CITY OF HAMPTON
CHESAPEAKE BAY
PRESERVATION AREA PROGRAM
FINAL
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CITY OF HAMPTON

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ABBREVIATIONS AND ACRONYMS

Chesapeake Bay Local Assistance Board	CBLAB
Chesapeake Bay Local Assistance Department	CBLAD
Chesapeake Bay Preservation Act	ACT
Chesapeake Bay Preservation Area	CBPA
Resource Protection Area	RPA
Resource Management Area	RMA
Intensely Developed Area	IDA
Chesapeake Bay Preservation Area Designation and Management Regulations	"Regulations"

I. EXECUTIVE SUMMARY

The Virginia General Assembly has enacted a number of initiatives to protect and restore state waters, ranging from incentive programs to specific delegation of authority to local governments. The most significant of these is the Chesapeake Bay Preservation Act, which serves to greatly expand local police powers and provide a means of better utilizing state resources. The Chesapeake Bay Preservation Act establishes a specific relationship between water quality protection and local land use authority. Pursuant to Section 10.1-2108 of the Code of Virginia: "counties, cities and towns are authorized to exercise their police and zoning powers to protect the quality of state waters consistent with the provisions of this chapter." The regulations adopted pursuant to the Act draw heavily upon the powers conferred to local governments and seek to build on the foundation of other state water quality protection initiatives.

The General Assembly has encouraged local governments to make full use of the significant expansion of authority and responsibility conferred by the Act. Accordingly, water quality protection is to be more closely considered in land use decisions, policy, and ordinances.

The state-local cooperation envisioned by the Act hinges on timely local implementation of the Criteria Regulations promulgated by the Chesapeake Bay Local Assistance Board (CBLAB). The Act requires localities one year after the adoption date of the Regulations (September 20, 1989) to designate Chesapeake Bay Preservation Areas (CBPAs) within their jurisdictions. Localities are further required by the Act to employ measures necessary to implement the CBLAB's performance criteria. These requirements are considered the two principal elements in the first-year program of the Bay Act.

The City of Hampton began updating its Comprehensive Plan for 1990 following the adoption of the Regulations. In February, 1990 the City of Hampton contracted with Maguire Associates, Inc. to assist in the implementation of the first-year program of the Bay Act. This report addresses the first-year program element of designating CBPAs within the City of Hampton. Upon completion, the City of Hampton will incorporate this element into its Comprehensive Plan.

II. INTRODUCTION

In order to satisfy the requirements of the first-year program, specifically the CBPA designation, a series of objectives was established by the City. The primary objectives of this Report are to:

1) Identify and delineate components of a Chesapeake Bay Preservation Area including tidal wetlands, tidal shores, non-tidal wetlands hydrologically connected by surface flow and bordering on tidal wetlands or tributary streams, tributary streams, and buffer areas.

2) Categorize the above components into Resource Protection Areas (RPAs) and Resource Management Areas (RMAs).

3) Provide an Environmental Inventory including the mapping and documentation of the above designations investigated in the Report.

In order to meet these objectives, a number of interrelated tasks were undertaken. A brief description of each task is provided below.

* LITERATURE SEARCH AND REVIEW

  Collection and review of pertinent resource data including statistics, maps, photographs, surveys and environmental reports relevant to the City.

* FIELD INVESTIGATIONS

  Reconnaissance survey of environmental resources identified in the literature. Field verification of resources previously delineated by the City of Hampton.

* DATA ANALYSIS

  Analysis of data collected through the literature and field investigations. Comparison of data with existing environmental resource inventories and mapping.

* PRELIMINARY MAPPING

  Preliminary delineation of environmental resources on planimetric drawings. Refinement of delineation based on field and office evaluations.

* PRESERVATION AREA DESIGNATION

Designation of preservation areas based on preliminary mapping of environmental resources.

* FORMAL MAPPING AND REPORT PREPARATION

Mapping and categorization of preservation areas into Resource Management Areas and Resource Protection Areas. Preparation of Report including a discussion of the methodology, mapping, and designation process.

