

# Calvert County Comprehensive Plan

## Chapter I: Land and Water

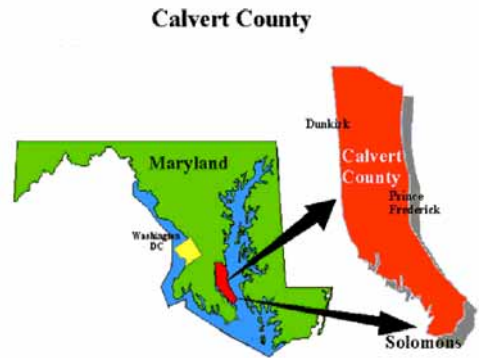


Calvert County Planning Commission  
Revised Draft Approved Plan  
February, 2010



**COUNTY DATA**

LAND	
Length	30 miles
Width	9 miles (at widest point)
Total Area	220 square miles; 140,000 acres
Length of Shoreline	101 miles
Distance from Prince Frederick to D.C.	46 miles
Distance from Prince Frederick to Baltimore	64 miles



**PEOPLE**

**Population & Households**

Year	1970	1980	1990	2000	2010	2020	Projected Build-out
Persons	20,682	34,638	51,372	74,563	90,700	96,000	100,000
Households	5,540	10,731	16,986	25,447	31,300	35,500	37,000
Persons Per Household	3.70	3.21	3.01	2.91	2.85	2.71	2.7

**General Demographic Characteristics, 2000**

Male	36,767	49.3%	White, only	62,578	83.9%
Female	37,796	50.7%	Black or African American, only	9,773	13.1%
Under 5	5,077	6.8%	American Indian & Alaska Native, only	220	0.3%
5-19	18,723	25.1%	Asian, only	655	0.9%
20-64	44,136	59.1%	Native Hawaiian & Other Pacific Islander, only	21	--
65+	6,627	8.9%	Some other race, only	368	0.5%
Median age	35.9	Two or more races	948	1.3%	
		Owner occupied housing	21,679	85.2%	

**ECONOMY (2000 Census Data)**

Median Household Income	\$65,945
Persons below poverty	4.4%
Persons in civilian labor force	38,786
Persons in civilian labor force unemployed	1,182 (3.3%)
Persons in Armed Forces	555
Mean Travel Time to Work	39.8 Minutes

**GOVERNMENT**

<b>2004 Fiscal Year 2010</b> Total Revenues/Expenditures	<b>\$151,643,504 \$220,192,150</b>
<b>2004 2010</b> Real Property Tax Rate	<b>\$2.23 \$0.892 Pper \$100</b> assessed value
<b>2010 Personal Property Tax Rate</b>	<b>\$2.23 Pper \$100</b> assessed value

# Chapter I: Land and Water

Draft for Planning Commission Review, February 24, 2010

New text in underline. Deleted text in strikethrough (~~example~~).

Changes are shown from the Planning Commission's Approved Plan (September 16, 2009)

## *Land Use & Growth Management*

### **Objectives**

- As an alternative to functioning primarily as a "bedroom community", adopt policies that will promote the County as a desirable location for high-technology industries, vacation destination, farming and aquaculture region, resource protection area (i.e., "greenbelt"), and retirement community.
- Manage the amount, location and rate of residential growth.
- Preserve the rural character of the County, its prime farmland, contiguous forests, historic resources, and environmentally sensitive areas.
- Develop town centers as attractive, pleasant, and convenient places to live, work, and shop.
- Direct commercial and industrial uses to appropriate locations; provide necessary infrastructure.
- Direct residential growth to appropriate locations; ensure a wide range of housing opportunities for all incomes and ages; maintain and enhance the quality of residential communities.

### *Sustainability Issues*

*Sustainable communities meet the needs of current and future County residents in the following ways:*

- *The built environment does not conflict with the maintenance of a healthy natural environment.*
- *Land use development patterns promote a balanced mix of residential, recreational, commercial, and industrial uses.*
- *Land use development patterns support the efficient use of tax revenues, and is anti-sprawl.*
- *Communities are designed to promote a strong sense of community, promote energy efficiency, reduce dependence upon automobiles, and provide access to the natural environment.*

### **Is Our Current Development Pattern Sustainable?**

Calvert County experienced rapid population growth for three decades. Many people throughout the United States moved away from central cities and suburbs to "rural fringe" areas such as Calvert County. The negative impacts of this development pattern on urban areas include increased poverty and crime and underutilized infrastructure. Negative impacts on people in

suburban and rural areas include a lack of infrastructure and increased long-distance commuting. Rural areas also experience a severe imbalance between housing and jobs and the rapid loss of farms, forests, and wildlife habitat. Air and water pollution created by automobile emissions and the overdevelopment of environmentally sensitive areas impact urban, suburban, and rural areas alike.

## Toward a More Sustainable Community

A better alternative to the current pattern of sprawl development emanating from metropolitan areas is to concentrate on making the cities and existing suburbs good places to live, shop, work, and go to school. When additional land is needed to accommodate population growth, it should be developed according to sound principles of community design within or adjacent to existing urban centers. Areas like Calvert County that lie at the outer edges of metropolitan areas should be maintained as natural resource protection areas, farming regions, and vacation/recreation /retirement areas. This approach would help to:

- Conserve natural resources.
- Maintain a healthy environment.
- Promote the health and well-being of residents throughout the region.
- Reduce expenditures for public infrastructure.
- Maintain a regional source of agricultural and forest products.

This alternative pattern of growth is supported by the 2009 Smart, Green, and Growing Act which modifies the Maryland Economic Growth, Resource Protection and Planning Act of 1992 as follows:

1. Quality of life and sustainability: a high quality of life is achieved through universal stewardship of the land, water, and air resulting in sustainable communities and protection of the environment;
2. Public participation: citizens are active partners in the planning and implementation of community initiatives and are sensitive to their responsibilities in achieving community goals;
3. Growth areas: growth is concentrated in existing population and business centers, growth areas adjacent to these centers, or strategically selected new centers;
4. Community Design: compact, mixed-use, walkable design consistent with existing community character and located near available or planned transit options is encouraged to ensure efficient use of land and transportation resources and preservation and enhancement of natural systems, open spaces, recreational areas, and historical, cultural, and archeological resources;
5. Infrastructure: growth areas have the water resources and infrastructure to accommodate population and business expansion in an orderly, efficient, and environmentally sustainable manner;
6. Transportation: a well-maintained, multimodal transportation system facilitates the safe, convenient, affordable, and efficient movement of people, goods, and services within and between population and business centers;
7. Housing: a range of housing densities, types, and sizes provides residential options for citizens of all ages and incomes;
8. Economic development: economic development and natural resources-based businesses

- that promote employment opportunities for all income levels within the capacity of the State's natural resources, public services, and public facilities are encouraged;
9. Environmental protection: land and water resources, including the Chesapeake and Coastal Bays, are carefully managed to restore and maintain healthy air and water, natural systems, and living resources;
  10. Resource conservation: waterways, forests, agricultural areas, open space, natural systems, and scenic areas are conserved;
  11. Stewardship: government, business entities, and residents are responsible for the creation of sustainable communities by collaborating to balance efficient growth with resource protection; and
  12. Implementation: strategies, policies, programs, and funding for growth and development, resource conservation, infrastructure, and transportation are integrated across the local, regional, state, and interstate levels to achieve these visions.

Calvert County's approach to implementing the State Visions begins with its overall theme of sustainability and with its Land Use Plan which establishes Priority Preservation Areas and Priority Funding Areas. It is reinforced by the establishment of a Water Resources Element (see Land and Water Resources). Its success will depend on progress in implementing the actions listed in all chapters of this plan.

## **Land Use Plan**

In order to promote Calvert County as a desirable location for high-technology industries, vacation destination, farming region, resource protection area, and retirement community, Calvert Countians must continue to:

- Manage the amount, location and rate of residential growth.
- Preserve the rural character of the County, its prime farmland, contiguous forests, historic resources, and environmentally sensitive areas.
- Develop town centers as attractive, pleasant, and convenient places to live, work, and shop.
- Direct commercial and industrial uses to appropriate locations and provide necessary infrastructure.
- Direct residential growth to appropriate locations and ensure a wide range of housing opportunities for all incomes and ages.
- Maintain and enhance the quality of residential communities.

## **Manage the Amount, Location and Rate of Residential Growth**

The number of households in Calvert County increased from 5,540 in 1970 to 25,447 in 2000. During most of that 30-year period, Calvert County was the fastest growing County in the State. Two major objectives in the 1997 Comprehensive Plan were to:

- Establish measurable benchmarks to determine appropriate residential buildout.
- Reduce the rate of residential growth in order to limit highway traffic congestion, maintain good schools, maintain sound fiscal policies, and preserve rural character.

Soon after the adoption of the 1997 Plan, the Planning Commission conducted a thorough analysis of the costs and benefits of reducing buildout. More than 20 different buildout reduction options were developed for public review and comment and a program to reduce buildout to

37,000 households was adopted in March 1999. The program included a combination of zoning ordinance changes, new funding for land preservation, and incentives which, taken together, reduced buildout by nearly 11,400 households.

In 2003, the Board of Calvert County Commissioners (BOCC) requested a status report on how well the adopted changes were working. At the same time, they reiterated the goal of limiting buildout to 37,000 households. The status report indicated that projected buildout had been reduced from an estimated 54,000 households to 42,600 households. The BOCC asked that additional buildout reduction options be presented to the public for review and comment. A joint public hearing with the Planning Commission was conducted in October 2003 and additional buildout reductions were adopted in December 2003.

A review of the existing Adequate Public Facilities Ordinance (APFO) was conducted in 2000 – 2001 and changes that strengthened the ordinance were adopted by the BOCC in May 2001. The APFO was again reviewed in 2003. Changes to further strengthen the ordinance were adopted in December 2003.

State legislation adopted in 2006 required counties to prepare a water resources element and to study development impacts on the assimilative capacity of waterways.

<b>Actions<sup>1</sup></b>	
I-1	Continue to support policies that link the amount, location and rate of residential growth to County land use objectives, including highway, school, and aquifer capacities. [P&Z]
I-2	Monitor residential growth and evaluate the effectiveness of existing regulations to meet growth management objectives. [P&Z]
I-3	a. Consider the development impact of two growth scenarios on waterways in the County watersheds.
	b. After completion of subwatershed plans, evaluate growth management regulations to determine the best approaches to maintain or improve water quality. [P&Z]

***Preserve the Rural Character of the County, its Prime Farmland, Contiguous Forests, Historic Resources, and Environmentally Sensitive Areas through the creation of Priority Preservation Areas***

Ever since the first Calvert County Comprehensive Plan was adopted in 1966, one of the County’s primary goals has been the preservation of its rural character. In addition, the ability to develop a sustainable economy based upon high technology, heritage, recreation, ecotourism, retirement, leisure, farming, and aquaculture depends first on preserving prime farmland, contiguous forests, historic resources, and sensitive areas.

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<sup>1</sup> An agency acronym list is provided in Appendix A.

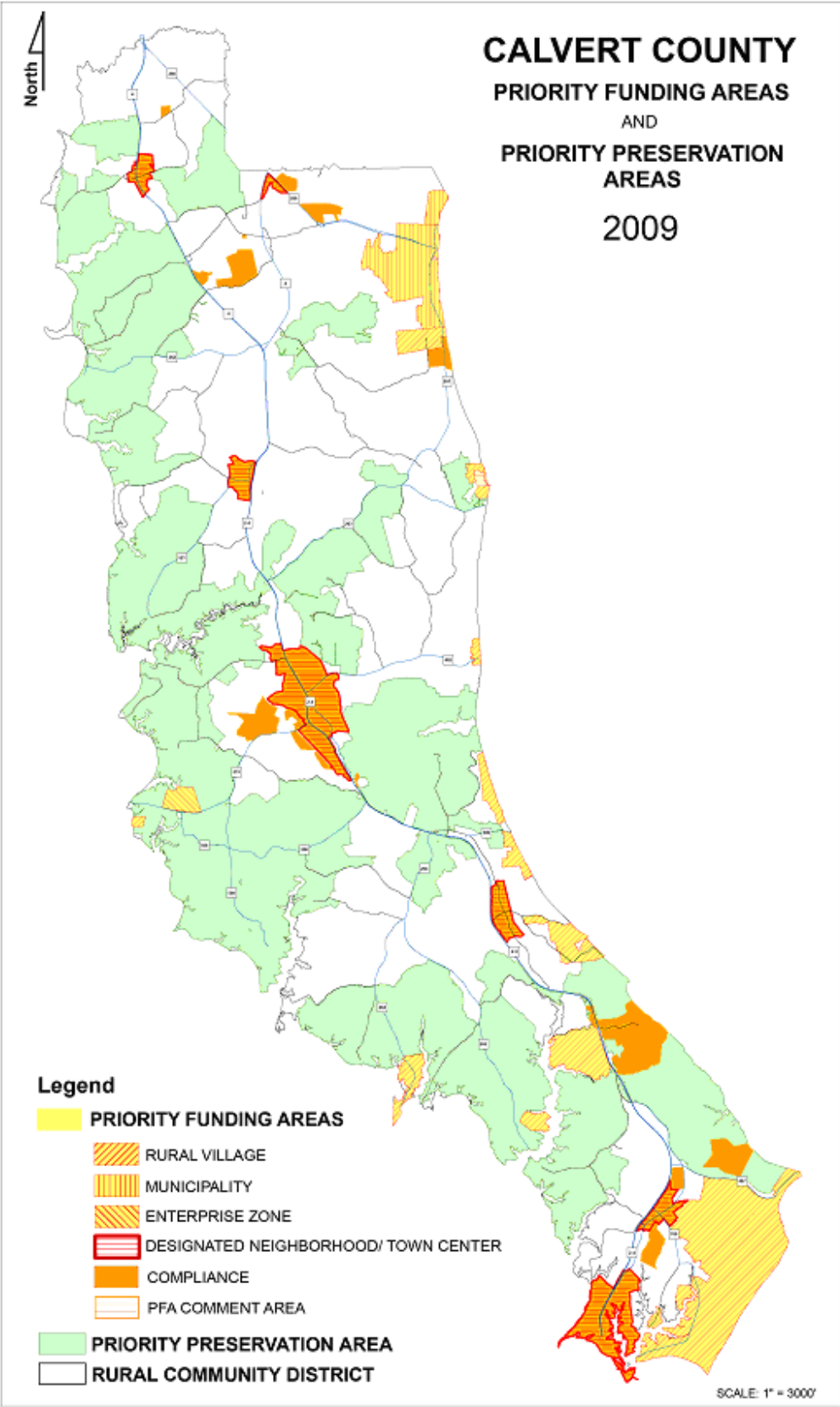


Figure I-A: Priority Preservation Areas and Priority Funding Areas Map

In 1999, Calvert County celebrated the enrollment of 20,000 acres of prime farm and forestland in County and State land preservation programs. A goal to preserve an additional 20,000 acres was adopted that year. To help meet the new goal, the County allocated an additional \$2,000,000 per year toward land preservation including an additional \$500,000 added to the Purchase and Retirement (PAR) Fund, \$500,000 in local support for the Maryland Agricultural Land Preservation program, and \$1,000,000 for a new County leveraging program. The County also actively participated in the Maryland Rural Legacy Program. By January 1, 2009, 26,300 acres had been permanently preserved. Working with County Land Trusts, the County has been able to protect most farms that have been at risk of being developed in the Priority Preservation Areas.

The preservation of historic structures and landscapes has been less successful. Too often, older buildings are bulldozed to accommodate new development and rural landscapes are routinely converted into residential subdivisions. The continued loss of these features threatens to undermine the objective of preserving the rural character of the County and developing heritage and ecotourism. In 2004, the National Trust for Historic Preservation named Southern Maryland tobacco barns as one of America’s 11 most endangered places. This designation opened up new possibilities for the preservation of these beautiful and culturally important structures.

