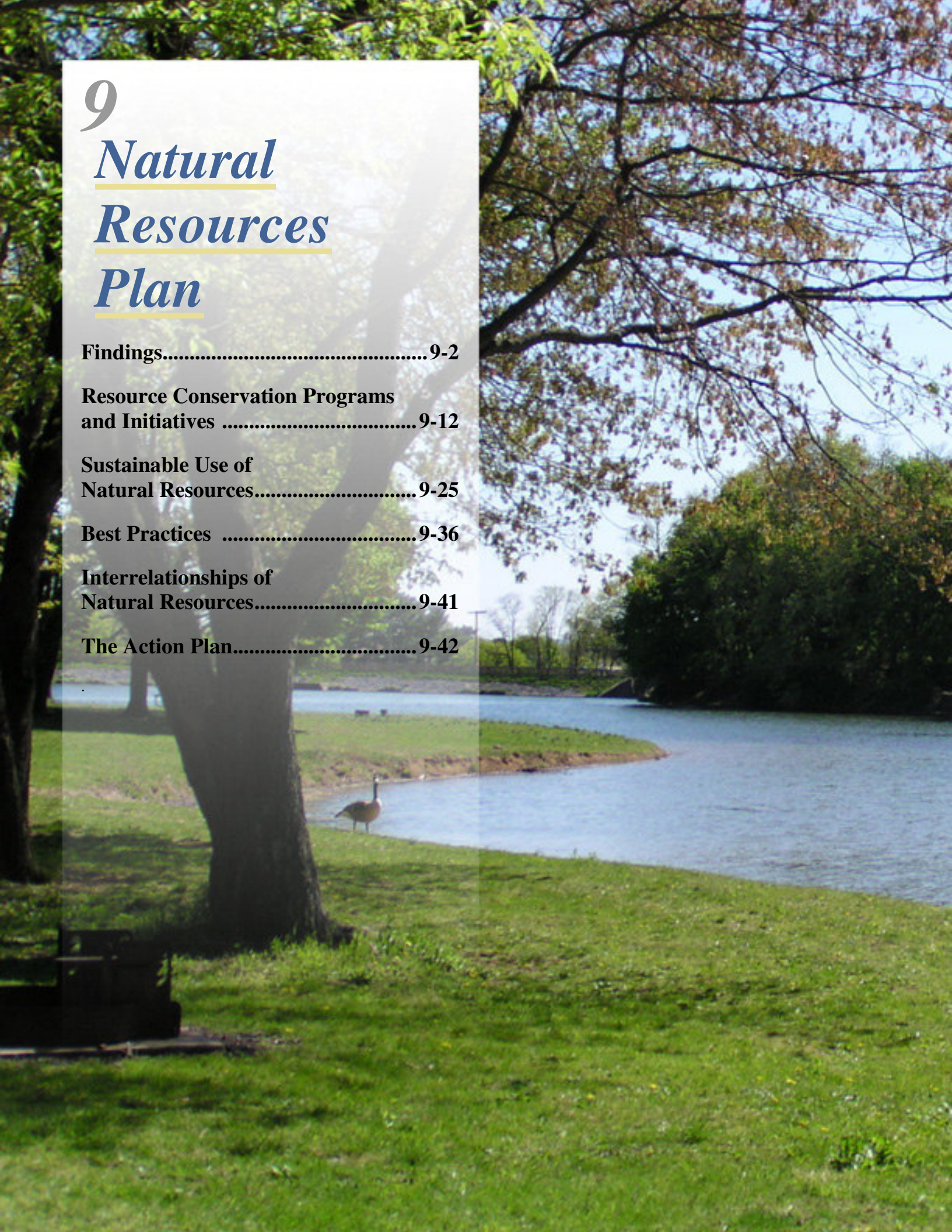


9 Natural Resources Plan

Land, water, minerals, vegetation and wildlife resources are dispersed throughout Lebanon County. The majority of lands in the county possess one or more natural attributes worthy of consideration in future community development and conservation planning. Each resource has a unique pattern to its distribution, and could be considered independently. Yet these resources interact with one another and their patterns overlap, creating the unique landscapes and ecology found within Lebanon County. As interrelated systems, they require more careful consideration of the impacts of resource use and management.

The purpose of this plan is to help local, regional, and state government officials and decision-makers, developers, and citizens make informed planning decisions regarding the protection of these resources. Sensitive environmental resources are inventoried in the *Natural Resources Profile* (Background Study #6). The profile also characterizes threats to resource existence and function and identifies protection techniques used by the county and its municipalities. Based on specific resource needs for further protection, this plan recommends preservation, protection, and/or management.

The major sections of the Natural Resources Plan: (1) summarize the significant natural resource features, threats, protection techniques, and recommendations from the profile and other resource investigations; (2) highlight the additional analysis needs for agriculture, forestry, water resources, and sensitive environmental features; (3) offer best practices for resource conservation and management; (4) convey the interrelationships of natural resources with other elements of the Comprehensive Plan; and (5) present an Action Plan that identifies a variety of actions for the county and its partners to undertake to balance environmental and economic values of Lebanon County.

MPC Requirement: *A plan for the protection of natural and historic resources to the extent the municipalities are not limited by other federal or state statutes, these resources include, wetlands, aquifer recharge zones, woodlands, steep slopes, prime agricultural land, flood plain, unique natural areas and historic sites.*

MPC Article III, Section 301(a)(6)

Overview Findings from the Natural Resources Profile and Other Resource Studies

In preparation for the development of this Natural Resources Plan, a detailed natural resources profile inventorying the natural resource features found within or having an influence on Lebanon County was prepared. The following are key findings from the profile. These findings characterize the vast array of resources, their condition, potential threats to the resources and resulting impacts.

Findings from the Profile

Significant Resource Assets

The natural landscape of south central Pennsylvania defines the character of Lebanon County. Its abundant water supplies, fertile valley, and forested mountains are assets that contribute to the community. They support the economy, create recreational opportunities, contribute to environmental quality, and provide an attractive place to live.

Climate

- Lebanon County enjoys a humid continental climate with average precipitation of 44 inches per year. Average temperatures range from 20 degrees Fahrenheit in winter to 90 degrees Fahrenheit in summer.

Topography

- Lebanon County contains a fertile valley bordered by east-west trending mountain ridges to the north and hills and ridges to the south.
- Over 9,200 acres, 4% of the county's slopes, are steep slopes (> 25 percent). These are primarily located along the ridges in the northernmost part of the county. Another 23,300 acres, 10% of the county's slopes, are precautionary steep slopes (15 to 25 percent). These are found in the southern hills and valley uplands.
- All but six municipalities with significant precautionary and steep slopes have municipal regulations managing the impact of development on these features; Bethel, Cold Spring, North Londonderry, North Annville, and South Annville Townships and Mt. Gretna Borough lack protection for these sensitive areas.
- Existing steep slope provisions include a restriction on the removal of total vegetative cover that relates to the percentage of the lot which may be developed; larger minimum lot sizes; and submission of an Erosion and Sedimentation Control Plan to the Lebanon County Conservation District on lots with slopes in excess of a certain percentage. These provisions can serve as models for those areas in Lebanon County without steep slope provisions.

Physiography and Geology

- The geology that underlies most of Lebanon County includes coal, limestone, dolomite, sandstone, shale, quartzite, and phyllite materials. Additionally, gneiss, granite, anthracite, metadiabase, metabasalt,

metarhyolite, and marble from the older formations are found in the extreme southeast region of the county.

- These formations have a direct impact on land suitability for development and mineral extraction. More than 2,000 acres of land are actively mined or quarried for non-industrial minerals and yield an average annual value of over $5 million. Limestone accounts for approximately 98% of this extraction activity.
- The Lebanon Valley is largely comprised of limestone and dolomite carbonate rock formations totaling over 73,700 acres or 31% of the county.

Water Resources

- Water is needed for both consumptive and non-consumptive uses. Consumptive uses, such as crop irrigation, livestock watering, human water supply, as well as natural evaporation diminish the amount of source water by diversion or withdrawal and/or make water unavailable for other uses. Non-consumptive uses, such as recreational water bodies, fish hatcheries, and hydroelectric dams, can sustain the amount of source water by avoiding water diversions or through withdrawal and return.
- A water budget is the total amount of precipitation, stream flow, evapotranspiration and groundwater in a specified area, typically a watershed. The water budget categories water inflows (precipitation), water outflows (stream flow and evapotranspiration and consumptive uses) and water storage (groundwater). A drought results when outflows exceed inflows and storage.
- Two principal types of aquifers are located in Lebanon County. Sandstone and shale aquifers lie beneath the northern and southern ridges. The carbonate rock aquifers traverse the middle portion of the county in an east-west direction.
- The carbonate aquifer system is the primary source of groundwater supply and reliance on groundwater resources for water supply has grown. In Lebanon County, groundwater supplied 77% of the 29.55 million gallons of water used each day for public supply, domestic wells, commercial, agriculture (irrigation and livestock), industrial, mining, and wastewater treatment in 1990. By 2000, groundwater supplied 98% of the 49.01 million gallons used each day for public supply**,** agriculture**,** and industrial water use; however, water use from domestic wells and commercial users was not reported by counties in

Pennsylvania. Preliminary water use estimates for 2005 indicate that 86% of 8.57 million gallon water supply for public supply, domestic, commercial, agriculture, thermoelectric power (cooling) and industrial uses came from groundwater; however, mining, the largest water user at 31.5 million gallon in 2000, was not reported for 2005.[1] The availability and quality of groundwater will be important to the continued health and growth of the county.

- The Pennsylvania Department of Environmental Protection has classified eight Special Protection Waters in Lebanon County. The water quality of these two Exceptional Value (EV) and six High Quality (HQ) surface waters exceeds Pennsylvania's water quality criteria. EV waters compromise only 2% of Pennsylvania's water bodies and may be of exceptional ecological or recreational significance. The Evening Branch and Fishing Creek tributaries of Mill Creek and Segloch Run are the two EV waters in the county. Cocalico Creek, Furnace Creek, Hammer Creek, Shearers Creek, Stony Creek, and Monroe Creek from its source to tailwaters of Lake Strause are the HQ waters in the county.

- The Pennsylvania Department of Environmental Protection identified water quality and habitat impairments to 37 different streams in Lebanon County. Impairments are caused by abandoned mine drainage, agricultural management practices, and road and urban runoff.

- Twenty-two (22) municipalities in the county have floodplain regulations which meet or exceed those required by the National Flood Insurance Program (NFIP); three (3) have had special conversions (no defined floodplain) by FEMA. Cold Spring Township is the only municipality in the county which does not participate in the NFIP. In Lebanon County, the Planning Department has been instrumental in developing model regulations and assisting communities to adopt floodplain management regulations which meet NFIP guidelines. Municipalities in the county participating in the NFIP have also adopted the Lebanon County Floodproofing Building Code. This code institutes floodproofing measures, restricts substantial improvements to existing structures, and prohibits new development from occurring in flood prone areas. The success of Lebanon County's floodplain management program is evidenced in the fact that the county has not experienced significant flood damage as a result of recent flood events.

[1] Estimates of Water Use in the United States 1990 and 2000 county datasets, U.S. Geological Survey, www.usgs.gov.

- Of the eight designated watersheds in Lebanon County, only the Tulpehocken Creek and Cocalico Creek watersheds have approved Act 167 Stormwater Management Plans, as required by the Stormwater Management Act (Act 167).

Watersheds in Lebanon County
- Cocalico Creek
- Conewago Creek
- Little Chiques Creek
- Quittapahilla Creek
- Tulpehocken Creek
- Swatara Creek (including the Indiantown Run, Little Swatara Manada Creek, Mill Creek and Trout Run subwatersheds)
- Spring Creek
- Stony Creek
- Clark's Creek (not designated for Lebanon County)

Soils Suitability for Agriculture and Development

- Approximately 133,000 acres or 57% of the county's soils are classified as having the necessary qualities to sustain farming activities under modern farm management practices. The majority of these soils, found in 37% of the county, are considered to be prime farmland soils and are located in a contiguous band along and just south of the US 422 corridor; farmland soils of statewide importance comprise the balance of farmland soils, cover 20% of the county and are found predominantly in the valley uplands just north of the US 422 corridor.
- Land use data from March 2006 indicated that approximately 100,000 acres, 42.7% of the county, is actively farmed. This figure represents lands used for agricultural production activities; it does not include homesteads, woodlands, drives and lanes, and other lands used for non-agricultural activities, though they may occur on farm property. Other sources such as the 2005/2006 Pennsylvania Agricultural Statistics Bulletin suggest that lands used and associated with farms in the county may be as high as 130,000 acres; while methodologies for farmland classification often vary, this higher figure may also suggest that farmers are utilizing marginal soils in their agricultural operations.
- Undoubtedly, some quality farmland soils have been developed for intensive community uses. Based on an analysis of the locations of farmland soils and the developed portions of the county, this figure is estimated at 32,646 acres, leaving roughly 100,000 acres of farmland quality soils available to the farming industry.
- Farmland conservation in Lebanon County occurs in the form of Agricultural Security Areas (ASA) and farmland preservation in Agricultural Easements. Agricultural security areas constitute 57,204 acres or 24% of the county as of January 2007; an increase of over 3600 acres since completion of the *Natural Resources Profile* in 2006. ASAs have been established in all but one township, Union Township, where agriculture is a

significant land use. As of June 2006, 10,996 acres or 4.7% of the county has been preserved as farmland.

- All but three municipalities with significant agricultural soils have municipal regulations managing the impact of development on these soils. North Annville, North Londonderry, and Union Townships lack protection for this sensitive resource.

- The two techniques predominately used to manage land use in support of agriculture within the county are large lot zoning and residential density control zoning (sliding scale zoning).
- Over 61,200 acres or 26% of the county contain soils with hydric components or inclusions. Since hydric soils are one of the decisive indicators of wetlands, their locations suggest potential wetlands. Onsite investigation is recommended for site development planning to determine the actual field presence or absence of hydric soils, soils with inclusions, and/or wetlands. Precautions should be taken to avoid, or if necessary to mitigate, disturbance of wetlands.
- The National Wetlands Inventory has identified 1,082 acres of forested wetlands and 685 acres of nonforested or emergent wetlands in the county.

Woodlands

- Forests cover approximately 34% of Lebanon County. The vast majority of forest lands are deciduous, though coniferous, mixed deciduous-coniferous, and wooded wetlands can be found.
- The Blue Mountain-Kittatinny Ridge is a globally-significant fall migration flyway, containing high quality interior-forest habitat that spans the county's northern border.
- The Highlands are a chain of hills and ridges with large unbroken tracts of forest stands that stretch across Pennsylvania, New York, New Jersey and Connecticut and span the southern region of the county. The Highlands are home to over 100 plants and almost 50 animals listed on the federal and state endangered, threatened, or species of concern inventory lists.

- Large public woodland areas in Lebanon County include: Middle Creek Wildlife Management Area, Stoever's Dam Park, and Clarence Schock Memorial Park at Governor Dick as well as Memorial Lake State Park, Swatara State Park and numerous state game land tracts.
- The only forest land preservation program being used in Lebanon County is the Forest Legacy Program (FLP), a federal and state partnership. The Lebanon County Conservancy is the designated local sponsor for applicants to the program. Only one landowner has applied to the program. Due to the nationwide competition for this very limited funding, the applicant was not approved. Parcels adjacent to preserved lands in the Highlands Region seem to have the best chance of receiving FLP funds.

Wildlife

- Lebanon County is home to 32 natural heritage sites of statewide importance. These sites support species of special concern, or have exemplary natural communities. The three most important sites in the county are the Fort Indiantown Gap Macrosite, the Indiantown Run Woods, and the Walnut Run Watershed (a subwatershed of Cocalico Creek), State Game Lands #156.
- There are 8 natural heritage sites of significance to local biological diversity in Lebanon County. The most important of these sites are Dogtown Wetlands, Lake Conewago, Swatara Creek at Route 78, Evening Branch Wetlands, and Swatara Floodplain and Union Canal.

