White Pond Water Quality Monitoring Program Update September 14, 2022

CURRENT WATER USE STATUS CHANGE: SWIM AT YOUR OWN RISK/PET ADVISORY

SUMMARY:

Water sampling conducted September 12, 2022, shows a rapid increase in bloom forming cyanobacteria (BFC) compared to samples taken a week ago on September 4. The increase in the BFC biomass can be attributed to the beginning of a late season maxima, which is a common late summer/early fall phenomenon. There is concern that cyanobacteria biomass may continue to increase rapidly over the next week or two. If this occurs, there is a possibility that wind-blown visible blooms and scums may accumulate temporarily at areas along the shoreline. These areas of concentrated cyanobacteria may contain significant levels of toxins. Out of an abundance of caution, water use status has been changed to Swim at Your Own Risk and a Pet Advisory has been issued. Pond users are reminded to avoid swimming or wading in areas of visible bloom or scums and to keep pets away from these areas.

Water samples will be taken again next week to continue to monitor cyanobacterial populations.

When water use advisories are issued, the town will notify the public via the White Pond Bloom Notifications (sign up at https://concordma.gov/3039/White-Pond-Watershed), as well as posting signage at public access points to the pond.

Cyanobacteria Sampling and Bloom Status

Water sampling conducted September 12 shows a rapid increase in bloom forming cyanobacteria (BFC) since samples taken on September 4. BFC samples taken near the Town Beach went from a phycocyanin (PC, a measure of cyanobacteria biomass) reading of approximately 20 ug/ L to over 260 ug/ L within the past week. Similar increases were seen at the Deep 2 and the Thoreau Cove sampling sites. These results are shown in the graphs below. *Dolichospermum* dominates the samples (70%) but *Microcystis* is also present in significant amounts (30%). The increase in BFC biomass can be attributed to the beginning of a late season maxima, which is a common late summer/early fall phenomenon in many ponds.

The increased BFC biomass and presence of both *Dolichospermum* and *Microcystis* prompted Lim-Tex to conduct ELISA analysis for total microcystins and anatoxin-a. Both toxins had detectable concentrations: microcystin = 0.206 ppb (ug/L) and anatoxin-a = 0.201 ppb. The concentration of both toxins is well below safe swimming water exposure limits. The MDPH swimming water standard for microcystin toxin is 8 ppb. Exposure standards for anatoxin-a vary; for comparison, the state of Oregon issues a Pet Advisory warning at a level of 1.0 ppb of anatoxin; Vermont sets a 10 ppb standard, and the World Health Organization has a 30 ppb standard.

There is concern that cyanobacteria biomass may continue to increase rapidly over the next week or two. If this occurs, there is a possibility that wind-blown visible blooms and scums may accumulate at areas along the shoreline and these areas may contain significant levels of toxins. Pond users are reminded to avoid swimming or wading in areas of visible bloom or scums and to keep pets away from these areas.

September 12 samples were also analyzed for picocyanobacterial biomass (which are present in the pond but generally do not cause visible blooms), to see if last week's rainfall caused an increase in these populations, but this was not observed.

Pond water will be samples weekly to monitor whether cyanobacteria biomass continues to increase. Toxin measurements will be taken as needed.

Pond users who are interested in learning more about the sampling program can visit the White Pond Reports webpage https://concordma.gov/3126/Bloom-Reports. Two documents on this page provide more information about the sampling protocol and rationale being used in the White Pond water sampling program.
White Pond Monitoring Addendum Oct 29, 2021,
https://concordma.gov/DocumentCenter/View/37187/White-Pond-Monitoring-Addendum-Oct-29-2021

Evaluation of Size Structure in Freshwater Cyanobacteria
https://concordma.gov/DocumentCenter/View/37186/Evaluation-of-Size-Structure-in-Freshwater-Cyanobacteria

A-Pod HAB Trap update

During the past week, visual surveys were conducted around entire pond perimeter. Slight scums and visible suspended HABs were seen before the main A-Pod "A" trap, with minor accumulations observed at trap B. Accumulations at both traps were too low to require removal of HAB biomass this week.

