



## ***MD 5 – Hughesville Transportation Improvement Project***

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from the regulatory agencies for any properties with a previous history of soil/groundwater contamination before ROW acquisition proceeds.

Alternative 5 would not displace or partially take any hazardous waste facilities.

The hazardous waste investigations described above did not include the use of intrusive methods. Therefore, it is possible that facilities identified as *low* or *medium* concern may show soil or groundwater contamination if sampled. The database information available for each one of these facilities has not been recently updated. The information available for each facility is based mostly on visual observations and interviews with business managers.

### **I. Secondary and Cumulative Effects Analysis**

#### ***1. Introduction***

This section discusses the potential secondary and cumulative effects on the environmental resources as the result of the proposed MD 5 improvements through Hughesville. As required in 40 CFR Part 1508.7, all past, present and reasonable foreseeable future actions have been included in the secondary and cumulative evaluation.

The cumulative and secondary, or indirect, effects to the natural, social and economic environment of the MD 5 project are included. A secondary and cumulative effects analysis (SCEA) boundary was delineated in order to evaluate the impacts of the project in the context of the surrounding communities. This SCEA boundary is shown in *Figure V-5*. The boundary was presented to the commenting State and Federal agencies the August, 1998 Inter-agency meeting.

The SCEA boundary is primarily located within the Lower Patuxent River watershed, and, to a lesser degree, in the Gilbert Swamp watershed (Potomac River basin). The northern, southern and eastern geographic limits of the SCEA boundary are coterminous with the County boundaries or subwatershed boundaries. The western SCEA boundary is coterminous with the Hughesville Census Designated Place (CDP) western boundary. In addition to MD 5, the other major roadway through the SCEA boundary is MD 231, which bisects the SCEA boundary in an east-west direction and extends into Calvert County. The SCEA boundary encompasses a large portion of Election District 9 (Hughesville) and a smaller portion of Election District 8 (Bryantown). The overall geographic boundaries of the SCEA boundary extend to Swanson



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Creek to the north, Patuxent River to the east, Indian Creek to the south and approximately 9,000 feet west of MD 5 (including the upper reaches of Gilbert Creek).

### **a. Methodology**

The methodology incorporates consideration of the past and present land use and socio-economic changes, as well as reasonably foreseeable potential future land use patterns influenced by the project. Planned future growth is projected by the County in its master planning process. A combined trends analysis and overlay approach was used for this analysis. The trends analysis methodology consisted essentially of review of analytical and/or mapped data to establish past, present and future effects by applying trends data and land use planning/development data. The secondary and cumulative analysis will address past effects (1972 to present); document direct project effects by alternative; address secondary, or project induced effects; and will project other future cumulative effects to the resources. Past effects will consider previous resource trends (when possible) while projected future effects will deal cumulatively with other proposed actions, both public and private.

The methodology employed for development of the land use map overlays included a comparison of Charles County 1973 and 1994 land use maps (obtained from the Maryland Office of Planning). The changes in land use establish a pattern of development from the time when MD 5 first became dualized through to the present. The study time frame was established from 1972 to 2020. In the early 1970s, MD 5 was dualized north and south of Hughesville. Dualization of MD 5 was necessary due to the increased development and congestion on the highway. The year 2020 is the design year for the project and is considered to be the reasonably foreseeable future. The time frame established for the SCEA is considered to be the time frame within which project specific effects, combined with effects of other actions, would potentially result in substantial cumulative effects. With this trends analysis of past and present land uses and the identified future land uses, an estimate of the secondary and cumulative effects is made for each resource.

The methodology for evaluating secondary and cumulative effects related to the proposed MD 5 improvements consisted of review of the Charles County Comprehensive Plan. Future land use provided in the Plan was used to predict potential future land use changes supported by the MD 5 proposed improvements. For those resources that are highly regulated (i.e., wetlands, forest habitat, endangered and threatened species and floodplains), the appropriate current regulatory



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programs will be considered in projecting future resource losses. Specific evaluation methodologies for the resources are detailed for each resource.

The secondary and cumulative analysis addresses the following natural, socio-economic and cultural resources:

- Land Use
- Water Resources
- Wetlands
- Floodplains
- Forest Habitat
- Endangered and Threatened Species
- Active Farmlands
- Historic and Archaeological Sites

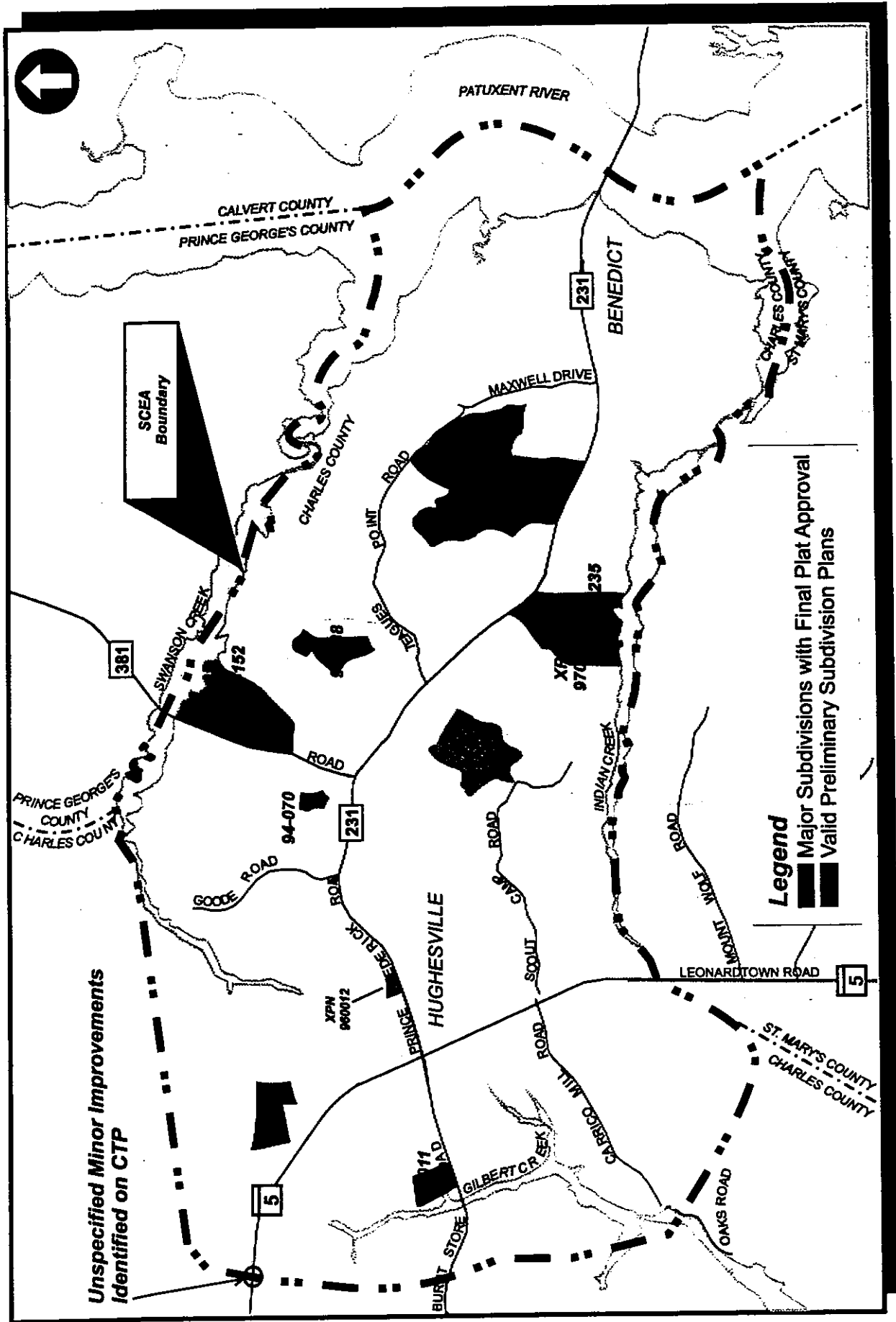
### **b. Summary of Reasonably Foreseeable Future Projects**

In the assessment of cumulative effects, it is necessary to identify all reasonably foreseeable projects that will likely occur within the SCEA boundary. For the purpose of this analysis, reasonably foreseeable future actions (RFFA) are based on the 1997 Charles County Comprehensive Plan, State, Federal and local agency plans for future projects, and known private actions. Impacts can be evaluated based on the proximity of the action or project to a resource. The following projects are culled from private sources and County and State capital improvement plans.

#### **Residential and Commercial Development**

The Charles County Planning Office (CCPO-PGM) was consulted for data on proposed major developments in the SCEA boundary. Ten developments including major subdivisions with final plat approval and valid preliminary subdivision plans were identified. Eight of the subdivisions have final plat approval and two were identified as having valid preliminary subdivision plans. The eight subdivisions having final plat approval represent 309 housing units. The number of housing units, including the valid preliminary subdivisions total 349 single family dwellings. The approximate locations of these proposed developments are depicted on *Figure V-6* (CCPO-PGM August 1998). A summary of the proposed developments is provided in *Table V-16*.

**FIGURE V-6**  
*Proposed Development and CTP Areas in the SCEA Boundary*





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**TABLE V-16**

*Proposed Major Developments in the SCEA Boundary, August 1998.*

Benedict Plantation	88-183	359.25	89	89	3/20/89
Old Blanford Estates II	91-011	46.6	14	14	12/6/93
Peach Tree Hollow	XPN970005	53.25	43	43	10/6/97
Woodlawn Manor	91-235	73.3	17	17	9/14/92
Swanson Creek Landing III	92-038	34.91	7	7	1/3/94
Carriage Crossing (Deer Run)	92-152	363	106	106	11/2/92
Trentino Estates	92-160	60	18	18	11/16/92
Murphy, Section II	94-070	40.5	15	15	12/4/95
Harvest Ridge	XPN960012	42.78	13	13	11/3/97
Eastern Hills	XPN950081	137.18	27	27	9/23/96

*Source:* CCPO-PGM, August 1998.

All proposed developments are single family detached residential subdivisions

**Major Transportation Initiatives**

Each year SHA works with local officials and the public to determine priority county transportation projects. These projects are programmed in the SHA’s six-year Consolidated Transportation Program (CTP). The County’s CIP is updated annually by the Charles County Department of Public Works and the CCPO-PGM and is coordinated with the Comprehensive Plan and the CTP (CCPO-PGM June 1997).

The MD 5 Hughesville Transportation Improvement Project is one of only two projects in the SCEA boundary that is included in the 1998-2003 CTP (MDOT-SHA 1998). The MD 5 project is included in the Primary Development and Evaluation portion of the CTP, with an estimated project implementation cost of \$30-35 million. The MD 5 project is currently funded for Project Planning activities only. Design, Right-of-Way acquisition and construction funds are not programmed at this time.

The other project on the CTP entails District level minor improvements (unspecified) along MD 5 west of the Hughesville area. These improvements typically include safety improvements, overlays or intersection work and are included in the FY 1998-1999 System Preservation Minor



Projects Program. The approximate location of these minor improvements is depicted on *Figure V-6*.

The private residential and transportation projects identified here, combined with the direct project impacts that would result from the MD 5 project, would have certain cumulative effects on environmental resources within the SCEA boundary.

