

GROWING TOGETHER

A COMPREHENSIVE PLAN FOR CENTRAL LANCASTER COUNTY, PENNSYLVANIA

PLANNING THE FUTURE • PRESERVING THE PAST

11. Natural Resource Protection



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Above
The Susquehanna River.

A. Goal

Air, water, and soil quality will be improved and protected, and natural areas, waterways, and riparian buffers will be protected and preserved in order to provide a healthy living environment.

B. Overview

Central Lancaster County is well known throughout the region for its scenic landscape and abundant natural resources. This chapter inventories and describes the natural features that define Central Lancaster County's character, and provides recommendations for their protection. For the purposes of this analysis, natural features are classified in general terms as land resources and hydrological resources. Land resources include topography, soils, and vegetation. Hydrological resources include watersheds, streams, floodplains, and wetlands.

Knowledge of natural features and landforms contributes to an understanding of the way in which existing land use patterns are shaped by the physical environment. This understanding is also of considerable importance in managing future growth, as it enables planners to determine the suitability of land for various types of land uses. For example, some areas are most suited to agricultural production or residential land use based



Rivers and streams greatly contribute to the character of Central Lancaster County's open space. Waterways also provide water resources to farms and urban centers.

on their physical characteristics, while others are best left as undisturbed open space. Protection of the region's land and hydrological resources is critical to sustaining the health, safety, and welfare of the region. Protection of individual natural features contributes to the health of the overall ecosystem, improving water and air quality and natural habitat, all of which impact quality of life. It is also intended to protect people and property from natural and man-made hazards.

While many municipalities throughout Central Lancaster County currently have ordinances containing provisions for natural resources, opportunities to strengthen protection measures still exist in areas where natural resources remain susceptible to degradation from development and land use activities. This plan seeks to identify such opportunities and offer strategies with which to strengthen regulations. The plan is also formulated based on the notion that Central Lancaster County communities would be best served by achieving uniform and consistent natural resource protection policies and regulations across all municipalities. That is, since natural resources do not adhere to political boundaries, the benefits of a healthy ecosystem are realized when all municipalities in a region enact a uniform minimum standard of protection.

This Natural Resource Protection chapter strives to be consistent with the policies and guidelines put forth in the Lancaster County Comprehensive Plan and the Lancaster County Water Resources Plan. These sources were frequently consulted in the preparation of this plan, as were various federal, state, and local sources, including local comprehensive plans and ordinances. Geographic Information Systems (GIS) mapping was used to overlay the various environmental and land use datasets in order to visualize the extent of the region's natural features and examine their implications for development and conservation planning. Public input was sought at monthly Steering Committee meetings, a Stakeholders Workshop, and a Community Summit. The information gathered at these public forums serves as the basis for the goals and objectives, and informs the recommendations put forth in this plan. A map that describes the plan can be found at the end of this chapter.

C. Existing Conditions

The discussion of existing conditions and key points includes a description of physical characteristics of the Central Lancaster County region, including topography, soils, vegetation, watersheds, wetlands, and floodplains. This section also identifies current protections of natural features afforded by each of the Central Lancaster County municipal zoning ordinances.

Topography

Topography refers to the relief of the land and is a result of geological processes such as uplift and erosion. Topography influences drainage, soils,

and vegetation. It is often described in terms of physiographic provinces, a land classification based on geological formations and landscape characteristics.

According to this classification, Lancaster County lies entirely within the Piedmont Province region of Pennsylvania. The Piedmont Province is comprised of three sections: the Piedmont Lowland Section, the Piedmont Upland Section, and the Gettysburg-Newark Lowland Section. The Central Lancaster County study area lies within the former two sections. The northern portion of the study area is in the Piedmont Lowland Section. This area is characterized by *karst* valleys separated by broad, low hills. Local relief is low, ranging from 60 to 700 feet. Its underlying rock type is predominantly limestone and dolomite, and its structure is complexly folded and faulted. The surface drainage pattern is dendritic, meaning that it has a branched form resembling a tree.

The Piedmont Upland Section, in the southern portion of the study area, is generally characterized by broad, rounded to flat-topped hills and shallow valleys with low to moderate elevations. It is mainly developed on complexly folded and faulted *metamorphic schist*. The drainage pattern is typically dendritic, but in some areas exhibits a pronounced rectangular orientation.

