SECTION 14
ENVIRONMENTAL QUALITY

Over time, the community has come to realize the value and limits of our natural resources, and that our actions impact the environment. Available scientific data now documents that the earth's ecological balance is adversely impacted when man's waste and environmental disturbance go beyond the level that can be absorbed by the planet. Due to increased environmental awareness, principles such as ecology and carrying capacity are being integrated into public policy to protect our natural resources.

The Comprehensive Plan addresses the issues that have a major impact on our area's ecological system and resulting environmental quality. These environmental issues can become sources of concern for area residents if not properly managed. This section primarily addresses the issues of air and water quality as they relate to Evansville and Vanderburgh County, although they are regional in scope. Additional environmental issues are discussed in other sections of the Plan.

AIR QUALITY

The Evansville Environmental Protection Agency (EEPA) has the responsibility to regulate and monitor air quality in the City of Evansville and four miles beyond the corporate limits, but not outside of Vanderburgh County. The EEPA operates a meteorological station and ambient air quality monitors located in Posey, Vanderburgh and Warrick Counties. The monitors test for levels of the following pollutants:

- -- Carbon Monoxide (CO)
- -- Nitrogen Oxides (NO, NOx, NO2)
- -- Sulfur Dioxide (SO2)
- -- Ozone
- -- Air-borne toxics
- -- Particulate Matter 2.5 microns in diameter (PM2.5)
- -- Particulate Matter 10 microns in diameter (PM10)
- -- Total Suspended Particulates (TSP), which also measures airborne lead (Pb).

Based upon the data from the air quality monitors, Vanderburgh County is currently considered by the United States Environmental Protection Agency (U.S. EPA) to be "in attainment" for the following air pollutants:

- -- Carbon Monoxide (CO)
- -- Nitrogen Oxides (NO, NOx, NO2)
- -- Sulfur Dioxide (SO2)
- -- Ozone – One (1) hour standard (120 ppb)
- -- Particulate Matter 10 microns in diameter (PM10)
- -- Total Suspended Particulates (TSP)

OZONE

Ozone is created by chemical reactions between Nitrogen Oxides (NOx) and Volatile Organic Compounds (VOCs). NOx originates from high temperature internal combustion from vehicles (mobile sources) and industrial and utility boilers. VOCs are substances such as gasoline, paints and solvents. The chemical reaction is triggered by strong sunlight, therefore, high levels of ozone occur during warm weather (May through September).

The U.S. EPA will revoke the one-hour, 120 part per billion (ppb) standard on June 15, 2005, having replaced the 1-hour standard with a new 8-hour ozone standard of 84 parts per billion (ppb). Final nonattainment designations will be made on June 15, 2004. Vanderburgh and Warrick Counties were designated as in "Basic" Nonattainment of this standard due to one Warrick County monitor registering an 8-hour design value of 85 ppb.

It is expected that in the near future, Posey, Vanderburgh and Warrick Counties will be able to demonstrate attainment of the 8-hour standard (that is all monitors in the Evansville – Henderson Metropolitan Statistical Area will register 8-hour design values at or below 84 ppb). However, to reverse the nonattainment designation will require a complicated rulemaking process expected to last at least two (2) years. Until an Ozone Implementation Rule is published by the U.S. EPA it is impossible to say with certainty what regulatory requirements or additional ozone reduction measures would be required if Vanderburgh and Warrick Counties fail to attain the 8-hour standard.

$PM_{2.5}$

Research indicates $PM_{2.5}$ is comprised of many different compounds including crustal (geologic in origin), nitrates, sulfates, ammonia and carbon compounds. $PM_{2.5}$ is at least in part a secondary pollutant – created by chemical reactions between primary pollutants such as sulfur dioxide, nitrogen oxides and volatile organic compounds.

In December 2004, the U.S. EPA designated the following counties as nonattainment for the 15.0 microgram / cubic meter annual standard: Dubois, Vanderburgh and Warrick. Of the counties listed, only Vanderburgh and Dubois Counties actually have $PM_{2.5}$ monitors, both of which exceed the annual standard.

