Chapter 2: Natural Resources Plan

INTRODUCTION

Northern Chester County is rich in natural resources that stretch across the Region connected by stream valleys of the French Creek, Pickering Creek and Schuykill River. These resources are an integral component of the northern Chester County landscape. Further, they are an essential element in maintaining a healthy and safe environment for residents living in the Region as well as providing recreation to residents and visitors to the area. This chapter provides recommendations for the protection of natural resources in the Region.

Municipalities in the Region have taken a proactive approach to resource protection by including regulations in their individual zoning and subdivision and land development ordinances. The recommendations contained in this chapter serve to support and expand those regulatory efforts on a regional basis.

A comprehensive inventory of the resources addressed in this chapter is included in Chapter 7: Natural Resources Inventory as well as the legal basis that enables municipalities and regional groups to enact natural resource protection regulations.

ORGANIZATION OF CHAPTER

The Recommendations included in this chapter are organized as follows:

GOAL AND OBJECTIVES

The following goal for the protection of natural resources guides planning in the Region:

NATURAL RESOURCES GOAL: Protect and preserve environmentally sensitive areas and resources that define the character of the Region.

The Natural Resources Protection Plan focuses on how best to achieve this goal and implement its related objectives. To help the reader understand how the recommendations in this Plan relate to the goal and objectives each recommendation is followed by one or more of the following objectives (the assigned number/letter) that corresponds to the recommendation.

OBJECTIVES

2-A Examine the existing municipal zoning and subdivision ordinances in the Region for their effectiveness in preserving and protecting sensitive natural resources and explore supplementary ordinance provisions which would minimize disturbance to resources, require buffer areas between them and development and mitigate the adverse impacts of development.

2-B Encourage innovative and creative techniques to effectively address natural resource protection issues.

2-C Preserve and protect areas that provide valuable wildlife habitat and natural diversity including stream valleys, steep slopes, floodplains, woodlands, wetlands, hydric soils, and hedgerows.

2-D Protect and restore regional watersheds and maintain quality and quantity of groundwater and streams within the Region and pursue measures to maintain and, where possible, improve water quality.

2-E Promote innovative stormwater management (best management practices) and wastewater disposal policies that emphasize the recharge of groundwater and water balance.

2-F Discourage uses that involve the exportation of extracted water from the watershed of origin.

2-G Limit the future disturbance of land resources such as steep slopes and woodlands to prevent increased runoff and degradation of stream valleys and headwater areas.

2-H Preserve and protect woodland resources to maintain character, wildlife habitat, and natural diversity.

2-I Preserve and promote the continuance of open space and greenway connections to maintain wildlife habitat and natural diversity.

2-J Examine, encourage, and promote public and private options for open space conservation, such as conservation easements, other private land conservation approaches, and acquisition.

2-K Support sustainable land use practices within the Region.

2-L Utilize the preservation and conservation techniques specified in existing documents such as *Sustainable Watershed Management for Northern Chester County Watersheds* (2000) when developing recommendations for the protection of resources in the Region.

NATURAL RESOURCE PROTECTION RECOMMENDATIONS

COORDINATION OF ORDINANCE PROTECTION STANDARDS

The following section provides general recommendations for the coordination of ordinance revisions that would more effectively protect the Region's natural resources. In particular, gaps in specific resource protection measures are identified.

MINIMUM RECOMMENDED PROTECTION STANDARDS

Sensitive natural resources can easily be lost to development or other land disturbance, unless specific resource protection standards are in place to protect them on a site-by-site basis. Effective ordinances require an applicant (submitting a plan for subdivision or land development) to provide a full inventory of resources on the site, and establish effective standards for the protection of those resources. Figure 2-1 (on following page) outlines the minimum recommended protection measures for natural resources under ten major categories. This serves as the benchmark for standards within the Region.

The establishment of specific disturbance limitations is of particular importance in protecting resources. In some cases, as with floodplains or wetlands, the recommended allowance for disturbance is zero percent.[1] In other cases, such as woodlands or moderately steep slopes, there is some allowance for disturbance, but an upper limit is established. When subjective wording such as "the resources shall be protected to the maximum extent possible" is used, there is too much room for interpretation and no measurable ceiling on potential disturbance.

STRIKING A BALANCE

Disturbance limitations should be reasonable and directly linked to protection of the resource which, in turn, should be clearly linked to health, safety, and welfare issues. The regulations cannot take all legitimate use of the land away from a property owner, leaving the municipality vulnerable to a "takings" challenge. For that reason, there are only a limited number of resources that allow for no disturbance and they are generally linked to state or federal mandates for their protection (i.e., floodplains and wetlands). Striking a proper balance between protection of the resource and allowing for reasonable use of the land is key in establishing an effective municipal or regional resource protection program.

The information in Figure 2-1 provides an abbreviated summary of recommended protection standards. The text in the 4th column of Figure 2-1 would have to be revised and/or expanded in order to be included as ordinance language.[2] The Glossary of Terms in this Plan should be consulted for sample definitions.

Note that all of the protection standards in Figure 2-1 should not be considered of equal value because some of the standards listed are more substantive and others are more administrative. Of greatest concern is the protection of steep slopes, wetlands, riparian forest buffers, floodplains, and woodlands. And, while it would be preferable that the protection standards be located in one Article or Section in the zoning or subdivision and land development ordinances

[1] A prohibition of disturbance means the protected resource cannot be regraded, filled, built upon, or otherwise altered or disturbed.

[2] For one example of how most of these standards can be put into practice, see Article IX, Section 902 of the North Coventry Zoning Ordinance.

(one of the administrative standards) for administrative and enforcement purposes, the inclusion of the standards scattered throughout the ordinances is better then not having them at all.

