2007 Parameter Data Salinity: Block Island Sites

The distribution and stability of an estuarine ecosystem, such as Greenwich and Little Narragansett Bay, depend on three important physical characteristics of the water: salinity, temperature and circulation. Each affects and is affected by the others. Salinity is a key factor influencing the physical make-up of estuarine systems. Salinity is the number of grams of dissolved salts present in 1,000 grams of water, so it is usually expressed in parts per thousand (ppt). Freshwater contains few salts (less than 0.5 ppt) which makes it less dense than full ocean strength seawater, which averages 25 to 30 ppt. This difference in density causes salinity to increase with depth, with freshwater remaining at the surface. Water with a salinity of greater than 0.5 ppt but less than 25 ppt is called brackish, meaning a combination of saltwater and freshwater.

Together, salinity, temperature and circulation dictate the physical characteristics of water. The warmer, lighter freshwater flows seaward over a layer of saltier and denser water flowing upstream. The opposing movement of these two flows forms saltwater fronts or gradients that move up and down an embayment in response to the input of freshwater. These fronts are characterized by intensive mixing. A layer separating water of different densities, known as a pycnocline, is formed. This stratification varies within any season depending on rainfall. Stratification is usually highest in the spring as the amount of freshwater in our baysor ponds increases due to melting snow and frequent rain. Stratification is maintained throughout summer due to the warming of surface waters.

In autumn, fresher surface waters cool faster than deeper waters and sink. Vertical mixing of the two water layers occurs rapidly, usually overnight. This mixing moves nutrients up from the bottom, making them available to phytoplankton and other organisms inhabiting upper water levels. This turnover also distributes much-needed dissolved oxygen to deeper waters. During the winter, water temperature and salinity are relatively constant from surface to bottom. (Adapted from the Chesapeake Bay Program website http://www.chesapeakebay.net/physicalcharacteristics.aspx?menuitem=14657)

The results reported here are from samples collected during the monthly water collections, and then analyzed in the URI Watershed Watch laboratory. URI Watershed Watch staff used both LaMotte salinity kits and two refractometers, with the average value reported. Additional salinity data may be available for Narrow River and some other estuarine sites, as monitored by the volunteers in the field using LaMotte kits.

Monitoring Locations	**2007 Data**					
	14-Jun	10-Jul	7-Aug	4-Sep	4-Oct	**MEAN**
Committee for Great Salt Pond Sites			**- - - (g/l or ppt) - - -**			
Great Salt Pond #1 (Mid-harbor) 1m	36	35	34	-	-	**35**
Great Salt Pond #1 (Mid-harbor) Deep	35	35	35	-	-	**35**
Great Salt Pond #2 (Narr Inn Cove) 1m	35	33	35	-	-	**34**
Great Salt Pond #2 (Narr Inn Cove) Deep	36	33	-	-	-	**34**
Great Salt Pond #3 (Champlin's) 1m	36	34	35	-	-	**35**
Great Salt Pond #3 (Champlin's) Deep	35	34	35	-	-	**35**
Great Salt Pond #4 (Trimm's) 1m	36	33	30	-	-	**33**
Great Salt Pond #4 (Trimm's) Deep	36	34	32	-	-	**34**
BI Tributary #1 (Ocean Ave)	4	3	5	-	-	**4**
BI Tributary #2 (Bridgegate Sqr)	4	2	3	-	-	**3**
BI Tributary #3 (Cormorant)	36	34	32	-	-	**34**
BI Tributary #4 (Beach Ave.)	3	3	4	-	-	**3**
BI Tributary #5 (Harris Pt)	34	35	31	-	-	**33**
BI Tributary #6 (Scott's)	Dry	Dry	Dry	DRY	DRY	**-**
BI Club Dock	-	35	35	-	-	**35**