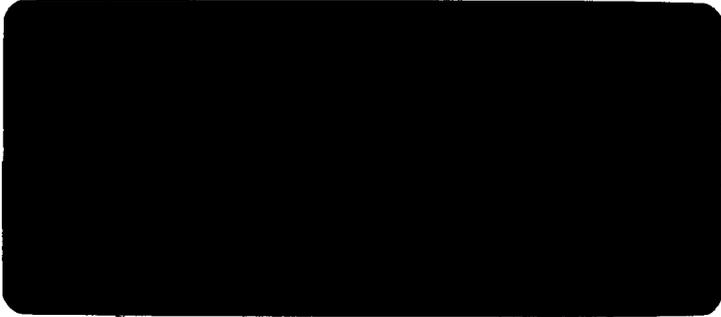


Hawaii Coastal Zone Management Program



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COASTAL RESOURCES
MANAGEMENT NEEDS ASSESSMENT
AND PROGRAM
FOR THE RICHMOND AREA

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Prepared by
The Staff of the Richmond
Regional Planning District Commission
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TABLE OF CONTENTS

	<u>Page</u>
I. INTRODUCTION	1
II. OVERVIEW	4
<u>Coastal Resources Management Program</u>	4
Background	4
Program Contents	5
Coastal Resources Policy	6
Grants To PDC's and Localities	7
<u>Chesapeake Bay Agreement</u>	9
Background	9
Contents of Agreement	11
III. REGIONAL GOALS	15
IV. COASTAL RESOURCE ISSUES	17
<u>Natural and Manmade Resources</u>	17
Surface Waters	17
Groundwater and Aquifers	23
Wetlands	30
Mining and Extraction Activities	35
Forestal Areas	39
Wildlife and Aquatic Life Habitat Areas	42
Scenic, Cultural and Historic Resources	47
<u>Natural Hazards</u>	50
Flood Hazard	50
Development Limiting Soils	54
<u>Riverfront Access for Recreation</u>	56
V. PRELIMINARY ASSESSMENT OF REGIONAL AND LOCAL PROGRAMS	60
<u>Environmental Parameters</u>	60
<u>Assessment of Regional Program</u>	61
Environmental and Development Information System	62
Planning and Policy Framework	63
Review and Coordination Framework	65
Budget and Manpower Resources	65

<u>Assessment of Local Programs</u>	66
Common Needs of Local Governments	67
Specific Local Needs	70
VI. IMPLEMENTATION PROGRAM	71
<u>Regional Program</u>	72
<u>Local Technical Assistance Program</u>	74
Principles	74
Technical Assistance Priorities	75

I. INTRODUCTION

Background

In May 1987, the Richmond Regional Planning District Commission was awarded a Coastal Resources Management Grant from the Virginia Council on the Environment (COE). This grant was part of an overall federal grant that the COE received from the National Oceanic and Atmospheric Administration, Office of Ocean and Coastal Resource Management under the Coastal Zone Management Act.

An element of the grant's work program is the initial assessment of the coastal resource management needs of the region and the preparation of an implementation program to address these needs. This document represents the preliminary results of this effort.

Purpose

The primary purposes of this report are: to provide a single source of background information on environmental parameters and programs related to the management and protection of coastal resources; and to present an implementation program which recommends actions for consideration by the RRPDC in addressing the coastal resource management needs of the region. These needs are based on an preliminary assessment of coastal resources recognized in the VCRMP as of particular or significant concern and the goals and objectives of the Chesapeake Bay Agreement.

The recommendations contained in the implementation program provide an initial framework upon which the RRPDC will be able to develop its annual regional and technical assistance work activities for the Virginia Coastal

Resources Management Program and the RRPDC's Work Program. The implementation program will enable the RRPDC to more effectively focus its limited resources on those coastal and Bay resource needs of most significance and help the staff in responding to technical assistance requests of local governments.

Scope

The basic study area of this report is limited by the geographic boundaries of the VCRMP, which includes only those jurisdictions bordering any tidally influenced river. Therefore the report covers all jurisdictions within Planning District 15, except for the counties of Goochland and Powhatan. (Even though these two jurisdictions were not included in this study, many of the recommendations of the report are also very germane to the proper conservation and management of natural and manmade resources within their borders.)

Although the VCRMP and Chesapeake Bay Agreement cover many different aspects of the problems and opportunities concerning the development and management of Virginia's coastal region and the Bay, the primary focus of this report is on the management of those land activities affecting natural resources. More specifically, the emphasis is on land and its interrelationship to the water quality of the region and Bay and on the protection, management, and proper use of environmentally significant lands.

Contents

This report is organized into six chapters including the Introduction. A brief background is given in Chapter II on the Virginia Coastal Resources Management Program (VCRMP) and the Chesapeake Bay Agreement. Those specific goals and policy statements from these programs relevant to this report, are identified.

Chapter III provides the basic policy framework for RRPDC's Coastal Resources Management Program. This framework sets forth the programmatic goals and objectives of the Program.

In Chapter IV, coastal resource issues are discussed in order to provide a background for assessment of regional and local programs. Each issue is described in a manner that is intended to educate the user of this report about the issue's significance, its relationship to other issues, and the programs and responsibilities of each level of government relating to the issue.

Specific environmental parameters are identified in Chapter V, which relate to the coastal resource issues discussed in the previous chapter. These parameters provide the benchmark upon which the RRPDC's and each local government's information, planning, policy, regulatory, and enforcement programs are preliminarily assessed to identify basic resource management needs.

The report concludes with recommendations for addressing the issues in Chapter IV, using the broad assessment of regional and local programs as its focus. The recommendations are grouped by regional and local levels.

II. OVERVIEW

To gain some insight into the initiatives for improved management and protection of Virginia's coastal resources, it would be helpful to have some familiarity with the Virginia Coastal Resources Program and the Chesapeake Bay Agreement. When related to other existing or environmental programs described in Chapter IV, these two programs represent a distinct commitment by the Commonwealth of Virginia to encourage and implement programs to enhance the protection of environmentally sensitive areas.

Coastal Resources Management Program

Background

In 1976, the U.S. Congress passed the Coastal Zone Management Act. The Act authorized a Federal grant-in-aid program to be administered by the Secretary of Commerce, who in turn delegated this responsibility to the National Oceanic and Atmospheric Administration, Office of Ocean and Coastal Resource Management.

The Coastal Zone Management Act (CZMA) 1972, as amended, is intended to encourage the effective and careful development of the nation's coastal areas by providing technical and monetary assistance to coastal states to voluntarily develop and implement management programs for their coastal areas. In order for states to be eligible for financial assistance and other incentives, they must develop a state management program meeting certain minimum federal requirements.

Virginia's initial participation in the Federal program came to an end in 1979, when the Federal government did not approve the State's management program after the General Assembly failed to approve a comprehensive state coastal zone management bill. In subsequent years, several bills were enacted (i.e., Primary Coastal Sand Dunes Act and non-vegetated wetlands statute) and a coastal management policy process was established by the Commonwealth, which led the State to seek Federal approval of its program.

In 1986, the Federal government approved the Virginia's Coastal Resources Management Program. The approved program generally relies on existing authorities and programs to implement its goals. The Council on the Environment, as lead agency, is to monitor all state actions which could affect coastal resources, and to resolve all conflicts between state agency decisions and the provisions of the Coastal Resources Management Program.¹

Program Contents

The Virginia Coastal Resources Management Program (VCRMP) consists of five major components. These components are: core regulatory program; geographic areas of concern; shorefront access planning; energy facility planning process; and shoreline mitigation planning. The areas of the Commonwealth within the scope of the Program are shown in Figure 1.

Core Regulatory Program. The central feature of the program is eight regulatory programs:

- o fisheries management
- o subaqueous lands management (beds of bays, oceans, rivers, streams, and creeks)
- o wetlands management
- o dunes management

¹ National Oceanic and Atmospheric Administration and Virginia Council on the Environment, Final Environmental Impact Statement and the Virginia Coastal Resources Management Program, July 1986.

- o nonpoint source pollution control
- o point source water pollution control
- o shoreline sanitation
- o air pollution

Geographic Areas of Concern. Where land and tidal waters meet, the VCRMP designates areas of special consideration in any planning and management process. The two categories of these special areas include:

1. Natural resource areas--wetlands, spawning, nursery, and feeding grounds, coastal primary sand dunes, barrier islands, significant wildlife habitats, significant public recreation areas, sand and gravel resources, and underwater historic sites.
2. Coastal natural hazard areas--highly erodible areas and coastal high hazard areas.

Shorefront Access Planning. The focus of this planning process is on access to the shorelines and access to use of the water.

Energy Facility Planning Process. This process involves the identifying energy facilities likely to locate in and significantly affect Virginia's coastal zone and assessing potential sites for such facilities.

Shoreline Erosion Mitigation Planning. Shoreline erosion mitigation planning addresses the need for continued assistance to public and private sectors in the form of erosion abatement programs.

Coastal Resources Policy

As part of Virginia's Coastal Resources Management Program, the Governor has directed State agencies to manage its programs in accordance with the following policies:²

1. Prevention of environmental pollution and protection of public health--protect and improve quality of coastal waters, reduce nonpoint pollution caused by inappropriate

² For a complete listing of goals and objectives, the reader is referred to Executive Order Number Thirteen, signed by Governor Gerald Baliles on June 23, 1986.

land uses and inadequate land use management practices, reduce damage from toxic and other hazardous materials, prevent deterioration of air quality, and protect public health from contaminated seafood.

2. Prevention of damage to natural resource base--protect tidal marshes, minimize damage to marine environment from alteration of subaqueous lands and aquatic vegetation, minimize disruption of finfish and shellfish population, reduce adverse effects of sedimentation on marine systems, and maintain areas of wildlife habitat and preserve endangered species.
3. Protection of public health and investment--conserve coastal dune systems, reduce or prevent losses of property caused by shorefront erosion, and minimize dangers to life and property from coastal flooding and storms.
4. Promotion of resources development--promote wise use of coastal resources for economic benefit of public, protect and maintain existing uses of estuarine waters for shellfish propagation and marketing, encourage provision of commercial and industrial access to coastal waters where appropriate, coordinate planning processes for major project, improve or maintain productive fisheries, encourage development of outer continental shelf energy reserves, and provide for extraction of mineral resources in an manner consistent with proper environmental practices.
5. Promotion of public recreation opportunities--provide and increase public recreational access to coastal waters and shorefront lands.
6. Promotion of efficient government operation--provide for shoreline permitting procedure which assures both adequate review and mitigation of probable impacts.
7. Provision of technical assistance and information--provide technical advise to public officials and private citizens on coastal resources, conduct continuing education programs on coastal resources, and maintain and improve data bases and maps supportive of decision makers' needs.

Grants To PDC's and Localities

The Council on the Environment has received two Coastal Zone Management grants from the National Oceanic and Atmospheric Administration. In the latest grant award (October 1, 1987 to September 30, 1987), the Council

provided each of the nine planning district commissions with a basic grant of \$40,000 (requires a 30 percent local match) and made approximately \$307,000 available to local governments in the form of discretionary, competitive grants.³ The remaining \$1.23 million of the grant went to support the Council's programs under the VCRMP, other related State programs, and required projects.

In future years, it is anticipated that the Council on the Environment (COE) will continue to disburse approximately 50 percent of the Coastal Zone Management funds to PDC's and local governments. However, Federal budget cutbacks are expected to cut the total amount of funds available to the Council on the Environment from \$1.9 million in FY 1988 to \$1.7 million in FY 1989. Furthermore, the local match requirements may be increased to 40 percent.

Basic PDC Grant Program. The basic grant program allows each PDC to develop its own program; however, the COE has required each PDC to concentrate on providing technical assistance to its local governments to improve their capabilities in addressing coastal resource management issues as affected by growth and development. Additionally, in the FY 1987 grant, the COE is requiring PDC's, including RRPDC, to evaluate regional and local comprehensive plans and development policies and procedures as related to growth management and protection of the coastal environment; and to assist the COE in gathering information on development guidelines for the Chesapeake Bay Agreement and

³ In January 1988, the Council on the Environment will announce which localities' applications for grants will be funded. It is the RRPDC's understanding that only 14 out of the 21 applications submitted will receive funding. Charles City County was the only locality that applied for funds in PDC 15.

working with local governments to incorporate development guidelines in the local planning and regulatory process.

Discretionary Grant Program. The discretionary grant program is intended to improve local planning capabilities in addressing coastal resource issues. In order of priority, the emphasis of these competitive grants is on providing land use development authority or plans in localities where none now exist; provide improvements to existing land development authority and plans where growth and development are greatest; provide shoreline access; provide for restoration or establishment of habitat areas; provide a mechanism for resolution of conflicts between shoreline property owners and others; develop coastal resource information and education programs; and conduct technical and legal studies related to the aforementioned categories.