Figure 2-1
Recommended Natural Resource Protection Standards

Protected Resource	Disturbance Limitations (Maximum Disturbance Allowed)	Suggested Location of Provisions	Other Protection Provisions to Include
Land Resources			
Steep Slopes • 15% to 25% • 25% and up	30% 0 to 15%	Zoning	• Standards to minimize disturbance, grading, erosion and to define method for measuring. • Certain activities/uses prohibited on 25%+ slopes
Woodlands/Hedge-rows/Specimen Vegetation, PNDI • Residential • Non-Residential (disturbance limitations apply to woodlands/hedgerows)	35% 50%	Zoning and SLDO (tree replacement Standards in SLDO)	• Exceptions for forestry or timber harvesting, per MPC; Timber harvesting plan required. • Protection standards (from construction activities) for trees to remain on site. • Include hedgerows in protected vegetation. • Specimen trees and PNDI sites cannot be disturbed unless no feasible alternative. • Tree replacement requirements if more than specified area or number of trees are removed. • Optional: Tree removal permit.
Water Resources:			
Wetlands	0%	Zoning	• Specific identification and delineation standards for wetlands. Require state and federal permits.
Wetland Margins	20%	Zoning	• Provisions for determining width of wetland margin. • Minimum 50-foot margin recommended.
Riparian Buffers • Inner Buffer • Outer Buffer	0% 20%	Zoning	• 75 to 100 feet total width depending on conditions adjacent to stream - 100 feet preferred. • Two-tier standard with stricter standards applied adjacent to stream. • Re-vegetation provisions for unforested riparian buffers.
Floodplain	0%	Zoning	• FEMA approved floodplain standards.
Stormwater Management	n/a	SLDO or separate ordinance	• Stormwater standards that promote infiltration and innovative use of BMPs, reduce stormwater runoff volume produced, and that discourage typical detention basin solutions to stormwater management.
Administrative:			
Site Plan Requirements	n/a	SLDO	• Protected resources must be identified and mapped on site plan.
Continued Protection of Resources	n/a	Zoning and SLDO	• Provisions for permanent protection of preserved resources.
Protection Standards Centrally Located	n/a	Zoning and SLDO	• Majority of standards located in one ordinance location for administrative ease and to avoid overlap and potential conflicts

Where resources overlap, the stricter protection standard applies.

CURRENT RESOURCE PROTECTION STANDARDS AND RECOMMENDATIONS

Because natural resources cross municipal boundaries, they are most effectively protected when coordinated on a regional basis. Consistency between municipal resource protection measures ensures that the Region's resources are protected at the same level. This

consistency is key to establishing comprehensive resource protection. To determine the current level of protection provided by the nine municipalities of the Federation, a detailed inventory and critique of each municipal zoning ordinance and subdivision and land development ordinance was undertaken in 2004 (and updated in 2006). The critique was based on the minimum recommended protection standards outlined in Figure 2-1 and a summary of the results is provided in Figure 2-2 (on following page). These protection measures were considered the most important for the protection of resources on a regionally consistent basis. It is recognized that some municipalities have protection measures in place that go beyond those shown in Figures 2-1 and 2-2. This plan supports the continuation of those extra measures.

The detailed inventory of municipal ordinances along with specific recommendations for addressing identified issues is located in Appendix C and should be used in conjunction with the summary provided in Figure 2-2. Appendix C includes an inventory of the following resource protection standards: steep slopes, woodlands (including timber harvesting), specimen vegetation, hedgerows, wetlands and wetlands margins, riparian forest buffers, floodplains, and stormwater best management practices (bmps) for each of the nine municipalities.

As noted above, at a bare minimum, steep slopes, woodlands, wetlands, floodplains, and riparian forest buffer protection standards, with specific disturbance limitations, should be enacted in each municipality.

While most of the townships in the Region have a fairly wide array of basic resource protection measures in place, there are some obvious gaps as seen in Figure 2-2. The townships with more “no’s” than “yes’s” in their column are in particular need of expanded resource protection measures. The recommendations in Appendix C should be used by each township to make specific improvements and additions to their resource protection measures.

The assessment of resource protection measures in Figure 2-2 should be interpreted as follows:

Yes Effective resource protection standards are in place.

Yes/R Effective resource protection standards are in place, but a recommendation is included to address a relatively minor issue.

Limited Standards are in place for the protection of the resource but a significant issue was identified that limits their effectiveness. Issues most frequently identified in this category include lack of specific disturbance limitations, need for a more stringent standard, or a lack of internal consistency creating conflicting standards.

No There are no standards in place for the protection of the resource. The minimum regulations suggested in Figure 2-1 should be implemented.

☑ Recommendation for the Coordination of Resource Protection Standards

ACTION 2-1 Implement consistent protection standards in each municipality in order to provide the most effective regional strategy for resource protection (in accordance with Appendix C).

Objective(s) addressed by Action 2-1: 2-A, 2-B, 2-C, 2-D, 2-G, 2-H, and 2-L.

General Observations

The following general observations about municipal resource protection standards should also be considered when updating ordinance protection standards:

- Keep the Protection Standards in a Central Location - Put the majority of resource protection standards in one article of the ordinance and remove conflicting ordinance standards. In those ordinances where inconsistencies or conflicts were found, they almost invariably had resource protection measures scattered throughout various ordinance sections.
- Maximum Disturbance Limitations are Key - Include a maximum disturbance limit for all applicable resources. It is better to have the applicant apply for a variance or request a waiver than to not have a bottom line to point to in the ordinance.
- Make the Standards Measurable - Keep the standards as straightforward and measurable as possible. Better to have a simpler standard that can be enforced than a complicated standard that cannot be properly applied.
- Create Specific Standards for Each Resource - Do not try to combine too many resources into one regulation. While floodplains, wetlands, and riparian buffers may have some common characteristics, they have different protection needs and a "one size fits all" approach may not be the best way to protect them.
- Woodland Management Plan versus Timber Harvesting Plan - A woodland management plan is not the same as a timber-harvesting plan. The management plan addresses woodlands to be retained on a site. Although some trees may be removed as needed to maintain a healthy woodland, the woodland management plan is not associated with a for-profit commercial operation. A timber-harvesting plan addresses issues associated with harvesting the trees from a site on an on-going and sustainable basis generally as part of a for-profit commercial use. The need for timber harvesting regulations is of particular importance now that the MPC requires the use to be permitted by right in all zoning districts. A certified forester should be involved in the development and review of plans for maintaining or harvesting of woodlands.

OTHER ORDINANCE PROTECTION MEASURES

In addition to the resource protection measures listed in Figure 2-1, there are other protection measures that have been implemented through municipal ordinances in the Region. These approaches can also be considered by those municipalities that want to implement additional protection measures beyond the recommended minimum. Examples of these measures are summarized below. Municipalities in the Region that have ordinances containing the listed provisions are identified. If a municipality is interested in learning more about any of these protection measures, the full ordinance provisions should be obtained from and discussed with the municipality that currently has them in place.

