Living Shorelines Tour
Site #2 - *Pocket Beach*

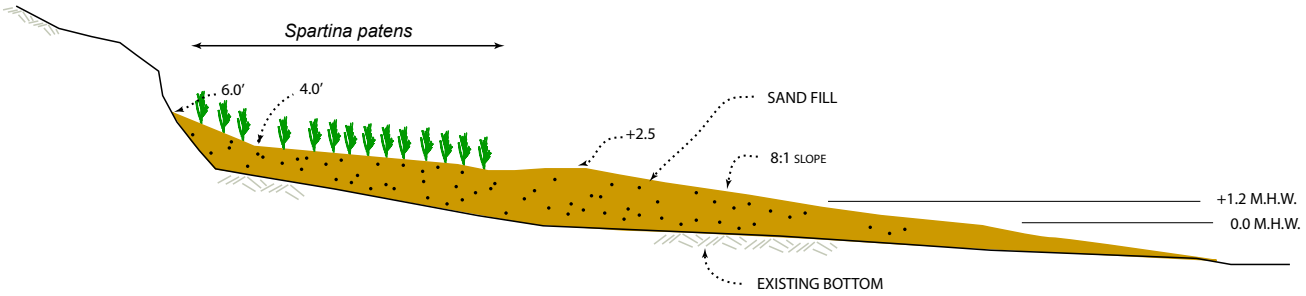
SHORE PROTECTION FUNCTION

Four pocket beach sites located between structures.

A beach is a gently sloping zone above the low waterline marked by an accumulation of sand or gravel deposited by tide or waves. On natural Bay beaches, most of the sediment is supplied by erosion of uplands adjacent to the coast. Beaches extend from a low waterline landward to a definite change in material or physiographic form, like a bank, cliff or line of permanent vegetation that marks the effective limit of storm waves. Some beaches may stretch for miles while others, called "pocket beaches", are typically small and can be found between two features that obstruct sand movement, like headlands or inlets. The beach protects upland features such as embankments, structures or vegetation from wave damage sustained under normal storm conditions. As waves advance into water about half as deep as the distance between wave crests, they slow down, grow higher and begin to peak. When the height of the wave is about three-fourths the depth of water below it, the wave loses its form. The crest topples forward as a breaker and its foamy remains rush up the beach as an apron of "swash." Some of the water sinks into the beach and the rest falls back to the sea as "backwash."

DESIGN & CONSTRUCTION ELEMENTS

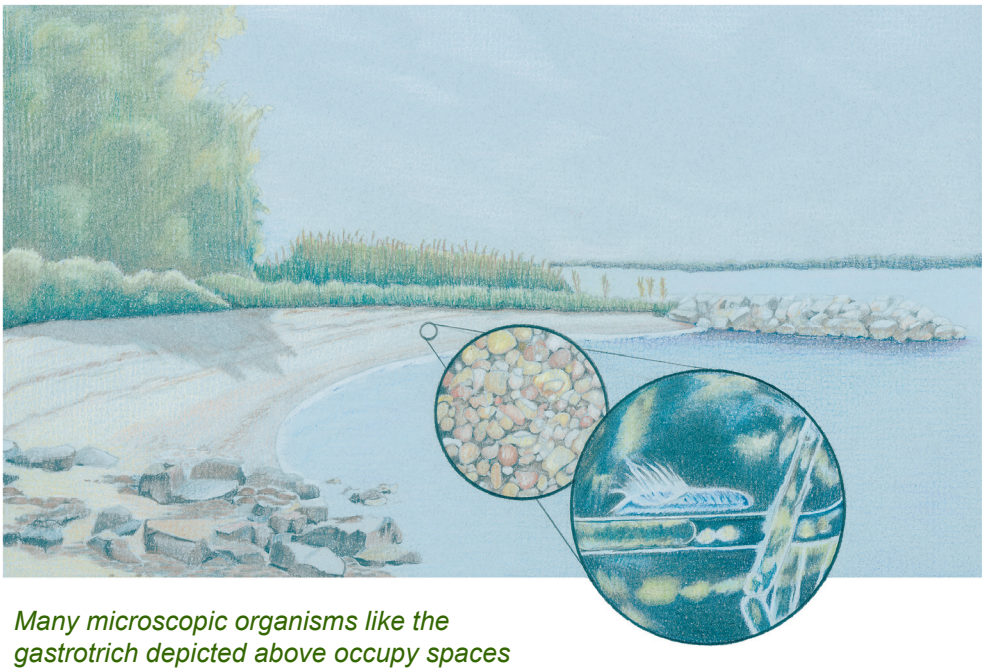
The pocket beaches at JPPM have been artificially created with sand to achieve a certain width and elevation. The width of the beach is referred to as the minimum dry beach width or volume that is needed to protect the shoreline. For long-term shore protection, a beach must remain stable and recover



Typical Pocket Beach Section

from storm events that can permanently erode sediment, moving it offshore to deeper waters. Although many beaches are naturally stable, others require replenishment of lost sand with material acquired from other sources. Fill material is typically selected on the basis of having minimal very fine silts, clays or sands (less than 10%), with grain size characteristics very similar to or somewhat coarser than that of the existing beach. Coarser material improves erosion resistance but may steepen the beach gradient. Beach fill volumes are calculated based on overfill ratios that specify a greater amount of borrow material to create a stable beach. This pocket beach may not require replenishment for many years. It is located in a concave portion of the shoreline protected by a breakwater head to the south and a sill spur to the north. Note how the pocket beach profile is gently sloped at the waters edge, and then moves more steeply upslope at the embankment to protect uplands during extreme storm events.

ECOLOGICAL ELEMENTS



Many microscopic organisms like the gastrotrich depicted above occupy spaces between marine sediments.

In addition to the familiar creatures that frequent the surface layer of the beach - like terrapin (see Site 1), shorebirds, fiddler crabs and raccoons - other organisms, much smaller in size, seek refuge and food on the pocket beach. For example, beach fleas, the common name for many species of amphipod Crustaceans, live on the beach. Less than an inch long, some can leap a distance of over three feet. During daylight hours they hide in burrows or moist places under decaying vegetation. Beach fleas

have tough exoskeletons and are herbivorous, feeding on whatever animal or vegetable matter is washed up on the beach. Even smaller than beach fleas are the marine meiofauna – animals of microscopic size living in marine sediments from the shore to deep waters. Surprisingly, this group is one of the earth's richest and most diverse communities. Gastrotrichs, commonly 0.1- 0.5mm in size, are one type of organism that lives between grains of sand on the intertidal zone of the beach. Gastrotrichs are part of the food and predator webs of other aquatic organisms. They also help clean up the beach by consuming dead bacteria and plankton that is continually washed ashore.

PERFORMANCE

Subsequent to its construction in 1999, the pocket beach fill material has consolidated and reached a relative state of equilibrium. Only a small amount of material has eroded, yet the shoreline configuration is constantly undergoing subtle changes. The most noticeable changes occur as a result of seasonal storm, wind and wave patterns that expose the beach to higher water levels and more concentrated wave energy.