

# Protecting and preserving freshwater ecosystems by employing effective swimmer's itch prevention strategies

Ronald Reimink

Dr. Patrick Hanington

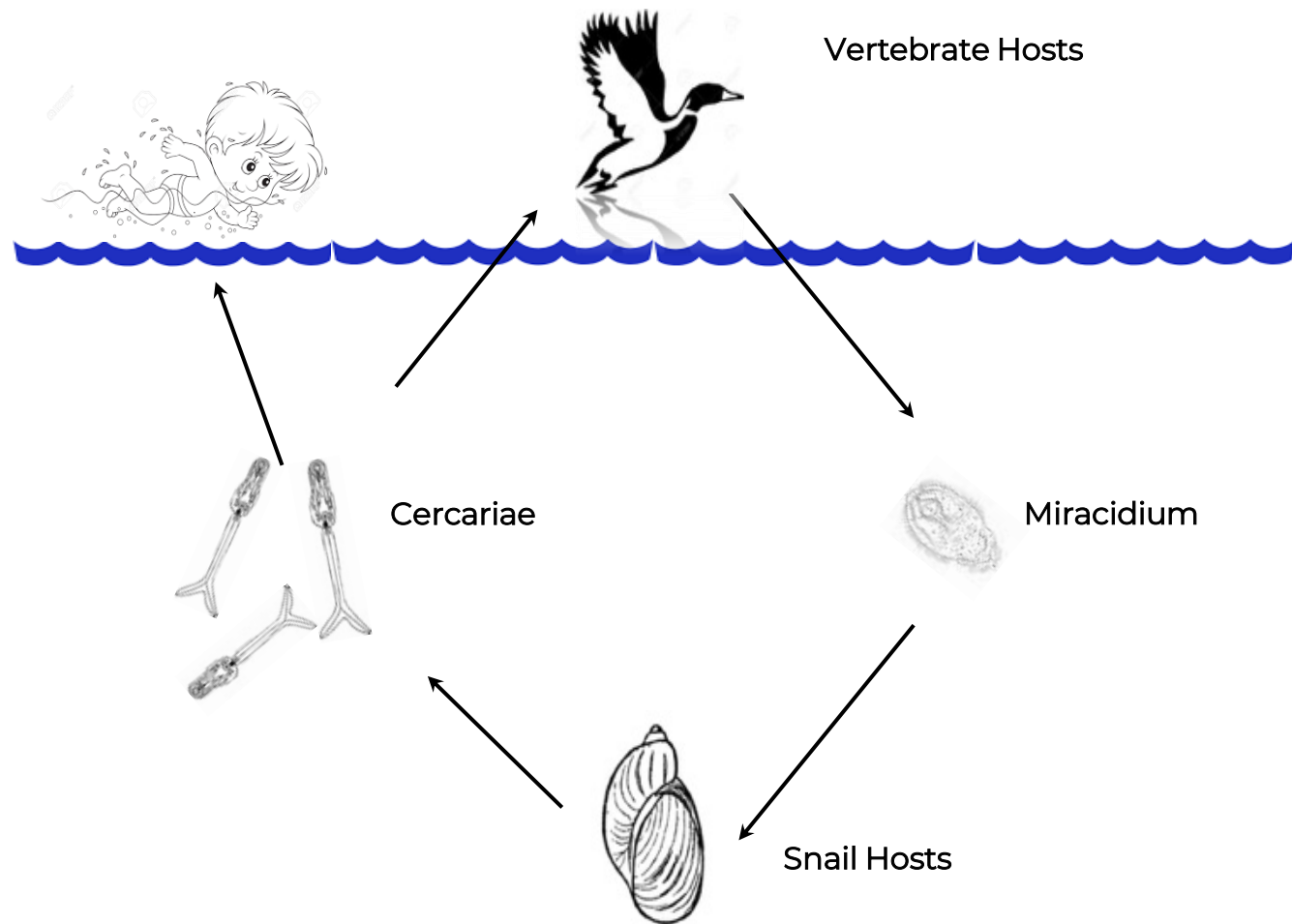
Kelsey Froelich, MSc



**UNIVERSITY  
OF ALBERTA**

# Avian Schistosome Life Cycle

## 1928 Discovery in Michigan



# History: what were we thinking?



Kill all the snails?

$\text{CuSO}_4$ ?

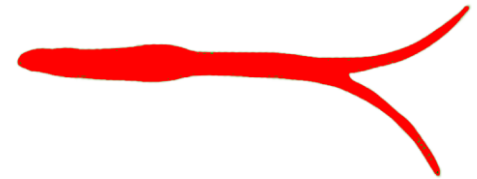




Common  
Merganser



*S.*  
*emarginata*



*T.*  
*stagnicolae*



# History: what were we thinking?



Remove all the  
ducks?



How is swimmer's itch still prevalent on lakes where mergansers were removed?

New technology has helped us answer this  
and other questions

# There are several species of swimmer's itch-causing parasite



The authors believe that there may be as many as 20 species of nonhuman schistosomes in Michigan alone.

Blankespoor, HD and Reimink, RL; 1991  
The control of swimmer's itch in Michigan: Past, Present and Future.

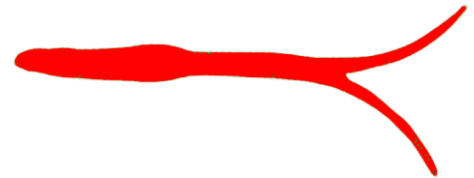




Common  
Merganser



*S. emarginata*



*T. stagnicolae*



Common Merganser



*Helisoma*  
*sp.*



*Lymnaea*  
*sp.*



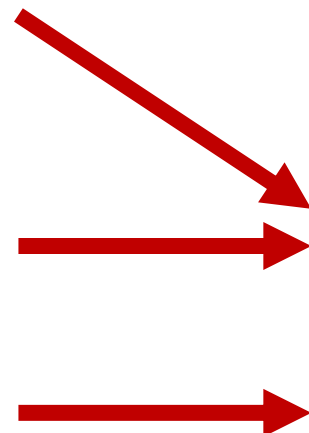
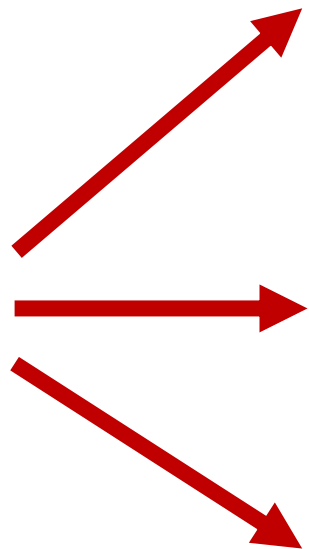
*S. emarginata*



