



Mabel Davis Pond Algae Bloom, Summer 2010

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*A June 24, 2009 citizen complaint to the Watershed Protection Department Spill Response Team regarding green coloration of a privately owned impoundment prompted investigation by the Surface Water Team to identify the coloration and cause. An analysis of water samples concluded that the green coloration of the pond water was a result of an algal bloom of *Anabaena*, however the cause of the bloom was not determined. Conditions in the contributing catchment in Mabel Davis Park continue to be monitored for additional information.*

Introduction

On June 24, 2009 Watershed Protection Department Spill Response Team member Stan Tindel was called to investigate irregular conditions (pea-soup green coloration) in an on-channel impoundment located within a residential lot owned by Terry Hall. The pond is located on Country Club Creek south of the intersection of Metcalf road and Wickshire Lane, just downstream of Mabel Davis Park.

Upon arrival Stan confirmed that there was considerable plant or algal growth in the pond but was unable to identify the source. Stan observed baseflow at the outfall of the pond, baseflow entering the pond from the creek located in Mabel Davis Park, and baseflow in the creek; however, no observations were made of the baseflow exiting the upper pond in Mabel Davis Park. Stan speculated that the pea-soup green coloration of the pond was due to a bloom of a small aquatic plant called watermeal (*Wolffia*). Since watermeal is not well documented in Austin area ponds, further investigation was conducted to document the bloom.

Methods

Physicochemical parameters (pH, DO, specific conductivity and temperature) and water samples were collected on June 24, 2009 from the pond, the creek that runs through Mabel Davis Park, as well as the upper pond above Mabel Davis Park. Water samples of the three locations were brought to the LCRA lab for analysis of nitrate+nitrite, orthophosphorus, and chlorophyll-*a*. A sample of the pond water was brought back to the City of Austin in-house lab for identification of the plant matter.

Results

The plant matter in Metcalf pool was identified to be *Anabaena*, a filamentous blue-green algae (cyanobacteria).

The water sample results (Table 1) from the LCRA lab showed the nitrate+nitrite level for all three sites to be below detection level (0.004 mg/L). Orthophosphate was 0.105 mg/L in the stream location and below detection levels at both ponds, 0.002 mg/L. Chlorophyll-*a* results from the lab showed that both the pond above Mabel Davis (# 4473) and the stream site (# 4470) were low; 21.2 µg/L and 2.39 µg/L respectively, however the downstream pond (# 4471) was high, 244 µg/L.

Table 1 Nutrients and Chlorophyll from upstream to downstream.

| SAMPLE_SITE | | Chlorophyll-A (µg/L) | Nitrate/Nitrite as N (mg/L) | Orthophosphorus as P (mg/L) | Pheophytin (µg/L) |
|-------------|--------------------------------------|-------------------------|--------------------------------|--------------------------------|----------------------|
| 4473 | Country Club @ Mabel Davis Pond W | 21.2 | <0.004 | <0.002 | 2.36 |
| 4470 | W. Country Club d/s Mabel Davis Park | 2.39 | <0.004 | 0.105 | 0.952 |
| 4471 | W. Country Club @ Pond Metcalfe | 244 | <0.004 | <0.002 | 104 |

Metcalf pond had a relatively normal specific conductivity value of 331.7 µS/cm but the stream flowing into the downstream pond had a specific conductivity of 747.1 µS/cm. Following the water upstream (Figure 1) the specific conductivity was found to decrease slowly reaching the lowest level of 361 µS/cm in one of the upper drop structures in the park, ~200' below Mabel Davis pond. Mabel Davis pond had a specific conductivity of 272.9 µS/cm and did not visibly contribute to flow in the stream.

Figure 1 The Specific Conductivity increases with downstream flow until below the pathway at site 4470.



Staff also performed a site visit to determine the level of groundwater in the area. Their findings were that three out of four observation pits were dry and one had only one inch of water, therefore, groundwater conditions were very low and were not likely the source of flow in the creek.

Discussion

There were concerns that groundwater flowing through the landfill, or water from leaking infrastructure associated with the City of Austin swimming pool were reaching the downstream pond. The leachate drainage system was identified to have had problems from 2008 to early 2009. At this time, it does not appear that this is the source of the flow. Sources of flow in the creek are still unclear, and could potentially include these sources. The most likely source of baseflow in this area is thought to be subsurface flow from the upstream of the Mabel Davis Pond. The unexplained downstream increasing trend in conductivity levels is still under investigation by hydrogeologists evaluating groundwater levels in Mabel Davis Park.

Data, observed conditions, and antecedent conditions were evaluated. It was proposed that the algal bloom was caused by an influx of nutrients from a recent storm event followed by low stream flow and high ambient temperatures. Terry Hall, the landowner was called on July 8th and informed of the determination. Mr. Hall mentioned that a subsequent 1.5 inch rain event washed out the algae in the pond.