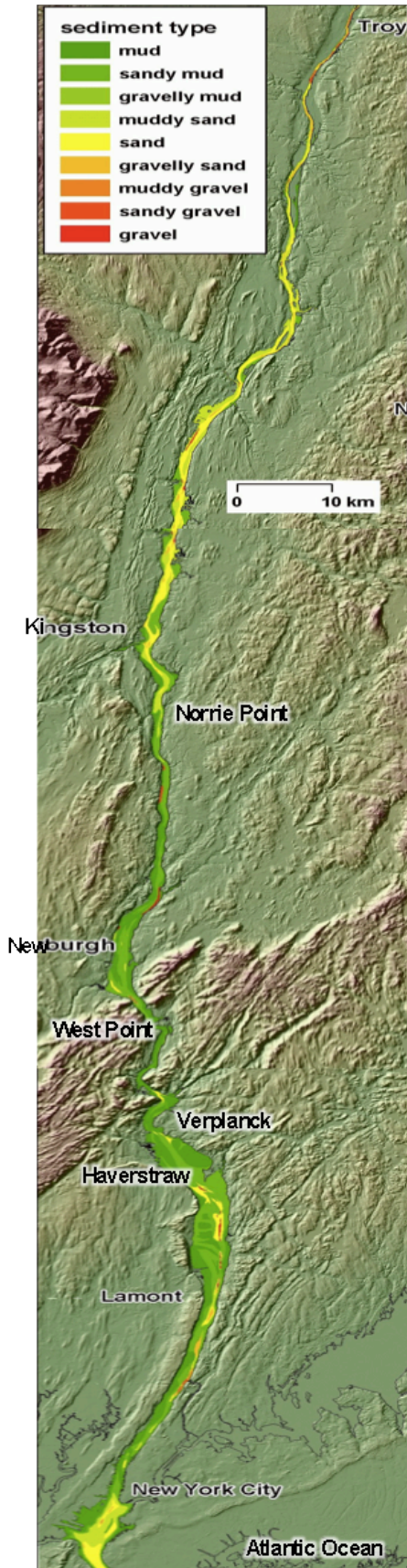


## ANALYZING YOUR SEDIMENT CORE: PULLING IT ALL TOGETHER



**This activity is designed to be completed back in the classroom after day at the river.**

**Core Log:** Start by examining your core, completing the push core log using the ‘Day in the Life Push Core Sediment Log’ (next page). This sheet will help you review what you see in your sediment sample.

**Next** combine this with observations you made when you were at your river site. Brick pieces, coal, slag, and shells, glass, sand etc. all collect along the waterfront and over time become part of the ‘sediment story’ as they break down.

**Now Consider How the Pieces Got There:**

Complete the sheet labeled “Consider the Past” noting which parts of the river’s story have added pieces to the sediments in your part of the river. Note how many are ‘natural’ and how many re added by humans by adding a ‘N’ or an ‘H’ in each box on the inventory sheet. Do humans influence our river bottom history?

**Write the Story:** Now write a ‘story’ or possible history of the sediments in your sample. Look over the information from the sections you have marked with a ‘yes,’ and write the story of sediments in your section of the river. Consider where the different items you found in your core might have come from. There is a sample below.


**Sample Story:** *We collected our core close to a marsh in a cove, it was filled with mud telling us the water is slow moving in this section of the river. The mud might have come from many other places in the river since it can travel long distances before it settles out, maybe it even came over the Troy Dam! We had some wood and plant pieces in the core probably washing out of the marsh. There were some small red flecks of brick that we think fell off a barge on its way to NYC 100 years ago when brick was being moved down the river to build in the city. Since we are near Haverstraw we expect these came from a brick company there. We also found some coal that we think started in Pennsylvania and made its way to the Hudson River through the D&H canal. The coal and brick were probably bigger and got broken into small pieces by tides and storms. Our sediment came from many places in the river! –Piermont*

## DAY in the LIFE PUSH CORE SEDIMENT LOG





GRAB ID#	Site Name	DATE	FORM COMPLETED BY:		
			GROUP #		
TIME	LATITUDE	LONGITUDE	WATER DEPTH	LOCATION	
	Yes	No			Descriptors - Please note additional observations
H <sub>2</sub> S smell					H <sub>2</sub> S smells of rotten eggs, suggesting anaerobic bacteria
Oil					
Oxidized top*					*oxidation (reaction with oxygen) creates a distinctly lighter colored layer of sediment.
					estimate dimensions of oxidized layer, etc. and draw below
	Absent	Rare	Common	Abundant	Additional Comments
Clay					dense feel
Mud					smooth feel between fingers
Sand					gritty feeling between fingers
Gravel					pea sized pieces of stone
Pebbles					pieces of stone larger than pea
Leaves					
Wood					
Shells Oysters (dead/alive?)					
Freshwater mussels (except zebra)					
Zebra mussels					
macroinvertebrates					
Brick					
Coal					
Slag					
Living vegetation:					
Length of Core:					Length of Oxidized core top (if present):
If Bagged - Number On Core Collection Bag					
Sketch of your core with measurements:					