It is unclear if or when any of these counties might realize sufficient improvements in air quality to demonstrate attainment with the standard. Until the U.S. EPA publishes a draft $PM_{2.5}$ Implementation Rule, it is impossible to say with certainty what regulatory requirements or additional $PM_{2.5}$ reduction measures will be required. The U.S. EPA is expected to consider direct particulate and sulfur dioxide emissions as criteria pollutants for $PM_{2.5}$ and is still considering whether to establish Nitrogen Oxides and Volatile Organic Compounds as criteria pollutants as well.

LIGHTING AND NIGHT SKY QUALITY

Light pollution is becoming an increasing source of conflict between neighbors and businesses, and urban and rural residents. There is growing recognition of the impact of reduced visibility in the night sky due to improper lighting which wastes energy and affects our quality of life.

To maintain dark skies, light pollution must be addressed and a strategy to promote sensible outdoor lighting is needed. The terms “dark skies” and “light pollution” are often used in describing three different negative effects of lighting which are light trespass, glare, and sky glow. Most glare and sky glow is unnecessary.

Light trespass occurs when light from one property illuminates; or “spills” unwanted light over a property line into, adjacent or nearby property.

Glare is created when light from a light source reduces the ability to see the object the light was meant to illuminate.

Sky glow from large urban areas, or individual commercial and industrial sites/areas is the effect of obscuring the night sky as a result of light being directed upwards.

The first principle of good exterior lighting is to illuminate only what is desired to be seen. Since requiring the replacement of existing lighting may be financially burdensome, dark sky requirements could be incorporated into the Zoning Code and applied immediately to new and replacement lighting, but be phased in over time for existing light fixtures.

WATER QUALITY

SURFACE WATER AND WETLANDS

Vanderburgh County contains significant surface water resources such as the Ohio River, Pigeon Creek and tributaries within the watershed of these two dominant natural features, along with lakes and wetlands.

Wetlands are areas that are frequency inundated by surface water that support water-dependent vegetation and/or aquatic life. Until recently, wetlands were considered to have little value. Wetlands were drained or filled for other uses that were perceived to be more beneficial. However, the benefits of wetlands are increasingly more evident and efforts to drain or fill have been replaced by protection measures and mitigation.

Wetlands have both direct and indirect benefits, and perform important roles that contribute to the quality of life of residents as well as being economically beneficial.

Wetlands are valuable in that they:

- provide a variety of habitat for numerous types of flora and fauna (wetlands generally have high plant and animal diversity).

- are important to water quality. Water moves slowly in wetland areas. This allows silt and other sediments a chance to settle and be filtered out before flowing into rivers and lakes. Plants in a wetland help absorb certain nutrients and chemicals that pollute waterways.

- are beneficial in slowing, reducing and storing floodwaters during and after periods of heavy rainfall, thereby reducing the losses from heavy flooding.

- are valuable in shoreline erosion control. Wetland vegetation helps hold and stabilize soils below the surface of the riverbank or edge of a lake. These plants anchor the shoreline soil with roots and reduce energy associated with waves, current, ice, runoff, ground water flow, and water level fluctuations.

- provide great outdoor recreation opportunities such as fishing, canoeing, hiking, hunting or bird watching.

The quality and functions of these water resources can be seriously degraded by pollution, especially in densely urbanized areas. Common examples of water pollution include: chemical contamination, sedimentation from erosion, fecal coliform from animal and human waste, temperature changes, etc.

Sources of pollution fall into two broad categories: point and nonpoint sources. Point sources are generally those that discharge directly into a water body through a discrete pipe or ditch. Nonpoint sources are those that generally cannot be linked to a specific point of discharge, such as urban or agricultural runoff.

Sources of pollution which threaten the quality of surface water in Vanderburgh County include:

-- point-source chemical discharges from industrial operations;
-- surface water runoff from parking lots, other urban land uses and agricultural areas causing contamination and sedimentation from soil erosion; and
-- combined sewer overflows (CSO) during storm events, and raw sewage discharges from structures with no septic field beds and/or no connection to the City sewer system.