III. CHESAPEAKE BAY PRESERVATION AREAS

The Chesapeake Bay Preservation Act requires each local government to designate CBPAs encompassing those land features which, if improperly developed, would contribute to the significant degradation of the water quality of the Bay and its tributaries. Some land features within the shoreline environment, such as wetlands, serve an important and direct water quality function in their own right by removing excess sediment, nutrients and potentially harmful or toxic substances from the runoff entering the Bay and its tributaries. Other features, such as floodplains, have a great potential to degrade water quality if they are improperly disturbed or developed. Thus, in developing the Regulations the CBLAB recognized the functional difference between two types of lands.

A. COMPONENTS

For all local governments, including Hampton, lands which have intrinsic water quality benefit are designated RPAs. Those lands which have the potential of degrading water quality or diminishing the functional values of the RPA, if not properly managed, are designated RMAs.

For the purposes of this report, all tidal wetlands, tidal shores, tributary streams, and non-tidal wetlands hydrologically connected by surface flow and bordering on tidal wetlands or tributary streams, as well as a 100-foot buffer area landward of these components are designated as RPAs. These lands perform important water quality protection functions by absorbing wind and wave energy, stabilizing soils, and filtering sediment and nutrients running off the land. The RPA constitutes the last barrier to the overland flow of runoff before it reaches surface waters. Because of their vital ecological importance, RPAs will be the most stringently regulated portion of CBPAs.

Further, land features such as drainage basins and floodplains are designated as RMAs. An RMA is designated contiguous to the entire inland boundary of the Resource Protection Area.

Inappropriate land use and development practices in the RMA may have an adverse impact on the water quality protection function of the RPA. It is therefore critical that the RMA encompass an area large enough to provide significant water quality protection through the employment of the performance criteria.

B. DEFINITIONS

The words and terms used in the "Regulations" have been carefully defined to convey the desired meaning. Many of these definitions are specific to the "Regulations", while others are derived from terms already employed in other water quality programs.

For example, there are several conceivable definitions for tidal shore, depending on the situation. The level of biological activity is highest in the littoral zone, that is, the shallow-water habitats which fall seaward of low-water. However, these submerged lands are generally state-owned lands beyond local government jurisdiction. The definition which the criteria employ (mean low water to mean high water level) tracks the language of the Tidal Wetlands Act (*Section 62.1-13.2 et seq. of the Code of Virginia*).

To provide the reader with the rationale and justification for the way Preservation Area components are defined in the Regulations, explanatory text is provided below.

1. **Tributary Streams.** The Regulations define tributary streams as "any perennial stream" since the connection of such streams to the Bay is a major pathway by which pollution enters the Bay. The definition is tied to the depiction of these features as they appear on the U.S. Geological Survey 7-1/2 minute topographic maps. USGS quad maps are recognized as being reasonably accurate and readily available. There are, however, certain limitations due to the map scale. For example, some drainage ditches may appear as perennial steams. Further, this scale (1:24,000) allows only an approximation of where a perennial stream stops and intermittent flow begins. More detailed information from other local maps or field reconnaissance may be used to supplement USGS quad sheets as necessary in designating tributary streams.

2. **Tidal Shores.** The Regulations define tidal shores as "land contiguous to a tidal body of water between the mean low water level and the mean high water level".

3. **Tidal Wetlands.** To ensure consistency, the definition for tidal wetlands in the Regulations is the state regulatory definition (*Section 62.1-13.2 et seq. of the Code of Virginia*). This is the same definition as applied by the Virginia Marine Resources Commission and the Hampton Wetlands Board.

4. **Non-Tidal Wetlands.** Non-tidal wetlands are defined as 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 defined in the Federal Manual for Identifying and Delineating Jurisdictional Wetlands (1989).

It is important to note that all three attributes of the definition - wetland vegetation, undrained hydric soils, and wetland hydrology must be satisfied in order to classify an area as non-tidal wetlands. Since the Regulations' definition is the same as that used in the Federal Manual, wetlands included within CBPAs are likely to be under Federal jurisdiction.

5. **Floodplains.** The 100-year storm return interval is used to define floodplains in the Regulations since this is the return interval used in the federal flood insurance program in which most local governments participate. Further, 100-year floodplain maps are relatively common as a result of that program. It should be noted that floodplains are land areas that are inundated by the overflow of streams and rivers, not drainage ditches. A regulatory floodplain is frequently defined by state and local regulations to include all land within reach of a 100-year flood, that is, a flood with a one percent probability of occurring in any given year.