Model Municipal Regulations for Natural Resource Preservation

- Cornwall Borough has by far the most extensive environmental regulations of the municipalities in Lebanon County. Article 20 of the zoning ordinance, as amended January 14, 2002, creates an Environmental Protection Overlay District (EP) to supplement the underlying district provisions with specific natural resources protection provisions.

Threats to Resource Presence or Quality

- Development places a great deal of pressure on the county's open space. The deep and fertile soils of Lebanon Valley with better drainage and less rock material are ideal for agriculture; however, the flatter landscape is also less expensive to develop and therefore more susceptible to development pressures. In the Blue Mountain-Kittatinny Ridge and Highlands regions and other upland areas, stresses include fragmentation and loss of forest cover and habitat.
- Approximately 65%, or 150,736 acres of the county are considered "very limited" for the application of on-lot sewage disposal systems.

Mismanagement of on-lot sewage disposal systems can pose significant threats to groundwater quality from nitrates, bacteria, and wastewater chemicals dumped into septic systems.

- Groundwater is the primary source of water for municipal, domestic, industrial, recreational, and agricultural uses in Lebanon County. As groundwater withdrawals increase to meet growing demands, stakeholders need information on the location and quantity of water resources available, and how to best develop, conserve, and protect them. Removal of groundwater resources faster than the sustainable rate could lead to a growing water deficit, the gradual failure of water supplies, diminishing stream and spring flows, and degraded aquatic and riparian habitat.
- With respect to water supply, the Susquehanna River Basin Commission (SRBC) has identified two potentially stressed areas (PSA) in Lebanon County where existing or projected withdrawals and uses are anticipated to exceed long-term sustainability or cause prevalent conflicts among users: the Spring Creek Watershed and the Fredericksburg area. The Spring Creek Watershed is undergoing rapid commercial, institutional, recreational, industrial, and residential development and virtually 100 percent of the 1-in-10-year drought recharge is already being utilized. Future development and water demand could extend this area eastward along the carbonate valley. In the Fredericksburg area withdrawals by food processors and a public water supplier are concentrated at the downstream end of three small watersheds and utilize essentially all of the 1-in-10-year flow. The proposed development of groundwater resources in the upstream areas to support substantial planned residential development could adversely impact the existing major withdrawals. As the Commonwealth continues efforts for updating the State Water Plan through the Water Resources Planning Act (Act 220), the Spring Creek Watershed and Fredericksburg area may be designated as Critical Water Planning Areas where "existing or future demands exceed or threaten to exceed the safe yield of available water resources." Lebanon County should be prepared to play a more active role in investigating water availability, current and future demands for water, and planning for supply-side and demand-side alternatives to assure an adequate supply of water.
- While not identified by SRBC as a PSA, the carbonate aquifer system of Lebanon Valley is an important source of groundwater to the communities and economy. Growth along this corridor is expected to continue and increased groundwater development is needed to meet the future water demand.

- The carbonate geology of Lebanon County lends itself to sinkholes and land subsidence. Sinkholes, subsidence, and closed topographic features have already developed along Route 422 in the Lebanon Valley. As groundwater withdrawals increase to support a growing population, the level of the water table will decline and the potential for subsidence will increase. Citizens and local officials need to understand how to reduce the risk of subsidence and sinkhole expansion and how to mitigate these conditions when they occur.
- Stormwater infiltration has been successfully demonstrated in carbonate areas when storm water management facilities are located and designed to minimize risk of sinkhole formation. Avoiding concentrated flows and dispersing runoff for infiltration are the recommended procedures.
- These changes to the natural landscape carry direct and indirect consequences for the water resources of the county. Removing the natural filter of the soil layer and vegetation exposes groundwater to contamination. Human activities including mismanagement of on-lot sewage disposal systems, leakage from underground tanks, and intensive land management in karst areas can further threaten groundwater quality. The increase in paved surface area and other impervious surfaces in combination with the application of fertilizers and pesticides increases the biological, chemical and particulate contaminants in surface waters, degrading water quality for aquatic habitat and increases treatment requirements for public water systems. Water shortages due to excessive consumption and drought can threaten supplies just as easily as inadequate recharge due to changes in land use and cover.
- Stream impairments due to urban runoff and storm sewers were identified for 7 streams: Beach Run, Brandywine Creek, Cocalico Creek, Gingrich Run, Quittapahilla Creek, Spring Creek, and Tulpehocken Creek.
- Industrial and municipal point sources caused impairments on Deep Run and Elizabeth Run.

Agricultural Management

- Agricultural sources accounted for nearly 80% or 29 of the impaired streams. Streams are most vulnerable to contamination from agricultural chemicals where poorly drained soils, agricultural practices, and topography

encourage the rapid movement of water off fields, or where tile drains and ditches quickly transport agricultural runoff from fields to streams. Nutrient management plans continue to be developed and implemented to remediate these kinds of impacts.

- Water samples with nitrate levels that exceed the United States Environmental Protection Agency (US EPA) Maximum Containment Level (MCL) standards for drinking water have been found in ground and surface waters associated with carbonate formations. Streams from agricultural areas underlain by limestone bedrock yield higher amounts of nitrate per unit area when compared to streams in areas with other land uses and bedrock types. Manure application rates may be the most important factor influencing nitrate concentrations in streams in agricultural watersheds underlain by limestone.
- According to the United States Geological Survey, it is unclear whether bacteriological contamination of well water is caused by inadequate protection of wells from surface runoff, septic system failure, the application of animal manure to fields, or other causes. The presence of bacteria in water from rural wells is one of the most important water quality issues related to human health for counties located in the Lower Susquehanna River Basin.
- The fish population has been impacted by agricultural activity in the agricultural settings, but the impact is related to habitat degradation rather than nutrients in the water.

Mineral Extraction

- Mineral extraction activities impact the quantity of groundwater as they pump water from the quarry pit to the surface to access deeper mineral seams. These activities are occurring in the valley along the major population corridor.
- Inactive, water-filled quarries provide a direct "pipeline" for pollutants to reach the groundwater.
- Drainage from active and inactive mines in northern Lebanon County caused impairments to the East Branch Rausch Creek, Rausch Creek, and Swatara Creek.

Air Quality

- Currently, six principal pollutants are monitored by regulatory, enforcement and research agencies, including the US Environmental Protection Agency (US EPA) and the Pennsylvania Department of Environmental Protection (DEP). Carbon monoxide, oxides of nitrogen, ground-level ozone, particulate matter and sulfur oxides are monitored for compliance with the Clean Air Act; lead is regulated separately.
- DEP monitors air quality in areas, called air sheds, having high population density, high levels of expected contaminants, or a combination of both factors. For transportation planning and air quality analyses, the Harrisburg and Lebanon urbanized areas share the same air basin or air shed. The Pennsylvania Air Quality Monitoring Annual Reports from 2005 to 2007 indicate improving trends for air quality as it relates to PM2.5; however, the 2005-2007 mean (three year average) for ozone is 81, which is above the new standard of 75 parts per billion.
- In addition, DEP has established additional standards for beryllium, fluorides, and hydrogen sulfide. It also monitors acid rain, mercury content in rain and ragweed pollen for their impacts on the environment and public health.
- In addition to the monitoring of air quality standards and the administration of operating permits for polluting businesses as performed by state and federal agencies, citizens' voluntary actions can help improve air quality in local communities.

Resource Conservation Programs and Initiatives

Federal and state agencies, county and municipal governments, watershed associations, and regional/interstate commissions are actively working in Lebanon County. They have performed studies, provided technical assistance, and organized educational initiatives to improve the public's understanding of natural resources. These agencies and their programs suggest potential resources, program models and partnerships for implementation of the county comprehensive plan.

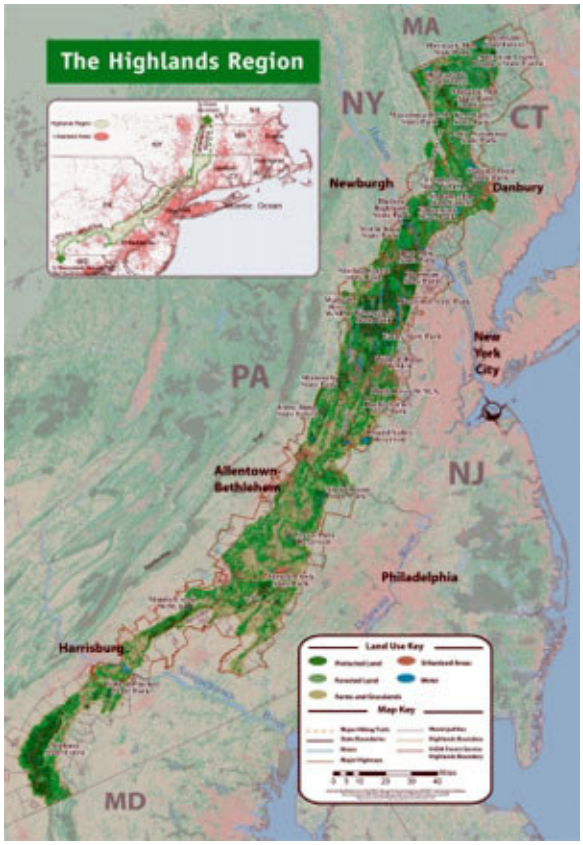
Federal and Interstate Programs and Initiatives

The Highlands

The Highlands are the portion of the Appalachian Mountains from south central Pennsylvania through New Jersey and New York to northwestern Connecticut, forming a vital linkage between the Berkshires and the Blue Ridge Mountains. The region contains ridge after ridge of forested mountains, high quality water bodies, and native wildlife habitat. In addition, the upland region contains major water supply watersheds for nearly 25 million people along the East Coast. Although the Highlands have been recognized as a significant natural resource area by the US Forest Service and by the State of New Jersey, vital open spaces in the Highlands are increasingly being lost to suburban

development. Bold action is needed to protect the critical treasures of the Highlands; the environmental and economic value of this region is in jeopardy.

The Highlands Conservation Act of 2004, H.R. 1964, recognized the national significance of the water, forest, agricultural, wildlife, recreational, and cultural resources of the Highlands region. Its purpose was to assist the States of Connecticut, New Jersey, New York and Pennsylvania in conserving priority land and natural resources in the Highlands region. As an implementation element of the act, the USDA Forest Service completed an inventory and evaluation of natural resources in the Highlands region. Its next study phase will be an analysis of land use patterns and changes over time in comparison to changes in the region's water resources quality and quantity. Additional resource studies and future growth models on these resources are still needed to provide a common understanding of the issues and challenges, and to develop the most promising strategies to conserve resources in a region undergoing rapid and extensive land-use change.



The Highlands region contains 31 critical treasures in Pennsylvania. These critical treasures include the Furnace Hills of Lancaster and Lebanon Counties, which provide habitat for more than 280 species of birds and animals, as well as native plant species. This region is the source of high quality waters for both aquatic resources and water supply in southern Lebanon County, as well as the location of the iron heritage of the Cornwall area. Furthermore, regional residents have adapted the Horseshoe Trail, once a commerce and supply route, to recreational purposes.

About 13,000 acres are protected, including a number of acres held as State Game Lands. The most specific threat to the Furnace Hills is the expanding demand for home sites, driven by the area's proximity to the PA Turnpike and other major roads, plus large-lot zoning. Subdivisions are consuming substantial acreages of critical lands in this area, fragmenting important forest lands and wildlife habitat and negatively impacting recreational resources such as the Horse Shoe Trail. Middle Creek Wildlife Management Area is also included among the critical treasures but is noted as already protected.

The Highlands Coalition, established in 1988, seeks to protect and enhance the sustainability of natural and human communities in the Highlands region of Pennsylvania, New Jersey, New York, and Connecticut. At a regional level, the Coalition works to secure federal and state funding for land protection in the Highlands and to foster more regional approaches to planning for and managing growth. At the local level,

the Coalition contributes to efforts to fend off inappropriate development projects that threaten important Highlands resources and work with planning boards and community groups to understand the values of the Highlands and incorporate them into their decision making. The Coalition is comprised of more than 150 local, state, regional and national conservation organizations.

Lebanon County has already made commitments to the conservation of the Highlands in the county. In January 2007, the Lebanon County Board of Commissioners signed a resolution in support of the "implementation of the spirit and intent of the Highlands Conservation Act and the protection of the Highlands region in Pennsylvania as an area rich in natural resources, which are important to the environmental quality and economic prosperity within the Commonwealth and our County." The Lebanon County Conservation District and Lebanon Valley Conservancy have joined the Highlands Coalition as members. More information on the Highlands, the Coalition and the status of priorities can be found at www.highlandscoalition.org.

The Susquehanna River Basin Commission

The Susquehanna River Basin Commission strives to enhance public welfare through comprehensive planning, water supply allocation, and management of the water resources of the Susquehanna River Basin. The Susquehanna River Basin Commission's Annual Water Resources Program identifies resource management objectives for the entire river basin:

- Reduce Flood Damages & Provide Effective Disaster Recovery
- Improve Water Quality
- Mitigate Drought Impacts
- Ensure Adequate Water Supply
- Promote Economic Development
- Protect and/or Restore Aquatic Ecosystems
- Restore Migratory Fish
- Manage Sediment
- Preserve Cultural & Historical Heritage
- Enhance Recreation
- Facilitate Data Management & Use

SRBC's coordination of planning and management studies has included development of the following publications and reports that have included information from and/or about Lebanon County:

- A Groundwater Management Plan for the Susquehanna River Basin
- The Lower Susquehanna Comprehensive Water Resources Study
- Swatara Watershed Water Supply Study

- Overview for the Development of Local Water Budgets
- Comprehensive Plan for Management and Development of the Water Resources of the Susquehanna River Basin

These publications and reports represent significant investment on the part of SRBC to develop water resource data that can inform local decision-making. They are available online at www.srbc.net.

The Chesapeake Bay Foundation

The Chesapeake Bay Foundation is the largest conservation organization dedicated solely to the Chesapeake Bay watershed. The Foundation's commitment is to work toward reducing pollution, improving fisheries, and protecting and restoring natural resources such as wetlands, forests, and underwater grasses. The Foundation offers restoration programs and environmental education programs to citizens of the watershed.

The Groundwater Foundation/Groundwater Guardian

The Groundwater Foundation works to make groundwater science accessible and understandable to citizens everywhere, so that they can be involved in protecting the environmental and economic vitality of their communities. The Foundation established the Groundwater Guardian program to support, recognize, and connect communities taking proactive, voluntary steps to protect groundwater. Lebanon County uses the Groundwater Guardian program to educate farmers, landowners, watershed groups, municipalities, water suppliers, and the public about non-point source pollution, best management practices and groundwater protection. Local priorities include:

- Continuing to facilitate the installation of best management practices on dairy and livestock farms in county watersheds.
- Serving as a liaison to various local watershed protection organizations, coordinating efforts for watershed education and outreach.
- Implementing public education and outreach efforts, combined with storm drain marking, as best practices to comply with State Separate Storm Sewer System (MS-4) requirements.

FEMA Map Modernization

The Federal Emergency Management Agency (FEMA) has undertaken the Flood Map Modernization project, a multiyear Presidential initiative supported by Congress that is directed at improving and updating the Nation's flood hazard identification maps. These flood maps have been produced and used for 35 years under the National Flood Insurance Program (NFIP), originally for the identification and delineation of flood hazard areas in communities and for setting flood insurance rates. However, they have come to be used for many purposes, including local planning, emergency preparedness and response, and natural resource management. Funding for the Map Modernization was first appropriated in fiscal year (FY) 2003, with additional funding provided in FY2004, FY2005, and FY2006.

The Map Modernization is responding to National Flood Insurance Program (NFIP) requirements and feedback provided by Federal, State, and local Program stakeholders on the need to update and improve the existing maps. FEMA has undertaken the Map Modernization project to:

1. Reflect recent development and/or natural changes in the environment,
2. Take advantage of revised data and improved technologies for identifying flood hazards,
3. Support a flood insurance program that is more closely aligned with actual risk, encourage wise floodplain management, and increase the public's flood hazard awareness,
4. Provide more timely updates of floodplain maps and easier access to the data, and
5. Help communities to be better prepared for flood disasters.