<b>Actions</b>	
I-4	Reserve the Farm and Forest District (Priority Preservation Areas) for farming and natural resource-related uses and direct residential growth away from these areas. [P&Z]
I-5	Continue to support the goal of permanently preserving a minimum of 40,000 acres of prime farm and forestland through County, State, and federal land preservation programs. [P&Z]
I-6	Continue to support and strengthen the County Purchase and Retirement Programs as a means of promoting participation in the Agricultural Preservation Program. Establish a procedure for collecting voluntary contributions to the PAR fund with payment of property tax. [P&Z, F&B]
I-7	Protect the scenic quality of existing rural landscapes and vistas. [P&Z]
I-8	Work with the Calvert County Tourism Advisory Committee to explore opportunities for developing heritage sites and ecotourism. [P&Z, ED]
I-9	Continue to support the land preservation efforts of local, State, and national land trusts. [P&Z]
I-10	Provide local support to the Maryland Agricultural Land Preservation Program and other State and federal agricultural preservation programs. [P&Z]
I-11	Do not locate public facilities such as sewer or water service areas, schools, and fire and rescue stations within the Farm and Forest District. [PW, PS, F&B, BOE]
I-12	Do not increase highway capacity within the Farm and Forest District. [PW]
I-13	Wherever possible, reduce negative environmental impacts of subdivision roads and make them visually compatible with the rural character of the surrounding area while maintaining road safety. [P&Z, PW]
I-14	Strengthen regulations and incentives governing the preservation of older structures. [P&Z]

I-15	Continue to work with the County’s land trusts to identify and preserve farms that are critical to the protection of lands in Priority Preservation Areas. [P&Z]
I-16	Continue to limit the types of public and quasi-public uses in the Farm and Forest District based upon their intensity. [BOCC]
I-17	Strengthen marketing and value-added opportunities for farm product sales in the region by the following approaches:
	a. Facilitate the creation of farmers markets in all town centers.
	b. Work with all food health regulators so they honor the intent of the law and accommodate small operations.
	c. Work with the Southern Maryland Agricultural Development Commission to facilitate the development of an animal processing facility and regional grain depot.
	d. Explore the opportunities for a local grain mill. [Sustainable Agriculture Workgroup]

***Develop Town Centers as Attractive, Pleasant, and Convenient Places to Live, Work, and Shop***

The 1983 Comprehensive Plan called for the creation of town centers in order to accomplish several goals:

- Avoid scattered and/or strip commercial development along MD 2/4.
- Expand the choice of housing options by providing zoning and infrastructure for multifamily development, including low- and moderate-income and elderly housing.
- Reduce dependence on vehicles.
- Reduce growth within agricultural and forest areas.

Within less than two years of adoption of the 1983 Comprehensive Plan, the County had defined boundaries and developed new mixed-use zoning regulations for seven town centers. Upgraded sewer and water systems in Solomons, Prince Frederick, North Beach and Chesapeake Beach followed shortly thereafter.

The 1983 Comprehensive Plan also recommended that towns be established around town centers and that single-family residential development be directed to towns. Areas within a one-mile radius of each town center were subsequently rezoned to permit higher density with the purchase of Transferable Development Rights.

Town centers are the County’s primary designated growth areas and Priority Funding Areas, as per state regulations. Thanks to active citizen participation in the development and implementation of Master Plans, town centers are becoming increasingly attractive and pleasant places to live, work, and shop. As town centers continue to improve, they will help attract the types of commercial uses that generate increased tax revenues and high-quality jobs and provide amenities that attract both visitors and retirees.

It is important to continue to promote a broad mix of commercial, office, residential, public, and quasi-public development within town centers as a means of promoting economic development, creating more local jobs, expanding cultural opportunities, reducing traffic congestion, preventing strip commercial development, providing a full range of housing opportunities, and providing convenient access to goods and services for County residents.

The provision of adequate roads, water, wastewater systems, public transportation, and high-quality internet communication systems, together with public amenities such as parks, town squares, trails, sidewalks, bikeways, and indoor recreational and cultural facilities, should remain a top priority, in accordance with master plans for town centers.

Emphasis should also be placed on creating a more compact pattern of development that will reduce dependence upon automobiles and enable people to live within convenient proximity to stores, offices, and services.

<b>Actions</b>	
I-18	Continue to promote a broad mix of commercial, office, residential, public, and quasi-public development within town centers. [P&Z]
I-19	Designate North Beach, Chesapeake Beach, Prince Frederick and Solomons as major Town Centers. Designate Dunkirk, Owings, Huntingtown, St. Leonard and Lusby as minor Town Centers.
I-20	Allow both major and minor Town Centers to have community water and sewer.
I-21	Promote town centers as community cultural and activity centers by locating schools, colleges, recreational, and cultural facilities within or adjacent to town centers. [GS, F&B]
I-22	Continue to improve the appearance of town centers by emphasizing Town Center Master Plan Capital Improvements Projects and Architectural Review. [P&Z]
I-23	Review Town Center Master Plans and Zoning Ordinances to look for additional ways to reduce dependence upon automobiles by promoting “pedestrian-friendly” site design and increasing pedestrian and bicycle circulation within and between residential, commercial, and office uses. [P&Z, PW]
I-24	As Master Plans are revised, look for ways to preserve and enhance the unique character of each town center. [P&Z]
I-25	Consider ways to strengthen regulations regarding derelict buildings. [P&Z]
I-26	Maintain a schedule to review and update Town Center Master Plans. [P&Z]

*Additional town center actions are listed in the remaining sections of this chapter.*

### ***Direct Commercial and Industrial Uses to Appropriate Locations and Provide Necessary Infrastructure***

Commercial uses include industries, offices, services, retail, wholesale, marine-related businesses, farming, and forestry. Providing appropriate locations for these uses will not only help ensure that they have the infrastructure they need, but will also help to reduce the potential for conflicts and negative impacts that can be associated with some commercial uses. Design standards can further help minimize these conflicts and negative impacts, allowing for more mixed-use development that can enhance quality of life as well as economic opportunity.

### **Commercial Uses in Town Centers**

Town centers are the primary locations for most commercial uses except for farming and forestry. They promote business growth by providing infrastructure and enabling businesses to benefit from proximity to each other (agglomeration economies). They also promote business

growth by providing attractive, mixed-use settings where offices, stores, restaurants, and homes are all within close proximity to each other. The strategy of directing commercial growth to town centers has been in effect since the adoption of the town center concept in the 1983 Comprehensive Plan. It has proven to be highly effective as a means of developing strong business growth.

<b>Actions</b>	
I-27	Continue to direct commercial growth to town centers. [P&Z]
I-28	Continue to provide for the construction and maintenance of public infrastructure to support business growth such as roads, water and sewer, and high-quality communication systems in accordance with town center master plans. [PW]
I-29	Promote strong business growth in town centers. Identify and implement ways to improve growth in town centers. [P&Z]
I-30	Major town centers are to serve as regional centers, providing goods and services that attract visitors from the entire County and/or from outside the County (as in tourism). Minor town centers are to serve as local convenience centers unless individual town center master plans determine otherwise. [P&Z, BOCC]

### **Commercial Uses in Employment Centers**

Employment Centers/Town Centers (EC/TCs) were established in 1992 in order to provide space specifically for targeted industries, such as high-technology firms and research industries. The intent is to restrict retail and service uses in these districts in order to reserve adequate and flexible space for high-revenue-generating uses that provide high-quality jobs for County residents. In order to provide these types of uses with needed infrastructure, the County has a long-standing policy of only allowing EC/TC Districts to be located adjacent to town centers. That policy should be continued.

<b>Actions</b>	
I-31	To help ensure the efficient utilization of public funds for infrastructure and to promote strong markets for local businesses, continue to require that Employment Districts be located within and/or adjacent to town centers. [P&Z]
I-32	Restrict retail and services uses in the Employment Center/Town Center District in order to reserve the EC/TC District for targeted businesses. Look for additional ways to encourage and promote these types of uses within the EC/TC District. [P&Z]
I-33	Develop a long-range Infrastructure Plan for the EC/TC District. [P&Z]
I-34	Maintain an inventory of EC/TC land. [P&Z]

### **Strip Commercial Development**

One of the primary reasons for developing the town center concept in 1983 was to prevent any further “strip commercial development” along Calvert County’s highways. This type of development contributes to traffic congestion, increases the potential for highway traffic accidents, reduces the drawing power of commercial uses by preventing them from benefiting from proximity to other commercial uses, reduces the ability of government to provide needed infrastructure, and detracts from the visual beauty of the countryside.

Several commercial uses already existed in scattered locations along roadways before the town center concept was adopted. These uses are currently zoned as Rural Commercial (RC) Districts. Some of these districts are already developed for commercial use and many of them continue to be owned and managed by local business people who provide valuable services to the community. At the same time, many of these sites have substantial redevelopment and expansion potential, which can undermine the town center concept and contribute to traffic congestion and highway traffic accidents. Regulations are needed to help ensure that these commercial uses maintain their existing small scale, rural character, and/or are phased out over time.

It is also imperative that the County continues to avoid creating new opportunities for strip commercial development along highways, except in existing, designated areas within existing town centers.

<b>Actions</b>	
I-35	Avoid the potential for strip commercial development along highways by using the following policies [P&Z, ED]:
a.	Do not permit additional commercial development along highways outside town centers.
b.	Do not expand existing town centers along MD 2, MD 4, or MD 2/4. In addition, do not expand Huntingtown, St. Leonard, or Lusby across MD 2/4 or Owings across MD 2.
c.	Do not designate additional town centers.
d.	Do not allow commercial uses to have direct access onto MD 2/4 in Huntingtown, St. Leonard, or Lusby.
e.	Prohibit the expansion of rural commercial districts.
f.	Evaluate existing regulations governing rural commercial uses and make changes as needed to ensure that they maintain their existing small-scale rural character.
g.	Require that rural commercial properties meet the same site design and architectural design standards that are required for businesses that locate within the nearest town centers.
h.	Develop a plan for phasing out some or all RC districts.

### **Commercial Uses in the Farm and Forest and Rural Community Districts**

Very few commercial uses are permitted in the Farm and Forest and Rural Community Districts and several of those that are permitted have created conflicts in the past.

As a general policy guide, commercial uses in the Farm and Forest District and Rural Community District should be limited to uses that support, complement, and promote farming, forestry, heritage, and ecotourism. Commercial uses in the Farm and Forest District and Rural Community District should be strictly limited to help avoid drawing traffic onto rural roads and creating conflicts with existing residential communities.

<b>Actions</b>	
I-36	Maintain a strong economic development program to promote agriculture and aquaculture, including the marketing of County-produced farm and fishing products. [ED]
I-37	Maintain a strong program to promote forestry management, including timber harvesting and the maintenance of wildlife habitat protection areas. [P&Z]
I-38	Consider permitting low-impact supplemental income opportunities within the Farm and Forest District and Rural Community District that support, complement, and promote farming and heritage/ecotourism. [P&Z]
I-39	Limit commercial uses in the Farm and Forest District and Rural Community District to help avoid traffic congestion and conflicts with existing residential communities. [P&Z]

### **Commercial and Industrial Uses in Industrial Districts**

Industrial Districts (I-1) are intended to provide areas in the County that are suitable for light industrial uses free from other uses which might affect such development.

<b>Actions</b>	
I-40	Maintain an inventory of Light Industrial (I-1) land. Periodically evaluate the need for additional I-1 land as part of a comprehensive rezoning process. [P&Z, ED]
I-41	Allow EC/TC uses and restrictions in I-1 Districts when adjacent to town centers. [P&Z]

### **Commercial Uses in Marine Commercial Districts**

Marine Commercial (MC) Districts provide locations adjoining waterways for businesses which supply and cater to marine activities and needs. These include: boat service and repair facilities, boat docks, marine equipment stores, wholesale and retail fish and shellfish sales, hotels, motels, restaurants, and cocktail lounges. Calvert's commercial waterfront is one of the County's main tourism attractions. The County needs to be proactive in facilitating its proper and effective use.

<b>Actions</b>	
I-42	Monitor the amount of marine zoning needed and the best locations in terms of the following factors: water depths, erosion potential, water quality, and critical navigation areas. [P&Z, ED]
I-43	Allow maximum utilization of areas zoned Marine Commercial (MC) without causing significant adverse effects on aquatic resources, visual aesthetics, or neighboring residential uses (e.g., outdoor lighting projecting onto residential property.) [P&Z]
I-44	To enhance tourism and guard against environmental degradation, conduct a study of County waterways, including issues related to derelict or sunken boats, mooring buoys, commercial boat sewage pumpout into sewer systems, outdoor lighting, unsightly vessels, boat lifts, and Molly's Leg. [P&Z]
I-45	Request enabling legislation for the County to take control of its waterways in town centers. [P&Z]

***Direct Residential Growth to Appropriate Locations; Ensure a Wide Range of Housing Opportunities for All Incomes and Ages; Maintain and Enhance the Quality of Residential Communities***

**Residential Land Use Patterns**

Residential development has followed several different patterns throughout the history of Calvert County. Until the early 20<sup>th</sup> Century, most people lived and worked on farms. The small towns of North Beach, Chesapeake Beach, Prince Frederick, and Solomons were exceptions.

Until the late 1960s and early 1970s, most newcomers tended to settle in small-lot communities along the Chesapeake Bay. Most of these communities were created prior to the adoption of zoning in 1967 and had originally been designed for seasonal use only. In the 1970s, large-lot residential subdivisions began to replace farms, becoming the dominant residential land use pattern in the County. Only during the last decade have significant numbers of households settled in town centers.

By 2002, 42% of all households were located in small-lot communities created prior to the adoption of zoning in 1967, 43% lived in subdivisions in the Rural Community District, and 15% lived in town centers.

Each of these residential land use patterns presents challenges:

- ***Residential Development in Town Centers and Areas within a One-Mile Radius of Town Centers which are not in the Farm and Forest District (FFD)***

Town centers and the non-FFD area within a one-mile radius of town centers are the County’s primary residential growth areas. It is important to evaluate current development standards to ensure that these areas develop efficiently and that they provide the kinds of amenities that are associated with good towns. These include sidewalks, bikeways, parks, pedestrian access to stores, offices, places of worship, libraries and schools, a low crime rate, good public services, and building and community design that serves a wide range of ages, interests, and incomes.

<b>Actions</b>	
I-46	Continue to permit a higher residential density with the use of Transferable Development Rights (TDRs) within a one-mile radius of the perimeter of North Beach, Chesapeake Beach, Prince Frederick, and Solomons; continue to permit a higher residential density with the use of TDRs within a one-mile radius of a defined central point within Dunkirk, Owings, Huntingtown, St. Leonard, and Lusby. [P&Z]
I-47	Allow multi-family housing (apartment and townhouses) in major Town Centers; do not allow multi-family housing in minor Town Centers except as may be permitted in Town Center Master Plans. [P&Z]
I-48	Work with area residents and builders to establish new design standards for residential neighborhoods within a one-mile radius of town centers. Connect residential neighborhoods to town centers by way of non-arterial roads, bikeways, and sidewalks. [P&Z, PW]

I-49	Identify and require or encourage amenities that will help retain and attract retirees. [P&Z]
I-50	Conduct a study to determine why retirees choose to move out of the County and look for ways to encourage them to stay. Include a cost/benefit analysis. [P&Z]

- ***Residential Development in the Residential District***

The challenge in small-lot communities, all of which are zoned Residential District, is that they were developed before many of the health and safety regulations that govern the layout and design of newer communities were adopted. Consequently, a number of these communities are experiencing problems with sewage disposal, stormwater management, and roads. Residents in these communities have also expressed concerns about the need for more than one road entrance in case of emergency and the need for more recreational facilities. The BOCC appointed a Private Infrastructure Advisory Committee to look into issues specifically related to these communities and to make recommendations to the BOCC.

While most of these communities are fully developed, a few still have a substantial number of platted, undeveloped lots that are exempt from most current regulations. These lots, totaling 4,100 in 2002 account for nearly one-quarter of the potential future households in the County. Efforts to address these issues are underway.

Approximately 1,300 acres of undeveloped land in scattered locations throughout the countryside are zoned Residential District. All were zoned in the late 1960s and early 1970s on the basis of criteria that are no longer consistent with the policy to direct higher-density residential growth to designated growth areas. Actions were taken in 1999 to encourage owners to enroll these lands into land preservation programs or to serve as receiving areas for TDRs.

