

COMMUNITY FOUNDATION QUINNIPIAC RIVER FUND

FINAL REPORT

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Project Name: Water testing to identify a point source polluter of diethylhexyl phthalate and other plasticizers in a continuing effort to report on the Quinnipiac River.

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Summary

This project was funded in part by The Community Foundation for Greater New Haven's Quinnipiac River Fund in order to study the presence of diethylhexyl phthalate and phthalate plasticizers in water from the Quinnipiac River with particular attention to the parts of the River above and below the industrial discharge point from Cytex Industries in Wallingford. Samples of water were collected and tested from locations in Wallingford, North Haven, and the tidal marsh on its way into New Haven harbor. The project period for this investigation was: March 20, 2014 to March 19, 2015.

Project Objectives

- Collect and analyze water and in the Quinnipiac River, in predetermined locations in Wallingford and North Haven for the presence of phthalate plasticizers.
- Measure water quality and climatic parameters at sample sites during collection.
- Disseminate research results on the analysis of chemical contaminants in the Quinnipiac River and its watershed.

Background

Phthalate esters are plasticizers commonly used to soften polyvinyl chloride products such as electrical conduit and sewage piping. As a result phthalate plasticizers are quite often found in samples which are collected for environmental monitoring programs. Plastic materials represent a portion of wastes released from landfills, trash transfer stations, industrial wastewater treatment plants, and municipal incinerators. Several of these plasticizers, specifically diethylhexyl

phthalate, are manufactured in Wallingford by Cytec Industries which has a discharge permit allowing outflow into the Quinnipiac River.

Although phthalate esters are practically insoluble in water, samples gathered from the Quinnipiac River at many sampling locations this past summer and fall, from May to November 2014, showed traces of three phthalate esters: diethylhexyl phthalate, benzylbutyl phthalate, and dibutyl phthalate. We sampled the River at points in Quinnipiac River State Park in Wallingford, North Haven, Hamden and New Haven. Many of these places are areas where local residents either enter the Quinnipiac River to go fishing, or fish directly off the banks of the River or where fishing and boating occur in the Tidal Basin of the River.

Samples were collected at these locations going from north to south along the River: 1) Hall Avenue, below the bridge in Wallingford, just below Community Lake; 2) Quinnipiac River State Park just below the Wallingford town line; 3) Toelles Road in the Quinnipiac River State Park, Wallingford; 4) Valley Service Road in North Haven where the Quinnipiac River meets town owned land; 5) The entrance to Quinnipiac River State Park behind the service station on the Wilbur Cross Parkway in North Haven; 6) State Street in North Haven, behind the River Street Tavern directly across from Agway; 7) Sackett Point Road, before the bridge over the River; 8) The Department of Energy and Environmental Protection's boat ramp behind the Tilcon paving plant in North Haven; 9) In the tidal marshes, at multiple points, in North Haven and Hamden via boat, from State Street to the Amtrak yard near the fuel storage tanks of way.

Laboratory Analysis and Sampling

We collected and analyzed water from the Quinnipiac River at locations noted above. These field tests included temperature, flow, and depth. All of the sampling and determination was performed by the Principal Investigator, Dr. Harry Pylypiw and two Quinnipiac University undergraduate students as part of their chemistry program research degree requirements. Analysis of water samples were performed at Quinnipiac University and the Connecticut Agricultural Station.

The technique and detection method we chose for analysis was first an extraction of water by solid phase micro-extraction followed by detection and determination via gas chromatography with a mass selective detector. The advantage of using this type of technique is that the analytical method separates, detects, and identifies chemical compounds in a simple simultaneous procedure. We also ran a mixed standard of eight phthalate esters to check the integrity of our sampling, extraction and detection method.

Results and Discussion

This study proceeded well into the summer of 2014 and continued into the fall semester of the academic year. We found diethylhexyl phthalate in water samples from locations just below Community Lake, Toelles Road at the Cytec discharge point, at several points in Quinnipiac River State Park, and at sample collection points, in both North Haven and Hamden, including the tidal marsh areas as the Quinnipiac River approaches the bridge over Interstate 91. Additionally, we found benzylbutyl phthalate and dibutyl phthalate at various spots down river

from Toelles Road at the Cytec discharge point, in Quinnipiac River State Park, and the tidal marsh areas of the river.

Measurements of river flow, depth, and ambient temperature were correlated with the analytical findings of the study and it appears that there is no relationship with any sample results obtained over the last five years. Even so, we will continue to monitor flow and temperature when obtaining samples in the future.

Disseminate of Research - Community Outreach

Our findings were presented at the Council on Undergraduate Research, June 28th to July 1, 2014; a conference which addresses undergraduate research projects; at the Northeast Regional Undergraduate Graduate Student Sigma Xi Poster Conference, April 23, 2014; in sessions sponsored by Quinnipiac University's Interdisciplinary Program for Research and Scholarship; and public relations venues at Quinnipiac University. The results from this research were disseminated to the following interested organizations: Quinnipiac River Watershed Association, The Nature Conservancy, and Rivers Alliance of Connecticut, Connecticut Coalition for Environmental Justice, The New Haven Green Fund, and The Connecticut Fund for the Environment.

Final Budget Statement

\$7000 was allotted by the Foundation for this project. \$3000 was spent for student stipends, \$1889 on a laptop for field sampling use, \$84 on conference posters, \$400 was paid to The Connecticut Agricultural Experiment Station for sample analysis, \$36 on supplies, and \$1591 on meetings, travel and conferences.