*Physa* *sp.*



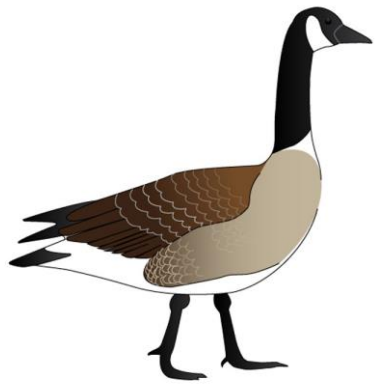
*Gyraulus*  
*sp.*



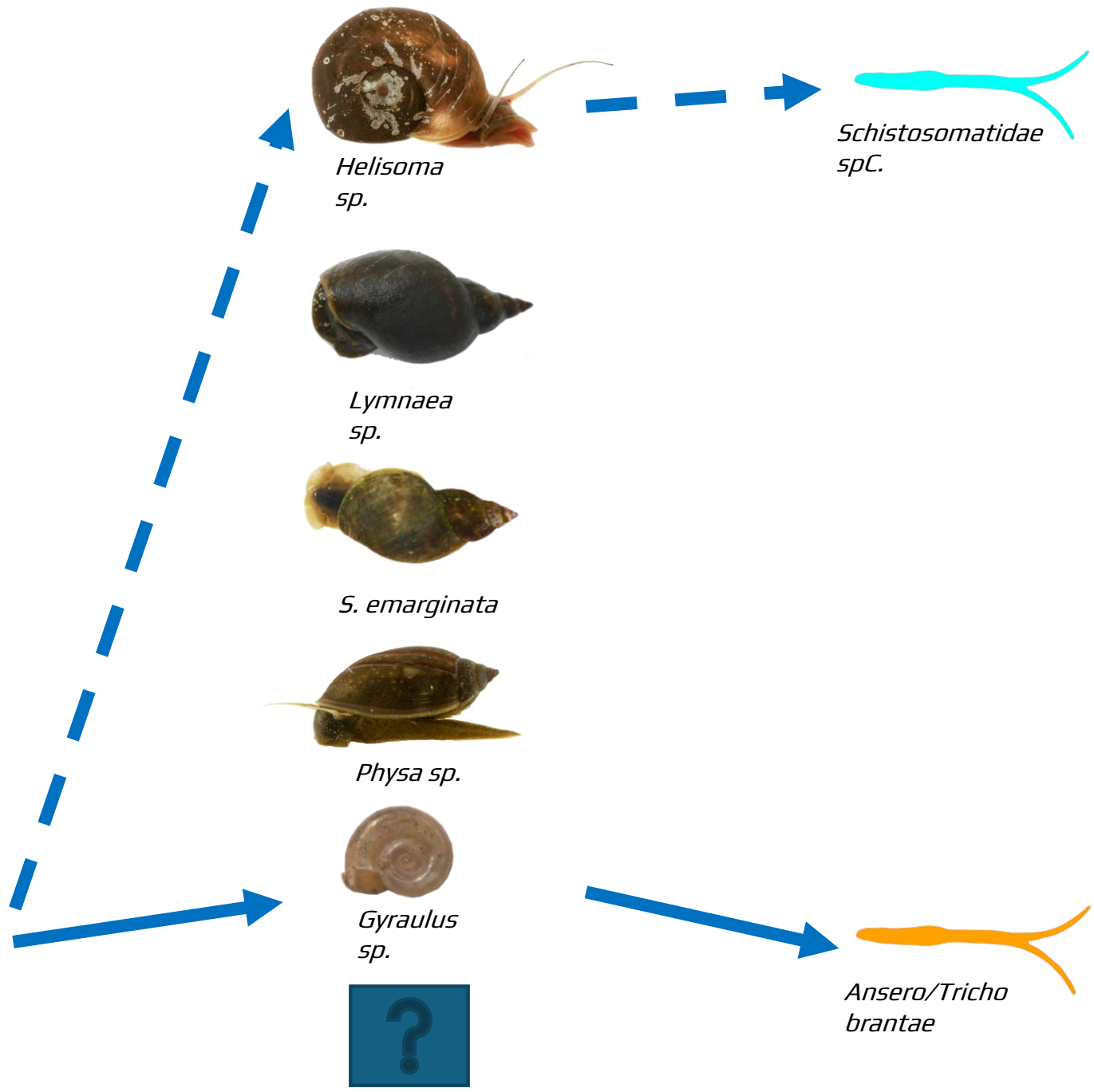
*T. stagnicola*



*T. physellae*



Canada  
Goose



*Helisoma*  
*sp.*

*Schistosomatidae*  
*sp.*

*Lymnaea*  
*sp.*

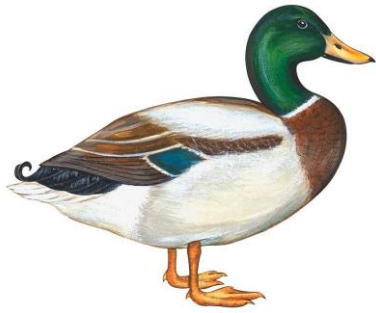
*S. emarginata*

*Physa sp.*

*Gyraulus*  
*sp.*



*Ansero/Tricho*  
*brantae*



Mallard



*Helisoma*  
*sp.*



*Lymnaea*  
*sp.*



*S. emarginata*



*Physa* *sp.*



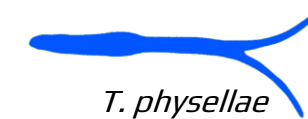
*Gyraulus*  
*sp.*



*T. szidati*



*T. ocellata*



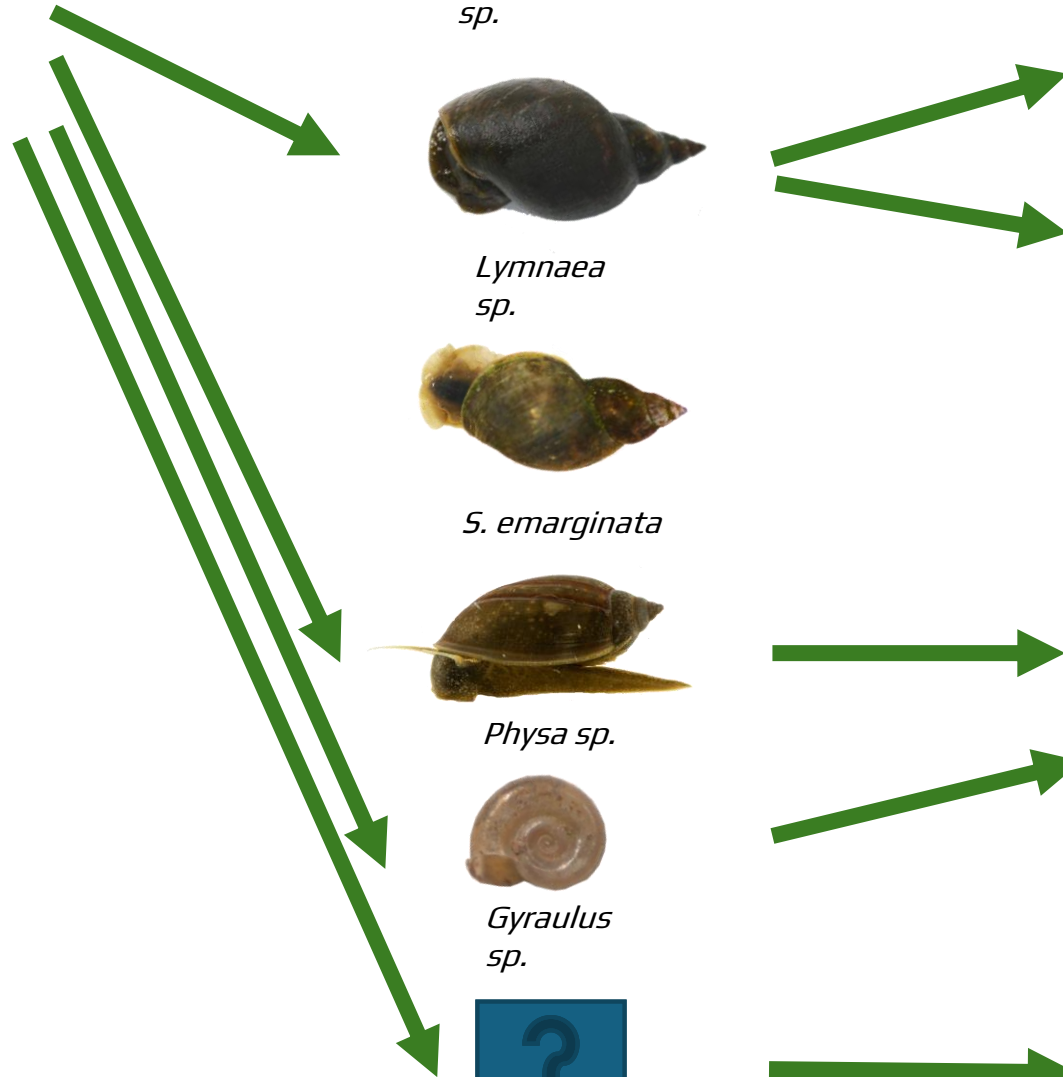
*T. physellae*

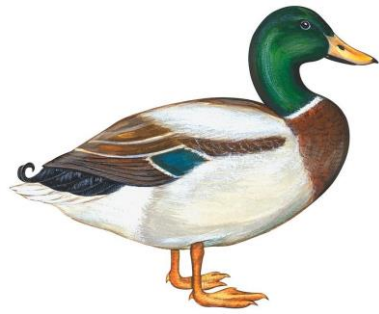


*Schistosomatidae*  
*sp1.*



*Dendritobilharzia* *sp.*

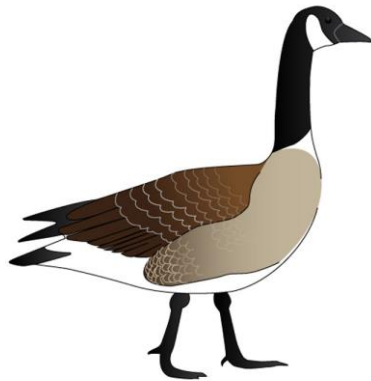




Mallard



Common Merganser



Canada Goose



*Helisoma*  
*sp.*



*Lymnaea*  
*sp.*



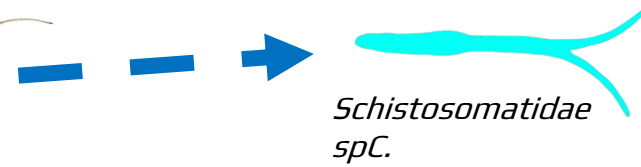
*S.*  
*emarginata*



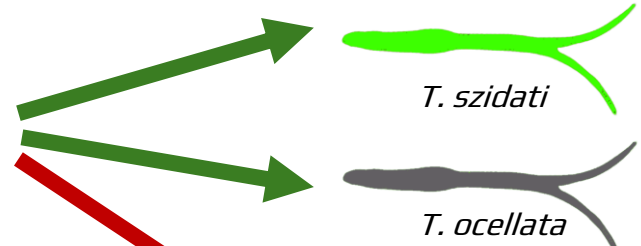
*Physa*  
*sp.*



*Gyraulus*  
*sp.*

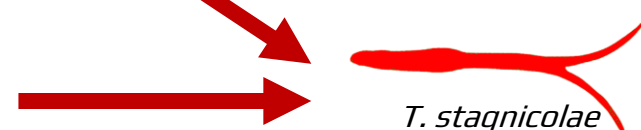


