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Local Management of Wetlands: Environmental Considerations

Kenneth L. Marcellus
Virginia Institute of Marine Science

George M. Dawes
Virginia Institute of Marine Science

Gene M. Silberhorn
Virginia Institute of Marine Science

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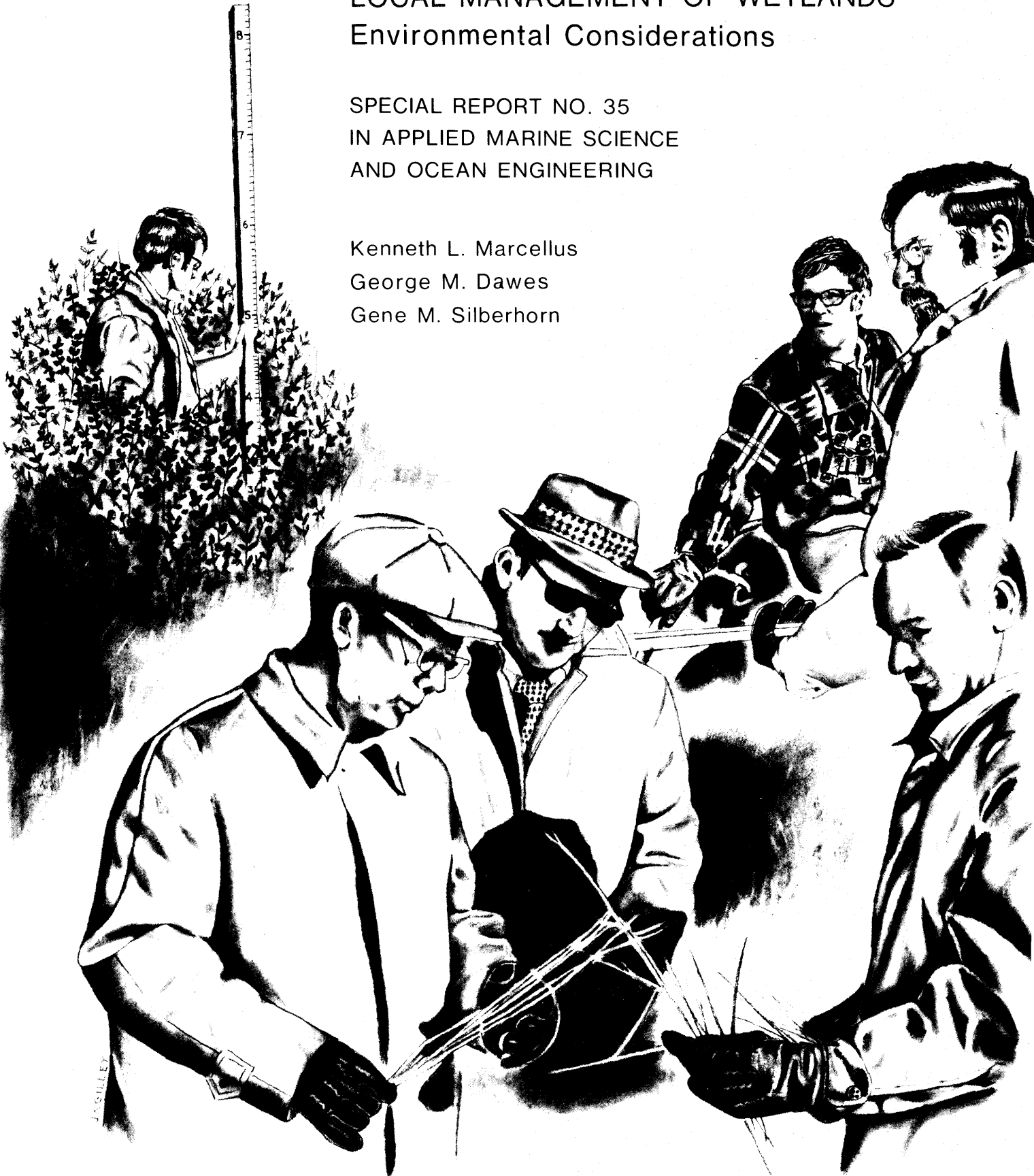
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LOCAL MANAGEMENT OF WETLANDS Environmental Considerations

SPECIAL REPORT NO. 35
IN APPLIED MARINE SCIENCE
AND OCEAN ENGINEERING

Kenneth L. Marcellus
George M. Dawes
Gene M. Silberhorn



VIRGINIA INSTITUTE OF MARINE SCIENCE
Gloucester Point, Virginia 23062

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LOCAL MANAGEMENT OF WETLANDS
-ENVIRONMENTAL CONSIDERATIONS-

By

Kenneth L. Marcellus
George M. Dawes
Gene M. Silberhorn

Special Report No. 35 in Applied Marine Science and Ocean Engineering
Virginia Institute of Marine Science
Gloucester Point, Virginia 23062

William J. Hargis, Jr.
Director

June 1973

PREFACE

In the spring of 1972, the Virginia Legislature enacted what is commonly known as the "Virginia Wetlands Act of 1972." This act, which became effective in July 1972, is of considerable importance to Virginians. It is also significant to those whose business or interest lies in coastal zone management.

The Wetlands Act establishes:

1. State controls over marshes in Virginia,
2. An inland limit of controls based on tidal ranges and elevations instead of arbitrary horizontal distances,
3. A management system based on local control (decision at the county, city or town level) with a state override capability (review and action by the Virginia Marine Resources Commission).

Effectiveness of the new management system is keyed to the locally-created wetlands boards. The Act charges the local boards to act in the public interest. In doing so, they must weigh many factors including the benefits and detriments of various uses of this resource.

The purpose of this paper is to provide local wetlands boards with the information necessary to evaluate the environmental considerations involved in altering wetlands.

ACKNOWLEDGMENTS

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We wish to thank Dr's. William J. Hargis, Jr., Jackson Davis, Michael E. Bender, Marvin L. Wass, John M. Zeigler, Robert B. Byrne, Messrs. John B. Pleasants and Mark E. Luttrell, all of the Virginia Institute of Marine Science, for their constructive review and suggestions which have added greatly to the practical effectiveness of this paper.

We also wish to thank the Honorable James E. Douglas, Jr., Commissioner of the Virginia Marine Resources Commission, for his personal review and suggestions. Valuable comments and recommendations were received from Mr. Cloyde Wiley, Director of the Bureau of Shellfish Sanitation, Mr. Lester Balderson of the Virginia Water Control Board, and Mrs. Joan Skeppstrom, member of the Virginia Marine Resources Commission.

Above all, we are grateful to members of those local wetlands boards who participated in seminars based on the material in this paper. The interaction with them, both during the seminars and subsequently during processing of applications, has been the prime factor in selection of subject matter and depth of discussion. We plan to continue to draw upon this close relationship in developing an expanded second edition.

Finally, we thank Mrs. Shirley Sterling for enduring the typing and re-typing of draft papers, and Mrs. Beverly Bennett for typing the final manuscript.

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INTRODUCTION

The Virginia Wetlands Act of 1972 (Appendix 1, pg. 31) establishes a new resources management system designed to implement the General Assembly's policy to - - -

"PRESERVE THE WETLANDS AND TO PREVENT THEIR DESPOLIATION AND DESTRUCTION AND TO ACCOMMODATE NECESSARY ECONOMIC DEVELOPMENT IN A MANNER CONSISTENT WITH WETLANDS PRESERVATION."

Wetlands Boards which are created pursuant to the Wetlands Act are key parts of the management system. They should have a knowledge of the local physical environment and its history. Presumably they know what their communities want. Above all, they should be committed -- it's their environment.

In considering applications for uses or activities in the wetlands, wetlands boards are bound by a clear charge to insure that the anticipated public and private benefit exceeds the anticipated public and private detriment, and that any development is accomplished in a manner consistent with wetlands preservation (Appendix 1, para. 62.1-13.5, subpara. 9, pg. 40).

In exercising their judgment in accordance with the foregoing charge, wetlands boards must consider many factors. Some of these are economic, social, aesthetic, recreational, and cultural. They must also reflect community desires as well as preserve options for the future.

The purpose of this pamphlet is to help you -- the board member -- to evaluate environmental considerations.

This will be done by defining wetlands in accordance with the law, discussing wetlands in general, outlining the nature and purposes of shoreline developments and structures, indicating some of their effects, (and some means of mitigating adverse effects) and reviewing permit processes and the roles of other agencies in the management system.

As one of the agencies in the management system, the Virginia Institute of Marine Science (VIMS) will work closely with your board. As the State agency charged with primary responsibility for the scientific evaluation of the tidal waters and nearshore lands of the Commonwealth, VIMS is available to your board as a technical advisor in regard to the environmental facets of the many factors you must consider. Whereas members of local boards are likely motivated because they are managing their wetlands, VIMS is motivated also because we firmly believe that wise use of wetlands is a key to preserving options for the future, and that environmental considerations must be a key factor in your judgments.

This pamphlet is introductory in nature. It will be revised periodically as experience is gained under the new management system. There are and will be other publications to assist you. You have already received Coastal Wetlands of Virginia (Interim Report) 1969 which provides an excellent general background on Virginia's wetlands. A second interim report which discusses the wetlands definition as well as wetlands research projects at VIMS has been printed and

will be made available. Shoreline situation reports, studies which evaluate erosion problems, are currently being prepared on a county by county basis. Much of the research which serves as a basis for this report and in other reports being written is being funded by the Research Applied to National Needs (RANN) Program of the National Science Foundation through the Chesapeake Research Consortium, Inc., (CRC). Though the management of Virginia wetlands is primarily a county or city function, the problems presented to the administrators at these levels of government are not dissimilar to those which are presented to the administrators at the State level in Virginia and in numerous other coastal states, particularly Maryland. The information presented here, though written with the Virginia Wetlands Act in mind, should have considerable application in the coastal management programs in other states.

Another function of the VIMS Wetlands Section is the classification, inventory and evaluation of tidal marshes by type. As the county by county sections of this program are completed they will be made available.

The biological, chemical, geological and physical complexities of wetlands preclude the establishment of hard and fast rules that can apply in every situation. While this pamphlet endeavors to provide some general management considerations, it must be emphasized that each and every proposal for wetlands alterations requires an analysis of specific environmental conditions at the site in question. You must make the decisions. VIMS will provide the technical environmental analysis upon which to base them. Where possible and necessary we will also supply recommendations to aid in project analysis, project improvement and in decision-making.

WETLANDS DEFINED

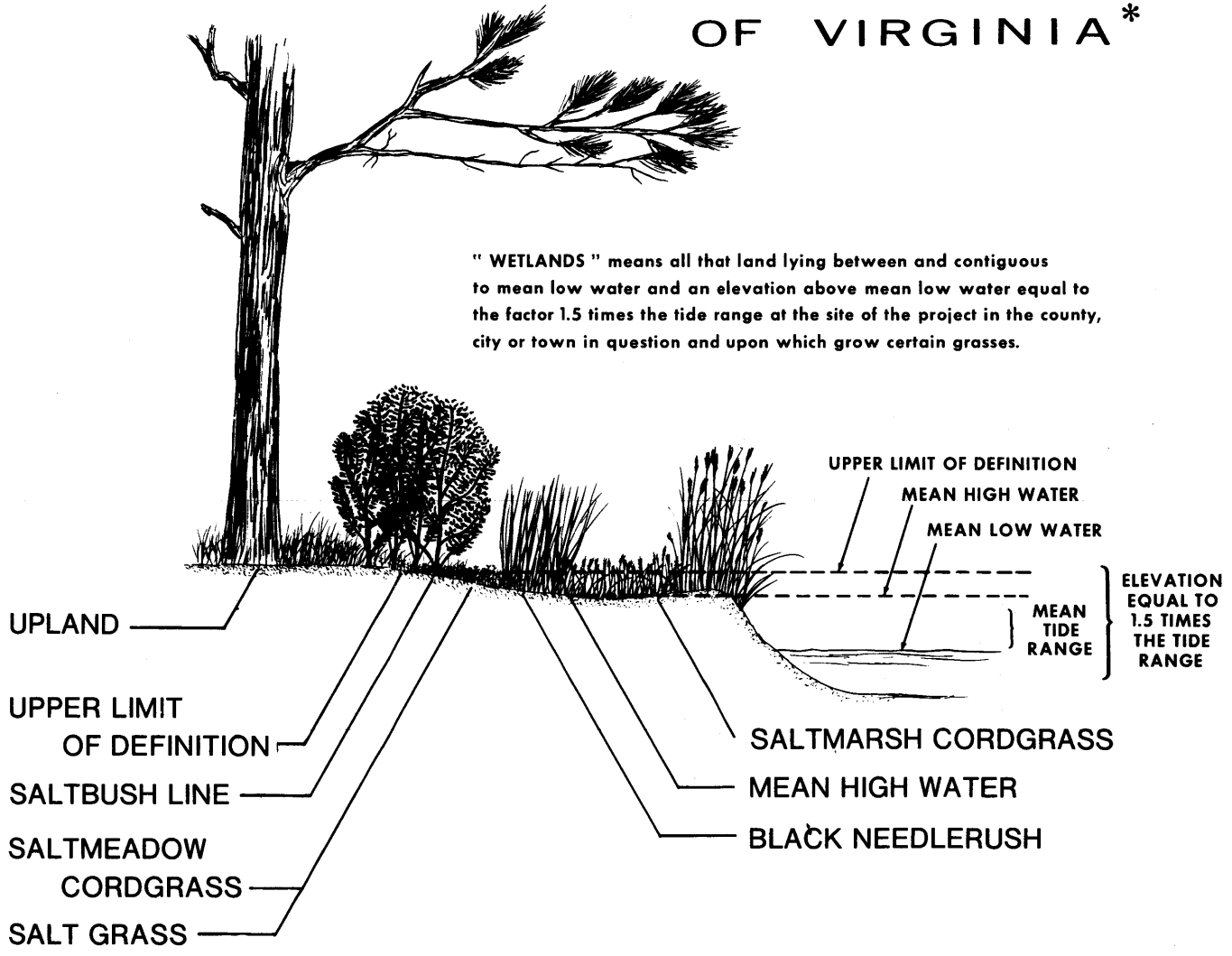
The Wetlands Act (Appendix 1, pg. 31) defines "wetlands" as all that land lying between and contiguous to mean low water and to an elevation above mean low water equal to the factor 1.5 times the mean tide range at the site of the proposed project; and upon which is growing any one or more of some 35 forms of marsh vegetation such as cordgrass, saltmeadow hay, saltgrass, black needlerush, wax myrtle and groundsel tree. Thus, this area with which you are concerned is legally defined in both physical and biological terms. Figure 1 (pg. 4) provides an illustrative sketch of the wetlands definition and Appendix 2 provides a Key as an aid to identifying some of the common marsh plants you will observe.

The definition was arrived at after lengthy research by VIMS, assisted by the Virginia Marine Resources Commission, which included survey measurements of marshes as well as analyses of definitions adopted by other states. Observations disclosed that the upper limits of the definition included essential marsh vegetation but did not encroach on agricultural land, hard-surfaced roadways, lawns, pastures or other areas which are not basic parts of the marine environment.

Your "working area" can be precisely located in accordance with the definition, should the need arise. To do so requires collecting tidal data for at least one month at the project, and it is recommended that professional assistance be sought. A procedure for locating the limits of the wetlands is outlined in Appendix 3 (pg. 80).

It is believed that a high degree of precision in locating the wetlands boundaries will usually not be needed. Experience has shown that projects involving the shoreline or some aspect of the adjoining water most often will lie within the physical limits established by the Wetlands Act, and upland activities which do not require filling or digging in low wet areas near the water generally will not be within the areas defined as wetlands. In addition, it is usually quite easy to determine whether wetland vegetation is or is not involved in the proposed project. Some aids to assist in approximating the upper limit of wetlands are shown in Figure 2 (pg. 5).

FIGURE 1. TIDAL WETLANDS OF VIRGINIA*

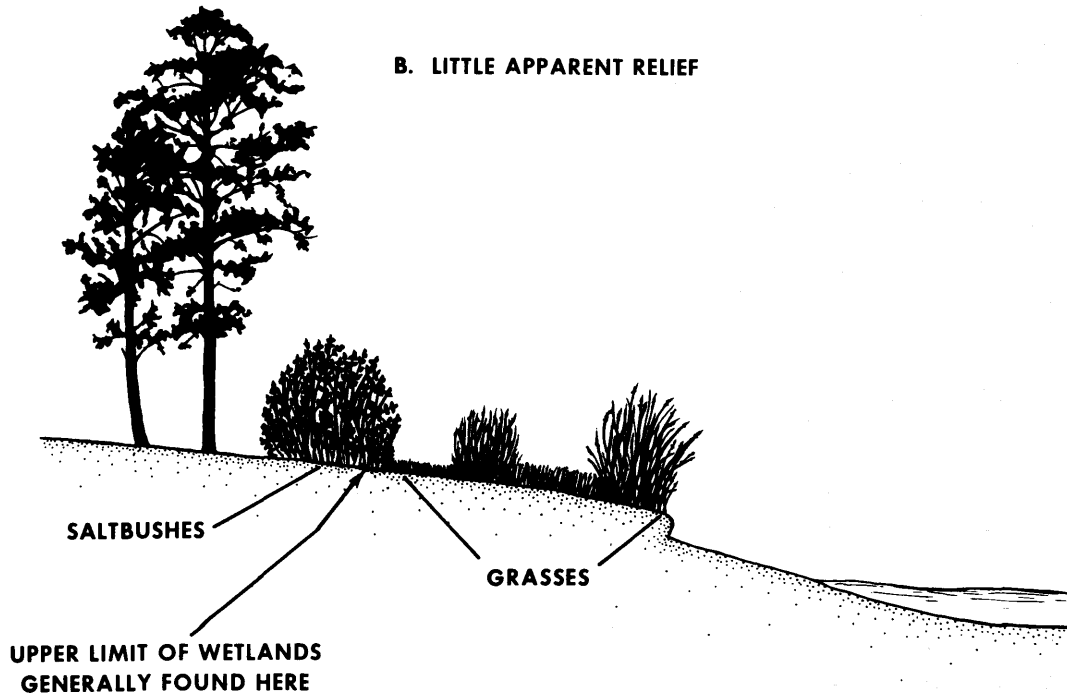
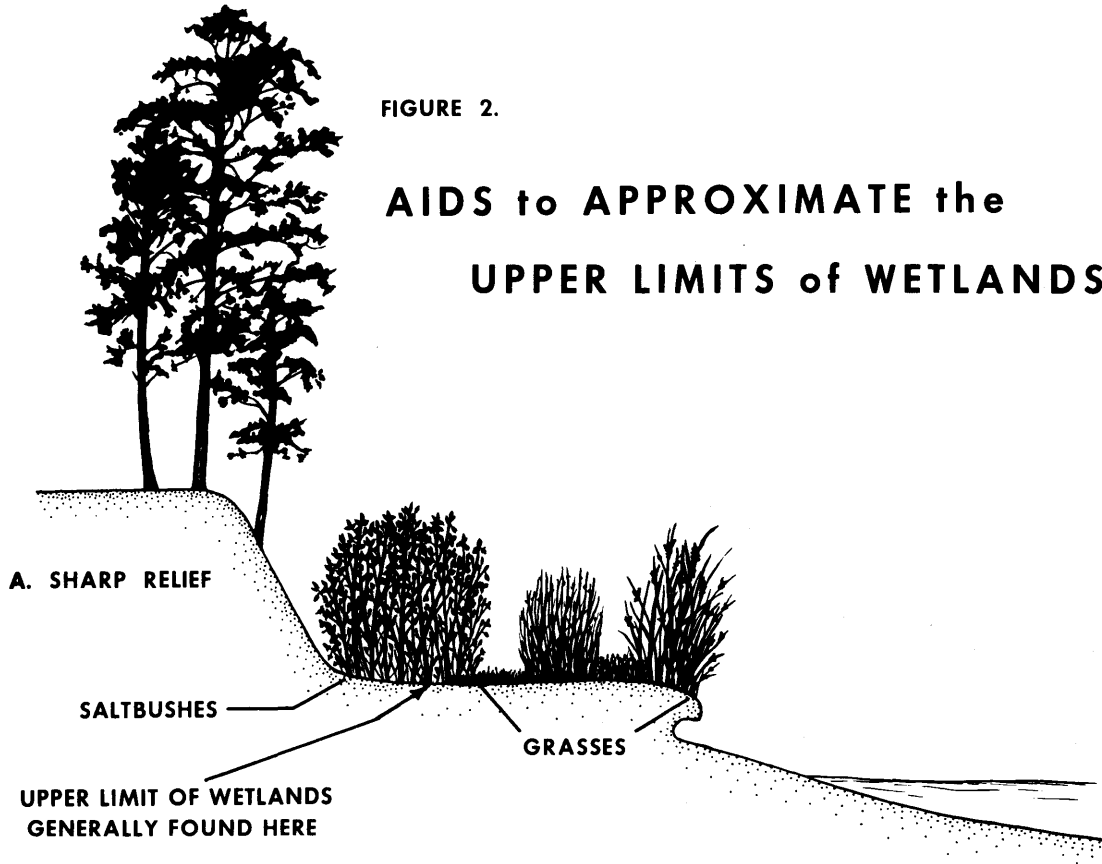


* EXCEPT BACK BAY

4

FIGURE 2.

AIDS to APPROXIMATE the UPPER LIMITS of WETLANDS



WETLANDS IN GENERAL

The roles of wetlands as an integral part of our marine environment are many and varied. They have significant functions in erosion control, sediment trapment, wildlife habitat, fish and shellfish production and recreational activities of man. The marshes are truly complex systems and the biological, chemical, and physical factors interacting in them are often not fully understood. However, one entity which seems to function in nearly all aspects of the dynamics of marsh is the vegetation growing there.

The wetland vegetation provides not only habitat for the various animals found in marshes but also provides an effective wave energy absorbing structure and an efficient water filter at the same time. The dense root systems help contain soil particles and prevent their erosion. The grasses slow the flow of water across the marsh and heavier particles settle to the surface of the marsh and are retained there. However, detritus materials and dissolved organic substances are suspended in the water flooding the marsh and flow out of these areas on the receding tides to become incorporated in the complex food webs of the aquatic environment.

