

From “I don’t know” to Idano: How Visiting a Little Known Lake Instigated a Lake District Survey

*View of Lake Idano from Above.
Photo credit: Mike Myshak.*

As July marks Lakes Appreciation month, we wanted to highlight a collaborative citizen science story happening in the Sturgeon River Watershed. Three of the key partners took time to tell us how their converging interests in some small lakes in the Glory Hills set in motion “a regional survey of a little lake district”.

A CLEARLY MYSTERIOUS LAKE

Shortly after Dave Trew retired from the NSWA in the summer of 2018, he was talking to family friend Ellen Andreassen, who lives north of Stony Plain. For years, Andreassen had been asking him to come out and see the lake on their property. When the Trews finally visited the property later that summer, Trew says, “I was quite awestruck when I saw the lake for the first time. . . I was amazed at how clean and clear it was.” Besides its clarity, Trew noted its rapid drop off, depth, and permanent outflow, which are uncharacteristic features of most of the lakes he’d encountered in central Alberta. Known informally to the family as Lake Idano (“I don’t know the name”), Andreassen expressed a desire to see the lake protected for future generations.

As Trew pondered this pristine lake, set in the Glory Hills, he was invited back to look at the springs that feed Lake Idano. In September, he and Andreassen followed a stream through the forest until they reached a lovely shallow waterbody with whitish sediments. This was later determined to be a groundwater-fed marl fen rich in calcium carbonate, not unlike the Wagner Fen. Two more fens were located further upstream, which also drain into Idano.

Still intrigued, Trew told Alberta Lake Management Society (ALMS) Executive Director, Bradley Peter, about the lake. The two of them arranged to sample Lake Idano the following summer and Trew says Peter was “equally impressed with its beautiful setting.” After running the lake chemistry samples, the nutrients were determined to be extremely low. Trew compares them to “a lake in the foothills or the Canadian Shield,” saying they are “nothing like most central Alberta lakes at all.”

THE GLORY HILLS & THE CARVEL PITTED DELTA: ABOUT THE REGION

The Glory Hills separate two major sub watersheds of the Sturgeon River and are also a transition zone between Boreal and Parkland ecosystems. They are part of a broader region west and north of Stony Plain, known as the Carvel Pitted Delta. This postglacial area of “knob and kettle” terrain was formed as glacial ice retreated, leaving mounds (knobs) and



*The first of the three marl fens upstream from Lake Idano.
Photo credit: Dave Trew.*



The three collaborators out on the lake. In the foreground is Dave Mussell, with Walt Neilson and Dave Trew in the boat opposite. Photo: Kaila Belovich.

pothole depressions (kettles). These kettle potholes filled with ice melt to become lakes. Some of the better known “kettle” lakes within this region include Chickakoo, Hubbles, Spring, and Jackfish lakes.

Shortly before Trew retired from the NSWA, hydrogeology specialist with AEPA, Alex Oiffer, had been working on an overview report of the Sturgeon River’s groundwater regime. When Oiffer explained to Trew that the Glory Hills are an important recharge area, Trew wondered if there were other similar lakes in the immediate area. He reviewed earlier work done by Ellie Prepas (U. of A.) and Pat Mitchell (AENV) and noted that three well known lakes in the Glory Hills (Hubbles, Eden, Roi) also displayed quite low nutrient levels. However, there were a very large number of other small lakes (~70) in the same general area for which recent data were unavailable.

In 2020, Oiffer connected Trew with Dr. Dan Alessi, Dept. of Earth Sciences, U. of A., who recommended that Trew work with a post-doctoral researcher named Dr. Konstantin von Gunten. Many private landowners graciously permitted Trew and von Gunten to come onto their properties that summer to study these lakes’ sediments and chemistries. Concurrently, ALMS was hoping to sample 10-12 lakes in the same area. That summer, a dozen of the “Carvel Lakes” were sampled between the two parties.