Soils

Soils are a direct result of geologic processes, as weathering of underlying rock gives rise to individual soil types. Soil composition is also a result of organic processes, namely the decay of plant and animal matter. Soils influence local plant and animal life and hydrological functions. They also impact land use patterns and activities, as their drainage and erosion properties often dictate suitability for uses such as agriculture, residential development, and on-lot sewage treatment. In general, soils on flat land that are mineral rich, deep, and well drained are the most productive. These soils also happen to be most favorable for development. On the other hand, shallow, poorly drained soils do not lend themselves to cultivation or development and preclude the use of on-lot sewage disposal.

For planning purposes, soils are most often analyzed according to their implications for agriculture and development (residential, commercial, and industrial land uses). Accordingly, this section contains a discussion of prime farmland soils, as well as seasonally high water table soils that pose constraints to agricultural production and development.

The U.S. Department of Agriculture Natural Resources Conservation Service (NRCS) has devised a classification system to represent the suitability of soils for most types of farming. These capability classes, as they are referred to, are practical groupings based on limitations of the soils, the risk of damage to the soils when they are farmed, and the way they respond to treatment. There are eight capability classes. Class I soils have few natural limitations, the widest range of use and the lowest risk of

Karst - Terrain characterized by the presence soluble rocks (notably carbonate rocks such as limestone, dolomite or magnesite), where drainage has been largely diverted into subterranean routes. The topography of such areas is dominated by sinkholes, sinking streams, large springs, and caves.

Metamorphic - Rocks that have recrystallized in a solid state as a result of changes in temperature, pressure, and chemical environment.

Schist - Any of various medium-grained to coarse-grained metamorphic rocks composed of laminated, often flaky parallel layers of chiefly micaceous minerals.

damage. Soils in the subsequent classes have progressively greater limitations, with Class VIII soils being so limited as to preclude their use for farming.

Class I, II, and III soils are generally considered the most suitable for agricultural use. Class I soils have few limitations that restrict their use. They are deep, nearly level, well-drained soils of uplands, and deep, level or nearly level, well-drained, silty soils of floodplains. Class II soils contain limitations that reduce the types of plants that can be cultivated. Limitations include risk of erosion, excess water, and shallow, droughty, or stony soils. Class II soils may also require moderate conservation practices. Class III soils are those that have severe limitations that reduce the choice of plants, or that require special conservation practices, or both. Limitations include soils with excess water and soils subject to severe erosion if they are not protected.

Lancaster County is renowned for its agriculture and is recognized as having some of the most fertile soil in the country. The Central Lancaster County region shares this honor. Prime farmland soils are in abundance throughout the region. Although some of these soils have been developed for residential, commercial, and industrial use within the Designated Growth Areas (DGA), the vast majority of prime soils outside of the DGA remains in productive agricultural use. Furthermore, nearly all of this land and the fertile soils it contains are permanently protected through agricultural easements or receive temporary protection (for a minimum of 10 years) under Pennsylvania's Act 319, commonly referred to as the Clean and Green Act. (See Map 6.13 on page 6.51).

Seasonally high water table soils are soils in which fluctuations in the weather cause groundwater to be at or near the ground surface at certain times of the year. These soils are unsuitable for development due to their saturated condition and risk of seasonal inundation. They are vital components of the hydrological cycle, acting as groundwater and aquifer recharge areas, providing for filtration of water prior to reaching drinking water supplies, and providing sensitive habitat.

In the Central Lancaster County region, seasonally high water table soils are primarily located along the region's watercourses and in proximity to wetland areas. They are most prevalent in the western portion of the study area – in West Hempfield and Manor Townships – and in East and West Lampeter Townships to the southeast.

Vegetation

Due to its agricultural history, the vegetative cover of the Central Lancaster County region is dominated by cropland and pasture. These croplands and pastures are interspersed with hedgerows and small plant communities, which provide edge habitat for various animal species. Woodlands, however, have been effectively cleared over the years for fuel and agriculture. Much of the original forest has been eliminated and what

remains today consists of second and third growth stands that are rather sparse and fragmented. Although some woodland corridors are in existence along the region's waterways, this fragmented woodland condition severely compromises the integrity of the woodlands themselves, and threatens species that require large, uninterrupted woodland areas for survival. Large woodland areas connected through a series of greenways, such as the Conestoga Greenways, allow bird and mammal species to migrate and retain patterns of movement and activity.