The vegetation production in marshes equals or exceeds nearly all agricultural crops on an acre per acre basis with the exception of a few items such as sugarcane. The natural richness of these areas is significant in maintaining the productivity of estuarine and coastal waters. Areas which have lost their wetlands to other types of activities have also lost their productive fish and shellfish grounds, their wildlife and the diversity of the natural environment.

Our coastal wetlands represent only one percent of the total area of the state, and marshes one-half of one percent. Yet 95% of Virginia's annual harvest of commercial and sport fish from tidal waters is dependent in part on wetlands. Ducks, rails, snipe and many other kinds of birds could not survive without wetlands. Muskrat, otter, beaver and mink dwell in and depend upon our wetlands.

These are only some of the reasons why it is "the public policy of this Commonwealth to preserve the wetlands and to prevent their despoliation and destruction and to accommodate necessary economic development in a manner consistent with wetlands preservation" (Wetlands Act No. 62.1-13.1, Appendix 1, pg. 34).

For more information as well as entertaining reading, Life and Death of the Salt Marsh, by John and Mildred Teal (Little, Brown and Company, Boston) is an excellent and interesting reference for salt marshes. It provides many reasons why wetlands should be protected. Wetlands of the United States, U. S. Department of the Interior Fish and Wildlife Service Circular 39, is also informative and describes tidal freshwater marshes as well as saline marshes.

TYPES OF WETLANDS AND THEIR EVALUATION

There are three physical parameters which determine the kinds of wetlands that will be found along the coastline of Virginia. These are land elevation, salinity, and tide range. On the Eastern Shore, for example, the marshes are often low in elevation and the surfaces are flooded by high salinity water on nearly every high tide. In the Chesapeake Bay the wetlands tend to be somewhat higher in elevation and only very high tides flood them with waters of varying salinities, depending on the volume of freshwater discharges from rivers.

In the rivers the marshes are influenced by less saline or fresh water. River discharges influence the degree of flooding and these marshes may be covered continuously for days when the river is flooding, or they may be flooded only by spring tides when the river is low.

The salinity of the water and the frequency and duration of tidal flooding influence the kinds of vegetation which grow on the marshes. In the high salinity areas only a few species of plants can successfully tolerate the physiological stresses of the concentrations of salts in the water. In the freshwater marshes however, where the physiological stresses are lessened somewhat, the variety of plants that may be found in any given area, is often very great. Here the tolerance to wetness and the ability to compete with other plants determines whether a given plant will be able to exist in this environment.

One of the aspects of tide range which limits the distribution of marsh plants is the length of time an area is flooded each day. Marsh plants, as opposed to aquatic plants which exist submerged or floating on the water surface, have limits as to how long they can be submerged before they begin to die. They compensate for submergence in part by growing taller so that the tips of their leaves are exposed to the air on all but the highest tides. Submergence for periods greater than 50% of the time are generally not tolerated. This is why the lower limits of vegetation occur at about the mean tide level.

Certain grasses are more tolerant of frequent submergence than are others and can therefore grow at lower elevations. Other species, however, are more competitive at the higher elevations in the marsh and this creates a zonation of plants relative to elevation across the surface of the marsh.

Wetlands in Virginia are being typed by VIMS on the basis of plant composition as influenced by salinity and marsh surface elevation relative to the tide range. In addition, an evaluation system is being worked out which will help determine the relative values of one wetland in comparison with any other wetland. Specific parameters being examined for this evaluation system include, marsh acreage, shoreline length relative to acreage, percent of the marsh flooded daily, the diversity of vegetation present, species productivity, value to wildlife, potential for detritus contribution to the marine environment, and the size of creeks and bays within the marsh.

These parameters can be placed in two groups; physical and biological. In consideration of some of the physical parameters it is believed that the larger

a wetland area, the more valuable it is. However, there may be certain limits to this which include how much of the area is flooded regularly. With respect to the marine environment, if a portion of a marsh is not flooded frequently, that section may have lesser values, particularly as a contributor of detritus to marine food webs than the portion which receives daily flooding.

In addition, the proximity of the marsh to the open water of natural creeks, bays or rivers is important. This is evaluated by examining the ratio of the length of shoreline to the acreage of marsh, with the higher the ratio, the closer the landward limits of the marsh are to the water. There is not a direct linear relationship between the ratio and the value of the marsh. It is believed that some optimum range of ratios exists and that deviations from this range correlate with lower marsh values.

The biological parameters of marshes, which could be incorporated in an evaluation system are highly diversified, and in many cases difficult to assess themselves. Many of the more difficult parameters to evaluate have been deleted from the marsh evaluation system because it would take an exceedingly long period of time to assess them properly. Those which have been included, however, can generally be easily evaluated in a relatively short period of time, and quite often by using remote sensing techniques such as aerial photography.

The key item examined with respect to the biological aspects of a marsh, is the vegetation. The ecological significance of an area can be estimated on the basis of the number of species of vegetation present, the potential productivity of the dominant forms, and on the relative value of those forms to wildlife, both terrestrial and aquatic. Not all grasses and shrubs in wetlands have equal values to all types of animal life that might be present, and these variations provide the means for placing varying levels of significance on different wetland units. For example, a marsh dominated by saltmarsh cordgrass would have a higher significance value than would an area dominated by black needlerush. Though these two plants often have similarly sized standing crops of vegetation, saltmarsh cordgrass provides a better wildlife habitat, is a more readily available detritus source, and is eaten by wildlife, particularly geese. However, black needlerush provides a very poor habitat because of its coarse hard stems, contributes less detritus because it occupies a higher location in the marsh, and is only very rarely (if at all) eaten by wildlife.

The evaluation of wetlands for the purpose of locating those marshes of primary ecological significance as well as those of lesser significance is accomplished by incorporating the previously described parameters into an equation. Each of the parameters is rated and assigned a numerical value which has been derived from specific measurements, field estimates, or has been arbitrarily selected (but based on data acquired from literature studies).

These values are inserted into the equation and the solution is then determined. The resulting value provides an index by which wetlands can be compared and those of greater or lesser importance determined. A series of wetlands, for example, all of those found in a given county or a river basin, may be compared with one another by this system.

Though the technique has certain limitations and it does not by any means include all important parameters, it does evaluate several factors and does provide an objective method for deriving an estimate of ecological significance. It is expected that this evaluation system will be continuously examined and upgraded to provide more and more refined estimates of significance of wetland units.

DREDGING, FILLING AND SHORELINE STRUCTURES

Certain activities in marshes are exempt from regulation by the Wetlands Act (Appendix 1, pg. 31) because they are considered to be reasonable uses of these lands. Other activities, not specified in the Act, however, generally require a permit. These activities fall into several general categories such as dredging, filling and the construction of solid structures such as bulkheads and groins.

Though it is realized that dredging, filling and the construction of certain shoreline structures may in some situations be legitimate tools of public and private management of the shoreline, their utilization must be carefully planned. The coastal zone is a highly dynamic area, and any artificial change may result in a number of other, possibly unwanted and detrimental changes. The design and location of shoreline structures is a technical and complex matter which quite often requires the advice of experts.

It is not possible to discuss within this manual all the situations and aspects which should be considered in the planning and construction of various shoreline structures. Nevertheless, a familiarity with the functions and effects of shoreline alterations, and why they are proposed will aid in evaluating proposals which come before your board.

Dredging

Dredging is performed to create channels or to maintain existing channels in order to provide water access to land or to other waterways. Sometimes it is performed to obtain fill to create land. In many situations channels are dredged to create "waterfront" properties to which high real estate values may be attached.

The maintenance dredging of channels to factories, storage facilities, sea-food processing houses, established marinas, boat yards, port areas and similar activities may be accepted as necessary for the continual operation of those facilities. In such situations the public at large may benefit from the dredging either in the availability of services, facilities or products of commerce. A large commercial port, for example, may directly benefit millions of people in an area covering several states.

However, dredging of new channels to create "waterfront" homesites represents a commercial venture with benefits to a very limited number of individuals and it is sometimes accomplished with environmental damages that affect the general public. A common rationale used to justify these ventures is that "the high value property created by these projects will benefit the community through increased tax collections." Such justification should be regarded with suspicion for there are recent studies in other states which indicate that increases in tax revenue do not offset the cost of necessary services that must be provided by the municipalities to these new landowners.

Whatever the reason for doing so, dredging can be hazardous to productive fish and shellfish habitats, spawning and nursery areas, food supplies to marine

organisms, and valuable marsh vegetation. Dredging may destroy productive bottoms directly by mechanical disruption or indirectly through the creation of silt which drifts with the currents and smothers oysters, clams, fish eggs and larvae, and beds of marine vegetation in areas beyond the actual site of dredging. It usually takes several years for a bottom to regain productivity after a dredge has passed through it and there is some doubt if the original level of productivity can ever be regained. The dredging of a channel into a salt marsh may change the salinity regime by allowing more water of a different salinity to penetrate the marsh, perhaps even endangering public and private water supplies. In addition, the dredging of a channel may alter the velocity of water flow in and out of the marsh which may, in time, lead to sedimentation problems in the future or may affect the rate in which beneficial marsh detritus is flushed into the marine environment. The dredging may also result in a partial drying of the marsh which may cause a change in the type of vegetation growing there. Where this has occurred in other areas, less productive plants have replaced more valuable species.

In terms of broad criteria, dredging may be considered favorably when --

- a. The public at large will benefit by the activity.
- b. The dredging project will not threaten wetlands of significant ecological value.
- c. The project specifications are at an absolute minimum size to accomplish the purpose and to minimize future maintenance dredging requirements. (Specialists should be called in to help evaluate this aspect).
- d. The dredging will not significantly influence fisheries; that is finfish spawning and nursery areas and shellfish areas must be evaluated before being dredged, extensive submerged grass beds will not be removed or any of these areas unduly threatened by silt loads.

Dredging should be viewed critically when --

- a. Wetlands of high ecological significance are threatened and the project will not provide services, facilities, or resources to a significant segment of the public at large.
- b. When significant fishery resources are threatened.
- c. When the projects are of such size that considerable silt loads will result and endanger nearby or remote shellfish or fish nursery or spawning grounds (as determined by specialists).

Once the board has determined that a specific dredging project may be permitted, it can help minimize potential damage by insisting upon the best equipment for the purpose, the best season of the year for dredging, and that the best procedures are utilized. Some of these considerations are --

- a. Dragline bucket dredges should be required whenever feasible. Hydraulic dredges put much greater loads of suspended solids (silt) into the water.
- b. If possible, dredging should be restricted to the months of November through mid-March when the more important marine organisms will be least affected by suspended materials. (Curtailement of dredging during the coldest part of the year might also be feasible in some areas to prevent damage to aquatic organisms. Comments would be supplied relative to this aspect by VIMS).
- c. The design of new channels must provide for adequate flushing in order to prevent the concentration of various contaminants in the water. Tide range, channel depth relative to the adjacent bay or river depth, length of the channel, and shoaling tendencies at the channel mouth all play a part in the flushing characteristics. Where the projected water exchange time is long, channels should be kept short and shallow. Provisions for flow-through systems should be made where feasible.
- d. There must be provision for sediment control. Runoff water from dredged material must not be allowed to wash back into the water until suspended sediments have settled out. This is particularly so in the case of hydraulic dredging where large amounts of water are involved; the material should be placed behind dikes or in settling basins until the return water is clear. (See Appendix 4, pg. 81, for criteria pertaining to dredge spoil). Channel bank faces, cut with either the hydraulic dredge or dragline bucket, must not be so steep that they slough off and suspend silt in the water. The speed of operation of hydraulic dredge cutting heads should be such that suspension of sediments and turbidity is minimized.
- e. In some cases it is possible to dredge new channels "in the dry" and not to open up the channel to its water source until it is completed. This is a very positive form of sediment control. A modification can sometimes be used in wet channels by damming the channel entrance until all work is complete. A recently developed technique is to suspend canvas curtains across the mouth of a channel. These "sediment curtains" which should reach from the surface to a depth of 3 to 4 feet, cause suspended particles to settle to the bottom more rapidly than if their path downstream was not impeded.
- f. Special caution is necessary when it is suspected that the sediments to be removed contain significant concentrations of potentially dangerous materials such as heavy metals or DDT. The dangerous materials will move with the silt and may be concentrated by clams and oysters while they are filtering suspended materials from the water during the process of feeding.

Concentrations of lead and other heavy metals may be found in the vicinity of heavy boating activities, factories, or other industrial operations and bottom sediments should be analyzed prior to dredging.

Wetland Filling

When wetlands are filled their biotic productivity and diversity is greatly reduced, and only slowly do these areas recover to viable natural segments of the environment. Their recovery, in addition, is to a habitat more upland in nature with definitely reduced values to the marine ecosystem. (One form of life, the mosquito, may find excellent breeding areas in the crevices that occur as the spoil materials dry and crack open. Subsurface materials dry slowly and rain-water impounds in these crevices and provides the necessary habitat for mosquitos to lay eggs).

The filling of wetlands results in the loss of a segment of an important natural resource. In the past wetlands have been filled for various reasons, many of which are ecologically unjustifiable. However, situations do, from time to time, require the filling of marshes. Some criteria for determining when filling may be justifiable are:

- a. When the filling will result in definite and significant benefits to the public at large.
- b. When only wetlands of minor ecological value are to be lost.
- c. When all other alternatives have been rejected because of ecological reasons.

Filling of wetlands should be viewed critically when --

- a. Wetlands of primary as well as high secondary ecological significance are threatened.
- b. Wetlands are to be filled to extend or create waterfront homes or sites for which upland sites would be more suitable. These include proposed uses such as buildings, parking areas or commercial recreational facilities when there is little apparent benefit to be gained by the public at large.
- c. Wetlands are to be used simply as disposal areas for refuse or dredged materials.

Should the board decide that a filling proposal is justified, these precautions will help minimize the damage --

- a. All material should be retained by dikes to prevent damage to adjacent land and water areas. There should be a buffer strip between the dikes and the outer limits of the proposed fill especially when the area to be filled is soft. There most likely will be a lateral displacement and upheaval of subsurface materials due to compaction caused by the deposition of sediments.
- b. The outside of the dike banks and the top of the dike should be vegetated as soon as possible to prevent erosion of sediments into adjacent

waters or marshes. Local agricultural agents can best advise you of types of vegetation which would be most effective in holding banks in your area.

- c. The capacity of the spoil area, the rate of filling (i.e., discharge volume from hydraulic dredging operation) and the dimensions of the spillway should be such that only sediment-free water is allowed to flow back to adjacent waters. There must be provisions for preventing the discharge waters from eroding the land, shoreline or stream bed.
- d. Upon completion of filling, the new surface should be conditioned by adding fertilizer, lime, mulch or topsoil as needed so that seeding operations will be successful. Again, your local agricultural agent can provide advice.
- e. Appendix 4 (pg. 81) provides some useful specifications for spoils disposal areas.

Bulkheads and Groins

Bulkheads and groins are basically shore defense structures designed to prevent materials from washing away or to trap materials along the shoreline. A major difference in the two types of structures is that bulkheads are constructed parallel to the shoreline while groins are perpendicular to the shore. Sometimes they are used to prevent the shorelines from eroding away; sometimes they are used to protect channels from filling in as a result of shoreline erosion. Bulkheads are often used in conjunction with filling in order to create "new land" suitable for upland uses. In the role of shoreline defense, these structures are generally justified, provided they are properly engineered and located. An inadequately engineered or improperly placed structure can cause more problems than it was intended to solve.

On this point you will recall, (page 6) that one of the benefits of marsh vegetation is its function in stabilizing the shoreline and reducing its rate of erosion. When fringing marshes are altered by such activities as dredging or cutting their beneficial attributes relative to erosion control will be lost. Normal tide and wave action may be all that is necessary to cause just as severe erosion as might have been caused by very high tides and storm driven waves before the alteration.

Shoreline defense mechanisms are expensive, and the substitution of the various types of these structures for healthy stands of vegetation may be as unwise economically as it could be ecologically. This is especially true when the structure causes additional problems such as accelerated rates of erosion or cuts off along-shore sediment drift resulting in the starvation of beaches.

Applicants for bulkheads or groins should be required to prove their case insofar as necessity is concerned. In addition, construction details should be already outlined. In examining proposals, key questions must be asked. Are bulkheads so designed and placed that they won't cause erosion somewhere else? Are

they embedded deeply enough to prevent soil loss underneath them? Are the ends so designed that soil won't erode from behind the bulkhead? Are they so anchored as to prevent failure over a reasonable design life (about 20 years)?

Groins are particularly complex structures to design and to position at the proper place to do the intended job. Their function is to trap sand and mud, which is moving along and close to the shore, and cause it to be deposited on or near shore as protection against erosion or to widen the beach. The interruption in the natural flow of suspended materials can cause the starvation and subsequent loss of lands nearby. Groins can result in the erosion of nearby lands because of the alteration of nearshore currents. To avoid adverse effects, the designer must have a knowledge of the net direction in which suspended materials move at the point under consideration, and he must have an appreciation of the volume of materials that move. Thereafter his specific design must include considerations as to the length of the groin, the depth below the bottom, and elevation above mean high water of the groin, whether the groin should trap all the materials or let some portions through. Obviously, proper design might require technical assistance from marine scientists or coastal engineers. Should you need information on environmental aspects and design criteria you may contact VIMS or the Extension Service of the Virginia Polytechnic Institute and State University. The Army Corps of Engineers and the U. S. Soil Conservation Service might also be contacted for advice. As a general rule, however, VIMS believes that the applicant's engineer or contractor should supply all data which can then be evaluated by VMRC and VIMS.

Generally speaking, construction of these structures may be justifiable when --

- a. Erosion is a definite threat to buildings, roads or other installations and vegetation either doesn't exist or is insufficient to provide the necessary protection.
- b. The construction is part of an approved marina or waterside facility and there is no other way, such as open-pile type structures, upon which to place the necessary services, to prevent fill material from entering the water, or to protect watercraft from wind and wave action.
- c. Existing channels are threatened by excessive deposition which cannot be controlled by other means.
- d. Safe navigation in the public interest requires sheltered channels.

Construction of bulkheads, groins, jetties and breakwaters should be viewed critically when --

- a. There is no significant public benefit.
- b. The purpose is to create "usable" land by filling in wetlands for purposes not directly connected with essential marine uses and for which upland areas could or should serve as well or better.

- c. The construction will result in cutting off wetlands from tidal waters.
- d. Evidence suggests that adjacent lands and aquatic areas, public or private, are in danger of being severely affected by the structure.

It is important that shoreline defense structures be designed relative to the conditions of the particular location they are intended for. Some questions which can be asked in regard to this include:

- a. Is the proposed structure adequate for the purpose it has to serve?
- b. Will the structure adversely affect other shoreline areas. That is, is there sufficient evidence that the structure is so designed and placed that it will not cause erosion elsewhere?
- c. Will useful and important public bottoms be encroached upon or otherwise adversely affected? If so, is the adverse effect permanent, temporary, or can damages be ameliorated or compensated?

Breakwaters and Jetties

These structures are primarily used to protect harbors from wind and wave action and, in some instances, to protect channels from siltation. They are often necessary adjuncts to man's commercial and recreational use of our marine environment.

Because they may interrupt natural shoreline processes, their design problems include many of the considerations involving bulkheads and groins. Your board should assure itself that an applicant for a breakwater or jetty has provided for essentially the same considerations discussed under groins and bulkheads.

MANAGEMENT CONSIDERATIONS

The preceding section discussed some considerations concerned with specific structures. This section is devoted to some common type of projects which may involve several structures and some types of projects which affect wetlands but which may not fall entirely within the responsibility of wetlands boards.

Effective management of the shoreline requires long-range planning and zoning. These functions are now the purview of local elected officials and their appointed planning commissions. While the Wetlands Act does not specifically assign long-range planning responsibilities to wetlands boards, it may well be that local or regional officials will in the future want to apply the expertise of wetlands boards in their planning processes. In any event, there will be developmental proposals which will require wetlands permits as well as local use permits or zoning changes, hence your board will be exerting some control on overall shoreline uses on both short and long-term bases.

DEVELOPMENT AND UTILIZATION OF LOW-LYING AREAS

Housing or commercial development in areas susceptible to flood or storm damage is definitely inadvisable on its own merits and has proven to be expensive to individuals and governments alike. This is tantamount to building in a river or coastal flood plain where during times of emergency and shortly thereafter it is usually recognized, when public funds are sought, how costly it can be to preserve and/or restore property destroyed or damaged by flood waters.

Whereas some activities by nature must occur in low-lying areas, there are potential effects of the development that are not always obvious. Some effects to consider are:

Erosion During Construction

Excess erosion during construction processes may result in harmful sediment deposits in nearby wetlands. Contractors should be required to utilize erosion and sediment control measures during and after completion of the project until vegetation or other means can be established for permanent regulation of erosion. Appendix 4, pg. 81, provides some criteria for dredge spoil disposal areas. In addition, upland grading should be so controlled that the soil only remains bare for minimum periods of time and that runoff water is processed through sediment traps prior to entering the aquatic environment.

Stormwater Runoff

There will be an increase in the amount and rate of surface water flow during rains due to compaction, development and paving of absorbent soils. The increased rate of flow can cause erosion where storm drains enter the wetlands. There are, however, engineering ways of slowing and diffusing rates of water flow and they should be used if any danger of erosion exists at a storm drain outfall.

Water Contaminants

Additional contaminants will accompany human uses and will also be discharged through storm drains. Some of these are oil and gas dripping on pavement from cars, detergents from cars being washed, nutrients from fertilizing in conjunction with landscaping, contaminants from pet droppings, and trash and debris. There can and should be some control of trash and debris by using clean-out traps in the storm drains. There can also be control of automobile service stations to require internal draining and removal of oils, oily debris and car washing residues.

