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A GUIDE TO BOATING-RELATED ACTIVITIES IN THE CRITICAL AREA

THE CHESAPEAKE BAY CRITICAL AREA COMMISSION

A GUIDE TO BOATING-RELATED ACTIVITIES IN THE CRITICAL AREA

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Annapolis, Maryland

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Contents

Introduction

The Chesapeake Bay is this nation's most productive estuary and Maryland's grandest natural resource. Marylanders have, however, witnessed a dramatic historical reduction in the health of the Bay's ecosystem. Water quality and wildlife habitat have suffered severe degradation as a result of the cumulative impact of intensified development within the Chesapeake Bay watershed. In 1984, in response to this decline, the State of Maryland enacted the Chesapeake Bay Critical Area Protection Program (Natural Resources Article § 8-1801 - 1816). This law defines the Critical Area as all waters and submerged lands of the Chesapeake Bay to the head of tide and all lands and waters within 1,000 feet of the mean high water line or from the edge of tidal wetlands. Within this 1000' area, the 100' nearest the mean high water line is reserved as a nearly development-free Buffer. The State outlined specific regulatory criteria (COMAR 27.01.01-.11) for protecting water quality as well as plant, fish and wildlife habitat from the adverse environmental effects of land development activities within the designated Critical Area. The criteria, developed by the State's Chesapeake Bay Critical Area Commission (CBCAC), are implemented by local governments in cooperation with the State through zoning and other local ordinances.

Critical Area legislation provides a variety of land planning measures, including the important and necessary regulation of water-dependent facilities. Critical Area criteria define water-dependent facilities as those structures or works associated with industrial, maritime, recreational, educational, or fisheries activities that require locations at or near the shoreline within the 100' Buffer. An activity is water-dependent only if it cannot exist outside the Buffer and is dependent on the water by reason of the intrinsic nature of its operation. Local jurisdictions are given substantial autonomy in developing their own Critical Area programs; thus, the Critical Area criteria do not provide a comprehensive list of those structures or uses which qualify as water-dependent. Individual local jurisdictions may develop such a list or may determine which uses qualify on a case-by-case basis. However, to preserve the primary objective of the criteria i.e., ensuring the least possible disturbance to the Chesapeake Bay shoreline, planned uses intrinsically must require a water-adjacent location to be allowed at the water's edge. For example, a boat launching structure is clearly water-dependent while a tackle shop is not and must be located outside the mandatory 100' naturally vegetated Buffer.

Boating-related facilities are the type of water-related development local planners are asked most frequently to approve. This document primarily addresses boating-related projects in the Critical Area. It is important to note, that a boating-related project is not automatically a water-dependent activity. Wet storage facilities, boat ramps and piers are examples of boating-related activities which are considered water-dependent. Dry-stack boat storage or "Boatels" are boating-related, but they are not water-dependent as they do not require a location directly on the water.

As a public education tool to aid the transfer of information and technology, this guidance paper is intended to help project applicants and local government planners foster environmentally sensitive boating-related waterfront development within a fair and reasonable permit regime. Permit applications are generally reviewed by several agencies and applicants are often required to conduct technical impact studies by each of several State and federal agencies in addition to those required by the Critical Area criteria (see Appendix B for a list of relevant agencies). Specifics of these studies will be discussed in lay terms, with reference to various study techniques and data sources.

The water-dependent facilities category encompasses a wide range of projects, in both size and function. A sampling of this range includes:

* Utilities such as power plants and water treatment plants;
* Water intake and/or outfall structures for industrial facilities;
* Major ocean shipping ports;
* Off-loading docks for commercial fishing;
* Structures for crab shedding; and,
* Recreational marinas and boat launching points.

The substantial diversity of water-dependent facilities makes it problematic to impose a single, fixed set of site location and impact study requirements for all proposed projects. A more flexible consideration of the compliance checks to which plans for a large power plant and those for a small pier are subjected might be warranted.

The Critical Area legislation was designed to accommodate reasonable growth while minimizing adverse environmental impacts to the Chesapeake Bay. Persons active in closest proximity to the water -- boaters, fishermen, marina and water-front property owners -- would appear to have an automatic "vested interest" in cultivating a healthy balance between

development and conservation. The restoration of the Chesapeake Bay ecosystem to a level comparable to its historical productivity is the ultimate measure of success. To respond to this challenging imperative the Critical Area Law implements a comprehensive framework of land-use regulations which:

* limit development activities in the Buffer to those that are water-dependent (COMAR 27.01.09), and;
* provide design and locational criteria which ensure that these activities will have minimal individual or cumulative impacts on water quality and fish, wildlife, and plant habitat (COMAR 27.01.03.02).

The Critical Area criteria provide broad locational guidelines for water-dependent facilities within three land-use designations. Briefly, the criteria encourage their placement in Intensely Developed Areas (IDAs); allow many non-industrial water-dependent uses in the Limited Development Areas (LDAs); and greatly restrict such uses in Resource Conservation Areas (RCAs). Appendix C lists locational requirements for water-dependent facilities in relation to these Critical Area designations. The outline provides only a starting point for the site-planning process. The unique features of each location, and the type and scale of a proposed use in relation to that location, are the crucial considerations that will ultimately determine whether a project should receive Critical Area approval. Local jurisdictions have the option of designating certain stretches of shoreline for commercial water-dependent development, thus limiting such projects to areas with suitable physical features and access to shore-based infrastructure.

New or expanded water-dependent facilities usually may be located in the Buffer in Intensely Developed Areas and Limited Development Areas provided that it can be shown that:

* they are water-dependent;
* the project meets a recognized private right or public need;
* adverse effects on water quality and fish, plant and wildlife habitat are minimized;
* insofar as possible, nonwater-dependent structures or operations associated with water-dependent projects or activities are located outside the Buffer; and
* the facilities are consistent with an approved local water-dependent facilities plan as specified in COMAR 27.01.03.04.

New development or expansions proposed in the IDA must also achieve a 10% reduction in post-development pollutant loading. If the 10% reduction cannot be met through the use of

retrofitting and stormwater management practices, mandatory offsets are required. These offsets may be implemented on- or off-site provided: that water quality benefits are equivalent; that their benefits are obtained in the same watershed; and that the benefits can be determined through the use of modelling, monitoring or other computation or mitigation measures (COMAR 27.01.02.03).

Water-dependent development or expansion in the LDA and RCA shall limit the impervious areas to 15% of the upland area of the site (COMAR 27.01.02. 03/04). Projects sited in the LDA or RCA which propose the addition of new impervious areas must "eliminate all stormwater runoff caused by the development in excess of that which would have come from the site if it were in its pre-development state" (COMAR 27.01.02.04). Water-dependent development within the RCA is further constrained as marinas and other commercial boat docking facilities proposing expansion in the RCA must demonstrate a net improvement in water quality for project approval (COMAR 27.01.03.06). New marinas and commercial boat docking facilities normally are not permitted in the RCA. However, it is conceivable that some degree of commercial water-dependent development could occur in these areas through the use of Growth Allocation. Requirements for the development of non-commercial water-dependent facilities (community piers etc.) within the RCA are discussed later in this document.

All proposed projects are subjected to an approval process which uses a checklist of necessary siting considerations (see example provided as Appendix A). However, as a rule, applicants who propose small-scale projects which meet basic requirements of suitable location and sound design should not need to submit extensive site-assessment study data. In contrast, those seeking to build large, complex projects can expect to be required to provide site-assessment study data of a much greater scope and intensity.

It is the desire and hope of the author that this guideline to boating-related facilities will achieve two goals: establish a template for streamlining approvals for small facilities while providing clear rationale for those measures required for boating-related development within the Critical Area.

Chapter I.

BOATING ON THE BAY: A DELICATE BALANCE

Boating is by far the most popular recreational use of the Chesapeake Bay. Maryland had approximately 200,000 vessels registered as of 1993, not including the many transient craft from out of state also cruising the Bay. Boating-related projects are likely the type of water-dependent facilities local planners will be asked most frequently to approve. Therefore, this paper is primarily concerned with evaluating site and design features for marinas and boat docks. Retrofitting techniques for existing facilities as well as guidelines and Best Management Practices (BMPs) for environmentally sensitive boat and marina operation are discussed.

Boating facilities and practices present a number of potential threats to the aquatic environment. These dangers are especially important to address in regard to the Chesapeake because the Bay's physical configuration -- a largely enclosed, relatively shallow body of water -- renders it particularly vulnerable to disturbance. Boating-related impacts are minimal when compared to the point and non-point source pollution generated as upland runoff from the Bay's densely developed watershed. However, many adverse environmental impacts can arise from improper boat operation and maintenance, and these impacts can and should be minimized. Fortunately, economically viable design and operating measures, coupled with environmental awareness, can lessen boating-related impacts.

This document provides a non-technical overview of particular ways in which the Bay ecosystem is deceptively fragile. Special attention to these characteristics is needed to ensure shoreline facilities are carefully planned and water-based activities are conducted in an environmentally conscientious way. These safeguards are a major step toward making widespread enjoyment of boating on the Chesapeake fully compatible with protecting the Bay's long-term health and natural bounty.

A) Marina Location and Habitat Considerations

An abundant and diverse stock of "living resources" is the baseline measure of a vital Chesapeake. Boat docks, even at their cleanest, create an intense human presence that disturbs

and displaces many forms of fish and wildlife (see review by Chmura and Ross, 1978). Critical Area planning strives to conserve native species at high levels of productivity; to ensure the survival of threatened life forms, to maintain outstanding representative natural areas in an undisturbed state, and to preserve the many values and functions of its tidal and nontidal wetlands. These measures are achieved through the establishment of the mandatory Buffer, the designation of Resource Conservation Areas, and particular restrictions on development at, or near, specific types of valuable habitat. All water-dependent growth is to be located where it poses a minimum threat to identified habitat areas.

Persons who apply to construct water-dependent projects must address the following habitat considerations:

Wetlands (tidal and nontidal) Any construction extending into tidal water is considered to impact tidal wetlands and requires authorizations, licenses or permits from federal (U.S. Army Corps of Engineers) and State (Maryland Board of Public Works and the Tidal Wetlands Division of the Maryland Department of Natural Resources) agencies. Through a process of interagency review and comment, with provision under State law for a public hearing in some circumstances, a range of relevant site features are examined to help determine the viability and appropriateness of a proposed project. These factors include the site's erosion potential, biological inventory, and water quality impacts (including sanitation provisions for the completed facility).

Areas of extensive wetlands are identified using official State regulatory wetland maps and site inspections. Under Maryland law, waterfront landowners have no automatic right to dredge or otherwise alter tidal wetlands to obtain open water access. In fact, tidal wetlands are under a very strict standard of protection. Plans for water-adjacent construction stand a much better chance of gaining approval if the proposed site is fast land.

All nontidal wetlands and other hydric areas determined to contain unique habitat or hydrologic value, are also protected. Proposed projects that will impact nontidal wetlands must submit a permit application to the Permit Service Center of the Water Resources Administration, Maryland Department of Natural Resources (DNR), with approval (required at federal, State, and local levels) contingent on impact avoidance and minimization.

Submerged Aquatic Vegetation (SAV) SAV is an indicator of good water quality in the Bay. SAV populations have begun to rebound after declining in recent decades to an all-time

low. Critical Area criteria mandate minimum SAV disturbance as a condition for locating water-dependent facilities. The Maryland Department of Natural Resources, in conjunction with the Virginia Institute of Marine Science (VIMS), performs an annual SAV survey, which can serve as a preliminary record of SAV sites. However, observers also report SAV in locations not shown on the State survey, therefore a growing season field survey for SAV at places being considered for water-dependent development is necessary. Boat operation, as well as dock location, can have a significant effect on the growth and productivity of SAV. Care should be taken so that water-dependent facilities are sited in areas where shallow water (SAV habitat) boat navigation is unnecessary. State Tidal Wetland Regulations (COMAR 05.08.05.05) generally prohibit dredging in shallow water habitat (less than 3 ft.) effectively protecting existing and potential SAV habitat. State Tidal Wetlands Regulations (COMAR 05.08.05.05) also specifically prohibit dredging within 500 yards of SAV beds from April 15 - October 15. Proposals for new or expanded construction which impacts existing SAV beds are considered unacceptable and, in most cases, are not permissible.

Rare, Threatened and Endangered Species The U.S. Fish and Wildlife Service (USFWS) and the Fish, Heritage, and Wildlife Administration of the Maryland DNR maintain lists of federal and State endangered and threatened species, as well as designated Natural Heritage Areas. All proposed development sites must be assessed by the above agencies to determine the presence of protected species or habitat protection areas. It must be determined that these resources will not be disturbed and an approved protection plan must be implemented prior to project approval.

The Critical Area criteria specifically state that water-dependent facilities should be located to prevent disturbance to sites of significance to waterfowl. Colonial waterbird nesting areas and historic waterfowl staging and concentration areas are extremely important and highly sensitive habitats. Regional waterfowl populations converge in certain areas to breed and feed during specific times of year. Thus, these sites are vital to the continued existence of many waterbird species. In particular, increased boating activities associated with new or expanded boating-related facilities can deter waterfowl from utilizing historic staging and concentration areas. New or expanded boating-related facilities should be located to avoid and minimize adverse environmental impacts to these highly sensitive areas. A general indication of waterfowl

areas can be obtained from Habitat Protection Overlays, however, the Wildlife Division of the Fish, Heritage and Wildlife Administration of the Maryland DNR must be consulted to make site-specific determinations of the potential effects of proposed activities on waterfowl populations.

Fish and Shellfish DNR data identify anadromous fish spawning waters and shellfish beds. Critical Area criteria require that water-dependent facilities be located so as not to disrupt these aquatic resources. Therefore, construction and dredging activities, when allowed, are often conditioned by "time-of-year" restrictions on in-water work. Tidal Wetlands Regulations (COMAR 05.08.05.05) place these restrictive "windows" on dredging activities in certain habitats during critical spawning and growing seasons for shellfish and anadromous fish species. Dredge restrictions in some areas and under site-specific conditions will be handled on a case-by-case basis by the Tidal Wetlands Division. The Tidal Wetlands Regulations specifically prohibit:

* mechanical dredging within 500 yards of shellfish areas between December 16 - March 14, and June 1 - September 30;
* hydraulic dredging within 500 yards of shellfish areas between June 1 - September 30; and,
* dredging between February 15 - June 15 in areas where yellow perch have been documented to spawn, and between March 1 - June 15 in areas where other important finfish species identified by DNR have been documented to spawn.

All Maryland waters within the Critical Area are designated as either Class I or Class II waterbodies. These standards are identical except that the latter demands a lower bacteria level for the harvesting of shellfish. Siting marinas in the vicinity of shellfish beds entails special calculations, which then result in a required offset distance separating the boat basin and the shellfish area. The Maryland Department of the Environment (MDE) requires the distancing of marinas from shellfish beds to help reduce the chances that shellfish will become contaminated by boating-related pollutants. As a precautionary measure, MDE prohibits the harvesting of shellstock from marina waters. The MDE institutes "Buffer Zones" in ambient waters near marina basins in which the harvesting of shellfish is prohibited between May 1 and September 30. Offset distances for harvesting and siting restrictions are determined by MDE on a case-by-case, site-specific basis.

B) Marina Site Selection and Flushing Potential

Potential marina sites that show they will have a minimal degree of adverse environmental impact on wetlands and other habitat resources must also be evaluated to determine whether there is an adequate flushing rate within the basin area to prevent an unacceptable accumulation of pollutants. Pollution associated with boat and marina operation can be reduced significantly through optimal design and management; nevertheless, dock areas are associated with their own particular range of environmental hazards. These include toxicity from piling preservatives and anti-fouling biocides; the release of oily bilge water; the discharge of boat sewage, fuel spills, and stormwater run-off from parking lots, hull maintenance areas and adjacent impervious structures.