Chesapeake Bay Agreement

Background

The U.S. Environmental Protection Agency (EPA) completed a seven-year, \$27 million study in 1983 which identified the specific pollution problems of the Chesapeake Bay. The concerns raised by this study resulted in the states of Maryland, Pennsylvania Virginia, the District of Columbia, Chesapeake Bay Commission and EPA signing an agreement initiating a unique, cooperative effort to save the Bay.

The first Chesapeake Bay Agreement was a rather broadly worded document which did not establish specific guidelines, strategies or timetables for each participant to follow. However it did result in the development of a "Restoration and Protection Plan" for the Bay that called for the reduction of pollutants such as toxic chemicals and nutrients.

The Agreement established the Chesapeake Executive Council, consisting of Cabinet secretaries or their equivalents of member jurisdictions and the EPA Region III Administrator. The Executive Council provides direction to the clean up efforts of the Bay. A Citizens Advisory Committee and a Scientific Advisory Committee have been formed to advise the Council and Chesapeake Bay Commission.

Virginia through its Chesapeake Bay Initiatives Program has implemented various programs to address the problems of excess phosphorus and nitrogen, toxic substances concentrated in bottom sediments of the Bay, and the decline of submerged aquatic vegetation. These programs may be grouped into seven areas: nonpoint source pollution control; point source pollution control; resource improvement; education; research; monitoring; and support.⁴

By 1985, the original Chesapeake Bay Agreement was coming under criticism for not establishing any goals for improvement of water quality. Although many projects were being conducted throughout the Bay region and new legislation adopted by individual participants (i.e., Virginia's Phosphate Ban in the 1987 General Assembly), the Chesapeake Bay Commission and other groups called for amendments to the existing agreement to set specific numerical goals and compliance schedules and to specify actions to achieve these goals.⁵

In response to this criticism and the recent availability of reliable technical information, a new draft agreement was drafted at the request of Governor Baliles in August 1987. This draft agreement was finalized and signed by the parties on December 15, 1987.

⁴ Virginia Council on the Environment, Virginia's Environment, March 1987.

⁵ Chesapeake Bay Commission, Annual Report to the General Assemblies of Pennsylvania, Maryland, and Virginia, 1986, p. 74.

Contents of Agreement

The Chesapeake Bay Agreement consists of goals and objectives for seven issue areas. For each area, specific priority commitments are identified. The implementation of actions to implement these commitments will largely rest with the individual parties to the Agreement.

The following is a synopsis of the issues and major policies and commitments contained in the Agreement:⁶

Living Resources. The goal is to "provide for the restoration and protection of living resources, their habitats, and ecological relationships." Some of the objectives are to protect, enhance, conserve, and/or restore submerged vegetation; tidal and non-tidal wetlands; coastal dunes and coastal and river shorelines; freshwater flows to the Bay; fin and shellfish populations; and waterfowl and wildlife.

Some priority commitments are:

- o To develop and adopt by January, 1988, guidelines for the protection of water quality and habitat conditions and use criteria as guidance in the implementation of water quality and habitat protect programs.
- o To develop and begin to implement by December, 1988, a Baywide policy for the protection of tidal and non-tidal wetlands.

Water Quality. The goal is to "reduce and control point and nonpoint sources of pollution to attain a water quality condition necessary to support the living resources of the Bay." The objectives address point and nonpoint source problems, some of the most significant include:

- o To reduce the discharge of untreated or inadequately treated sewage into Bay waters from such sources as combined sewer overflows and leaking sewer systems.

⁶ Chesapeake Executive Council, "1987 Chesapeake Bay Agreement," December 14, 1987.

- o To establish and enforce nutrient and conventional pollutant limitations to ensure compliance with water quality laws.
- o To reduce the levels of nonpoint sources of pollution.
- o To manage sewage sludge, dredged spoil and hazardous wastes to protect the Bay system.
- o To manage groundwater to protect the water quality of the Bay.
- o To reduce the discharge of metals and organics from sewage treatment plants and industrial sources.

The commitments to achieve this goal are very ambitious and include the following:

- o To develop, adopt, and begin implementation by July, 1988, of a basinwide strategy to achieve a 40 percent reduction by the year 2000 of nitrogen and phosphorus entering the main stem of the Chesapeake Bay and to re-evaluate this target level by December, 1991.
- o To develop and adopt by July, 1988, a basinwide implementation plan for the management and control of conventional pollutants entering the Chesapeake Bay system from point and nonpoint sources.⁷

Population Growth and Development. The goal for this category is "plan for and manage the adverse environmental effects of human population growth and land development in the Chesapeake Bay watershed." This issue is of critical concern to the Region and local governments, particularly since its implications for increased State involvement in land use planning and zoning are obvious.

To achieve this goal, the document puts forth the following objectives:

- o To provide local governments with financial and technical assistance to continue and expand their management efforts.

⁷ It is the staff's understanding that such a plan will be river basin specific in order to encourage and implement those controls which would be most cost-effective, depending on the nature and source of the pollutant.

- o To consult with local government representatives in the development of Chesapeake Bay restoration and protection plans and programs.
- o To identify and give public recognition to innovative and otherwise noteworthy examples of local government restoration and protection-related programs.
- o To promote among local and State governments and the Federal government, and the private sector, the use of innovative techniques to avoid and, where necessary, mitigate the adverse impacts of growth.
- o To encourage local governments to manage growth to minimize alteration and avoid degradation of the wetlands of the Bay system.

Two of the significant commitments called for in the agreement to achieve the goal and objectives are:

- o To adopt by January, 1989, development guidelines designed to reduce adverse impacts on water quality and living resources of the Bay and to cooperatively assist local governments in evaluating land use and development decisions within their purview.
- o To develop by December, 1988, a strategy to provide incentives, technical assistance and guidance to local governments to actively encourage them to incorporate protection of tidal and non-tidal wetlands and fragile natural areas in their land use planning, water and sewer planning, and other growth-related management processes.

Public Information and Education. This category has the following two goals:

- o Promote greater understanding among citizens about the Chesapeake Bay system, the problems facing it, and policies and programs designed to help it, and to foster individual responsibility and stewardship of the Bay's resources.
- o Provide increased opportunities for citizens to participate in decisions and programs affecting the Bay.

Specific objectives and commitments are called for in the document to implement these goals.

Public Access. The goal of this category is "promote increased opportunities for public appreciation and enjoyment of the Bay and its tributaries." Specific objectives and a commitment to action are also proposed.

Governance. The governance section has the following two goals:

- o Support and enhance a comprehensive, cooperative, and coordinated approach toward management of the Chesapeake Bay system.
- o Provide for continuity of management efforts and perpetuation of commitments necessary to ensure long-term results.

This section concludes with a series of objectives and commitments, most of which are related to the development and implementation of a coordinated Baywide monitoring, research, and data management system.

III. REGIONAL GOALS

In the preparation of the coastal resources management program, it is useful to define specific programmatic goals and objectives for the program. These goals and objectives form the broad policy direction for the program and will be used by the RRPDC in developing its annual work program.

Goals

The two goals of the Regional Coastal Resources Management Program are as follows:

- o An effective and ongoing regional coastal resources management program to support the goals of the Virginia Coastal Resources Management Program and Chesapeake Bay Agreement.
- o An ongoing technical assistance program to local governments which is responsive to meeting their responsibilities to protect, conserve, and wisely manage coastal resources.

Objectives

To achieve the aforementioned goals the RRPDC staff has established the following programmatic objectives:

- o To develop and adopt specific environmental and growth policies at the regional level with the involvement of local member governments that provide for the protection, management, and conservation of the region's land and water resources.
- o To improve the expertise, training, and sensitivity of the RRPDC staff in addressing environmental issues.
- o To educate and train the RRPDC and local staffs concerning environmental regulations and permitting procedures.
- o To expand the environmental and development information, mapping, and monitoring capabilities of the RRPDC with particular emphasis on computer applications.

- o To educate decision makers and the public about critical regional environmental issues related to coastal and Bay resources.
- o To provide technical assistance to local governments, upon request, to meet specific planning and environmental management needs.
- o To prepare model ordinances and policy briefing or technical background papers on environmental and coastal resource issues for use by local government officials within the region.
- o To provide technical assistance to local government staffs in the review of development proposals and preparation of specific plans and ordinances related to coastal and environmental resource issues.
- o To assist local governments in the expansion of their environmental and development information, mapping, and monitoring capabilities.
- o To assist local governments in the preparation of Coastal Resource Management Grants upon request.

IV. COASTAL RESOURCE ISSUES

This Chapter provides general background information on coastal resource issues with little emphasis on specific issues and problems in the Richmond Region, which will be accomplished at a later date. It is intended to provide the reader with a working knowledge of the relationship of development to coastal resources and the responsibilities and programs of various levels of government in managing, protecting, and conserving these resources.

Before discussing coastal resources, it should be pointed out that little attention is given to comprehensive planning, capital improvements planning and programming, zoning, and subdivision ordinances under the subsections on local programs and responsibilities. This oversight was intentional.

Although these tools are important and should be considered by local governments in addressing coastal resource issues, it was believed that it would be redundant to continue mentioning their availability without specifics on their usage. As previously mentioned, a major element of the RRPDC's FY 1987-88 Coastal Resources will be to assess the local planning, policy-making and regulatory process as to how well they address environmental concerns.

Natural and Manmade Resources

Surface Waters

Background Description. Virginia has been described as "water rich" in that its average annual rainfall produces an abundance of free-flowing waters.

There are 976 square miles of surface waters including lakes, tidal rivers and bays, and more than 3,000 miles of non-tidal rivers and streams.⁸

Surface waters contribute positive benefits to the economy and quality of life. They are used for drinking, waste treatment, industrial processes, hydropower, agricultural irrigation, groundwater recharge, wildlife habitats, transportation, and recreation. Surface waters support a vibrant commercial fishing industry in the State that is centered on the Chesapeake Bay and its tributaries.

The Richmond Region is inextricably tied to the Chesapeake Bay. The Bay, together with its tributary arms, forms a huge and complex estuarine system. The Region lies within two major tributary basins of the Chesapeake Bay, the York River and James River basins. Significant tributaries within the Region are the Pamunkey, Chickahominy, James and Appomattox rivers in the James and York River basins.

The average freshwater flow of the James River is 10,940 cubic feet per second (cfs), and the average for the York is 2,660 cfs. Together they account for 17 percent of the total freshwater inflow in the entire Chesapeake Bay drainage basin.⁹

The principal rivers within the Region, such as the James, are coming under increased competition for in-stream use and off-stream consumption of surface water. The James and Appomattox rivers have water quality problems such as nutrient enrichment, contributing to high algal activity and wide fluctuations in dissolved oxygen levels. Furthermore the combined sewer

⁸Virginia's Environment, 1984-86 Biennial Report, Council on the Environment, March 1987.

⁹U.S. Army Corps of Engineers Baltimore District, Chesapeake Bay Low Freshwater Inflow Study, Appendix C-Hydrology, September 1984.

system of the City of Richmond contributes untreated waste to rivers during major storm events.

Many manmade activities in the Region affect the quantity and quality of surface waters. The impounding of surface waters can affect water quality by reducing freshwater inflow and increasing salinity downstream, changing downstream aquatic habitats. Water impoundments or rivers may be diverted to other basins outside. Once removed from this area, enough water may not be available for other users both off-stream and in-stream. This problem may limit future economic growth.

Point source discharges from municipal and industrial waste treatment plants introduce "conventional" and toxic pollutants to surface waters. The effect of nutrients (nitrogen and phosphorus) from municipal sewage treatment plans (STP) has received considerable attention recently. This has resulted in a statewide ban on the sale of detergents containing phosphates (effective January 1, 1988). The requirement for removal of nutrients at major STP's through conventional or newer biological treatment processes is under intense consideration by the Commonwealth to meet goals of the Chesapeake Bay Agreements and proposed nutrient standards for Virginia's rivers.

The contamination of surface waters from nonpoint sources is receiving increased attention. Stormwater runoff from agricultural and urban areas are known to contain silt and sediments, nutrients, pesticides, heavy metals, toxics, and manmade trash and debris.

Another pollution source is contamination by airborne particulates. The increased attention given to effects of acid rain is an example of addressing this problem.

Shoreline erosion is a serious problem affecting our waterways. The construction of buildings, parking lots, and roadways has resulted in the increased rapid runoff of stormwater which is channeled into streams and creeks causing scouring and erosion. Careless development along waterways has stripped the shoreline of its natural ability to resist erosion resulting in the construction of expensive artificial structures that aren't always effective.

Federal Programs and Responsibilities. The authority of the federal government for the protection of surface waters is derived from the Clean Water Act (CWA). The Environmental Protection Agency (EPA) is the lead agency charged with the implementation of the CWA, but other federal agencies such as the U.S. Army Corps of Engineers (COE), the U.S. Fish and Wildlife Service (FWS), among others and the State play significant roles.

