

The Effect of Hybrid Road Salt Pollution on Aquatic Plants

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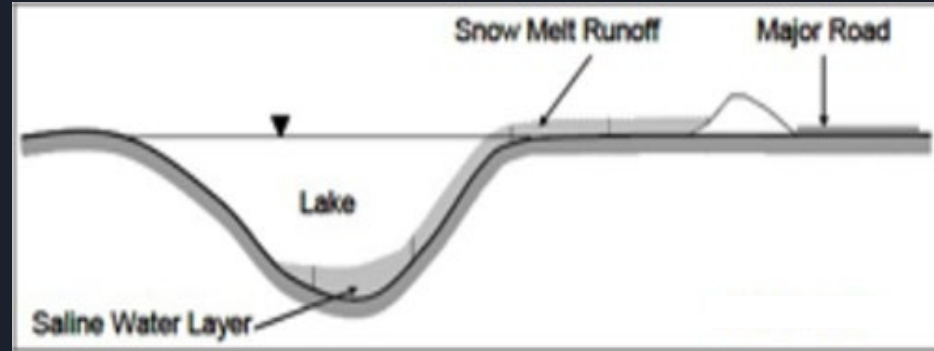
Road Salts

- Used to melt snow and ice
- 20 million tons of rock salt is used each year in the US (Breining 2017)
- Decrease in accident rates after a snowstorm (Nelson et. al, 2009)



Harmful Effects of Road Salts

- Raise the chloride levels in lakes
- EPA chronic exposure 230 mg/L
- EPA acute exposure 860 mg/L
(Dugan et al., 2017)
- 7,700 freshwater lakes are at high risk of exceeding these limits (Dugan et al., 2017)
- Creates density gradients (Dugan et al., 2017)



(Dugan et al., 2017)

Types of Rock Salts

- NaCl
- CaCl_2
- MgCl_2
- KCl
- Hybrid Road Salts



<https://www.pca.state.mn.us/water/salt-and-water-quality>



Research Question/Hypothesis

- Which type of road salt mixture, NaCl and CaCl_2 or NaCl, KCl, and MgCl_2 , is more environmentally friendly?
- The road salt mixture of NaCl, KCl and MgCl_2 will be more environmentally friendly

Methods

- Selected two environmentally friendly brands of hybrid rock salts
 - NaCl and CaCl₂
 - NaCl, KCl, and MgCl₂
- Test the effect of both salts at two different concentrations, 100 mg/L and 900 mg/L, on coontail
- Measured the mass of the coontail at the beginning and end of the experiment



<https://www.lakerestoration.com/p-99-coontail.aspx>

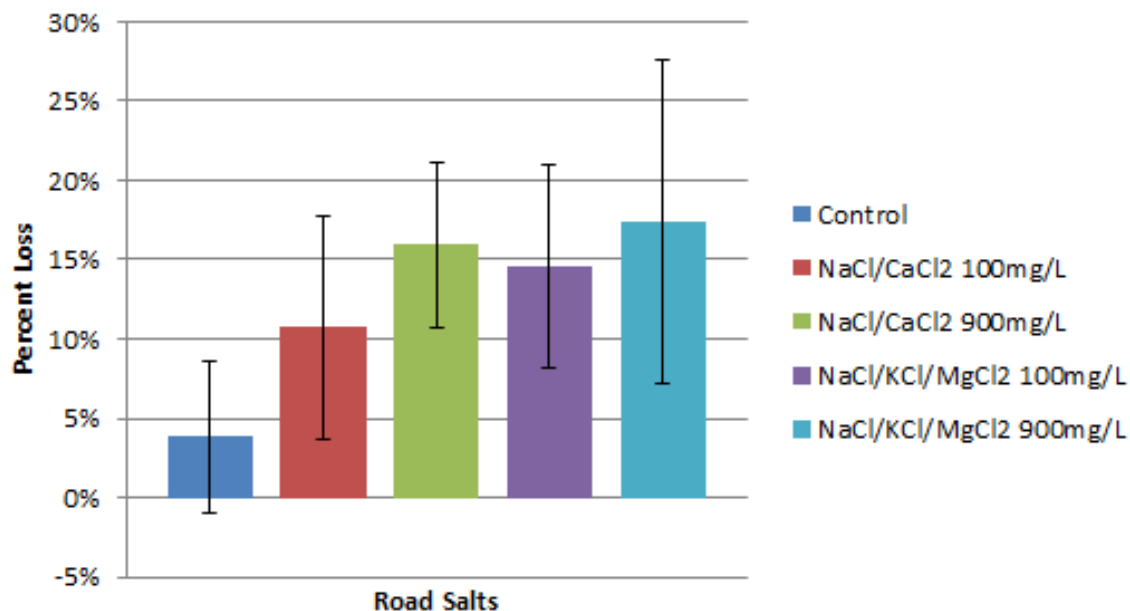


Methods

- Set up 25 mesocosms
 - Control: 3 L of lake water
 - 100 mg/L of NaCl and CaCl₂
 - 900 mg/L of NaCl and CaCl₂
 - 100 mg/L of NaCl, KCl and MgCl₂
 - 900 mg/L of NaCl, KCl, and MgCl₂
- After one week, the coontail mass was measured again and the percent loss was recorded
- Temperature, pH levels and dissolved oxygen levels were monitored

Results

Percent Loss of Coontail Mass for Different Rock Salts and Concentrations





Discussion/Conclusion

- Need more evidence to conclude that the NaCl, KCl, and MgCl₂ road salt were more harmful than the NaCl and CaCl₂
- Support that both road salts are harmful to coontail

Discussion/Conclusion

- Use less road salt rather than different road salt
- Shovel before salting your driveway



https://www.nwtimes.com/news/local/illinois/road-salt-supplies-questionable-for-some-ill-ind-departments/article_d5a48873-18bf-58fd-b5ad-bdb66f89cb29.html



Future Research

- Comparing my results to a 100% NaCl rock salt
- Researching the effect of environmentally friendly alternatives such as beet juice
- Repeat my experiment for more data



Bibliography

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