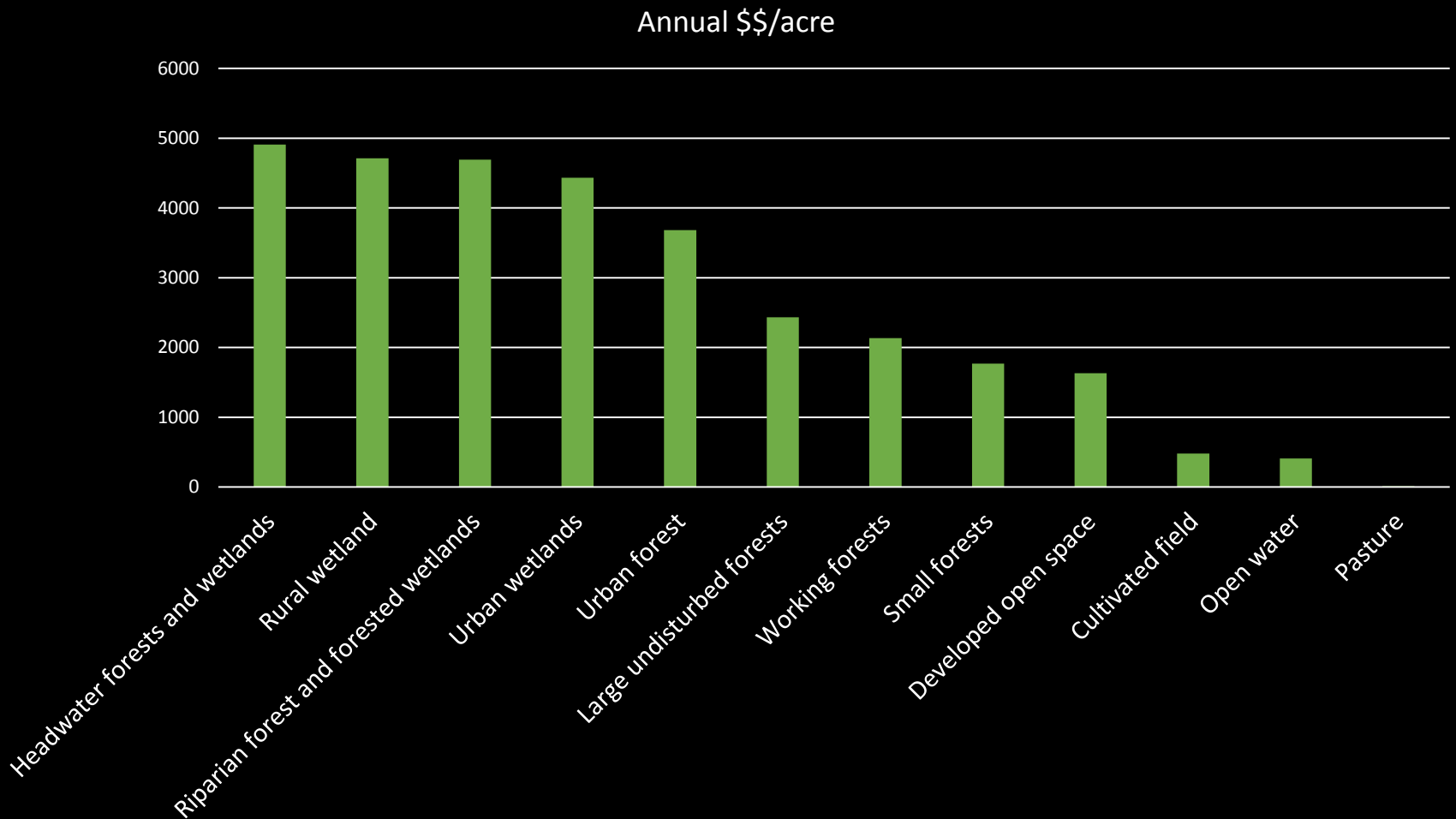
Watershed Protection is less expensive than building new “gray infrastructure”



Source: Hanson, Craig et al. (2011). *Forests for water: exploring payments for watershed services in the US South.* World Resources Institute Issue Brief, Issue 2, 15.

Natural System Service	Min	Mean	Max
Habitat	\$29.14	\$165.69	\$481.77
Water Supply	\$1.10	\$45.03	\$174.79
Flood Protection	\$12.90	\$23.86	\$35.15
Pollination	\$7.90	\$20.76	\$32.72
Water Quality	\$8.10	\$11.40	\$11.50
Biological Control	\$2.10	\$2.10	\$2.10
Soil Formation	\$0.66	\$0.80	\$1.10
Total	\$61.90	\$269.64	\$739.13

Cover Type Values



Outdoor Recreation

Table 17. Economic Impact Summary in Terms of Jobs and State and Local Taxes.

