

# Swimmer's Itch Survey 2016 – Raffel Ecology Lab

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## Proposed Project

My lab studies how environmental factors like temperature and pollution influence parasite exposure and disease risk. In 2015 my graduate student Maddie Messner surveyed eight lakes in northern Michigan, collecting data on the parasite that causes swimmer's itch (the infective **cercaria** stage of avian schistosomes) and potential drivers of exposure risk. We propose to expand this survey in 2016 to include a larger number of lakes, which will allow us to conduct more powerful analyses to determine why some lakes have higher risk for swimmer's itch. Our ultimate goal is to inform local management strategies.

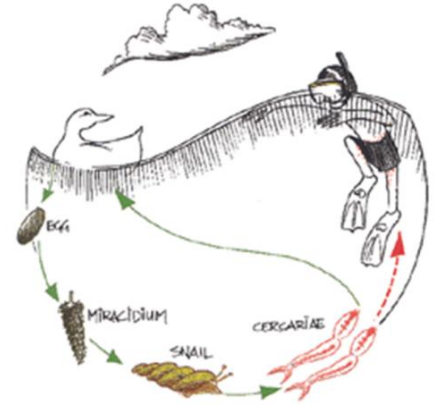
## What determines swimmer's itch exposure?

### **Cercaria abundance in water, which is driven by:**

1. Snail population density
2. Proportion of snails infected
3. Cercariae produced per infected snail

### **We plan to measure a variety of environmental variables that might influence these factors and increase cercaria abundance:**

- Lake size/depth/hydrology
- Land use & soil/rock types
- Climate (temp, rain, wind)
- Snail & invertebrate densities
- Pollution & algae growth
- Bird visitation



## 2016 Summer Research Aims

1. **Daily measurements:** Goal #1 is to obtain field data on cercaria abundance that can be used to validate models being developed by our lab to predict short term (day to day) fluctuations in swimmer's itch exposure. This will require at least 2 weeks of daily sample collection from each site in Jul/Aug. **We are seeking at least one local volunteer to assist with daily sampling at each lake.**
2. **Spatial Survey:** Goal #2 is to obtain data from **20+ lakes across Michigan** to test which variables best predict schistosome cercaria abundance. If sufficient funds can be raised (\$500 per extra site), we will sample multiple sites at larger lakes. Our priority is to sample lakes in the Michigan Swimmer's Itch Partnership, which is helping to raise funds. **We plan to share data and results with all participating lakes, including local presentations if requested.**

## Survey Methods:

- Collect daily samples of cercariae from water using 35  $\mu$ m mesh filters (**volunteers needed**)
- Use qPCR and conventional PCR (DNA methods) to quantify cercariae and (hopefully) identify species
- Survey snail populations using custom-built view buckets and quadrat sampling
- Measure pollutant concentrations in water using ELISA kits and standard nutrient analyses
- Track periphyton (algae) growth using ceramic tiles and chlorophyll extraction assays
- Collect temperature/weather data using HOBO data loggers and climate databases

## Project costs (~\$20,000 to sample 20 lakes, assuming 1 site per lake):

- Summer support for two graduate student research assistants (\$3745 each including fringe)
- Travel costs to and from sites (\$2000)
- PCR reagents, ELISA test kits, materials, and supplies (\$500 per site sampled)

## How can our lake association get involved?

- Recruit at least 1 volunteer (with waders) to collect daily water samples for 2-3 weeks in Jul/Aug
- Join the **Michigan Swimmer's Itch Partnership** (contact Jim Vondale [cvjv1022@aol.com](mailto:cvjv1022@aol.com))
- Talk with Dr. Raffel or one of his graduate students (Madelyn Messner [mlmessner@oakland.edu](mailto:mlmessner@oakland.edu) and Jason Sckrabulis [ipsckrab@oakland.edu](mailto:ipsckrab@oakland.edu)) about selecting sampling site(s) at your lake(s)
- Obtain Oakland University's liability release form from Dr. Raffel and have volunteers sign it
- Pledge to donate \$1000 (plus \$500 per extra site you would like sampled) to help support project costs

**If you would like to support this project, please mail checks to the address below. Make checks payable to "Oakland University" and write "Raffel Lab Research, Biology Dept" in the memo. Please indicate a return address so you can receive a gift receipt for tax purposes.**

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