SOUTHERN WATERSHED SPECIAL AREA MANAGEMENT PROGRAM

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SOUTHERN WATERSHED AREA MANAGEMENT PROGRAM

PHASE II

FINAL REPORT

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SOUTHERN WATERSHED AREA MANAGEMENT PROGRAM

PHASE II

FINAL REPORT

I. INTRODUCTION

Through Phase II of the Southern Watershed Area Management Program (SWAMP), the Cities of Virginia Beach and Chesapeake, working with the Hampton Roads Planning District Commission, have been able to build upon the cooperative accomplishments made in Phase I of the project. The first phase of the project was largely focused on creating a framework for the two cities to work together. This was accomplished through the creation of a set of goals and objectives for management of the Southern Watershed Area (SWA) and a Memorandum of Agreement that was signed in the fall of 1995. In Phase II progress has been made in several different areas including the completion of a survey of agencies working in the Southern Watershed Area, the creation of a Water Quality Task Force and efforts to implement the goals and objectives created in Phase I. In addition, the foundation for Phase III of the project has been established. Phase III will involve increased community participation and education.

II. OVERVIEW OF THE WORK OF THE COMMITTEES

A. Local Government Advisory Committee:

Throughout Phase II of the project the Local Government Advisory Committee (LGAC) has continued to guide the Southern Watershed Area Management Program. In monthly meetings representatives from the planning, public works, public utilities and agriculture departments in Chesapeake and Virginia Beach discuss and analyze issues pertaining to the SWA. These meetings have resulted in an improved understanding of the problems facing the SWA and insight into possible solutions. The LGAC has also worked together to define the mission of the Water Quality Task Force and to develop a scope of work for the next phase of SWAMP.

One of the most valuable aspects of SWAMP is the forum that it provides for discussion between representatives of the two Cities of issues that affect the SWA. The monthly meetings foster a degree of communication between the two localities that would not occur otherwise. Although it is difficult to quantify the impact of these discussions on the formulation of policy or the functioning of programs in the two localities, it is safe to say that the dialog between the two cities has an affect. An example of this is the interaction that has taken place between the SWAMP project and the Comprehensive Plan revision processes that are underway in the two cities. In the case of Virginia Beach a meeting was held to address

environmental issues as they relate to the Comprehensive Plan. Mr. Clay Bernick, a member of the LGAC, attended the meeting and was able to bring information concerning the goals and objectives of SWAMP to the table. At the meeting several issues pertinent to the SWA were discussed, including the need for controlled burning for habitat management and the desire to link existing preservation areas into a contiguous buffer system. Mr. Bernick reported the results of the Comprehensive Plan meeting back to the LGAC. This information was subsequently integrated into the planning process for the next phase of SWAMP. This example highlights the interaction that is developing between local planning processes and the SWAMP project.

B. Water Quality Task Force:

The Water Quality Task Force (WQTF) was created to analyze existing water quality data, critique the existing monitoring network and make recommendations on future actions. The Task Force includes representatives from the Department of Environmental Quality, United States Fish and Wildlife Service, the United States Geological Survey, the Virginia Department of Game and Inland Fisheries, the Department of Conservation and Recreation/Division of Natural Heritage, The Nature Conservancy, Back Bay Restoration Foundation, Department of Conservation and Recreation/Division of Soil and Water Conservation, the Hampton Roads Sanitation District and the Cities of Virginia Beach and Chesapeake. The first meeting took place on February 23, 1996. The goals for the first meeting were as follows:

- Evaluate existing water quality data and determine its sufficiency for identifying current water quality problems and pollution sources in the Southern Watershed Area. Determine if the existing data set is sufficient to answer critical watershed management questions.

- Identify deficiencies and gaps in the existing water quality data. The gaps could be due to a wide variety of reasons, including geographic areas with insufficient monitoring or incompatibility between data sets due to different collection methods or research goals.

- Outline a process for creating a data set that is sufficient to improve understanding of the linkages between land use patterns and water quality in the SWA. Specific areas of interest include the creation of a more extensive water quality monitoring network, creation of a common repository for water quality data and improved communication and coordination between agencies performing water quality testing and research in the SWA.

The first meeting began with representatives from Virginia Beach and Chesapeake providing an overview of land use trends and significant planning issues in the SWA. Then representatives from each of the participating organizations provided a synopsis of the water quality monitoring and data analysis activities that they are involved in. The meeting ended with discussion of cause and effect relationships between land use patterns and water quality in the SWA. The general conclusions of the meeting are as follows:

- Sufficient information does not yet exist to fully understand the linkages between land use activities and water quality. However, several studies currently under way will provide additional insight.

- Existing monitoring programs are targeted at a variety of different goals and the coordination between the programs is not strong enough.

- It was pointed out that while the land use/water quality linkages are not well understood in the SWA, data from studies of structural and nonstructural BMPs in other regions may be applicable to the SWA.

Following the first meeting the HRPDC staff collected and analyzed information on the monitoring practices of the agencies on the Task Force. This analysis resulted in a set of matrices and maps that summarize the aggregate monitoring network. A copy of the tables and matrices is included in Appendix I.

The second meeting of the Task Force took place on May 14, 1996. The HRPDC staff presented the results of the research into water quality monitoring in the Southern Watershed Area. The presentation featured a set of maps showing the location of water and sediment sampling sites, a table describing the parameter sets analyzed by various agencies, a set of tables describing the details of the monitoring programs in each subwatershed in the SWA, and a set of matrices that provide an element by element comparison of each parameter set. This analysis resulted in an improved understanding of the interrelationships and overlaps in the existing monitoring programs. After the presentation the group discussed future direction for the monitoring programs. The discussion yielded a consensus that a detailed statistical analysis of the existing water quality data sets is needed to provide insight into land use/water quality relationships and the design of future monitoring programs. (Note: The first step in this analysis has been included in the work plan for the next phase of SWAMP)

III. MAJOR PROJECT INITIATIVES

A. Southern Watershed Agency Survey:

At the direction of the Local Government Advisory Committee the HRPDC staff completed a survey of 24 agencies working in the SWA. The survey was designed to answer the following questions:

- What are the research and regulatory programs underway in the SWA?
- Who maintains what information on the SWA?
- Which agencies are working together?
- What are the information needs of agencies working in the SWA?
- How can data consistency and interagency coordination be improved?

The responses to the survey varied from multi-page typewritten documents to handwritten notes. In order to facilitate better understanding of the responses a set of single page summaries was prepared. Each summary sheet contains a listing of programs that the agency is involved in, the data bases that the agency maintains and a section dealing with interagency communication. The summary sheets are included in Appendix II.

B. Further Refinement of Watershed Management Goals and Strategies for Implementation:

In Phase I of SWAMP a set of goals and objectives for management of the SWA were developed. Two of the tasks outlined for Phase II were the refinement of the goals and objectives and the development of strategies for their implementation. Through a series of discussions and meetings the LGAC and the WQTF have worked towards the development of strategies for the implementation of the goals. As a result of this process the goals and objectives have been sharpened and more completely defined. The following are examples of both the refinement of the goals and the development of plans for implementation.

Goal A: Water Quality should be Protected and Enhanced for Water Supplies and Natural Resource Conservation.

- Through the work of the Water Quality Task Force the following conclusions have been reached:

A solid understanding of the linkages between the land use patterns and water quality in the SWA does not yet exist.

The LGAC and the WQTF will continue to work together to develop a better understanding of the existing water quality data sets with the long range goal of improving the monitoring network and ultimately the understanding of water quality issues in the SWA.

Despite the lack of a sufficient understanding of the land use/water quality link, there are many proven and effective Best Management Practices (BMPs) that can be applied now in the SWA to protect water quality.

The investigation of water quality issues has been an iterative process where the analysis of existing programs and technical data has lead both to a refinement of goals and to improved insight into how to implement the existing goals and objectives.

Goal B: Preserve Open Lands to Help Protect and Enhance Water Quality:

Several opportunities are being investigated including linking existing preservation areas in the SWA and establishing a buffer and corridor system to preserve habitat and insure that management options such as the use of controlled burns remain viable.

Goal C: Ensure Compatibility of Recreational Activities and Commerce with Natural Resource Protection:

Efforts in this area include the investigation of options for nature based tourism and other forms of sustainable economic development and the discussion of the possibility of a visitor center in the SWA to support educational and recreational programs. Phase III of SWAMP will include a study of several possible sustainable economic development initiatives.

Goal D: The Character of the Southern Watershed Area Should Remain Rural while Providing for Rural Residential Development:

The LGAC has discussed this issue extensively. Both Virginia Beach and Chesapeake consider preservation of the rural character of the SWA to be a high priority, and this will be reflected in the Comprehensive Plan revisions underway in both Cities. Phase III of SWAMP will include a study of development controls intended to

preserve rural character in rapidly developing areas. Examples from both inside and outside the State of Virginia will be compared with the development controls currently in use in the SWA.

Goal E: Agricultural and Forestal Activities in the Southern Watershed should be Sustained and Encouraged:

The discussion and investigation of sustainable economic development initiatives has included agricultural and forestal activities as a focus. The Phase III study of this topic will include an investigation of organic farming as a method of both preserving agriculture and protecting water quality in the SWA. Although not directly related to the current SWAMP project, the Virginia Beach Agriculture Reserve Program is an important initiative that will be integrated into SWAMP where possible.