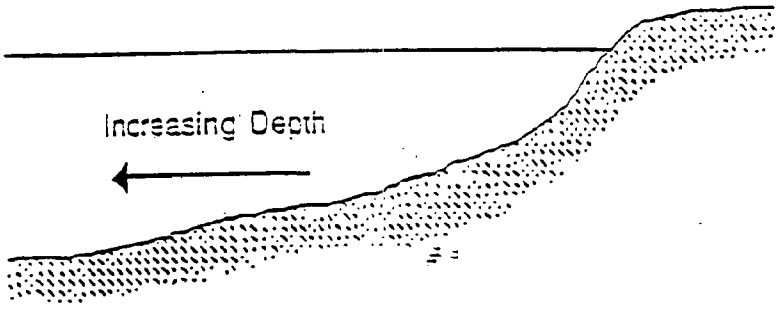
Due to its relatively shallow depth and low tidal amplitude (usually about 1 to 1.5 feet) the Chesapeake Bay is especially susceptible to flushing problems. If a proposed site has physical parameters characteristic of a poorly flushed waterbody then site-specific studies may be required to determine flushing rates. However, when "minor" (see Chapter II for definition of "minor") expansions are proposed and the applicant can clearly demonstrate that the flushing potential has been maximized through proper site selection, design considerations and the implementation of applicable BMPs, flushing studies may be waived at the discretion of local planners.

Geometry based, tidal prism models, using measurements of the surface area, tidal volume (including a return flow factor), and the amount of freshwater tributary inflow (if any), help to estimate the time it takes for water in a prospective marina to be partially or completely displaced by "new" water. According to the U.S. Environmental Protection Agency, a flushing time of four days or less is usually acceptable (EPA,1985). Flushing can be monitored visually by means of dyes or small monitoring devices called drogues. However, such field monitoring is expensive because an observer must be on hand over a fairly sustained length of time.

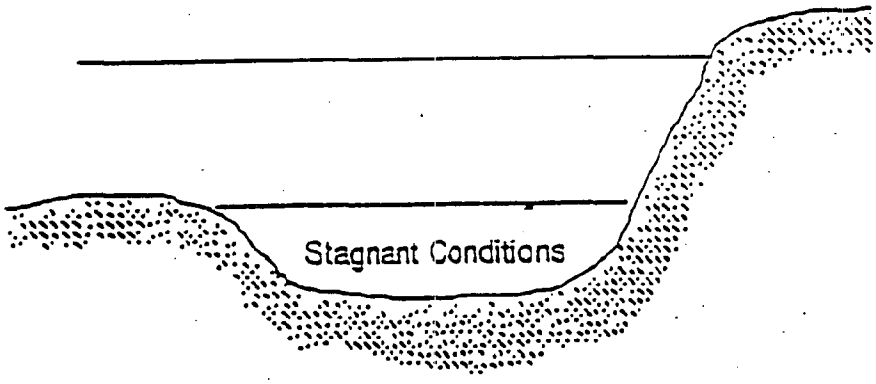
Other factors besides tidal and tributary flow affect flushing. A site with as many slips as possible sited near open water will flush better than a narrow, enclosed one. Wind exposure, or the lack of it, plays a significant role in flushing. In effect, there is a trade-off between a safer harbor and a cleaner one. The traditional boat basin location, in a weather-protected cove or enclosure, is well represented among existing Chesapeake marinas, some of which have serious pollution problems.

Marina planners must take bottom configuration as well as surface configuration into account when designing new facilities. A continuous, gradual downward slope from the berthing area into deeper water is ideal. Irregular deep pockets or sumps within the marina area will be traps for stagnant water and should be avoided (**see Fig. I**).

Finally, general geographic and hydrographic factors must be considered. Flushing is impeded in areas at the head of the tide, and in areas where the salinity or temperature gradients cause density variations which result in stratification of the water column. Such areas are undesirable for marina development.



Good Flushing



Poor Flushing

Figure I. Marina bottom contours and flushing potential.

Adequate flushing is essential for satisfactory water quality. It aids in the dispersal and dilution of pollutants and helps ensure that levels of dissolved oxygen (DO) in the water column are high enough to support aerobic conditions. DO concentrations are inversely correlated with a rise in water temperature. Freshwater inflow into the Bay declines in the summer, which is the peak time of year for boating activity. For all these reasons summer can be considered a "worst-case-scenario". Marina planners should gear site evaluations to test whether planned projects can meet water quality standards under conditions of high water temperature, low inflow and heavy boating activity.

The U.S. Environmental Protection Agency provides a discussion of BMP's concerning environmentally sound siting, design and management of new marinas in its documents Coastal Marinas Assessment Handbook (1985) (hereafter referred to as the "handbook") and Guidance Specifying Sources of Non-Point Pollution in Coastal Waters (1993), in Chapter 5; "Management Measures for Marinas and Recreational Boating."

They are discussed as follows:

> "*Site and design new marinas such that the bottom of the marina and the entrance channel are not deeper than the adjacent navigable water unless it can be demonstrated that the bottom will support a natural population of benthic (bottom dwelling) organisms.*" (EPA, 1993)

Water depth is an important constraint when considering site-selection and marina design. If comprehensive water depth information is not available for both the proposed marina basin and associated channels, a bathymetric survey of these areas should be conducted.

> "*Design new marinas with as few segments as possible to promote circulation within the basin.*" (EPA, 1993)

Flushing efficiency of a marina is inversely related to the number of segments within the marina basin (NCDEM, 1990; EPA, 1993). For instance, an open water basin will flush better than a basin which has one segment, and a one segment marina will flush better than a basin with multiple segments. Examples of types of marinas and degrees of segmentation are shown in **Figure II**.

Marina designs which promote flushing have higher dissolved oxygen levels than those with inappropriate depth and design restrictions such as improper entrance channel placement, bends,

and square corners (NCDEM, 1990). These areas can form deep, poorly circulated, anoxic areas and may also serve as traps for sediment and organic detritus. The decomposition of this concentrated organic debris causes an increased biological oxygen demand. In a poorly flushed area, this quickly results in oxygen depletion and a subsequent reduction in water quality.

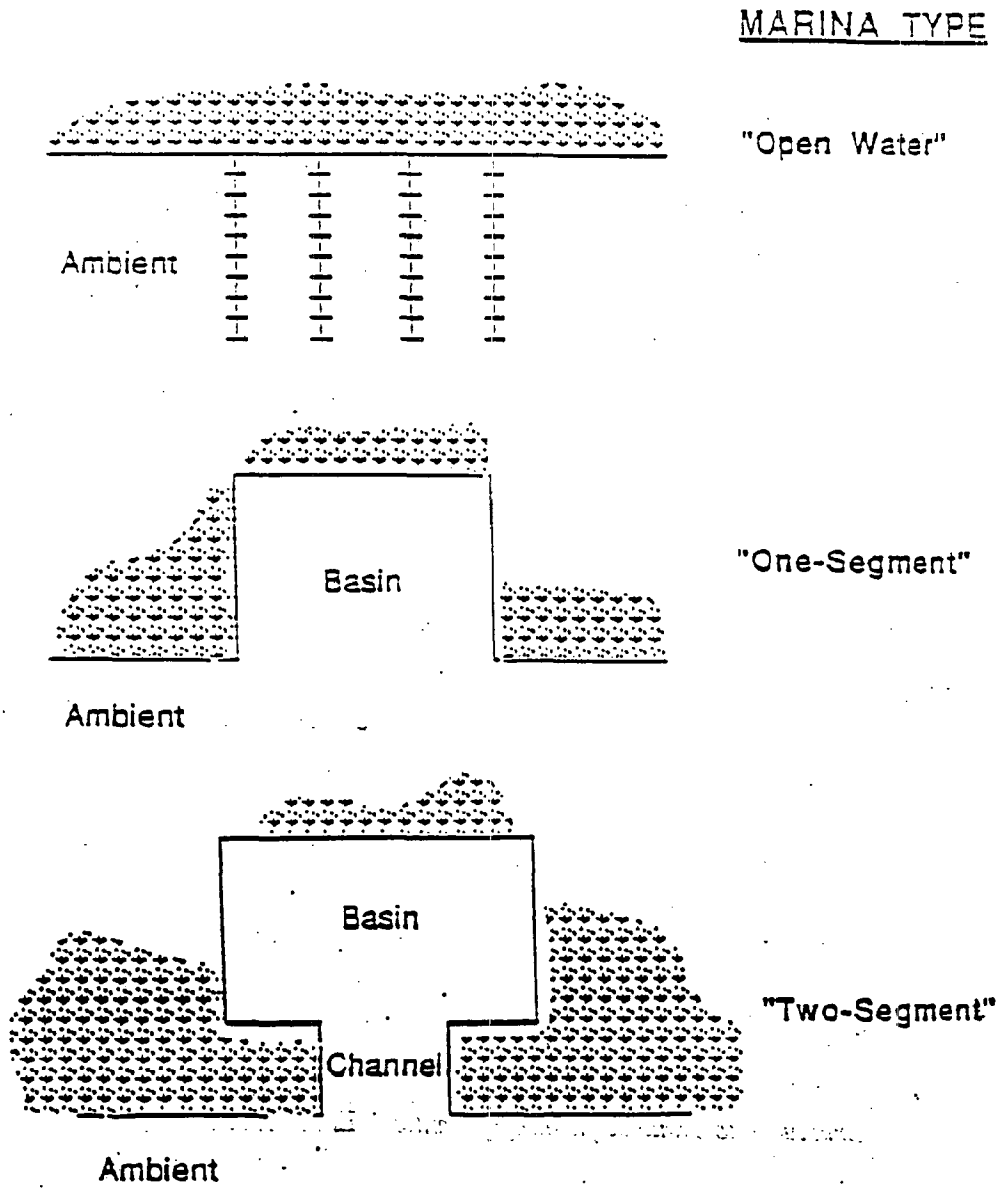


Figure II. Classification of marina designs and segments.

In tidal waters, marina design should incorporate rounded edges and not use sharp-edged corners (which can accumulate organic debris and contribute to water quality stress) to exploit the natural hydraulic patterns of flow and prevent the occurrence of areas where flushing is insufficient (EPA,1993). Studies have suggested that the combination of these practices when applied to the development and design of new marinas can result in strong internal circulation within the marina basin and ultimately aid in sustaining acceptable water quality levels (EPA, 1985).

> "*Consider other design alternatives in poorly flushed waterbodies (open marina basin over semi-enclosed design; wave attenuators over a fixed structure) to enhance flushing potential.*" (EPA, 1993)

It is important to consider both the flushing potential as well as marina and boat safety during site-selection and developmental design of a new marina. Sites located on open water or at the mouths of large tributaries tend to have higher flushing efficiencies than those located in coves or small tidal creeks and tributaries, thus they are generally preferable for marina siting. (EPA, 1993)

In areas of poor flushing an open marina design coupled with the use of wave attenuators should be considered (EPA, 1985). Open marina designs do not include man-made or natural barriers, thus they allow for a free exchange of water between ambient water and the water within the marina. Wave attenuators are attractive for several reasons; they do not restrict or inhibit the flow and exchange of water, they do not adversely affect benthic communities, they minimize potential interference with fish migration and shoreline processes and they are visually aesthetic, easy to remove, and cost effective (EPA, 1985).

> "*Design and locate entrance to promote flushing*" (EPA, 1993).

There are a variety of practices which can lead to increased flushing. Dunham and Finn (1974) found that entrance channel alignment should follow the natural channel alignment and that any necessary bends should be gradual. In areas of low tidal amplitude the EPA recommends that the marina entrance should be as wide as possible while still affording the boats in the basin an adequate degree of protection (EPA, 1985). However, proper design and placement of entrance channels may alleviate potential water quality problems. It is important

to consider wind action when designing entrance channels. When entrance channels are aligned parallel to the direction of the prevailing wind, flushing may be increased (EPA, 1985).

The location of a marina entrance can radically alter marina flushing rates and should be considered with other factors that influence flushing. Nece (1983), determined that when a marina basin is square or rectangular, a single entrance at the center of the marina results in better flushing than does an asymmetric entrance channel. The possibility of shoaling should be considered when designing a marina entrance. This may occur in areas with significant sediment transport, especially if the entrance is located perpendicular to the flow of the waterway. Shoaling within the marina entrance may require extensive maintenance dredging of the channel or it may form a sill at the entrance of the marina basin. Shoaling at the marina entrance can reduce both flushing potential and water circulation thus having adverse effects on water quality.

> "*Establish two openings, where appropriate, at opposite ends of the marina to promote flow-through currents.*" (EPA, 1993)

In areas with low tidal amplitude, additional alternatives to those already discussed should be considered to increase flushing potential and overall circulation. "An elongated marina situated parallel to a tidal river can be adequately flushed using two entrances to establish a flow-through current so that wind-generated currents or tidal currents move continuously through the marina" (EPA, 1993). In situations where both openings cannot be used for boat traffic a smaller opening can be used solely to increase flushing. In many cases this can be accomplished by installing a buried pipeline. (EPA, 1993)

> "*Designate areas that are and are not suitable for marina development; i.e., provide advance identification of waterbodies that do and do not experience flushing adequate for marine development.*" (EPA, 1993)

For example, it has been suggested and promoted in the criteria (COMAR 27.01.03.04.A) that the headwaters of many small tidal creeks, due to physical constraints and habitat considerations are unsuitable for development due to poor flushing potential and increased susceptibility to water quality stress (EPA, 1993).

C) Marina Siting and Access to Land-Based Infrastructure

Critical Area criteria encourage placement of boating facilities and other waterside structures in areas already developed. The Commission strongly discourages a "sprawl" approach to marine recreational development that unnecessarily disturbs pristine stretches of the fragile Bay shoreline. These general directives are augmented by the specific requirements of the planning and zoning departments in each jurisdiction. Road access and parking areas capable of accommodating anticipated traffic are necessary and on-shore sanitation facilities are required for project approval. State law mandates a required number of toilets and showers based on marina size; wastewater management, whether municipal or on-site disposal must be approved by the appropriate local jurisdiction. All new and expanded marinas in Maryland are required to have adequate boat waste pump-out facilities. These pump-outs should be integrated into the proposed wastewater plan. If dedicated slipside collection of waste is not achievable, waste may be temporarily stored in either an above or below ground holding tank. These tanks are permitted within the Buffer.

Clearly, access to a reasonably advanced degree of existing shore-based infrastructure is a highly desirable characteristic for potential marina sites. Project planners should note that proposals for locations abutting residential neighborhoods will likely encounter aesthetically-oriented zoning regulations such as structure height limitations, restrictions on sign size or lighting, and screening or landscaping requirements.

D) Marina Design and Management Measures

Each potential marina site presents a unique combination of advantages and drawbacks. Critical Area criteria list a series of environmental concerns that proposed boating-ralated facilities plans (for both new construction and expansions) must address. The intent here is to relate these regulations to the underlying ecological principles, and ultimately to the practices required for environmentally sensitive development.

Specifically, the local plan requirements section of the Critical Area water-dependent facilities regulations require that the local jurisdictions base their water-dependent permit approval process upon consideration of how well the submitted project plans address eight areas of concern (COMAR 27.01.03.04). Some of these concerns are integral to initial site-selection; in particular, all proposed development sites must demonstrate adequate flushing capacity and minimal

wetlands, wildlife and fisheries impacts. Some of the other concerns are heavily influenced by design. The eight plan requirements are listed below and are briefly explained in a boating facilities context. The water quality requirement (#4) is complex, involving various components of marina design. Thus, this presentation of the criteria will be followed by a more detailed discussion of anticipated water quality problems and recommended abatement measures.

Plans for a new and expanded water-dependent facility must show:

(1) *That the activities will not significantly alter existing water circulation patterns or salinity regimes --*

Tidal flux, wind, temperature and barometric pressure all influence water circulation within the Chesapeake Bay. Water circulation coupled with the mixture of freshwater runoff and saltwater together with the type of sediment present at the site creates a variety of chemical and physical conditions or environments within the estuarine system. This in turn influences the type and distribution of plant, fish and wildlife habitats and communities. Water-dependent facilities should be designed to maintain existing circulation patterns and salinity regimes.

