TIDAL WETLANDS GUIDELINES

Promulgated by the
Virginia Marine Resources Commission

Prepared by the
Habitat Management Division

with
contributions from the
Virginia Institute of Marine Science

Developed Pursuant to Chapter 13 Title 28.2, Code of Virginia

May 2021 Update

Section I

Introduction

The purpose of this document is to revise the existing Wetlands Guidelines to provide "minimum standards for the protection and conservation of wetlands," and "ensure protection of shorelines and sensitive coastal habitat from sea level rise and coastal hazards" as directed in §28.2-1301 of the Code of Virginia. Minimum standards for protection from sea level rise and coastal hazards shall require that permitted activities be designed to survive the impacts of sea level rise, using a model or forecast that incorporates or utilizes the 2017 National Oceanographic and Atmospheric Administration's (NOAA) Intermediate-High scenario projection curve or, in the future, any updated projection based on the best available science and selected through the Coastal Master Plan process. As directed under the 2020 amendments to § 28.2-104.1 of the Code of Virginia, the Virginia Marine Resources Commission (VMRC) "shall permit only living shorelines approaches to shoreline management unless the best available science shows that such approaches are not suitable. If the best available science shows that a living shoreline approach is not suitable, the Commission shall require the applicant to incorporate, to the maximum extent possible, elements of living shoreline approaches into permitted projects." This document will aid citizens and local decision makers in making on-site jurisdictional determinations, explain the risks and benefits provided by various shoreline treatments, establish performance criteria for permitted shoreline activities including wetland mitigation, ensure wetlands protection from sea level rise and coastal hazards, identify criteria relating to living shorelines, and identify preferred shoreline management options in the event the best available science shows that a living shoreline approach is not suitable.

Issuing a wetlands permit does not negate the need for permittee compliance with the Chesapeake Bay Preservation Act (CBPA), § 62.1-44.15:72, as amended in 2020, and any regulations adopted thereunder required to promote coastal resilience and adaptation to sea level rise and climate change. All proposed development, redevelopment, land disturbance, clearing or grading, independent of any proposed tidal wetland impacts, must comply with the aforementioned CBPA, which is enforced through locally adopted ordinances. Compliance with state and local CBPA requirements mandates the submission of a Water Quality Impact Assessment (WQIA) for the review and approval of the local government. Wetlands boards should advise applicants to contact the appropriate local government office to determine if a WQIA is required for the proposed activity(ies).

Further, implementation of the guidelines must be consistent with the Virginia Coastal Master Plan and Planning Framework authorized by Executive Order 24 (November 2018), including by requiring the use of the 2017 NOAA Intermediate-High scenario projection curve or, in the future, any updated projection based on the best available science and selected through the Coastal Master Plan process, in evaluation of all permit applications.

The Local Wetlands Boards have served the Commonwealth well since they were established in 1972 with the passage of the Wetlands Act. The public hearing process provided by the Wetlands Ordinance allows each applicant the opportunity to present their facts to the board for consideration and for the board to evaluate any public comment. These are essential elements of any permit decision along with the requirements of the ordinance, the Code of Virginia, and the guidelines and standards that are provided in the following document. These guidelines are a key tool in performing this citizen-based administration of the program, which aims to effectively balance wetlands preservation with protection and use of private property.

Originally adopted in 1974, the Wetlands Guidelines were formally amended to include nonvegetated wetlands in 1982. The Wetlands Mitigation-Compensation Policy was added to the Guidelines when they were reprinted in 1993, following their adoption in 1989. The last amendment to Virginia's tidal wetlands guidance was an update to the Mitigation-Compensation Policy in 2005. Through this policy, the Commission requires the compensation of all permitted tidal wetland losses provided all mitigative measures have been considered to avoid any impact. The need to compensate for all permitted wetland losses is emphasized by the Commonwealth's commitment to the restoration of the Chesapeake Bay. In 2000, Virginia, as a Chesapeake Bay Program partner, committed to "achieve a no-net loss of existing wetlands acreage and function in the signatories regulatory programs."

In addition to tidal wetlands, Virginia's coastal zone is composed of many different but highly interrelated ecological systems. These include the Commonwealth's State-owned submerged lands, which are vitally important as fish and shellfish feeding, spawning and nursery habitat, non-tidal wetlands, and the adjacent riparian buffer. The latter two provide key roles in the filtering of storm water runoff, nutrient uptake and maintenance of water quality in the Chesapeake Bay. Tidal wetlands equally provide critical habitat in support of the Commonwealth's recreational and commercial fisheries and vital ecological services required for a healthy Chesapeake Bay. Preservation of existing tidal wetlands and the management strategies necessary to ensure their continued existence, therefore, is paramount given the daily stressors associated with the use or development of wetlands coupled with the added risks associated with sea level rise and climate change.