The Map Modernization process, like the existing FEMA process, will provide municipalities with the opportunity to review the draft FEMA maps. This review should carefully compare current municipal floodplain designations with the new FEMA data. Once the FEMA maps are finalized, municipalities should then decide whether to incorporate the new FEMA data into their local plans and regulations or to update their plans and regulations with reputable local floodplain delineation data, including accurate source listing.

State Programs and Initiatives

PA State Water Plan

The 2002 Pennsylvania Water Resource Planning Act calls for the Pennsylvania State Water Plan to be completed by March 2008, and updated every 5 years thereafter to maintain a working knowledge of how much water is available and how much water is needed by region. During the updating of the State Water Plan, areas will be identified

where the demand for water exceeds, or is projected to exceed, available supplies. These areas would be designated as Critical Water Planning Areas, and Critical Area Resource Plans will be developed to include a water availability evaluation, an assessment of water quality and water quantity issues, and an identification of existing and potential adverse impacts on water resources uses.

TMDL Program

PA DEP is responsible for the Total Maximum Daily Loads (TMDL) Program. The program was established as a means to improve water quality through the Federal Clean Water Act. The purpose of the TMDL Program is to identify sources of pollution and develop threshold plans to outline tolerable levels of pollutants in streams where water quality goals have not been achieved. This planning process involves stream or watershed assessments, determination of impaired water bodies, development of TMDL thresholds and remediation plans, implementation of remediation activities and reassessment of streams/watersheds.

PADEP has developed TMDL plans for the following nine streams in the county: Conewago Creek Watershed, Crosskill Creek, Deep Run Watershed, Deep Run/Beach Run, and Elizabeth Run, Earlakill Run, Owl Creek, Quittapahilla Creek Watershed, and Unnamed Tributary of Swatara Creek. The Conewago Creek Watershed is the only TMDL that has begun developing a TMDL implementation plan. Implementation of the other threshold plans is needed. TMDL threshold plans are needed for the following streams: Cocalico Creek Watershed, Hammer Creek and Middle Creek.

Stormwater Management Program

The Department of Environmental Protection's Stormwater Management Program provides grant moneys to counties to develop stormwater management plans for designated watersheds. This planning effort, as required by the Storm Water Management Act of 1978, results in sound engineering standards and criteria being incorporated into local codes and ordinances in order to manage stormwater runoff from new development in a coordinated, watershed-wide approach. The program also provides for research into new stormwater issues and computational techniques of watershed hydrology and water quality. It provides technical assistance to individuals and municipalities in solving drainage problems through investigations and using the Pennsylvania Infrastructure Investment Authority (PENNVEST) as technical consultants

in a program to provide low interest loans to municipal governments who wish to construct projects to solve stormwater runoff problems. The program is also involved in various water quality initiatives working directly with the Chesapeake Bay Program, the Department's Nutrient Management Program and the Coastal Zone Program in research and advisory roles.

Each county is required to develop stormwater plans for each of the watersheds within its boundary. Since 1985 DEP has provided grants to counties to subsidize up to 75% of the cost of preparing plans. Municipalities are also provided similar grants for plan implementation. The regulations specify that stormwater management plans be undertaken in two phases; Phase I, the preparation of a scope of study (level of effort, personnel details undertaking the effort, time frame, and cost estimates for Phase II) and Phase II, the actual plan preparation.

PA DEP has designated 8 watersheds in Lebanon County, of which only two have approved Act 167 stormwater management plans. The Lebanon County Planning Department and local municipalities have implemented the existing plans by amending their subdivision and land development ordinances to: (1) adopt required criteria for the Tulpehocken and Cocalico Creek watersheds; and (2) extend water quality standards, infiltration requirements, best management practices, and other PA DEP stormwater management guidelines to the remainder of the county under the jurisdiction of the county ordinance. Lebanon County should continue to develop or support development and implementation of watershed specific stormwater management plans. A prioritized list of needed stormwater management plans is listed in the Action Plan.

Wellhead Protection Program

The Safe Drinking Water Act requires each state to develop and implement a Wellhead Protection Program (WHPP) that describes how the state will protect ground-water sources used by public water systems from contamination. In Pennsylvania, the WHPP is designed to provide for the protection of groundwater resources that serve as a source of drinking water for community water systems. Through the program, wellhead protection areas are delineated, potential sources of contamination are identified, and communities are encouraged to adopt land use zoning and other ordinances to ensure the protection of their water supply. Wellhead protection promotes sound land-use planning and complements the principles of pollution prevention.

A comprehensive local WHPP consists of five steps:

1. Form a community steering committee to represent all community interests in the wellhead protection plan.
2. Define the land area to be protected – generally zone I represents a protective zone immediately surrounding a water supply source ranging from a radius of 100 to 400 feet; zone II, a radius of 1/2 mile, which is the area determined to overlay that portion of the aquifer through which water is diverted to a well; and zone III, an area which contributes surface water or groundwater to zone II.
3. Identify and locate contaminants and sources that have the potential to adversely impact the drinking water supply of each wellhead protection area.

4. Manage the wellhead protection area (WHPA) through regulatory and non-regulatory tools to ensure that land use activities do not pose a threat to groundwater.
5. Plan for future wellhead needs and the long-term protection of these sites.

Pennsylvania Water Resources Education Network

The Pennsylvania Water Resources Education Network (WREN) works for the protection and management of Pennsylvania's surface and groundwater resources through education and informed policy making. Within Lebanon County, WREN has helped organize programs on wellhead protection and drinking water protection and non-point source pollution prevention.

Capital Region Water Board

The Capital Region Water Board improves public water management in the Capital Region of Pennsylvania by facilitating regional cooperation. The Board has taken a particular interest in addressing the lagging viability of small systems in south central Pennsylvania by searching for regional solutions. After its initial investigation, the Board found that extensive inter-basin transfers and diversions make it difficult to analyze the feasibility of even small regional systems. The Board may re-scope its effort to encompass larger regions. The board also completed a water supply study of the Swatara Creek watershed in 2003; the study makes sound alternatives for securing adequate water supplies, particularly during drought periods.

Forest Stewardship Program

Pennsylvania's Forest Stewardship Program, described as "our link to the past – our legacy for the future", is a voluntary program to help forestland owners learn how to improve and maintain the ecological health of their land. Funded by the U.S. Department of Agriculture Forest Service, the Pennsylvania Department of Conservation and Natural Resources Bureau of Forestry administers the program and provides technical assistance. The program links forestland owners to a partnership of private landowners, professional resource managers, and representatives from conservancies, higher education, industry, and government. This partnership can guide the forestland owner to decide what to do, provide help to do it correctly, and instruction in how to become a Forest Steward.

The Forest Stewardship Program is open to private landowners with more than five acres of forestland. However, nonforested open lands qualify if the landowner intends to manage them for water quality, wildlife habitat, or timber production. The goal of the program is to help the forestland owner realize and reap the many benefits of being a Pennsylvania Forest Steward—enriching the life of their land while enriching the lives of those who depend on forests.

To become a Forest Steward, the forestland owner develops a plan for the future forestland management with the assistance from a DCNR Bureau of Forestry Service forester and one Forest Stewardship professional. They help the landowner evaluate existing resources and learn how to manage the forest for wildlife, recreation, aesthetics, timber production, or whatever objectives the landowner wants to accomplish. The landowner decides what activities to incorporate into the Forest Stewardship Plan. Nine landowners in Lebanon County have become Forest Stewards for 1,949 acres of forestland.[2]

Sustainable Forestry Initiative

In 1995, the American Forest and Paper Association created the Sustainable Forestry Initiative, a voluntary, industry-driven effort developed to ensure abundant, healthy, and productive resources in the future. After more than 10 years of advocacy in partnership with broader conservation and environmental organizations, this industry partnership established an independent forest certification organization, Sustainable Forestry Initiative, Inc., to oversee the sustainable forestry initiative program.

The Pennsylvania Sustainable Forestry Initiative (PASFI) works to ensure the progress of the national initiative here in Pennsylvania. Through the PASFI program, landowners receive the information they need to enhance their ability to make good forest management decisions. Loggers learn safer, more productive skills and proper environmental practices. The forest industry as a whole becomes better understood by the public and enjoys continued accessibility to the timber resource -- and everyone benefits from the perpetuation of a healthy forest and the wealth of life enriching products derived from it.

Participants of the PASFI training program benefit from a program designed to foster understanding of the SFI program principles, Best Management Practices (BMPs), regeneration and resource conservation, safety and OSHA issues, transportation, and business management. A Master Logger status is a voluntary program that recognizes loggers who demonstrate excellence.

Blue Mountain-Kittatinny Ridge Conservation Project

Similar to the Highlands initiative, the Blue Mountain-Kittatinny Ridge Conservation Project is a collaborative effort of local, regional, and state organizations and agencies to focus public attention on the importance of the 185-mile long forested ridge through Pennsylvania; and to promote conservation activities to protect the ridge from further habitat loss, fragmentation, and inappropriate land use. Also like the Highlands, the Kittatinny Coalition is a voluntary member-based support and advocacy organization leading the promotion of conservation efforts.

After an initial characterization of resources, threats, and opportunities for conservation, the Conservation Plan for Kittatinny Ridge Conservation Corridor, prepared by the Audubon Pennsylvania, reached four major conclusions:

1. The corridor is a major migratory flyway. The Kittatinny Ridge is recognized as a “globally significant” migration flyway for tens of thousands of raptors,

[2] Per communication with PA DCNR, Bureau of Forestry, Rural and Community Forestry Section, August 20, 2007.

and millions of songbirds (orioles, tanagers, warblers, etc.) who use the ridge's forests as stopover habitat during their spring and fall migration through Pennsylvania. Migrant birds pack into the Kittatinny at much higher densities than other places in both spring and fall because it is the last ridge for southbound migrants, and the first ridge for northbound migrants. Migratory species include significant populations of endangered or threatened species such as Bald Eagles (PA endangered and federally threatened)3, Peregrine Falcons (PA endangered) and Ospreys (PA threatened). Significant populations of PA Species of Special Concern include the Northern Goshawk (PA Candidate-Rare), the Northern Harrier (PA Candidate-At Risk) and the Northern Saw-whet Owl (Condition Undetermined).

2. The corridor supports abundant terrestrial wildlife. The forested mountain habitat supports numerous species of special concern, including the Pennsylvania threatened Allegheny woodrat and Eastern small-footed myotis (bat). Black bear, bobcat, wild turkey, and ruffed grouse are found in healthy numbers. The many streams that flow off the ridge to the north and south are home to more than 34 species of freshwater fish.

3. The corridor influences water resources. Public water system withdrawals within one mile of the ridge serve 57,097 residents in Lebanon County. Few residents and elected officials understand the relationship between their public water and the forested mountain corridor.

4. The corridor is significantly impacted by development. New residential housing is currently having the biggest impact in the Kittatinny Ridge municipalities around the greater Harrisburg area. New development of any type on or adjacent to the Kittatinny Ridge increases demand on the limited water supply. Removal of the forest cover further compounds the problem by reducing infiltration rates and decreasing the recharge of groundwater.

The Conservation Plan makes recommendations in four categories. Those most relevant to Lebanon County are listed below.

In the area of Science

1. Pursue municipal or county designations of the ridge as locally important for birds, migration, groundwater recharge, and other ecological factors.

In the areas of Land Planning, Management and Conservation…

2. Identify parcels to connect and extend public land holdings along high ecological value corridors and using conservation easement programs to expand the protected habitat range.
3. Identify public water authority watersheds and work for their permanent protection. One example is the Lebanon Water Authority's Seigrist Reservoir in Schuylkill County.

[3] On June 28, 2007, the Bald Eagle was removed from the list of federally threatened species.

4. Partner with the agricultural community to help protect valley farmland adjacent to the forested slopes. Agricultural land at the base of the ridge is an important groundwater recharge area and provides a buffer to the forests.
5. Identify historic features along the Kittatinny Conservation Corridor.
6. Partner with intersecting greenway groups for municipality and landowner work.

In the area of Public Policy…

7. Promote Environmental Advisory Councils and build interest in local natural resource protection policies and practices.
8. Develop and implement a local government assistance program for the ridge to help municipalities build the infrastructure of policies and programs needed to achieve a basic level of protection for the entire ridge.
9. Where development is unavoidable, encourage municipalities to require developers to use open space protection planning tools such as the Natural Lands Trust's "Conservation by Design" model.
10. Develop a list of elements to include in ordinances for forest slope protection.

In the areas of Education and Outreach…

11. Develop materials and strategies to increase public awareness of ridge values and threats.
12. Develop landowner habitat enhancement & protection initiatives to help private landowners with stewardship and conservation options.
13. Work closely with DCNR's Forest Stewardship program and district foresters to consider Kittatinny conservation strategies and activities in landowner forest management plans.[4]

Based on these corridor-wide recommendations, Lebanon County should continue support of the Kittatinny Coalition through efforts that focus attention on the importance of this forested ridge through the county and to promote conservation activities. Large tracts of mature upland forests should be identified and brought under forest stewardship plans. Where possible, linkage of these forest tracts should be sustained or re-established to mitigate forest fragmentation. Landowners can learn more about managing their lands for a healthy forest and wildlife habitat through the Bureau of Forestry, which has training programs on Forest Stewardship. The Kittatinny Coalition offers a variety of tools and programs to help municipalities and landowners preserve the unique natural corridor.

[4] http://pa.audubon.org/PDFs/KittatinnyConservationPlan-Apr2007.pdf

County and Municipal Programs

Many of the municipalities in Lebanon County have taken actions to conserve and protect important natural resources. The methods used to address steep slopes, floodplains, biodiversity and agricultural soils vary in type and intensity.

Steep Slopes

Several of the municipalities in Lebanon County have incorporated steep slope protection provisions into their zoning ordinances. These provisions can serve as models for Cold Spring, Bethel, North Londonderry, North Annville, and South Annville Townships and Mt. Gretna Borough where steep slope protection provisions are lacking.

Ten Aspects of Steep Slope Regulation

The following ten aspects of community development and environmental protection should be considered when developing regulations to manage development on steep slopes.

1. Topography – provisions should define steep and precautionary slope by a specific percent grade.
2. Slope Stability – provisions should specify standards for slope stability prior to development and the grading necessary for stable slopes post-development.
3. Drainage and Erosion – provisions should identify all highly erodible soils, major watersheds and drainage courses, and potential impacts from increased runoff and sedimentation on water quality and require proposed plans to minimize erosion and runoff.
4. Infrastructure – provisions should assess the long-term feasibility of septic systems on steep slopes and potential risk to ground and surface water supplies in the event of system failure. Provisions may require a system inspection/maintenance program.
5. Access – provisions should evaluate the potential for accidents and ease or difficulty of emergency vehicle access and specify maximum grades for driveways and roads.
6. Aesthetics – provisions should document the rationale for protection of viewsheds, referencing the extent and quality of views to the hills, peaks or hillsides of special symbolic value to the community; survey community values, as documented by scenic resource studies; and evaluate the impacts that development would have at different distances.
7. Natural Qualities – provisions should identify and map vegetation communities and wildlife habitats and threats to these resources, giving special attention to rare and endangered plant and animal species, as well as species that have adapted to available habitats.
8. Fire Hazard – provisions should evaluate the frequency and causes of hillside wildfires and fire department response time and access requirements, and identify fuel reduction methods and architectural and landscaping factors in fire safety.
9. Recreational Values – provisions should consider area-wide needs and opportunities for hiking, hunting, climbing, and wildlife observation, which may be suitable to sloped sites.

10. Open Space – provisions should evaluate open space management methods such as creating greenways, wildlife habitat preservation areas, and conservation areas; these may be used as a means of redirecting potential development.[5]

Floodplains

Twenty-two (22) municipalities in the county have floodplain regulations which meet or exceed those required by the National Flood Insurance Program (NFIP). However, in those municipalities where only approximated studies have been done, only one floodplain district has been designated (General Floodplain District-GFP). GFP regulations are stringent since the location of the floodway has not been defined within this district. Detailed floodplain studies in these municipalities would help in the designation of different floodplain districts, identifying the most sensitive floodplain areas and allowing more flexibility in the requirements relating to building and development in less sensitive areas.