Septic Systems

Septic tanks require minimum elevations above water tables to function

properly. Suitable soil types are also important for adequate percolation and low-lying lands are often deficient in percolation rates because of high water tables. Even where adequate elevations and percolation factors exist, septic tank drain fields should be as far as possible from waterways, generally no less than 100 feet. Where adequate elevations do not exist, septic tanks must be pumped into higher drainfields or into municipal treatment facilities. Your board can also query local health officials as to the adequacy of soil conditions and the allowable density of septic tanks in a given area.

Subsurface Water Supplies

Some developments require large amounts of water from subsurface sources. Heavy withdrawals of ground water can permit salt water to intrude and contaminate the freshwater supply. Channels allowing salt water to flow inland of natural shores may also result in contamination of subsurface waters. Advice from hydrologists should be sought prior to allowing deep, wide or lengthy channels to be dredged.

Hazardous Materials

Operations involving chemicals, oils, paints and other hazardous materials must be controlled to prevent discharges into the wetlands. In addition to requiring the routine safe removal of such contaminants to safe disposal areas, controls should also provide for disposal of large or unexpected discharges.

Protection from Floods

Low-lying areas can and do flood under extremes of weather conditions. Furthermore, the general rise in sea level will make low-lying areas more subject to flooding in the future. Development in these areas is unwise and should be discouraged strongly. If, however, development is deemed necessary after careful deliberation, adequate safeguards should be mandatory to protect property against water damage. Buildings might be constructed on pilings or otherwise elevated, or dikes might be constructed around the property. Advice from the U. S. Army Corps of Engineers can be sought for details applicable to specific locations.

COMMUNITY BOAT BASINS

The dredging of channels has been mentioned as a means of creating "water-front" property in the sense that each individual resident can have a pier and direct water access from his own lot. There are many instances when a community boat basin, or basins, may accomplish nearly the same purpose at considerably less damage to the environment. Properly located, community boat basins can reduce the amount of dredging necessary and can concentrate boats in those areas where dredging is less damaging to the wetlands. If the amount of required dredging is minimized, it may also lead to lower per capita costs for maintenance dredging in the future.

A community boat basin may not be as convenient to an individual as a backyard pier. It may even be more expensive in that a parking facility will have to be provided and, depending on the scope of the basin, perhaps supervisory personnel. The individual costs and inconveniences may or may not be offset by such factors as increased security for boats, ready availability of some services (depending on scope), and association with other boaters. The trade-offs must be evaluated for each proposal.

It should be remembered that the esthetic and other natural attributes of an area proposed for development, very possibly the attributes which precipitated the development initially, cannot be evaluated monetarily and once they are lost they cannot be replaced. The loss of that resource will mean the loss of options for its use in the future. Wise, long-term planning and consideration of long-term goals is mandatory when land use plans are being proposed. Community boat basins might allow the necessary access to the water while preserving other land and water area use options for the future.

Though the community boat basin is not designed to be operated as a commercial marina, many of the design features and facilities provided by commercial marinas should be incorporated, especially environmental quality control features as discussed in Appendix 5, "Some Considerations Pertaining to Marinas," pg. 83.

MARINAS

Boating is a popular family oriented recreational activity. Whether the interests be in fishing, water skiing or simply cruising, enjoyment can be had by all members of a household in this exciting, yet restful get-away-from-it-all form of relaxation.

Boating is dependent, however, on several factors, one of which is access to the water. Waterfront homesites offer access in some locations, but often navigation channels are inaccessible without extensive modification of the bottom or construction of above-water piers.

The amenities of the shoreline would soon be lost if everyone had his own access to navigable water, and more significantly, many people would be prohibited from utilizing this public resource if there were not access points available to them.

Businessmen have recognized this problem and have provided a solution in the form of marinas. These facilities, among other things, do provide an access site to the water, and when strategically located, well designed and well managed they can become an asset to the community they serve.

The construction and operation of marinas results in the concentration in one locality of stresses characteristic of boating activities on the marine environment. Provided these stresses are kept to a minimum, the result may be beneficial in that real and potential damages are not spread over a large sector of the shoreline as the result of many small projects of individual property owners.

There are some special considerations involved in marina development or expansion and for convenience these have been set forth in Appendix 5, pg. 83.

PERMIT PROCEDURES

General

There are many governmental agencies involved in the program for the wise use of our wetlands. Local Wetlands Boards have a key role in granting, denying or modifying permits in the wetlands themselves. It is expected that the expertise developed by the wetlands boards as experience enhances their knowledge will also be utilized by other local and state agencies in regard to developments which affect the coastal zone. A review of the other agencies and their roles will be helpful in fulfilling your responsibilities and in assisting applicants to meet permit requirements.

The Virginia Marine Resources Commission (VMRC) is the key management agency for the coastal zone and the fisheries within the Commonwealth. In accordance with the Wetlands Act, the VMRC will perform the functions of a wetlands board for all localities which do not establish their own boards. It will also review the decisions of local boards, approving, modifying or reversing the board's action as appropriate. If there is an appeal from an action of the local board, the Commission will hear it. In all of its actions, the VMRC will consider and coordinate the advice of other agencies.

VMRC also directly controls the state bottoms, those water-covered areas seaward of mean low water. As the control agency of lands adjacent to your area of responsibility, there will undoubtedly be times when your action on a permit will be conditioned upon VMRC actions relevant to state bottoms and vice versa.

VIMS is the primary supplier to VMRC, to other state agencies and to the wetlands boards of scientific information and technical advice pertaining to the marine environment and its resources. You are required to notify both VMRC and VIMS when you have a permit application. VIMS will automatically respond to your board before your official deliberations, but you may, and are encouraged to, ask for specific advice and information. VIMS will do its best to provide it in a timely fashion.

The State Water Control Board is responsible for water quality in all Virginia waters. There can be no discharges into the waters without a permit of approval from the Water Control Board, whose primary concern is the release of materials which could adversely affect water quality. The Water Control Board, like VMRC and VIMS, must be notified 20 days in advance of a wetlands board hearing on a proposal.

The Virginia Department of Health is concerned with sewage discharges in relation to its responsibility for setting health standards. The term "sewage discharges" includes sewage disposal arrangements for facilities in cities and communities as well as at marinas, and the relationship of marina operations to water quality standards over adjacent shellfish beds (Appendix 5, pg. 83). A concurrent Public Health permit is required for a sewage discharge or the establishment of a marina and it would be well to advise the Department of Health

(Bureau of Shellfish Sanitation) prior to a hearing involving a marina or sewage discharge of any type.

The Commission of Game and Inland Fisheries must be notified in advance of a wetland board hearing due to its interest in game and wildfowl in the wetlands.

The Wetlands Act also requires wetlands boards to notify the Division of State Planning and Community Affairs and the Department of Highways in advance of hearings. These are precautionary notices affording those offices an opportunity to check against general plans or projected highway proposals.

The local governing body must, of course, be aware of proposals before the board so that it can check against its zoning ordinances or otherwise comment on the impact of the proposal on the community.

The U. S. Army Corps of Engineers, the U. S. Department of Interior and the U. S. Environmental Protection Agency have interests in the Commonwealth's shoreline. The Corps of Engineers has a primary interest in navigation and therefore any structure which extends into navigable waters requires a Corps permit whether or not it requires a permit from a wetlands board (see 62.1-13.5, subpara. 3, in Appendix 1, pg. 37). Generally speaking, the Corps construes navigable waters to be any water lying below the mean high water line.

The Corps of Engineers will review permit proposals with the Bureau of Sport Fisheries and Wildlife of the Department of Interior and the Environmental Protection Agency for those agencies' comments relative to ecological factors. Whenever the Corps receives an application, it will notify the VMRC. Even though the proposed activity may be a "permitted use" under the Virginia Wetlands Act, VMRC will notify all interested state agencies on the chance that some agency may have a specific interest or objection.

Initial Permit Procedures

The Wetlands Act is specific regarding the information which must be included in a permit application. The key administrative step in efficient permit processing is a complete and detailed application and your board will be advised to insist that applicants provide all essential details. Remember, there are a number of agencies who must take some action on the application, and they are physically remote from the area. In the case of VIMS, for example, the application is the basis for technical evaluation prior to making a field investigation. The prior technical evaluation tells us, amongst other things, what specialist or combinations of specialists from VIMS should make the field investigation. An incomplete application can cause unnecessary repeated visits.

Of paramount importance in this respect, is the need for a detailed map indicating the location of the proposed project in the county or city as the case may be.

Appendix 6 (pg. 85) lists the contents of an application as required by the

Wetlands Act along with some detailed amplification desired by VIMS. If an application is not complete, the wetlands board should immediately return it to the applicant for full completion prior to receiving it for board action. Because most applicants will have local marine contractors do the work and supply drawings and details, your board may save itself some time by contacting local contractors and explaining to them what should be included in applications. VIMS will assist in briefing groups of contractors should you so desire.

Administrative Processes

Once a proper application is received by your board, the board must follow the administrative processes prescribed by the Wetlands Act. The basic process is diagrammed in Figure 3 (pg. 25).

You will note that VIMS and VMRC must receive a copy of the application. This is basically a responsibility of the applicant, but many boards are requiring copies in triplicate and are assuming the responsibility of transmitting copies to VMRC and VIMS. VIMS favors the latter process for it assures receiving the application. In any event, prompt receipt of the application is a necessity. The early receipt of the application will enable VIMS and VMRC to better program our field investigations and to better respond to your requirements.

You will note in Figure 3, pg. 25, that there must be two publishings of a public notice. The State Water Control Board also requires a public notice as a part of its certification process pertaining to dredging and filling operations. The applicant can save time and money by combining the notices. This can be done by adding the following paragraph to the Board's notice:

"In addition, if there are comments relating to water quality, such additional comments or correspondence should be addressed to the State Water Control Board, P. O. Box 11143, Richmond, Virginia 23230 and should reach the State Water Control Board not later than 15 days after this notification."

VIMS will automatically respond to an application by conducting its investigation and advising your board in writing, prior to the public hearing, of our findings and recommendations, if any. VMRC will often advise you of its investigations, if made. You can normally expect to receive from VIMS a brief description of environmental factors involved, a brief statement of the environmental impact of the proposed project, suggestions for minimizing any adverse environmental impact if appropriate, and the overall position of VIMS as to whether the project is objectionable or not. Copies of VIMS comments will also be sent to interested state agencies, the Corps of Engineers and to the applicant.

While the foregoing response is automatic, your board may wish for specific contact with VIMS in some special cases. Please ask!

BASIC PERMIT PROCESSES

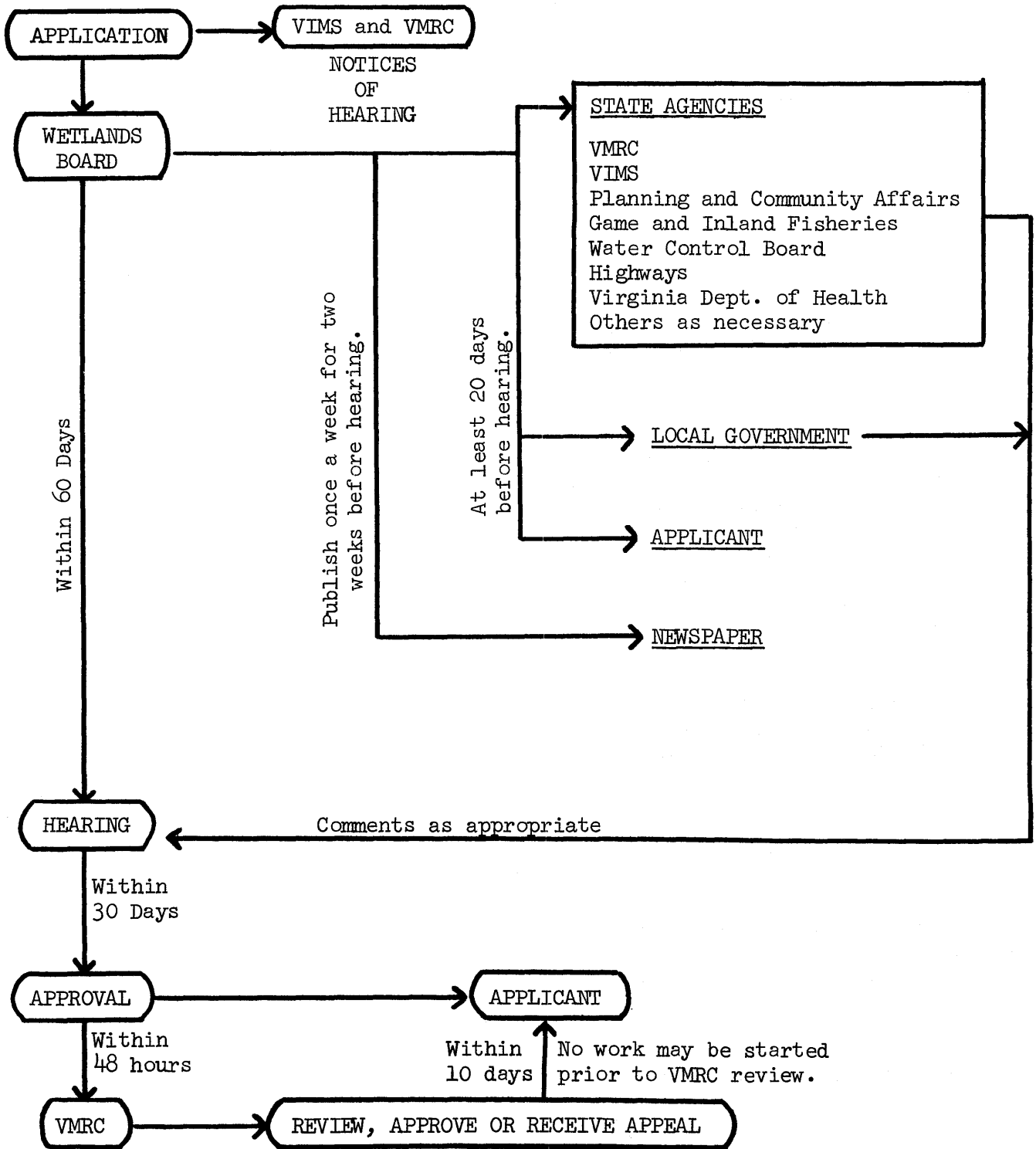


Figure 3

Field Investigations

After receiving the application and starting it on its administrative path, there should be a visit to the site of proposed activity to ascertain actual field conditions. In most cases, a visit by one or two members will suffice. It is desirable, if possible, to have the applicant present.

The first thing to determine is if there are actual wetlands involved (Figure 2, pg. 5) and if the board has jurisdiction. Secondly, the statements contained in the application should be verified or, if necessary, corrected. Thirdly, you must try to determine the real primary and secondary intent of the project. Unfortunately, some applicants, intentionally or not, conceal their real purposes. For example, an applicant proposing a channel for private boat access may actually have in mind sub-dividing lots along the new channel (with all the attendant problems pertaining to low-lying development as previously discussed in pages 18 to 19.

Thereafter, it is a matter of assessing existing environmental conditions, their worth, the environmental impact(s) of the proposed activity, means of minimizing any adverse impact, and developing a final opinion on the overall desirability of the project.

Each case is unique and demands an evaluation of existing conditions at the site in question. However, Appendix 7 (pg. 87) provides a general checklist which may be of assistance to you in your field investigations.

As noted before, VIMS will also make field investigations and advise you of its opinions. We will attempt to do so as quickly as possible, but if we cannot, a continuance will be requested. In many cases, VMRC, the State Water Control Board or the Bureau of Shellfish Sanitation will also make field investigations and advise you accordingly.

Should you wish specific help or advice from the various agencies arrayed behind you, refer to Appendix 8 (pg. 89) which lists the agencies, their spheres of interest, their addresses, telephone numbers and persons to contact.

The Hearing

You are now prepared for the public hearing where you accumulate all possible evidence -- the application, results of your own investigation and the investigation of others, the testimony of the applicant and the testimony of other interested parties.

There are several actions that can be taken at the hearing. You may --

1. Grant the permit as presented.
2. Grant the permit in a modified form (either at the request of the applicant or by board direction).

3. Deny the permit without prejudice. That is, deny the specific permit but allow the applicant to subsequently submit a new application to accomplish the same purpose but in a different manner.
4. Deny the permit.
5. Direct the applicant to provide more information prior to final action.
6. Defer a decision for up to 30 days. CAUTION: If a decision is not made within 30 days, the permit is automatically approved as submitted.

There is a portion of the permit application that has not yet been discussed and which a board should consider. The applicant indicates the period of time in which he expects to accomplish the project. He should be given adequate time. On the other hand, he should be held to reasonable limits. A frustrating enforcement or surveillance problem results if an applicant is allowed much more time than is necessary. On the other hand, the board must remember that an applicant is subject to the vagaries of contractors. On balance, VIMS favors a reasonable time limit with the applicant bearing the responsibility for applying for an extension if he can't meet the original expiration date. If an applicant does not meet the expiration date and does not apply for an extension of time, he should not be allowed to proceed with actual work without applying for a new permit.

Post Hearing

Within 48 hours of its decision, the board must notify the applicant and the Marine Resources Commission of its action. The Commission shall then review the decision of the local board when:

1. An appeal is made by the applicant or by the county, city or town where the wetlands are located within 10 days of the board's decision, or
2. The Commissioner, within 10 days of receipt of notice of the board's decision, requests a review, or
3. 25 or more freeholders of property in the county, city or town where the wetlands are located petition the Commission for a review.

In cases of review by VMRC the board must forward its record of the public hearing which will then become the basis for the review. The Commission may request additional information to clarify points of the record.

An appeal will first be heard by the Marine Resources Commission. Should the appellants be dissatisfied with the Commission's action, the Wetlands Act provides for judicial review processes.

Upon termination of the Commissioner's review period and if no requests for review have been filed, the board, if it had approved the application, may then grant a permit to the applicant to begin work on his project. (An amendment to

the Wetlands Act specifies that no work shall commence on an approved project until the time period has expired during which the Commissioner of Marine Resources may request a review of a board's decision).

Your board will perform an additional public service as well as have better control of the situation if it advises the applicant, where applicable, that he must also have other permits before he can commence work. If the board desires very positive control, an approved permit can be issued with conditions that work cannot be commenced until the applicant has produced evidence that all other necessary permits or approvals have been obtained. Other permits or approvals which often are required are (see also Appendix 8, pg. 89):

Corps of Engineers: Permits causing changes anywhere below mean high water (MHW). These are called Navigation Permits.

VMRC: Permits causing changes anywhere below mean low water (MLW). These are called Subaqueous Permits.

Bureau of Shellfish Sanitation: Submits comments concerning shellfish to VMRC when any marina and any type of sewage discharge is involved.

Water Control Board: Requests certification that water quality conditions when any dredging, filling or proposed discharge or release of materials into the water is involved will not be permanently impaired.

Enforcement

Enforcement of the Wetlands Act is a function of VMRC but is also a role in which wetlands boards may, and hopefully will, become involved. An individual board may or may not be aggressive in enforcement at its own option. Without enforcement, however, effective management is unlikely to occur. It is virtually a certainty that your board will be approached by an individual who wishes to report a violation. In some cases, the apparent violation may be in progress and both the individual and the board may wish to stop an on-going operation before more damage is done.

Your first place to seek legal advice is, of course, your Commonwealth's Attorney. All violations should also be reported to the VMRC. For your convenience Appendix 9 (pg. 93) lists VMRC inspectors, who have police power, and the districts they serve.

A 1973 amendment to the Wetlands Act provides for the receipt of court orders to enjoin an individual doing work on a project which is in violation of the Wetlands Act. (See Appendix 1).

CONCLUSION

The enactment of the Wetlands Act is a significant step toward preserving environmental amenities of tremendous commercial, recreational and aesthetic importance to man in Virginia. While many agencies are involved in managing this resource, local wetlands boards are a vital factor in effective implementation of the Act. You can be sure that your activities are going to be scrutinized with great interest. Improved and wiser management of our vital aquatic environment and resources is of interest to many groups at all levels. Some contend that localities (i.e., counties, cities and towns) cannot effectively manage these and other public resources, that they cannot resist local pressures and alleged or potential revenue-producing activities even when public benefits are questionable or long-range detriment is possible. Pressures for centralization of management at the state or national levels are formidable. This is particularly true of matters concerning water quality, shoreline use, wetlands and other matters pertaining to the marine environment. If local wetlands boards fail to act effectively, the credibility of local control will be severely damaged. You cannot afford to be ineffective. The wetlands and the rights of the people at large will suffer if your efforts are not successful.

Your judgments will involve many factors. This pamphlet addresses only the environmental aspects of your decision process. It is hoped that this manual and the other publications which have been mentioned will give you a greater knowledge, understanding and awareness of our wetlands, and especially of the contributions they make to the economy, recreation and aesthetic enjoyment of our surroundings.

Access to the environment and resources of our coastal waterways -- visually and physically -- is of great importance to the citizens of Virginia. Your task is to weigh the proposals for development of this in the best public interest. VIMS and VMRC will endeavor to assist you in all ways possible. VIMS will expand, improve and update this document in the future as new information becomes available. In this regard, your experience will be valuable to other wetlands boards and you are encouraged to communicate freely with VIMS.

APPENDIX 1

THE VIRGINIA WETLANDS ACT OF 1972
(Chapter 2.1, Title 62.1, Code of Virginia)

Plus

Amendments (1973 Session General Assembly)

CHAPTER 2.1

Wetlands

Sec.

- 62.1-13.1 Declaration of policy.
- 62.1-13.2 Definitions.
- 62.1-13.3 Standards for use and development of wetlands.
- 62.1-13.4 Marine Resources Commission to develop guidelines.
- 62.1-13.5 Counties, cities and towns authorized to adopt wetlands zoning ordinance; terms of ordinance.
- 62.1-13.6 Appointment, terms, etc., of local wetlands boards; jurisdiction of county wetlands board over wetlands in town.
- 62.1-13.7 Officers, meetings, rules, etc., of wetlands boards; records and reports.
- 62.1-13.8 Local governing body to supply meeting space and services for wetlands board; removal of board member.
- 62.1-13.9 Permits required for certain activities; issuance of permits by Commission.
- 62.1-13.10 Commissioner of Marine Resources to review all decisions of wetlands boards.
- 62.1-13.11 When Commission to review decision of wetlands board.
- 62.1-13.12 Procedure for review.
- 62.1-13.13 When Commission to modify or reverse decision of wetlands boards.
- 62.1-13.14 Notice of Commission's decision.
- 62.1-13.14.1 Permit issuance prohibited during decision review period.
- 62.1-13.15 Appeals to courts.
- 62.1-13.16 Investigations and prosecutions.
- 62.1-13.17 Commission may receive gifts, etc.
- 62.1-13.18 Violation of orders, rules and regulations.