*Schistosomatidae*  
*spC.*



*T. szidati*

*T. ocellata*



*T. stagnicola*



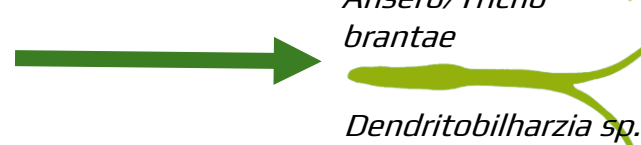
*T. physellae*



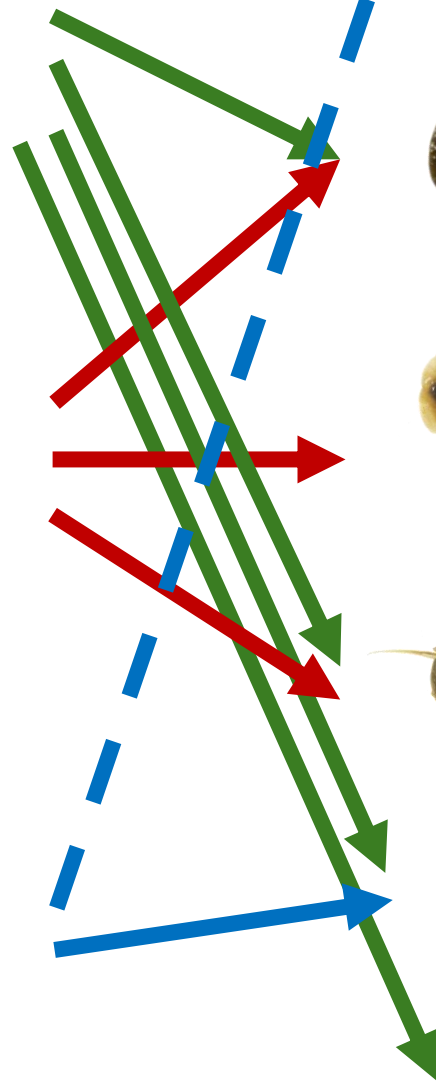
*Schistosomatidae*



*Ansero/Tricho*  
*brantae*



*Dendritobilharzia* *sp.*





## Evidence of a Putative Novel Species of Avian Schistosome Infecting *Planorbella trivolvis*

Authors Brooke A McPhail, Sydney P Rudko, Alyssa Turnbull, Michelle A Gordy, Ronald L Reimink, Daniel Clyde, Kelsey Froelich, Sara V Brant, Patrick C Hanington

A novel schistosome species hosted by *Planorbella* (*Helisoma*) *trivolvis* is the most widespread swimmer's itch-causing parasite in Michigan inland lakes

Authors DM Soper, TR Raffel, JP Sckrabulis, KL Froelich, BA McPhail, MD Ostrowski, RL Reimink, D Romano, SP Rudko, PC Hanington

Transient definitive host presence is sufficient to sustain avian schistosome populations

Authors Sydney P Rudko, Brooke A McPhail, Ronald L Reimink, Kelsey Froelich, Alyssa Turnbull, Patrick C Hanington

