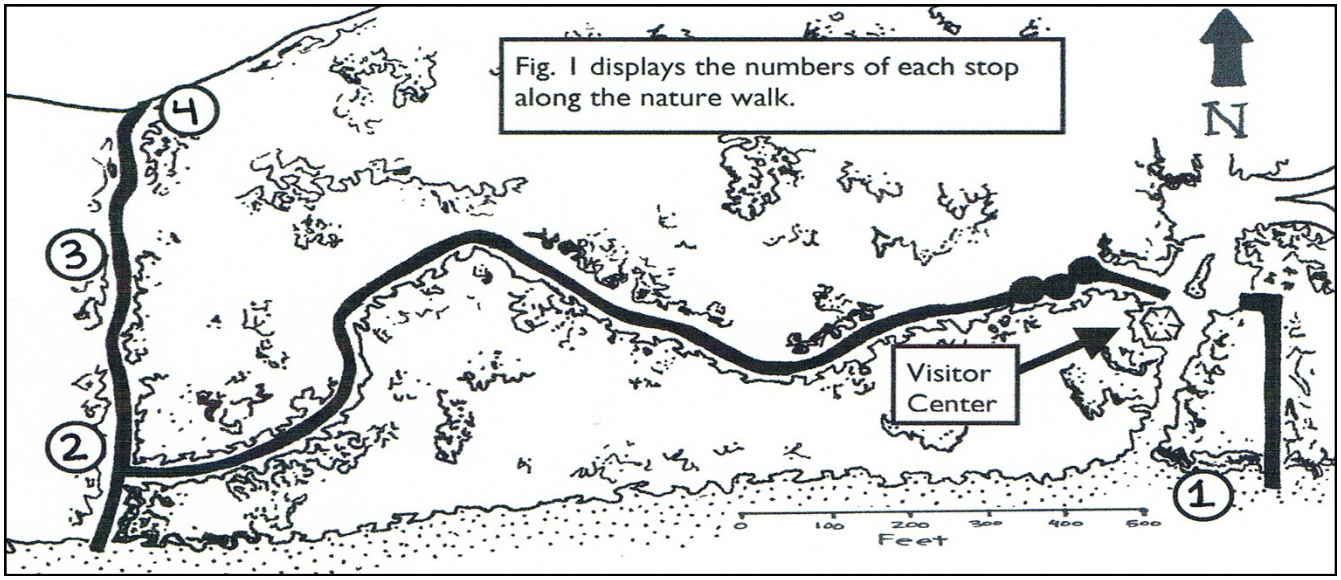

roots and layering inside. The layering consists of light quartz deposits and dark magnetite and garnet deposits. Beaches do recover from storms naturally, usually over several months to years. In the recovery phase, sand is brought back ashore by smaller less powerful waves and deposited as berms naturally widening the beach.

Stop 2: Dunes / Swale Zone

The dune/swale zone is located behind the protection of the primary dunes. Here the vegetation varies and is subject to different environmental conditions than the primary dunes. The primary dune is a severe environment with high winds, temperatures and dry sandy soils. On the swale side of the dune, the swale zone is protected from the harshness of the environment. Here you will find vegetation such as bayberry, beach heather, beach plum, beach pea and poison ivy.

In some swale areas on Fire Island, the surface lies below the water table creating wetlands. Some good examples of these wetlands can be found on Fire Island at the Sunken Forest and Watch Hill areas.

The secondary dunes are located behind the primary dunes and swale zone. Since the primary dunes block most of the winds and salt spray, secondary dunes are more stable. This added stability and thick vegetation provides shelter for many animals within the community such as raccoon, red fox, white-tailed deer.

Stop 3: Maritime Forest

Behind the secondary dune is a unique barrier island community, the maritime forest. The vegetation in this habitat is not fully tolerant to the salt spray in the winds therefore the forest grows outwards instead of upward. The main plants are American Holly, Pitch

Pine, Japanese Black Pine and Eastern Red Cedar. Poison ivy is also present throughout the maritime forest so watch out.