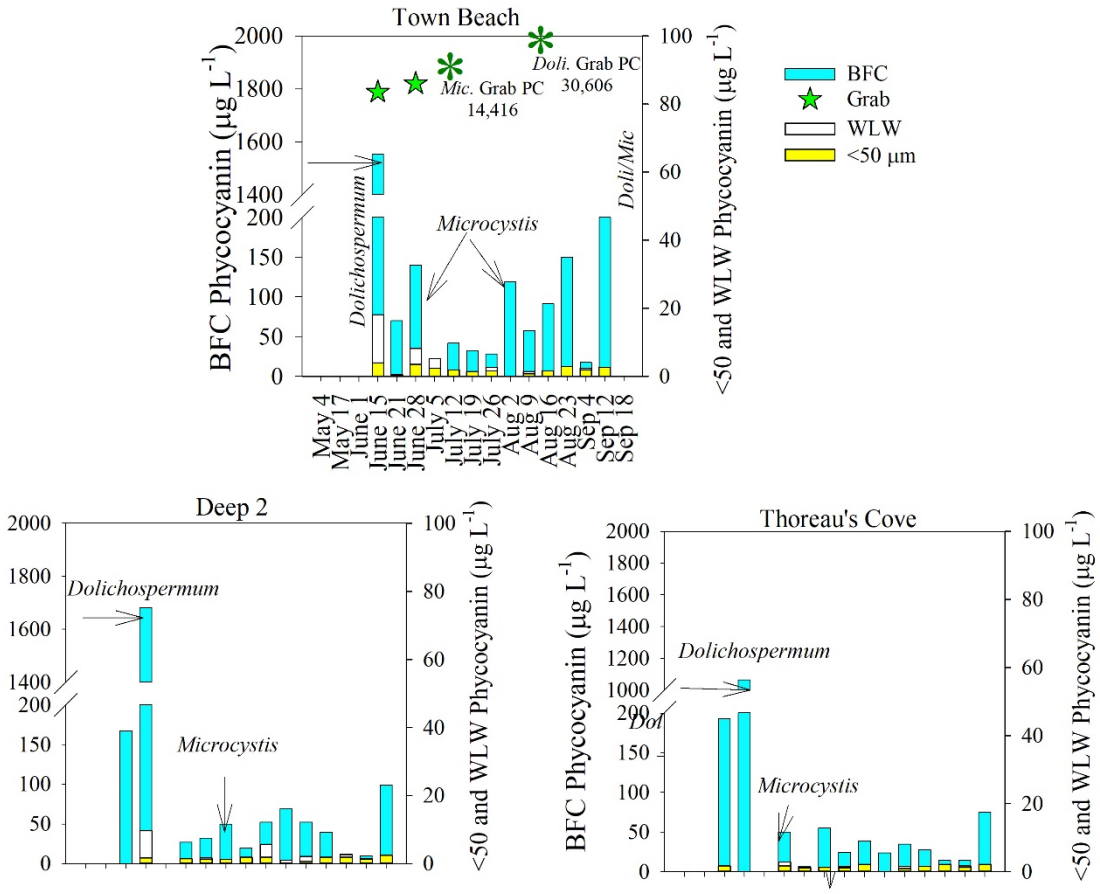
No scums or HAB accumulations were noted around pond itself outside of the A-Pod trap areas.