Applicable sections of the CWA include:

1. Section 402 National Pollution Discharge Elimination System (NPDES)--requires a federal permit for the discharge of any pollutant or combination of pollutants. The discharge must meet the requirements of the CWA as outlined in other sections of the Act. A state may take responsibility for the implementation of the program (as is the case in Virginia) with the EPA exercising general oversight responsibility.
2. Section 404 Permits for Dredged or Fill Material--requires a permit from the COE for projects that result in the discharge of dredge or fill material into the waters of the United States. The term 'waters of the U.S.' has been defined to mean virtually any water body imaginable, from territorial seas to wetlands, to intermittent streams and low depressions that may occasionally contain water. A permit application is evaluated based on the projected benefits and disbenefits for the following areas; fish and wildlife; conservation; economics, aesthetics, historic values; navigation; land use; recreation; flood damage protection; water quality; water supply; and general needs

and welfare.¹⁰ The corps reviews permit applications in cooperation with the:

- o U.S Fish and Wildlife Service;
- o U.S. Environmental Protection Agency;
- o National Marine Fisheries; and
- o Marine Resources Commission.

In addition, the Federal government affects water supply through U.S. Corps of Engineer's flood protection and water resource projects. However, its major influence on water allocation issues is its permitting authority under Section 404 of the Clean Water Act. This authority gives the Federal government direct involvement in the approval process for any new dam and water supply facility.

State Programs and Responsibilities. In the Commonwealth water allocation is accomplished through the self-administering riparian doctrine. The riparian doctrine is a set of legal principles followed by State courts for ruling on conflicts concerning water rights. The State does not have a policy directly affecting water allocation, although it is currently investigating the establishment of minimum in-stream flow policy which will affect allocation issues. However, the various State agencies and programs aimed at protecting water quality have an indirect affect on water quantity.

For surface waters, the primary State role is the protection of water quality, which is the responsibility of the VWCB. The Board establishes water quality standards, issues wastewater discharge permits and certificates, adopts regulations, and requires compliance.¹¹ Approval of NPDES permits is also required of the Virginia Department of Health (DOH).

¹⁰U.S. Army Corps of Engineers, Water Resources Development Projects in Virginia, 1985.

¹¹The State's water quality program derives primarily from EPA's delegation of authority to the VWCB under the Clean Water Act.

Section 401 Certification of the Clean Water Act calls for the certification, by the State, of any project requiring a federal permit that involves the construction or operation of a facility which results in any discharge to navigable waters. COE permits and Federal Energy Regulatory (FERC) permits require 401 certification.

No-discharge permits are issued under another program administered by the VWCB. These permits are issued to any operation that stores or uses substances that could pollute the waters of the Commonwealth, but are not discharged under normal circumstances.

The Department of Conservation and Historic Resources (DCHR) has the authority to control erosion and sedimentation through the 1973 Virginia Erosion and Sediment Control Laws. This authority applies to land disturbing activities with the exception of agricultural activities. Actual implementation and enforcement of this Law is carried out by local governments.

Other programs affecting land use activities that can affect surface water quality are administered by the Marine Resources Commission (VMRC) and the Department of Waste Management (DWM). VMRC is responsible for permitting activities affecting subaqueous land and tidal wetlands such as pier or bulkhead construction. DWM is responsible for permitting solid waste facilities, hazardous waste treatment, storage, and disposal facilities.

In addition to these regulatory programs, a number of other Statewide programs make contributions to improving water quality:

- o Agricultural Best Management Practices Program
- o Urban Nonpoint Source Pollution Control Program
- o Shoreline Residential Sanitation Program/
Shellfish Enhancement Task Force
- o Chlorine Discharge Control Program
- o Infiltration and Inflow Renovation Program

- o Pilot Nutrient Removal
- o Chesapeake Bay Pilot Toxics Strategy
- o James River Water Quality Monitoring Program
- o Virginia Resources Authority
- o Virginia Water Facilities Revolving Loan Fund
- o Acid Rain Deposition Program¹²

Local Programs and Responsibilities. Localities have a great impact on the quality and even quantity of surface water through planning and local development controls. In particular, the use of stormwater management strategies and regulatory tools, such as stormwater detention and erosion and sediment control ordinances, can be used to reduce the quality of stormwater runoff caused by development and other land disturbing activities.¹³ The reduction in stormwater runoff, combined with land use strategies and development practices (Best Management Practice) can ameliorate the increased pollutant loadings to water bodies caused by development.

Furthermore, localities are responsible for provision of public water and wastewater services which obviously have a direct impact on surface water quality and quantity. Localities may also affect the availability of water through conservation programs and development of reservoirs. They have a significant role in affecting major water allocation projects within their boundaries.

Groundwater and Aquifers

Background Description. Groundwater is a vast natural resource that is of great economic importance. Contrary to popular belief that it can be found as underground rivers or lakes, groundwater is actually the water that fills

¹²Virginia Council on the Environment, Development of Virginia River Policy, 1987.

¹³However, according to a 1984 Attorney General's opinion, the existing Erosion and Sedimentation Law does not provide authority for local governments to address water quality concerns, except for sedimentation.

the cracks and pore spaces in rocks and sediments. Groundwater occurs in many types of geologic formations. Those formations that store, transmit, and yield water in an economically useful amount are known as aquifers.

Groundwater is an essential part of the hydrologic cycle or the circulation of water between the oceans, atmosphere, and land. Groundwater makes up approximately 4 percent of the water in the cycle.¹⁴ The volume of groundwater in storage is greater than the volume of fresh surface water combined in lakes, streams, and rivers.¹⁵ Groundwater contributes approximately 30 percent of the flow of surface streams in the United States.¹⁶

Virginia is divided into five physiographic provinces or regions with each having its own geologic structure, climate, and characteristic set of landforms. The two regions which have the greatest impact on the Chesapeake Bay system are the Coastal Plain, which extends from the Atlantic Coast to the fall line, and the Piedmont which extends from the fall line to the Blue Ridge Mountains.

About half of the groundwater used in the Commonwealth is withdrawn in the Coastal Plain Region, which covers approximately half of the Richmond Region.¹⁷ Three trillion gallons of recoverable water have been estimated to exist in the Coastal Plain aquifers.¹⁸

¹⁴Veronica I. Pye and Ruth Patrick, "Groundwater Contamination in the United States," Science, August 1983, 22:713-718.

¹⁵Ibid.

¹⁶Torsten Sponenberg and Jacob Kahn, "A Groundwater Primer for Virginians," Virginia Water Resources Research Center, 1984.

¹⁷Ibid.

¹⁸Ibid.

Water quality of the Coastal Plain aquifers is good, except in those areas close to the Bay, where saltwater zones occur and where overuse has resulted in saltwater intrusion. The geology (mainly unconsolidated sand) and population density in this region make contamination of the groundwater potentially high.¹⁹

Although the Piedmont Region is the largest physiographic region in the Commonwealth, its groundwater yields are limited due to the absence of unconsolidated deposits to allow precipitation to recharge aquifers. Subsurface geologic features also account for the wide variation of groundwater quality in this region.

Water quality problems caused by the geologic features include hardness, high dissolved solids, alkalinity, and high concentrations of sulfate. However, these geologic features reduce dramatically the potential for groundwater contamination from external sources.

Approximately 80 percent of Virginians used groundwater for a part of their everyday needs in 1980, compared to only 20 percent in the Region.²⁰ Virginians withdrew 370 millions gallons per day of groundwater in 1980.²¹ The distribution of those groundwater uses were as follows: 39 percent rural, 30 percent public supply, 29 percent industrial, 2 percent irrigation, and 1 percent thermoelectric.²²

¹⁹Virginia's Groundwater Protection Steering Committee, Virginia's Groundwater Protection Strategy, 1987.

²⁰RRPDC, Regional Water Needs Assessment, 1986.

²¹Margaret Hrezo and Pat Nickinson, "Protecting Virginia's Groundwater," Virginia Water Resources Research Center, November 1986.

²²Ibid.

The degradation of the natural quality of groundwater is called contamination. Most of the problems encountered in groundwater contamination occur due to waste materials and by-products from manmade products and man's waste disposal practices.

The wastes and by-products are often disposed of at landfills may leach out to underlying groundwater without proper landfill management, siting procedures, or construction methods. Other sources of groundwater contamination include spills or leaks; mine drainage; saltwater intrusion; water, oil, gas wells and surface water infiltration; agricultural and urban runoff; highway deicing and salts; and atmospheric contaminants.²³

The use of groundwater in the Commonwealth is expected to increase as the development potential of additional surface water supplies are limited by high construction costs, increased competition for streamflow, loss of good reservoir sites, and opposition to impoundments.

In many instances, groundwater may be the only choice a locality has to meet its water needs. If the Commonwealth is going to increase its reliance on groundwater, to meet its future needs, then both its quantity and quality must be maintained.

Federal Programs and Responsibilities. Federal laws, enacted to address primarily other environmental problems have been applied to groundwater. These laws include the Clean Water Act, the Safe Drinking Water Act, the Resource Conservation and Recovery Act (RCRA), the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), the Federal

²³U.S. Environmental Protection Agency, "The Report to Congress: Waste Disposal Practices and Their Effects on Groundwater," 1977.

Insecticide, Fungicide and Rodenticide Act (FIFRA), and the Toxic Substances Control Act (TSCA).

1. Clean Water Act of 1972--This act granted the Environmental Protection Agency (EPA) the authority to protect both surface water and groundwater; however, EPA has refrained from applying it to groundwater.²⁴
2. Safe Drinking Water Act--This act, containing several sections that can be applied to groundwater, established:
 - o maximum contamination levels for public drinking water supplies;
 - o the Underground Injection Control Program regulating permits for the disposal and monitoring of toxic wastes by underground injection; and
 - o the Sole Source Aquifer Program allowing an aquifer to be designated as the only source of a public drinking water supply.
3. Resource Conservation and Recovery Act--This act established guidelines for the management of solid and hazardous wastes including their treatment, storage and disposal. It also established the monitoring regulations of landfills and disposal sites to prevent and detect leaching which can lead to groundwater contamination.
4. Comprehensive Environmental Response, Compensation and Liability Act--CERCLA or "Superfund" authorizes the federal government to cleanup abandoned waste dumps and spill sites, many of which pose a threat of contamination to groundwater. One of CERCLA's primary concerns is to prevent toxics from these sites from leaching into the groundwater.
5. Federal Insecticide, Fungicide and Rodenticide Act--FIFRA provides control over the storage and use of pesticides, and requires that pesticide manufacturers study the long-term environmental problems, including groundwater contamination, associated with their products.
6. Toxic Substances Control Act--TSCA provides several controls over the manufacture, processing and use of existing and new chemicals that may present unreasonable risk to the environment or enter the environment in substantial quantities. In evaluating the chemicals, its

²⁴Mosher, loc. cit.

potential for groundwater contamination must be considered.

In 1984, EPA established its groundwater protection strategy. The strategy calls for the primary responsibility of protecting groundwater to be with to the states. The strategy led to the establishment of the Leaking Underground Storage Tank Program and called for a ban on the use of pesticides above aquifers used for drinking water, the division of groundwater into three classes of protection, and the abandonment of severely polluted aquifers not economically worth cleaning up under the superfund statute.

State Programs and Responsibilities. The Virginia Constitution provides the foundation of the legal authority to protect groundwater in the Commonwealth. Article XI of the Constitution states that it is the policy of the Commonwealth "to protect its atmosphere, lands, and waters, from pollution, impairment, or destruction, for the benefit, enjoyment, and general welfare of the citizens of the Commonwealth."²⁵ But as with federal regulations, most Commonwealth's regulations to protect groundwater were not established with that sole purpose in mind.

Regulations to protect groundwater fall into three categories: (1) deals with specific sources of pollution such as waste disposal sites and septic tanks; (2) establishes up and enforces water quality standards for aquifers; and, (3) regulates the use of land above critical aquifer recharge areas.²⁶

In the Commonwealth of Virginia, no single comprehensive law directly groundwater, or a State agency with sole responsibility for groundwater.

²⁵Sponenberg and Kahn, loc. cit.

²⁶Lawrence Mosher, "Polluted Groundwater Clearly a Problem But Few Agree on Extent or Solution," National Journal, 1984, 16:223-225.

