Cassidy Craig

October 4, 2013

STEM Season Change Model Analysis

1. According to my model, when the temperature of the Susquehanna River is 10.889°C (on November 14, 2013), the dissolved oxygen should be 8.4 ppm. The actual dissolved oxygen in the Susquehanna River November 14, when the temperature was 10.889°C, was 10.6 ppm. My model was 2.489 ppm lower than the actual dissolve oxygen in the Susquehanna River.

According to my model, when the temperature of the Potomac River is 11.889°C (on November 14, 2013), the dissolved oxygen should be 8.4 ppm. The actual dissolved oxygen in the Potomac River on November 14, when the temperature was 11.889°C, was 9.5 ppm. My model was 1.1 ppm lower than the actual dissolved oxygen in the Potomac River.

According to my model, when the temperature of the Norfolk watershed is 13.389°C (on November 14, 2013), the dissolved oxygen should be 8.5 ppm. The actual dissolved oxygen in the Norfolk watershed on November 14, when the temperature was 13.389°C, was 7.7 ppm. My model was 0.8 ppm higher than the actual dissolved oxygen of the Norfolk watershed.

There was a difference in dissolved oxygen level that my scratch model produced and the actual dissolved oxygen of the three rivers. The change occurred because my group might have been adding too much indicator to the water sample. Additionally, my group could have taken the temperature of two spots in the river and averaged the two to get the total temperature of the river for each day. Finally, my group could record the data for the entire year, which would give us a more reliable model.

1. The dissolved oxygen levels are increasing as the ablative cover decreases in percentage, and the temperature of the water decreases as the ablative cover increases in percentage. Specifically, when the ablative cover is 100%, the dissolved oxygen is 8.6 ppm. When the ablative cover is 100%, the temperature of the water is 16.945°C. This model would make sense if it occurred on a day towards the end of summer or beginning of fall, even though the ablative cover does not directly relate to the seasons. The water temperature was not as hot as it would be in the summer, but not as cold as it would be in the winter. For example, my group found very similar results when we conducted these tests in late September and early October. When the ablative cover was 10%, the dissolved oxygen was 8.8 ppm, and the temperature was 18.3°C. As the ablative cover was decreased 90%, the dissolved oxygen levels increased by 0.2 ppm, and the temperature increases by 1.355°C. This makes sense, even though the numbers in the two examples are very different, because as the ablative cover decreased and the temperature of the water increases, the dissolved oxygen in the water increases. I came to this conclusion by studying my scratch/fathom program and comparing these two examples.
2. The change occurred because my group might have been adding too much indicator to the water sample. Additionally, my group could have taken the temperature of two spots in the river and averaged the two to get the total temperature of the river for each day. Finally, my group could record the data for the entire year, which would give us a more reliable model.

I could have made a more realistic version of my model by adding the perfect amount of indicator solution to the water sample. When measuring the dissolved oxygen in the water samples, my group would sometimes add too much or too little indicator solution. This would affect the amount of dissolved oxygen in the water. Adding to much or too little indicator solution could alter the actual amount of dissolved oxygen in the water sample. Additionally, my group could have taken the temperature of two spots in the river. Taking the average of two temperatures would have given me a more accurate temperature of the river. Finally, my group could record the data for the entire year, which would give us a more reliable model. Taking and recording the pH, temperature, ablative cover, and dissolved oxygen for an entire year would have given me a more reliable model because I would have had more data to compare my results to. I made an example table and model with the average data for the four seasons. Row one is equivalent to summer, row two is equivalent to spring, row three is equivalent to fall, and row four is equivalent to winter. This model would still show the dissolved oxygen levels increasing as the temperature decreased slightly. This would represent a more reliable version of my model.









1. My group and the other dissolved oxygen group did not record data on the same days. Additionally, the other dissolved oxygen group had one more trial than my group. Other than these differences we did not have any differences between our data collection processes. On the other hand, the ablative cover in our observations differed drastically between our groups. Because our groups did not record data on the same days, the ablative cover changes from day to day since it does not directly relate to the seasons. This cause a huge difference in our ablative cover percent.