GAINING SOME CLARITY: OTHER CLEAR LAKES

Trew recalls, “We encountered a series of lakes that were very similar to the first one, within two miles.” Not all the lakes, however, were as clear and some in the settled areas of the Carvel Pitted Delta were more typical of the productive (high in nutrients and algae) lakes associated with the Parkland ecoregion. Von Gunten completed a lot of the analysis in the lab that fall, drafted a paper that was submitted for peer review and published in 2022 (alms.ca/wp-content/uploads/2022/10/Natural-controls-on-phosphorus-concentrations-in-small-Lakes-in-Central-Alberta-Canada.pdf). Trew sums up the paper’s findings by saying, “It basically speaks to the role of calcium in these clear lakes,” adding that calcium binding with phosphorus is an important feature. High concentrations of phosphorus are the main reason for algal and cyanobacteria blooms that are found in most central Alberta lakes.

HISTORICAL STUDY OF PARKLAND LAKES

In 1990, the *Atlas of Alberta Lakes* was released to showcase the 100 most known or studied lakes across the province. Six of those lakes were in the Carvel Pitted Delta and were described in great detail. Trew is also grateful for a fisheries colleague who recently drew his attention to an older, uncirculated study from the same area. A detailed sportfish capability survey of 36 Parkland County lakes was commissioned by the Fisheries Branch in 1986. The work was conducted by Edmonton consulting firm RL&L Environmental Services Ltd. The reports also contain depth measurements and water quality data which will provide the current team an invaluable comparison for how these Carvel lakes may have changed over time. Since 2005, ALMS has also conducted sampling programs on five lakes under its LakeWatch program. In 2018, the NSWA published a report on Hubbles Lake, one of the largest lakes in the Glory Hills, also noting its depth and low productivity. What was yet to be more fully understood is that there were smaller lakes that were similar in the area.

After running the lake chemistry samples, the nutrients [in these lakes] were determined to be extremely low. Trew compares them to, “a lake in the foothills or the Canadian Shield,” saying they are, “nothing like most central Alberta lakes at all.”

THE VALUE OF PARTNERSHIPS

Walter Neilson first met Trew through the NSWA in 2010. As president of the Mayatan Lake Management Association (MLMA), Neilson was seeking input about lake management. The organization had formed organically when he and other local landowners were concerned that the lake couldn't support a proposed RV park development along its shoreline.

Neilson says, "We morphed pretty quickly into a group that was looking at stewardship issues and protecting lakes." Trew and the NSWA helped the association implement the work to create both a ***State of the Watershed Report*** and a ***Watershed Management Plan***.

A decade later, Trew was telling Neilson about the initial dozen Carvel lakes they'd surveyed in 2020. Because Mayatan is also found in the region, Neilson told Trew, "We'd like to help and assist you." Neilson and the MLMA applied for grants, which they've received to fund the technical aspects of the survey work from 2021-2023. He downplays his role and part in keeping the project going. "I've provided low level grunt support for the work that they're doing, to get out and get on these lakes," he says with a laugh. "It's been a very good partnership." The team conducted water quality surveys on 50 Carvel lakes in 2022.

Neilson says that the Carvel Lakes work appealed to MLMA because Parkland County has told the association that it's hard to study these smaller lakes individually. "If you get an overview picture of a number of lakes, then it's easier for them to think about what actions might be useful to protect those lakes. Working on a multi-lake project made a lot of sense to us."

In 2022, retired GOA biologist, Dave Mussell, joined the project. Like Trew, Dave Mussell had a long career with the provincial government, where their paths had crossed many times. Mussell worked in Environmental Engagement and Consultation, and conducted information gathering for the protection of natural areas. More recently, he'd worked with Trew while serving on watershed technical advisory committees for Mayatan Lake and the NSWA. When Mussell retired in 2021, Trew asked him about joining the project.

Since joining the project, Mussell has taken on specialized components and assisted in data analysis. Neilson calls Mussell, "A wizard at doing all sorts of things. He's been spearheading the bathymetry [surveys] and taking video, underwater pictures, and [aerial] drone work."