6. **Highly Erodible Soils.** The Regulations define highly erodible soils by the incorporation of a formula that accounts for most of the characteristics that actually result in excessive soil erosion including, the effects of the interaction of rainfall, the erodibility factor, slope gradient, and slope length. This formula is familiar to soil scientists and soil conservationists. Using this definition will also permit areas of highly erodible soils to be easily mapped from digital soil data. Also important is the fact that the definition is consistent with the definition used in Virginia to identify highly erodible agricultural soils for determining compliance with requirements of the 1985 Federal Food Security Act (Farm Bill).

7. **Highly Permeable Soils.** The definition of highly permeable soils is based upon recommendations by the U.S. Department of Agriculture - Soil Conservation Service and is consistent with SCS's classification system. Again, the use of this definition will allow highly permeable soils to be easily mapped from digital soil data.

The SCS estimates that this definition (six inches per hour) describes approximately 30% of coastal plain soils, whereas, the next lower mapping break-point - moderately rapid (two inches per hour) - describes approximately 75-80 % of the land in Tidewater Virginia.

8. **Buffer Areas.** The Regulations define buffer areas as "an area of natural or established vegetation managed to protect other components of a RPA and state waters from significant degradation due to land disturbances. The Act defines CBPAs as "certain lands... which if improperly developed may result in substantial damage to the water quality of the Chesapeake Bay and its tributaries." At first glance, this broad definition might seem to include virtually all of Tidewater Virginia, since any land improperly developed will contribute to water quality degradation.

The key to understanding this definition, however, is the meaning of "substantial" damage. Clearly there are lands which have greater potential for water quality impact than others. In fact, the Regulations recognize two distinct types: those which intrinsically protect water quality (RPAs) and those which have the potential, by their nature, to cause serious negative impacts if used or developed improperly (RMAs).

Thus the Regulations work to prevent water quality degradation on two levels: protecting the viable water quality function of certain lands and preventing negative impacts from others.

RPAs perform natural pollution control functions. Biological activities in these areas are specially adapted for controlling runoff, trapping sediment, and recycling nutrients and pollutants. By virtue of their proximity to water courses, RPAs provide the last line of defense before pollutants enter the Bay and its tributaries.

The second class of lands, RMAs, are prone to amplifying the impacts of pollutants. Highly erodible soils, steep slopes, highly permeable areas, floodplains, and certain wetlands accelerate the process of pollutants reaching ground water and surface water. Their characteristics cause them to have a greater potential for pollution as a result of improper development practices.

The types of lands which have been identified as CBPAs are important features in the hydrologic cycle and, as such, have direct and substantial links to water quality. The Regulations have been designed to recognize this relationship as a means to achieving enhanced water quality in the Bay.

C. VALUES

1. **Wetlands.** Wetlands, which include marshes, swamps, bogs, pocosins and wet meadows, are transition areas between drier uplands and the deep waters of streams, rivers, lakes and bays. In recent decades, the ecological values of wetlands have become better understood. Nevertheless, wetland loss has been a major contributor to water quality damage. Between 1956 and 1977, over 63,000 acres of Virginia's wetlands were lost at an average annual rate of over 3,000 acres. Since they are linked to both upstream and downstream ecosystems, wetlands play key roles in regional hydrologic cycles, and their functional values may extend well beyond the boundaries of the wetlands themselves. (The Conservation Foundation, 1988).

Wetlands benefit water quality by acting as a filter in trapping and holding nutrients and microbes which come from upland runoff. Aquatic plants in wetlands change inorganic nutrients into organic material, storing it in their leaves or in the peat soil composed of their remains. The stems, leaves and roots of wetland plants also slow down and trap sediment, so the wetland acts as a settling basin, keeping downstream water clean by holding back silt and other insoluble material. Toxic chemicals and other pollutants which are washed in with sediment can be caught by this filtering process as well (Hershner, 1989).

Wetlands also act as a sponge by slowing down fast-moving erosive water, absorbing the energy of it for flood control and storm-damage protection, and acting as a buffer against coastal erosion from wave action. Water is stored in the highly absorptive soils of wetlands, which serve as reservoirs from which groundwater can be replenished during dry seasons (Thurow, 1975).

