



Michigan Swimmer's Itch Partnership

Michigan Lake Associations Working Together to Reduce Swimmer's Itch Through Control, Prevention, Research, and Education

Inside This Manual

What Is Swimmer's Itch?	1
The History of Swimmer's Itch in Michigan	2
The Solution	3
Common Merganser Release Sites	4
Who Can Help	5
Resources	6

Our Mission

We work together with lake associations to provide leadership in Michigan to address swimmer's itch through effective, comprehensive, science-based control programs, development and testing of preventive measures such as lotions and clothing, education, and general research.



What Is Swimmer's Itch?

Swimmer's itch (cercarial dermatitis) is a skin irritation caused by a larval form of certain flatworms from the family Schistosomatidae.

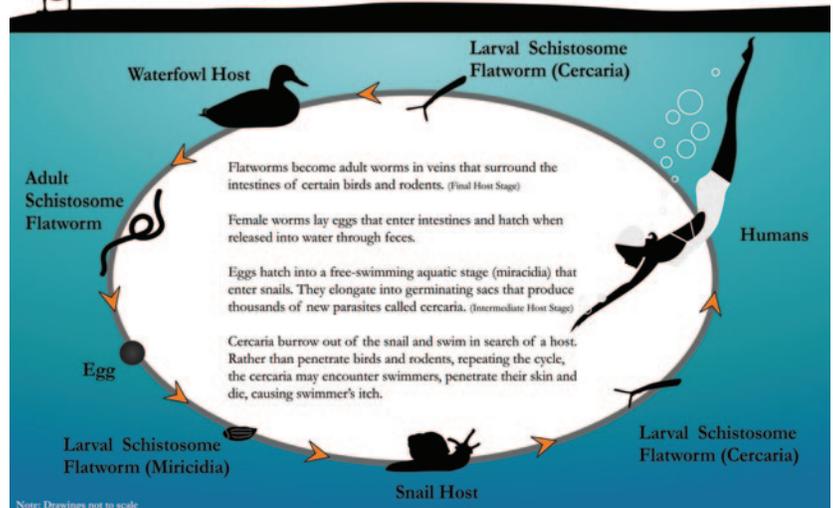
Schistosome flatworms are parasites with complex life cycles usually involving certain species of snails and waterfowl. Upon hatching, free swimming Schistosomatidae larvae seek out an intermediary host, usually snails, to continue the life cycle. The larvae, known as cercariae, are only 1/32 of an inch long and generally invisible to the naked eye. Since humans are not the proper host, the larvae soon die upon mistakenly burrowing into the skin. The resulting skin condition and itching sensation is caused by an immune response to the dead larvae under the skin and symptoms vary by person. Many species of parasitic flatworms are naturally occurring in most lakes. However, not all larval species cause swimmer's itch. Research in Michigan has revealed various life cycles of schistosomes paired with snails and waterfowl. In many Michigan lakes, the common merganser duck is the primary or sole vertebrate host.

Not all people are sensitive to swimmer's itch. Some who are exposed to the larvae never develop the itch. Those who are sensitive may feel a dull, prickly sensation as the larvae burrow into the skin.

This may occur either while swimming or immediately after leaving the water. At each point of entry a small red spot may appear and begin to itch. Symptoms include intermittent periods of itching that will continue for several days.

The Life Cycle of Swimmer's Itch

Here is the cycle that leads a parasite to enter the skin of vulnerable lake swimmers, causing a painful itch.



The History of Swimmer's Itch in Michigan

1928 Swimmer's itch was discovered at the University of Michigan Biological Station on Douglas Lake in Northern Michigan by Dr. William W. Cort of Johns Hopkins University.

1939 The State of Michigan initiated a program to apply copper sulfate, a molluscicide, to lakes with swimmer's itch. While copper sulfate is still permitted, it kills plants and fish, which don't contribute to swimmer's itch. Research indicates its effectiveness is limited (see pg. 3).

Early 1980s Schistosomes residing in common merganser ducks were discovered to be responsible for many outbreaks of swimmer's itch, prompting Dr. Harvey Blankespoor (Hope College) and Ron Reimink to begin removing common mergansers from lakes.

