

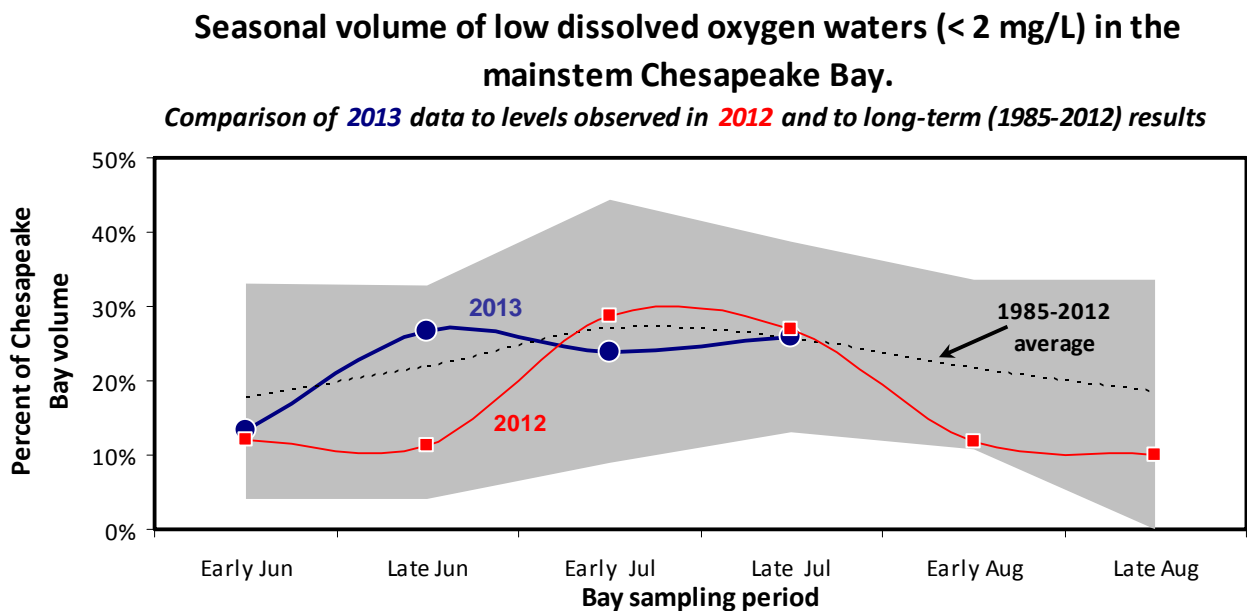
Tracking status of Chesapeake Bay's summer "DEAD ZONE"

Late July 2013 report

During June and July, the volume of water with poor oxygen concentrations (< 2 milligrams per liter - mg/L) in the deep portions of Chesapeake Bay in Maryland has oscillated about the long term (1985-2012) average. During the last week in July, the volume of water with low oxygen levels increased slightly above the volume measured two weeks earlier and is now just above the 28-year average for the same late July period. While oxygen levels remains slightly better than the peak volume of late June, very low oxygen in more than a quarter of the Chesapeake Bay's waters are too low for fish, shellfish and crabs to survive. The State's restoration goal for the Chesapeake Bay is to reduce nutrient loads to a level that will provide dissolved oxygen at concentrations that support aquatic resources during all months of the year.

Water quality data collected each summer by the Maryland Department of Natural Resources' (DNR) Chesapeake Bay Monitoring program are analyzed to define how much of the Bay has very low dissolved oxygen levels (less than 2 mg/L) - what has been popularly called the "Dead Zone". This is far below the 5 mg/L minimum needed for fish, shellfish and crabs to thrive. Data collected in the last week of July showed that 25.8 percent of the volume of the Chesapeake Bay in Maryland had low oxygen levels (0 to 2 mg/L); essentially equivalent to the long-term (1985-2012) late July average in the Bay (Figure 1). While these conditions are better than oxygen levels observed in 2012, more than a quarter of the Bay still has oxygen levels too low to support aquatic life.

Figure 1.



The volume of low oxygen observed in late July (5.49 cubic kilometers) is better than the late July forecast of 6.1 cubic kilometers from the University of Michigan and is within the average summer range forecast by the University of Maryland (<http://ian.umces.edu/ecocheck/forecast/chesapeake-bay/2013/>). These forecasts are based on lower nitrogen levels found flowing into the Bay from the Susquehanna River this past winter/spring.