Stop 4: Fresh Water Marsh & Lagoon

There are several areas where you will find a freshwater marsh supported by groundwater underneath Fire Island. Ferns, mosses and cattails give way to eel grass as the lagoon gets closer. Inhabitants found in these areas include the great egret, white rumped sandpiper, and horseshoe crabs.

Looking out at the Great South Bay we see one of the largest back barrier lagoons in the northeast U.S. Because the back-barrier region is sheltered, salt marsh, sea grass, and mudflat communities develop. These communities team with plant and animal life and their muddy or sandy sediments are rich with organic matter.

Tick Safety

Several species of ticks live on Fire Island. These tiny ticks can transmit Lyme disease and other illnesses, so you should avoid grassy areas or leaf litter where these ticks may be abundant. Wear light-colored clothing and check yourself frequently for ticks. If bitten, remove the tick carefully with fine-tipped tweezers and consult a doctor.

SELF GUIDED SCIENCE WALK

Smith Point County Park

Fire Island, Shirley, NY

Robert Angelora
Earth Science Research Project
Summer 2010

STONY BROOK
STATE UNIVERSITY OF NEW YORK

Introduction:

To get to Smith Point County park take William Floyd Parkway (Long Island Expressway, exit 68 south) to its southern terminus at Fire Island.

Barrier beaches line much of the East Coast of the United States. Most of the South Shore of Long Island is composed of barrier beaches. These beaches are long and narrow accumulations composed mostly of sand that is deposited by waves and currents. The sand is continually reworked by wind and water.

Fire Island is Long Island's largest example of a barrier beach. It is an island bound by the open Atlantic Ocean to the south, the Great South Bay to the north, and an inlet at each end that connects the bay to the Atlantic. Figure 1 shows the stops along this self guided walk which will reveal the features that make up a barrier beach. (Figure 2 shows a cross section of Fire Island Barrier Beach.)

Walk:

We begin our walk just Southwest of the main parking lot at the Fire Island Wilderness Visitor Center. (Figure 1 displays the stop numbers for this walk)

Stop 1: Beach

A beach is an accumulation of material, such as sand and shell fragments that are moved and deposited along the shore by waves. Sand on Fire Island is dominantly quartz, and includes the less abundant dark minerals magnetite, and garnet. Quartz is mostly white or clear, abundant in local rocks, and is resistant to weathering. The magnetite is black and interestingly enough, magnetic. If you were to scoop up sand with your hand, you could use a magnet to separate magnetite from the other minerals. Garnet is reddish purple color and like magnetite has a higher density than quartz. These minerals while mixed together in most places are not evenly distributed along the beach. As wind or water moves across the sand it picks up the less dense quartz, leaving behind the denser magnetite and garnet. These accumulations of darker minerals are lag deposits. If you were the flowing water, wouldn't you want to drop the denser minerals first?

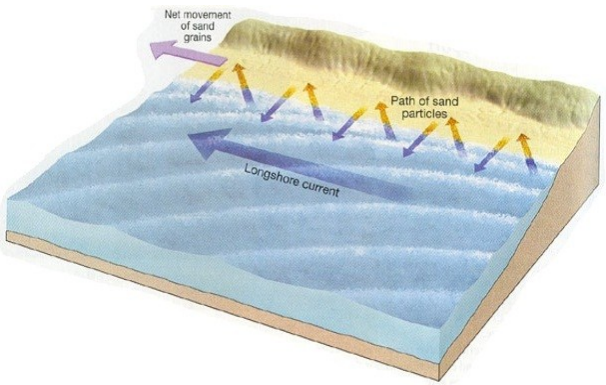

Fig. 3 Waves approaching our beaches at an angle result in the movement of sand up and down the