1985-1987 Dr. Blankespoor treated common mergansers with Praziquantel, finding that the drug is ineffective at preventing swimmer's itch.

1998 Dr. Harvey Blankespoor and Ron Reimink formed SICON, LLC, a swimmer's itch consulting firm.

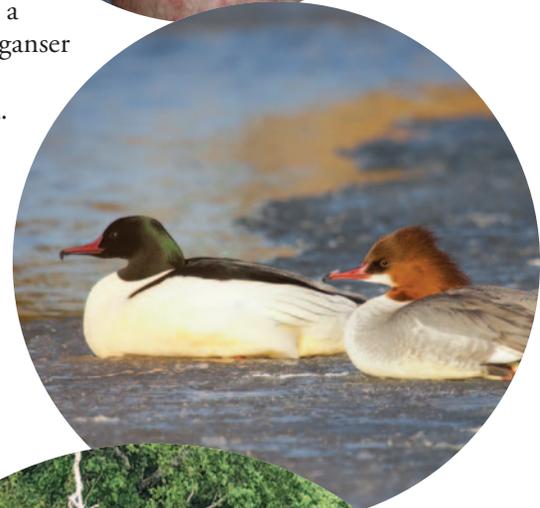
2015 The Michigan Department of Natural Resources (MDNR) permitted a three-year research study on Higgins Lake to evaluate common merganser control activities. The Michigan Swimmer's Itch Partnership (MISIP) was formed by lake associations to reduce the incidence of swimmer's itch.

2017 Public Act 107 of 2017 included a one-time appropriation of \$250,000 for a swimmer's itch pilot program. The MDNR engaged with a core team of lake associations to define roles, responsibilities and interests. to develop a common merganser control program. The MDNR received a federal permit to control common mergansers and individually authorized Higgins Lake, Glen Lake, Crystal Lake, Lake Leelanau, and Lime Lake to launch a pilot program.

2017 research funded by the appropriation included common merganser nesting behavior and swimmer's itch control measures such as physical barriers and cercariae management devices.

2018 The Michigan Wildlife Conservation Order was amended to include a damage and nuisance control permit for common mergansers. The order authorized the MDNR to establish the Common Merganser Control Policy and Program, and permits to five lake associations were issued. Alternative management strategies were investigated to provide options beyond common merganser removal. qPCR assays were developed, capable of determining which schistosome-duck pairing is causing swimmer's itch at a particular site². Ten sites were analyzed for relocation release sites.

2019 Common merganser control continued. MISIP issued its first competitive request for research proposals yielding three initiatives, including a state wide snail survey, an assessment of common merganser relocation effectiveness, and common merganser movement behavior. MDNR approved four of the ten analyzed sites. MDNR met with MISIP to update the Common Merganser Permit Program.



The Solution

Swimmer's itch, although extremely annoying and uncomfortable, is not a communicable or fatal condition. One can take over-the-counter drugs to reduce the symptoms of swimmer's itch. Antihistamines can be used to help relieve itching while topical steroid creams may help to reduce swelling. Before taking any of these drugs, however, consult your physician or dermatologist for advice.



BEST PRACTICES for Swimmers and Riparian Landowners

- Don't swim first thing in the morning. Cercariae are released from snails at daylight and so may be concentrated.
- Swim offshore and away from downwind areas. Cercariae float on the water's surface and can be blown and concentrated in downwind areas.
- Remove snails daily from your swim area using a net dragged along the lake bottom or by hand.
- Don't feed birds near docks or swimming areas.
- Rinse your body with clean water and towel off thoroughly after swimming.
- Some people find luck using waterproof sunscreen before swimming.
- Report swimmer's itch cases to your local health department or lake association.

BEST PRACTICES for Lake Associations

- Educate members about swimmer's itch.
- Keep track of reported cases of swimmer's itch.
- Assess the problem of swimmer's itch to determine which schistosome-waterfowl pairing drives the swimmer's itch life cycle. Interrupting the swimmer's itch life cycle is a common way to control it, and an assessment is the first step (refer to page 5).

