

ENVIRONMENTAL RESOURCE PLAN

■ TODAY'S CONDITIONS

Land use patterns have a direct effect on the quality of the environment. This is as true today as it was a century ago.

From 1850 through 1950, western Pennsylvania extracted its living from the natural resources of its hills: lumber, coal, oil and natural gas. There were no environmental protections in place, so the result was over-timbering, acid mine drainage, mine subsidence, deplorable air pollution, acid rain and untreated wastewater flowing directly into the County's rivers and streams. The region was being poisoned by the very industries that had helped it to grow.



Photo credit: Kevin Smay

Pittsburgh emerged from World War II exhausted and dirty. It had made huge contributions to the war effort and, as a result, suffered from environmental pollution and general degradation. Conditions were so dangerous and disgusting that business leaders, led by Richard King Mellon, and government officials led by Pittsburgh Mayor David Lawrence, forged a new partnership. The result was the Allegheny Conference on Community Development.

In 1945, the Allegheny Conference proposed a grand design for Pittsburgh. Over the next decade and a half, their program, the Pittsburgh Renaissance, was a pioneering effort to reduce air and water pollution. The Renaissance rebuilt downtown Pittsburgh.

Environmental remediation continues even today, but the County's natural resources have made a significant

recovery. Today, the City's beautiful natural setting is our prime amenity.

AIR QUALITY

In the early part of the 20th century, coal smoke from industrial furnaces, locomotives and domestic fires filled the air in quantities that can scarcely be imagined today. Furthermore, sulfuric acid, formed by sulfur dioxide in coal smoke reacting with water in the atmosphere, caused acid rain which killed vegetation on the hillsides surrounding the City and on the riverbanks.

Smoke-control legislation was enacted in 1941, but suspended during World War II. In 1946 smoke control measures were finally enforced countywide. The 1950s and 1960s brought even stricter air pollution controls. The effects were dramatic: eight years later the hours of "heavy smoke", as reported by the U.S. Weather Bureau, were reduced by 94%. This was in 1954, when the steel mills were still running at full capacity, more than 20 years before the first mill closings.

One result of cleaner air was the eventual return of vegetation to the hills and riverbanks. The decline of the steel industry in the 1970s brought severe economic hardship to the entire region, but did lead to a cleaner environment.

Today, Allegheny County is in the Pittsburgh-Beaver Valley Air Quality Control Region (AQCR). Air quality is monitored by State and local authorities as part of the State Implementation Plan (SIP). Six criteria pollutants are the focus of this monitoring: carbon monoxide (CO), lead (Pb), nitrogen dioxide (NO₂), ozone (O₃), particulate matter (PM), and sulfur dioxide (SO₂). The attainment status for each of these pollutants is listed in Table 4K.1.

A 2004 emission inventory report showed the Cheswick power plant in Springdale Borough is responsible for 80% of all sulfur dioxide emissions in Allegheny County.

GEOLOGY

Allegheny County is located within the *Allegheny Plateaus* Physiographic Province, predominantly in the Pittsburgh Low Plateau Section. The Pittsburgh Low Plateau is characterized



TABLE 4K.1 –Pittsburgh-Beaver Valley AQCR Attainment Status 2006

CRITERIA POLLUTANT	ATTAINMENT STATUS
CO	Maintenance
Pb	Attainment
NO ₂	Attainment
O ₃	Non-Attainment
PM ₁₀ / PM _{2.5}	Attainment / Non-Attainment
SO ₂	Attainment

by a rising and falling upland surface cut by many narrow and shallow valleys. The bedrock underlying the Pittsburgh Low Plateau consists of layers of shale, siltstone, sandstone, limestone and coal.

Coal is found in numerous beds underlying much of the County. The Pittsburgh Coal bed has been extensively mined. Other important coal beds are the Redstone Coal, Upper Freeport Coal, Middle Kittanning Coal and the Lower Kittanning Coal.

A portion of the southwestern part of the County lies in the Waynesburg Hills Section. The Hills are characterized by narrow hilltops with steeply-sloped, narrow valleys. Rock layers in the Hills are sandstone, shale, red beds and limestone. The Pittsburgh Coal bed underlies 50 square miles of southern Allegheny County in the Waynesburg Hills Section.

Mining of minerals and use of coal and gas reserves are discussed in the Resource Extraction Plan.

Elevations in the County range from 682 feet above sea level along the Ohio River at the County's border, to 1801 feet at River Hill in Forward Township.

HYDROLOGY

Watercourses are a prominent feature of Allegheny County – there are over 2,000 miles of stream and 90 miles of river. Four large rivers flow through the County: the Allegheny, Monongahela, Ohio, and Youghiogheny.



Photo credit: Kevin Smay

The Allegheny and Monongahela rivers meet at the Point in the City of Pittsburgh to form the Ohio River, which is a principal tributary of the Mississippi River.

The principal drainage destination on the northern and northeastern sides of the County is the Allegheny River. The river flows through Allegheny County for approximately 29 miles and provides the northeastern-most drainage into the Mississippi River watershed. The Monongahela River drains the southeastern portion of the County and extends for 35 miles through Allegheny County. The river is navigable for its entire length in the County with a series of locks and dams maintaining a consistent depth of nine feet.

The Monongahela River is one of the few major, navigable northward flowing rivers in the world.

The Ohio River extends for 15 miles through the County, receiving drainage from the western and southwestern sections of Allegheny County.

The Youghiogheny River is a major tributary of the Monongahela River, flowing for about 17 miles along the southeastern Allegheny County/Westmoreland County border to its confluence with the Monongahela near McKeesport.

There are notably large floodplain areas located along the County's four biggest drainage ways.

In addition to rivers, major streams include Chartiers Creek, Pine Creek and Montour Run.



Photo credit: McCormick Taylor

Wetlands are among our most valuable natural resources in that they reduce flooding, improve water quality, and support a wide variety of plant and animal species. Wetlands are generally characterized by a high water table, poor drainage and some degree of surface ponding. There are approximately 1,700 acres of wetlands in the County as identified by the National Wetlands Inventory.

Many people who live at the bottom of watersheds in flood-prone areas experience a loss of property value and a discouraging cycle of personal property damage.

Hydric soils are poorly drained soils unsuitable for development. They are often indicators of wetlands. This is especially true of the County's two primary hydric soils – Atkins and Brinkerton silt loams. There are several other soils types

in the County with inclusions of hydric soils. There are approximately 198,000 acres of hydric soils in the County – less than 1% of the County's total land area – mostly along waterways.

WATER QUALITY

At the turn of the last century, much effort went toward managing the flow of the rivers for navigation. Little effort went toward improving their water quality. Nearly 200 years of using the rivers as open sewers had taken a toll. Pittsburgh had the highest rate of typhoid fever in the nation at the time because it was dumping raw, untreated sewage into the rivers and pumping raw, untreated drinking water out of the rivers. In 1907, the city built its first water treatment plant.

Degraded in the past, the County's waterways are recovering and are now a focus of development plans.

Incredibly, though, until the 1950s most municipalities in Allegheny County still allowed their sanitary sewers to empty untreated into the area's streams and rivers. Factories dumped waste chemicals and hot wastewater into the rivers. Fish and other wildlife were unable to tolerate the conditions. The County's waters were lifeless.

