REPORT OF THE
DEPARTMENT OF CONSERVATION
AND RECREATION

FINAL REPORT FOR HOUSE JOINT RESOLUTION NO. 555 STUDY OF BACK BAY

TO THE GOVERNOR AND
THE GENERAL ASSEMBLY OF VIRGINIA

HOUSE DOCUMENT NO. 47

COMMONWEALTH OF VIRGINIA
RICHMOND
1998

George Allen
Governor

Becky Norton Dunlop
Secretary of Natural
Resources

Kathleen W. Lawrence
Director

COMMONWEALTH of VIRGINIA

DEPARTMENT OF CONSERVATION AND RECREATION

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December 30, 1997

The Honorable George Allen, Governor
Commonwealth of Virginia
Capital Square
Richmond, VA 23219

Members of the 1998 General Assembly
Commonwealth of Virginia
General Assembly Bldg., Capital Square
Richmond, VA 23219

Dear Governor Allen and Members of the General Assembly,

Enclosed for your review is the report of the 1997 House Joint Resolution 555; Study of the Back Bay which was patroned by Del. Bob Purkey and prepared by the Department of Conservation and Recreation. We appreciate the assistance of Delegate Purkey and his staff in the preparation of this report.

Sincerely,

Kathleen W. Lawrence

Kathleen W. Lawrence
Director

Final Report

for

House Joint Resolution No. 555

Study of Back Bay

Prepared by the Virginia Department of Conservation and Recreation
In cooperation with the Virginia Dare Soil and Water Conservation District

Final Report: Back Bay Study

Requested by the 1997 Virginia General Assembly through passage of HJR 555

Prepared by the Virginia Department of Conservation and Recreation
In cooperation with the Virginia Dare Soil & Water Conservation District

Study Contents:

Executive Summary

Through passage of House Joint Resolution 555, the 1997 General Assembly directed the Virginia Department of Conservation and Recreation (DCR) to conduct a study of the nonpoint source (NPS) pollution problems impacting the Back Bay watershed, recommend potential solutions and estimate the costs of implementing proposed solutions. Back Bay is a unique estuary in the extreme southeast corner of the Commonwealth, and is also the northern most portion of the Albemarle-Pamlico-Currituck Sound Estuarine System, the majority of which is located in North Carolina. Once renowned for its waterfowl hunting and freshwater sport fishery, the watershed has experienced a significant decline in habitat and water quality over the past few decades. Back Bay has been the focal point for numerous past studies which addressed water quality and quantity issues.

To conduct this study, the Department of Conservation and Recreation established an ad-hoc advisory study committee comprised of resource experts from local, state and federal agencies, as well as representatives from local community interests. The Department of Conservation and Recreation contracted with the Virginia Dare Soil and Water Conservation District to provide assistance with the conduct of the study and the development of this study report. Five meetings of the study committee and two public meetings with participation by study patron Delegate Harry R. Purkey, provided a forum for the open exchange of ideas and recommendations. These discussions and contributions by resource experts provide the basis for the NPS pollution reduction strategies contained in this report.

Two legislative initiatives that are recommended to assist the coordination of water quality efforts of the Back Bay are:

1) **Establishment of a Back Bay Watershed Commission to provide the framework and forum for future analysis and planning by local leaders to enhance water quality of Back Bay.**

2) **Creation of a watershed coordinator position at the local level. The position will serve as staff to the Commission and strive to coordinate work within the watershed. Local options to support annual recurring position costs should be investigated and resolved.**

Virginia Department of Conservation & Recreation (DCR) Study: Nonpoint Source Pollution Problems Impacting Back Bay

Introduction:

Legislative Charge:

The 1997 Virginia General Assembly passed House Joint Resolution (HJR) 555. Delegate Harry R. Purkey, representing the 82nd District, served as Patron of the resolution. The legislation requests ". . . *the Department of Conservation and Recreation in coordination with other state agencies and local stakeholders to study the effect of nonpoint source pollution on the Back Bay and determine the strategies and costs of implementing measures to improve the water quality of Back Bay.*" (The complete resolution is included as Item A in the appendix.)

DCR approach to completing the study:

It is the intent of the Department of Conservation and Recreation to present to the Governor and General Assembly a meaningful summary of the nonpoint source pollution problems impacting Back Bay, and to provide recommendations for corrective actions with estimates of their costs for implementation. DCR directed existing staff and funds to carry out a study process and contracted with the Virginia Dare Soil and Water Conservation District to provide assistance with the conduct of the study and development of a summary report.

It was recognized early in the process that many prior studies dealing with water quality issues impacting Back Bay and other southern watersheds have been conducted. One outcome of this analysis is development of a comprehensive list of the past studies. The list is provided as Item B in the appendix of this report.

Time and resources do not allow a comprehensive analysis of past studies. To capitalize on previous work, review of certain studies and consultation with individuals knowledgeable with past reports has been integrated in the process of conducting this study.

In addition to considering past studies, much of the findings and recommended corrective strategies evolved through discussions with members of an ad-hoc committee. DCR established the study group which was comprised largely of resource experts within local, state and federal agencies, to provide a forum for identifying nonpoint source pollution problems and potential solutions.

Membership of the committee grew during the course of the study and included representation by the Back Bay Restoration Foundation and other local community interests. A complete list of committee participants is included as Item C in the appendix. In addition to establishing a study group DCR invited public participation and held two public meetings to solicit comments and recommendations from all interests. All written and verbal communication has been given consideration and, to the extent possible, incorporated in this report.

We hope that this document will serve as a useful resource and stimulate additional efforts aimed at improving the water quality of Back Bay.

Watershed Overview

Back Bay is a small, dynamic estuary approximately ten miles south of the Chesapeake Bay in Virginia Beach. It has experienced a decline over the past two decades in its value as habitat for migratory waterfowl, as well as freshwater game fish. The area was once referred to as one of the best waterfowl hunting and fishing areas in Virginia. The economic benefits of Back Bay through hunting, fishing, and recreational use were significant when the bay was in its prime. Studies and historical documents indicate that the abundance of waterfowl and fish in Back Bay increases and declines in somewhat natural cycles.

Several studies and attempts to determine the source of the decline in water quality and living resources of Back Bay have pointed to a multiple set of complex reasons. The lack of submerged aquatic vegetation (SAV) and the increased runoff into Back Bay have been identified as major factors in the decline of the system. The decline in SAV is in large measure attributable to the increased turbidity in the Bay that results from the resuspension of bottom sediments by wave action and the excessive algae production resulting from nutrient enrichment. The problem is complicated. To reestablish the SAV, the turbidity must be reduced, but for this to occur the resuspension of the bottom sediments must also be reduced, which occurs most effectively with SAV. This dilemma has stymied management efforts in Back Bay for decades.

The system is rather unique since Back Bay is "land limited," meaning that the system has only a discreet area from which water flows into or out of the system. The Mann Report of 1984 calculated that it takes 1.5 years to completely flush the system without benefit of other influences, such as hurricane or high storm activity. Development along the beach and the increase in dunes throughout Back Bay National Wildlife Refuge and False Cape State Park has significantly reduced wash over potential from the Atlantic. This wash over effect has the potential to flush the system of sediments and other nonpoint source pollution contributors. Historically, Back Bay has shown a tremendous revitalization after each strong storm, most notably those in 1936, 1951, 1955 and 1962. It is anticipated that there will be similar improvements upon another direct impact from a storm in the future.

The Back Bay watershed is the northern most portion of the Albemarle-Pamlico-Currituck Sound Estuarine System. The entire watershed covers 104 square miles (39 square miles aquatic), which is roughly 30 percent of the total area of the City of Virginia Beach. Back Bay is generally very shallow throughout, ranging in depth from one to ten feet, with an average depth of four feet. It is wind tidal with generally high water levels in the summer with southerly winds and lower water levels in the winter when northerly winds dominate. The average annual tide range is 2.8 feet. Agricultural use is concentrated mostly in traditional row crops such as corn soybeans and wheat, with increasing acres in specialty fruits, vegetable and flowers. Within the watershed, there are also a few intensive livestock operations and several equestrian facilities. An extensive ditching system is maintained throughout the watershed to facilitate drainage for agricultural activities and development. There has also been a decline in forested land within the watershed in the past twenty years or so, mostly for conversion to cropland. This conversion has slowed

significantly in recent years.

Urban activity continues to impact the watershed, but several measures are now in place to limit development in the southern portions of Virginia Beach. Significant development in the northern portion of the watershed (Ocean Lakes/Dam Neck region) occurred in the mid 1980s. Continued development is most prevalent now in the LagoMar section of the watershed, with small subdivisions (5-25 homes) scattered throughout the area. The green line designation by the locality, while seen by some as a line limiting development, really delineates where traditional city services, such as roads, must be paid for by the developer. The new Agriculture Reserve Program (ARP) is a voluntary program to sell the development rights of prime farmland. This program will have a significant impact on maintaining agriculture and open space around Back Bay. The goal of this program is to preserve the traditional farm economy, while reducing the municipal outlay of tax dollars for services and infrastructure.

Also located within the watershed are several resources managed by state and federal agencies. These include: Back Bay National Wildlife Refuge and Mackay Island Wildlife Refuge, both operated by the U.S. Department of the Interior - U.S. Fish and Wildlife Service; False Cape State Park, operated by the Virginia Department of Conservation and Recreation; and the Princess Anne Waterfowl Management Area operated by the Virginia Department of Game and Inland Fisheries.

Nonpoint Source (NPS) Pollution Problems Impacting Back Bay:

Over the course of many years, studies have examined the water quality parameters of the Back Bay watershed. The conclusions drawn have identified a variety of causes for the degradation of this once thriving water body, but most problems can be generalized in terms of nonpoint source pollution. As established in many of the studies focusing on Back Bay, water quality characteristics are often subject to temporal, seasonal, annual and even multi annual changes in environmental conditions, many of which are cyclical in nature. The natural irregularity of rainfall, which averages 47 inches annually in Virginia Beach, creates fluctuations in the concentrations of salt, nutrients, pollutants and other substances which affect the water quality of the Bay.

Significant change is inherent in a dynamic system like Back Bay given the many natural forces that characterize the watershed. This "land limited" system serves as the basin to collect stormwater runoff from surrounding land surfaces. Combining its physical characteristics with the natural processes and cycles of its living resources (from the smallest one celled organism to large aquatic species) results in a delicate, precarious system. Without contributions from man's land use changes, the system of Back Bay would likely experience natural cycles of health and decline. The only aspect that would benefit from intervention is control of nonpoint source pollutants that result from certain land use activities . The group concluded that the challenge is to take all reasonable steps to identify, prioritize and minimize pollutant contributions to improve the water quality of Back Bay.

During the course of work associated with HJR 555, agency professionals, local experts and stakeholders reviewed the work of past studies and discussed personal experiences on Back Bay. Sediments and nutrients appear to be the most significant pollutants in Back Bay. The extent of pollution from toxic materials such as pesticides is not understood. The presence of such pollutants cannot be readily detected and limited water testing is conducted for these parameters. Increased sediment and nutrient loadings appear to be from both man's activities and from natural processes.

Efforts to reduce contributions of nutrients and sediments associated with man's activity may help reestablish submerged aquatic vegetation. While efforts to improve water quality in Back Bay may be successful to some degree, it is recognized that the ecosystem will continue to change because of the variety of natural forces at work within the watershed.

To date, Back Bay has not been subjected to significant point source inputs. The nonpoint source inputs of nutrients have consistently been shown to come via the principal tributary creeks, with significantly elevated nutrient loadings from Nawney Creek and Hells Point Creek. Agricultural and urban runoffs are primary nonpoint sources for pollution within the watershed. Back Bay is the northernmost embayment in a connected series that drains into the Albemarle-Pamlico Estuarine System. It is extremely sensitive to wind driven tides and it is common for southerly winds to dominate the area as much as two-thirds of the time. This

information has generated questions regarding the impact the neighboring waters of North Carolina may have on Back Bay. To date, there is little to no data examining this relationship.

During the course of the study many issues pertaining to the watershed surfaced for discussion. Although the study committee acknowledged their significance, the group was compelled to focus discussion on nonpoint source pollution problems and solutions. Two examples of discussion topics raised during the conduct of the study which have significance, but pose minimal impacts to water quality are briefly summarized as follows:

1) Use of high speed, small watercraft: Safety and nuisance concerns were expressed due to minimally restricted and minimally enforced regulations on jet skis and other small, high speed watercraft. While potential impacts to water quality were not believed to be significant, further attention to this issue by local representatives and decision makers is recommended.

