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Groundwater fills bay with mercury

By MARY ANN BRAGG
STAFF WRITER

Contaminated groundwater is producing high levels of mercury in Waquoit Bay, according to research released yesterday by the Woods Hole Oceanographic Institution.

In a unique approach, the research focuses on total mercury rather than the more biologically dangerous form of the heavy metal called methyl mercury, which accumulates in fish, according to Woods Hole marine chemist Matt Charette and researcher Sharon Bone.

"Until we look at that fraction of the mercury, and how that's cycling within the bay, we really don't know if there's cause for concern," Charette said of the potential for methyl mercury contamination in Waquoit Bay.

The research was published in the online version of the journal Environmental Science and Technology.

According to the federal Centers for Disease Control and Prevention, the human nervous system is sensitive to all forms of mercury and exposure to the toxic metal can lead to permanent brain damage.

Charette said the Waquoit Bay study used relatively new techniques to measure how much groundwater flows into coastal waters.

"Along the east coast of the U.S., a lot of groundwater flows into coastal areas and, the question is, can that be a source of possible pollutants?" said Bone, lead author of the Woods Hole study and now a graduate student at the University of California, Berkeley. "Our hope is that people will start thinking of groundwater as a possible source of pollution, and the fact that they might need to measure it in order to identify all the sources of mercury that are entering coastal waters."

Waquoit Bay is located in the towns of Falmouth and Mashpee on the south side of Cape Cod and is part of the Waquoit Bay National Estuarine Research Reserve, where the Woods Hole research was conducted.

Charette said rain is the most likely source of the mercury.

He said mercury released into the air from the smokestacks of oil- and coal-burning industrial plants in the Midwest falls back to earth in the Northeast's rainfall.

That mercury then trickles down to aquifers and other groundwater systems, with the tainted groundwater eventually draining into coastal waterways.

In the case of Waquoit Bay, the quantity of mercury discharged into the bay via groundwater was 10 to 100 times greater than the mercury entering the bay through rainfall and other atmospheric sources, Bone said.

A Cape Cod Commission environmental official said the Woods Hole research adds to the scientific knowledge of Waquoit Bay, but he said the public needs to recognize the narrow focus of the study.

Tom Cambareri, the commission's water resources program manager, said the primary contributors to the fouling of the Cape's coastal waters are mismanaged wastewater, poor storm water treatment and lax air pollution controls. A Waquoit Bay National Estuarine Research Reserve spokesman shared Cambareri's caution. "The primary issues affecting the coast are, of course, nitrogen loading and the effects of changing climates," spokesman Brendan Annett said. "This opens up new questions."

Charette said the next steps for the Woods Hole research will look at the methyl mercury content of Cape groundwater and examine where the mercury goes in the marine environment after it enters the bay.

Mary Ann Bragg can be reached at mbragg@capecodonline.com.

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