Biodiversity

Lebanon County's natural resources play an important role in the overall environmental quality in the county. Collectively, they compose ecosystems that maintain clean air, enrich the soil, purify the water, protect against stormwater damage and regulate climate.

The 2003 Natural Area Inventory identified 32 sites of statewide significance, suggesting a variety of exemplary natural communities or areas supporting species of special concern, and 8 sites of local significance. The inventory provides a tool to depict areas where the need of land management activities coincide with important natural resource features. Landowners are encouraged to incorporate the recommendations in site-specific management plans, such as forest stewardship and farm management plans.

Agricultural Soils

Like much of south central Pennsylvania, Lebanon County is blessed with large contiguous areas of prime agricultural lands and productive farming communities in the Great Valley between the Kittatinny Ridge and the Highlands. Due to the physical ease of construction, these areas are often the most vulnerable to development pressures. Consequently, municipalities that wish to preserve their agricultural lands and farming communities should incorporate agricultural preservation provisions into zoning ordinances. Large lot zoning and residential density control zoning (sliding scale zoning) are predominately used within the county to permit agricultural uses as well as non-

[5] Olshansky, Robert. Planning for Hillside Development: Planning Advisory Service Report No. 466, American Planning Association, Chicago, 1996.

agricultural uses by right. While these techniques generally exclude commercial and industrial activities, they do not preserve farmland from development.

Local Watershed Programs

The Swatara Creek Watershed Plan presents management options to address opportunities and issues relating to water quality, population growth, land use, Swatara State Park, and the Swatara Greenway. At the local level, the Swatara Creek Watershed Plan encourages the comprehensive planning process at the local and county level to set proper goals for resource conservation and utilize environmentally conscious land use controls along the Swatara and its tributaries, especially with respect to floodplain management. The Swatara Creek Watershed Plan promotes effective sewer management through Act 537 planning, transportation and population impact studies, and forming partnerships with local school districts and universities for stream rehabilitation and education.

The Quittapahilla Creek Watershed Assessment identified restoration and management strategies to address problematic or declining stream conditions. Water quality improvements will be a significant challenge within the development corridor along the Quittapahilla. The Quittapahilla Creek Watershed study also projected future nutrient and sediment loading problems and recommended appropriate mitigation strategies.

Using the assessment and restoration plans for guidance, the Tri-County Conewago Creek Association seeks to continue to work with landowners throughout the watershed to make stream improvements on their property by stabilizing eroded stream banks, fencing and planting trees along the creek, and conducting educational and public outreach initiatives.

Sustainable Use of Natural Resources

Sustaining the Agricultural Industry

Agriculture is Lebanon County's number one industry and is particularly suited to the county due to its climate, soils, adequate rainfall, ideal geographic location in relation to national population centers and dedicated farm families. Lancaster, Chester, and Berks Counties are among top national producers; however, Lebanon is not far behind in its contribution to the 55% of Pennsylvania agricultural production that is found south and east of the Appalachian Trail.

The Lebanon County Conservation District estimated that Lebanon County had 1,105 farms on 124,500 acres of farmland (53.6% of total land area of county) in 2005. This figure differs from the farmland estimate of 99,996 acres (42.7%) tabulated in the Land Use Profile, Background Study #9, as a result of different methodologies for farmland classification.

Of this total acreage, 80,200 acres was in crops – corn, hay, soybeans, vegetables, fruit, etc. generating over $41.4 million in revenue. The remaining land was in livestock production, generating $199.8 million in sales. These figures rank Lebanon County among the top 10 counties in Pennsylvania for swine, milk, egg, barley, broilers, cattle and calves, corn for silage, corn for grain, and soybeans.

Beyond its contribution of the economy, other benefits of agriculture include providing water recharge areas, rural character, scenic views, wildlife and vegetation corridors, and low cost for community services. Sustaining the industry requires attention to all three components of the agricultural industry: the farmer, agribusinesses, such as suppliers, processors, and distributors, and the land. Pennsylvania has enabled the protection of farmers and farmland through legislation that protects farmers from nuisance complaints, reduces the tax burden on farmers, and funds land preservation programs at the county level.

Programs for the Protection of the Farmer

1. **Clean and Green** – Act 31 of 1974. The PA Farmland and Forest Land Assessment Act assesses land for its use value not its fair market value, providing relief from property taxes on land only (not buildings). It is generally administered by the county assessment office. There are three categories: farm, forest reserve, and agricultural reserve (also known as open space if open to the public). The act provides a permanent covenant as long as the agricultural use exists. If agricultural uses are discontinued, roll back taxes must be paid. In most counties, back taxes are revenue for the agricultural easement program. Some subdivision is permitted. Lebanon County does not participate in the Clean and Green program because current assessment values, dating to 1968, for fair market value are lower than the farm value today. Reassessment and establishment of the program has been projected to cost farmers more in property taxes, though the conservation district does receive inquiries about the program.

2. **Agricultural Security Areas (ASA) program** – Act 43 of 1981. This program protects farmers from ordinances restricting normal farming structures and practices; provides protection from condemnation; and serves as a prerequisite for agricultural preservation. It is a voluntary program administered by the local municipality. In Lebanon County, roughly 57,787 acres were enrolled in the ASA program by 747 landowners as of November 2007; participation across municipal lines is permitted and encouraged. The enrollment is short-term – only seven years, then participation must be renewed. Land can be removed from the ASA program before the end of the seven years.

3. **Right to Farm Act** – Act 133 of 1982, provides protection from nuisance action against farmers following accepted farming practices. The act acknowledges that "when nonagricultural land uses extend into agricultural areas, agricultural operations often become the subject of nuisance suits and ordinances. As a result, agricultural operations are sometimes forced to cease operations. Many others are discouraged from making investments in farm

improvements." Similar provisions specifically protecting the right to practice forestry were enacted as part of the Pennsylvania Municipalities Planning Code in 1992.

4. **Agriculture Communities and Rural Environments (ACRE) Legislation** - Act 38 of 2005, the ACRE legislation, provides further technical assistance from the Department of Agriculture in evaluating restrictive ordinances. ACRE is intended to help resolve some of the interface issues that occur when the non-farm community meets production agriculture. It includes provisions for: administrative review of disputed agricultural ordinances; enhanced environmental compliance; requires odor management Best Management Practices on new/expanding concentrated animal feeding operations (CAFOs) and concentrated animal operations (CAOs); addresses federal air quality mandates; closes the manure export loophole; ensures minimum setbacks/buffers; improves agriculturally-impaired streams; and monitors the use/impact of antibiotics. This recent legislation has also been applied to the protection of silvicultural (forestry) operations.

Programs for the Preservation of Farmland

1. **Agricultural Conservation Easements -** 1988 amendment to Act 43 of 1981. The purchase of conservation easements permanently preserves farmland by purchasing development rights. The program allocates state funds for leveraging with county funds. Minimum requirements for easements include:

   - Enrollment in the ASA program
   - Minimum of 50 acres, unless adjacent to eased farmland
   - At least 50% cropland or pasture
   - At least 50% of soils in capacity classes in I-IV (system of classification)

   Additional provisions of Lebanon County's Agricultural Land Preservation Program state that an eligible farm tract:

   - Must have a conservation plan meeting Resource Management System (RMS) standards and approved by the Lebanon County Conservation District including an "Act 6 level" of nutrient management plan review by the Conservation District by the time of closing.
   - Must be compatible with municipal land development plans.
   - Must be willing to accept a cap of $2500 per acre.

- Must not have more than 50% of its acreage enrolled in a reserve program such as CRP.

Lebanon County's preserved farmland totals 12,597 acres on 120 farms as of November 2007. The program previously paid a maximum of $1500/acre. An increase to a maximum of $2500/acre was approved in 2006.

The Lebanon County Agricultural Land Preservation Board and Conservation District have established a goal of 98,000 acres of preserved farmland through easements. The Land Use Policy Map designates a similar 98,109 acres for agriculture. This acreage reflects lands planned for agriculture and agribusiness through effective agricultural zoning and farmland preservation easements; not all farmland will necessarily be preserved through easements.

While Lebanon County's agricultural land preservation program is effectively making progress, it is not keeping up with development's conversion of farmland. Land zoned for agriculture totaled 114,921 acres in 2006. While most municipal regulations limited the number of lots able to be subdivided, the regulations could do more to support agribusiness and more aggressively direct development to other locations. Until stronger regulations are in place, development will continue to consume at least some portion of farmland. In addition, the county's criteria for agricultural preservation should strive to create larger contiguous preserved areas, if agriculture is to be sustained as a significant part of the county's economy.

Many farmers and citizens misunderstand the program. Only the development rights are purchased. Property ownership is retained and it can be sold at fair market value for farmland use. Preserved Lancaster County farms are bringing top value to the seller. Recent sales of farms in the eastern part of Berks County have sold for $7,200/acre. As a result, preservation is financially rewarding to the farmer.

2. **Agricultural zoning through local land use planning and zoning** - To be profitable in today's economy, farmers need more land for more animals and more crops. In the past, zoning has designated land areas for nearly all uses except agriculture. Agriculture has been and continues to be perceived as vacant land waiting for development. Agricultural zones in many cases permit residential or other uses by right; do not limit non-agricultural uses; and create conflicts with non-agricultural neighbors (e.g. flies, odor, traffic, pesticides, noise, etc.). The municipal comprehensive plan provides the legal basis for agricultural zoning to support agricultural preservation, addresses productive soils, and demonstrates that agriculture is an established land use that is important to the local economy. Proper agricultural zoning is critical to minimizing conflicts. It should limit non-agricultural uses (i.e. housing) provide for agricultural production and agricultural businesses; and set standards for large scale agricultural operations. These provisions provide certainty to the farming community that agriculture has a place in the

community's future – with or without farmland preservation programs that provide compensation and site-specific land protection.
Agricultural zoning techniques include:

- Subdivision limitations – to reasonably limit, though not exclude, subdivision for development; the sliding scale technique has been upheld in the Pennsylvania court system.
- By right uses limited to agricultural activities – those that are compatible with and supportive of agriculture and specify appropriate standards for normal agriculture, including large scale livestock production and processing uses; all non-agricultural uses are permitted by special exception.
- Designation of districts that 1) encompass large contiguous areas, not islands of farmland; 2) avoid areas of present and future development; and 3) allow a municipality to meet its "fair share" responsibility.
- Residential development standards – to specify dwelling locations and clustering on least productive soils, minimum and maximum lot sizes, and the use of agricultural nuisance disclaimer (e.g. attached to real estate sales agreements).

In addition to these protection programs, Pennsylvania has invested in agriculture through other retention programs.

- PAgrows – Under the direction of the Secretary of Agriculture, PAgrows assists farmers, food processors, farmer's market operators and other agricultural businesses to put the pieces of the lending puzzle together. PAgrows assists these farming professions in filing paperwork for government loan programs, understanding the Schedule F on farm tax returns, and other financial questions.
- Center for Farmland Transition – The Center for Farmland Transition assists new farmers looking to get started, existing farmers who wish to make changes to their operations, and those transitioning their assets either to retire or for new careers. The Center harnesses the work of Penn State Extension and other entities in the state that have compiled and produced information that is vital to farmers in transition. Lebanon County can utilize the Center for those transitioning both in and out of farming to sustain its agricultural economy, landscape and heritage.

- Pennsylvania Preferred – Pennsylvania Preferred is a program designed to brand locally sourced Pennsylvania products. Within Lebanon County the following companies produce and/or distribute Pennsylvania Preferred products:
  - Aqua-Life, Inc., Richland
  - ASK Foods, Inc., Palmyra
  - Baklava Goddess, Inc., Schaefferstown
  - Food Kart, Lebanon
  - Gray's Apple Ridge Orchard, Jonestown
  - Hain Pure Protein Corp., Fredericksburg
  - Henry Molded Products, Lebanon
  - Laudermilch Meats, Inc., Annville
  - Manna Foods, LLC, Lebanon
  - McGeary Organics, Annville
  - McGeary Organics, Inc., Annville
  - Plain & Fancy Custom Cabinetry, Schaefferstown
  - Sandi's Breads, Annville
  - Seltzers Smokehouse Meats, Palmyra
  - Stony Bridge Landscaping and Garden Center, Lebanon
  - Ulrich's Farm Market, Schaefferstown
  - Weaber, Inc., Lebanon
  - Zweiers Food Kart, Lebanon
- Pennsylvania Agritourism and Blue Ribbon Passport. In 2004, the Department of Agriculture created the Blue Ribbon Passport program to promote tour packages of county fairs, wineries, bed and breakfasts, and other events that highlight agriculture within various regions within the State, To date, Schuylkill, Lehigh, and Berks County have created Blue Ribbon Passport brochures to promote these locations, including one location in Lebanon County. Lebanon County contains numerous sites with components for creating its own Blue Ribbon Passport. Such a program would entail identifying sites open to the public, developing a touring route to visit the various locations, establishing guidelines that address private property boundaries, and promoting the tour through a pamphlet, the county and partner agency websites, and other means. An individual or office would function as a point of contact for individuals interested in more information in participating in the tour.

What is the Future of Agriculture in Lebanon County?

The Penn State Cooperative Extension began an initiative in 2005 to explore this issue with the local farming community. Through outreach meetings and interviews, the Extension staff made several key findings and recommendations. These findings and recommendations were marked as "preliminary" and the outreach program suspended due to the limited participation by the farming community, which may not fully represent the farming community. Further discussion of the issues raised to date is needed if the public sector is to respond in support of the agricultural industry.

Preliminary Findings on the Future of Agriculture in Lebanon County

- 84% of farms are owned by individuals and 16% by family partnerships
- 18% of farmers plan to farm for 1-5 more years, 11%, 6-10 more years, and 26% are not certain how long they will remain in farming
- Financial stability underlies farmers' plans for future farming. The cost of farmland for sale, lack of farmland for rent, and strained farm/non-farm communications were major factors that caused farmers to begin questioning the future of agriculture.
- Energy/fuel costs, the rising price of farmland, the increase in the county's population and the loss of neighboring farms were trends that threaten the future of agriculture, according to 4 out of 5 farmers.

Based on this research, the future of agriculture in Lebanon County could be improved through three clear actions: 1) the development of a Crop Management Association to help farmers maintain a working knowledge of nutrient management requirements; 2) the expansion of the Farm-City program for better agricultural literacy among citizens and farm/non-farm relations; 3) increased technology and business management education for farmers.

Need for a Comprehensive Agricultural Strategy

Findings from the assessment of current farmer, industry and farmland protection methods and the Future of Agriculture in Lebanon County, as well as the model program developed by Berks County, suggest that Lebanon County needs a more comprehensive strategy to sustain its agricultural economy. Such a strategy would include the following:

1. An agriculture task force. This group would work in tandem with the Farmland Preservation Board for the preservation of farmland; the task force would promote the importance of farmland preservation through agriculture preservation zoning and the purchase of agriculture conservation easements, while the board would administer the program and review applications.
2. An acreage goal for farmland preservation. This number would consider active farmland, agricultural soils, lands zoned for agriculture, lands enrolled in the ASA program, and the spatial distribution of current preserved farmland illustrated as the farmland preservation plan or map.

Using Berks County's preservation program as a model, figures should include:

	Berks County[1]	Lebanon County
Total county acreage	550,000	234,000
Acres in farmland	189,912	99,996
Percent in farmland	34.4%	42.7%
Acre goal for agricultural use	168,000	98,109
Acres in effective agricultural zoning	154,000	114,921
Percent in effective agricultural zoning	28.0%	49.0% in agricultural zoning, predominantly with slide scale provisions
Acre goal for farmland preservation (easements)	80,000	75,000[2]-98,000[3]

[1] As of November 2007
[2] As estimated by the Lebanon County Planning Department
[3] As established by the Lebanon County Agricultural Land Preservation Board and Conservation District

3. Establish agriculture protection zoning for all desired farmland. Provide incentives to municipalities to strengthen or renew their agricultural zoning provisions and establish such zoning in those municipalities that have significant farmland and lack agricultural land protection, namely North Annville, Union, and North Londonderry Townships.

