

## **Assessment of Water Quality Pond Habitat**

October 7, 2007

On Tuesday Sept 25, 2007, at 4 pm I meet with Dave Peak of the Bowles Metropolitan District to assess the overall health of the water quality retention pond designed by Wright Water Engineers. The pond and associated detention forebay ponds were constructed approximately 10 years ago and water quality sampling has been conducted by Wright Water since that time.

The retention pond is long and slender with an inlet on the west end of the pond as well as one on the south side of the pond. Water enters the pond from three forebay ponds that are designed to catch and retain initial runoff coming from the Grant Ranch Community. Some water may also enter the pond via yard runoff from several houses on the south side of the pond. The pond empties to the north via a grated outlet drop box and water is piped to a drainage that runs east into the Bow Mar property and drainage that flows to Bow Mar Lake. The retention pond and 3 forebay detention ponds were designed to provide and protect the water quality entering the Bow Mar Lake. Water quality at the source locations at the forebay ponds and at the outlet of the water quality retention pond have been tested for 10 years and water quality is reported as generally being good.

A homeowner(s) has stated that the pond is unhealthy and choked with algae and that some animal life associated with the pond may have died due to the pond's poor quality.

### **Visual Observations**

The pond is approximately 4-5 feet deep and is surrounded by a band of cattails that varied from 10-15 feet wide. The center of the pond covered with a matt of green floating algae. Duckweed, a floating vascular aquatic plant, was observed in the water quality west forebay pond, the west inlet to the retention pond, and in the cattails that surrounded the water quality pond. Vegetation above the high water line, although dominated by non-native grasses and some weeds, was generally dense and healthy.

There appeared to be no areas of active erosion contributing to sedimentation and associated nutrient in the pond. Water clarity was good. Water level appeared to be higher than normal as indicated by a live willow that was submerged in 8-12" of water. This is likely due to the recent rainy weather on the previous Monday. Animals and other aquatic life observed included about a dozen mallard ducks, dragonflies, and a variety of aquatic insects. Mosquitoes in this type of pond are likely, however the presence of VectoLex or VectoBac donuts have been placed in the pond to reduce populations.

### **Ecological Assessment**

The algal matt across the lake could be considered by some to aesthetically unappealing, but algae is somewhat normal for a pond of this size, depth, and designed water quality function at this time of the year. Higher than average summer temperatures may have contributed to the matt earlier in the year and it may also be more persistent later in the year due to high water temperatures. A summary of water quality data provided by Wright Water Engineers dated September 26, 2007, indicated that total nitrogen levels

after storms were on May 1 was 9.2 mg/L (milligrams per liter), on June 6 was 10.9 mg/L, and on August 8 was 7.2mg/L with a running average discharge concentration of 7.3 mg/L. Dry weather sampling nitrogen levels averaged 9.5 mg/L. These levels of nitrogen are significantly higher than criteria of a maximum allowable concentration of 4.2 mg/L. These levels of total nitrogen in this watershed are likely the result of runoff from fertilized turf and open space areas. No other sources of nitrogen are apparent in this watershed. The extent and dominance of this algal matt is likely the result of high nitrogen levels.

Several solutions to reduce nitrogen levels and/or thus algal matts in the pond could be considered. 1) Reduce fertilizer applications, modify timing, and /or change the products applied to fertilize turf and/or open space areas. Do not fertilize on the bottom or side slopes of water quality detention forebays. 2) Increase the number of macrophytes like cattails and bulrushes as well as duckweed to compete and shade out algal species in the water quality ponds. Increasing macrophytes will, however, reduce the amount of open water during times when algae do not dominate, generally late fall, winter, and spring. Fifty percent open water is desirable for maximum waterfowl productivity. 3) Copper sulfate could be used to treat the algae. Since cooler fall temperatures are already starting, it is likely that the algal matt will not persist much longer. 4) Mechanical removal is also an option to reduce the cover and competitiveness of algal.

Overall, the health of the pond was good with the exception of the dense algal matt. It is highly unlikely that the pond's algal situation has killed birds, mammals, or other vertebrate wildlife.