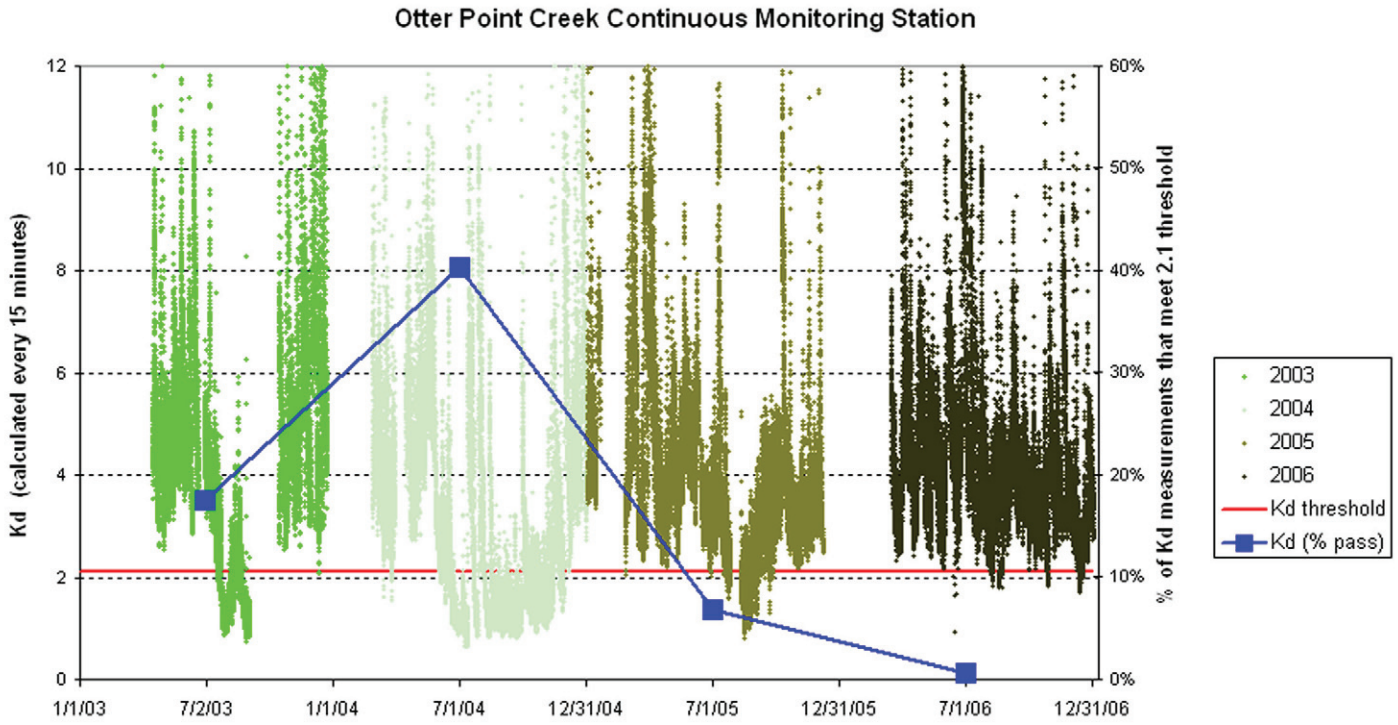
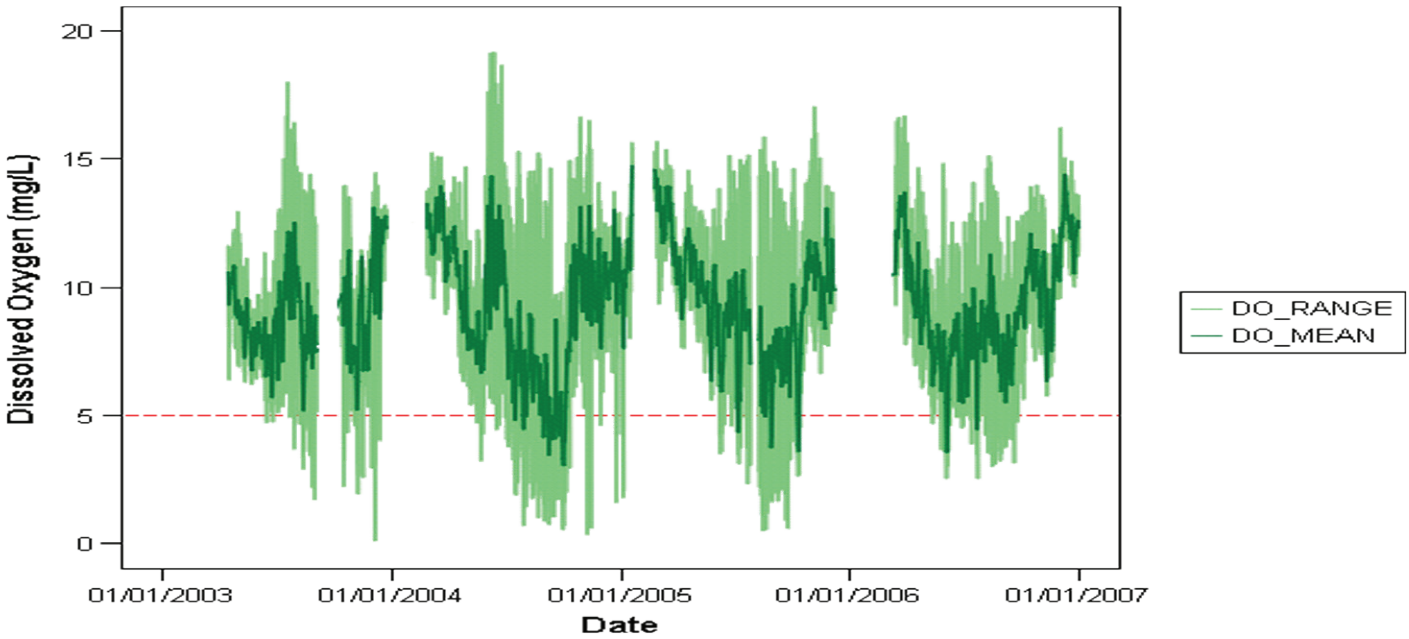