Woodland vegetation also plays a considerable role in preventing erosion, especially on steep slope areas where the tree roots stabilize the soil, holding it in place, and the foliage intercepts the falling rain. Groundwater recharge and water quality is also improved when stormwater runoff is slowed and is allowed to infiltrate into the soil.

Watersheds

A watershed (or drainage basin) is an area of land that draws overland flow and groundwater to a common stream or water body. It includes the land across its surface, the streams that drain the land, and the underlying soils, geology, and groundwater. Watersheds are defined by drainage divides (ridgelines), which direct surface and groundwater down the valley and into the stream channel or water body below. Ridgelines act as a line of separation between adjacent watersheds.

Watersheds function within a series of natural processes related to the hydrologic cycle. In general, when rainfall reaches the land, it either evaporates or transpires, runs downward across the surface into a stream or water body, or infiltrates through the soil, migrating under the surface as groundwater. The groundwater may be stored in an aquifer, eventually reaching the surface again through a seep or spring. Important contributing components of a watershed are groundwater recharge areas, stream baseflows (which depend on a groundwater source), tributary streams (especially first order streams), stream channels, floodplains, and riparian and aquatic habitats. Each is critical to ensuring the proper function of the watershed and the hydrologic cycle.

Watersheds are organized in a hierarchy whereby the drainage basin of a principal stream encompasses the smaller drainage areas of its tributary streams. The terms frequently used to describe this hierarchy are as follows from the largest unit to the smallest: drainage basin, watershed, sub-basin, and first order stream drainage area. First order stream drainage areas are the drainage areas that contribute to the headwater streams. They are extremely sensitive areas, as disturbance of headwater areas can potentially impact the entire downstream system.

Lancaster County lies almost entirely within the Lower Susquehanna Sub-basin (which forms part of the Susquehanna/Chesapeake Basin), where the Susquehanna River drains all but a small portion of the county. The River stretches approximately 445 miles from its headwaters in central New

York to Havre de Grace, Maryland where it empties into the Chesapeake Bay. Contributing watersheds in the Central Lancaster County region are the Chickies Creek Watershed (including Chickies Creek, Little Chickies Creek, and Conewago Creek), the Conestoga River Watershed, the Pequea-Octoraro Creeks Watershed, and the Mill Creek Watershed. The Susquehanna is the Bay's largest tributary; therefore, the health of the Bay depends largely on the quality of the Susquehanna's waters and that of its contributing watersheds. This can be achieved through preservation and sound management of the various components of the watersheds.

Wetlands

Wetlands are commonly defined as transitional areas between terrestrial and aquatic systems where the water table is at or near the land surface, or the land is covered by shallow water. For regulatory and legal purposes, the Commonwealth of Pennsylvania (25 Pa. Code Chapter 105) uses the following definition: "Those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions."

Wetlands contain three main components which are used in their identification: (1) water at or near the soil surface for significant parts of the year, (2) hydric soils, and (3) wetland indicator vegetation, such as cattails and reeds. Because they are such an extremely important resource—acting as water storage and recharge areas, helping to maintain water quality by filtering-out contaminants and sediments, and providing critical habitat and breeding areas for plants and wildlife—wetlands are regulated at the federal level.

Floodplains

Floodplains are formed by the frequent shifting of streams as they meander through valleys. The shifting of a stream produces an increasingly broad, flat valley floor, which is largely or completely covered by *alluvial soils*. The stream usually occupies only a small portion of the flat valley floor; however, during periods of inundation, the entire floor may be flooded, thus the term floodplain is used.

For the purpose of administering the Federal Flood Insurance Program, the Federal Emergency Management Agency (FEMA) has mapped flood hazard areas based on the extent of the 100-year flood event. Protection of these floodplain areas serves two main purposes: first, it prevents loss or damage of property and risk of injury from flooding; second, it preserves the important ecological functions of floodplains, such as water absorption and pollutant filtering. Development in floodplain areas reduces the capacity of the floodplain to carry floodwaters, resulting in increased flood heights and velocities and, therefore, increased hazard. Flood hazards are also exacerbated by ever increasing impervious surface cover, which prevents

Alluvial soils – Soils deposited through the action of moving water; typically very fertile.

infiltration of stormwater runoff. Stormwater management systems that convey runoff through pipes only increase the speed and force with which stormwater reaches the receiving stream, thereby increasing peak stream flows and degrading stream channels. Allowing floodplains to remain in conservation and open space, minimizing impervious surface cover, and requiring the use of best management practices for stormwater management will effectively protect floodplains and minimize the risk of damage, loss, and injury.

