

**Alberta Conservation Association
2019/20 Project Summary Report**

Project Name: Hasse Lake Fisheries Restoration

Fisheries Program Manager: Peter Aku

Project Leader: Troy Furukawa

Primary ACA staff on project: Troy Furukawa and Brendan Ganton

Partnerships

Alberta Environment and Parks

North Saskatchewan Watershed Alliance

Northern Light Fly Fishers

Parkland County Alternative Land Use Services Program

Key Findings

- In winter, much of the water column was anoxic under the ice by mid-February.
- Following positive discussions with Parkland County and AEP, we plan to restock Hasse Lake with trout by fall 2020; we will extend the powerline and install aeration infrastructure on the lake by fall 2020 to enable winter aeration to support the stocked trout.
- Due to estimated high cost (over one million dollars), alum treatment of Hasse Lake to improve water quality is currently not an economically viable option for ACA.

Abstract

In recent decades, changes in watershed land use have resulted in increased nutrient runoff, particularly phosphorus, into Hasse Lake that has led to increased intensity and frequency of

algal blooms, especially blue-green cyanobacteria blooms; poor oxygen conditions; and fish kills. Recurring summer and winter fish kills have decimated what used to be a popular stocked sport fishery; there has been no recreational fishery on the lake since 2012. In the summer of 2015, ACA initiated a project with the primary focus of working with local community groups and landowners in the watershed to reduce nutrient loading to the lake, improve water quality, and restore the recreational fishery. Each year we monitored summer and winter water quality conditions; however, we did not conduct surveys during the summer of 2019 due to the departure from ACA of key project staff. In 2019, we also investigated the potential use of alum treatment and lake aeration as alternative approaches to improve water quality and support a year-round population of stocked fish. In the winter, much of the water column was anoxic under the ice by mid-February. Based on sediment phosphorus release rates, estimated cost for alum treatment of Hasse Lake was over US\$660,000 (equivalent to over one million Canadian dollars); at this price, alum treatment is not an economically viable option for ACA. Following positive discussions with Parkland County and AEP, we plan to restock Hasse Lake with trout by fall 2020; we will extend the powerline and install aeration infrastructure on the lake by fall 2020 to enable use of winter aeration to support the stocked trout.

Introduction

In recent decades, changes in watershed land use have resulted in increased nutrient runoff, particularly phosphorus, that has led to water quality degradation in many Alberta lakes, including Hasse Lake. High productivity, frequent noxious algal blooms, particularly blue-green algae, and resultant poor oxygen conditions have led to recurring summer and winter fish kills in Hasse Lake that has decimated what used to be a vibrant and popular recreational fishery; there has been no recreational fishery on the lake since 2012. Death and decomposition of dense algal blooms increase biological oxygen demand in the waterbody, resulting in a low dissolved oxygen concentration that can lead to low fish survival. In the summer of 2015, Alberta Conservation Association (ACA) initiated the Hasse Lake fisheries restoration project with the primary focus of working with local community groups and landowners in the watershed to reduce nutrient loading to the lake, improve water quality, and restore the recreational fishery. Key partners include, Parkland County, the Parkland County Alternative Land Use Services Program (ALUS),

North Saskatchewan Watershed Alliance, and Northern Light Fly Fishers. Since project inception, we have engaged in various activities, including surveys to characterize existing (if any) fish community composition, outreach, riparian zone protection, and generating pertinent information leading to removal of fecal coliform advisories on the lake by Alberta Health Services. Each year we monitored summer and winter water quality; however, in 2019, we did not conduct summer surveys due to the departure from ACA of key project staff. In 2019, we also investigated the potential use of alum treatment and lake aeration as alternative ways to improve water quality and support year-round survival of stocked fish in the lake.

Methods

We assessed winter water quality between December 2019 and March 2020 using a handheld multi-parameter probe meter (YSI Professional Plus). We measured monthly profiles of temperature, dissolved oxygen, conductivity, and pH at three sampling locations and derived averages for each depth across the three sampling locations.

With over 70% of the Hasse Lake shoreline protected through landowner restoration agreements (ALUS program) and the remainder having relatively healthy riparian vegetation, coupled with additional on-going restorative activities throughout the watershed, all of which should contribute to reducing nutrient loading in surface runoff, we turned our efforts to improving in-lake water quality to aid re-establishment of a sport fishery on the lake. To improve water quality and support a year-round population of stocked fish in the lake, we investigated the potential use of two alternative approaches: 1) alum treatment and 2) lake aeration (an approach we already use on several lakes). We worked with alum treatment experts from the USA, HAB Aquatics Solutions Inc., to determine sediment phosphorus release rates in Hasse Lake that was used to estimate required alum dosage and cost for the phosphorus control. Similarly, we worked with Parkland County to determine cost for aeration infrastructure installation and electrical powerline extension to the lake.

Results

In the winter, much of the water column was anoxic under the ice by mid-February. Based on sediment phosphorus release rates, estimated cost for alum treatment of Hasse Lake was over US\$660,000 (equivalent over one million Canadian dollars); at this price, alum treatment is not an economically viable option for ACA. Following positive discussions with Parkland County and AEP, we plan restock Hasse Lake with trout by fall 2020. ACA assumed the lead role in working with Fortis Alberta for powerline extension and installation of aeration infrastructure on the lake by fall 2020 to enable winter aeration and ensure year-round survival of the stocked trout.

Conclusions

With the plans in place to protect the riparian zone and reduce nutrient loading in surface runoff to the lake, we turn our efforts to improving in-lake water quality to aid reestablishment of a sport fishery on the lake. Following positive discussions with Parkland County and AEP, we plan to restock Hasse Lake with trout by fall 2020; we will extend powerline and install aeration infrastructure on the lake by fall 2020 to enable winter aeration and ensure year-round survival of the stocked trout.

Photos



The island at Hasse Lake is a favourite spot for gulls, geese, pelicans, and other waterfowl.
Photo: Brendan Ganton