Other Examples of Implementation of the Goals and Objectives Developed in Phase I:

In many cases the actions of the individuals participating in the LGAC and the research and analysis produced by the SWAMP project have an impact on local programs and policy. The following are examples of this phenomenon:

- Federal resource agencies paid special attention to the SWAMP program as a part of the environmental review associated with the Virginia Department of Transportation's Route 168 project in Chesapeake. The SWAMP program was viewed as an indicator of the City's commitment to protecting water quality and the control of secondary impacts associated with the roadway.

- SWAMP has fostered a heightened awareness of the importance of the SWA in Chesapeake. The implications of the program and references to the MOA have been included in the review of development projects in the watershed. SWAMP has lead to healthy debate over the appropriateness of some land use decisions.

- SWAMP has lead to enhanced communication between Chesapeake and Federal agencies managing the Great Dismal Swamp National Wildlife Refuge and has lead to an inclusion of the Dismal Swamp in comprehensive planning efforts.

- By attending the LGAC and WQTF meetings, public works employees in both cities who work with the NPDES stormwater monitoring programs have been able to interact with state and federal agencies who are monitoring water quality in the SWA. This communication should lead to tighter coordination between the monitoring programs in the future.

- As a result of the work of the WQTF the HRPDC staff is looking into the possible redeployment of the automated monitoring equipment used by USFWS in its Back Bay stormwater monitoring program.

C. Recommendations on Additional Technical Studies:

To assist in implementing the goals, a number of additional technical studies were identified by the LGAC. The LGAC recommended that the following studies be pursued as priorities.

Statistical analysis of the existing water quality data: The overarching goal of this study will be to produce an improved understanding of water quality trends in the SWA. To accomplish this the consultants hired for the job will attempt to combine the water quality data from all of the agencies testing in the SWA into one large set and then analyze that aggregate set to determine if significant trends exist. It is likely that due to differences in testing methodologies and quality control that only a subset of the information will be suitable for analysis. If this is the case then the consultants will be asked to identify the significant differences in the data sets so that compatibility issues can be successfully addressed in the configuration of future monitoring programs. The specifics of the analytic process will be determined by an interdisciplinary team assembled from local, state and federal agencies working in the SWA.

Analysis of Development Controls: Zoning codes, subdivision ordinances, site plan regulations, and related land use and environmental management regulations will be critical factors in determining the type of development that takes place in the SWA. These development controls will be analyzed to determine their ability to protect water quality and critical habitat. Comparisons will be made to development controls that effectively protect critical habitat in other geographic areas. The results of this analysis will be used as these regulations are revised in Virginia Beach and Chesapeake.

Research of Options for Sustainable Economic Development: Demonstration of the economic value of the unique natural features of the

SWA is a critical factor in their preservation. Several options for sustainable economic development will be examined including nature tourism, agricultural tourism, and organic farming. Aspects of nature tourism that will be examined include the possible creation of canoe trails, a visitors center, and a tour guide training program. In addition, options for growing and marketing organic produce will be explored.

D. Problem Identification:

Through a series of discussions and analytic studies both the LGAC and the WQTF identified problems facing the Southern Watershed Area. By far the most vexing problem is the continued increase in development pressures. In both Virginia Beach and Chesapeake the SWA has become the primary growth area. Several factors have combined to create this problem. The following is a partial list of the factors:

- Oceana Naval Air Station will expand in the near future. An EIS evaluating the proposed expansion is in progress. The addition of new personnel at Oceana is likely to increase the development of new housing in the SWA.

- The Southeastern Parkway and Greenbelt is projected to be constructed in the near future. It will run from Oceana Naval Air Station to Chesapeake. Ultimately, the plans call for a connection to Interstate 464.

- The bulk of the new development in Virginia Beach is taking place in the northern portion of the Southern Watershed Area (SWA). This is an east/west band through the middle of the City. Many types of development are taking place, including a 20,000 seat amphitheater, golf courses, and new office and retail buildings including a Super Walmart and a Super Target store.

- In the Greenbrier section of Chesapeake, the TransAmerica project is in the development approval phase. This is a significant project that will include residential, office, and commercial uses. There are many environmental concerns associated with this project.

- The Great Bridge section of Chesapeake is characterized by rapid development, suburban sprawl, and strain on existing infrastructure.

- Southern Chesapeake: There is a high demand in the southern part of City for large lot development. The planning

department is looking at rural clustering as a method of dealing with the development pressure.

- The Fentress area of Chesapeake: This area will likely see increased military activity as a result of expansion at Oceana. Fentress is zoned for light industrial development.

- The Route 168 bypass and improvements to Route 168 south will have a large impact on development patterns in the SWA. Chesapeake plans to limit new development to nodes at interchanges.

- The completion of the Lake Gaston pipeline will supply needed water to the region and will likely be a factor in increasing development in the SWA.

The next phase of the SWAMP project will directly address the growth issue through a stakeholder workshop and research into development controls.

E. Public Education:

In March of 1996 the HRPDC staff briefed the Area VI Virginia Soil and Water Conservation District on the SWAMP project. In August the HRPDC staff presented the Back Bay Restoration Foundation with an overview of the SWAMP project and answered the groups questions on the Southern Watershed Area. View graphs from these presentations are available. In addition, the matrices and tables analyzing the water quality monitoring network in the SWA that were developed for the WQTF are available for public education.

F. Intergovernmental Agreements:

Memorandum of Agreement between Chesapeake and Virginia Beach: The MOA between the Cities of Chesapeake and Virginia Beach was executed on October 10, 1995 in Chesapeake and September 26, 1995 in Virginia Beach. The final version of the MOA calls for the appointment of a Southern Watershed Coordinator for each city, institution of a staff-level process for cooperative environmental management of the Southern Watershed, the development of educational materials, and continued technical water quality studies. In addition, the MOA establishes the mission statement, goals and objectives developed in Phase I of SWAMP as the framework for decisions made by the two signatory local governments. The priorities developed by the SWAMP committee will serve as the basis for developing an action plan for the SWA. A copy of the signed MOA is included in Appendix III.

G. Intergovernmental Information Exchange:

As a result of the MOA the LGAC has established a process by which information on significant new land development projects in the two cities is exchanged during the monthly meetings. Significant projects are those which do not follow the provisions of the Comprehensive Plans or are adjacent to the shared border of the two cities.

H. Information Exchange with North Carolina:

Two North Carolina Basin Plan Meetings were held in Ahoskie and Elizabeth City on July 25, 1996. These meetings were part of a follow up to the Albemarle/Pamlico Estuarine Study. HRPDC staff attended the meetings and reported the proceedings to the LGAC. The meeting in Ahoskie focused on the Chowan River Basin and the Elizabeth City meeting was one of two meetings on the Pasquotank Basin. The format for both meetings was the same. The first half of each meeting involved presentations by local and state planning staff and local citizens on water quality issues and the structure of the basinwide planning process. The second half of each meeting consisted of group discussions of priority water quality issues. Meeting attendees were given the opportunity to voice concerns and identify specific water quality issues. The input from each group will be summarized by North Carolina Division of Water Quality staff and distributed to attendees.

In addition, HRPDC staff and a representative from Chesapeake attended the Corps of Engineers Canal #2 Meeting that took place on July 25, 1996 in Currituck County, NC. The purpose of the meeting was to identify potential issues associated with the operation of Canal No. 2 and its impact on Currituck Sound. Those issues and available documentation of those issues are to serve as the basis for a COE study of Canal No. 2 under the authority of Section 1135 of the Water Resources Development Act of 1986. That section allows the COE to reexamine COE projects that do or are perceived to be having a negative environmental impact and to develop a mitigation project addressing those impacts.

Canal No. 2, a COE project, is perceived to be having a negative impact on fisheries in the Sound due to rising salinity levels. It is thought, and some documentation exists to support this, that Canal No. 2 allows higher salinity water to move from the Lynnhaven system to the Currituck system during periods of northeast wind. This is attributable in part to the increase head on water flowing south due to the higher tide range in the Lynnhaven. A USGS study conducted during the early 1990s provides some corroboration of the perception that higher salinity waters due flow south, past the West Neck Road bridge. This study is to be completed in late 1996 and be may be followed by a more comprehensive study.

IV. FUTURE PLANS:

The following activities have been identified as priorities for Phase III of SWAMP.

Achieve stakeholder consensus on a shared vision for the SWA that protects significant natural and cultural resources: One of the key elements of the next phase of the SWAMP project will be the development of a shared vision for the future of the Southern Watershed Area. The Local Government Advisory Committee developed a set of goals and objectives for the SWA during Phase I of SWAMP. The goals include the protection of water quality, preservation of open lands, and preservation of the rural character of the SWA. The consensus building process will provide an opportunity to develop a framework for achieving these goals. This process is particularly timely in that both Virginia Beach and Chesapeake are in the process of updating their comprehensive plans. The vision developed through this process will be refined and focused in the subsequent years of the grant.

