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Nutrients help turn river green

By Anna Eleria and Rebecca Scibek/Special to the TAB

While this summer was filled with warm, sunny days that encouraged recreation on the Charles River and in its parklands, it also saw an explosive growth of a potentially harmful algae in the Lower Charles. First identified in early August, the fluorescent green algal bloom extended from the Harvard/Massachusetts Avenue Bridge east to the Museum of Science, with dense, floating mats of algae most visible in lagoons, canals and along the river's edge in Boston and Cambridge.

Algal blooms have been a problem in the Charles River for years, but this year's bloom was remarkable for two reasons. First, it was the first time that the algae bloom was identified - a sample collected in early August was identified as microcystis, a type of blue-green algae that secretes toxins and grows naturally in fresh and estuarine waters. Second, the amount of algae was extremely large. The abundance of algae was due to heavy late spring and early summer rainstorms that brought an enormous influx of nutrients to the river, followed by a period of extremely warm water temperatures, creating perfect conditions for algae growth.

To notify the public of the potential hazard, the state posted signs along the river warning people to avoid direct contact with the water.

In early August, the density of sampled algae was ten times greater than the moderate health risk threshold designated by the World Health Organization (WHO). Samples taken the second week in September by Massachusetts Department of Conservation and Recreation (DCR) showed that algae levels had decreased significantly, close to the WHO low health risk threshold. CRWA sent water samples (with algae concentrations slightly above the low health risk probability threshold) to a laboratory at the State University of New York in Syracuse to determine if and how much of the toxin was released by the algae. The results showed that a small, but significant, amount of toxin was present in the water at that time. Exposure to the toxin at that level could lead to short-term health problems such as skin irritations, diarrhea, and nausea.

To notify the public of the potential hazard, CRWA informed all boathouses involved in the Flagging Program, a daily water quality public notification system, of the algal bloom, and instructed those within the affected area to fly red "do not boat" flags. DCR posted signs along the river warning people to avoid direct contact with the water. CRWA and state environmental and health agencies are continuing to work together to better monitor and understand the algae issue.

Algae is a natural and critical part of the Charles River ecosystem that provides food for fish and other small aquatic animals. However, too much algae drives the ecosystems out of balance, as it blocks sunlight from underwater plants, creates large day-night swings in oxygen levels in the water, produces scum and odor and may secrete large amounts of toxins. Upon die-off, algae consumes large amounts of oxygen, which can damage or kill fish and plant species that are dependent on dissolved oxygen in the water.

The primary cause of algal blooms in freshwater is excessive phosphorus, a nutrient found in wastewater treatment plant discharges and in stormwater runoff. The single greatest source of nutrients in the Charles River is run-off from high-density residential land, which comprises nearly fifty percent of Newton's land. Lawn fertilizers, soaps and detergents are the main human sources of phosphorus. Other "natural" sources of phosphorus from residential areas are decaying leaves, grass clippings, and pet waste, all of which increase the level of algae-inducing nutrients when they flow into the river through storm drains or small streams.

The property management practices of homeowners and municipalities have a dramatic impact of the amount of nutrients flowing into the Charles. Property owners should minimize fertilizer use, use only low phosphorus fertilizers, pick up and dispose of dog waste, and dispose of yard waste properly (not in the street or into storm drains). Cities and towns should minimize the use of fertilizers on public playing fields, parks and landscaped areas, provide yard waste pickup, enforce "pooper-scooper" laws, clean catch basins regularly, and build "green infrastructure" wherever possible.

Other factors, such as low river flow volume, warm water temperature and the presence of dams, magnify the impacts of phosphorus and increase algae growth. CRWA continues to develop science-based solutions to tackle these problems, and to advocate for policies and programs that will help reduce algae levels and ensure cleaner, safer waters for fish, wildlife and the public.

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