1. Department of Waste Management--The Department of Waste Management is authorized under the Virginia Code to protect groundwater in several instances:

- o prohibition of underground injection of hazardous wastes;
- o monitoring groundwater in the facility of hazardous waste facilities to detect the presence of hazardous substances;
- o establishing a groundwater protection standard for a specific facility if groundwater contamination is detected;
- o ensuring that the groundwater standard is not exceeded by monitoring the facilities compliance; and
- o taking corrective action against an individual or facility if the groundwater protection standard is exceeded.²⁷

2. Virginia State Water Control Board (VWCB)--The VWCB's authority to protect groundwater is contained in the following laws or acts; however, the VWCB has recently adopted a groundwater protection strategy to address contamination and depletion problems.

a. Groundwater Act of 1973--This act protects groundwater quantity. The act authorizes the VWCB to declare an area to be a groundwater management area if the following conditions are met:

- o groundwater levels in the area are declining;
- o wells in the area interfere with each other; and
- o the available groundwater supply is overdrawn or polluted.²⁸

Two areas of the Commonwealth declared groundwater management areas are the

²⁷Virginia Council on the Environment, loc. cit.

²⁸Torsten D. Sponenberg and Jacob Kahn, "A Groundwater Primer for Virginians," Virginia Water Resources Research Center, 1984.

Eastern Shore of Virginia and the Southeastern Tidewater area.

- b. State Water Control Law--This act provides an anti-degradation policy concerning State waters including all surface and groundwaters.
- c. Virginia Oil and Gas Act--This act protects groundwater by calling for the prevention of contamination or pollution of State waters by oil, gas, or saltwater during the development of oil and gas resources.
- d. Virginia Department of Health--The Department is directly involved in protecting groundwater quality through its permitting system for landfills, on-site septic systems, and disposal of waste sludge. It is also responsible for regulating and inspecting well systems for water supply.

Local Programs and Responsibilities. Although the Virginia Code does specifically provide authority for protection of groundwater to local governments, several tools in addition to land use planning and development ordinances are available. Probably the most significant are the construction of central public utilities to direct growth and protect groundwater from depletion and contamination that may result from on-site water withdrawal and wastewater treatment. The use of mandatory tap-on connections for water and sewer aid greatly in the implementation of such a utilities strategy.

Wetlands

Background Description. In the past, wetlands were seen as foul, unproductive, and useless land. As a result, wetlands were drained and filled in order to bring them into uses considered desirable to man.

Recently, the importance of wetlands has been recognized. In an attempt to protect the Country's remaining wetlands, the federal government has passed laws and regulations to achieve that end. In addition, the Commonwealth

developed the Virginia Wetlands Act in 1972, setting up the regulation of activities occurring in tidal wetlands.

The U.S. Army Corps of Engineers defines wetlands as follows:

The term "wetlands" means those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs and similar areas.²⁹

Wetlands are not always isolated ecosystems, many are associated with the shallow water zones of rivers, lakes, and ponds. In general, wetlands are defined by the predominance of "hydrophytes" (plants adapted for life in wet soils) and the presence of "hydric soils" (saturated or periodically flooded soils).³⁰

Wetlands can be divided into two broad types: (1) tidal wetlands and (2) non-tidal wetlands.

Tidal wetlands are those whose water levels change with the lunar tides. They can be characterized further as being saline or freshwater, which is determined by the distance they are from seawater and the amount of freshwater inflow entering the system.

Non-tidal wetlands are separated from the influence of tides. They are normally freshwater and are many times found in the 100 year floodplain.

Tidal wetlands (freshwater and saline) and non-tidal wetlands can be further broken down into community types. These types are submerged aquatic vegetation, non-vegetated, emergent, scrub-shrub, and forested wetlands.

²⁹Code of Federal Regulations, 33 CFR, Section 323.2, 7-1-86 edition.

³⁰Ralph W. Tiner, Jr., Mid-Atlantic Wetlands A Disappearing Natural Treasure, U.S. Fish and Wildlife Service, June 1987.

As previously mentioned, the value of wetlands have been recognized only recently. Wetlands provide fish and wildlife habitat. They are the primary habitat for wood ducks and muskrat among others. Wetlands provide food and cover for many birds, fish and mammals. Many important commercial and game fish use wetlands as their spawning grounds.

Wetlands improve water quality. They do this in several ways: (1) removing and retaining nutrients; (2) processing chemical and organic wastes; and, (3) reducing sediment loads to receiving waters.³¹ In this way wetlands serve as natural nonpoint source pollution filters.

Wetlands are able to absorb the flow of flood waters and reduce flood damage. Wetlands act as holding areas for excess water, releasing water slowly. This characteristic acts to slow the velocity of flood waters and reduces damage caused by erosion. This can be especially valuable in urban and agricultural areas.

Shoreline erosion is reduced in wetland areas. Wetland plants serve to anchor soil down with the intricate webbing of their root system. Water velocities are decreased and wave action is dampened. The planting of wetland vegetation along shorelines is a useful tool to prevent shoreline erosion.

Groundwater discharge and recharge are associated with wetlands. The discharge of groundwater through wetlands is important in maintaining streamflow and the overall health of a waterway. Groundwater recharge is not well documented and the amount of recharge is not well-known. It is thought that this process occurs mainly in upland areas.

Wetland plants make nutrients available to other organisms. Nutrients are taken up by plants and are consumed when the plants are eaten. Algae,

³¹Ibid.

bacteria and aquatic invertebrates consume nutrients and then themselves are consumed, which is an important link in the food chain.

Wetlands are used recreationally for hunting, fishing and boating. The public's perception of wetlands as ugly eyesores has change and many people visit wetlands to observe their exceptional natural beauty. In 1980 alone, according to the U.S. Departments of Commerce and Interior, 28.8 million people visited wetlands to observe, feed or photograph wildlife.³²

In Virginia, wetlands are distributed throughout five physiographic Regions: the Coastal Zone, Lower Coastal Plain, Upper Coastal Plan, Piedmont, and Appalachian Highlands.

The Richmond Region lies within portions of the Coastal Zone, and the upper and lower Coastal Plan. Together these physiographic provinces contain 72 percent of the Commonwealth wetlands. Typical wetland types in the region include: coastal marches, tidal flats/beaches, inland emergent wetlands, inland shrub wetlands, inland forested wetlands, and freshwater ponds.

Between 1956 and 1977, over 63,000 acres (6 percent of total) of Virginia's coastal wetlands and inland vegetated wetlands were lost. Inland forested wetlands were most threatened, experiencing a 9 percent loss in 21 years. Inland vegetated wetland loss was greatest in the Lower Coastal Plain Region where about 14 percent of these wetlands were destroyed. Losses in this region accounted for 80 percent of the State's inland vegetated wetland losses.³³

³²Conserving Air Wetland Resources: Avenues for Citizen Participation, Chesapeake Bay Foundation, 1987.

³³Ibid.

Inland vegetated wetland losses resulted primarily from agricultural activities (40%). Activities such as dredging and channelization for navigation and flood protection, sand and gravel mining, and others were responsible for 27 percent of the loss. The creation of lakes and ponds accounted for 25 percent and urbanization caused a 3 percent loss in this type of wetland.

In contrast, coastal wetland losses were caused mostly by urban development (43%), followed by a 36 percent loss due to natural causes such as erosion, hurricanes, natural succession from one wetland type to another and the natural rise in sea level. Agricultural activities, the creation of ponds and other factors made up 21 percent of the losses.

Federal Programs and Responsibilities. The Clean Water Act's definition of a wetland describes virtually every wetland type that may be subject to protection. Regardless, many activities can occur in wetlands that are exempted from regulation. Other regulations described below also fall short of desired goals for various other reasons.

1. Section 10, Rivers and Harbors Act of 1899--gives the U.S. Army Corps of Engineers (COE) the authority to regulate dredge and fill operations in "navigable waters" of the U.S. including adjacent wetlands.
2. Section 404 of the Clean Water Act (CWA)--authorizes COE to regulate dredge and fill operations in the "waters of the U.S." which is defined to include all wetlands. The Environmental Protection Agency (EPA) has veto power over the COE when a project does not meet certain guidelines.
3. National Environmental Policy Act (NEPA)--requires on environmental impact statement (EIS) for all federal or federally assisted projects including permits with significant environmental impacts.
4. Executive Order 11990 on the Protection of Wetlands--requires projects using federal funds to avoid impacts on wetlands. Addressed through EPA review of NEPA EIS.

5. 1985 Farm Bill: "Swamp Buster" Provision--withholds federal assistance to farmers who attempt to convert wetlands to farm production.
6. Federal Aid to Wildlife Restoration Act--provides grants to states for the acquisition, restoration, and maintenance of wildlife areas.
7. Fish and Wildlife Coordination Act--Grants authority for U.S. Fish and Wildlife Service review of projects requiring a federal license or permit.

State Programs and Regulations.

1. The Virginia Wetlands Act of 1972--administered by the Virginia Marine Resources Commission (VMRC). Protects tidal wetlands by requiring a permit for activities affecting them (see Local Programs and Regulations). Non-tidal wetlands are not covered by this Act; however, the Chesapeake Bay Agreement calls for regulations to protect these sensitive areas, and a non-tidal wetlands bill is to be introduced in the 1988 General Assembly Session.
2. Virginia Water Control Board (VWCB) Wetlands Policy--intended to recognize the importance of wetlands by giving them due consideration in the issuance of 401 certificates and 402 permits (see Surface Waters).

Local Programs and Regulations. The Virginia Wetlands Act of 1972 authorizes localities to establish local wetlands boards to issue permits for activities in tidal wetlands. It authorizes the development of wetlands zoning ordinances by those boards. The VMRC issues permits for localities without wetlands boards and has general administrative authority over the program. (At this time only Charles City County and New Kent County have wetlands boards in the Region.)

Mining and Extraction Activities

Background Description. Mining activities have contributed greatly to the welfare and economic progress of the Commonwealth. Colonial settlers at Jamestown established a glass industry and soon thereafter iron was being

produced. Since that time the extraction of many other minerals has taken place for the production of numerous items.

Production of industrial minerals in Virginia is a multimillion-dollar-a-year industry was valued at about \$289,344,000 in 1983.³⁴

Minerals are usually extracted from quarries and pits. Although this may be the most efficient and sometimes the only way to extract certain minerals, it is not without problems. To begin with, quarries and pits are unattractive. Often seen as open wounds on the landscape. Their appearance can be improved through thoughtful landscaping, placement of buildings and structures, painting with colors that blend in with the landscape, and keeping the area free from clutter.

While in active use a careless operation may produce excessive runoff from the exposed, unprotected earth. The runoff can clog streams, smothering aquatic organisms found there. Sedimentation can change the direction and natural flow of a stream causing it to move in directions that may be undesirable. The runoff may contain minerals or other substances toxic to plants and animals.

Groundwater is also vulnerable to contamination from mining activities. Mining and extraction activities can pose a threat to wells. They can disrupt the flow of groundwater, changing its direction resulting in changes in the water table. Groundwater contamination can be far reaching and corrective action is many times very difficult.

The effects of blasting can be disturbing if not properly conducted. The concussion, noise, and ground vibration must be kept within limits that do not

³⁴Harry W. Webb and John P. Moore, Minerals for Virginia, Virginia Division of Mineral Resources Publication 62, 1985.

adversely affect other activities outside the site. Dust and truck traffic can also pose environmental and safety threats if not controlled.

After the mineral resources of an operation have been exhausted the reclamation of a site is the final important step in a successful operation. If not reclaimed, a site has the potential to adversely affect surface and groundwater resources, as well as the aesthetics of the area. Reclamation is the process of returning mined land to a safe and stable condition which can support a productive use either concurrent with extraction or at its completion.³⁵

Mining activity in the Region, which lies east of the fall line, involves sand and gravel production.³⁶ Sand and gravel is extracted from pits or is dredged from river bottoms. Seven operations are active on the James River with about four others located on or near the Chickahominy River. The paving and building industries are the chief consumers of sand and gravel with lesser amounts used for railroad ballast, fill, filtration, and other purposes.

Extraction techniques for sand and gravel are different from those of quarries. They do not normally require blasting. Power shovels, frontend loaders, and draglines are the principal means of removing these materials. Operations are normally found around rivers or old river beds where sand and gravel are naturally deposited.

³⁵Ibid.

³⁶West of the fall line, abandoned coal mines and possible methane pockets are located in isolated locations in Chesterfield and Henrico counties. Abandoned mine vents are a safety hazard. The potential for land subsidence exists in these areas.

Federal Programs and Responsibilities. Much of the regulation of mining and extraction activities has been delegated to the states. In some cases a permit may be required from the U.S. Army Corps of Engineers under Section 404 of the Clean Water Act. A permit of this type may be necessary more often in this region where sand and gravel deposits are closely associated with waterways.