Other planned transportation improvements in the SCEA boundary that have not been incorporated into the CTP and the County's CIP were identified in the 1997 County Comprehensive Plan. The SHA proposes a project to increase the capacity of MD 231 from Benedict to MD 5. This project is to be funded with State sources, in part by Charles County and/or developers where appropriate, and is designated a mid range project (to be completed between 2005 and 2015). No Charles County transportation improvements were identified within the SCEA boundary.

## ***2. Social Environment***

This section provides an evaluation of trends and future projections in estimating secondary and cumulative effects. The data presented in this section was obtained directly from readily available sources, including primarily, the Charles County Comprehensive Plan.

### **a. Land Use**

The SCEA boundary lies within the eastern portion of Charles County, which was the seventh fastest growing county in Maryland between 1990 and 1995 (annual growth rate at 1.89 percent compared to 1.09 percent for the State of Maryland). Election District 9 (Hughesville) experienced a 44 percent population growth between 1980 and 1995 as compared to the countywide total of 53 percent (Charles County Department of Planning and Growth Management, CCPO-PGM June 1997). The population projection for Election District 9 is expected to increase 106 percent from 1995 to 2020 (CCPO-PGM June 1997). The projected number of housing units within Election District 9 is expected to increase 131 percent from 1995 to 2020. The rate of growth in housing units is projected to be higher than the population growth rate due to the projected decrease in average household sizes over the period that will continue to create increased demand for new housing units.



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The Charles County Comprehensive Plan (adopted June 23, 1997) establishes a comprehensive plan to direct and manage the future development of Charles County. This document updates the 1990 Comprehensive Plan. Through growth management strategies, 70 to 75 percent of new growth will be directed to the Development District, despite an increase in growth pressure in the rural areas. No Development Districts are within the SCEA boundary. As Charles County grows, a major challenge will be to maintain rural character outside the Development District and to retain the sense of belonging and cohesiveness exhibited in many of the County's older rural communities, such as those throughout the SCEA boundary (CCPO-PGM June 1997). The two guiding principles of the land use plan are the preservation of the County's rural character and protection of its natural resources.

Zoning will influence the type and amount of development within the SCEA boundary. Zoning within the SCEA boundary consists primarily of the Agricultural Conservation (AC), with Neighborhood Commercial (CN), Village Commercial (CV), Light Industrial (IG), Rural Residential (RR) and Village Residential (RV) scattered along roadways (CCPO-PGM 1997, Zoning Map). The County future land use plan contains 13 general areas or districts:

1. Development District
2. Town Centers
3. Major Mixed Use or Planned Unit Development
4. Village Centers
5. Rural Residential Districts
6. Rural Conservation Districts
7. Agricultural Conservation District
8. Chesapeake Bay Critical Area
9. Neighborhood Conservation Districts
10. Commercial and Business Districts
11. Employment and Industrial Park Districts
12. Highway Corridor Districts
13. Historic Preservation Districts

Land Use Districts within the SCEA boundary include the Agricultural Conservation District, the Neighborhood Conservation District, the Highway Corridor District, as well as the towns of Hughesville and Benedict, which are Village Centers.



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### **Agricultural Conservation District (ACD)**

ACDs represent areas where farming is prevalent. Included are farmlands, open fields, woodlands, stream valleys, and marshes, which collectively comprise virtually all of the remaining areas of the County which have not been classified under one of the other land use concepts. The prime objective is not to accommodate development, and to prevent scattered, uncontrolled development over areas of open countryside. Residential development is permitted without clustering, with a minimum lot size of 3 acres. Within the SCEA boundary, the ACDs are the predominant land use district.

### **Neighborhood Conservation District (NCD)**

NCDs are established to recognize residential subdivisions that have already been developed in the County both in and beyond the Development District. Future development in NCDs will be permitted to continue in the density and pattern for which respective subdivisions were designed at the time they were first planned. Within the SCEA, NCDs are present south of Hughesville along MD 5, and east of Hughesville along the north side of MD 231 (northwest of Benedict).

### **Highway Corridor Districts (HCDs)**

HCDs are designed to protect and improve the visual quality along key highway corridors to ensure the aesthetic and architectural character of the County. Within the SCEA, MD 5 is a HCD.

### **Village Centers (VCs)**

VCs are included in the land use plan to recognize and provide for the special needs of these rural unincorporated population centers. Characteristics common to most of the villages are post offices, country stores and, frequently, fire departments. The Plan's objectives for villages is to preserve and enhance their present character, so that they may continue to act as rural service areas and to serve their traditional roles in County life. As previously mentioned, Hughesville and Benedict are village centers.

As noted in the Transportation element of the Charles County Comprehensive Plan, the transportation objectives of the County correlate closely with the objectives of designated land uses. Transportation objectives pertaining to land use strive to plan improvements to the overall County transportation network to correspond to and support the overall land use Plan. Specifically, the goal is to concentrate transportation improvements that support new development in the Development District and Town Centers and limit transportation improvements in Rural Conservation and Agricultural Conservation districts to maintenance and



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upgrading on non-standard roads and under capacity bridges. This objective will provide for a safe and functional road system while limiting development in rural areas.

Besides establishing transportation planning objectives that are consistent with the Growth Management and Land Use Plan, the County has incorporated measures to mitigate the effects of development on infrastructure and services. Adequate Public Facilities (APF) requirements, which apply to the SCEA area, were added to the Charles County Zoning Ordinance in 1992 and a draft Adequate Public Facilities Manual was compiled in 1994. Under the APF Requirements, subdivision, site plan, or zoning permit applications must submit an Adequate Public Facilities Study to the Planning Commission that includes the proposed development's impact on transportation facilities. Developers must demonstrate that adequate infrastructure and services exist, are part of an approved Capital Improvement Program (CIP) project, or will be provided through a mitigation strategy to serve the new development (CCPO-PGM June 1997). These strategies are now being implemented to discourage development outside the service area, and encourage it within the area.

Besides transportation facilities, land use plans and zoning ordinances, other factors have an influence on the amount, type and distribution of development in a given area. These additional factors include availability of water and sewerage service and economic conditions. Due to the unpredictable nature of the economy, no attempt is made here to address this factor with regards to its influence on development in the SCEA boundary.

The Comprehensive Plan states that 75 percent of all new growth in the County will be directed to the Development District, which essentially covers the extreme northern portion of the County and is closely coincident with the service area of the Mattawoman Wastewater Treatment Plant (WWTP). The SCEA area is outside the Development District and is not served by the Mattawoman WWTP. Sewerage service in the SCEA boundary is provided by 1) the Hughesville Sanitary Commission, a private/community system, serving 13 commercial lots and; 2) the Southern Maryland Correctional Institution, located southwest of Hughesville.

Groundwater is presently the only source of potable water in the County. The only public municipal system within the SCEA boundary is the Benedict system, which serves about 350 persons and is operated by the County.



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### ***Summary of Secondary and Cumulative Effects – Land Use***

The residential developments expected within the SCEA boundary correspond to those subdivisions having final plat approval or valid preliminary subdivision plans. According to information/data obtained from the CCPO-PGM, there are ten subdivisions planned within the SCEA boundary, which will cover approximately 1,210 acres. In addition to these residential developments, minor transportation improvements have been identified within the SCEA boundary. According to readily available information/records obtained, these are the only planned projects within the SCEA boundary. None of the proposed projects are directly dependent on the MD 5 improvements.

Other public service amenities will likely influence the rate of development in the SCEA boundary. Because none of the SCEA boundary lies within the Mattawoman Wastewater Treatment Plant service area, development is discouraged. In addition, the SCEA area is predominantly within an ACD, where development is discouraged. None of the SCEA area falls within the Development District, where development is targeted.

### ***3. Natural Environment***

#### **a. Water Resources**

##### **Surface Water**

Numerous sources were consulted for readily available data regarding historic surface water quality data for the SCEA from the time period 1972 to the present and projected water quality through 2020. These included: the Charles County Department of Environmental Health (CCDEH), which had no readily available data for the SCEA; the DNR-Monitoring and Non-Tidal Assessment Division (MANTA), which had data on two Patuxent River stations; the U.S. Environmental Protection Agency's (EPA) STORET Program, which did not have enough data to conduct a trends analysis; and the U.S. Geological Survey-Water Resource Division's QWDATA Program, which had no data specific to the SCEA. Existing data for the Patuxent and Potomac River watersheds were considered as the SCEA boundary lies within both of these watersheds.

Water quality of surface waters is regulated by the MDE pursuant to the COMAR 26.08.02 (Water Quality), revised February 7, 1995 (ACM, Environment Article, Section 9-13 through 9-316, 9-319, 9-320, and 9-325). The purpose of these regulations is to protect surface water



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quality through the adoption and implementation of water quality standards. The surface water quality standards consist of designated uses of the State waters, and criteria to protect the designated uses. One regional initiative to protect surface waters and control nonpoint source (NPS) pollution is the Stormwater Management Program (implemented in 1984), which requires that stormwater from urban land be treated using best management practices (BMPs). Charles County government, as well as other county governments in the Patuxent River and Lower Potomac Tributary basins, has been delegated authority over this program. The Federal Program in place to regulate NPS pollution is the National Pollutant Discharge Elimination System (NPDES) Permits for Municipal Separate Storm Sewer Systems (implemented in 1990). This federal program, resulting from 1987 amendments to the Clean Water Act, mandates that local jurisdictions with populations greater than 100,000 are required to inventory, monitor and assess their stormwater management programs. The Charles County Soil Conservation District and the Maryland State Department of Agriculture also have programs that protect the water quality of surface waters through enforcement of BMPs on agricultural lands, and through development and enforcement of Soil Erosion and Sediment Control Standards.

Past and current stresses to surface water quality in the SCEA area include: agricultural runoff; stormwater runoff; and sedimentation/siltation due to development. Anticipated future stresses on surface water quality are stormwater runoff from developed areas, agricultural runoff, and sedimentation/siltation from soil erosion/disturbance due to residential and commercial development.

None of the land area within the SCEA boundary is served by public sewers. There is a site-specific area (juvenile camp) in Hughesville that has its own sewage treatment facility and is served by Maryland Environmental Services. There are no wastewater treatment plants within the SCEA boundary (Charles County Department of Utilities-Water and Sewer 1998). Also, there are no central water systems or potable water supplies within the SCEA boundary that use surface waters.

The MDE has documented an overall improvement in water quality in the Patuxent River basin since the mid 1980s as a result of declines in point source nutrient loads from wastewater treatment plants. Declines in point source phosphorous loads are attributed to implementation of the phosphate detergent ban and numerous wastewater treatment plant upgrades in the mid 1980s. Declines in point source nitrogen loads became evident starting in 1991 as a result of implementation of biological nutrient removal at eight major wastewater treatment plants in the basin. The Lower Potomac Tributary basin has shown substantial nutrient (nitrogen and



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phosphorus) load reductions as well, and these are also attributed to upgrades at wastewater treatment plants, the phosphate detergent ban, and the implementation of BMPs.

### *Results*

Monitoring station data for the Lower Potomac Tributary basin represented areas that were too far outside of the SCEA boundary to be representative of it. Various sources were consulted to summarize the overall water quality of the Lower Potomac basin. The MDE (1993) states that water quality has improved overall since 1985, in terms of nitrogen and phosphorus loads, and that most surface waters in the basin are suitable for water contact recreation and aquatic life (classified as Use I waters). However, high nitrogen levels occurred at 12 percent of the stream miles in the basin; primary sources of nitrates are agriculture and acid rain. About one-third of the stream miles had low dissolved oxygen levels during summer, probably from farming practices and urban runoff (DNR-MANTA 1998).

