

Instructions

QUINNIPIAC RIVER FUND GRANT AWARD - FINAL REPORT QUESTIONS

This form is to be completed by all nonprofit organizations that received a grant through the Quinnipiac River Fund.

Grant Details

Grant Details

Organization Name

University of New Haven

Grant Description

to support the study of bioaccumulation of heavy metals found in a targeted fish species indigenous to the Quinnipiac River.

Total Grant Amount

18,930.00

Report Questions

1. List the specific objectives/outcomes of the project and tell how they were met during the grant period. Also, provide an update on any special conditions of the grant (if applicable).

This project aimed to

- Capture Fundulus from three locations along the lower Quinnipiac River at three sampling times. This objective was met by traveling to the three locations and capturing Fundulus with baited minnow traps or a seine net.
- Euthanize and prepare Fundulus for sample analysis by sorting them into gutted and whole fish groups, and lyophilizing. The fish were euthanized using a two step euthanasia method in accordance with the American Veterinary Medical Association (AVMA) 2020 guidelines. They were all weighed, and some fish were gutted prior to lyophilization.
- Determine the concentration of specific metals bioaccumulated in Fundulus via ICP-MS and ICP-AES. All of the fish samples were shipped to Source Certain International in Australia for sample analysis. The samples were digested with nitric acid, and the generated results from the analysis were shared.
- Compare whole Fundulus to gutted Fundulus to find where metals bioaccumulated in the fish. This objective was achieved through statistical analysis with VSN International Genstat Version 22.
- See if the metals bioaccumulated differentially based on the location along the Quinnipiac River. This objective was achieved through statistical analysis with VSN International Genstat Version 22.
- Find if the metals bioaccumulated differentially by sampling time. This objective was achieved through statistical analysis with VSN International Genstat Version 22.

2. Please share your successes, challenges and any lessons learned through the implementation of your project. Were there any unintended consequences or lessons learned that may affect how you operate your program moving forward?

One challenge associated with this project was finding *Fundulus* along the river's southernmost location. After several attempts at different locations surrounding the mouth of the river, we decided to use a seine net rather than a minnow trap, which brought more success. Another challenge was meeting sample weight requirements for ICP-MS and ICP-AES analysis. Each sample needed to weigh between 2-5 grams, and the initial idea of using *Fundulus* livers and tissues did not meet the weights. We changed our method by comparing whole versus gutted fish which allowed us to meet the sample weight goals. A final challenge was the shipping process when the samples got lost in a FedEx facility. The samples eventually were found and SCI received them.

The successes of this project include receiving probative results from SCI from their analysis for metals. There are many interesting metals that we are looking further into, and comparing which metals accumulate where in the fish. Also, there appears to be locational differences in our results.

Going forward, we have a successful method for fish capture, preparation, and lyophilization that will be used in the future. We also found that ICP-MS and ICP-AES worked well for the purposes of our grant, and will use these methods with SCI for the future. We also have identified metals of interest from this project that can be specifically targeted in the future with a larger species of fish to examine how the food chain is impacted.

3. What are the opportunities and needs of your organization as it continues to move forward with its work to positively impact the Quinnipiac River?

As we have been approved for another QRF grant next year to continue our work with the metals in fish we do not need anything further. The money that has been granted to us to examine the river has been invaluable. We are currently working on a manuscript that we hope to publish in the next few months. We hope that the manuscript will highlight the condition of the river and how cleaning it up needs to continue.

Attachments

Financial information (required): Please provide a detailed accounting of how the specific grant dollars were spent based on the budget submitted in the grant application.

Detailed Accounting

Accounting.docx

Pictures (optional): Please attach one to three pictures in JPEG format, in the highest resolution possible, of activities that have occurred throughout the grant period as a result of grant funding. By providing pictures, your organization is consenting to unlimited use of the pictures by The Community Foundation for Greater New Haven and/or the Valley Community Foundation in publications in print and online (including www.thequinnipiacriver.com). Please include a description of each photo and, when known, the photographer to be credited.

Picture 1

Differences in Means of Levels of Aluminum by Location and Tissue.jpg

Description and Photo Credit

ANOVA showing the different levels of Aluminum in fish tissue by location. Note that toxic levels are 0.2ppm.

Picture 2

Discriminant Analysis by Location and Tissue (All Elements).jpg

Description and Photo Credit

Discriminate Analysis showing the differences in tissues and locations. There is enough discriminating power to separate all of the tissues from locations.

Picture 3

% Correct allocations vs Number of variables added.jpg

Description and Photo Credit

A stepwise progression illustrating how by adding different elements how it impacts the % correct allocation of the tissue. The decline in correct allocation when more elements are added is due to some elements having amounts below detectable levels.