Lay the foundation for new and enhanced enforceable policies that protect significant natural and cultural resources while encouraging sustainable economic development: The SWA is facing intense development pressures. Both cities are in the process of attempting to balance the impacts of development and resource protection. Through the previously mentioned consensus building process, it should be possible for phase III of SWAMP to provide valuable insight on opportunities for sustainable economic development and workable solutions to the problems posed by new development. In the subsequent years of the grant, specific enforceable policies will be developed to aid in the preservation of cultural and natural resources in the SWA. In many cases, these efforts will dovetail with efforts already initiated by the two cities. As an example, the City of Chesapeake has a review of its subdivision ordinance in its work plan. Phase III of SWAMP will include research on subdivision ordinances that have been successful in protecting the rural character of other geographic areas. This information will feed into the decision making process in Chesapeake. The combination of research and consensus building with citizens, elected officials, the development community, and other groups will influence the development and refinement of enforceable policies. As phase III of SWAMP progresses, it will be possible to specifically enumerate the enforceable policies that will be pursued.

Explore options for nature tourism and other forms of sustainable economic development in the SWA: The focus of this research will be on the identification of forms of economic development that support the goals of habitat and water quality protection. Opportunities for canoeing, birding, hiking, hunting, fishing, and biking will be explored. In addition, possibilities for a visitor center and canoe launch sites will be examined. The application of organic farming and other forms of sustainable agriculture to the SWA will be studied.

Provide insight into water quality trends in the SWA: Existing data will be analyzed to determine water quality trends. The results of this research will be used to evaluate the existing monitoring network, identify water quality problem areas, and inform future decisions on land use policy in the SWA.

Increase public awareness of the SWA as an economic and natural resource: Provide opportunities for public involvement in recreational and educational programs in the SWA.

Southern Watershed Festival: A Festival to promote public awareness of the natural resources in the SWA. The Festival will emphasize several themes including the potential economic benefit of protecting the natural resources in the SWA, recreational opportunities, and education on the detrimental effects of inappropriate land use and development patterns.

APPENDIX A:

ANALYSIS OF THE WATER QUALITY MONITORING NETWORK IN THE SOUTHERN WATERSHED AREA

PARAMETER SETS

DEQ: The following are the parameter sets used by DEQ for water quality testing. All of the tests are performed on water obtained through grab samples with the exception of the last two sets of tests which are performed on sediment samples.

FIELD: Field measurements of Dissolved Oxygen, Temperature, Salinity, Conductivity, and pH

NUT: Total Kjeldahl Nitrogen (TKN), Total Phosphorus, Ortho-phosphate, Ammonia, Nitrite, Nitrate

NME1: Biochemical Oxygen Demand (BOD), Chloride, Sulfate, Conductivity, Total Solids, Fixed Solids, Total Suspended Solids (TSS), Volatile Suspended Solids (VSS), Fixed Suspended Solids (FSS), pH, Alkalinity, Turbidity

NME5: Chemical Oxygen Demand (COD), Total Organic Carbon (TOC), Hardness

NME12: Total Solids, Volatile Solids, Fixed Solids, TSS, VSS, FSS, Turbidity

FCMF: Fecal Coliform Membrane Filter

CHLa: Chlorophyll a and Phaeophyton

MET8: Arsenic, Cadmium, Chromium, Copper, Iron, Lead, Manganese, Mercury, Nickel, Selenium, Zinc

MET1S: Sediment Metals: Antimony, Aluminum, Arsenic, Beryllium, Cadmium, Chromium, Copper, Iron, Lead, Manganese, Mercury, Nickel, Selenium, Silver, Thallium, Zinc

PES1S: Sediment Pesticides: Total PCBs, Pentachlorophenol, Dieldrin, Total Chlordane, Total DDT, Total DDE, Total DDD, Endrin, Toxaphene, Heptachlor, Heptachlor Epoxide, Dicofol (Kelthane), Aldrin

USFWS: The following section contains the water quality parameters analyzed by USFWS. These tests are performed on samples obtained during storm events by automated sampling devices. Dry weather samples are taken for comparison to wet weather samples. For ease of comparison, the USFWS test parameters have been grouped in sets that are similar to those used by DEQ. The set names are the same as those used by DEQ but have been prefixed with "US".

USNUT: Total Kjeldahl Nitrogen (TKN), Total Phosphorus, Ortho Phosphate, Ammonia, Nitrite, Nitrate

USNME1: Total Suspended Solids (TSS), Volatile Suspended Solids (VSS), Turbidity

USCHLa: Chlorophyll a

USSED: Sediment Metals: Aluminum, Arsenic, Barium, Beryllium, Boron, Cadmium, Chromium, Copper, Iron, Lead, Magnesium, Manganese, Molybdenum, Nickel, Selenium, Silver, Strontium, Thallium, Vanadium, Zinc. Sediment Pesticides: Total PCBs, Endrin, Toxaphene, Heptachlor Epoxide, Hexachlorobenzene, Chlordane, Oxychlordane, DDD, DDE, Mirex, Atrazine, Alachlor, Metachlor. Also included in this set: Polynuclear Aromatic Hydrocarbons, Chlorphenoxy Herbicides, Microtox Bioassay, Sago Pondweed Bioassay, Amphipod Bioassay.

HRSD: HRSD takes automatic flow weighted composite samples of runoff from the Progress Farm and manual grab samples from Scopus Creek and Lake Tecumseh.

HRSD1: Runoff from Progress Farm: Organic Nitrogen, Ammonia, Nitrate, Nitrite, Total Phosphorus, pH, BOD, TSS, Fecal Coliform, Fecal Strep.

HRSD2: Grab Samples: Depth, DO, Temperature, pH, Ammonia, Nitrate, Nitrite, Total Phosphorus, Ortho Phosphorus, BOD, TSS, Chlorophyl a, Pheophytin, Copper, Cadmium, Mercury, Lead

CHESAPEAKE PUBLIC WORKS: CPW will sample stormwater runoff at five locations using automatic samplers.

CHES1: Flow, TSS, TDS, BOD, COD, Total Phosphorus, Dissolved Phosphorus, Nitrate, Nitrite, TKN, Total Ammonia, Arsenic, Cadmium, Chromium, Copper, Lead, Zinc.

VIRGINIA BEACH PUBLIC WORKS: VBPW will sample stormwater runoff at one location in the Southern Watershed Area using an automatic sampler.

VB1: Flow, TSS, TDS, BOD, COD, Total Phosphorus, Dissolved Phosphorus, Nitrate, Nitrite, TKN, Total Ammonia, Arsenic, Cadmium, Chromium, Copper, Lead, Zinc.

CHESAPEAKE PUBLIC UTILITIES: CPU collects grab samples at two locations on the Northwest River, one location at Tulls Bay, and one at Currituck Sound. The first four parameter groups all apply to samples taken at the water treatment intake on the Northwest River. Parameters in CPU1 are measured daily, CPU2 weekly, CPU3 monthly, and CPU4 quarterly. Parameters in CPU5 are measured weekly on samples taken at locations other than the intake.

CPU1: Turbidity, Total alkalinity, pH, True color, Total and Fecal Coliform, Total Hardness, Iron, conductivity, Temperature, Chloride, DO, Manganese, Rainfall

CPU2: TOC, Sodium, Aluminum

CPU3: TDS

CPU4: THM, Giardia, Crypto,

CPU5: Chlorides, pH, Temp.

NORFOLK PUBLIC UTILITIES: NPU takes grab samples once a month at Stumpy Lake.

NORFOLK1: Temperature, Chlorophyll a, Algae, Total and Fecal Coliforms, Heterotrophic Plate Count, pH, True color, Turbidity, Alkalinity, TDS, TSS, Ortho-Phosphate, Total Phosphate, DO, TKN, Total Iron, Manganese, UV Absorbance, Trihalomethane Formation Potential, Secchi Disk, Nitrate, TOC

BA

Monitoring Location	Agenc
Route 629 Bridge	DEQ
Mouth of Creek	VGIF
Adjacent to Hell Point Golf Course	USFWS

BACK BAY

Monitoring Location	Agen
Runoff from Progress Farm	HRSD
Scopus Creek	HRSD
Lake Tecumseh	HRSD

NORTHWEST RIVER: MAIN STEM

Monitoring Location	Agency	Collection Method	Parameter
Intake	Chesapeake Public Utilities	Grab Samples	CPU1
			CPU2
			CPU3
			CPU4
Panther Landing	Chesapeake Public Utilities	Grab Samples	CPU5
Tull Bay	Chesapeake Public Utilities	Grab Samples	CPU5
Route 168 Bridge	DEQ	Grab samples taken with bucket	FIELD, NU NME1, MN FCMF
			MET8, ME PES1S

NORTHWEST RIVER: INDIAN CREEK

Monitoring Location	Agency	Collection Method	Parameter
Indian Creek Road Bridge	DEQ	Grab samples taken with bucket	FIELD, NU NME1, MN FCMF
			MET8, ME PES1S

BACK BAY: HELL POINT CREEK

Monitoring Location	Agency	Collection Method	Parameter Set	Collection Frequency
Route 629 Bridge	DEQ	Grab samples taken with bucket	FIELD, NUT, NME1, MME5, FCMF	Monthly
			MET8, MET1S, PES1S	Annually
Mouth of Creek	VGIF	Grab samples taken with bucket	FIELD, NUT, NME1, MME5, FCMF, CHLa	Quarterly
			MET8, MET1S, PES1S	Annually
Adjacent to Hell Point Golf Course	USFWS	Automated rain event triggered samplers	USNUT, USNME1, USCHLa	As triggered by rain events between 7/94 - 6/95, dry weather control samples