Standard plank and piling docks have minor effects on water circulation, and are not considered a problem in this context. In fact, these structures may act as important substrate for the colonization of ecologically important epibiotic communities. In addition, many species of birds use these structures for nesting and roosting. However, all of these new communities develop at the expense of the natural benthic community, which may suffer from the dredging and driving associated with construction and the subsequent reduction in light. Solid concrete and steel pier structures massively impede water flow and are strongly discouraged.

Vertical bulkheads generate reflective waves that can complicate navigation and cause erosion or shoaling. Vertical-sided boat basins also flush less readily than those with sloping sides. For these reasons, natural vegetation should be used in place of bulkheads for bank stabilization wherever possible. If vegetative stabilization is not an appropriate alternative, sloped rip rap or stone revetments should be considered. It should be noted that all structures should be kept to the minimum size sufficient to fulfill their anticipated function(s).

Some marinas will need to provide a form of wave attenuation. Floating breakwaters may be sufficient. Fixed jetties and breakwaters, if needed, should be contoured to reduce reflective waves. They should be kept to a minimum length because they tend to promote unwanted

sediment deposition and shoaling in the lee areas they create, disrupt littoral drift and interrupt natural circulation patterns. Prevailing salinity regimes are unlikely to be affected by boating facilities; this directive is more relevant to industries proposing intakes and outfalls of massive amounts of water.

(2) *That the water body upon which these activities are proposed has adequate flushing characteristics in the basin area --*

Most siting and design practices for increasing flushing potentials (as discussed earlier) are applicable only to site selection or basin design of new marinas. There is little one can do to increase flushing in an existing marina basin other than reconfigure basin geometry or add new channels and openings through dredging. Such dredging activities, however, should be kept to a minimum.

Water-dependent facilities should be located where the waterbody has adequate natural flushing characteristics. The waters of a site can become contaminated by pollutants generated by the deleterious introduction of untreated stormwater runoff from uplands, vessel discharge and improperly managed sanitation facilities. If a body of water has a low exchange rate or poor flushing potential, pollutants will concentrate and water-quality will deteriorate. Sitings of water-dependent facilities should be avoided on dead-end channels and canals or at the upper reaches of tidal creeks or estuaries, as these areas characteristically have low tidal range, low net flow and are productive shallow water habitat areas. Pollutants are better dispersed and diluted in areas with greater flushing capabilities such as open water or areas near the mouth of a tidal tributary or creek. A convex shoreline is preferable to a concave shoreline for projects located on open water sites.

Water-dependent facilities should be designed to enhance natural water circulation and increase flushing potential. Siting and design practices and considerations for maximizing flushing rates have been discussed previously and are summarized below:

* extend slips channelward into naturally deep water;
* site basin in area with a gradually sloping bottom which leads to deeper water;
* site facilities or expansions in areas devoid of sumps or deep holes;
* avoid using solid structures such as breakwaters and bulkheads;

* design basins so that they have rounded corners and no vertical walls;

* site channels in the direction of the prevailing winds to aid in the mixing of the water; and,

* establish two openings, at opposite ends of the marina to promote flow-through currents.

Proposals for small scale developments and minor expansion of water-dependent facilities may not require a complete flushing study to fulfill the environmental assessment requirements. Instead, such proposals should demonstrate that to the extent possible the locational requirements and Best Management Practices (as discussed above) are implemented. However, proposed projects located in areas physically characterized as having low flushing potentials may require complete flushing studies and this determination should be made on a case-by-case basis by local jurisdictions and other resource agency personnel.

For new water-dependent facilities or facilities proposing major expansion or significant redevelopment, the USEPA suggests complete flushing studies. If application of a tidal prism flushing model predicts a turnover rate of four or more days, the EPA recommends a field study employing dyes or drogues for the precise determination of flushing rates. These studies are costly, therefore, it would be beneficial to locate proposed structures in areas which have previously been assessed for flushing rates or basins which are physically characterized as having high flushing potentials. As discussed earlier, complex numerical models exist in which site-specific data can be entered to give an approximate flushing rate. Baseline data may be available for a proposed site or the applicant may be required to obtain the necessary data.

> (3) *That disturbance to wetlands, submerged aquatic plant beds, or other areas of important aquatic habitats will be avoided and/or minimized --*

This is a locational prerequisite which requires water-dependent facilities to locate in areas where they pose minimal threat to valuable habitat areas. Proposed sites should be thoroughly evaluated to determine the presence and possible impacts to any of these resources:

a) Submerged Aquatic Vegetation (SAV)

b) Tidal and Nontidal Wetlands[1]

c) Shellfish Beds

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[1] If disturbance to wetlands is permitted, mitigation will be required.

d) Rare, Threatened, or Endangered Species

e) Spawning, Nursery, or Propagation Areas for Anadromous Fish

f) Shallow Water Habitat

g) Colonial Waterfowl Nesting Sites

h) Forest with Interior Dwelling Bird Species (FIDBs)

i) Natural Heritage Areas

j) Tributary Streams

k) Waterfowl Staging Areas

The appropriate federal, State, and local agencies (see Appendix B) should be contacted for professional assistance. If any of the above habitats are found at or in close proximity to the proposed site, the project must be altered or moved so as to avoid and/or minimize adverse ecological impacts.

> (4) *That the adverse impacts to water quality that may occur as a result of these activities, such as non-point source runoff, sewage discharge from land activities or vessels, or from boat cleaning and maintenance operations, is minimized* --

Preventing contaminants from entering the water is inherently more effective than planning on their adverse environmental impact being compensated for through mixing and dilution. One is hard pressed to come up with a place where this truism applies more forcefully than the Chesapeake Bay. A discussion of Best Management Practices for stormwater management, boat repair and maintenance pollution control, and marine sanitation follows the review of the criteria.

> (5) *That shellfish beds will not be disturbed or be made subject to discharge that will make them unsuitable for harvesting* --

Water-dependent facilities should be located so as to avoid and/or minimize disturbance to shellfish beds. The economic and ecological benefits of shellfish beds are obvious and have received much attention. Shellfish areas are readily disturbed by deteriorating water quality caused by pollutants arising from water-dependent facilities. Upland runoff, organic hydrocarbons (petroleum, pesticides etc.), heavy metals, and sewage all may result in adverse effects to shellfish. In addition, the turbidity, sedimentation, and turbulence created by heavy boating activities and dredging can damage spat attachment. Wave action can also remove the

sandy substrate necessary to bed survival. Excessive siltation created by dredging, construction or improper boat operation can result in the burial and suffocation of shellfish.

The discharge of sanitary waste from water-dependent facilities can contaminate shellfish and prohibit harvesting. To avoid this problem, the State of Maryland restricts the location of these facilities within a certain distance from harvestable shellfish beds. Restrictions are based on size of the proposed project (number of slips) and survival time of coliform bacteria. MDE determines the appropriate restrictions on a case-by-case basis utilizing site-specific information. MDE must be contacted when any water-dependent development is proposed and their written comments should be attached to a submitted application regarding the presence of shellfish resources and required offset distances.

> (6) *That dredging shall be conducted in a manner, and using a method, which causes the least disturbance to water quality and aquatic and terrestrial habitats in the area immediately surrounding the dredging operation or within the Critical Area --*

Dredging adversely impacts water quality and aquatic life through increased turbidity, decreased dissolved oxygen, and destruction of benthic communities. Projects that entail minimum construction and maintenance dredging are preferred; however, the permissible extent and frequency of dredging can only be determined on a site-by-site basis. Marina planners must recognize how both natural currents and structural features such as existing or proposed breakwaters, etc. make certain areas susceptible to shoaling. Facilities should be designed to direct boat traffic away from such areas.

Dredging operations involve high equipment and labor cost, as well as the time and procedural commitment of complying with detailed federal, State and local regulations. Thus, environmental considerations aside, economic factors virtually preclude projects that call for an excessive degree of dredging.

Due to the high potential for adverse environmental impacts, water-dependent activities should be sited in areas which require little, if any, dredging. Sites located near naturally deep basins (at least 6 feet MLW) will minimize or eliminate the need for dredging. Sites on long, narrow, or winding channels, or near shallow water habitat should be avoided, as these usually require extensive maintenance dredging. Again, areas of high shoaling or sediment deposition should not

be utilized as frequent maintenance dredging will be required. State Tidal Wetlands Regulations (COMAR 05.05.08.05) place specific restrictions on dredging activities in areas where SAV, wetlands, shellfish beds, anadromous fish spawning or propagation waters and other valuable habitats occur (see pgs. 2-4).

Proper siting and design of water-dependent facilities can minimize the need for dredging. Some simple siting and design features which help reduce the need for dredging as well as its negative impacts are listed as follows:

* locating slips for boats of deep draft in naturally deep water;
* having dredged channels follow the course of the natural channel;
* extending piers and docks into naturally deep waters;
* providing dry-stack storage for smaller boats and using lifts to transport them to the water;
* using a dredging method that minimizes environmental impacts;
* using turbidity curtains to confine suspended sediments; and,
* complying with time-of-year restrictions placed on dredging activities by Tidal Wetlands Regulations (COMAR 05.08.05.05).

Dredging requires permitting from State (Maryland Department of Natural Resources/ Department of the Environment) and Federal (U.S. Army Corps of Engineers) agencies.

> (7) *That dredged material will not be placed within the Buffer or elsewhere in that portion of the Critical Area which has been designated as a Habitat Protection Area except as necessary for: (a) backfill for permitted shore erosion protection measures; (b) use in approved vegetative shore erosion projects; (c) placement on previously approved channel maintenance material disposal areas; and (d) beach nourishment --*

Convenient sites for the disposal of dredged material are at a premium; if dredged material must be trucked away, the expense of the operation greatly multiplies. Dredging proposals for industrial harbor areas face the possibility of resuspending toxic sediments. The disposal of contaminated dredged material is a very controlled activity in Maryland.

Filling, of open water and/or wetlands invariably results in significant adverse impacts to aquatic resources. Wetlands and ecologically important shallow water habitat can be buried and forever lost to filling activities. Filling also temporarily increases turbidity, lowers dissolved

oxygen, and may release pollutants (nutrients, organic hydrocarbons, heavy metals etc.) into the aquatic environment. Appropriate site selection can reduce dramatically the need for filling activities. Sites should have adequate upland area for project development and possible future expansion thus effectively eliminating the need for major filling projects. Filling requires permits from federal and State agencies. It should be noted that most filling of wetlands or shallow water habitats is considered unacceptable and in most cases permits/licenses will not be issued.

(8)*That interference with the natural transport of sand will be minimized.*

This requirement relates to the need to consider circulation patterns and how in-water structures affect them. Beach areas naturally rely on intermittent and seasonal replenishment of sand lost annually. Poorly planned construction can remove the source of this replenishment, by causing sand formerly washed up on the beach to go into new shoal formation at different locations.

The construction of bulkheads, groins, jetties or other solid structures can greatly alter the natural transport of sand. When it is absolutely necessary to construct such structures it is important to minimize their length and to design them to allow littoral material to bypass the access way. This may help minimize the disruption in littoral drift.

i) Stormwater Management Measures

The State of Maryland requires stormwater management plans for any property which proposes the grading or disturbance of 5000 sq. ft. of new, undisturbed area. Peak management of both the two- and ten- year storms is required. MDE's Sediment and Stormwater Administration should be contacted for guidance on the development and implementation of the required stormwater management plan. Critical Area criteria require that any development or re-development within the IDA be accompanied by urban BMP's to help mitigate potential water quality impacts associated with stormwater runoff. The criteria further specify that these practices be capable of achieving at least a 10% reduction in post-development pollutant loading (COMAR 27.01.02.03). This requirement is commonly referred to as the **"10% Rule"**. Computation measures have been devised which can be used to demonstrate the reduction in phosphorus (the "keystone" pollutant contributing to the decline of the Bay) loading at the development site.

Guidance for compliance with the **"10% rule"** is provided in "Applicant's Guide for 10% Rule Compliance: Urban Stormwater Quality Guidance for the Maryland Chesapeake Bay Critical Area in Intensely Developed Areas (IDA)" which was prepared for the Commission by the Metropolitan Washington Council of Governments in May of 1993.

For projects in LDAs or RCAs, any amount of new impervious surface must "eliminate all stormwater runoff caused by the development in excess of that which would have come from the site if it were in its pre-development state" (COMAR 27.01.02.04). Marinas and other commercial water-dependent boat docking facilities which propose expansion or redevelopment in the RCA must demonstrate that the development activity will not adversely affect water-quality. In fact, such proposals must demonstrate that post development water quality at or leaving the site will have improved over existing conditions. This entails both pre- and post-development water quality monitoring.

Marinas, through BMP's, must control and minimize any adverse impacts to water quality. Locations adjacent to tidewaters are a stormwater management challenge. Stormwater runoff is particularly damaging to water quality at marina sites. In addition to the pernicious introduction of nutrients into an already eutrophic water column, marinas may experience significant run-off from parking lots and hull maintenance areas. This runoff may contribute a variety of toxic organic compounds and heavy metals to the aquatic environment. The design ideal is to ensure that there is no rapid, unfiltered runoff into adjacent water from either the marina area or upland development.

The appropriate design and operation of a marina hull maintenance area can be significant in reducing toxic runoff from marinas into adjacent waterbodies. The USEPA recommends design features which include the use of discrete and impervious areas (e.g., cement areas) for hull maintenance and boat service activities; the use of roofed areas that prevent rainwater from contacting pollutants; and the development of management practices for the control and drainage of off-site runoff away from the hull maintenance area for separate treatment (EPA, 1993). The EPA has set a standard which requires an 80% annual reduction of total suspended solids in runoff from hull maintenance areas, and has designated a comprehensive instructional guide to Best Management Practices for the achievement of this goal (see EPA, 1993).

Boat hull maintenance areas should be designed so that all vessel repair and maintenance occurs over dry land and preferably under roof. The facility should provide for the collection and appropriate disposal of debris, residues, solvents, spills, and stormwater runoff (EPA, 1993). Hull maintenance areas should be designated and clearly posted so that no maintenance should occur outside of these areas. The use of impervious surfaces in these areas will greatly enhance the collection of toxic debris either by vacuuming or sweeping.

In addition to controlling runoff from boat maintenance areas, it is important to maximize on-site green space areas to reduce the overall quantity of runoff, and provide for a filtration/infiltration and/or a retention /detention mechanism to enhance the quality of the runoff. This can be accomplished using many different BMP's. The State of Maryland together with the USEPA specifies appropriate practices. The applicability of one practice over another varies from site to site. Such practices include:

a) Design of boat hull maintenance areas to capture contaminated runoff

b) Source control practices

c) Sand filter

d) Wet Pond

e) Constructed wetland

f) Infiltration basin/trench

g) Chemical and filtration treatment systems

h) Vegetated filter strip

i) Grassed swale

j) Porous pavement

k) Oil-grit separator

l) Holding tank

m) Swirl concentrator

n) Catch basins

o) Catch basin with sand filter

p) Adsorbents in drain inlets.

The removal efficiency, applicability, and both installation and maintenance costs of these practices are fully discussed in the USEPA publication Guidance Specifying Management

Measures For Sources of Non-Point Pollution In Coastal Waters (1993) and are found in Chapter Five. These should be considered and implemented where applicable when designing stormwater management systems.

Where applicable, the use of vegetated filter strips, grassed swales, and created wetlands are the preferable Best Management Practices. These vegetative practices coupled with the mandatory 100-foot natural Buffer, in many cases, can provide adequate stormwater quality management, in addition to providing areas of habitat, recreation and aesthetic beauty. However, when necessary, retention and detention practices such as berms, catchment basins, settling ponds, and sand and gravel filtration systems (in conjunction with culvert systems) can be used to impede runoff and reduce sediment load.