The need to incorporate additional standards necessary for the protection and coastal resilience of Virginia's tidal wetland acreages was addressed by the General Assembly with the passage of living shorelines legislation in 2011 and 2020. Senate Bill 964 (2011) established living shorelines as the preferred alternative; Senate Bill 776 (2020) took the further step of requiring the Virginia Marine Resources Commission and local wetlands boards to approve only living shoreline approaches to shoreline management unless the best available science shows that such approaches are not suitable. If the best available science shows that a living shoreline approach is not suitable, the Commission must require the applicant to incorporate, to the maximum extent possible, elements of living shoreline approaches into permitted projects.

The resulting 2021 revision of the Wetlands Guidelines, therefore, incorporates advances in tidal wetlands scientific principles emerging since the 1993 revision. In passing the Wetlands Act in 1972, the legislature stated the policy of that legislation as follows:

> *"Therefore, in order to protect the public interest, promote the public health, safety and the economic and general welfare of the Commonwealth, and to protect public and private property, wildlife, marine fisheries and the natural environment,*

> *it is declared to be the public policy of this Commonwealth to preserve the wetlands, and to prevent their despoliation and destruction and to accommodate necessary economic development in a manner consistent with wetlands preservation."*

The 2020 amendments to §28.2-1301 added the language below, following the phrase "in a manner consistent with wetlands preservation," to state:

> *"...and any standards set by the Commonwealth in addition to those identified in §28.2-1308 to ensure protection of shorelines and sensitive coastal habitats from sea level rise and coastal hazards, including guidelines and minimum standards promulgated by the Commission pursuant to subsection C."*

The 1972 policy, stated above, coupled with the language added in the 2020 legislation, provide the guiding principles set forth in these guidelines.

Section II

Wetland Types and Properties

In the pages that follow, wetlands are re-described by type as required in the Virginia Code, §28.2-1301. The original Wetlands Guidelines recognized twelve types of vegetated wetlands (marshes) and five types of nonvegetated wetlands (tidal flats and beaches). The revised Guidelines now recognize two tidal wetland types, nonvegetated and vegetated wetlands.

Tidal wetland types are often defined by the vegetation species present, which are primarily determined by salinity and the frequency and duration of inundation. While such approaches have merit in aiding in understanding some aspects of the ecology of a tidal wetland, within the context of the current regulatory framework in Virginia, a simpler approach based upon the presence or absence of vegetation and the hydroperiod (frequency and duration of inundation) provides adequate descriptors to support management decisions. Though defined below as wetland types, as prescribed by statute in Virginia, each of these, including nonvegetated and vegetated, are generally found as zones within a wetland and all are integral to the ecological function of the system.

Nonvegetated Tidal Wetlands

Jurisdictional intertidal nonvegetated wetlands in Virginia are defined as those unvegetated lands that lie between mean low water and mean high water. They can consist of a continuum of grain sizes from fine silts and clays to coarser grains that include sand, gravels, cobbles, and shell. For practical reasons these are divided below into Soft Sediment and Hard Substrate categories that reflect some of the variations that they provide in terms of ecological functions and coastal resilience.

> A. Soft Sediment Habitats - These intertidal habitats consist of silts, clays, and sands, sometimes with disaggregated shell fragments. Though often further distinguished as fine-grained (mostly, silts and clays) and coarse-grained (mostly sand and fine gravels), they in fact represent a continuum of grain size mixtures that provide ecological

functions—supporting micro- and macroalgae, communities of invertebrates that serve as food for fish, shrimp, crabs, and birds, and nutrient cycling. They also provide some attenuation of waves. Importantly, many of these functions do not vary uniformly with grain size. For instance, the abundance and diversity of invertebrate communities are often greatest in intermediate and mixed grain-size habitats, as is nutrient cycling, while the ability to attenuate wave energy will generally increase with grain size, steepness of slope, and distance from the upland.

B. Hard Substrate - Natural hard substrates in intertidal nonvegetated wetlands in Virginia can include coarse gravels, cobbles, and intertidal oyster reefs. Natural rock habitats are not common, but natural intertidal oyster reefs were historically abundant in some areas of the lower Chesapeake Bay and are currently widespread in the coastal bays along the seaside of the Eastern Shore. Intertidal oyster reefs have been shown to support abundant infaunal and epifaunal benthic organisms and serve as refuge and foraging areas for juvenile crabs and fishes. Intertidal oyster reefs have also been shown to attenuate wind waves and boat wakes, and to reduce erosion of adjacent vegetated wetlands. Placement of hard substrate such as stone riprap and concrete on nonvegetated wetlands to provide erosion control has been a common practice in Virginia. These features negatively affect the ecological functions of nonvegetated wetlands within the footprint of, and adjacent to the hard substrate, while also providing a hard substrate habitat for a different suite of organisms and further attenuating wave energy.

Vegetated Tidal Wetlands

Jurisdictional vegetated wetlands in Virginia are defined as those lands containing vegetation that lie between mean low water and 1.5 times the local mean tide range. Vegetation types are largely determined by salinity regime (saltwater/brackish or freshwater) and the degree of saturation, which is determined by the hydroperiod and drainage. Vegetation species that typify these zones are listed in the Code of Virginia (§ 28.2-1300).