# Ecological importance of parasites

# Recent Scientific Research

Oecologia (2020) 192:477–488  
https://doi.org/10.1007/s00442-019-04572-0

British Ecological Society  
doi: 10.1111/1365-2656.12030

COMMUNITY ECOLOGY – ORIGINAL RESEARCH

## Parasite infectious stages provide essential fatty acids and lipid-rich resources to freshwater consumers

Keira M. McKee<sup>1</sup> · Janet Koprivnikar<sup>1</sup>  · Pieter T. J. Johnson<sup>2</sup> · Michael T. Arts<sup>1</sup>

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<sup>4</sup>D  
Received: 18 February 2019 / Accepted: 2 December 2019 / Published online: 13 December 2019  
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Biology  
Department of Ecology -  
Colorado, 80309, USA

Manuscript received: 14 August 2019 / Accepted: 13 December 2019  
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Author details ▾

# Recent Scientific Research

**Production of marine invertebrates: a potentially overlooked resource**

David W. Sims

Received: 19 October 2020 | Accepted: 16 November 2020

DOI: 10.1111/1365-2656.13409


British Ecological Society

Journal of Animal Ecology

BRITISH ECOLOGICAL SOCIETY

**RESEARCH ARTICLE**

**Parasitology** Trematode parasites exceed aquatic insect biomass in Oregon stream food webs

Daniel L. Preston<sup>1</sup>  | Tamara J. Layden<sup>2</sup> | Leah M. Segui<sup>3</sup> | Landon P. Falke<sup>1</sup> | Sara V. Brant<sup>4</sup> | Mark Novak<sup>3</sup>

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2. Department of Biology, University of Oregon, Eugene, Oregon, USA  
3. Department of Biology, University of Oregon, Eugene, Oregon, USA  
4. Department of Biology, University of Oregon, Eugene, Oregon, USA

Correspondence: Daniel L. Preston, dpreston@uoregon.edu

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Author details

# Recent Scientific Research

**Production of marine trematode cercariae:  
a potentially overlooked path of energy flow  
in benthic systems**

David W. Thieltges<sup>1,\*</sup>, Xavier de Montaudouin<sup>2</sup>, Brian Fredensborg<sup>3</sup>,  
K. Thomas Jensen<sup>4</sup>, Janet Koprivnikar<sup>5</sup>, Robert Poulin<sup>1</sup>

<sup>1</sup>Department of Zoology, University of Otago, PO Box 56, New Zealand  
<sup>2</sup>University Bordeaux 1 — CNRS, UMR EPOC 5805, Arcachon Marine Station, 2 rue du Pr Jolyet, 33120 Arcachon, France  
<sup>3</sup>Department of Biology, University of Texas-Pan American, 1201 W University Drive, Edinburg, Texas 78539, USA  
<sup>4</sup>Department of Biological Sciences, Marine Ecology, University of Aarhus, Finlandsgade 14, 8200 Aarhus N, Denmark  
<sup>5</sup>Department of Biological Sciences, University of the Pacific, Stockton, California 95211, USA

**Parasitology**

**Check for updates**

**Author details** ▾



# Recent Scientific Research

Oecologia (2020) 192:477–488  
<https://doi.org/10.1007/s00442-019-04572-0>

COMMUNITY ECOLOGY – ORIGINAL PAPER

British Ecological Society  
doi: 10.1111/1365-2656.12030

**Journal of Animal Ecology**

Parasite infection and resource availability

Keir  
2Un  
4D

**Biomass and productivity of trematode parasites in pond ecosystems**

Daniel L. Preston\*, Sarah A. Orlofske, Jason P. Lambden and Pieter T. J. Johnson

Department of Ecology and Evolutionary Biology, University of Colorado, Ramaley N122, Campus Box 334, Boulder, Colorado, 80309, USA

and lipid-rich

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on

author details v

13 December 2019

manuscript received 14, 8200 Aarhus N, Denmark  
The Pacific, Stockton, California 95211, USA

Parasitology

# Recent Scientific Research

Production of marine trematode cercariae as prey for zooplankton: effect on fitness traits of predators

Published online by Cambridge University Press: 14 June 2018

Ekaterina Mironova , Mikhail Gopko , Anna Pasternak, Viktor Mikheev and Jouni Taskinen

British Ecological Society  
doi: 10.1111/1365-2656.12030

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Parasitology

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Dani... Department... Colorado, 8030...

There are at least 8, and maybe 10, avian schistosome species that we have genetically identified thus far from 10 MI lakes



- These parasites (along with others) are ecologically important
- As are the hosts that they use to complete their life cycles

So, what can I do to prevent swimmer's itch?

# A Comparison



## Mosquitoes

**Follow the 4 D's**  
To avoid mosquito bites

**DEET**  
Whenever outside, use repellent that contains DEET

**DRESS**  
Wear long, loose, and light-colored clothing.

**DRAIN**  
Drain any standing water where mosquitoes may lay their eggs.

**DAWN/DUSK**  
Limit your time outdoors when mosquitoes are most active.

DCHHS  
Dermatology & Allergy  
Health Services

## Swimmer's itch



**Prevention is Possible**

We have learned enough about the parasites that cause swimmer's itch to greatly reduce this common nuisance through education on how to minimize the chances of contact with these itch-causing parasites.

**Learn More**

- Center for Disease Control and Prevention (CDC)  
[cdc.gov/parasites/swimmersitch](https://www.cdc.gov/parasites/swimmersitch)
- Lake Leelanau Lake Association  
[lakeleelanau.org](https://lakeleelanau.org)
- University of Alberta  
[swimmersitch.info](https://swimmersitch.info)
- Freshwater Solutions, LLC  
[freshwatersol.com](https://freshwatersol.com)

**Prevent Swimmer's Itch**

Scan the code to report your case of swimmer's itch, learn where others are contracting it, and learn more about swimmer's itch.