The Commission prefers the redevelopment of existing structures and facilities to the development of new water-dependent facilities. Therefore, anti-runoff strategy as applied to boating facilities should focus on improving existing operations. Upgrading or retrofitting upland stormwater management facilities is a major part of this strategy; reduced sediment load will directly benefit water quality as well as lessen the need for dredging. Older marinas with sheet-flow drainage are limited in their range of anti-runoff options, especially if they are located in built-out areas that preclude installing catchment basins or creating large landscaped areas. Berming and planting a small area along the water's edge may still be feasible, and should be considered. When bulkheads are replaced, a simple runoff detention retrofit using perforated pipe, gravel and filter cloth can be incorporated into the job for little more expense than conventional bulkheading.

Questions about stormwater permitting and applicable Best Management Practices should be directed to local jurisdictions with adopted stormwater ordinances or MDE. Water quality certification through the EPA and MDE is required of any marina offering boat repair and maintenance.

ii) Specific Boating-Related Hazardous Materials

Boating uses generate a specialized range of environmental hazards in addition to general watershed-wide runoff effects. Boats and timber structures, when placed in the water, are vulnerable to rot and barnacle encrustation (fouling) that must be warded off with a variety of

toxic chemical preservatives and biocides. Boat fueling and boat hoist operations also carry the risk of pollutant discharges.

Some abatement can be realized by switching to less hazardous materials. For instance, anti-fouling paints containing tributyltin (TBT), extremely toxic to marine organisms, were phased out (except for aluminum vessels) several years ago; the copper compounds now used are less harmful, but still are toxic and warrant cautious handling. If wood pilings are treated with a more refined grade of creosote or with an alternative preservative, the toxic load they introduce into the aquatic environment can be reduced; pilings and bulkheads of recycled plastic may be utilized in the future.

Such recent and potential advances notwithstanding, the most important controls for boating related toxic material involve careful containment and disposal. Any maintenance or repair procedure employing scraping, power spraying, solvents etc. should never be performed in, on or over the water. In fact, in new marinas it is required to be performed outside of the Buffer. Where possible, existing facilities should relocate such activities upland, preferably out of the Buffer. Optimally, all paint chips and other hazardous debris from boatyard work should be collected into a separate self-contained disposal system, typically a floor drain below the repair yard equipped with settling tank and clean out. If a retrofit of this scope is not feasible for an existing operation, repair debris should at least be caught and collected on a dropcloth. Waste material associated with boat maintenance, if left uncontained, has the potential to cause serious metal contamination of the soil and water. However, as a retrieved residue, it is not classified as restricted hazardous waste and should be accepted by any currently approved landfill.

Liquid material such as waste oil, gasoline, diesel fuel, kerosene, mineral spirits, and used antifreeze should all be stored separately in clearly labeled containers. These used materials should be stored in impervious areas, and curbs and berms should be constructed around these areas to prevent the spread of an accidental spill. If individuals within a marina collect, contain, recycle or dispose of their own liquid waste, appropriate signs and mailings should direct marina patrons to proper disposal or recycling facilities.

Well-maintained equipment and careful operation will minimize spill risks from boat fueling but marina owners should have containment booms on hand for emergencies. The majority of fuel spilled in the Bay occurs during the fueling process when fuel spills over and out of the air vent.

A relatively cost effective device (available commercially for about $85) called a fuel/air separator can effectively control this widespread problem. Marina patrons should be encouraged to use these devices. Marina fuel pumps should be equipped with automatic shut-off nozzles to prevent unnecessary spills. Oil contamination from bilge discharges can be reduced by requiring vessels to use adsorbent filter pads in their bilge. These pads are reasonably priced and adsorb up to twelve times their own weight in oil.

iii) Marine Sanitation

Boat sewage discharges cause serious localized pollution pockets, especially in constricted near-shore shallow waters. Overall they are a fairly minor component of the excess nutrient pollution that has disrupted Chesapeake Bay ecology -- but a component that can and should be eliminated completely. Technical methods for the handling of marine sewage are reliable and economically achievable. Proper disposal of marine sewage by boaters on the Bay can be achieved through expanded availability of appropriate facilities, increased public education and environmental awareness and strict enforcement of marine sewage regulations.

Marina owners should incorporate language into the lease agreement specifying compliance with waste disposal practices. Federal law requires the mandatory disabling of "Y" valves in type III Marine Sanitation Devices (MSDs) to prevent the accidental or intentional discharge of raw sewage into State waters. Recently passed State legislation incorporates this requirement into State law effective in 1997, and mandates enforcement by State law enforcement personnel. The USEPA has suggested that the placement of dye tablets into holding tanks could greatly discourage illegal dumping within the waters of the Chesapeake.

Under the Clean Vessel Act of 1992 the USFWS offers grants for marinas to install marine sewage disposal facilities, which includes pump-outs to dispose of sewage from boat holding tanks, dump stations, and the disposal of portable toilet waste. This money is administered through the Boating Administration of the Maryland DNR. Recent legislation adopted by the Maryland General Assembly requires all existing marinas with more than 50 slips and all new and expanded marinas with 10 or more slips to install sewage pump-out facilities. It is estimated that by 1997, Maryland will triple its pumpout capacity by adding 200 new stations. Vessels which are found dumping sewage into Maryland waters will face stiff fines and legal penalties.

Visible and convenient dock locations will encourage pump-out use. An information campaign addressed to the boating public could contrast the minimal effort entailed in proper handling of sewage with the chronic damage caused by dumping. This information campaign coupled with adequate signage and enforcement could drastically increase boater use. Marinas should also combat the boat sewage problem by making sure that their required on-shore restroom facilities are adequate and well maintained.

An obvious way to reduce the intentional dumping of sewage into marina basins is the incorporation of language into individual leases which requires compliance with a no dumping policy. Contracts might read ... "Head discharge overboard will result in voiding this contract immediately and expulsion from the marina with forfeiture of rental fees. Heads are to be pumped out without a per-service fee at the marina as often as requested."

Boat heads use disinfectants such as formaldehyde or chlorine, and various deodorizing chemicals, all of which impede the biological processes neutralizing waste. These chemicals have deleterious effects on marine life -- another argument against dumping. They also call for some precautions when introducing boat sewage into land-based waste systems, whether septic or municipal. If boat waste goes into municipal sewers in small increments, they should be able to maintain efficient operation. Only when a large "slug" of chemical-laden effluent enters a system is there a chance of problems. Municipal sewer authorities should be encouraged to approve connections for marina pump-outs and dedicated slip-side systems, since the alternative practice of collecting waste in a holding tank, and periodically trucking large quantities to the sewage plant poses a greater risk to the treatment systems. Marinas with septic tanks should follow a similar dilution principle by mixing pump-out wastes with waste water from on-shore toilet, shower, and laundry facilities prior to on-site disposal.

iv) Solid Waste Management Measures

Facilities that are clean and well-kept encourage users to keep them that way. In addition to being aesthetically offensive, discarded waste, plastic in particular, poses a serious threat to birds and aquatic creatures who ingest it or become snarled in it. Studies in recent years have demonstrated that this is a surprisingly major factor in wildlife mortality. Proper disposal facilities should be convenient and available to all marina patrons. The recycling of non-

hazardous waste such as glass, plastics, wood, paper, cardboard, aluminum, and scrap metal should be instituted where feasible. The EPA recommends that used lead-acid batteries be stored on an impervious surface, under cover, and sent to or picked up by an approved recycler. Receipts should be maintained for inspection.

Accumulation of fish scraps at piers and in near-shore waters creates several pollution problems: odor, attraction of pests, and elevated biological oxygen demand which can lead to oxygen depletion. Offshore disposal of fish waste is a less acute concern, but still is generally undesirable. Marinas with significant fishing activity should establish separate fish-cleaning areas with secure, regularly serviced receptacles. Modern enclosed composting methods are an even more environmentally desirable means for the ultimate disposal of all organic wastes.

v) Boat Operation and the Environment

The behavior of boaters greatly influences whether their recreation has a minimal or significant adverse environmental effect. One obvious example is the management and proper use of marine sanitation devices and the appropriate handling of sewage. Another is the degree of compliance to speed limits and no-wake rules in near shore or shallow water. Boating activity can resuspend bottom sediments resulting in the reintroduction of toxic compounds into the water column. Boating in shallow water can increase turbidity which ultimately results in decreased photosynthetic activity of algae and SAV. Boat operation may also shear or uproot SAV and damage oyster bars and other important habitats. Prop wash can also cause the erosion of shorelines and a general degradation in water quality. The EPA suggests the exclusion of motorized vessels from areas that contain important shallow water habitats (small tidal creeks, SAV, shellfish beds etc.) and the establishment and strict enforcement of no-wake zones to decrease turbidity and wave-induced erosion. This hazard is particularly relevant in light of the accelerating popularity of jet-skis, since jet-ski operators, unlike most people using conventional craft, do not face the risk of incurring major engine or other damage from running hard in shallow water.

vi) Public Education and Environmental Awareness

The most effective tool for fighting pollution is public education. The creation of public education/outreach/training programs should be instituted for boaters as well as marina owners and operators. Environmental education can help prevent the improper disposal of polluting materials. Educational programs can be designed to promote "green" marinas and will serve to enhance environmental awareness as well as promote marinas and boating activities. Educational signs placed in marinas and at boat launching sites can direct boaters to pump-out facilities. Adequate signage and mailings instructing boaters in the necessity of utilizing these facilities can greatly increase boater use.

vii) The Benefits of Operating an Environmentally Proactive Marina

It is in the vested interest of the marina owner to maintain a clean, environmentally sound marina. The new breed of marina patron is the product of the "green" generation and in most cases is concerned with the health of the Bay. By instituting environmentally proactive marinas, owners and operators can increase marina patronage and customer satisfaction, while decreasing the chances of being cited for failure to comply with environmental regulations. The EPA recommends that marina owners incorporate certain environmental requirements (mandatory disabling of "Y" valves, placement of dye tablets in holding tanks and the inclusion of a "no-discharge" clause) within their leases and contracts (EPA,1993). This would help to establish an owner/patron relationship that serves the public and private interest. Marina patrons who refuse to comply with environmental regulations could be held in breach of contract and forced to comply with marina policy.

E) Concerning Houseboats, Liveaboards, and Boatels

According to the MDE (COMAR 26.04.02.01), a "floating home" means "any vessel", whether self-propelled or not, which is:

> *"(a) used, designated or occupied as a permanent dwelling unit, place of business, or for any private or social club, including a structure constructed upon a barge primarily immobile and out of navigation, or any structure which functions substantially as a land structure while the same is moored or docked within Maryland;*

and, (b) which has a volume coefficient greater than 3,000 square feet based upon the ratio of habitable space of a vessel measured in cubic feet and the draft of a vessel measured in feet of depth."

MDE regulates houseboats as structures (not vessels), which are required to have full, permanent dedicated slipside sewer and wastewater collection. The primary environmental concern at issue is the appropriate handling of sewage and wastewater. In addition, permanent floating structures may result in severe light reduction and can eliminate or alter many benthic habitats. Maryland defines "domestic sewage" as the liquid or water-carried waste derived from dwellings, including floating homes etc. Sewage and grey water discharges from houseboats, floating homes and liveaboards can have significant adverse effects on water quality and public health. Therefore, MDE requires that floating homes (as defined above) be permanently connected to dedicated slipside sewage connections which empty into sewage treatment facilities approved by the local health department.

Liveaboards have yet to be defined and regulated under Maryland law. However, the USEPA in its document Guidance Specifying Management Measures for Sources of Nonpoint Pollution in Coastal Waters (1993) suggests that liveaboards also be serviced by a dedicated slipside sewage collection. Maryland is expected to codify these suggestions in the near future. All marinas serving vessels on which people remain overnight should be especially conscientious about sanitation. This means enforcing no-discharge rules, providing convenient pump-out facilities or dedicated slipside service, and keeping on-shore facilities in top condition.

Dry-stack boat storage facilities or "Boatels" refer to structures that are either partially or completely covered, which are on land and are used for the vertical storage of boats on racks. Dry-stack storage is an expanding enterprise, particularly in built-out regions with heavy demand for boat access as it is an economically viable alternative to in-water slips for the storage of Class A (less than 16 feet) and Class 1 (16 feet to less than 26 feet) vessels. These structures serve as an efficient means for large-scale access to the water in areas where the creation of many new slips is impractical or undesirable. Dry storage can be environmentally friendly in that it requires less destruction of the fragile Bay shoreline and it virtually eliminates the need for toxic anti-fouling compounds. The main planning issues to consider in regard to boatels are runoff control provisions, traffic capacity, and aesthetics.

A boatel is not directly a water-dependent facility according to Critical Area criteria, and therefore, must be located outside of the mandatory 100' Buffer. This is not an obstructive regulation, given that the turning radius for large boat lift vehicles requires virtually that distance anyway. The lift will need a hard surface on which to operate. If a boatel is allowed, adequate vehicular access and stormwater management measures are standard requirements. A jurisdiction may also require height limits, enclosed racks, and/or landscaping for visual screening.

F) Guidance on Criteria Regulating Community Piers and other Non-Commercial Boat Docking and Storage Facilities

Shoreline subdivisions initiate the construction of many individual private docks and boat houses, and/or a community pier to provide both riparian and non-riparian lot purchasers access to the water. Water-dependent development associated with shoreline subdivisions can have a profoundly negative effect on habitat value, natural diversity and aesthetic beauty of riparian habitat if improperly located, designed or operated.

The State of Maryland defines "Community Piers" as: "boat docking facilities associated with subdivisions and similar residential areas, and with condominiums, apartment, and other multiple-family dwelling units (COMAR 27.01.01.01)." Private piers, installed or maintained by riparian landowners, which are not part of a subdivision are excluded from this definition. The location of boating facilities is regulated through zoning and other development ordinances. Commercial marinas and yacht clubs are generally located in areas specifically zoned for such maritime use. However, community piers or marinas are often sited in residential areas with special use permits.

The criteria (COMAR 27.01.03.07) are applicable to new or expanded community marinas and other non-commercial boat-docking facilities. Generally, community piers are permitted in the IDA, LDA, and in the RCA districts. The construction or expansion of community piers is subject to the conditions set forth for water-dependent development. The location and design of a boating facility should be such that it or the boating activity it engenders does not cause or aggravate:

* adverse impacts on wetlands, aquatic resources, and navigation;
* congestion and safety problems;

* turbidity or other adverse water quality impacts;
* shore erosion problems; and/or
* other adverse environmental impacts.

In addition, community piers must comply with the same requirements, considerations, and management practices set forth for marina development. Of course the degree of site assessment depends on the scope of the proposed project.

The Critical Area criteria stipulate that community piers or other non-commercial boat docking and storage facilities must:

* be water-dependent;
* meet a recognized private right or public need;
* be community-owned and established for landowners within a platted and recorded riparian subdivision;
* be associated with a residential development approved by the local jurisdiction for the Critical Area and be consistent with all criteria and local regulations for the Critical Area;
* minimize adverse effects on water quality and fish, plant and wildlife habitat;
* insofar as possible, locate nonwater-dependent structures or operations associated with water-dependent projects or activities outside of the Buffer;
* make sure that disturbance to the Buffer is the minimum necessary to provide a single point of access to the facility;
* not offer food, fuel or other goods and services for sale, and provide and maintain adequate and clean sanitary facilities; and,
* not permit private piers in the development when a community pier is provided.

The Critical Area criteria provide a precise mechanism for the determination of the number of allowable slips to platted lots within the Critical Area. The number of slips permitted at a facility shall be the lesser of the following:

* one slip for each 50 feet of shoreline in a subdivision located in an Intensely or Limited Development Area, and one slip for each 300 feet of shoreline in a subdivision located in a Resource Conservation Area; or

* a density of slips to platted lots or dwellings within the subdivision in the Critical Area in accordance with the following schedule:

Platted lots or dwellings in the Critical Area	**Slips**
Up to 15	1 for each lot
16 - 40	15 or 75%, whichever is greater
41 - 100	30 or 50%, whichever is greater
101 - 300	50 or 25%, whichever is greater
More than 300	75 or 15%, whichever is greater

The section regulating the development of community vs. private piers is an important component of the criteria. The Commission recommends the development of community piers, which meet the legitimate needs of the landowners, over the establishment of many individual private piers. However, if some riparian landowners constructed private piers prior to Critical Area approval of a local jurisdiction's Program, a community facility may still be permissible. However, lots containing private piers or the expanse of collective shoreline contained in those lots cannot be included when determining the number of permissible slips in the subdivision. When a lot is used in the determination of the allowable number of slips the owners forfeit their right to construct a private pier. It should be noted that a community fishing pier and swimming platform can be allowed if it is of modest scope, properly designed and meets the requirements of the criteria for water-dependent facilities.