<b>Actions</b>	
I-51	Continue to work with existing small-lot communities to resolve issues specifically related to these communities. [P&Z, CR, PW, PS]
I-52	To address health and safety issues in small-lot communities platted before the adoption of current regulations, look for ways to reduce the number of dwelling units that can be developed within these communities. [P&Z]

- ***Residential Development in the Farm and Forest District and Rural Community Districts***

Residential development within these Districts has always come into conflict with the long-standing goal of preserving land for farming, forestry, and wildlife habitat. Over the years, the County has adopted a number of programs to try to minimize both the number and the impact of residential subdivisions in the Farm and Forest District and Rural Community District while still trying to protect landowner equity. These programs include large lot zoning, critical area regulations, clustering, the TDR program, and several State and County purchase of development rights (PDR) programs.

The creation in 1992 of three overlay districts within the RUR District (Farm Community District, Resource Preservation District, and Rural Community District) was intended to help resolve some of the issues related to this development pattern. Farm Community and Resource

Preservation Districts were identified as the County’s prime preservation areas while the Rural Community District was identified as a receiving area (along with town centers and R1 and R2 Districts) for development rights transferred from Farm Community and Resource Preservation Districts. In 2006, the Farm Community and Resource Preservation Districts were combined to create the Farm and Forest District.

<b>Actions</b>	
I-53	Continue to look for ways to direct residential growth away from the Farm and Forest District. [P&Z]
I-54	Give priority to farming (such as “right to farm” regulations), forestry, wildlife habitat protection, and heritage/ecotourism within the Farm and Forest District. [P&Z]
I-55	Continue to look for ways to minimize potential negative impacts (such as traffic, trespassing, destruction of older buildings, and visual changes to the landscape) within the Farm and Forest District. [P&Z]

## ***Transportation***

### **Objectives**

- Stage the development of the transportation system to complement the overall development of the County.
- Maintain MD Routes 4 and 2/4 as the main transportation corridor, providing for safe and efficient travel.
- Maintain and improve the arterial and non-arterial road systems to provide for safe and efficient travel.
- Improve and expand existing public transit services to capture the highest ridership possible.
- Promote transportation alternatives such as public transit, carpools, vanpools, bicycling, and walking.
- Develop a sustainable program for financing transportation construction and improvement.
- Continue a countywide transportation planning program that is integrated with State and regional planning programs.

### ***Sustainability Issues***

*A sustainable transportation system provides an overall framework for good urban and rural development. However, its success will necessarily depend upon the settlement pattern. The land use settlement pattern determines the amount and spatial distribution of travel as well as the ability of various modes to serve travel demand. Sustainable communities promote energy efficient, safe, and convenient travel patterns because they:*

- *Allow for shorter and fewer automobile trips by integrating land use activities that complement daily life—parks, shopping, social, and institutional centers—into the pattern of residential living.*

- *Allow multiple trip purposes to be served with a single trip through mixed-use development and pedestrian-oriented design.*
- *Allow for alternatives to the single-occupant vehicle to serve commuting travel.*
- *Allow alternatives to the automobile to serve everyday travel needs, such as walking, bicycling, and public transit.*

## **Trends in Transportation**

Traffic volumes in Calvert County, especially on MD Routes 4 and 2/4, have more than doubled in recent decades. The traffic problem is most evident in Prince Frederick where a high level of automobile commuting has combined with highway-oriented commercial development to cause recurring, morning and evening, traffic congestion. Traffic signals at the entry to Prince Frederick back up the flow of traffic and increase travel delays, fuel consumption, and air pollution.

In 2000, according to the U.S. Census, about 61 percent of employed County residents, or 22,760 persons, commuted to jobs outside of the County. The commute for one-quarter of the County labor force exceeded one hour. Nearly 78 percent of commuters drove alone to work, 16 percent carpooled, about 4 percent worked at home, and only about 2 percent used public transit, walked, or bicycled to work. The County's low-density residential pattern and continued residential growth mean that these travel patterns and behaviors will continue and that congestion on the County's main highway will worsen. Indeed, the distribution of workplaces in southern Maryland has become more dispersed over the last decade, meaning that downtown Washington, D.C., the traditional destination for commuter bus services, represents a smaller proportion of workplace destinations. Over the long term, as job destinations disperse, it becomes more difficult and costly to expand commuter bus service. Therefore, expansions in commuter bus service will likely be limited to routes serving the Suitland Metro Center in Washington D.C. and perhaps Lexington Park in St. Mary's County.

Changes in the distribution of commuting patterns and the regional nature of travel suggest that the Thomas Johnson Bridge, which connects the County to Lexington Park, needs to be expanded. The County, region, and State are studying the long-term land use and traffic implications of adding a new span to the bridge. All alternatives will be studied including public transit.

The County looks to the level of service (LOS) on MD Routes 4 and 2/4 as one indicator of the impact of development on the quality of life in Calvert County. Maintaining an adequate LOS during peak periods, might serve as a benchmark for measuring how well the County is managing growth and development. LOS has worsened on MD 2/4 and severe congestion may be expected on MD 2/4 in the Prince Frederick area. LOS in Prince Frederick is no longer adequate and, absent major improvements in Prince Frederick, severe daily congestion and delays will persist.

To help resolve congestion in Prince Frederick, Calvert County planned a loop road system around the town center, two overpasses and an underpass, and the widening of MD 2/4. The County has made significant progress toward implementing the Prince Frederick Loop Road, including committing funds to engineering and construction. The projects in Prince Frederick will

improve conditions for the future, provided that County growth does not significantly exceed 37,000 dwelling units.

Indeed, preventing severe congestion on MD Routes 4 and 2/4 over the long term will prove more costly and difficult as residential growth continues. To date, the County’s use of zoning and its purchase of development rights to reduce residential buildout have proved the most effective steps taken to addressing traffic on MD 2/4. The impacts of these decisions will be seen in future years. Still, more road construction will be needed if the County seeks to maintain an adequate LOS on MD Routes 4 and 2/4 over the long term.

## Arterial Highways

Arterial highways such as MD Routes 2, 4, 2/4, 231, and 260 serve fast and heavy traffic between urban centers. Direct access to property along arterial highways should be managed so that overall highway capacity can be preserved for through traffic.

The County considers the gradual conversion of MD Routes 4 and 2/4 into a controlled access expressway as key to resolving future traffic congestion. Making that conversion requires primarily five efforts:

- It is the policy of Calvert County that new access points to MD Routes 4 and 2/4 shall not be allowed.
- Development plan review in which new highway access is coordinated and the rights-of-way of future service roads and overpasses are reserved.
- The purchase of rights-of-way for new overpasses along MD Routes 4 and 2/4.
- Traffic engineering and town planning solutions that minimize new traffic signals.
- Highway construction including widening, overpasses, the upgrade of the older sections of MD Routes 4 and 2/4 that were retained when the highway was dualized, and the addition of acceleration and deceleration lanes and shoulders where needed.

Highway construction is the most expensive of the four actions required. To date, the County has relied on the State to fund needed improvements on the State highway system. To meet and expedite its highest priority transportation needs, the County may have to consider using local revenues in combination with State resources.

<b>Actions</b>	
I-56	Continue to implement measures to maintain the safety and efficiency of travel:
	a. Reduce existing and prohibit future direct property access, especially to MD Routes 4 and 2/4.
	b. Require parallel connecting roads along MD Routes 4 and 2/4 during the development/subdivision process with the long-term goal of having all driveways served by connecting roads. [P&Z]
I-57	Continue to adopt and update a County transportation plan, including an arterial highway system element. [P&Z]

I-58	Promote the regular update of a regional transportation system plan based upon and designed to serve the land use development goals of Calvert County and the other units of government in the Southern Maryland region. [P&Z]
I-59	Develop a funding strategy to expedite the planning and construction of needed projects on the State highway system in Calvert County. [P&Z, F&B]

## Non-Arterial Roads

Collector and local roads, such as subdivision streets, are also important components of the County’s overall transportation system. This is especially true of collector roads. These roads, which are generally County-owned and maintained, collect traffic from local roads and convey it to the arterial highways. In town centers, collector and local roads provide for local circulation and access to businesses.

Many of the non-arterial roads in Calvert County were meant to be farm-to-market routes. The builders of these roads did not intend them to carry heavy traffic volumes. Under such conditions, they present safety and maintenance problems. Upgrading rural roads to modern design standards is costly and often makes rural lands more accessible to urban development. Major renovations to old County roads can cost up to \$1 million per mile.

Priority should be given to upgrading those roads that serve town centers. Roads that serve rural and natural areas generally have lower traffic volumes and do not warrant the same design improvements required of those serving growth areas. By coordinating road improvements with land development goals, the County can keep its road construction costs lower and support new growth where it is expected.

Each of the town center master plans proposes road construction projects. In most cases, implementation of these projects would help manage access onto MD Routes 4 and 2/4 and provide a framework for higher density residential and commercial development. In some cases, these improvements are needed to resolve existing traffic congestion. In 1995, the County began constructing the Prince Frederick Loop Road. The first section, between MD 231 and Stoakley Road, and north to MD 4, is open to traffic. The County is implementing the other sections now according to a construction schedule it adopted.

Financing road improvements is a challenge. The County studied options for raising revenue for new road construction and has opted to use a combination of new development excise tax revenues, the sale of bonds, and general fund revenues.

Road maintenance is also costly and the County relies on gasoline tax revenues, which are transferred to the County, for this purpose. However, these funds cannot be used in Calvert County’s private communities, which are home to a large number of County residents.

<b>Actions</b>	
I-60	Maintain the program to renovate road sections and intersections. This includes widening roads, adding shoulders, removing dangerous curves, replacing bridges, correcting poor sight distance, and adding turning lanes and roundabouts. Prioritize improvements based on traffic counts and proximity and service to town centers. [PW]

I-61	Continue the program for resurfacing. Prioritize resurfacing based on traffic counts, structural condition of paving, and skid resistance of existing surfaces. [PW]
I-62	Continue systematic road maintenance and timely snow removal. Prioritize maintenance based on need per total length of roadway/section. [PW]
I-63	If amendments are made in federal and/or State standards, amend the County road design requirements to allow for safe roads that are not over designed. [PW, P&Z]
I-64	Develop a Countywide policy for building and maintaining sidewalks and bicycle ways at the time of new road construction. [P&Z, PW]
I-65	Construct new roads as called for in the County Transportation Plan and as identified in the adopted town center master plans. Ensure that environmental impacts, including stormwater impacts, are taken into consideration in road design and are properly managed during road construction. [PW]
I-66	Continue to adopt and update a County transportation plan, including a nonarterial road system element. [P&Z]
I-67	Prepare traffic circulation studies and transportation plans as needed for town centers. [P&Z, PW]
I-68	Continue to retrofit existing roads with sidewalks, especially within town centers and connect communities within a one-mile radius of town centers by an internal network of sidewalks and roads. [PW]
I-69	Develop an approach to fund road maintenance in existing private communities. [F&B, PW]

## Public Transit

Good transportation planning requires that highway and transit facilities be planned together. Highway capacity can be optimized when a highly accessible and efficient transit system is in place.

Rapid transit is intended to facilitate fast movement along heavily traveled corridors, such as MD 2/4. Rapid transit can be provided by commuter rail, light rail, and by buses operating in exclusive rights-of-way. The rail options require high urban population densities to justify their costs and to operate successfully. This condition is not likely in Calvert County: County planning policy promotes a rural development pattern with relatively small urban concentrations (town centers). Commuter bus service is provided successfully by the Maryland Transit Administration to Washington D.C. although it is not rapid transit. The County and Maryland Transit Administration continue to cooperate to expand transit service to other areas where high concentrations of jobs are located, such as Lexington Park in St. Mary's County.

The County operates two levels of local transit service. A fixed route service is operated between town centers. A demand-responsive service provides service to the elderly and disabled in the Prince Frederick Town Center and environs.

Waterborne commuter ferry service is a form of transit with potential for Calvert County especially as the southern part of the County becomes more economically integrated with Lexington Park. The potential must be kept viable. Any ferry service should be properly planned and integrated into the overall transportation system and land use pattern.

The County Transportation Plan recommends an overall framework for public transit service that should continue to be implemented by Calvert County. Specifically, it calls for the creation of local transit service areas in the major town centers and for express bus service between those centers. The plan also recommends expansion of commuter bus service and the park and ride lots that serve carpool, vanpool, and commuter bus ridership.

<b>Actions</b>	
I-70	Provide adequate commuter parking lots at key locations throughout the County. Encourage the shared use of parking lots. [P&Z]
I-71	Expand and improve bus service as recommended in the County's Transportation Plan which recommends a significant improvement in the accessibility and convenience of fixed route transit service throughout the County. [CR]
I-72	Expand and improve demand-responsive transit services. [CR]
I-73	Promote the regular update of a regional transportation system plan based upon and designed to serve the land use development goals of Calvert County and the other units of government in the Southern Maryland region. [P&Z]
I-74	Prepare local transit development plans based on town centers as needed. [CR, P&Z]
I-75	Update the County transportation plan, including a public transit element. [P&Z, PW, CR]

## **Transportation System Management**

Building added highway capacity is expensive. Efforts must be directed to making the most efficient use of existing roads before building new capacity. Addressing transportation problems through constructing new highways alone can prove exceedingly wasteful.

Transportation system management (TSM) uses non-capital-intensive improvements to achieve objectives such as: optimizing existing roads; encouraging the use of buses, vanpools, and carpools; reducing vehicle use and traffic congestion; effecting motor fuel savings and reducing emissions; and helping to modify travel demand and patterns. TSM measures with potential in Calvert County include:

- Traffic engineering techniques such as traffic signal synchronization, the proper placement of driveways, and exclusive turning lanes and roundabouts at intersections.
- The promotion and marketing of area-wide transit, carpools, and vanpools including expanded carpool lots.
- Town center and community land use planning and site design aimed at minimizing the need for travel by car.

<b>Actions</b>	
I-76	Continue to monitor traffic conditions and assess the potential for technological solutions to traffic problems. [PW]
I-77	Enhance opportunities for walking and bicycling in town centers. [P&Z, PW]
I-78	Establish bicycle routes to connect residential, commercial, employment, educational, and open space areas as feasible. [P&Z]

I-79	Provide or require sidewalks in established and newly developing commercial areas of town centers. [PW, P&Z]
I-80	Provide adequate commuter lots at key locations throughout Calvert County, especially in town centers as part of coordinated land development plans. Such commuter lots may then become future transit stations. [P&Z, PW]
I-81	Continue to update the County transportation plan, including a Transportation System Management element. [P&Z]

## ***Energy***

### **Objectives**

- Develop policies, procedures, and practices that promote energy conservation and efficient use of energy resources.
- Use alternative energy sources when economically feasible and compatible with the environment.
- Encourage energy efficiency during site selection, site design, and building design for residential, commercial, and institutional developments.
- Reduce both residential and commercial average annual increase of energy consumption.
- Reduce the County government's energy consumption.
- Plan for the County's future energy needs.