LOW				
Activity	Direct Impact	Output	Employment	State and Local Taxes
Walking	\$13,893,811	\$20,658,192	303	\$1,631,069
Fishing	\$10,852,128	\$16,135,626	237	\$1,273,989
Hunting	\$8,285,632	\$12,319,599	181	\$972,695
Bird Watching	\$2,544,787	\$3,676,466	29	\$270,570
Wildlife Watching	\$5,720,584	\$8,264,554	65	\$608,232
Camping	\$54,274,630	\$88,445,373	930	\$6,509,579
Kayaking/Canoeing	\$3,255,397	\$4,840,329	71	\$356,248
Bicycling	\$17,920,122	\$26,644,765	391	\$1,961,055
Hiking	\$8,104,723	\$12,050,612	177	\$886,925
Jogging/Running	\$6,335,192	\$9,419,561	138	\$693,280
Nature Study	\$1,519,636	\$2,195,425	18	\$161,583
Totals	\$132,706,641	\$204,650,503	2,539	\$15,325,225
EXPECTED				
Activity	Direct Impact	Output	Employment	State and Local Taxes
Walking	\$14,611,658	\$21,725,532	319	\$1,715,341
Fishing	\$12,726,586	\$18,922,689	277	\$1,494,042
Hunting	\$36,392,861	\$54,111,193	794	\$4,272,353
Bird Watching	\$24,680,571	\$35,656,142	279	\$2,624,119
Wildlife Watching	\$26,968,466	\$38,961,470	307	\$2,867,378
Camping	\$68,322,817	\$111,338,153	1170	\$8,194,488
Kayaking/Canoeing	\$15,463,136	\$22,991,564	337	\$1,692,179
Bicycling	\$58,274,890	\$86,646,772	1273	\$6,377,202
Hiking	\$78,264,852	\$116,369,105	1705	\$8,564,766
Jogging/Running	\$7,692,733	\$11,438,039	168	\$841,840
Nature Study	\$2,279,453	3,293,135	27	\$242,375
Totals	\$345,678,023	\$521,453,709	6,656	\$38,886,083

Table 9. Cumberland County Air Pollution Benefit Values (\$millions/year)

Source: ESI (2014)

Pollutant	Min	Mean	Max
O₃	\$4.5	\$17.0	\$21.9
PM₁₀	\$4.7	\$11.9	\$18.5
NO₂	\$4.2	\$8.5	\$11.3
SO₂	\$0.5	\$0.9	\$1.5
CO	\$0.1	\$0.1	\$0.1
Total	\$14.0	\$38.5	\$53.4

Table 11. Cumberland County Carbon Storage and Sequestration Benefits (millions/year)

Source: https://www.itreetools.org/resources/manuals/Vue_Manual_v5.pdf, <http://www.epa.gov/climatechange/EPAactivities/economics/scc.html>.
The dollar value estimates were derived using the social cost of carbon.

Pollutant	Min	Mean	Max
Carbon Sequestration	\$2.7	\$2.8	\$3.0
Carbon Storage	\$89.2	\$89.8	\$90.4
Total	\$91.9	\$92.6	\$93.4

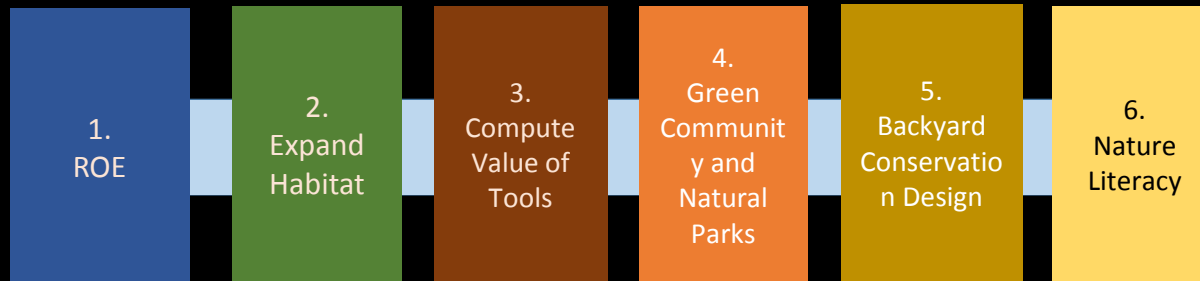
How do municipalities, property owners and businesses get the best financial return on the environment?