Control of these and all other pollution sources is essential to bring about an improvement in the water quality. Pollution control and preservation can result in tree lined, high quality stream corridors providing benefits to the community that might not be realized from disturbed

streams with poor water quality. Some of the benefits and opportunities are:

-- providing habitat and serving as valuable wildlife corridors that increase species diversity;
-- providing needed green space and breaks between urban uses;
-- providing scenic areas and enhancing the aesthetic quality of the community; and
-- providing unique recreational and educational opportunities.

Research has noted that poor water quality severely inhibits species diversity and that wooded stream corridors promote species diversity by maintaining a cooler water temperature, providing insect life to support fish populations and decreasing sedimentation by reducing the erosive action of streams.

Considering that our surface water resources are presently being used by the community in many ways (such as potable water use of the Ohio River, and recreational use), and increased use is expected, it is obvious that high water quality should be maintained to protect these important resources. Maintaining high water quality or improving areas with poor water quality can be accomplished through enforcement of existing environmental regulations, continued efforts to separate old combination sewers, and through proper watershed management techniques including preservation of natural stream corridors, erosion control and use of retention and detention areas where needed.

Considering the benefits that these areas provide, wetland protection and preservation are important issues. The review of development proposed in or near wetland areas should involve an environmental assessment to address any potential wetland impacts.

CURRENT GROUP EFFORTS

Concerns for water quality and interest in watershed planning were the impetus in forming a regional grass roots group, the Pigeon - Highland Watershed Steering Committee (PHWSC). This group is concerned with water quality in the 393 square mile watershed of Pigeon Creek. Some of these concerns are:

-- illegal dumping and filling in the floodplain and along the creek itself;
-- restricted use of the channel for canoeing;
-- the relationship to the Pigeon Creek Greenway; and
-- water and sediment retention structures in the rural areas.

The Pigeon-Highland Watershed Steering Committee (PHWSC), working with the aid of a watershed coordinator, completed the Pigeon-Highland Watershed Management Plan. This was the only watershed plan in the state that met the Indiana Department of Environmental Management's 2003 requirements. The PHWSC membership includes Gibson, Posey, Vanderburgh, and Warrick County's Soil and Water Conservation District , Indiana Department of Natural Resources Division of Soil Conservation, the U.S. Department of

Agriculture, Natural Resources Conservation Service, Four Rivers Resource Conservation and Development Area, Inc. (RC&D), and the Pigeon Creek Greenway. A future project includes installation of soil erosion and nutrient management practices in the Locust Creek watershed. The project should incorporate “CORE 4” practices, which are nutrient management, pest management, conservation tillage and buffers.

Creating awareness about and prevention of "non-point source pollution" is the focus of this not-for-profit group which is a joint effort of the Vanderburgh County Surveyor's Office, Soil & Water Conservation District, the Westside Improvement Association and the Four Rivers Resource Conservation and Development Area. These organizations are combining resources to establish a community wide effort to increase public awareness about clean streams and lakes.

GROUND WATER

Ground water is water that has penetrated below the surface of the soil and/or rock and is trapped in a subsurface strata known as an aquifer.

There are two types of aquifers in Vanderburgh County. The first aquifer is situated along the Ohio River and the floodplain areas associated with the river system, and consists of unconsolidated sand and gravels. Permeability and water storage capacity are very high in this aquifer. The second aquifer is located outside the floodplain areas of the river and covers approximately the northern two-thirds of the County. This aquifer consists mostly of sandstone and shale bedrock, and has corresponding low permeability and water storage capacity.

According to the 1990 Census data, approximately 93 percent of the households in Vanderburgh County were served by the municipal water supply. The remaining households rely on a private water supply, either in the form of a cistern or a well.

Two factors limit our ability to make use of ground water resources: availability and contamination. Availability is governed by the aquifers permeability (the capacity for fluid movement) and the demand placed on the aquifer. If demand exceeds the ability of the aquifer to replenish its volume, the aquifer will become depleted. Contamination is the infiltration of foreign substances into the aquifer which then renders the water unsuitable for use.