BACK BAY: LAKE TECUMSEH AND SCOPUS CREEK

Monitoring Location	Agency	Collection Method	Parameter Set	Collection Frequency
Runoff from Progress Farm	HRSD	Automatic flow weighted composites	HRSD1	Two times per quarter
Scopus Creek	HRSD	Grab samples	HRSD2	June and August of each year
Lake Tecumseh	HRSD	Grab samples	HRSD2	August of each year

BACK BAY: SHIPPS BAY

Monitoring Location	Agency	Collection Method	Parameter Set	Collection Frequency
Off Little Island	VGIF	Grab samples taken with bucket	FIELD, NUT, NME1, MME5, FCMF, CHLa	Quarterly
			MET8, MET1S, PES1S	Annually

BACK BAY: SAND BAY

Monitoring Location	Agency	Collection Method	Parameter Set	Collection Frequency
East of Ragged Island	VGIF	Grab samples taken with bucket	FIELD, NUT, NME1, MME5, FCMF, CHLa	Quarterly
			MET8, MET1S, PES1S	Annually
Greenhill (Eastern Shore of Back Bay)	USFWS	Automated rain event triggered samplers	USNUT, USNME1, USCHLa	As triggered by rain events between 7/94 - 6/95, dry weather control samples
Refuge Dock (Eastern Shore of Back Bay)	USFWS	Automated rain event triggered samplers	USNUT, USNME1, USCHLa	As triggered by rain events between 7/94 - 6/95, dry weather control samples
Ragged Island (Sediment Sample)	USFWS	Box corer	USSED	4/91 - 5/91

BACK BAY: SHIPPS BAY

Monitoring Location	Agency	Collection Method	Parameter Set	Collection Frequency
Off Little Island	VGIF	Grab samples taken with bucket	FIELD, NUT, NME1, MME5, FCMF, CHLa	Quarterly
			MET8, MET1S, PES1S	Annually

BACK BAY: SAND BAY

Monitoring Location	Agency	Collection Method	Parameter Set	Collection Frequency
East of Ragged Island	VGIF	Grab samples taken with bucket	FIELD, NUT, NME1, MME5, FCMF, CHLa	Quarterly
			MET8, MET1S, PES1S	Annually
Greenhill (Eastern Shore of Back Bay)	USFWS	Automated rain event triggered samplers	USNUT, USNME1, USCHLa	As triggered by rain events between 7/94 - 6/95, dry weather control samples
Refuge Dock (Eastern Shore of Back Bay)	USFWS	Automated rain event triggered samplers	USNUT, USNME1, USCHLa	As triggered by rain events between 7/94 - 6/95, dry weather control samples
Ragged Island (Sediment Sample)	USFWS	Box corer	USSED	4/91 - 5/91

BACK BAY: BEGGARS BRIDGE CREEK

Monitoring Location	Agency	Collection Method	Parameter Set	Collection Frequency
Muddy Creek Road below Dawley's Corner	BBRF	Grab samples taken with bucket	FIELD, NUT, NME12, FCMF	Monthly
			CHLa	Quarterly
			MET8, MET1S, PES1S	Annually
Adjacent to Muddy Creek Road Bridge	USFWS	Automated rain event triggered samplers	USNUT, USNME1, USCHLa	As triggered by rain events between 7/94 - 6/95, dry weather control samples
Mouth of Creek (Sediment Sample)	USFWS	Box corer	USSED	4/91 - 5/91

BACK BAY: BEGGARS BRIDGE CREEK

Monitoring Location	Agency	Collection Method	Parameter Set	Collection Frequency
Muddy Creek Road below Dawley's Corner	BBRF	Grab samples taken with bucket	FIELD, NUT, NME12, FCMF	Monthly
			CHLa	Quarterly
			MET8, MET1S, PES1S	Annually
Adjacent to Muddy Creek Road Bridge	USFWS	Automated rain event triggered samplers	USNUT, USNME1, USCHLa	As triggered by rain events between 7/94 - 6/95, dry weather control samples
Mouth of Creek (Sediment Sample)	USFWS	Box corer	USSED	4/91 - 5/91

NORTH LANDING RIVER: MAIN STEM

Monitoring Location	Agency	Collection Method	Parameter Set	Collection Frequency
Virginia/North Carolina Line	DEQ	Grab samples taken with bucket	FIELD, NUT, NME1, NME5, FCMF	Quarterly
			MET8, MET1S, PES1S	Annually
Milldam Creek	DEQ	Grab samples taken with bucket	FIELD, NUT, NME1, NME5, FCMF	Quarterly
			MET8, MET1S, PES1S	Annually
Blackwater Creek	DEQ	Grab samples taken with bucket	FIELD, NUT, NME1, NME5, FCMF	Quarterly
			MET8, MET1S, PES1S	Annually
Route 190, Old Pungo Ferry Road	DEQ	Grab samples taken with bucket	FIELD, NUT, NME1, NME5, FCMF	Quarterly
			MET8, MET1S, PES1S	Annually
2 Miles Upstream of Route 190	DEQ	Grab samples taken with bucket	FIELD, NUT, NME1, NME5, FCMF	Quarterly
			MET8, MET1S, PES1S	Annually
Pocaty River	DEQ	Grab samples taken with bucket	FIELD, NUT, NME1, NME5, FCMF	Quarterly
			MET8, MET1S, PES1S	Annually
West Neck Creek	DEQ	Grab samples taken with bucket	FIELD, NUT, NME1, NME5, FCMF	Quarterly
			MET8, MET1S, PES1S	Annually

NORTH LANDING RIVER: MAIN STEM

Monitoring Location	Agency	Collection Method	Parameter Set	Collection Frequency
Virginia/North Carolina Line	DEQ	Grab samples taken with bucket	FIELD, NUT, NME1, NME5, FCMF	Quarterly
			MET8, MET1S, PES1S	Annually
Milldam Creek	DEQ	Grab samples taken with bucket	FIELD, NUT, NME1, NME5, FCMF	Quarterly
			MET8, MET1S, PES1S	Annually
Blackwater Creek	DEQ	Grab samples taken with bucket	FIELD, NUT, NME1, NME5, FCMF	Quarterly
			MET8, MET1S, PES1S	Annually
Route 190, Old Pungo Ferry Road	DEQ	Grab samples taken with bucket	FIELD, NUT, NME1, NME5, FCMF	Quarterly
			MET8, MET1S, PES1S	Annually
2 Miles Upstream of Route 190	DEQ	Grab samples taken with bucket	FIELD, NUT, NME1, NME5, FCMF	Quarterly
			MET8, MET1S, PES1S	Annually
Pocaty River	DEQ	Grab samples taken with bucket	FIELD, NUT, NME1, NME5, FCMF	Quarterly
			MET8, MET1S, PES1S	Annually
West Neck Creek	DEQ	Grab samples taken with bucket	FIELD, NUT, NME1, NME5, FCMF	Quarterly
			MET8, MET1S, PES1S	Annually

NORTH LANDING RIVER: POCATY RIVER

Monitoring Location	Agency	Collection Method	Parameter Set	Collection Frequency
US Naval Airfield Fentress Station	Chesapeake Public Works	Automatic sampler slaved to a flow meter	CHES1	Four times per year during storm events
Blackwater Road Bridge	DEQ	Grab samples taken with bucket	FIELD, NUT, NME1, MME5, FCMF	Monthly
			MET8, MET1S, PES1S	Annually

NORTH LANDING RIVER: BLACKWATER CREEK

Monitoring Location	Agency	Collection Method	Parameter Set	Collection Frequency
Blackwater Road Bridge	DEQ	Grab samples taken with bucket	FIELD, NUT, NME1, MME5, FCMF	Monthly
			MET8, MET1S, PES1S	Annually

NORTH LANDING RIVER: MILLDAM CREEK

Monitoring Location	Agency	Collection Method	Parameter Set	Collection Frequency
Blackwater Road Bridge	DEQ	Grab samples taken with bucket	FIELD, NUT, NME1, MME5, FCMF	Monthly
			MET8, MET1S, PES1S	Annually

NORTH LANDING RIVER: POCATY RIVER

Monitoring Location	Agency	Collection Method	Parameter Set	Collection Frequency
US Naval Airfield Fentress Station	Chesapeake Public Works	Automatic sampler slaved to a flow meter	CHES1	Four times per year during storm events
Blackwater Road Bridge	DEQ	Grab samples taken with bucket	FIELD, NUT, NME1, MME5, FCMF	Monthly
			MET8, MET1S, PES1S	Annually

NORTH LANDING RIVER: BLACKWATER CREEK

Monitoring Location	Agency	Collection Method	Parameter Set	Collection Frequency
Blackwater Road Bridge	DEQ	Grab samples taken with bucket	FIELD, NUT, NME1, MME5, FCMF	Monthly
			MET8, MET1S, PES1S	Annually

NORTH LANDING RIVER: MILLDAM CREEK

Monitoring Location	Agency	Collection Method	Parameter Set	Collection Frequency
Blackwater Road Bridge	DEQ	Grab samples taken with bucket	FIELD, NUT, NME1, MME5, FCMF	Monthly
			MET8, MET1S, PES1S	Annually

NORTH LANDING RIVER: WEST NECK CREEK

Monitoring Location	Agency	Collection Method	Parameter Set	Collection Frequency
Route 603 Bridge, Indian River Road	BBRF	Grab samples taken with bucket	FIELD, NUT, NME12, FCMF	Monthly
			CHLa	Quarterly
			MET8, MET1S, PES1S	Annually
Route 627 Bridge	DEQ	Grab samples taken with bucket	FIELD, NUT, NME1, MME5, FCMF	Monthly
			MET8, MET1S, PES1S	Annually

NORTH LANDING RIVER: SALEM LAKES

Monitoring Location	Agency	Collection Method	Parameter Set	Collection Frequency
Salem Lakes Detention Ponds	Virginia Beach Public Works	Automated sampling stations	VB1	Approximately 20 storm events will be monitored during the first two years of operation.