### ***Sustainability Issues***

*Sustainable communities meet the needs of current and future County residents in the following ways:*

- *Renewable energy sources are used.*
- *Energy sources used do not adversely impact the environment.*
- *Energy consumption is reduced.*
- *Energy-efficient land use patterns promote economic and social activities that are less dependent on automobiles.*

*There has been a growing awareness that most of the world's resources are limited and that we should be reducing our consumption and reusing and recycling whatever possible. This ethic applies not only to physical objects, such as paper, but also to the less tangible objects, such as energy.*

### **Energy Facilities**

Two major energy plants are located within Calvert County: the Calvert Cliffs Nuclear Power Plant and the Cove Point Liquefied Natural Gas (LNG) facility. The Calvert Cliffs Nuclear Power Plant is the County's most significant source of revenue, although it supplies little electricity directly to Calvert County. In March 2000, Calvert Cliffs Nuclear Power Plant became the first plant in the United States to earn 20-year extensions of its operating licenses

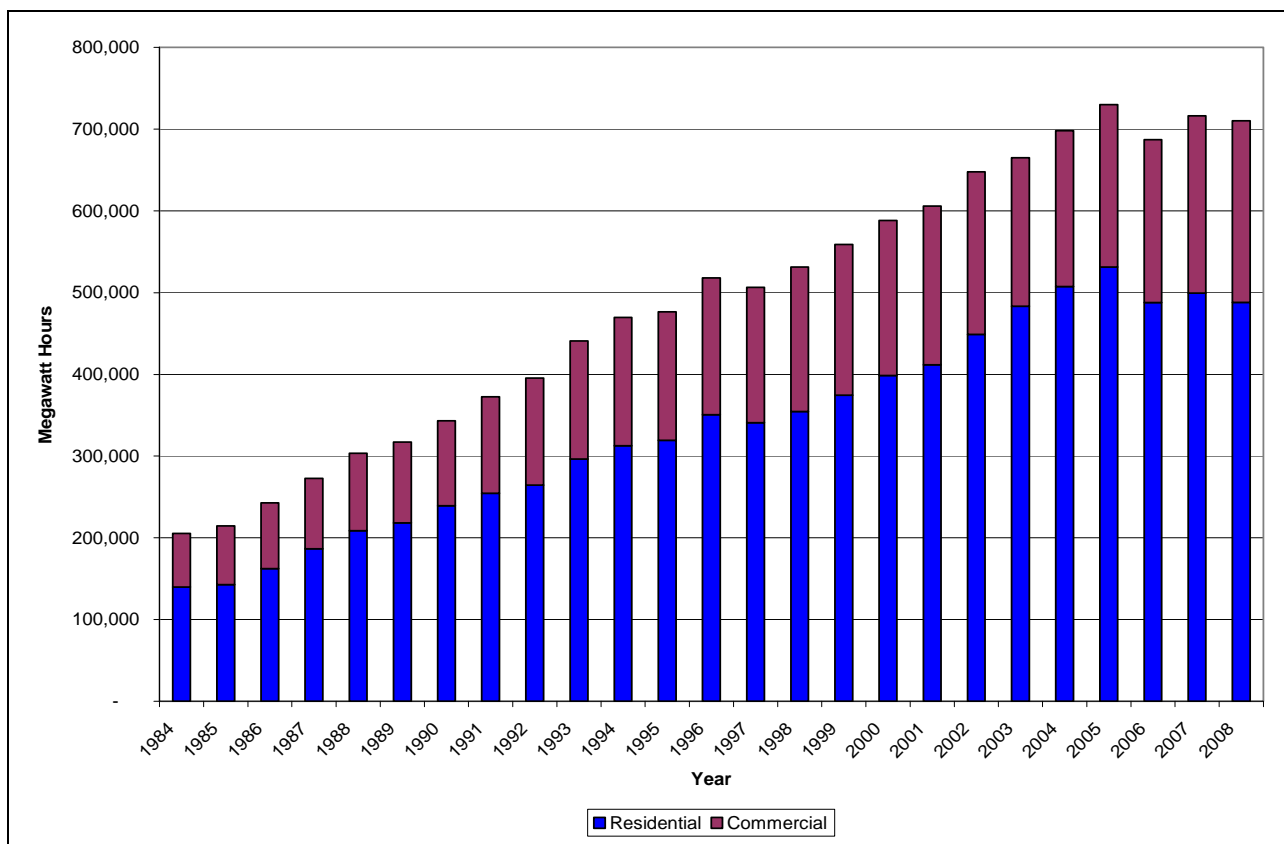
from the U.S. Nuclear Regulatory Commission. One issue that affects the County, but that must be resolved at the Federal level, is the long-term storage of spent nuclear fuel.

The Cove Point LNG facility was reactivated in July 2003 and receives LNG via ships that come from various producing basins throughout the world. This facility is the largest LNG import facility in the United States and is the County’s second largest source of revenue.

## County Trends in Energy Use

Calvert County's energy use has been increasing, due to population growth and higher per capita use. Southern Maryland Electric Cooperative (SMECO) supplies approximately 80% of all residential and commercial electricity while Constellation Energy supplies the rest.

SMECO's sale of energy to residences increased from 139,651 megawatt hours in 1984 to 488,042 megawatt hours in 2008, (see Figure I-B). While much of this increase was due to residential growth, SMECO reports increased usage per capita. SMECO's commercial energy sales increased from 66,000 megawatt hours in 1984 to 222,212 megawatt hours in 2008. Due to increased demand for energy, SMECO constructed a new substation in Mutual, purchased sites in Huntingtown and Prince Frederick, and is securing a site in Dunkirk.



**Figure I-B: Energy Sales 1984-2008, Southern Maryland Electric Cooperative**

The State of Maryland passed the Electric Customer Choice and Competition Act of 1999. The Act allows customers to choose their power supplier (generator). Companies other than the local

utility company may provide electricity, including environmentally friendly power such as solar, wind, and geothermal. Local utility companies continue to deliver power and maintain their distribution systems. The Maryland deregulation began in July 2000. Customer choice was available to SMECO customers in November 2001.

In order to provide utility service in the future, new or expanded utility corridors will need to be identified. Utility corridor planning can reduce the number of new corridors, thereby providing more cost-effective service, reducing impacts on neighboring uses, reducing tree removal, and providing known locations for future electromagnetic fields. While scientific evidence is not conclusive about the public health effects of electromagnetic radiation, policy-based approaches advocate prudent avoidance, "limiting exposures which can be avoided with small investments of money and effort," (American Planning Association, 1991).

## **Lighting**

Of all electricity sold in the U.S., lighting accounts for 25% to 30% of energy in commercial buildings (EPA 2001) and 5% to 10% for a typical home (SMECO Energy Tips, 2002). The nation's demand for electricity could be cut by more than 10% if energy-efficient lighting were used (EPA 2001). New lighting technology, such as compact fluorescent lighting and light emitting diodes (LEDs), can reduce energy consumption and at the same time save money. The initial cost of installing energy efficient technology should be compared to the life-cycle cost (operating cost times lamp life plus purchase price) of energy-efficient equipment versus standard equipment. The County government is using solar energy to power the outdoor safety lights at three solid waste compactor sites. Although the initial cost was higher, the solar energy system paid for itself in two years, and there is no monthly electric bill. In addition to cost savings, reducing energy used for lighting also reduces environmental impacts; every kilowatt hour of lighting electricity not used prevents emissions of 1.5 pounds of carbon dioxide, 5.8 grams of sulfur dioxide, and 2.5 grams of nitrogen oxides.

While Calvert County is fortunate to have the Arthur Storer Planetarium, a unique science and cultural facility available to students and visitors, it is not a substitute for seeing real stars in the night sky, which is one of the pleasures of living in the country. Urban dwellers often marvel at the number and brightness of stars that can be seen in rural areas. As the character of Calvert County takes on more suburban qualities, residents express the desire to maintain aspects of its rural character. As the population and number of structures increase, there is the potential for Calvert Countians to lose this connection to the stars from light pollution. Lighting can be used effectively without overlighting an area. Some types of street and security lights, such as high-pressure sodium lamps, use less energy and produce more light. Lighting can be used to minimize shadows around buildings and parking areas. "Lighting on buildings, under trees and shrubs can be used effectively to illuminate the surroundings, while not blinding pedestrians and residents," (Community Forestry Network 1994). The County Commissioners created a Lighting Task Force in 2002 to research outdoor lighting issues and to make recommendations for regulations to address light pollution. The Lighting Task Force presented its recommendations to the County Commissioners in 2003. In May, 2006, the County Commissioners adopted outdoor lighting regulations as part of the new Calvert County Zoning Ordinance.

## **Cost Savings**

The average amount an American single-family household spent on all energy use was \$1,492 in 1997 (U.S. Department of Energy 2001). The national percentage of household energy to run electric air conditioning and appliances was about 31% in 1997. In comparison, the amount was 46% for households in the South Atlantic (Delaware, Maryland, Washington, D.C, Virginia, West Virginia, North Carolina, South Carolina, Georgia, and Florida). The warmer climate contributes to the higher percentage of energy consumption for these uses. Cost savings can be achieved by the choice of appliances and the choice of fuel used to heat and cool homes, for example, propane gas and geothermal. Heat pumps, especially ground-source, “are far more ‘efficient’ at converting electricity into usable heat because the electricity is used to move heat, not generate it.” There are two types of ground-source heat pumps, closed-loop and open-loop systems. Closed-loop systems are the most common and preferred. Open-loop systems are less preferred and should be discouraged, due to risks of contaminating the water source or inadequately recharging the aquifer, (U.S. Department of Energy 2003).

## **Energy Conservation Programs**

Energy efficiency is important in several ways; not only does it save money, it reduces environmental impacts and defers the need to build new power plants. SMECO offers several energy conservation programs. Home energy monitoring kits are available for loan through the Southern Maryland Public Libraries. The Energy Star Home Program is a program offered by SMECO and the U.S. Environmental Protection Agency that targets new home construction. “An Energy Star Home is built to use 30% less energy (for heating, cooling, and water heating) than a home built to the standards of the current national Model Energy Code,” (SMECO 2003). Benefits to the homeowner are reduced energy use and reduced energy bills compared to homes built to standard codes. More details about this and other energy conservation programs are available from SMECO, 888-440-3311 or [www.smeco.com](http://www.smeco.com).

Energy assistance is available to low-income citizens through the Maryland Energy Assistance Program and the Electric Universal Service Program, administered by the Maryland Department of Human Services, Office of Home Energy Programs. Weatherization and energy-efficiency measures are available. The Southern Maryland Tri-County Community Action Committee is the local contact for the program.

The Maryland Energy Administration offers a number of incentives for both businesses and residents to install energy saving technologies.

In addition to ways to reduce consumption, reusing materials can aid in efficient use of energy. A waste-to-energy plant is one way to produce energy while reducing the amount of waste that goes to the landfill. The waste-to-energy concept is discussed further in the Waste Management section.

## **Site Planning and Building Design**

Before we became reliant on heating and cooling equipment, buildings were constructed to take advantage of breezes and the seasonal path of the sun. Within the County's older shore

communities, many of the houses are comfortable even in the summer, due to windows that take advantage of breezes off the water and shading from mature trees. Today, building designers often ignore natural rhythms and rely totally on mechanical systems to heat and cool buildings, systems that are more expensive to own and operate. One of the primary ways to build in harmony with the natural environment is to be cognizant of the sun. Use of natural lighting and reduction of artificial lighting reduces energy needed for lighting and reduces air conditioning needed to cool buildings from heat generated by lights.

Site planning and building design can promote energy efficiency through the use of appropriate vegetation and building materials. For instance, properly planted trees can typically reduce energy used for cooling individual buildings by up to 75% and heating energy consumption by 30% (U.S. Department of Energy 2003). Another way to reduce air conditioning is by using white- or light-colored surfaces for external walls and roofs; energy use may be decreased by 40% (Center for Building Science News 1994).

“Green or sustainable building is the notion of designing, constructing, operating and maintaining buildings and landscapes in a manner that minimizes environmental impacts. It incorporates energy efficiency, water conservation, waste minimization, pollution prevention, resource efficient materials and indoor environmental quality into all phases of a building’s life...conventional building practices tend to consume enormous amounts of nonrenewable natural resources and raw materials, generate excessive waste, overbuild and disrupt natural hydrology and degrade natural ecosystems and wildlife habitat. All of this adversely impacts Maryland’s communities, tributaries, watersheds and the Bay,” (Maryland Department of Natural Resources). Some green buildings have living roof structures--plant-covered roofs. The benefits of living roofs include reduced energy consumption and prevention of stormwater runoff. Green building techniques are being advocated by many organizations and governments, including the American Institute of Architects Committee on the Environment, the National Association of Home Builders, the Chesapeake Bay Foundation, the U.S. Department of Energy, the State of Maryland, and the City of Austin, Texas. Some local governments provide technical assistance, offer incentives, and/or require development projects to meet green codes.

## **Orientation of Buildings and Streets**

Working with natural forces through passive solar heating and cooling can keep temperatures comfortable and reduce energy consumption. Street orientation relates directly to how much sunlight or shade a building receives. If streets are oriented with forethought, buildings can be shaded in the summer and receive sunlight in the winter, due to the sun's varying angle and height through the seasons. Streets oriented to the cardinal points (north, south, east, and west) receive very little shade during the summer. In the morning and afternoon, the north-south streets are shadowed, yet they receive the full force of the sun at midday. During the winter, almost all the streets are shadowed, thus the buildings are colder and require greater amounts of fuel to heat them. In contrast, streets oriented diagonal to the cardinal points (northeast, southeast, southwest, and northwest), take advantage of the sun's position. In the summer, shadows are cast most of the day, and in the winter, more sunlight is cast on the streets. Streets and buildings oriented in this manner can reduce the need for mechanical equipment to heat or cool the buildings.

## Land Use and Automobiles

Calvert County's geography and development patterns have created an automobile-dependent community. Nationwide, automobile dependence has intensified since World War II. Creation of the Interstate highway network, decentralization of the cities, high home ownership, and the increase of two-income households are examples of trends that have intensified automobile use. The high percentage of County residents who commute out of the County for work, and the long duration of their commutes, combine to create high consumption of gasoline. Thus, land use—the location of homes, jobs, shopping, and recreation—affects energy consumption.

High automobile use is a concern from an energy standpoint as well as from an environmental standpoint. By directing development to town centers and promoting a mixture of land uses (residential, commercial, recreational, and institutional), the length of daily trips and the number of trips can be reduced. Promoting use of park and ride lots and buses are two more ways to reduce gas consumption. Given the County's peninsular shape and its previous patterns of scattered subdivisions, methods should be explored to reduce the impact of travel. Refer to the Transportation Section for more discussion of this topic.

Gasoline-powered vehicles negatively impact the environment by creating air pollution and continue the United States foreign-oil dependence. Methods that can reduce negative impacts include vehicles powered by alternative fuels, such as natural gas, bio-diesel, hydrogen, electric, hybrid electric, or solar. Improvements in these technologies have been made and greater improvements may result in the coming years. Natural gas for vehicles is an attractive alternative to gasoline since natural gas emissions of carbon monoxide are significantly reduced along with other emissions that produce ozone and other greenhouse gases. SMECO is using bio-diesel vehicles, and the County government and the Board of Education have a small fleet of propane forklifts. In 2000, the State of Maryland began allowing an excise tax exemption for electric and hybrid vehicles through the Maryland Clean Energy Incentive Act. The County purchases vehicles through a low-bid procurement process. In order for the County to consider purchasing energy-efficient vehicles, the procurement process may need to be modified to account for environmental impact costs and fuel savings over the lifecycle of the vehicle.

<b>Actions</b>	
I-82	Reduce travel-related energy consumption by promoting compact mixed-use development in town centers. [P&Z, ED]
I-83	Encourage telecommuting and flexible working schedules for employees to conserve energy used for transportation. [CA, ED]
I-84	Encourage energy conservation through the County Transportation Plan (commuter parking lots, public transit service, commuter bus service, car and van pooling, and bicycle and pedestrian pathways). [P&Z, PS, F&B, PW]
I-85	Consider converting a portion of the County vehicle fleet to alternative fuels based upon economic and environmental feasibility. [PW, PS]
I-86	Conduct an assessment of the County government's energy use and seek ways to improve energy efficiency. [GS]
I-87	Review the local building code for areas where greater energy efficiency could be promoted. [P&Z, GS]

I-88	Promote education of energy-conserving techniques, including demonstration projects of energy-saving techniques, to the public, to school students, and to those who design local communities. [Constellation Energy, SMECO, P&Z, GS]
I-89	Consider requirements and/or incentives for energy-efficient buildings and developments. [P&Z, PW]
I-90	Consider using solar energy, natural gas, and geothermal energy for County facilities and consider promoting their use as alternative sources of energy. [GS, PW]
I-91	Discourage light pollution. Enact regulations and incentives to minimize light pollution. [BOCC, P&Z, GS]
I-92	Consider building orientation during site design to take advantage of solar energy and reduce the need for artificial heating and cooling. [P&Z, PW]
I-93	Plan for future utility needs by identifying areas for future and expanded distribution lines. Consider utility corridor planning. [P&Z]
I-94	Promote and participate in Federal, State, and utility-sponsored energy efficiency programs. [P&Z, GS, PS]
I-95	Encourage utilities to expand energy conservation programs. [CR]
I-96	Encourage tree planting around homes to reduce heating and cooling. [P&Z]
I-97	Consider elements of environmental and energy efficient design (“green” building) in appropriate County codes. [P&Z]
I-98	Maintain a Green Team within County government to make recommendations for improved county energy efficiency and reduced environment impacts from the built environment. [BOCC]

## ***Waste Management***

### **Objectives**

- Ensure the safe and environmentally sound disposal of solid waste, wastewater, and hazardous waste generated in Calvert County.
- Reduce nutrient pollution from sewage treatment facilities and septic systems.
- Promote conservation of resources; e.g., solid waste source reduction, reuse and recycling of waste, and water conservation.
- Investigate efficiency and effectiveness of regional approaches to waste management.
- Allow for sewage treatment facilities for town centers.
- Identify and require correction of malfunctioning septic systems.

