

**INVESTIGATION AND RECOMMENDATION OF PEST POPULATION SUPPRESSION IN
ARTIFICIAL URBAN WATERSCAPE**

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ABSTRACT

In late 2003, the residential areas of Southern UBC campus, Hawthorn Place had a small pond about 8" deep installed at the lower end of a rain-fed artificial creek constructed with rocks over plastic membrane. Algae were found to be growing in the pond. The algae growth was assumed to result in insect reproduction and in combination with the residents pest complaints, the storm basin drain was lowered to prevent water accumulation thus removing the pond.

This project is being proposed to examine the insect fauna in the Hawthorn Place Park pond once it is rewetted, and to recommend a biological-controlled program to suppress the pest population. The water features will be reintroduced by changing elevation of the drain outlet. Doing so will contribute to headwaters of the watershed that flows from Hawthorn Place through to the Botanical Gardens and then Trail 7 Creek within Pacific Spirit Park. The re-establishment of the headwaters as well as the watershed surface feature is believed to provide ecological services, slowing storm-water, reduce influx into sewage treatment and public amenities by means of a potential children's park and waterscape feature.

Based on the result of the experiment, an ecologically benefiting and sustainable method which will promote local species diversity as well as a chemical free pest management program will be suggested. The experiment will be composed of two phases. Phase one from Jan-April will be the literature stage where the local history of the water feature as well as the various pre-existing bio-pest protocols will be studied. Phase two from April-August will be the field application stage where a survey of the local pest population will be performed and the result findings of phase one will be put to test followed by a critical evaluation and a recommendation of future pest population suppression based on the tested result.

Research Question/Hypothesis

Preliminary studies have shown that mosquitoes, an example of pests arisen from urban water sources, breed extensively in still, shadowed and turbid water. These water sources are often the result of accumulated rain or condensation found in abandoned containers. We believe that these mosquito populations are able to thrive due to a lack of trophic diversity which promotes the establishment of potential predators. To investigate this question, we propose the following hypothesis to be tested by comparing water sources close to the artificial creek from middle April to middle August:

H₀: The presence of a diverse trophic level in the water habitat will not have any impact on the residing pest population.

H_A: The presence of a diverse trophic level in the water habitat will have a negative impact on the residing pest population.

METHOD

The experiment will be composed of two phases. Phase one from Jan-April will be the literature stage where the local history of the water feature, biodiversity measuring methodologies, as well as the various pre-existing bio-pest protocols will be studied. Phase two from April-August will be the field application stage where a survey of the local water sources' pest population as well as the trophic levels will be performed. A comparison will be made between the findings of phase two for investigating the research question of interest.

STRENGTHS AND WEAKNESSES OF THE STUDY

Strengths

The proposed experiment falls under the Campus as a Living Laboratory (CLL) initiative and is a part of the UBC Social, Ecological, Economic Development Studies (SEEDS) program. The research reaches out to and is supported by UBC campus operation and administration personnel where the findings will directly benefit the local residents as well further the understanding of ecosystem service. The findings will also contribute towards the UBC's strategic commitment to towards sustainability planning and learning in collaboration with academic and operational staff.

The area proposed for this study is very accessible. With a simple study design, this project could significantly contribute to the education and well-being of residents in the development. In addition, urban landscapes are poorly studied for their influence on wildlife, so this would make a contribution to a wider understanding.

Weaknesses

It's easy to get pulled into the proposal to provide a bio-control, but this is a very complex question that requires years of planning and sampling, well beyond the capabilities of this study. This aspect is easily addressed through careful parameterization of the research to hypotheses that are short, simple and relevant.

Residents in the area may not have a good understanding of the purposes of the study and there may be some resistance to putting the water features back into function. If the insect succession of

the artificial creek in trophic level establishments takes longer than we thought, we may not come up with much data for the field component of this study.

PUBLIC HEALTH SIGNIFICANCE

Mosquitoes are an annoyance to humans and are frequently managed for within urban areas. They are also disease vectors for things like West Nile Virus, which has been found in isolated cases west of the Rockies. As a part of this study, we will be able to extend the understanding of the risk that public water features such as ponds and fountains pose to human health.