Sec.

62.1-13.18.1 Enjoining of unlawful acts.

62.1-13.19 Jurisdiction of Commission not affected.

62.1-13.20 Exemptions.

62.1-13.1. Declaration of policy. -- The Commonwealth of Virginia hereby recognizes the unique character of the wetlands, an irreplaceable natural resource which, in its natural state, is essential to the ecological systems of the tidal rivers, bays and estuaries of the Commonwealth. This resource is essential for the production of marine and inland wildlife, waterfowl, finfish, shellfish and flora; is valuable as a protective barrier against floods, tidal storms and erosion of the shores and soil within the Commonwealth; is important for the adsorption of silt and of pollutants; and is important for recreational and aesthetic enjoyment of the people for the promotion of tourism, navigation and commerce.

Continued destruction of Virginia's coastal wetlands will greatly contribute to the pollution of the Commonwealth's rivers, bays and estuaries; will diminish the abundance of Virginia's marine and inland animals and waterfowl, finfish, shellfish and flora as sources of food, employment and recreation for the people of Virginia; will increase costs and hazards associated with floods and tidal storms; and will accelerate erosion and the loss of lands productive to the economy and the well-being of our citizens.

Therefore, in order to protect the public interest, promote the public health, safety and the economic and general welfare of the Commonwealth, and to protect public and private property, wildlife, marine fisheries and the natural environment, it is declared to be the public policy of this Commonwealth to preserve the wetlands and to prevent their despoliation and destruction and to accommodate necessary economic development in a manner consistent with wetlands preservation. (1972, c. 711.)

62.1-13.2. Definitions. -- For the purposes of this chapter, the following words shall have the meanings respectively ascribed to them:

- (a) "Commission" means the Virginia Marine Resources Commission.
- (b) "Commissioner" means the Commissioner of Marine Resources.
- (c) "Person" means any corporation, association, or partnership, one or more individuals, or any unit of government or agency thereof.
- (d) "Tidewater Virginia" means the following counties: Accomack, Arlington, Caroline, Charles City, Chesterfield, Essex, Fairfax, Gloucester, Hanover, Henrico, Isle of Wight, James City, King George, King and Queen, King William, Lancaster, Mathews, Middlesex, Nansemond, New Kent, Northampton, Northumberland, Prince George, Prince William, Richmond, Southampton, Spotsylvania, Stafford, Surry, Sussex, Westmoreland, and York; and the cities of Alexandria, Chesapeake, Colonial Heights, Fairfax, Falls Church, Fredericksburg, Hampton, Hopewell, Newport News, Norfolk, Petersburg, Portsmouth, Richmond, Suffolk, Virginia Beach and Williamsburg.
- (e) "Governmental services" means any or all of the services provided by a county, city or town to its citizens for the purpose of maintaining such county, city or town and shall include but shall not be limited to such services as constructing, repairing and maintaining roads, sewage facilities, supplying and

treating water, street lights, and construction of public buildings.

(f) "Wetlands" means all that land lying between and contiguous to mean low water and an elevation above mean low water equal to the factor 1.5 times the mean tide range at the site of the proposed project in the county, city or town in question; and upon which is growing on July one, nineteen hundred seventy-two and grows thereon subsequent thereto, any one or more of the following: saltmarsh cordgrass (Spartina alterniflora), saltmeadow hay (Spartina patens), saltgrass (Distichlis spicata), black needlerush (Juncus roemerianus), saltwort (Salicornia spp.), sea lavender (Limonium spp.), marsh elder (Iva frutescens), groundsel bush (Baccharis halimifolia), wax myrtle (Myrica sp.), sea oxeye (Borrichia frutescens), arrow arum (Peltandra virginica), pickerel weed, (Pontederia cordata), big cordgrass (Spartina cynosuroides), rice cutgrass (Leersia oryzoices), wildrice (Zizania aquatica), bulrush (Scirpus validus), spikerush (Eleocharis sp.), sea rocket (Cakile ecentula), southern wildrice (Zizaniopsis miliacea), cattails (Typha spp.), threesquares (Scirpus spp.), button bush (Cephalanthus occidentalis), bald cypress (Taxodium distichum), black gum (Nyssa sylvatica), dock (Rumex spp.), yellow pond lily (Nuphar spp.), marsh fleabane (Pluchea purpurascens), royal fern (Osmunda regalis), marsh hibiscus (Hibiscus moscheutos), beggar's ticks (Bidens sp.), smartweeds (Polygonum sp.), arrowhead (Sagittaria spp.), sweet flag (Acorus calamus), and switch grass (Panicum virgatum), tupelo (Nyssa aquatica).

The wetlands of Back Bay and its tributaries shall mean all marshes subject to regular or occasional flooding by tides, including wind tides, provided this shall not include hurricane or tropical storm tides and upon which one or more of the following vegetation species are growing or grows thereon subsequent to the passage of this amendment: saltmarsh cordgrass (Spartina alterniflora), saltmeadow hay (Spartina patens), black needlerush (Juncus roemerianus), marsh elder (Iva frutescens), groundsel bush (Baccharis halimifolia), wax myrtle (Myrica sp.), arrow arum (Peltandra virginica), pickerel weed (Pontederia cordata), big cordgrass (Spartina cynosuroides), rice cutgrass (Leersia oryzoices), wildrice (Zizania aquatica), bulrush (Scirpus validus), spikerush (Eleocharis sp.), cattails (Typha spp.), threesquares (Scirpus spp.), dock (Rumex sp.), smartweeds (Polygonum sp.), yellow pond lily (Nuphar spp.), royal fern (Osmunda regalis), marsh hibiscus (Hibiscus moscheutos), beggar's ticks (Bidens sp.), arrowhead (Sagittaria spp.), and switch grass (Panicum virgatum).

(g) "Wetlands Board" or "board" means a board created as provided in 62.1-13.6.

(h) "Wetlands zoning ordinance" means that ordinance set forth in 62.1-13.5.

(i) "County, city or town" shall mean the governing body of such county, city or town.

(j) "Back Bay and its tributaries" means the following as shown on the U. S. Geological Survey Quadrangle Sheets for Virginia Beach, North Bay, and Knotts Island; Back Bay north of the Virginia-North Carolina State Line; Capsies Creek north of the Virginia-North Carolina State Line; Deal Creek; Devil Creek; Nawney Creek; Redhead Bay, Sand Bay, Shipp's Bay, North Bay, and the waters connecting

them; Beggars Bridge Creek; Muddy Creek; Ashville Bridge Creek; Hells Point Creek; Black Gut; and all coves, ponds and natural waterways adjacent to or connecting with the above-named bodies of water.

62.1-13.3. Standards for use and development of wetlands. -- The following standards shall apply to the use and development of wetlands:

(1) Wetlands of primary ecological significance shall not be altered so that the ecological systems in the wetlands are unreasonably disturbed;

(2) Development in Tidewater Virginia, to the maximum extent possible, shall be concentrated in wetlands of lesser ecological significance, in wetlands which have been irreversibly disturbed before July one, nineteen hundred seventy-two, and in areas of Tidewater Virginia apart from the wetlands. (1972,c.711.)

62.1-13.4. Marine Resources Commission to develop guidelines. -- In order to implement the policy set forth in 62.1-13.1 and to assist counties, cities or towns in regulation of wetlands, the Commission shall, with the advice and assistance of the Virginia Institute of Marine Science, which will evaluate wetlands by type and maintain a continuing inventory of those wetlands, from time to time promulgate guidelines which scientifically evaluate wetlands by type and which set forth the consequences of use of these wetlands types. In developing guidelines, the Commission is empowered to consult with any governmental agency. (1972,c.711.)

62.1-13.5. Counties, cities and towns authorized to adopt wetlands zoning ordinance; terms of ordinance. -- Any county, city or town may adopt the following ordinance:

Wetlands Zoning Ordinance

1. The governing body of _____, acting pursuant to chapter 2.1 of Title 62.1 of the Code of Virginia, for purposes of fulfilling the policy standards set forth in such chapter, adopts this ordinance regulating the use and development of wetlands.

2. Definitions -- For the purposes of this ordinance:

(a) "Commission" means the Virginia Marine Resources Commission.

(b) "Commissioner" means the Commissioner of Marine Resources.

(c) "Person" means any corporation, association or partnership, one or more individuals, or any unit of government or agency thereof.

(d) "Governmental services" means any or all of the services provided by this _____ to its citizens for the purpose of maintaining this _____ and shall include but shall not be limited to such services as constructing, repairing and maintaining roads, sewage facilities, supplying and treating water, street lights and construction of public buildings.

(e) "Wetlands" means all that land lying between and contiguous to mean low

water and an elevation above mean low water equal to the factor 1.5 times the mean tide range at the site of the proposed project in this _____; and upon which is growing on the effective date of this act or grows thereon subsequent thereto, any one or more of the following: saltmarsh cordgrass (Spartina alterniflora), saltmeadow hay (Spartina patens), saltgrass (Distichlis spicata), black needlerush (Juncus roemerianus), saltwort (Salicornia spp.), sea lavender (limonium spp.), marsh elder (Iva frutescens), groundsel bush (Baccharis halimifolia), wax myrtle (Myrica sp.), sea oxeye (Borrichia frutescens), arrow arum (Peltandra virginica), pickerel weed (Pontederia cordata), big cordgrass (Spartina cynosuroides), rice cutgrass (Leersia oryzoices), wildrice (Zizania aquatica), bulrush (Scirpus validus), spikerush (Eleocharis sp.), sea rocker (Cakile ecetula), southern wildrice (Zizaniopsis miliacea), cattails (Typha spp.), threesquares (Scirpus spp.), button bush (Cephalanthus occidentalis), bald cypress (Taxodium distichum), black gum (Nyssa sylvatica), tupelo (Nyssa aquatica), dock (Rumex spp.), yellow pond lily (Nuphar spp.), marsh fleabane (Pluchea purpurascens), royal fern (Osmunda regalis), marsh hibiscus (Hibiscus moscheutos), beggar's ticks (Bidens sp.), smartweeds (Polygonum sp.), arrowhead (Sagittaria spp.), sweet flag (Acorus calamus), and switch grass (Panicum virgatum).

The wetlands of Back Bay and its tributaries shall mean all marshes subject to regular or occasional flooding by tides, including wind tides, provided this shall not include hurricane or tropical storm tides, and upon which one or more of the following vegetation species are growing or grows thereon subsequent to the passage of this amendment: saltmarsh cordgrass (Spartina alterniflora), saltmeadow hay (Spartina patens), black needlerush (Juncus roemerianus), marsh elder (Iva frutescens), groundsel bush (Baccharis halimifolia), wax myrtle (Myrica sp.), arrow arum (Peltandra virginica), pickerel weed (Pontederia cordata), big cordgrass (Spartina cynosuroides), rice cutgrass (Leersia oryzoides), wildrice (Zizania aquatica), bulrush (Scirpus validus), spikerush (Eleocharis sp.), cattails (Typha spp.), threesquares (Scirpus spp.), dock (Rumex sp.), smartweeds (Polygonum sp.), yellow pond lily (Nuphar spp.), royal fern (Osmunda regalis), marsh hibiscus (Hibiscus moscheutos), beggar's ticks (Bidens sp.), arrowhead (Sagittaria spp.), and switch grass (Panicum virgatum).

(f) "Wetlands board" or "board" means a board created as provided in 62.1-13.6 of the Code of Virginia.

(g) "Back Bay and its tributaries" means the following as shown on the U. S. Geological Survey Quadrangle Sheets for Virginia Beach, North Bay, and Knotts Island: Back Bay north of the Virginia-North Carolina State Line; Capsies Creek north of the Virginia-North Carolina State Line; Deal Creek; Devil Creek; Nawney Creek; Redhead Bay, Sand Bay, Shipps Bay, North Bay, and the waters connecting them; Beggars Bridge Creek; Muddy Creek; Ashville Bridge Creek; Hells Point Creek; Black Gut; and all coves, ponds and natural waterways adjacent to or connecting with the above-named bodies of water.

3. The following uses of and activities on wetlands are permitted, if otherwise permitted by law:

(a) The construction and maintenance of noncommercial catwalks, piers, boathouses, boat shelters, fences, duckblinds, wildlife management shelters,

footbridges, observation decks and shelters and other similar structures provided that such structures are so constructed on pilings as to permit the reasonably unobstructed flow of the tide and preserve the natural contour of the marsh;

(b) The cultivation and harvesting of shellfish, and worms for bait;

(c) Noncommercial outdoor recreational activities, including hiking, boating, trapping, hunting, fishing, shellfishing, horseback riding, swimming, skeet and trap shooting, and shooting preserves; provided that no structure shall be constructed except as permitted in subsection (a) of this section;

(d) The cultivation and harvesting of agricultural or horticultural products; grazing and haying;

(e) Conservation, repletion and research activities of the Virginia Marine Resources Commission, the Virginia Institute of Marine Science, Commission of Game and Inland Fisheries and other related conservation agencies;

(f) The construction or maintenance of aids to navigation which are authorized by governmental authority;

(g) Emergency decrees of any duly appointed health officer of a governmental subdivision acting to protect the public health;

(h) The normal maintenance, repair or addition to presently existing roads, highways, railroad beds, or the facilities of any person, firm, corporation, utility, federal, state, county, city or town abutting on or crossing wetlands, provided that no waterway is altered and no additional wetlands are covered;

(i) Governmental activity on wetlands owned or leased by the Commonwealth of Virginia, or a political subdivision thereof.

4. (a) Any person who desires to use or develop any wetland within this _____ (county, city or town), other than for those activities specified in 3 above, shall first file an application for a permit with the wetlands board and shall send copies to the Commission and the Virginia Institute of Marine Science.

(b) An application shall include the following: the name and address of the applicant; a detailed description of the proposed activity and a map, drawn to an appropriate and uniform scale, showing the area of wetland directly affected, with the location of the proposed work thereon, indicating the area of existing and proposed fill and excavation, especially the location, width, depth and length of any proposed channel and the disposal area, all existing and proposed structures; sewage collection and treatment facilities, utility installations, roadways, and other related appurtenances or facilities, including those on adjacent uplands, and the type of equipment to be used and the means of equipment access to the activity site; the names and addresses of owners of record of adjacent land and known claimants of water rights in or adjacent to the wetland of whom the applicant has notice; an estimate of cost; the primary purpose of the project;

any secondary purposes of the project, including further projects; the public benefit to be derived from the proposed project; a complete description of measures to be taken during and after the alteration to reduce detrimental off-site effects; the completion date of the proposed work, project, or structure and such additional materials and documentation as the wetlands board may deem necessary.

(c) A nonrefundable processing fee to cover the cost of processing the application, set by the applicable governing body with due regard for the services to be rendered, including the time, skill, and administrator's expense involved, shall accompany each application.

5. All applications and maps and documents relating thereto shall be open for public inspection at the office of the recording officer of this _____ (county, city or town).

6. Not later than sixty days after receipt of such application, the wetlands board shall hold a public hearing on such application. The applicant, the local governing body, the Commissioner, the owner of record of any land adjacent to the wetlands in question, known claimants of water rights in or adjacent to the wetlands in question, the Virginia Institute of Marine Science, the Division of State Planning and Community Affairs, the Department of Game and Inland Fisheries, Water Control Board, the Department of Highways and governmental agencies expressing an interest therein shall be notified of the hearing by mail not less than twenty days prior to the date set for the hearing. The wetlands board shall also cause notice of such hearing to be published at least once a week for two weeks prior to such hearing in the newspaper having a general circulation in this _____ (county, city or town). The costs of such publication shall be paid by the applicant.

7. In acting on any application for a permit, the board shall grant the application upon the concurring vote of three members. The chairman of the board, or in his absence the acting chairman, may administer oaths and compel the attendance of witnesses. Any person may appear and be heard at the public hearing. Each witness at the hearing may submit a concise written statement of his testimony. The board shall make a record of the proceeding, which shall include the application, any written statements of witnesses, a summary of statements of all witnesses, the findings and decision of the board, and the rationale for the decision. The board shall make its determination within thirty days from the hearing. If the board fails to act within such time, the application shall be deemed approved. Within forty-eight hours of its determination, the board shall notify the applicant and the Commissioner of such determination and if the board has not made a determination, it shall notify the applicant and the Commission that thirty days has passed and that the application is deemed approved.

The board shall transmit a copy of the permit to the Commissioner. If the application is reviewed or appealed, then the board shall transmit the record of its hearing to the Commissioner. Upon a final determination by the Commission, the record shall be returned to the board. The record shall be open for public inspection at the office of the recording officer of this _____ (county, city or town).

8. The board may require a reasonable bond in an amount and with surety

and conditions satisfactory to it securing to the Commonwealth compliance with the conditions and limitations set forth in the permit. The board may, after hearing as provided herein, suspend or revoke a permit if the board finds that the applicant has failed to comply with any of the conditions or limitations set forth in the permit or has exceeded the scope of the work as set forth in the application. The board after hearing may suspend a permit if the applicant fails to comply with the terms and conditions set forth in the application.

9. (a) In making its decision whether to grant, to grant in modified form, or to deny an application for a permit the board shall base its decision on these factors:

(1) Such matters raised through the testimony of any person in support of or in rebuttal to the permit application.

(2) Impact of the development on the public health and welfare as expressed by the policy and standards of Chapter 2.1 of Title 62.1 of the Code of Virginia and any guidelines which may have been promulgated thereunder by the Commission.

(b) If the board, in applying the standards above, finds that the anticipated public and private benefit of the proposed activity exceeds the anticipated public and private detriment and that the proposed activity would not violate or tend to violate the purposes and intent of Chapter 2.1 of Title 62.1 of the Code of Virginia and of this ordinance, the board shall grant the permit, subject to any reasonable condition or modification designed to minimize the impact of the activity on the ability of this _____ (county, city or town), to provide governmental services and on the rights of any other person and to carry out the public policy set forth in Chapter 2.1 of Title 62.1 of the Code of Virginia and in this ordinance. Nothing in this section shall be construed as affecting the right of any person to seek compensation for any injury in fact incurred by him because of the proposed activity. If the board finds that the anticipated public and private benefit from the proposed activity is exceeded by the anticipated public and private detriment or that the proposed activity would violate or tend to violate the purposes and intent of Chapter 2.1 of Title 62.1 of the Code of Virginia and of this ordinance, the board shall deny the permit application with leave to the applicant to resubmit the application in modified form.

10. The permit shall be in writing, signed by the chairman of the board and notarized.

11. No permit shall be granted without an expiration date, and the board, in the exercise of its discretion, shall designate an expiration date for completion of such work specified in the permit from the date the board granted such permit. The board, however, may, upon proper application therefore, grant extensions.

62.1-13.6. Appointment, terms, etc., of local wetlands boards; jurisdiction of county wetlands board over wetlands in town. -- (a) In and for any county, city or town which has enacted or enacts a wetlands zoning ordinance pursuant to this chapter, there shall be created a wetlands board, which shall consist of five residents of the county, city or town appointed by the governing body of the county,

city or town. Their terms of office shall be for five years each except that original appointments shall be made for such terms that the term of one member shall expire each year. The chairman of the board shall notify the governing body at least thirty days in advance of the expiration of any term of office, and shall also notify the governing body promptly if any vacancy occurs. Appointments to fill vacancies shall be only for the unexpired portion of the term. Members may serve successive terms. Members of the board shall hold no other public office in the county or city except that they may be members of the local planning or zoning commission, directors of soil and water conservation boards, or of the local board of zoning appeals. A member whose term expires shall continue to serve until his successor is appointed and qualified.

(b) If a town does not enact a wetlands zoning ordinance within one year from the time the county in which such town is found enacts a wetlands zoning ordinance, application for wetlands found in such town shall be made to the county wetlands board. (1972, c. 711.)

62.1-13.7. Officers, meetings, rules, etc., of wetlands boards; records and reports. -- The board shall elect from its membership a chairman and such other officers as it deems necessary who shall serve one-year terms as such and may succeed themselves. For the conduct of any hearing and the taking of any action, a quorum shall be not less than three members of the board. The board may make, alter and rescind rules and forms for its procedures, consistent with ordinances of the county, city or town and general laws of the Commonwealth, including this chapter. The board shall keep a full public record of its proceedings and shall submit a report of its activities to the governing body at least once each year, and a copy of its report to the Commission. (1972, c. 711.)

62.1-13.8. Local governing body to supply meeting space and services for wetlands board; removal of board member. -- The governing body of the county, city or town creating a wetlands board shall supply reasonable meeting space for the use of the board and such reasonable secretarial, clerical, legal and consulting services as may be needed by the board. The local governing body is authorized to expend the necessary public funds. Any board member may be removed for malfeasance, misfeasance or nonfeasance in office, or for other just cause, by the governing body which appointed him, after hearing held after at least fifteen days' notice. (1972, c. 711.)

62.1-13.9. Permits required for certain activities; issuance of permits by Commission. -- No person shall conduct any activity which would require a permit under a wetlands zoning ordinance unless he has a permit therefor. Until such time as the county, city or town in which a person proposes to conduct an activity which would require a permit under a wetlands zoning ordinance adopts the wetlands zoning ordinance such person shall apply for a permit directly to the Commission except as provided in 62.1-13.6 (b). If an applicant desires to use or develop wetlands owned by the Commonwealth, he shall apply for a permit directly to the Commission and in addition to the application fee required by the wetlands zoning ordinance, he shall pay such fees and royalties as provided in 62.1-3.