4. Seek funding for the permanent preservation of agricultural land through the purchase of agriculture conservation easements. Without large sums of money put to this program, the future of the agriculture industry will be compromised. At minimum, establish local funds to match the available state allocation. Capital investment sends a strong message to all about the importance of the agricultural industry to Lebanon's economy and its future. It also saves tax dollars as that land will not be houses which drive up the cost of community services, especially if housing developments are constructed where there are no community services and infrastructure.

5. Employ an agriculture industry coordinator. This coordinator would be a leader for education and public relations, farmer and food products industry retention and growth, and farmland preservation. With such a large and diversified industry, a go-to person would help government, agencies, and citizens understand the importance of the industry and would improve agricultural literacy in the community. The coordinator might also help local farmers and citizens understand the implications of state and federal legislation, such as the 2007 Federal Farm Bill, and work with the Lebanon County Tourist Promotion Agency to develop agri-tourism in the county.

6. Establish a Crop Management Association to help farmers maintain a working knowledge of nutrient management requirements.

7. Establish educational and training programs to assist farmers in developing their technology and business management skills.

Berks County's Farmland Preservation Strategy

Berks County's Zoning Incentive Programs aim to protect agriculture as an ongoing component of the county's economy. It reimburses a municipality for the cost of adopting agricultural zoning through its agricultural preservation zoning incentive program and conservation zoning incentive program as funded by federal grants and by the county. The program is consistent with the county comprehensive plan.

Berks County Incentive Program Process

1. Meet with municipal officials to introduce program.
2. Enter into agreement between municipality and county.
3. Municipality hires planning consultant.
4. Committee of farmers, landowners, and officials formed to develop ordinance or tailor model ordinance (purpose and provisions in the text) and determine location (district/map).
5. Hold meetings. All meetings are advertised and open to the public. Berks County Planning Commission and Extension Office staff attend meetings to support discussion.
6. Committee submits ordinance and map to municipal planning commission; Berks County confirms consistency with county plan and program; governing body adopts ordinance.

Berks County's AZIP (Agriculture Zoning Incentive Program) has yielded huge successes. By spending $66,000, 11 municipalities placed over 70,000 acres under Agriculture Preservation Zoning. These areas matched the county's comprehensive land use plan.

A model agriculture zoning ordinance is available from Berks County. When used, it is reviewed and revised to suit each municipality. The model ordinance:

- Allows farm related businesses and limits scale through number of employees and space dedicated to business
- Uses animal units per acre to address different scales of animal production; as size of operation increases, more standards apply
- Requires best management practices for mushroom operation (Berks County's most intensive agricultural sector)
- Sets environmental standards for large pork producers
  In principle, it allows modern agriculture by right, based on economics of sustaining a family on a particular commodity.

Berks 2020, the Berks County Comprehensive Plan, shows the following goals for agricultural land preservation. Of the 550,000 total acres in county:

- A goal for future agricultural use of 168,000 acres – a larger goal of 200,000 acres is used to rally support for farmland preservation and additional conservation areas
- A goal of 154,000 acres in effective agricultural zoning
- A goal of 47,000 acres in easements

Sustaining the Forest Products Industry

As the seventh largest employer in Pennsylvania, the forest industry accounts for 10 percent of the manufacturing jobs. Every dollar in timber sales yields an estimated $17 in economic value. In Lebanon County, the industry includes primary processors, such as loggers and sawmills; secondary processors, such as furniture, flooring, and cabinet manufactures; and allied industries, such as lumber wholesalers, retailers, and equipment suppliers.

Local companies such as Weaber, Inc., a Sustainable Forestry Initiative, Inc. participant and certified producer of hardwood lumber, including raw hardwood logs, finished boards, molding, flooring, and stair treads, and Rigidply Rafter, Inc., a major manufacturer of roof systems and laminated products, have located and grown in Lebanon County due to their proximity to forested lands and regional access to mid-Atlantic markets. The sustainability of forest lands concerns these companies. While approximately 25 percent of the logs for local processors come from land being cleared for development, the industry understands that this supply is not sustainable.[6] Poor forest regeneration and forest fragmentation impact the quality of timber growing in the region. If forests are not managed for long term production, yields may decline and timber prices will rise. For these reasons, sound land planning by local government and forest management or stewardship plans for private forest tracts are needed to sustain the supply and quality of local timber and wood products. In Lebanon County, local zoning generally permits forestry without undue restrictions; however, regulations could do more to encourage the conservation of remaining forest resources from future development. On the private sector side, forest stewardship plans have been developed to aid in sustaining forest land in Lebanon County.

As heavy users of the state and local roadways, a well-maintained transportation system is also important to processors and allied industries. Weight limits on bridges require re-routing and result in delays in supply and product delivery. Poor road conditions wear down trucks and equipment.

Proper forest management ensures a forest's long-term health and preservation of the environmental quality provided by forest ecosystems. A forest stewardship program can promote proper management of forest and woodland resources by educating and developing the forest landowner's unique relationship with the land. Support of forest management objectives from residents is also important to sustaining the forestry industry in Lebanon County. Therefore a forest stewardship program should not only include the landowner, but also educate the county citizenry that timber harvesting is an essential tool of good forest management.

[6] Per communication, May 13, 2005, Tom Buzby and Stan Templin, Weaber, Inc.

Sustainable Use of Water Resources

Balancing environmental, human, and economic water needs is a critical challenge for Lebanon County. Unlike land-based resources, water moves through the community and the landscape. As it does, its volume and quality at any given location are impacted by the natural environment, utility systems and land management activities it encounters. The complexity of this water or hydrologic cycle makes it impossible to comprehensively manage water supply and quality at a single location.

The most effective approach to protecting water resources is managed development – its amount and location. Local officials have the most direct influence on stormwater runoff and groundwater recharge through the authority to regulate land use. Comprehensive plans and their implementing of ordinances are the tools available to protect water resources. Unfortunately, this water cycle and associated impacts from development are not well understood by local officials. A better understanding of the available and renewable water supply, impacts from development, and best planning and management practices is needed to implement better planning at the local level.

A comprehensive study of Lebanon County's water resources should be initiated to define the current availability of water in the county and related regions, describe how the hydrology of the system functions, and provide a baseline for comparing existing conditions and projected trends. A detailed hydrogeologic investigation of the aquifer system should address (1) location of important recharge areas, (2) groundwater availability, (3) the groundwater quality, (4) current and potential sources of contamination, and (5) the relationship of karst features to surface and groundwater flow systems.

An integrated water resources plan should follow to provide recommendations that sustain groundwater recharge, maintain stream baseflows, provide for the flood-carrying capacity of streams, improve water quality, preserve riparian and aquatic resources, and provide adequate future water supply. This would include or be coordinated with the completion of Stormwater Management Plans for Quittapahilla Creek, Swatara Creek, Spring Creek, Conewago Creek, Little Chiques Creek, and Stony Creek and the adoption of associated implementing ordinances by the respective municipalities, as well as the updates to municipal sewage facilities plans. The plans should be consistent with the stormwater plans of the eight designated Act 167 watersheds, as well as the Act 537 municipal sewage facilities plans; a prioritized list of needed stormwater management plans is listed in the Action Plan and a similar list of needed sewage facilities plans or updates is included in the Community Facilities and Services Action Plan. Ultimately, the plans' recommendations would guide planned growth in a manner that is consistent with the sustainable withdrawal and discharge to streams and aquifers and support the drafting of ordinances and best management practice requirements that promote adequate recharge of groundwater.

Best Practices for Resource Conservation and Management

Subdivision and Land Development Techniques

A more detailed discussion of these techniques, including examples of their application in Pennsylvania, is included in the Growth Management Strategies White Paper in the appendix.

Agricultural Protection Zoning

Agricultural Protection Zoning, or exclusive agricultural zoning, designates areas where farming is the primary land use and discourages other land uses in those areas. Agricultural protection zoning stabilizes the agricultural land base by keeping large tracts of land relatively free of non-farm development. This technique is most appropriate for areas that are trying to protect an unfragmented agricultural landscape and where there is limited pressure to convert agricultural lands to residential development.

Sliding Scale Zoning

Unlike exclusive use zoning, sliding scale zoning allows some non-farm residential development without special review. The technique limits the number of times that a parent parcel (a parcel existing on the date of ordinance adoption) can be subdivided. Sliding scale zoning can be useful in agricultural areas where there are significant development pressure and land speculation. The use of sliding scale zoning is most effective in areas where a wide range of parcel sizes exist and non-farm development has already begun to occur. Since this method does permit non-agricultural uses, it allows communities to avoid a claim that land has been "taken" without compensation. The use of buffer areas is highly recommended to avoid land use conflicts between new residential development and agriculture fields.

Planned Residential Development

Planned residential development provisions are a means of permitting innovative planned developments or neighborhoods that achieve the preservation of sensitive natural areas or historic sites. This is accomplished by ‘shifting” development to more appropriate portions of the site.

Transfer of Development Rights

A Transfer of Development Rights (TDR) program allows conservation and development to coexist within a municipality. Growth is directed to preferred locations through the sale and purchase of development rights. Development rights are established for a given piece of land and can be separated from the title of that property. These rights can then be transferred in fee simple from one property to another property where development is desirable and planned. The transfer of development rights leaves the rural landowner in possession of title to the land and the right to use the property as a farm, open space or for some other purpose, and leaves the purchaser with the right to develop more intensively in designated growth areas. In Pennsylvania, this program can only be

used to transfer development rights within a municipality or among municipalities with a joint zoning ordinance. It is up to each municipality to establish procedures for how the transfer is to occur.

A Purchase of Development Rights (PDR) program operates in a similar manner, although the rights are held by a municipality until they are purchased by a developer.

Growing Greener Conservation Design

Growing Greener Conservation Design is a package of related techniques for conserving interconnected networks of open space within expanding communities. It enables local officials to designate and protect portions of nearly every property as each parcel is proposed for residential development. This package of techniques is unique in the way that it accomplishes its conservation objectives without disturbing landowner equity, without constituting a "taking," without depending upon public tax dollars or landowner generosity, and without involving complicated regulations for transferring development rights from one part of the community to another.

The Growing Greener technique integrates the comprehensive plan, zoning ordinances, and subdivision and land development ordinances. Growing Greener places an emphasis on build-out maps and greenway maps of the comprehensive plan to predetermine the location of open space. Open space zoning and density determination based on unconstrained lands are included in the zoning ordinance. Practices pertaining to the subdivision and land development ordinance include the submission requirements, review procedures, and the four-step design approach. Because Growing Greener encompasses so many different techniques, it requires careful attention and planning to ensure that all necessary regulations are in place. The desired outcomes are difficult to achieve if all of the pieces are not being implemented.

Cluster Development

Cluster Development is a zoning technique which provides flexibility in housing density as a means of integrating at least a minimal amount of open space into a new subdivision. Typically, both lot size reductions and the percentage of open space that are created are fairly modest. The open space that is protected through cluster design may be owned by a homeowners' association, a nonprofit conservation organization, the municipality, or by a combination and used to provide suitable areas for village greens, playing fields, or meadows. Frequently, density is calculated on the basis of total tract area, rather than on actual buildable land area, which results in a density inflation on parcels containing significant amounts of undevelopable land.

Open Space / Conservation Design

Open space / conservation design is an enhanced variation of the cluster zoning technique in which a higher percentage of the site is dedicated to open space. The purpose of this advanced technique is to preserve a larger amount of land for conservation uses, while still allowing full-density development. In contrast to cluster development, where the emphasis is more often placed on providing active recreational areas, open space zoning is more suited for protecting farmland, woodland habitat, historic sites, and scenic views. Under this technique, developers of a subdivision are required to dedicate a significant portion of their unconstrained land to permanent open

space uses. Housing is designed to compliment the aesthetic views of the preserved land and streets are designed to access the residential community in a manner that minimizes disturbance of natural areas. One of the more popular methods advocated by Randall Arendt has been branded Conservation by Design. The four step process 1) identifies primary and secondary conservation areas, 2) designs open space to protect them, 3) arranges houses outside of those protected areas and 4) lays out streets, lots and infrastructure.

Low Impact Development

Low Impact Development (LID) is essentially a stormwater management approach that implements small, decentralized, cost-effective techniques at the lot level. Stormwater is not conveyed to large detention facilities, but rather addressed at the source to resemble the site's predevelopment hydrology. LID meets Pennsylvania's Stormwater Management Policy that requires that post-development runoff rates throughout a watershed do not exceed pre-development levels. The key distinction of LID from other strategies is that LID designs development as a functioning part of the hydrologic system rather than land conservation and growth management.

Model Ordinances for Environmental Protection

In Lebanon County, environmentally sensitive areas are geographic areas recommended for permanent preservation. These areas include the interior forest habitats of the Blue Mountain-Kittatinny Ridge, the unbroken tracts of forest stands in the Highlands, and the contiguous steep slope areas of these locales. Forested riparian areas of headwater streams, riparian corridors and floodplains of all streams and rivers, and prime agricultural soils are valuable resources. Wellhead water supply areas and important recharge zones, especially in the carbonate areas, also comprise essential environmental resources of the county. As previously defined, these natural features contribute to the character of the county and form a foundation for the vision of the Natural Resources Plan.

The purpose of designating environmentally sensitive areas is to preserve important environmental functions these natural features offer for wildlife habitat, water quality assimilation, stormwater drainage and flood attenuation, and infiltration and groundwater recharge. Recognizing the need for sustainable growth, only those features which are vital to preserving the environmental quality in the county are designated.

The table of model ordinances for environmental protection (Table 9-1) offers a summary of example ordinances for the protection and preservation of sensitive environmental resources. Detailed language of the ordinances is included in the appendix.

Table 9-1 Model Ordinances for Environmental Protection

Model Ordinances for Source Water Protection		
Ordinance	***Reference***	***Comment***
Wellhead Protection Zone	**South Middleton Township, Cumberland County, PA**	This model has a good set of definitions and an easy-to-reference table of regulated uses by zone. It includes three appendices of maps, pollutant thresholds, and best management practices in text and graphics. The model also addresses the specific karst geology of the Great Valley.
Reservoir Protection Overlay Zone	**U.S. Environmental Protection Agency**	The Reservoir Protection Overlay Zone regulations are intended to ensure the adequate protection of current or potential public water supply reservoirs. The establishment of these regulations is intended to protect public health, insure the availability of safe drinking water, and prevent the degradation of the water supply in the reservoir through the regulation of land uses and development within the reservoir drainage area.
Groundwater Protection Overlay District	**U.S. Environmental Protection Agency**	The purpose of the Groundwater Protection Overlay District is to protect public health and safety by minimizing contamination of shallow aquifers and preserving and protecting existing and potential sources of drinking water supplies. It is the intent to accomplish this through both public education and public cooperation, as well as by creating appropriate land use regulations that may be imposed in addition to those currently imposed by existing zoning districts or other county regulations.
Watershed Management and Protection Area Overlay	**York County, Virginia**	The Watershed Management and Protection Area Overlay District ordinance uses a watershed approach to preventing contamination of surface drinking water supplies through land use regulation and impact study requirements.
Carbonate Area District Ordinance	**West Whiteland Township, Chester County, Pennsylvania**	To protect the water resources associated with carbonate geologic formations in West Whiteland Township, from land-use and development patterns that would threaten their quality and quantity as a result of pollution and the alteration of natural drainage patterns.
Model Ordinances for Riparian Buffer Preservation and Stream Protection		
Buffer Protection and Management	**Baltimore County, Maryland**	The Buffer Protection and Management Ordinance is intended to provide riparian buffer design standards, building set backs, and buffer management criteria. The Baltimore County, Maryland ordinance includes language specifying the expansion of buffers for erodible soils and steep slopes.