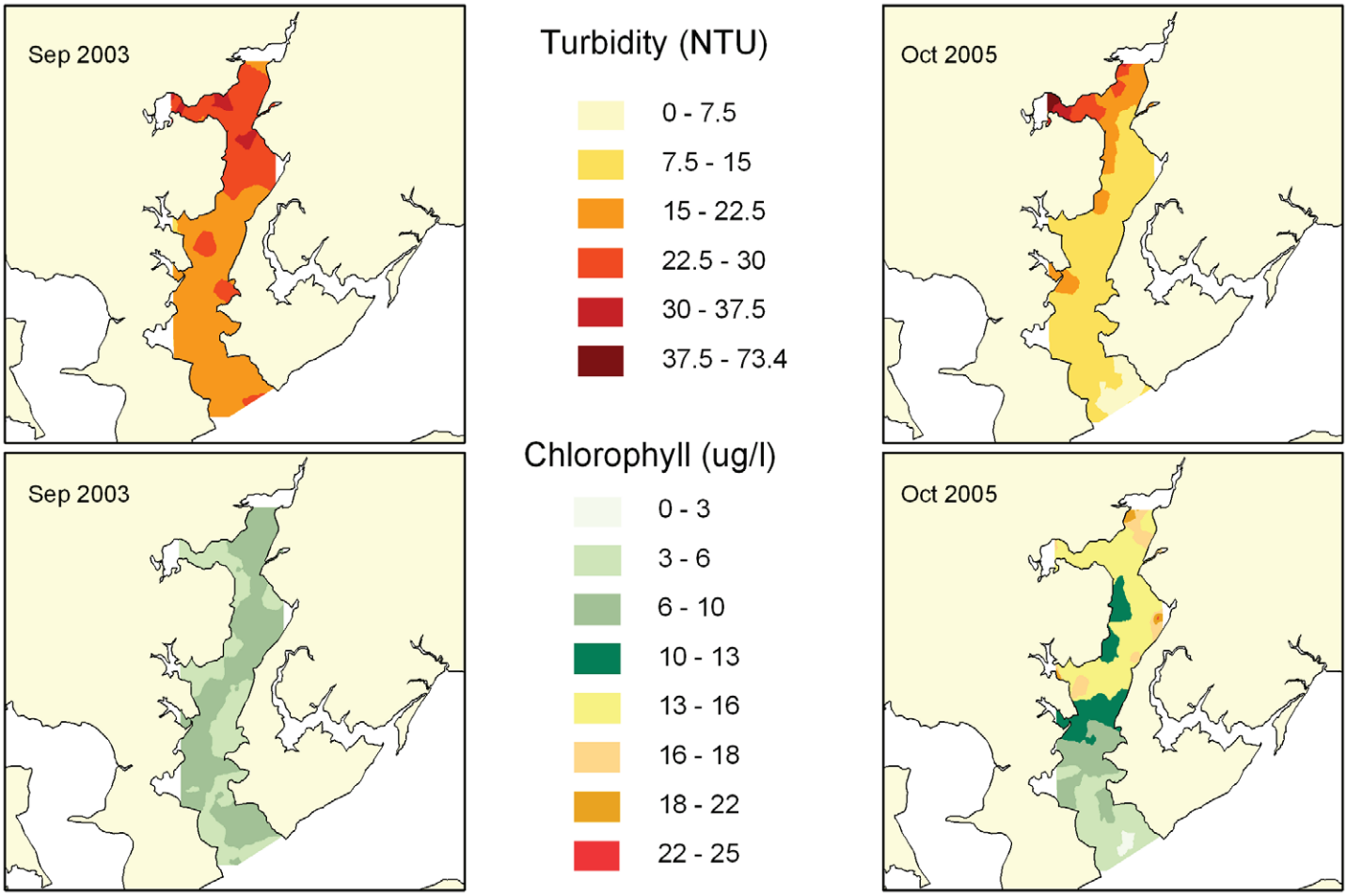