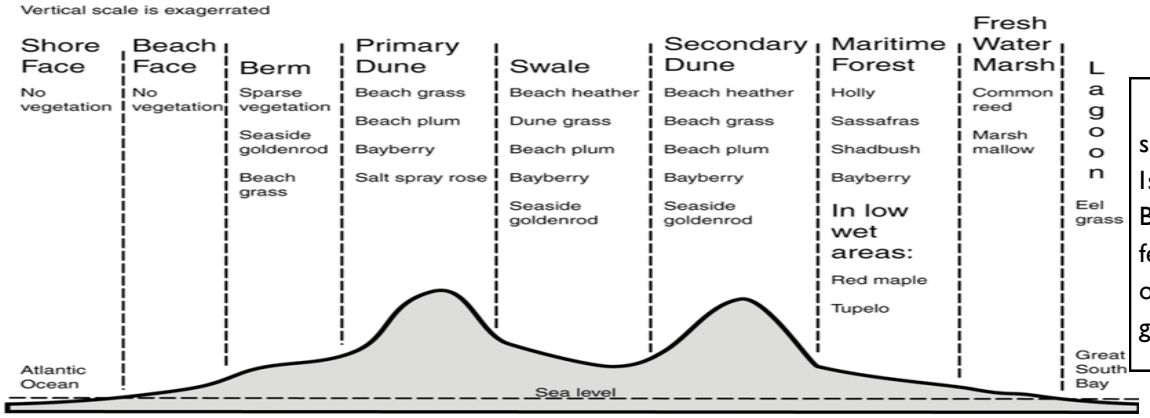

Fig. 2 A cross section of the Fire Island Barrier Beach shows the features from the ocean to the lagoon that make up

Starting at the area closest to the ocean is the shore face. This area is always submerged but shallow enough to be affected by the action of the waves on the bottom sediment. The beach face located between the low and high tide marks also slopes towards the water. This area is constantly washed by wind-generated waves. The size of the waves is determined by wind speed, duration, and direction in which they blow. As each wave runs up the beach at an angle, it carries sand a short distance up the beach. The backwash travels down the slope of the beach and carries some of the same sand grains back toward the water perpendicular to the beach. The transport of sand in this zig-zag pattern is known as littoral drift, and on our South Shore beaches the dominant drift is from east to west as seen in figure 3. Throw a ball into the waves and see which way the ball drifts.

Still another current is generated by waves, one that often proves to be deadly. Rip currents are a common, unpredictable threat to swimmers in the shore zone. Rips form when waves force more and more water onshore until the current builds up enough force to flow seaward through incoming waves as seen in figure 4. Rip currents generally appear as narrow streams of water, discolored by suspended sediment, moving across the surf zone. Try spotting one along the beach walk. If caught in a rip current you should swim parallel to shore in order to get out of the current.

The part of the beach farthest from the shoreline is the back beach or berm, which is composed of material deposited by large waves during storms or the highest tides. This area is usually rather flat and may even slope away from the shoreline. In summer, you will often find beach-goers relaxing and soaking up the sun here.

Located up behind the back beach are the primary dunes which are accumulations of sand deposited by wind. Waves supply sand by building up the beach during high tide and as the sand dries it may be picked up and carried by the wind. The sand is often deposited behind a piece of driftwood or another object lying on the beach. Once sand accumulates it begins to grow into a dune. Beach grass provides stability for the dunes, as their roots tend to resist erosion. During large storms waves may reach these dunes and erode some of the sand leaving a vertical scarp several feet high. This sand is usually relocated just offshore into an underwater feature called a sand bar. An inspection of this shoreward face may reveal

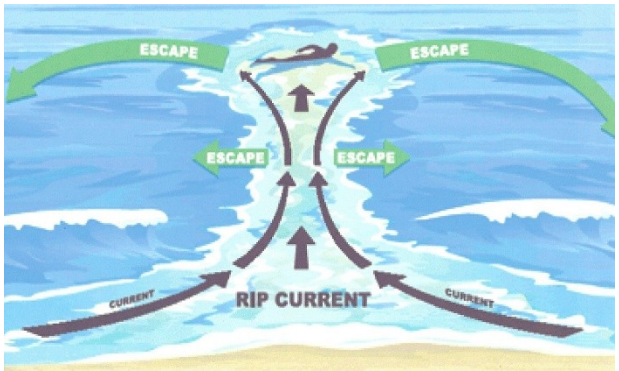

Fig. 4 Diagram of rip currents. Swimming