Data obtained for the Patuxent River indicate that there is a general improvement in water quality in the Patuxent River, resulting from the overall decreasing trend in nitrogen and phosphorus concentrations. Further supporting these results are the data presented in the Patuxent River Tributary Strategy Basin, Water Quality and Habitat Summary Report (DNR, April 10, 1998), which indicate that the current (1994-1996) nitrogen levels in the Lower Patuxent basin for this station are good and that the trend (1985-1996) is a 16 percent decrease in nitrogen concentrations. The data in this report indicate that the current (1994-1996) phosphorus levels are fair and that the trend (1985-1996) is a 33 percent decrease in phosphorus concentrations, indicating an improvement in water quality. The report data also indicate that the current (1994-1996) dissolved oxygen levels are fair, but there are no detectable statistically substantial oxygen trends.

The DNR-MANTA reports that, based on DNR's fish Index of Biotic Integrity (IBI) which combines information on different fish species to indicate the overall health of the ecosystem, the streams of the Lower Potomac basin were of good quality overall. In addition, based on an aquatic macroinvertebrate index which assesses overall water quality based on pollution-tolerance values assigned to individual families, 43 percent of stream miles in the Lower Potomac basin were assessed as good (DNR-MANTA 1998). These reports are based on results of the Maryland Biological Stream Survey (MBSS) conducted by DNR in 1995. The Patuxent River basin has an overall low IBI score in terms of its estuarine fish community; however, fish young of the year (YOY) have increased since 1983, indicating an improved water quality in the



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Patuxent River and its freshwater tributaries (DNR 1998). Based on a macroinvertebrate EPT value (i.e., type of an index), 66 percent of stream miles in the Patuxent River basin were assessed as fair (DNR April 10, 1998). No specific data were readily available for Indian Creek, Swanson Creek, or Gilbert Creek.

### ***Summary of Secondary and Cumulative Effects – Surface Water***

There has been an overall improvement of water quality in the Patuxent River basin and the Lower Potomac basin since the mid 1980s, due largely to the reduction in point source nitrogen and phosphorus loads, which is in direct response to the Federal and State initiatives to improve water quality of the Chesapeake Bay watershed.

While control of point source nutrient pollution has been successful and goals for point source nutrient reduction have largely been met in the Patuxent and Lower Potomac Tributary watersheds, NPS pollution continues to be a problem which will likely worsen as the watersheds become more populated. The Lower Potomac Tributary basin has shown rapid population growth since 1970 (almost 90%) and projected growth for the next 30 years is also expected to be rapid (70%) (MDE 1995). The Patuxent River basin (as of 1990) is expected to grow more than 54 percent by the year 2020 (DNR 1998).

In 1984, the Patuxent River Commission (PRC) developed the Patuxent River Policy Plan while, in 1995, the Lower Potomac Tributary Team developed the Lower Potomac Tributary Strategy. These Programs were developed to help control NPS pollution and achieve the goal of a 40 percent reduction in nitrogen and phosphorus reaching the Chesapeake Bay by the year 2000, pursuant to the 1987 Bay Agreement (MDE 1995). Implementation of Soil Erosion and Sediment Control (SESC) plans, stormwater management plans, agricultural BMPs and Soil Conservation and Water Quality Plans (SCWQPs) will make substantial contributions to nutrient reductions in these tributaries. There have also been a variety of Federal and State initiatives since 1984 that have provided regulatory support for implementing these and other Policy Plan strategies. Examples of these initiatives are the Chesapeake Bay Critical Area Management Act (1984), State Economic Growth, Resource Protection, and Planning Act of 1992, and the State Phosphate Ban (1985).

Implementation of the proposed MD 5 project is expected to result in direct impacts to surface waters from extension/modification of existing culverts and addition of new culverts and potential temporary water quality degradation from soil erosion and sedimentation due to



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construction activities (i.e., clearing and grading). Incorporation of BMPs, such as grassed swales and detention/retention basins, is expected to mitigate long-term water quality degradation from stormwater runoff from the new roadway facility. Incorporation of soil erosion and sediment control measures, as part of an approved SESC Plan, is expected to minimize the extent and duration of temporary soil erosion and sedimentation impacts of the project.

The County has received major subdivision development applications (See Chapter II) for 349 lots totaling about 1,210 acres within the SCEA boundary. Collectively, these developments will be expected to increase NPS pollutant loadings to surface waters within the SCEA boundary.

The cumulative effects of all proposed and/or potential developments (highway and non-highway) to fisheries and water quality of the watersheds within the SCEA boundary would be a continued degradation of water quality and watershed stability, especially to Gilbert Creek and Swanson Creek (DNR-MBSS 1998). To further stress the cumulative effects of highway and non-highway development on streams and water quality, the DNR-MANTA report on the Lower Potomac basin states that, "Given the level and types of stream impacts noted in 1995 and the projected changes in land use, human population size and water demands in the Lower Potomac basin, it is likely that fish communities and other ecological attributes of streams in the basin will become more degraded in years to come. Comprehensive implementation of BMPs, such as stream buffer protection and enhancement, may partially offset impacts to streams during and after development" (DNR-MANTA 1998).

State and Federal programs/initiatives, such as Smart Growth, Priority Funding Areas Programs, Rural Legacy Program, NPDES, etc. will continue to be implemented and amended to minimize surface water quality impacts and promote protection of watersheds.

### **Groundwater**

Limited readily available data was available for analysis of groundwater within the SCEA. General information regarding regulatory authority and general overall quality of local aquifers was available through CCDEH and MDE.

Groundwater withdrawals and discharges in Charles County are regulated by the CCDEH and the MDE. The CCDEH has the responsibility of enforcing State regulations pertaining to individual residential water supply wells that pump less than 18,925 liters per day (5,000 gallons per day). MDE-Individual Well and Septics Program issues water appropriation permits and well



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drilling permits and monitors quality of public water supply wells. Individual on-site sewage disposal systems are regulated by the CCDEH.

### ***Results***

Groundwater is the source of all potable water in Charles County. Approximately 70 percent of the population in Charles County is served by a central water system and there are 85 such systems. Within the SCEA, there is one existing central water system (at Benedict near Patuxent River) that is designated as W1, which means that it is in the final planning stages and/or has received final plat approval (CCPO-PGM November 1998). In Hughesville, there is an area designated as W6E, which means that there is no planned water service. Within the SCEA, there is no planned extension of the central water systems (public or private) for the ten-year period of the County's Water and Sewer Plan (1998-2008). The Magothy, Aquia, and Patapsco are the primary aquifers used for potable water supplies within the SCEA boundary (CCPO-PGM November 1998), and all are of excellent quality (CCDEH 1998).

### ***Summary of Secondary and Cumulative Effects - Groundwater***

Groundwater quality and quantity within the SCEA boundary have not been substantially affected in the past, since 1972. This has been concluded due to the regulation of groundwater withdrawals and discharges in the SCEA boundary in conjunction with land use planning controls and other regulatory programs, which have and should continue to effectively protect groundwater resources in the SCEA boundary.

Implementation of the proposed MD 5 project is not expected to cause future adverse impacts to groundwater resources. Based on the 1997 Charles County Comprehensive Plan, the majority of the SCEA boundary falls within an area designated as Agricultural Conservation District, which means that development in these areas will be strongly discouraged. Therefore, it is anticipated that future groundwater withdrawals will not be substantial. There is no planned water service in Hughesville, and there is no planned extension of the central water systems (public or private) within the SCEA boundary for the ten-year period, according to the County's Water and Sewer Plan (1998-2008). Though it is not known when, if ever, the public water and sewer systems will serve more of the SCEA, the extent of this service will undoubtedly increase over the study time frame (to year 2020), with a corresponding increase in population and percent of population served. It is, however, expected that current Charles County and MDE regulatory programs pertaining to groundwater withdrawals and discharges, and other regulatory programs (e.g, State



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Forest Conservation Act, Non-tidal Wetlands Act, etc.) will effectively protect groundwater resources within the SCEA.

### b. Wetlands

Specific quantitative wetlands trends data for the SCEA were not readily available through existing documented sources for the time period 1972 to the present; however, statewide, countywide and watershed wetlands trends data were readily available. In addition to reviewing existing wetlands trends data from the past, a Geographical Information Systems (GIS) approach for the wetlands trends analysis within the SCEA boundary was implemented using ARC Info. Readily available wetland boundaries within the SCEA boundary were obtained from the DNR Technology Toolbox, which contains both 1981 National Wetlands Inventory (NWI) data from the U.S. Department of the Interior's Fish & Wildlife Service (USFWS 1981) and DNR wetlands data (1993) within the SCEA. Comparison of wetlands data from 1981 to 1993 allows for an overlay analysis of wetland trends from 1981 to 1993. This NWI data is the earliest data available within the time frame established for the SCEA. Although the most desirable wetlands analysis would result from comparing wetlands data from two different time periods and from the same data source, neither NWI data nor DNR data were available for both 1981 and 1993. Therefore, 1981 NWI wetlands were compared to 1993 DNR wetlands to analyze wetland trends from one time period to another. The results of several studies were considered to allow for a comparison of wetland trends between the GIS analysis and other existing data sources.

Wetlands within the MD 5 Hughesville Transportation Improvement Project study area were field delineated and surveyed in the summer and fall of 1998. Proposed direct wetland impacts that would result from the MD 5 Hughesville Transportation Improvement Project were determined based on ROW limits for each build alternative.

#### Results

Wetland impacts vary considerably between the two build alternatives currently being studied. Less than 0.02 acres of palustrine forested (PFO) wetland would result from the construction of Alternative 2. No streams would be impacted by this alternative. The worst case scenario for wetland impacts would result from Alternative 5 (standard diamond interchange), which would result in 2.1 acres of PFO wetland impact and 105 linear meters (346 linear feet) of stream impact.



**Results**

**GIS Analysis of Wetlands Trends in the SCEA Boundary - 1981 to 1993**

Wetlands within the SCEA boundary are dominated by PFO systems associated with various non-tidal waterways including the Patuxent River, Swanson Creek, Indian Creek (all within the Patuxent River Lower Area Drainage) and Gilbert Creek (Gilbert Swamp Drainage). Palustrine emergent (PEM) and scrub/shrub (PSS) systems are also common within the SCEA boundary but are not as extensive as forested systems. Tidal wetland systems within the SCEA boundary are limited to estuarine emergent and scrub/shrub systems associated with tidal portions of the Patuxent River. *Figure V-7* shows wetland systems within the SCEA boundary as of 1993 (DNR Technology Toolbox-DNR Wetlands Inventory 1989-1995).