- Well Withdrawal Impact Study - Such a study can be required for subdivisions or land developments above a specified size. The purpose of the study is to evaluate the impact of the proposed development on groundwater resources. (East Pikeland, North Coventry)
- Water System Analysis - This analysis would be required for larger subdivisions or land developments. Its purpose is to determine the best long-term approach for providing adequate water supply, wastewater disposal, and stormwater recharge for the proposed development while minimizing the impact on the natural water system. (North Coventry)

Figure 2-2
Assessment of Existing Natural Resource Protection Measures

Resource	East Coventry	East Nantmeal	East Pikeland	East Vincent	North Coventry	South Coventry	Wallace	Warwick	West Vincent
Land Resources:									
Steep Slopes (15-25%, 25%+)	Yes/R	Yes	Yes/R	Limited	Yes	Limited[3]	Yes	Yes/R	Limited
Woodlands Protection	Yes/R	Yes	Limited	Limited	Yes	Limited	Limited	Yes	Limited
Timber Harvesting Plan required	Yes/R	Yes	No	Limited	Yes	Limited	Yes/R	Yes	No
Specimen Vegetation/PNDI Sites	Limited	Yes/R	Limited	Yes	Yes	Yes	Yes/R	Yes	Limited
Hedgerows	No	Yes/R	Limited	Limited	Yes	Limited	Yes/R	Yes	Limited
Tree Replacement required	Yes/R	No	Yes/R	Yes	Yes	Yes	No	Yes	No
Tree Protection during construction required	Yes	Yes	Yes/R	Yes	Yes	Yes	Yes	Yes	Yes/R
Tree Removal Permit	No	No	No	No	Yes	No	Yes	Yes	No
Water Resources:									
Wetlands	Yes	Yes	Limited	Yes	Yes	Yes	Yes/R	Yes	Yes
Wetland Margins	Yes/R	Yes	Limited[4]	Yes/R	Yes	Limited	No	Yes	Yes
Riparian Buffers	Yes/R	Yes	Yes/R	Yes/R	Yes	Yes/R	Yes/R	Yes	Yes/R
Floodplain	Limited	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Stormwater BMP's	Yes/R	Limited	Yes/R	Yes/R	Yes/R	No	No	Yes	Yes/R
Administrative:									
Plan Requirements for Natural Resources	Yes/R	Yes/R	Limited	Yes	Yes	Limited	Yes	Yes	Yes
Provisions for continued protection	No	No	No	Limited	Yes	Limited	Yes	Yes/R	Yes
Protection Standards Centrally Located	Yes	Yes	Limited	Yes	Yes	Yes	Yes/R	Yes/R	Limited

[3] PNDI sites are protected, "limited" designation applies to specimen vegetation.
[4] Ordinance contains three conflicting standards.

- No Negative Impact on Water Balance - The subdivision and land development ordinances can contain provisions requiring that new development or the expansion of existing development cannot have a negative impact on the water balance after the development occurs as compared to predisturbance conditions. (Wallace, West Vincent)
- Application of Standards - The resource protection provisions can be worded so that they apply to building permits, zoning variances, special exceptions, and conditional uses, as well as to subdivision and land development proposals. (South Coventry, North Coventry)
- "Growing Greener" Provisions - Several municipalities in the Region have incorporated Natural Lands Trust's Growing Greener standards into their ordinances. This planning concept entails a four-step process for designing open space subdivisions that ensures that sensitive environmental features are considered first when planning the development. Site constraints are also used to determine the maximum permitted density or number of units on the site. (North Coventry, Wallace, West Vincent)
- Water Resource Protection Overlay District - A separate overlay district can be established devoted to the protection of water resources. An overlay map of "Water Resource Protection Areas" identifying regional aquifer, fracture traces, surface water threats, and groundwater threats is included in the zoning ordinance. (The basis of these mapped areas is described in detail the text.) Certain uses, which could have a potential negative impact on water resources, have additional regulations applied to them if they are proposed in the water resources protection overlay area. This district can also contain the protection provisions for wetlands, high groundwater areas, stream buffers, fill and grading activities, erosion and sedimentation control, and stormwater management related to building construction. (West Vincent)

RESOURCE PROTECTION MEASURES

This section provides recommendations for resource protection measures that complement and supplement ACTION 2-1 and the recommendations included in the individual municipal tables in Appendix C.

RELATIONSHIP BETWEEN RESOURCES

It is important to understand the correlation that exists and is necessary to maintain amongst the Region's natural resources. Although not always physically connected, the status or condition of land, water, and biotic resources will impact the status or condition of related resources. For example, the disturbance of an area of woodland on a steep slope will have a direct impact on the associated slope and the stream corridor at the bottom of the hill. The removal of the vegetation and associated root systems will severely reduce the underlying soil's holding capacity, increasing erosion and sedimentation and significantly reducing the soil's infiltration capacity and the quality and recharge of groundwater. The understanding of this relationship is a key issue to be addressed when analyzing natural resources and when developing recommendations for management and protection.

WATER RESOURCES

Water is the single most important resource and its protection in regards to both quality and quantity is a primary goal of the Natural Resources Protection Plan. Proper management of water resources is necessary to 1) meet growing demands for its use, 2) protect it from degradation, and 3) maintain and improve water quality, wherever possible. Watersheds of the Region serve as a source of drinking water for communities beyond the boundaries of this Region. Therefore, the management of water resources within the associated watersheds has far-reaching implications.

Related Plans and Studies:

Water Resources Management Study – Prepared by the Federation of Northern Chester County Communities with assistance from the Chester County Planning Commission. Although the status of water resources has changed and been impacted by development since this study was completed in 1988, the data included in this study and discussion of the role of local government in water resource management is still applicable.

Sustainable Watershed Management for Northern Chester County Watersheds - A Model Program to Balance Water Resources and Land Development in the Schuylkill River Tributary Watersheds – Prepared by the Green Valleys Association with assistance from Cahill and Associates and the Brandywine Conservancy. This Plan contains comprehensive data for the Watersheds of Northern Chester County and establishes goals for sustainable watershed management which focus on the impact of development on water resources. In addition, the Plan includes a "Water Balance Model" that evaluates present and future conditions in terms of groundwater based on existing or proposed land use.

Watersheds: An Integrated Water Resources Plan for Chester County, Pennsylvania and Its Watersheds – Prepared by the Chester County Water Resources Authority. *Watersheds* includes numerous municipal implementation strategies for the effective protection and management of water resources. Chapter 7 of *Watersheds*, entitled "Stakeholder Roles - Opportunities for Stewardship" outlines twelve categories of strategies for municipal implementation. Section 13.3 of the *Chester County Water Resources Compendium* (the accompanying technical documentation for *Watersheds*) includes extensive and specific recommendations for municipalities to implement the twelve strategies shown in Figure 2-3.