Wetlands are more sensitive than deeper water to pollution because the exposure of their larger relative surface area to wind movement and the sun's warmth speeds up the chemical processes taking place in the water. Development overloads and degrades the natural filtering system by accelerating the natural process of silting, often adding pollutants as well. Wetlands have a threshold of tolerance for what they can effectively assimilate; beyond that threshold, they will no longer have the same filtering and water-storing capacity. Wetlands cannot function as bottomless settling basins and must be protected from pollution and sediment flow in order to maintain their value. The ecology of wetlands is also disturbed by exaggerated high and low water levels caused by increased stormwater runoff and pumping for irrigation and water supplies (Thurow, 1975).

Wetlands are either tidal or nontidal depending on their proximity to tidal waters, such as bays and oceans. Tidal wetlands include marshes and salt ponds, and nontidal wetlands are generally inland areas such as forested swamps.

Tidal wetlands, which include vegetated marshes and nonvegetated sandflats or mudflats, are the most easily recognized of the wetlands in the coastal area. They are dominated by tidal action which regularly floods them. Typically, these wetlands are found along the coast but they may also be found along creeks and rivers which are influenced by tides although they are distant from the coast. Thus, tidal wetlands may be either salty or fresh depending on their proximity to the coast and the amount of freshwater entering them (Rice, 1987).

Both vegetated marshes and non-vegetated mudflats protect the shoreline and adjacent upland by reducing erosion caused by wave action. They also filter pollutants and excess sediment carried to the shore by estuarine waters.

2. **Tidal Shores.** The shoreline interface where the water meets the land is the scene of dramatic changes caused by the natural forces of wind and water. As a result of the impacts associated with seasonal tidal fluctuations, hurricanes, tropical storms, and "northeasters", wind and water-generated wave action displaces shore sediments through erosion and transports them from place to place through the process of deposition. In this manner, the shape and make-up of the tidal shore is constantly in a state of change.

Tidal shore stability is generally governed by three main determinants: the amount and type of materials making up the beach, the intensity of the natural and human forces responsible for change, and the stability of sea level.

3. Buffer Areas. Recent developments in land use planning techniques have recognized the benefits that arise from the use of vegetative buffers in screening or separating incompatible land uses. Such buffers are most commonly associated with screening wind, noise or unsightly views, but buffers can be particularly effective as well, in filtering stormwater runoff from disturbed sites.

Buffer areas are zones of undeveloped, vegetated land that are managed to reduce the impact on water quality of land disturbing operations in adjacent areas. The buffer area can either be spatially arranged as a linear strip or as a free-form mass of vegetation, depending upon the desired use for which the buffer is intended. Similarly, buffer areas can be naturally existing zones of vegetation or planted zones of vegetation, depending upon the character of the site and the extent of site disturbance.

Vegetated buffer areas provide a wide variety of environmental, aesthetic, and recreational benefits. Benefits that can be derived from the implementation of buffer areas include the following:

- Sediment control
- Nutrient assimilation
- Streambank stabilization
- In-stream temperature maintenance
- Outdoor recreation
- Flood control/protection
- Groundwater recharge area protection
- Aesthetics protection
- Runoff volume reduction

Although all these benefits are important, the benefit perhaps most notable in terms of water quality protection is the potential for filtering sediment and assimilating nutrients from surface runoff caused by storms.

Buffer areas provide the moderating effects of vegetation, protective soils, and organic litter to slow down the rate of stormwater runoff and protect nearby population centers from the hazards of flooding associated with high rates of runoff. Buffers slow down runoff from impervious surfaces, thus allowing more consistent flows in water-courses and the continued renewal of groundwater storage areas. And finally, buffer areas provide a margin of safety by protecting watercourses form the degrading influence of sedimentation and pollution.

The Regulations require that a buffer area not less than 100 feet wide be located adjacent to and landward of tidal shores, tidal wetlands, nontidal wetlands connected by surface flow and contiguous to tidal wetlands or tributary streams, and along both sides of any tributary stream.

Tributary streams are an integral part of an area's watershed, which is the land area drained by a river (or, in Tidewater Virginia, by the Chesapeake Bay) and by small rivers and streams which feed into the river.

IV. ENVIRONMENTAL INVENTORY

The Regulations require an inventory of certain key features that are components of CBPAs. In order to prepare the inventory a number of guidelines were followed to designate preservations areas within the City of Hampton.