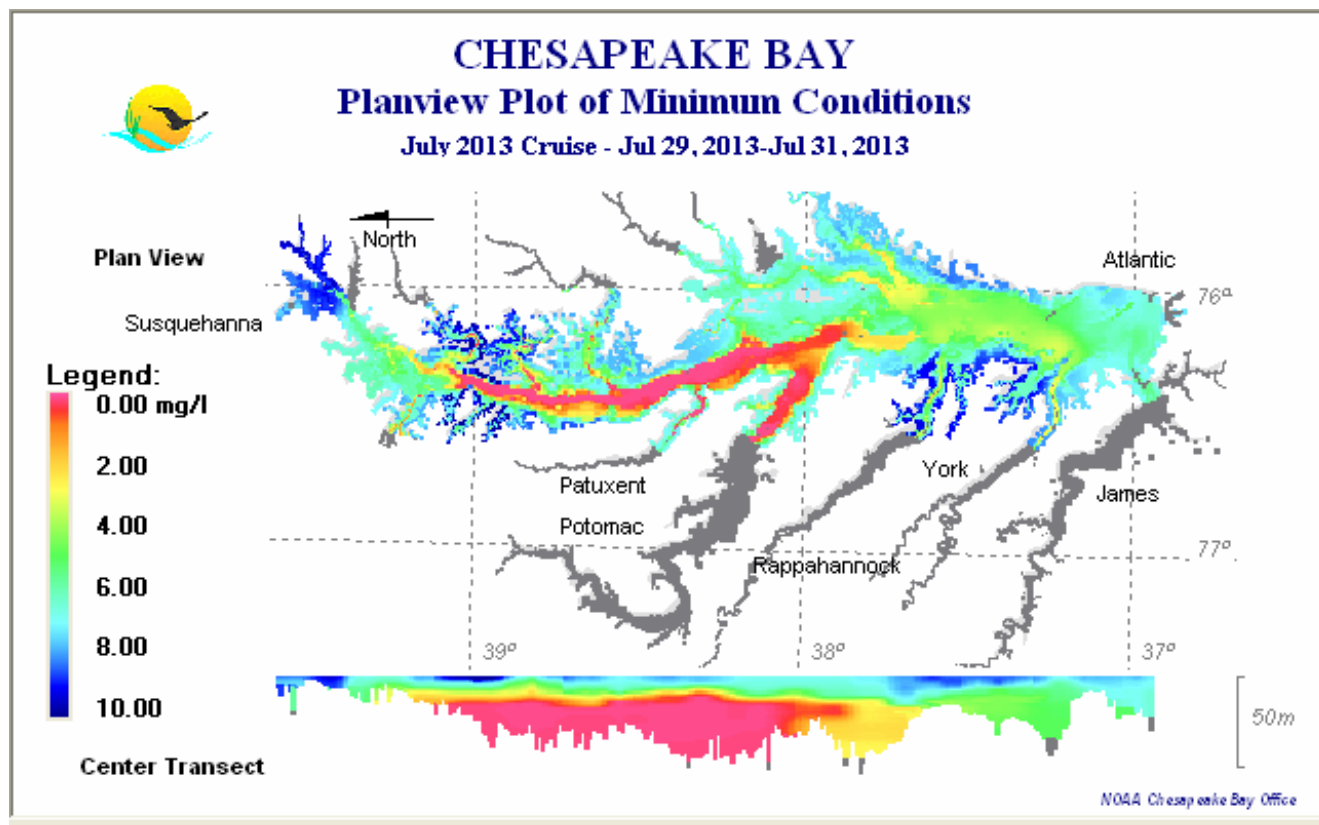
What are Dead Zones?

In the Chesapeake Bay, surface and deep waters are naturally separated each summer as warmer and less salty surface waters float on top of cooler, more salty waters deeper in the Bay. Algae and plants in deeper waters can't create oxygen by photosynthesis so oxygen here is gradually consumed through respiration by animals, plants and bacteria. Oxygen in deeper waters of the Bay begins to decline in the late spring, sometimes to the point where only anaerobic bacteria can survive. As the summer progresses, the volume of low oxygen waters in the Bay will

increase to a peak in July (**Figure 1**) before slowly declining. These conditions can continue into the early fall, when cooler temperatures and fall storms mix surface and deep waters.

Combining Maryland's Bay data with lower Bay data collected by the VA Department of Environmental Quality for the same period can provide a more complete picture of oxygen conditions throughout the Bay. With the NOAA - Chesapeake Bay Program Office's INTERPOLATOR program and these mainstem Bay datasets, a snapshot of dissolved oxygen conditions and distribution throughout the main Bay is developed. The distribution of oxygen across the Bay's bottom waters and as a vertical profile from the Susquehanna Flats to the Bay mouth are shown for the last week of July 2013 (**Figure 2**).

Figure 2



Colors from orange to pink indicate low oxygen levels. Since mid-July, the upstream reach of anoxic conditions (less than 0.2 mg/L - bright pink color) retreated from the Tolchester area to the mouth of the Patapsco River but widened across the Bay between the Choptank and Patuxent River mouths. Low oxygen conditions in the upper Virginia portion of the Bay have improved.

Maryland DNR will continue to monitor the oxygen conditions of the Bay and lower tidal rivers every two weeks this summer and will provide updates of oxygen conditions on the Eyes On The Bay website. Implementation of the Bay Total Maximum Daily Load for nutrients commits Maryland and the other Bay watershed States to accelerate their pollutant reduction strategies which should reduce the size and duration of the Bay's 'Dead Zone'.

For more information:

- Real-time Maryland Tidal Water Quality Conditions: www.eyesonthebay.net
- Restoring the Chesapeake Bay: Maryland's Actions & Progress: www.baystat.maryland.gov/
- What You Can Do to Help the Bay: www.baystat.maryland.gov/what_you_can_do.html