A. Regularly Flooded - These tidal wetland types are located between mean low water and mean high water. This zone encompasses the region commonly referred to as the low marsh and dominant plants vary by salinity regime. These wetlands have high exchange rates of carbon, nutrients, and refractory plant matter with the adjacent waterway; provide regular shallow water refuge for aquatic fauna of all life stages; attenuate small waves; and effectively trap waterborne sediment and upland runoff.

B. Irregularly Flooded - Located between mean high water and spring tide high water levels, this wetland type encompasses the high marsh and salt bush zones. It supports a diverse mixture of vegetation and is most often characterized by species less tolerant of regular inundation that vary by salinity regime. Irregularly flooded tidal wetlands provide similar functions to regularly flooded tidal wetlands during inundation, but also provide unique bird and mammal habitat, water quality enhancement, and resilience functions during storm events and astronomical high tide events. Oligohaline/freshwater tidal marshes in this zone undergo seasonal changes in species composition and biomass (with the exception of tidal freshwater forests) that can alter ecological and resilience functions.

These newly recognized wetland types incorporate state-of-the-science understanding of wetland communities based on tidal hydrology and their ability to provide ecological and resilience functions within the shorescape. Science has shown the multifaceted importance of tidal wetlands, regardless of landscape position, to natural ecosystems and humankind. Although distinct wetland communities exhibit varied levels of select functions, tidal wetlands all contribute to estuarine and riparian ecological health. Vegetated and nonvegetated wetlands are known to function synergistically to provide the full suite of ecosystem services necessary to sustain habitat, primary production, water quality, and coastal resilience. Wetlands types, therefore, should not be viewed as a method of grading importance, but only as functional categories.

It is an accepted scientific principle that each tidal wetland type is important to maintain comprehensive functional integrity. Nonvegetated and vegetated wetlands serve as a buffer between the estuary and the upland, interacting with both. Therefore, all tidal wetlands should be managed holistically within the subaqueous to riparian buffer continuum.

Section III

Criteria for Determining Wetlands Jurisdiction and Evaluating Alterations of Wetlands

This section addresses the methods for determining tidal wetlands jurisdiction, followed by a description of activities that can adversely affect tidal wetland functions. General and specific criteria that can assist in evaluating these activities against tidal wetland alterations are included.

As previously stated, wetlands managers are charged by Code with the preservation of tidal wetlands, while accommodating necessary economic development in a manner consistent with wetlands preservation and consistent with any standards set by the Commonwealth to ensure protection of shorelines and sensitive coastal habitats from sea level rise and coastal hazards. These requirements, coupled with the 2020 legislative mandate to permit only living shoreline approaches to shoreline management unless the best available science shows that a living shoreline is not suitable, mean(s) that definitive guidance cannot be provided in a single document for every shoreline treatment scenario likely to arise in Tidewater Virginia. The suitability of a living shoreline for a stabilization project will depend upon a number of factors that include, but are not limited to, hydrodynamic setting, local bathymetry, sediment composition at the location of any structures, conditions in the adjoining riparian zone, potential impacts on adjacent properties, and potential impacts on adjacent habitats, such as riparian vegetation, submerged aquatic vegetation (SAV) and oyster reefs. When needed, jurisdictional-specific and project-specific assistance is available upon request from the Virginia Marine Resources Commission's Habitat Management Division and the Virginia Institute of Marine Science's Office of Research and Advisory Services. Localities may also utilize the Department of Conservation and Recreation's Shoreline Erosion and Advisory Service (SEAS) site-specific advice, if provided, and rely on the additional online tools and information provided by the VIMS Shoreline Studies Program and the Center for Coastal Resource Management (CCRM) as an initial guide, that may require on-site inspection for verification and alternatives analyses. When considering the suitability of a living shoreline design or treatment, the Commission or the local wetlands board shall look to the Virginia Institute of Marine Science Office of Research and Advisory Services in instances in which there is a question as to what constitutes the "best available science."

Determining Tidal Wetlands Jurisdiction

Determining accurate tidal wetland jurisdictional boundaries is critical for fair and proper management, and must be clearly delineated and understood prior to evaluating the proposed use and development of tidal wetlands. Section 28.2-1302 of the Virginia Code defines the jurisdictional boundaries of both nonvegetated and vegetated tidal wetlands. Jurisdictional nonvegetated wetlands must be contiguous to mean low water and are located between mean low water and mean high water. Vegetated wetlands must be contiguous to mean low water, support one or more of the plant species named in §28.2-1302, and extend "from mean low water to an elevation equal to the factor one and one-half times the mean tide range at the site of the proposed project." Jurisdictional vegetated wetlands include those that are regularly flooded and some or all of those that are irregularly flooded as described in § 28.2-1302 of the Code of Virginia. Jurisdictional boundaries can be determined or estimated by conducting onsite elevation surveys with reference to the predicted normal low and high tide lines, using natural shoreline features and indicators, using the saltbush community location (if present) for vegetated, or by state regulatory and academic personnel. Often the applicants/agents will provide jurisdictional boundaries using the methods just described. Regardless of method, the Commission recommends that jurisdictional boundaries be determined prior to application development and/or processing.