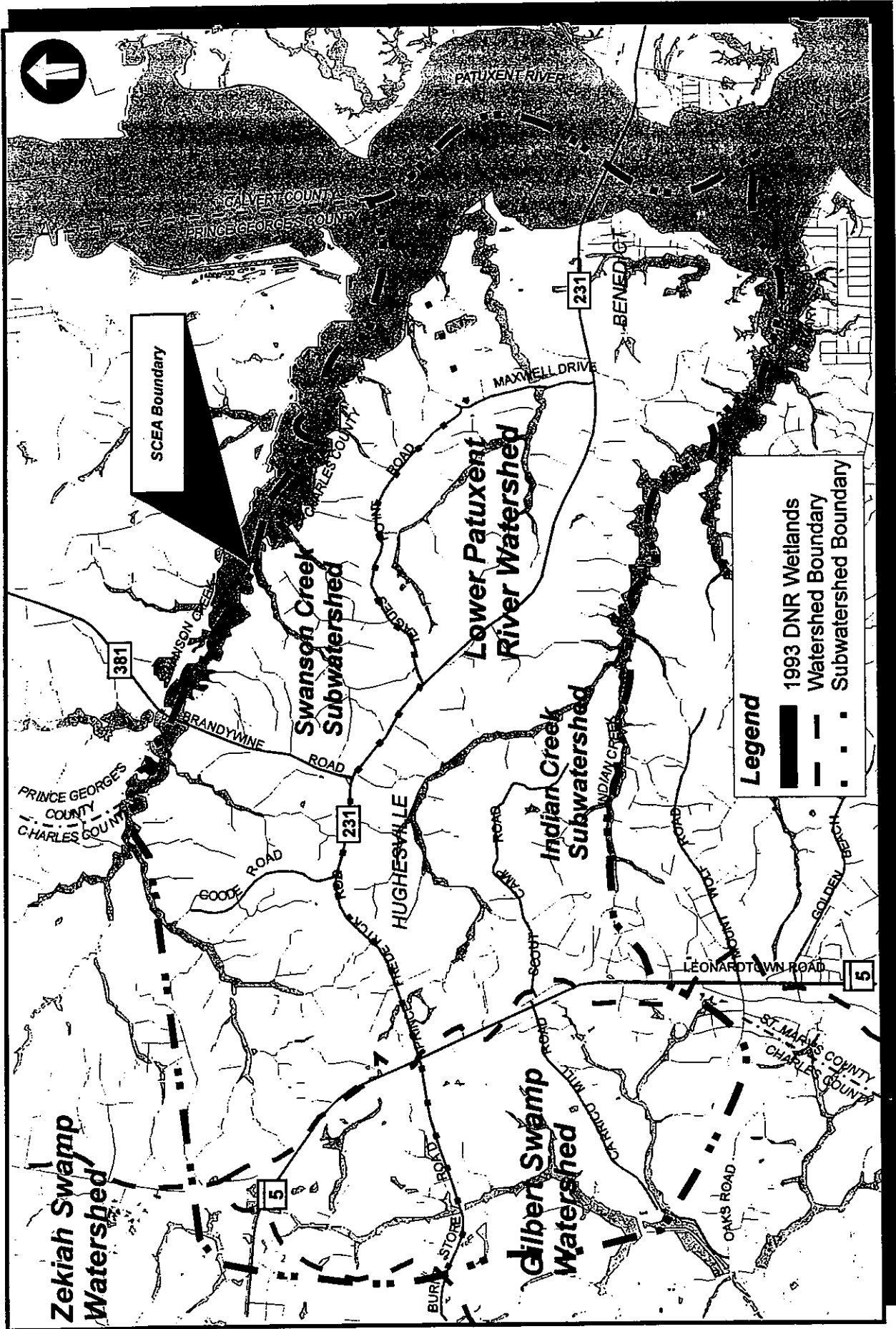
The results of the GIS analysis are summarized in *Table V-17*. The results of the analysis suggest that there was a loss of 9.4 acres of vegetated wetlands from 1981 to 1993. The loss of 39.4 acres of vegetated wetland within the SCEA boundary represents a 0.9 percent loss of vegetated wetland from the period 1981 to 1993. Based on the wetland differences from 1981 to 1993, it can be concluded that the SCEA area had relatively minimal wetland losses during this period. Additional comparisons of data indicate that palustrine open water (ponds) increased by 6.1 acres (29 percent) during this time period. Data also shows that tidal vegetated wetlands decreased by approximately 4 acres (1.5 percent). Nontidal vegetated wetlands data indicates that PEM wetlands increased by 18.3 acres (88 percent), PFO decreased by 29.3 acres (4 percent) and PSS increased by 5.6 acres (12 percent).

**TABLE V-17**

*Comparison of 1981 NWI Wetlands (USFWS 1981) and 1993-94 DNR Wetlands (DNR)*

Wetland Classification	1981	1993	Net Difference	% Change
	ACRES			
Estuarine Emergent	255.9	246.1	-9.9	-3.9%
Estuarine Scrub Shrub	---	5.9	5.9	---
Total Vegetated Estuarine	255.9	252.0	-3.9	-1.5%
Palustrine Emergent	20.7	39.0	18.3	88.3%
Palustrine Scrub Shrub	48.1	53.7	5.6	11.7%
Palustrine Forested	722.1	692.8	-29.3	-4.1%
Total Vegetated Palustrine	790.9	785.5	-5.4	-0.7%
Combined Total Vegetated (Estuarine/Palustrine)	1046.8	1037.4	-9.4	-0.9%
Palustrine Open Water	20.8	26.9	6.1	29.3%
Lacustrine	44.0	45.5	1.4	3.2%

**FIGURE V-7**  
 1993 DNR Wetlands & Watershed/Subwatershed Boundaries





It should also be noted that due to the comparison of data from two different data sources, it is possible that the 0.9 percent overall vegetated wetland difference discussed above may partially be attributed to data interpretation and input methodologies associated with the two different original data sources. Either way this data is interpreted, it can be concluded that the net overall vegetated wetland losses were relatively minimal over the 12-year period from 1981 to 1993.

Although data suggest a relatively minor overall net loss of wetlands, it also shows that the most substantial difference between 1981 and 1993 is the loss of 29.3 acres of forested wetland. Another relatively substantial difference in data is the overall 18.3 acres net gain of PEM wetlands during this period. It is possible that the increase in PEM wetlands from 1981 to 1993 is the result of the conversion of forested wetlands to emergent systems.

#### **1955 - 1978 Maryland Statewide Trends**

Wetlands data for the SCEA were not readily available before 1981, therefore statewide trends for the period 1955 to 1978 were considered. This period was considered to include the beginning of the SCEA time frame, 1972. During the period 1955 to 1978, it was reported that approximately eight percent of the estuarine vegetated wetlands and six percent of the palustrine vegetated wetlands were lost (Tiner and Finn (1986), in Tiner and Burke 1995).

Approximately 15,000 acres (8 percent) of palustrine vegetated wetlands (mostly emergent) were lost during this period (Tiner and Burke 1995). Agriculture accounted for most of the palustrine wetland losses, with urban development accounting for only eight percent of the losses. Pond construction accounted for nearly 30 percent of vegetated wetland losses. Pond acreage during this period increased by 366 percent or 14,000 acres. Vegetated forested and emergent wetlands were affected most by the construction of open water ponds.

*Table V-18* compares estimated wetland trends for certain classification types in Maryland (1955 to 1978 versus 1982 to 1989). It should be noted that the forested statistic can be misleading since the net change figure includes changes in wetland type, such as induced by timber harvest. According to Tiner and Burke (1995), a closer examination of results show that between 1955 and 1978, 9,125 acres of palustrine forests were destroyed, for an annual loss rate of 397 acres. By comparison, 2,534 acres were destroyed from 1982 to 1989, for an annual loss rate of 362 acres. These results indicate a slight reduction in the annual loss rate of PFO wetlands.



**TABLE V-18**

*Comparison of Estimated Wetland Trends (Net Changes) For Certain Classification Types in Maryland (1955 to 1978 versus 1982 to 1989) from Tiner and Finn (1986) and Tiner and Burke (1995)*

Wetland Classification	1955	1978	Net Difference	% Change
	1982	1989		
Estuarine Emergent	255.9	246.1	-9.9	-3.9%
Estuarine Scrub Shrub	—	5.9	5.9	—
<b>Total Vegetated Estuarine</b>	<b>255.9</b>	<b>252.0</b>	<b>-3.9</b>	<b>-1.5%</b>
Palustrine Emergent	20.7	39.0	18.3	88.3%
Palustrine Scrub Shrub	48.1	53.7	5.6	11.7%
Palustrine Forested	722.1	692.8	-29.3	-4.1%
<b>Total Vegetated Palustrine</b>	<b>790.9</b>	<b>785.5</b>	<b>-5.4</b>	<b>-0.7%</b>
<b>Combined Total Vegetated (Estuarine/Palustrine)</b>	<b>1052.8</b>	<b>1037.5</b>	<b>-15.3</b>	<b>-1.4%</b>
Palustrine Open Water	20.8	26.9	6.1	29.3%

**1981-1988/89 Charles County Trends**

The USFWS conducted several wetland trends studies in specific geographic areas in Maryland, including Charles County. Data for Charles County during approximately the same time period as the Statewide trends indicates that Charles County lost wetlands due primarily to residential development (44.9 acres), unknown conversions (30.9 acres), commercial development (17.4 acres) and roads (12.3 acres). Similar to the Statewide trends, County wetland trends for approximately the same period show that PFO wetlands also suffered the majority of impacts. Tiner and Burke (1995) reported that 106.1 acres of PFO was converted to upland and 25.4 acres of PFO wetland was converted to ponds. *Table V-19* shows data reported on Charles County quantitative changes in wetland classifications that experienced more than 10 acres change.

**Summary of Secondary and Cumulative Effects - Wetlands**

Based on comparison of all the available wetlands data and the GIS-specific trends analysis in the SCEA boundary, it can be concluded that the SCEA GIS trends are similar to the trends experienced state- and countywide. For example, Maryland experienced a net loss of 1.4 percent of palustrine vegetated wetlands as compared to the SCEA loss of 0.7 percent over a similar time period. Similarly, Maryland lost 0.5 percent of estuarine vegetated wetlands as compared to the



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**TABLE V-19**

*Recent Wetland Trends in Charles County (1981 to 1988/89) Based on U.S. Fish and Wildlife Service Reports. Data Reported For Wetland Types Experiencing More Than 10 acres of change.*

Wetland Classification	Net Change 1955-78	Avg. Annual Net Change 1955-78	Net Change 1982-89	Avg. Annual Net Change 1982-89
Estuarine Emergent	-9,845	-428	-72	-10
Estuarine Scrub-Shrub	-183	-8	279	40
Estuarine Forested	No Data	N/A	-766	-109
Estuarine Nonvegetated	1,049	46	1,074	153

SCEA loss of 1.5 percent. Both studies show that PFO wetlands suffered the most loss/conversion while pond acreage increased. Countywide wetland trends for the period 1981 to 1988/89 also show that PFO wetlands suffered the majority of impacts. The most substantial causes of land use conversion from wetland to upland in Charles County (from the early 1980s to the early 1990s) resulted from new housing developments, commercial development and the construction or upgrading of roads.

It is anticipated that the percentages of future wetland loss/conversion within the SCEA boundary will be less as compared to the past data trends. This anticipated decline in future wetland loss is based on the notion that government regulatory programs will minimize wetland destruction in the future (Tiner and Burke 1995). Existing wetlands now receive better protection than in the past. Techniques and procedures for protecting Maryland’s remaining wetlands include land use regulations, direct acquisition, conservation easements, tax incentives, public education, and the efforts of private individuals and corporations.

Federal and State wetland regulations are the most widely used means of controlling wetland impacts in Maryland. Based on the current implementation of the no overall net loss goal established by the Non-Tidal Wetlands Act, it is anticipated that future wetland losses within the SCEA boundary will be minimal.



