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Natural Science Fellowship Summary

Freshwater ecosystems in the Northeast are adversely impacted by road salt usage during winter months. In the state of Maine, high usage of road salt has led to an increase in salinity in some bodies of water (Dugan et al. 2017). A compound as common and seemingly innocuous as sodium chloride has been shown to have detrimental effects on reproduction, development, and general survival of some freshwater organisms (Karraker et. al, 2008). *Daphnia ambigua* is a species of zooplankton that inhabits bodies of freshwater, including ponds and lakes of Maine. *Daphnia ambigua* are considered a model species due to their sensitivity to pollutants in their environment and their role as a keystone species in aquatic ecosystems. These tiny crustaceans are a food source for many invertebrates and small fish, causing them to play a critical role in controlling algal productivity in lakes (Miner 2012). Due to their sensitivity, they are used as indicators of environmental stressors, and their response can shed light on ecological changes and imbalances (Martins 2007). The water chemistry of these lakes plays an important role when beginning to analyze and discuss the importance of calcium as a buffer towards salt toxicity. The harmful effects of salt can be counterbalanced via the addition of calcium.

During the summer of 2020, the Rogalski lab conducted an experiment testing the effect of sodium chloride on the health and reproduction of *Daphnia ambigua* amongst 3 lakes. They found that *Daphnia* from higher calcium lakes were most tolerant towards salt. This summer we conducted a similar experiment in order to quantify and analyze the effect of calcium chloride on the reproductive ability and growth BT/F2f1 0375.24 Tm0 g0 G(the)-7(r)-6(e)4(pr)-6 ability and growth BTBT/

Fig 1. *Daphnia ambigua* that were exposed to the calcium treatment in Hall water produced a higher total progeny than both the untreated Egypt and Hall Pond water under the NaCl treatment. The x-axis depicts the treatment groups (control and NaCl addition), while the y-axis represents the total average progeny. Colors represent the water source used in the experiment. Blue represents untreated Egypt water, black represents untreated Hall water, and orange represents Hall water with calcium added (matching levels found in Egypt). Error bars denote 1 standard