Table 9-1 Model Ordinances for Environmental Protection (continued)

Model Ordinances for Riparian Buffer Preservation and Stream Protection		
Ordinance	***Reference***	***Comment***
Stream Buffer Ordinance	**U.S. Environmental Protection Agency**	The Stream Buffer Ordinance is intended to provide numerous environmental protection and resource management benefits to water resources.
Model Ordinances for Forest Conservation		
Ordinance	***Reference***	***Comment***
Timber Harvesting Ordinance	**Penn State Cooperative Extension**	The model has been developed with the intention of being fair to all stakeholders affected by a timber harvesting operation, from the local citizens to the forest landowners and the forestry industry. This balanced approach leads to an ordinance whose standards are considered to be "reasonable." In this model ordinance, eight sections deal with topics appearing most frequently in existing ordinances, each followed by a discussion of that section's function and purpose. The sections include: (1) policy; purpose, (2) scope; applicability, (3) definitions, (4) notification; preparation of a logging plan, (5) contents of the logging plan, (6) forest practices, (7) responsibility for road maintenance and repair; road bonding, and (8) enforcement.
Model Ordinances for On-Lot Disposal Systems		
Ordinance	***Reference***	***Comment***
On-Lot Management Program	**Lebanon County, Pennsylvania**	An On-Lot Management Program is designed to ensure that On-Lot Disposal Systems (OLDS) are maintained properly to avoid malfunctions or failures.

Interrelationship of Natural Resources Plan with other Elements of the Comprehensive Plan

Ridgelines, stream corridors, and geologic formations span not only municipal boundaries but also elements of community development. This integration is characterized below.

Economy

Land, minerals, vegetation and wildlife support local industries, such as agriculture, forestry, mining and quarrying and recreation. The protection and sustainable use of natural resources strengthens the economy and ensures a future for these industries.

Land Use and Infrastructure

The land use policies recommended within this plan focus growth to areas of existing and planned infrastructure. Through this growth management approach, agricultural and forested open space is conserved, energy demands are reduced, and natural communities are protected. For those resources that traverse the growth areas, greenways provide protected travel corridors. Managing land use to protect the water supply and quality ultimately benefits public water customers with minimal increases in water rates.

Transportation

Many natural resources, such as ridgelines and stream valleys, provide a naturally connected network for non-motorized, recreational travel. The Appalachian Trail and Horseshoe Trails follow the scenic ridgelines of Blue Mountain and South Mountain, respectively. The Swatara Creek Water Trail takes advantage of the creek's expansive corridor. Design and construction of transportation corridors whether hiking and paddling trails or highways and bridges need to consider the presence and function of natural resources and minimize the environmental impacts they impose on these resources.

Recreation, Historic Resource Preservation, and Greenways

Cultivating a stewardship ethic among citizens can be coordinated with other community initiatives. Outdoor recreation can draw citizen's attention to the presence and quality of forested lands. Local heritage can feature natural resources that have led to the establishment of local industries. Furthermore, the designation of greenways can raise awareness for the functions and interconnectedness of land and water resources.

Action Plan

The Natural Resources Action Plan presents actions to address the challenges of maintaining the county's natural resources with the complexities of managing growth and development. These actions were developed after consideration of 1) community input on issues and concerns, 2) review of studies and plans from other organizations, 3) inventory of significant natural resource assets and baseline conditions, and 4) evaluation of existing regulations that impact natural resources.

The Natural Resources Action Plan recognizes the importance of promoting the quality and quantity of water, land, and ecological resources while sustaining the economic vitality of Lebanon County. Although the natural resources in Lebanon County are diverse, they are interrelated. Therefore, the actions help preserve these relationships and maintain the unique character of Lebanon County.

The Action Plan begins with an overview of the strategic framework of the plan. That is, the goals and objectives that the plan will ultimately help to achieve. This is followed by the set of recommended action items that, when implemented, will work toward achieving the desired goals and objectives. For each action, an intended outcome, a proposed time horizon, lead and support partners, and funding sources are included.

Vision, Goal and Objectives

Vision

Achieving a balance among environmental, human, and economic needs in Lebanon County is a challenging task. While natural features are critical for the ecological functions and economic benefits, preserving all these natural features in a pristine state from the impacts of development is not be practical. Changing land uses will cause impacts to these natural resources that define the character of Lebanon County. However, striving to accommodate planned growth in a manner that maintains the functionality of these natural resources is a desire of the county's citizenry.

It is important that government decision-makers and the public be aware that ecologically sensitive features, such as floodplains, wetlands, and steep slopes, may be set aside and avoided upon future development. These areas are critical to the natural hydrologic functions of watersheds and serve to reduce property loss, which can lead to enormous costs for residents. Preserving natural areas can reduce soil erosion, protect water quality, improve water supply, and prevent floods, and also provide opportunities for compatible land uses such as recreational greenways and local parks.

Likewise, agriculture and forestry provide both ecological and economic benefits and preserve the aesthetic landscapes of the county. Forestry thrives on the northern and southern mountains and property owners strive to manage these lands by maintaining the

resource. The agricultural industry thrives on the fertile soils and climate of the Lebanon Valley maintaining open space area by aggressively preserving farmland through zoning and agricultural land preservation programs. Both offer sustainable production of marketable commodities while sustaining vegetated open space that filters the air.

Lebanon County's vision for its natural resources is to achieve a balance of environmental, human, and economic needs that protects environmentally sensitive areas, preserves natural resources features, sustains the integrity and function of watershed processes, maintains clean air, and enhances the unique character of Lebanon County by managing growth in the most appropriate areas. The following goals, objectives, and recommendations support that vision.

Goals and Objectives

1. Maintain and enhance the quantity and quality of water resources.

A. Promote sustainable groundwater and surface water protection through land use planning and best practices for land development.

B. Complete Act 167 studies, watershed assessments and watershed conservation plans for all watersheds in the county.

C. Minimize site disturbance and stormwater generation due to increased impervious surfaces, maximize infiltration and maintain or improve stormwater quality.

D. Support restoration of impaired streams and best practices for stream protection.

E. Support and encourage municipalities to integrate water resources planning with land use planning.

F. Coordinate protection efforts through partnerships between state and local agencies, trusts, conservation groups and private entities.

G. Maintain and update the City/County Geographic Information Systems geodatabase with current natural resources data to enable the generation of sustainability reports and the tracking of changes over time.

H. Facilitate water-based recreation activities.

2. Protect and preserve Lebanon County's diverse ecologically sensitive areas.

A. Discourage and limit development activity in ecologically sensitive areas. These areas include floodplains, wetlands, mountain ridges and steep slopes

B. Develop greenway corridors to provide connectivity between significant ecologically sensitive areas.

C. Coordinate protection efforts through partnerships between state and local agencies, trusts, conservation groups and private entities.

D. Develop and implement incentive and assistance programs for the preservation of important ecologically sensitive areas.

E. Maintain and update the City/County Geographic Information Systems geodatabase with current natural resources data to enable the generation of sustainability reports and the tracking of changes over time.

3. **Protect prime farmland, sustain the agricultural economy, and promote the rural heritage of Lebanon County.**
   A. Develop and implement a comprehensive agricultural sustainability strategy.
   B. Increase agri-tourism within the county.
   C. Maintain and update the City/County Geographic Information Systems geodatabase with current natural resources data to enable the generation of sustainability reports and the tracking of changes over time.

4. **Encourage a healthy balance between the economic benefits of forestry and mineral extraction and the sustainability of the operation and associated effects on the natural environment.**
   A. Support initiatives to minimize effects on the natural environment, including the potential for pollution of the groundwater, that are associated with mineral extraction and quarrying operations.
   B. Encourage responsible mineral extraction operations within the county.
   C. Promote the multiple benefits that the woodlands and forests in Lebanon County have to offer.
   D. Coordinate an educational program to promote woodland management planning with local property owners and the Lebanon County Conservation District.
   E. Support the initiatives of Audubon Pennsylvania to focus public attention on the importance of the forested ridge, to promote conservation activities, and to protect the ridge from further habitat loss, fragmentation, and inappropriate land use.
   F. Coordinate protection efforts through the promotion of partnerships between state and local agencies, trusts, conservation groups and private entities.
   G. Maintain and update the City/County Geographic Information Systems geodatabase with current natural resources data to enable the generation of sustainability reports and the tracking of changes over time.

5. **Maintain EPA's attainment status for air quality in Lebanon County.**
   A. Measure air quality and assess trends.
   B. Acknowledge air quality impacts from development in public policy.
   C. Promote voluntary air pollution reduction among citizens.

Recommendations

Goal 1:	**Maintain and enhance the quantity and quality of water resources.**
Objective 1A:	**Promote groundwater and surface water protection through land use planning and best practices for land development and land management.**
Action 1A1:	**Improve surface water quality in streams assessed as impaired to achieve state designated use water quality standards in all streams.**
Intended Outcome:	Implementation of the Total Maximum Daily Load (TMDL) recommendations. Reduction in the number of impaired streams from the Integrated Water Quality Monitoring and Assessment List in Lebanon County, beginning with the headwater streams and those streams supporting the most sensitive resources.
Time Horizon:	Ongoing throughout plan implementation and updates
Lead Partners:	Pennsylvania Department of Environmental Protection; Lebanon County Conservation District
Support Partners:	Local watershed associations; Chesapeake Bay Foundation
Funding Sources:	Pennsylvania Department of Environmental Protection and Pennsylvania Department of Conservation and Natural Resources Growing Greening Grant Program; Chesapeake Bay Targeted Watersheds Grant Program
Action 1A2:	**Improve aquifer recharge and groundwater quality by identifying significant aquifer recharge areas and developing overlay ordinances to protect and preserve those areas most critical to the groundwater supply.**
Intended Outcome:	Municipal governments are provided important resource feature information to assist in planning for future growth.
Time Horizon:	2008-2009
Lead Partners:	Lebanon County Planning Department; Lebanon County Conservation District; Municipalities
Support Partners:	Pennsylvania Department of Environmental Protection Bureau of Watershed Management; Water Planning Office; U.S. Geological Survey; PA Bureau of Topographic and Geological Survey; Susquehanna River Basin Commission; Delaware River Basin Commission.
Funding Sources:	Pennsylvania Department of Environmental Protection and Pennsylvania Department of Conservation and Natural Resources Growing Greener Grant Program; U.S. Geological Survey Cooperative Water Program

Action 1A3:	***Accelerate agricultural management training, planning, and BMP implementation by developing and updating Agricultural Conservation Plans and Nutrient Management Plans as a means to conserve soil and water resources.***
Intended Outcome:	Improved groundwater quality, i.e. reduction of groundwater contaminants from agriculture.
Time Horizon:	Ongoing throughout plan implementation and updates
Lead Partners:	Lebanon County Conservation District
Support Partners:	Pennsylvania Farm Bureau; Natural Resource Conservation Service; Pennsylvania Department of Agriculture, State Conservation Commission; Lebanon County Cooperative Extension Office
Funding Sources:	Nutrient Management Grant Program; Plan Development Incentives Program; Agri-Link Investment Program; Chesapeake Bay Financial Assistance Program; Environmental Quality Incentive Program

Action 1A4:	***Complete a comprehensive study of Lebanon County's water resources to provide guidance and recommendations to accommodate existing land use and planned growth in a manner that preserves the quality and quantity of the streams and aquifers.***
Intended Outcome:	Information on location, availability, and vulnerability of the water resource supply. Specified community growth and resource protection areas.
Time Horizon:	2010-2011
Lead Partners:	Lebanon County Planning Department; Lebanon County Conservation District; Municipalities
Support Partners:	PA DEP Bureau of Watershed Management; Land Develop Companies
Funding Sources:	PENNVEST Low Interest Loans; Pennsylvania Department of Environmental Protection Stormwater Management Grants; Pennsylvania Department of Community and Economic Development

Objective 1B:	**Support the development of watershed-based stormwater management plans.**
Action 1B1:	***Complete Act 167 plans for the six remaining designated watersheds in Lebanon County with the priority watersheds being those in the high growth areas of Lebanon County.***
Intended Outcome:	Completion of stormwater management plans for all of Lebanon County. Improved management of stormwater for appropriate groundwater and surface water recharge.
Time Horizon:	2008-2009 for Quittapahilla and Spring Creek; 2010-2011 for Swatara Creek; 2012-2013 for Conewago and Little Chiques Creek; 2014-2015 for Stony Creek
Lead Partners:	PADEP Bureau of Watershed Management, Stormwater Management Program; Lebanon County Conservation District, Lebanon County Planning Department
Support Partners:	Municipalities; Developers
Funding Sources:	PENNVEST Low Interest Loans; Pennsylvania Department of Environmental Protection Stormwater Management Grants

Objective 1C:	**Minimize site disturbance and stormwater generation due to increased impervious surfaces, maximize infiltration and maintain or improve stormwater quality.**
Action 1C1:	***Provide information and technical assistance on low impact development and design techniques.***
Intended Outcome:	Review of all municipal ordinances for unnecessary requirements for impervious cover for land development. Incorporation of low impact development and design standards.
Time Horizon:	Ongoing throughout plan implementation and updates
Lead Partners:	Municipalities; Municipal engineers; Land Development Companies
Support Partners:	Center for Watershed Protection, Builders for the Bay; Pennsylvania Department of Community and Economic Development; Chesapeake Bay Program; Center for Chesapeake Communities; U.S. Environmental Protection Agency
Funding Sources:	Municipalities; Pennsylvania Department of Community and Economic Development

Action 1C2:	***Support multi-municipal efforts for stormwater management through consistent implementation and enforcement of ordinances from adopted Act 167 plans.***
Intended Outcome:	Reduction in stormwater generation.
Time Horizon:	2010-2011
Lead Partners:	Lebanon County Planning Department; Municipalities
Support Partners:	Lebanon County Conservation District
Funding Sources:	PENNVEST Low Interest Loans; Pennsylvania Department of Environmental Protection Stormwater Management Grants

Objective 1D:	**Support restoration of impaired streams and best practices for stream protection.**
Action 1D1:	***Design and install stream improvements to achieve reasonable results for aquatic environments and water quality.***
Intended Outcome:	Improved stream habitat and water quality with recognition that restoration of impacted waterways may have limitations; some human impacts cannot be removed or cannot be removed at a reasonable cost to the community. Maintenance of Chapter 93 stream designations and meet state water quality standards.
Time Horizon:	Ongoing throughout plan implementation and updates
Lead Partners:	Lebanon County Conservation District
Support Partners:	Local watershed associations; Municipalities; Developers
Funding Sources:	Pennsylvania Department of Conservation and Natural Resources Growing Greener Land Acquisition Grant and Pennsylvania Department of Environmental Protection Growing Greener Stream Restoration
Action 1D2:	***Support adoption of stream buffer ordinances.***
Intended Outcome:	Improved stream habitat and water quality.
Time Horizon:	2010-2011
Lead Partners:	Lebanon County Conservation District
Support Partners:	Local watershed groups; Municipalities; Developers; Lebanon County Planning Department
Funding Sources:	Pennsylvania Department of Conservation and Natural Resources Growing Greener Land Acquisition Grant; Pennsylvania Department of Environmental Protection Growing Greener Stream Restoration

Objective 1E:	**Support and encourage municipalities to integrate water resources planning with land use planning.**
Action 1E1:	***Expand public water and sewer service only to designated growth areas.***
Intended Outcome:	Reduced rate of development of rural lands; protection of recharge areas.
Time Horizon:	Ongoing throughout plan implementation and updates
Lead Partners:	Municipal Authorities; Municipalities; Agencies that Fund Infrastructure such as PENNVEST, USDA, and local financial institutions
Support Partners:	Pennsylvania Infrastructure Investment Authority; Pennsylvania Department of Environmental Protection
Funding Sources:	PENNVEST; Pennsylvania Department of Environmental Protection Act 537 Sewage Facilities Planning Grants; Clean Water State Revolving Fund; Drinking Water State Revolving Fund; Engineering Services Program
Action 1E2:	***Using the Act 537 guidelines and model On-Lot Disposal Systems (OLDS) ordinances, develop on-lot management districts.***
Intended Outcome:	Maintenance of on-lot disposal systems (OLDS) for the protection of groundwater and surface water.
Time Horizon:	2012-2013
Lead Partners:	Municipalities
Support Partners:	Lebanon County Planning Department; Pennsylvania Department of Environmental Protection
Funding Sources:	PENNVEST Homeowner Loans; Pennsylvania Department of Environmental Protection Act 537 Sewage Facilities Enforcement Reimbursements
Action 1E3:	***Develop wellhead protection programs for all public wells, using PADEP guidance.***
Intended Outcome:	Wellhead protection for all public water system wells, beginning with public wells in carbonate aquifers.
Time Horizon:	2010-2011
Lead Partners:	Municipal Water Authorities and Water Purveyors
Support Partners:	Lebanon County Planning Department; PA DEP Bureau of Watershed Management; Lebanon County Conservation District
Funding Sources:	Pennsylvania Source Water Protection Program; Pennsylvania Water Resources Education Network; Pennsylvania Rural Water Association