Figure 2-3
Twelve Categories of *Watersheds* Strategies for Municipal Implementation

1.	Involving the Public in Watershed Stewardship
2.	Providing Water-Based Recreation and Cultural Resources
3.	Establishing Networks of Forested Riparian Buffers
4.	Using Conservation (Low Impact) Development Designs
5.	Protecting Natural Resources through Land Preservation
6.	Protecting Ground Water Quality
7.	Protecting Sources of Public Drinking Water Supplies
8.	Agricultural and Landscape Management
9.	Reducing Stormwater and Flooding Impacts
10.	Natural Stream Restoration and Stabilization
11.	Protecting Ground Water Balances and Stream Baseflow
12.	Integrated Water Resources Planning

Watershed Action Plans - *Watershed Action Plans* have been prepared for the following Watersheds: French Creek, Brandywine Creek, Pigeon Creek, Pickering Creek, and the Stony Run. These include 1) a detailed discussion of the watershed characteristics, 2) prioritized management needs and priorities, and 3) management objectives and recommended actions.

Areas of Concern: *Watersheds* and the complementing *Watershed Action Plans* have identified areas within the Region that have flooding concerns. Two areas identified as "regional flooding concerns" include the Lower Branch of the French Creek in Phoenixville Borough and the East Branch of the Brandywine Creek in Downingtown Borough. While these isolated areas bear the brunt of the Region's flooding, addressing these concerns can only be done on a regional basis. A similar approach should be applied to smaller flood-prone areas that cross municipal jurisdiction.

☑ Recommendation For the implementation of Water Resources Plans and Studies

ACTION 2-2 Implement the applicable recommendations of the *Sustainable Watershed Management Plan*, *Watersheds,* and the applicable *Watershed Action Plans*.

Objective(s) addressed by Actions 2-2: 2-B, 2-C, 2-D, 2-E, 2-F, 2-K, and 2-L.

STORMWATER MANAGEMENT

These include 1) a detailed discussion of the watershed characteristics, 2) prioritized management needs and priorities, and 3) management objectives and recommended actions. The goal of BMP's is to employ the most suitable technique or combination of techniques that will best manage the stormwater flow and protect water quality based on an evaluation of site conditions and planning requirements. The implementation of BMP's can address the ten principles of stormwater management:

Ten Principles of Stormwater Management

- Minimize the volume of stormwater runoff generated;
- Define "predevelopment condition" as "woodland, pasture, or meadow condition;"
- Promote infiltration to protect ground water recharge and reduce runoff;
- Protect water quality by removing pollutants prior to discharge to streams;
- Protect instream channels and geomorphology conditions;
- Reduce impacts of development to flood flows;
- Protect adjacent lands from direct stormwater discharge;
- Ensure long-term operation and maintenance of stormwater facilities;
- Establish forested riparian buffer networks; and
- Protect wetlands and floodplains to reduce runoff and flooding.

In general, BMP methods are less intrusive and blend in better with the natural landscape than standardized pipe-and-basin methods and can be implemented through 1) the stormwater management section of the subdivision and land development ordinance or 2) as a stand-alone stormwater ordinance.

Hierarchy of Techniques

Within the stormwater management regulations, a hierarchy of techniques and site design criteria should be established with the most protective techniques at the top of the hierarchy. Techniques at the top of the list emphasize infiltration practices over detention practices. The ordinance should require that an applicant prove that soils and site conditions are not

suitable to accommodate infiltration facilities before the use of traditional detention basins can be considered. BMP facilities are usually implemented in combination for the most effective management of stormwater runoff.

State Stormwater Regulations

The National Pollutant Discharge Elimination System (NPDES) Phase II stormwater regulations recently enacted by the Commonwealth affect seven of the nine municipalities within the Northern Federation as of March 2003 (Warwick and East Nantmeal Townships do not require an MS4 Permit at this time). Originating from the Federal Clean Water Act, these regulations require municipalities to identify and eliminate sources of non-point source pollution to the waters of the Commonwealth, and are primarily focused on pollutants associated with stormwater runoff. Municipalities are required to regulate erosion and sediment control associated with land development, and post-construction stormwater management systems to reduce the discharge of non-point source pollution and stormwater runoff into streams. Municipalities are also required to maintain public education and public involvement programs to increase the use of pollution protection measures by the public, and to establish "good housekeeping" practices on all municipal properties to reduce the impacts of stormwater runoff.

The PA Stormwater Management Act of 1978 (PA Act 167) requires all counties to prepare stormwater management plans for each watershed to address stormwater runoff from development. Each municipality in the watershed must implement the stormwater management criteria developed by these plans within their stormwater ordinances. PA Act 167 plans have not yet been completed for the watersheds within the Northern Federation, although a plan for Valley Creek watershed will be completed in 2008.

Related Plans and Studies:

Model Stormwater Management Ordinance - The Chester County Water Resources Authority (WRA) has developed a model stormwater management ordinance based on the ten principles of stormwater management, as listed above. This model ordinance addresses all components found in an Act 167 stormwater management ordinance. The Model Stormwater Management Ordinance is considered a comprehensive model that can be adapted to meet the needs of any municipality in the county and can simply be downloaded from the WRA website. This Ordinance has been and/or is being considered for adoption by several municipalities in Chester County

☑ Recommendation For Stormwater Management

ACTION 2-3 Implement stormwater management ordinances that include best management practices and design criteria, such as those within the Model Stormwater Management Ordinance developed by the Chester County Water Resources Authority or similarly comprehensive stormwater management regulations.

Objective(s) addressed by Actions 2-3: 2-B, 2-C, 2-D, and 2-E.

EROSION AND SEDIMENTATION CONTROL

In addition to stormwater management, BMP's also accommodate a reduction in soil erosion and sedimentation during and after the construction phase. If they have not already done so, municipalities in the Region should amend their individual subdivision and land development ordinances with provisions that address erosion and sedimentation control. See CCCD discussion below.

Chester County Conservation District Reviews

The Chester County Conservation District (CCCD) provides a review service for any project that disturbs one or more acres of land during the life of the subdivision or land development. In order to further protect against soil erosion and sedimentation, however, municipalities can enter into a memorandum of understanding with the Conservation District that enables them to review erosion and sedimentation controls proposed on smaller development sites. The Conservation District can also review municipal erosion and sedimentation standards to ensure they are comprehensive.

☑ Recommendations for Erosion and Sedimentation Control

The actions that follow are in sequential order:

ACTION 2-4 Establish a partnership with the CCCD and take advantage of the review service offered by the District.

ACTION 2-5 Review and revise, as necessary, soil erosion and sedimentation regulations to bring it into compliance with CCCD recommendations and/or standards.

Objective(s) addressed by Actions 2- 4 and 2-5: 2-A, 2-C, 2-D, 2-E, and 2-G.

IMPERVIOUS COVERAGE

Impervious coverage refers to areas or structures that restrict the infiltration of stormwater. For example, an asphalt driveway or swimming pool restricts the infiltration of stormwater promoting additional runoff while a garden or wildflower meadow slows stormwater runoff while accommodating infiltration to groundwater. See Figure 2-4. The percentage of impervious coverage permitted for specific uses (residential, commercial, institutional, or industrial) should be limited to the amount necessary to accommodate facilities such as driveways, primary structures, and accessory structures in order to avoid unnecessary additional impervious surfaces.