### ***Sustainability Issues***

*Sustainable communities conserve natural resources, reduce consumption, reuse products, and recycle. Their citizens look at the long-term consequences of consumption practices to ensure that natural resources are not depleted nor degraded and, thus, are available for use by future generations. Waste is disposed of in ways that have the least environmental impact and are fiscally responsible. Toxic waste is avoided where possible, reduced, reused, recycled, or*

*disposed of in a way that will not pollute drinking water, subsurface groundwater, surface water, air, or land.*

*Calvert County will ensure the safe and environmentally sound disposal of solid waste, wastewater, and hazardous waste generated in Calvert County by providing adequate and efficient facilities and programs for disposal. In addition, the County will promote conservation of resources; e.g., solid waste source reduction, reuse and recycling, and water conservation. Such conservation will extend the useful life of County waste disposal facilities and groundwater supplies, reduce environmental impacts, and reduce waste disposal costs.*

## **Solid Waste**

**Landfill Disposal Needs.** A state of the art, double-lined landfill designed to protect the environment was opened in Appeal in 1993. In 1997, in order to head off the major cost of expanding the landfill, the County entered into a 20-year agreement with an independent private contractor to build and operate a solid waste transfer station at the Lusby landfill site. Waste is transferred out of the County, thereby extending the life of the landfill for many years. Also, in FY 1997, the County capped the landfill in Barstow.

**Household Waste.** Household waste collection, including recycling, is currently provided at the compactor sites, Appeal Landfill, or by private haulers. The most successful recycling programs are achieved by using curbside collection of waste and recyclables. Franchising curbside collection with recycling is an alternative approach that could be used in Calvert County.

**Recycling Program.** Calvert County citizens and businesses recycled 12.5% of the County waste stream in 2008, short of the State goal of 15%. County staff recently discovered that it was reporting recycled land clearing waste which does not count in the state's recycling requirement for counties. With its update to the Solid Waste Plan in 2009, the County intends to increase recycling to lengthen the life of the landfill, reduce the cost of waste management, reduce the use of our natural resources, and reduce the potential threat that domestic waste poses to the environment.

**Yard and Land Clearing Waste.** Citizens are encouraged to compost their own yard waste such as grass clippings, leaves, and twigs. Most yard waste that reaches the landfill is composted. A small percentage is disposed of with the household waste.

Land-clearing debris, such as tree stumps, is not allowed to be disposed of at the County Landfill; thus most are disposed of at private landfills which accept land-clearing debris. An increasing amount of this material is being ground into mulch, reused, and recycled. But problems associated with landfills for land-clearing debris, such as traffic, noise, visual blight and proximity to residences still pose problems.

**Construction Waste.** Much of this material is accepted at the landfill. However, to save space and extend the life of the landfill, more of it should be recycled or converted to mulch. There are no landfills in Calvert County that accept rubble (broken concrete, bricks, asphalt, etc).

Another method of solid waste disposal is to convert waste to energy through combustion. This process combusts much of the waste stream and produces usable energy, but causes air pollution. In addition, energy can be captured from the County’s existing landfills. As garbage decomposes in landfills, methane is created which can be captured and burned to produce heat or electricity.

<b>Actions</b>	
I-99	Increase recycling (measured as a percentage of waste stream) and consider mandatory recycling, where and when long-term benefits result. Explore increasing the types of waste stream items that can be recycled. [PW]
I-100	Encourage franchised curbside collection and recycling. [PW]
I-101	Adopt a policy that ensures that the majority of land-clearing debris, yard waste, and construction waste is converted to mulch or is in other ways recycled or reused rather than landfilled. [PW]
I-102	Work jointly with local businesses on source reduction (e.g., decrease packaging), reuse, and recycling. [PW]
I-103	Provide public education on source reduction, reuse, and recycling of solid waste materials. [PW]
I-104	Explore the feasibility and environmental acceptability of a waste-to-energy plant in the Southern Maryland Region. [PW]
I-105	Increase enforcement of anti-littering regulations and increase fines. [PS]
I-106	Develop guidelines on how to dispose of stable wastes in a sustainable, non-polluting manner. [SCD, P&Z, PS, Extension Service]

## **Wastewater**

Wastewater is all-liquid, non-hazardous waste produced by residential, commercial, industrial, and institutional uses. It mostly consists of human waste disposed of through community, shared, or individual sewer systems. Most of the domestic waste in Calvert County is disposed of in onsite sewage disposal systems (septic systems). The greatest threats from wastewater disposal are nutrient pollution (nitrogen and phosphorus) and disease transmittal. Nutrient pollution has been linked to the decline of living resources in the Chesapeake Bay.

**Septic Systems.** In Maryland, Calvert County has the highest percentage of sewage being disposed of into septic systems. The Maryland Department of Planning has estimated that septic systems contribute 25% of the non-point nitrogen pollution in Calvert County. Septic systems only remove about one-half of the nitrogen and release the effluent to the soil below the vegetated layers. It is estimated that about 8 lbs. of nitrogen per person per year is released to the environment. Recently, nitrogen-removing septic systems have been developed which could greatly reduce the discharge of nitrogen from septic system wastewater disposal.

To protect the environment from malfunctioning septic systems, the County requires that all new and replacement septic tanks are chambered to prevent overflow to the environment if the tank fails. On existing lots, there is an additional requirement that sufficient and appropriate space be provided on the lot for one primary and two secondary drainage fields. These requirements have

been in place since January 1993. Homeowners are encouraged to pump out their septic tanks every three to five years.

**Septage Treatment.** Septage is all wastewater and sludge collected from septic systems. Since 1995, all septage must be disposed of at a County approved septage treatment facility, currently at the Solomons Wastewater Treatment Plant, or on land that has received a State permit for such disposal.

**Shared Wastewater Facilities.** Shared wastewater facilities are systems that serve more than one lot or parcel in subdivisions. Shared facilities can also be used to serve areas of any size that are experiencing septic failures.

The current requirements for septic recovery areas dictate that lots are larger than the minimum lot size allowed. Thus, lots consume more area than necessary. With shared facilities, more nutrients can be removed and less land consumed. However, the use of shared wastewater systems should not allow increased housing density, which could work against the County’s growth control objectives.

**Community Wastewater Systems.** Community wastewater systems are defined as any public wastewater system that treats waste from more than one lot or parcel. Three town centers have large wastewater treatment plants to support the existing populations and allow growth in these areas. Treatment is slow-rate land application for Prince Frederick, biological-nutrient removal followed by rapid infiltration land application for Solomons and biological nutrient removal treatment with discharge into the Chesapeake Bay for Chesapeake Beach and North Beach.

**Wastewater Policy.** Slow-rate, land application of treated wastewater is the preferred method of wastewater disposal in the County and is the most sustainable. The effluent is sprayed onto either forestland or cropland planted with certain grasses. Vegetation takes up the nutrients and then is harvested. The nutrients are thus recycled rather than discharged into waterways where they would have adverse impacts on aquatic resources. In addition, the shallow water aquifers are recharged in the area of the application. The disadvantages of land application are costs and land consumption.

In light of the County's intention to reduce growth and the growth rate, the provision of new community sewerage service should not allow an increase in residential density. When providing community wastewater treatment to correct an existing problem, such as failing septic systems, no increase in density will be allowed based upon provision of the sewerage system.

<b>Actions</b>	
I-107	Require all new community sewerage systems to be land application systems and explore other beneficial ways of reusing wastewater. [PW, P&Z]
I-108	Develop incentives for the use of nitrogen-removing technologies for new, replacement, and existing septic systems and for shared facilities to reduce nutrient pollution of our waterways. [HD, PW, P&Z]
I-109	Require new septic systems and replacement septic systems <b>in the Critical Area to be use nitrogen-removing reducing systems (as required by Maryland law)-or-other technology that will reduce nitrogen by at least 50%.</b>

I-110	For existing problem areas (failing septic systems), search for funding and means to correct the problem. This could include installation of a shared or community wastewater system, composting toilets or gray-water systems. Systems may not be expanded to allow additional densities unless they are in areas where sewerage systems are allowed. [HD, PW, P&Z]
I-111	Permit water and sewer in all town centers when needed to support environmental health and/or support County-identified economic development goals, when and if cost-effective and economically feasible. [P&Z, PW]
I-112	Explore the feasibility, including cost-effectiveness, of allowing shared septic or wastewater treatment facilities with nitrogen removal and land disposal in clustered subdivisions without increasing overall housing density. [HD, PW, P&Z]
I-113	Explore an educational or mandatory program to have septic tanks pumped out on a regular basis (every 3 to 5 years). [CR]
I-114	Provide public education on water conservation to reduce demands on our aquifers and reduce demands for wastewater disposal. [PW]
I-115	Plan for expansion of the Prince Frederick Wastewater Treatment Plant. [PW]

## Hazardous Waste

Hazardous waste, if improperly disposed of, is a threat to the health and safety of Calvert County citizens and the environment. Industry, commerce, farming, and homeowners generate hazardous waste. When these toxic materials enter our soils and waterways, they also enter the food chain. This can reduce the productivity of soils and have negative impacts on wildlife and fisheries. Hazardous waste disposal is currently regulated by the State.

**Household Hazardous Waste Collection.** Educating the public on alternatives to using household products that create hazardous waste can reduce the use of these substances. Household hazardous waste collection can reduce the potential of these toxic substances being disposed of in the County Landfill or at other inappropriate places. The County currently accepts used motor oil and antifreeze, paints, herbicides, pesticides and other household hazardous waste at green box sites and the County landfill.

**Commercial, Industrial, and Agricultural Hazardous Waste Disposal.** Federal and State regulations control the use and disposal of hazardous wastes. These wastes are not allowed in the County Landfill. Nuclear waste from the Calvert Cliffs Nuclear Power Plant is currently stored onsite because a federal repository is not yet available.

**Leachate Treatment.** The liquid that accumulates at the bottom of lined landfills, leachate, is considered a hazardous waste and is treated at an appropriate wastewater treatment plant. Currently, the leachate from the Appeal Landfill is treated at the Solomons Wastewater Treatment Plant.

<b>Actions</b>	
I-116	Continue to collect hazardous household waste at the compactor sites and Appeal Landfill. [PW]
I-117	Continue to press Congress to site and build a nuclear waste repository. Require that nuclear waste be moved from the County to the federal repository. [BOCC]
I-118	Provide public education on use of safe alternatives to toxic compounds. [PS, PW]
I-119	Continue to provide guidance and training to farmers and homeowners through the Soil Conservation District and University of Maryland Extension Service on the proper use and disposal of toxic compounds and application of fertilizers, pesticides, and herbicides. [CR]

## *Land and Water Resources*

### **Objectives**

- Encourage preservation, protection, and conservation of natural resources.
- Establish a comprehensive approach to environmental planning with special emphasis on watershed planning.
- Protect environmental features that will help ensure continuance of a healthy and pleasant place to live for current residents and future generations.
- Protect environmentally sensitive areas (wetlands, floodplains, wetland and water way buffers, steep slopes) from development impacts to provide:
  - Sufficient habitat to maintain our current diversity of fauna and flora
  - Protection of habitat and individuals of rare, threatened, or endangered species
  - Nutrient removal
  - Flood control.
- Preserve stream valleys to maintain their important natural functions and to provide greenways throughout the County.
- Practice community planning and site design that conserves energy, protects natural resources, and minimizes impacts on the landscape.
- Encourage restoration of lost and/or damaged natural environmental features.
- Foster greater public awareness, education, and support of environmental concerns.
- Develop an implementation plan to accommodate growth in Priority Funding Areas while reducing nutrient loads in waterways to targeted levels.
- Ensure sufficient water supply and water/sewer treatment capacity to serve future growth in Calvert County.
- Protect the quality and quantity of groundwater aquifers.

### *Sustainability Issues*

*“A healthy ecosystem and natural environment are the foundation of all that we do. The natural environment, our life support system, is the basis for a healthy world, healthy economy, healthy*

*society, and a healthy quality of life," - Citizen Planners of Ventura County. Policies that promote a sustainable environment include the following:*

- *Environmentally sensitive areas (wetlands, floodplains, wetland and waterway buffers, steep slopes), large tracts of forested land and wildlife corridors are preserved or restored for the beneficial functions they provide:
  - o *Habitat for fauna and flora*
  - o *Nutrient and sediment retention and removal*
  - o *Flood control*
  - o *Recreation, etc.**
- *Sufficient sensitive areas should be preserved such that our current diversity of fauna and flora are maintained.*
- *Solid waste, wastewater, and hazardous waste are disposed of safely, relative to public health, and in environmentally sound ways so that groundwater and surface water quality remain viable for fisheries and useful to humans in terms of consumption, irrigation, and recreation.*
- *Natural resources, such as groundwater, surface water, forests, and fisheries are used conservatively and in nonpolluting ways so that they will be available for future generations.*
- *Pollutants are kept to levels below which they might have significant impacts on human health and below the assimilative capacity of receiving waters.*
- *True cost-pricing is established as the basis of economic viability. In true cost-pricing, long-term economic gains and preservation of the quality of life are valued above short-term profits. The value of natural capital and natural services should be evaluated in any determination of cost/benefit analysis. Long-term impacts on environmental and social issues must be considered as part of an economic analysis.*
- *Measures are taken to abate existing pollution problems.*

## **Water Resources**

Over the last 40 years, it has become increasingly evident that our source of drinking water is becoming overtaxed and that the release of sediment, wastes, and excess nutrients into the waterways has exceeded the assimilative capacity of our waterways. In 2006, HB 1141 was signed into law which requires jurisdictions to include a Water Resources element in their comprehensive plans. The plans must address potable water, wastewater, and stormwater.

### **Potable Water**

Too often, we take potable water for granted. Faucets run when not needed, and leaky faucets drip hundreds of gallons per day. Lawn sprinkler systems run automatically, even in the rain. We use drinking water to flush toilets.

Calvert County is situated over a favorable geological formation of groundwater resources. Four major aquifers (the Piney Point, Nanjemoy, Aquia, and Magothy) supply nearly all of the County's potable water. These four aquifers are protected from surface water contamination by clay-confining layers. A fifth deeper aquifer, the Patapsco, has been explored for additional

groundwater resources. Findings in Calvert County by the Maryland Geological Survey (MGS) are promising.

The recharge areas are located in Prince George's and Anne Arundel Counties and beyond, but it takes thousands of years for that water to reach the aquifers beneath Calvert County. The major threat to groundwater quality in Calvert County is deep wells, especially abandoned ones. These wells penetrate the confining layers and provide a direct potential conduit for pollutants to enter the deep aquifers.

Geologists have been warning that the seemingly inexhaustible supply is running out. Some have been listening. A decade ago, the Southern Maryland Counties jointly funded an aquifer study, which was conducted by the Maryland Geological Survey (MGS). They followed that up with another MGS study which was published in 2008.

The study noted that the water levels in nearly all the aquifers serving the three counties are dropping. The good news is that the report indicated that there are adequate supplies for Calvert County at least until 2030 based on population and land use projections and considering several scenarios. The favorable findings were due to the proactive zoning actions taken by the Board of County Commissioners. The Board reduced zoning density so that residential buildout should not exceed 37,000 households, ~~20% more than currently exist~~. Beyond that date (2030) and number of households (37,000 households), the geologists won't speculate as to the adequacy of water supply.

Charles and St. Mary's Counties have not adopted buildout limits and they draw from basically the same aquifers as Calvert. Another concern is that the recharge areas extend well beyond Southern Maryland boundaries and some of those recharge areas are being developed. When aquifers are drawn down below maintenance levels, a number of undesirable impacts can occur, including: existing well failures, stream-flow reduction or wetland degradation, intrusion of brackish water, and land subsidence. At all locations in Calvert, there is remaining available drawdown capacity by 2030 (see Table I-A). However, all of the scenarios show aquifer levels dropping.