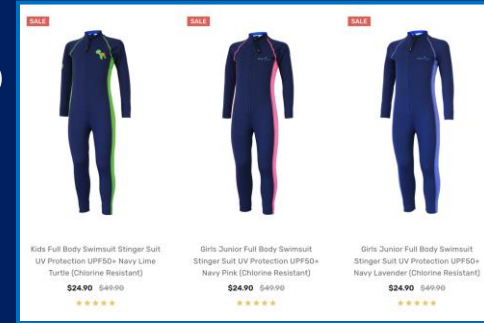
lakeleelanau.org

Lake Leelanau Lake Association



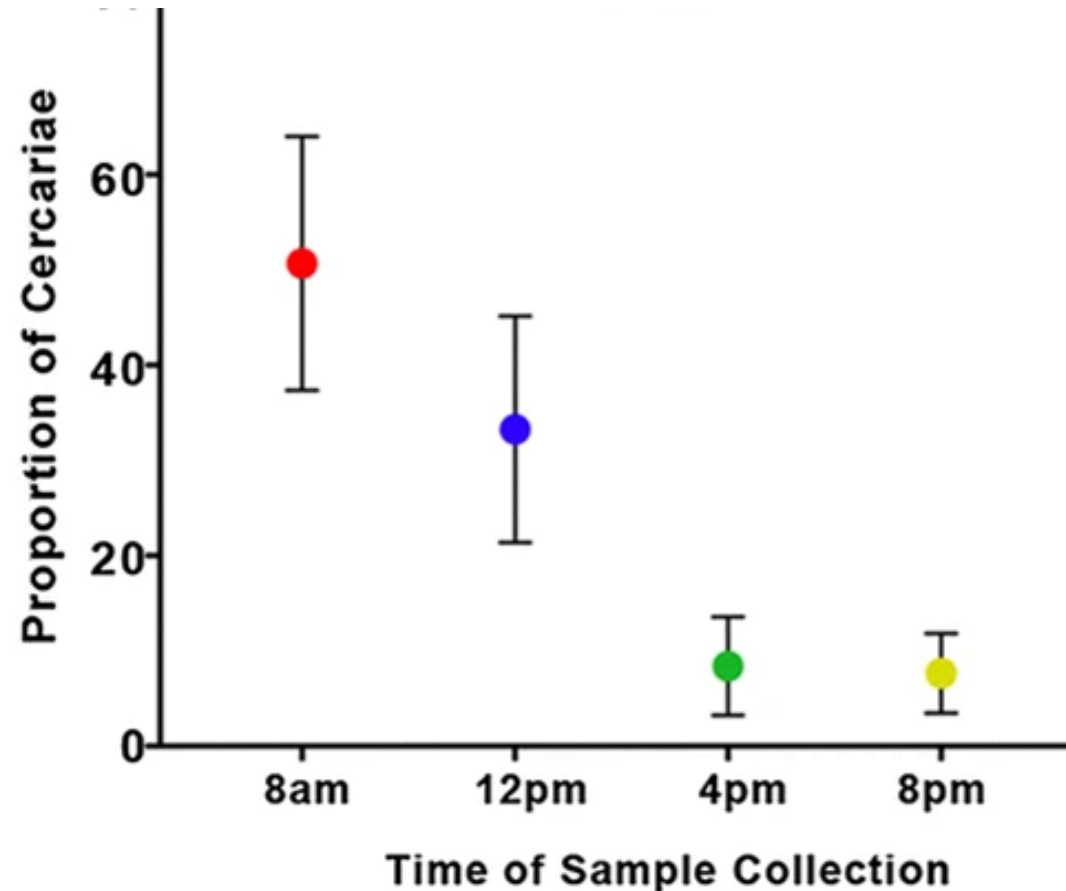
# Prevention Strategies

## 1. Rash Guards

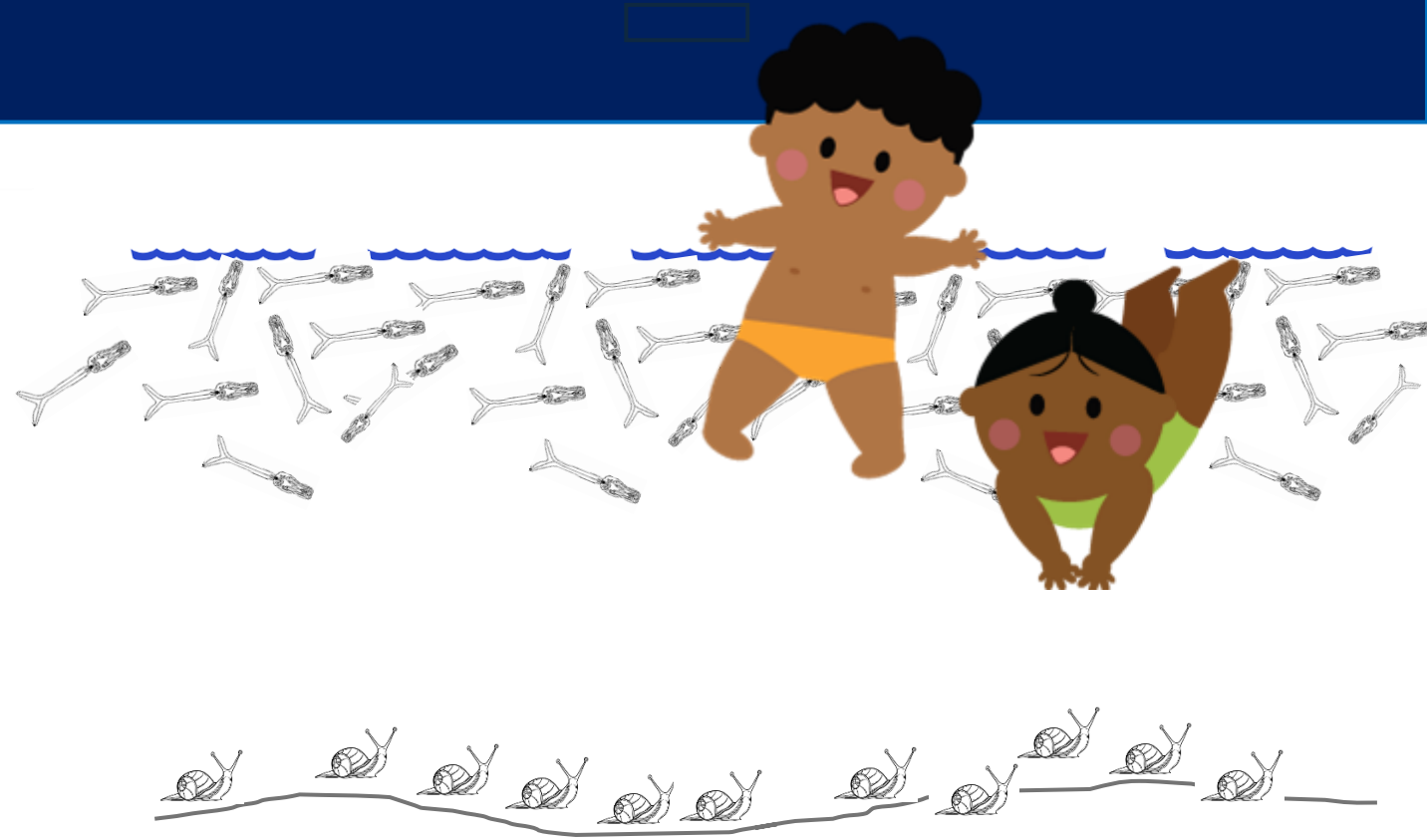
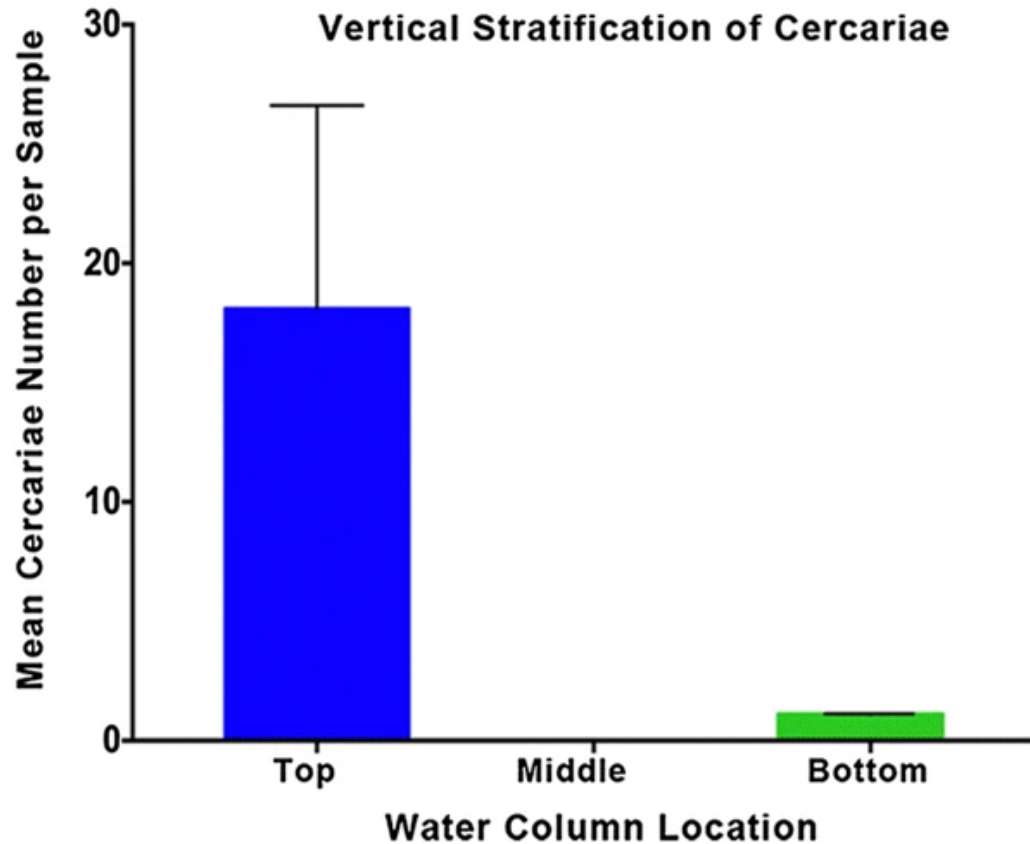