State Programs and Responsibilities. The Code of Virginia grants authority to several state agencies to develop regulations for the mining and extraction industry:

1. Division of Mined Lands Reclamation, Minerals Other Than Coal Section (DMLR, MOTC)--This agency issues mining permits based on a review of an operation and reclamation plan and public hearings. The agency receives bond and permit fees, enforces extraction and reclamation regulations, permit renewal, and operates the Mineral Reclamation Fund.
2. Virginia Water Control Board (VWCB)--Responsible for issuing permits under Section 402 of the Clean Water Act (CWA), and the National Pollution Discharge Elimination System (NPDES).
3. State Air Pollution Control Board--Enforces Environmental protection Agency (EPA) air quality regulations. Issues permits for the construction and operation of air pollutant emitting, industrial activities.
4. Virginia Marine Resources Commission (VMRC)--Issues permits for mineral extraction in State-owned waters or wetlands.
5. Division of Mines and Minerals--Enforces mining regulations in accordance with Virginia Code and issues licenses for all mining activities.

Local Programs and Responsibilities. A locality's comprehensive plan may have a section that sets guidelines for the location and operation of mining activities. Such guidelines could be implemented through zoning and subdivision ordinances.

Forestal Areas

Background Description. Within the Richmond Region, forest land accounted for 915,810 acres of commercial forest land in 1980, which was almost 65 percent of the region's total area.³⁷ By 2005, the RRPDC projects that over 60,000 acres will be lost to development or to lumber harvesting without replacement.

Timber is an economic resource in the Region. The Chesapeake Corporation, Bear Island Paper, Georgia Pacific and others have large holdings in timber. Some of these holdings will undoubtedly come under increased development pressure.

Isolated stands of trees are removed through development process. Insensitive development practices led to stripping of vegetation from sites, particularly in intensive strip commercial areas, which contribute to increased runoff and water quality problems.

The contribution to the Commonwealth's quality of life that the forests provide cannot be underestimated. The forests contribute aesthetic, recreational, economic, and ecological benefits.

In 1982, the forest industry employed 57,000 persons in the Commonwealth, whose salaries and wages amounted to \$827,666. The number of manufacturing sites includes 511 sawmills, 17 veneer and plywood plants, 18 wood treating plants, 54 furniture plants, 7 pulp and paper mills, 22 palet and container manufacturing plants, and other plants such as stave mills, excelsior plants, particle board plants, piling plants and flooring mills.³⁸ Other sectors tied

³⁷Richmond Regional Planning District Commission, Regional Data Report, June 1982.

³⁸Virginia's Forests Its Common Wealth, Virginia Division of Forestry, 1983.

to the forest industry include construction, transportation, marketing, and energy. The total contribution to the Commonwealth's economy amounted to \$3.2 billion while employing 111,000 people in 1983.³⁹

Federal Programs and Responsibilities. The primary involvement of the federal government in the protection of forests is through the acquisition and management of these areas through the U.S. National Park Service and U.S. Forest Services system of national parks and forests. The U.S. Fish and Wildlife Service also acquires and manages wildlife refuges and national fish hatcheries which usually include areas of protected woodlands. In addition, the federal government provides financial and technical assistance to state and local agencies concerning forestry management.

In addition, the Federal Farmland Protection Policy Act sets forth the preservation of productive farm, range, and forest lands as a national policy objective. The lead implementing agency for this policy is the U.S. Department of Agriculture (USDA).

The USDA implements this policy through its technical and direct funding assistance programs, coordination with other federal agencies, and reviewing responsibilities under the provisions of the National Environmental Policy Act and other environmental reviews. The agency's policy on farm, range and forest land preservation is contained in the Secretary of Agriculture's Memorandum 9500-2, dated March 10, 1982, entitled "Statement on Land Use Policy."

State Programs and Responsibilities. The Commonwealth of Virginia has an active program for acquisition and management of lands for State parks (Division of Parks and Recreation) and Wildlife Management Areas

³⁹Ibid.

(responsibility of the Commission of Game and Inland Fisheries). In addition, the Division of Parks and Recreation develops and maintains a long range outdoor recreation plan (Virginia Outdoors Plan) which provides guidelines in the development and acquisition of a comprehensive system of outdoor recreational facilities.

This agency also provides matching monies to State and local agencies for the acquisition and development of outdoor recreation areas. Unfortunately, the cutbacks in federal funding levels has severely reduced the funding available. The State Division of Forestry also provides technical assistance to local governments and private landowners in forestry management.

Local Programs and Responsibilities. Other than accepting conservation easements and comprehensive planning, local governments have several tools available for woodlands preservation. First is the land use assessment program, which allows localities to adopt a preferential tax assessment for lands devoted to agricultural, horticulture, forestry, and open space uses. Another tool is the Agricultural and Forestal District Act, which allows jurisdictions to establish special districts with the consent of landowners that restricts conversion of forestal lands to other higher uses. (It should be emphasized that these tools are ineffectual in developing areas and may have some unwanted negative impacts.) A third tool is to establish tree ordinances (requires enabling legislation) and open space requirements in site plan and subdivision review to encourage retention of existing trees.

Forest's contributions to the environment are considerable. They provide habitat to numerous game and non-game species. Some habitats are unique in their makeup with some "stands" containing rare or endangered species of plants and animals.

They serve as natural wind breaks that function to protect loose soil from shifting and creating damaging dust storms. Their canopies act to soften the impact of rain which helps to control erosion. Root systems hold soil together which also prevents erosion.

Nutrients in the soil are taken-up by trees to meet their growth requirements. In this way forests help improve the quality of waters in nearby waterbodies by removing nutrients that would otherwise enter the streams in detrimental amounts.

The beneficial affect that forests have on water quality his been recognized. Many municipal watershed systems have active forest management programs for continued protection of the water supply.

In urban areas forest act to filter stormwater runoff in stream corridors. By leaving standing trees or by planting saplings, new development can be enhanced and the environmental integrity maintained.

The process of photosynthesis that takes place on a cellular level in the treetops converts carbon dioxide to oxygen which is released into the atmosphere. This contributes to an improved air quality.

Wildlife and Aquatic Life Habitat Areas

Background Description. In terms of recreational enjoyment and commercial markets, the fish and wildlife of the Chesapeake Bay are the major factors for the Bay's prominence in today's society. Commercial interests depend on the fish and wildlife of the Bay as a major source of income and employment. Recreational activities such as hunting, boating, fishing,

camping, bird watching, and nature photography are increasing every year as more and more people utilize the Bay system to spend their leisure time.⁴⁰

Aquatic life habitats are important to both commercial and sport catches in the Bay. Commercial and sport fishing accounted for 35 percent and 65 percent respectively of the finfish catch in 1975.⁴¹ In 1974, over 100 million pounds of fish were harvested from the Bay.⁴² These habitats are also important to the shellfish harvest which comprises up to 80 percent of the total commercial harvest value.⁴³ The harvesting sector of commercial fishing employs an average of 18,000 people while 7,000 people are employed in the processing sector.⁴⁴

The marshes and woodlands of the Bay provide wildlife habitats for a variety of waterfowl, birds, reptiles, amphibians, and mammals. The productivity and ecological balance of the Bay is dependent on these animals. They serve as both predator and prey and contribute to the economy of the area both directly or indirectly. These animals also contribute to the human enjoyment of the Bay.

In the Commonwealth, 80 percent of all fish and wildlife habitats are privately owned.⁴⁵ In addition to assisting landowners with understanding and

⁴⁰U.S. Army Corps of Engineers, Chesapeake Bay Study Summary Report, March 1984.

⁴¹U.S. Army Corps of Engineers, Chesapeake Bay Study Appendix E: Biota, March 1984.

⁴²Ibid.

⁴³U.S. Army Corps of Engineers, Chesapeake Bay Study Summary Report, March 1984.

⁴⁴Ibid.

⁴⁵Council on the Environment, Virginia's Environment, 1987.

enhancing fish and wildlife habitats on their land, the Virginia Commission of Game and Inland Fisheries manages approximately 4 million acres of public land.⁴⁶ The Commission has acquired and manages 31 wildlife areas in the Commonwealth using monies earned from the selling of sporting licenses and taxes on hunting equipment.

The Bay and its tributaries provide thousand of acres of natural habitat for many species of fish and wildlife. However, many of these habitats have been threatened or destroyed by the growth and development of the Commonwealth. Impoundments in Virginia's rivers have eliminated hundreds of miles of spawning habitats. A species may suffer reduction in population size or complete elimination if it loses its habitat or access to its habitat. Habitat loss combined with increases in species population will intensify the competition among organisms for the remaining habitats.

Habitat destruction also interrupts the natural flow of energy in the environment, which could result in the loss of energy to the entire ecosystem. When a species habitat is altered or destroyed, this directly affects the next higher trophic level which depends on that species to help sustain its well being. The loss of a habitat can result in a chain reaction throughout the food web involving the loss of energy of each sequential trophic level.⁴⁷

Destruction and obstruction of fish and wildlife habitats take many forms. These include:

- o structural (dams and floodwalls);
- o dredging activities (widening and deepening of navigation channels);
- o filling (spoil islands and illegal dumping of trash and debris);
- o marine development;

⁴⁶Ibid.

⁴⁷U.S. Army Corps of Engineers, Tidal Flooding Study Appendix C: Recreational and Natural Resources, February 1984.

- o shoreline erosion; and
- o aquatic weed control.⁴⁸

To allow for the continued and necessary growth of the Commonwealth while preserving natural habitats, improvements in the management and protection of fish and wildlife habitats must be made and enforced.

Federal Programs and Responsibilities. The federal government has park, forest and wildlife management area programs (see previous discussion under Forestal Areas). The following federal agencies and acts address the protection of habitat access and the prevention of destruction, alteration, or contamination of habitats.

1. Federal Energy Regulatory Commission (FERC)--FERC is responsible for reviewing hydropower project applications in consultation with the Commission of Game and Inland Fisheries and the U.S. Fish and Wildlife Service. FERC can issue, modify, condition, or deny a license depending on the impacts a project may have on fish and wildlife. In enforcing the Federal Power Act, FERC requires dam operators to provide for fish passage.
2. U.S. Army Corps of Engineers--The Corps is authorized under Section 404 of the Clean Water Act to regulate dredging and filling of navigable waterways and tidal wetlands (see discussion under Surface Waters).
3. U.S. Fish and Wildlife Service--The Fish and Wildlife Service has no specific regulatory authority. The Service depends on the permitting authority of the Corps and FERC to implement its recommendations on projects. If the Service determines that a proposed project presents a threat to a habitat, it can request mitigation. Mitigation can be in the form of avoidance, minimization, compensation, or full replacement of the habitat.
4. Federal Aid and Sport Fish Restoration Act--This Act provides federal cost sharing funds of up to 75 percent for the construction, operation, and maintenance of fishways. However, projects operating with or applying for a license from FERC cannot apply for these funds.

⁴⁸Council on the Environment, Virginia River Policy, 1987.

5. Anadromous Fish Conservation Act--This act provides federal cost sharing fund of up to 50 percent for the construction, operation, and maintenance of fishways. As with the Federal Aid and Sport Fish Restoration Act, projects operating with or applying for a license from FERC cannot apply for these funds.

State Programs and Responsibilities. The State has park and wildlife management area programs which enhance and protect wild and aquatic life (see previous section on forestal lands). The following state agencies address the protection of habitat access and the prevention of destruction, alteration, or contamination of habitats.

1. Marine Resources Commission (MRC)--The MRC has specific guidelines concerning projects which involve building, dumping or encroaching upon river beds owned by the Commonwealth. These guidelines:
 - o generally do not permit the filling of wetlands or subaqueous lands;
 - o discourage dredging in shellfish areas;
 - o may impose certain seasonal limits on dredging to reduce adverse effects on important fisheries; and
 - o classify and evaluate tidal wetlands.
2. Commission of Game and Inland Fisheries--The Commission does not have specific authority or a formal written policy to negotiate habitat damage control. However, when a project proposal is reviewed, the Fish Division will request that no habitat destruction take place. Other responsibilities of the Commission pertaining to habitat protection include:
 - o requiring all dams above fall line that interfere with fish passage to provide fish ladders;
 - o ensuring that trash, logs, and other materials not obstruct the free passage of fish or vessels for more than a week; and
 - o regulating or prohibiting dredging, monitoring, or drilling activities that could harm a fish or wildlife habitat.
3. Virginia Water Control Board (VWCB)--Section 401 of the Clean Water Act authorizes the VWCB to provide water quality certificates for any license issued by FERC. The VWCB can protect natural habitats by ensuring that

dissolved oxygen, temperature, and turbidity are maintained within certain ranges that are adequate to protect aquatic life. The WVCB also makes the final decision on all state discharge permits, which allows the WVCB to protect natural habitats such as shell fish growing waters.

Local Programs and Responsibilities. Local governments are limited in their ability to protect and conserve wildlife habitats, even with comprehensive planning and development regulations. Since a great majority of wildlife areas are in private ownership, the most effective tools are those that rely on acquisition of development or fee-simple property rights through purchase, donation, or dedication. The conservation easement tool can also be combined with preferential tax treatment and provisions of the Agricultural and Forestal District Act if appropriate.