Table I-A. Summary of Model Results for Critical Locations in Calvert County, 2030

Aquifer	Location	Management			Simulated Head			Remaining Available Drawdown		
		Level	Scenario			Scenario				
			1	2b	5b	1	2b	5b		
Aquia	Chesapeake Ranch	-363	-197	-236	-140	166	127	223		
Upper Patapsco	Chesapeake Ranch	-497	-72	-85	-97	425	412	400		
Aquia	Prince Frederick	-263	-121	-147	-90	141	115	173		
Aquia	Solomons	-359	-200	-240	-146	159	119	213		
Upper Patapsco	Solomons	-473	-75	-88	-101	398	384	372		
Aquia	Huntingtown	-230	-75	-92	-61	155	138	168		
Lower Patapsco	Huntingtown	-929	-64	-75	-83	865	853	845		
Upper Patapsco	Prince Frederick	-537	-87	-79	-84	470	458	453		
Upper Patapsco	Solomons	-472	-76	-89	-100	396	382	371		

For these reasons, the 2008 [Calvert County Comprehensive Water and Sewerage Plan](#) calls for maintaining an aggressive water conservation program to reduce overall water demands. [The Water and Sewerage Plan contains projections for overall water demand through 2017 and present and projected water supply demands and planned capacity for water systems \(public,](#)

industrial, and private community/institutional) through 2017. Table I-B shows data on government-owned well systems in the major Town Centers and includes anticipated demand in 2030.

Table I-B. Present and Projected Water Supply Demands and Planned Capacity

<u>Municipal Well Systems in Major Town Centers</u>	<u>2008 Average Daily Demand Million Gallons per Day (mgd)</u>	<u>2008 Planned Capacity Million Gallons per Day (mgd)</u>	<u>2030 Average Daily Demand Million Gallons per Day (mgd)</u>
<u>Chesapeake Beach</u>	<u>0.501</u>	<u>0.630</u>	<u>0.700</u>
<u>North Beach</u>	<u>0.131</u>	<u>0.200</u>	<u>0.280</u>
<u>Prince Frederick</u>	<u>0.234</u>	<u>0.245<sup>2</sup></u>	<u>0.500</u>
<u>Solomons</u>	<u>0.364</u>	<u>0.550</u>	<u>0.700</u>

Few problems have been encountered in the County with reference to the quantity and quality of potable water available. Ground water is used exclusively for this purpose. Concerns with levels of arsenic have been raised recently by water operators, water system customers and by the general public. Recent amendments to the Federal Safe Drinking Water Act regulations made arsenic maximum contaminant level more stringent, by lowering the permissible arsenic limit from 0.050 micrograms per liter to 0.010 micrograms per liter, effective January 22, 2006 for community water systems. Wells withdrawing from the Aquia and Piney Point aquifer formation have increased potential of withdrawing water with some level of naturally occurring arsenic. Based upon the historic arsenic sampling, arsenic concentrations in all but two of the Calvert County Public Water system wells currently meet the EPA's standard for arsenic. These systems should continue to meet the arsenic maximum contaminant level for the foreseeable future. The three systems that have naturally occurring arsenic present at a level exceeding the current arsenic maximum containment level are Dares Beach, Chesapeake Heights and Chesapeake Ranch Estates Water Systems (a private system). Calvert County is researching alternative arsenic removal options to identify the best alternative technology balanced with the expense of the treatment.

<b><u>Actions</u></b>	
I-120	Continue to use the Calvert County Water and Sewerage Plan as a water resources management implementation document for the Calvert County Comprehensive Plan. [BOCC, P&Z, PW]
I-121	Update the Water and Sewerage Plan data every year and conduct a thorough review every three years. [P&Z, PW]
I-122	Urge the state to conduct groundwater studies to get a better understanding of regional and statewide water consumption and recharge area protection issues as called for in the state's Wolman Report (click here to see the report). [BOCC]
I-123	If state studies are not conducted, then every six years (or comprehensive plan cycle) work with the Southern Maryland counties to update the aquifer study. [BOCC]

<sup>2</sup> Application in to increase Water Appropriation and Use Permit Allocation to 600,000 GPD (daily average on a yearly basis).

I-124	Continue to urge residents to consume less water. Maintain an education program to prevent waste of water. Establish a progressive surcharge for excess use of water in public water systems for residential uses. Continue to require the use of water saving equipment in all new development and redevelopment. [PW]
I-125	<p>a. Continue to monitor water quality issues and be proactive in ensuring that the water is safe to use. [P&amp;Z, PW]</p> <p>b. Implement procedures to reduce the naturally occurring arsenic in the public water systems to levels that do not exceed the EPA’s maximum contaminant level. [PW]</p>
I-126	Review the Water Resources Element every six years and, if necessary, update or refine the analysis. [P&Z]

*Specific strategies to implement these actions are found in the Water and Sewerage Plan, available on the web at <http://www.co.cal.md.us/residents/building/planning.documents>.*

## **Wastewater**

No new point source discharge systems have been constructed in Calvert County in the last 33 years. To do so would have been contrary to the policies in the Comprehensive Plan. Instead, Calvert County has opted to serve multiple lots with land application systems so that the nutrients from sewerage treatment systems don’t make their way into surface water. In addition, the County upgraded the Prince Frederick system so that it now has two spray irrigation systems to treat sewerage waste. Previously, there had been a direct discharge into Parkers Creek.

Of the eleven existing systems, only three are larger than 500,000 gallons per day. Calvert’s one large point discharge system is located in Chesapeake Beach. It operates under an agreement between Calvert County and the municipalities of Chesapeake Beach and North Beach. In the last few years, the three jurisdictions allowed the extension of the lines into South Anne Arundel County (Herrington Harbor area) in order to improve water quality along the Bay which was being impacted by failing septic systems.

The Chesapeake Beach Sewerage System is being upgraded to meet new Maryland Department of the Environment nutrient caps. At the same time, stormwater infiltration issues in the system are being addressed. When complete in 2011, it will meet state standards for the residential buildout of the region, based on the current comprehensive plans of both municipalities and the County, for areas planned to be served by community sewerage. Wastewater from septic systems is addressed under ‘Stormwater.’ The 2008 Calvert County Comprehensive Water and Sewerage Plan contains an inventory of existing sewage treatment plans. The inventory includes maximum site capacity, existing capacity, and average peak flows in million gallons per day(MGD). Table I-C shows data on community sewerage systems larger than 500,000 gallons per day and includes anticipated demand in 2030.

Table I-BC. Community Current and Projected Sewerage Capacity (Systems Larger than over 500,000 Gallons per Day)

<b>Municipal Plant (over 500,000 gallons) -Name (Owner)</b>	<b>Point of Discharge</b>	<b><del>2008 Max. Site Capacity Secondary/ Advanced (MGD)<sup>3</sup></del></b>	<b>2008 Existing Capacity (MGD)<sup>4</sup></b>	<b>2008 Average Peak Flows (MGD)<sup>5</sup></b>	<b><u>Anticipated Flow in 2030 (MGD)<sup>6</sup></u></b>
Chesapeake Beach (Town of Chesapeake Beach)	Direct discharge - outfall (Chesapeake Bay)	<del>1.5<sup>7</sup></del>	1.18	0.85	<u>1.2</u>
Prince Frederick (Calvert County)	PF I: Spray irrigation  PF II: Spray irrigation	<del>0.50 PF II</del>	0.75 Total (0.45 PF I) (0.30 PF II)	0.44 (0.185 PF I) (0.255 PF II)	<u>0.95</u>
Solomons Island (Calvert County)	Rapid infiltration discharge (basins)	<del>1.017</del>	1.017	0.335	<u>0.8</u>

[Note: Table I-C was revised: the last column showing the operating agency (Calvert County Department of Public Works – Division of Water and Sewerage for all three systems) was deleted. The column was replaced with anticipated flows in 2030. This note will not be included in the clean copy of the approved plan.]

Chesapeake Beach Sewage Treatment Plant’s 2030 expected plant capacity will be 1.5 MGD. The proposed upgrade will accommodate this demand. Until the total maximum daily load limits are established by the State, it is not

<b><u>Actions</u></b>	
I-127	Require new sewerage treatment systems to be land application systems and explore other beneficial ways of reusing wastewater. [BOCC]
I-128	Continue the policy of restricting new sewerage service areas for multiple users to Priority Funding Areas, except for connection to septic failure areas. In those cases, only connect to existing developed lots. [BOCC]
I-129	Develop and/or update wastewater capacity management plans for all County owned or operated community sewerage systems. [PW]
I-130	Estimate the approximate number of additional households and the associated commercial and industrial development and approximate quantity of additional wastewater capacity needed to support projected growth in the priority funding areas. [PW, P&Z]
I-131	Work with the Board of Education to upgrade the Northern High School Treatment Plant. [PW]
I-132	Plan for expansion of the Prince Frederick Wastewater Treatment Plant. [PW]

*Specific strategies to implement these actions are found in the Water and Sewerage Plan, available on the web at:*

*<http://www.co.cal.md.us/residents/building/planning/documents/>.*

<sup>3</sup> Source: Calvert County Comprehensive Water and Sewerage Plan 2008

<sup>4</sup> Ibid.

<sup>5</sup> Ibid.

<sup>6</sup> Based on Scenario 2 (45% of all new residential growth occurs in Town Centers). Projections also include anticipated commercial growth.

<sup>7</sup> Upon completion of upgrade.

## Stormwater

When John Smith explored the Chesapeake Bay over 400 years ago, the land was covered with forest and water quality was excellent. Even intensive farming in the next 300 years didn't significantly impact the productivity of the watershed. In 1900, most of Calvert was farmed, including steep slopes, and fish and shellfish in county waterways were still abundant. Dr. Walter Boynton, Professor at the University of Maryland Center for Environmental Science (UMCES), estimates that the turning point was around 1960. By then, sewer treatment plants, residential sprawl and use of chemical fertilizers on farms and yards began to over-nutify the waterways, leading to algal blooms and reduced water clarity. Since then, the Bay watershed's human inhabitants have witnessed a major decline in submerged aquatic grasses, the near elimination of oyster beds, the reduction in yellow perch, white perch, and the lowered harvest of crabs.

In 1987, the second Chesapeake Bay Agreement was signed, which established a 40% nutrient reduction goal. In 2000, a new Chesapeake Bay Agreement established new goals for restoring the bay by 2010. While there have been nutrient reductions, the goals for restoring the bay will not be met by 2010. HB 1141 delegates the responsibility to address many of the targeted goals to the jurisdictions.

To meet its responsibilities, the Board of County Commissioners commissioned its staff to study all available environmental reports on the state of the waterways and to collect and map all available information that would lead to responsible decisions. That report, *A Sustainable Strategy for Calvert's Watersheds*, is available on the web at: <http://www.co.cal.md.us/residents/building/planning/documents/compplan/WaterResourcesElement.asp>. It serves as a guidance document for this section of the Plan.

Utilizing the Chesapeake Bay Model formulas provided by the Maryland Department of the Environment, staff ~~has~~ estimated nutrient loads for nitrogen and phosphorus for 2030 (the approximate buildout limit based on current zoning). The first bars in both charts represent the nutrient loads based upon 2007 land uses (LU). The second bars represent the estimated nutrient loads assuming "best management practices" (BMPs) based upon the tributary strategy. The initial numeric reductions in nutrients between the 2007 land uses (the first bar) and the second bar depicted in Table Figure I-C and Table Figure I-D are mainly attributable to anticipated tributary strategy "best management practices" implementation. The third bars, Scenario 1, represents Calvert County's buildout, if 35% of all future residential growth is located in the Town Centers with community sewer. The fourth bars, Scenario 2, represents County buildout if 45% of all future residential growth is located in the Town Centers with community sewer. The negligible increases in nutrients, with both scenarios, is a result of the County's stewardship mentality and its growth management strategy (see Page 4). Whether or not the reductions from the 2007 nutrient loads will result in good water quality will be determined through water testing.

Until total maximum daily loads (TMDLs) are established, the County government does not know what water bodies are suitable receiving waters. There is insufficient information to make a determination regarding the suitability of receiving waters given the expected land use plan impacts.

It is also evident from Figures I-C and I-D that point sources (PS) are not the major sources of pollutant loads, due to the fact that Calvert mainly uses land application treatment systems.

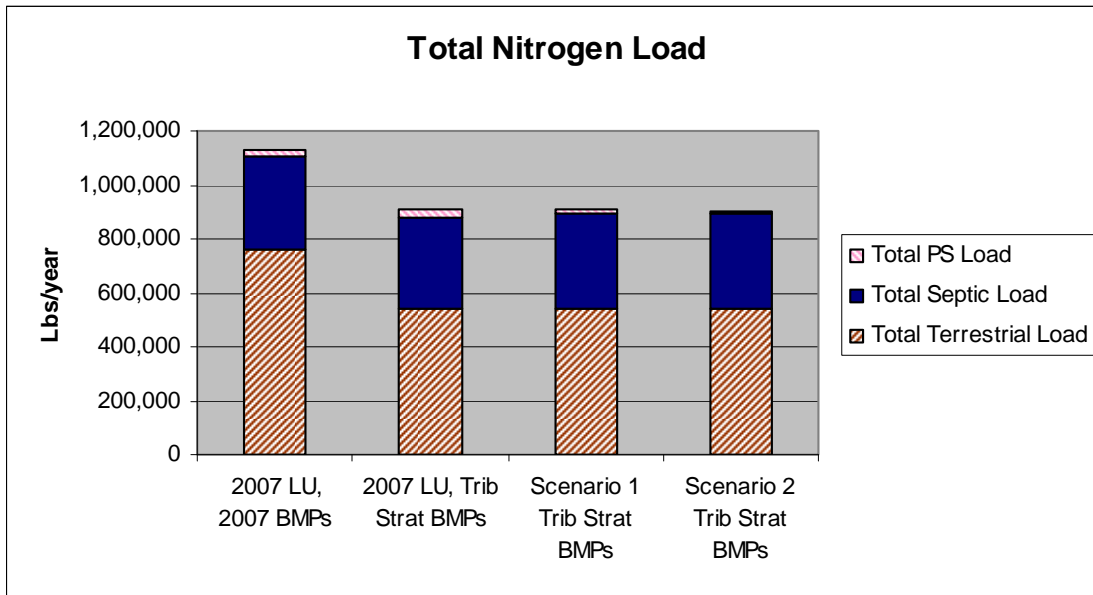


Figure I-C. Projected Total Nitrogen Loads

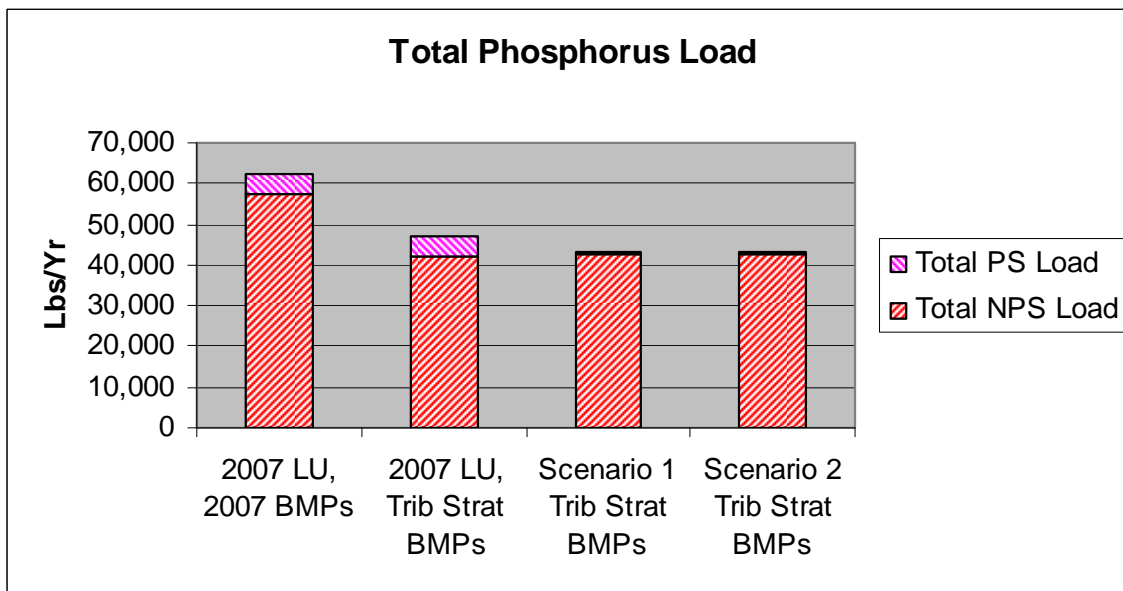


Figure I-D. Projected Total Phosphorus Loads

The following tables (Tables I-D through I-H) show the summary results from the Calvert County 2007 Nutrient Loading Analysis that were used to create Figures I-C and I-D above. The tables show both non-point source (NPS) figures and point source (PS) figures for nitrogen and phosphorous loading.