In 1955, the Allegheny County Sanitary Authority (ALCOSAN) was contracted to build wastewater collection and treatment facilities throughout the city. Industries were also required to treat their wastewater. Slowly, the rivers recovered and by the 1970s, when local and national governments instituted water pollution laws, the fish population began to increase. There is still much work to do, but today the rivers are populated by a diversity and abundance of fish species, and a variety of waterfowl.

Surface Water Quality

Still, there are water quality problems that need to be addressed. According to the National Water-Quality Assessment program of the U.S. Geological Survey, the major findings that emerged from an assessment conducted in the Allegheny and Monongahela River basins between 1996 and 1998 were:

- Streams and rivers in the two river basins range from those of high quality that support diverse aquatic life



to those that are seriously degraded and support few aquatic species and few human uses of the water.

- Acid- and mineral-laden mine drainage from abandoned coal mines is one of the most serious and persistent water quality problems in the basins, limiting water use and aquatic resources. Sulfate concentrations were five times greater in streams draining mined areas than in streams draining unmined areas.



Photo credit: Bernadette E. Kazmarski

- Zinc in bed sediment exceeded aquatic life guidelines at 15 of 50 sites.
- A group of now-banned industrial chemicals, polychlorinated biphenyls (PCBs), was detected in over 40% of sediment and fish tissue samples. Consumption advisories are in place for several fish species because of PCB and chlordane contamination in some large river reaches.
- In sampled streams in basins dominated by urban or agricultural land, pesticides and volatile organic compounds (VOCs) were commonly detected, although generally at concentrations meeting drinking water and aquatic life standards and guidelines.
- Since 1980, treatment of drainage from active and abandoned mines has generally resulted in improved

water quality, with increased pH and lower metal and sulfate concentrations, but diversity and abundance of aquatic organisms remain reduced in comparison to unmined areas.

- Some of the most degraded stream reaches have, since the early 1900s, supported few aquatic organisms. Yet, the quality of many reaches is now improving, and abundant fish and invertebrate populations include sensitive species not seen here in decades.
- Streams in forested settings are among the most diverse nationally with respect to aquatic insects among sites sampled.

The Ohio River, since it receives water from both the Ohio and the Monongahela Rivers, experiences similar contamination. Additionally, dioxin levels exceed water quality standards in Pittsburgh and decrease in concentration in a downstream direction.

The State Water Plan, currently being prepared by the Commonwealth, identified the following water quality issues for Allegheny County:

- Lower Allegheny River
 - Inadequately treated municipal and industrial waste causing acid mine drainage and nutrient enrichment
- Monongahela River
 - Mine drainage
 - Untreated and/or inadequately treated municipal and industrial discharge
 - Variety of non-point pollution sources
 - Thermal pollution
 - Landfill leachate
 - Excessive mineral constituent concentrations
- Ohio River
 - Mine drainage
 - Raw and inadequately treated sewage and industrial discharges

Abandoned Mine Drainage

Past mining operations have polluted local streams and waterways with Abandoned Mine Drainage (AMD) through exposing acid producing rocks to rainfall and runoff. Mine drainage can also be alkaline, and pollute streams with

metals such as iron, manganese and aluminum. The following streams experience AMD problems:

- Chartiers Creek
- Dolphin Run
- Half Crown Run
- Little Plum Creek
- Long Run
- Montour Run
- Raccoon Creek
- Thompson Run

This topic is addressed more thoroughly in the Resource Extraction Plan.

Sewer Overflows

According to the National Research Council, in 2005, overflow of outdated combined stormwater and sanitary sewers directly into streams and rivers was the most serious water pollution problem affecting the County.

During dry weather, the sewage collection system, which transports wastewater from thousands of homes to the wastewater treatment plant, operates effectively. However, when it rains or snow melts, extra stormwater gets into the sewage collection system through direct connections or through leaky, cracked pipes. This extra volume of water overloads the sewage collection system pipes and raw sewage overflows at hundreds of locations before it reaches the treatment plant. Untreated sewage runs into waterways, overflows from manholes or backs up into homeowners' basements.

The service area of ALCOSAN has at least 450 combined and separate sewer overflow structures from which untreated sewage is discharged into local streams during wet weather, more than any similar authority in the country.

River Conservation Plans

The Pennsylvania Rivers Conservation Program has been developed to conserve and enhance river resources through preparation and accomplishment of locally initiated plans. The program provides technical and financial assistance to municipalities and river support groups to carry out planning, implementation, acquisition and development activities. River conservation plans have been completed for rivers and creeks on the Pennsylvania River Registry:

- Monongahela River (1998)
- Youghiogheny River (1998)
- Montour Run (2000)

- Nine Mile Run (2000)
- Allegheny River (2001)
- Lower Chartiers Creek (2001)
- Turtle Creek (2003)
- Allegheny Monongahela and Ohio Rivers (2004)
- Sewickley Creek (2005)
- Pine Creek (2007)

In order for a river to be placed on the registry, it must have an approved plan and local municipal support. All of these plans have implementation strategies.

Groundwater Quality

Although not regulated, the quality of water from domestic wells meets Federal standards for drinking water for most substances analyzed in the National Water-Quality Assessment program study conducted in the Allegheny and Monongahela River basins between 1996 and 1998. However, the study found that:

- Compared to groundwater in unmined areas, water in shallow private domestic wells near reclaimed surface coal mines had higher concentrations of sulfate, iron and manganese, even after all mining and reclamation had been completed.
- Overall, volatile organic compounds (VOCs) were detected at very low levels in the groundwater samples analyzed. Gasoline related compounds were detected slightly more frequently and at slightly higher concentrations in groundwater near reclaimed surface coal mines than near unmined areas.
- Nitrate was detected in over 60% of sampled wells, although only one domestic well sample exceeded the drinking water standard for nitrate.
- Radon was detected at levels exceeding the proposed Federal drinking-water standard of 300 pCi/L (picocuries per liter) in over half of the groundwater samples.

FLOODING AND STORMWATER MANAGEMENT

Rivers and streams often have to carry more water than their channels can contain. The excess water spills onto adjacent lowlands – the floodplain – until the water volume decreases enough to be contained within the channel again.



When a storm hits the region, 16 multi-purpose flood control reservoirs built and maintained by the U.S. Army Corps of Engineers in the headwaters of the Allegheny and Monongahela rivers retain excess water upstream of the dam. Controlled releases of this excess water help to prevent or reduce downstream flooding.



Photo credit: Bernadette E. Kazmarski

However, flooding problems are still experienced throughout much of the County. Although there is no comprehensive, county-wide inventory of chronic flooding problems, the Allegheny County Emergency Service Department has designated 12 waterways as priority streams relative to flooding (see Map 4K.1), based on data collected on flooding and the resultant damages:

- Bull Creek
- Chartiers Creek
- Deer Creek
- Lowries Run
- McLaughlin Run
- Montour Run
- Pine Creek
- Plum Creek
- Rawlins Run
- Robinson Run
- Sawmill Run
- Streets Run

These streams are high-priority for protection from further development and other activities that would increase flooding. The Emergency Management Division is considering adding two more streams to the list: Girty's Run and Dirty Camp Run.