2) Freshwater pumping for the Back Bay National Wildlife Refuge impoundments: One wildlife management practice performed by Refuge staff is seasonal pumping of water from Back Bay into impoundments which serve as habitat for water fowl. While there are approximately 880 total acres of impoundments, slightly more than 500 acres (of the total) receive flood waters. The impoundments serve to pass water though the natural sponge of a marsh environment which is optimally managed to provide food and habitat for water fowl species. No data was immediately available to determine the impact of this practice on the salinity or sedimentation rate of the Bay.

Nutrients

With regard to nutrient loadings, nitrogen and phosphorus concentrations significantly influence both surface and groundwater quality. Nonpoint sources of these nutrients may include atmospheric deposition and runoff from urbanizing areas, agricultural fields and livestock operations. All of these factors can contribute to nutrient enrichment and accelerated eutrophication in surface water. Farming has existed for centuries around Back Bay. Increasing urbanization has occurred within the watershed during the past few decades at a time when water quality in Back Bay has shown its most significant decline.

Monitoring data indicates that during seasonal peaks, algal blooms and bloom conditions are a common occurrence. Many types of algal blooms are not detectable to the naked eye and do not precipitate a fish kill, which may explain why casual observers are not aware of their presence. Sources of nutrients within the watershed include: atmospheric deposition, natural decomposition of surrounding marsh plant material, increases in population of both livestock and wildlife, pet waste concentrations in urbanizing areas, failing or poorly maintained septic systems, and over fertilization of lawns and crops. In addition, monitoring has documented both elevated levels of fecal coliform and higher nutrient concentrations in areas of the land/ocean interface, which is the eastern boundary of Back Bay.

Sediments

The causes of increased sediment levels in Back Bay mirrors many of the issues associated with increased nutrient levels, and similarly are a result of both natural occurrences and manmade disturbances. Significant erosion of both the islands in Back Bay and the marsh and shorelines are the result of wildlife and wave action (naturally wind-driven, as well as accelerated by a significant increase in the usage of small personal water craft). Deforestation and devegetation due to loss of wetlands and forested buffers within the watershed remove an integral filter that improves the quality of runoff water from both agricultural and urban lands.

The effects of sedimentation within the watershed are many. Foremost is the decrease in sunlight caused by the suspension of soil particles (and organic matter) which is aggravated by the natural turbidity of Back Bay. Wind driven wave action tends to keep particulates in suspension. The decrease in sunlight has an adverse impact on submerged aquatic vegetation (SAV). Without significant SAV, wind driven wave action tends to be greater, which tends to keep soil and organic particles in suspension. This cause and effect relationship is complex, and not easily reversed.

Changes in the hydrology of the watershed, coupled with changes in the structure of biological communities and the overall ecosystem can all be attributed to the degree of sedimentation in Back Bay.

Nonpoint Source Strategies – An Overview

During the course of this study many nonpoint source reduction strategies were generated through verbal and written contributions. From group discussions, participants often concluded that many of the current NPS reduction efforts being carried out by agencies, private organizations and volunteers are valuable and necessary contributions to improve water quality. Current initiatives include:

- targeted educational efforts for developers, homeowners, farmers, lawn care services and school children
- improved targeting of major public and private landowners with land management plans and enforcing an implementation schedule of planned practices
- greater funding for successful programs such as the Agriculture Reserve Program and the Virginia Agricultural Best Management Practices Cost-Share Assistance Program
- enforcement of current mandatory best management practice (BMP) installations associated with urban development projects

Beyond continuation and strengthening of many existing NPS reduction efforts, new strategies and approaches were generated. Recommendations include:

- enforcing local and state septic system maintenance requirements and providing incentives to upgrade systems
- establishing incentives for low maintenance lawns
- establishing incentives encouraging BMPs for other land uses
- restoring vegetative buffers, particularly in tributary streams that feed Back Bay
- requiring grass buffers for roadside ditches
- encouraging conservation measures in urban development projects
- providing incentives to reward those that voluntarily implement measures to improve water quality

While there was consensus that some strategies need greater resources, and other approaches must be initiated, the true test of improvements in the water quality of Back Bay will be the long term health of its living resources. Further research and long term monitoring of living resources is needed while long term water quality monitoring and analysis of certain pollutant indicators in Back Bay are increased and better coordinated.

This portion of the report aims to capture, organize and describe various NPS reduction strategies and provide further recommendations for research and monitoring.

Recommended Strategies:

Primary Recommendations--

Recommendations for new strategies to address nonpoint source water quality problems in Back Bay are summarized below. The establishment of a Watershed Commission and a full-time Watershed Coordinator are considered the utmost priority. The strategies that follow these primary recommendations are significant, but are offered in no particular order of importance.

Establishment of a Back Bay Watershed Commission

A Back Bay Commission, with membership consisting of local decision makers and opinion leaders, representative of interests in the watershed, should be established for the purposes of:

- ensuring intergovernmental coordination between federal, state and local agencies,
- developing an action plan for improving water quality in the Back Bay watershed which integrates current and future efforts by public and private groups,
- Analyzing, coordinating and initiating further study and research within the watershed. Development of an action plan should give consideration to past studies and management recommendations for the watershed. For example, the R. Mann & Associates report from 1984 provides valuable management recommendations, many are still valid and worthy of consideration. (Excerpts from the report are included as Item H in the appendix of this report). Planned actions should recognize and complement present and future work of private groups and agencies that aim to address water quality issues.

Membership of the Commission should consist of the Commonwealth's local Delegates and Senators, one or more members of the Virginia Beach City Council including the Mayor of the City of Virginia Beach, and three private citizens representing the interests and industry within the watershed. Staff and resource persons supporting the Commission may include one or more representatives from the Hampton Roads Planning District Commission. The study committee recommends that agencies and groups such as those involved in this study be utilized on advisory committees. State agency field staff may be directed to provide technical support and assistance.

Creation of a Watershed Coordinator position to be placed at the local level.

A Watershed Coordinator position should be established. The Watershed Coordinator would serve as a staff liaison to the Back Bay Watershed Commission and perform assignments under the Commission's direction. ***The position should be housed at the local level, potentially with the Virginia Dare Soil and Water Conservation District. Options for funding and supporting the position should be investigated and resolved.***

Additional New Initiatives–

BMP Tax Credit Program

Effective January 1998, the Virginia Best Management Practices Tax Credit Program allows agriculture producers to claim a tax credit for best management practices implemented on their farm. The credit is allowable for a variety of best management practices including structural practices, agronomic practices and the purchase for precision equipment. ***A coordinated state and local effort should be made to market the benefits of improved water quality and Back Bay stewardship. This message should include exposure to incentive options that promote adoption of BMPs, such as the BMP Tax Credit Program and other incentives that encourage local citizen participation and BMP implementation.***

Incentives for low maintenance lawns

The study committee recommends that urban best management practices be encouraged and highlighted by the locality. Many groups and agencies are currently involved in educational efforts regarding the water quality and quantity benefits of low maintenance lawns. ***The City of Virginia Beach should establish a program for citizens to be recognized for their efforts to enhance water quality through the use of lawn and garden best management practices.***

Urban BMP Cost-Share Program

While much focus has been given to best management practices on private, agricultural lands, little attention has been given to urban best management practices. There is considerable focus on measures to prevent erosion and sediment from leaving construction sites, but no incentives for maintaining post-construction best management practices or for retrofitting ineffective practices. ***Local and state agencies should solicit grants for cost-sharing private innovative urban efforts and retrofitting municipal practices that are no longer effective. (Financial support through the Water Quality Improvement Act may provide one path for fulfilling this initiative.)***

Riparian Buffer Restoration

While a significant portion of the Back Bay watershed is buffered by marsh and forest, the northern tributary is heavily urbanized and has very few buffers. ***Cooperating state and local agencies can identify and prioritize areas suitable for buffer restoration. Public-Private Partnerships should then be established to implement buffer restoration projects.***

Pet Waste Ordinance

Increasing urbanization throughout the watershed brings additional pets and pet waste. An existing ordinance has traditionally been perceived as applying to "city" residents, rather than rural residents. ***The City of Virginia Beach should ensure that pet waste ordinance requirements are understood by residents of the watershed and enforced by city staff.***

Inventory Underground Storage Tanks

Many older homes throughout the city have underground storage tanks for heating fuel. Potential threats to water systems are not yet fully understood. ***An assessment of the potential threats storage tanks in the watershed pose to water quality is needed. Further research and analysis is recommended.***

Septic System Maintenance Requirement & Enforcement

The local government has a complete inventory of homes with septic systems. By utilizing this tool, the locality can conduct targeted educational efforts to citizens regarding the importance of system maintenance. ***Educational programs and pump-out requirements for septic systems should be established and enforced by the City of Virginia Beach. Incentive options to offset property owner expenses for system upgrades should be explored and presented to local decision makers for resolution.***

Minimize Impervious Surfaces in New Construction

With increasing urbanization, roads, parking lots and the like are increasing. ***The City of Virginia Beach should reevaluate current standards for road widths, curb and gutter, etc. to minimize the amount of impervious surfaces contributing to runoff.***

Further Research, Monitoring and Study --

Water Quality Monitoring

Current water quality monitoring efforts are done by the City of Virginia Beach, Virginia Department of Environmental Quality, Virginia Department of Game & Inland Fisheries and the Back Bay Restoration Foundation. In recent months, the Hampton Roads Planning District Commission (HRPDC) has coordinated an effort through their Southern Watershed Special Area Management Program (SWAMP) to determine locations of existing monitoring stations, identify parameters that are included in the monitoring and assess how improved coverage might benefit the body of data that is being gathered. In addition, HRPDC is investigating a contractual arrangement with the Applied Marine Research Lab (AMRL) through Old Dominion University to conduct an analysis of the existing water quality data to determine which parameters and monitoring stations presently provide enough data to conduct a statistical trends analysis. ***Continued, improved monitoring and regular analysis of the data gathered is critical to documenting improvements being made within the watershed.***

Submerged Aquatic Vegetation (SAV) Monitoring

The response of living resources in Back Bay to any improvement in water quality also needs to be monitored. One of the more important components of the Back Bay ecosystem which has not been effectively monitored or mapped in recent years is submerged aquatic vegetation. Advances in aerial photography and global positioning systems (GPS) have made monitoring submerged aquatic vegetation much more feasible. ***The study committee recommends establishment of a pilot submerged aquatic vegetation monitoring program in partnership with the Department of Interior which would focus on the eastern shoreline of Back Bay adjacent to Back Bay National Wildlife Refuge, Barbours Hill Wildlife Management Area and False Cape State Park.***

Economic Analysis

Much discussion of the study committee has centered around the fact that Back Bay was once a thriving hunting and fishing destination, bringing significant revenue to the area. Presently, and in the future there should be particular attention paid to Back Bay as an eco-tourism destination. ***An economic analysis of the watershed is needed to determine the future potential economic significance of the watershed.***

Climatology Study

Historical and future data regarding rainfall, temperature and prevailing winds within the Back Bay watershed can provide insight with the effects of nature on the watershed through wave action and subsequent erosion rates, etc. ***A climatology study is needed to adequately document problems within the watershed that are naturally occurring.***

Computer Modeling

With much of the data mentioned above, computer models can be generated to predict future impacts on water quality within a watershed. Subsequently, best management practices can be targeted to address potential problem areas. ***Modeling of the Back Bay watershed is needed to more fully understand the future water quality impacts.***

Water Control Structure Study

Water table control structures are still a relatively innovative best management practice in the region. Consequently, little data exists as to document their true effectiveness in removing nutrients and sediment. It is generally accepted that water held in a ditch rather than released to a tributary reduces nutrient and sediment contributions to a watershed. ***Funding to conduct a study of the effectiveness of water table control structures at removing nutrients and sediment from farm field runoff is recommended.***

Continuing Ongoing Efforts –

Education

A variety of public and private groups have active educational programs highlighting nonpoint pollution in general or the Back Bay watershed specifically. They include: Back Bay National Wildlife Refuge, Back Bay Restoration Foundation, False Cape State Park, Friends of Back Bay, Hampton Roads Planning District Commission, Southeastern Association for Virginia's Environment, Virginia Cooperative Extension, Virginia Dare Soil and Water Conservation District, and the Virginia Department of Conservation and Recreation. Specific audience groups should address at a minimum, developers, homeowners, lawncare services, agricultural producers and school children of all ages. The parties involved in the study process have indicated a willingness to continue to meet and coordinate these efforts to minimize program overlap and duplication. ***Specific and increased funding for educational programs is critical to changing the behavior and stewardship of land users. Educational programs should incorporate methods to assess changes in behavior that result from educational activities in order to project reasonable reductions of NPS pollutants.***