CONTROL OPTIONS

On Lakes Where Common Mergansers are the Host

The following control options require a Common Merganser Control Permit, valid for three years, from the MDNR. The Common Merganser Control Policy and Procedures outlines these options in detail and has additional requirements.

- **Common Merganser Capture, Transportation, and Relocation:** From May 15 to August 15, hens and broods are captured and transported by permitted contractors using standard practices to release sites.
- **Egg and Nest Destruction out of Natural Cavities:** From April 1 to July 1, eggs are oiled, shaken, and replaced back in the nest, or removed or disposed of. Nest material is also moved or altered. These activities deter nesting and/or re-nesting.
- **Harassment:** Harassment can be used in conjunction with the methods above at different times of the year and includes boat chases and scare devices.

On Lakes Where Common Geese are the Host

- The MDNR's Resident Canada Goose Program has options to address goose-human conflicts through a Wildlife Damage and Nuisance Control Permit that allows activities including elimination of feeding, hunting, scare devices, dogs, etc. As a last resort, geese can be removed under a Canada Goose Round Up (Capture) and Hold Permit if the site meets eligibility requirements.

Copper Sulfate

Copper sulfate is permitted by the Michigan Department of Environment, Great Lakes, and Energy (EGLE) as the only chemical treatment for swimmer's itch. It works by killing snails. It is also toxic to other animals and plants and accumulates in sediments. A study by Froelich, Reimink, Rudko, VanKempen, & Hanington¹ in 2019 found copper sulfate significantly reduced populations of snails within the treatment area, but was found to have no significant impact on swimmer's itch-causing parasites in the water. Likely cercariae can still swim into the treatment area from untreated areas and cause swimmer's itch.



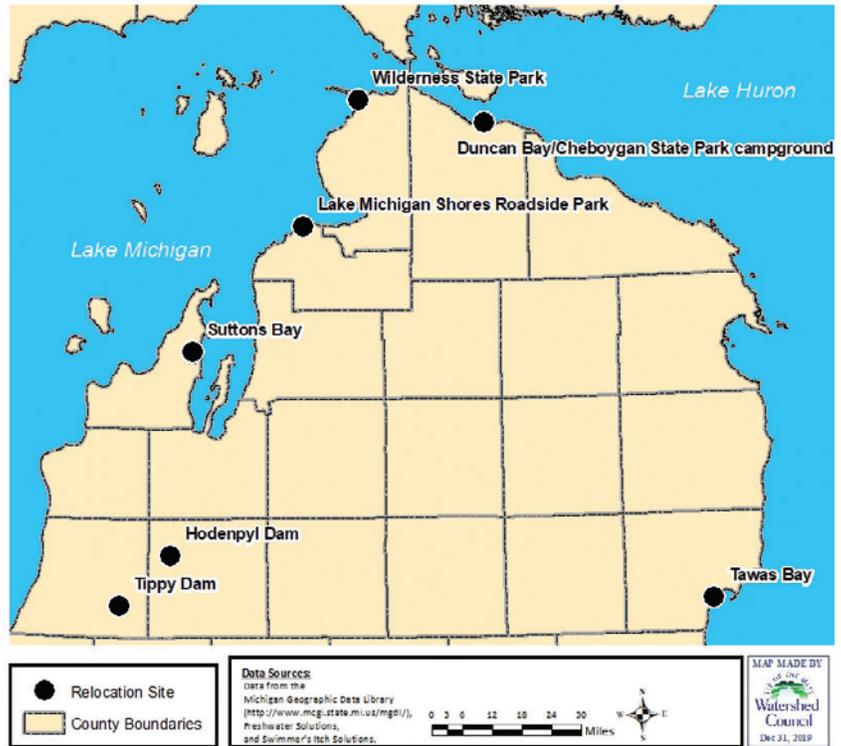
Common Merganser Release Sites

The MDNR requires that each relocation site meets the following criteria:

1. *Stagnicola sp.* snails are not present on the water body.
2. Habitat that can support common mergansers.
3. Written approval of the relocation by the land manager, owners, or their designee of the release site. Sites on state-owned land are approved through an Application/Permit to Use State Land.