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The most substantial regulatory programs at the Federal level are the following:

- “Section 10” program (authorized by Section 10 of the Rivers and Harbors Act of 1899) administered by the U.S. Army Corps of Engineers (Corps)
- “Section 404” program (authorized by Section 404 of the Federal Water Pollution Control Act of 1972, as amended by the Clean Water Act of 1977 and later amendments) administered jointly by the Corps and the U.S. Environmental Protection Agency (EPA).

The most substantial regulatory programs at the State level include:

- Tidal wetlands licensing and permitting program (authorized by the 1970 Tidal Wetlands Act) administered by MDE
- Nontidal Wetlands management and permitting program (authorized by the 1989 Nontidal Wetlands Protection Act, effective January 1991) administered by MDE
- “Section 401” Water Quality Certification program (authorized under Section 401 of the Clean Water Act) administered by MDE
- “Section 307” Coastal Zone Consistency determination (authorized in Section 307 of the Coastal Zone Management Act of 1972, pursuant to Maryland’s Federally approved Coastal Zone Management Plan) administered by MDE.

### c. Floodplains

There was no existing readily available data regarding specific quantitative floodplain impacts within the SCEA boundary from the time frame 1972 to the present. Future impacts to 2020 were projected based on regulatory programs now implemented.

Floodplains are lands typically adjacent to a body of water with ground surface elevations that are inundated by the base flood. A floodway is the channel and adjacent land area required to discharge the waters of the 100-year flood of a watercourse without increasing the water surface elevations more than a specified height. Floodplains provide important functions including temporary storage of floodwaters, moderation of peak flood flows, maintenance of water quality, groundwater recharge, prevention of erosion, habitat for wildlife and recreational opportunities.

The Charles County Floodplain Management Ordinance (Chapter 238, Article II of the Charles County Code), authorized by the CCPO-PGM, requires any person or entity to obtain a permit for any development proposed within the regulated floodplain zone. This ordinance, enacted in April 1992, prohibits or discourages development in the regulatory floodplain. Any variances to this ordinance requires a detailed alternatives analysis that demonstrates the proposed



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development cannot be located out of the floodplain and that encroachments onto the floodplain are minimized.

At the federal level, the regulatory floodplain consists of those areas of the County which are subject to the 100-year flood. Floodplain zones must be determined by using the Floodway Maps and Flood Insurance Study (FIS) prepared by the Federal Emergency Management Agency (FEMA), if available. If these sources are not available for an area, federal Flood Insurance Rate Maps (FIRM) or any other source more detailed than the FIRM may be used to determine floodplain zones.

### ***Results***

Based on FEMA FIRM maps, 100-year floodplains occur within the SCEA boundary at the following locations:

- Swanson Creek and some associated unnamed tributaries
- Patuxent River and some associated unnamed tributaries
- Indian Creek
- Gilbert Creek

### ***Summary of Secondary and Cumulative Effects - Floodplains***

Implementation of the MD 5 Hughesville Transportation Improvement Project will not adversely affect regulated 100-year floodplains. Future cumulative effects to floodplains are expected to be negligible to none. This rationale is based on the current County floodplain regulations per the Floodplain Management Ordinance (1992). As previously noted, development within the floodplain is generally prohibited and requires a variance for encroachment into the floodplain. In considering a variance, comments from the State Coordinating Officer of the Water Management Administration must be considered and maintained with the permit file.

#### **d. Forest Habitat**

Readily available data regarding forest habitat was available for portions of the SCEA boundary as well as overall County trends. A variety of existing documented sources provide forest loss dating back to approximately 1980. In addition, MOP land use maps were overlaid with 1994 land use maps to determine the amount of forest loss from 1973 to 1994. Projected future forest habitat impacts (to 2020) were projected based on increased population projections and proposed development.



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Forest habitats in the SCEA boundary are primarily present as forested corridors alongside streams and larger rivers within the SCEA boundary, and as fragmented patches interspersed with highway, commercial, residential, and agricultural development. The EPA Landscape Atlas Maps (1990 data) indicate that the Patuxent River basin is less than 48 percent forested and that greater than 21 percent of this forested area is fragmented, while the Lower Potomac basin is between 48 and 64 percent forested and between 14 and 21 percent fragmented. Furthermore, the Patuxent basin has less than 24 percent of forest interior habitat (large tracts of contiguous forest cover), while the Lower Potomac basin has between 24 and 40 percent (EPA 1997). The total amount of forest habitat (wetland and upland) within the SCEA boundary for the present (1994) conditions is 12,690 acres, equivalent to approximately 56 percent of the SCEA boundary. This forest habitat occurs in more than 25 tracts. Scrub/shrub, herbaceous/grassland, and active and fallow agricultural field habitats are also present within the SCEA boundary.

The State Forest Conservation Act of 1991 (ACM, Natural Resources Article, Sections 5-1601 through 5-1613) was enacted to protect the forests of Maryland by making forest conditions and character an integral part of the planning process. The Act seeks to maximize the benefits of forests and slow the loss of forest land in Maryland while allowing development to take place. A Forest Stand Delineation (FSD) is required as part of the submittal package for all development plans and grading permits where the land parcel is greater than 3,716 square meters (40,000 square feet) and the wooded areas on the property total more than 929 square meters (10,000 square feet). An approved Forest Conservation Plan (FCP) must also be obtained prior to the issuance of grading permits. The Act is regulated by the DNR, but is implemented and administered by local governments.

The Charles County-Forest Conservation Ordinance (Ordinance #96-91) was enacted in 1997 to reduce the loss of the County's forest resources (CCPO-PGM 1997). The ordinance established the Charles County Forest Conservation Program, pursuant to the requirements of the State Act. Similar to the State Act, the two major requirements of the County Program are submittal of a FSD and a FCP for applications for development on land areas of 3,716 square meters (40,000 square feet) or more. Proposals for development of wooded properties must include provisions to set aside a specified proportion (15-50 percent, depending on zoning status) of the site as woodland preservation area. Currently designated priorities for preservation are wooded 100-year floodplains, wooded non-tidal wetlands, wooded stream corridors, wooded slopes, large contiguous wooded areas and critical woodland habitats, Rare/Threatened/Endangered plant species, and specimen and historic trees (CCPO-PGM 1997).



*Results*

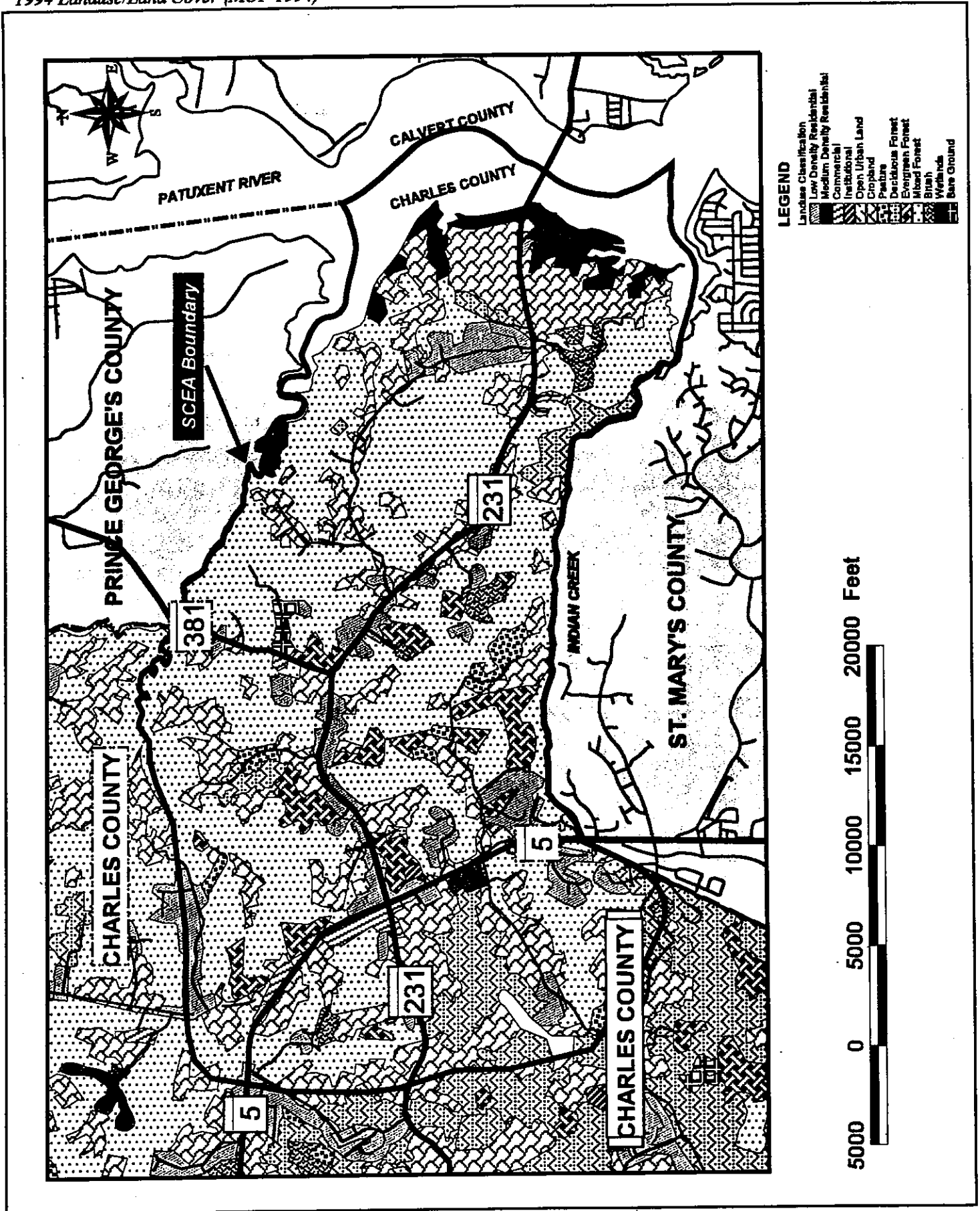
Stresses to forest habitats include development (e.g., highway, commercial, residential, agricultural), forest fragmentation, timber industry activities, and pesticide applications. The population in the Patuxent River basin has more than doubled since 1970 and, as of 1990, it is expected to grow more than 54 percent by the year 2020 (DNR 1998). During the 1980s in the Patuxent River basin, there was a 15 percent loss in forested lands, while there was a 92 percent increase in land areas being developed. Between 1990 and 2020, developed land is projected to increase by 77 percent, while forested land is projected to decrease by 26 percent. By the year 2020, developed land will become the major land use category in this basin (DNR 1998). For the Lower Potomac Tributary basin, forested land has decreased from 63 percent in 1990 (MDE 1993) to 38 percent in 1994 (MOP 1994), and is projected to decrease further by the year 2020. In addition, Charles County is documented as one of the counties with the highest rate of change (39%) and highest numerical change (>5,000 acres) between 1985-1990 in Maryland, in terms of acres converted to development; total forest lost between 1985-1990 was 9,554 acres (MOP, October 1991).