Targeted Land Management Planning

Conservation planning assistance is available, but on a limited basis due to current workloads and staffing levels of all agencies working within the watershed. Significant efforts have been made in targeting large livestock producers for nutrient management. This is due in part to the fact that these producers are required to have an approved nutrient management plan as a part of their Virginia Pollution Abatement (VPA) permit. There is much work to be done in animal waste management on horse farms. Virginia Beach has approximately 2,200 horses with 20 commercial facilities and the industry is expected to continue to grow. This presents a unique nutrient management problem. In addition, areas enrolled in programs such as the Virginia Agricultural Best Management Cost-Share Program are required to have conservation plans. The same should be true of any land acquired by groups such as the Nature Conservancy, Back Bay National Wildlife Refuge, or acres enrolled in the Agriculture Reserve Program. ***Focus funding to effectively achieve targeted land management planning. In addition, changes are needed to various local and federal programs in order to require conservation plans for program participation.***

Agriculture Reserve Program

Virginia Beach has developed the first Agriculture Reserve Program in the Commonwealth. The program is designed to pay landowners for the development rights of farmland currently under production. As with most programs, the applications exceed the funding levels approved. The program could be strengthened to ensure there is a mechanism to also help achieve water quality goals by requiring conservation plans for acreage enrolled in the program. Certainly there is a definite water quality benefit to eliminating the potential for creation of impervious surfaces, but if that farm is not well managed, the potential for associated water quality degradation remains. ***Increased local funding is needed to maintain and expand this voluntary program. In addition, participants should be required to maintain an approved conservation plan.***

Virginia Agricultural BMP Cost-Share Program

The Virginia Ag BMP Cost-Share Program is a voluntary financial incentive program to encourage farmers to install best management practices to improve water quality. The program is coordinated at the state level by the Department of Conservation and Recreation. Locally, this program is administered by the Virginia Dare Soil and Water Conservation District. Since 1994 there have been limited funds available to watersheds outside the Chesapeake Bay watershed. The Virginia Dare District has applied for cost-share funds under the Water Quality Improvement Act. Cooperators from all of the southern watersheds within the Virginia Dare District will be eligible to receive funding. ***The Virginia Dare Soil and Water Conservation District has been granted funds from Water Quality Improvement Act for the 1998 calendar year and will be carrying out this initiative.***

Agricultural Stewardship Act

Since April of 1997, the Virginia Department of Agriculture and Consumer Services has overseen the implementation of the Virginia Agricultural Stewardship Act. The Act is complaint driven. Once a complaint is received and determined to be valid, a farm conservation plan is developed with the landowner to address the water quality problem. Various federal, state and local agencies are available for technical assistance for these plans including: Natural Resources Conservation Service, Virginia Cooperative Extension, and Virginia Dare Soil and Water Conservation District.

Nutrient Management

Significant contributions of nutrients to the watershed occur from urban and agricultural land uses. The Department of Conservation and Recreation has regional specialists available to assist landowners in developing nutrient management plans principally for their crop and livestock operations. Virginia Cooperative Extension as well as other public and private organizations provides literature and resource experts to address nutrient management issues from both agricultural and urban land uses.

Illicit Dumping Ordinance

The City of Virginia Beach has an illicit dumping ordinance enabling the levy of fines against persons caught dumping debris, chemicals, etc. ***It is recommended that the City secure funding to ensure that staff is available to enforce these provisions.***

Appendix

Item A House Joint Resolution 555

Item B List of past studies of Back Bay

Item C Technical Committee

Item D Map of the Watershed

Item E Process Outline/Timetable

Item F Written Comments Received

Item G City of Virginia Beach Southern Watershed Ordinance

Item H Excerpts from the 1984 Roy Mann Associates report: A Management Plan for Back Bay

Item A

971867412

HOUSE JOINT RESOLUTION NO. 555
AMENDMENT IN THE NATURE OF A SUBSTITUTE
(Proposed by the Senate Committee on Rules
on February 17, 1997)
(Patron Prior to Substitute—Delegate Purkey)

Requesting the Department of Conservation and Recreation, in coordination with other state agencies and local stakeholders, to study the effect of non-point source pollution on the Back Bay and determine the strategies and costs of implementing measures to improve the water quality of the Back Bay.

WHEREAS, Back Bay in the City of Virginia Beach has been an important habitat for fish and an essential flyway for migrating waterfowl; and

WHEREAS, in recent years inappropriate land use practices, septic tank seepage, and agricultural runoff have had significant impact on the Bay's freshwater; and

WHEREAS, these factors have contributed to the decline over the years of submerged aquatic vegetation, although there are indications that some grass areas are beginning to recover; and

WHEREAS, the environmental insults have contributed to the destruction of habitat, causing a decline in the fishery; and

WHEREAS, a once-thriving fishery attracted not only Virginia sportsmen but also fishermen from other states on the East Coast, generating revenue for local businesses in Virginia Beach; now, therefore, be it

RESOLVED by the House of Delegates, the Senate concurring, That the Department of Conservation and Recreation, in coordination with other state agencies and local stakeholders, be requested to study the effect of non-point source pollution on the Back Bay and determine the strategies and costs of implementing measures to improve the water quality of the Back Bay.

Technical assistance shall be provided to the Department of Conservation and Recreation by the Department of Health, the Department of Agriculture and Consumer Services, and other appropriate natural resource agencies. The Department of Conservation and Recreation shall also seek the assistance and participation of representatives from the United States Department of Fish and Wildlife Services.

All agencies of the Commonwealth shall provide assistance to the Department of Conservation and Recreation for this study, upon request.

The Department of Conservation and Recreation shall complete its work in time to submit its findings and recommendations to the Governor and the 1998 Session of the General Assembly as provided in the procedures of the Division of Legislative Automated Systems for the processing of legislative documents.

Official Use By Clerks

Passed By The House of Delegates		Passed By The Senate	
without amendment	☐	without amendment	☐
with amendment	☐	with amendment	☐
substitute	☐	substitute	☐
substitute w/amdt	☐	substitute w/amdt	☐

Date: _____ Date: _____

_____ _____

Clerk of the House of Delegates Clerk of the Senate

Item B

Listing of known previous studies

revised 7/15/97

Studies we have on hand:

Albemarle-Pamlico Estuarine Study. April 1991. Executive Summary of the Status and Trends Report of the Albemarle-Pamlico Estuarine Study and the Findings of the Albemarle-Pamlico Estuarine Study Management Conference. 9 pp.

Alden, R. W., III. 1989. Multivariate analyses of spatiotemporal water quality patterns of Back Bay, Virginia. AMRL Technical Report No. 707. 58 pp.

Fulford, Richard S. 1996. Back Bay Stormwater Monitoring Project Final Report. U.S. Fish and Wildlife Service. 29 pp.

Hampton Roads Planning District Commission. April 1995. Southern Watershed Special Area Management Program Final Report. 106 pp.

Hampton Roads Planning District Commission. October 1996. Southern Watershed Special Area Management Program Final Report Phase II 64 pp.

Mann, R., Associates Inc. 1984a. A Management Plan for Back Bay. Vol. 1: Main Report. Prepared for City of Virginia Beach, VA. Roy Mann Associates, Inc., Boston MA.

Mann, R., Associates Inc. 1984b. A Management Plan for Back Bay. Vol. 2: Water Quality. Prepared for City of Virginia Beach, VA. Roy Mann Associates, Inc., Boston MA.

Marshall, H.G., and M. D. Norman (eds.). 1991. Proceedings of the Back Bay Ecological Symposium. Dept. of Biological Sciences, Old Dominion University, Norfolk, VA. 305 pp.

Matthias, Robert. 1992. Background Information on a Proposed Biological Study of Back Bay. Grants Office, City of Virginia Beach, VA. 9 pp.

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Morton, John M., and Cynthia Kane. 1994. Back Bay, Virginia : A Literature Review and Synthesis of Natural Resources Status and Trends. U.S. Fish and Wildlife Service. Virginia Field Office, White Marsh, VA. 54 pp.

Listing of known previous studies

revised 7/15/97

(studies, reports and articles we have on hand – cont'd.)

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Norman, M. D., and R. Southwick. 1987. Back Bay: Report on salinity and water clarity in 1986. Unpublished report. Virginia Dept. of Game and Inland Fisheries, Richmond, VA. 29 pp.

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Listing of known previous studies

revised 7/15/97

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Bohlen, W.F., D.F... Cundy, and J.M... Framontano. 1979. Suspended material distributions in the wake on estuarine channel dredging operations. Estuarine and Coastal Marine Science. 9:699-711.

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revised 7/15/97

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Item C

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Chuck Traub
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Stu Wilson
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Mr. Al Ablowich, President
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Virginia Beach, VA 23456

Mr. Robert Dean
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Virginia Beach, VA 23456

Ms. Mary Heinricht
SAVE/TEN
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South. VA Regulatory Sec., COE
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Ms. Laura McKay
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Mr. Eddie Vaughan, President
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Ms. Mary Reid Barrow
209 73rd Street
Virginia Beach, VA 23451

Mr. Don Horsley, Chairman
VA Beach Agriculture Advisory Commission
3169 Land of Promise Road
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Mr. Daniel Horne
VA Dept of Health - Water Programs
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Mr. Michael Lipford
The Nature Conservancy, VA Chapter
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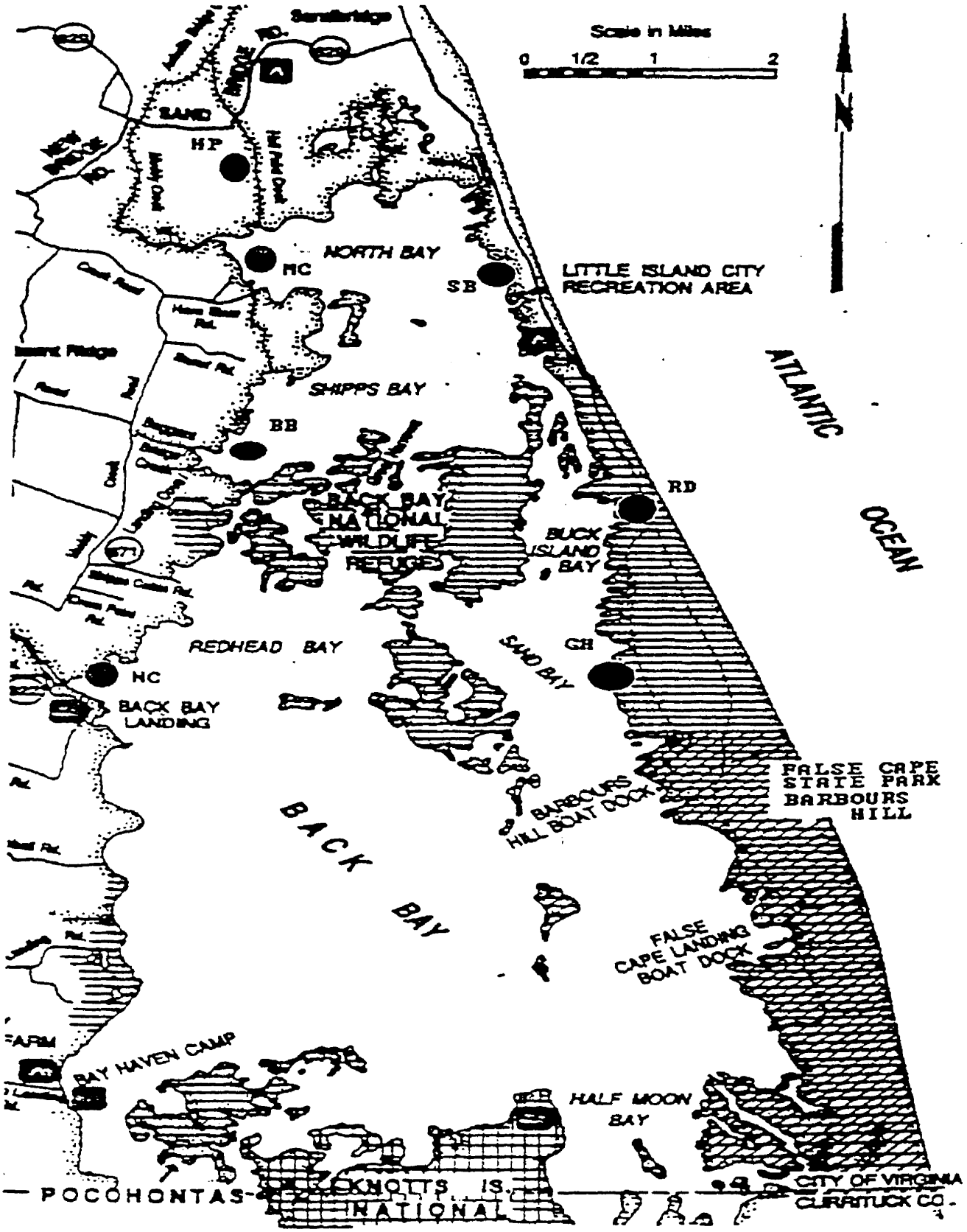
Item D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RD
ATLANTIC OCEAN
REDHEAD BAY
SAND BAY
GH
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BACK BAY LANDING
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BARBOURS HILL
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FALSE CAPE LANDING BOAT DOCK
BAY HAVEN CAMP
HALF MOON BAY
KNOTTS IS.
POCOHONTAS
NATIONAL
CITY OF VIRGINIA
CURRITUCK CO.

