



A Swimmer's Itch Control Program for Higgins Lake

Annual Report for Maintenance Year 4

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by

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* This report was written for the Higgins Lake Swimmer's Itch Organization (HLSIO), a non-profit 501 (c) (3) group tasked with managing and funding a comprehensive swimmer's itch control program on Higgins Lake.

----- *SPECIALIZING IN EDUCATION AND CONTROL* -----

Executive Summary

In 2021, Swimmer's Itch Solutions, LLC (SIS) partnered with the HLSIO for another year of a swimmer's itch control maintenance program on Higgins Lake. In early spring, SIS secured all necessary federal and state permits to conduct this maintenance program. **As was the case last summer, no common merganser broods appeared on Higgins Lake in 2021.**

We strongly encourage the HLSIO to continue its common merganser trapping and relocation program as a swimmer's itch control strategy. There is every reason to believe that it alone is responsible for the significantly decreased in SI cases since 2015. It should be noted that Higgins Lake has many migratory waterfowl in the spring and fall, including mergansers, yet their collective contribution to increasing SI-causing parasites in the lake appears to be minor compared to common merganser broods in the summer.

Introduction

Swimmer's itch, also known as schistosome cercarial dermatitis, is a common problem in many recreational lakes throughout the northern United States and the world. It can be caused by any of over 70 different avian schistosome parasite species that mistakenly penetrate human skin instead of the skin of their natural definitive host. When this happens, the parasite dies at the site of penetration causing an inflammation of the skin and the formation of a papule. Swimmer's itch papules can itch intensely for up to 10 days.

Brief review of avian schistosome life cycles

All avian schistosome species have a similar two-host life cycle. As adults they live within a definitive host, most commonly a duck; when sexually mature the worms release their eggs, which make their way into the feces of their host. If these feces land in water, eggs of the parasite hatch into larval stages (miracidia), which are infective to an appropriate species of snail (the intermediate host). Upon finding a suitable snail, the miracidium will penetrate the soft tissue and develop within its digestive glands. Over the next 30 days it matures and then produces thousands of cercariae that are released into the water every day, especially during the warm-water summer months. If a cercaria locates the correct vertebrate host species, it penetrates and develops into an adult worm to complete its life cycle. If a cercaria accidentally penetrates human skin, it dies in the skin, and an immune reaction can result, usually causing a raised papule that can itch intensely.

In many northern Michigan lakes, severe outbreaks of swimmer's itch have predominantly and most commonly been attributed to the avian schistosome, *Trichobilharzia stagnicola*. This parasite species typically utilizes the common merganser (*Mergus merganser*) as its definitive host and *Stagnicola emarginata* as its intermediate (snail) host.

Off-season Preparation/Research and Development

Summary of work completed: All necessary federal and state permits (US Fish & Wildlife, US Geological Survey, and Michigan DNR) were obtained for work on Higgins Lake (Roscommon County, MI).

Swimmer's Itch Solutions, LLC continues to work with the MISIP, which is composed of representatives of approximately 40 lake associations in Michigan dedicated to fighting swimmer's itch. We were under contract with the Crystal Lake & Watershed Association, the Larks Lake Association, and the Black Lake Preservation Society during the summer of 2021. We also provided technical and other support to the MISIP including sharing control and research results with member lake associations. We continue to work with leading experts in the field of swimmer's itch.

Control Program

Waterfowl surveys

Summary of work completed: Waterfowl surveys of the entire shoreline of Higgins Lake were conducted on June 8, 2021 (Figure 1) and August 12, 2021 (Figure 2). Not surprisingly, several dozens of resident mallards were observed during both surveys. We saw a single common merganser during the first survey, and one group of 3 second-year (SY) adult common mergansers on the lake in August. The particular individuals observed in the second survey are most likely non-resident birds that are engaging in pre-migratory behavior.