Action 1E4:	***Prepare Integrated Resource Plans to meet future water supply and wastewater needs.***
Intended Outcome:	Planning for the entire water cycle from source water supplies, to treatment, to wastewater treatment and discharge/infiltration in the context of projected growth.
Time Horizon:	2008-2009
Lead Partners:	Municipalities; Municipal Authorities
Support Partners:	Pennsylvania Department of Environmental Protection; State Water Planning Office
Funding Sources:	PENNVEST Homeowner Loans; Pennsylvania Department of Environmental Protection Act 537 Sewage Facilities Enforcement Reimbursements; Act 220 State Water Plan

Action 1E5:	***Encourage communitywide resolution of sewage disposal problems.***
Intended Outcome:	Consensus on the need for sewer service to villages, particularly those where growth is planned.
Time Horizon:	2008-2009
Lead Partners:	Municipalities; Municipal Authorities
Support Partners:	Pennsylvania Department of Environmental Protection; State Water Planning Office
Funding Sources:	Municipalities

Objective 1F:	**Coordinate protection efforts through the promotion of partnerships between state and local agencies, trusts, conservation groups and private entities.**
Action 1F1:	***Review development proposals for consistency with watershed studies.***
Intended Outcome:	Implementation of adopted watershed management plans, e.g., River Conservation Plans and Stormwater Management Plans.
Time Horizon:	2008-2009
Lead Partners:	Municipalities; Lebanon County Planning Department
Support Partners:	Pennsylvania Department of Conservation and Natural Resources, Rivers Conservation Program; Swatara Creek Watershed Association; Quittapahilla Watershed Association; Tri-County Conewago Creek Association; Pennsylvania Department of Environmental Protection South-central Regional Office
Funding Sources:	Municipalities

Action 1F2:	***Consolidate water resources information for shared use by all stakeholders.***
Intended Outcome:	Convenient access to water resource data and water management tools by county, local officials and citizens for planning and decision-making.
Time Horizon:	2012-2013
Lead Partners:	PA DEP State Water Plan; Lebanon County Conservation District; Lebanon County Planning Department; Municipalities
Support Partners:	Susquehanna River Basin Commission; Delaware River Basin Commission; U.S. Geological Survey; Municipal Water Authorities; Lebanon County Conservation District; Watershed Associations
Funding Sources:	State Legislative Earmark for Water Resources Planning Act

Objective 1G:	**Maintain and update the City/County Geographic Information System geodatabases with current natural resources data to enable the generation of sustainability reports and the tracking of changes over time.**
Action 1G1:	***Compile water resources information in a comprehensive database from current and future resource assessment investigations and planning projects.***
Intended Outcome:	Convenient access to spatial water resource data county and local officials and citizens. Application of such data and tools to local planning and decision-making.
Time Horizon:	2012-2013
Lead Partners:	Lebanon County Conservation District; Lebanon City/County GIS; Municipal GIS
Support Partners:	Municipalities; U.S. Geological Survey; Susquehanna River Basin Commission; Delaware River Basin Commission; Pennsylvania Department of Environmental Protection, Water Panning Office; Pennsylvania Spatial Data Access (PASDA)
Funding Sources:	Pennsylvania Department of Environmental Protection Growing Greener Program; U.S. Geological Survey Cooperative Funds; County and Municipalities
Action 1G2:	***Measure and report the progress of stream restoration efforts.***
Intended Outcome:	Regular reporting of progress toward implementation of TMDL plans and removal of streams from the 303(d) impaired waters list.
Time Horizon:	Ongoing throughout plan implementation and updates
Lead Partners:	Lebanon County Conservation District; Local watershed associations
Support Partners:	EPA Chesapeake Bay Program, PA DEP Chesapeake Bay Program, Lebanon County Conservation District, Swatara Creek Watershed Association; Quittapahilla Watershed Association; Tri-County Conewago Creek Association; Chesapeake Bay Foundation; Trout Unlimited, PA Game Commission; PA Fish and Boat Commission
Funding Sources:	Chesapeake Bay Target Watershed Program; Pennsylvania Department of Environmental Protection Growing Greener Program

Objective 1H:	**Facilitate water-based recreation activities.**
Action 1H1:	***Link water trail system to other recreation, cultural and open space assets.***
Intended Outcome:	Improved/expanded public access to water resources for recreation. Improved public understanding of the need to preserve and protect the water resources.
Time Horizon:	2012-2013
Lead Partners:	Local watershed associations
Support Partners:	Lebanon County Planning Department; Municipal Park and Recreation Boards; Pennsylvania Fish and Boat Commission; Trout Unlimited.
Funding Sources:	Pennsylvania Fish and Boat Commission; Pennsylvania Department of Conservation and Natural Resources
Action 1H2:	***Expand water resource access opportunities to encourage public use.***
Intended Outcome:	Improved/expanded public access to water resources for recreation. Improved public understanding of the need to preserve and protect the water resources.
Time Horizon:	2014-2015
Lead Partners:	Lebanon County Planning Department; Municipal Park and Recreation Boards
Support Partners:	Pennsylvania Fish and Boat Commission; Local watershed associations; Trout Unlimited
Funding Sources:	Pennsylvania Fish and Boat Commission; Pennsylvania Department of Conservation and Natural Resources

Goal 2:	**Protect and preserve Lebanon County's diverse ecologically sensitive areas.**
Objective 2A:	**Discourage and limit development activity in ecologically sensitive areas.**
Action 2A1:	***Incorporate steep slope protection provisions in local regulations for Bethel, Cold Spring, North Londonderry, North Annville, and South Annville Townships and Mt. Gretna Borough.***
Intended Outcome:	Implementation of consistent steep slope provisions. Protection of public safety and preservation of environmental resources.
Time Horizon:	2008-2009
Lead Partners:	Lebanon County Planning Department; Municipalities
Support Partners:	Municipalities with existing steep slope protection provisions; Lebanon County Conservation District
Funding Sources:	Municipalities

Action 2A2:	***Review existing steep slope provisions and strengthen them to address the ten steep slope topics.***
Intended Outcome:	Implementation of consistent steep slope provisions and strengthening provisions lacking specific criteria for ecologically sensitive areas.
Time Horizon:	2008-2009
Lead Partners:	Lebanon County Planning Department; Municipalities
Support Partners:	Kittatinny Coalition; USDA Forest Service; PA Highlands
Funding Sources:	Municipalities; Pennsylvania Department of Conservation and Natural Resources Growing Greener; National Fish and Wildlife Grant Program

Objective 2B:	**Develop greenway corridors to provide connectivity between significant ecologically sensitive areas.**
Action 2B1:	***Designate the following as conservation greenways: the Blue Mountain/Kittatinny Ridge, the Highlands, the Swatara Creek Greenway, the Little Swatara Creek Greenway, the Quittapahilla Creek Greenway, and the Tulpehocken Greenway.***
Intended Outcome:	Designation of priority corridors for resource stewardship.
Time Horizon:	2008-2009
Lead Partners:	Lebanon County Planning Department; Lebanon Valley Conservancy
Support Partners:	Municipalities; Local watershed associations; DCNR; Lebanon County Conservation District; Lebanon County Agricultural Land Preservation Board
Funding Sources:	Pennsylvania Department of Conservation and Natural Resources; Pennsylvania Department of Environmental Protection; Municipalities
Action 2B2:	***Seek acquisitions, easements and stewardship plans to protect conservation greenway corridors.***
Intended Outcome:	Managed stewardship of conservation greenways.
Time Horizon:	2010-2011
Lead Partners:	Lebanon County Conservation District; Lebanon County Agricultural Preservation Board; Lebanon Valley Conservancy
Support Partners:	Lebanon County Planning Department; Municipalities
Funding Sources:	Lebanon County Commissioners; Lebanon County Conservation District; Federal Farm and Ranchlands Protection Program; Pennsylvania Department of Agriculture; Commonwealth of Pennsylvania Growing Greener, DCNR

Action 2B3:	***Explore feasibility of additional conservation greenways, e.g. between the Swatara/Little Swatara and Quittapahilla Creek greenways, and between the Highlands and the Quittapahilla Creek greenway.***
Intended Outcome:	Improved connectivity of conservation greenways.
Time Horizon:	2012-2013
Lead Partners:	Lebanon County Conservation District; Lebanon Valley Conservancy
Support Partners:	Lebanon County Planning Department; Municipalities
Funding Sources:	PA Growing Greener; Pennsylvania Department of Conservation and Natural Resources

Objective 2C:	**Coordinate protection efforts through partnerships between state and local agencies, trusts, conservation groups and private entities.**
Action 2c1:	***Review development proposals for consistency with watershed studies.***
Intended Outcome:	Acceptance and implementation of local watershed studies through municipal ordinances and enforcement.
Time Horizon:	Ongoing throughout plan implementation and updates
Lead Partners:	Local watershed associations; Municipal engineers; Lebanon County Planning Department
Support Partners:	Developers
Funding Sources:	Pennsylvania Department of Community and Economic Development, Pennsylvania Department of Environmental Protection
Action 2C2:	***Develop an educational process to assist in protection efforts.***
Intended Outcome:	An improved resource stewardship ethic among Lebanon County citizens.
Time Horizon:	2014-2015
Lead Partners:	Lebanon County Conservation District
Support Partners:	Lebanon County Planning Department; Municipalities; Local watershed associations; Developers
Funding Sources:	Pennsylvania Department of Conservation and Natural Resources; and Pennsylvania Department of Environmental Protection; Lebanon County Conservation District

Action 2C3:	**Educate municipal officials, municipal staff and the public on conservation strategies and associated benefits, using meetings, county publications, newspaper and online articles, and other methods, as appropriate.**
Intended Outcome:	An improved resource stewardship ethic among local officials and citizens.
Time Horizon:	Ongoing throughout plan implementation and updates
Lead Partners:	Lebanon County Conservation District
Support Partners:	Lebanon County Planning Department; Municipalities; Local watershed associations; Developers; Lebanon Valley Conservancy; LEBCO MPO
Funding Sources:	Pennsylvania Department of Conservation and Natural Resources; Pennsylvania Department of Environmental Protection; Lebanon County Conservation District; LEBCO MPO

Action 2C4:	***Support the establishment, development and utilization of the Lower Susquehanna Center for Land and Water.***
Intended Outcome:	Regional center for technical, funding, outreach and administrative assistance on water resources issues.
Time Horizon:	2008-2009
Lead Partners:	Lebanon County Conservation District; Lebanon County Planning Department
Support Partners:	Lebanon Valley Conservancy; Local watershed associations; Municipalities
Funding Sources:	Pennsylvania Department of Conservation and Natural Resources; Pennsylvania Department of Environmental Protection; Pennsylvania Department of Community and Economic Development

Objective 2D:	**Develop and implement incentive and assistance programs for the preservation of important ecologically sensitive areas.**
Action 2D1:	***Identify areas for effective wetland banking program.***
Intended Outcome:	Lebanon County Conservation District manages opportunities for wetland restoration, educates the public of the benefits of wetland restoration and opportunities to secure assistance and funding for wetland restoration.
Time Horizon:	2008-2009
Lead Partners:	Lebanon County Conservation District, DEP
Support Partners:	Lebanon County Planning Department
Funding Sources:	Growing Greener, Pennsylvania Department of Environmental Protection Nonpoint Source Implementation Program (Section 319) grants, Farm Service Agency Conservation Reserve Enhancement Program (CREP); Pennsylvania Game Commission; PennDOT

Action 2D2:	***Work with municipalities in updating floodplain delineation.***
Intended Outcome:	Floodplain practices, associated ordinances, and FEMA mapping have been reviewed and best management practices have been implemented.
Time Horizon:	2008-2009
Lead Partners:	Lebanon County Conservation District; FEMA; Lebanon County Planning Department
Support Partners:	Municipalities
Funding Sources:	FEMA

Objective 2E:	**Maintain and update the City/County Geographic Information Systems geodatabase with current natural resources data to enable the generation of sustainability reports and the tracking of changes over time.**
Action 2E1:	***Measure and report the progress of open space protection initiatives.***
Intended Outcome:	Regular reporting of open space protection achievements and priority threats.
Time Horizon:	Ongoing throughout plan implementation and updates
Lead Partners:	Lebanon County Planning Department; Lebanon Valley Conservancy
Support Partners:	Lebanon County Conservation District; Pennsylvania Department of Conservation and Natural Resources; Pennsylvania Department of Environmental Protection
Funding Sources:	Pennsylvania Department of Conservation and Natural Resources; Pennsylvania Department of Environmental Protection; Lebanon Valley Conservancy
Action 2E2:	***Measure and report the progress of greenway efforts.***
Intended Outcome:	Regular reporting of greenway conservation and enhancement achievements.
Time Horizon:	Ongoing throughout plan implementation and updates
Lead Partners:	Lebanon County Planning Department
Support Partners:	Lebanon County Conservation District; Pennsylvania Department of Conservation and Natural Resources; Pennsylvania Department of Environmental Protection
Funding Sources:	Pennsylvania Department of Conservation and Natural Resources; Pennsylvania Department of Environmental Protection; Lebanon Valley Conservancy

Action 2E3:	***Install stream gauges and program data collection and delivery to the geodatabase.***
Intended Outcome:	Improved stream data.
Time Horizon:	Ongoing throughout plan implementation and updates
Lead Partners:	Lebanon County Conservation District
Support Partners:	Lebanon County Planning Department; Pennsylvania Department of Conservation and Natural Resources; Pennsylvania Department of Environmental Protection
Funding Sources:	Pennsylvania Department of Environmental Protection

Goal 3:	**Protect prime farmland, sustain the agricultural economy, and promote the rural heritage of Lebanon County.**
Objective 3A:	**Develop and implement a comprehensive agricultural sustainability strategy.**
Action 3A1:	***Coordinate municipal long range planning acknowledging farming as a developed land use.***
Intended Outcome:	Understanding by local officials and citizens of agriculture as a built land use. Adoption and implementation of effective agricultural zoning.
Time Horizon:	2010-2011
Lead Partners:	Lebanon County Planning Department
Support Partners:	Lebanon County Conservation District; Local farmers
Funding Sources:	Pennsylvania Department of Community and Economic Development

Action 3A2:	***Establish a farmland preservation target, criteria for preservation, and permanent funding to achieve target.***
Intended Outcome:	Preservation of sufficient farmland to sustain the agricultural industry.
Time Horizon:	2008-2009
Lead Partners:	Lebanon County Commissioners; Lebanon County Conservation District; Lebanon County Agricultural Land Preservation Board; Lebanon Valley Conservancy
Support Partners:	Local farmers; Municipalities
Funding Sources:	Bond financing; U.S. Farm and Ranchlands Protection Program; Lebanon County Commissioners; Lebanon County Conservation District; Municipalities; Pennsylvania Department of Agriculture

Action 3A3:	***Establish a program to educate farmers on financial matters, maintaining existing farms and transitioning farms to new farmers.***
Intended Outcome:	Improved access to farm business assistance programs. Improved retention of farmers and active farmland.
Time Horizon:	2012-2013
Lead Partners:	Lebanon County Conservation District; Penn State Cooperative Extension
Support Partners:	Pennsylvania Department of Agriculture's Center for Farmland Transition; Local farmers; PA Farmlink
Funding Sources:	Pennsylvania Department of Agriculture

Objective 3B: Increase agri-tourism within the county.

