

**Day in the Life of the Hudson River -10/20/2015 (9AM-2PM) Data**

**RIVER MILE 98**

**Tivoli South Bay (near Bard Field Station between mouth of Saw Kill & Blithewood Manor)**

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**MUCK STATION**

**Turbidity**

Long site tube (cm)

10:00 AM: 18 cm

10:30 AM: 22 cm

11:00 AM: 7 cm

12:00 PM: 16 cm

Average: 15.75

Observations: very turbid; seining and sediment sampling created more turbidity; falling tide led to muddier water. South Tivoli Bay tends to be very turbid.



Taking core sediment samples.

Photo credit: Tom O'Dowd

**Push Core Sediment Log**

Sulfur smell (H<sub>2</sub>S): yes!

Clay: abundant

Mud: abundant

Sand: abundant

Gravel: common (We broke one sediment core tube because our site is so rocky!)

Leaves: rare (small flecks of flakey leaves were abundant; larger leaves not so much)

Wood: rare (small slivers and splinters)

Shells: rare

Freshwater mussels: Absent

Zebra mussels: Absent

Macroinvertebrates: common (esp. female giant water bug; also: dragonfly larva, snail, and walking stick)

Brick/coal/slag: Absent (we've seen brick shards at this site before but not today; hard to tell—very murky)

Living vegetation: common (duckweed and dead/dying water chestnut)

We bagged a core and sent with Ingrid.

**Soils on land around the South Tivoli Bay**

According to the Dutchess County "General Soil Map" (USDA NRCS), the most common soil at our site is "Hudson-Vergennes-Raynham" soil which is very susceptible to erosion with a K factor of 0.49 out of a range of 0.02-0.69 everywhere and 0.1-0.64 in Dutchess County.

Source: <http://www.co.dutchess.ny.us/CountyGov/Departments/Planning/nrichapfour.pdf>

## AIR STATION: WIND, HUMIDITY, PRESSURE, AND AEROSOLS

### Kestrel measurements

### Beaufort scale observations

### Compared to HRECOS/NERRS station at the Bard Field Station

#### Overall:

Humidity was highest by the river and decreased as we measured further and further inland.

Wind speed varied throughout the day. Overall it decreased as the day continued, ending with 0 mph in the final group. Wind speed had major high point at the water and on a high altitude road surrounded by trees (possibly gusts or wind channeling). Temperature increased throughout the day.

Learned about hydrosphere and atmosphere relationship, micro ecosystems along the river, and possible anthropogenic impacts on these measurements!!

Location	Time	Relative Humidity (%)	Wind Speed (Beaufort)	Wind Speed (mph)	Temperature (F)	Notes
Near water	10:20	52	1	1.2	53.2	High speed = trees make wind tunnel?
Field station	10:20	51		n/a		
Up hill	10:20	48.5		3.4		
Near water	10:40	49.7	0-2	2.3	55	Humidity didn't follow hypothesis!
Field station	10:40	51.5		1.1		
Up hill	10:40	50.2		n/a		
Near water	11:15	54.4	1-2	1.7	55.7	
Field station	11:15	49		1.1		
Up hill	11:15	51.8		2.4		
Near water	12:30	49	0-2	1.8	57.5	Question: What % humidity for it to rain?
Field station	12:30	47.2		1.5		
Up hill	12:30	48.8		1.7		
Near water	12:50	64	1	0	58.3	
Field station	12:50	56.7		0		
Up hill	12:50	56.1		0		

#### Side study: "Anthropogenic wind speed" (blowing on the instrument with mouth):

Group 2: 19.7 mph, fresh breeze

Group 3: 22.5 mph



## **WATER CHEMISTRY STATION**

### **Salinity**

Using quantabs, quantabs # = 1.8 or 2, therefore 41-48 ppm chloride or 74-88 ppm total salinity. Erik Kiviat hypothesized that road salts are impacting salinity levels despite winter being a thing of the distant past. Apparently pools of salty water persist in the environment and produce salty runoff throughout the year (we even saw salt accumulated on the Bard Field Station driveway uphill from the building; and tasted it—not recommended. We rinsed our mouths out afterward). Erik said normal salinity would be under 20 ppm in true freshwater.

### **pH**

Using color match test

9:52 AM: pH = 8

10:30 AM: pH = 7.5 (with someone blowing bubbles into it—testing that the edition of CO<sub>2</sub> increases acidity and reduces pH)

11:00 AM: pH = 8

12:10 PM: pH = 8

We hypothesized that algal photosynthesis might be reducing CO<sub>2</sub> and therefore reducing acidity and increasing pH.

### **Dissolved Oxygen**

9:52 AM: water temperature 8°C. DO = 13 ppm which equals 110% saturation!

10:30 AM: water temperature 8°C. DO = 10 ppm which equals 90% saturation.

11:00 AM: water temperature 8°C. DO = 10 ppm which equals 90% saturation.

We hypothesized that the day started cold, with a large input of highly oxygenated water from the nearby Saw Kill and its waterfalls, plus photosynthesis by algae and other plants may have contributed.

### **Data from nearby sampling stations**

HRECOS data South Tivoli Bay

NERRS data South Tivoli Bay

NERRS data Saw Kill Creek



Doing DO, pH, and salinity tests.  
Photo credit: Tom O'Dowd

## LIFE STATION: FISH AND BIRDS AND MACROINVERTABRATES

### Fish

With ~2 meter beach seine net

- 5 Banded killifish (size of largest: 4 cm)
- 1 blue-gill sunfish (size of largest: 3 cm)
- 2 pumpkinseed sunfish (size of largest: 3 cm)
- 2 stickleback (size of largest: 3 cm)
- 1 American eel (size of largest 7 cm)

### Macroinvertebrates

(in the seine net)

- 1 dragonfly larva
- 5 female northern water bugs
- 1 walking stick

### Birds

Spotted with binoculars and the naked eye

- ~50 Canada Geese (seen and heard at 9:00 AM)
- 9 Mute Swans
- 1 adult Bald Eagle (around 8:30 AM)
- 2 juvenile Bald Eagles (pestering a great blue heron, seen and heard)
- 4 great blue herons
- 2 Kingfishers (seen and heard)
- ~25 gulls (at 12:00 PM)
- ~20 Cormorants (likely Double-Crested); half stationary, half in motion
- Various seagulls (25+)
- 1 Blue Jay
- 4 American Crows
- 1 Red-Tailed Hawk



Seining on Tivoli South Bay.  
Photo credit: Tom O'Dowd



Eel, pumpkinseed, and killifish.  
Photo credit: Tom O'Dowd



Female giant water bug.  
Photo credit: Tom O'Dowd

**PHYSICAL CONDITIONS STATION: TIDES AND CURRENTS AND WATERSHEDS**

**Tides (observed)**

**Currents (observed in the “center” of the Saw Kill)**

**Currents (observed near the “shore” of the Saw Kill)**

**CURRENT (ft in 30 sec)**

10 am	Center: 14.1	Shore: 8.8
10:30	Center: 27	Shore: 4.9
11:00	Center: 28	Shore: 9
12:00	Center: 32	Shore: 11
12:40	Center: 20	Shore: 7



**TIDE (Inches above an arbitrary point)**

10:15 am	9.5
10:45	6.3
11:15	2

Immeasurable after this (we did not have a long enough tide stick!)

Learning about the Saw Kill watershed and the Hudson River watershed.

Photo Credit: Tom O’Dowd.



Acting out the tides near Blithewood Manor.

Photo Credit: Tom O’Dowd.