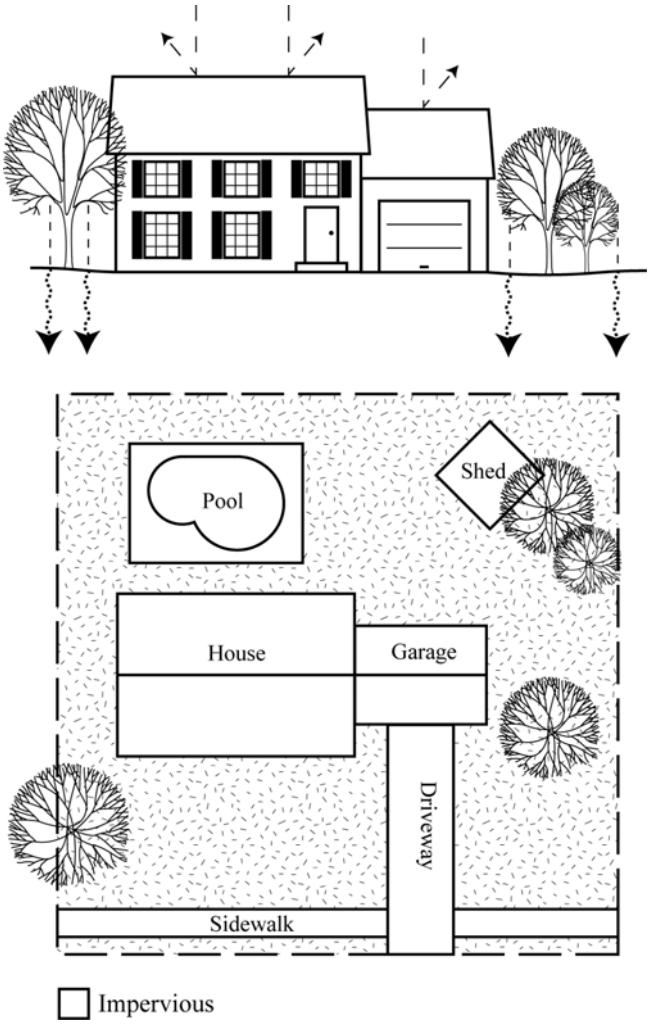
Porous Paving Options

The use of porous paving facilities can further reduce the need for additional impervious surfaces. There are two forms of porous or pervious paving:

1) A permeable paving material, comprised of an arrangement of interlocking, prefabricated, perforated blocks, laid on a soil base and providing a stable pervious surface for low-volume vehicular use. Therefore, it can be utilized in overflow parking situations, areas requiring only emergency access, and driveways.
2) Porous pavement, which is a type of pavement that looks and performs similarly to standard asphalt or concrete, allows rain and snowmelt to pass thru it reducing runoff from the site and surrounding area. Porous pavement can and has been used in parking

areas and other low speed vehicular facilities such as driveways. Keep in mind, unlike standard asphalt or other impervious paving materials, porous pavement requires regular maintenance to ensure that the porosity of the paving material has not been damaged or in any way compromised by pollutants or debris associated with vehicular facilities.

Figure 2-4
Examples of Impervious Coverage



☑ Recommendations for the Reduction of Impervious Coverage

ACTION 2-6 Review and amend impervious surface percentages in each municipal zoning ordinance, as necessary, to reduce the amount of impervious surfaces while increasing the amount of infiltration area associated with subdivision and land development in all zoning districts.

ACTION 2-7 Review and amend requirements in municipal ordinances to allow the use of porous paving in certain applications to promote the use of this alternative to standard asphalt paving.

Objective(s) addressed by Actions 2- 6 and 2-7: 2-A, 2-B, 2-D, 2-G, and 2-L.

WOODLANDS PROTECTION

Woodlands and other vegetation provide protective ground cover and stability for soils on steep slopes and contribute to stream water quality. Canopies of trees also play an important role in reducing the amount and intensity of rainfall, providing shade, and reducing the impacts of temperature extremes. Woodlands also serve as buffers from the wind, visual infringements, and noise while also providing scenic quality and retaining and/or increasing land value.

Native and Invasive Plant Species

As is the case in much of the Northeast, the edges and interior of woodlands are being overrun by invasive, introduced plant species. Characteristics of these invasive plants include a rapid growth rate, adaptability, high reproduction rate, and a lack of control mechanisms in the local environment. Species including the Norway Maple, Multiflora Rose, Autumn Olive, Oriental Bittersweet, Japanese Honeysuckle, and Mile-a-Minute Weed are overrunning the native species and becoming a dominant species throughout the county and Region. While they provide cover and food for some wildlife, introduced invasive species have displaced much of the native vegetation, resulting in a reduction of plant and wildlife (natural) diversity.

Invasive plant species impair forest regeneration by creating such dense masses that native tree species will not grow or their growth is impeded. An example is the Multiflora Rose, especially where it grows along streams, because it is an unsuitable food source for local wildlife and limits the amount of suitable detritus (plant debris) reaching the stream. Overall, invasive plant growth can impede the lifespan of a woodland by actually decreasing the capacity of the woodland to regenerate itself.

The use of native plants provides several benefits over invasive species including their adaptation to local climate and promotion of natural diversity. Landscaping and street tree regulations adopted by the Region's municipalities should promote and/or require the use of native species. A list of acceptable plants should be included in municipal ordinances. Further, these ordinances should prohibit the use of invasive vegetation and include a list of invasive species to accommodate the identification of these species. Finally, the Region should provide residents with a list of native plant species and invasive plant species and encourage the use of the former when choosing these plants for residential landscaping applications. See Appendix D: Recommended Plant Lists.

