

# Return on Environment: The Environmental Value of Protected Open Space

## Placing a Value on Open Space Preservation

Chester County's approximately 140,000 acres of protected open space not only help to preserve the County's scenic landscapes, but these spaces also provide residents with opportunities to experience and learn about the natural places in their communities. These protected areas also impart significant economic benefits to the surrounding region. The information contained in this brochure draws on established research and new analyses described in Chester County's *Return on Environment* (2019) report to place a dollar value on several types of ecosystem services provided by protected open space.



## Open Space Preservation Reduces Stormwater Runoff and Pollution

Because protected lands are largely undeveloped, they generate significantly less stormwater volume than the surrounding developed lands and allow less rainfall to reach streams as stormwater runoff, which helps to avoid erosion, pollution, and flooding.

If all the County's protected open space within the Brandywine Creek Watershed were developed at the same extent and density as nearby unprotected developed lands, and there were no requirements for conservation plan implementation on protected agricultural lands, the annual volume of surface runoff would increase by nearly 2.1 billion gallons per year, or nearly 36,000 gallons per year for every acre of protected open space. This open space helps the Brandywine Creek Watershed to avoid \$263 million of one-time capital costs for stormwater infrastructure construction, plus additional annual investments of \$27 million to operate and maintain this infrastructure and \$107 million needed to remove annual pollutant loadings.

In total, protected open space, on average, avoids \$4,600 per acre of stormwater infrastructure construction costs, \$479 per acre per year of annual operations and maintenance costs, and \$1,870 per acre per year of annual pollutant load reduction costs. Protected open space reduces the burden placed on communities and their stormwater infrastructure to manage the volume of runoff and pollutant loads, thereby avoiding both capital and long-term maintenance expenditures.

**\$97 Million**  
Annual value of  
environmental benefits

**\$120 Million**  
Savings from stored  
carbon in trees

**\$263 Million**  
Value of stormwater  
capital cost avoided

## Summary of Ecosystem Services Provided by Chester County's Protected Open Space

### Water Supply

The soil of undeveloped land absorbs water that replenishes streams, reservoirs, and aquifers. This natural system provides for the continuous recharge of Chester County's groundwater and streams. Chester County realizes nearly \$40 million in annual cost savings from natural water supply services on protected open space.

### Water Quality

Natural landscapes, forests and wetlands in particular, provide a natural protective buffer between human activities and water bodies. Chester County receives \$8.2 million in annual economic benefit from the ability of open space to naturally protect water quality.

### Flood Mitigation

Many natural landscapes serve as a buffer protecting people and properties from destructive natural events, such as flooding. Protected open space helps to mitigate the risk of flood during storm events by slowing, trapping, and absorbing rainfall that would otherwise become floodwaters. The total annual benefit provided by natural flood mitigation services is equal to \$18.3 million.

### Wildlife Habitat

Chester County's protected open spaces serve as habitats for a diverse array of plants and animals, including several threatened and endangered species. Intact forests and wetlands are home to species important to the ecosystem and that people value. Wildlife habitat on the County's protected open space has an estimated annual value of nearly \$13.1 million.

### Air Pollution Removal

Trees mitigate significant amounts of air pollution through respiration. An analysis of regional satellite imagery reveals that protected open space in Chester County contains more than 47,000 acres of tree canopy—about 35 percent of all protected open space. It is estimated that trees on protected open space annually provide \$13.5 million in air pollution removal services in Chester County.

### Carbon Sequestration and Storage

Trees mitigate the impacts of excess atmospheric carbon by absorbing and storing carbon from carbon dioxide. Trees on Chester County's protected open space store an estimated 1,684,940 tons of carbon, which avoids \$120 million in damages that would result from this increase in carbon emissions.



Ecosystem Service	Description of Benefits Provided by Protected Open Space	Total Benefit (millions)
Water Supply	Infiltration of precipitation to replenish streams and groundwater	\$39.4/yr
Water Quality	Provides a protective buffer between water resources and human activity that filters out pollutants	\$8.20/yr
Flood Mitigation	Slows, traps, and absorbs floodwaters during storm events to avoid additional flood volume	\$18.3/yr
Wildlife Habitat	Provides habitat and cover for an array of species, including several threatened and endangered species	\$13.1/yr
Air Pollution Removal	A plant's respiration removes many harmful air pollutants, such as ozone.	\$13.5/yr
Carbon Sequestration	New tree growth absorbs nearly 65 million tons of carbon per year	\$4.6/yr
Carbon Storage	Trees on protected open space store an estimated 1.68 million tons of carbon	\$120
Stormwater Benefits	Value of avoided capital costs in the Brandywine Creek Watershed	\$263



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