AGENCY COMPARISON MATRIX

The following tables are organized around the parameter sets used by DEQ for water quality testing. Comparisons are made between all agencies for each parameter sets. In addition, the final table contains comparisons for parameters not contained in any of the DEQ sets.

DEQ FIELD SERIES

ELEMENT	DEQ	USFWS	Chesapeake Public Utilities	Norfolk Public Utilities	Chesapeake and Virginia Beach Public Works	HRSD
Dissolved Oxygen	X		X	X		X
Temperature	X		X	X		X
Salinity	X					
Conductivity	X		X			
pH	X		X	X		X

AGENCY COMPARISON MATRIX

DEQ NUTRIENT SERIES

ELEMENT	DEQ	USFWS	Chesapeake Public Utilities	Norfolk Public Utilities	Chesapeake and Virginia Beach Public Works	HRSD
Total Kjeldahl Nitrogen (TKN)	X	X		X	X	
Total Phosphorus	X	X			X	X
Ortho Phosphate	X	X		X		X
Ammonia	X	X				X
Nitrite	X	X			X	X
Nitrate	X	X		X	X	X

AGENCY COMPARISON MATRIX

DEQ NME1 SERIES

ELEMENT	DEQ	USFWS	Chesapeake Public Utilities	Norfolk Public Utilities	Chesapeake and Virginia Beach Public Works	HRSD
Biochemical Oxygen Demand (BOD)	X			X	X	X
Chloride	X		X			
Sulfate	X					
Conductivity	X		X			
Total Solids	X					
Volatile Solids	X					
Fixed Solids	X					
Total Suspended Solids (TSS)	X	X		X	X	X
Volatile Suspended Solids (VSS)	X	X				
Fixed Suspended Solids (FSS)	X					
pH	X		X	X		X
Alkalinity	X			X		
Turbidity	X	X	X	X		

AGENCY COMPARISON MATRIX

DEQ NME12 SERIES

ELEMENT	DEQ	USFWS	Chesapeake Public Utilities	Norfolk Public Utilities	Chesapeake and Virginia Beach Public Works	HRSD
Total Solids	X					
Volatile Solids	X					
Fixed Solids	X					
Total Suspended Solids (TSS)	X	X		X	X	
Volatile Suspended Solids (VSS)	X	X				
Fixed Suspended Solids (FSS)	X					
Turbidity	X	X	X	X		

AGENCY COMPARISON MATRIX

DEQ FCMF SERIES

ELEMENT	DEQ	USFWS	Chesapeake Public Utilities	Norfolk Public Utilities	Chesapeake and Virginia Beach Public Works	HRSD
Fecal Coliform	X		X	X		X

AGENCY COMPARISON MATRIX

DEQ CHLa SERIES

ELEMENT	DEQ	USFWS	Chesapeake Public Utilities	Norfolk Public Utilities	Chesapeake and Virginia Beach Public Works	HRSD
Chlorophyll a	X	X		X		
Phaeophyton	X					X

AGENCY COMPARISON MATRIX

DEQ MET8 SERIES

ELEMENT	DEQ	USFWS	Chesapeake Public Utilities	Norfolk Public Utilities	Chesapeake and Virginia Beach Public Works	HRSD
Arsenic	X				X	
Cadmium	X				X	X
Chromium	X				X	
Copper	X				X	X
Iron	X		X			
Lead	X				X	X
Manganese	X		X	X		
Mercury	X					X
Nickel	X					
Selenium	X					
Zinc	X				X	

AGENCY COMPARISON MATRIX

DEQ MET1S SERIES

(SEDIMENT METALS)

ELEMENT	DEQ	USFWS	Chesapeake Public Utilities	Norfolk Public Utilities	Chesapeake and Virginia Beach Public Works	HRSD
Antimony	X					
Aluminum	X	X				
Arsenic	X					
Beryllium	X	X				
Cadmium	X	X				
Chromium	X	X				
Copper	X	X				
Iron	X	X				
Lead	X	X				
Manganese	X	X				
Mercury	X					
Nickel	X	X				
Selenium	X	X				
Silver	X	X				
Thallium	X	X				
Zinc	X	X				

AGENCY COMPARISON MATRIX

DEQ PES1S SERIES

(SEDIMENT PESTICIDES)

ELEMENT	DEQ	USFWS	Chesapeake Public Utilities	Norfolk Public Utilities	Chesapeake and Virginia Beach Public Works	HRSD
Total PCBs	X	X				
Pentachlorophenol	X					
Dieldrin	X					
Total Chlordane	X					
Total DDT	X					
Total DDE	X					
Total DDD	X					
Endrin	X	X				
Toxaphene	X	X				
Heptachlor	X					
Heptachlor Epoxide	X	X				
Dicofol (Kelthane)	X					
Aldrin	X					

AGENCY COMPARISON MATRIX

OTHER OVERLAPS

ELEMENT	DEQ	USFWS	Chesapeake Public Utilities	Norfolk Public Utilities	Chesapeake and Virginia Beach Public Works	HRSD
True Color			X	X		
Total Dissolved Solids		X	X	X		
Total Coliforms			X	X		

APPENDIX B:

SUMMARY OF SOUTHERN WATERSHED AGENCY SURVEY

SUMMARY OF SURVEY RESPONSE

Organization: City of Virginia Beach, Department of Public Works

Contact Person: Mr. Ralph Smith, Director

SWA Programs:

Current: Wet Weather Monitoring for VPDES MS4 Permit, Dry Weather Field Screening for VPDES MS4 Permit. Wet weather field monitoring involves sampling storm water runoff to characterize water quality. Dry weather screening involves detection of illicit discharges and illegal dumping.

Past: Wet weather monitoring program began in 1992, but was sporadic until 1994 when quarterly monitoring was started.

Future: Continuation of current program.

Data Base:

Content: Information from wet and dry weather monitoring.

Format: GIS and associated data bases.

Access Method: Contact Mark Johnson, NPDES Administrator.

Interagency Communication:

Current Agency Interaction: Hampton Roads Sanitation District, Virginia Beach Department of Planning.

Desired Future Contacts: Virginia Department of Conservation and Recreation, Virginia Department of Environmental Quality.

Needed data for projects in SWA: Storm water quality data, Receiving water quality data, Precipitation water quality data.

Suggestions for improvements: All agencies should use standard testing and sampling methods so that data can be compared.

Organization: City of Virginia Beach, Agriculture Department.

Contact Person: Mr. Louis Cullipher, Director of Agriculture.

SWA Programs:

Current: Educational and technical services, agricultural reserve program. The agricultural reserve program involves the City purchasing development rights.

Past: Supportive role with other agencies.

Future: Virginia Beach is funding a dredging study. The Agricultural Advisory Commission requested that the SWA be included in this study. BMPs will be installed on agricultural drainage outfalls when practical.

Data Base:

Content: No response.

Format: No response.

Access Method: No response.

Interagency Communication:

Current Agency Interaction: Essentially all agencies.

Desired Future Contacts: Welcome opportunity to work with all.

Needed Data: Water quality data and interpretations, Land use data and trends.

Suggestions for improvements: Water quality data should be linked to rainfall. Some samples in the past were not. More data needed from Sandbridge area.

Organization: City of Chesapeake, Utilities Department

Contact Person: Mr. Frank Sanders

SWA Programs:

Current: Design phase of the upgrade of the Northwest River Water Treatment Plant. The plant will use reverse osmosis membrane technology and four deep wells (approximately 1,300 vertical feet).

Past: We are not a regulatory agency and are not currently performing any research.

Future: Same as above.

Data Base:

Content: Daily tests on raw Northwest River water. Samples are collected at the Route 168 bridge. Weekly testing of chlorides, pH and temperature at two sites along the Northwest River in North Carolina and one site at the Ferry Dock on Currituck Sound.

Format: Lotus 123

Access Method: Contact the Water Resources Administrator: 421- 2146

Interagency Communication:

Current Agency Interaction: VA Department of Health, VA DEQ, Army Corps, US EPA, USGS.

Desired Future Contacts: None

Needed Data: Ground water data in Hampton Roads and the Eastern Shore. Surface water data for Northwest River, North Landing River, and Back Bay.

Suggestions for improvements: Distribute results of survey to participants, consolidation of data bases maintained by different agencies.

Organization: City of Chesapeake, Agriculture Department/ Virginia Cooperative Extension

Contact Person: Mr. Richard Rhodes

SWA Programs:

Current: Farm field tests: On farm tests are conducted for corn, wheat, and soybeans. Weed control, disease control, and cultural practices are evaluated to determine the best methods for producing these crops.

Past: Same as above.

Future: Same as above.

Data Base:

Content: Data from farm field tests.

Format: Written report.

Access Method: Contact Cooperative Extension to obtain a copy of the report.

