

VIMS – CCRM Coastal Management Decision Tools
Currently Defended Shorelines - Definitions



Defense Types	
Bulkhead	A vertical structure that acts as a retaining wall usually constructed parallel to a shoreline.
Revetment	A sloped structure constructed with large, heavy stone or other material (riprap) placed against the upland bank for erosion protection. The size of a revetment should be dictated by the wave height expected to strike the shoreline.
Bulkhead toe revetment	A sloped stone structure placed on the channelward side of a bulkhead.
Miscellaneous debris	Concrete rubble, old bricks, or demolition debris used as substitute for quarry stone in revetment structures.
Groins	Structures placed perpendicular to the shoreline to capture material moving in the littoral zone and to accumulate sand along the shoreline. The sandy beach provides the desired erosion protection.
Groin Field	A series of several groins built parallel to each other along a beach shoreline.
Marsh sill	A low revetment placed offshore from an existing marsh, or in conjunction with placement of sand to expand an existing marsh or create a marsh where it does not occur naturally.
Offshore breakwater(s)	Series of large rock structures placed offshore to maintain a beach; where no beach or only a narrow beach exists, beach nourishment should be included.
Unconventional defense structures	Unique materials not commonly used or without established performance record, including but not limited to pre-cast concrete, well-casing groins, gabion baskets filled with stone, reef balls, oyster castles, "Sea-Bees", dry-stacked block walls, other engineered walls.
Multiple Structures	More than one type of structure present at same location, e.g. revetment or bulkhead and groins, revetment and offshore breakwater.
Integrated vegetation buffers	Create or enhance wetland and riparian buffer vegetation along gradient from mid-tide landward to upland area; allow native vegetation to grow without frequent mowing or add new wetland and riparian buffer vegetation, e.g. trees, shrubs, deep-rooted grasses, perennials, and ground covers. May require bank grading. Replace waterfront lawn with ornamental grasses, native shrubs and small trees.
Defense Structure Condition	
Structural Integrity	The physical condition of a defense structure.
Serviceable / No erosion	Structure is undamaged and easy to repair; no erosion above, along toe or at ends of structure; of sound structural integrity.
Failing	Structure is losing integrity; structure shows signs of normal wear and tear. Bulkheads: leaning, biodegradation, rotting timber, heavy cover of fouling organisms (barnacles, oysters or algae); loss of backfill (sinkholes) along top of bulkhead, missing sheet piles. Revetments: slope is flat, stones are scattered above or channelward from original footprint, filter cloth is exposed.
Flanked	Erosion is visible behind, above or around end(s) of structure.
Failed	Structure is ineffective and no longer serves original purpose; structure has missing, broken or collapsed parts; also Dilapidated, Derelict

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Shoreline Conditions	
Energy/Risk Level	<p>Combination of expected wave energy and threat to property, human health and safety; includes erosion risk and proximity of primary and accessory structures</p> <p>Low – narrow fetch generally less than 0.5 mile, upper reaches of tidal creeks, tidal coves, limited navigation by motorized boats, no primary or secondary improvements in close proximity to shoreline, and/or minor erosion.</p> <p>Moderate – fetch generally between ½-2 miles, some motorized boat traffic and boat wakes, primary or secondary improvements near shoreline, and/or active erosion.</p> <p>High – fetch generally greater than 2 miles, major tributaries, open bays, Bayfront, numerous motorized boats and boat wakes that strike shore, and/or primary or secondary improvements in very close proximity to shoreline, and/or significant storm erosion.</p>
Beach present	<p>Shoreline type dominated by loose, unconsolidated sand.</p> <p>Wide beach - generally includes area above Mean High Water elevation and higher than regular tidal action.</p>
Beach potential	<p>Shallow nearshore water depth and gradual intertidal slope is present where a created beach could be placed for sand buffer and offshore breakwaters.</p>
Shoreline length	<p>Length of shoreline currently defended or potentially defended, may include single or multiple parcels along reach with similar shoreline conditions.</p>
Nearshore water depth	<p>The vertical distance between the water surface and the submerged bottom usually referenced in feet below the mean low water elevation (e.g. – 2 ft MLW).</p> <p>Shallow - at 30 ft. channelward from MLW, water depth is \leq 3 ft.</p> <p>Deep - at 30 ft. channelward from MLW, water depth is $>$ 3 ft.</p>
Navigation condition	<p>Waterway depth and width allowances, presence or absence of motorized boats, natural or dredged channel.</p> <p>Navigation limited refers to restricted channels, canals, boat basins, and/or mooring areas that limit ability to put a defense structure further channelward.</p>
Other Actions & Terms	
Inspect and maintain	<p>Periodically check condition and repair existing structure in current footprint.</p>
Modify upland land use	<p>Reduce risk by changing location or elevation of upland structures and improvements, e.g. house moving, house raising, driveway relocation, hook up to public sewer; may include variance requests for setbacks, other zoning restrictions.</p>
Grade bank	<p>Reduce the steepness of a slope to allow for wave run-up and to improve vegetation growing conditions; ability to grade may be limited by upland structures or dense vegetation providing desirable ecosystem services.</p>
Beach nourishment	<p>Placement of good quality sand along a beach shoreline to increase the beach width and raise the elevation of the nearshore area.</p>
Landward	<p>Location toward upland.</p>
Channelward	<p>Location toward water.</p>