The *PA Storm Water Management Act* (Act 167), enacted in 1978, enables counties to prepare stormwater management plans for designated watersheds, which provide the basis for local municipal stormwater management ordinances. When a plan for a watershed has been prepared and approved by the Pennsylvania Department of Environmental Protection

(PADEP), local municipalities within the watershed must enact stormwater management ordinances to control runoff water volumes, water quality and peak rates of stormwater runoff from development sites.

To date, Act 167 plans have been completed for 8 of the 25 designated watersheds in Allegheny County:

- Deer Creek
- Flagherty Run
- Girty's Run
- Monongahela River
- Montour Run
- Pine Creek
- Squaw Run
- Turtle Creek

In December 2007, Allegheny County Council approved an update to the County's 1985 *Stormwater Management Plan* for Girty's Run, Pine Creek, Squaw Run and Deer Creek watersheds.

STEEP SLOPES

Half of the land area in Allegheny County is either moderately sloped or steeply sloped (see Map 4K.2). Generally, the steepest slopes are found in the valleys of the tributaries to the major rivers.

SOILS

Much of Allegheny County has a thin soil cover with areas of low-permeability, clay-rich soils underlain by bedrock. Soils are classified by the U.S. Department of Agriculture, Natural Resource Conservation Service according to their suitability for development, agriculture or other uses. The Soil Survey of Allegheny County provides maps of the soil series, or soil types found within the County, along with descriptions of their characteristics and suitability for different land uses.

WOODLANDS

Woodlands cover approximately 280 square miles, or more than a third of the County. Tree cover is a valuable resource in that it provides:

- Slope stability
- Aesthetic value
- Habitat for a great diversity of plant and animal species
- Opportunities for recreation
- Management of stormwater runoff
- Improved water quality

The majority of forested areas are located on the steeply sloped hills and ridges of the County's stream and river valleys.



Photo credit: Kevin Smay

State Game Lands #203, located in Marshall Township and Franklin Park Borough, encompasses about two square miles of woodlands. Another 29 square miles is owned by Allegheny County, mostly as parks. The overwhelming majority of the County's woodlands are privately owned.

NATURAL HERITAGE AREAS

The Allegheny County Natural Heritage Inventory identifies and maps important biotic and ecological resources that make up the natural heritage of Allegheny County (see Map 4K.3). These areas, which include Biological Diversity Areas, Landscape Conservation Areas and Other Heritage Areas, provide habitat for a great diversity of plants and animals, including rare, threatened and endangered species. Natural heritage areas also provide scenic and recreational opportunities for residents and visitors.

In addition to this classification system, each area has been assigned one of three County significance ranks of either 'Exceptional', 'High' or 'Notable'.

The significance rankings have been used to set priorities for protection.

Biological Diversity Areas

Allegheny County has 30 listed Biological Diversity Areas (BDAs):

- Allegheny River
- Barking Slopes
- Beckets Run
- Campbell Run Valley
- Campmeeting Woods
- Clinton Wetlands
- Crouse Run Valley
- Deer Creek Valley
- Guyasuta Run Valley
- Harrison Hills
- Hemlock Grove
- Jacks Run Valley
- Liberty Valley(Dead Man's Hollow)
- Lower Allegheny River Islands
- Lowries Run
- Mayview Valley
- Millers Run
- Millerstown Woods
- Moon Run Slopes
- North Park Lake
- Oakmont Flood Plain
- Ohio River
- Painters Run Slopes
- Peregrine Falcon
- Peters Creek Wetland
- Plum Creek Valley
- Simpson Run
- Toms Run Valley
- Trillium Trail
- Willow Run Slopes

BDAs are:

- Natural or human influenced habitat that harbor one or more occurrences of plants or animals recognized as state or national species of special concern,
- Areas that possess a high diversity of native species of plants and animals, or
- Areas that support a rare or exemplary natural community, including the highest quality and least disturbed examples of relatively common community types.

Landscape Conservation Areas

Allegheny County has three Landscape Conservation Areas (LCAs):

- Big and Little Sewickley Creek
- Montour Run Valley
- Raccoon Creek Valley

An LCA is a large contiguous area that is important because of its size, open space and habitats. Although an LCA may include a variety of land uses, it has not been heavily disturbed and thus retains much of its natural character.



Other Heritage Areas

There are six Other Heritage Areas in the County:

- Beechwood Farms Nature Reserve
- Blue Run Valley
- Bullock-Pens Park
- Frick Park
- Gilfillan Woods
- Salamander Park

OHAs are areas that are consistently utilized for scientific monitoring of the environment or other natural science studies. This classification includes land regularly used by educational institutions, local environmental organizations or the general public for nature study or instruction.

The Western Pennsylvania Conservancy released the Natural Heritage Inventory in 1994. The Conservancy realizes the inventory is outdated and has plans to update it.

■ ISSUES AND ANALYSIS

This section examines what can be done to protect quality of our environmental resources; maintain clean and abundant air, water and energy resources; and promote safety from natural hazards.

KEY CHALLENGES

In developing the Environmental Resource Plan, the Environmental Quality Resource Panel helped to identify these key challenges:

- Reducing sewer overflows
- Impacts of development on steep slopes
- Impacts of development landslide-prone areas
- Loss of forest land
- Improving air quality, especially for ozone and particulate matter
- Flood prevention and mitigation
- Protecting and improving ground and surface water quality
- Wetland protection
- Loss of Natural Heritage Areas
- Protection of wildlife and biodiversity corridors

The following provides an understanding of these issues.

REDUCING SEWER OVERFLOWS

Nearly a third of the County's municipalities are served by combined sewer systems. Combined sewer pipes carry both wastewater (used water and sewage that goes down the drain in homes and businesses) and stormwater (rain or snow that washes off streets and parking lots) to a wastewater or sewage treatment plant. In a combined sewer system, the mixed wastewater and stormwater flow together in a single pipe. During wet weather and high groundwater table conditions, many of these systems are hydraulically overloaded, causing an overflow.

Because these overflows violate the Clean Water Act, regulatory agencies, such as the U.S. Environmental Protection Agency (EPA) and PADEP, have denied new sewer system tie-ins. This restriction is limiting economic growth in many municipalities.

Eleven wastewater treatment agencies operating in the County have permits that include requirements for addressing combined sewer overflow. Forty-one of the 126 sewered municipalities within the County have been operating under the requirements of corrective action plans. The municipalities of Edgewood, Penn Hills, Pittsburgh and Swissdale are all under consent orders as well.

Combined sewer overflows (CSOs) must be significantly reduced over the next decade. Communities are required to reduce CSOs in the system from 50-60 annually down to 4-5 per year or the EPA will force the community to correct the problem in a very short time frame and may impose very large penalties and fines for noncompliance.

Actions required for achieving compliance with Clean Water Act and Safe Drinking Water Act regulations and to address stormwater drainage issues within the County will require major capital investments. The costs of maintaining, repairing and replacing aging infrastructure and expanding the capabilities of the existing systems are significant. Preliminary estimates place the cost of achieving compliance with the current combined sewer overflow regulations for ALCOSAN and the tributary systems at over \$3 billion.