Interagency Communication:

Current Agency Interaction: Virginia Dare Soil and Water Conservation District, No response.CS, Chesapeake Utilities Department.

Desired Future Contacts: No response.

Needed Data: No response.

Suggestions for improvements: No response.

Organization: City of Chesapeake, Planning Department

Contact Person: Ms. Jaleh Pett

SWA Programs:

Current: Enforcement of zoning and subdivision ordinances, development of the Southern Chesapeake, Great Bridge, and Greenbrier Area Plans, and development of a City-wide Trails Plan. Also, several major transportation projects including the Raleigh-Norfolk Connector and the Route 168 Bypass.

Past: Development of the Comprehensive Plan, Parks and Recreation Plan, City Land Use Plan, and the City Road Plan.

Future: Possible agreement with VA Division of Natural Heritage to conduct a natural areas inventory for the City.

Data Base:

Content: Development statistics. No water quality data.

Format: No response.

Access Method: Contact Planning Department.

Interagency Communication:

Current Agency Interaction: City of Virginia Beach, HRPDC, Soil and Water Conservation District, Department of Conservation and Recreation.

Desired Future Contacts: Work more closely with Virginia Beach Planning Department on projects in SWA.

Needed Data: Water quality data that would indicate what pollutants exist in the Northwest River and the source of those pollutants. Better indication of location and type of wetlands in the SWA.

Suggestions for improvements: Data should be collected using standard units and uniform testing procedures. Creation of one central database.

Organization: Virginia Marine Resources Commission, Habitat Management Division

Contact Person: Mr. Randy Owen

SWA Programs:

Current: Submerged lands: title 28.2 of Code of Virginia, Chapter 12, Virginia Wetlands Act: title 28.2 of Code of Virginia, Chapter 13, Coastal Primary Sand Dunes and Beaches: title 28.2 of Code of Virginia, Chapter 14

Past: Processing of joint permit applications for projects in the SWA, including piers, boat ramps, etc.

Future: Continued oversight of current programs.

Data Base:

Content: Joint permit applications requesting authorization to work within the SWA. Limited fisheries landings data.

Format: No response.

Access Method: Contact Habitat Management Division for permit application data. Written request to Fisheries for landings data.

Interagency Communication:

Current Agency Interaction: VIMS, Army Corps, USFWS, VA Department of Conservation and Recreation, VA Department of Game and Inland Fisheries, VA Department of Health, VA Department of Historic Resources, Virginia Beach Wetlands Board, Chesapeake Wetlands Board.

Desired Future Contacts: Not applicable.

Needed Data: Any information on the elevation of ordinary water level in Back Bay, North Landing River, Northwest River, or any tributaries.

Suggestions for improvements: No response.

Organization: Virginia Dare Soil and Water Conservation District

Contact Person: Ms. Julie Bright, District Manager

SWA Programs:

Current: 1) Administration of the Virginia agriculture BMP cost share program: financial assistance and incentives to install state approved innovative BMPs on agricultural land. 2) Conservation planning: Nutrient management, planning assistance, BMPs.

Past: Same as above.

Future: Future funding for agricultural BMP cost sharing is questionable for non-Chesapeake Bay areas.

Data Base:

Content: Soil surveys for Chesapeake, Virginia Beach, and Portsmouth. Historic aerial photographs. Soil survey for Norfolk will be completed soon.

Format: Soil surveys are bound documents.

Access Method: Soil surveys for Chesapeake and Virginia Beach can be viewed at office or ordered by mail, Portsmouth soils data can be viewed at Chesapeake NRCS office and photocopied. Aerial photographs can be viewed at Chesapeake NRCS office.

Interagency Communication:

Current Agency Interaction: USDA: Natural Resources Conservation Service, Virginia Department of Forestry, VC, False Cape State Park, Back Bay Wildlife Refuge, Trojan Waterfowl Management Area, Department of Agriculture: Chesapeake and Virginia Beach.

Desired Future Contacts: HRPDC

Needed Data: Improved maps and aerial photos, grant sources for agricultural BMPs.

Suggestions for improvements: No response.

Organization: Virginia Department of Conservation and Recreation, Divisions of Natural Heritage, State Parks, and Planning and Recreation Resources.

Contact Person: Ms.Caren Caljouw

SWA Programs:

Current: Hydrologic Assessment and Conservation Program for the North Landing River Preserve System, Resource Management Planning and Implementation for the North Landing River Natural Area Preserve, Wetlands Ecology of Large Ecosystems in the City of Chesapeake, Conservation Planning for the Protection and Management of Natural Areas in Virginia Beach.

Past: North Landing River Public Access and Visual Assessment, Natural Area Source Book: a Guide for Land Managers, Scientists, Educators, and Conservation within the Virginia Coastal Resources Management Area, Natural Area Inventories of the City of Virginia Beach, An Inventory and Protection Plan for Southeast Virginia's Critical Natural Areas and Exemplary Wetlands.

Future: No response.

Data Base:

Content: The Division of Natural Heritage tracks information regarding natural heritage resources.

Format: Biological Conservation Datasystem: includes manual files, maps, and a computer data base system (AREV program) that links natural heritage resources, their locations, sites, tracts, protection and management information records.

Access Method: Lisa Berlinghoff (804) 371-2708, Tim Berry (804) 692-0984

Interagency Communication:

Current Agency Interaction: Cities of Chesapeake and Virginia Beach, HRPDC, USFWS, DEQ, EPA, TNC, NOAA, Army Corps, VIMS, VDOF, VDGIF, etc.

Desired Future Contacts: None additional needed at this time.

Needed Data: More comprehensive hydrology/water quality data, land use statistics, summaries of past, current, and future projects of other agencies.

Organization: Virginia Department of Environmental Quality

Contact Person: Roger Everton, Michelle Fults

SWA Programs:

Current: Permitting and monitoring as they relate to air, water, and waste activities and UST, LUST, and AST remediation programs. The main project in the SWA is the monitoring station network located in Back Bay and its surrounding tributaries, North Landing River, West Neck Creek, and Northwest River. This network is operated in association with the Back Bay Restoration Foundation and Virginia Department of Game and Inland Fisheries.

Past: Monitoring network, air, water, and waste permits, remediation, water quality assessment.

Future: Same as above.

Data Base:

Content: Water quality monitoring information, location of monitoring stations, VPDES discharges, shoreline surveys, etc.

Format: STORET, Foxpro.

Access Method: Contact Michelle Fults (804) 552-1142

Interagency Communication:

Current Agency Interaction: Back Bay Restoration Foundation, DCR.

Desired Future Contacts: Any agency with water quality or habitat information that could be used in the preparation of 305(b) Water Quality Assessment Reports or Water Quality Management Plans.

Needed Data: Water quality and environmental quality information that would be valuable for the general public.

Suggestions for improvements: Publish a list of available reports, data, and contacts every six months.

Organization: Virginia Department of Forestry

Contact Person: Fred Turck

SWA Programs:

Current: Debris in stream law: states that it is unlawful to dispose of trash, debris, tree laps, or logs into a creek stream, or river. Water quality law: provides for prevention of sedimentation of Virginia waters by silvicultural activities. Seed tree law: provides for reforestation or conversion to other use of harvested areas which were comprised of 10% or more loblolly or white pine.

Past: Same as above.

Future: Same as above.

Data Base:

Content: Records of all timber harvesting activities in the SWA, logging site inspection data, records of voluntary Best Management Practices for logging and reforestation.

Format: No response.

Access Method: Written request to any DOF field, district, or regional offices.

Interagency Communication:

Current Agency Interaction: DCR, DGIF

Desired Future Contacts: No response.

Needed Data: No response.

Suggestions for improvements: No response.

Organization: Virginia Department of Conservation and Recreation, Division of Soil and Water Conservation, Bureau of District and Landowner Assistance

Contact Person: Cindy Linkenhoker, Stormwater Management Engineer

SWA Programs:

Current: Nutrient management plans for livestock farms. Administered in conjunction with DEQ Virginia Pollution Abatement Permitting process.

Past: Research plots for fertilizer and manure application and timing on crops and forages.

Future: Hydric soils with subsurface drainage leaching of groundwater nutrients to groundwater.

Data Base:

Content: Nutrient reductions from nutrient management planning, manure testing, soil nitrate testing, and fertilizer research plots results.

Format: No response.

Access Method: Contact DCR-DSWC office in Suffolk or central office in Richmond.

Interagency Communication:

Current Agency Interaction: DEQ, NRCS, CFSA, CES, VPISU, City of Virginia Beach, City of Chesapeake, USCOE.

Desired Future Contacts: HRPDC

Needed Data: No response.

Suggestions for improvements: No response.

Organization: Virginia Department of Conservation and Recreation, Division of Soil and Water Conservation, Bureau of Urban Programs

Contact Person: Cindy Linkenhoker, Stormwater Management Engineer

SWA Programs:

Current: Virginia Stormwater Management Program: regulates water quality and quantity. Virginia Erosion and Sediment Control Program.

Past: Same as above.

Future: Same as above.

Data Base:

Content: Hydrologic unit maps for entire State, disturbed acreage data for the entire State, number of local stormwater management programs, number of localities operating adequate E&SC programs, approved plans of all state projects.

Format: No response.

Access Method: Contact DCR-DSWC office in Suffolk or central office in Richmond.