Using turbidity, chlorophyll and salinity data from the Continuous Monitoring stations, DNR scientists can calculate the coefficient of light attenuation (Kd). Light attenuation measures how far light travels through the water column. Clear water has a low Kd, while cloudy water has a high Kd. Underwater grasses (SAV) depend on light penetrating the water column, so abundance of grasses can be related to the Kd values. For the Bush River, Kd values at or below 2.1 are considered optimal for SAV growth in depths of one meter or less. Graphing the Kd data for the 4 year period 2003 – 2006 (above) shows that 2004 was the best year for Kd, with a steady decline in the two following years. The graph on page three shows a similar declining trend in SAV acreage.

Continuous Monitoring data also shows a highly variable dissolved oxygen range in Otter Point Creek (below). High oxygen levels are observed when a large algal community produces oxygen during daylight hours. At night, when the algae respire, the oxygen is consumed, resulting in very low oxygen levels. The wide variability in the oxygen levels observed at Otter Point Creek suggests a substantial algal community, and many algae blooms have been observed over the last several years.



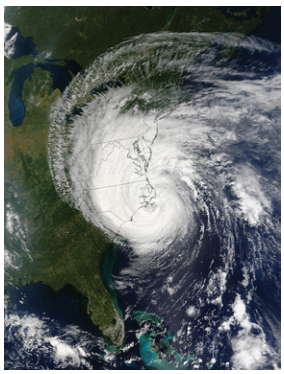
Water Quality Mapping Data Is Used to Investigate Sources of Cloudy Water



Water Quality Mapping data for turbidity (top) and chlorophyll (bottom) from September 2003 (left) and October 2005 (right)

Turbidity is the scientific term for water cloudiness, and DNR shallow water quality instruments measure turbidity in NTU's (Nephelometric Turbidity Units) by detecting how much light is reflected from suspended particles in the water. Turbidity values of less than approximately 5.5 NTU will allow adequate light penetration for submerged aquatic vegetation (SAV) growth at a depth of one meter, all other factors being equal. However, average turbidity was found to exceed 7 NTU during a majority of water quality mapping cruises over a three-year period (2003-2005). Sediments, either washed into a river or stirred up from the bottom, tend to contribute to turbidity during and after storm events. Algal blooms, measured as high chlorophyll levels by water quality mapping instruments, also contribute to high turbidity readings and block sunlight from penetrating through the water.

The September 2003 mapping cruise was conducted the week following Hurricane Isabel's trek up the Bay. The storm surge and rainfall associated with that major hurricane were the cause of the observed high turbidity during this cruise. The high turbidity water that dominated the upper portion of the Bush River in October 2005, however, was associated with chlorophyll concentrations exceeding 15 µg/L for the same cruise (see map). This indicates that algae populations were contributing to the overall turbidity. Such investigation of the data generated by shallow water quality mapping can give Chesapeake Bay scientists valuable information about how and when algal blooms and sedimentation occur, to what extent these phenomena cover the river, and what role they may play in the Bush River ecosystem as a whole, including the recovery of SAV.



For more Bush River Water Quality Mapping data, please visit www.eyesonthebay.net.