General Criteria

The primary objective in the application of the following criteria is to minimize the loss of wetlands and the adverse ecological effects of all permitted activities with any proposed uses of the shoreline.

A. Alteration of the shoreline or construction of shoreline facilities may be permitted in the circumstances described in 1 and 2 below, provided that marine fisheries, valuable fish habitat, wetlands and wildlife resources, flood protection, and water quality are not detrimentally affected, and the proposed use does not contribute to cumulative net losses of tidal wetlands. Alteration of the shoreline or construction of shoreline facilities may be justified in order to:

1. Gain access to navigable waters by:
    - a. Commercial, industrial, and recreational interests for which it has been clearly justified that waterfront facilities are required and the interest is water dependent;
    - b. Owners of land adjacent to waters of navigable depth or waters which can be made navigable with only minimal adverse impact on the environment.

2. Protect property from significant damage or loss due to erosion or other natural causes, provided that only living shoreline approaches are used unless the best available science shows that such approaches are not suitable.

VMRC, in cooperation with other interested state agencies and local wetlands boards, established a general permit regulation that authorizes and encourages the use of living shorelines as the preferred alternative for stabilizing tidal shorelines in the Commonwealth as authorized by Virginia Code § 28.2-104.1. The streamlined process offers two permit options that negate the need for the local wetlands board public hearing and permit, provided the locality has not opted out of the general permit provision. To take advantage of this expedited permit process and learn more about designing living shorelines, visit https://www.vims.edu/research/departments/physical/programs/ssp/shoreline_management/living_shorelines/index.php for advice on how to complete the application and meet the qualifications for a living shorelines general permit. You may also contact the VMRC Environmental Engineer assigned to your project location, viewable at https://mrc.virginia.gov/Territory_Assignments.pdf

B. Alteration of the shoreline is **not permitted**:

1. For purposes or activities that are non-water dependent.

2. For purposes of creating waterfront property from lands not naturally contiguous to tidal waters or for purposes of accessing waterfront property by the placement of fill material not justified by A.1 above.

3. When damage to properties owned by others is a likely result of the proposed activity.

4. When the alteration will result in the drainage or discharge of effluents or storm water which impair wetlands, water quality or other marine resources.

5. When there are alternatives which can achieve the given purpose without adversely affecting water quality, marine fisheries, wildlife, marshes, oyster grounds, submerged aquatic vegetation (SAV) or other natural resources.

6. If the local government has determined that the proposed alteration does not comply with the Chesapeake Bay Preservation Act (CBPA), § 62.1-44.15:72, as amended in 2020; and any regulations adopted thereunder required to promote coastal resilience and adaptation to sea level rise and climate change.

Rationale: These criteria recognize riparian rights and reserve the shoreline for those uses or activities which require water access. These criteria also point out that even some water dependent activities often have a significant and long term adverse impact on the marine environment through such effects as changed upland hydrology, sedimentation, changes in water current patterns near the shoreline, and the introduction of pollutant discharges which frequently lead to closure of shellfish grounds. For example, the dredging of channels into fastlands may also lead to deterioration of ground water by saltwater intrusion into aquifers.

C. Utilization of open-pile type structures for gaining access to adequate water depths is required unless the construction of solid structure, dredging or filling is shown to be necessary.

Rationale: The construction of solid structures, or the conduct of dredging and filling operations, often causes irretrievable loss of wetlands through their direct displacement or by indirect effects of sedimentation or altered water currents. Open-pile type structures permit continued tidal flow over existing wetlands and subtidal areas, avoid potential sedimentation problems, future maintenance dredging, and have less effect on existing water current patterns.

D. As directed by Virginia Code §28.2-104.1, only living shoreline approaches to shoreline management are allowed unless the best available science shows that such approaches are not suitable. If the best available science shows that a living shoreline approach is not suitable, the project must incorporate, to the maximum extent possible, elements of living shoreline approaches. All shoreline alterations should, 1) be designed and constructed to mitigate coastal hazards including storm-level hydrological energy that may reasonably be expected over the useful life of the project, and 2) be functionally resilient and structurally designed to endure the impacts of sea level rise using the 2017 NOAA Intermediate-High scenario projection curve or, in the future, any updated projection based on the best available science and selected through the Coastal Master Plan process.

Rationale: High intensity storms of marine origin are frequent in the mid-Atlantic region and Chesapeake Bay. The useful life of the project is defined as the average amount of time in years that the project is estimated to function when installed properly and routine maintenance is practiced. Shoreline alterations that are generally proposed to address coastal resiliency and control active erosion should ensure that the stabilizing objectives address the most erosive conditions predictable to the project site. This will reduce the likelihood of future adverse environmental impacts from storm events associated with structural failure, reduce maintenance and repair costs, and decrease or eliminate added shoreline disturbances. It is critical to maintain tidal wetland resources and thus, their important functions as sea level rises.

