Shore Structures

Protect Upland Resources

Photo: Jason Werling/Sandusky Register

Properly designed and built shore structures help protect important upland resources.

Both hard and soft structures help protect the upland resources at Cedar Point Amusement Park from the forces of wind and wave energy.

The hard structures include a jetty, breakwaters, bulkheads, revetments and seawalls, the latter of which forms a boardwalk in front of the hotels. The seawall is placed at the back (landward) side of the beach.

The beach, dunes and dune vegetation are soft structures that also provide erosion protection.

Upland resources protected by shore structures include, hotels, restaurants, parking lots, marina facilities, roller coasters and other attractions.

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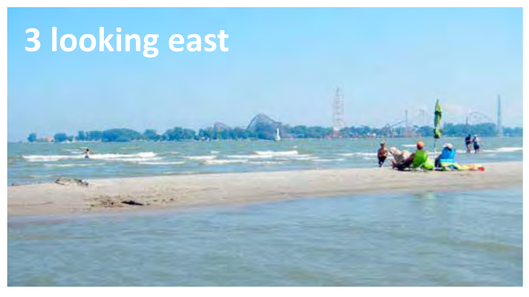
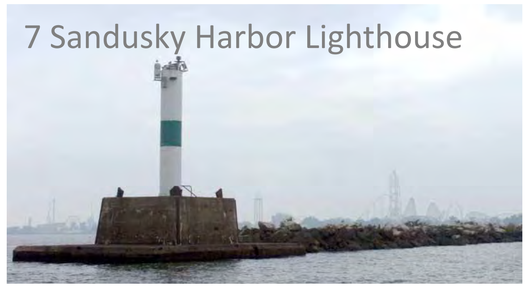
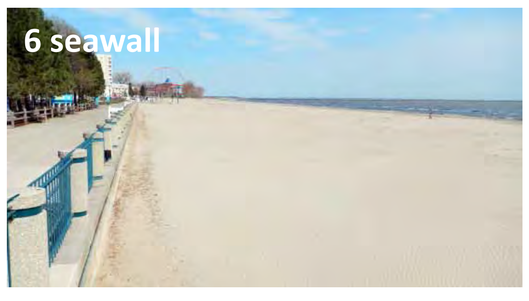


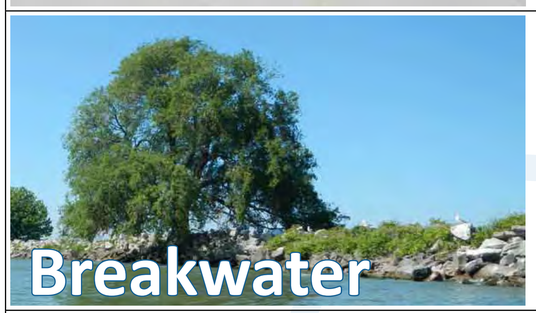
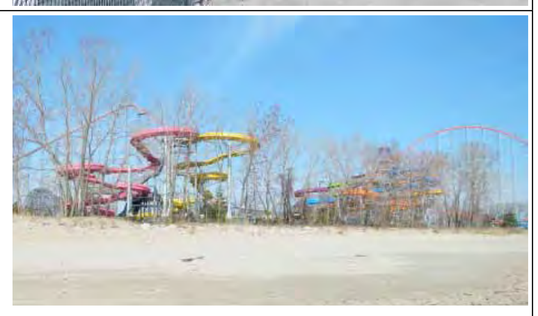
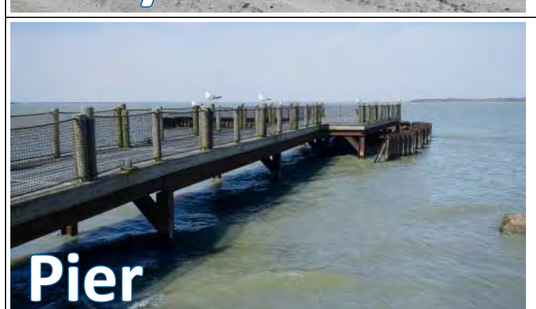
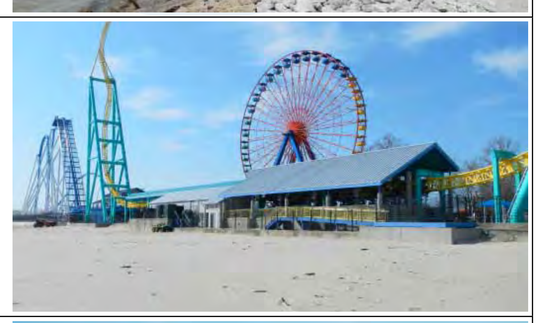