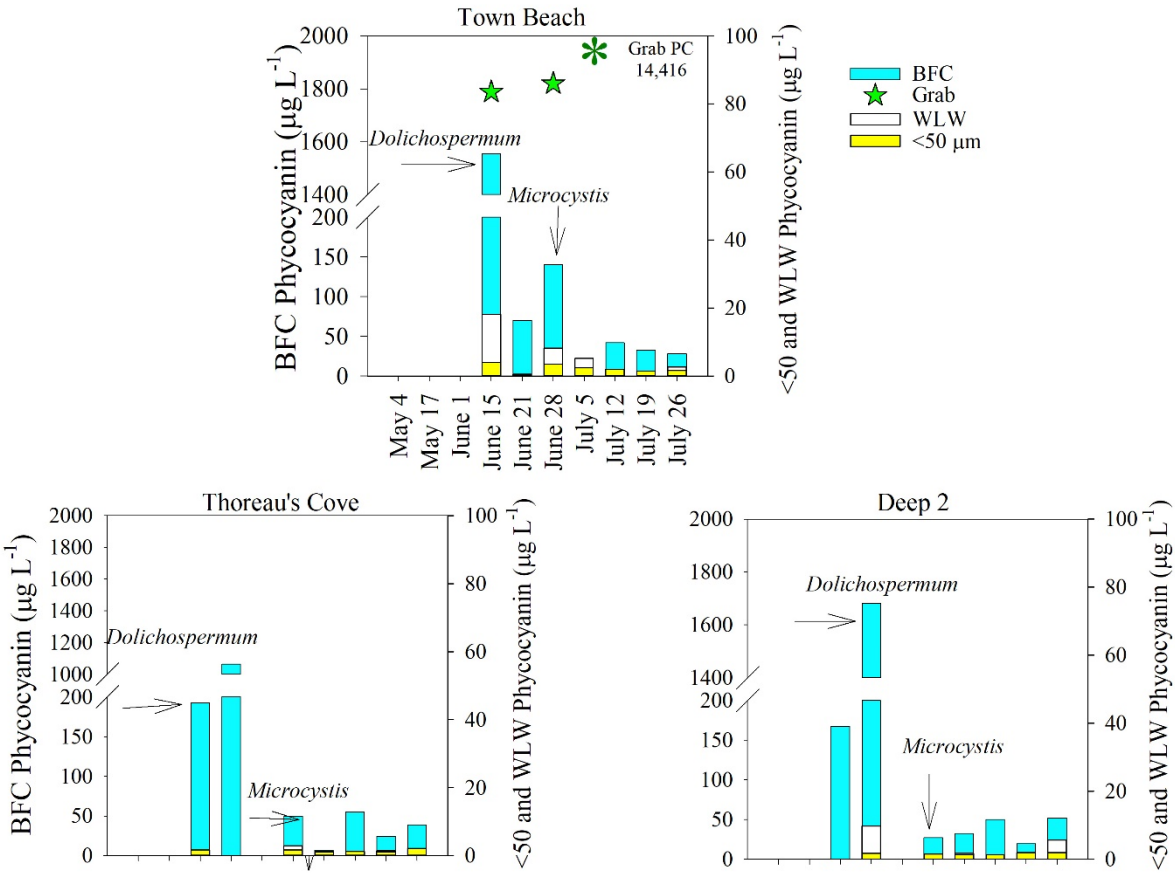
Phycocyanin (PC) data in vertical sonde surveys show some variability across the pond but with low PC values. HABs as indicated by PC (measure of HAB biomass) seem to be more depleted closer to shore than in deep/central areas of the pond.

Water clarity has continued to improve and shows some variability in deep hole transect across the pond. Last week at the center of the pond, water clarity was measured at 21 feet (around noon, no clouds and only slight water turbulence). This week at noon with very little water turbulence, water clarity improved with a range from 21.4 feet (east deep hole off beach); 22.5 feet from center deep hole; and 22.2 feet from western deep hole area.

Assessments of water currents in the pond were also completed using multiple drogues at different depths. Water currents carried drogues clockwise until they were hung up on shorelines/docks, etc. Deep drogues followed similar tracks. Scums and suspended HABs were seen building up and entering the main A-Pod "A" without apparent wind transport, so this is likely attributable to water currents.

White Pond phycocyanin (PC) levels through September 12 at 3 sample sites. Note the increase in phycocyanin in BFC samples at all sites compared to samples taken September 4.




Town Beach
Grab PC
14,416
Dolichospermum
Microcystis
BFC
Grab
WLW
<50 µm
BFC Phycocyanin (µg L-1)
<50 and WLW Phycocyanin (µg L-1)
May 4
May 17
June 1
June 15
June 21
June 28
July 5
July 12
July 19
July 26
Thoreau's Cove
Dolichospermum
Microcystis
Deep 2
Dolichospermum
Microcystis