There are a large number of potential sources of contamination in ground water. The Indiana Department of Environmental Management listed 228 documented cases of contaminated ground water in Indiana in recent years. These are listed in Table 14-7.

TABLE 14-7: GROUND WATER CONTAMINANTS/PERCENT OF FREQUENCY

Contaminant Source	Percentage
Unknown	33.3
Solid and hazardous waste	21.0
Underground storage tank	19.7
Hazardous material	18.4
Sewage	16.3
Pesticide application	6.1
Salt storage and handling	3.5

Source: Vanderburgh County Health Department

As indicated, there are a number of activities which can result in the contamination of ground water, many of which can be prevented. Ground water generally moves very slowly through the aquifer, and once contaminated, there is very little that can be done.

Within Vanderburgh County there is a small number of documented cases of ground water contamination, since few are detected or reported. The lack of detection is a function of the Water Utility's extensive water distribution system. This system, in conjunction with the German Township system, serves the majority of the County. Because a relatively small number of people within the County use ground water as their source of drinking water, there is a small base of observation points for contamination.

In conclusion, it can be stated that a strong potential for the occurrence of undetected ground water contamination exists in Vanderburgh County. Thus, the City/County should strive to avoid future environmental circumstances that could result in ground water contamination.

FOREST RESOURCES

Forests and urban trees provide many benefits to the local population. Our forest areas supply the hardwoods that are used to make many needed products. It is estimated that the Indiana hardwood industry contributes $2.5 billion a year to the State's economy. Examples of other benefits include:

-- creating shade to reduce air temperature and energy costs;
-- producing needed oxygen and filtering air pollutants;
-- reducing soil erosion and storm water runoff;
-- supplying both habitat and food for wildlife;
-- adding to vital open space and aesthetic enhancement;
-- offering recreational opportunities; and
-- generating feelings of serenity and well being.

Although urban trees and forests are a renewable natural resource, it takes many years for trees to grow from seedlings to maturity. Considering the benefits provided and the fact that the larger forested areas are disappearing in Vanderburgh County, they are an important physical feature and resource to consider in formulating a future land use plan for the County.

In addition to traditional development, alternatives for preserving these areas should also be considered such as purchase for new park sites or conservation/open space easements. Within forested areas, development proposals involving low density uses or cluster development that leave as many trees as possible and involve replanting when trees are lost in construction would minimize the potential impact on forest resources. Local forest land owners should also be encouraged to participate in the State's Classified Forests Program. This initiative provides tax incentives to landowners if they keep their woodlands forested, and offers free advice and services on forest management. In the urban area, developers should be encouraged to save existing trees on sites they propose for development, and/or plant new trees at the completion of construction.

ENVIRONMENTAL QUALITY ACTION PLAN

GENERAL GOAL

Provide a quality environment which is ecologically sound, healthful, safe, and aesthetically pleasing achieved through resource management, planning and enforcement of existing environmental regulations.

OBJECTIVE

Preservation of natural physical features and open space in both urban and rural areas which are important for maintaining environmental quality.

POLICIES

Encourage appropriate public and private organizations to survey the local natural features such as wooded areas, stream corridors and wetlands, etc., identify those resources that should be preserved due to their value, and pursue their protection through purchase of title, development rights or easements.

Ensure in the subdivision and site planning process that natural areas (wooded areas, stream corridors, wetlands, etc.) are preserved and minimize the impacts on these resources.

Utilize all available measures and programs to reduce soil erosion and sedimentation, and to otherwise preserve the natural environment.

Evaluate the development of recreational facilities as an appropriate use in natural areas identified for preservation.

When purchasing/preserving natural areas (wooded areas, stream corridors, wetlands, etc.), ensure fair compensation to the landowners.

Evaluate and select recommended techniques to minimize tree loss caused by construction activities and promote replacement planting.

Make available a brochure explaining and illustrating the recommended construction techniques at the Area Plan Commission and Building Commission counters.