TECHNOLOGICAL ADVANCES PROVIDE NEW INSIGHTS

Mussell dove into the bathymetry work, although it was new to him. This work models lake contours and depths, using the latest technology. He vividly describes how fish finding devices can now generate hundreds of samples of the lake bottom using sound signals. From this, it creates a map of the lake bottom's contours and depth, which is accurate to within 10-20 millimetres. This data can be combined with Google Earth, so it's publicly accessible and can be used to calculate the volume of the lake. This alone provides a much greater understanding of what the lakes in the region look like beneath the surface.

Mussell says these new technologies are an example of what separates this project from historical studies. They provide a much more accurate and often, less time-consuming processes, that bring together greater understanding of these lakes. He names other scientific advances, such as sampling techniques for aquatic invasives and for groundwater isotopes, saying, "The value of the work that we're doing is we're constructing a regional picture about these lakes in a way that hasn't been done before."

Dr. Brian Smerdon (Dept. of Earth Sciences, U of A) is leading the groundwater component of the Carvel Lakes study. For this project, Smerdon examined lake samples for traceable isotopes of hydrogen, oxygen and radon. Water that is derived from groundwater has a certain isotopic signature that is different than water derived from surface runoff or precipitation. This information will allow the team to better understand how much groundwater is coming from the bed of the lake and larger patterns in lake water chemistry and hydrology.



Dr. Konstantin Von Gunten (R) with volunteer Alec Macdonald as they take in their first view of breathtaking Gerharts Lake in 2020. Photo credit Dave Trew.

ANSWERS INFORM DECISION MAKING & MANAGEMENT

Mussell emphasizes that this work will not only provide a better level of understanding of how sensitive the lakes are to disturbance, it will put good information in front of decision makers and landowners. “Without that information, decisions get made in ignorance and how the decisions themselves affect the environment they happen in. That is the story of so much human development. We’re smarter than that, but we tend to ignore the information that’s available or don’t have information to use in the management and development process.”

THE WAY FORWARD & THE ROLE OF CITIZEN SCIENCE

Mussell and Trew have high praise for Bradley Peter and his ALMS team as collaborators in the project. Mussell says, “This is a good project for them because their focus has been largely on monitoring lakes, so this gives them an opportunity for them to zero in on management level type of information that can be collected.” The Land Stewardship Centre has been the major funder, with additional financial support from Parkland County, Stony Plain Fish and Game, and the NSWA. Neilson attributes the many partners to Trew’s ability to generate enthusiasm and get people interested, saying, “He’s not only a really good scientist, he’s a very good collaborator.”

Mussell says that while the project may not be unique, it is somewhat unusual for Alberta. He calls it a “citizen science” (to which Trew adds “senior citizen science”) project because the main people driving the project are investing a huge amount of their own time and resources. They also happen to be highly skilled and bring the needed technical skills to complete the work, which is not always the case with citizen science.

Mussell praises how some individual landowners have taken great pride and interest in protecting the lakes on their properties. Although this is not the case for every lake they’ve studied, Mussell commends those who “have a long history of very good stewardship and have looked after that lake for generations.” Perhaps nobody understands this better than Neilson, after 13 years as president of the MLMA. He says, “The stewardship of lakes in this province is very much dependent on volunteer efforts.”



Chara are colourful branched algae found in lakes that are calcium-rich, such as the “clear” lakes in this survey. It is also known as Muskgrass, because of its strong garlicky odour. Photo credit: Dave Mussell.



The final product and main intent of the Carvel Lakes project is to raise public awareness about these unique lakes by generating improved information and educational products.

To find out more about the project, check out the link below. This page includes videos, more photos, and links to presentations as you scroll down:

<https://alms.ca/carvel-pitted-delta/>

A view of the sparkling clear waters of another small unnamed lake close to Idano Lake. Photo credit Dave Trew.