The Commission shall process such application in accordance with the

provisions of the wetlands zoning ordinance and the Commissioner shall sign such permit; provided, however, that the Commission shall have the authority to designate one or more hearing officers who may, in lieu of the Commission, conduct public hearings as required in 62.1-13.5, and thereafter report such findings and recommendations to the Commission. (1972,c.711.)

62.1-13.10. Commissioner of Marine Resources to review all decisions of wetlands boards. -- The Commissioner shall review all decisions of the wetlands board and notify the Commission of any decision which in his opinion should be reviewed by the Commission. (1972,c.711.)

62.1-13.11. When Commission to review decision of wetlands board. -- The Commission shall review a decision of a wetlands board made under a wetlands zoning ordinance when:

(1) An appeal is taken from such decision by the applicant for a permit or by the county, city or town where the wetlands are located; or

(2) The Commissioner requests such review. The Commissioner shall request such review only when he reasonably believes that the policy and standards of this chapter have not been adequately achieved or that any guidelines which may have been promulgated by the Commission have not been reasonably accommodated. In order to make such a request, the Commissioner must notify the board and the applicant and the county, city or town where the wetlands are located within ten days of receipt of notice to the Commissioner of the decision of the board.

(3) Twenty-five or more freeholders of property within the county, city or town in which the proposed project is located sign and submit a petition to the Commission, provided, such petition must include a statement of particulars setting forth those specific instances wherein the petitioners do allege that the board did fail to follow the policy, standards or guidelines of this chapter.

(4) Where not otherwise provided, the foregoing requests for review or appeal shall be made within ten days from date of initial determination by the board; and provided that the Commission shall hear and decide such review or appeal within forty-five days after notice of such review or appeal is received a continuance may be granted by the Commission on a motion of the applicant or the freeholders as specified in 62.1-13.11(3) or the county, city or town where the wetlands are located. (1972,c.711.)

62.1-13.12. Procedure for review. -- (a) The Commissioner shall cause notice of the review or appeal to be given to the board, to the applicant, to the freeholders specified in 62.1-13.11(3) and to the county, city or town where the wetlands are located.

(b) The Commission shall hear the appeal or conduct the review on the record transmitted by the board to the Commissioner and such additional evidence as may be necessary to resolve any controversy as to the correctness of the record. And the Commission, in its discretion, may receive such other evidence as the ends of justice require. (1972,c.711.)

62.1-13.13. When Commission to modify or reverse decision of wetlands board. -- The Commission shall modify or reverse the decision of the wetlands board:

(1) If the decision of the wetlands board will not adequately achieve the policy and standards of this chapter or will not reasonably accommodate any guidelines which may have been promulgated by the Commission hereunder; or

(2) If the substantial rights of the appellant or the applicant have been prejudiced because the findings, conclusions or decisions are

(a) In violation of constitutional provisions; or

(b) In excess of statutory authority or jurisdiction of the wetlands board; or

(c) Made upon unlawful procedure; or

(d) Affected by other error of law; or

(e) Unsupported by the evidence on the record considered as a whole; or

(f) Arbitrary, capricious, or an abuse of discretion. (1972,c.711.)

62.1-13.14. Notice of Commission's decision. -- The Commission shall notify the parties of its determination within forty-eight hours after the appeal or review. (1972,c.711.)

62.1-13.14:1. No permit shall be issued until the time within which a request for review or an appeal to the Commission may be made has expired; and, if any such request for review or appeal is made, no activity for which such permit is required shall be commenced until the Commission has notified the parties of its determination.

62.1-13.15. Appeals to courts. -- (1) An appeal from any decision of the Commission concerning an application for a permit granted or denied directly by the Commission, or from any decision of the Commission on review of or appeal from a decision of the board may be taken by the applicant, any of the freeholders as set forth in 62.1-13.11(3), or by the county, city or town where the wetlands are located, within thirty days after the rendering of such decision of the Commission, to the circuit court or corporation court having jurisdiction in the governmental subdivision in which the wetlands involved in the decision are located.

(2) Judicial review shall be in accord with the provisions of 9-6.13, except that the circuit court or corporation court shall modify or reverse the decision of the Commission or remand the case for further proceedings:

(a) If the decision of the Commission will not adequately achieve the policy and standards of this chapter or will not reasonably accommodate any guidelines which may have been promulgated by the Commission; or

(b) If the substantial rights of the appellant have been prejudiced because of findings, conclusions or decisions are

- (1) In violation of constitutional provisions; or
- (2) In excess of statutory authority or jurisdiction of the Commission; or
- (3) Made upon unlawful procedure; or
- (4) Affected by other error of law; or
- (5) Unsupported by the evidence on the record considered as a whole; or
- (6) Arbitrary, capricious, or an abuse of discretion.

(c) From the final decision of the circuit court or corporation court an appeal shall lie to the Supreme Court in the manner provided by law for appeals in civil cases. (1972, c.711.)

62.1-13.16. Investigations and prosecutions. -- The Commission shall have the authority to investigate all projects whether proposed or ongoing which alter wetlands. The Commission shall have the power to prosecute all violations of any order, rule, or regulation of the Commission or of a wetlands board, or violation of any provision of this chapter. (1972, c.711.)

62.1-13.17. Commission may receive gifts, etc. -- The Commission may receive gifts, grants, bequests, and devises of wetlands and of money which shall be taken and held for the uses prescribed by the donor, grantor, or testator and in accord with the purposes of this chapter. The Commission shall manage such wetlands in such a way as to maximize their ecological value and in accord with the purposes of this chapter. (1972, c.711.)

62.1-13.18. Violation of orders, rules and regulations. -- (a) Any person who knowingly, intentionally, negligently or continually violates any order, rule or regulation of the Commission or of a wetlands board established pursuant to this chapter or violates any provision of this chapter or of a wetlands zoning ordinance enacted pursuant to this chapter or any provision of a permit granted by a wetlands board or the Commission pursuant to this chapter shall be guilty of a misdemeanor. Following a conviction, every day the violation continues shall be deemed a separate offense. (1972, c.711.)

62.1-13.18:1. In addition to and notwithstanding the provisions of 62.1-13.18, upon petition of the Commission or a wetlands board to the court of record having jurisdiction in the city or county wherein any act is done or is threatened to be done which is unlawful under the provisions of this chapter, the court may enjoin such unlawful act and may order the person so acting unlawfully to take such steps as are necessary to restore, protect and preserve the wetlands involved.

62.1-13.19. Jurisdiction of Commission not affected. -- Nothing in this chapter shall affect the Commission's sole jurisdiction over areas and activities as defined by Title 28.1 or 62.1-3 of this Code. (1972, c.711.)

62.1-13.20. Exemptions. -- Nothing in this chapter shall affect (1) any project commenced prior to July one, nineteen hundred seventy-two; provided, however, that this section shall not be deemed to exclude from regulation under this chapter any activity which expands or enlarges upon a project already in existence or under construction at the time of such date, except for those activities exempted under 62.1-13.5(3) (h); (2) any project or development as to which, prior to July one, nineteen hundred seventy-two; a plan or plan of development thereof has been filed pursuant to ordinance or other lawful enactment with either an agency of the federal or state government, or with either the planning commission, board of supervisors, or city council of the jurisdiction in which the project or development is located; and (3) any project or development, whether or not commenced prior to July one, nineteen hundred seventy-two; if located or to be located in whole or in part on ground or in an area an interest in which was authorized by the General Assembly to be conveyed prior to July one, nineteen hundred seventy-two. (1972,c.711.)

APPENDIX 2

IDENTIFICATION OF SOME KEY MARSH PLANTS

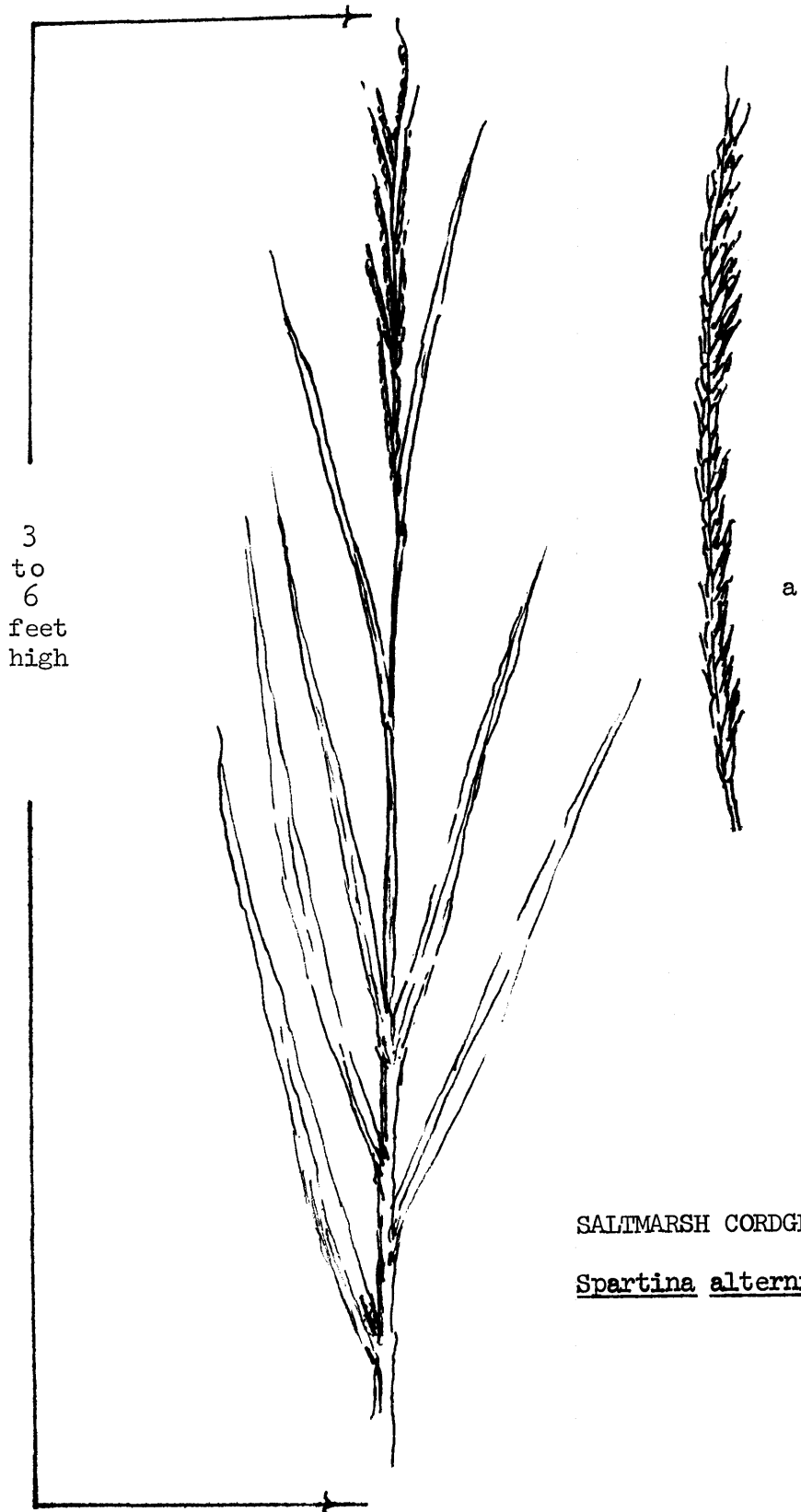
The Wetlands Act lists 35 species of plants found in marshes. Some of those species are obviously more abundant than others. The following descriptions should assist in the identification of these more common plants.

In salt marshes there are perhaps six very common species. In addition to their being relatively easy to identify there are few species with which they might be confused.

In tidal freshwater marshes, however, the number of plant species present may exceed 50 in areas less than an acre in extent. Some of the more common species have been included here.

As for the identification of the other marsh plants listed in the Act, a complete guide to the identification of plants listed in the 1972 Wetlands Act is being prepared and will be available shortly.

The plant names appearing in the descriptions marked with an asterisk are the preferred common names listed in the Wetlands Act.



3
to
6
feet
high

SALTMARSH CORDGRASS

Spartina alterniflora

a. Branch of fruiting head.

COMMON NAME(S): *Saltmarsh Cordgrass
Smooth Cordgrass

SCIENTIFIC NAME: Spartina alterniflora

GENERAL DESCRIPTION:

Three forms: Tall, up to 6 feet, intermediate and short, up to 2 feet. Leaves flat, about $\frac{1}{2}$ " to $\frac{3}{4}$ " at base, edges smooth. Flowering time, end of Aug.-first part of Sept. Branches of flowering head erect and compacted.

DISTINGUISHING FEATURES:

Often with snails attached to stems or leaves. At low tide, lower stems and leaves usually with a thin film of mud and algae. The coarseness and medium height of this grass contrasts with meadow grasses (saltgrass and saltmeadow hay) which are shorter and more slender. Saltmarsh cordgrass also heads out later in the season than any of the marsh grasses.

WETLAND HABITATS:

Salt marsh: abundant and throughout from about mean sea level to the limit of high tides.
Brackish water marsh: abundant to the high tide limit and along tidal creeks.
Freshwater marsh: generally absent.
Swamps: absent.

ANNUAL PRODUCTION:

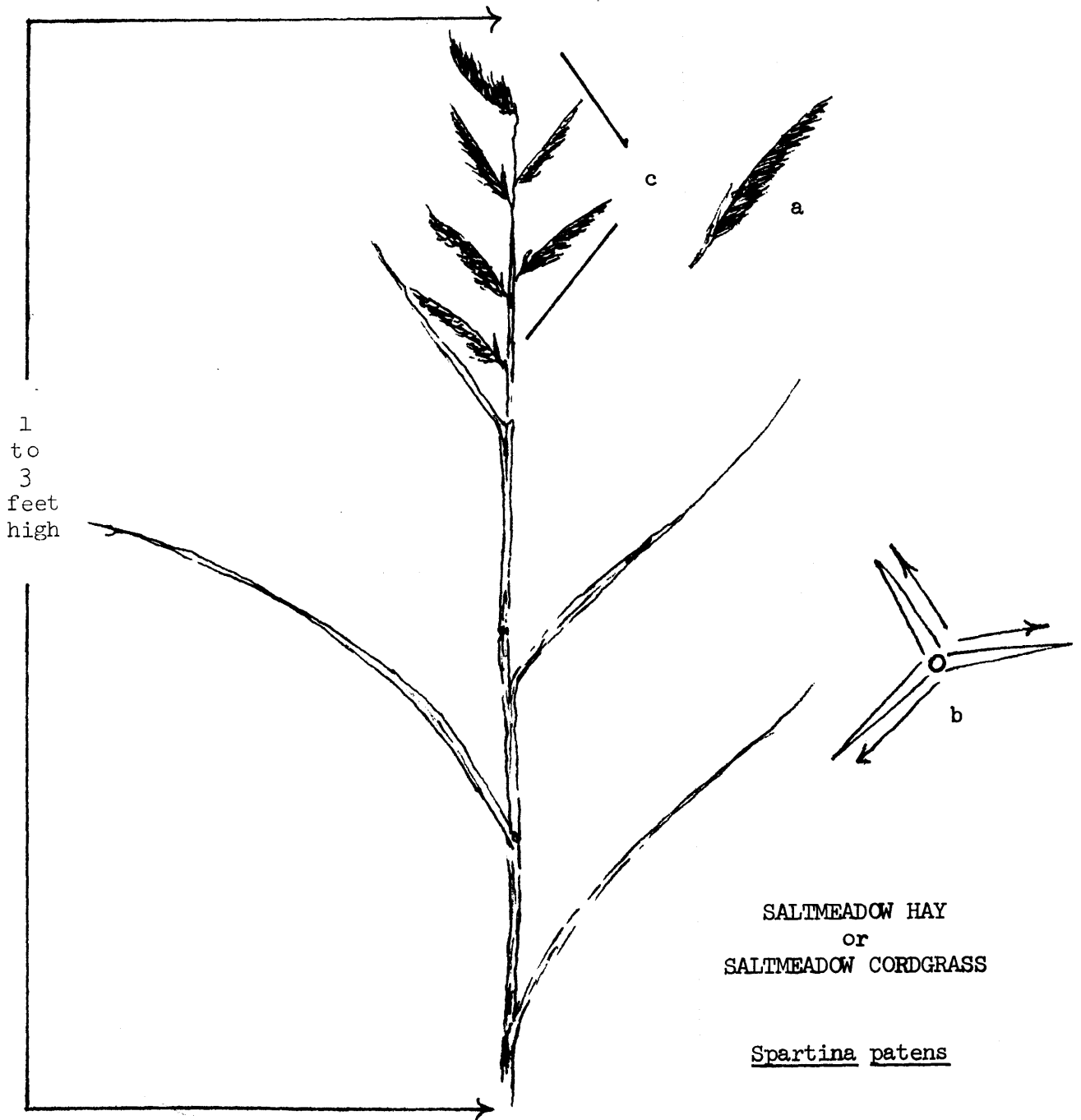
4 to 6 tons per acre, may exceed 10 tons per acre. Considered to be one of the most valuable salt marsh plants.

ASSOCIATED ANIMAL SPECIES:

Killifish, periwinkles, fiddler crabs, ribbed mussels, grasshoppers, spiders, muskrats (food and house construction in brackish water), otters, raccoons, herons, clapper rails, willets, black ducks, kingfishers and red-winged black birds. Seeds, at times, eaten by waterfowl. Root stocks consumed by geese.

EROSION CONTROL:

One of the best plants for resisting shoreline erosion because of network of roots which accumulate and hold sediments.



- a. Branch with flowers.
- b. Leaves arranged in 3 or more planes.
- c. Flowering or fruiting head.

COMMON NAME(S): *Saltmeadow Hay
Saltmeadow Cordgrass

SCIENTIFIC NAME: Spartina patens

GENERAL DESCRIPTION:

Grows in association with Saltgrass (Distichlis spicata) forming soft tufted meadows. Fine and wiry in general appearance. Leaves are rolled inward to the point they appear to be round and are $\frac{1}{2}$ to $\frac{2}{3}$ the length of the stem. Leaves come out from the stem in 3 or more planes. Flower head with several spreading branches. Seeds arranged on one side of the branch. Flowering time first of July to mid August.

DISTINGUISHING FEATURES:

Forming cowlicks or swirls in high meadows. Rolled trough-like leaves and branching heads makes this plant easily identifiable.

WETLAND HABITATS:

Saltmarsh: Abundant in higher areas of the marsh, above mean high water. Often associated with Saltgrass and as ground cover in Salt-bush communities.

Brackish Water Marsh: As above.

Freshwater Marsh: Absent.

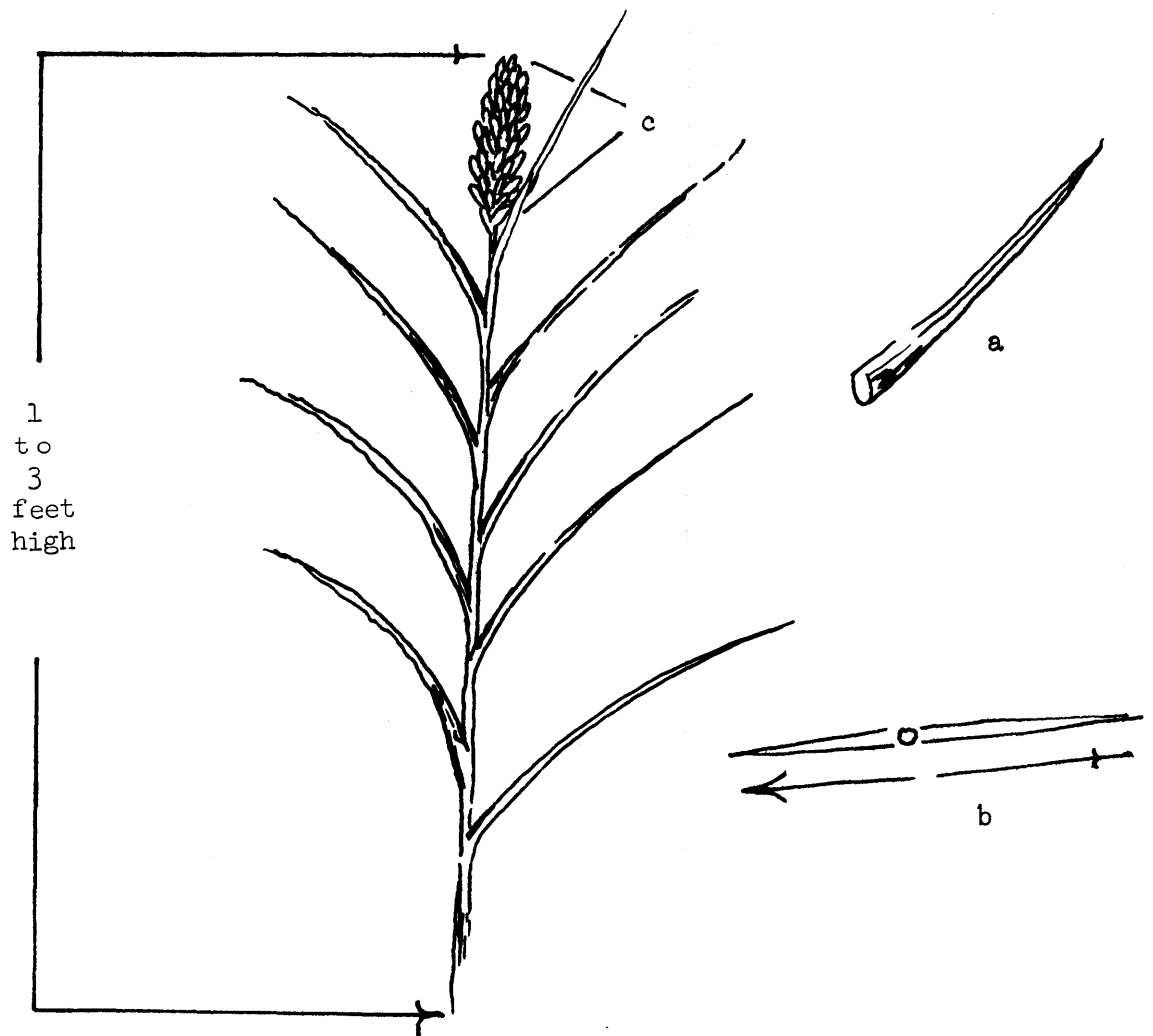
Swamps: Absent.