Interagency Communication:

Current Agency Interaction:DEQ, NRCS, CFSA, CES, VPISU, City of Virginia Beach, City of Chesapeake, USCOE

Desired Future Contacts: HRPDC

Needed Data: No response.

Suggestions for improvements: No response.

Organization: HRPDC

Contact Person: Eric Walberg

SWA Programs:

Current: Southern Watershed Special Area Management Program: This project is entering phase II, which will involve the implementation of the goals and objectives formulated in the first phase of the project. A Memorandum of Agreement between the Cities of Chesapeake and Virginia has been signed. This agreement will provide a framework for development of a coordinated management program for the Southern Watershed Area. In addition, the Scope of Work for phase II calls for expansion of the Local Government Advisory Committee, creation of a Water Quality Task Force, and examination of land and water use conflicts.

Past: Phase I of SWAMP involved the development of a mission statement, goals, and objectives for the Southern Watershed Area. Prior to SWAMP, the HRPDC developed the Environmental Management Program for the Hampton Roads Virginia Portion of the Albemarle-Pamlico Estuarine Watershed.

Future: Implementation of Phase II of SWAMP.

Data Base:

Content: Library containing a broad spectrum of water quality and watershed planning documents.

Format: Bound reports.

Access Method: Visit HRPDC office in Chesapeake.

Interagency Communication:

Current Agency Interaction: All agencies involved in SWAMP survey, private entities, and the State of North Carolina.

Desired Future Contacts: Any agency that has Geographic Information System coverages or attribute data for the Southern Watershed Area. .

Needed Data: ARC/INFO coverages showing hydrologic features, roads, city boundries, topography, water quality monitoring stations, parcel boundries, and ecosystem boundries would be helpful

Suggestions for improvements: Improved communications and data sharing between agencies and groups working in the SWA.

Organization: Navel Air Station Oceana, Civil Engineering Department

Contact Person: Mr. Brian Hostetter, Natural Resources Manager

SWA Programs:

Current: Establishment of a 300 acre ecological reserve area (ERA) on the North Landing River at NALF Fentress: The management plan for the ERA will be coordinated with the VA Department of Conservation and Recreation and will be designed to complement their plan for the North Landing River Natural Area.

Past: Provided the City of Chesapeake with a storm water monitoring location. Currently have VPA permit for spray irrigation field at NALF Fentress.

Future: None planned.

Data Base:

Content: VPA permit requirements, biological data for NALF Fentress.

Format: No response.

Access Method: Written request.

Interagency Communication:

Current Agency Interaction: Virginia DEQ, USACOE

Desired Future Contacts: No response.

Needed Data: Biological Survey Data

Suggestions for improvements: Quarterly Newsletter, distribute survey participants names and addresses.

Organization: United States Department of the Interior, United States Geological Survey

Contact Person: Mr. Michael Focazio, Hydrologist

SWA Programs:

Current: 1) Hydrologic study of protected wetlands in the North Landing River Basin. This study will determine hydrologic and water chemistry controls on the low salinity marshes, Atlantic White Ceder wetlands, and pocosines. The study will also determine land use effects on the wetlands. 2) Salty groundwater study: determine the extent and controls on salty ground-water in the deep confined aquifers. 3) Borrow pit reconnaissance study.

Past: Ground water flow modeling of deep confined systems, observation well network, stream gage network.

Future: Possible study of the shallow ground water resources in Virginia Beach.

Data Base:

Content: Yearly report listing all ground water levels and stream gage data for all stations in the state. Any water quality data obtained that year is included.

Format: Digital or hard copy.

Access Method: Call USGS at (804) 278-4750

Interagency Communication:

Current Agency Interaction: VA Department of Conservation and Recreation, HRPDC, VA DEQ.

Desired Future Contacts: Any who need hydrologic information.

Needed Data: Hydrologic, Land Use, Biologic

Suggestions for improvements: No response.

Organization: United States Department of Agriculture, Natural Resources Conservation Service

Contact Person: Mr. Gene Crabtree, District Conservationist

SWA Programs:

Current: Swampbuster provision of the Food Security Act: Discourages landowners from clearing or draining wetlands.

Past: Same as above. Wetland reserve program.

Future: USDA Water Quality Improvement Project: voluntary approach to improving water quality by using improved management practices.

Data Base:

Content: Soils information.

Format: Electronic database and static maps.

Access Method: Request by phone or visit office.

Interagency Communication:

Current Agency Interaction: Virginia Dare Soil and Water Conservation District, US Navy, USFWS, TNC.

Desired Future Contacts: Any agency or group dealing with natural resources.

Needed Data: USGS water data

Suggestions for improvements: Meet every four to six months to discuss programs and projects.

Organization: United States Army Corps of Engineers, Norfolk District

Contact Person: Mr. R. Harold Jones, Supervisory Environmental Scientist

SWA Programs:

Current: 1) Section 404 of the Clean Water Act which regulates the discharge of dredged or fill material into waters of the US. 2) Section 10 of the Rivers and Harbors Act which regulates dredging and the placement of structures in navigable waters of the US.

Past: Same as above plus pre-application consultations, jurisdictional determinations, and permit review.

Future: Same as above.

Data Base:

Content: Permit action/enforcement data, Federally listed threatened and endangered species data base.

Format: No response.

Access Method: Contact R Harold James.

Interagency Communication:

Current Agency Interaction: EPA, FWS, NMFS, DEQ, VAGIF, Cities of Virginia Beach and Chesapeake

Desired Future Contacts: Same as above.

Needed Data: Information regarding large projects, subdivisions, etc. at the earliest possible stage of planning.

Suggestions for improvements: All data collection should be for a specific purpose or use.

Organization: US Department of the Interior, Fish and Wildlife Service, Division of Ecological Services, Virginia Field Office, White Marsh, VA.

Contact Person: Stephen Zylstra

SWA Programs:

Current: The Virginia Field Office provides technical assistance to the US Army Corps of Engineers in the review of projects affecting wetlands and waterways in the Southern Watershed Area. The Service also has advisory and regulatory responsibilities for the management of Federally listed threatened and endangered species.

Past: Same as above.

Future: Same as above.

Data Base:

Content: Information on wetlands and endangered species in the SWA.

Format: Type and location of wetlands is indicated on 1:24,000 topographic maps.

Access Method: Wetlands maps available from USGS. Endangered species information is available in the field office.

Interagency Communication:

Current Agency Interaction: Army Corps, EPA, NMFS, NRCS, VDGIF, DEQ, DCR, VMRC, VDOT, VIMS, ODU, HRPDC, City of Virginia Beach, etc.

Desired Future Contacts: Contacts initiated as need arises.

Needed Data: Digitized maps showing land use and zoning in Virginia Beach and Chesapeake. Additional information on drainage patterns and water quality. Surveys of recent Refuge land acquisitions should be conducted by local experts to identify endangered species.

Suggestions for improvements: Regular meetings between agencies involved in the SWA to exchange project information and research data. Making data gathered by different agencies compatible would be helpful.

Organization: US Department of the Interior, Fish and Wildlife Service, Division of National Wildlife Refuges, Back Bay National Wildlife Refuge.

Contact Person: John B Gallegos, Refuge Wildlife Biologist.

SWA Programs:

Current: Back Bay National Wildlife Refuge is constantly involved in assessing impacts to the lands and waters under its management, whether the impact is within or outside the Refuge boundaries. Key issues in this area have been construction of a City sewer line through Refuge forested habitats, housing development proposals, dredging proposals, and water quality management. In addition, the Refuge and VFO are jointly sponsoring the "Back Bay Initiative", an ecosystem team management effort aimed at assessing and monitoring water quality and land use issues in the Back Bay watershed. Several studies have come out of this initiative including a literature review and synthesis paper, a study assessing sediment toxicity, and a multi-year study of stormwater events.

Past: Same as above.

Future: Same as above.

Data Base:

Content: Weekly and biweekly water quality testing records. Stormwater events data. Hourly local weather conditions.

Format: Hard copy and electronic data base.

Access Method: Contact refuge manager.

Interagency Communication:

Current Agency Interaction: Army Corps, USDA, Dam Neck Naval Base, VDGIF, VIMS, City of Virginia Beach, East Carolina University, HRPDC, etc.

Desired Future Contacts: Ms Leslie Trew, Virginia Department of Conservation and Recreation.

Needed Data: Digitized maps showing land use and zoning in Virginia Beach and Chesapeake. Additional information on drainage patterns and water quality. Surveys of recent Refuge land acquisitions should be conducted by local experts to identify endangered species.

Suggestions for improvements: Regular meetings between agencies involved in the SWA to exchange project information and research data. Making data gathered by different agencies compatible would be helpful.

Organization: Department of Game and Inland Fisheries

Contact Person: Mr. Mitchell Norman

SWA Programs:

Current: No response.

Past: No response.

Future: No response.

Data Base:

Content: Historic data on salinity and turbidity of Back Bay. This information is collected quarterly. DGIF also has nutrient and chlorophyl data for Back Bay.

Format: No response.

Access Method: No response.

Interagency Communication:

Current Agency Interaction: No response.

Desired Future Contacts: No response.

Needed Data: No response.

Suggestions for improvements: No response.