Item E

Department of Conservation & Recreation (DCR)

Outline of Back Bay Study

Requested by 1997 General Assembly Action by passage of HJR555

Scope of the Back Bay Study (planned):

- Will be limited to nonpoint (NPS) source pollution problems
- Will aim to identify major causes of NPS pollution
- Will propose strategies to improve water quality
- Will develop estimates of costs to implement strategies

Process Outline and Schedule for Study Completion (planned):

June (early) 1) Issue a mailing to all identified interest groups/agencies (see list attached) outlining the planned process for conduct of the study, and inviting comments and participation.

June 27 2) Form and convene an ad-hoc technical study committee (see membership) to:
- review past studies
- identify significant NPS problems impacting Back Bay

July 15 (begin 1 P.M.) 3) Hold a "public" meeting to (published in Va Register 6/23/97):
- entertain comments from stakeholders and interested individuals

July 17 4) Convene technical committee to:
- revisit NPS threats to Back Bay
- refine and consolidate proposed strategies to address NPS problems
- develop cost estimates for implementation of most practical strategies

August 5) From preceeding actions, begin compiling a draft study report and issue to members of the technical committee

Sept. 3 6) Convene technical committee to review/revise the draft study report

Sept. (mid) 7) Issue draft report to attendees of public meeting, and all other interested groups/individuals inviting review and acceptance of comments

Sept. 29 (begin at 7:00 P.M.) 8) Hold second "public" meeting to gather add'l comments & recommendations

Oct. 7 9) Convene final meeting of ad-hoc technical study committee for final input

By Oct. 31 9) Incorporate comments in a revised (still draft) report for review by DCR Directors Office.

(Above outline prepared 5/16/97, revised 7/11/97, revised 9/2/97, revised 9/26/97)

Item F

City of Virginia Beach

LESLIE L. LILLEY
CITY ATTORNEY

MUNICIPAL CENTER
BUILDING 1
2401 COURTHOUSE DRIVE
VIRGINIA BEACH, VA 23456-9004
(757) 427-4531
FAX (757) 426-5687
TDD (757) 427-4305

September 29, 1997

Julie Hillegass, District Manager
Virginia Dare Soil & Water Conservation District
Post Office Box 6097
Virginia Beach, Virginia 23456

Re: House Joint Resolution No. 555 - Study of Back Bay

Dear Ms. Hillegass:

Thank you for giving the City of Virginia Beach an opportunity to provide comments on the draft of the final report for HJR-555. I understanding from Louis Cullipher and Clay Bernick that they have provided you additional technical and factual comments for inclusion in the final draft. Accordingly, I'll limit my comments to some general observations.

First of all, to the extent that development of the watershed within the City's jurisdiction is permitted under current land use laws, such development is regulated by the Southern Watersheds Management Ordinance - Appendix G. This ordinance is intended to protect, enhance, and restore the quality of the waters within the Southern Watersheds of Virginia Beach which includes Back Bay. I am including a copy of the ordinance for your review and consideration. You will note that the design criteria and performance standards in this ordinance address many of the concerns articulated in the draft report.

Additionally, this watershed is subject to the City's flood plain regulations under the Site Plan Ordinance (Appendix C), the Wetlands Zoning Ordinance (Article 14 of the City Zoning Ordinance), and the Erosion and Sediment Control Regulations (Chapter 30 of the City Code). Inclusion of the regulatory framework governing the watershed within the City's jurisdiction would provide the potential readers of this report with a more accurate perspective on the measures being taken by local government to protect and enhance this vital natural resource.

Re: House Joint Resolution No. 555 - Study of Back Bay

With respect to some of the information contained in the report under the heading of "Non-Point Source (NPS) Pollution Problems Impacting Back Bay," it should be noted that sediment and nutrient problems are not attributable solely to agricultural operations and urban run-off. In 1991, a contaminant study was performed in Back Bay by the U. S. Fish and Wildlife Service to determine if herbicides or other pesticides used in agricultural operations influenced the decline of submerged aquatic vegetation (SAV). In its executive summary, the Service stated that the study results concluded that "SAV declines in Back Bay are primarily influenced by increased turbidity on the bay, rather than the toxic effect of agricultural chemicals."

Moreover, as Louis Cullipher may have already noted in his remarks, the watershed consists of a large area of soils containing high organic matter. These swamps and marshes contribute organic particles which later convert to nitrogen compounds and consequently contribute to nutrient enrichment and accelerated eutrophication in surface water. Accordingly, the report should reflect these additional factors.

The report accurately notes that farming in this area has declined. However, the comments regarding urbanization need clarification. Urbanization has increased but at a relatively slow pace. And, as I have previously stated, the report should state that urbanization in this watershed is subject to a multi-layered regulatory regime in Virginia Beach.

As for the elevated levels of fecal coliform and higher nutrient concentrations in areas of land/ocean interface, it is essential to note that the Sandbridge residential community is currently on septic tanks. However, with the completion of the sewer project in the Sandbridge area, these levels should decline substantially.

The Agricultural Reserve Program mentioned in the report is designed to promote and encourage the preservation of rural farmland through the acquisition of development rights. The acquisition is accomplished via the purchase of agricultural land preservation easements upon such parcels. The ordinance which established this program makes no mention of the production status of the land. Preservation easements may be purchased only upon parcels which meet the eligibility criteria set forth in the ordinance. The section pertaining to the ARP should be corrected to reflect the foregoing.

Additionally, in the portion of the report dealing with targeted land management planning, I would caution against suggesting that the Agricultural Reserve Program require conservation plans for "acres enrolled" thereunder. First of all, the City does not acquire the land in fee simple. It purchases a preservation easement. Secondly, the objective of the program is to promote preservation through voluntary rather than regulatory means. Your suggestion, if implemented, would defeat the major objective of the program.

Re: House Joint Resolution No. 555 - Study of Back Bay

With respect to the section concerning the City's illicit dumping ordinance, I would add that the ordinance also enables the City to compel the clean-up of affected sites by the responsible party. The suggestion to secure increased funding for enforcement is excellent.

In conclusion, I thank you again for affording the City this opportunity and I hope that you will not hesitate to contact me if I can be of further assistance to you in this endeavor.

With kindest regards, I am

Very truly yours,

Vanessa T. Valldejuli

Vanessa T. Valldejuli
Assistant City Attorney

VTV/clb
Enclosure
cc: Louis Cullipher, Agriculture
Clay Bernick, Planning/Environmental Management
Leslie L. Lilley, City Attorney
William M. Macali, Deputy City Attorney

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City of Virginia Beach

CITY OF VIRGINIA BEACH
Department of Agriculture
Municipal Center, Building 14

2449 Princess Anne Road
Virginia Beach, VA 23456-9077
(757) 426-5775 FAX: (757) 426-5684

September 16, 1997

Mr. Mark Meador
Field Operations Coordinator
203 Governor Street, Suite 206
Richmond, VA 23219

Dear Mark:

Following are comments regarding the Back Bay Study:

- There has been a lot of dialogue regarding the source of the sediment now filling the channels in Back Bay. I propose that much of the sediment is from eroding islands and fringe marshes. I suggest that by comparing photos from 1927 to the most recent, we can determine the volume of sediment moved. Most is still in Back Bay since very little leaves the system.

- Access the impact of land disturbance in marsh as a result of man and animals (snow geese) on the spread of phragmites.

- I will be unable to participate in the meeting on September 29 due to meeting out of state.

There are many signs that Back Bay is coming back. This is evident by an increase in SAVs etc. We should do a good job of comparing water quality data now to the data when Back Bay was declining. Perhaps there will be no significant difference in data. This would support the notion that the productivity of the bay is more of a function of biological cycles.

✧ I am very interested in the Back Bay Study. Please keep me informed.

Sincerely,

Louis E. Cullipher
Director

LEC:jr

Back Bay Restoration Foundation

P. O. Box 868
Virginia Beach, VA 23451

REMARKS TO THE BACK BAY
STUDY GROUP (HJR 555)
JULY 16, 1997

Good afternooon. I am Dr. Steve Vinson, the Executive Director of the Back Bay Restoration Foundation. The Foundation is a non-profit organization founded in 1984 to address the deteriorating quality of Back Bay. This estuary, located in the largest watershed in the City of Virginia Beach, suffered from pollution generated by development in one of the fastest growing cities in the country. Sportsmen and conservationists committed themselves to the Foundation's activities of environmental education and ecosystem monitoring and enhancement. Under the leadership of a fourteen member board, the Foundation established a successful program of cooperation and coordination of its activities with local, state and federal governmental and private organizations. BBRF members and volunteers have contributed thousands of hours to aquatic vegetation planting; wood duck nesting box and osprey nesting platform construction, erection and maintenance; water control structure placement and water testing. In 1988 the Foundation was named the "Water Conservationist of the Year" by the Virginia Wildlife Federation in recognition of its conservation efforts in Virginia.

Back Bay is a complex ecosystem that despite considerable study has not yielded answers to some important questions such as exactly what factors are responsible for the fluctuations of submerged aquatic vegetation. However, there is much that we do know. The Bay has increasingly been isolated over the years from inputs and circulation with adjacent water bodies. The water with the materials it carries is now almost solely derived from the watershed located entirely within the city of Virginia Beach. The Mann Report noted a flushing time of at least 1.5 years indicating just how susceptible the Bay is to the input it receives from its watershed.

The Bay has never been subjected to significant point source inputs and the nonpoint source inputs of nutrients and suspended solids have consistently been shown to come via the tributaries. Agricultural and urban runoff are the nonpoint sources. Farming has existed for centuries witin the watershed while increasing urbanization has occurred within the watersehd within the past few decades when the Bay has shown its most significant decline. The conclusion is easy enough to make that urbanization poses the

more significant threat to the Bay.

Therefore what should we do? The City of Virginia Beach has taken a bold step with a concensus of support by instituting the Agricultural Reserve Program. This highly successful, voluntary program is preserving agriculture in the watershed while preventing urban sprawl with its attendant costs to taxpayers. The city should be supported in this endeavor and other measures such as holding the Green Line against excessive development in the southern rural portion of the city.

While farming is maintained there needs to be additional support for best management practices on agricultural lands. Farmers need to be supported with programs that promote the use of methods such as water control structures that provide benefits to both the Bay and the farmer. Meaningful financial assistance needs to be provided such that the farming community faces no signifcant deterent to best management practices on their land.

Much of the watershed and probably some of its more vital parts are not protected or preserved for agricultural use. Where development is allowed to occur in the watershed best management practices need to be fully instituted. Education of developers in appropriate sediment and erosion control can go a long way; but significant incentives need to be in place for enforcement if education fails.

Homeowners are know to use approximately ten times the amount of toxic chemicals such as pesticides on their lawns as do farmers on their fields. The education of the public, particularly the homeowner needs to be increased as more of the watershed is converted to homes and lawn area.

In conclusion, let me say that their needs to be continued study of the Bay. However, no amount of study is going to restore Back Bay. Every month I obtain samples and do field water testing of the tributaries of Back Bay. No analysis of that data has been performed in over ten years. Let's do something with the information we already have. The time is overdue for institution of the measures known to have a beneficial impact on Back Bay, its watershed and the people that live in that watersehed. Fund the initiatives for agricultural and urban best management practices. Provide for public education and dissemination of information about the value of our Back Bay to everyone living in the watershed, indeed in the city.