D. Current Protections Afforded by Municipal Zoning Ordinances

Municipalities within the Central Lancaster County region provide varying levels of protection for natural features, as summarized in Table 11.1 and described in further detail below.

Table 11.1 – Current Zoning Ordinance Provisions for Natural Resource Protection

	Prime Agr. Soils	Floodplains	Steep Slopes	Riparian Buffers
East Hempfield Twp	Prime soils	100 year		
East Lampeter Twp		100 year and floods of record		200 feet
East Petersburg Borough		100 year, 500 year, and alluvial soils		
Lancaster City		100 year and 500 year		
Lancaster Twp		500 year	25%	100 feet on Conestoga, Little Conestoga, and 2 unnamed tributaries
Manheim Twp		100 year		
Manor Twp		100 year, 500 year, and alluvial soils		
Millersville Borough		100 year		80 feet on Conestoga
Mountville Borough		100 year and alluvial soils		
West Hempfield Twp	Classes I, II, III	100 year and 500 year	20%	
West Lampeter Twp	Classes I, II, III	100 year, 500 year, alluvial soils, and floods of record		

Source: Thomas Comitta Associates, Inc.

Only the zoning ordinances of East and West Hempfield Townships and West Lampeter Township contain provisions for the preservation of prime agricultural soils. These townships regulate residential development in their

agricultural zones through sliding scale provisions, and attempt to limit the construction of structures on prime agricultural soils.

All municipalities regulate development activities in floodplain areas and prohibit the construction of structures unless in association with a permitted use, such as a recreational use, or granted by a Special Exception. Lancaster Township regulates up to 500 year floodplains, while the others only regulate 100 year floodplains at a minimum.

Lancaster Township and West Hempfield Township provide for the protection of steep slopes. Lancaster Township regulates activities on slopes of 25 percent or greater. It requires a minimum lot area of 40,000 square feet if more than 50 percent of the permitted lot area is on steep slopes. West Hempfield regulates activities on slopes of 20 percent or greater.

Riparian buffer standards are currently in place in East Lampeter and Lancaster Townships and Millersville Borough; however, the standards differ in terms of buffer widths and the waterways to which they apply. Lancaster Township prohibits gravel and paved areas, storage of hazardous materials, and structures (other than those associated with natural, recreational, and utility uses) within 100 feet of the Conestoga River, Little Conestoga River, and two unnamed tributaries. Millersville prohibits paving, buildings, and outdoor storage within 80 feet of the Conestoga River.

None of the municipal zoning ordinances contain provisions for the protection of high water table soils or wetland buffer areas and none provide for the net-out of environmental features (that is, the exclusion of environmentally constrained lands in the calculation of housing unit density).

The analysis of current protections afforded by municipal zoning ordinances shows that there is great variation among the Central Lancaster County municipalities in the standards for natural resource protection. Because natural features are not confined to political boundaries, the actions of one municipality will impact others in the region. For example, a municipality may have very stringent floodplain regulations in place; however, if its upstream neighbor has little to no regulation, the threat of damage or injury from flooding will still remain.

This plan recommends that the Central Lancaster County municipalities enact environmental protection standards that are consistent and uniform in order to gain maximum protection and equal benefit for all. The objectives and implementation strategies aimed at achieving this level of protection and benefit are outlined below.

Objectives and Strategies

This section describes the objectives and strategies that will support the Natural Resource Protection goal for Central Lancaster County. For further details regarding the timeframe and lead agencies responsible for each strategy, please see the Implementation Matrix in Chapter 15.

Goal: Air, water, and soil quality will be improved and protected, and natural areas, waterways and riparian buffers will be protected and preserved in order to provide a healthy living environment.

Objective NR.1 - Improve air quality as mandated by federal and state standards, bringing the region to ozone attainment.

Ground-level ozone is a major component of smog. Lancaster County is currently classified as a marginal non-attainment area according to the EPA's one-hour and eight-hour ozone criteria. It is also listed as a non-attainment area for fine particulate matter (PM-2.5). Lancaster County needs to address these pollutants in order to meet the national ambient air quality standards specified under the Clean Air Act. (See the Pennsylvania Department of Environmental Protection at <http://www.dep.state.pa.us/dep/deputate/airwaste/aq/attain/status.htm>.)