A local jurisdiction may grant a variance from this provision in accordance with the regulations adopted by the Commission concerning variances as part of local program development set forth in COMAR 27.01.11 and notification of project applications set forth in COMAR 27.03.01.

The "under the table" rental of community slips by community members to non-community members is a widespread problem. The purpose of the community pier is to serve members of the community in a recreational (not financial) manner. Community organizations should

discourage this practice. This can be accomplished by requiring that a boat docked in an individual's assigned be registered to that person. The penalty for violating this covenant should be the revocation of slip privileges.

G) Guidance on Structures Over Tidal Wetlands In the Critical Area

i) Background

Under the 1986 Critical Area criteria, water-dependent facilities are defined as:

> *"those structures or works associated with industrial, maritime, recreational, educational or fisheries activities that require location at or near the shoreline within the Buffer... An activity is water-dependent if it cannot exist outside of the Buffer and is dependent on the water by the intrinsic nature of its operation." (COMAR 27.01.03.01).*

The definition clearly characterizes water-dependent facilities in terms of the minimum 100-foot shoreline Buffer of the Critical Area. However, it does not clearly define water-dependent facilities in terms of their location in tidal waters and tidal wetlands. Furthermore, the criteria specifically prohibit disturbance to the Buffer from structures that are not water-dependent, yet parallel restrictions for tidal waters and wetlands waterward of the Buffer were not clearly outlined in the 1986 Critical Area regulations.

In 1989, the Maryland General Assembly adopted Natural Resources Article, § 8-1808.4, to address the construction of structures on piers located in tidal wetlands of the Critical Area. Generally, subsection (e) of the law prohibits local jurisdictions (except Prince Georges County) from issuing a building permit for the construction of a structure that is not water-dependent on a pier located in State or private tidal wetlands in the Critical Area.

There are several exceptions to the subsection (e) prohibition. Under subsection (e) (2), a local jurisdiction may issue such a building permit, if a wetlands permit was issued for the project by the Secretary of the Department of Natural Resources on or before January 1, 1989. Under subsection (e) (3), a local jurisdiction may issue such a building permit within the Intensely Developed Areas. However, the pier must appear on a DNR aerial photograph dated before

December 1, 1985. In these cases, pier expansion is limited by criteria outlined under the legislation. Finally, subsection (e) (4) allows for the repair of these structures.

If a structure that is not water-dependent is to be permitted by the local jurisdiction under the exceptions of subsection (e) (3) or (e) (4) of the Law, an applicant is required to demonstrate that the project will meet several environmental objectives. Using standards established by the local jurisdiction's Critical Area program, an applicant must show that the construction will have no long term adverse effects to the water quality of the adjacent waterbody. The quality of stormwater runoff from the project also must be improved. New sewer or utility lines must not affect adjacent waters.

Except as noted above, non-water-dependent structures are not to be permitted on piers on or over State or private wetlands in the Critical Area. The Law clarifies the intent of the Critical Area legislation to protect water quality and aquatic habitat waterward of the Buffer.

ii) Environmental Impacts from Structures on Piers

A number of direct as well as cumulative environmental impacts can occur from the establishment of structures over wetlands and open water. Construction activities (e.g., pile driving, use of heavy equipment) can destroy or disturb wetland and benthic communities, and structures can cause shading that can eliminate certain wetland and submerged communities or can result in a change in species composition.

Impervious structures increase the volume and velocity of storm water runoff, creating greater potential for erosion of wetlands and shallow water habitats. Pollutants, such as nutrients and hydrocarbons, collect and concentrate on structures as a result of human activity or from atmospheric deposition and during storms, those pollutants are flushed into the water and wetlands without the filtering benefits of "Buffer" vegetation and soils.

While the adverse environmental impacts of a single structure may be minimal, the cumulative effects of many structures placed along a reach of shoreline are significant. The cumulative effect of pollutant loading severely degrades water quality. Structures located in a confined waterbody can reduce flushing and circulation, resulting in a subsequent decline in water quality. As a result of cumulative impacts, entire communities of wetland and benthic organisms may be adversely affected or even eliminated from an area.

iii) Development Requirements for Structures in Tidal Areas

Development requirements for the construction of structures over tidal wetlands, tidal waters and their Buffers are outlined below:

The construction of water-dependent structures is permitted in tidal waters, tidal wetlands and their Buffers.

Only certain types of structures are water-dependent. They are necessary to provide access to the water and their intrinsic nature requires their location in, on, over or under the Buffer, tidal wetlands and tidal waters. Examples of water-dependent structures include piers, docks, crab shedding structures, boat ramps, moorings, swimming platforms (not associated with pools). Critical Area criteria and Natural Resources Article, Section 8-1808.4 permit the construction of water-dependent structures in the Buffer and within tidal wetlands, only when they do not pose a major threat to valuable habitat.

Structures that are not water-dependent may not be constructed within tidal water, tidal wetlands and their Buffers.

A number of structures are not water-dependent because they do not require a location along the shoreline or within tidal wetlands and waters. Examples of such structures include:

1. Dwellings
2. Restaurants, shops and other commercial buildings
3. Gazebos, decks and recreational areas
4. Sheds and storage buildings
5. Parking
6. Sanitary facilities

Certain structures and activities should be evaluated on a case-by-case basis to determine if their location in tidal wetlands is permitted.

Some structures may need to be evaluated on a case-by-case basis as to whether they should be permitted in the Buffer, tidal wetlands or tidal waters. Structures must be examined individually with regard to proposed use and potential impacts on water quality and natural habitat.

NOTES

Chapter II.

GENERIC SITE SELECTION AND EVALUATION PROCEDURES FOR WATER-DEPENDENT EXPANSION AND DEVELOPMENT

Water-dependent facilities are defined as those structures or works associated with industrial, maritime, recreational, educational or fisheries activities that require a location at/on or near the shoreline. An activity is water-dependent if it cannot exist outside the Buffer and is dependent on the water by the intrinsic nature of its operation. Operators of water-dependent facilities, the success of which depends on a healthy aquatic environment, have a "vested interest" in preserving such a regime. Environmentally sensitive site planning and project design are essential to the survival of water-dependent uses. Site planning and evaluation must include a careful, thorough assessment of the adverse environmental effects that may occur along the fragile shoreline.

The Critical Area Commission recognizes the need for a practical outline and clear guidance describing the necessary site evaluation and regulatory considerations which require attention during the site-selection and project approval processes. The Critical Area Commission also realizes that there are varying impact levels of water-dependent development and expansion, and has taken this into consideration when developing standard assessment processes. The standard review, recommended to local, county, and State agencies, for proposed "minor" expansions of water-dependent facilities is designed to serve as a model which these jurisdictions may use to develop their site evaluation and review processes. This abbreviated review process also should enable local regulatory agencies to assess plans for water-dependent facilities prior to large financial investment by applicants. This process may be sufficient in assessing minor proposals; but, a complete environmental review may be required at the discretion of local planners. The Town of North Beach developed a checklist which can be used in a generalized planning context or as a site specific analysis of a proposed project at a particular site. A slightly modified version of this checklist is provided as Appendix A. It may serve as a "model" to assist local planners in developing and instituting complete and reasonable abbreviated assessments of proposals for "minor" water-dependent growth and expansion. The project review process for

new water-dependent facilities or for facilities which propose "significant" expansion of existing water-dependent facilities is of greater scope and intensity and is provided in section B of this chapter.

A) Abbreviated Review Process for "Minor" Expansions, Retrofitting, and Redevelopment Proposals

What characterizes a "minor" expansion of a water-dependent facility, and how does it differ from new facilities or facilities proposing "significant" expansions? The Commission holds that minor expansions:

* will not require dredging of more than 199 cubic yards of material during construction;
* will not require filling of wetlands or shallow water habitats;
* will be conducted in a way which extends additional slips into deeper water;
* will not require the construction of new bulkheads or wave attenuating structures;
* will implement applicable Best Management Practices; and,
* will fully address the Critical Area criteria.

The maximum number of in-water slips which may be added to a water-dependent facility under the abbreviated process shall be 10 slips or 10% of existing slips (whichever is greater) without implementing upland improvements, and a maximum of 20 slips or 15% of existing slips (whichever is greater) if approved upland enhancement or mitigation results in a net increase in water quality. Improvement in stormwater management, specifically at hull maintenance areas, is the preferred mitigation.

The minor expansion of a water-dependent facility, utilizing the abbreviated process, should also achieve the expansion only once during the life span of the facility regardless of a change in ownership, name, use or time. Such expansion may be accomplished incrementally over a specific time frame. Proposed waterward expansions other than the initial plans approved through the abbreviated assessment should be subject to a complete environmental review (see Section B) unless it can be clearly demonstrated that water quality will be increased through the use of BMPs and appropriate retrofitting techniques.

Proposed sites for "minor" expansions should be evaluated by the appropriate agencies (see Appendix B) to determine if such expansion would have adverse effects on the following:

Natural Resources

1) Submerged Aquatic Vegetation (SAV)
2) Tidal and Nontidal Wetlands
3) Shellfish Beds
4) Rare, Threatened, or Endangered Species
5) Spawning, Nursery, or Propagation Areas for Anadromous Fish
6) Shallow Water Habitat
7) Colonial Waterfowl Nesting Sites
8) Forests with Interior Dwelling Bird Species
9) Natural Heritage Areas
10) Tributary Streams
11) Waterfowl Staging Areas

Water Quality Impacts

12) Flushing Characteristics[1]
13) Existing Water Quality Conditions
14) Navigation

If the proposed additional in-water slips will have an adverse impact upon any of these resources, then the applicant should change or alter the location, size, and/or number of the proposed in-water slips to avoid or to minimize any adverse impacts to these resources.

Most siting and design practices for increasing flushing potentials are applicable only to site selection or basin design of new marinas. One can do little to increase flushing in an existing marina basin other than reconfigure basin geometry or add new channels and openings through massive dredging. Such dredging would most likely cause major adverse environmental impacts, which would likely outweigh environmental benefits derived from increased flushing; in addition, the cost and the regulatory hurdles would be exorbitant.

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[1]Minor expansions should be sited and designed to maximize flushing potential. To qualify as a "minor" expansion, proposals should demonstrate that to the greatest extent possible the project complies with the suggested applicable flushing management practices. Appendix A presents a review of some planning considerations for maximizing flushing.

The checklist and guidelines for minor expansions and development as provided in Appendix A:

* describe the proposed uses and services as well as list some general site characteristics and requirements;
* discern the need for permits from federal, State and local regulatory agencies; and,
* pinpoint possible activities and site characteristics that may create adverse environmental effects.

Associated with the checklist are a set of guidelines that are to be used in the evaluation process. The guidelines briefly describe aspects of a proposed activity or project that may impact aquatic resources. Siting considerations and some mitigating techniques are also provided.

B) Complete environmental review for new water-dependent facilities or significant expansions proposed within the Critical Area.

The primary differences between the review processes for minor vs. major development are in water quality and flushing data that may be required in the latter. Minor expansions seldom warrant such complex and expensive studies. The facility already exists and a modest addition, if managed properly, should not result in significant alterations to water quality or flushing rate. The importance of proper site selection and design techniques in the development of new water-dependent facilities is well documented (see review by Chmura and Ross, 1978).

New facilities, or those undergoing major expansions, can adversely affect the aquatic environment. By the assessment of existing water quality and flushing rates, local planners and engineers can determine the appropriateness of a proposed facility to its location. Through monitoring the location and design of proposed projects, in relation to existing water quality and flushing rate, local planners can ascertain environmental impacts and guide development in an environmentally sensitive manner.

All (major and minor) project proposals must evaluate the site for possible impacts to:

Natural Resources

1) Submerged Aquatic Vegetation (SAV)
2) Tidal and Nontidal Wetlands
3) Shellfish Beds

4) Rare, Threatened, or Endangered Species

5) Spawning, Nursery, or Propagation Areas for Anadromous Fish

6) Shallow Water Habitat

7) Colonial Waterfowl Nesting Sites

8) Forest with Interior Dwelling Bird Species

9) Natural Heritage Areas

10) Tributary Streams

11) Waterfowl Staging Areas

The checklist and guidance for minor expansion and development provided in Appendix A should suffice for project description and habitat assessment for both the abbreviated and complete environmental assessment. In addition to the completed checklist, the following information (excluding flushing studies and water quality monitoring) should be included with all proposals requiring either the abbreviated or complete environmental assessment.

Mapping Information Needed for Site Evaluation

Vicinity Sketch All project proposals should include a clear vicinity sketch at 1"=2000'scale with the property boundaries clearly indicated. A circle or star for the property area is not acceptable.

Plan Submittal Depending upon the size of the property, proposed development, and existing natural features, submittal requirements may differ as to scale and presentation. However, all of the requested information must be clearly indicated. It may be necessary to submit two plans at the same scale, one showing existing conditions and the other, proposed development. Topography needs to be clear, with contour lines labeled as to the elevation so that all contours throughout the property are clearly legible. Existing conditions should reflect any variety in vegetative communities if they occur on site (for instance, tidal wetlands, nontidal wetlands, tidal marsh, mixed deciduous/coniferous forest, mature oak hardwood, mixed woody successional, pastureland, old field etc.) and communities should be clearly delineated and labeled. 1" to 100" or 200" is suggested for the mapping.

Floodplain Delineate the ultimate calculated nontidal floodplain or indicate the coastal flood hazard elevation as indicated on the FEMA series maps.

Wetlands All tidal and nontidal wetlands are to be drawn on all plans. Mean high water should be indicated by line or note.

Bathymetry Existing water depths are to be indicated throughout the proposed marina as well as the controlling depths in the navigational channel. A description of the adjacent estuarine system is required including existing and potential SAV habitat, shellfish beds, condition of shoreline, spawning and nursery areas etc.

Soil Types These should be shown on the plans, not just on an attachment from the Soil Survey. Use entire soil mapping unit (e.g. SaB2 or MvE), not just series name (e.g. Sassafras).

Steep Slopes Clearly indicate 15% and greater slopes. It is important to separate those into >15% and >25%.

Upland Natural Areas, Areas of Critical State Concern, Chesapeake Bay Critical Area Boundaries and Habitat Protection Areas Indicate these (where applicable) on the plan.

Spawning Areas, Nursery Areas, Submerged Aquatic Vegetation and Shellfish Beds Indicate the nearest of these based on current records. If necessary, this may be done on a 1"=2000' scale map.

Buffers Indicate the following where applicable on the plan:

Nontidal wetlands	25' Buffer
Tidal wetlands	100' Buffer
Streams (perennial and intermittent)	100' Buffer
Tidal shoreline	100' Buffer

Expanded Buffer - for all contiguous wetlands, steep slopes, and hydric and highly erodible soils.

Areas of Clearing, Limits of Disturbance, Construction Areas Indicate all planned and potential areas of clearing for all uses (landward structures such as houses, yards, patios, decks, parking lots, roads, septic fields, stormwater management, swimming pools, pumping stations, underground holding tanks, water wells etc. and waterward development such as groins, jetties, docks, piers, breakwaters, structures on piers etc.). Be realistic in terms of sizes as there may be woodland clearing and impervious surface requirements. Be sure all construction areas are located outside of the Buffer unless the facility is absolutely water-dependent. If there is a

question as to whether a structure or function is water-dependent it should be addressed to the local Critical Area Program.