APPENDIX C:

MEMORANDUM OF AGREEMENT BETWEEN VIRGINIA BEACH AND CHESAPEAKE

SOUTHERN WATERSHED AREA MANAGEMENT PROGRAM

MEMORANDUM OF AGREEMENT

Whereas, Section 15.1-21 of the Code of Virginia enables local governments to enter into cooperative agreements to exercise those powers that each may be enabled to exercise; and

Whereas, a Virginia Coastal Resources Management Program grant was obtained by the Hampton Roads Planning District Commission to facilitate and coordinate a "Southern Watershed Area Management Program" with the two local governments, Virginia Beach and Chesapeake; and

Whereas, the "Southern Watershed Area" has been defined for the purposes of this program as the watersheds of the Back Bay, North Landing River and Northwest River water bodies (refer to map); and

Whereas, Section 15.1-446.1 requires every governing body to adopt a comprehensive plan for the territory under its jurisdiction by July 1, 1980; and

Whereas, the comprehensive plan shall be made with the purpose of guiding and accomplishing a coordinated, adjusted and harmonious development of the territory which will, in accordance with present and probable future needs and resources, best promote the health, safety, morals, order, convenience, prosperity and general welfare of the inhabitants; and

Whereas, the Local Government Advisory Committee for the Southern Watershed Area Management Program developed consensus on goals and objectives for the Southern Watershed Area Management Program based on and in harmony with the goals and objectives previously developed for the Comprehensive Plans of each locality;

NOW THEREFORE, the signatory parties enter into the following Agreement:

This Memorandum of Agreement, entered into this 11 day of October, 1995 between the two cities, Virginia Beach and Chesapeake, establishes the Cooperative Regional Southern Area Watershed Management Program. It outlines the roles and responsibilities of each entity in administering this program.

BASIC PREMISES

1. Section 15.1-431 of the Code of Virginia, requires that when a proposed comprehensive plan or amendment thereto, a proposed change in zoning map classification, or an application for special exception for a change in use, or to increase by greater than fifty percent of the bulk or height of an existing or proposed building, but not including renewals of previous approved special exceptions, involves any parcel of land located within one-half mile of a boundary of an adjoining county or municipality, then written notice shall also be given by the local commission, or its representative, at least ten days before the hearing to the chief administrative officer, or his designee, of such adjoining county or municipality. This Agreement intends to develop a coordinated mechanism for fulfilling this requirement and going a step further to design a formal process for implementing the Southern Watershed Area Management Program.

2. The Cities of Virginia Beach and Chesapeake have developed a local government consensus on Watershed goals, objectives and priorities for the Southern Watershed Area from the goals, objectives and priorities adopted in the local Comprehensive Plans. This consensus, developed through the Local Government Advisory Committee for the HRPDC "Southern Watershed Special Area Management Program" (SWAMP) is the basis for developing a broader, more comprehensive environmental and natural resource management program for the Southern Watershed Area.

3. The MISSION STATEMENT, GOALS and OBJECTIVES for Environmental Management in the Southern Watershed of Chesapeake and Virginia Beach developed through consensus by the Local Government Advisory Committee for SWAMP will be accepted as an integral part of the Cooperative Regional Southern Watersheds Area Management Program. Local Government decisions affecting the Southern Watershed of Chesapeake and Virginia Beach should be consistent with these GOALS and OBJECTIVES.

4. The Memorandum of Agreement and associated local government responsibilities relating to Virginia Beach and Chesapeake's Southern Watershed Area Management Program serves as an instrument of cooperative regional planning. The policies and related responsibilities effected by this Agreement shall not restrict either locality's legitimate function to study, plan and, if deemed to be in the public interest, adopt appropriate planned land use, zoning and other development related changes in the defined Southern Watersheds Area.

5. The policies and related responsibilities effected by this Agreement shall not allow either locality to prevent or restrict the other locality from exercising, at its own discretion, what it determines to be the appropriate use of lands contained within its boundaries.

6. This Agreement establishes the administrative framework which will be used by the two local governments to ensure that planning and management initiatives affecting the Southern Watershed of Chesapeake and Virginia Beach are coordinated and integrated.

7. This Agreement applies only to the cities of Virginia Beach and Chesapeake. Both local governments will be participants in and signatories to the Agreement.

8. This Agreement shall remain in effect until either signatory local government shall elect to withdraw. The Agreement may be amended at anytime with both cities' consent.

LOCAL GOVERNMENT RESPONSIBILITIES

Under the terms of this Agreement, the signatory local governments are responsible for the following:

1. The signatory local governments shall appoint a staff person to serve as the "Southern Watershed Coordinator." The Southern Watershed Coordinator will have the following duties:

   A. The Coordinator will serve as the point of contact for all issues relating to, and requests for, information regarding the Southern Watershed Area.

B. The Coordinator will identify and monitor local issues and proposals which may affect the Southern Watershed Area. The Coordinators for Chesapeake and Virginia Beach will keep one another advised of such issues and proposals as they arise and develop.

C. The Coordinator, or designee, will attend all meetings for the Southern Watershed Area Management Program.

D. The Coordinator will promote and further the goals and objectives of the Southern Watershed Area Management Program.

2. A formal institutional staff-level process for cooperative environmental management of the Southern Watershed will be designed and implemented. A schedule of regular meetings for information exchange between the two signatory local governments will be developed.

3. The MISSION STATEMENT, GOALS and OBJECTIVES developed by the Local Government Advisory Committee for the HRPDC SWAMP are intended to serve as the framework for decisions made by the two signatory local governments. The PRIORITIES developed by the SWAMP Committee are intended to serve as the basis for developing an action plan for the Southern Watershed Area, unless public interest dictates otherwise.

4. The two signatory local governments should continue informal discussions concerning broader coordination of development review affecting the shared resources in the Southern Watershed Area.

5. Through the Cooperative Regional Southern Watershed Area Management Program, the signatory local governments should develop educational materials on the sensitive lands, water quality issues and general significance of the natural resources of the Southern Watershed to provide to public officials and citizens.

6. Through the Cooperative Regional Southern Watershed Area Management Program, the signatory local governments should aspire to coordinate and integrate the multitude of activities and interests in the Southern Watershed Area, including endeavors of State and Federal Agencies within the area.

7. Through the Cooperative Regional Southern Watershed Area Management Program, the signatory local governments should continue analysis of technical water quality studies, including exploring the opportunity for watershed-wide educational water quality monitoring programs.

8. The Cooperative Regional Southern Watershed Area Management Program will not require financing or budgeting from or by the signatory local governments.

9. The Cooperative Regional Southern Watershed Area Management Program will not purchase, own, hold or convey any real or personal property.

10. The Cooperative Regional Southern Watershed Area Management Program will not undertake any endeavors which may expose the signatory local governments or the Program to liability.

APPROVED AS TO CONTENT

Robert J. Scott
City of Virginia Beach
Department of Planning

APPROVED AS TO FORM

Lavinia T. Saddington
City of Virginia Beach
City Attorney

APPROVED AS TO CONTENT

Brent R. Nielson
City of Chesapeake
Department of Planning

APPROVED AS TO FORM

Mark S. Hallam
City of Chesapeake
City Attorney

CITY OF VIRGINIA BEACH, VIRGINIA

By: C. Oral Lambert
City Manager/Authorized Designee
of the City Manager

(SEAL)

ATTEST:

Barbara Hodges Smith, CMC
City Clerk

STATE OF VIRGINIA

CITY OF VIRGINIA BEACH, to-wit:

I, KAREN M. AKERS, a Notary Public in and for the City and State aforesaid, do hereby certify that C. Oral Lambert, Jr., ~~City Manager~~/Authorized Designee of the City Manager Pursuant to § 2-154 of the City Code, whose name is signed to the foregoing Agreement, bearing date the 11th day of October, 1995, has acknowledged the same before me in my City and State aforesaid.

Given under my hand this 23rd day of October, 1995.

Karen M. Akers
Notary Public

My commission expires: January 31, 1999

CITY OF CHESAPEAKE, VIRGINIA

By: James W. Rein
City Manager

(SEAL)

ATTEST:
Dolores A. Meece
City Clerk

STATE OF VIRGINIA

CITY OF CHESAPEAKE, to-wit:

I, Wanda B. Futrell, a Notary Public in and for the City and State aforesaid, do hereby certify that James W. Rein, City Manager, whose name is signed to the foregoing Agreement, bearing date the 11 day of October, 1995, has acknowledged the same before me in my City and State aforesaid.

Given under my hand this 13 day of October, 1995.

Wanda B. Futrell
Notary Public

My commission expires: 30 September, 1998

CERTIFIED TO BE A TRUE COPY OF THE SOUTHERN WATERSHED AREA MANAGEMENT PROGRAM MEMORANDUM OF AGREEMENT entered into October 11, 1995 between the City of Virginia Beach and the City of Chesapeake

Ruth Hodges Smith, CMC/AAE
City Clerk

This project was funded, in part, by the Virginia Coastal Resources Management Program of the Department of Environmental Quality through Grant #NA570Z0561-01 of the National Oceanic and Atmospheric Administration, Office of Ocean and Coastal Resource Management, under the Coastal Zone Management Act of 1972, as amended. The views expressed herein are those of the authors and do not necessarily reflect the views of NOAA or any of its subagencies or DEQ. This project received $15,500 (50%) of its funding from the Virginia Coastal Resources Management Program of the DEQ through a grant from NOAA, and $15,500 (50%) from the HRPDC and the Cities of Chesapeake and Virginia Beach.

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