ANNUAL PRODUCTION:

3 to 5 tons per acre per year. In some areas it is grazed in conjunction with Saltgrass or may be harvested as a forage crop.

ASSOCIATED ANIMAL SPECIES:

Fiddler crabs under dead grass left from the previous year, winged insects and etc. Meadows are transitory areas for woodland animals as they migrate daily to the waters edge in search for food.



SALT GRASS

Distichlis spicata

- a. Trough-shaped leaves (rolled inward).
- b. Leaves arranged in one plane.
- c. Flowering or fruiting head.

COMMON NAME(S): *Salt Grass

SCIENTIFIC NAME: Distichlis spicata

GENERAL DESCRIPTION:

Short grass. One of the components of the saltmarsh meadow. Leaves somewhat trough-shaped but not appearing round. Leaves arranged in 1 plane on the stem (opposite sides of the stem). Heads are unbranched, appearing short, dense and whitish-green in color. Flowering time early August to September.

DISTINGUISHING FEATURES:

Leaves in 1 plane and a compact unbranched flowering head set this species off from the other marsh grasses. A salt grass meadow has a whitish, uniform appearance when in full bloom. Rhizomes (underground stems) are yellowish in color with very fine bands.

WETLAND HABITATS:

Salt marsh: occurs in many habitats in the salt marsh. It is most abundant in high marsh meadows where it occurs with saltmeadow hay. Salt grass is also found with the short form of saltmarsh cordgrass, but more often in low wet depressions in meadow areas, and at times, with saltbush communities.

Brackish water marsh: as above.

Freshwater marsh: absent.

Swamps: absent.

ANNUAL PRODUCTION:

2 to 3 tons per acre/per year.

ASSOCIATED ANIMAL SPECIES:

Fiddler crabs, winged insects and etc. (see this section under Saltmeadow hay). Seeds are of some value to waterfowl and other birds.



3
to
4
feet
high

NEEDLERUSH

Juncus roemerianus

- a. Fruiting head.
- b. Stem round in cross section.

COMMON NAME(S): *Black Needlerush
Needlerush

SCIENTIFIC NAME: Juncus roemerianus

GENERAL DESCRIPTION:

Characteristically grows in dense stands, darker green than other species in the marsh. A round-stemmed rush, without leaves. Very coarse, grows up to 3 feet high. Tip of stem "needle sharp," usually brown or black in color. Flower heads appear $\frac{1}{2}$ to $\frac{2}{3}$ the way up the stem from mid-June to late July.

DISTINGUISHING FEATURES:

Stands are delineated from other marsh species by their uniform height, dark appearance (top half brownish, bottom dark green to nearly black), and high density of individual plants. Other features are the distinctly round stem and the needle-like tip.

WETLAND HABITATS:

Salt marsh: Occurs in patches or bands in higher levels of the marsh. In a gradient between saltmarsh cordgrass and dry land, it is usually found between the saltmeadow cordgrass and the high meadow community. However, in sandy areas it may be found near the waters edge. Tends to grow in colonies in Virginia within which other grasses are only occasionally found.

Brackish water marsh: as above.

Freshwater marsh: absent.

Swamps: absent.

ANNUAL PRODUCTION:

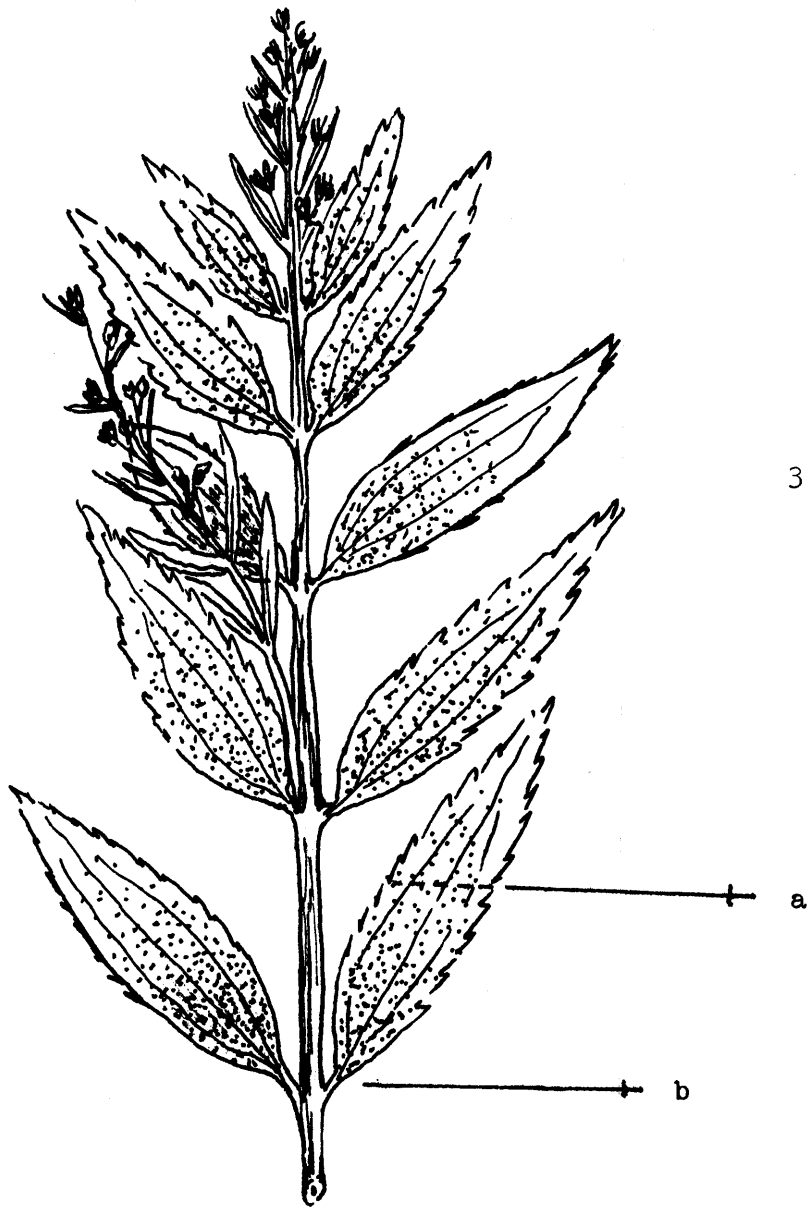
4 to 6 tons of vegetation per acre/per year. Considered to be of little value to wildlife.

ASSOCIATED ANIMAL SPECIES:

Fiddler crabs, snails when near the waters edge, winged insects, etc.

EROSION CONTROL:

The tough rhizomes and root system of this plant serve as a buffer to erosion.



3 to 10 feet high

MARSH ELDER

Iva frutescens

- a. Leaves thick and fleshy.
- b. Leaves opposite each other on the stem.

COMMON NAME(S): *Marsh Elder
Gall Bush

SCIENTIFIC NAME: Iva frutescens

GENERAL DESCRIPTION:

Woody shrub with leaves usually opposite on the stem, from 3' to 8' high. Leaves light green, thick (succulent) with more or less pointed tips. Grows in stands with another shrub, groundsel tree (Baccharis halimifolia). Because of winter kill and salinity changes, there may be various amounts of dead wood present. Yellowish green flowers appear mid-August in this area.

DISTINGUISHING FEATURES:

Distinct from groundsel tree, the other shrub commonly found in salt water marshes, in that marsh elder has opposite leaves, presence of dead wood and has pointed leaves. Leaves will snap in half when folded. Marsh elder blooms 1 month to 6 weeks before groundsel tree does in this area.

WETLAND HABITATS:

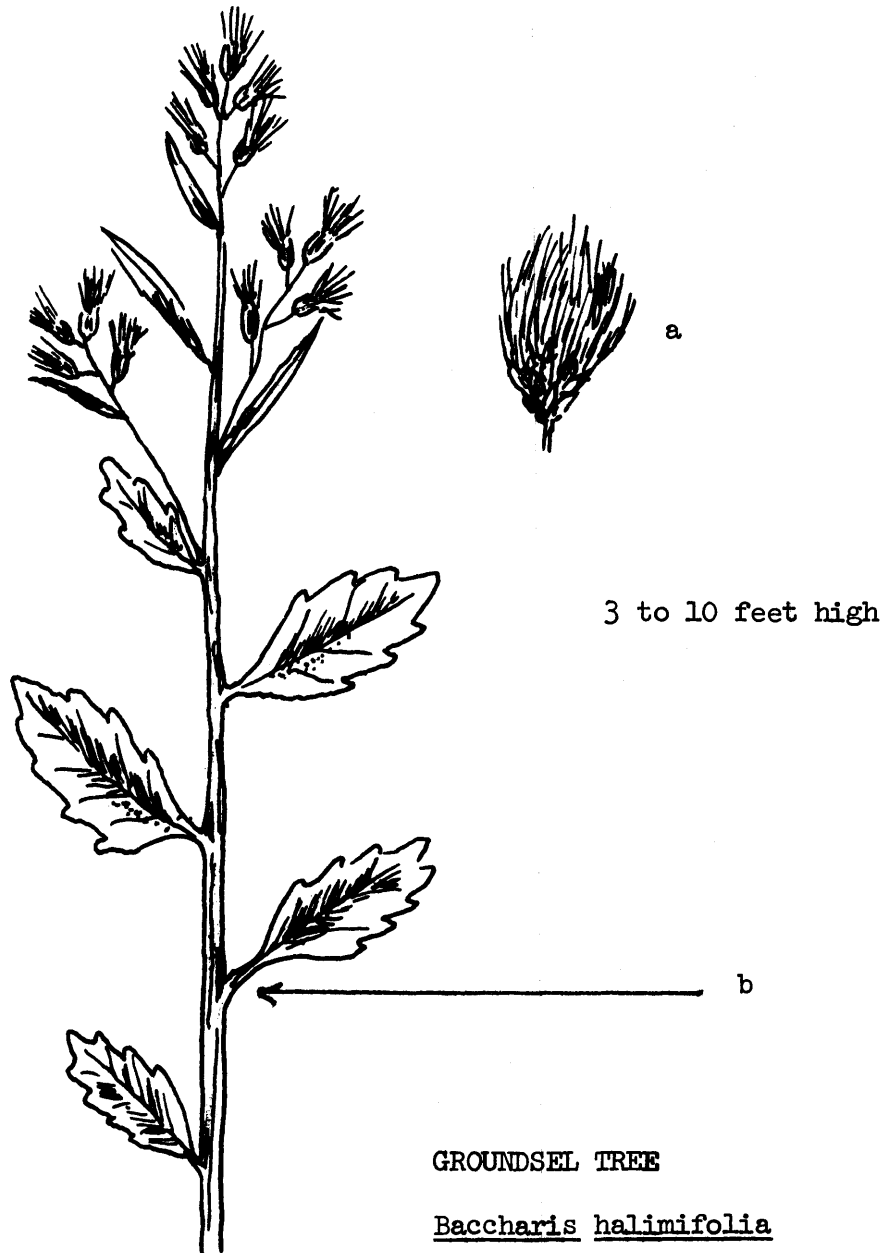
Saltwater marsh: higher areas in the marsh. Usually indicates the approximate upper limit of a wetland community as set down in the Wetlands Act.
Brackish water marsh: Higher parts of the marsh, often bordering woodlands.
Freshwater marsh: occasional.
Swamps: absent or seldom found.

ANNUAL PRODUCTION:

Not available.

ASSOCIATED ANIMAL SPECIES:

Provides nesting areas for many species of birds, especially on the Eastern Shore where there is a scarcity of trees.



- a. Fruiting head.
- b. Leaves alternate.

COMMON NAME(S): *Groundsel Tree

SCIENTIFIC NAME: Baccharis halimifolia

GENERAL DESCRIPTION:

Shrub from 3 to 8 feet high, usually with leaves alternate on the stem. Leaves leathery and dark green, thinner than marsh elder, without pointed tips. Yellow flowers with white seed heads appearing later.

DISTINGUISHING FEATURES:

Differs from marsh elder on several counts in that groundsel tree has (1) alternate leaves (2) dark green leaves (3) blooms later (yellow) (4) little evidence of dead wood (5) white plumed seed heads.

WETLAND HABITATS:

Salt marsh: with marsh elder, this species constitute the saltbush community in salt and brackish water marshes. This community occurs at higher elevations in the marsh and usually indicates the upper limit of the marsh.

Brackish water marsh: usually fringes the upper limit of the marsh.

Freshwater marsh: absent.

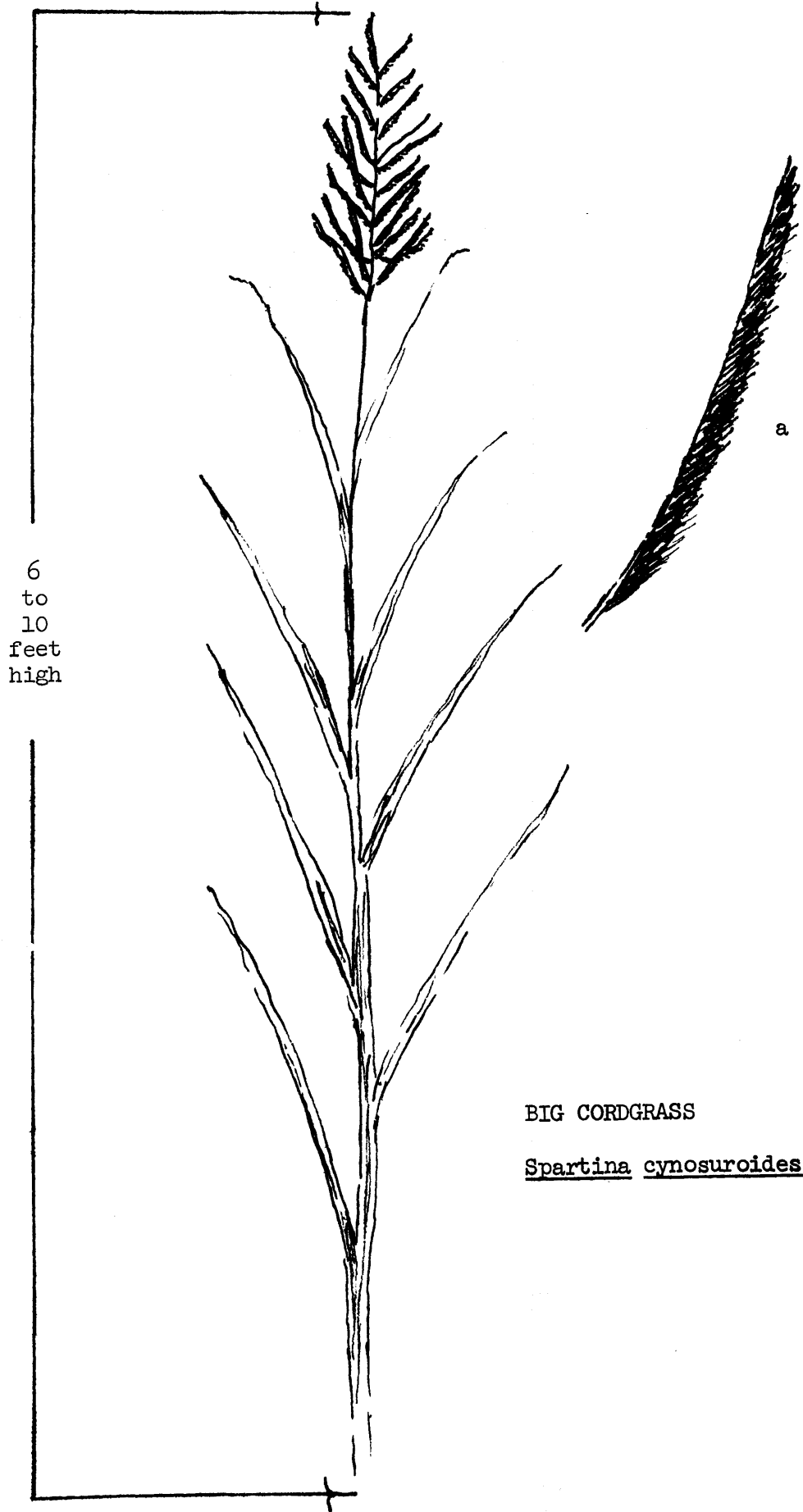
Swamps: absent.

ANNUAL PRODUCTION:

Not available.

ASSOCIATED ANIMAL SPECIES:

Provides nesting areas for birds.



6
to
10
feet
high

BIG CORDGRASS

Spartina cynosuroides

a. Branch of fruiting head.

COMMON NAME(S): *Big Cordgrass

SCIENTIFIC NAME: Spartina cynosuroides

GENERAL DESCRIPTION:

A coarse, tall grass that grows from 6 to 10 feet high. Leaves are 3/4" to 1" wide at the base. Leaf edges are very sharp and can inflict cuts when rubbed toward the base. Heads are large, with up to 30 spreading branches which are usually visible on previous season's stalks. Flower head appears in late July.

DISTINGUISHING FEATURES:

Big cordgrass is generally the tallest of the marsh grasses. Tall grasses do occur in marsh habitats (reedgrass, Phragmites communis and wildrice, Zizania aquatica) but they are not nearly as abundant. Reedgrass has many more wider but shorter leaves at intervals all along the stem and has a plume-like flowering head. Wildrice is usually shorter than big cordgrass and has a head with both erect and drooping branches. Another distinguishing characteristic of big cordgrass is the cutting leaves with upward trending bristles.

WETLAND HABITATS:

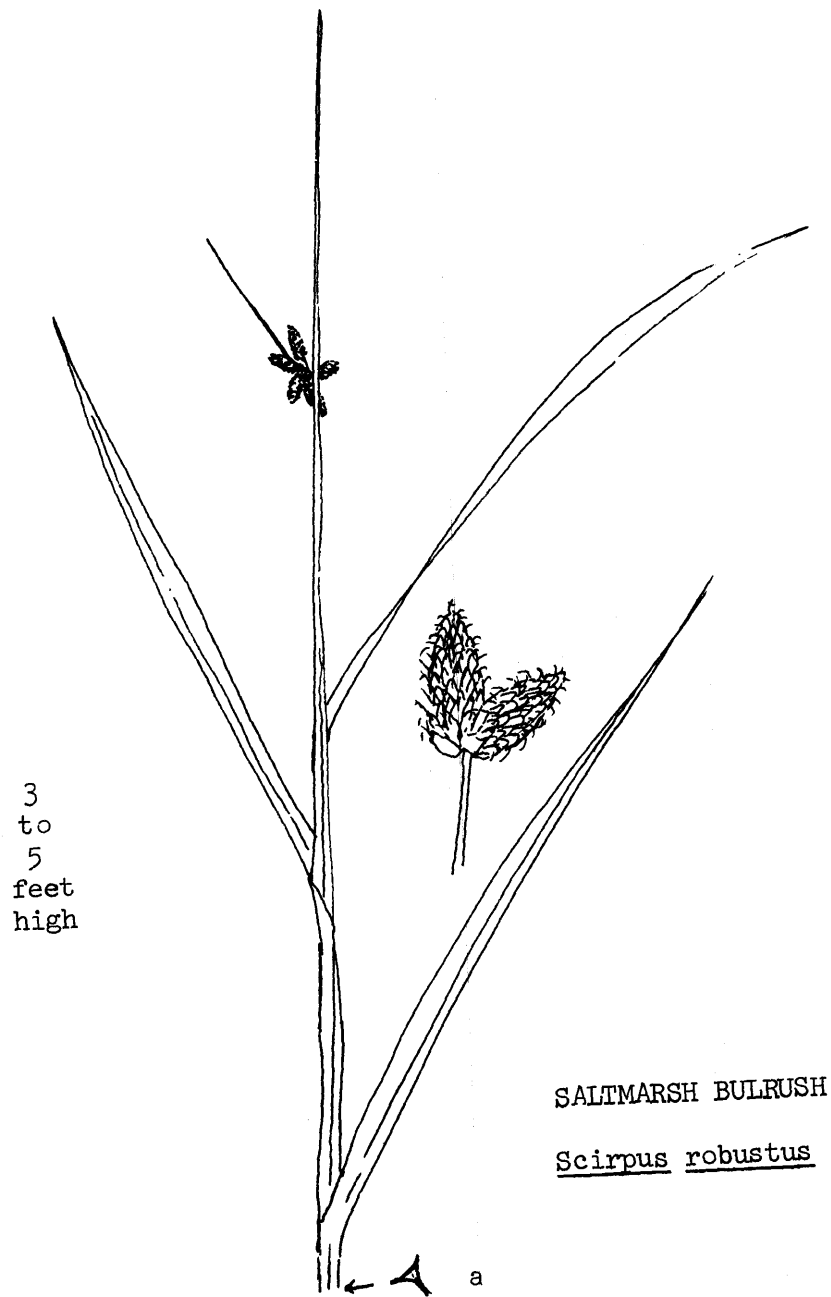
Saltwater marsh: Seldom found here. Only in areas of reduced salinity.
Brackish water marsh: a common component in these areas. Abundant along some of the rivers that feed into Chesapeake Bay, such as the York. Usually found above mean high water.
Freshwater marsh: may be quite extensive in this type of marsh.
Swamps: absent.

ANNUAL PRODUCTION:

3 to 5 tons of vegetation per acre annually. Seeds eaten by waterfowl.

ASSOCIATED ANIMAL SPECIES:

Longbilled marsh wren, muskrat, fiddler crabs, swallows during migration, geese and raccoons.



- a. Triangular-shaped stems
(sides concave)

COMMON NAME(S): *Saltmarsh Bulrush

SCIENTIFIC NAME: Scirpus robustus

GENERAL DESCRIPTION:

Characteristically, this plant has triangular-shaped (in cross-section) stems. Leaves are grass-like. Mature plants vary from 4 to 5 feet high. Robust flowering cluster, made up of brown cone-like heads. Blooms in July.