Table I-D.

<b>Scenario List</b>	<b>Scenario Description</b>
2007 LU, 2007 BMPs	Year 2007 with 2007 Level of BMP Implementation
2007 LU, Trib Strat BMPs	Year 2007 with TS BMP Implementation
Scenario 1	Scenario 1, with TDRs
Scenario 2	Scenario 2, with TDRs

Table I-E.

<b>Land Use and Septic Systems</b>				
	2007 LU, 2007 BMPs	2007 LU, Trib Strat BMPs	Scenario 1 Trib Strat BMPs	Scenario 2 Trib Strat BMPs
	(Acres)	(Acres)	(Acres)	(Acres)
Development	51,013	51,013	54,268	53,960
Agriculture	18,181	18,181	17,292	17,376
Forest	64,211	64,211	61,887	62,107
Other	3,923	3,923	3,880	3,884
<b>Total Area</b>	<b>137,326</b>	<b>137,326</b>	<b>137,327</b>	<b>137,327</b>
Residential Septic (EDUs)	28,670	28,670	31,790	31,270
Non-Residential Septic (EDUs)	6,705	6,705	6,705	6,705

Table I-F.

<b>Total Nitrogen Loading</b>				
	2007 LU, 2007 BMPs	2007 LU, Trib Strat BMPs	Scenario 1 Trib Strat BMPs	Scenario 2 Trib Strat BMPs
	(Lbs/Yr)	(Lbs/Yr)	(Lbs/Yr)	(Lbs/Yr)
Development NPS	422,807	296,693	313,446	311,886
Agriculture NPS	227,783	141,665	134,856	135,500
Forest NPS	80,992	78,461	75,645	75,912
Other Terrestrial NPS	27,280	21,116	20,872	20,895
<b>Total Terrestrial Load</b>	<b>758,862</b>	<b>537,936</b>	<b>544,819</b>	<b>544,192</b>
Residential Septic (EDUs)	317,033	317,033	327,373	322,018
Non-Residential Septic (EDUs)	26,455	26,455	24,636	24,636
<b>Total Septic Load</b>	<b>343,487</b>	<b>343,487</b>	<b>352,010</b>	<b>346,655</b>
<b>Total NPS Nitrogen Load</b>	<b>1,102,349</b>	<b>881,423</b>	<b>896,829</b>	<b>890,847</b>
<b>Total PS Load</b>	<b>26,903</b>	<b>26,903</b>	<b>10,760</b>	<b>10,760</b>
<b>Total Nitrogen Load (NPS+PS)</b>	<b>1,129,252</b>	<b>908,326</b>	<b>907,589</b>	<b>901,607</b>

Table I-G.

<b>Total Phosphorus Loading</b>				
	2007 LU, 2007 BMPs	2007 LU, Trib Strat BMPs	Scenario 1 Trib Strat BMPs	Scenario 2 Trib Strat BMPs
	(Lbs/Yr)	(Lbs/Yr)	(Lbs/Yr)	(Lbs/Yr)
Development NPS	40,118	26,861	28,137	28,017
Agriculture NPS	13,432	12,083	11,491	11,547
Forest NPS	1,031	942	908	911
Other Terrestrial NPS	2,820	2,158	2,118	2,122
<b>Total Terrestrial Load</b>	<b>57,401</b>	<b>42,044</b>	<b>42,654</b>	<b>42,597</b>
<b>Total PS Load</b>	<b>5,174</b>	<b>5,174</b>	<b>776</b>	<b>776</b>
<b>Total Phosphorus Load (NPS+PS)</b>	<b>62,575</b>	<b>47,218</b>	<b>43,430</b>	<b>43,373</b>

Table I-H.

<b>Impervious Cover and Open Space</b>					
		2007 LU, 2007 BMPs	2007 LU, Trib Strat BMPs	Scenario 1 Trib Strat BMPs	Scenario 2 Trib Strat BMPs
		(Acres)	(Acres)	(Acres)	(Acres)
<b>Total Impervious Cover</b>		9,533	9,533	10,060	10,039
<b>Open Space</b>	Agriculture	18,181	18,181	17,292	17,376
	Forest	59,766	59,766	57,442	57,662

There are two other major factors that determine water quality: percentage of impervious surfaces and percent of forest cover. The Center for Watershed Protection (CWP) identifies urban watersheds as those with more than 10% impervious surfaces and rural watersheds as those with less than 10% ~~percent~~ impervious surfaces. At this time two of the County’s 22 subwatersheds are urban: South Creek, which flows through North Beach, and Mill Creek, which flows through Solomons. Two other subwatersheds are approaching 10% ~~percent~~ (see Figure I-E). According to CWP, a benchmark for good water quality is less than 10% impervious surfaces.

It should be no surprise that the higher the percentage of forest canopy, the better the opportunity for good water quality. Scientists have suggested that 60% forest canopy is a good benchmark. In Calvert about 57% of the land is under forest canopy; however, the percentage varies widely, by subwatershed. Both the American Planning Association and American Forests recommend that jurisdictions in the Northeastern part of the United States maintain a minimum 40% forest canopy to protect water quality in urban watersheds.

State laws sometimes appear to have conflicting objectives. With respect to directing growth to priority funding areas and preserving water quality, the perceived conflict might appear to be how to concentrate growth AND not exceed the assimilative capacity of the waterways. The Plan philosophy is that not all subwatersheds are the same. There should be different goals for urban subwatersheds and rural subwatersheds.

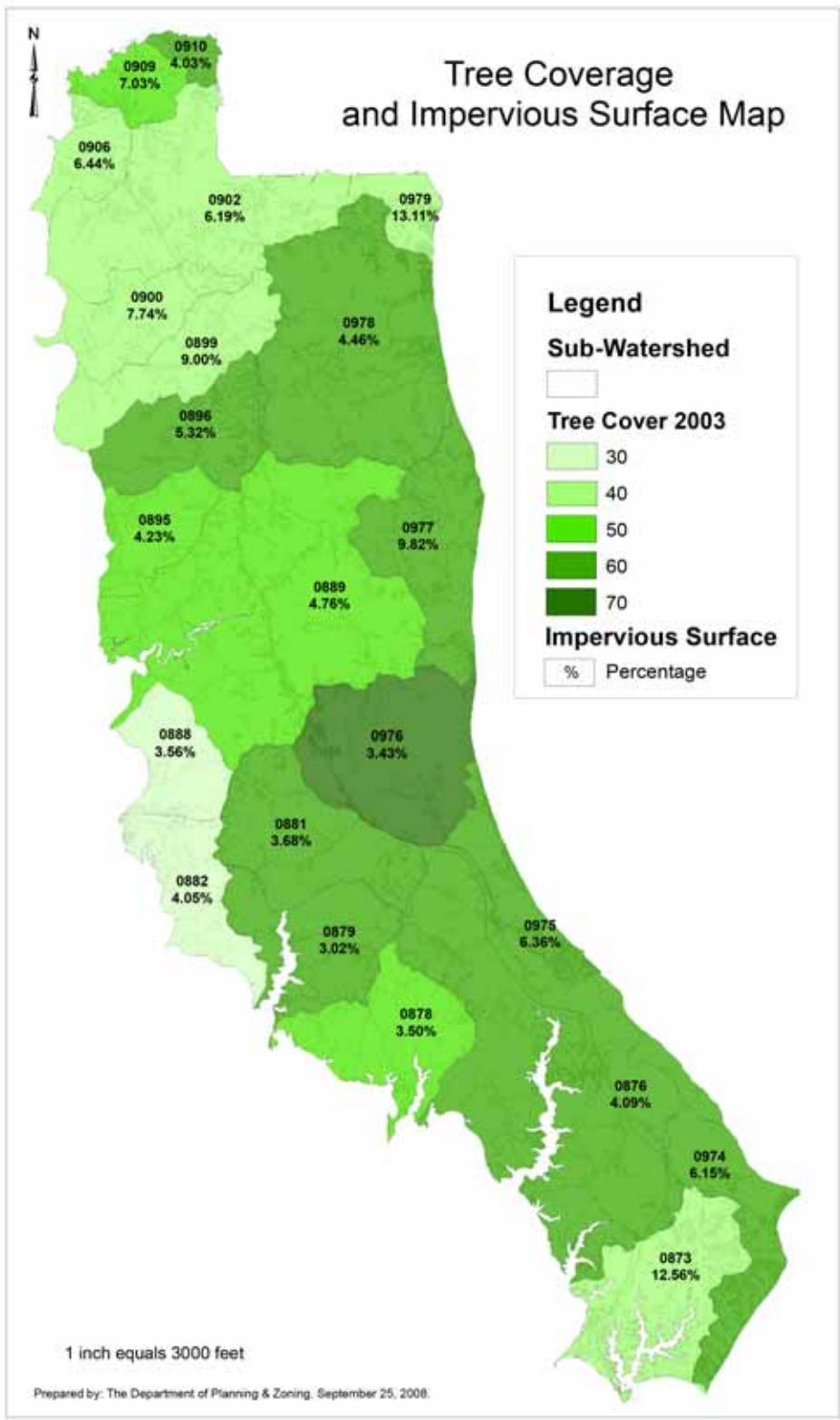


Figure I-E. Tree Coverage and Impervious Surface Map

Within the urban subwatersheds (>10% impervious surfaces) it is reasonable to maintain ‘fishable/swimmable’ status and to seek to achieve quantifiable water quality goals. Physical conditions in some subwatersheds could make these goals unachievable, though achievable over the entire watershed. Freshwater criteria in streams should also consider the potential loading of nutrients or sediments over time in addition to the following instantaneously measured concentration goals:

- Thresholds for fresh water:
  - <0.71 milligrams of nitrogen per liter
  - <0.031 milligrams of phosphorus per liter
  - <10 **Nephelometric turbidity units (NTUs)** ~~TNUs~~ of turbidity<sup>8</sup>
  
- Thresholds for tidal water:
  - Chlorophyll <10 micrograms per liter of water (April-October)
  - Secchi Depth measurements > 1 meter (in waters deeper than 1 meter, April-October)
  - Oxygen levels: 4 mg/l for deep waters and 6 mg/l for surface waters.

Within the rural subwatersheds, achieve the urban subwatershed goals, plus the following:

- Maintain or create anadromous fish spawning streams
- Develop and maintain shellfish beds, with the goal of making them open to harvesting.

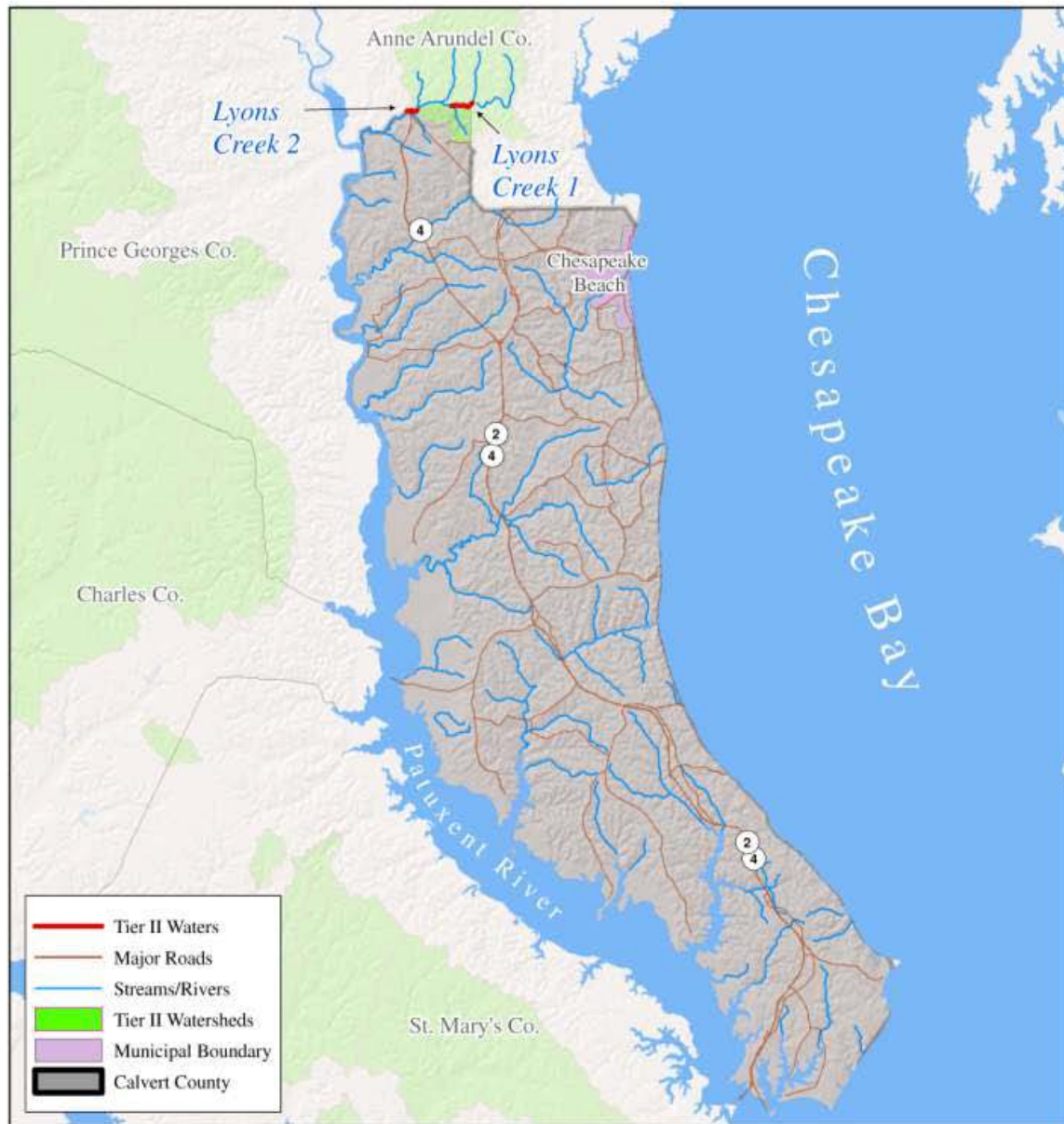
Calvert County has two segments of high quality waters, Lyons Creek segments 1 and 2, which are identified by the State as Tier II waters ([see Figure I-F](#)). Tier II waters have water quality “better than the minimum requirements specified by the water quality standards.” As per state law these two segments merit special protection (see COMAR 26.08.02.04-1). Zoning actions may also be needed to protect these high quality waters.