Most importantly get the people involved. There are many who want to be and by involving them that sense of stewardship you create will far exceed the value of any other initiative. No one knows Back Bay better than members of organizations such as Back Bay Restoration Foundation. Allow us to be involved and make sure that we receive equal consideration for funding of

intitatives. After all we have been working at it for over twelve years already. Thank you.

UNITED STATES DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE
BILL WIDNER
1548 HOLLAND ROAD
SUFFOLK, VA 23434-6528

SUBJECT:Eng- Back Bay Committee Meeting DATE:Oct. 8, 1997

TO:Ms. Julia Hillegass
County Agricultural Building
P. O. Box 6097
Virginia Beach, Virginia 23456-0097

I missed you at the October 7 meeting, and am sorry to hear about the death of your grandmother. I wish you and your family the best during this trying time.

The meeting was interesting from the perspective that interests to keep the Back Bay study autonomous and interests to make it part of a regional study of the Chesapeake Bay caliber dominated discussion. Joan's suggestion, that Delegate Purkey needed at least a couple of tangible and defensible items which could be presented as a need, resulted in the group suggesting funding of one person to be the Back Bay Coordinator and be stationed at the DEQ Tidewater Office.

As I listened, I realized that I'd forgotten the problem and solution. Upon listening further, the group seemed to be saying that the problem and solution lies in the fact that lots of work has been done but none of it has been analyzed! I think this means that we don't have a clue!

I'd suggest that Virginia Beach through the City government be thoroughly made aware of all aspects of the Back Bay work before any suggestions are made or actions taken. Also, the City GIS and other resources should be used to allow City compatibility rather than being concerned with outside compatibilities.

Finally, the draft Final Report asks for unspecified and unfounded funding outside the Back Bay drainage area which is outside the legistative charge (HJR 555). So, to meet the legislative charge, I'd suggest the Roy Mann Management Plan for Back Bay be considered for implementation upon City of Virginia Beach consideration and approval of work and costs.

William H. Widner, Jr.
Conservation Engineer

SOME OBSERVATIONS FROM THE WHAT'S IT WORTH DEPARTMENT

As a user and interested party of Back Bay over the past thirty years, some thoughts come to mind as we set out on our task.

1. We had the "good old days" of great duck hunting and bass fishing on the Bay
2. Periods of abundant submerged aquatic vegetation, notably milfoil
3. Increased pollution and sedimentation as a result of more cultivation and residential development
4. Battles of the pros and cons of saltwater pumping

Through these good times and bad, some of us have never lost faith and hope that the bay could be restored. Not to its mid-century heyday, but certainly improved to provide a place where sportsmen could enjoy its fruits. Over the past twenty-odd years, a number of efforts have made a positive contribution. SAV plantings have certainly helped to restore underwater plant life. They have not only survived, but reproduced. Encouragement and use of water control structures and best management practices (BMPs) has helped. Several agencies and organizations have conducted water sampling and testing programs. Unfortunately, these have been fragmented and uncoordinated, thus their value limited. (i.e. not all areas covered, at different times, different parameters analyzed). This does not necessarily mean that the information is useless. Lots can be derived from it and amplified by a synergistic approach. With the impetus of HJR 555 behind us, we have an outstanding opportunity to "get it together" and examine water quality and other factors that can help restore the Bay.

We have people with broad and deep practical experience (and observation) in the Bay. Coupled with these is a cadre of technical specialists who can help collect the data and chart the course to success. A willing volunteer force stands ready to assist wherever they can be used.

Towards this end, several thoughts come to mind that are offered for consideration in the coming discussions.

1. Collect all the existing reports and historical data on water sampling and their results
2. Get all the parties together who are (and have been) collecting water samples to discuss their activities,
3. Determine the sampling methods used and establish uniform sample collection techniques, with sample locations. Plotting all of these, identify important locations that are missing, particularly the mouths of creeks and ditches emptying into the bay.
4. Coordinate the addition of the missing areas among he sampling collection groups in order to fill in the gaps
5. Provide for an "alert system" for special sample collection after a significant rain event, say 1" or more in a 24 hour period
6. Agree on the parameters to be tested and use the state consolidated lab for sample testing to ensure uniformity and continuity. Submit the data to the STORIS system for easy retrieval and availability to all interested parties.

Respectfully submitted,

Charles Traub III
784 Glasgow Ct.
Virginia Beach, VA. 23452 (757) 340-9056

To: Mark Meador, DCR July 21,1997
From: Chuck Traub, Back Bay Restoration Foundation

Subj: Back Bay water quality sampling and analysis

Background: One of the major concerns of the technical committee of the JHR 555 Back Bay study has been the need for expanded and improved water quality data. Every other prior study has cited this need. Only by coordinated long term study and analysis can problems of the the bay be identified and corrected.

Proposed action: Toward that end, attached is a draft proposal to ensure cooperation and coordination by all agencies and stakeholders to establish a viable water quality analysis program. It is offered as a working document, to be "fine tuned" by the specialists in the respective state agencies represented on the technical committee.

Respectfully,

Chuck Traub

Charles Traub III
784 Glasgow Ct.
Virginia Beach, VA. 23452

DRAFT WORK PLAN

1. Call a meeting of all cognizant governmental agencies and stakeholders -
2. (interested parties)to formulate a water sampling and analysis plan. This should include as a minimum the following :

DEQ (Water Control Board)
DGIF (recommend Mitchell Norman, fisheries biologist)
Back Bay National Wildlife Refuge (and Mackay Island)
False Cape State Park
Dept. of Health (VA. Beach office)
VA. Beach Dept. of Agriculture
US SCS
VA. Beach Planning department (Dir. Environmental Management)
Virginia Dare Soil and Water Conservation District
SWAMP
Back Bay Restoration Foundation

2. Request each of the participants be prepared to provide information on their existing water sampling/monitoring programs, to include:

Sample locations (map of sites)
Frequency of collection and timing
On site observations
Sample parameters tested
Time frame of existing data (since?)

3. Using a map of Back Bay, such as the ADC map of Back Bay or appropriate 7.5 minute quad maps, plot all current sampling locations and the respective collectors. From this representation, determine void areas in sampling, such as the mouths of creeks and ditches, etc. Discuss which agency (sampler) is is best suited to assume responsibility for sampling these sites. This map should also show primary land uses adjacent to the bay, preferably by overlay.

4. Discuss and agree on:

Frequency, timing and methodology of sampling
Provision for special sample collections, such as after a significant rain event, say 1" in 24 hours

Parameters to be tested on all samples. As a minimum, suggest: BOD, TSS, SALINITY, pH, nitrates and chlorophyll

Testing lab to be used. Suggest the state consolidated lab to ensure uniformity and cost savings

Item G

APPENDIX G

SOUTHERN WATERSHEDS MANAGEMENT ORDINANCE*

*Editor's note—This appendix is derived from Ord. No. 2115, adopted Mar. 24, 1992. The text has been set out as adopted except for minor stylistic changes made for conformity with the remainder of this publication. Editorial emendations made for the purpose of clarity are included in brackets [ ].

Cross references—Floodplain regulations, App. A, § 1200 et seq.; wetlands zoning ordinance, App. A, 400 et seq.; coastal primary sand dune zoning ordinance, App. A, § 1600 et seq.

Sec. 1. Title.

This ordinance shall be known as the Southern Watersheds Management Ordinance of the City of Virginia Beach.

Sec. 2. Findings of fact.

(a) The watersheds of the North Landing River, the Northwest River and Back Bay, collectively referred to herein as the Southern Watersheds of the city, and the waterways they contain, constitute a unique and sensitive environment inclusive of coastal primary sand dunes, tidal wetlands, nontidal wetlands and sensitive soils.

(b) Extensive floodplains and marsh fringes bordering the waterways within the Southern Watersheds provide a unique and valuable habitat. Lan 's adjacent to waterways have an intrinsic water quality value due to the ecological and biological processes they perform or which occur within them.

(c) Much of the land area comprising the Southern Watersheds currently supports forestal, agricultural, recreational, and conservation activities. Any future development must be undertaken in a manner which encourages harmony among development, agriculture, recreation and conservation.

(d) The primary topographic feature characterizing the Southern Watersheds is the flatness of the lands surrounding Back Bay, the North Landing River, the Northwest River and their respective tributaries. The lack of topographic relief is a unique characteristic of the Southern Watersheds which must be considered when undertaking development and agricultural activities within the watersheds.

(e) Submerged aquatic vegetation, certain migratory waterfowl and finfish populations have seriously declined within the Back Bay watershed. Proper management of existing wetland habitats and the reestablishment of aquatic vegetation can improve habitat conditions for both migratory waterfowl and aquatic life.

(f) Back Bay is generally shallow with a few narrow channels. Wind-driven tides often inundate the lower floodplains. Wind tides, coupled with storm events, influence the physical conditions of the Bay, including salinity, suspended solids and nutrient levels.

(g) The increase of nutrients such as phosphorus and nitrogen accelerates eutrophication of receiving waters, adversely affecting plant and animal communities.

(h) Land-disturbing activities resulting in the alteration of natural topography, and removal of vegetation tends to increase erosion.

(i) Vegetated areas adjoining waterways and wetlands protect those resources by reducing the generation and transport of sediment.

(j) Indigenous ground cover, especially forested floor area, is effective in holding soil in place, thereby preventing site erosion, and in filtering stormwater runoff. By minimizing impervious cover and land disturbance, rainwater infiltration is enhanced and stormwater runoff reduced.

(k) Unstable ditch and canal banks and eroding marsh areas contribute sediment and nutrients to receiving streams.

(l) The major hydraulic pathways by which pollutants generated by agricultural activities enter receiving streams are surface runoff and groundwater discharge. The major pollutants are sediment and nutrients.

(m) For agriculture tillage and cropping systems, nutrients, animal waste management, irrigation, drainage, pest management and other factors must be considered in conjunction with each other.

(n) The implementation and assessment of agricultural best management practices (BMPs) must be performed within the framework of the entire farming system.

(o) A realistic program for the implementation of agricultural BMPs cannot be developed in the absence of a holistic assessment of BMP effectiveness and impacts, including environmental, economic, social and other motivational factors.

(p) The National Pollutant Discharge Elimination System (NPDES) Program generally requires a reduction of pollutant loads in stormwater runoff to the maximum extent practicable.

(q) Periodic water quality monitoring has indicated elevated levels of fecal coliform bacteria in several canals, connected to Back Bay, adjacent to the Sandbridge community. These canals have, in the past, been classified Class I health hazards in violation of health department standards for primary contact waters.

(r) In 1989, the North Landing River was designated as a Virginia Scenic River pursuant to the Virginia Scenic Rivers Act of 1970. According to VR680-21-07.2, the North Landing River and its tributaries covered under the scenic river designation are considered high-quality resource waters and subject to antidegradation and appropriate water quality standards, as set by the Virginia Water Control Board. The wetlands of the North Landing River, Northwest River and Back Bay support high concentrations of natural heritage resources and migratory waterfowl, making this area a national conservation priority.

(s) In 1990, the United States Fish and Wildlife ice completed an environmental assessment land protection plan that established an acquisition boundary, within which lands that are nationally important for wildlife could be purchased for inclusion in the National Wildlife Refuge System. When acquired, these environmentally sensitive lands would be managed as part of the Back Bay National Wildlife Refuge.

(t) There is not an absolute relationship between soil type and topographic elevation. Some poorly drained soils, such as Acredale, may occur both at low elevations adjacent to Back Bay and at higher elevations in the interior portions of the city. These hydric soils of different elevations are not equally suitable for development. Conversely, there are a few areas of well-drained soils that occur at relatively low elevations.

Sec. 3. Objectives.