Removal of common merganser broods

Summary of work completed: For the past 6 years, Higgins Lake riparians have promptly and accurately reported all common merganser broods on the lake. Nine broods were trapped and relocated in 2015 and that number has been steadily decreasing every year since then (there were only 2 broods in 2019). No common merganser broods were observed on Higgins Lake in 2020, and for the second consecutive year, no common merganser broods were observed on Higgins Lake this summer. This was confirmed with waterfowl surveys of the entire shoreline (see above).

We are convinced that the removal of the Gerrish Township common merganser nest boxes, first erected in 2017, have played a significant role in the observed decrease in common merganser broods on Higgins Lake. Had Eric Ostergren not spear-headed this removal effort, it's reasonable to assume that a half-dozen (or more) common merganser hens would have produced broods this summer. In another instance of nest site reduction, a confirmed nest that likely produced a brood each year from 2015-2018 was eliminated in July 2018.

Another contributing factor to the 6-year reduction of common merganser broods on Higgins Lake may be that all captured birds (hen and ducklings) are relocated more than 60 miles from their natal site. Many biologists believe that when hatch-year common merganser ducklings mature to breeding age, they return to nest in areas nearby where they fledge. In fact, many waterfowl species exhibit this behavior. Thus, ducklings captured on Higgins Lake and relocated to Tawas City or Cheboygan probably aren't coming back to Higgins to breed. Corroborating evidence for this hypothesis can also be found in the absence of any web tags (put on all captured ducklings over the past 4 years) on Higgins Lake adult common mergansers.

At some point in the near future, we expect common merganser broods will once again appear on Higgins Lake. The lake is just too large, and the habitat is too ideal, for common merganser hens not to breed and produce broods on Higgins Lake.