Action 3B1:	***Identify farms using innovative farming practices.***
Intended Outcome:	Identification of potential agri-tourism sites. Shared knowledge of innovative practices.
Time Horizon:	2014-2015
Lead Partners:	Agricultural Farming Coordinator
Support Partners:	Lebanon County Planning Department; Lebanon County Conservation District
Funding Sources:	Pennsylvania Department of Agriculture

Action 3B2:	***Establish a heritage farm recognition/certification program.***
Intended Outcome:	Recognition of historical farms in Lebanon County. Increased public awareness for long-term farms and farming in the county.
Time Horizon:	2010-2011
Lead Partners:	Lebanon County Conservation District; Preservation Trust of Lebanon County; Lebanon County Historical Society
Support Partners:	Lebanon County Chamber of Commerce, Lebanon County Tourism Promotion Agency; Lebanon County Recorder of Deeds, Assessment and MIS Offices
Funding Sources:	Pennsylvania Department of Community and Economic Development; Lebanon Valley Chamber of Commerce

Action 3B3:	*Establish a historic barn recognition program.*
Intended Outcome:	Recognition of historical barns in Lebanon County. Increased public awareness for long-term farms and farming in the county.
Time Horizon:	2010-2011
Lead Partners:	Lebanon County Historical Society; Preservation Trust of Lebanon County
Support Partners:	Lebanon Valley Chamber of Commerce; Lebanon County Conservation District
Funding Sources:	Capital Campaign

Action 3B4:	*Develop a Blue Ribbon Passport Program for Lebanon County.*
Intended Outcome:	Lebanon County will have a successful program that highlights its agricultural heritage, historic structures, bed and breakfasts, and farmers market.
Time Horizon:	2012-2013
Lead Partners:	Pennsylvania Department of Agriculture, Lebanon County Tourism Promotion Agency; Lebanon Valley Chamber of Commerce
Support Partners:	Local farmers; Businesses; Lebanon County Planning Department; Lebanon County Conservation District
Funding Sources:	Pennsylvania Department of Agriculture; DCED; Lebanon County Chamber of Commerce, PennDOT; Pennsylvania Department of Conservation and Natural Resources

Objective 3C:	**Maintain and update the City/County Geographic Information Systems geodatabase with current natural resources data to enable the generation of sustainability reports and the tracking of changes over time.**
Action 3C1:	***Measure and report the success and progress of farmland preservation efforts.***
Intended Outcome:	Regular reporting of progress toward the target farmland preservation goal.
Time Horizon:	Ongoing throughout plan implementation and updates
Lead Partners:	Lebanon County Conservation District; Lebanon City/County GIS Department
Support Partners:	Lebanon County Planning Department
Funding Sources:	Lebanon County Conservation District

Action 3C2:	***Measure and report on the progress of ASA enrollments.***
Intended Outcome:	Regular reporting of ASA enrollments as a leading indicator of interest in the farmland preservation program.
Time Horizon:	Ongoing throughout plan implementation and updates
Lead Partners:	Lebanon County Conservation District; Lebanon City/County GIS Department; Lebanon County Recorder of Deeds and Assessment Offices
Support Partners:	Lebanon County Planning Department
Funding Sources:	Lebanon County Conservation District

Action 3C3:	***Measure and report on lands lost to unplanned development.***
Intended Outcome:	Regular reporting of the amount of farmland lost to unplanned development.
Time Horizon:	Ongoing throughout plan implementation and updates
Lead Partners:	Lebanon County Conservation District; Lebanon City/County GIS Department
Support Partners:	Lebanon County Planning Department
Funding Sources:	Lebanon County Conservation District

Goal 4:	**Encourage a healthy balance between the economic benefits of mineral extraction and the sustainability of the operation and associated effects on the natural environment.**
Objective 4A:	**Support initiatives to minimize effects on the natural environment, including the potential for pollution of the groundwater, that are associated with mineral extraction and quarrying operations.**
Action 4A1:	***Monitor streams to limit the impact of pollution from mineral extraction and quarry operations.***
Intended Outcome:	Development of baseline water quality data downstream from mineral extraction sites.
Time Horizon:	2012-2013
Lead Partners:	Lebanon County Conservation District
Support Partners:	Lebanon County Planning Department; Municipalities
Funding Sources:	Pennsylvania Department of Community and Economic Development; Pennsylvania Department of Environmental Protection

Objective 4B:	**Encourage responsible mineral extraction operations within the county.**
Action 4B1:	***Establish performance criteria to limit environmental impacts, e.g. noise, dust, etc.***
Intended Outcome:	Adoption of performance criteria in local ordinance provisions associated with mineral extraction.
Time Horizon:	2014-2015
Lead Partners:	Lebanon County Conservation District
Support Partners:	Municipalities; Lebanon County Planning Department
Funding Sources:	Pennsylvania Department of Community and Economic Development; Pennsylvania Department of Environmental Protection
Action 4B2:	***Require mine land reclamation consistent with planned growth and conservation goals.***
Intended Outcome:	Adoption of mine land reclamation provisions into local ordinances.
Time Horizon:	2012-2013
Lead Partners:	Lebanon County Planning Department
Support Partners:	Municipalities
Funding Sources:	Pennsylvania Department of Community and Economic Development
Action 4B3:	***Consider development of mineral resource districts, mineral resource protection policies or other appropriate measures to protect the resource and to balance mineral extraction with other land uses.***
Intended Outcome:	Sound planning for future mineral extraction activities.
Time Horizon:	2010-2011
Lead Partners:	Lebanon County Planning Department
Support Partners:	Municipalities
Funding Sources:	Pennsylvania Department of Community and Economic Development; Pennsylvania Department of Environmental Protection

Objective 4C:	**Promote the multiple benefits that the woodlands and forests in Lebanon County have to offer.**
Action 4C1:	***Develop information and strategies to increase public awareness of Kittatinny Ridge and Highlands Region values and threats.***
Intended Outcome:	Increased understanding by local officials and the public on the environmental and recreational assets that the woodlands offer.
Time Horizon:	2010-2011
Lead Partners:	Lebanon County Conservation District
Support Partners:	United States Geological Survey; Pennsylvania State University; USDA Forest Service; Kittatinny Coalition; DCNR Bureau of Forestry
Funding Sources:	U.S. Environmental Protection Agency Environmental Education Grants Program; National Fish and Wildlife Foundation; Pennsylvania Department of Environmental Protection Environmental Education Grant Program; Water Resources Education Network.

Objective 4D:	**Coordinate an educational program to promote woodland management planning with local property owners and the Lebanon County Conservation District.**
Action 4D1:	***Develop landowner habitat enhancement and protection initiatives to help private land owners with stewardship and conservation options.***
Intended Outcome:	Implementation of healthy forestry practices to maintain sustainable woodlands, capable of timber production and multiple uses.
Time Horizon:	Ongoing throughout plan implementation and updates
Lead Partners:	Lebanon County Conservation District
Support Partners:	USDA Forest Service; Kittatinny Coalition; DCNR Bureau of Forestry
Funding Sources:	USDA Forest Service
Action 4D2:	***Work with the Forest Stewardship Program to assist forest landowners in better managing their forestlands by providing information, education, and technical assistance.***
Intended Outcome:	Improved understanding of the short-term and long-term benefits of improved forest management activities through adequate planning.
Time Horizon:	Ongoing throughout plan implementation and updates
Lead Partners:	DCNR Bureau of Forestry
Support Partners:	USDA Forest Service
Funding Sources:	Voluntary technical assistance program

Action 4D3:	***Work with the Pennsylvania Sustainable Forestry Initiative to assist forest landowners in better managing their forestlands by providing information, education, and technical assistance.***
Intended Outcome:	Abundant, healthy, and productive forest resources for future generations have been sustained.
Time Horizon:	Ongoing throughout plan implementation and updates
Lead Partners:	PASFI (the state implementing agency of SFI, Inc.)
Support Partners:	Lumber and wood product industry partners
Funding Sources:	PASFI technical assistance program; Pennsylvania Hardwoods Development Council of the Pennsylvania Department of Agriculture

Objective 4E:	**Support the initiatives of Audubon Pennsylvania to focus public attention on the importance of the forested ridge, to promote conservation activities, and to protect the ridge from further habitat loss, fragmentation, and inappropriate land use.**
Action 4E1:	***Implement the recommendations of the Conservation Plan for Kittatinny Ridge Conservation Corridor.***
Intended Outcome:	Maintenance of the ecological integrity and viewshed of the Kittatinny Ridge.
Time Horizon:	2010-2011
Lead Partners:	Audubon Pennsylvania
Support Partners:	Lebanon County Conservation District; Nature Conservancy of Pennsylvania; Kittatinny Coalition
Funding Sources:	Pennsylvania Department of Conservation and Natural Resources

Action 4E2:	***Support Part 2 of the Highlands Regional Study in order to develop the most promising strategies to conserve the resource.***
Intended Outcome:	The priority lands and natural resources in the Highlands Region have been conserved.
Time Horizon:	2010-2011
Lead Partners:	USDA Forest Service
Support Partners:	United States Geological Survey; Pennsylvania State University; Pennsylvania Department of Conservation and Natural Resources
Funding Sources:	USDA Forest Service

Objective 4F:	**Coordinate protection efforts through the promotion of partnerships between state and local agencies, trusts, conservation groups and private entities.**
Action 4F1:	***Support the efforts of the Kittatinny Coalition.***
Intended Outcome:	Increased membership in the Coalition by Lebanon County stakeholders.
Time Horizon:	Ongoing throughout plan implementation and updates
Lead Partners:	Audubon Pennsylvania; Kittatinny Coalition
Support Partners:	Central Pennsylvania Conservancy; Lebanon Valley Conservancy; Fort Indiantown Gap; Lebanon County Conservation District; The Nature Conservancy of PA; Wildlands Conservancy; Pennsylvania Department of Conservation and Natural Resources; PA Environmental Council; PA Land Trust Association; Pennsylvania Forest Products Association
Funding Sources:	Growing Greener Grant Program; USDA Forest Service

Objective 4G:	**Maintain and update the City/County Geographic Information Systems geodatabase with current natural resources data to enable the generation of sustainability reports and the tracking of changes over time.**
Action 4G1:	***Monitor changes in woodland and forest cover.***
Intended Outcome:	Regular reporting of changes in forest cover.
Time Horizon:	Ongoing throughout plan implementation and updates
Lead Partners:	Lebanon City/County Geographic Information Systems Department
Support Partners:	Lebanon County Planning Department; Municipalities; DEP; DCNR Bureau of Forestry; USDA Forest Service-Highlands Region Project; PA Spatial Data Access
Funding Sources:	Municipalities; Lebanon County

Action 4G2:	***Monitor and report protection status of Natural Area Inventory sites.***
Intended Outcome:	Regular reporting of the progress made toward the protection of NAI sites through stewardship and land preservation.
Time Horizon:	Ongoing throughout plan implementation and updates
Lead Partners:	Lebanon City/County Geographic Information Systems Department
Support Partners:	Lebanon County Planning Department; Municipalities; Nature Conservancy Technical Science Office; DEP; DCNR Bureau of Forestry; USDA Forest Service-Highlands Region Project; PA Spatial Data Access
Funding Sources:	Municipalities; Lebanon County Planning Department; Pennsylvania Department of Conservation and Natural Resources Wild Resource Conservation Fund and Community Conservation Partnership Program

Goal 5:	Maintain EPA's attainment status for air quality in Lebanon County.
Objective 5A:	**Measure air quality and assess trends.**
Action5A1:	**Monitor baseline air quality data, analyze trends, and report findings with the best available (regional) data from DEP and PennDOT.**
Intended Outcome:	Reduce the negative air quality effects from stationary and mobile sources.
Time Horizon:	2008-2009 and ongoing
Lead Partners:	Lebanon County Planning Department; LEBCO MPO; PennDOT; DEP
Support Partners:	Air Quality Partnership; FHWA; FTA; EPA
Funding Sources:	Public/private partnerships; Current and future TIPs
Objective 5B:	**Acknowledge air quality impacts from development in public policy.**
Action 5B1:	**Participate in PA DEP pollutant permit reviews for industrial sites.**
Intended Outcome:	Develop a working knowledge of local air pollutant types and sources
Time Horizon:	2008-2009 and ongoing
Lead Partners:	Lebanon County Planning Department; Municipalities
Support Partners:	LEBCO MPO
Funding Sources:	Lebanon County and Municipalities for staff time

Action 5B2:	**Revise zoning to reduce travel demands, i.e. through use of mixed use zoning and bicycle/pedestrian linkages (Energy Conservation Plan Action Item 1F1).**
Intended Outcome:	Reduce the dependency on the single occupant automobile by promoting, encouraging, and incorporating the use of public transit, connecting parks and developments with sidewalks and trails, and creating walkable developments.
Time Horizon:	2012-2013 as an implementation of up-to-date municipal comprehensive plans
Lead Partners:	Municipalities; Lebanon County Planning Department
Support Partners:	LEBCO MPO
Funding Sources:	Local municipalities; Pennsylvania Department of Community and Economic Development (DCED) Land Use Planning and Technical Assistance Program (LUPTAP); PA DCED Main Street Program; PA DCED Elm Street Program; PA DCED Local Municipal Resources and Development Program (LMRDP); PA DCED Community Revitalization Program (CRP) PA DCED Urban Development Program; Community Development Block grants; PennDOT's Transportation Enhancement Program and Safe Routes to School Program (for projects); Pennsylvania Advocates for Nutrition & Activity (PANA); Safe Routes to School Program
Action 5B3:	**Continue to use Congestion Mitigation Air Quality (CMAQ) Funds in innovative ways to reduce pollution from mobile sources.**
Intended Outcome:	Manage CMAQ Funds effectively so that air quality is improved via LRTP and TIP projects
Time Horizon:	2008/2009 and ongoing
Lead Partners:	LEBCO MPO and staff; County of Lebanon Transit Authority (COLT); PennDOT; FHWA; FTA
Support Partners:	Municipalities; Developers; Susquehanna Regional Transportation Partnership
Funding Sources:	Current and future TIPs; Public/Private partnerships

Objective 5C:	Promote voluntary air pollution reduction among citizens.
Action 5C1:	**Provide access to air quality information and pollution reduction techniques.**
Intended Outcome:	Enable government, businesses and citizens to make environmentally-responsible decisions
Time Horizon:	2009 and beyond
Lead Partners:	Air Quality Partnership
Support Partners:	Lebanon County Planning Department; LEBCO MPO; Municipalities; Businesses
Funding Sources:	Funds not needed
Action 5C2:	**Encourage the use of carpooling and transit (Energy Conservation Plan Action Item 1F2 and 1F3).**
Intended Outcome:	Increased transit ridership and private ridesharing/carpooling and decreased single occupant vehicle traffic.
Time Horizon:	2008-2009 and ongoing as an implementation to the COLT business plan
Lead Partners:	Commuter Services of South Central Pennsylvania; Susquehanna Regional Transportation Partnership; Lebanon Valley Chamber of Commerce; County of Lebanon Transit Authority (COLT); LEBCO MPO
Support Partners:	Lebanon County Planning Department
Funding Sources:	Susquehanna Regional Transportation Partnership; LEBCO MPO Congestion Mitigation Air Quality (CMAQ) funds; COLT; PennDOT
Action 5C3:	**Encourage the use of hybrid or alternative fuel vehicles for public transportation and municipal use (Energy Conservation Plan Action Item 1F4 and 1F5).**
Intended Outcome:	Decreased consumption of and dependency on gasoline and diesel fuels.
Time Horizon:	2010-2012
Lead Partners:	Lebanon County Conservation District; Lebanon County Commissioners; County of Lebanon Transit Authority
Support Partners:	Lebanon County Planning Department; LEBCO MPO
Funding Sources:	Pennsylvania Department of Environmental Protection (DEP) Alternative Fuels Incentive Grant Program; DEP Energy Harvest Grants; Pennsylvania Energy Development Authority Grants (PEDA) Grants; PennDOT and Federal Transit Administration Public Transportation Assistance Funds (typically allocated to County of Lebanon Transit)

Intentionally Blank