An environmental inventory usually consists of information gathered and presented on map form. Accordingly, a series of maps were prepared delineating the location of resources and problem areas. According to the Regulations, the following environmental features were identified:

Tributary Streams

Tidal Shores

Tidal Wetlands

Non-tidal Wetlands

Buffer Areas

An environmental inventory helps identify natural and living resources in the community. It also indicates how these resources may constrain future development and, in turn, what impact development may have on their long term viability. It also further delineates areas with features of special planning interest. Finally, the environmental inventory provides information critical to the City in its endeavor to balance the value of anticipated growth and economic development with the value of natural features and environmental resources.

A. METHODOLOGY

The inventory of the environmental features was accomplished through the following methodology. First, current mapping and literature of pertinent environmental features were obtained and reviewed. As part of the effort, the following resources were secured:

* U.S. Geological Survey (USGS) topographic maps - Norfolk North, Newport News North, Newport News South and Hampton, VA quadrangles. Scale: 1"=2000'

* National Oceanic and Atmospheric Administration (NOAA) navigation charts. Variable scales.

* National Wetland Inventory (NWI) maps - Newport News North, Newport News South and Hampton, VA quadrangles. Scale: 1"=2000'.

* Virginia Institute of Marine Science (VIMS) Tidal Marsh Inventory - City of Hampton. Scale: 1"=2000'.

* Federal Emergency Management Administration (FEMA) floodplain maps. Scale 1" = 400'.

* Aerial photographs from the City of Hampton, Virginia Department of Transportation, and the Norfolk District, Corps of Engineers.

Subsequently, the above data were carefully reviewed and compared with existing coastal resource information for general accuracy and consistency. The information was then transferred to a working drawing (blueline) for each planimetric sheet (e.g. B-7, H-2, etc.). This transfer was accomplished by first modifying the scale of the pertinent resource map to that of the working drawing, i.e. 1" = 200', and then overlying the latter on the former map. Information was then traced to the working drawing and properly identified and roughly delineated to allow for field verification and fine tuning of the delineation.

After environmental information was transferred to each working drawing, a reconnaissance survey of the entire City was conducted. Working drawings, resource maps and aerial photography were taken in the field and utilized to confirm and/or refine environmental resource boundaries. Once the pertinent environmental features were field verified, all information was properly delineated and identified on the working drawings. Once the features were delineated, the working drawings helped form the environmental inventory.

As noted earlier, the delineation of environmental resources was based on existing data, mapping resources, and field verification. There are certain limitations in the accuracy of these resources due to scale and methodology. In addition, certain environmental features have been altered or no longer exist, therefore, mapping may not represent current conditons throughout the City. Nevertheless, the environmental inventory provides an important tool for local land use planning and, as such, are appropriate for the designation of Preservation Areas.

The majority of these mapping resources were available at a scale of 1:24,000 (1" = 2000'), which facilitated the preparation of overlays of environmental features. Some of the available mapping projects, like the USGS topographic maps were widely used. Other available mapping resources are less familiar, or present a new resource to localities.

Although the Management Regulations do not dictate a map scale for the designation of CBPAs, the City of Hampton elected to prepare their designation maps at a scale that provided the best fit with their comprehensive plan, zoning map, tax maps, and local topographic mapping. For most governments, the 1:24,000 scale will generally be adequate. For urban and rapidly developing suburban localities, more detailed mapping of Preservation Areas is more desirable.

The scale of the final map or maps designating CBPAs is in large part dependent upon the performance criteria the City plans to implement at the end of the first year. Since the City of Hampton will implement the criteria via an overlay zoning district approach, it prepared maps at a scale consistent with the zoning map. For this project, CBPAs were designated on an overlay at a scale of 1" = 200'.

With the preparation of the inventory and the introduction of improved information as it becomes available, the City of Hampton will have a comprehensive environmental information base to use in all of their land use planning efforts. As time and staff resources permit, additional analyses can be undertaken which, in turn, will enhance this important information resource.

B. MAPPING

The following section describes the guidelines that were implemented in formally mapping individual features as components of CBPAs. The guidelines address the use of existing mapping resources available for this effort. The USGS topographic maps and NWI maps were the most fundamental and practical maps used. USGS topographic maps were very helpful in showing contours and the shape of the City's terrain. The NWI maps were equally helpful in locating and delineating the City's wetlands, both tidal and non-tidal.