Plant Characteristics

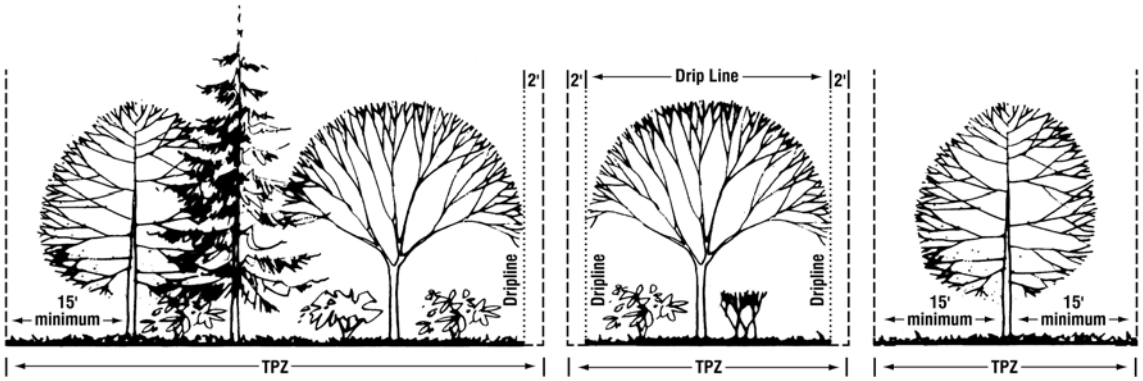
One of the most important things to consider when choosing a plant species for a specific use is the plant's characteristics. These characteristics include growth habit, height and width at maturity, light sensitivity and/or requirements, and soil requirements. For example, certain plant species are appropriate for use as street or parking area trees because they are tolerant to salt-spray, soil compaction, pollution, and other typical urban or vehicular conditions. In addition, plant species to be used for specific applications may require special handling while being raised as nursery stock such as pruning to allow pedestrian circulation along a sidewalk.

Groups of plant materials that should be considered include: medium and large canopy trees; medium and large street/urban trees; evergreen trees, deciduous shrubs; evergreen shrubs; and wetlands and riparian forest buffer species. Further, plant lists should be revised to require the use of a variety of plant species in order to limit the impacts of monoculture in the local plant community.

Tree Protection Zone (TPZ)

An important consideration in the protection of woodlands and specimen trees is the implementation of measures to ensure that the trees identified for preservation are not damaged during the construction phase. To accomplish this, a tree protection zone or similar designation (generally encompassing the drip line of the trees) should be delineated on both the site plan and on the ground through the use of colored tape or fencing. Encroachment of heavy equipment into this area shall be prohibited. Without these additional protection measures, many of those trees which were to be preserved are not likely to survive the construction phase.

Figure 2-5
Tree Protection Zone (TPZ)



Although specific criteria should be set forth in each individual municipal ordinance, the following is a general guideline: The TPZ shall be fifteen feet from the trunk of the tree to be retained, or the distance from the trunk to the drip line, whichever is greater. Where there is a group of trees or woodlands, the TPZ shall be the aggregate of the protection zones for the individual trees. See Figure 2-5.

☑ Recommendations for preserving vegetation and woodlands, promoting the use of native plant species, and prohibiting the use of invasive species

ACTION 2-8 Review and revise plant lists in municipal ordinances to identify and promote the use of a diversity of native plant species and prohibit the use of invasive plant species.

ACTION 2-9 Review and revise plant lists in municipal ordinances in order to specify groups of plants that are appropriate or adaptable to specific planting situations.

ACTION 2-10 Review and consider the implementation of recommendations that address the protection of the Hopewell Big Woods and Pennsylvania Highlands.

ACTION 2-11 Revise the development and design standards section in each municipal subdivision and land development ordinance to include Tree Protection Zone specifications. In addition, any Tree Protection Zones should be identified on the conservation plan that is required with the submittal of a preliminary plan. See Figure 2-5.

Objective(s) addressed by Actions 2-8 thru 2-11: 2-B, 2-C, 2-G, 2-H, and 2-I.

WILDLIFE HABITAT/NATURAL DIVERSITY

Providing connected high quality resource and habitat areas that are large enough to sustain a variety of wildlife and plant species is needed to maintain natural diversity. Natural diversity is the total variety and variability of living organisms and the ecological habitats in which they occur. Implementing and enforcing consistent protection standards for a broad range of natural resources throughout the Region will help to preserve many of these important habitats. See ACTION 2-1.

Habitat pertains to a Region or area where a plant or animal naturally grows or lives. There are several major habitats found in this general area of Chester County and they include: streams and wetlands, wooded stream corridors, woodlands, open lands, and hedgerows. The importance of these habitats to natural diversity is discussed in detail in Chapter 7: Natural Resources Inventory.

By allowing conservation development as an option in the zoning ordinance, the integrity of larger areas of habitat can be maintained. The implementation of a Transfer of Development Rights program, while more steps are required, is another option for preserving large areas of open space. The ordinance measures, in combination with the other open space protection measures discussed in this Plan, should facilitate the maintenance and protect the integrity of diverse natural habitats.

☑ Recommendation for maintenance of Wildlife Habitat and Natural Diversity

See ACTION 2-1.

OPEN SPACE/WILDLIFE CORRIDORS/GREENWAYS

In response to the growth that has occurred in the Region, municipalities, private organizations, and state and county governments have established areas of protected open space such as parks, easements, greenways, and nature preserves. Unfortunately, too many of these protected lands are configured as isolated parcels surrounded by land that is either developed, or has the potential to be developed (based on municipal land use plans and zoning map designations). The key to reducing the isolation of open space areas is to link those areas into an integrated regional network.

Open Space Network

In an open space network, protected open spaces are linked together by greenways or trails. Linking open space facilities increases the recreation potential of each individual open space facility and can reduce reliance on the automobile.

An open space network also includes nature preserves and wilderness areas linked together by wildlife corridors. These corridors allow animal populations to roam as they do under natural or undisturbed conditions. Of course, wildlife is not restricted only to wildlife corridors. As a result, an open space network serves two functions: it provides for human recreation and connection, and wildlife migration.

Related Plans and Studies:

Linking Landscapes: A Plan for the Protected Open Space network in Chester County, PA. Chester County Planning Commission, 2002.

Open Space Planning: A Guide for Municipalities. Chester County Planning Commission, 2005.

☑ Recommendations for the Establishment of Open Space/Wildlife Corridors/Greenways

The actions that follow are in sequential order:

ACTION 2-12 Review municipal open space resources maps and develop a map of public and private open space resources in the Region in order to identify where connection of these resources by open space/wildlife corridors/greenways is possible.

ACTION 2-13 Revise municipal land use plans and zoning regulations to promote and/or require the implementation of open space/wildlife corridors/greenways through the development process and/or municipal acquisition.

Objective(s) addressed by Actions 2-12 thru 2-13: 2-I and 2-J.

LAND USE MEASURES

There are several planning tools that address natural resource protection on an area-wide basis from a land use perspective and they include:

- Directing growth to the most appropriate areas;
- Conservation development;
- Net-out of Natural Resources;
- Transfer of Development Rights; and
- Agricultural Zoning.

DIRECTING GROWTH TO THE MOST APPROPRIATE AREAS

To protect those areas with sensitive natural resources (identified in Chapter 7) municipal plans and ordinances should direct future growth away from resource protection areas. In addition, plans should set policy for infrastructure in areas considered most appropriate for future development and avoid extensions into other areas designated for resource protection.