Scenic, Cultural and Historic Resources

Background Description. The Commonwealth of Virginia has an abundance of scenic, cultural and historic resources. Many of these are in the Richmond Region, including the "Falls of the James," the historic plantations of Charles City County, land of Richmond National Battlefield Park system, and historic neighborhoods in the City of Richmond.

In recent years, there has been a slow, but steady realization that scenic, cultural and historic resources must be preserved and protected. At a time when land in the Region is developing quite rapidly, the natural beauty of scenic resources has become a rare and valued commodity. In particular, many Civil War trenches and battlefield sites, not protected by the National Park System are threatened by urban encroachment.

Preservation and protection of cultural and historic resources is equally important. These resources provide residents and visitors close contact to the history and culture of the Region. Such notions support the goals of the

General Assembly when it established the Historic Landmarks Commission in 1966, which called for "perpetuating those structures and areas which have a close and immediate relationship to the values upon which this State and the nation were founded."⁴⁹

Federal Programs and Responsibilities.

1. National Historic Preservation Act of 1966--This Act is the most significant tool for preserving historic resources at the federal level. The Act provided for the National Register of Historic Places; limited grants-in-aid for historic preservation; and an Advisory Council on Historic Preservation. Most importantly, according to the Act, placement on the National Register provides historic sites with some protection from demolition and in limited cases, makes the site eligible for federal assistance in preservation.⁵⁰
2. National Environmental Policy Act (NEPA) of 1969--This is another federal regulatory tool for protection of special resources. The Act requires that before a federal agency can develop or alter a site, it must identify the nature of the resource to be impacted by the action. This includes the identification of historic or cultural patterns in an area. Specifically, the Act states that the nation must work to "preserve important historic, cultural and natural aspects of our national heritage."⁵¹
3. National Park Service of the U.S. Department of Interior--National Park Service is responsible for maintaining any National Park sites. (Two portions of the Richmond National Battlefield Park, one in Henrico County and another in Chesterfield County, are located on or near the James River shoreline.) Under federal guidelines, no new development is allowed within the parks and new

⁴⁹Virginia Historic Landmarks Commission. The Virginia Landmarks Register, Richmond, Virginia: The Commission, 1986, p.5.

⁵⁰Frank S. So, et al, The Practice of Local Government Planning, Washington, D.C.: International City Management Association, 1979, pp. 340-341.

⁵¹Richmond Regional Planning District Commission, Regional Development Issues: An Element of the Richmond Regional Policies Plan, Richmond, Virginia, 1981, p. 118.

construction along the access roads must first be approved by the Park Service.⁵²

State Programs and Responsibilities. The Historic Preservation Act of 1966 also charged the states with the responsibility of submitting nominations to the National Register. Thus, Virginia established the Historic Landmarks Commission in 1966 to serve the Commonwealth as part of the federal program. In accordance with the Act, the executive director of the Commission serves as the State historic preservation officer and is responsible for coordination between state and federal agencies.⁵³

The principal function of the Virginia Historic Landmarks Commission is to maintain the Virginia Landmarks Register. Unlike the National Register, the State Register has no enforcement or regulatory power over development. The staff can serve in an advisory capacity only when a historic landmark is threatened.

The State also has have a Scenic Rivers Policy which recognizes the values of scenic rivers and their tributaries. The Scenic Rivers Act of 1970 "establishes the protection and conservation of certain rivers and their immediate environs possessing great natural and pastoral beauty." Since 1970, portions of eleven rivers, including the James, have been designated scenic rivers "in recognition of their quality as resources of statewide significance."⁵⁴

⁵²Richmond Regional Planning District Commission, Eastern Henrico County Land Use Study, an unpublished report, Richmond, Virginia, 1987.

⁵³Virginia Historic Landmark Commission, The Virginia Landmarks Register, p. 6.

⁵⁴Virginia Council on the Environment, Development of a Virginia River Policy, Richmond, Virginia, 1987, pp. 25-26.

This policy places few restrictions on land use in these protected areas, however. The only regulatory power in the Act is the requirement that approval to construct a dam or other structure which will impede the natural flow of the designated section must be authorized by an act of the General Assembly. Many recent development proposals along the State's rivers do not impede the natural flow and therefore the Scenic Rivers Policy does not apply.⁵⁵

In addition, the General Assembly has established programs for preservation easements on sites of historic interest and the Virginia Outdoors Foundation to encourage private gifts of money, securities, land and other properties to preserve open spaces. In Virginia, if conservation easements are granted to public bodies, the landowner may benefit from income, property, and estate tax deductions.

Local Programs and Responsibilities. Local governments are restricted in regulating development solely for aesthetic purposes. However, they protect historic areas through establishment of historic zoning districts. The use of conservation easements, discussed previously can help preserve open space, which may include areas of historic scenic and cultural significance.

Natural Hazards

Flood Hazards

Background Description. Man has been subject to periodic flooding since he first settled in the Chesapeake Bay drainage basin. This periodic flooding has resulted in millions of dollars of property damage, loss of human lives, and affected fish and wildlife resources.⁵⁶

⁵⁵Ibid.

⁵⁶Council on the Environment, Virginia's Environment, March, 1987.

The James River has had numerous floods in the recent years. These floods have caused extensive property damage in the Richmond area and have threatened to put the region's major water and wastewater treatment plants out of service for periods of time.

An expensive floodwall is to be constructed to protect the urban waterfront of Richmond and from future flooding; however, flood proofing is still needed for both the water treatment and wastewater treatment plants.

Flood hazard area consists of two parts: the floodway and the floodway fringe. The floodway includes the channel and the are immediately adjacent which often carries excess flow. The floodway fringe is a broader area which in times of severe flooding will also be covered by runoff.

Occasional flooding of river valleys is natural. However, as inappropriate land uses are permitted in the floodplain, flooding becomes a problem. Land on the floodway should be designated for non-structural uses including agriculture, recreation, and roads. Limited development in the floodway fringe can be acceptable if structures are sufficiently elevated and flood proofed.

Flood control measures can be in the form of structural, institutional, or a combination of the two. Structural measures include reservoirs and retarding structures, channel improvement, levees, by-passes, and floodways.⁵⁷ Institutional measures include financing (flood insurance), land use controls, and information exchange.⁵⁸

⁵⁷U.S. Army Corps of Engineers, Chesapeake Bay Study: Main Report, March 1984.

⁵⁸Council on the Environment Document, loc. cit.

Federal Programs and Responsibilities. The federal government is authorized under several statutes to implement measures for the purpose of flood control and protection. These statutes include:

1. Flood Control Act of 1936--This act was the first national flood control policy. It authorizes the Corps of Engineers to conduct studies and construct structures for flood alleviation for major streams.
2. Flood Control Act of 1948--This act authorized the construction of small flood control projects that have not been specifically authorized by Congress.
3. Presidential Executive Order 11988--This Presidential Order deals with floodplain management. The order requires all agencies to evaluate impacts of their activities on floodplain areas and to mitigate these impacts if any are found.
4. Clean Water Act--Section 404 of Clean Water Act authorizes the Corps to regulate dredging and filling of wetlands and other activities that could affect navigable rivers.
5. National Flood Insurance Act--This act authorized a federal flood insurance program and created the Federal Emergency Management Agency (FEMA). FEMA is responsible for developing criteria or standards which encourage states and local governments to adopt adequate measures for flood hazard mitigation.
6. Flood Disaster Protection Plan--This act requires the purchase of flood insurance to protect buildings acquired or constructed in flood hazard areas with federal funds or financial assistance.

State Programs and Responsibilities. The following state agencies and acts address flood control and protection:

1. Flood Damage Reduction Act--This act is designed to reduce flood damage through management of floodplains by zoning ordinances and ensuring that land uses in the floodplains are appropriate.
2. Erosion and Sediment Control Law--This law requires soil and water conservation districts to approve erosion and sediment control plans which meet state conservation standards.

3. Soil and Water Conservation Division (SWCD)--In addition to approving erosion and sediment control plans, the SWCD is responsible for:
 - o making low interest loans to local governments or water authorities for the purpose of constructing flood prevention projects; and
 - o inspections of some, but not all, dams in the Commonwealth.

4. Virginia Water Control Board (VWCB)--The VWCB's responsibilities include:
 - o collecting and distributing information pertaining to flooding and floodplain management;
 - o making periodic inspections of local floodplain planning activities to determine their effectiveness;
 - o urging local governments to encourage citizens to purchase flood insurance and ensure compliance with flood zone ordinances; and
 - o coordinating with federal and state agencies to maintain a current list of flood-prone communities.

Local Programs and Responsibilities. Institutional measures are the primary and most cost-effective means for local governments to manage flood control and protection. The greatest tools local governments have for implementing these measures are comprehensive land use plans and the establishment of flood plain regulations in their zoning or separate flood plain ordinances.

Local governments must adopt and enforce the minimum standards required by the Federal Emergency Management Agency (FEMA) for mitigation of flood losses to participate in the National Flood Insurance Program. Some of FEMA's minimum standards include:

- o a permit must be obtained for all proposed development in the floodplain;
- o a property owner cannot build in the floodplain unless his bottom floor is above the height of the hundred-year flood;

- o setting limits on the amount that floodplain construction can raise the expected water level of the hundred-year flood; and
- o requiring mapping of the hundred-year floodways and their fringe areas.

Development Limiting Soils

Background Description. Soil is the most important component that must be considered when determining where development is appropriate in an area. Other factors (e.g., slope, flooding, etc.) can be altered to accommodate some kind of limited development. However, soils may be so poor that practically any urban use is incompatible. Inappropriate uses of soil can result in public health and safety hazards including flooded basements, caved-in excavations, damaged highways, septic tank seepage, mud slides, stream pollution, and disappearance of wildlife.

Soil characteristics including texture, drainage, structure, particle size, physical size, physical composition, an degree of development play a strong role in determining soil usefulness.⁵⁹ Soil properties and the problems they cause which must be considered before urban or suburban development is undertaken include:

- o high water table--can cause wet basements, cracked foundations, and failing septic tanks;
- o clay soils--high shrink/swell rates can cause damage to foundations, roads, and underground utilities.
- o shallow soils--can make construction costly or impractical; and,
- o steep slopes--cause construction costs to increase chances of landslides.

Proper application of soils information to development decisions can prevent these problems and save millions of dollars in annual losses.

⁵⁹U.S. Corps of Engineers, Chesapeake Bay Study Appendix C: Recreational Natural Resources, February 1984.

The Coastal Plain Region is composed of sedimentary rock that consists of unconsolidated clays, silts, and sand which are up to 2,200 feet thick, which may create problems for building foundations and increase the potential for groundwater contamination.⁶⁰ High water tables in this region create problems with seepage into basements, cracking foundations and drainage of septic tanks.

The Piedmont Region is composed mainly of igneous and metamorphic rocks which produce a more residual soil. Some areas of unconsolidated soils also exist in the Region. With harder and denser soils closer to the surface, the Piedmont Region provides a stronger natural foundation for construction. However, the Piedmont Region does have problems with high shrink/swell rates of clay soils, steep slopes (15% or greater), abandoned mines, and drainage.

Federal Programs and Responsibilities. Except for provisions of the 1985 Farm Bill providing incentives and penalties designed to take highly erodible land of production no federal programs or agencies are responsible for limiting or regulating development due to soil suitability for particular land uses. The U.S. Department of Agriculture Soil Conservation Service, conducts soil surveys in cooperation with state agencies, but it has no authority to force the adoption of its findings or recommendations.

State Programs and Responsibilities. The only State agency which deals directly with limiting or regulating development due to soils and their suitability for particular land uses is the Virginia Department of Health (VDH). In relating soil types to land use, VDH only has authority to regulate development based on the suitability of the soil for septic tank drainage.

⁶⁰Richmond Regional Planning District Commission Document, "An Environmental Survey: The Richmond Region," June 1973.

The Virginia Department of Conservation and Historic Resources, Division of Soil and Water Conservation is authorized under the Erosion and Sediment Control Law to deal with this problem indirectly. The Department regulates erosion and sediment control in conjunction with development but it does not have authority to regulate development due to the soil type and its suitability for a particular land use.

Local Programs and Responsibilities. The direct responsibility for limiting or regulating development due to soil types and their suitability for particular land uses lies with local governments. Localities can use zoning ordinances and comprehensive plans to restrict development if the soils are unsuitable for particular land uses.

Riverfront Access for Recreation

Background Description

Virginians spend much of their leisure time in or around the State's water resources. Statewide it is estimated that water-related activities account for one third (1/3) of all outdoor recreation. Water-based activities, in fact, account for 48 percent of all activity-days in the State.⁶¹

Unfortunately, demand for water-based recreation is far greater than the level the State or localities can accommodate on publicly-owned land. Most of the land adjacent to Virginia's rivers and streams is privately owned and cannot be considered accessible to the general public.