The wet weather issue has become a priority for the region's state and federal legislators. Federal funding totals \$17 million to date and the Commonwealth of Pennsylvania recently awarded a \$2 million grant to the 3 Rivers Wet

Weather Program (3RWW) to help municipalities address the issue. 3RWW has awarded more than \$6.8 million to communities over the last four years to help fund 33 innovative sewer projects that can become models for other municipalities and regions. Many of these projects involve multiple communities collaborating to solve the wet weather issue.

IMPACTS OF DEVELOPMENT ON STEEP SLOPES

Much of the County's steeply sloped land is highly susceptible to landslides and rockfalls. The red bed (claystones) of the Waynesburg Hills is especially prone to slope failure. Very steep slopes in particular can be difficult and dangerous to develop. There are a number of potentially significant environmental impacts associated with disturbance of steep slopes, including:

- Difficulty of re-establishing vegetation
- Decreased stormwater run-off absorption rates
- Increased volume and velocity of stormwater runoff
- Increased potential for accelerated erosion
- Potential for landslides and rockfalls
- Ugly scarification and other visual impacts



Photo credit: PennDOT

Steep slopes may provide spectacular opportunities for development, but they also present special challenges for construction. Poorly done and excessive hillside development can diminish the very views and natural features that people valued in the first place. And in the absence of strict controls, public safety may be at risk.

In 2005, the Heinz Endowments commissioned a study, *The Physical and Ecological Investigation of Pittsburgh's Hillsides*.

The study, managed by the Allegheny Land Trust, identified options for protecting the City's wooded hillsides. The main recommendations of the study were:

- Adopt standards, rather than guidelines, for development in the Hillside District
- Amend the City of Pittsburgh's zoning code to establish a steep slope overlay district (based on slopes of 25% or greater) that encourages conservation through strict, legally defensible controls
- Prohibit development on slopes 40% and greater
- Address buffer areas

While the study was specific to the City of Pittsburgh, its findings and recommendations are applicable throughout Allegheny County.

IMPACTS OF DEVELOPMENT ON LANDSLIDE-PRONE AREAS

Landslides are common in Western Pennsylvania, and have shaped the landscape of the region throughout its history. "Monongahela", a Native American word, is variously interpreted as "river of the falling banks", "many landslides", "high banks or bluffs, breaking off and falling down in places", or "places of caving or falling banks".

'Landslide' is a general term for the mass movement of soil and rock on an unstable slope. Landslides can be rapid or very slow, and involve large or small areas and volumes of material. The principal types of movement are falling, sliding, flowing and slumping, but combinations of these are common.

Slopes in the Waynesburg Hills have a high susceptibility to landslides, while those in the Pittsburgh Low Plateau have a high to moderate susceptibility. However, major landslides occur regularly in both physiographic regions (see Map 4K.4).

The most recent major landslide occurred in Kilbuck Township in the Spring of 2006. Over ½ million cubic yards of rock and soil material fell onto Route 65 and spilled across the adjacent railroad lines. The landslide caused major disruptions to critical transportation infrastructure - two days for rail, and two weeks for highway. The rail impacts were felt throughout the country. As of 2008, Route 65 still has a single-lane closure in the area of the slide. The landslide was caused when a steep, landslide-prone hillside was excavated to prepare a building site for a large-scale commercial



development. It was the biggest - and most costly - landslide in the County in decades, and highlights the need for greater control of development in landslide-prone areas.

LOSS OF FOREST LAND

Forested lands throughout the County are under pressure from development. According to the University of Pittsburgh's Center for Social and Urban Research, the greatest population increases since the early 1990s have been in forested areas. That growth areas should face the greatest losses in tree cover is ironic, given the correspondingly greater need for the benefits that these natural systems provide.

Forest lands are important as wildlife habitat. They contribute to the stability of soils and slopes, improve air quality, and play an important role in water management. Tree cover can significantly reduce both the quantity and velocity of surface runoff to streams and rivers, thereby reducing sediment loads and flooding. Trees can take carbon dioxide out of the air and store it as carbon in wood, thereby reducing greenhouse gases that contribute to global warming. Tree cover along streams and wetlands lowers water temperature as well, which is important to stream ecology.

The northerly and southerly parts of the County have experienced the most significant growth and development, causing a loss of forest cover and altering the hydrological characteristics of watersheds. The flooding that has resulted has caused severe problems for a number of downstream communities.

Municipalities with higher percentages of tree cover have a greater percentage of streams in attainment of water quality standards. The positive effect begins when the percentage of tree cover is above 40%. At greater than 40%, attainment of water quality standards increases sharply as the percentage of tree cover increases.

Water management will become increasingly expensive for growing municipalities, and for the County, unless more attention is paid to managing human activities in the landscape and maintaining adequate vegetative cover in critical locations within watersheds.

The County's extensive wooded hillsides have also helped to define a scenic identity for Allegheny County. The landscape attracts visitors for sightseeing, and for a wide variety of outdoor sports and recreation including outdoor festivals,

fishing, boating, hiking, birding, and bicycling - all of which generate significant economic benefits.

Simply put, extensive loss of forest lands will be a blow to the quality of ecosystems necessary for future sustainability and to the quality of life in the region.

IMPROVING AIR QUALITY

Particulate matter in the air remains a significant concern. In 2007, the American Lung Association named Pittsburgh the second worst metropolitan area in the nation polluted by year-round particle pollution (Annual PM2.5) and Allegheny County the second most polluted county by short-term particle pollution (24-Hour PM2.5). The ranking is driven by the fine particle monitor located in Liberty Borough, downwind of U.S. Steel's Clairton Coke Works (the largest cokemaking facility in the United States), as well as other industry. The Liberty/Clairton area is a special non-attainment area for fine particles, also known as PM2.5 (particulate matter with diameters smaller than 2.5 micrometers). This area includes five municipalities: Glassport, Liberty, Lincoln and Port Vue Boroughs, and the City of Clairton. This smaller non-attainment area is surrounded by the larger Pittsburgh-Beaver Valley non-attainment area.

The air quality in the rest of the region is hardly pristine. According to the American Lung Association, if the Liberty/Clairton area were omitted from the ranking, Allegheny County would still place as 22nd worst in the nation, and Pittsburgh would be the 19th worst metro area in the U.S. The second highest fine-particulate readings in Allegheny County were found in North Braddock. Three-year averages from monitors located in Stowe, Clairton, Harrison and Lawrenceville exceeded the annual standard.

The American Lung Association, in its 2008 *State of the Air* report, named Pittsburgh the sootiest city in America. The ranking is based on based on air quality measurements of short-term particle pollution between 2004 and 2006.

It is anticipated that reductions of pollution from the coal-fired power plants upwind of Allegheny County will help reduce PM2.5 in the County.

Large power plants are major sources of air pollution. The vast majority of these large power plants (over 70%) are coal-fired. A disproportionate share of emissions comes from a handful of plants that have not yet installed modern pollution controls, or which operate inefficiently. A 2005

report by the Environmental Integrity Project ranks the top fifty power plant polluters for sulfur dioxide (SO₂), nitrogen oxides (NO_x), carbon dioxide (CO₂) and mercury. According to the report, the Cheswick power plant in Springdale is the 15th dirtiest plant for SO₂ and 45th worst for mercury, based on emission rates, which measure the amount of pollution per megawatt-hour of electricity generated. The plant is planning to install an air pollution control system to reduce emission levels.