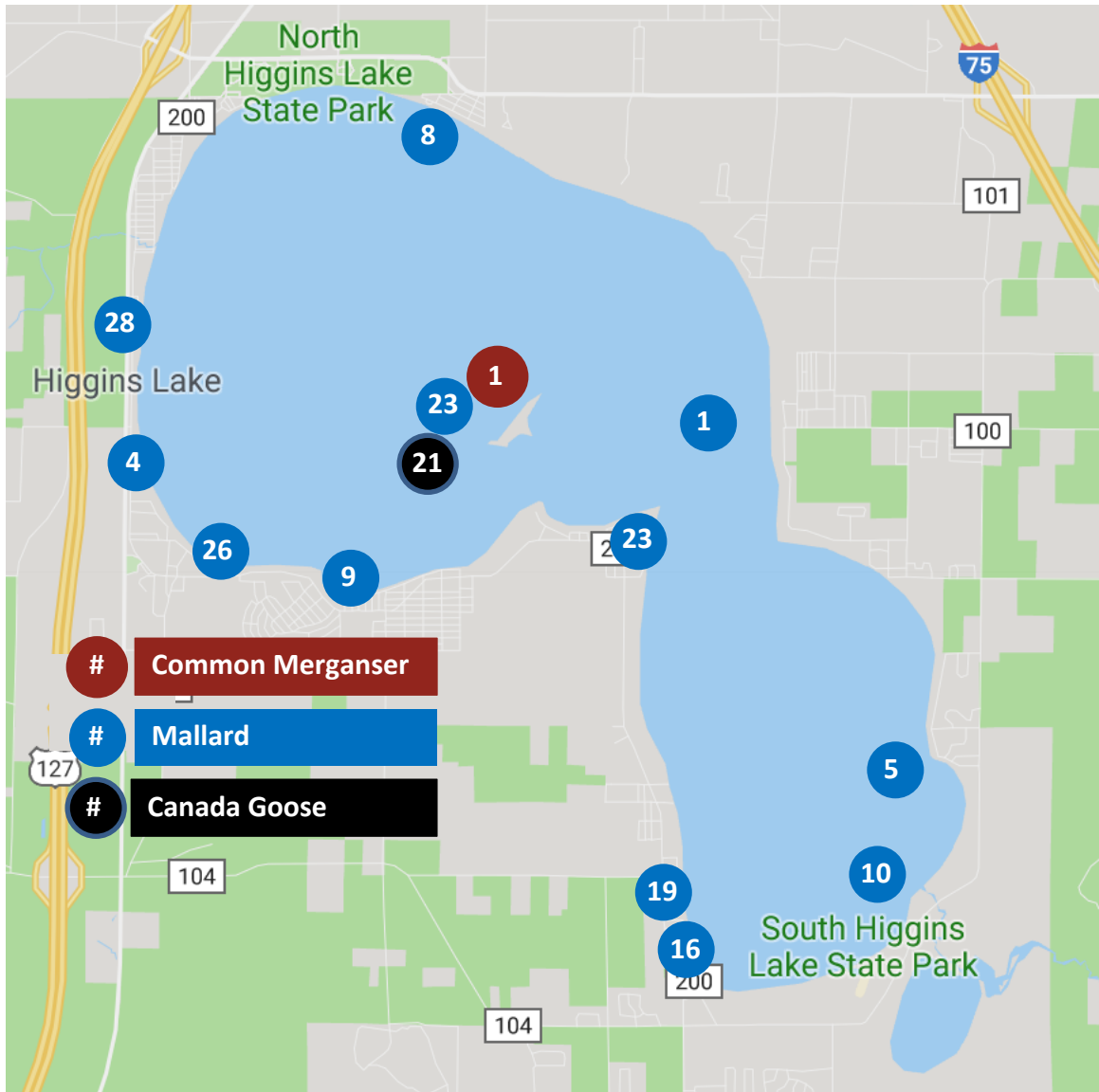


Figure 1. Number of common mergansers, mallards, and Canada geese observed during a June 8, 2021 shoreline survey of Higgins Lake (Roscommon County, MI).