# Prevention Strategies

## 2. Swim in the afternoon

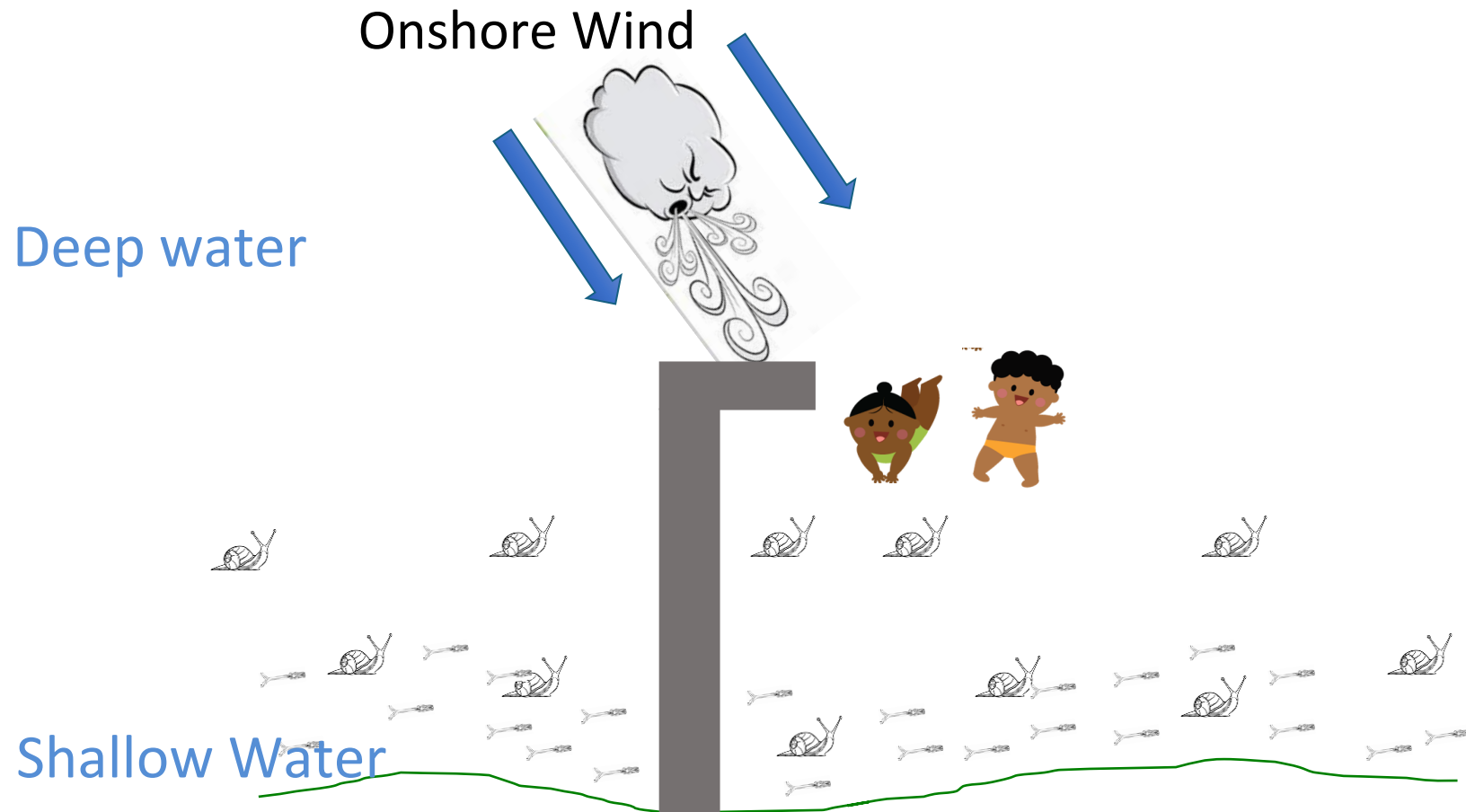


# Behavior of Cercariae



# Prevention Strategies

## 3. Swim deeper and avoid onshore winds









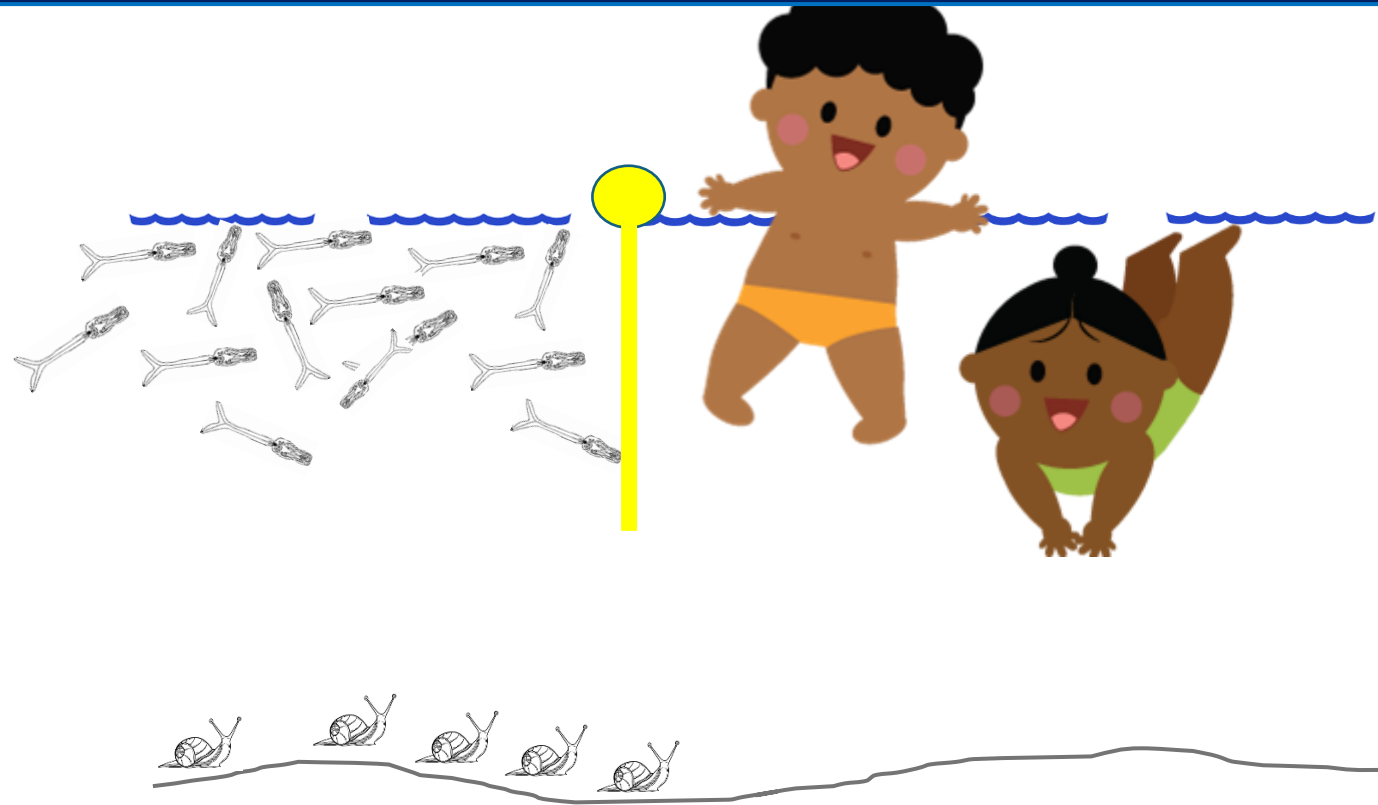