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<sup>8</sup> [The measurement of the concentration of a solution, suspension or dispersion based upon its light-scattering properties.](#)

# High Quality (Tier II) Waters in Calvert County

[Code of MD Regulations 26.08.02.04-1]



Martin O'Malley, Governor  
Anthony G. Brown, Lt. Governor  
Shari T. Wilson, Secretary  
Robert M. Summers, Deputy Secretary

0 1.5 3 6 Miles



Maryland Department of the Environment  
Science Services Administration  
Montgomery Park Business Center  
1800 Washington Boulevard  
Baltimore, Maryland 21290-1718

Date Map Prepared: May 2009

Figure I-F. High Quality (Tier II) Waters in Calvert County (source: Maryland Department of the Environment, map dated May, 2009)

<b>Actions</b>	
I-133	Prepare watershed plans for all 22 subwatersheds, including the actions and capital improvements necessary to implement the plans. Once completed, the watershed plans would be included in the guidance document and added to or referenced in the WRE of the Comprehensive Plan. They will also be included in the subsequent amendment to the Water and Sewerage Plan and submitted to the Planning Commission for consideration in actions on subdivision and site plan cases. [P&Z]
I-134	Continue to monitor water quality:
	a. Promote stream testing.
	b. Prepare baseline studies of freshwater and tidal creeks.
	c. Monitor the effectiveness of wetland creation, rain barrels, rain gardens, nitrogen removing septic systems, and nitrogen barriers.
	d. Evaluate water quality goals as progress is made. [P&Z]
I-135	Include tree ordinances with tree canopy goals in all town center ordinances. [P&Z]
I-136	Update the Stormwater Management Ordinance, using the latest model ordinance recommended by the state. [PW]
	a. In communities developed without stormwater management regulations, require roof-top disconnects and rain gardens or other non-structural techniques in addition to payment of fees-in-lieu. [PW]
	b. Consider using the fees-in-lieu to grant funding assistance for homeowners who voluntarily wish to retrofit their existing development by installing rain barrels or rain gardens. [PW]
I-137	Require open section road design outside Priority Funding Areas. When upgrading non-arterial roads, consider the latest in low-impact development to reduce runoff and treat stormwater on-site. [PW]
I-138	Identify all Tier II stream segments and drainage areas as part of the subwatershed plan preparations. Develop zoning strategies to protect these high quality waters. [P&Z]

## **Natural Resources**

Natural resources are those actual and potential forms of wealth supplied by nature. This wealth can be measured by the value of the products supplied and by the services they provide. For example, a tree as lumber will have a given market value, but a tree also provides the services of producing oxygen, moderating temperatures, providing habitat, controlling flood waters and stormwater, reducing pollution, and stabilizing the soil. Often, our natural resources are considered only as products to be exploited without regard to the value of the services they provide. It is often the case that the value of their service is much greater than their value as products. To ensure their availability to future generations, care must be taken not to decimate our nonrenewable natural resources and to conserve the renewable ones. Conservation management, preservation, and regulatory protection are some of the means by which our natural resources are protected for future generations.

## Forests

Forest once covered more than 95% of the Chesapeake Bay watershed. Today less than 60% remains. For the first time in one hundred years, the percentage of forestlands in the watershed is declining. Some forests are cleared for farming, but development is the greatest threat.

Forest cover is the most natural and least polluting land use, and forest cover adjacent to streams (riparian forests) is essential to preserving water quality. Forests absorb nitrogen in both surface and shallow groundwater, trap phosphorous-laden sediment, and remove other pollutants resulting from adjacent land uses and from atmospheric deposition. In addition to pollution prevention, forests provide important habitat for wildlife, induce groundwater recharge and minimize flooding. Riparian forests provide organic matter, such as leaf litter, which serves as the basis of the food chain for aquatic species. The riparian forest canopy provides shade, which is critical for moderating stream temperature, and the roots of the trees stabilize stream banks and protect against erosion. In addition to all of these other benefits, forests are a renewable resource that can play an important role in developing and maintaining a sustainable economy.

According to an analysis report using *CITYgreen* provided by American Forests, the County's tree canopy provides total stormwater savings of over \$1.5 billion and removed over 9 million pounds of air pollutants in 2006.

Forest interior (forest more than 300 feet from a forest edge) provides important habitat to many species. Many species of birds can only reproduce in forest interior habitats. These are known as forest interior dwelling birds and some examples are: scarlet tanager, barred owl, pileated woodpecker, and whippoorwill.

Forest covers 81,781 acres or 58% of land use in Calvert County. Forest interior represents 37% of forest cover or 22% of the County land area. Forty-four percent of the estimated forest interior habitat is currently protected, 56% is thus threatened by development.

A model was used to determine the impact of land use decisions on potential forest interior habitat in Calvert County. Regulatory approaches can only protect an additional 11% of forest interior habitat and, therefore, in addition to regulatory approaches, land preservation measures must be pursued to achieve a higher level of protection.

<b>Actions</b>	
I-139	Map forest resources and track forest loss and gain. [P&Z]
I-140	Replace 100% of forest loss outside the Critical Area and town centers. [P&Z]
I-141	Preserve and restore riparian forests. [P&Z, SCD]
I-142	Maintain large tracts of forest and especially forest interior in the rural areas. [P&Z]
I-143	Maintain or establish habitat corridors between large tracts of forest and between urban areas and adjoining forested areas. [P&Z]
I-144	Support land preservation that protects forested areas (e.g., local land trusts, County land trusts, easement programs, Forest Stewardship Program). [P&Z]
I-145	Adopt a map of the forest interior in Calvert County to guide the Planning Commission in subdivision and site plan review. [P&Z]

## Minerals

The primary mineral resources found in Calvert County are sand and gravel, used mainly in the construction industry. Most of the sand and gravel is found in the higher, interior portions of the County, but supplementary amounts occur in the lowland terraces bordering the Patuxent River. With the growth the County is experiencing, there is the potential that these valuable resources will be covered over by development. The County should encourage extraction of mineral resources outside of sensitive areas before the establishment of permanent uses on the mineral deposit site.

Ceramic clay suitable for face brick or structural tile is available in the Marlboro Clay, a relatively thin but persistent layer found at shallow depths in the northwestern part of the County. A further clay resource having a potential for lightweight aggregate occurs in the St. Mary's Formation in southern Calvert County. Extraction of other minerals, including small amounts of phosphorite, glauconite, and, in northern Calvert, impure diatomite, is not economically feasible at the present time.

<b>Actions</b>	
I-146	Require that significant mineral resources be shown on subdivision preliminary plans and on site plans. [P&Z]
I-147	Make State maps of mineral resources in Calvert County available to the public. [P&Z]

## Air Quality

Calvert County has been included as part of the Washington, D.C. severe nonattainment area for ozone. A nonattainment area means that air pollution levels are often unhealthy for County citizens. Calvert County has also been participating in the Metropolitan Washington Air Quality Committee (MWAQC) to address the requirements of the federal Clean Air Act.

Motor vehicle emissions are a significant source of air pollution in the Washington Metropolitan Area. Emissions from motor vehicle trips originating in Calvert County have been estimated to comprise just over one percent of these regional totals. The County's share of the regional air quality problem may increase if existing travel behavior continues or accelerates. In 2000, the average travel time to work for a Calvert County resident exceeded 39 minutes (longest for the State), with about 60 percent of the County work force commuting to jobs outside of the County.

The other significant source of air pollution is fossil fuel-burning power plants. Air pollution reaches Calvert County from as far away as the Ohio valley. The fossil fuel burning power plant closest to Calvert County is Chalk Point located just across the Patuxent River from the mouth of Hunting Creek. A landscape model of nitrogen loading to Hunting Creek indicated that atmospheric deposition was the greatest source of nitrogen pollution.

A study by the Harvard School of Medicine identified a serious public health problem caused by the fine-particulate pollution generated from five fossil-fuel plants within 50 miles of Washington, D.C. Fine-particulates, one-seventh of the width of a human hair, are formed when sulfur dioxide and nitrogen oxide gases react down wind from the power plant stacks. The

researchers hypothesize that the health hazard could be greatly reduced by the installation of readily available pollution controls that effectively cut sulfur dioxide and nitrogen oxide emissions.

A 2007 report produced by the Metropolitan Washington Air Quality Committee notes that air quality has markedly improved since 1990. The Committee expects the Washington Metropolitan Area to meet attainment ozone goals in 2009.

Atmospheric deposition is a significant source of nitrogen pollution in the Bay, estimated to contribute about 25% of the total nitrogen load. The nitric compounds are produced mainly by automobiles and coal or fuel oil-burning power plants.

MWAQC data indicated that air quality in the Washington Metropolitan Area improved from 1986 to 1995 but then remained about the same through 2002.

<b>Actions</b>	
I-148	Promote car-pooling, public transit, pedestrian, and bicycle modes of transportation and land use planning that would decrease automobile travel. [P&Z, PS]
I-149	Increase employment opportunities in the County for residents. [ED]
I-150	Work with the Tri-County Council of Southern Maryland to take the necessary political steps to reduce emissions from the Chalk Point and Morgantown power plants. [BOCC]
I-151	Reestablish the air quality monitoring station in Prince Frederick and encourage establishing additional sites in the County in the near future. [BOCC]

## **Fisheries**

In the early 1900s, Calvert County's economy was primarily based on agriculture and fisheries. The abundant fisheries resources in Calvert County have been reduced significantly since the early 1900s due to reduction in stocks from poor water quality (see Surface Water section above), overfishing, and poor fisheries management. The fisheries industry in Calvert County has experienced a similar drastic decline. Water quality in the Patuxent River has been improving and the State has become more proactive in fisheries management. The State established a fishing moratorium on striped bass between 1985 and 1990. Since 1990, the striped bass spawning index has increased dramatically. If water quality continues to improve and the fisheries are properly managed, then fisheries and shellfisheries should increase to a sustainable level.

<b>Actions</b>	
I-152	Maintain and improve surface water quality by taking the actions listed in the Water Resources, Forest, and Air Quality sections above.
I-153	Support effective fisheries management efforts that are fair and equitable to both watermen and sport fishermen. [P&Z]
I-154	Support aquaculture that is practiced in an environmentally sensitive manner. [P&Z, ED]

## **Sensitive Areas**

Sensitive areas include wetlands, waterways, vernal pools, floodplains, steep slopes, cliffs, and habitat for rare, threatened, and endangered species. These areas are very sensitive to the impacts of development and are generally unsuitable for development. In addition, wetlands, waterways, and floodplains filter pollutants and provide natural flood control, stormwater management, and habitat for wildlife including rare, threatened, and endangered species. The costs of providing these functions should be considered and mitigated when impacts to these areas are proposed. Most importantly, these areas should be preserved and conserved to the greatest extent possible.

While recognizing the importance of protecting all sensitive areas, priority should be given to protecting Priority Preservation Areas and rural subwatersheds. ~~In those~~Those areas, ~~they~~ will provide the greatest benefit for meeting the County’s water quality goals and providing habitat for wildlife. As suggested by the Center for Watershed Protection, urban subwatersheds with more than 10% impervious surfaces have already been compromised to the extent that they should not be expected to achieve the same level of water quality as rural subwatersheds. Likewise, the tree canopies and greenways are also compromised in urban areas and many wildlife species are adversely affected by close contact with humans. In Priority Funding Areas, the main focus should be to maintain tree canopies, manage stormwater runoff, and limit nutrient and sediment loading.

## **Streams and Their Buffers**

Streams are conduits to lowlands, rivers, and the Chesapeake Bay. They provide habitat for many aquatic organisms, including areas for fish spawning and feeding. They also provide drinking water for wildlife and a means of transportation for organic materials which support aquatic species. At the same time, streams provide a direct pathway for pollutants to move downstream into our rivers and the Chesapeake Bay. These pollutants, including sediment, nutrients, and toxic waste, can cause serious damage to aquatic ecosystems and the fisheries production within them. Forest and wetland buffers adjacent to streams serve the important function of removing pollutants before they enter the stream. They also provide excellent habitat and habitat corridors for wildlife.

<b><u>Actions</u></b>	
I-155	Address actions in Water Resources section.
I-156	Map and establish greenway systems along stream valleys to preserve as much of these low lands as possible. [P&Z]
I-157	Require and maintain sufficient buffers from all perennial and intermittent streams to provide environmental protection. [P&Z]
I-158	Reforest stream buffers wherever possible. [P&Z, SCD]

## **Wetlands**

Wetlands are lands where water is the dominant factor determining the nature of soil development and the types of plant and animal communities. These are generally low lands covered with shallow water, sometimes temporarily or intermittently. Wetlands include both fresh and saline

areas and are referred to by such common names as fresh and salt water marshes, swamps, wet meadows, and bogs.

Wetlands provide flood and water storage, pollution control, wildlife habitat, and a major food supply for aquatic organisms, migratory waterfowl, and other wildlife. It is estimated that Maryland has already lost about one-half of its wetlands to date. The State has set a goal of "no net loss" of wetlands.

<b>Actions</b>	
I-159	Maintain strong regulations restricting impacts on wetlands outside Priority Funding Areas. [P&Z]
I-160	Restore or create wetlands in areas that will reduce nutrient pollution runoff from farms and developed areas. [P&Z, PW, SCD]
I-161	Examine the effectiveness of 50 ft. buffers and alter buffer requirements, if the study so indicates. [P&Z]
I-162	Establish or re-establish forested wetland buffers where possible and feasible. [P&Z, SCD]
I-163	Maintain substantial monetary penalties for the unauthorized destruction of wetlands. [P&Z]

## **Floodplains**

Floodplains are generally low-lying areas that are inundated with water (flooded), either due to high seas and sea level or excessive amounts of rainwater runoff. The 1-percent annual chance floodplain is that area that represents the statistical chance an area will flood in any given year (Federal Emergency Management Agency). Most of the floodplain areas in Calvert County consist of wooded wetlands, while some areas are farmland, residential, commercial or town center. The wooded wetlands serve as natural flood management devices, remove pollutants, and provide wildlife habitat. The Zoning Ordinance, Subdivision Regulations, and the Flood Management Ordinance regulate development in the 1-percent annual chance floodplain.

<b>Actions</b>	
I-164	Continue to direct housing and other development out of undeveloped floodplain areas. [P&Z]
I-165	For development in the floodplain, ensure that construction practices minimize damage to property and the environment during flooding. [P&Z]
I-166	Require vegetation in floodplains to remain with the exception of removing vegetation for access and stormwater management. [P&Z]
I-167	Consider raising the floodplain protection level to two feet above the base 1-percent annual chance floodplain elevation set by the Federal Emergency Management Agency and measure maximum building elevation from that point. [P&Z]

## Steep Slopes and Highly Erodible Soils

Most of the steep slopes in Calvert County are covered and stabilized by forest cover. Loss of this vegetative cover can result in severe erosion, landslides, loss of fertile topsoil, filling in of waterways, flooding, and a decrease in water quality. Preservation of severe slopes adjacent to waterways is especially important because of the potential harm to water quality and aquatic habitat. Steep slopes are also areas of both plant and animal diversity. These steep slope areas are, therefore, generally unsuitable for development.

<b>Actions</b>	
I-168	Review Subdivision Regulations, Zoning Ordinance, and the Sediment Control Ordinance concerning development, grading, and alteration of natural vegetation on areas with severe slopes. [P&Z, PW]
I-169	Revise site planning criteria to encourage use of natural features of a site and discourage grading of steep slopes. [P&Z, PW]
I-170	Develop regulations to address development on steep slopes of existing lots and parcels. [P&Z, PW, SCD]

## Wildlife Habitat and Habitat for Rare, Threatened, and Endangered Species

Due to the large areas of the County still in forest and wetland, there is an abundance and wide diversity of wildlife. The rapid conversion of forest to developed land destroys or significantly alters valuable wildlife habitat resulting in a reduction of wildlife resources. The adoption of the mandatory subdivision cluster regulations has done much to reduce the impacts of residential development on wildlife habitat. The County should preserve sufficient amounts of sensitive land to maintain its current diversity of wildlife and plant life.

Calvert County is also home to several rare, threatened, and endangered species such as the Bald Eagle and the Puritan tiger beetle. The protection and conservation of these species is of global concern. Over the last 600 million years, the natural rate of extinction has been about one species per year. The current rate of extinction worldwide is at least 1000 species per year. It is important that Calvert County does its part to protect the rare, threatened, and endangered species found within its boundaries. Protection of indigenous populations of rare, threatened, and endangered species and their habitats contributes to the maintenance of biological diversity, which is essential to the continuance of healthy ecosystems upon which the human species depends.

<b>Actions</b>	
I-171	Work with the State to map rare, threatened, and endangered species outside the Critical Area and develop protective measures. [P&Z]
I-172	Protect from shore erosion control those areas of Calvert Cliffs that have significant Puritan tiger beetle populations. [P&Z]
I-173	Develop methods to protect the habitats of rare, threatened, and endangered species. Take steps to increase their numbers if possible. [P&Z]

## Environmental Education

As the population and accompanying development in the County increases, the amount of pollution caused by non-point runoff from individual home sites will increase. Many of the impacts originating from this type of runoff could be avoided or at least minimized. Pollution from individual home sites results from many activities including: overfertilization of lawns, pesticide application, house painting, running of lawn mowers, and use of septic systems, especially malfunctioning ones. Public education on the impact of citizen activities on the environment and what citizens can do to avoid these impacts is an important protection measure for our environment.

<b>Actions</b>	
I-174	Maintain, support, and improve the environmental education programs for school-aged children. [BOE]
I-175	Develop environmental education programs for adults and families. [P&Z, GS, CR]