The Richmond Region is in need of additional active and passive recreation facilities. According to the 1984 Outdoors Plan, a 26 percent

⁶¹Commonwealth of Virginia, Department of Conservation and Historic Resources, 1984 Virginia Outdoors Plan, Richmond, Virginia: The Department, 1984, p. 37.

deficiency in park and recreation acreage exists. This Plan specifically states that a high demand exist for beach use and outdoor swimming in the Region, and therefore, "opportunities to increase water access should be pursued."⁶²

Federal Programs and Responsibilities

In recent years, the federal government's role in promoting better recreational access has been primarily to perform maintenance and limited development rather than the acquiring of new facilities. Two agencies have been responsible for riverfront recreational facilities in the federal system.

The National Park Service is responsible for improving and protecting components of the federal park system in Virginia. The Service maintains 18 units or 290,791 acres in the State. In the Richmond Region, the Service is responsible for the Richmond National Battlefield Park, some of which has direct shoreline frontage.⁶³

The National Park Service also works with the State's Division of Parks and Recreation to coordinate the development of State comprehensive outdoor recreation plans and to administer the land and Water Conservation Fund program. The funds for the latter are passed through the Division for distribution to State agencies and localities for the development of recreational facilities.

A second agency, the U.S. Fish and Wildlife Service, also works to preserve, protect and expand (when possible) recreation access to shoreline areas. The Service manages wildlife refuges and several fish hatcheries

⁶²Ibid., p. 110.

⁶³Virginia Council on the Environment, Development of a Virginia River Policy, Richmond, Virginia, 1987. p. 30.

statewide. The objectives of the Service are: 1) "to provide, promote and perpetuate opportunities for the public to observe and enjoy wildlife" and, 2) "to provide compatible, non-wildlife-oriented, recreation opportunities, such as picnicking and hiking."⁶⁴

State Programs and Responsibilities

Because of recent federal funding cutbacks, the State has been forced to accept broader responsibilities for programs which provide public access to rivers and streams. Four State agencies currently share these responsibilities as outlined below.

1. Virginia Commission of Game and Inland Fisheries--This agency is primarily responsible for providing public boating access to Virginia's lakes, rivers and streams. According to Virginia Code 29-11, the Commission is responsible for acquiring "by purchase, lease or otherwise, lands and structures for use as public landings, wharves or docks . . ." Under 62-168, the Commission is responsible for administering the motor boat fund for "purposes of direct benefit to the boating public."⁶⁵
2. Division of Parks and Recreation--The Division is responsible for coordinating outdoor recreation planning including parks, camping grounds, fishing and hunting, beaches, etc. The aforementioned Virginia Outdoors Plans, prepared by the Division, surveys existing State parks and facilities to determine recreational needs in the future.

While the Division is the agency primarily responsible for providing recreation access to the State's rivers and streams, it has cooperative arrangement with several public and private agencies for portions of these responsibilities. For example, the U.S. Soil and Conservation Service cooperates with the Division to provide public recreation provisions on small watershed impoundment projects. Under another agreement, Westvaco Corporation provides for recreational opportunities on several corporation holdings.⁶⁶

⁶⁴Ibid., p. 31.

⁶⁵Ibid., p.28.

⁶⁶Ibid. p. 29.

Another responsibility of the Division of Parks and Recreation is to provide financial assistance to localities for development of recreation facilities through the Virginia Outdoors Fund. The Division also provides technical assistance to localities in recreation planning and development.

3. Virginia Department of Transportation (VDOT)--VDOT may expend recreational access road funds for the construction of access roads and trails to recreation areas. VDOT may also use these same monies to construct or maintain walkways or platforms for public fishing as part of bridge construction.⁶⁷
4. Department of Forestry (DOF)--The Department of Forestry cooperates with other State agencies to provide access to water resources within State forests. DOF has an agreement with the Commission of Game and Inland Fisheries to provide river access in Department-owned lands. DOF also works with the Commission to clean debris from rivers in State forestland.⁶⁸

Local Programs and Responsibilities

Local governments are given the authority to provide for parks and playgrounds by the Code of Virginia. To do so they have the tools to purchase and accept through donation or dedication, lease or condemn and establish recreational programs. Using these tools in conjunction with comprehensive planning and development regulations they may acquire additional public access sites to rivers.

⁶⁷Ibid. p. 30.

⁶⁸Ibid.

V. PRELIMINARY ASSESSMENT OF REGIONAL AND LOCAL PROGRAMS

As the first step in the development of a Regional Coastal Resources Management Program for the RRPDC, an assessment of the RRPDC's and local government comprehensive land use planning and implementation programs was undertaken. This assessment focused on those environmental parameters related to or affecting the coastal resource issues discussed in the preceding chapter. Additionally, in the case of the RRPDC, the report also examines the addressing of regional growth and development issues.

The assessment involved a detailed review of the RRPDC's planning program and operations; however, for local governments the assessment was only cursory, since the RRPDC staff, in cooperation with the local government staffs, will be performing a more in-depth evaluation of local planning programs, as part of the RRPDC's FY 1987-1988 Coastal Resources Management Program Grant.

Environmental Parameters

The RRPDC staff identified 13 basic categories of environmental parameters related to the protection, conservation, and management of coastal and Bay resources. The primary emphasis of the assessment was on those environmental parameters affecting water quality, since it directly relates to the Chesapeake Bay ecosystem.

The environmental categories covered in the assessment and the specific considerations addressed are as follows:

1. Soils and Topography--as to considerations of erosion potential and development limitations.
2. Surface Drainage--as to considerations of stormwater runoff(volume and quality) and development limitations.
3. River, Creeks, and Stream Shorelines--as to considerations of the environmental vulnerability to development impacts from adjacent land uses.
4. Flood Plains--as to considerations of property hazards and protection of environmental functions.
5. Tidal and Non-Tidal Wetlands--as to considerations of development limitations and protection of environmental functions.
6. Critical Watersheds--as to considerations of protection of water supply impoundments and environmentally sensitive or significant areas within specific watersheds.
7. Groundwater and Aquifers--as to considerations of the potential for groundwater pollution from development, mines and land fills, and hazardous wastes.
8. Cultural, Historic, and Scenic Resources--as to considerations of the preservation and enhancement of these resources.
9. Forest and Woodlands--as to considerations of conservation, resource potential and environmental functions.
10. Mining and Extraction Activities--as to considerations of resource potential and environmental and public hazards.
11. Wildlife Areas--as to considerations of environmental protection.
12. Riverfront Recreation Areas--as to considerations of public access to riverfront areas.
13. Mineral Resources and Extraction Activities--as to considerations of conserving productive mineral resource areas and mitigating adverse impacts of such activity on development and the ecology.

Assessment of Regional Program

In assessing the RRPDC regional planning program, the RRPDC staff

determined if the program addressed the 13 environmental categories listed in the previous section and growth and development issues.

This assessment consisted of four components:

- o availability of useful analytical data on specific environmental parameters;
- o existence of current regional policies or plans addressing environmental parameters;
- o coordination and review framework for implementing plans and policies; and
- o adequacy of manpower and budgetary resources.

Environmental and Development Information System

Although the RRPDC has completed several studies identifying and mapping many of the environmental factors and has an extensive data system of demographic and economic information, its environmental and development information system has several deficiencies:⁶⁹

1. A significant portion of the available environmental information lacks consistency in format; requires further analysis; has specific gaps in its geographic coverage; and is not in readily accessible and usable formats.
2. Information on some environmental parameters is completely lacking, such as wetlands, mining and extraction activities, and wildlife areas.
3. Except for population, employment, and public utilities data, most information on development trends is unavailable or incomplete and therefore inhibits the establishment of any worthwhile monitoring system for

⁶⁹ Some of these studies and reports include: Environmental Survey of the Richmond Region (1973); Regional Development Issues (1982); and James River Corridor Study (1982). The primary source on development trends is the Regional Data Report (1982), currently being completely updated, which provides both trends and projection data. Important sources for small area data on estimates and projections of the number of housing units, employment, and population are the annual 3-C data reports. These reports are done cooperatively by the RRPDC and local governments for the MPO transportation planning process within the urban portion of the region.

identifying development impacts on the environmentally sensitive areas.

Planning and Policy Framework

The Virginia Area Development Act (Section 15.1-1406 of the Code of Virginia) requires planning district commissions to prepare a "comprehensive plan for the guidance of development" in their districts. Although, the Code does not detail what is to be contained in the plan, it does suggest that it should "promote the orderly and efficient development of the physical, social, and economic elements of the district." This plan is to be updated at least every five years.

Few, if any, planning district commissions have completed a "comprehensive plan" in the last eight years, particularly since the demise of the "701" HUD planning grant program. A similar situation exists for the RRPDC.

The Richmond Regional Planning District did initiate the development of a regional policies plan in 1981, which was to address growth management and environmental issues. This plan was intended to address regional growth management and environmental issues identified in the report Regional Development Issues, completed by the RRPDC staff in 1981.

Unfortunately, except for a transportation policies element, the regional policy plan was never completed for many technical and political reasons. Instead the RRPDC has worked on addressing issues in specific functional areas, such as an environmental study of the James River Corridor; wastewater management plan for the Richmond-Crater area; water resources studies for water supply, minimum in-stream flow, and nutrient enrichment; solid waste

management plan and resource recovery feasibility study; and transportation plans and studies.

In addition, the RRPDC, in conjunction with the University of Virginia, has developed a stormwater model (VAST) for the Richmond area. This model has a definite potential for modeling of various land use strategies and BMP measures in specific basins in terms of predicting their pollutant loadings.

In some cases, most notably water resources, the RRPDC has adopted specific policies to address critical issues. However, these policies have been oriented to meeting some outside threat, i.e., pending water quality regulations or proposed exportation of water from the James River to outside the region, than addressing interjurisdictional issues that may infringe on local prerogatives.

Thus the RRPDC's current planning and policy framework can best be charitably summarized as lacking any coherent regional focus that addresses regional issues in a comprehensive and coordinated manner. The program results in piecemeal approaches to solving interjurisdictional and related environmental issues. It only tangentially addresses the real problems and opportunities facing the region and has yet to face up to critical growth management and environmental protection issues.

The critical unknown is whether local governments want to and/or are able to recognize and encourage regional approaches to addressing some of these problems without fearing a loss of their local sovereignty. With more education of RRPDC members and local policy makers some substantive progress may be made; however, more than likely the threat of State intervention in land use planning and zoning may provide the real incentive for local governments to work more closely together in addressing these problems.

Review and Coordination Framework

In general, the RRPDC has in place few effective tools to implement its plans and policies; however, this deficiency has not be too critical considering the lack of any effective regional policy framework. The major tools which have had some effect are the provision of technical assistance to local governments and provision of information on environmental and other issues. Of course these tools are limited to the extent local governments call on the RRPDC for assistance.

Another area where the RRPDC may have some influence is through the Commonwealth Intergovernmental Review Process and the State of Virginia's environmental review process administered by the Virginia Council on the Environment. Unfortunately, these review processes only involve federal and/or state programs and therefore fail to include the vast majority of projects, both public and private, which affect the region's natural resources or growth and development patterns.

Other than in specific isolated instances, the RRPDC is given little opportunity to review and/or comment on draft plans and studies of local governments. In fact, unless the RRPDC staff specifically requests them, it rarely receives approved and/or adopted local studies or plans.

Without an effective and meaningful policy framework, the RRPDC would best focus its primary efforts, at least for the short term, on the expansion of its technical assistance program to local governments in the areas of environmental and growth management.

Budget and Manpower Resources

With the Coastal Resources Management Program, the RRPDC has been able to expand its support for environmental programs beyond the areas of water

resources management. The Chesapeake Bay Agreement, with its emphasis on protection of water resources through improved land use planning and development controls, undoubtedly provides an opportunity for the RRPDC to address environmental and growth management issues.

However, the RRPDC does not currently have the resources in terms of numbers of professional planners and technical expertise to adequately perform the needed regional planning and technical assistance tasks. While budgetary constraints may limit expansion of the staff, opportunities do exist to educate and train professional staff on specific issues of importance to the Chesapeake Bay Agreement and Virginia Coastal Resources Program.

Furthermore, in the critical area of nonpoint source pollution management, the RRPDC lacks the financial resources to adequately finalize its VAST model for use in the evaluation of land use strategies and BMP alternatives. If additional funding is available, the VAST model can be fully validated for use in the RRPDC technical assistance program to local governments.

Assessment of Local Programs

As part of the development of the Regional Coastal Resources Management Program, the RRPDC staff conducted interviews of local planning directors or their designees to survey if their planning and regulatory programs were addressing the 13 environmental parameters listed previously. This survey was extremely cursory and not intended as an in-depth assessment of local planning programs, since a more in-depth analysis will be conducted in the FY 1987-1988 Coastal Resources Grant Program.