This ordinance is intended to protect, enhance and restore the quality of waters within the Southern Watersheds of the city. In order to protect maintain, and enhance both the immediate he long-term health, safety and general welfare of the citizens of the City of Virginia Beach, this ordinance has the following objectives:

(a) To encourage productive and enjoyable harmony among agricultural, recreational, developmental and conservation interests, and the natural resources of the city;

(b) To enhance, restore and protect the chemical, physical and biological integrity of waters within the Southern Watersheds;

(c) To encourage the construction of drainage systems which maintain or functionally approximate existing natural systems;

(d) To encourage the protection of watercourses and the use of them in ways which do not impair their beneficial functioning;

(e) To minimize or reduce the transport of pollutants to the waters of the Southern Watersheds;

(f) To protect groundwater;

(g) To minimize or reduce erosion and sedimentation;

(h) To prevent damage to wetlands and critical-edge habitat;

(i) To prevent damage from flooding, while recognizing that natural fluctuations in water levels are beneficial;

(j) To protect, restore and maintain plant and animal, including fish, communities in the Southern Watersheds;

(k) To improve drainage systems in a manner which promotes bank stabilization, utilizing both structural and nonstructural methods; and

(l) To sustain and accelerate accomplishments in protecting water quality by continuing education, community involvement and incentives as appropriate.

Sec. 4. Definitions.

The following words and terms used in this ordinance shall have the following meanings, unless the context clearly indicates otherwise:

(a) *Agricultural lands:* Those lands used for the planting and harvesting of crops or plant growth

of any kind in the open, pasture, horticulture, dairy farming, floriculture, or the raising of poultry or livestock.

(b) *Best management practice (BMP):* A practice, or combination of practices, determined to be the most effective practical means of preventing or reducing the amount of pollution generated by nonpoint sources to a level compatible with water quality goals.

(c) *Clearing:* The removal of vegetation from surface soils.

(d) *Construction footprint:* The area of all impervious surface created by development of land, including, but not limited to, buildings, roads, construction staging areas, drives, parking areas and sidewalks, and any other land disturbed for the construction of such improvements.

(e) *Conventional tillage:* The combined primary and secondary tillage operations normally performed in preparing a seedbed for a given crop grown in a given geographical area.

(f) *Critical-edge habitat:* Those lands adjacent to wetlands and waterways that provide for flood control, water quality enhancement, wildlife use, public access and recreation, and aesthetics.

(g) *Detention:* The collection and storage of surface water for subsequent gradual discharge.

(h) *Developer:* Any person who engages in development, either as an owner, or as the agent or representative of an owner, of property.

(i) *Development:* The construction or installation of any improvement upon a parcel of land, or any land disturbance, whether or not undertaken in connection with development, but not including activities associated with agriculture or silviculture or the construction of improvements used primarily for agricultural purposes.

(j) *Drainage facility:* Any manmade or artificially altered component of the drainage system.

(k) *Drainage system:* The system through which water flows from the land, including all watercourses, water bodies and wetlands.

(l) *Erosion:* The wearing or washing away of soil by the action of wind, water or other natural processes.

(m) *Flood:* A temporary rise in the level of any water body, watercourse or wetland which results in the inundation of areas not ordinarily covered by water.

(n) *Forebay:* An extra storage area provided near the inlet to a best management practice facility to trap incoming sediments.

(o) *Grade control structures:* A mechanical device used to collect surface water from a given elevation and outlet it at a lower elevation for purposes of minimizing erosion of a slope or ditch bank.

(p) *Hoe drain* or *power take-off drain:* A shallow surface drain constructed perpendicular to the orientation of rows of crops, used for the purpose of collecting and transporting excessive water.

(q) *Impervious surface:* A surface which is compacted or covered with a layer of material so that it is highly resistant to infiltration by water, including, but not limited to, most conventionally surfaced streets, roofs, sidewalks, parking lots, and other similar structures.

(r) *Land disturbance:* Any activity upon land which causes, contributes to, or results in the removal or covering of the vegetation upon such land, including, but not limited to, clearing, dredging, filling, grading or excavating. The term shall not include minor activity such as home gardening, individual home landscaping and home maintenance.

(s) *Natural heritage resources:* Rare, threatened or endangered species and their habitat, rare or state-significant natural communities or geologic sites, and similar features of scientific interest benefiting the welfare of the citizens of the commonwealth pursuant to the Virginia Natural Area Preserves Act of 1989.

(t) *Natural system:* A system which predominantly consists of or uses those communities of plants, animals, bacteria and other flora and fauna which occur indigenously on the land, in the soil, or in the water.

(u) *Nontidal wetlands:* Those wetlands, other than tidal wetlands, that are inundated or saturated by surface or ground water 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, as identified or referred to in the City of Virginia Beach Soil Survey by soil names Backbay Mucky Peat; Duckston portion of Duckston-Corolla Fine Sands; Dorovan Mucky Peat; Duckston Fine Sand; Nawney Silt Loam; Pamlico Mucky Peat; Rapahannock Mucky Peat, Strongly Saline and Pocaty Peat.

(v) *Noxious weed:* A plant which is undesirable because it conflicts with, restricts or otherwise interferes with management objectives of this ordinance, including, but not limited to, Johnsongrass, Purple Loosestrife and Shattercane.

(w) *Person:* An individual, fiduciary, corporation, firm, partnership, association, organization, municipal corporation or other entity or combination thereof.

(x) *Property line ditch:* A ditch or canal used as, or located upon, a boundary between adjacent properties in private ownership.

(y) *Receiving body:* Any water body, watercourse or wetland into which surface waters flow, either naturally, in manmade ditches or in a closed conduit system.

(z) *Retention:* The collection and storage of runoff without subsequent discharge to surface waters.

(aa) *Sediment:* Particulate material, whether mineral or organic, that is in suspension or has settled in a water body.

(bb) *Sedimentation facility:* Any structure or area which is designed to hold runoff water until suspended sediments have settled.

(cc) *Shoreline:* The interface between land and the ordinary high-water mark.

(dd) *Silviculture:* The care and cultivation of forest trees.

(ee) *Site:* Any tract or parcel of land, or combination of tracts, lots or parcels of land which are in common ownership or are contiguous and in diverse ownership where development is to be performed as part of a subdivision or construction project.

(ff) *Structure:* That which is built or constructed, an edifice or building of any kind or any piece of work artificially built up or composed of parts joined together in some definite manner, but not including fences or signs.

(gg) *Subdivision:* The division of any parcel of land into two (2) or more lots or parcels. The term shall include all changes in lot lines, the creation of new lots involving any division of an existing lot or lots and, if a new street is involved in such division, any division of a parcel of land. When appropriate to the context, the term shall also include the process of subdividing and the territory subdivided.

(hh) *Tidal wetlands:* Vegetated and nonvegetated wetlands, as defined in section 1401 of the City Zoning Ordinance [Appendix A].

(ii) *Tillage equipment:* Farm equipment commonly used to invert the soil surface layer, including, but not limited to, disc harrows and moldboard plows.

(jj) *Tributary stream:* A watercourse contiguous to wetlands or shorelines, as defined in this ordinance.

(kk) *Vegetation:* All plant growth, including, but not limited to, trees, shrubs, vines, ferns, herbs, mosses and grasses.

(ll) *Waters or community of waters:* Any and all water on or beneath the surface of the ground, including the water in any watercourse, water body or drainage system and diffused surface water and water percolating, standing or flowing beneath the surface of the ground, as well as coastal waters.

(mm) *Watercourse:* Any natural or artificial stream, river, creek, channel, ditch, canal, conduit, culvert, drain, waterway, gully, ravine, swale or wash in which water flows, either continuously or intermittently, and which has a definite channel, bed or banks.

(nn) *Water-dependent facility:* A development of land which must be located on a shoreline by

reason of its intrinsic nature, including, but not limited to, ports, intake and outfall structures of power plants, water treatment plants, sewage treatment plants, storm sewer outfalls, marinas and other boat docking structures, beaches and other public water-oriented recreational areas, fisheries or other marine resource facilities and shoreline protection measures as authorized under the provisions of the Wetlands Zoning Ordinance. [Appendix A, § 1400 et seq.]. In the case of facilities having both water-dependent components and components which are not water-dependent, only those portions which are water-dependent shall fall within this definition.

(oo) *Wetlands:* Tidal and nontidal wetlands as defined herein.

Sec. 5. Applicability.

This ordinance shall apply to development upon all lands within the watersheds of the North Landing River, the Northwest River and Back Bay, collectively referred to herein as the Southern Watersheds and, to the extent set forth in section [illegible] of this ordinance, to agricultural activities within the Southern Watersheds.

Sec. 6. Exemptions.

The following activities shall be exempt from the provisions of this ordinance:

(a) Maintenance, alterations or improvements of existing structures not changing or affecting the quality, rate, volume or location of surface water discharge; provided, however, that any such activity resulting in a land disturbance exceeding an area of two thousand five hundred (2,500) square feet shall be required to comply with the erosion and sediment control requirements set forth in sections 30-56 through 30-78 of the City Code; [and]

(b) Development upon any lot or parcel of land lawfully created and located within a residential zoning district permitting single-family dwellings or duplexes as a matter of right prior to the date of adoption of this ordinance [March 24, 1992]; and

(c) Construction, installation, operation and maintenance of water, sewer, electric, telephone, cable and gas lines and their appurtenant structures, provided that:

(1) To the greatest practicable degree, the location of such facilities shall be located outside of and no less than fifty (50) feet from wetlands and shorelines;
(2) No greater area of land shall be disturbed than is necessary;
(3) The construction, installation, operation and maintenance of such facilities shall comply with all applicable state and federal requirements and shall be designed and constructed in a manner which minimizes adverse effects upon water quality; and
(4) Any land disturbance exceeding an area of two thousand five hundred (2,500) square feet shall comply with the erosion and sediment control requirements set forth in sections 30-56 through 30-78 of the City Code; and

(d) Silvicultural activities, provided that such activities comply with all applicable stat and federal requirements.

Sec. 7. Performance standards.

(a) Development resulting in or requiring a land disturbance exceeding an area of two thousand five hundred (2,500) square feet shall comply with the erosion and sediment control requirements set forth in sections 30-56 through 30-78 of the City Code.

(b) On lots greater than or equal to one (1) acre in area and not served by the public sewer system, a reserve sewage disposal drainfield site with a capacity at least equal to that of the primary sewage disposal drainfield site shall be provided unless, in the judgment of the Virginia Beach Health District of the Virginia Health Department, the area of such lot is insufficient to accommodate such reserve drainfield site shall be provided unless, in the judgment of the Virginia Beach Health District of the Virginia Health Department, the area of such lot is insufficient to accommodate such reserve drainfield site. On lots subject to the criteria for septic tank installation

n poorly drained soils, a reserve sewage disposal drainfield site with a capacity no less than one-half of the primary sewage disposal drainfield site shall be provided unless, in the judgment of the Virginia Beach Health District of the Virginia Health Department, the area of such lot is insufficient to accommodate such reserve drainfield site. The construction or installation of any impervious surface shall be prohibited on the area of all sewage disposal drainfield sites, including reserve drainfield sites, until the property is served by the public sewer system.

(c) Development in, or within fifty (50) feet of, any wetland or shoreline, except wetlands or shorelines established in connection with structural best management practice facilities, shall be prohibited; provided, however, that vegetation may be cleared for the establishment of access paths if such removal is undertaken in a manner which minimizes land disturbance and impacts to remaining vegetation and maintains the functional value of the fifty-foot area as a stormwater filter; and provided further, that water-dependent facilities may be located within such area. Public highways may be constructed in or across wetlands or shorelines or within fifty (50) feet thereof under the following conditions:

(1) Any land-disturbing activity associated with such construction shall be in compliance with the erosion and sediment control requirements set forth in sections 30-56 through 30-78 of the City Code, or in the case of state agency projects, with such conservation plan or erosion and sediment control specifications as may be approved by the department of conservation and recreation;

(2) There is no practicable alternative location which would have less adverse impact on wetlands or waters within the Southern Watersheds, taking into consideration cost, existing technology, and logistics in light of overall project purposes; and

(3) Appropriate and practicable measures are taken to minimize potential adverse effects of such construction, including any discharge of material associated therewith, on wetlands or waters within the Southern Watersheds.

(d) The following design criteria shall apply to the fifty-foot area described in subsection (c):

(1) Such area shall consist of a mixture of indigenous evergreen and deciduous trees, grass and shrubs;

(2) Trees and shrubs, which may be of seedling variety, shall be planted on ten-foot centers; and

(3) Except as allowed in subsection (c), vegetation located in such area shall not be cleared, cut or mown.