On sites with existing trees and especially in forested areas, developers should use the recommended construction techniques to minimize tree loss.

Investigate changes to the Subdivision and Zoning Ordinances to establish landscaping requirements in the development of a site.

Compile a list of native trees recommended for planting and a list of those trees that are hearty enough to survive in the right-of-way as street trees or in parking lot landscaped islands. When planting trees, developers, non-profit organizations and the City/County should be encouraged to plant species from the recommended tree lists.

Encourage the use of floodplain land for open space, recreation or agriculture.

OBJECTIVE

Provide an environment with minimal adverse visual and health effects from air, land, noise, and water pollution.

POLICIES

Support the consolidation of the City Environmental Protection Agency into a City-County agency with responsibility to address all environmental concerns.

Support education for industrial personnel as to the procedures and equipment available to reduce pollution, and educate residents on conservation practices to minimize pollution.

Support coordinated efforts, legislation and programs that will continue to bring about workable solutions for resource and pollution problems at the local, state, and federal levels.

Require adequate buffering by both distance and landscaping (i.e. trees) between residential areas and those existing and new uses which tend to generate nuisance and pollution such as certain agricultural uses, commercial/industrial uses and major transportation facilities.

Maintain strong controls and adequate enforcement procedures for control of signs, billboards, litter, weeds and abandoned automobiles to improve the quality of roadside and neighborhood appearance.

Regulate development within the approach zones of the airport through existing federal, state and local rules and regulations.

Continue efforts in improving the environmental quality of those areas which are deteriorating while preserving good environmental qualities through systematic code enforcement.

The design for new public and private improvements such as streets, landscaping, signing, and lighting should utilize appropriate materials and progressive techniques resulting in a quality environment.

Encourage future industrial development that will maintain or improve the County's compliance with existing environmental standards.

OBJECTIVE

Through education, create an awareness of the characteristics and problems of air, soil, water and wildlife resources and the importance of resource use, management and planning.

AIR QUALITY GOAL

To maintain and improve the air quality for the community.

OBJECTIVE

Protect the health and welfare of people, plants, and wildlife from the harmful effects of air pollution.

POLICIES

Continue the air surveillance monitoring system to assess air quality in the Evansville area.

Continue the City's industrial emission inventory data base to identify the quantity of criteria pollutants being emitted into the air.

Encourage the development or redevelopment of mixed use centers as well as pedestrian accessible, neighborhood shopping establishments to minimize unnecessary auto travel.

Encourage the use of bicycles, car pools, the public transportation system, and alternative fuels for transportation to reduce traffic volumes and pollutants.

Encourage continued enforcement of local, state, and federal regulations on emissions and fuel standards to maintain and improve air quality.

SURFACE WATER QUALITY GOAL

To improve the surface water quality in Vanderburgh County.

OBJECTIVE

Ensure that surface water quality meets the standards in the Clean Water Act.

POLICIES

Support the watershed management and planning efforts for the Ohio River and Pigeon Creek.

Investigate techniques, such as overlay zoning or conservation easements, to protect and enhance the scenic value along Pigeon Creek.

Encourage the creation of man-made wetlands to act as filters and settling traps for surface water runoff.

At all levels of government, encourage continued enforcement of erosion control, drainage and water quality regulations to protect surface water resources.

GROUND WATER QUALITY GOAL

Ensure the availability of a continuous supply of quality ground water for the residents of Vanderburgh County.

OBJECTIVE

Ensure that our ground water is free of contaminants.

POLICIES

Encourage the development of a ground water monitoring system.

Discourage the use of septic systems as a means of waste disposal.

LIGHTING AND NIGHT SKY GOAL

Protect and preserve the quality of the nighttime environment.

OBJECTIVES

Reduce light pollution caused by uplighting, excessive over lighting, glare and light trespass.

Promote energy efficient lighting, thereby conserving private and public funds, while providing adequate lighting for the task.

POLICY

Amend the Zoning Ordinance to incorporate and implement "Dark Sky" regulations.