The MDNR can recommend and approve relocation sites. Analysis must be performed by a qualified contractor. Staff from MDNR's Wildlife, Fisheries, Parks and Recreation, and Law Enforcement Divisions discuss proposed common merganser release sites in January of each year. They consider if the site has good habitat for common mergansers, nearby fish stocking, recreational uses, and conflicts with neighbors and landowners. Their recommendations for each control season may include quotas, a description of the approval process, notification procedures, and additional requirements for use of the site.

2019 MISIP Relocation Sites



Who Can Help

Lake Associations

Lake associations are on the front line of combatting swimmer's itch. Associations gather and disburse information to members regarding the importance of reporting cases of swimmer's itch, the presence of common merganser ducks, and providing education to lake property owners. The associations also develop control activity plans using a Nuisance Animal Control Business and apply for Common Merganser Control Program permits through the DNR.

Michigan Department of Natural Resources

From 2017-2019, the State of Michigan, through the MDNR, provided monetary support for the functions performed by the Michigan Swimmer's Itch Partnership (MISIP). The MDNR established and administers the regulations for the Common Merganser Control Program.

U.S. Fish and Wildlife Service

The U.S. Fish and Wildlife Service has the authority to protect and manage migratory birds through the Migratory Bird Act (formerly the Migratory Bird Treaty with Canada, enacted in 1916). The Migratory Bird Act provides a uniform system of protection for certain species of birds which migrate between the United States and Canada. Common merganser control is regulated by this Act.

Michigan Swimmer's Itch Partnership

The Michigan Swimmer's Itch Partnership (MISIP) is a coalition of lake associations formed in 2014 for the purpose of reducing the incidence of swimmer's itch in Michigan lakes. MISIP provides leadership in Michigan to address swimmer's itch through comprehensive assessments, science-based control programs, the promotion of new research efforts, and education. MISIP has worked closely with the MDNR to develop the Common Merganser Control Program and Permit.

MISIP establishes Assessment and Control standards for contractors and lake associations. It provides research opportunities for scientists whose projects are intended to address issues relative to the control of swimmer's itch.

- An assessment defines and evaluates which schistosomes are present and links probable cause for which schistosomes are at play in a lake. This can include an initial assessment and assessing control program success. Three factors are included in an assessment:
 - Determine the level of snail infection using snail density count, qPCR, or DNA barcoding
 - Waterfowl brood survey
 - Documentation of increasing or severity of swimmer's itch cases
- Control programs include capture and relocation of waterfowl, physical deterrents, and mechanical barriers.
- Research identifies new facts and knowledge to inform assessment and solutions for control programs. Research priorities may be driven by lake associations, the MDNR, and researchers.

Nuisance Animal Control Businesses

There are currently four Michigan companies which trap and relocate common merganser ducks:

Swimmer's Itch Solutions, LLC
Dr. Curt Blankespoor
www.swimmersitchsolutions.com

Freshwater Solutions, LLC
Ronald Reimink
www.freshwatersol.com

Crystal Lake and Watershed Association
www.Crystallakewatershed.org

Glen Lake Association
www.Glenlakeassociation.org

Nuisance animal control businesses (public, for-profit, and nonprofit) must obtain a permit from the MDNR to conduct common merganser control activities. Permits are valid for one year.

Master Bird Banders

Because the common merganser is protected by the Migratory Bird Treaty Act, a Federal Bird Banding and Marking Permit is required by the U.S. Geological Survey Bird Banding Laboratory. The Permit allows a master bander to place a small numbered aluminum band around a bird's leg. Information about the band and bird is sent to the Patuxent Wildlife Research Center Bird Banding Laboratory when the bird is banded and again if it is found. MISIP encourages banding of relocated birds to better understand common merganser behavior.



Resources

For further reading, look for these reports and publications.
All abstracts can be found at misip.org/resources. Full papers are provided where noted.