DISTINGUISHING FEATURES:

Differs from the marsh grasses in that the stems are triangular-shaped rather than round. Another sedge with triangular stems occurs in brackish water marshes, olney threesquare, however, it differs from this species in that it has no leaves. The dark brown, robust flower cluster of saltmarsh bulrush is also distinct. Later in the seasons the stems turn dark brown and can easily be seen among marsh grasses.

WETLAND HABITATS:

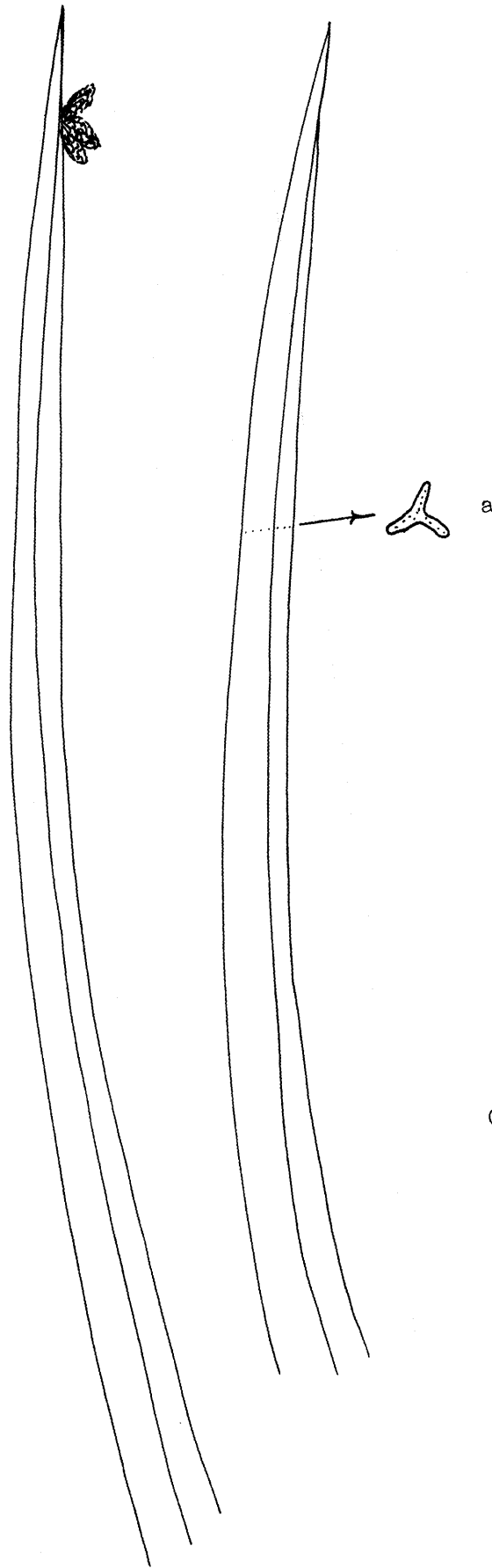
Salt marsh: absent to occasional in streamside marshes.
Brackish water marshes: low wet, muddy areas, especially along small tidal rivulets.
Freshwater marsh: present, but not as common as in brackish water marshes.
Swamps: absent.

ANNUAL PRODUCTION:

Not available.

ASSOCIATED ANIMAL SPECIES:

Muskrats use this plant to build houses as well as for food. Fiddler crabs in the substratum. Seeds of value as a wildlife food. Various species of waterfowl.



2
to
4
feet
high

OLNEY THREESQUARE
Scirpus olneyi

a. Triangular-shaped stems in cross-section.

COMMON NAME(S): *Olney Threesquare

SCIENTIFIC NAME: Scirpus olneyi

GENERAL DESCRIPTION:

A sedge with exaggerated triangular-shaped stems. Leaves not apparent. Very small cone-like flower cluster near tip of stem. Usually 3 to 4 feet high, upper end of stem shrinking and turning brown towards the end of the season. Blooms in July to early August.

DISTINGUISHING FEATURES:

Unlike the marsh grass, olney threesquare has triangular stems and no leaves. Differs from black needle-rush, which also has no leaves, in that it has triangular rather than round stems and is much lighter green.

WETLAND HABITATS:

Salt marsh: absent.

Brackish water marsh: low wet areas. Much the same habitat as saltmarsh bulrush but generally closer to the upland border.

Freshwater marsh: not as common here as above.

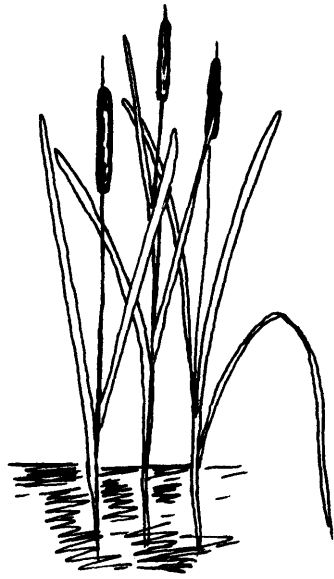
Swamps: absent.

ANNUAL PRODUCTION:

Not available.

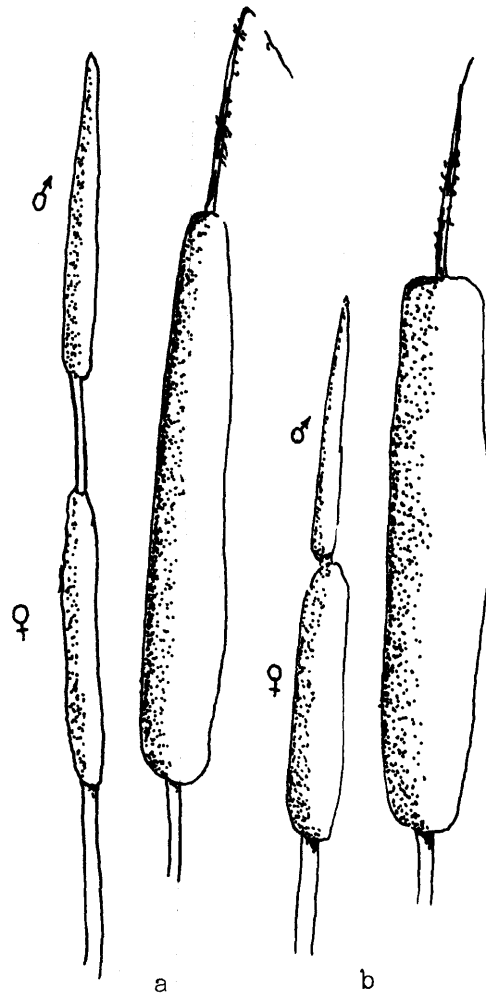
ASSOCIATED ANIMAL SPECIES:

Desired by muskrats, various species of waterfowl.



NARROW-LEAVED CATTAIL
Typha angustifolia

COMMON CATTAIL
Typha latifolia



a. Narrow-leaved cattail (Flower and fruiting head)
b. Common cattail (Flower and fruiting head)

Illustrations after Fassett, A Manual of Aquatic Plants.

COMMON NAME(S): *Cattails

SCIENTIFIC NAMES: Typha angustifolia
(Narrow-leaved cattail)
Typha latifolia
(Common cattail)

GENERAL DESCRIPTION:

Cattails are perhaps the most easily recognized grass-like plants. Leaves long, flat and narrow. Highly compacted, cylindrical, brownish seed head in the fall. Narrow-leaved cattail with leaves 1/8" to 1/4" rarely to 1/2" wide; common cattail with leaves 3/8" to 3/4" wide. Narrow-leaved cattail with male and female parts somewhat separated on stalk (see illustration). Common cattail, with male and female parts contiguous or nearly so. Hybrids occur when both species are found together.

DISTINGUISHING FEATURES:

The cylindrical "cattail" head is the most characteristic feature of the two plants. The flat, smooth, narrow and long leaves without a midrib separates cattails from grass species.

WETLAND HABITATS:

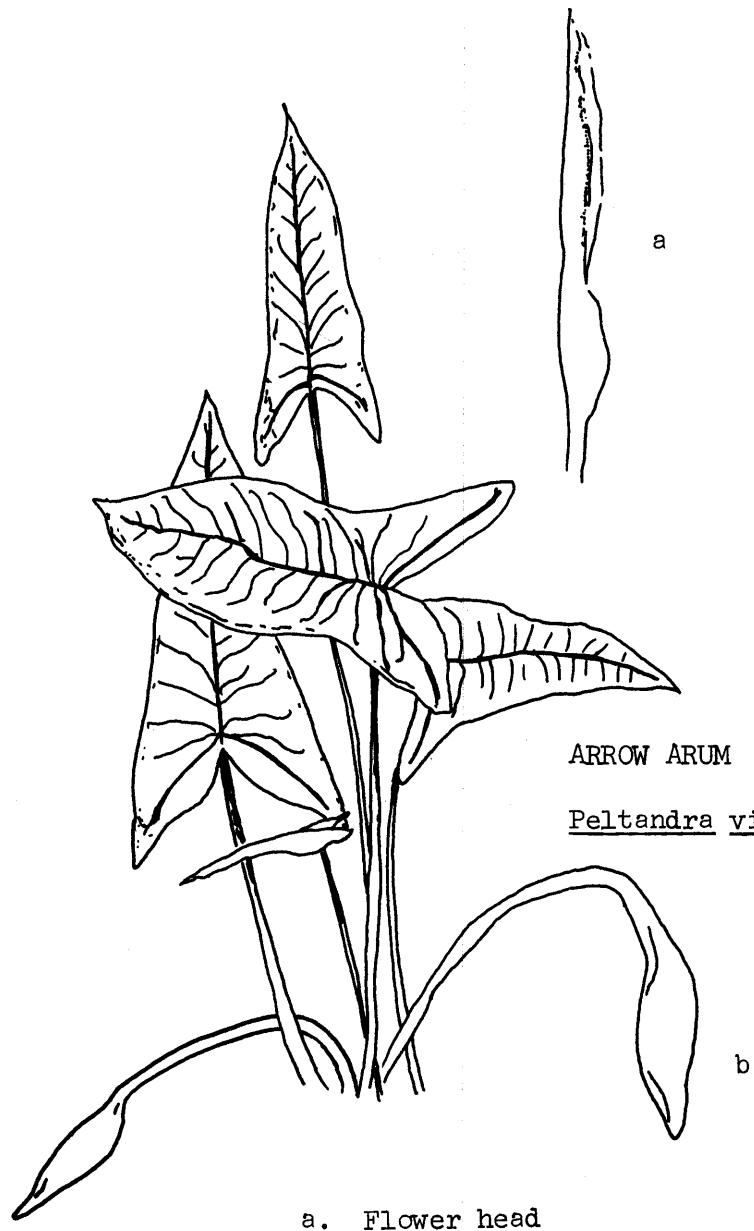
Freshwater marshes and upland margins of brackish or low saline marshes.

ANNUAL PRODUCTION:

-3-4 tons per acre annually.

ASSOCIATED ANIMAL SPECIES:

Rootstocks eaten by muskrats and geese. Provides nesting habitat for marsh birds, especially redwing blackbirds.



ARROW ARUM

Peltandra virginica

- a. Flower head
- b. Fruiting head

COMMON NAME(S): *Arrow Arum
Duck Corn

SCIENTIFIC NAME: Peltandra virginica

GENERAL DESCRIPTION:

Emergent succulent perennial growing in clumps to 4 feet high. Leaf blades broad and triangularly shaped, up to 2 feet long, 3 prominent radiating veins. Flowers inconspicuous, compacted on a spike (spadix) surrounded by a sheathing leaf-like structure (spath). Seeds green to brown, 3/8" in diameter, clear gelatinous covering grows to golf ball size in spring.

DISTINGUISHING FEATURES:

Arrow Arum may be confused with two other plants with similarly shaped leaves. Leaf distinction is made on page 70. Also differentiation in flower color is possible:

Arrow Arum - greenish, fleshy, inconspicuous.

Arrowhead - white, conspicuous.

Pickerel Weed - blue, clustered, conspicuous.

Heavily-laden seed heads arch over in fall, releasing many floating seeds.

WETLAND HABITATS:

Largely confined to freshwater marshes and swamps.

ANNUAL PRODUCTION:

1 to 2 tons per acre annually.

ASSOCIATED ANIMAL SPECIES:

Seeds and fleshy parts occasionally eaten by waterfowl, wood ducks primarily. Roots and leaves eaten by muskrats.

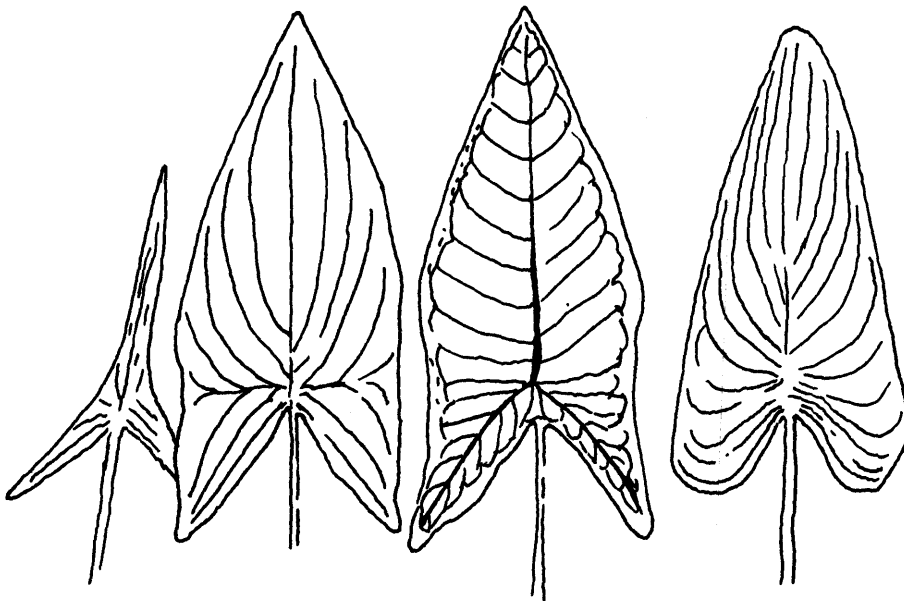


a

PICKEREL WEED

Pontederia cordata

a. Blue flower head



Arrowhead

Arrow Arum

Pickerel Weed

COMMON NAME(S): *Pickeral Weed

SCIENTIFIC NAME: Pontederia cordata

GENERAL DESCRIPTION:

Fleshy perennials with creeping rootstocks, usually forming dense colonies. Heart-shaped leaves slightly resembling Arrow Arum, except having shorter and more rounded lower lobes. Blue flowers are clustered terminally on an erect stem. Each flowering stem bears a single leaf below the flowers.

DISTINGUISHING FEATURES:

This plant can be diagnosed from other species with similarly shaped leaves by the prominent spike of blue flowers and curving veins of the leaves. (Note the venation pattern and leaf shape on the facing page).

WETLAND HABITAT:

Found almost exclusively in freshwater marshes and swamps.

ANNUAL PRODUCTION:

1/2 to 1½ tons per acre annually.

ASSOCIATED ANIMAL SPECIES:

Seeds and fleshy parts sometimes eaten by waterfowl.



ARROWHEAD

Sagittaria latifolia

a. Typical leaf variation

COMMON NAME(S): *Arrowhead
Duck Potato

SCIENTIFIC NAME: Sagittaria latifolia

GENERAL DESCRIPTION:

Relatively tall perennials (up to 4 feet) with arrow-shaped leaves and white flowers. The underground tuber is a favorite food for ducks. Seed heads resemble globular burs, brownish in color.

DISTINGUISHING FEATURES:

Can be distinguished from Arrow Arum and Pickerel Weed in that this species has white flowers and arrow shaped leaves. Arrowhead is not nearly as common as the other two species. The leaves are quite variable ranging from quite broad (12" or more) to narrow (1/2"). See illustration on page 72.

ANNUAL PRODUCTION:

Approximately 1/2 to 1 ton per acre annually.

ASSOCIATED ANIMAL SPECIES:

Very valuable waterfowl food (tubers and seeds).



WATER DOCK

Rumex verticillatus

- a. Flowering head
- b. Dry fruiting head
(rusty brown)

COMMON NAME(S): *Water Dock
Swamp Dock

SCIENTIFIC NAME: Rumex verticillatus

GENERAL DESCRIPTION:

A tall emergent plant with long narrow leaves. Elongated, greenish flower head in late spring - early summer. Aggregated, rusty brown seed (fruit) heads noticeable in mid to late summer. Dry fruits arranged in whorls on stem. Thin, tissue-like sheath associated with each leaf.

DISTINGUISHING FEATURES:

This plant most closely resembles its relative, the southern smartweed. However, Rumex is a taller, more robust plant with larger leaves which taper in both directions. Dock has greenish flowers arranged in whorls, whereas smartweed has a compact, cylindrical head of pink flowers.

WETLAND HABITATS:

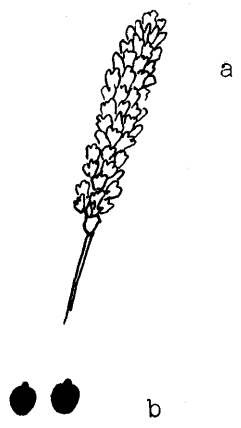
Freshwater marshes and swamps.

ANNUAL PRODUCTION:

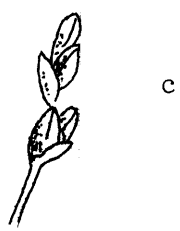
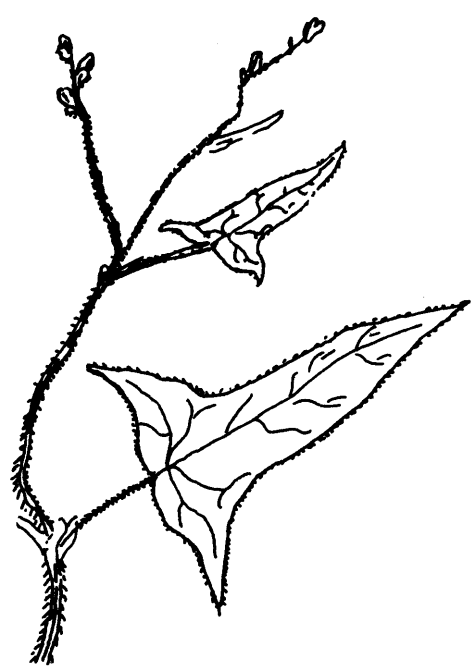
1-2 tons per acre annually.

ASSOCIATED ANIMAL SPECIES:

A good to excellent waterfowl food.



SOUTHERN SMARTWEED
Polygonum densiflorum



TEAR THUMB
Polygonum arifolium

- a. Flowering head
- b. Seeds
- c. Flowering head

COMMON NAME(S): *Smartweeds

SCIENTIFIC NAMES: Polygonum densiflorum
(Southern Smartweed)
Polygonum arifolium
(Tear Thumb)

NOTE: These are two of several species of smartweeds occurring in Virginia wetlands.

GENERAL DESCRIPTION:

Southern smartweed, an erect plant, terminal compacted spike made up of pink flowers. Tear thumb, a prickly, vine-like plant, twining with other vegetation. The flowers of Tear thumb are less conspicuous, (fewer in number) pale pink or greenish. Both species have tissue-like sheaths near the leaf nodes.

DISTINGUISHING FEATURES:

Tear thumb is the only prickly, vine-like plant in freshwater marshes except for an occasional invasion of blackberry canes. The southern smartweed is distinguishable from water dock, in that dock is a more robust plant with larger leaves, longer and more loosely arranged flower heads and rusty brown fruits.

WETLAND HABITAT:

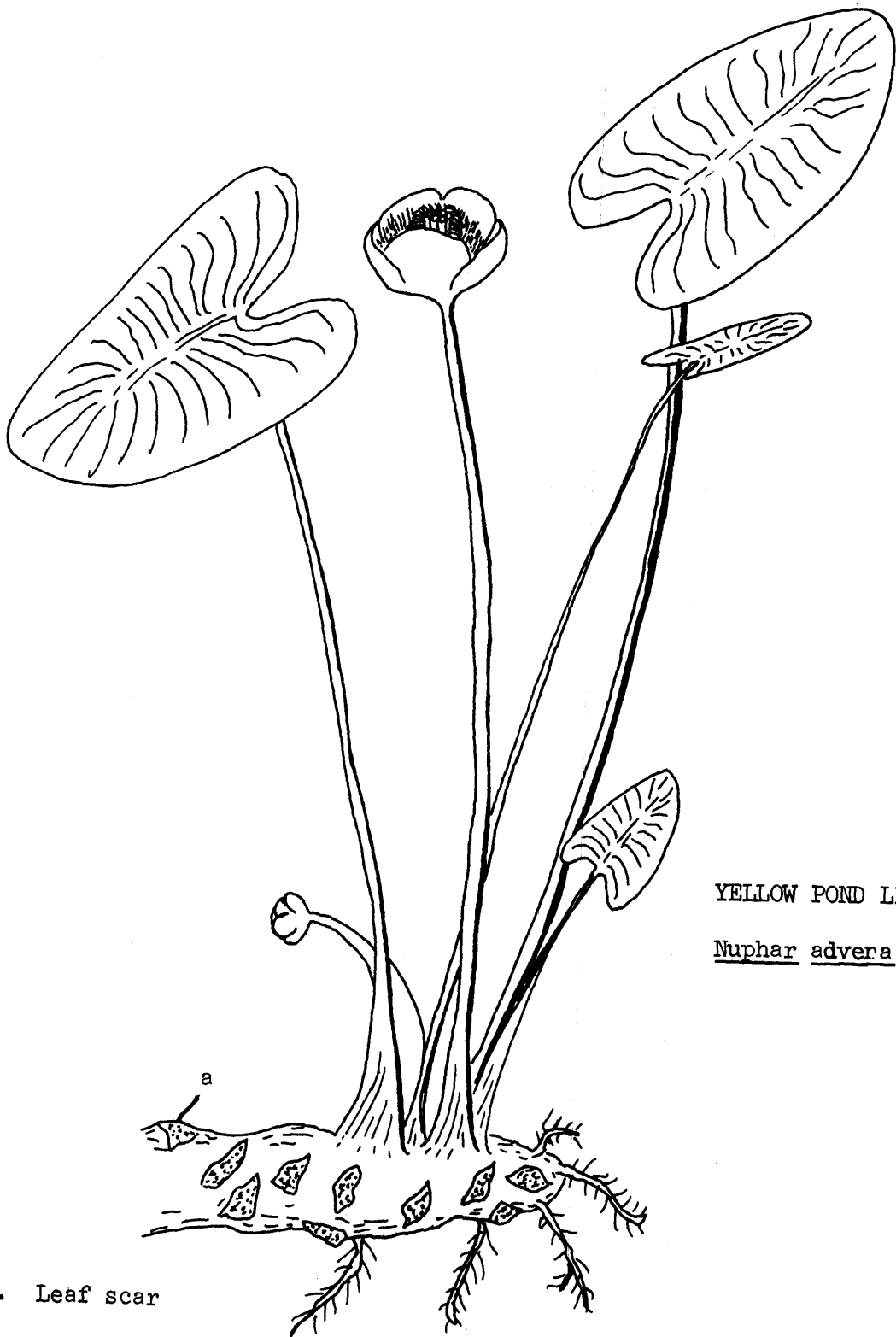
Found nearly exclusively in freshwater marshes and swamps.