Strategies

NR.1.A Develop a coalition of interests to increase pressure on government regulators and polluters to reduce sources through implementation of best available technology and enhanced enforcement.

LIMC should seek to improve collaboration and communication among local, statewide, and national organizations that are concerned about air quality, as well as other environmental issues. Organizations might include the EPA, local environmental groups, child health advocates, transportation experts, or manufacturing and agricultural alliances that are concerned about compliance with environmental regulations. Such a coalition of interests can be used to specifically address the air quality needs of the Lancaster County region, while accessing data, expertise, and advocacy capabilities found throughout the country.

NR.1.B Use land control policies to help reduce automobile-generated air pollution.

Despite advances in technology that reduce auto emissions, air pollution is on the rise due to the increased number of miles traveled by car. (See "Clean Air Act Credit for Urban Policy Changes", <http://www.smartgrowth.org/library/otgartic.html>.) This increase in miles traveled is largely due to sprawling development patterns, which can be addressed through a number of land use policies. Such policies include: elimination of minimum parking requirements; zoning to permit transit-oriented developments and to encourage higher densities near transit

stations; incentives to increase transit ridership, along with disincentives for single-occupancy vehicles; zoning to permit mixed uses in urban areas; initiatives to encourage pedestrian and bike transportation (including providing sidewalks and bike lanes); and offering tax incentives to encourage infill development. Other policies for reducing the number of vehicles on the road may involve public transit and park-and-ride facilities.

Objective NR.2 - Maintain and improve water quality by protecting aquifers and aquifer recharge areas from contamination.

Ground water is a very significant natural resource. Approximately half of all Americans get their household water supply from ground water, and this proportion can rise up to 95 percent in rural areas. Ground water also plays a significant role in agricultural and industrial activities.

Aquifers are areas where ground water exists in sufficient quantities to supply wells or springs. Water is stored in the spaces between sand, gravel, soil, and rock. Recharge areas are places where precipitation, storm water runoff, or stream water re-enters the groundwater system. Contaminants that enter aquifers or aquifer recharge areas can adversely impact the ground water quality within a community. Common contaminants include landfill waste, sewage, de-icing salt, fertilizers, and pesticides.

Strategies

NR.2.A Judge the merits of projects that could negatively impact aquifers and find a way to measure and enforce so that aquifers will be protected for the benefit of the people of Lancaster County.

Municipalities that rely on ground water should conduct periodic ground water measurements, and enforce guidelines for land use and development in order to protect water quality. Such guidelines could be incorporated into site plan reviews (to determine if a project would be damaging to aquifers), design standards (such as requiring double-walled tanks for underground chemical storage), and operating standards (such as limiting pesticide use).

In terms of zoning, each municipal zoning ordinance should be amended to prohibit development on seasonally high water table soils, require wetland buffer areas, and net-out environmentally constrained lands from the calculation of lot areas.

NR.2.B Require pre-treatment of stormwater in at least two different ways prior to release into the aquifer, waterway, or watershed to assure clean water.

During and after a rainstorm, stormwater runs off of ground surfaces into lakes, rivers, and streams, eventually reaching underground aquifers. This storm water often carries with it pollutants from the ground, such as sediments, metals, and oil. A number of different pretreatment tools can be used to reduce water contamination caused by stormwater runoff. Infiltration trenches, vegetative buffers, filter strips, and grassy swales are just a few of

the techniques used to slow the pace of runoff and filter contaminants from the water.

Stormwater management techniques are often referred to as “Best Management Practices” or BMPs. A database that provides technical information and monitors the effectiveness of BMPs can be found from the International Stormwater Best Management Practices Database, at <http://www.bmpdatabase.org/>. The Natural Resources Defense Council also compares strategies used throughout the US in the management of stormwater runoff; more details are available at <http://www.nrdc.org/water/pollution/storm/stoinx.asp>. Lancaster County has developed a model ordinance for stormwater management.

NR.2.C Require all municipalities to impose or expand protection zones and zoning on aquifer recharge areas.