Related Plans:

Landscapes: Managing Change in Chester County – prepared by the Chester County Planning Commission. ***Landscapes*** encourages the establishment of growth boundaries in order to direct growth to the most appropriate areas. The Livable Landscapes map identifies six Landscapes: Natural, Rural, Rural Center, Urban, Suburban, and Suburban Center. The Plan provides guidelines for land uses in each of these categories while permitting the local municipality to establish specific design standards for their community, such as density of uses.

Regional Land Use Plan – prepared by the Federation of Northern Chester County Communities with assistance from the Chester County Planning Commission. The Plan includes an extensive inventory and analysis of land use trends and municipal and regional planning recommendations including resolution of municipal border conflicts and land use planning coordination.

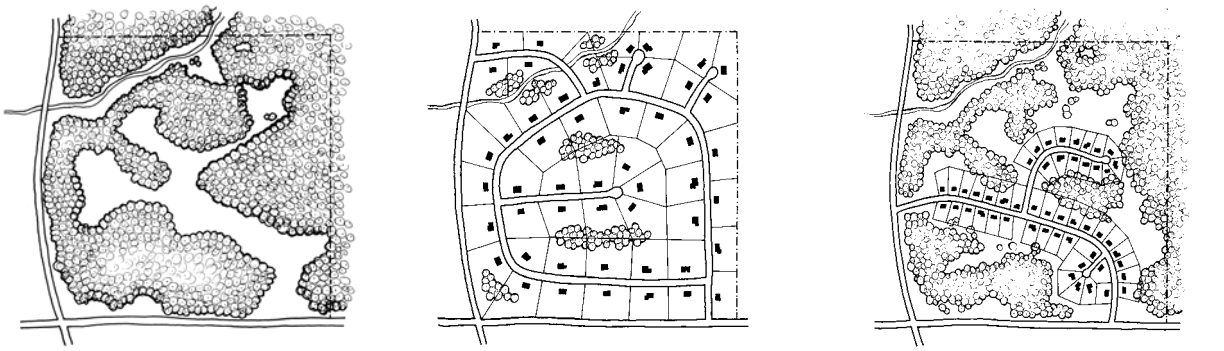
CONSERVATION DEVELOPMENT

Conservation development provides a means of both preserving open space and allowing development to be directed away from natural resources on the site and should be promoted. Figure 2-6 is an illustration of a conservation development (image to the left) and the conventional treatment of the same lot (middle image). Depending on the type of facility options available and the district in which the subdivision is located, up to 75% open space can be required. In other words, on a parcel of 100 acres at least 75 acres would be preserved in permanent open space after the development is completed. Uses permitted in open space can include natural and historic resources, recreational facilities, as well as existing agricultural uses. In any case, a minimum of 50% open space retention should be required. Please refer to the implementation options listed below.

Lower Base Density for Conventional Development

Keep or even lower the base density for conventional subdivisions, while allowing a higher density for conservation subdivision. This offers a significant incentive for choosing the conservation development option over conventional subdivisions. Allowing a higher gross density through the conservation option could also increase the percentage of open space that would be retained.

Figure 2-6
Conservation and Conventional Development



EXISTING CONDITIONS | CONVENTIONAL DEVELOPMENT | CONSERVATION DEVELOPMENT

Allow Conservation Development By-Right versus Conditional Use

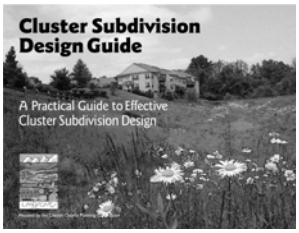
Allow conservation development as a by-right use, but also require conventional subdivisions to go through the conditional use or special exception approval process. Townships have taken this approach to the next level and permit conservation subdivisions as the only option for larger parcels (20, 30, or 40 acres) in certain zoning districts.

Density-Neutral

As concerns about the maintenance of community systems increase, a number of municipalities have considered a density–neutral conservation development option. This option results in a reduction of the actual percentage of open space preserved while reducing the need for the municipality entering into an agreement for a community sewage system.

Additional Provisions

Cluster Subdivision Design Guide – prepared by the Chester County Planning Commission. This design guide includes discussion and photographs of positive design elements that have been used in outstanding conservation developments in Chester County and sample ordinance language for the implementation of these elements. The following provisions are included in the Design Guide and should be considered:



1. "Minimize intrusion upon public and private views, on and off the site. To the maximum extent possible, the open space shall be configured so that the view of the built portion of the proposed subdivision form the public roads is minimized. The post-development view of the site from the road should be as similar to the pre-development view as possible."
2. Maximize the conservation of site features identified in the open space plan as having environmental, scenic, historical or recreational value.
3. "Preserve agricultural uses and Class I, II, and III agricultural soils as defined by the U.S. Department of Agriculture."
4. In areas designated as open space, include woodlands, meadows, watercourses, floodplains, wetlands, steep slopes or similar conservation areas or wildlife habitat maintained in its natural state.
5. "Easements for drainage, access, sewer or water lines, wells and underground utility rights-of-way. Above ground utility or street rights-of-way may traverse the open space but shall not count towards the minimum required open space."
6. Include limits on constrains in the open space and limitations on size and shape of open space.

The following Federation municipalities currently allow for a conservation development option: East Nantmeal, East Pikeland, East Vincent, North and South Coventry, Wallace, Warwick, and West Vincent.

☑ Recommendations for Conservation Development

ACTION 2-14 Review the Chester County Planning Commission's *Cluster Subdivision Design Guide, A Practical Guide to Effective Cluster Subdivision Design* (2003) for examples of good conservation development subdivision design throughout the county and model ordinance language.

ACTION 2-15 Determine if the municipality is achieving the desired type of conservation development design. If not, update ordinance language and communicate desired strategies to developers to get the preferred outcome.

Objective(s) addressed by Actions 2-14 and 2-15: 2-A, 2-B, 2-C, 2-G, 2-H, and 2-J.

NET OUT OF NATURAL RESOURCES

In order to preserve valuable primary natural resources such as floodplains, wetlands, and steep slopes consideration should be given to requiring a "net-out" of these and other natural resources. A net-out provision is implemented through the zoning ordinance and essentially excludes these resources from the parcel or tract area prior to the density calculation in a given zoning district. Therefore, the disturbance of natural resources is minimized by removing them

from the density calculation altogether. For example, if an applicant's 100-acre property contained ten acres of steep slopes and five acres of floodplain and wetlands, their density calculation would be based on 85 acres or the area free of natural constraints.