Once the relevant environmental features were labelled and delineated, data from the working drawings were transferred to mylar overlays at the same scale. Consistency in format was essential to provide meaningful mapping for the following resources.

1. **Tributary Streams.** Tributary streams were reasonable place to begin the mapping process, as they provided the "skeleton" for RPA boundaries and provided linkage to the other environmental resources. Where other RPA features did not exist, the RPA consisted of the 100-foot buffer area along both sides of the tributary stream.

Identifying and mapping tributary streams was not a complicated process, since they were clearly marked on USGS topographic quadrangle maps. On USGS maps, the Bay and its tributaries are shown in blue. Perennial streams, which are portrayed on these

maps with solid blue lines, must also be included in mapping tributary streams because their flow of water is constantly connected to the larger rivers. Intermittent streams, which are shown as broken blue lines, are only sporadically connected by water flow to tributary streams, so they were not delineated.

In mapping tributary streams, consideration was given to the presence of drainage and navigation canals that are linked to the regional watershed system. Typically, such canals are indicated on USGS maps in the same manner that tributary streams are indicated. However, drainage and navigation canals are generally the results of human intervention into the drainage system and tend to follow rather obvious straight or angular paths.

In addition, it is important to note that certain tributary streams and drainage/navigation canals were shown on USGS maps in purple, rather than the standard blue color. As discussed earlier, the purple color indicates features that have been added or revised on more recent quad maps. Therefore, these purple water features were mapped, along with the more prevalent blue water features, during the environmental inventory process.

2. **Tidal Shores.** Tidal shores are defined in the Criteria Regulations as the land contiguous to a tidal body of water between the mean low water level and the mean high water level. In Hampton, portions of the major rivers and their tributaries are tidally influenced, which simplified identification. All tidal lands immediately adjacent to the Bay were included in the tidal shore designation, in addition to the tidal shores of the Hampton, Back, Newmarket, and Harris Rivers. In addition, almost all the streams that feed into the tidal portions of the rivers mentioned, and those smaller tidal rivers and inlets not mentioned, have significant lengths of tidal shores.

The process of mapping tidal shores began with information provided on USGS topographic quadrangle maps, which give a general depiction of rivers and their tributary streams.

Navigation maps from the National Oceanic and Atmospheric Administration (NOAA), portray the area between the high water line and the low water line, which constitutes the tidal shore. These maps aided in the depiction of tidal shores.

USGS topographic/bathymetric quadrangle maps were also utilized. These maps depict depth contours (isobaths) at 1-meter intervals to show the land beneath bodies of water. The increased level of shoreline detail shown on these maps was also useful in the delineation of tidal shores.

Since the upper reaches of some of the tributary streams were nontidal, these areas had to be examined in more detail. Useful information was obtained from NWI maps, which are published by the U.S. Fish and Wildlife Service. The presence of tidal wetlands along a tributary stream is a strong indicator of the probably existence of tidal flows. Local navigational data and related data on tidal ranges can also be used to determine tidal influence.

Additional information on the extent of tidal flows necessary for tidal shore designation was secured from the Virginia Institute of Marine Sciences (VIMS), the U.S. Army Corps of Engineers, and the U.S. Fish and Wildlife Service, as well as from other public and private maritime organizations and clubs.

Field checking was conducted to fill data gaps and insure consistency throughout the City.

3. **Wetlands.** The mapping of wetlands was perhaps the most lengthy and important task in the designation of CBPAs. Resources that were used in mapping wetlands included the NWI maps and USGS topographic maps. Of these, the NWI maps were the most significant resource for local Preservation Area designation. NWI maps are normally most effective when used in conjunction with the other resources, especially hydric soils data from soil surveys. Unfortunately there is no Soil Survey for the City of Hampton, therefore, hydric soils were determined in the field. Another mapping resource that was useful in identifying wetlands is color aerial photography. Such photography was secured from the Norfolk District, Corps of Engineers.