Land Use/Land Cover (LU/LC) maps for 1973 and 1994 were obtained from the MOP to assess the cumulative effects on forest habitat (wetland and upland) (*Figure V-8*). Changes in LU/LC (e.g., from forest land to agricultural land and vice-versa, from forest or agricultural land to built-up land and vice-versa, etc.) were calculated by overlaying the 1973 map with the 1994 map to determine the total amount of forest habitat net loss or gain, forest habitat cleared, and forest habitat regenerated over this time period. Total forest habitat area within the SCEA boundary was also calculated for both years. To quantify forest fragmentation for both the past and present conditions, the total number of forest tracts were roughly estimated using the MOP's LU/LC maps (1973 and 1994).

For 1973, the total amount of forest habitat within the SCEA boundary was approximately 14,165 acres (63% of the SCEA), while in 1994 it was 12,690 acres (56% of SCEA); a net loss of 1,475 acres (- 10%) of forest habitat over the 21-year period (*Table V-20*). About 1,805 acres of forest habitat have been cleared since 1973, while roughly 330 acres have been regenerated (through natural succession and/or planting) since then. Not only do the data indicate an overall net loss of forest habitat within the SCEA boundary, these data also indicate that there are a greater number of isolated (fragmented) tracts of forest now (1994) than were in the past (1973). It was estimated that the present (1994) forest habitat occurs in more than 25 tracts, while in

**FIGURE V-8**

1994 Landuse/Land Cover (MOP 1994)





**TABLE V-20**

*Forest Habitat Changes Within the SCEA Boundary Between 1973 and 1994*

FOREST HABITAT (within SCEA)	TOTAL AREA	
	1973 (percent of SCEA)	1994 (percent of SCEA)
1973	14,165 (63%)	-1,475 (-10%)
1994	12,690 (56%)	
cleared/converted	1,805	
converted to agriculture	450	
converted to development	1,355	
regenerated	330	

FOREST FRAGMENTATION (within SCEA)	ESTIMATED NUMBER OF TRACTS	AVERAGE SIZE OF TRACTS (hectares/acre)	PERCENTAGE INCREASE/DECREASE
1973	17	750	47%
1994	25	500	

**Source:**

Maryland Office of Planning's Land Use/Land Cover Maps (1973 and 1994), Scale: 1" = 1 mile.

*\*Note:* This not only shows that the number of forest tracts has increased over time, but also shows that the average size of forest tracts has decreased over time, from 303 hectares (750 acres) to 202 hectares (500 acres); thereby indicating that forests have become smaller in size and more fragmented.

1973 forest habitat occurred in roughly 17 tracts within the SCEA; a 47 percent increase in forest fragmentation over the 21-year period (*Table V-20*).

Data regarding Forest Interior Dwelling Bird Species (FIDS) and their habitats within the SCEA boundary were assessed to determine cumulative effects. FIDS habitat is conservatively defined by the DNR as: 1) contiguous upland forests of 50 acres or greater; 2) riparian forests greater than 91 meters (300 feet) in width that border a stream for at least 182 meters (600 feet); 3) riparian forests at least 46 meters (150 feet) wide and connected to one of the above; or 4) forest patches 10 acres or larger and within 300 feet of the first two definitions. Breeding Bird Survey (BBS) data (1966 through 1996) were obtained from the USFWS-BBS Program, and from the Breeding Bird Atlas Project in Maryland and the District of Columbia. The latter is a joint effort of the Maryland Ornithological Society (MOS), the DNR, and the USGS-Patuxent Wildlife Research Center (PWRC).



According to Breeding Bird Atlas Project data specific to the SCEA boundary, there are many forest-breeding bird species that are not experiencing adverse effects from development or changes in land use practices. In fact, certain FIDS have increased their breeding populations within the SCEA boundary (e.g., Acadian flycatcher, great-crested flycatcher, tufted titmouse, red-eyed vireo). The following six FIDS, however, are showing a generally decreasing trend in their breeding populations within the SCEA boundary (as well as within Charles County).

**FIDS**

- Yellow-throated Vireo (\*)
- Eastern Phoebe
- Ruby-throated Hummingbird
- Kentucky Warbler
- Eastern Wood Peewee (\*)
- Scarlet Tanager (\*)

The primary reasons for the general decline in breeding populations of certain FIDS within the SCEA boundary are from: 1) forest habitat loss and fragmentation, and wintering habitat loss due to development; 2) loss of food sources (mainly insects) due to pesticide applications (especially to control gypsy moths); 3) human disturbance; and/or 4) Brown-headed Cowbird parasitism. As noted previously, there is the likelihood that forest habitats will continue to be developed and become highly fragmented. Data from the USGS-PWRC indicate a general negative trend estimate in Maryland between the 1966-1996 BBS period for many species in the Woodland Breeding Species Group. The three species noted above with (\*) are listed as declining breeding species (USGS-PWRC web page-BBS Summary of Trends Data 1998).

***Summary of Secondary and Cumulative Effects – Forest Habitat***

Direct forest impacts vary substantially between the two build alternatives currently being studied. Alternative 2 would result in 2.4 acres of forest impact. Alternative 5, standard and compressed diamond interchange options would result in 50.4 acres and 48.2 acres of forest impact, respectively.

Although the current forest protection regulations will provide some insurance that forest land will not be indiscriminately destroyed or displaced, there is the likelihood that forest habitats (primarily upland) will continue to be developed and become highly fragmented, as is indicated



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by the previously-mentioned population and development projections. Over the cumulative effects time frame, there has been an overall net loss of approximately 1,475 acres, 10 percent, of forest habitat and an estimated 47 percent increase in forest fragmentation within the SCEA boundary. Natural succession will continue to offset some of these losses as will afforestation or reforestation mitigation requirements of approved Forest Conservation Plans pursuant to the County's Forest Conservation Program.

The proposed MD 5 project is not expected to have substantial negative effects on forest-breeding bird populations, since only a total of about 2 to 50 acres of forest habitat would be displaced, depending on the alternative selected.

The estimated potential cumulative forest habitat impact is 1,496 acres. It should be noted that this figure represents the maximum estimated forest impact that would occur, based on the proposed development known at this time. The actual forest impact will be less due to the influence of forest protection and wetlands protection regulatory programs.

All known and potential developments within the SCEA boundary will likely increase forest habitat fragmentation from the 1994 estimated total based on past and present indications. However, not enough data is available at this time to accurately quantify this increase. This increase in forest habitat fragmentation will affect wildlife species that depend on forest interior habitats (i.e., FIDS). However, because of current regulations and standards that protect forests/forest buffer zones, some of the known and/or potential forest habitat areas within the proposed development sites will remain undeveloped.

The cumulative effects of this highway project coupled with other highway or non-highway development projects would likely be that certain species of concern (such as FIDS) would decrease from substantial declines in their populations due to continued loss or fragmentation of habitat.

### e. Endangered and Threatened Species

Readily available information obtained regarding endangered and threatened species was obtained through coordination with DNR and USFWS. These agencies provided data on state/federal endangered and threatened species in the SCEA boundary. Data on past impacts to these species was not readily available. Projected qualitative future impacts can only be



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estimated based on proposed land use and development in relation to the sensitive species protection areas.

Rare, Threatened and Endangered (RTE) species are regulated by the Federal government pursuant to the Endangered Species Act of 1973 (P.L. 93-205, 87 Stat. 884), and the State of Maryland pursuant to the Maryland Endangered Species Act of 1973 (ACM, Natural Resources Article, Section 10-210). The Maryland Nongame and Endangered Species Conservation Act of 1975 (ACM Natural Resources Article, Section 10-2A01 et seq.) further protects RTE species. This Act mandates the investigation, management and protection of both nongame wildlife and Endangered/Threatened species of wildlife and plants through the DNR-Wildlife & Heritage Division (WHD), Heritage and Biological Conservation Program (HBCP). Certain State permitting programs, such as the wetlands and hazardous waste discharge permit programs, require review of public development permit applications by the HBCP before public development is permitted. On private lands that are within State designated Critical Areas (i.e., Critical Habitat Protection Areas and Natural Heritage Areas), the County government regulates development with regards to rare species, and requests the HBCP to review private development permit applications. For private development permit applications that are outside of the State Critical Areas, there is no enforcement policy currently in place.

Stresses to RTE species populations arise from development, resulting in habitat loss/fragmentation and wetland/water quality degradation. Other stresses to RTE species populations include human disturbance (especially during the breeding and nesting season), illegal collecting, and road mortalities and noise pollution due to development.

### ***Results***

Consultation with the DNR-WHD has revealed that their Natural Heritage database has several records (both historical and recent) for State-listed RTE species within the SCEA boundary (see Correspondence – Chapter VII). Two active bald eagle nests are known to occur within the SCEA. The bald eagle has a State Status of Endangered, which means that the species is in danger of extinction throughout all or a substantial portion of its range, and a Federal Status of Threatened. One nest site is from 1992 and is along Indian Creek in Charles County, while the other is from 1998 and is along the Patuxent River near the mouth of Swanson Creek, also in Charles County. These two active nest sites are situated within DNR-designated Sensitive Areas (as described below in this section). Two rare plant records were also noted in the DNR-WHD correspondence. These were the Spurred Butterfly-pea (State Status = State Rare, which means



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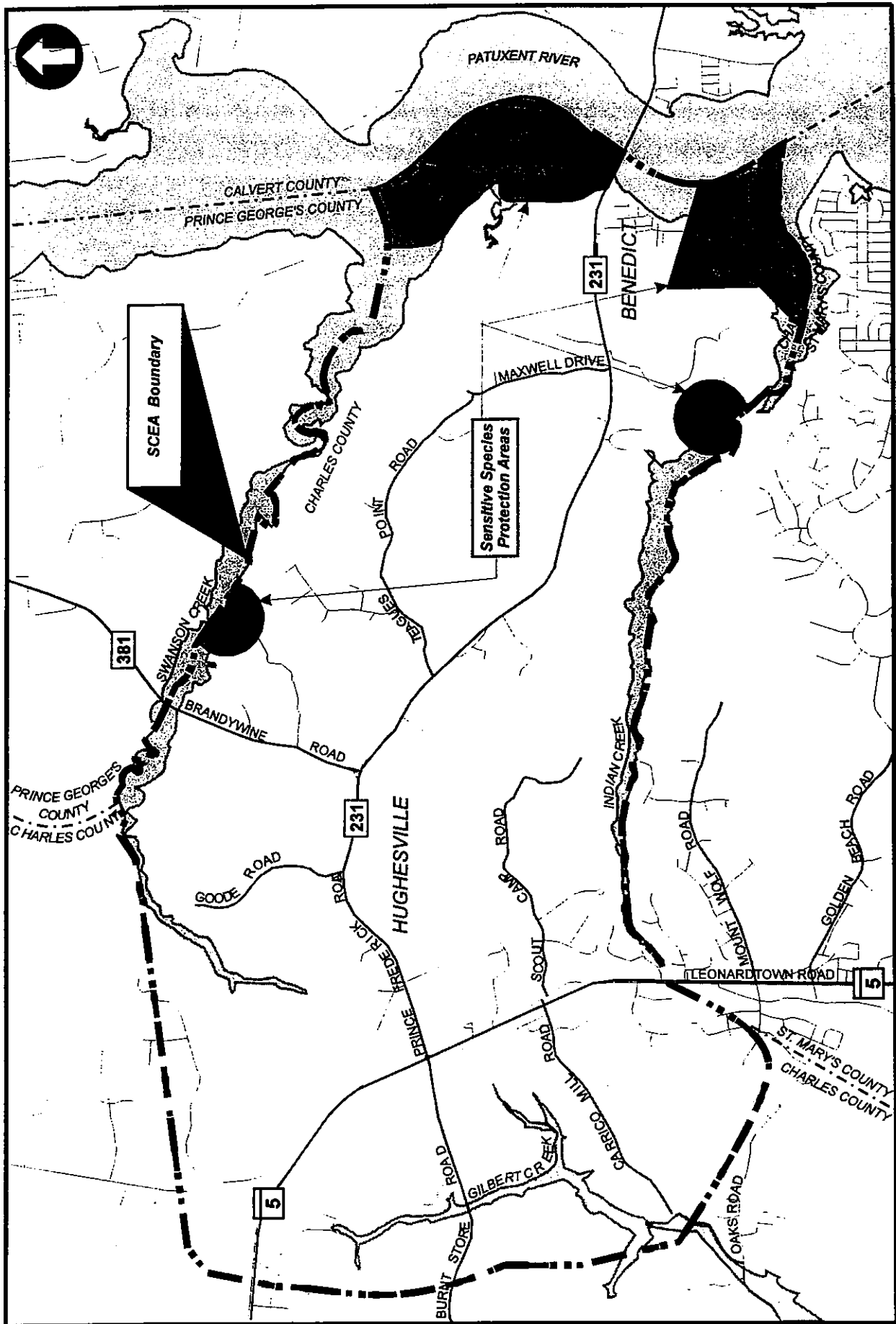
that it is imperiled in Maryland because of rarity or because of some factor making it vulnerable to becoming extirpated), and the Clasping-leaved pondweed (State Status = State Rare). The habitat requirements of the Spurred Butterfly-pea are sandy woods and fields (Fernald 1950). Clasping-leaved pondweed exists in aquatic/wetland habitats (Fernald 1950).