2020. Rudko, S.P., Froelich, K., Reimink, R.L., Hanington, P.C. Assessing contributions from migratory waterfowl to swimmer's itch in Michigan. **(Paper in progress)**

2019. McPhail, B.A., Rudko, S.P., Turnbull, A., Gordy, M.A., Reimink, R.L., Froelich, K., Hanington, P.C. Evidence of a novel species of avian schistosome infecting *Helisoma* snails **(Submitted for publication)**

2019. Rudko, S.P., Reimink, R.L., Peter, B., White, J., Hanington, P.C. Democratizing water monitoring: Implementation of a community-based qPCR monitoring program for recreational water hazards. **(Submitted for publication)**

2019. Rudko, S.P., Turnbull, A., Reimink, R.L., Froelich, K., and Hanington P.C. Species-specific qPCR assays allow for high-resolution population assessment of four species of avian schistosome that cause swimmer's itch in recreational lakes. *International Journal of Parasitology: Parasites and Wildlife* 9, 122-129.

¹2019. Froelich, K.L., Reimink, R.L., Rudko, S.P., VanKempen, A.P., and Hanington, P.C. Evaluating the efficacy of molluscicide copper sulfate (CuSO₄) at reducing cercariae concentrations at a recreation site in Michigan. *Parasitology Research* 118(5):1673-1677.

2019. Relocation Site Analysis Research. Freshwater Solutions and University of Alberta. **(Full report)** 

²2018. Rudko, S.P., Reimink, R.L., Froelich, K., Gordy, M.A., Blankespoor, C.L., and Hanington, P.C. qPCR cercariometry as a method to quantify larval avian schistosome abundance and assess environmental and biological drivers of their concentration in recreational waters. *EcoHealth* 15(4), 827- 839.

2018. Understanding How Snail Infection Levels Affect qPCR results, Blankespoor, C.L, and De Jong, R.D. **(Full report)** 

2016. Michigan Swimmer's Itch Survey. Raffel, T.R., Messner, M., Sckrabulis, J., McWhinnie, R. **(Full report)** 

2010. Blankespoor, H.D. Swimmer's Itch: Misguided Flatworms. In K.J. Nadelhoffer, A.J. Hogg, and B.A. Hazlett (Eds.). *The Changing Environment of Northern Michigan : A Century of Science and Nature at the University of Michigan Biological Station*. pp. 163-172. Ann Arbor: University of Michigan Press. **(Full paper)** 

2004. Verbrugge, L.M., J.J. Rainey, R.L. Reimink, and H.D. Blankespoor. Prospective study of swimmer's itch incidence and severity. *Journal of Parasitology* 90(4): 697-704.

2004. Verbrugge, L.M., J.J. Rainey, R.L. Reimink, and H.D. Blankespoor. Swimmer's Itch: Incidence and Risk Factors. *American Journal of Public Health* 94(5): 738-741.

2001. Blankespoor, C.L., R. L. Reimink, and H.D. Blankespoor. Efficacy of Praziquantel in Treating Natural Schistosome Infections in Common Mergansers. *Journal of Parasitology* 87: 424-426. **(Full paper)** 

2001. Randall J. DeJong, R.L. Reimink and H.D. Blankespoor. Hematozoa of hatch-year common mergansers from Michigan. *Journal of Wildlife Diseases* 37 (2): 403-407.

1998. Blankespoor, H.D. and R. L. Reimink. An Apparatus for Individually Isolating Large Numbers of Snails. *Journal of Parasitology* 84(1): 165-167.

1995. Reimink, R.L., J. A. DeGoede, and H.D. Blankespoor. Efficacy of Praziquantel in Natural Populations of Mallards Infected with Avian Schistosomes. *Journal of Parasitology* 81(6): 1027-1029.

1991. Blankespoor, H.D. and R. L. Reimink. The Control of Swimmer's Itch in Michigan: Past, Present, and Future. *Michigan Academician* 24: 7-23. **(Full paper)** 

1979. Guth, B.D., H.D. Blankespoor, R. L. Reimink, and W.C. Johnson. Prevalence of Dermatitis-Producing Schistosomes in Natural Bird Populations of Lower Michigan. *Proceedings of the Helminthological Society of Washington* 46(1): 48-53.