ANNUAL PRODUCTION:

1-2 tons per acre annually.

ASSOCIATED ANIMAL SPECIES:

Seeds are a valuable waterfowl food.



YELLOW POND LILY

Nuphar advena

a. Leaf scar

COMMON NAME(S): *Yellow Pond Lily
Spatter-dock

SCIENTIFIC NAME: Nuphar advena

GENERAL DESCRIPTION:

An immersed fleshy perennial with floating heart-shaped to round leaves. Flowers large, somewhat globular, solitary, yellow with a greenish center. Rootstocks are thick, yellowish in color, and generally contain numerous leaf scars.

DISTINGUISHING FEATURES:

Cannot be confused with the foregoing species in that the leaves are oriented horizontally (floating) and the flower is large (2"), yellow and solitary.

WETLAND HABITATS:

Confined to freshwater marshes and swamps.

ANNUAL PRODUCTION:

1/2 to 3/4 tons per acre annually.

ASSOCIATED ANIMAL SPECIES:

Minor waterfowl food.

APPENDIX 3

HIGH PRECISION DETERMINATION OF WETLANDS BOUNDARIES AT A SPECIFIC LOCATION

(CAUTION: It is recommended that technical assistance be sought for conducting this procedure and that the publication Tidal Datum Planes and Tidal Boundaries and Their Use as Legal Boundaries, VIMS Special Report No. 22 by Boon and Lynch, 1971, be consulted)

PROCEDURE

1. Set a tide gauge in the water near the site of the boundary in question.
2. For a period of at least one month, record daily high and low water levels.
3. For the same period, collect tide data from the nearest (by water) Tide Recording Station for which tidal data are available for at least 19 years (see list of stations below).
4. The mean low water level (MLW - the average of all low water levels during the collecting period) and the mean high water level (MHW - the average of all high water levels) must be determined for both the site in question and for the established Tide Recording Station.
5. The variation of the monthly mean from the 19 year mean at the Tide Recording Station must then be added algebraically to the mean values for the data at the site. This is a correction factor.
6. The corrected MLW mark on the tide gauge at the site is then surveyed and a reference mark (elevation) is established on land.
7. The difference between the elevation of the corrected MHW and MLW levels represents the tide range. The tide range is multiplied by 1.5 and the resulting value becomes the upper limit of the wetlands when measured above the corrected MLW mark.
8. Surveys can then proceed accordingly.

For information pertaining to tide gauge stations in specific localities, it is recommended that contact be made with:

National Oceanic and Atmospheric Administration
Rockville, Maryland

APPENDIX 4

SUGGESTED CRITERIA FOR DREDGE SPOIL DISPOSAL AREAS

A. When dredging is accomplished by bucket or dragline, and the spoil is to be disposed of in or near wetlands, suggested criteria are:

1. Build an earth-tight bulkhead along the perimeter of the disposal area sufficient to confine the dredge spoil and prevent its leaking or running back into the water. The bulkhead or dike (berm) should have a top elevation at least 3 feet above the average upper limit of spring tides and at least 1 foot above the projected water surface in the enclosed area.

2. Earth dikes (berms) should be compacted as they are placed, have side slopes no steeper than 1 vertical to 3 horizontal, the top width to be at least 3 feet, and the toe of the slope to be at least 15 feet from existing marsh grasses.

3. Spillway boxes or release pipes should be provided to prevent water from eroding or over-topping the dike. Fill should be so placed that rain water will flow down to the spillway or release pipe.

4. Discharge or water runoff from spoil disposal sites should be free of organic waste products or other objectionable material which could float into the water or which, upon decomposition, would degrade water quality.

5. As soon as possible after completion of the project, the disposal area should be graded and vegetative cover provided.

B. When dredging is accomplished by hydraulic pipeline methods, suggested additional criteria for disposal areas are:

1. Earth dikes, if used, should be constructed by dragline or land fill methods to the specifications previously described. Placing of material for a dike by hydraulic methods should not be permitted.

2. The volume of the disposal area lying below the elevation of the spillway crest should, at all times during the dredging, be sufficient to provide a detention time long enough to clarify the discharge water to meet water quality standards. For very coarse soils the volume of the detention area should be about twice the volume of dredged material. For very fine soils the volume of the detention area should be at least three times the volume of dredged material.

3. The spillway should be placed as far as possible from the discharge end of dredging pipes.

4. The pumping rate should be regulated to allow no greater than a $1\frac{1}{2}$ inch crest of water flow over the spillway. A broad, level spillway will facilitate this.

5. The dredge pipeline should have tight joints to prevent leaks. It should normally be floated on the water surface to permit continual surveillance for sediment release. Air release valves should not allow sediment release.

6. Grading and vegetative cover should be accomplished as soon as possible. (It is recognized that hydraulically filled areas may take many months to dry sufficiently for people or equipment to move across. Seeding may have to be delayed for periods possibly as long as a year. The spillway should therefore be maintained until the area is permanently seeded and vegetation is well established and providing adequate ground cover to retain the soil).

APPENDIX 5

SOME CONSIDERATIONS PERTAINING TO MARINAS

Access to coastal waters is essential for both commerce and recreation. Marinas are a common form of access for those persons who do not have their own waterfront facilities. While marinas may be considered desirable from this viewpoint, they can also have undesirable impacts on the marine environment. The establishment of a new marina or the enlargement of an existing marina means more boats and people with the accompanying problems of handling sewage and other vessel wastes, controlling fuels and oils, trash, and wastes from boat maintenance activities. Applicants for these types of facilities should indicate how they will control and handle wastes and refuse from their proposed facility.

It is most important to consider the possibility of closing nearby oyster beds and the consequences arising therefrom. Restriction or elimination of direct harvesting of shellfish from waters adjacent to marinas can result in losses to both commercial and recreational fishing interests.

The Bureau of Shellfish Sanitation of the Department of Health use factors that may close oyster grounds for a distance of $\frac{1}{2}$ mile in all directions from a marina. Generally, these are:

<u>Number of Boats</u>	<u>Condemned Area (All Directions)</u>
1 - 50	1/8 mile
51 - 100	1/4 mile
100+	1/2 mile

These condemnations become effective April 1 each year and extend through October 31 (closed during this period).

The Bureau of Shellfish Sanitation also enforces the Virginia Code which requires certain shoreside restroom and shower facilities. These are:

<u>No. Slips or Moorings</u>	<u>Water Closet</u>		<u>Urinals</u>	<u>Lavatories</u>		<u>Showers</u>	
	<u>Men</u>	<u>Women</u>	<u>Men</u>	<u>Men</u>	<u>Women</u>	<u>Men</u>	<u>Women</u>
1 - 20	1	1	1	1	1	1	1
21 - 40	1	2	1	2	2	2	2
41 - 60	2	3	2	2	2	2	3
61 - 80	3	4	2	3	3	3	3
81 - 100	3	5	3	3	3	3	3

Additional facilities are required where restaurants, motels, laundries, etc. are provided. Buildings housing these facilities shall be conveniently located, but in no case should the facilities be more than 200 feet walking distance from the

shore end of any dock they are intended to serve. Also, where there are more than 100 slips, there shall be provided one additional water closet, lavatory and shower for each sex for each additional 40 slips or fraction thereof and one additional men's urinal for each 100 additional slips or fraction thereof.

The Virginia Code also requires pump-out facilities for boat holding tanks, but no specific number has been established. The Virginia Water Control Board can provide advice in specific instances. The Water Control Board can also give advice regarding the necessity of having hose connections from boats to shore-side sewage facilities in the case of those persons, who live aboard boats or who stay aboard for extended periods of time.

Some other considerations are:

Trash Receptacles

Trash receptacles should be plentiful and conveniently located. As a very minimum, there should be one at each access point to slips. It is wise to have a separate, closed metal container for the disposition of those wastes associated with boat maintenance such as paints, varnishes, thinners solvents, old brushes, paint rags, oil cans and oily wastes.

Boat Maintenance Areas

Maintenance of boats generates noxious wastes which can imperil fish life. It can result in the permanent imbedment in the bottom of poisonous heavy metals such as lead, zinc, copper or arsenic. Maintenance at individual slips can be restricted to that which can be done without materials falling overboard. Outside hull painting, for example, might be restricted to one area which can be protected by floating booms. Haul-out facilities, if any, could be designed so that all bottom scraping and painting is accomplished over dry land where residues can be collected and disposed of safely. If floating dry-docks are involved, they may be restricted to a single area surrounded by floating booms.

Protection from Storm Damage and Emergency Plans

While a basic purpose of a marina is the provision of a safe harbor, storms often do considerable damage in them. The design of the marina should be such that large waves cannot be generated in or enter the marina. Docks, wharves and mooring sites and other facilities should be designed and constructed to withstand flooding and strong winds. A vessel which breaks free from its mooring during a storm can cause havoc in a marina. Minimum standards should be set and action plans established for emergencies.

APPENDIX 6

CONTENTS OF A WETLANDS APPLICATION

<u>Content</u>	<u>Wetlands Act Requirement</u>	<u>VIMS Recommended Amplification</u>
Identification	Name and address of applicant.	Telephone numbers, home and business.
Location	Map showing wetlands affected and location of work thereon.	A general vicinity map showing the location of the project, state roads leading to the vicinity and county or local roads leading to the project. Where a project is difficult to locate on the ground, an additional enlarged sketch of the immediate vicinity, with directions, is helpful.
Detail	Map drawn to appropriate and uniform <u>scale</u> , showing the <u>area of wetland</u> affected, with the <u>location</u> of the work thereon, indicating the area of existing and proposed <u>fill</u> and <u>excavation</u> , especially the <u>location</u> , width, depth, and length of any proposed <u>channel</u> and the <u>disposal area</u> , all existing and proposed <u>structures</u> ; <u>sewage collection</u> and <u>treatment facilities</u> , <u>utility installations</u> , <u>roadways</u> , and other related appurtenances or facilities, <u>including those on adjacent uplands</u> , and the <u>type of equipment</u> to be used and the <u>means of equipment access</u> to the activity site; the names and addresses of owners of record of adjacent land and known claimants of water rights in or adjacent to the wetland of whom the applicant has notice; an estimate of cost; the <u>primary purpose</u> of the project; any <u>secondary purposes</u> of the project, <u>including further projects</u> ; the <u>public</u>	For new channels: Slope of bank. Depth of existing channel to which new channel is to be connected. Whether channel is dead-end or will have water flowing through. Bank erosion control measures. For spoil disposal: Height of berm. Width of berm at top and at bottom. Spillway detail or other de-watering technique. Distance of toe of berm from existing marsh. Erosion control during operation and revegetating detail. For bulkheads, groins, jetties, etc.: Precise dimensions - height, length, width, depth to be sunk, distances apart.

APPENDIX 6 (continued)

Wetlands Act Requirement

benefit to be derived from the proposed project; a complete description of measures to be taken during and after the alteration to reduce detrimental off-site effects; the completion date of the proposed work, project or structure and such additional materials and documentation as the Wetlands Board may deem necessary.

VIMS Recommended Amplification

Construction materials and details - deadmen, end-wall construction.

For upland development:

Drainage system and pollutant controls.

Density of use-- number of houses, apartments, people involved in commercial operations, number of boats in marina.

For everything:

Land elevations and water depths.

APPENDIX 7

GUIDELINES FOR FIELD INVESTIGATIONS

I. WETLANDS

Are wetlands, by legal definition, actually involved?

To what extent (acreage)?

What type:

Fringing marsh or marsh in depth?

High or low?

Vegetative growth:

Uniformly covered or just widely scattered small clumps?

Predominantly grasses or saltbushes?

Evidences of aquatic, wildfowl or animal life (may differ in accordance with seasons)?

Evidence of shoreline erosion in general vicinity (is marsh possibly serving as erosion deterrent)?

Amount of marsh in general vicinity (is this the only marsh or is there much marsh acreage in the area)?

II. THE SITE

Does the application accurately reflect physical conditions on the site (MLW, dimensions, elevations, existing structures)? If not, adjust accordingly.

Are there nearby areas or activities which might be affected by, or might affect, the applicant's proposed activity?

Are there hidden purposes for the activity which will actually broaden the scope of the project (is a private boat channel for one boat or for many boats and docks in conjunction with a housing development)?

III. THE IMPACT

How much marsh will be directly destroyed?

To what extent, if any, will additional marsh be damaged or destroyed (indirect effects)?

Unnecessarily placing dredge spoil on marsh?

Uncontrolled sedimentation?

Changes in water regime (volume and rate of flow, salinity, drainage of marsh)?

What else may be adversely affected?

Erosion of nearby land?

Sedimentation of water?

Sedimentation of oyster grounds?

Sewage or other pollutants?

APPENDIX 7 (continued)

IV. MINIMIZING IMPACT

Can open-pile structures be substituted for channel dredging, proposed solid structures, or fill?

Can dredge spoil be disposed of elsewhere?

Can landfill be obtained elsewhere?

Can dragline dredging be substituted for hydraulic dredging?

Can dredging be scheduled for months of November through mid-March?

What sediment controls can be effected?

Dredge in the dry?

Sediment curtains?

Berm construction and dewatering controls?

Can marsh vegetation substitute for bulkheads or groins?

What pollutant controls are necessary?

Sewage, debris, and noxious chemical controls in marinas?

Septic tank locations and concentrations in light of soil type and drainage patterns?

Debris and litter controls in storm drains?

Can community dock systems substitute for individual backyard docks?

Reduce dredging?

Save marsh areas?

APPENDIX 8

PRIMARY STATE AND FEDERAL AGENCIES INVOLVED WITH WETLANDS PERMITS

AGENCY, ADDRESS AND PHONE	KEY PERSONNEL (*DENOTES NORMAL CONTACT)	AGENCY FUNCTION IN WETLANDS
<p>VIRGINIA MARINE RESOURCES COMMISSION P. O. Box 756 2401 West Avenue Newport News, Va. 23607 Ph: 244-3572</p>	<p>James E. Douglas, Jr., Commissioner *S. M. Rogers, Environmental Officer *See Appendix 9 for listing of VMRC Districts and Inspectors</p>	<p>1) Permitting agency where local wetlands boards do not exist. 2) Reviews actions of local wetlands boards. 3) Enforces Wetlands Act. 4) Permitting agency for subaqueous applications. 5) Controls public shellfish beds, fishing and bathing grounds.</p>
<p>NB: Must receive copy of all applications when filed and notice of public hearing.</p>		
<p>VIRGINIA INSTITUTE OF MARINE SCIENCE Gloucester Point, Va. 23062 Ph: 642-2111</p>	<p>Dr. William J. Hargis, Jr. Director Dr. Kenneth L. Marcellus Head, Wetlands Section *George M. Dawes Wetlands Board Liaison and Permit Inspector</p>	<p>1) General wetlands research and advice. 2) Wetlands education. 3) Specific environmental advice to VMRC and local boards.</p>
<p>NB: Must receive copy of all applications when filed and notice of public hearing.</p>		

APPENDIX 8 (continued)

AGENCY, ADDRESS AND PHONE	KEY PERSONNEL (*DENOTES NORMAL CONTACT)	AGENCY FUNCTION IN WETLANDS
STATE WATER CONTROL BOARD P. O. Box 11143 4010 West Broad St. Richmond, Va. 23230 Ph: 770-5401	Eugene T. Jensen Executive Secretary *Les Balderson Environmental Officer	1) Water quality control and advice. 2) Must certify dredging and filling plans to permitting agency.
NB: Must receive notice of public hearing; should receive copy of application if dredging or filling in- volved.		
8 BUREAU OF SHELLFISH SANITATION DEPARTMENT OF HEALTH James Madison Bldg. 109 Governor St. Richmond, Va. 23219 Ph: 770-6277	Cloyde W. Wiley Director	1) Must comment on proposed marina installations and sewage discharges for impact on shellfish.
NB: Should receive copy of application and notice of public hearing in cases involving marinas or dredging.		

APPENDIX 8 (continued)

AGENCY, ADDRESS AND PHONE	KEY PERSONNEL (*DENOTES NORMAL CONTACT)	AGENCY FUNCTION IN WETLANDS
DIVISION OF STATE PLANNING AND COMMUNITY AFFAIRS 1010 James Madison Bldg. 109 Governor St. Richmond, Va. 23219 Ph: 770-3785	Robert H. Kirby Director	1) Compatibility of proposals with general plans.
NB: Must receive notice of public hearing.		
DEPARTMENT OF HIGHWAYS 1221 E. Broad St. Richmond, Va. 23219 Ph: 770-2701	Douglas B. Fugate Director	1) Compatibility of proposals with highway plans.
NB: Must receive notice of public hearing.		
NAVIGATION PERMIT SECTION U. S. ARMY CORPS OF ENGINEERS 803 Front St. Norfolk, Va. 23510 Ph: 625-8201	Mark Harrell	1) Requires permits for all activity lower than mean high water line. 2) Coordinates applications and permits with other Federal Agencies (Environmental Protection Agency, Department of Interior, etc.).

APPENDIX 8 (continued)

AGENCY, ADDRESS AND PHONE	KEY PERSONNEL (*DENOTES NORMAL CONTACT)	AGENCY FUNCTION IN WETLANDS
COMMISSION OF GAME AND INLAND FISHERIES P. O. Box 11104 4010 W. Broad St. Richmond, Va. 23230 Ph: 770-4974	Chester F. Phelps Executive Director	1) Preservation and enhance- ment of game and fresh- water fish habitat. 2) Interest in public boating and maintains public boat ramps.
NB: Must receive notice of public hearing.		
DIVISION OF LOCAL HEALTH SERVICES DEPARTMENT OF HEALTH James Madison Bldg. 109 Governor St. Richmond, Va. 23219 Ph: 770-3575	Dr. Samuel A. Graham, Jr. Director *Local Field Offices	1) Septic tanks. 2) Correction of pollution sources discovered by Bureau of Shellfish Sani- tation. 3) Installation and operation of sanitary facilities at marinas. 4) Testing and recommending local recreation waters.

APPENDIX 9

MARINE RESOURCES COMMISSION DISTRICTS
(1973)

DISTRICTS

INSPECTORS

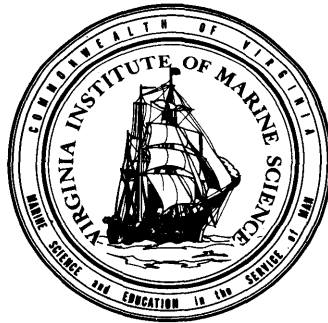
1 and 2	Counties of Fairfax, King George, Northumberland, Prince William, Stafford, Westmoreland	Donald Z. O Bier Route 1, Box 113 Montross, Va. 22520 Ph: 224-4723
4 and 5	Counties of Lancaster, Northumberland	Leo Henry Sampson Route 2 Heathsville, Va. 22473 Ph: 482-3546
6	Counties of Lancaster, Richmond	William H. Towles Rt. 2 - Box 368 Lancaster, Va. 22503 Ph: 462-2943
8	County of Gloucester	James M. Lyell Rt. 2 - Box 53 Hayes, Va. 23072 Ph: 642-2310
9	Counties of Gloucester, King and Queen, King William	Lynwood F. Hogge Wicomico, Va. 23184 Ph: 642-2767
10	County of Mathews	George F. Diggs Port Haywood, Va. 23138 Ph: 725-2206
11	Counties of Mathews, Middlesex	Guy L. Armistead Hudgins, Va. 23076 Ph: 725-3325
12 and 14	Counties of Essex, Middlesex	Calvin Odel Ingram Hardyville, Va. 23070 Ph: 776-4214
15 and 16	Counties of James City, New Kent, York	E. Glenn Phillips 149 Bennett Rd. Poquoson, Va. 23362 Ph: 868-9893

APPENDIX 9 (continued)

DISTRICTS

INSPECTORS

17	City of Hampton	John R. Hanson P.O. Box 653 Hampton, Va. 23369 Ph: 868-6006
18	County of James City, City of Newport News	Willie M. Hogge 138 Normandy Lane Newport News, Va. 23606 Ph: 596-1237
19	Counties of Isle of Wight, Surry	Duncan R. Minga Rescue, Va. 23424 Ph: 357-2015
20	County of Nansemond	Marvin G. Hamilton Crittenden, Va. 23342 Ph: 238-2802
21 and 22	Cities of Chesapeake, Norfolk, Portsmouth, Virginia Beach	W. E. Abbott 1212 Winston St. Norfolk, Va. 23518 Ph: 588-8165
24	Counties of Accomack, Northampton	Orris J. Stewart Exmore, Va. 23350 Ph: 442-6962
25	County of Northampton	Edgar D. Miles Box 51 - Willis Wharf, Va. Ph: 442-6728
26	County of Accomack	Donald M. Corbin Sanford, Va. 23426 Ph: 824-3087
28	County of Accomack	Lewis E. Budd Eastside Chincoteague, Va. 23336 Ph: 336-5327
29	County of Accomack	Joseph R. Boulter Wachapreague, Va. 23480 Ph: 787-2359



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