TCF - Quinnipiac River Fund Final Report

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 the effects of temperature change on the behavior of freshwater crustaceans in the Quinnipiac River.

Total Grant Amount

20,000.00

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).

The main aims of this research project were to assess how temperature affects crayfish behavior and to generate a manuscript with the results. Crayfish behavior was successfully monitored in the laboratory via artificial environments and CCTV cameras. Four 1-week long trials each with four water temperatures were run on individual crayfish while overhead cameras recorded the aquaria constantly. After collection all videos were analyzed with a behavioral program called BORIS (Behavioral Observation Research Interactive Software) using an ethogram with the behaviors of aggression, submission, lethargy, hyperactivity, and foraging. As there were over 2,600 hours of collected video, only three trials have been processed at this point. All ethogram event data was then compiled and analyzed statistically in VSN International GenStat. The PI and research assistant are now in the process of finishing and revising a manuscript on the project for publication and for internal distribution at the University of New Haven for future projects.

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?

The most notable challenge that was experienced during this research project was successfully finding crayfish in the Quinnipiac River. According to resources originally used during the formulation of the project, crayfish are present in the River. However, despite setting out traps overnight many times at multiple upstream locations of the river (Meriden, Southington, Plainville) as well as attempting to hand-

trap at the same locations, we never caught or visually identified any crayfish in the Quinnipiac River. Given our sources confirmed the presence of crayfish in the river, the PI was comfortable with obtaining crayfish from other local waterways as a substitute because they would show similar thermal trends as the Quinnipiac River. All crayfish that were tested during this project were caught from Wilmot Brook in Hamden CT or Sprout Creek in LaGrange NY.

An additional challenge that arose from not identifying crayfish in the Quinnipiac River was the unsuccessful completion of the field research component of the proposed project. This was due to the fact that no suitable locations were found that contained crawfish and the field component could be conducted. It is believed that the laboratory experiments demonstrated how the behavior of the animals was impacted by the changes in thermal loading.

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 this grant work continues in the future, student involvement in all aspects of the research will carry on. Student activities will include setting up and carrying out lab and field experimentation, behavioral analysis of collected videos, statistical analysis of compiled behavior data, and drafting/revising reports both for internal use and external publication. The equipment purchased through this grant will be used in the future for upcoming research, namely undergraduate crayfish thesis projects some of which have already started. One of these undergraduate projects investigated the behavioral impact that varying concentrations of estrogenic and caffeine compounds. Furthermore, the data collected from all research projects that utilize the associated equipment will be made available to all researchers for use in as many projects as possible. At this point, neither the PI nor the University of New Haven will need any additional financial assistance from the Quinnipiac River Fund for the continuation and subsequent completion of this project.

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

financial activity.docx

Pictures (optional): Please attach 1 to 3 pictures of activities that have occurred throughout the grant period (with a description for each) as a result of grant funding. All pictures should be submitted in JPEG format and may be uploaded to www.thequinnipiacriver.com and used in Foundation publications.

Picture 1

lab experimental set up.jpg

Description

Figure 1: Image of the laboratory thermal experimentation set up. Experimentation consisted of four

replicates each with four experimental mesocosms of varying temperatures based on the data collected from the PI's previously funded grant project through the 2020 Quinnipiac River Fund. Each of the experimental mesocosms were to be set to a different temperature within the Quinnipiac River's annual range; extreme low (0°C), low (10°C), high (25°C), and extreme high (35°C).

Picture 2

Differences in Means of Event Duration by Water Temperature.jpg

Description

Figure 2: Differences in Means of Event Duration by Water Temperature (ANOVA, $F(3,1218)=21.16$, $p<0.001$ s.e.d. - standard error of differences).

Picture 3

Differences in Means of Event Duration by Behavior by Water Temperature .jpg

Description

Figure 3: Differences in Means of Event Duration of Behavior by Water Temperature (unbalanced ANOVA, $F_{behavior}(4,1205)=49.27$, $p<0.001$, $F_{water\ temp}(3,1205)=23.84$ $p<0.001$, $F_{int}(9,1205)=1.45$, $p=0.161$ s.e.d. = standard error of differences).