See additional pictures of the shore, learn how shore structures function and what upland resource they protect on the "Type of Shore Structures" chart.

Ohio Department of Natural Resources Office of Coastal Management coastal.ohiodnr.gov

Types of Shore Structures

Shore Structure	How does it function? (interact with energy)	What does it look like?	What upland resource does it protect?
	Beaches are a natural form of erosion protection along a shore. They also provide recreational access to the water. Beaches are an economic catalyst and their value is dependent upon water quality and public access.	**Appearance**: Sand and cobble. **Materials**: Nourished beaches should consist of sediment of the same size or larger than the sand naturally at the site. If smaller, the sediment will leave the beach too quickly.	
	Breakwaters reduce the energy of approaching waves, creating a calm environment landward of the structures.	**Appearance**: Often attached to and built at an angle from the shore but may also be built in the nearshore. **Materials**: Concrete block or rock structures.	
	Bulkheads are built to retain or prevent the sliding of land; most commonly used for mooring facilities in marinas and harbors but can be used as retaining wall at base of the bluff.	**Appearance**: Vertical structure extending above and below the ground surface. **Materials**: Steel sheet pile, tied into land with tiebacks that are usually underground.	
	Dunes are a mound, ridge or hill of drifted sand along the coast that provide greater protection of the upland from storm waves while creating a source for beach building material. Dunes should be mostly untouched to allow for the growth of vegetation.	**Appearance**: Slightly to moderately higher in relief than the beach area and located inland of the shore. Vegetation is often used to increase dune stability while capturing additional sediment moved by the wind. **Materials**: Sand and vegetation	
	Floating docks float on the water's surface and rise and fall with water elevation changes. Used to moor recreational boats, they are normally present in protected harbors/marinas. The docks may be removed during winter to prevent ice damage.	**Appearance**: Decks are typically close to the water surface to make boarding boats easier. **Materials**: Timber or plastic decking placed above floating pads or pontoons. Floats are typically constructed with foam encased in plastic.	
	Jetties are used to prevent silting and stabilize river mouths, inlets and shipping channels.	**Appearance**: Shore connected and may contain lighthouses or navigational aids at the lakeward end. **Materials**: Armor stone, concrete blocks or concrete modules.	
	Piers extend into the lake. Piers are primarily used for lake access, watercraft access or scenic recreation.	**Appearance**: Permanent, shore-perpendicular structures that are supported by the lakebed. **Materials**: Timber or steel piles, cribbing, steel sheet pile or concrete blocks; usually decked with concrete or timber.	
	Revetments are sloped onshore structures built at the toe of the bluff to reduce wave-based erosion along the shore.	**Appearance**: Armor stone or concrete block that is placed on an angle (slope); can have a rough or smooth face depending on stone/ block placement. **Materials:** Stone, precast concrete block.	
	Seawalls are onshore structures built primarily to reduce wave-based erosion at the toe of the bluff and limit overtopping and flooding of the land behind the structure.	**Appearance:** Vertical, shore-parallel with a flat, stepped or curved face; sometimes wide enough for a walkway on the top of the structure. **Materials:** Pre-cast concrete blocks or modules, cast-in-place concrete, or stone-filled cribs.	
	While shipping channels do not protect the upland, a shipping channel is a natural or dredged marked waterway for moving ship traffic. Shipping lanes typically have a minimum depth across their specified minimum width.	**Appearance**: The channel itself will appear the same as the surrounding water, however markers will be spaced along it. **Materials**: Dredge equipment as needed for maintaining channel depth. A jetty may often be adjacent to parts of the channel.