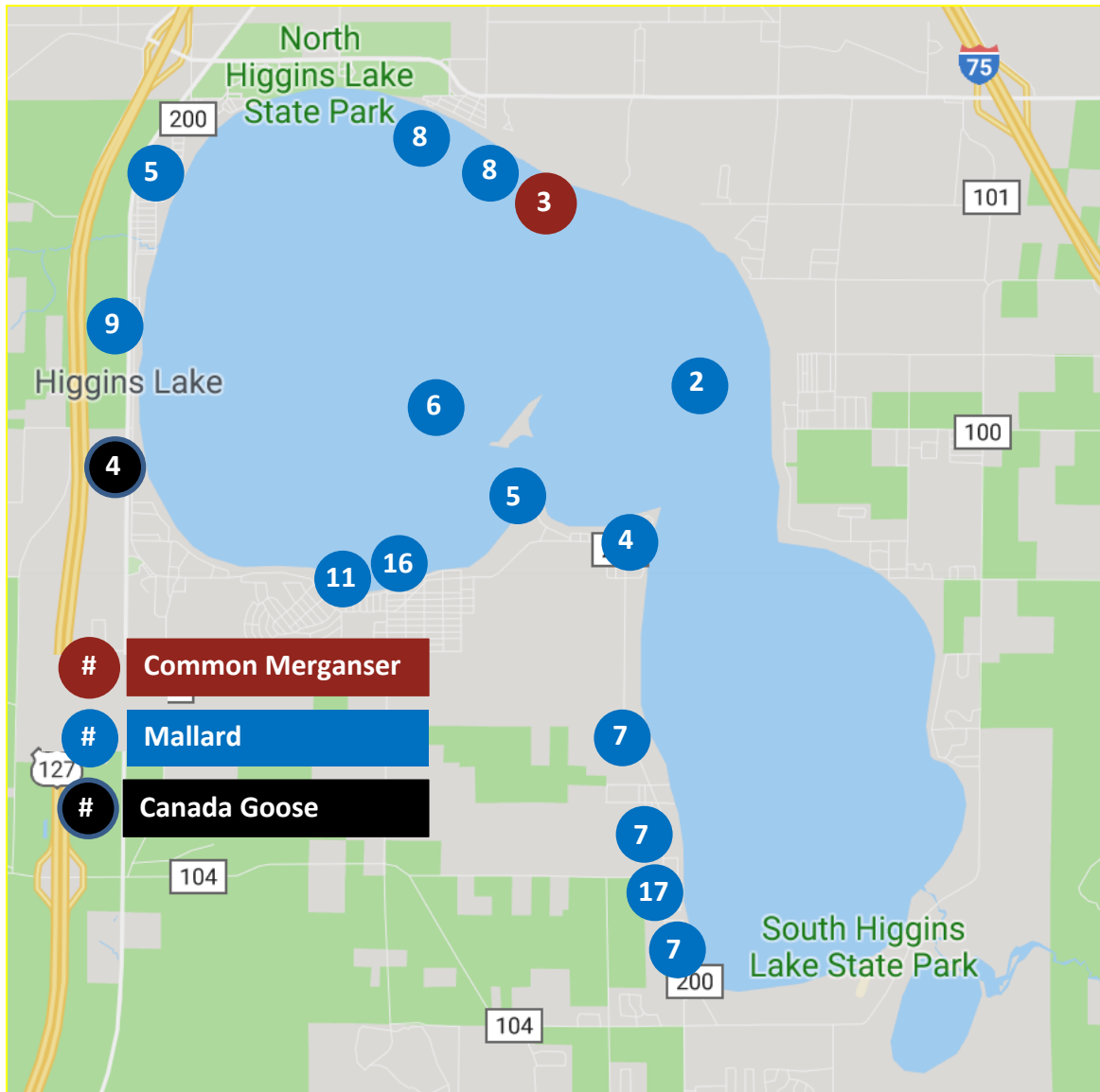


Figure 2. Number of common mergansers, mallards, and Canada geese observed during an August 12, 2021 shoreline survey of Higgins Lake (Roscommon County, MI).

Assessment Program

Swimmer's Itch Case Reports

Summary of work completed: On our website (www.swimmersitchsolutions.com) we maintained pages solely dedicated to swimmer's itch education, research, and control on Higgins Lake. These pages serve as a centralized repository to report swimmer's itch cases and common merganser nest sites and broods. They also provide important information that facilitates our efforts in providing the most successful comprehensive swimmer's itch control program possible.

Cases of swimmer's itch were reported at 20 unique locations on Higgins Lake in 2021 (Figure 3). We chose to report distinct locations instead of individual cases because it avoids the duplication of data that arises with multiple reports by the same individual or in the same location. The number of reported swimmer's itch cases is very small, with the 2021 data representing a 50% decrease from last year.

The anecdotal testimonials from Higgins Lake riparians, and the overwhelmingly positive reviews on various social media platforms, all show the continued success of our control program.

Conclusion: *The low number of reported cases suggest that swimmer's itch is at an ideal level on Higgins Lake in 2021. At present, there is no known control program or technology that can completely eliminate or eradicate swimmer's itch from a lake.*