By establishing aquifer recharge protection zones, municipalities are able to classify, regulate, and protect those areas that recharge aquifers and contribute to the quality of the local water supply. Local governments can regulate land uses within these zones. Some uses, such as solid waste landfills or petroleum refinement, may be prohibited in a protection zone. Other uses may be subject to meeting certain performance standards during construction and operation. Since water can travel throughout aquifers, all LIMC municipalities should work to develop and enforce compatible regulations to protect local recharge areas. See the zoning ordinance amendments suggested in strategy NR-2.A.

NR.2.D Develop education programs for homeowners and businesses within recharge areas on the use and disposal of chemicals.

In order to help protect aquifers, local residents and business owners must know how to properly dispose of hazardous materials. They must also understand the importance of regularly monitoring septic systems, and they should be prudent in their use of fertilizers and pesticides on gardens and crops. LIMC should develop educational programs and materials that inform the public about what they can do to protect aquifers. Such materials should be particularly targeted to those residents and business owners who are living and working in a recharge zone.

Objective NR.3 - Improve and preserve the quality of waterways.

Improving and preserving local waterways can generate a number of benefits for Central Lancaster County. Such efforts can protect wildlife, preserve traditional landscapes, offer recreational opportunities, and boost property values along waterways. LIMC should promote the following strategies for restoring and protecting local waterways.

Strategies**NR.3.A Provide technical assistance and funding for restoration of stream areas.**

Stream systems contain diverse and complex ecologies, which are often damaged over time by human interference and development. Stream restoration is the process by which a stream is returned, to the extent possible, to its pre-disturbance ecological condition. LIMC municipalities should collaborate with land trusts, conservancies, and other organizations that specialize in stream restoration. They should apply for restoration funding from state programs, such as the Pennsylvania Department of Conservation and Natural Resources' (DCNR) Greenways grant. Additional information about funding and technical assistance programs for restoring streams and other watersheds can be found on the Environmental Protection Agency's website, at <http://www.epa.gov/owow/nps/funding.html>.

NR.3.B Require watershed-wide assessments for all development proposals of regional significance for water quality and flow.

When examining the ecological impact of a larger-scale development proposal, a local government should look beyond its borders to see how such a development could impact the entire watershed area, and affect neighboring communities. LIMC offers a collaborative structure that can encourage and monitor such regional considerations regarding land use, development, and watershed management.

NR.3.C Limit activities that have adverse impacts on waterways and wetlands.

Wetlands are critical natural resources that provide habitats for wildlife, control flooding, and improve groundwater recharge. A number of common practices can impact waterways and wetlands, including damming and dredging, agricultural and industrial activities, and new construction and erosion. Regulations should be used to guide such activities, monitor their impacts, and limit their adverse effects on waterways and wetlands.

Municipalities should amend their zoning ordinances to limit impervious cover, require riparian buffers, require the use of BMPs for stormwater management, and strictly limit disturbances of steep slopes, floodplains, wetlands, and other sensitive areas.

Objective NR.4 - Improve soil quality and stability through administration and enforcement of erosion control programs, cleanup activities, best management practices, and effective education.

Healthy soil is important to maintaining a healthy region. Quality soils control water runoff, filter pollutants, sustain plant and animal life, cycle nutrients like carbon and phosphorus, and provide a foundation for building construction. If soil is eroded or degraded, then these benefits are

diminished. Central Lancaster County should institute programs to ensure that soils in the region remain healthy and safe from erosion. More information is available from the National Resources Conservation Service at <http://soils.usda.gov/sqi/>.

Strategies

NR.4.A Increase requirements for erosion control and step up enforcement and technical/funding assistance.

The Lancaster County Conservation District should seek to increase provisions for erosion and sediment control and promote the use of best management practices throughout Central Lancaster County. Funding or technical assistance for erosion control is often available through programs related to watershed conservation or agricultural management. Zoning ordinance and subdivision and land ordinance amendments related to waterways and wetlands (addressed in Strategy NR-3.C) will also help with erosion control.

Objective NR.5 - Preserve natural areas and corridors through land use controls, transfer of development rights, land acquisition, and adherence to the Designated Growth Area program.

Maintaining undeveloped tracks of land is important for protecting wildlife, water systems, and the region's unique character. Preserved natural corridors can also become economic assets when they contribute towards attracting tourists or drawing a talented workforce to the region. Several land conservation tools can be used to protect such corridors, including transfers of development rights, donated conservation easements, and land acquisition by public or not-for-profit agencies. Lancaster County's Designated Growth Areas offer yet another technique for encouraging development in existing urban areas or village centers, and discouraging development in natural areas.