## ANALYZE YOUR SEDIMENT USING THE HISTORY OF THE HUDSON RIVER

### CONSIDER THE PAST – Analyze your core sample to discover its past!

 <p><b>Course Grain</b> _____</p> <p><b>Fine Muds &amp; Clays</b> _____</p>	<p><b>SEDIMENT GRAIN SIZE – Natural _____ Human _____</b></p> <p><b>We find sand in dynamic high-energy sections of the river:</b></p> <ul style="list-style-type: none"> <li>• Dropped at the mouths of many creeks and streams where they enter the Hudson, like in the Catskill and Kingston regions.</li> <li>• In New York Harbor where it enters on the tide, carried from the ‘long shore’ current moving along the New Jersey and Long Island coasts.</li> <li>• Lining the upper Hudson shipping lane from which it is dredged.</li> </ul> <p><b>We find muds and clays in slower moving stretches of the river:</b></p> <ul style="list-style-type: none"> <li>• Settled out in wider reaches like Haverstraw and Newburgh Bays.</li> <li>• Close to marsh areas where plants help settle the sediments.</li> </ul>
 <p><b>Oyster Shells in the area</b> Yes _____ No _____</p> <p><b>Other Shells</b> Yes _____ No _____</p>	<p><b>OYSTERS &amp; OTHER SHELLS – Natural _____ Human _____</b></p> <ul style="list-style-type: none"> <li>• Oysters were abundant in salty sections of the estuary at least 6000 yrs. ago when native tribes feasted on them. Piles of cast-off oyster shells (middens) lined the shallows like garbage mounds up to Verplanck.</li> <li>• Early European settlers noted that oyster beds covered the harbor bottom until pollution killed them. Restoration efforts are now underway.</li> <li>• Shells of native mussels, clams, and blue crabs are found throughout the estuary - sometimes whole shells, sometime just pieces.</li> </ul>
 <p><b>Zebra</b></p>  <p><b>Rangia</b></p> <p>Yes _____ No _____</p>	<p><b>ZEBRA MUSSELS &amp; RANGIA CLAM – Natural _____ Human _____</b></p> <ul style="list-style-type: none"> <li>• Zebra mussels are limited to the freshwater Hudson, Rangia clams to the brackish section.</li> <li>• These non-native species arrived in the Hudson late in the 20<sup>th</sup> century.</li> <li>• Zebra mussels attach to hard surfaces, Rangia clams live in the sediments.</li> <li>• They eat large amounts of phytoplankton, food that other species rely on.</li> <li>• They outcompete native mussels for food, killing them off.</li> </ul>
 <p>Yes _____ No _____</p>	<p><b>BRICKS – Natural _____ Human _____</b></p> <ul style="list-style-type: none"> <li>• Starting in the 1800s the Hudson’s shores began to fill with brickyards, with almost 100 of them producing 500 million bricks a year at one time!</li> <li>• Haverstraw was the most famous location for brick making, with over 40 brickyards, but brick kilns lined the shores all along the estuary.</li> <li>• Brick was moved by barge. Until 1941, when the last Haverstraw yard closed, the main run was from Haverstraw to New York City.</li> <li>• Brick was in high demand as a building material in early New York since fires were a threat, especially in the cities.</li> </ul>

## ANALYZE YOUR SEDIMENT USING THE HISTORY OF THE HUDSON RIVER

 <p><b>Yes</b> _____ <b>No</b> _____ (note slag is generally black when wet and at first glance can look like coal. Coal has a luster or sheen and slag has a lumpiness)</p>	<p><b>SLAG – Natural</b> _____ <b>Human</b> _____</p> <ul style="list-style-type: none"> <li>• Metal ores (iron, copper, lead, etc.) found in nature are not pure. They are heated to separate the metal from impurities, which form a waste called slag.</li> <li>• In early American history the Hudson Valley was a leader in iron-making with several mines and foundry operations located close to the ore deposits, water power, and transportation.</li> <li>• Located across the river from West Point in Cold Spring, West Point Foundry was one of the region’s most prominent iron foundries, making guns, locomotive trains, steam engines, boilers, water pipes, etc.</li> <li>• Slag ended up in the Hudson directly from foundry waste and from the loading of ships moving the iron on the river.</li> </ul>
 <p><b>Yes</b> _____ <b>No</b> _____</p>	<p><b>EURASIAN WATER CHESTNUT PODS – Natural</b> _____ <b>Human</b> _____</p> <ul style="list-style-type: none"> <li>• The Eurasian water chestnut is an invasive plant, not native to the Hudson River but brought here in the late 1800s from Eurasia.</li> <li>• The plant prefers shallow, still, freshwater areas of the river like the cove at Norrie Point, where it forms dense plant beds or mats on the water surface.</li> <li>• Pictured is a seed pod of this plant – often called ‘devil heads’ due to their sharp spikes. The seeds float, moving and spreading this plant throughout freshwater, and can sprout and grow up to 12 years after forming!</li> </ul>
 <p><b>Yes</b> _____ <b>No</b> _____</p>	<p><b>COAL – Natural</b> _____ <b>Human</b> _____</p> <ul style="list-style-type: none"> <li>• Pennsylvania coal came to the Hudson on the Delaware and Hudson Canal along the Rondout Creek to Kingston, New York.</li> <li>• At its peak in the 1860s-1870s one million tons of coal entered the Hudson Valley via the canal.</li> <li>• Barges moved coal both upriver to Albany and downriver to New York City to heat homes and businesses and power factories and steamboats. It is part of our industrial history.</li> </ul>
 <p><b>Yes</b> _____ <b>No</b> _____</p>	<p><b>WOOD DEBRIS &amp; PLANT MATERIAL – Natural</b> _____ <b>Human</b> _____</p> <ul style="list-style-type: none"> <li>• Small pieces of wood and plant debris enter the river from the forests and fields that border the river and can be moved great distances by the water.</li> <li>• Phragmites, cattails, reeds, and other marsh plants drop large amounts of this material into the river.</li> <li>• Storms can knock trees and plants into the river and into tributary streams, where currents, winds, and tides move it from place to place.</li> </ul>