Specific Criteria – Shoreline Protection Strategies

The following specific criteria are established for use in the design, evaluation or modification of individual projects. Specific strategies should attempt to incorporate environmental protection and resiliency as elements of the landowner's desired project objectives.

1. Properly designed and constructed living shorelines are vital to address coastal resiliency, shoreline stabilization, and tidal wetlands sustainability in response to sea level rise. As stated above, by statute, only living shoreline approaches to shoreline management may be approved unless the best available science shows that such approaches are not suitable. Numerous hydrological and geological factors, and shoreline energy potential need to be assessed when developing a living shoreline approach.

Site-specific conditions also need to be addressed that include, but are not limited to: fetch exposure, bank height and condition, upland structure proximity and vulnerability, offshore water depth and sediment consistency, presence and proximity of submerged aquatic vegetation, potential maximum storm wave conditions, conditions of adjacent shorelines, and sunlight availability.

Rationale: When properly located, designed, and constructed, living shorelines can address shoreline stabilization objectives while providing an opportunity for resource sustainability. Not only should there be considerations specifically for tidal wetlands vegetation, but submerged aquatic vegetation and riparian communities,_which need room to migrate with rising sea levels, also play important roles in estuarine water quality, habitat, and wave attenuation, and thus require integration with living shoreline strategies.

2. The placement of either offshore breakwaters or submerged nearshore sills parallel to a portion of shoreline, that elevate the height of an existing beach and retain the sand nourishment or create a protected living shoreline between the structures and the shoreline, is a reasonable strategy consideration in higher hydrological energy shoreline situations. Both breakwaters and sills must be specifically designed for the shoreline segment in question and must be shown to function under future sea level rise conditions.

Rationale: Properly located, designed, and constructed breakwaters and sills can be effective at attenuating wave energy, and they support the sustainability of the landward beach or living shoreline. Depending on the dimensions of the beach and living shoreline, they can also function to dampen storm waves.

3. Shoreline protection structures can be permitted only if there is active, detrimental shoreline erosion which cannot be otherwise controlled by use of a living shoreline. If the Commission or local wetlands board deems that hardening the shoreline is necessary, then living shoreline elements shall be incorporated into the project design, to the maximum extent possible. Shoreline protection structures must be specifically designed for the shoreline segment in question and must be shown to function under future sea level rise conditions.

Rationale: Hardened shorelines typically result in unacceptable direct and/or indirect adverse impacts to tidal wetlands and adjacent subaqueous bottomlands. They also create barriers to tidal wetland migration with sea level rise. The unnecessary use of revetments and bulkheading is not permitted and shoreline hardening may be allowed as an alternative only when absolutely necessary and where the best available science shows that a living shoreline approach is not suitable. A structural approach to shoreline stabilization may be necessary in certain limited instances in response to hydrological and geological shoreline factors, and/or to sufficiently address erosion control. Shoreline modification to address upland and landscape issues other than storm water runoff is not permitted.

4. Rock revetments are the preferred alternative if the best available science demonstrates that a living shoreline is not suitable. Rock revetments must be specifically designed for the

shoreline segment in question and must be shown to function under future sea level rise conditions.

Rationale: Vertical retaining structures tend to reflect wave energy that negatively impacts adjacent wetland and/or subaqueous natural resources. They can also create negative effects upon neighboring properties. Waves, whether from natural causes or from boat wakes, are better absorbed or dissipated by riprap revetments. In addition, the slope and open spaces in riprap structures provides acceptable, but not optimal, habitat for crabs and small fish.

5. Erosion control structures, such as a bulkhead or seawall, are not allowed unless the Commission or the board determines that such approach is necessary and that no other alternative approach is suitable. If a structure is deemed necessary, it should ordinarily be placed as far landward as possible as long as the local government determines it is consistent with the Chesapeake Bay Preservation Act (CBPA), § 62.1-44.15:72, as amended in 2020, and any regulations adopted thereunder required to promote coastal resilience and adaptation to sea level rise and climate change.

Rationale: Landward placement reduces or eliminates direct impacts to tidal resources, but can promote secondary impacts from reflected wave energy and riparian hydrological exchange. Vertical structures also eliminate the ability of tidal wetlands to migrate landward in response to sea level rise.

6. The placement of a groin on eroding shorelines in an effort to trap sand and build up a beach may be permitted when there is sufficient sand in the littoral drift system. If a groin is considered justified, it should be low profile in design and only as long as is necessary to trap sand drifting in the littoral zone. Ideal groin length can be determined by examining the sand fillets in any existing groins along the same shoreline reach or can be based on the width of the local beach. Groins must be required to function under future sea level rise conditions.

