

LOGGING TASKS:

1 NATURE CENTER
VIEW THE EXHIBITS (INDOOR OR OUTSIDE) AND EXPLAIN HOW DIFFERENT TYPES OF WILDLIFE ADAPT TO THE CHANGING ENVIRONMENT IN THE SALT MARSH.

2 THE POND
LIST THE DIFFERENT TYPES OF ANIMALS YOU CAN OBSERVE PRESENTLY USING THE POND.

3 URBAN FOREST
TRY AND GUESS WHICH OF THE TREES OR PLANTS ARE INVASIVE.

4 BEACH
AT THE TIME OF YOUR VISIT, IS IT HIGH TIDE OR LOW TIDE? HOW DO YOU KNOW?

5 WET MEADOW
DRAW A SOUND MAP. FIRST MARK AN "X" IN THE CENTER OF THE PAGE. THE "X" SHOWS YOU ON THE MAP. CLOSE YOUR EYES AND LISTEN FOR AT LEAST ONE MINUTE. NOW DRAW PICTURES OR SYMBOLS REPRESENTING ALL THE SOUNDS YOU HEAR IN RELATION TO YOU.

6 ESTUARY
WHAT DIRECTION IS THE RIVER FLOWING? HOW DOES THIS RELATE TO THE OBSERVATIONS YOU MADE ABOUT THE TIDE AT THE BEACH HABITAT?

7 SALT MARSH
TRY AND GUESS WHICH OF THE BIRDS OBSERVED ARE MIGRATORY.

8 COMMUNIPAW
IF YOU WERE STANDING HERE 2000 YEARS AGO, ON WHAT WOULD YOU BE STANDING? WHAT ABOUT 200 YEARS AGO?

9 NY BIGHT
NAME THE DIFFERENT TYPES OF VESSELS OBSERVED NEAR THE BIGHT.

10 BLACK TOM
IF BLACK TOM WAS ONCE AN ISLAND, HOW DID IT BECOME PART OF THE MAINLAND?

11 MUDFLAT
WHERE DOES THE SILT THAT BUILDS THE MUDFLAT COME FROM?

5

NAME _____

DATE _____ Start Time _____

10 horizontal lines for logging answers, numbered 1 to 10 on the left. A red vertical line is on the far left.

GET CREDIT FOR YOUR FINDS!

- ♦ Get credit for your finds by emailing your answers to the logging tasks to estuarycache@gmail.com.
- ♦ You will receive an Estuary Discovery Trail Certificate by email. Learn more at goingcoastal.org.
- ♦ Setup free membership on earthcache.org.
- ♦ Log your finds on earthcache.org. Begin at cache GC2T1ER, learn more about the Liberty State Park caches and upload your photos.

Other display items

- A Find difficulty (1 - 5)
- B Terrain difficulty (1 - 5)
- C GPS status
- D Distance units
- E Closeness order (1, 2, 3...)
- F Size of geocache (1 - 4)

Selecting a different geocache

Press to go to 'NEXT' closest geocache in list

Scrolling through pages

Press to see other 'PAGES'

- Geocaching
- Geocache code
- Compass & position
- List of found geocaches

Page functions

Press for action on each 'PAGE'

- Go to next closest geocache
- Go to next closest geocache code
- View heading, latitude, longitude, & satellites
- Scroll through the found cache list

Follow arrow A and distance B to your first cache!

Hold straight in front & walk

Press & hold to go to the 'START' of list

HOW TO USE THE GEOMATE JR.

PLEASE WATCH YOUR STEP!

a virtual treasure hunt educating visitors on the richness of harbor estuary resources at Liberty State Park



NY-NJ HARBOR ESTUARY EARTHCACHE DISCOVERY TRAIL



③ **START YOUR EXPLORATION OF THE ECOLOGY AND NATURAL HISTORY OF THE NY-NJ HARBOR ESTUARY AT THE NATURE INTERPRETIVE CENTER**

① THE **FRESHWATER POND** HABITAT WAS CREATED DURING REMEDIATION OF CONTAMINATED SOILS FROM THE SITE. THERE IS A GREAT VARIETY OF WILDLIFE THAT CAN BE OBSERVED THROUGHOUT THE YEAR AT THE POND. IT IS A PRIME HABITAT FOR MANY RESIDENT AND MIGRATORY BIRD SPECIES.



② THE TREES AND SHRUBS OF THE **URBAN FOREST**, TO THE RIGHT OF THE PATH, HOLD THE SOIL IN PLACE SO THAT IT DOESN'T WASH AWAY IN THE RAIN OR BLOW AWAY FROM THE WIND. TREES CLEAN THE AIR, COOL THE LAND, AND PROVIDE FOOD AND SHELTER TO MANY LIVING THINGS, INCLUDING HUMANS. THE PRESENT-DAY URBAN WOODLAND IS DOMINATED BY INVASIVE SPECIES. AN INVASIVE SPECIES IS A TYPE OF ORGANISM NOT NATIVE TO THE REGION AND WHOSE INTRODUCTION CAN CAUSE ENVIRONMENTAL HARM.



③ AN **EDGE HABITAT** VISIBLE, THOUGH NOT ACCESSIBLE FROM THE TRAIL PATH. IT IS A TYPICAL TRANSITIONAL ZONE FROM SANDY BEACH TO SMALL SHRUBS. THE LITTORAL ZONE IS THE INTERTIDAL ZONE WHERE LAND AND SEA MEET, COVERED WITH WATER AT HIGH TIDE AND EXPOSED TO THE AIR DURING LOW TIDE. OVER THE COURSE OF A DAY IN THE ESTUARY, THE WATER WILL RISE AND FALL TWICE. TIDES ARE CAUSED BY THE GRAVITATIONAL PULL OF THE MOON AND THE SUN.