(e) The following additional performance standards shall be requirements of all development, except single-family dwellings or duplexes separately built and not part of a subdivision:

(1) After development, runoff from the site shall approximate the rate of flow and timing of runoff that would have occurred following the same rainfall under predevelopment conditions and, to the extent practicable, natural conditions, unless runoff is discharged into a regional BMP facility;

(2) Measures ensuring compliance with the following design storm event criteria shall be incorporated:

Parcel Size	*Design Storm Event*
Less than 300 acres	10-year storm
300 to 500 acres	25-year storm
Greater than 500 acres	50-year storm

(3) The natural hydrodynamic characteristics of the watershed shall be maintained to the greatest extent practicable.

(f) The following additional performance standards shall be requirements of all development:

(1) The quality of surface waters and groundwater shall be protected and enhanced where practicable;

(2) Erosion during and after development shall be minimized;

(3) Groundwater levels shall be protected;

(4) The beneficial functioning of wetlands as areas for the natural storage of surface waters and the chemical reduction and assimilation of pollutants shall be protected;

(5) The location, construction or design or structures in areas prone to flooding shall be undertaken in such manner as to prevent increased flooding and damage resulting from such development;

(6) Salt water intrusion shall be prevented or minimized;

(7) Natural fluctuations in salinity levels in estuarine areas shall not be altered;

(8) Land disturbance shall be minimized; and

(9) Injury to plant and animal communities and adverse impacts upon fish and wildlife habitat shall be minimized.

Sec. 8. Design criteria.

In order to ensure that the objectives of this ordinance and the performance standards set forth hereinabove will be attained, development subject to the provisions of section 7(e) shall be in accordance with the following requirements, which shall be in addition to the requirements of subsections (a), (b), (c) and (d) of section 7:

(a) Channeling runoff directly into water bodies shall be prohibited; and stormwater runoff shall be routed through systems designed to increase time of concentration, decrease velocity, increase infiltration, allow suspended solids to settle and remove pollutants;

(b) Watercourses shall not be dredged, cleared of vegetation, deepened, widened, straightened, stabilized or otherwise altered, except for the purpose of governmental flood control or water quality projects or normal maintenance. Maintenance of such watercourses shall be in accordance with the erosion and sediment control requirements of sections 30-56 through 30-78 of the City Code;

(c) Water shall be retained or detained before it enters any watercourse in order to prevent siltation or other pollution;

(d) Streambank erosion control shall be designed so as to meet or exceed the minimum state stormwater management criteria, which require that stormwater runoff be discharged into a channel which conveys runoff from a two-year storm event without flooding or erosion;

(e) The area of land disturbed by development shall be as small as practicable. Those areas which are not to be disturbed shall be protected from construction activity by adequate barriers. Whenever practicable, existing vegetation shall be retained and protected on the development site;

(f) Wetlands and watercourses shall not be used as sediment traps;

(g) Erosion and sedimentation facilities shall receive maintenance as prescribed by the approved management plan required by section 9 of this ordinance;

(h) Artificial watercourses shall be designed to reflect the degree of erodibility of soil types through which such watercourses are constructed and to result in flow velocities sufficiently low to prevent erosion of the banks or bed of such watercourses;

(i) Stormwater management ponds shall be used to detain or retain the increased and accelerated runoff generated by development and shall remove pollutants in stormwater to the maximum extent practicable. Water shall be released from detention pond into watercourse or wetlands at a rate and in a manner approximating the natural flow which would have occurred before development;

(j) The use of wetlands for storing and purifying water may be used as the final treatment as part of a comprehensive stormwater management plan, provided their capacity is not overloaded, thereby harming

the wetlands and transitional vegetation. Wetlands shall not be damaged by the construction of stormwater management systems;

(k) Structural best management practice (BMP) facilities shall not be used as sediment traps during construction unless so designed and approved in accordance with the construction plans;

(l) No structural best management practice (BMP) facility shall be constructed within the ten-year floodplain adjacent to West Neck Creek south to Indian River Road and adjacent to the North Landing River south to North Landing Road, to include Salem Canal;

(m) The use of multiple best management practice (BMP) facilities, both structural and nonstructural, is encouraged;

(n) Stormwater management facilities incorporating the following design criteria are encouraged:

(1) Retention areas should be designed so that maintenance necessitated from siltation deposition is easily achieved. Forebay areas should be constructed at each stormwater inflow site, and an emergent wetlands bench should be established around the forebay perimeter;

(2) Retention areas should include an emergent wetlands bench area around the perimeter of the facility. Shorelines shall be designed so that benched areas are winding rather than straight, thereby maximizing the length of shoreline and offering more space for the growth of emergent vegetation;

(3) Retention areas and borrow pit operations should be designed to include a dewatering facility to capture all sediment;

(4) Maintenance access routes should be provided to all structural best management practice (BMP) facilities;

(5) Retention area facilities should include the planting of grasses and herbaceous and woody vegetation along the perimeter of such facilities to improve aesthetics and below the top of bank to promote water quality improvement; and

(6) Infiltration facilities should not be located under areas of impervious cover; and

(o) Stormwater, wastewater and potable water supply facilities and facilities used for the underground storage of petroleum products shall be designed and located so as to optimize water quality benefits while protecting potable water supplies.

Sec. 9. Southern Watersheds Management Plan.

(a) The developer of any land within the Southern Watersheds shall, prior to undertaking any land-disturbing activity, submit a Southern Watersheds Management Plan if such development is subject to the requirements of section 7(e) hereof. No such land-disturbing activity shall take place until the plan is approved and all required permits and approvals have been granted. There shall be included in the plan sufficient information for the development services center and the departments of planning, natural resources and rural services [repealed by Ord. No. 2129] and public works to evaluate the environmental characteristics of the affected areas, the potential and predicted impacts of the proposed activity on waters and wetlands within the Southern Watersheds and the effectiveness and acceptability of those measures proposed by the applicant for preventing or minimizing adverse impacts. The plan shall contain maps, charts, graphs, tables, photographs, narrative descriptions and explanations and citations to supporting references, as appropriate, to communicate the information required by this section.

(b) The plan shall contain the name, address and telephone number of the owner of the property sought to be developed and the developer. In addition, the legal description of the property shall be provided and its location with reference to such landmarks as major water bodies, adjoining roads,

railroads or subdivisions shall be clearly identified by a map.

(c) The plan shall include a detailed description of the existing environmental and hydrologic conditions of the site and receiving waters, including the following information as appropriate to the circumstances:

(1) The direction, flow rate and volume of stormwater runoff under existing conditions;

(2) The location of areas on the site where stormwater collects or percolates into the ground;

(3) A description of all watercourses, water bodies and wetlands on or adjacent to the site or into which stormwater flows. Information regarding their water quality and the current water quality classification, if any, given them by the Virginia Water Control Board shall be included;

(4) Groundwater levels, as indicated by the Virginia Beach Soil Survey;

(5) Location of floodplains, including floodways and flood fringes;

(6) Identification of vegetation existing on the site;

(7) The topography of the site; and

(8) Soil types or taxonomic units existing on the site.

(d) Proposed alterations of any site containing, or adjacent to, a wetland or shoreline shall be prescribed in detail. Such description shall address:

(1) Changes in topography resulting from development;

(2) Areas where vegetation will be cleared or killed;

(3) Areas to be covered with impervious surfaces, including a description of the surfacing material; and

(4) The size, location and proposed use of any buildings or other structures.

(e) Predicted impacts of the proposed development on existing conditions shall be described in detail. Such description shall address:

(1) Changes in water quality;

(2) Changes in groundwater levels;

(3) Changes in the incidence and duration of flooding on the site and upstream and downstream from it; and

(4) Impacts on wetlands.

(f) A plan for the control of stormwater runoff, identifying all components of the drainage system and any measures for the detention, retention or infiltration of water, shall be described in detail.

(g) The location of on-site potable water wells and wastewater facilities shall be identified.

(h) A plan for the maintenance of best management practice facilities.

(i) Erosion and sedimentation facilities shall be maintained in accordance with the Virginia Erosion and Sediment Control Handbook.

(j) Stormwater management facilities shall be inspected twice each year and following every storm which causes the capacity of the facility to be exceeded to ensure that the facility remains operational. Any failures shall be corrected immediately.

(k) The plan shall include any other information which the developer or the departments of planning and public works believe is reasonably necessary for an evaluation of impacts of the development upon water quality.

Sec. 10. Agricultural lands.

(a) Persons engaged in agricultural activities are encouraged to explore and make use of all available resources offered in connection with the conversation of agricultural lands, including personal contacts, on-site field studies concerning the usage of potential agricultural best management practices, focused educational programs, demonstration and education projects, cost-share incentives and technical assistance provided by city, state and federal resource agencies.

d) The director of the department of natural esources and rural services, in concert with the Department of Agriculture, Virginia Department of Forestry and the United States Department of Agriculture, Soil Conversation Service, shall coordinate the exploration of all available resources as described in section 10(a) of this ordinance. The director shall maintain a record of all efforts relating to the development of individual farm conservation plans, cost-share incentives, focused educational programs and the development and implementation of agricultural best management facility projects, and shall report thereupon every six (6) months to the city council.

*Editor's note—The department of natural resources and rural services was abolished by Ord. No. 2129, adopted May 2, 1992. See the editor's note to ch. 2, art. XXV, § 2-457 et seq.

Sec. 11. Procedures.

(a) A presubmittal meeting with the development services center to discuss the project in order to facilitate the development review process is encouraged.

) A processing fee shall be collected at the ...e the Southern Watersheds Plan is submitted, which fee shall defray the cost of administration of this ordinance, including costs associated with plan review, issuance of permits, periodic inspection for compliance with approved plans, and necessary enforcement. Such fee shall be in an amount equal to the fee required by section 7 of the Stormwater Management Ordinance [Appendix D].

(c) Within sixty (60) working days after submission of the completed Southern Watersheds Plan, the development services center shall approve the plan, with or without specified conditions or modifications, or reject the plan, and shall notify the applicant accordingly. If the development services center has not rendered a decision within sixty (60) working days after submission of the plan, the plan shall be deemed approved and the applicant shall be authorized to proceed with the proposed activity. If the plan is rejected or modified, the development services center shall specify such modifications, terms or conditions as will allow approval of the plan; provided, however, that it shall not be the responsibility of the development services center to design an acceptable project.

[(d), (e) *Reserved.*]

(f) The Southern Watersheds Management Plan shall not be approved unless it clearly indicates that the proposed development meets all requirements of this ordinance, except such requirements as have been deleted or modified pursuant to variance.

(g) *Inspections:* No Southern Watersheds Management Plan shall be approved without adequate provision for inspection of the property, as follows:

(1) *Initial inspection:* prior to approval of the management plan;

(2) *Bury inspection:* prior to burial of any underground drainage structure;

(3) *Erosion control inspection:* prior to any land-disturbing activity and as deemed necessary thereafter to ensure effective control of erosion and sedimentation; and

(4) *Finish inspection:* at such time as all land-disturbing or development activities have been completed.

Sec. 12. Variances and appeals.

(a) The city manager or his designee may authorize in specific cases a variance from any retirement of this ordinance which will not be contrary to the public interest when, by reason of the existence of special conditions, a strict enforcement of such requirement will result in unnecessary hardship. No variance shall be authorized unless:

(1) Strict application of the ordinance will produce undue hardship;

(2) The condition giving rise to the asserted hardship is not of so general or recurring nature as to make reasonably practicable the formulation of general regulations to be adopted as an amendment to the ordinance; and

(3) The granting of the variance will not:

(i) Adversely change the rate or volume of stormwater runoff;

(ii) Have an adverse impact on a wetland, shoreline, watercourse or water body;
(iii) Contribute to the degradation of water quality;
(iv) Be of substantial detriment to adjacent property or adversely affect the character of adjoining neighborhoods; or
(v) Otherwise impair attainment of the objectives of this ordinance.

When a variance is granted, the city manager or his designee may attach such conditions and safeguards as are deemed necessary to protect water quality in the Southern Watersheds, and may require a guarantee or bond to assure compliance. Any person aggrieved of the decision of the city manager or his designee may appeal such decision to the city council within thirty (30) days of the date of such decision. Any person aggrieved of a decision of the city council may appeal such decision to the circuit court within thirty (30) days of the date of such decision. Review of such decision shall be in accordance with the procedures and standards of the Administrative Process Act. The city manager or his designee shall maintain a record of all variance actions and report thereupon biannually to the city council.

(b) Any decision, determination or order made by any officer in the administration or enforcement of this ordinance may be appealed to the city council within thirty (30) days from the date of such decision, determination or order. Any decision of the city council may be appealed to the circuit court within thirty (30) days of the date of such decision. Review of such decision shall be in accordance with the procedures and standards of the Administrative Process Act.