The DNR-Chesapeake and Coastal Watershed Service has indicated on their Charles County Sensitive Species Project Review Areas map (dated July 1997) that four sensitive areas, which primarily contain State-listed RTE species and/or substantial natural communities, are present within the SCEA boundary (*Figure V-9*). Two of the sensitive areas (one of which is an active bald eagle nest site) are along the Patuxent River at the easternmost limits of the SCEA. Another sensitive area (which also is an active bald eagle nest site) is approximately 160 acres in size (within the SCEA boundary) and is situated 4.5 miles south of Hughesville along Indian Creek. The fourth Sensitive Area is approximately 80 acres in size (within the SCEA boundary) and is situated 3 miles north of Hughesville on Swanson Creek. The four sensitive areas are not within or immediately adjacent to the MD 5 project impact area and, therefore, are not expected to be adversely affected (directly or indirectly) by the proposed MD 5 project. In addition, these areas are within an Agricultural Conservation District, and, development is discouraged in these areas.

The USFWS was contacted for information on Federally-listed rare species within or immediately adjacent to the SCEA. They revealed that several nesting territories of the Federally-threatened bald eagle occur within and adjacent to the eastern edge of the SCEA: 1) near the Patuxent River in southeastern Prince George's County and; 2) along the forested areas of the Patuxent River and Indian Creek south and west of Benedict in Charles County (see Correspondence - Chapter VII). These bald eagle sites are within two of the Sensitive Areas described in the previous paragraph (DNR-WHD September 1998).

Through analyzing BBS data, Vesper Sparrow (grassland species) was revealed as occurring within the SCEA. This species is on the list of Rare, Threatened and Endangered Animals of Maryland (DNR-WHD 1997). It is designated with a State Status of Watch List (Breeding), which means that its breeding population is rare to uncommon in the State and should be monitored. Other grassland and scrub/shrub species that are declining as breeders within the SCEA boundary include: Northern Bobwhite, Eastern Kingbird, Eastern Meadowlark, Yellow-breasted Chat, Eastern Towhee, and Grasshopper Sparrow. Although these species are not on the State's database list of RTE species, they are documented as becoming rare breeders within the SCEA, and in Maryland (BBS data 1966-1996, from the USGS-PWRC web page; and Robbins and Blom 1996).

**FIGURE V- 9**  
*Sensitive Species Protection Areas in SCEA Boundary*





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The primary reasons for the general decline in breeding populations of these grassland and scrub/shrub bird species within the SCEA boundary are from: 1) loss of grassland and scrub/shrub land habitat due to development (especially suburban sprawl); 2) changing agricultural practices; 3) loss of food sources (mainly insects) due to pesticide applications; 4) human disturbance (especially during the breeding and nesting season); and/or 5) Brown-headed Cowbird parasitism. Through overlaying the 1973 and 1994 LU/LC maps from MOP, it was determined that there was an overall net loss of about 479 acres of agricultural/grassland habitat within the SCEA. Loss of agricultural/grassland habitat has also been substantial in Maryland (USGS-PWRC web page-BBS Summary of Trends Data).

### ***Summary of Secondary and Cumulative Effects – Endangered and Threatened Species***

Although the proposed MD 5 project is not expected to have any direct effects on RTE species or their habitats (since none were recorded in the State or Federal databases within or immediately adjacent to the SCEA boundary), the cumulative effects of this highway project coupled with other highway or non-highway development projects would likely be that certain species of concern (i.e., FIDS, grassland birds, rare plants) would become even more rare, and especially vulnerable to extirpation, as their habitats continue to succumb to development and as new development continues to fragment forest habitat. Nesting territories for the bald eagle were documented within the SCEA boundary near the Patuxent River; therefore, the bald eagle breeding and foraging territory could be adversely affected by the cumulative effects of continued development, human disturbance and water quality degradation. However, the federal and state regulatory programs currently in place will ensure adequate protection of this species. Additionally, recent trends in the bald eagle population show an increasing or stable breeding population, due to the decline of pesticide use.

#### **f. Active Farmlands**

Readily available data used for the SCEA of active farmlands consisted of overlaying the 1973 and 1994 MOP land use maps to determine the amount of active farmland lost from 1973 to 1994. Projected future impacts were estimated based on proposed land uses in relation to existing active farmlands.

Active farmlands, for the purposes of this report, are lands with the Anderson Level I land use/land cover (LU/LC) classification of 2 (agricultural land), which may also include farmlands in fallow or meadow-like conditions (Anderson, et al. 1976).



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Protection of agricultural lands in Charles County is accomplished under two County-administered programs: The Maryland Agricultural Preservation Program and the Transfer of Development Rights (TDR) program. Charles County has participated in the State of Maryland's Agricultural Land Preservation Program since 1978. By forming an Agricultural Land Preservation District under the State program, a farmer agrees to maintain his property as a farm for at least five years with no agricultural development. In 1980 and 1989, Charles County passed a local Agricultural Land Preservation Ordinance that offers benefits to landowners who form a district under the State program. Enrollment as a district is not permanent protection, but is a first step. Benefits of enrollment include: eligibility to sell permanent easements; entitlement to a 100 percent local property tax credit; and eligibility to sell Transfer of Development Rights (CCPO-PGM 1997).

### *Results*

As of 1996, nearly 7,000 acres of agricultural lands within Charles County are enrolled in the land preservation district program, however, no approved agricultural land preservation districts are located within the SCEA. An easement property (Serenity Farms, Inc.) is located in the eastern portion of the SCEA. A property owner of an easement property sells property rights to the State to protect the land for agriculture (CCPO-PGM October 1998). The property owner is monetarily compensated for selling these rights; however, the owner has the right to buy back property rights after 25 years.

Agricultural policy in Charles County is dictated by two bodies: The Charles County Agricultural Land Preservation Board and the Agricultural Advisory Committee. The former, appointed by the County Commissioners, helps develop and recommends County policies and procedures on agricultural land preservation. The Agricultural Advisory Committee, composed of farmers, makes comments and recommendations to the County Commissioners.

The TDR program was adopted in 1992 as part of comprehensive rezoning. Under this program, development rights can be transferred from properties enrolled in Agricultural Land Preservation Districts to receiving areas in the Development District.

Stresses to active farmlands include development pressures, economic conditions and natural disasters. According to the Charles County Comprehensive Plan (1990) and the Census of Agriculture for Maryland (1987, 1998), in 1969 there were 738 farms in the County



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encompassing 106,662 acres (36% of County). In 1992, there were 496 farms, encompassing 59,389 acres (20% of County).

MOP's LU/LC maps (1973 and 1994) were used to calculate the total number of active farmlands for each time period within the SCEA, and to analyze the secondary and cumulative effects on this resource. Changes (i.e., net loss or gain) in the total number of active farmlands over this time period (1973 to 1994) were calculated through overlaying the 1973 map with the 1994 map.

There was an overall net loss of 480 acres of active farmlands (involving 15 tracts) during the 1973-1994 time period within the SCEA boundary; 7,034 acres (31% of SCEA boundary) of active farmlands in 1973 and 6,554 acres (28% of SCEA boundary) in 1994 (*Table V-21*). Tracts refer to contiguous areas of agricultural land and are not necessarily coincident with parcel ownership. The six percent loss of active farmland within the SCEA boundary over this 21-year period is not substantial.

**TABLE V-21**

*Agricultural Land Changes Within the SCEA Boundary Between 1973 and 1994*

Agricultural Land (within SCEA)	Total Area (in acres) (percent of SCEA)	Net Change (in acres) (percent change)
in 1973	7,034 (31%)	- 480 / 15 ** (-6%)
in 1994	6,554 (28%)	
converted to development/ or reverted to forest	730	
forest converted to agriculture	250	

**Source:**

Maryland Office of Planning's Land Use/Land Cover Maps (1973 and 1994), Scale: 1" = 1 mi.

**\*Note:** Tracts refer to contiguous areas of agricultural land and are not necessarily coincident with parcel ownership.

***Summary of Secondary and Cumulative Effects – Active Farmlands***

The MD 5 proposed project would directly affect from 1 to 2 acres of active farmland, depending on the build alternative selected. This is not substantial in terms of the overall viability of



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farming within the Hughesville region. The estimated potential agricultural land impact due to potential cumulative effects is 334 acres of existing (1994) agricultural land. This figure represents the maximum impact based on proposed development within the SCEA boundary.

### **g. Historic and Archeological Sites**

Cultural resources within the area of potential effect for the MD 5 Hughesville Transportation Improvement Project study area were identified and are documented in the Historic Resources Survey and Determination of Eligibility Report. Direct cultural resource impacts that would result from the MD 5 Hughesville Transportation Improvement Project vary according to the alternative.