FLOOD PREVENTION AND MITIGATION

In September 2004, the remnants of Hurricane Ivan caused massive flooding throughout Western Pennsylvania. Flooding and mudslides damaged and destroyed bridges, closed roadways, and damaged and destroyed thousands of homes and businesses. In January 2005, the remnants of Hurricane Katrina once again produced flooding and mudslides that caused severe damage in Allegheny County.

Not all severe flooding in the County has been hurricane related, however. In June 2004, high winds and heavy rains caused flooding. In January 1996, a combination of ice, heavy snow and rain caused severe flooding statewide. The Allegheny and Monongahela Rivers crested within five hours of each other, causing major flooding downtown and elsewhere in the County.

Much flash flooding in the County has been caused by development in the uplands and along streams. When rain falls or snow melts on impermeable surfaces, it is usually collected in a system of gutters and storm sewers and either released directly into a receiving waterway (more typical of older development), or conveyed to stormwater detention facilities where it is gradually released into a receiving waterway. When there is too much precipitation in too short a time, both natural and manmade stormwater management systems can be overwhelmed. Large volumes of water are passed rapidly downstream, overtopping channel banks and adjacent floodplain areas; and are even forced up out of inlets, storm sewers and drain pipes.

A good example of a streamshed that has experienced severe flash flooding is Pine Creek. Pine Creek and its tributary streams drain about 67 square miles of northwestern Allegheny County and include some 14 municipalities. The watershed begins near the Butler County line and reaches the Allegheny River at the Borough of Etna.

Historic patterns of land development in the municipalities at the bottom of the Pine Creek watershed greatly reduced the capacity of the floodplain in its southerly reaches. More recent land development in the northerly municipalities further diminished the capacity of the floodplain in its northerly reaches. In 1986, a flash flood on Pine Creek resulted in the deaths of eight people and extensive damage in Etna Borough and Shaler Township, municipalities located at the bottom of the watershed.

Communities at the bottom of watersheds in flood-prone areas experience declines in property values and a discouraging cycle of personal property damage.

■ Stormwater Management

Allegheny County's many municipalities, diverse patterns of land use and development, and complex topography and geology underscore the need for coordinated stormwater management planning. Stormwater management involves the control of water that runs off the surface of the land from rain or melting ice or snow. The volume and speed of runoff substantially increase with increased land development. Management of stormwater is necessary to mitigate the impacts of development such as frequent flooding, erosion and sedimentation problems, damages to roads, bridges and other infrastructure, as well as non-point source pollution from impervious surfaces.

Better development controls and practices – including best management practices adapted for the County's particular soils and topography – are essential for mitigating existing problems and preventing future flooding. Stormwater management programs typically consist of three elements: the enforcement of effective runoff source controls, structural flood control measures and improved channel maintenance. Pennsylvania's Act 167 requires local storm management regulations to control runoff volumes and peak rates of stormwater runoff from development sites.

Poorly maintained stormwater management facilities can contribute to flooding. A lack of maintenance can cause reduced capacity in pipes, inlets and swales due to the accumulation of sediment and debris.



PROTECTING AND IMPROVING GROUND AND SURFACE WATER QUALITY

Allegheny County's ground and surface waters provide sources of drinking water, recreational opportunities, wildlife habitat and the means for transporting people, goods and services.

Polluted stormwater runoff is often transported to municipal separate storm sewer systems (MS4s) and ultimately discharged into local rivers and streams without treatment. When deposited into nearby waterways through MS4 discharges, pollutants can impair the waterways, thereby discouraging recreational use of the resource, contaminating drinking water supplies and interfering with fish and wildlife habitat.

National Pollutant Discharge Elimination System (NPDES) permits require owners of MS4s to develop, implement and enforce a stormwater management program designed to reduce the discharge of pollutants to the "maximum extent practicable". Ninety-seven municipalities are currently developing the stormwater management programs required by the NPDES permits.

As previously discussed, combined sewer overflows are a serious problem in Allegheny County and in the region. Deteriorated sewage infrastructure, combined sewers and sewers that bypass treatment plants have created unsafe and unhealthy conditions in the County's streams and rivers. As little as one-tenth of an inch of rain – an average area rainfall is one-quarter inch – can cause raw sewage to overflow into the County's rivers and streams. Melting snow can cause the same effect.

Sewage overflows present a public health risk. The bacteria in sewage deplete oxygen from the waters, suffocating delicate aquatic life. While exposure to disease-causing organisms, such as giardia or cryptosporidium, is not considered fatal for a healthy adult, it can be deadly for those with weaker immune systems – small children and the elderly. Phosphorous and nitrogen in sewage provide nutrients that can trigger algal blooms, blocking oxygen and sunlight from reaching water organisms. The discharge of heated water used for cooling power plants further causes harmful reductions in dissolved oxygen concentrations. State and federal regulations require sewer agencies to reduce overflows and meet Clean Water Act requirements.

During the recreational boating season, May 15 – September 30, the Allegheny County Health Department issues river

advisories to warn individuals using the rivers to limit contact with the water when sewage overflows have likely contaminated it with bacteria (fecal coliforms and e.coli) and viruses. A river advisory can last for several days after a rainfall. Since the program began in 1995, river advisories issued by the Health Department have been in effect for nearly 50% (70 days) of each recreational season.

WETLAND PROTECTION

Wetlands provide many important ecological functions, including:

- Pollutant removal
- Floodwater storage and absorption
- Groundwater recharge and discharge
- Wildlife habitat
- Shoreline protection

When wetlands are lost or degraded by land development, these benefits must often be replaced by costly water treatment and flood control infrastructure. Given the many environmental benefits wetlands provide, wetland conservation and restoration should be an integral part of a comprehensive local watershed management strategy.

LOSS OF NATURAL HERITAGE AREAS

The *Allegheny County Natural Heritage Inventory* was completed in 1994 by the Western Pennsylvania Conservancy. This scientific study made a thorough search for plant and animal species and communities that are unique or uncommon in the County. It also identified areas important for general wildlife habitat, education and scientific study. Further investigation could reveal greater significance at a Natural Heritage Area or uncover a previously unidentified site. An update is needed to reassess this and to assess current development threats to these areas.

Historically, wildlife habitats in the County have endured dramatic changes. A century ago, mining and industrialization altered the landscape. Today, there are new and different, but just as serious, threats to wildlife. The largest threat to wildlife habitats, both terrestrial and aquatic, is sprawling development. Although the population of the County has decreased in several decades, the amount of rural and suburban land being consumed continues to increase. Habitat paved over can rarely be reclaimed or restored.

Serious threats to the viability of natural areas come from road runoff, habitat fragmentation, logging, invasive species and fragmentation of wildlife areas by roads or development.

PROTECTION OF WILDLIFE AND BIODIVERSITY CORRIDORS

Wildlife or biodiversity corridors are linear strips of land that connect larger areas of wildlife habitat together. The corridors allow flora and fauna to travel across a wider territory to:

- Move from where food and water is scarce to where food and water is plentiful
- Prevent overgrazing
- Move from overpopulated to less populated areas
- Access a wider range of breeding partners, thus preventing inbreeding and loss of genetic diversity in a local population

The County's ridge tops and stream valleys – when not developed – are natural corridors for animal travel.