Habitat Protection Areas Identify all areas as described in the Critical Area Criteria for habitat protection. Include any areas within 1320' of the site boundaries.

Narrative Information Needed for Site Evaluation

Rare and Endangered Species A letter from the DNR Natural Heritage Program is required. However, the consultant or other representative is responsible for identifying those species on the DNR's list, since DNR have not totally documented the State for rare or endangered species. This work is to be done during the growing or breeding season.

Vegetative Description Vegetation should be clearly described in the narrative as communities unless it is uniform throughout the proposed site. Please be aware that since some plant species (herbaceous layer, some wetland species, and SAV) are not readily identified during the winter, a growing season field survey is required. All plants should be described in both common and scientific nomenclature.

Animals Differentiate between observed and expected species. List them by both common and scientific names. Do not generalize and list as "snakes", "birds" etc.

Stormwater Management Stormwater management may be presented conceptually but must address water quality for roads, parking (including driveways) and roof leaders. An analysis of the soils map, indicating infiltration potential examples, and examples of specific measures that may be installed should be included. Soil borings are required to demonstrate infiltration feasibility. Stormwater management requirements will not be waived for roads or parking areas. Impervious surface should be minimized. Stormwater management requirements for Intensely Developed Areas (IDA) differ from Limited Development Areas (LDA) and Resource Conservation Areas (RCA). Stormwater management facilities must be located outside nontidal wetlands and their Buffers. Peak management will also be necessary for the Two- and Ten-year storms. It should be noted that stormwater discharged directly into tidal waters through a stable method of conveyance (i.e. that will not cause significant erosion on its way to the Bay) generally does not require peak management (quantity control). However, water quality management is still required.

Pollutants List specifically which pollutants are expected to increase over existing conditions. Describe Best Management practices proposed to minimize the introduction of pollutants into the marine environment.

Shoreline Protection Measures Justify the method to be used according to the criteria for shore erosion control. Documented erosion rates will be necessary for all bulkheading and revetments.

Mitigation Any tidal wetland mitigation that has been approved must be carried out at least in a 1:1 ratio. Non-tidal wetland and forest mitigation should be performed at least in a 1:1 ratio if located outside of the Buffer and at 3:1 if located inside the Buffer.

Calculations Provide total acreage of property in the Critical Area, woodland acreage in the Critical Area, acreage of woodland to be cleared for all uses and total impervious surface, and total disturbance. Provide worksheets demonstrating numerical results of flushing models, and the 10% rule.

Flushing and Water Quality Provisions Each water-dependent facility which requires a complete environmental assessment must demonstrate that it is to be located on a waterbody which exhibits acceptable flushing characteristics. Again, the circulation and flushing characteristics of marina basins greatly influence local water quality by affecting the distribution and dilution of potential boating-related pollutants. Because of the obvious control flushing exercises over water quality, the Commission requires flushing studies to illustrate that the proposed body of water flushes within an acceptable time frame (4 days or less). The most common flushing calculation methodology is based on dilution calculations which are determined by a theory of mass flow as applied to a tidal prism flushing model. This model is described in detail in the Environmental Protection Agency's publication "Coastal Marinas Assessment Handbook" (1985). This calculation can give preliminary estimates of expected flushing rates and is applicable to the planning stages of marina development. The model combines site-specific flushing and circulation data with marina geometry, siting and design data in mathematical models. The EPA differentiates between open and semi-enclosed marina basins. Open marina basins are held to flush with the ambient water while semi-enclosed basins may demonstrate different flushing characteristics. The flushing provision need apply only to new development or significant re-developments. "Minor" projects which demonstrate that proper site selection and project design

have implemented Best Management Practices and have adequate flushing may have this requirement waived at the discretion of the local planners.

All new or major expansion of water-dependent development must demonstrate, through water quality monitoring, that the intended use poses minimal threat to water quality, and that at no time will water quality degrade below the levels described in State of Maryland's Receiving Water Quality Standards. Water quality certification may be required through the Maryland Department of the Environment and the United States Environmental Protection Agency.

NOTES

Appendix A

A CHECKLIST AND GUIDELINES TO SERVE AS AN ABBREVIATED REVIEW OF PROPOSALS FOR "MINOR" EXPANSIONS OF BOATING-RELATED FACILITIES IN THE CRITICAL AREA

These checklists and guidelines are intended to serve as examples of an abbreviated review process for minor expansions of water dependent facilities. To qualify as a minor expansion a project can only propose the addition of either 10 slips or 10% (whichever is greater) of existing in-water slips to an existing structure without implementing upland improvements, and may add up to 20 slips or 15% of existing slips (whichever is greater) if it can be demonstrated that upland mitigation will result in a net increase in water quality. The preferred mitigation is the improvement or retrofitting of existing hull maintenance areas. Proposals for minor expansions must:

* not require the dredging of more than 199 cubic yards of material during construction;
* not require the filling of wetlands or shallow water habitats;
* be conducted in a way which extends slips into deeper water;
* not require the construction of new bulkheads or wave attenuating structures;
* implement available Best Management Practices, and utilize environmentally sound design technologies; and,
* fully address the Critical Area criteria.

The minor expansion of water dependent facilities using this abbreviated review process should achieve the expansion only once during the life span of the facility regardless of a change in ownership, name, use or time. Any proposed waterward expansions other than the initial plans approved through the abbreviated assessment should be subject to a complete environmental assessment unless it can be demonstrated that water quality will be improved through the use of BMPs and appropriate retrofitting techniques.

The checklist is structured so that Section I effectively provides a project description and Section II addresses environmental concerns. An answer of "YES" to questions II A through K (on pages 51-52) should trigger an environmental concern that should receive a thorough

evaluation by the local Critical Area program during the approval process. In most cases if "YES" is checked, professional assistance should be obtained so that the necessary technical information to support the evaluation can be obtained. An answer of "UNKNOWN" should also prompt an effort to obtain professional assistance. Agency contacts and the type of assistance/information they provide are listed in Appendix B.

The checklist and guidelines for minor expansions and development will:

* describe the proposed uses and services as well as list some general site characteristics and requirements,
* discern the potential need for permits from federal, State and local regulatory agencies; and,
* pinpoint possible activities and site characteristics that may create potential for adverse environmental effects.

This abbreviated review process can also be used by prospective developers who are considering water-dependent facilities for a particular project. If the checklist is received at an early stage of project planning, it will alert developers to the following: 1) proposed uses and services allowed at the site; 2) potential permitting needs; and, 3) possible environmental concerns which could place constraints on the project.

Associated with the checklist are a set of guidelines that are to be used in the evaluation process. The guidelines generally describe aspects of a proposed activity or project that may impact aquatic resources. Siting considerations and some mitigating techniques are also provided.

The checklist and guidelines as presented are patterned after similar plans presented in the following documents: 1) Program 3: Water Dependent Facilities Plan for the Town of North Beach; 2) U.S. Environmental Protection Agency. 1985. "Coastal Marinas Assessment Handbook" EPA Region 4 #904/6-85-132.

CHECKLIST FOR MINOR EXPANSIONS OF BOATING-RELATED FACILITIES

I. PROJECT DESCRIPTION

A. Location

Municipality _____ County _____

Body of Water _____

Critical Area Designation _____

Zoning _____

Existing Land Use _____

B. Type of Water-Dependent Facility (ies)

Marina ..... New ____ Expanded ____

Community Docking ..... New ____ Expanded ____

Public Beach ..... New ____ Expanded ____

Research Areas ..... New ____ Expanded ____

Fisheries Facilities ..... New ____ Expanded ____

Aquaculture ..... New ____ Expanded ____

Other (please describe) _____

_____

C. Intended Use	Public	Private
Commercial	_____	_____
Recreational	_____	_____
Educational	_____	_____

D. Services & Facilities

1. Marina services:

Fuel ..... ____ Electricity/Water .. _____

Boat Launch/Ramp..... ____ Boat Hoist ..... _____

Dry stack Storage .... ____

Marine Sewage Disposal Facility:

Pumpout ..... _____ Portable Toilet Dump Station .. _____

Repair and Maintenance (engine, hull, propeller) .. _____

Other (please describe) .. _____

2. Marina facilities:

Ship's store ..... ____ Hotel ..... _____

Recreational Facilities (description) _____

_____

Restaurant ..... _____ Parking ..... _____

Access Road ..... _____ Seafood Processing .. _____

Boat Construction .... _____ Utilities ..... _____

3. Community Docking:

Electricity ..... _____ Boat Launch/Ramp .... _____

Water ..... _____ Boat Hoist ..... _____

Sanitary Facilities ..... _____

Marine Sewage Disposal Facilities:

Pumpout ... _____ Portable Toilet Dump Station .. _____

Other (please describe) .. _____

4. Public Areas:

Boat Launch/Ramp ..... _____ Boat Hoist ..... _____

Electricity ..... _____ Restaurant/Shop .... _____

Water ..... _____ Parking ..... _____

Access Road/Utilities . _____ Sanitary Facilities _____

Public Fishing Pier ... _____

Marine Sewage Disposal Facility:

Pumpout .. _____ Portable Toilet Dump Station ... _____

Passive Recreation (nature study, hunting etc.) .. _____

Other (please describe) .. _____

E. Types of Boats

Sail ..... _____ Power ..... _____

Both ..... _____ Size Range ..... _____

Other (please describe) .. _____

F. Size

Number of slips..... _____

Range in slip size .... _____

Submerged area (acres) _____

Upland area:

Within the Buffer .. _____

Outside of the Buffer .. _____

G. Hydrographic Conditions

Tidal Range ..... _____

Water depth of at site .... Minimum (MLW) _____

Maximum (MLW) _____

Completed project depth .... Minimum (MLW) _____

Maximum (MLW) _____

H. Critical Area Criteria

Is the proposed activity considered	YES	NO	UNKNOWN
water-dependent by the Critical Area criteria?[1]	___	___	___
Does the activity fulfill a public/private need?	___	___	___
Are the proposed uses/services/facilities permitted in the land use designation?	___	___	___

[1]Development activities are allowed within the Buffer provided that the proposed activity can demonstrate that it is water-dependent and fulfills a public or private need. If it cannot be readily discerned that a project or structure meets these standard criteria, then the Chesapeake Bay Critical Area Commission may be contacted to assist in interpreting the intent of the Law.

II. PROJECT ASSESSMENT YES NO UNKNOWN

A. Will dredging be required for:

1) Access channel? ..... ___* ___ _____

2) Boat basin? ..... ___* ___ _____

B. Will filling be required:

1) In wetlands? ..... ___* ___ _____

2) In open water? ..... ___* ___ _____

C. Is the disposal of dredged material required?..... ___* ___ _____

Will the material be placed in either a Buffer or Habitat Protection Area? ..... ___* ___ _____

D. Will structures be required:

1) Pier and piles ..... ___* ___ _____

2) Bulkhead ..... ___* ___ _____

3) Revetment ..... ___* ___ _____

4) Boat ramp/launch..... ___* ___ _____

5) Jetties ..... ___* ___ _____

6) Groins..... ___* ___ _____

7) Breakwaters..... ___* ___ _____

E. Is the water at the site characterized as having a low flushing potential (e.g., located on dead end channels or canals or at the upper reaches of an estuary or tidal creek, or having low tidal range or a low net flow)? ..... ___ ___ _____

F. Will activities alter existing water circulation patterns or salinity regimes? ..... ___ ___ _____

G. Will activities disturb wetlands, submerged aquatic vegetation (SAV) or other important habitats? ..... ___* ___ _____

H. Will activities disturb shellfish beds or subject them to contaminated discharge? .. ___ ___ _____

I. Will water quality be affected by:

1. non-point surface run-off? ..... ___* ___ _____
2. sewage discharge? ..... ___ ___ _____
3. boat maintenance activities? ..... ___* ___ _____
4. bottom wash discharge? ..... ___* ___ _____

J. Will the natural transport of sand be affected? ..... ___* ___ _____

K. Will the project affect a Habitat Protection Area including past and present waterfowl staging and concentration areas? ..... ___ ___ _____

* Indicates the possible need for permits from federal and/or State Agencies.

GUIDELINES FOR WATER-DEPENDENT PROJECT CHECKLISTS

I. Project Description/Items A - I

The Critical Area designation on the local Critical Area map should be used to determine the land-use category of the project parcel. This boating-related facilities guidance paper and the local Critical Area program (COMAR 27.01.03) should be evaluated thoroughly to determine if:

* the proposed use and all services and facilities are allowed within the Critical Area designation;
* all the conditions of the accepted use can be met;
* all structures and activities that are not water-dependent are located outside of the Buffer; and,
* available Best Management Practices, if applicable, are instituted.

II. Project Assessment/Items A - K

Item A: Dredging Aquatic ecosystems can sustain a myriad of detrimental environmental alterations from dredging activities. Dredging can:

* alter existing water circulation and salinity regimes;
* lead to a reduction in dissolved oxygen;
* increase turbidity and sediment deposition; and,
* resuspend pollutants (organic toxins, nutrients, heavy metals).

This can result in the degradation or elimination of wetlands, submerged aquatic vegetation (SAV), commercially important finfish and shellfish areas, as well as the destruction of native benthic habitats.

Due to the high potential for adverse environmental impacts, water-dependent activities should be sited in areas which require little, if any, dredging. Locating a site near naturally deep basins (at least 6 ft. MLW) will minimize or eliminate the need for dredging. Sites should not be proposed on long, narrow, or winding channels, or near shallow water habitat to avoid extensive maintenance dredging. Areas of high shoaling or sediment deposition should not be considered for the same reason. No dredging should be proposed in areas where SAV, wetlands, shellfish beds, anadromous fish spawning waters and other valuable habitats occur. State Tidal Wetland

Regulations (COMAR .05.08.05.05) place certain restrictions on dredging activities near sensitive aquatic resources (see pgs. XX-XX). Proper siting and design of water-dependent facilities can minimize the need for dredging. Some simple siting and design features which reduce the need for dredging are listed as follows:

* locating slips for boats of deep draft in naturally deep water;
* having dredged channels follow the course of natural channels;
* extending piers and docks into naturally deep waters;
* providing dry-stack storage with lifts to transport smaller boats to the water;
* using a dredging method that minimizes environmental impacts;
* using turbidity curtains to prevent suspended sediments from reaching sensitive habitat; and,
* complying with time-of-year restrictions placed on dredging activities by Tidal Wetland Regulations (COMAR 05.08.05.05).

Dredging activities require permitting from State (Maryland Department of Natural Resources and Department of the Environment) and federal (U.S. Army Corps of Engineers) agencies.

Item B: Filling Filling may result in significant adverse impacts to aquatic resources. Wetlands and ecologically important shallow water habitat can be buried forever. Filling temporarily increases turbidity, lowers dissolved oxygen, and may release pollutants (nutrients, organic hydrocarbons, heavy metals etc.) into the aquatic environment. Appropriate site selection can dramatically reduce the need for filling. Sites should have adequate upland area for project development and future expansion to eliminate the need for major filling projects. Filling requires permits from federal and State agencies. It should be noted that most filling of wetlands or shallow water habitats is considered unacceptable and is not permissible.

Item C: Disposal of Dredged Material When dredging is necessary a water-dependent facility should be located near currently authorized upland disposal areas. Upland areas are the preferred disposal sites because toxic metals, organic hydrocarbons, and other pollutants found in contaminated dredged material are less likely to enter the water. Areas designated for disposal

should be adequate to receive both dredged material from initial construction as well as material from future maintenance dredging. The disposal of dredged materials in wetlands is unacceptable.

According to Critical Area criteria placement of dredged material in the Buffer is not permitted except for the following:

(a) backfill for permitted shore erosion protection measures;

(b) use in approved vegetated shore erosion projects;

(c) placement on previously approved channel maintenance spoil disposal areas; and,

(d) beach nourishment." (COMAR 27.01.03.04.b)

Disposal areas must be approved by the U.S. Army Corps of Engineers and the Maryland DNR and MDE. Upland disposal of hydraulically dredged material also requires a permit of water quality certification from MDE.