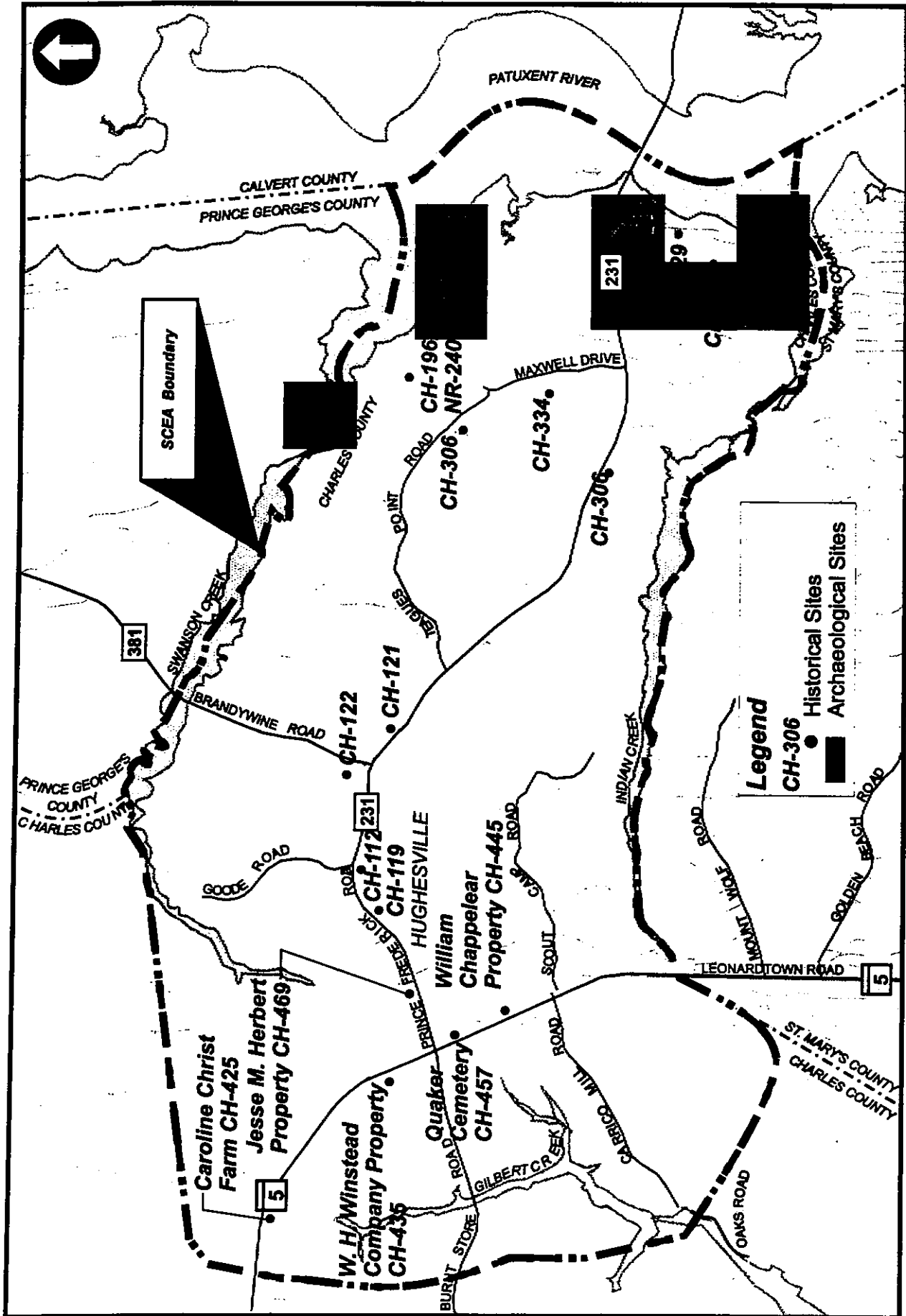
Digital data obtained from the DHCD Technology Toolbox was referenced to assess secondary and cumulative effects within the identified SCEA boundary (DHCD June 1998). The DHCD toolbox contains the location and attribute data for National Register of Historic Places, Maryland Inventory of Historic Properties and Maryland Archeological Sites. *Figure V-10* shows the location of these resources within the SCEA boundary and potentially eligible historic properties within the MD 5 Hughesville Transportation Improvement Project study area.

The MHT, Office of Preservation Review (DHCD-DHCP-MHT 1998) was contacted to determine availability of MHT records regarding the loss of historic or archaeology buildings/sites since 1972. According to MHT, no readily available records exist on the loss of historic/archaeology sites since 1972.

*Table V-22* lists all National Register and Maryland Inventory of Historic Places identified within the SCEA boundary. These sites were overlaid against the Valid Preliminary Subdivision Plan (CCPO-PGM August 1998) to determine potential cumulative impacts to historic places from all proposed development activities within the SCEA boundary.

Maryland archeological sites are inventoried and recorded by the MHT; however, exact locations of these sites are confidential and are protected from release under state law. The MHT uses a grid overlay that provides a general description to the location of archeological sites without identifying the exact location. Each cell is equal to a 121-acre area. All grids that contain known archeological sites were overlaid with proposed development plans (and compared to

**FIGURE V-10**  
*Historic and Archeological Sites In SCEA Boundary*





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TABLE V-22

National Register of Historic Places and Maryland Inventory of Historic Properties Secondary and Cumulative Impacts

Historic Resource	NR	MD	Classifier	Address	Zoned Area	Secondary Impact	Cumulative Impact
Old Fields Chapel		✓	CH-112	Prince Frederick Hughesville Rd. (231)	AC		
Herbert House		✓	CH-119	Prince Frederick Hughesville Rd. (231)	AC		
Benedict Road House		✓	CH-121	Prince Frederick Hughesville Rd. (231)	AC		
Patuxent City House		✓	CH-122	Brandywine Rd (MD 381)	AC		✓
Maxwell Hall	✓	✓	NR-240, CH-196	Teagues Point Rd	AC		
Benedict Hill House, site (Higdon House)		✓	CH-211	Center Street	AC		
Prior's Cleave (The Heights, Truman's Place)		✓	CH-225	Wilkerson Road	AC		
Benedict		✓	CH-229		RV, CV		✓
Hawkin's Log House		✓	CH-306	Teagues Point Rd	AC		✓
Dearbought		✓	CH-334	Teagues Point Rd	AC		✓
St. John AME Church		✓	CH-366	Prince Frederick Hughesville Rd. (231)	AC		
National Register Eligible Site (Identified through SEIS Historic Database)							
William Chappellear Property			CH-445	8780 Leonardtown Road	AC		✓
Quaker Cemetery			CH-457	NE Corner of Leonardtown Road and Lukes Lane	RV		✓
W.H. Winstead Company Inc. Property			CH-435	8275 Leonardtown Road	CV		✓
Jesse M. Herbert Property			CH-469	15610 Prince Frederick Road	AC		
Caroline Christ Farm			CH-425	7761 Leonardtown	AC		



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future land use/zoning) to determine potential secondary and cumulative impacts to archeological resources.

In addition to the cultural resources identified through the DHCD database, five resources within the area of potential affect for the MD 5 project study area were identified as National Register Eligible historic properties:

- William Chappelear Property (Ch-445)
- Quaker Cemetery (CH-457)
- W. H. Winstead Company Inc. Property (CH-435)
- Jesse M. Herbert Property (CH-469)
- Caroline Christ Farm (CH-425)

### ***Results***

#### **National Register Eligible Sites (identified through SHA's Historic Inventory)**

Alternative 5 would require right-of-way acquisition from the William Chappelear Property and would not require property acquisition from the other three resources. The MHT has concurred that Alternative 5 would have an adverse effect upon the NRE William G. Chappelear Property (CH-445). Alternative 2 would not require property acquisition from any of the National Register Eligible properties. The MHT determined that Alternative 2 would have an adverse effect upon three NRE properties including the W.H. Winstead Company, Inc. Property (CH-435), William G. Chappelear Property (CH-445) and Quaker Cemetery (CH-457) properties. In a letter dated March 3, 1999 (see correspondence in Chapter VII), the SHPO disagreed with SHA's effect determination for Alternative 2. The basis for this opinion was that each property would have their settings altered (36 CFR Part 800.9(a)), by the widening of MD 5 from four lanes to seven lanes. Should Alternative 2 be selected, further consultation will be undertaken on the assessment of effect in accordance with Section 106 of the National Historic Preservation Act. These three resources may therefore be subjected to cumulative impacts, depending on the alternative selected.

#### **National Register of Historic Places**

National Register of Historic Place listings are properties identified as significant consistent with Section 106 of the National Historic Preservation Act. In the State of Maryland, this listing is administered by the State Historic Preservation Office.



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Maxwell Hall (NR-240) is the only property on the National Register of Historic Places that falls within the SCEA. Based on the overlay analysis, it was determined that Maxwell Hall is located in an area zoned as Agricultural Conservation (AC). Based on the Charles County Subdivision Plan (CCPO-PGM August 1998), Maxwell Hall is not located in an area that is proposed for development, therefore, this site faces no imminent threat of secondary or cumulative impact.

### **Maryland Inventory of Historic Properties**

The Maryland Inventory of Historic Properties is a listing of historic structures, monuments, districts and other properties maintained by the MHT Office of Research, Survey and Registration. According to the DHCD Toolbox, 11 listings on the Maryland Inventory of Historic Properties fall within the SCEA boundary. These sites include:

- Old Fields Chapel (CH-112)
- Herbert House (CH-119)
- Benedict Road House (CH-121)
- Patuxent City House (CH-122)
- Maxwell Hall (also on National Register - NR-240) (CH-196)
- Benedict Hill House, site (Higdon House) (CH-211)
- Prior's Cleave (The Heights, Truman's Place) (CH-225)
- Benedict (CH-229)
- Hawkins' Log House (CH-306)
- Dearbought (CH-334)
- St. John AME Church (CH-366)

Portions of the Historic District of Benedict (in the eastern portion of SCEA boundary) fall within areas zoned as Village Residential (RV) and Village Commercial (CV). Potential cumulative impacts to these resources may occur due to the potential for development within RV and CV zoned areas. In addition to Benedict facing potential cumulative impacts, three other sites fall within areas identified as having final plat approval: Hawkins' Log House (CH-306); Dearbought (CH-334); and Patuxent City House (CH-122). Hawkins Log House and Dearbought both fall within the proposed subdivision, Benedict Plantation, which received final plat approval on March 20, 1989. Patuxent City House (CH-122) falls within the proposed subdivision, Murphy Section II, which received final plat approval on December 4, 1995. Due to the location of these sites within areas having final plat approval, these sites may suffer cumulative impacts.



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### **Maryland Archeological Sites**

A total of nine grids indicating the presence of archeological sites were identified within the SCEA boundary. These grids are grouped together in three primary clusters. The largest cluster of grids is located within Benedict, especially within the Patuxent River Natural Resource Management Area. The other two grid clusters are located in the extreme northeast section of the County, near the confluence of Swanson Creek and the Patuxent River.

Several grids fall within or near the historic district of Benedict, in RV or CV zoned areas. Due to development pressures typically within RV/CV zoned areas, these areas may be subjected to potential cumulative impacts. Based on an overlay with the Charles County Subdivision Plans, no grids were identified in areas having valid preliminary subdivision plans.

### ***Summary of Secondary and Cumulative Effects – Historic and Archeological Sites***

Past records (from 1972) on historic and archeology sites within the SCEA were not readily available, therefore, a trends analysis from the beginning of the SCEA time frame was not possible for these resources. Potential future cumulative effects on historic and archeological resources were assessed based on planned development within the SCEA boundary in relation to these resources.

To assess potential future impacts, an overlay analysis approach was used to determine if any of these resources are within areas proposed for planned development. Individual resources within areas planned for development or within areas zoned to potentially accommodate future development, it was assumed that potential cumulative impacts may occur. Using this methodology, it was determined that no National Register of Historic Places sites would suffer cumulative effects. It was also determined that four Maryland Inventory of Historic Properties sites fall within areas proposed for future development, and, these four sites may therefore suffer cumulative effects. Finally, several Maryland Archeological Site grids fall within the historic district of Benedict, in RV or CV zoned areas. Due to development pressures typically within RV/CV zoned areas, these areas may be subjected to potential cumulative impacts. No archeological grids were identified in areas having valid preliminary subdivision plans.