Primary resources such as floodplains, steep slopes, and wetlands are commonly netted out of the calculation in their entirety. Secondary resources such as prime agricultural soils and woodlands can be netted out based on a percentage of the existing resource. For example, woodlands or prime agricultural soils can be netted out based on 50% of the existing resource. If, on a given parcel or tract, there were six acres of existing woodland and ten acres of prime agricultural soils, a total of eight acres would be netted out prior to the density calculation discussed above.

☑ Recommendations for Net-out of Natural Resources

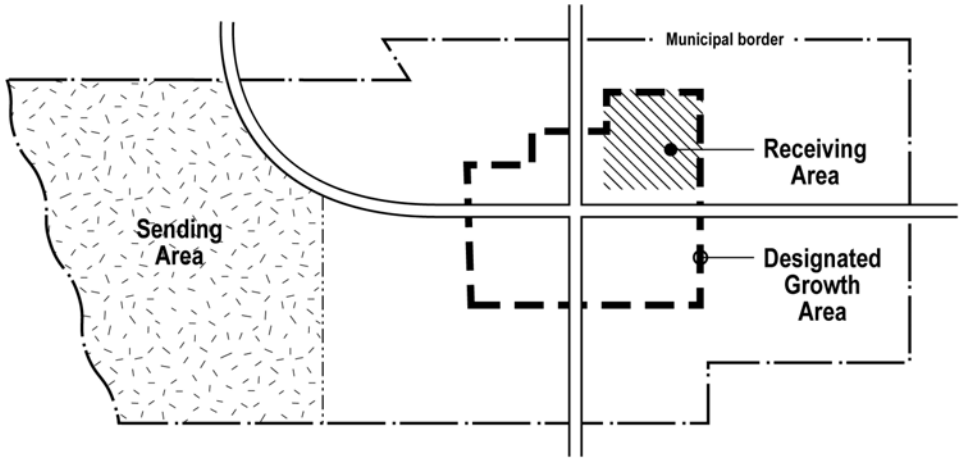
ACTION 2-16 Review and revise and/or establish net-out provisions to enhance protection and preservation of natural resources.

Objective(s) addressed by Action 2-16: 2-A, 2-B, 2-C, 2-G, and 2-H

TRANSFER OF DEVELOPMENT RIGHTS (TDR)

Transfer of Development Rights (TDR) is a way of preserving open space, natural resources, historic resources, and farmland in the Region. A TDR program, although implemented through the zoning ordinance, is optional and depends on voluntary use by private landowners for its success. The TDR technique directs growth to preferred locations in the area through the sale and purchase of development rights. Areas targeted for preservation become the "sending areas" for the development rights and those areas designated as appropriate for growth are the "receiving areas." See Figure 2-7. The owners of the sending areas can sell their development rights to owners of the receiving areas who are provided with a development density bonus. This density bonus provides the incentive to purchase the development rights. The TDR option offers one of the most equitable systems for preserving open space and agricultural lands by compensating the owner of the preserved land, while guiding the growth towards development centers. The price of the development rights is determined by a willing buyer and a willing seller under fair market conditions.

Figure 2-7
Transfer of Development Rights



The establishment and success of the TDR program would require a considerable commitment on the part of each municipality and the Region as a whole. The development of a regional comprehensive plan creates a larger potential area for the development of such a program. It should also be noted that the townships themselves can acquire development rights and either retire the rights or sell them to a willing buyer in established receiving areas. This option is useful if an important piece of land is available for sale and there are no immediate buyers for the development rights. If the township wishes to purchase such development rights, consideration must be given to how such a purchase would be funded. A local land trust can also act as a bank for the purchased development rights.

Minimum Considerations for Transfer of Development Rights Program:

1. Municipal personnel to manage the TDR program.
2. Appropriately designated land areas for both receiving and sending areas.

The following municipalities currently allow for transfer of development rights: East Nantmeal, East Pikeland, East Vincent, South Coventry, and West Vincent.

☑ Recommendation for a Transfer of Development Rights Program

ACTION 2-17 Determine if TDR is an appropriate mechanism for the municipality to protect natural, scenic, and agricultural resources. If it is, adopt regulatory language, or for those municipalities that already permit TDR, review ordinance language and revise as necessary to promote implementation.

Objective(s) addressed by Actions 2-17: 2-A, 2-B, 2-C, 2-G, and 2-H

EFFECTIVE AGRICULTURAL ZONING

See Chapter 6: Agricultural Resources Plan and ACTIONS 6-21 thru 6-23

PRIVATE CONSERVATION

In addition to municipal land trusts, the Brandywine Conservancy, the Natural Lands Trust, the French and Pickering Creek Conservation Trust, and the Nature Conservancy, are private conservation organizations in the area that accept conservation easement donations. Representatives meet quarterly as part of the Chester County 2020 initiative. Education and discussion with landowners on the benefits of using the land trusts is important to the success of these efforts. In addition to providing information on local land trusts, the Region could assemble and distribute information on other options for landowners who wish to preserve open space.

Related Guidebook:
Taking Control of Your Land: A Land Stewardship Guidebook for Landowners – prepared by the Chester County Planning Commission. This guidebook provides options that a landowner can use to decide what is best for their property, while protecting the landscapes of the Region and county.

☑ Recommendation for the preservation of open space through private conservation measures

Action 2-18 Promote coordination and communication between the Region's existing land trusts. Information on the full range of options that landowners' have for preserving open space could be distributed by the Region and its municipalities.

See Action 1-3

Objective(s) addressed by Action 2-18: 2-B, 2-C, 2-G, 2-H, 2-I, 2-J, and 2-K.

CONCLUSION

The Region should develop consistent ordinance standards for resource protection to be adopted by each municipality. The protection of natural resources is one area where the Region can successfully implement its policies on a municipality-by-municipality basis without necessarily adopting a regional zoning ordinance. By adopting the same levels of natural resource protection and stormwater management control measures, these resources can effectively be protected on a regional basis. In many cases, resource protection measures have already been adopted by an individual municipality in the Region and these could provide the basis for the regional protection standards.

A complete summary of natural resources recommendations is located in Chapter 1: Coordination and Implementation Plan. The numbers next to each recommendation above correspond to those in the Implementation Plan.

Figure Sources:

2-1 Chester County Planning Commission, 2004.

2-2 Municipal Ordinances, Chester County Planning Commission, 2004

2-3 *Watersheds. An Integrated Water Resources Plan for Chester County, Pennsylvania and its Watersheds*. Chester County Water Resources Authority, 2002.

2-4 Chester County Planning Commission, 2005.

2-5 Chester County Planning Commission, 2004.

2-6 *Cluster Subdivision Design Guide*. Chester County Planning Commission. West Chester, Pennsylvania, 2003.

2-7 Chester County Planning Commission, 2005.