Rationale: Groins are designed to trap sand and build beaches. When groins and groin fields function properly, they can provide a functional level of erosion control but can also deprive downdrift shorelines of sand and thus may accelerate erosion to adjacent properties. This is highly dependent on the amount of sand available in the system. The low-profile groin is designed to resemble the natural beach slope and allow sand to by-pass and thus nourish downstream properties once the groin has filled. Groins which are too long for the existing beach may shunt sand out to deeper water thus making it unavailable to downdrift properties. Where sand availability is limited, the use of groin cells could require continued placement of sand to maintain erosion control function and thus the use of groins ordinarily should not be allowed.

7. The use of jetties at the entrance of a channel in order to maintain navigable depths or protect the entrance from wave attack is justified only when there is a clear and demonstrated need for such a structure and adjacent properties will not be significantly adversely affected.

Rationale: Jetties attempt to prevent the littoral drift from entering the channel by trapping sediment moving along the shoreline. Sand tends to accumulate on the updrift side of a jetty and sediments are transported away from the jetty on the downdrift side. This can often result in accelerated erosion of the downdrift shoreline.

Section IV

Minimum Standards – Protection and Conservation of Tidal Wetlands

Pursuant to § 28.2-1308 of the Code of Virginia, the Commonwealth's existing standards below originally applied to the use and development of wetlands by type and class and shall continue to be considered by the Commission and any local wetlands board in the determination of whether any permit should be granted or denied:

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

2. Development in Tidewater Virginia, to the maximum extent practical, shall be concentrated in wetlands of lesser ecological significance, in vegetated wetlands which have been irreversibly disturbed before July 1, 1972, in nonvegetated wetlands which have been irreversibly disturbed prior to January 1, 1983, and in areas of Tidewater Virginia outside of wetlands.

As evidenced in the updated tidal wetlands types outlined in Section II, advances in scientific understanding highlight the significance of ecological functions across all vegetated and nonvegetated natural tidal wetland communities. Disturbances to any natural tidal wetland must now be critically reviewed within a comprehensive framework that recognizes their intrinsic ecological value. In deciding whether to grant, grant in modified form or deny a permit, to ensure protection of tidal wetlands, shorelines and sensitive coastal habitats from sea level rise and coastal hazards, the following four additional minimum standards shall also be considered by the Commission and all local wetland boards as directed by §28.2-1301B, §28.2-1302.9 and §28.2-1302.10A3:

1. Any application for a project including erosion control projects, removal of vegetation, construction access or land disturbance, that will impact the Resource Protection Area must also be independently approved by the local government as consistent with the Chesapeake Bay Preservation Act (CBPA), § 62.1-44.15:72, as amended in 2020, and any regulations adopted thereunder required to promote coastal resilience and adaptation to sea level rise and climate change, including where applicable, the requirement of an approved Water Quality Impact Assessment and any required mitigation measures.

2. If a General Permit is not suitable given onsite conditions, project review of any proposed uses or development of tidal wetlands shall include data derived from an onsite analysis and provided on scaled drawings that minimally includes the square footage of existing and resulting tidal wetland types, existing and proposed grade elevations and slope, mean high, mean low and the 10-year storm event water levels as calculated by NOAA and the Federal Emergency Management Agency (FEMA), existing and projected bathymetric elevations to the minus 1-foot mean low water elevation and the current shoreline condition of adjacent

properties to include any existing treatments. Additional consideration of shoreline variables shall also be given to fetch exposure, fastland bank condition, bank height, bank composition, nearshore stability, upland use/proximity to infrastructure/cover, width and elevation of backshore region, and boat wakes. Access pathway(s) for land-based construction should be included on the drawings and their impacts considered, as well as all other requirements in § 28.2-1302 of the Code of Virginia.

3. Proposed uses or development of tidal wetlands must allow, to the maximum extent possible when considering existing structures and infrastructure (including but not limited to roads, houses, and outbuildings), and natural impediments (including but not limited to steep banks and bluffs), the landward migration of existing vegetation over the useful life of the project, using the 2017 NOAA Intermediate-High scenario projection curve outlined in Section III-D of these Guidelines or, in the future, any updated projection based on the best available science and selected through the Coastal Master Plan process.

4. Proposed uses or development of tidal wetlands shall only be approved if the uses or development proposed meets the criteria outlined in Section III of these Guidelines. Project review shall include the use of data derived from existing online advisory tools, engineering analyses or other online tools that facilitate the measurements of fetch, depth offshore, shoreline morphology, shoreline orientation, nearshore morphology, oyster leases, submerged aquatic vegetation, tide range, storm surge frequency, erosion rate, design wave determination, and sea level rise. Project review shall determine whether the submitted proposal satisfies the statement required by § 28.2-1302B of the Code of Virginia that thoroughly reflects and documents the analysis undertaken by the applicant *indicating whether use of a living shoreline as defined in § 28.2-104.1 for a shoreline management practice is not suitable, including reasons for the determination,* which must be provided with any proposal. The public hearing may not be scheduled prior to the receipt of this information. Applications shall be considered incomplete until this statutory requirement is met and the information supporting the required statement is provided as part of the application to the Commission or local wetlands board staff.