Innovation that inspires
policy and personal choices

Engaging People in Habitat Creation, Restoration and Stewardship

Leveling The Playing Field

Changing the Rules of The Game



Culture Change

Leveling the Playing Field- Innovation

1. Begin every land use, economic development, tourism and recreation planning process with a clear understating of the financial value of nature's current financial portfolio of assets. Ask what is needed to sustain these avoided costs.
2. Map the relative financial values of natural system services to reflect financial priorities and to develop protection and risk management strategies to maintain these assets.
3. Develop stewardship buffer zones (green corridors) along riparian areas and around parks, trails and natural preserves that expand natural system services by incentivizing the use of native plants and good stewardship practices.

Schuylkill Township ROE

Natural System Services, Air Quality and Recreation	Value
	\$
Biological Control	13,941
	\$
Pollination	428,576
	\$
Wildlife Conservation	5,540,340
	\$
Soil Formation	12,372
	\$
Waste Treatment	212,598
	\$
Flood Prevention	1,371,062
	\$
Water Supply	6,368,694

Total Value - Ecosystem Service, Air Pollution,
Carbon Sequestration

\$ per acre



Legend

Value

- Low \$0/acre
-
-
-
- High \$10,950/acre

750 0 750 1500 2250 3000 ft

Change the Rules of the Game- Innovation

1. Estimating the annual return on environment for all new proposed ordinances like, riparian buffer zones, cluster development, tax incentives and open space referendums
2. Develop a stewardship pro forma for every new development proposal that reflects the full cost of benefits in the form of tax revenues and jobs and the true cost of services over time as well the loss in natural system services that will be paid by tax payers.
3. Chronicle the ROE losses and report them to all interested agencies.
4. Create incentives to protect and restore critical natural system services like green corridors, stream buffers and cluster development, using native plants in backyard design.

Change the Rules of the Game- Innovation

- 5. Train all residents in backyard conservation design and stewardship, particularly in stewardship buffer zones.**
- 6. Create a habitat benefits calculator to help residents understand the value of backyard stewardship. Chronicle the potential benefits of backyard conservation design and stewardship and provide this information to neighborhoods and all interested agencies.**
- 7. Teach the principles of good stewardship to land owners along with a clear idea of what the financial value is for them and the community as a whole.**

Sense of Place

Percent Canopy Cover in Relation to
Neighborhood Stability

50%
want
to
leave
15
%

60
%
80%
want to
stay



Property Value



The Value of Proximity to Open Space is Positive and Significant

According to a detailed analysis conducted by the Delaware Valley Regional Planning Commission (2011), homes in southeastern Pennsylvania located near protected open space captured a measurable increase in their value because of their proximity.

Suburban properties located less than one mile from protected open space captured an average measurable increase in their value of up to \$10,000.

In the Lehigh Valley ROE Report (2015), homes within $\frac{1}{4}$ mile of protected open space on average had a premium of \$14,600.

The trends are not always nature's friend.



People Over 65 Years of Age are Less Interested in the Environment Than Before.

With which one of these statements about the environment and the economy do you most agree -- protection of the environment should be given priority, even at the risk of curbing economic growth (or) economic growth should be given priority, even if the environment suffers to some extent?

■ % Protection of the environment should be given priority

■ % Economic growth should be given priority



GALLUP

Gallup Poll Trends

The Largest Crop in the Chesapeake Bay Watershed in 2009

Increased development across the watershed has made stormwater runoff (also called polluted runoff) the fastest growing source of pollution in The Chesapeake Bay.

Chesapeake Bay Journal, 2012



Why do people have an emotional attachment to where they live?

Economic

Development



1. Openness and welcoming
2. Social offerings
3. Lots of beauty and greenery



Return on Environment

The Economic Benefits of Protecting and Restoring Natural Systems



Nature's value is real, significant and impacts a wide range of stakeholders

ROE can help level the playing field and change the rules of the game in conservation, economic development,

ROE Methodology

1. Consider the services nature provides and quantify the biophysical information for each ecosystem service;
2. Collect data on what people are willing to pay to replace these services by observing how people have paid for the service previously in markets, through regulation, or to replace it (the eco-price).
3. Calculate the economic benefits of those services by land cover/habitat type on a per acre basis;
4. Map the economic value of natural system services across the urban-rural gradient of the landscape;
5. Develop a plan to create sustainable patterns of habitats and corridors to maintain or enhance habitat and economic value (green corridors);
6. Create a strategy that protects or enhances natural system services based on their true value to quality of life, health, cost of living, sense of place and local economy.