④ THE **WET MEADOW & FIELD** IS A TYPE OF FRESHWATER MARSH SATURATED WITH WATER PART OF THE TIME. THE GROUND IS LIKE A SPONGE, SOGGY AND DAMP. THE WET MEADOW IS A NUTRIENT RICH ENVIRONMENT THAT PROVIDES VITAL FOOD AND HABITAT FOR MANY INSECTS, AMPHIBIANS, REPTILES, BIRDS, AND MAMMALS. DURING HEAVY RAINSTORMS, THE WET MEADOW COLLECTS AND FILTERS RUNOFF. THE WET MEADOW OFFERS PERFECT GROWING CONDITIONS FOR GRASSES AND THE NEARBY COTTONWOOD TREE.



⑤ **ESTUARIES** ARE TRANSITION ZONES WHERE SALTY SEAWATER FROM THE OCEAN MIXES WITH FRESHWATER FROM THE RIVER. THE DIRECTION OF THE HUDSON RIVER'S FLOW IS CONTROLLED BY OCEAN TIDES. AS THE TIDE RISES, OCEAN CURRENTS PUSH THE WATER NORTH, UP THE RIVER. LOW TIDES REVERSE THESE CURRENTS. THE TIDES REVERSE DIRECTION FOUR TIMES DURING A TIDAL DAY, WHICH IS 24 HOURS AND 50 MINUTES.



⑥ THE **SALT MARSH** PROVIDES CRITICAL HABITAT FOR A VARIETY OF RESIDENT AND MIGRATORY BIRDS. MANY BIRDS SUCH AS CORMORANTS, AND SOME SPECIES OF GULLS AND DUCKS RESIDE HERE YEAR ROUND, WHILE OTHERS ARE MIGRATORY. THE BIRD MIGRATION ROUTE, WHICH STRETCHES ALONG THE COAST FROM FLORIDA TO NOVA SCOTIA, IS CALLED THE ATLANTIC FLYWAY. MANY OF THE BIRDS HERE TODAY ARE ON THEIR WAY TO NORTHERN CANADA (IN THE SPRING) OR TO THE GULF OF MEXICO (IN THE FALL).



⑦ THE CACHE IS AT THE WAYSIDE MAP AT THE EDGE OF **OVERLOOK FIELD**. THE GROUND HERE IS ALL MADE-LAND. THERE IS NO NATURAL LANDSCAPE. THE RAILROADS CREATED THIS WIDE EXPANSE OF LAND NOW KNOWN AS LIBERTY STATE PARK FROM 1860 TO 1928, FILLING IN MARSHLAND AND INTERTIDAL FLATS. THE HACKENSACK TRIBE OF THE LENAPE NATIVES USED THE MARSHLANDS AS A SUMMER ENCAMPMENT CALLED **COMMUNIPAW**, WHICH MEANS "BIG LANDING PLACE AT THE SIDE OF A RIVER."



⑧ FORMED BY THE COASTAL INDENTATION BETWEEN NEW JERSEY AND LONG ISLAND, THE **NEW YORK BIGHT** FORMS A GULF AT THE ENTRANCE TO THE PORT OF NEW YORK AND NEW JERSEY. THE BIGHT INCLUDES MAJOR SHIPPING CHANNELS OR NAUTICAL HIGHWAYS THAT CRISSCROSS THE HARBOR ESTUARY AND UPPER BAY MARKING SAFE PASSAGES AND DANGER ZONES WHERE NOT TO GO. HUGE CONTAINER SHIPS, BARGES, OIL TANKERS, CARGO VESSELS, TUGBOATS, AND MANY OTHER MERCHANT SHIPS OPERATE WITHIN THESE WATERS.



⑨ **BLACK TOM** WAS ORIGINALLY A SMALL OFFSHORE ISLAND. IT WAS ONE OF FOUR GLACIAL MORAINNE ISLANDS, MADE OF DIRT AND ROCKS DEPOSITED BY THE LAST GLACIER. THE ISLANDS WERE ONCE SURROUNDED BY OVER 5,000 ACRES OF LOW-LYING TIDAL FLATS KNOWN AS THE JERSEY FLATS, MADE OF MUD AND SEDIMENT DEPOSITED BY THE HUDSON RIVER AS IT EMPTIED INTO UPPER NEW YORK BAY. THE JERSEY FLATS WERE HISTORICALLY HOME TO THE LARGEST OYSTER BED IN THE WORLD.



⑩ **INTERTIDAL MUDFLATS** ARE AN IMPORTANT HABITAT IN THE ESTUARY ECOSYSTEM. HUDSON RIVER SILT CONTINUOUSLY DEPOSITS AND BUILDS THE MUDFLAT WETLAND. THERE IS ALGAE GROWING ON THE MUD. THE MUDFLAT SUPPORTS A COMMUNITY OF MUD SNAILS, CLAMS, MUSSELS, AND WORMS THAT BURROW INTO THE MUD. SHOREBIRDS AND WATERFOWL GO HERE TO FEED. MUDFLATS HELP PROTECT WATER QUALITY IN THE HARBOR AND KEEP THE SHORELINE FROM ERODING.