In addition to the consideration of the aforementioned minimum standards deemed necessary to ensure the conservation and protection of tidal wetlands, the Commission or board shall evaluate all proposed shoreline treatments utilizing the best available science provided in the record, as previously defined in Section III of the Guidelines. In evaluating the suitability of a living shoreline, the Commission or local wetlands board must incorporate consideration of long-term sustainability and coastal resilience, and local geological and hydrological factors and other environmental factors contributing to erosion. To further guide the Commission and local wetland boards, a site shall be deemed suitable for a living shoreline treatment unless the best available science demonstrates that such approach is not suitable.

Section V

Best Available Science Resources

Habitat Engineers within VMRC's Habitat Management Division provide an experienced conduit through which the best available science and the suitability of a site for a living shoreline can be relayed to an applicant. The Virginia Institute of Marine Science (VIMS) is designated as the Commonwealth's science advisor on coastal and marine natural resource-related issues. As such, VIMS will be the arbiter in situations in which the *best available science* is in question.

Glossary

In the course of considering applications for permits pursuant to the Wetlands Zoning Ordinance, various terminology may be used. As such, the following definitions apply:

Armor
Larger stone used as the outer layers of a revetment directly exposed to wave action (see also ***Stone size***).

Bank height
The approximate height of the upland bank above mean low water.

Bathymetry
The topography, or contours, of a waterway correlated to water depths.

Beach
The shoreline zone comprised of unconsolidated sandy material upon which there is mutual interaction of the forces of erosion, sediment transport and deposition extending from the low water line landward to where there is a marked change in either material composition or physiographic form such as a dune, bluff, or marsh, or where no such change can be identified, to the line of woody vegetation (usually the effective limit of storm waves), or the nearest impermeable man-made structure, such as a bulkhead, revetment or paved road.

Best Management Practice (BMP)
Measures that have the combined effect of ensuring project integrity for the design life of the project while minimizing the potential adverse impacts associated with construction and maintenance.

Beach nourishment
The placement of good quality sand along a beach shoreline to raise the elevation of the nearshore area.

Breakwater
A structure usually built of rock positioned a short distance from the shore. The purpose is to deflect the force of incoming waves to protect a shoreline.

Bulkhead
A vertical structure that acts as a retaining wall usually constructed parallel to a shoreline.

Buried toe
The trenched seaward toe of a revetment to help prevent scour and shifting of the structure.

Core stone
Smaller stone used as the base of a revetment to provide a stable base for armor stone.

Downdrift
The resulting direction material is carried as waves strike a shore and move "down" along a shoreline.

Ecosystem Services
Components of nature, directly enjoyed, consumed, or used to yield human well-being.

Fastland
Land that is high and dry near water, upland.

Fetch
The distance along open water over which wind blows. For any given shore, there may be several fetch distances depending on predominant wind directions, but there is generally one fetch which is longest for any given shoreline exposure.

Filter cloth
Synthetic textile placed between bulkhead sheeting and backfill or underneath a revetment to prevent soil loss yet provide permeability.

Gabion
A basket or cage filled with stone, brick or other material to give it a weight suitable for use in revetments or breakwaters. In the marine environment, usually made with galvanized steel wire mesh with a PVC coating.

Groin
A rigid, vertical structure extending perpendicular to shore to trap transporting sand or other material down a shoreline.

Groin field
A series of several groins built parallel to each other along a shoreline.

Headland
A point of land jutting out into a body of water or a shoreline section less resistant to erosion process than adjacent shorelines.

Halophyte
A plant that naturally grows where it is affected by salinity in the root area or by salt spray.

Hydrophyte
A plant that has adapted to living in or on aquatic environments

Jetty
A structure similar to a groin, but typically designed to prevent shoaling of a navigation channel.

Joint Permit Application or ***JPA***
The standard Joint Permit Application for shoreline stabilization structures and other activities conducted in wetlands and the marine environment. The applicant completes one form and submits to either local agency or VMRC, which is responsible for distributing to local, state and federal permitting and advisory agencies (e.g. VIMS, Dept. of Wildlife Resources, Dept. of Conservation & Recreation, Dept. of Environmental Quality, US Army Corps of Engineers).

Incidental effects
Indirect impacts of an activity or structure, such as those resulting from redirected wave energy, trapped sand or sedimentation.

Littoral transport
The movement of sand and other materials along the shoreline in the littoral zone, or the area between high and low watermarks during non-storm periods.

Low profile
The recommended design for groins with a channelward elevation no greater than mean low water to allow sand bypass to continue once the groin cell is filled, reducing the potential for adverse downdrift effects.

Marsh fringe
A band of marsh plants which runs parallel to a shoreline.

Marsh toe revetment
A low revetment built to protect an eroding marsh shoreline.

Mean low water
The average height of low waters over a nineteen year period. Virginia is a low water state, meaning private property extends to the mean low water line.