When planning for future growth and development, it is important to provide for the protection of the County's natural places.

Land trusts in the County have been working to preserve biodiversity corridors. In 2003, the Allegheny Land Trust purchased 98 acres in Sewickley Heights, adjacent to Sewickley Hills Park. The property consists of open meadows, wooded slopes, spring seeps and headwaters of Little Sewickley Creek. It is located within the Little and Big Sewickley Creek Area Landscape Conservation Area (LCA), which is the buffer surrounding the Camp Meeting Woods Biological Diversity Area. The land was zoned for single and multi-family housing sites, which if constructed, would have had a significant negative environmental and aesthetic impact.

RECOMMENDATIONS

GOAL OF THE PLAN

Natural resources are managed to conserve unique assets; provide recreational and visual enjoyment; maintain clean and abundant air, water, and energy; and provide safety from natural hazards.

OBJECTIVES OF THE PLAN

The objectives of the Environmental Resource Plan are to:

- A. Meet federal, state and local air quality standards.
- B. Improve quality of surface water and groundwater resources.
- C. Identify and protect ecologically sensitive areas such as wooded steep slopes, stream headwaters, woodlands and wildlife corridors.
- D. Encourage development in Places identified in the Future Land Use Plan to minimize impacts to greenfields.
- E. Protect and restore critical stream valleys, floodplains and wetlands to preserve their functions for floodwater storage, water supply, and groundwater recharge.
- F. Eliminate urban, agricultural and industrial pollution runoff to protect streams and watersheds.

The following provides an understanding of the objectives.

A. Meet Air Quality Standards

Since a portion of the County is in non-attainment for PM_{2.5}, a criteria pollutant, Allegheny County is required to develop and implement a plan to reduce levels of PM_{2.5} in that portion of the County. Allegheny County must also participate in the development and implementation of its portion of a state-developed plan for the multi-county Western Pennsylvania area to bring it into attainment for ozone and PM_{2.5}.

The Allegheny County Health Department's Air Quality Program is developing a plan to control fine particulates



in the Liberty/Clairton area. This attainment plan is known as a State Implementation Plan, or SIP, and must be submitted to the EPA by early 2008.

The County will work with PADEP and EPA to develop and implement measures to encourage and assist local businesses and industries in reducing particulate emission sources. Local governments will be encouraged to implement and enforce measures to reduce emissions within their municipalities, such as prohibiting open burning or requiring measures to reduce dust during construction.

Alternative Energy Sources

The Pennsylvania legislature passed the *Alternative Energy Bill* in November 2004. The Bill has increased interest in implementing alternative energy production systems statewide and in the County. This issue is discussed in more depth in the Energy Conservation Plan.

Working with PADEP and EPA, the County will continue to develop programs to promote and attract sources of 'green' renewable energy, and encourage residents and businesses to purchase power from these sources.

Alternative fuel options for motor vehicles are increasing, but supplies and availability are still limited at this time. The County will support and encourage their use, however, as the availability of alternative fuels and fuel-efficient vehicles increases.

Reducing Traffic Emissions

The County will continue working to reduce congestion on roadways in the County, to reduce emissions from motorized vehicles. The federal Congestion Mitigation and Air Quality Improvement (CMAQ) Program funds transportation projects or programs that will contribute to attainment or maintenance of the national ambient air quality standards (NAAQS) for ozone, carbon monoxide (CO), and particulate matter (PM). The CMAQ program supports two important goals of the County: improving air quality and relieving congestion. CMAQ funds are intended to improve air quality and must be spent in non-attainment or maintenance areas, which Allegheny County is.

The Transportation Plan describes several possible CMAQ eligible project categories and Demand Management Strategies that the County will employ to reduce congestion and fuel consumption.

Transit-Friendly Development Patterns

Transportation and land use strategies to reduce automobile dependency are a cornerstone of the County's energy conservation and emissions reduction plans. Reducing vehicle miles traveled is also part of the County's strategy to address climate change.

Energy consumption from personal travel can be reduced by investing in more fuel-efficient forms of transportation, including transit. The Future Land Use Plan promotes land use patterns that support transit. Many Places are located on existing transportation corridors, and/or are in areas with transit service. The biggest impediment to efficient and affordable transit use is low density, spread-out development. Therefore, one of the key benefits of concentrating development in Places is that it supports the development of transportation alternatives, which will more provide choices and options for movement between Places. Increasing mobility will also help to ensure better access to jobs, shopping, schools and other destinations for more people.

Most Places designated on the Future Land Use map are supportive of transit use. The transit services may range from circulator vehicles within a Place, such as Oakland, to transit that connects one Place to another, such as Oakland to the Airport. In either case, transit will reduce the number of trips by private automobile and reduce energy consumption as a result.

Transit-Oriented Development (TOD) is a key element in the County's planned economic growth. TODs offers a mix of uses including office, retail and housing. Since they are accessible by many modes of transportation, TODs can reduce the number of vehicles on the road.

B. Improve Quality of Surface and Groundwater Resources

Abandoned Mine Drainage

Since mining has the greatest influence on surface and groundwater quality of any single land use in the County, according to the National Water-Quality Assessment program, efforts to remediate the effects of mining activities will significantly improve water quality. The County will support the efforts of state agencies and nonprofits who are working to reclaim and remediate abandoned mine lands to minimize the impacts of acid mine drainage. This is especially important in the Chartiers Creek drainage basin, since abandoned mine drainage is so prevalent there.

Wet Weather Issues

Addressing the problem of untreated sewage and stormwater overflowing into waterways is also crucial to improving the quality of the region's surface waters. The County supports the work of 3 Rivers Wet Weather to promote the most cost-effective, long-term, sustainable solutions to improving the quality of Allegheny County's water resources. This includes educating the public, advocating inter-municipal partnerships and promoting the use of improved sewer technology.

The University of Pittsburgh's Institute of Politics' Environment Policy Committee recently released a framing paper describing southwestern Pennsylvania's most pressing problems concerning stormwater, sewage, water quality and flooding. The Committee established, with the endorsement of the Southwestern Pennsylvania Commission, an independent Regional Water Management Task Force, with the charge of finding and implementing practical, regionally relevant solutions. The County will keep apprised of the work of this committee.

More recommendations for wet weather problems can be found in the Utilities Plan.

Reclaiming the Riverfronts

Restoring riverbanks will help to improve water quality. Allegheny County has made a significant commitment to reclaiming, rejuvenating and conserving its riverfronts. The County is applying for federal, state and private foundation grants to raise \$100 million for land acquisition and construction of the world's largest urban linear park. This park will run 128 miles along the County's four major rivers and touch more than half of the County's 130 municipalities. The plan is the product of years of study and collaboration among civic leaders, environmental groups and developers. The park will include hillside preservation in places like Mount Washington and across from the Clairton Coke Works.

Allegheny County, Friends of the Riverfront and the Pennsylvania Environmental Council are teaming together to implement a strategic plan for the Allegheny County Riverfront Project. This team will have to work with a variety of other partners, including local governments, to accomplish the many specific tasks that will lead to the acquisition, restoration and development of riverfront areas.

