



October 5, 2017

DRONE PROJECT FOR MALLA by Brenda Martin and Wade Leonard



Preparing for Flight Operations



Nearly ideal conditions on Malcom Lake September 27, 2017



The LSC continues to implement Lake Plan activities aimed to monitor, protect and improve our lakes through recommendations and actions. Aquatic Plant mapping began in 2015 to help monitor plant growth with the intention of identifying invasive species. In 2015 the Stewardship Committee participated in an aquatic plant mapping program through Carleton University using boats and GPS equipment. Although we were registered for the program in 2016, it was cancelled. As a result, we had only one year of data for Malcolm Lake and insufficient data for Ardoch Lake. Finding an alternative program was costly. We heard about the new drone program that the local school (Granite Ridge Education Centre) would be initiating and felt that a real-life environmental need could make a great local partnership. Through discussions with teacher, Wade Leonard, the project co-ordinator, it seemed to be an excellent match for our needs. It has the potential for grid mapping each season for plant growth and fisheries' spawning beds but also will provide shoreline mapping that will be beneficial especially pre-development on Ardoch Lake. From a non-threatening distance, it will be able to assess the heron rookery. There is even the potential to prepare a video each season of the rookery.

Joint planning began in the summer with a schedule for early September arranged. Dates were set for September 27 and 28<sup>th</sup> when a second staff member was available to accompany the class on their site visits to Malcolm and Ardoch Lakes. Like all new projects, you can anticipate some delays beyond the group's control. Drone Operation is a very serious activity and all safety items needed to be addressed. Excellent prompt, co-operation from property owners ensured that we had launch and recovery sites in place; then we added more to downsize the grid sections so that battery power would not be a factor. Our special thanks for the boat support provided by Roy Burgess, Dan Weber, and Bud Griswold with backup from Glen Fowler. Plans had considered weather conditions so that the drone would not be flying in heavy wind or storm. Students were well prepared in their roles from setting up and packing up the drone, recording conditions, using proper drone language, walkie-talkie communication to those in the boats, and most importantly-maintaining eye contact with the drone at all times. Young eyes proved to be much better at this task.



The GREC Ground Crew – from left to right: Spencer Crain, Teacher Jamie McCullough, Tanner Meeks, Teacher Wade Leonard, Ryleigh Rioux, Nathan Lowery, Erica Thompson, Claudia Thompson, Zach Commodore

It was an exciting start with very hot weather the first day and freezing finger weather the second day! Everyone learned on site how to adapt. The Malcolm Lake drone crew ran into some steep learning curves during the operation. While the crew did manage to complete 3 missions, they had considerable difficulty with the autonomous program the use called Drone Deploy. The crew ran into Geofencing issues, as they were within the controlled airspace of the Tomvale Airport, despite having Navigation Canada clearance and despite having a three day clearance to operate next to the

airport from the drone software company. The crew felt that the geofencing issues they experienced caused other software glitches, among them, the inability to fly a planned mission; not wanting to take off outside from outside the mission flight cell, failure to take photos during the mission; (a check that the drone is actually taking photos and not just in flight), weak satellite signals for Ardoch Lake did not allow the mapping option at this time. The crew has not had any unresolvable issues with either their drone or the mapping software before these operations. They have also flown a 'glitch free' mission subsequent to the Malcolm Lake operations. Operations manager and teacher Wade Leonard is following up with the software company in an attempt to resolve or find 'work arounds' to the issues experienced during the Malcolm Lake Operations.



Ardoch Lake looking to the west, Malcolm Lake is in the distance.

Although not all of the lake was completely mapped, there was considerable mapping of Malcolm Lake. A video and photos were completed for Ardoch Lake with the mapping to be completed at a later date. Pictures from the first day were shared showing incredible detail of underwater structures even with rippled water as the storm approached. Mr. Leonard is in the process of consulting with experts in the fields of GIS analysis and aquatic ecosystems related to analysis of the information obtained. A map of the early results is provided below.



An orthographic map of Malcolm Lake composed of approximately 600 separate photos 'stitched' together in a supercomputing cloud computer.