Mean tide range
The vertical distance between mean high water and mean low water.

Nearshore
The area close to the shore but still partly submerged. This area is where sand bars and shoals often form.

Nonvegetated Wetlands
Unvegetated lands lying contiguous to mean low water and between mean low water and mean high water, including those unvegetated areas of Back Bay and its tributaries and the North

Landing River and its tributaries subject to flooding by normal and wind tides but not hurricane or tropical storm tides.

Oligohaline
Brackish water with a salinity of 0.5 to 5.0 parts per thousand from ocean-derived salts.

Pressure treated
The process of preserving wood by impregnating it with chemicals to reduce or retard invasion by wood destroying organisms.

Reach
A discrete portion of a shoreline somewhat homogeneous in its physical characteristics and upon which there are mutual interaction of the forces of erosion, sediment transport, and accretion.

Resilience
The capability to anticipate, prepare for, respond to, and recover from significant multi-hazard threats with minimum damage to social well-being, health, the economy, and the environment. Similarly, we define adaptation as adjustment in natural or human systems to a new or changing environment that exploits beneficial opportunities or moderates negative effects.

Return walls
Bulkhead end sections perpendicular to the shoreline to tie the bulkhead into the upland and prevent the bulkhead from being flanked as the shoreline continues to retreat on either side of the structure.

Revetment
A sloped structure constructed with large, heavy stone, often in two layers, used to anchor the base of the upland bank. The size of a revetment is dictated by the energy of the shoreline environment where it is proposed.

Riprap
Stone that is hard and angular that will not disintegrate from exposure to water or weathering.

Scarp
A low steep slope caused by wave erosion.

Seawall
A vertical wall or embankment, usually taller and larger than a bulkhead.

Shoal
A shallow area in a waterway, often created by nearby sandbars or sandbanks.

Shore orientation
The compass direction the shoreline faces. Some directions are more prone than others to the erosive forces of storm events.

Sill
An erosion protection measure that combines elements of both revetments and offshore breakwaters. Sills are usually built of stone, low in profile and built close to shore.

Sediment barrier or ***Silt screen***
Structures placed at the toe of a slope or in a drainage way to intercept and detain sediment and decrease flow velocities. Barriers may be constructed of posts and filter fabric properly anchored at the base or hay bales staked in place end to end.

Sheet pile
A wooden plank or steel sheet used in the construction of bulkheads and groins.

Slope
The degree of deviation of a surface from the horizontal measured as a numeric ratio, percentage or in degrees. When expressed as ratio, the first number is the horizontal distance and the second is the vertical distance.

Splash apron
A structural component, often of rock, used to prevent forceful waves from scouring out material from the top of a revetment or bulkhead.

Spur
A vertical structure normally used perpendicular to groins to redirect incoming waves to allow a sheltered area in the lee and promote the accumulation of sand.

Stone size
Classes of riprap stone based on weight per VDOT specifications

Class A1	25-75 pounds, ≤ 10% weighing more than 75 lbs, "man-sized"
Class 1	50-150 pounds, 60% weighing more than 100 lbs
Class 2	150-500 pounds, 50% weighing more than 300 lbs
Class 3	500-1,500 pounds, 50% weighing more than 900 lbs
Type 1	1,500-4,000 pounds, average weight 2,000 lbs
Type 2	6,000 – 20,000 pounds, average weight 8,000 lbs

Storm surge
The resulting temporary rise in sea level due to large waves and low atmospheric pressure created during storms.

Subaqueous or ***Submerged lands***
The ungranted lands beneath the tidal waters of the Commonwealth extending seaward from the mean low water mark to the 3 mile limit.

Submerged aquatic vegetation (SAV)
Rooted plants found in shoal areas of Chesapeake Bay, which provide important ecological roles, such as providing food, shelter and oxygen as well as trap sediment and dissipate wave energy.

Submerged aquatic vegetation (SAV) bed
SAV observed on site or mapped at any density class in at least one of the previous five years by the Virginia Institute of Marine Science.

Time-of-year restrictions
Restrictions that limit construction projects during periods of heightened sensitivity for species of concern, such as anadromous fish, nesting shorebirds, shellfish, submerged aquatic vegetation, and threatened and endangered species, such as the bald eagle and northeastern beach tiger beetle.

Tombolo
The area of accumulated beach material in the lee of a breakwater structure.

Useful life of the project
The average amount of time in years that the project is estimated to function when installed properly and routine maintenance is practiced.

Wave climate
The average wave conditions as they impact a shoreline, including waves, fetch, dominant seasonal winds and bathymetry.

Wave energy
The force a wave is likely to have on a shoreline depending on environmental factors, such as shore orientation, wind, channel width, and bathymetry.

Wave height
The vertical measurement of a single wave from its base or trough to its top or crest.

Wetland type
A class of wetland distinguished based on the presence or absence of vegetation, substrate type (for nonvegetated) and degree of inundation (for vegetated).

Adopted May 25, 2021

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