Item D: Structures Boating-related facilities may require protective structures for shore erosion control. Bulkheads or revetments may be necessary for erosion control and bank stabilization. Pilings and piers are established for boat moorings and human access. Breakwaters may be necessary to absorb wave energy and protect moored boats, and groins and jetties are sometimes used to minimize littoral drift and maintain access to open water.

Improperly designed structures can have significant environmental impact. Aquatic resources (SAV, wetlands, shellfish beds, fish habitat etc.) may be adversely affected, even eliminated. Water quality can be reduced when solid structures such as breakwaters reduce natural circulation and mixing. Treated structures such as breakwaters and pilings may leach toxic compounds into the environment.

The simplest method to avoid or minimize adverse ecological effects from structures is to site a water-dependent activity in a naturally protected area. An area that is not subject to significant wave action eliminates the need for protective structures such as bulkheads, revetments and breakwaters. High activity areas (such as boat ramps) should be located away from sensitive natural resources (SAV, wetlands, and aquatic habitats).

Non-structural shoreline control (vegetative stabilization) should be utilized wherever possible. If structures are required the following should be implemented to minimize adverse environmental effects:

* avoid solid structures;
* do not treat structures with toxic anti-fouling biocides and preservatives (e.g. creosote, copper salts, etc.);
* use rip rap in place of solid bulkheads;
* allow for the maximum penetration of sunlight to wetlands and SAV by elevating docks, piers, and walkways, orient them in a north-south direction, minimize their width, and space pilings as far apart as possible; and,
* do not perform construction during spawning or breeding months.

Construction of structures require permits from the Maryland DNR and the U.S. Army Corps of Engineers.

Item E: Flushing Boating-related facilities should be located where the body of water has adequate flushing characteristics. The waters of a site can become contaminated by pollutants generated from the deleterious introduction of stormwater runoff from uplands, vessel discharge and the improper operation of marine sanitation facilities associated with water-dependent use. If a body of water has a low exchange rate or poor flushing potential, pollutants will concentrate and water-quality will quickly deteriorate. Sitings of water-dependent facilities shall be avoided on dead-end channels or canals or at the upper reaches of a tidal creek or estuary, as such areas characteristically have low tidal range and low net flow. Pollutants are better dispersed and diluted in areas with greater flushing capabilities such as open water or areas near the mouth of a tidal tributary or creek. A convex shoreline is preferable to a concave shoreline for projects located on open water sites. A two- to four-day flushing rate is considered acceptable for most project areas.

The basin of an expanded marina or docking facility should be designed to enhance natural circulation and flushing. To maximize flushing potential, plans should consider:

* extending additional slips channelward into naturally deep water;
* siting of expansion in areas with a gradually sloping basin which leads to deeper water;

* siting areas of expansion in areas devoid of sumps or deep holes;
* extending additional slips into open water;
* avoiding the use of solid structures such as breakwaters;
* constructing basins with rounded corners and no vertical walls; and,
* siting channels in the direction of the prevailing winds to enhance mixing of the water.

Item F: Water Circulation and Salinity Tides, wind, temperature, and barometric pressure influence water circulation within the Chesapeake Bay. Water circulation in conjunction with the mixture of fresh surface runoff and sea water creates a variety of chemical and physical conditions within the Bay. This in turn affects the type and distribution of plant, fish and wildlife habitats and communities. Water dependent facilities should be designed to maintain the natural circulation and salinity regimes of an area.

Shoreline structures established for water-dependent facilities can significantly alter existing water circulation patterns within a site. Solid structures, such as breakwaters, groins, jetties and bulkheads are especially likely to interfere with tides and currents and subsequently alter water-circulation patterns. Dredging can also alter circulation and salinity regimes.

Water quality of a site can be greatly affected when structures, particularly breakwaters, are established and water circulation is reduced. Decreased circulation can result in stagnation of an area with resulting fluctuation in both physical and chemical parameters leading to a dramatic reduction in water quality. To minimize adverse effects to circulation and salinity planners should:

* avoid solid structures;
* place pilings for structures (such as piers) as far apart as possible;
* utilize floating breakwaters where possible; and,
* site project so that little or no dredging is necessary (unless minimal dredging will enhance existing poor circulation).

Item G: Wetlands, Submerged Aquatic Vegetation and Aquatic Habitats Water-dependent facilities will more likely than not be located in estuaries. Estuaries are unique in that they maintain a diversity of plant and animal habitats that are of significant commercial, recreational,

and ecological value. Unfortunately, estuarine areas are susceptible to a multitude of adverse environmental effects from water-dependent facilities including: space impacts from pollution generated from upland facilities, dredging and fill activities, shoreline alteration from structures, as well as discharge and turbulence from vessels. Because of this diversity of potential impacts to aquatic resources, the exact location of valued wetlands, SAV beds and sensitive fishery areas should be identified and water-dependent facilities must be sited away from these areas.

The dramatic decline of SAV throughout the Chesapeake Bay estuary and its tributaries placed a high priority on the protection of existing and potential SAV habitat. State and federal permitting agencies will, in most cases, deny an application which will cause negative impacts to an existing SAV bed. In addition, projects proposed in shallow water habitats are strongly encouraged to consider alternative locations because of the high potential for the recolonization of aquatic plants. Applications for projects with direct impacts on SAV habitats are considered unacceptable and in most cases will be disallowed.

Some planning considerations for minimizing disturbance to SAV or other shallow water habitats are:

* minimize the need for filling and dredging through proper site selection;
* extend piers into deep water;
* do not schedule construction or dredging during growing or spawning seasons;
* use turbidity curtain during dredging;
* minimize the effects of shading through use of high, narrow piers that extend over wetlands and are oriented in a north/south direction;
* place shoreline structures as far upland as possible;
* use floating docks or breakwaters to minimize habitat loss and allow for circulation;
* instead of a vertical bulkhead, vegetation and (if necessary) sloped rip rap revetments should be used for shoreline erosion protection;
* boat ramps and other areas of high activity should be located away from valuable habitat; and,
* speed limits or no wake zones should be established around valuable natural resources.

Item H: Shellfish Beds Water-dependent facilities should be sited and designed to minimize disturbance to shellfish beds. The economic and ecological benefits of shellfish beds are obvious and have received much attention. In particular, oyster bars provide extremely valuable benthic habitat. Oyster bars provide spawning and nursery areas for both fish and invertebrates, substrate for sessile organisms, and food for a variety of organisms including humans. Oyster beds also help to establish and maintain current velocities and sedimentation patterns, and by filtering harmful nutrients out of the water column improve its quality.

Shellfish areas are readily disturbed by deteriorating water quality caused by pollutants arising from water-dependent facilities. Upland runoff, organic hydrocarbons (petroleum, pesticides etc.), heavy metals, and sewage may adversely affect shellfish. The turbidity, sedimentation, and turbulence created by heavy boating activities or dredging can damage both adult and spat attachment. Wave action can also remove the sandy substrate essential to shellfish bed survival. Excessive siltation created by dredging or construction can result in the burial and suffocation of shellfish.

The discharge of sanitary waste from water-dependent facilities can contaminate shellfish and prohibit harvesting. Maryland restricts the location of such facilities to areas a certain distance from harvestable shellfish beds. Restrictions are based on size of the proposed project (number of boats) and survival time of coliform bacteria. MDE imposes restrictions on the siting of marinas in relation to shellfish beds on a case-by-case basis utilizing site-specific information. MDE should be contacted and written comments attached to submitted applications addressing the proposed development in relation to shellfish resources.

Item I: Water Quality Sediments, nutrients and toxic materials (hydrocarbons, heavy metals, pesticides) generated from upland facilities can be carried to the water through stormwater runoff and groundwater flow. Spills and discharges from boat maintenance activities contribute significantly to the degradation of water quality.

Proper site selection and project design can minimize the potential for water quality degradation. Water-dependent facilities should be located on waterbodies with high flushing capabilities, as pollutants are diluted and dispersed in areas with high rates of water exchange. It has been stated that "dilution is the solution to pollution" and in some ways this is very true.

High flushing rates are very helpful in maintaining desirable water quality. Of course, minimizing pollutants in the first place, by treating runoff in upland areas, is preferred to polluting and then banking on flushing to take care of the problem.

Proper stormwater management can be effective in reducing pollutant loadings from upland areas. Best Management Practices for the operation and maintenance of an environmentally sound water-dependent facility are presented in the USEPA publications "Guidance Specifying Management Measures For Sources Of Non-Point Pollution In Coastal Waters; in Chapter 5: Management Measures for Marinas and Recreational Boating (1993) and The Coastal Marinas Assessment Handbook (1985) Applicable BMPs are also discussed within the body of this water-dependent facilities guidance paper and should be implemented where possible. Some BMPs include:

* compliance with State established sediment\erosion control measures[1];
* use of green areas and porous surfaces where possible (e.g. grass, parking);
* minimizing the removal of existing vegetation between upland facilities and the water;
* using vegetated swales and sediment detention basins (where applicable) to decrease runoff velocity and increase on-site infiltration;
* replant disturbed areas with a variety of trees, shrubs and grasses;
* where possible, implement all applicable BMPs for containing pollutants from engine and hull maintenance areas (discussed in the body of this document);

Item J: Transport of Sand As the minor expansion of water-dependent facilities does not include for the construction of new jetties or breakwaters, the natural transport of sand should not be greatly affected. However, if small bulkheads or other structures are allowed they should be designed to allow littoral material to bypass the access way. This will minimize any disruption in littoral drift.

Item K: Habitat Protection Areas Including Waterfowl Concentration Areas The proposed expansion of water-dependent facilities must not adversely affect Habitat Protection Areas as

[1] Maryland MDE and DNR should be contacted about proposed stormwater management and Best Management Practices and written comments should be attached to submitted applications.

described in COMAR 27.01.09. Depending on the type of habitat, a variety of protective measures must be taken. Appropriate state agencies should be contacted for information. A listing of relevant agencies is located in Appendix B.

The Critical Area criteria specifically require that the location of new or expanded water-dependent facilities be sited to prevent disturbance to sites of significance to waterfowl. Increased boating activities associated with new or expanded water-dependent facilities can deter waterfowl from utilizing historic staging and concentration areas. A general indication of waterfowl areas can be obtained from Habitat Protection overlays; however, the Fish, Heritage and Wildlife Administration of the Maryland Department of Natural Resources should be consulted to make site-specific determinations of the potential effects of proposed activities on waterfowl populations.

APPENDIX B

AGENCY CONTACTS

AGENCY	ACTIVITY/RESOURCE
	State Agencies
1) Chesapeake Bay Critical Area Commission 45 Calvert Street, (2nd Floor) Annapolis, Maryland 21401 (410) 974-2426	Permissible land use; interpretation of Critical Critical Area criteria and general guidance on water-dependent development in the Critical Area.
2) Department of Natural Resources Water Resources Administration Nontidal Wetlands Division Tawes State Office Building Annapolis, Maryland 21401 (410) 974-3841	Permissible uses of Nontidal Wetlands, Interpretation of Nontidal Wetland Regulations, and guidance on development impacting Nontidal Wetlands in the Critical Area, Guidance for the permitting process, mitigation and technical assistance concerning Nontidal Wetlands.
3) Department of Natural Resources Water Resources Administration Tidal Wetlands Division Tawes State Office Building Annapolis, Maryland 21401 (410) 974-3871	Interpretation of Tidal Wetland Law and Regulations, Guidance on dredging, filling, permissible structures, direct stormwater discharges, structures on piers, wetland ecology and habitat considerations and impacts to Tidal Wetlands resulting from water-dependent development in the Critical Area.

4) Department of Natural Resources
Tidewater Administration
Coastal and Watershed Resources Division
Tawes State Office Building
Annapolis, Maryland 21401
(410) 974-2784

Evaluation of projects to verify consistency with federal Coastal Zone Program.

5) Department of Natural Resources
Tidewater Administration
Chesapeake Bay Research and Monitoring
Tawes State Office Building
Annapolis, Maryland 21401
(410) 974-3782

Estuarine monitoring, Toxicology and Resource monitoring.

6) Department of Natural Resources
Tidewater Administration
Fisheries Division
Tawes State Office Building
Annapolis, Maryland 21401
(410) 974-3358

Information on fisheries, both finfish and shellfish stock. Biological, ecological and environmental impacts affecting fish populations, guidance on protecting shellfish and anadromous fish during development activities (also contact Tidal Wetlands Division).

7) Department of Natural Resources
Maryland Environmental Service
2011 Commerce Park Drive
Annapolis, Maryland 21401
(410) 974-7281 or 1-800-I-RECYCL

Information on the proper disposal of all waste and recycling facilities. Information on the disposal of dredged material.

8) Department of Natural Resources
Fish, Heritage & Wildlife Administration
Tawes State Office Building
Annapolis, Maryland 21401
(410) 974-551

Guidance on Heritage Area, rare, threatened or endangered species, waterfowl concentrations and historic staging areas, unique habitats, habitat considerations, FIDBs, and Habitat Protection Areas (HPAs), also information on the presence of protected resources and guidance on implementing protection and/ or conservation plans.

9) Department of Natural Resources
Boating Administration
Waterway Improvement Program and
Tawes State Office Building
Annapolis, Maryland 21401
(410) 974-2743

Information on channel maintenance, navigation, marine construction, and State dredging activities. Removal of debris and derelict boats, engineering and inspection of marine development.

10) Department of Natural Resources
Boating Administration
Planning & Policy Program
Tawes State Office Building
Annapolis, Maryland 21401
(410) 974-2939

Pumpout Grants, and interpretation of Pump-out legislation. Guidance on the Clean Vessel Act, Moorings, MSDs boat operation and BMPs.

11) Department of Natural Resources
Boating Administration
Shore Erosion Program
Tawes State Office Building
Annapolis, Maryland 21401
(410) 974-3727

Shore Erosion Control, vegetative stabilization, bulkheads, rip rap and stone revetments, breakwaters, etc.

12) Department of Natural Resources
Maryland Geological Survey
Coastal and Estuarine Geology and
Hydrogeology and Hydrology
2300 St. Paul Street
Baltimore, Maryland 21218
(410) 554-5544 and (410) 554-5550

Information on coastal and estuarine geology and hydrogeology and hydrology of the Chesapeake Bay, historical erosion rates bay-wide.

13) Department of the Environment
Sediment and Stormwater Administration
2500 Broening Highway
1st Floor, Building 30
Baltimore, Maryland 21224
1-800-992-8017

Guidance on sediment and erosion control, stormwater permits, and stormwater management techniques and technologies. Information on appropriate management practices and retrofitting methods for runoff control.

14) Department of the Environment
Water Quality Program
2500 Broening Highway
1st Floor, Building 30
Baltimore, Maryland 21224
(410) 631-3902

Guidance on water quality certification and permits, general water quality, presence of shellfish resources and required offset distances for harvesting shellfish and\or siting of water-dependent facilities, required sanitation provisions.

15) Marylahd Office of Planning
Comprehensive Planning Division
301 West Preston Street
Baltimore, Maryland 21201
(410) 225-4562

State comprehensive planning and water resources coordination.

16) Department of Agriculture
Aquaculture Office
50 Harry S Truman Pkwy
Annapolis Maryland 21401
(410) 841-5724

Information on aquaculture.

17) Board of Public Works
Wetlands Administration
Louis L. Goldstein Treasury Building
Room 209
Annapolis, Maryland 21401
(410) 974-2664

Requires application and review for any project impacting State Wetlands requiring State Wetlands License.

18) Maryland Historic Trust
100 Community Place
Crownsville, Maryland 21032-2023
(410) 514-7631

Requires comments on all project applications.

Federal Agencies

19) U.S. Army Corps of Engineers
Baltimore District
P O Box 1715
Baltimore, Maryland 21203-1715

Require permits for any dredging, filling, or construction activities in tidal or nontidal wetlands, disposal of dredged material in addition to water quality certification.

