Naturalist Notes - Tide Pools

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South of Cape Cod and Long Island, the Atlantic coastline of the eastern United States is bordered by an extensive coastal plain. Coastal plains are the product of millions of years of erosion: ocean-bound rivers carry sand grains, clay particles, and other sediments from the breakdown of rock and soil, and as they slow down near the coast they start to drop their load over the landscape. Given enough time, hills and bedrock are eventually buried beneath a sloping plain of sediments. From Florida to New Jersey, this plain of sediments parallels our coastline.

During the Ice Age, the landscape was glaciated from Cape Cod northward. In fact, Cape Cod and Long Island are made of the sediments that melted out of a stagnant glacier. They are terminal moraines that rise above the level of the sea. But starting with the north shore of Massachusetts, bedrock and hills meet the waves head-on and there is no more coastal plain. The weight of the ice from the last ice age depressed the landscape downward, and as the glacier melted, rivers ran fast again and global sea levels rose. The resulting sea level rise inundated the landscape, flooding hills and valleys under the waters of the Gulf of Maine.

On a Tin Mountain trip to the seashore with students from the New Suncook School, we all got to admire the rocky coastline of our neck of the world. Looking out seaward from the bluffs overlooking the ocean, students learned that the land used to extend nearly 100 miles outward. Perhaps there were once mastodons grazing out there beyond the horizon. That inundated landscape became the relatively shallow embayment of the ocean, the Gulf of Maine.

We were at Fletcher’s Neck Sanctuary, which is now part of the Biddeford Pool Land Trust. We were here to explore tide pools, those fascinating intertidal nooks that allow us to catch a glimpse of the fascinating life forms beneath the waves. Some creatures are trapped in these rock basins, waiting for the high tide to deliver them to sea. Others flourish in the shallow water and live in these tide pools all year. For the tide pools to even be here, though, there has to be one more quirk of nature besides the glacial history that flooded the landscape and coastal plain away: the tides themselves.

High tide comes twice a day, once every twelve hours. Thanks to our neighbor the moon and its gravitational pull, we experience a tidal bulge at opposite ends of the earth, creating two high tides. The pull of the moon's gravity is greatest on the part of the earth that is closest to it, which is why the side of earth directly facing the moon experiences one of the high tides as the moon pulls on the water.

The moon also creates a slight bulge on the surface of the earth itself, though not to the same effect as the water. Thus, on the opposite side of the globe, the earth is pulled toward the moon a bit while the water there is pulled less due to inertia. This creates another concurrent bulge of ocean water on the far side of earth.

The drowned shoreline of New England and its high tidal range create ideal conditions for tide pools. Tide pools are wonderful to explore, especially for children. Biddeford Pool is actually a round tidal inlet that becomes mud flats at low tide. The good tide pooling is in the East Point Audubon Sanctuary, at the tip of Fletcher’s Neck.

In the lower tidal pools are often found large, shiny kelp leaves, making for a great place for hiding creatures such as crabs or even an occasional eel. Beautiful pink and orange hues are algaes that grow along the smooth rock bottoms of the pools, creating a beautiful saltwater garden along with the kelps and other seaweeds.

At Biddeford Pool, we saw a nice colony of spine-covered green sea urchins. When placed in a container of sea water, the urchins showed off their bizarre pinkish tube feet, which filter food from the water and help them move. They have a unique habit of covering themselves with shell fragments and bits of rock for camouflage, using their pink tube feet. They also have feet like suction cups on their bottom side and a small mouth for feeding in the middle of their underside.

There is more to explore of tidal pool life than can possibly be shared in this space. But the ideal conditions of tide, climate, and geology allow many wonderful and even bizarre creatures to flourish in these cold waters. Sometimes they even spend a bit of time between the tides, captured in the tidal pools for all to find and admire.