The City of Pittsburgh is also working to preserve its riverfronts. The City's 1998 *Riverfront Development Plan* seeks "to maintain an open space area with the potential for public access along the banks and to impose additional requirements on structures or uses within the district." The City intends to acquire all of the 35 miles of riverfront property within its borders.

Redevelopment of brownfields located along the Three Rivers will contribute to improved water quality. Local governments can contribute to the success of riverfront redevelopment by mandating development setbacks from the river through local zoning ordinances. These actions must be taken before sites are redeveloped and the opportunity is lost.

Riverfront blight is a pervasive problem in the County. Litter, flood debris and illegal dumping contribute to the damage. The County supports the efforts of PA Greenways in Allegheny County and numerous watershed organizations to clean up our rivers.



C. Identify and Protect Ecologically Sensitive Areas

More needs to be done to preserve and protect the County's ecologically sensitive areas from degradation.

The *Allegheny County Conservation Corridors Plan* identifies 29 conservation corridors, ranks them in order of priority and proposes that they be protected through the actions and partnerships of municipal governments, nonprofit organizations and community groups. The plan defines conservation corridors as "ribbons of undeveloped open space which include and link sensitive natural features... [such as] floodplains, wetlands, and steep unstable slopes."

In developing *Allegheny Places*, experts from the County Parks Department, local land trusts and environmental groups have also identified priority areas for conservation. These priority areas are based on the *Conservation Corridors Plan* and provide for a network of connected green space throughout the County.

Priorities for conservation can change as development threats emerge or as new information becomes available concerning habitats of threatened species. The list of preservation priorities from the *Conservation Corridors Plan* and the Greenway Network for *Allegheny Places* provides a starting point, but it should be revisited and revised through the years. The County will initiate coordination between the range of environmental groups and land trusts active in the County to revisit the Greenway Network to ensure the list of conservation priorities is current and comprehensive.

Protecting Waterways and Wetlands

The wetlands associated with the County's streams and rivers control flooding, improve water quality and support a diversity of plants and animals. Wetland regulations require land developers to delineate and limit disturbances to wetlands.

The County will protect wetlands by:

- Directing development away from these areas
- Encouraging cluster development on higher ground surrounding wetlands
- Purchasing wetlands that are important for protecting local floodplains or ecological systems

The primary federal authority protecting streams and wetlands is the Clean Water Act. Recent Supreme Court decisions have potentially restricted the scope of the Clean Water Act, making headwater streams and isolated wetlands vulnerable. Furthermore, the federal program does not regulate impacts to streams and wetlands resulting from activities within their drainage areas. Numerous studies have documented how indirect impacts from land development significantly alter the hydrology of streams and wetlands, and have secondary effects on water quality, habitat and biodiversity. Headwater streams and isolated wetlands are extremely vulnerable to direct and indirect impacts because they typically receive stormwater runoff, are relatively easy to fill or relocate, and are often unmapped.

Headwater streams and isolated wetlands provide a host of benefits that are just beginning to be understood, including:

- Ecological linkages to downstream receiving waters
- Capacity to store floodwaters and recharge groundwater supplies
- Removal of excess nutrients and sediment
- Supporting habitat for many threatened or endangered species

Most local governments do not currently have the regulatory tools in place needed to protect headwater streams and isolated wetlands. Municipalities are strongly encouraged to implement regulations to control activities in or around vulnerable headwater streams and wetlands.

Retaining Forest Cover

Allegheny Places promotes the redevelopment of existing centers and brownfields to reduce development pressures on greenfields, many of which are forested. The Future Land Use Plan includes recommendations to ensure that land development takes place in a responsible way. This includes the use of appropriate land development controls that lead to development

that is high quality and contributes to the long-term conservation of environmental resources. Conservation subdivisions can simultaneously provide for development while preserving valuable forest cover.

The Parks, Open Space and Greenways Plan seeks to establish greenways and preserve open space to protect bio-diverse areas, including forest lands. Conservation easements and land stewardship initiatives are primary tools used to accomplish this.

Another way to retain forest lands is to support timbering as an economic activity similar to farming. Timbering is not land development since few landowners harvest timber in preparation for development. Landowners who can harvest their woodlots for economic gain have an incentive to leave the forest in an undeveloped condition. As with farmers, forest landowners should be encouraged by their communities to keep their lands in a perpetually forested condition.

The Municipal Planning Code (MPC) amendments prohibit local governments from using a zoning ordinance to unreasonably restrict forestry activities. The latest MPC amendments specifically direct all municipalities to permit forestry activities in their zoning ordinances as a “use by right” in all zoning districts. The intent is to make it easier to carry out all forestry activities by limiting the scope of zoning and other regulations.

Preserving Land Resources

The County is known for its beautiful hillsides and valleys. In order to protect these resources as well as to prevent environmental hazards such as landslides, development on steep slopes will be discouraged. Large areas containing steep slopes should be offered for dedication to the municipality, a private land trust or a nonprofit agency in order to preserve and maintain the area in its natural state. The use of conservation easements on steep slopes is also encouraged to preserve the area in perpetuity. The *Opportunities for Hillside Protection* developed for the City of Pittsburgh will be used as a model for local municipalities to use when updating their land development ordinances.

The Western Pennsylvania Conservancy prepared the *Allegheny County Natural Heritage Inventory* in 1994.

The County will work with the Conservancy to update this inventory and set priorities for areas for protection. To ensure the best use of limited funding, the County will develop a list of planned and ongoing recreation plans and conservation activities by local organizations and municipalities.

D. Encourage Development In Places Identified in the Future Land Use Plan to Minimize Impacts to Greenfields

Allegheny Places promotes the redevelopment of existing centers and brownfields to reduce development pressures on greenfields. *Allegheny Places* defines greenfields as lands not previously developed at the edge of the urban area. Greenfields help to delineate one village, city or town from another. Greenfields also provide places for outdoor recreation including playing fields, parks, golf courses, and hiking and bicycle trails; and for conservation of natural resources such as wetlands, wooded hillsides, and greenways.

Development in greenfields can require significantly more infrastructure than development in brownfields and in existing centers. Costly water, sewer and road extensions are often needed to support development in greenfields. *Allegheny Places* targets redevelopment and reinvestment in brownfields and existing centers to support improvements to the County’s essential existing infrastructure.

When development approvals are piecemeal, parochial, and/or reactionary, valuable greenfields can be fragmented or lost. *Allegheny Places* provides an effective planning framework for identifying and coordinating which areas should be developed and which areas should be protected or preserved. The County will promote protection of greenfields by:

- Directing development away from these areas,
- Encouraging the protection of natural ecosystems and green spaces, and
- Encouraging efficient development density in proximity to existing infrastructure and community resources to minimize the need for the development of new infrastructure.

While local municipalities have control over land uses, County funding will be directed to projects that support the Future Land Use Plan. To be consistent with



Allegheny Places, major developments should be located in the Places identified on the Future Land Use map. The County will not support (through financial or other assistance) locating major projects in areas outside of designated Places. The County will further work with municipalities to achieve consistency with the comprehensive plan to direct development away from greenfields.

Land is a limited resource that should be used wisely and, when possible, recycled and reused.