Other than specific needs identified by a particular jurisdiction, the assessment is a general one rather than focusing on specific needs of a

particular jurisdiction. It was believed that it would be premature to identify specific needs without a more in-depth analysis of each local government's program. For purposes of this initial report, identification of the generic needs of local governments will suffice until more detailed assessments are accomplished.

Therefore, this assessment is organized by those needs common to local governments and those specifically recognized by local government staffs in the survey as important.

Common Needs of Local Governments

The survey of the six local government planning staffs focused on if their planning information and assessment systems, comprehensive and related plans and policies, and regulatory programs address the 13 environmental parameters listed previously. This survey did not try to identify how effectively these parameters are addressed or the effectiveness of each local government's administrative and regulatory framework for effectuating adopted development plans and policies which address environmental concerns.

Planning Information. The survey revealed the following common problems with local government information on environmental parameters:

1. Most local governments have not mapped or assessed environmental parameters to any degree. Generally the governments rely on the uninterpreted data and recommendations contained in publications such as the local soil classification reports, where available. Therefore, analysis of environmental parameters requires individual interpretation and assessment of these parameters on a case-by-case basis.
2. For most of the governments information is readily unavailable for the following parameters tidal and non-tidal wetlands, forest and woodlands, wildlife areas, sand

and gravel and other mineral extraction areas, and groundwater vulnerability and aquifers.⁷⁰

3. No local governments have a complete series of maps and/or readily accessible data files that present environmental parameters in a format which is generally useful for planning and development review. The biggest overall need is for the systematic mapping at appropriate scale(s) and documenting of environmental features and the assessment and display of these features in a manner useful for local government's planning and regulatory programs.

Land Use and Policy Planning. The responses of the local planning staffs on considerations of environmental parameters in their comprehensive land use plans and related plans and policies indicate the follow general needs:

1. Most local comprehensive plans address few of the environmental parameters, except for some small area and/or sector plans. Where these factors are addressed it is usually done in very broad terms with few guidelines or criteria provided for their application in the planning and regulatory process.
2. The categories which need to be addressed are wetlands, critical watersheds and shorelines, forests and woodlands, surface drainage and stormwater runoff, groundwater vulnerability, wildlife areas, and mineral extraction.

Development Regulations and Review. A proper assessment of local development regulations will require more in-depth investigation; however, the survey did reveal several specific needs common to most of the localities.

1. Other than flood plains, few of the localities directly address the environmental parameters in their regulatory ordinances in terms of specific standards and criteria. In general most localities try to address some of the parameters in their site plan and subdivision review on a case by case basis generally without specific written or adopted standards or policies.⁷¹ These case-by-case

⁷⁰Although information on wetlands was not available at local planning offices, the U.S. Fish and Wildlife Service has completed a mapping survey of wetlands within the coastal area jurisdictions.

⁷¹ The absence of these regulations is not unusual, considering that most of the localities have not been able to prepare a planning and policy base for addressing many of these parameters.

assessments may fail to address the accumulative impacts of development. Furthermore, the absence of a proper planning and policy framework may eventually create legal difficulties for addressing these environmental concerns during development review process.

2. Related to water resources, a significant area requiring further assessment are local approaches to addressing stormwater management in terms of quality and quantity of the runoff.
3. The development of specific standards and criteria for regulating sand and gravel and other mineral extraction activities is considered an important item for most of the localities.

Manpower and Budget Considerations. Opposition resulting from real and perceived fears of infringement on private property interests limits expanded consideration of environmental factors in planning and the land development review and regulatory process; however, manpower and budget considerations are also significant limiting factors.

1. Most local governments do not have the staffing and budget to adequately plan for and regulate development in accordance with sound environmental principles. In the small rural counties, a one-person staff hardly has the time to make such an effort without outside assistance. In the larger jurisdictions, just keeping up with the demands created by growth and higher priority items generally work against considerations of many of the environmental parameters.⁷²
2. In regard to opposition to more stringent development controls, it is obvious that most localities will require extensive education programs for their policy boards, planning commissions, developers, and public to truly effectuate changes in their planning and land use regulatory programs.
3. In general most of the staffs lack any technical expertise in-house or from other local government agencies in environmental matters. Without the budget to hire or train in-house staff, it is difficult for local planning

⁷² To address this problem, one local jurisdiction is hiring a environmental consultant to assist its staff in addressing environmental considerations in its development review process.

staffs to adequately address some of the more complex issues.

Specific Local Needs

In the course of the local staff interviews, several of the localities identified the following specific needs:

1. Charles City County--development of an environmentally based comprehensive plan.⁷³
2. Chesterfield County--preparation of specific development standards and criteria for environmental quality.
3. Hanover County--technical assistance in providing environmental reviews for development proposals; and improved monitoring and enforcement capacity for agriculture sludge application.
4. Henrico County--provision of educational programs for elected officials and technical staff on environmental concerns and development of information and development guidelines for preservation of prime and productive agricultural lands.
5. Richmond City--completion of major updating of flood plain maps, improved stormwater management capabilities, improved legal enforcement by court system of soil and erosion ordinance, development of city-wide environmental policies, and streamlining of permitting process to improve staff availability for other tasks.

⁷³ Charles City County has submitted an application for a discretionary Coastal Resources Management Grant from the Virginia Council on the Environment to fund the preparation of a new comprehensive land use plan. The RRPDC staff will provide the technical planning services if the grant is approved. The anticipated date for action on the grant application is sometime in January 1988.

VI. IMPLEMENTATION PROGRAM

The Richmond Regional Planning District Commission staff reviewed the background information provided in the Coastal Resources Issues section and the results of the preliminary survey of local planning departments to identify specific actions and projects for inclusion in the recommended Regional Coastal Resources Management Program. These actions are not intended to be all inclusive and will be subject to further refinement as the results of more in-depth assessment of local planning and development review programs are undertaken as well as new needs are identified by the RRPDC and local staffs.

The recommended program is organized by those actions or projects to be accomplished at the regional level and those at the local level. The regional projects are those projects which benefit more than one jurisdiction or directly relate to the development of specific information, policies, or actions at the PDC level. Local projects and tasks are those which the RRPDC staff will do for specific jurisdictions upon request of that local government.

The recommended implementation program will be used by the RRPDC to identify specific regional projects to be completed and to respond to local requests for technical assistance under its annual Coastal Resources Grant Program. The program will be updated on an annual basis as conditions warrant and new needs and opportunities are identified.

Local technical assistance projects are grouped by the priority by which the RRPDC will respond to a request. The response of the RRPDC will be governed by these set of priorities and overall technical assistance guidelines presented in the section on the local technical assistance program.

Regional Program

The following tasks have been identified by the RRPDC staff for inclusion in the regional program based on contractual agreements with the Council on the Environment, proposed Chesapeake Bay Agreement and Virginia Coastal Resources Management Program, regional programmatic goals in Chapter III, and the needs assessment in Chapter V:

- 1.1 Assist the Council on the Environment in gathering information for preparation of draft Development Guidelines in accordance with the Chesapeake Bay Program.
- 1.2 Review the draft Development Guidelines with the participation of local government staffs and provide comments to the Council on the Environment.
- 1.3 Develop specific objectives and guidelines in coordination with the Council on the Environment and with input from local governments for directing the assessment of local comprehensive plans and land development procedures. This assessment should have some relationship to the Development Guidelines which will be developed for the Chesapeake Bay Agreement.
- 1.4 Complete assessment of local planning programs and incorporate recommendations in the update of the Regional Coastal Resources Management Program.
- 2.0 Prepare model mineral extraction (principally sand and gravel) and reclamation ordinance for use by localities.
- 3.0 Prepare technical briefing paper(s) for use by RRPDC and local technical staffs on the following Federal/State programs: Clean Water Act (Sections 401/402/404); River and Harbors Act; Virginia and Federal Wetlands regulations; Scenic Rivers Act; and Soil Erosion and Sediment Control Act. This task is already ongoing. The basic intent is to familiarize the RRPDC and local technical staffs about the requirements and procedures of

these laws and regulations affecting protection of the environment.

- 4.0 Send staff to conferences and seminars to expand their knowledge and expertise in critical environmental and resource management areas; and develop in-house staff experts on issues such as wetlands protection, nonpoint pollution management, and water resources management.
- 5.0 Prepare articles on coastal resources and Chesapeake Bay issues for inclusion in the RRPDC's Regional Quarterly.
- 6.0 Complete environmental reviews of projects as needed under the Commonwealth Intergovernmental Review Process and Federal Environmental Impact Statement and Virginia Environmental Impact Process.
- 7.0 Prepare applications at the request of local governments for obtaining discretionary grants under the Coastal Resources Management Program from which the RRPDC would receive funding to provide services.
- 8.0 Provide technical advice and information to local governments and public upon request on environmental and coastal resource matters. This task refers to those requests of a specific nature, which would be limited in terms of their demands on the time of the RRPDC staff.
- 9.0 Review and update Regional Coastal Resources Program on at least an annual basis.
- 10.0 Prepare a series of regional maps at suitable scale with supporting descriptive text, which depicts and interprets critical environmental and development factors affecting the growth of the region. The RRPDC has much data available, some of which has been mapped; however, some of it is out-of-date or is in unusable form. Furthermore, newer data is now available, such as on wetlands, that needs to be incorporated. This effort will provide a basis for development of a regional policies plan.
- 11.0 Prepare an assessment of regional growth and development issues to provide the framework and focus for development of a regional policies plan. The regional issues assessment should be presented in brief policy papers format.
- 12.0 Develop a regional policies plan in cooperation with local governments, which addresses environmental and coastal resource issue identified in Task 11. With the emphasis on more growth management in the Chesapeake Bay region, it is essential that the region's governments work together to address critical growth and environmental issues in a

regional forum, primarily because these issues are not artificially confined by jurisdictional boundaries. Furthermore, the need for such cooperation is particularly pertinent now that the State is actively considering a stronger role for itself in local planning and zoning matters.

Local Technical Assistance Program

A significant portion of the Coastal Resources Management Program involves the provision of technical assistance to local governments by the RRPDC. As a minimum, the RRPDC proposes to allocate at least 25 percent of its Coastal Resources Management Program for technical assistance activities. In the FY 1987-1988 grant, the total amount tentatively allocated for technical assistance is slightly over \$16,000. This allocation will be increased as more projects or needs are identified.

The technical assistance program will be guided by overall operating principles and a set of priorities. These priorities are based on the Regional goals and objectives in Chapter III and general needs assessment in Chapter V.

Principles

The program priorities will be used to determine which projects will be selected by the RRPDC staff for technical assistance; however, these basic principles will influence the selection process:

1. If competing projects are of equal priority, preference will be given to those jurisdictions which:
 - a. were last to receive technical assistance under this program; and,
 - b. lack the staff resources and capability to complete project;
2. The acceptance of any project by the RRPDC for technical assistance will depend upon availability of Commission staff, level of effort involved, technical staffing

requirements, budgetary limitations, and level of commitment, if any, of local staff involvement.

3. No technical assistance requests under this program will be accepted by the RRPDC for those jurisdictions currently receiving, at the time of the request, planning services from the RRPDC funded by a discretionary grant under the Virginia Coastal Resources Management Program.
4. All project requests must be related to the Coastal Resources Management Program and/or Chesapeake Bay Agreement.
5. The funding cap for any single project will be \$5,000, unless it is augmented by local funds and/or the level of technical services provided each locality under the RRPDC's regular technical assistance program.

The RRPDC will establish a formal request procedure and deadline dates for receiving technical assistance requests, except as provided below in the section on priorities. A formal process is needed to insure each local government is given an opportunity to be fairly considered for assistance under this program.

Technical Assistance Priorities

The RRPDC staff suggests that following priorities listed in order of magnitude for selection of projects under the technical assistance program:

1. Projects involving assistance to local governments in the evaluation of development proposals as to environmental impacts. Technical assistance for any such projects will be on an as requested basis subject to acceptance by the RRPDC staff. Such requests will not be subject to competition with other projects and will be administered outside the normal technical assistance request process. However if these requests become burdensome or too difficult to handle, specific guidelines may have to be developed at a later date.
2. Projects resulting directly from the recommendations contained in the assessment of local comprehensive planning and development review programs(see Task 1.4 of Regional Program).
3. Projects assisting local governments in developing their mapping and planning information bases for environmental

and development information with specific priority given to those environmental parameters listed in the Regional Coastal Resources Management Program.

4. Projects involving the preparation of specific plans and ordinances related to environmental issues which have not been identified in the assessment of local comprehensive planning and development review programs (see Task 1.4 of the Regional Program).
5. Projects involving the preparation of applications for funding under the discretionary grant program of the Virginia Coastal Resources Program, from which the RRPCD would not receive any funding.