20) U.S. Environmental Protection Agency
Chesapeake Bay Program
410 Severn Avenue
Annapolis, Maryland 21401
(410) 266-6873

Guidance on the siting, design, and management and operation of marinas and other water-dependent structures. Information on BMPs, and water quality monitoring, determination of flushing rates, water circulation patterns and salinity regimes. Environmentally sensitive methods of construction, and the presence and protection of aquatic resources.

21) U.S. Department of the Interior
Fish and Wildlife Service
900 Bestgate Road, Suite 401
Annapolis, Maryland 21401
(410) 224-2732

Comments on dredging, filling, disposal of dredged spoil, disturbance to wetlands or other aquatic resources. Guidance on water-dependent development.

Research Institutes

22) Johns Hopkins University
Chesapeake Bay Institute
4800 Atwell Road
Shady Side, Maryland 20764
(410) 867-7550

Guidance and technical assistance on marine and estuarine processes, such as flushing, salinity regimes circulation patterns, transport of sand and water quality data. General biological and ecological information on estuarine organisms. Toxicology.

23) University of Maryland
Center for Environmental and
Estuarine Studies (CEES)
P O Box 775, Horn Point
Cambridge, Maryland 21613
(410) 228-9250

Information on chemical, physical, biological processes of estuarine systems.

Appendix C

LOCATIONAL REQUIREMENTS FOR
WATER-DEPENDENT FACILITIES

WATER-DEPENDENT FACILITY	CRITICAL AREA LAND USE DESIGNATION PERMITTED	COMMENT
Industrial and Port Related Facilities (New, Expanded, Redeveloped)	IDA	May be permitted only in shoreline areas designated as Buffer Exemption Areas (BEAs)
Marinas and other Commercial Maritime Facilities (New)	IDA LDA	
Marinas and other Commercial Maritime Facilities (Expanded)	IDA LDA RCA	Permitted in RCA only if net improvement in water quality is achieved
Community Piers (New and Expanded)	IDA LDA RCA	Subject to limitations on slip density
Public Beaches and Other Public Water-Oriented Recreation Areas (New)	IDA LDA RCA	Allowed in LDA and RCA under certain conditions

* Key: IDA - Intensely Developed Area
RCA - Resource Conservation Area
LDA - Limited Development Area

(Table adapted from CBCAC, 1986)

Glossary

Anadromous fish means fish that travel upstream (from their primary habitat in the ocean) to freshwaters in order to spawn.

Atmospheric deposition is a process whereby pollutants are transported from ground-based sources and through atmospheric processes are deposited on a distant land or water surface.

Bathymetric means pertaining to the depth of a waterbody.

Benthic means "bottom-dwelling", or associated with the sea bottom.

Best management practices (BMPs) means conservation practices or systems of practices and management measures that control soil loss and reduce water quality degradation caused by nutrients, animal waste, toxics, and sediment.

Buffer means a naturally vegetated area or vegetated area, established or managed to protect aquatic, wetland, shoreline, and terrestrial environments from man-made disturbance.

Colonial nesting water birds means herons, egrets, terns, and glossy ibis. For purposes of nesting, these birds congregate (that is "colonize") in relatively few areas, at which time, the regional populations of these species are highly susceptible to local disturbances.

Commission means the Chesapeake Bay Critical Area Commission.

Community piers means boat docking facilities associated with subdivisions and similar residential areas, and with condominium, apartment, and other multiple-family dwelling units. Private piers are excluded from this definition.

Critical Area means all lands and waters defined in Natural Resources Article, § 8-1807, Annotated Code of Maryland. They include:

(a) all waters of and lands under the Chesapeake Bay and its tributaries to the head of tide as indicated on State wetland maps, and all State and private wetlands designated under Natural Resources Article, Title 9, Annotated Code of Maryland;

(b) all land and water areas within 1,000 feet beyond the landward boundaries of the State or private wetlands and the heads of tides designated under Natural Resources Article, Title 9, Annotated Code of Maryland; and

(c) Modification of these areas through the inclusions or exclusions proposed by local jurisdictions and approved by the Commission as specified in Natural Resources Article, § 8-1807, Annotated Code of Maryland.

Density means the number of dwelling units per acre within a defined measurable area.

Development activities means the construction or substantial alteration of residential, commercial, industrial, institutional, or transportation facilities or structures.

DO means dissolved oxygen; the concentration of free molecular oxygen in the water column.

Ecosystem means a more or less self-contained biological community together with the physical environment in which the communities organisms occur.

Endangered species means any species of fish, wildlife, or plants which have been designated as such by regulation by the Secretary of the Department of Natural Resources. Designation occurs when the continued existence of these species as viable components of the State's resources is determined to be in jeopardy. This includes any species determined to be an "endangered" species pursuant to the federal Endangered Species Act.

Estuary means a somewhat restricted body of water where the flow of freshwater mixes with salt water transported, by tide, from the ocean. Estuaries are some of the most productive ecosystems on the planet.

Eutrophication is the process by which an excess of plant nutrients (e.g., nitrogen and phosphorus) reduces the oxygen dissolved within a body of water, producing an environment that does not readily support aquatic life.

Fecal Coliform refers to the bacteria present in mammalian feces, used as an indicator of the presence of human feces, bacteria, viruses, and pathogens in the water column.

Fisheries activities means commercial water-dependent fisheries facilities including structures for the packing, processing, canning, or freezing of finfish, crustaceans, mollusks, and amphibians and reptiles and also related activities such as wholesale and retail sales, product storage facilities, crab shedding, off-loading docks, shellfish culture operations, and shore based facilities necessary for aquaculture operations.

Fixed breakwaters means a breakwater constructed of solid, stationary material.

Floating breakwater means a breakwater constructed to possess a limited range of movement.

Flushing time refers to the time required for a waterbody, e.g., a marina basin, to exchange its water or a percentage thereof with water from the parent waterbody.

Forest interior dwelling birds means species of birds which require relatively large forested tracts in order to breed successfully (for example various species of flycatchers, warblers, vireos, and woodpeckers).

Highly erodible soils means soils with a slope greater than 15%, or those soils with a K value greater than .35 and with slopes greater than 5%.

Historic waterfowl staging and concentration area means an area of open water and adjacent marshes where waterfowl gather during migration and throughout the winter season. These areas are "historic" in the sense that their location is common knowledge and because the area has been used in recent times.

Hydric soils means soils that are wet frequently enough to periodically produce anaerobic conditions, thereby influencing the species composition or growth, or both, of plants on those soils.

Hydrographic means pertaining to ground or surface water.

Intensely developed areas (IDA) refers to any land area of 20 or more contiguous acres, or the entire upland portion of a municipality within the Critical Area (whichever is less) where residential, commercial, institutional, and/or industrial land uses predominate, and where relatively little undisturbed, natural habitat occurs. These areas also have at least one of the following characteristics: a density of development equal to or greater than four dwelling units per acre; the presence of public sewer and water systems with a density of greater than three dwelling units per acre; or, a concentration of industrial, institutional or commercial uses.

Impervious surface means an area covered with solid material or that is compacted to the point where water can not infiltrate underlying soils (e.g., parking lots, roads, houses, patios, swimming pools, tennis courts etc.). Stormwater runoff velocity and volume can increase in areas covered with impervious surfaces.

Limited development areas (LDAs) are those areas which are currently developed in low or moderate intensity. They also contain areas of natural plant and animal habitats, and the quality of runoff from these areas has not been substantially altered or impaired. These areas have at

least one of the following features: housing density between one dwelling unit per five acres and four dwelling units per acre; not dominated by agriculture, wetland, forest, barren land, surface water or open space; or has a mix of open space, dwellings, and the presence of public water and sewer facilities. Areas with IDA characteristics, but less than 20 adjacent acres, are classified as LDA.

Marina means any facility for the mooring, berthing, storing, or securing of watercraft, but not including community piers and other non-commercial boat docking and storage facilities.

Mean high water (MHW) is a tidal datum defined by NOAA as the arithematic mean of the high water heights observed over a specific 19 year netonic cycle. (The National Tidal Datum Epoch)

Mean low water (MLW) is a tidal datum defined by NOAA as the arithematic mean of the low water heights observed over a specific 19 year netonic cycle. (The National Tidal Datum Epoch)

Mitigation refers to a variety of processes by which offsets for adverse environmental disturbance may be provided. Some mitigating techniques include tree plantings, wetland creation, improvement in stormwater management and cash payment in lieu of on-site mitigation. Mitigation is determined primarily by local government planners on a case-by-case basis using site-specific information.

Natural features means components and processes present in or produced by nature, including but not limited to, soil types, geology, slopes, vegetation, surface water, drainage patterns, aquifers, recharge areas, climate, flood plains, aquatic life, and wildlife.

Natural heritage area means any communities of plants or animals which are considered to be among the best Statewide examples of their kind, and are designated by regulation by the Secretary of the Department of Natural Resources.

Natural vegetation means those plant communities that develop in the absence of human activities.

No-discharge zone means an area where the discharge of any marine sewage is not permitted.

Nonpoint source pollution means pollution generated by diffuse land use activities rather than from an identifiable or discrete facility. It is conveyed to waterways through natural processes, such as rainfall, stormwater runoff, or groundwater seepage rather than by deliberate discharge.

Nonpoint source pollution is not generally corrected by "end of pipe" treatment, but rather, by changes in land management practices.

Nontidal wetlands means: (a) An area that is inundated or saturated by surface water at a frequency and duration sufficient to support, and that under normal circumstances does support, a prevalence of vegetation typically adapted for life in saturated soil conditions, commonly known as hydrophytic vegetation;

(b) Is determined according to the Federal Manual; and,

(c) Does not include tidal wetlands regulated under Natural Resources Article, Title 9, Annotated Code of Maryland.

Nutrient refers to a group of elements which nourish growth. In the Chesapeake Bay system, nitrogen and phosphorus are the nutrients contributing to excessive plant (e.g., Algal) growth and eutrophication.

Offsets means structures or actions that compensate for undesirable impacts.

Organics refers to carbon-containing substances such as oil, gas, pesticides, and plant matter.

Permeable surfaces refers to areas characterized by material that allow stormwater to infiltrate the underlying soils (e.g., soil covered or vegetated areas).

Pollutants means waste material that contaminates air, soil, or water. Sediment, nutrients, and toxic chemicals are considered the major groups of pollutants contributing to the decline of the Chesapeake. Phosphorus is the "Keystone pollutant" effecting the Bay.

Port means a facility or area established or designated by the State or local jurisdictions for the purpose of water-borne commerce.

Project approvals means the approval of development, other than development by a State or local government agency, in the Chesapeake Bay Critical Area by the appropriate local approval authority. The term includes approval of subdivisions plats, and site plans; inclusion of areas with floating zones; issuance of variances, special exemptions, and conditional use permits ; and issuing of zoning permits. The term does not include building permits.

Public water-oriented recreation means shore-dependent recreation facilities or activities provided by public agencies which are available to the general public.

Pump-out refers to a device that pumps or receives human body waste out of a type III marine sanitation devices (holding tanks). These devices vary in size and nature of operation; however, they are primarily used to suction sewage from a holding tank where it is temporarily stored until deposition in an appropriate waste treatment system.

Redevelopment means the process of developing land which is or has been developed.

Removal efficiency is the capacity of a pollution control device to remove pollutants from wastewater and runoff.

Resource conservation areas (RCAs) are characterized by nature-dominated environments, such as wetlands and forest, or resource utilization activities, such as agriculture, forestry, fisheries activities, and aquaculture. These areas have at least one of the following features: a density of one dwelling unit per five acres or less; or the dominant land use is in agriculture, wetland, forrest, barren land, surface water or open space. In addition, new development is to be limited to a density of one dwelling unit per 20 acres in an RCA.

Retrofitting means the improvement of existing facilities and Best Management Practices utilizing updated technology so as to increase their applicability and removal efficiencies. In doing this, management measures can be enhanced and water quality can be improved without the financial investment required for the implementation of totally new management mechanisms.

Riparian habitat means a habitat that is strongly influenced by water and which occurs adjacent to streams, shorelines, and wetlands.

Shallow water habitat means aquatic habitat less than 3 feet in depth at mean low water.

Shoaling is the deposition of sediment causing a waterbody or a location within a waterbody to become more shallow.

Significant means a quantity, amount, or degree of importance determined by State or local government.

Significantly eroding areas means areas that erode 2 feet or more per year.

Site Plan refers to a plan, to scale, showing uses and structures proposed for a parcel of land as required by the Critical Area regulations involved. It includes lot lines, streets, building sites, buildings, other impervious surfaces, other areas of human disturbance, and major landscape features. Site plans are reviewed by the local jurisdiction and the Critical Area Commission staff.

Species in need of conservation means those fish and wildlife whose continued existence as a State's resources are in question and which may be designated by regulation by the Secretary of Natural Resources as in need of conservation pursuant to the requirements of Natural Resources Article, §§ 10-2A-06 and 4-2A-03. Annotated Code of Maryland.

Steep slopes means slopes of 15% or greater incline.

Structure means anything constructed or erected on the ground or which is attached to something located on the ground. Structures include but are not limited to, buildings, radio and TV towers, sheds, piers, gazebos, decks, boathouses, swimming pools, tennis courts, boat ramps, bulkheads etc.

Threatened species refers to any species of fish, wildlife, or plants designated as such by the Secretary of the Department of Natural Resources which appear likely, within the foreseeable future, to become endangered, including any species of wildlife or plant determined to be a "threatened" species pursuant to the federal Endangered Species Act.

Tidal range is the difference in height between mean low tide and mean high tide.

Tidal wetlands refers to those vegetated, or unvegetated, lands bordering, or lying beneath, tidal waters which are subject to regular or periodic tidal action.

Topography means the existing configuration of the earth's surface including the relative relief, elevation, and position of land features.

Tributary streams means those perennial or intermittent streams in the Critical Area which are so noted on the most recent Geological Survey 7.5 minute topographic quadrangle maps (scale 1:24000) or on more detailed maps of studies at the discretion of the local jurisdictions.

Turbidity refers to the degree of sediment suspension in the water column.

Use means the purpose or activity for which a piece of land or its building is designed, arranged, or intended, or for which it is occupied or maintained. Land use planning and control - through zoning and other devices such as Critical Area Law - is a primary concern of the public and planners; with depletion of natural resources and the degradation of the environment , land use is increasingly being recognized as a major national issue.

Variance refers to a device which grants a property owner relief from certain provisions of the Critical Area ordinances when, because of particular physical surroundings, shape, or

topographical condition of the property, compliance would result in an unwarranted hardship upon the owner, as distinguished from a mere inconvenience or a desire to benefit economically. Authority to decide variances is vested in the local jurisdiction's Board of Appeals or, in certain jurisdictions, a special hearing examiner. All variances granted by Boards of Appeal or hearing examiners within the Critical Area are reviewed by Critical Area Commission staff for consistency with State regulations.

Water-dependent facilities means those structures or works associated with industrial, maritime, recreational, educational, or fisheries activities that require a location at or near the shoreline within the Buffer specified in COMAR 27.01.09.

(a) An activity is water-dependent if it cannot exist outside the Buffer and is dependent on the water by reason of the intrinsic nature of its operation. These activities include but are not limited to, ports, the intake and outfall structures of power plants, water-use industries, marinas and other boat docking structures, public beaches and other public water-oriented recreation areas, and fisheries activities.

(b) Excluded from this regulation are individual private piers installed or maintained by riparian landowners, and which are not part of a subdivision which provides community piers.

Watershed means a large region of uplands where the slope of the topography contributes stormwater runoff to an adjacent waterbody or network of waterbodies. The watershed for the Chesapeake Bay encompasses some 16 million acres.

Wildlife habitat refers to those plant communities and physiographic features that provide food, water, and cover, nesting, and foraging or feeding conditions necessary to maintain populations of animal in the Critical Area.

Zoning permit means an official finding that a planned use of a property, as indicated by an application, complies with the requirements of the jurisdiction's zoning ordinance and Critical Area criteria or meets special conditions of a variance or special permit.

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