# Prevention Strategies

## 4. Use a baffle



# Prevention Strategies

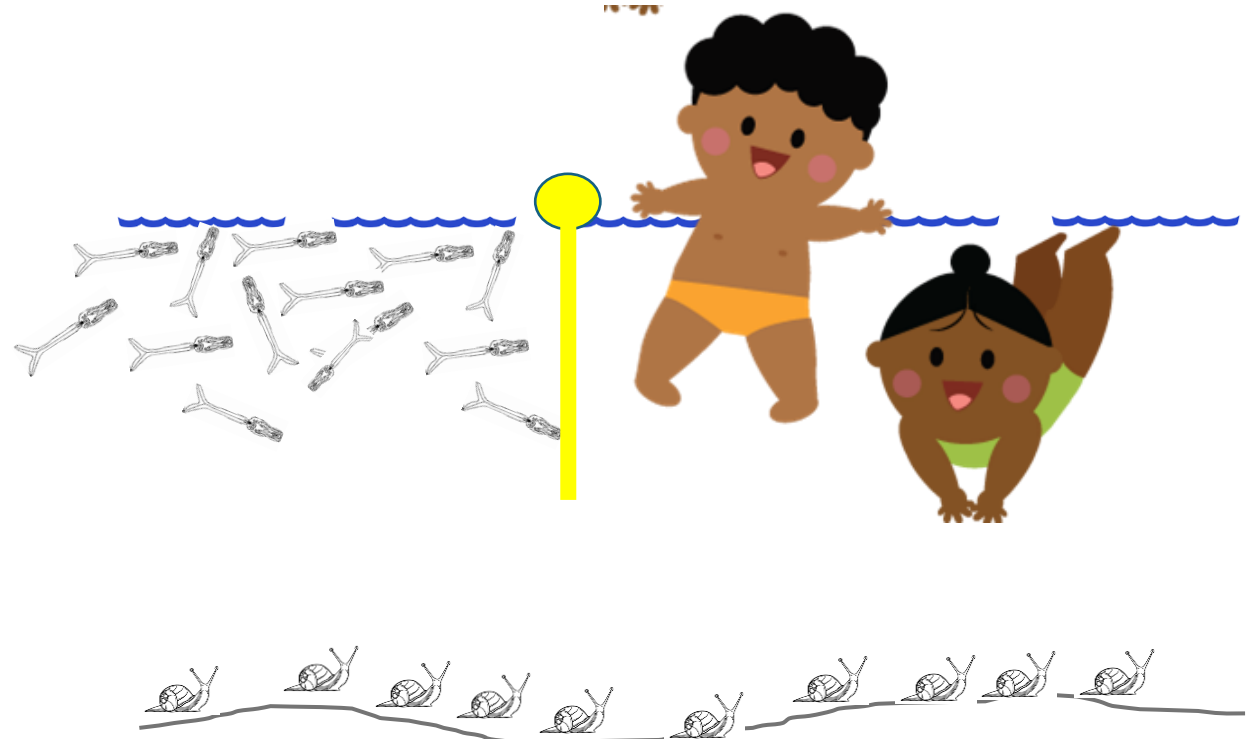
- Remove snails inside baffle





# Prevention Strategies

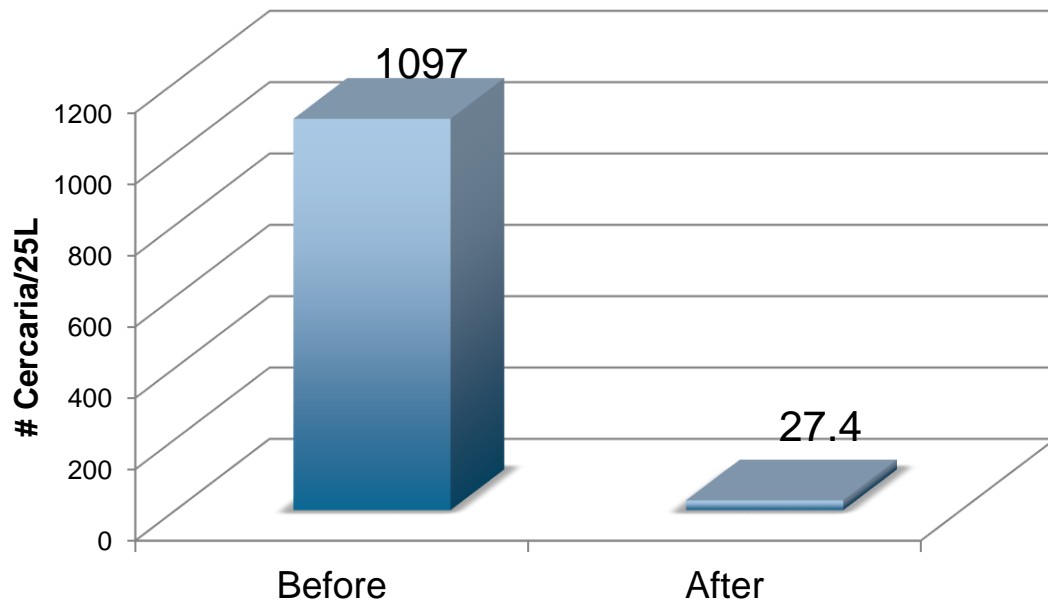
- 'Skim' cercariae off surface of swim area