In the paragraphs below, procedures for identifying and mapping wetlands are described based on the *Federal Manual for Identifying and Delineating Jurisdictional Wetlands (1989)*. The mapping of wetlands was accomplished in general accordance with the procedures outlined in the Federal Manual. This procedure centered on the use of NWI maps, backed up by other mapping resources. Areas where the NWI data was supported by data from other resources was identified on working maps and checked against aerial photographs, or field verified. Field verification was applied more frequently in non-tidal isolated wetlands as these areas were difficult to distinguish from upland areas.

It should be noted that although the NWI for Tidewater is criticized for a high degree of inaccuracy, inaccuracies are primarily the result of the scale of the map. Problems arise when NWI maps are used for regulatory programs. It is not the intent of the NWI maps to provide detailed wetland information for regulatory matters, i.e., Section 404 Permits. For the purposes of delineating CBPAs and generally establishing a planning information base, NWI maps were a useful and important tool. Delineation of detailed

boundaries of wetlands or other components of Preservation Areas for regulatory purposes should ordinarily be determined on a site-specific basis by an applicant prior to site plan review.

NWI maps are produced by the U.S. Fish and Wildlife Service as part of their systematic effort to classify and map America's remaining wetlands. In most cases, photo-interpretation of color-infrared photographs was combined with an examination of existing information and field verification by Fish and Wildlife Service biologists to produce inventory maps. NWI maps are able to show wetlands as small as 1/10 of an acre. However, in preparing NWI maps, the Fish and Wildlife Service used aerial photo imagery that is variable in scale and in resolution. Wetlands without a very distinct "signature" on an aerial photograph may not be mapped unless they are greater than one acre in size.

The procedure for identifying and mapping wetlands is described in detail in the *Federal Manual for Identifying and Delineating Jurisdictional Wetlands*. This manual was published in 1989 as a cooperative effort by several federal agencies: the U.S. Army Corps of Engineers, the U.S. Environmental Protection Agency, the U.S. Fish and Wildlife Service, and the U.S.D.A. Soil Conservation Service. The federal manual serves as the technical basis for recognizing and defining wetlands which are jurisdictional, that is, regulated by federal law.

C. DESIGNATION

1. **Resource Protection Areas (RPAs).** The Regulations establish the RPA as the shoreward component of the Chesapeake Bay Preservation Area. Lands that were included in the RPA designation include the following:

* Tidal wetlands
* Nontidal wetlands connected by surface flow and contiguous to tidal wetlands or tributary streams
* Tidal shores
* Tributary streams
* A buffer area not less than 100 feet in width landward of all other components of RPAs and along both sides of any tributary stream

In their natural state, the RPA components provide intrinsic water quality benefits, including the protection of physical, biological, ecological, and chemical processes which trap, convert, and assimilate nutrients, runoff, toxics, and sediment. Ironically, these same

functions make the RPA components especially susceptible to pollution. Excess nutrients, sediment, runoff, toxics, and other adverse effects of human activities overload these areas, impairing their short-and long-term ability to function properly and to minimize these same impacts on state waters and aquatic resources.

These areas, which are generally closest to the water, are also the most sensitive components of CBPAs. Therefore, RPAs were carefully defined to ensure that these areas are included in the local designation process and protected. The regulations require these areas, as a minimum, to be mapped and designated as RPAs. Within RPAs, land uses and developments are to be closely regulated. Generally, development is limited to water dependent facilities and redevelopment of existing structures.

Once the components of the RPA were delineated, a buffer area was designated. The buffer is an area not less than 100 feet wide, located next to, and landward of, the other RPA components and along both sides of any tributary stream.

The RPA designation criteria, coupled with readily available data and mapping resources for most of those components, provided a rather direct, logical method for designating RPAs. These components tended to be adjacent to each other, following the stream pattern.

2. **Resource Management Areas (RMAs).** The Regulations establish the RMAs as the landward component of Chesapeake Bay Preservation Areas. Lands that were considered for designation as RMAs include the following:

* Nontidal wetlands
* Floodplains
* Highly erodible soils
* Highly permeable soils
* Other lands at local discretion

RMAs are important in terms of water quality primarily because, if improperly used or developed, they could release significant amounts of nonpoint source pollutants into the surface and ground water systems. The Regulations do not limit the types of land use and development that may occur within the RMA. Instead, a variety of performance criteria will be applied to any use or development within RMAs to ensure that those land disturbances that do occur will minimize the adverse impact on water quality.