E. Protect and Restore Critical Environmental Functions

Protecting Wetlands

Wetlands are extremely valuable to both people and the environment along the County's waterways. Some of the important functions and benefits of wetlands include:

- **Erosion and Sedimentation Control** – Wetlands act as buffers along shorelines, protecting the property from waves or stream activity. Wetland vegetation filters out sediment by decreasing water velocity and settling suspended particles in the wetland, thereby preventing the sediment from reaching the lake.
- **Flood Protection and Abatement** – Wetlands act like giant sponges, soaking up excess water and releasing it slowly.
- **Water Filtration and Purification** – Wetlands are capable of filtering many pollutants from water that is destined for lakes, rivers and sources of drinking water. Water leaving a wetland is frequently cleaner than water entering the wetland.
- **Fish and Wildlife Habitat** – Wetlands are one of the most productive and valuable wildlife habitats. Many species of fish and wildlife depend on wetlands for breeding, nesting and feeding. Due to the loss of wetland habitat, many endangered fish, wildlife and plant species depend on remaining wetlands.

- **Recreation** – Wetlands provide a variety of recreational opportunities, including fishing, bird watching, photography, canoeing, hiking, hunting and trapping.

Landowners are urged to avoid clearing or replacing natural native vegetation along the wetland edge for a minimum width of 50 feet.

Restoring and Preserving Floodplain Functions

The County's objective is to protect and preserve the ability of floodplains to carry and store flood waters safely, in order to protect human life and property from damage.

Floodplains are low-lying areas adjacent to streams, lakes, wetlands and rivers that are covered by water during a flood. Floodplains that are relatively undisturbed work as nature's own disaster damage control; they are naturally designed to accommodate floodwaters. Proper management of floodplains is essential. When the volume of water carried by a waterway, such as a stream, is too great and the water cannot move downstream fast enough to stay within the stream channel, it spills over into the adjacent floodplain.

Act 166, the Pennsylvania *Flood Plain Management Act*, requires compliance with the National Flood Insurance Program (NFIP). The main intention of the Act is to regulate new construction, development and major improvements in floodplain areas.

Act 166 requires that municipalities identified as having areas subject to flooding participate in the NFIP by enacting floodplain management regulations that comply with the minimum standards of NFIP and also with the regulations set forth by the Act. Act 166 only applies to development within the 100-year floodplain. This area is shown on municipal floodplain maps created by the Federal Emergency Management Agency (FEMA) and can also be referred to as a Special Flood Hazard Area. Most regulation is achieved through ordinances and the issuance of building permits.

Municipalities must review proposed projects and impose conditions on any permits issued to reduce the potential for damage from floodwater. Permits

are required for any development as well as for filling or grading activities in the floodplain.

Where feasible, efforts should be made to reclaim developed floodplains, especially those subject to repeated flooding and flood damage. Floodplains should be reconsidered for land uses such as recreation and conservation uses that require minimal structures and impervious surface.

Recommendations for stormwater management can be found in the Utilities Plan.

Avoiding Future Stormwater Problems

Land development will continue to affect stormwater management in the County. New development that creates large areas of impervious surfaces can cause increases in stormwater runoff, contributing to drainage, flooding and erosion problems. The potentially adverse impacts of land development activities can be mitigated through the use of best management practices (BMPs), including good site design, and structural and non-structural stormwater controls.

Approximately 31,000 acres of land within designated Places in the Future Land Use Plan lie within watersheds of a priority stream. Priority streams were identified by the Allegheny County Emergency Service Department based on a history of flash flooding and resultant damages. Furthermore, approximately 26,000 acres of land within designated Places lie within watersheds for which no Act 167 planning has been completed. Stormwater runoff from these Places must be adequately controlled through the use of appropriate BMPs and other technologies.

BMPs are generally two-fold: reduce the amount of stormwater runoff created through careful site planning; and manage as much of the runoff that is created on the site as possible. Typically, on-site management of stormwater runoff relies heavily on in-ground filtration techniques. Allegheny County's soils, weather, and topography can make in-ground filtration particularly problematic, however. The development of BMPs appropriate to the County is needed. Greater use of preventative BMPs, such as retention of existing site vegetation, should be promoted.

Municipalities should adopt and enforce site development regulations that require sensitive site design targeting reduction of stormwater runoff, especially for major development. Municipalities should also require the use of BMPs.

Landowners are encouraged to use natural retention measures to control runoff.

Restoring Riverbank Landscapes

The Riverlife Task Force commissioned the *Three Rivers Landscape Management Guidelines* in 2006 to focus and provide direction to the many independent initiatives that are taking place along the riverfronts from the 31st Street Bridge on the Allegheny River to the Hot Metal Bridge on the Monongahela River to the West End Bridge on the Ohio River. The guidelines are based on sustainable design strategies and are focused on restoring native plants, conserving water and managing stormwater. The overall recommendations of the guidelines include:

- Strengthening the landscape requirements of the City of Pittsburgh Riverfront Zoning Overlay
- Building on the identity and visibility of Three Rivers Park
- Using Three Rivers Second Nature GIS studies to prioritize and track management activities
- Training landscape managers
- Ensuring that river edge management is adequately budgeted

Although the study has focused on targeted areas along the Three Rivers, the County will encourage similar studies to include all of the riverfronts in Allegheny County. Riverlife's guidelines will also be a resource for implementing the Three Rivers Park System, the 128-mile long riverfront park along the four major rivers that was adopted by the Allegheny County Council.

F. Eliminate Pollution Runoff to Protect Streams and Watersheds

According to the University of Pittsburgh's Center for Social and Urban Research, tree cover is positively associated with higher water quality in Allegheny County streams. Streams that are in attainment of



water quality standards have a higher percentage of tree cover (75%) within a 660-foot buffer along the water's edge than for streams not in attainment (57%).

Lands adjacent to streams, lakes or other surface water bodies that are adequately vegetated provide an important environmental protection and water resource management benefit. The benefits of riparian buffers are that they:

- Prevent excessive nutrients, sediment and other pollutants from reaching surface waters
- Provide for shading of the aquatic environment so as to moderate temperatures, retain more dissolved oxygen and support a healthy assemblage of aquatic flora and fauna
- Provide for the availability of natural organic matter (fallen leaves and twigs) and large woody debris (fallen trees and limbs) that provide food and habitat for small bottom dwelling organisms (insects, amphibians, crustaceans and small fish), which are essential to maintain the food chain
- Increase stream bank stability and maintain natural flow of the stream system, thereby reducing stream bank erosion and sedimentation and protecting habitat for aquatic organisms

- Maintain base flows in streams and moisture in wetlands
- Control downstream flooding
- Conserve the natural features important to land and water resources, such as headwater areas, groundwater recharge zones and floodways

The characteristics of the riparian lands – such as slope, soil characteristics and plant community structure and density – help to determine the width of the buffer strip.

The County urges local municipalities and landowners to protect riparian zones of streams and rivers and adjacent wetlands. Many municipalities have already adopted riparian buffer provisions into their zoning ordinances. The County subdivision and land development ordinance includes provisions for riparian buffers. Those municipalities that have not done so should enact such an ordinance. The *Three Rivers Park Landscape Management Guidelines* describes and illustrates restoration measures for the river edge landscape.