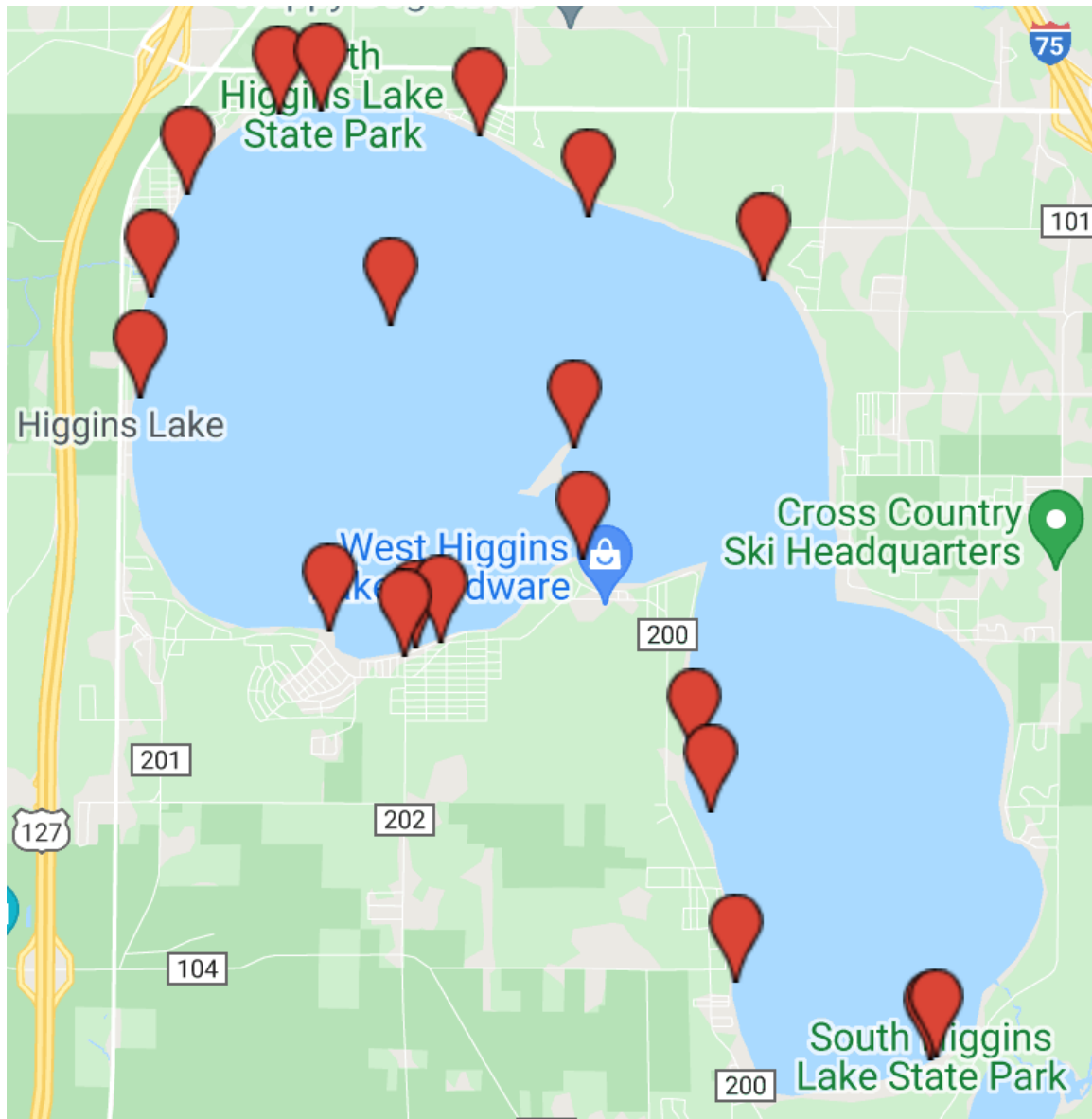


Figure 3. Locations of swimmer's itch cases on Higgins Lake (Roscommon County, MI) that were reported on www.swimmersitchsolutions.com/Higginslake from May 1 - September 30, 2021. Each red balloon represents a distinct location for a swimmer's itch case report.

Recommendations for 2022 and beyond

Based on the results of our work this summer, we strongly encourage the HLSIO to continue its common merganser trapping and relocation program as a swimmer's itch control strategy. Our data strongly suggest that the program is working. Anecdotal reports from many lake residents over that same time period also strongly support this claim.

We also recommend that the HLSIO continue a yearly assessment/monitoring of swimmer's itch levels on Higgins Lake with the explicit purpose of putting itself in the best possible position for any future common merganser trapping/relocation permit renewals.