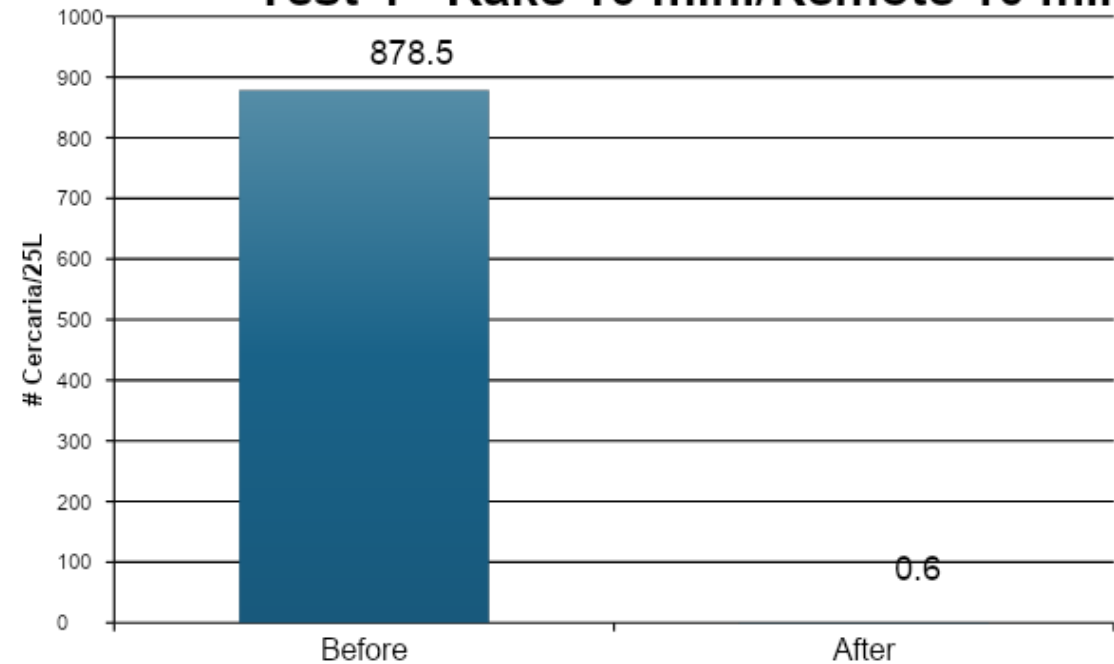
# Prevention Strategies

- 'Skim' cercariae off surface of swim area

**Test 1 - Rake 5 min.**



**Test 4 - Rake 10 min./Remote 10 min.**



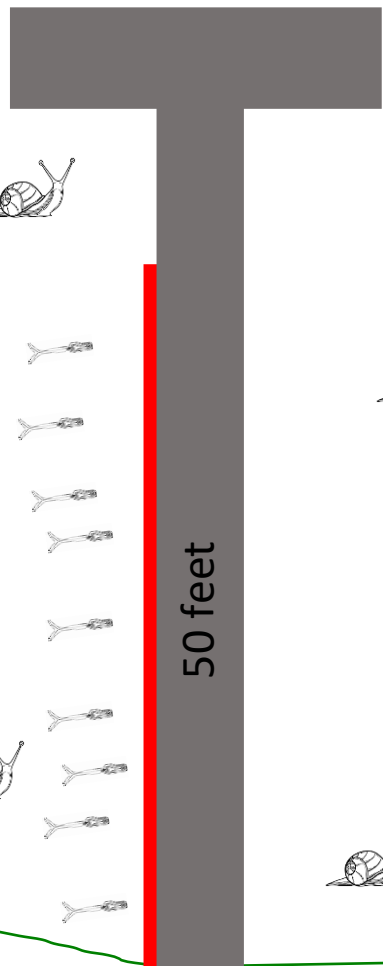
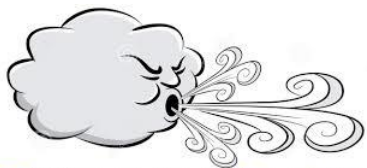
# Prevention Strategies

- Swim on the opposite side of wind

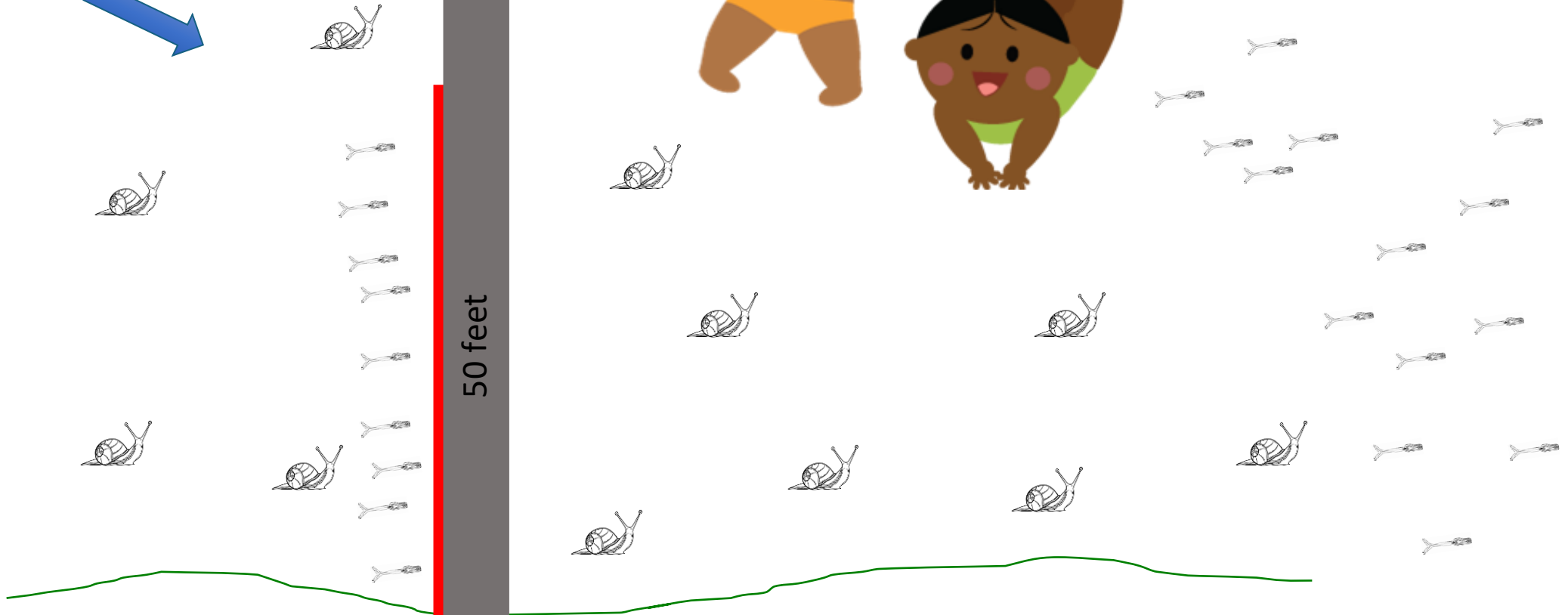




Wind



50 feet





# Prevention Strategies

## 5. Creams and Lotions



You have the power to prevent  
swimmer's itch



Ultimately, what kind of lake are you hoping to have?

