

Responses to Questions from the BBASC

Set 3, Received April 25, 2012

Gregg Easley of the TCEQ relayed the following questions from a BBASC member to the BBEST.

1. Question. *Was consideration made for the toxic Golden Algae events on the Brazos?*

Answer. Yes. See the discussion of golden alga events on page 2-12 of the BBEST report, quoted in full below.

“Over the past three decades, the naturally occurring golden alga (*Prymnesium parvum*) has bloomed in water bodies across the United States and Texas, including reservoirs within the Brazos River Basin. Golden alga is tolerant of large variations in temperature and salinity. Under certain environmental conditions, golden alga can produce toxins that can cause massive fish and bivalve kills. In Texas, golden alga blooms are winter phenomena that develop under conditions suboptimal for their reproductive growth but conducive for toxicity generation (Roelke et al. 2010a, 2010b, 2010c; Brooks et al. 2011). During these stressful times, the production of toxins suppresses the golden alga’s competitors and deters its predators (Granéli et al. In press). The toxins also immobilize bacterial prey during this period when the alga enters into a heterotrophic mode of growth (*P. parvum* is a mixotroph, an organism that both performs photosynthesis and consumes other organisms to obtain energy), which allows it to feed on bacteria more efficiently and maintain higher densities in the water column (Brooks et al. 2011).

“Golden alga blooms are complex and involve changing water flow, salinity, nutrient concentration, light intensity, and temperature, various combinations of which may increase or decrease a golden alga bloom (Brooks et al. 2011). While increased water flow may cause hydraulic disruption of the organism’s ecology or dilute salinities to levels that do not support a bloom, in the Brazos River Basin the location of the precipitation event may be important because western portions of the Brazos Basin have naturally high salinity. Runoff can wash more nutrients and suspended sediments into the water body, which may increase or diminish the golden alga blooms depending on time of year and other environmental factors. Currently, the precise combination of factors that initiate or terminate a toxic bloom is not fully understood. Recent research in Texas has addressed alternative approaches for managing impacts of golden alga blooms when they occur (Barkoh et al. 2005; Sager et al. 2007; Roelke et al. 2010c, 2011; Brooks et al. 2011).”

2. Question. *Should there be some input from the group that conducted the GA studies?*

Answer. The BBEST recommends an open and thorough dialogue on any subject that the BBASC finds of interest. We encourage discussions with experts outside of the BBEST if they will help the BBASC make informed decisions.

3. Question. *Do they have a minimum e-flow recommendation?*

Answer. The group that conducted the GA studies does not make a minimum e-flow recommendation as such. The studies that associate GA toxicity levels with discharge showed a flow above which no toxic blooms occurred (Roelke *et al.*, 2010). The BBEST reviewed those studies and felt that the pulse flows in our recommendations are consistent with the flow levels that prevent toxic blooms.

The BBASC (with or without the help of BBEST members) might wish request specific information from the experts.