Sec. 13. Severability.

The provisions of this ordinance shall be deemed severable; and if any of the provisions hereof are adjudged to be invalid or unenforceable, the remaining portions of this ordinance shall remain in full force and effect and their validity unimpaired.

Sec. 14. Enforcement.

(a) Any development commenced without the prior approval of a Southern Watersheds Management Plan or which is conducted contrary to such approved plan shall be deemed a public nuisance and may be enjoined or abated by the city in a manner provided by law without the necessity of showing that no adequate remedy at law exists.

(b) In addition to any other penalty or remedy herein provided, any person convicted of violating any of the provisions of this ordinance shall be punished by a fine of not more than one thousand dollars ($1,000.00) or by confinement in jail for a period of not more than thirty (30) days, either or both.

(c) Without limiting the remedies which may be obtained pursuant to this section, the city may bring a civil action against any person for a violation of any of the provisions of this ordinance. Such action may seek the imposition of a civil penalty of not more than two thousand dollars ($2,000.00) for each violation.

(d) With the consent of any person who has violated or failed, neglected or refused to comply with any of the provisions of this ordinance, the city manager or his designee may provide, in an order issued by him against such person, for the payment of a civil charge of not more than two thousand dollars ($2,000.00); provided, however, that such order shall not excuse compliance with any of the provisions of this ordinance. Monies collected pursuant to this subsection shall be dedicated to the natural resources conversation and restoration fund.

(e) Prior to the approval of any Southern Watersheds Management Plan, there shall be required of the applicant a reasonable performance bond, cash escrow, letter of credit or other legal surety or combination thereof acceptable to the city attorney to ensure that measures may be taken by the city, at the applicant's expense, should he fail, after reasonable notice, within the time specified in such notice, to comply with the requirements of this ordinance. Within sixty (60) days after final inspection of the development activity, such surety, or the unexpended or unobligated portion thereof, shall be returned to the applicant or terminated, as the case may be.

(f) Upon notice from the city manager or his designee that any activity is being conducted in

iolation of any of the provisions of this ordi-nance, such activity shall immediately be stopped. An order to stop work shall be in writing and shall state the nature of the violation and the conditions under which activity may be resumed. No such order shall take effect until it has been tendered to the owner of the property upon which the activity is conducted or his agent or to the person conducting such activity. Any person who continues an activity ordered to be stopped, except as directed in the stop-work order, shall be guilty of a violation of this ordinance.

Sec. 15. Vested rights.

The provisions of this ordinance shall not affect the vested rights of any person under existing law.

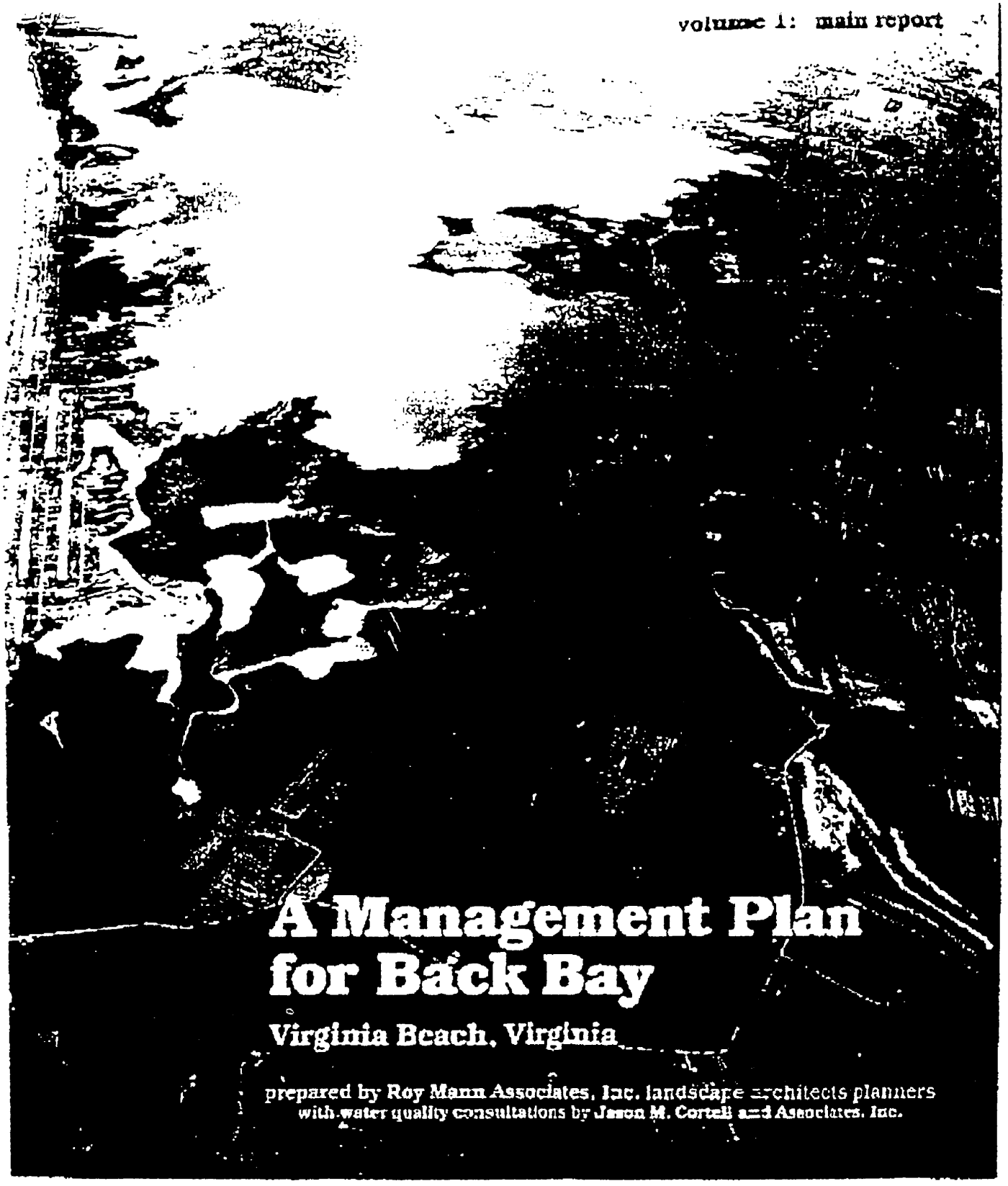
Sec. 16. Effective date.

This ordinance shall become effective on the date of its adoption.

Adopted by the Council of the City of Virginia Beach on the 24th day of March, 1989.

Item H

volume 1: main report



A Management Plan for Back Bay

Virginia Beach, Virginia

prepared by Roy Mann Associates, Inc. landscape architects planners
with water quality consultations by Jason M. Cortell and Associates, Inc.

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PREFACE

Virginia Beach's Back Bay is a remote, untamed estuary lying in the lee of False Cape, a landscape and seascape of marshes and open water, dune ridges and islands, watermen and anglers going for large-mouth bass, ducks and geese carving flight formations against the open sky. It is also a thousand other things to thousands of other people: it is a place for respite and reflection, it is a place for indulgence in the excitement of coastal wilderness, it is a land to farm. It is home, too, for small villages and hamlets dating from the colonial age of Princess Anne.

Above all else, the marvel of Back Bay is that it is what it is within the embrace of a rapidly urbanizing region. It exists wholly within the municipal boundaries of Virginia Beach, among the fastest growing cities in the United States. Its existence as a district of the City raises a challenging issue: will the wildness and beauty of Back Bay continue to survive, a protected precinct within a populous city? Or will it, and the rural lands of its watershed, succumb to inevitable expansion of development southwards from central Virginia Beach?

The questions are tough and challenging, the potential answers even more so.

This report was undertaken by the City of Virginia Beach to identify the measures that could be adopted by the City, as well as other public bodies and the private sector, in pursuit of the City's Comprehensive Plan. The Plan, approved by City Council, states as policy that the rural qualities of the Back Bay area are of value to Virginia Beach and that residential development of densities greater than those which presently exist would erode these qualities.

The recommendations offered by this report are in direct response to the City's study mandate. Some will undoubtedly generate wide public discussion, but this is inevitable, appropriate, and timely, for the future of Back Bay is worthy of the close attention at this time of the people and institutions of Virginia Beach. Hopefully, the end results of this discussion will provide Virginia Beach with the means to better manage and enjoy the qualities of Back Bay and its adjacent lands for many generations to come.

SUMMARY OF SELECTED MAJOR RECOMMENDATIONS

Principal Findings

1 Back Bay and the watershed and other related lands associated with its resource quality are of unique environmental, ecological, cultural and economic value, in its present condition, to the City and people of Virginia Beach.

2 Maintaining the diversity and abundance of Back Bay wildlife, fisheries, floodplain, agricultural uses and productivity, and rural characteristics of the Back Bay watershed and those portions of the North Landing River watershed and the Atlantic Shore in which human actions might affect this diversity and abundance is a proper goal for the City in pursuit of protecting the Back Bay's resource values.

3 Alternate strategies for improving the City's means for achieving this goal might be considered. Full public discussion and full appreciation of the implications of each strategy should be undertaken and a clear and consistent set of steps subsequently adopted.

Urban Development

1 A Land Management Enhancement Strategy would constitute the least degree of change in City tools. It would include:

- Extension of the "Green Line" northward at selected points to protect prime agricultural soils and critical watershed drainage areas and upland wildlife habitat.
- Retention of existing zoning.
- Amendment of zoning to eliminate "spot" zoning.
- Maintaining the current capital improvements program for the Back Bay and North Landing River watersheds.

2 An Improved Land Management Tools Strategy would imply a moderate degree of change. It would include:

- Amendment of the Comprehensive Plan to create a new "Back Bay Management District" to articulate goals, objectives, and policies for development and resource conservation. The district would extend to all Back Bay watershed lands and waters, those of the North Landing River watershed flanking the Pungo peninsula, and the Atlantic shore.
- Amendment of the Comprehensive Zoning Ordinance to create new zones to protect forests, primitive lands, and productive agricultural soils within the Back Bay Management District.
- Reduction of front foot property tax assessments for productive agricultural lands.

  Establishment of a "Public Lands Trust" to which open space lands can be donated, free of inheritance tax.
- Adoption of other measures that can be easily adopted without significant changes in City authority or programs, including those which are also included in the Land Management Enhancement Strategy defined above.

3 A Protective Watershed Management Strategy would entail the greatest degree of change in City tools, but would achieve the greatest improvement of Back Bay resource protection. It would include:

- Creation of a Back Bay Management District, as also recommended under the Improved Land Management Tools Strategy.
- Adoption of zoning for areas of critical community value. This measure would be similar to the recommendation for new zones under 2b, above. Areas of Critical Community Value could include, in addition to forests, primitive lands, and productive agricultural soils: hamlet centers, public access points, floodplain areas adjoining critical wetlands and wildlife habitats, and lands adjoining significant aesthetic and environmental resources, such as the Lotus Garden.
- Creation of a Virginia Beach Land Bank. This measure could require substantial start-up financing, but through its revolving fund, could allow the City to acquire land threatened by inappropriate development and to later resell such land to appropriate users under suitable deed restrictions.
- Adoption of a system for the Transfer of Development Rights (TDR). This measure could require moderately substantial administrative effort, but would allow private land owners and developers to work out the transfer of development under City guidance. TDR would not prevent all development, but much development could be diverted to more suitable areas outside the Back Bay and North Landing River watersheds, to the satisfaction of both land owners and developers.

Water Quality and Salinity Control

1 The Little Island Salt Water Pumping Station should be maintained at its present capacity, but its pump lines should be extended 6000 feet, with three spaced outfalls to permit better dispersion of introduced salt water. The improved dispersion should achieve somewhat higher average salinities in those portions of greater Back Bay where salinity is presently low and should prevent the excessively high salinity peaking that occurs with the present inadequate dispersion.

2 Agricultural practices should be improved in several respects:

- Cropland erosion should be minimized through proper crop rotation and other measures.
- Modified-till and no-till practices should be adopted, where soil qualities allow.
- Livestock animal waste holding facilities and lagoon spoil mounds should be properly designed and maintained.

The reader will find these and other recommendations more fully explained on the following pages. The decisions the people of Virginia Beach and the governmental institutions will be making in near time on management approaches and techniques for the Back Bay will help determine the future of this unique resource for all time.

Therefore, good reader, consider well the contents of this report and guide your conclusions of the future of Back Bay accordingly.