Strategies

NR.5.A Increase collaborative land protection projects and funding for areas of conservation importance.

LIMC municipalities should collaborate with the Lancaster County Conservancy to identify their conservation priorities, to increase the effectiveness of tools like TDRs, and to ensure that natural corridors can persist throughout the county. Efforts should be made to work with government actors at state and federal levels to leverage funding for conservation initiatives (for example, the DCNR greenways grant). The private and not-for-profit sectors, including a variety of land trusts and conservancies, should also be tapped for their investment power and expertise.

NR.5.B Increase required studies and analysis for development proposals in targeted conservation areas.

Proposals for development within targeted conservation areas should undergo more rigorous scrutiny than proposals for non-conservation areas. Developers interested in building within conservation zones should be required to produce additional environmental impact reports to confirm that the proposed development would not adversely impact local ecosystems, water resources, or natural character. Undeveloped corridors should be maintained to the greatest extent possible. While some proposal regulations are intensified, municipalities can simultaneously streamline approval processes for infill development within designated Urban Growth Areas. Such regulatory actions will encourage growth to occur in a way that is compatible with regional conservation goals.

NR.5.C Increase required level of redevelopment in Urban and Village Growth Areas.

LIMC municipalities should increase their density goals (dwelling units per acre) for urban and village growth areas. They should also create transferable development rights ordinances that designate existing urban and village areas as receiving zones and lands outside of urban and village growth areas as sending zones.

Objective NR.6 - Establish riparian buffers and restore disturbed areas along the Susquehanna river, Conestoga River, and smaller waterways.

Riparian buffers are strips of grass, shrubs, and trees along the banks for streams and rivers, which serve as a barrier between waterways and human land uses. They filter pollutants out of storm water, provide habitats for wildlife, and contribute to the aesthetic quality of riverside communities. While riparian buffers are naturally occurring phenomena, many have been lost to development. LIMC municipalities should focus on establishing new riparian buffers and restoring lost riparian buffers to protect water resources and improve river and stream conditions throughout the region.

Strategies**NR.6.A Require comprehensive watershed analysis on all watershed areas.**

A watershed analysis is a procedure undertaken by the County, which is used to organize and understand ecosystem information. It looks at how human, aquatic, riparian, and terrestrial systems interact within a watershed. Conducted by teams of specialists, a watershed analysis facilitates the development of management programs and strategies that will help maintain and restore local waterways.

NR.6.B Implement the prototype sections of the Conestoga Greenway Plan as developed by the LIMC.

Municipalities should work together to implement the recommendations of the Conestoga Greenway Plan.

NR.6.C Obtain the northwestern portion of the Enola low grade line and convert it to a rail trail interconnected to Lancaster County Conservancy's extended Turkey Hill Trail.

LIMC should collaborate with organizations such as the Lancaster County Conservancy, dedicated to the preservation of land, to obtain rights to the line.

NR.6.D Interconnect the Conestoga Greenway to riparian trails and nearby parks in LIMC municipalities.

LIMC municipalities should collaborate with private property owners in neighboring municipalities to obtain trail easements that are needed to create trail connections.

Objective NR.7 - Provide public education about natural resources for students and the public at large.

LIMC municipalities should encourage efforts to educate the public about natural resources in order to foster a sense of stewardship and promote sustainable environmental practices among the residents of Central Lancaster County.

Strategies

NR.7.A Create a coordinated program to deliver environmental education to all schools in the area.

Information about natural resources and local ecosystems should be incorporated into school curriculums throughout Central Lancaster County. School districts can partner with public and not-for-profit conservation entities to design programs, develop classroom materials, and plan for activities and field trips that can enhance students' understanding of local and global environmental issues.

NR.7.B Provide education about natural resources through the use of schools, the media, and government publications to ensure public knowledge of what is needed to provide and maintain a healthy living environment.

Public outreach efforts can be used to present clear messages and provide households with detailed information about practices that they can adopt to help protect and restore environmental resources. LIMC municipalities should work with environmental organizations and local media (newspapers, television, radio, etc.) to promote clear, accurate, and regular reporting on key environmental issues. A regional committee might be created, and charged with ensuring dissemination of such information.

Map 11.2