Unlike the delineation of RPAs, which must closely adhere to the Regulations, was the designation of RMAs was left in large part to the City. The delineation of RPAs followed the natural boundaries of the land features themselves. By contrast, the geographic extent of RMAs were determined by the City according to the analysis of components of RMAs and an examination of local conditions. The features mentioned earlier are land forms which were considered for inclusion within the RMA boundary. For example, a locality may choose not to designate certain isolated nontidal wetlands which may not have a direct impact on the water quality of the Bay and its tributaries. At the same time, the lands that may be designated as part of the RMA are not limited to those components mentioned here. A locality may choose to include, as part of the RMA, certain other lands which, for example, serve as groundwater recharge areas.

For the City of Hampton, the designation of the RMA consists of the 100-year floodplain or a distance of 500 feet from the RPA in the southern portion of the City, whichever is greater. Additionally, Brick Kiln Creek, Salt Ponds and most of the northern Back River drainage basins are designated as RMAs. These areas were singled out because they ultimately drain into Chesapeake Bay and are sensitive to increases in stormwater runoff.

3. **Determining the Geographic Extent of the RMA.** While localities have broad authority in the designation of Resource Management Area and may choose among several options, it is essential to utilize the environmental inventory as a basis for that determination. In the final analysis, the designation must be legally defensible and based upon water quality protection, consistent with the Act, the Criteria Regulations, and other police powers specifically granted under Title 15.1 of the Code of Virginia.

4. **Intensely Developed Areas** (IDAs). The designation of Intensely Developed Areas (IDAs) was intended to address the unique land use patterns and water quality impacts of heavily urbanized areas. Such areas are characterized by industrial, commercial, residential, and institutional uses which are spatially concentrated, heavily trafficked, and largely devoid of natural vegetation. Examples of these areas generally include downtown Hampton, Phoebus, Mercury Central, and Buckroe. Development within these areas is usually confined to either redevelopment of previously developed sites or construction on small, vacant or "infill" parcels. The concentration of intensive uses and the prevalence of impervious surfaces in these areas contribute a variety of nonpoint source pollutants, such as hydrocarbons and heavy metals, to surface waters.

5. **Delineating IDAs.** Delineation of IDAs was the final stage in the designation of CBPAs. Following the delineation of RPAs and RMAs, Hampton officials examined the pattern of land uses within Preservation Areas. The analysis focused on present conditions, as opposed to projected trends. For example, the IDA boundary was not used to define the geographic extent of an "urban growth area" to be built over time.

Instead, designation of IDAs involved the consideration of concentrations of existing development and infill areas for a one-time delineation as an overlay to CBPAs.

The Regulations established two basic conditions which must characterize any area to be designated as an IDA. Section 3.4 of the Regulations states:

> "Areas of existing development and infill sites where little of the natural environment remains may be designated as Intensely Developed Areas."

This condition was the over-riding test before any area within the City was delineated as an IDA. In addition to this central requirement, IDA designation was further contingent upon the characteristics of an area meeting any one of the following three conditions:

* Development has severely altered the natural state of the area such that it has more than 50% impervious surface;

* Public sewer and water is constructed and currently serves the area by the effective date of the Regulations (October 1, 1989). This condition does not include areas planned for public sewer and water;

* Housing density is greater than or equal to four dwelling units per acre.

Delineating the boundaries of the IDA involved examining the land use pattern within CBPAs to determine where the above conditions were present. Hampton officials began by locating concentrations of high density development. Potential IDAs were reviewed in relation to the comprehensive plan, particularly where the plan identifies redevelopment areas. The criteria outlined above was then applied to determine eligibility for IDA status. The IDA boundaries were drawn so as to bypass larger, naturally vegetated areas. At the same time, the designation process did not isolate small, individual sites as IDAs; rather, IDAs were intended to serve as areas where future redevelopment activity is focused.

V. CHESAPEAKE BAY PRESERVATION AREA OVERLAY DISTRICT MAPS

NOTE: Due to the mapping limitations related to scale and size of the drawings (11 x 17"), it was deemed impractical to include these in the report. Full size maps (24 x 36") are on display and can be reviewed at the City of Hampton Planning and Zoning Department.

VI. LITERATURE CITED

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