



Reducing Road Salt Pollution in the Adirondacks

Brittany Christenson, Executive Director

A Look at the “Park”



Unique Geographic Area

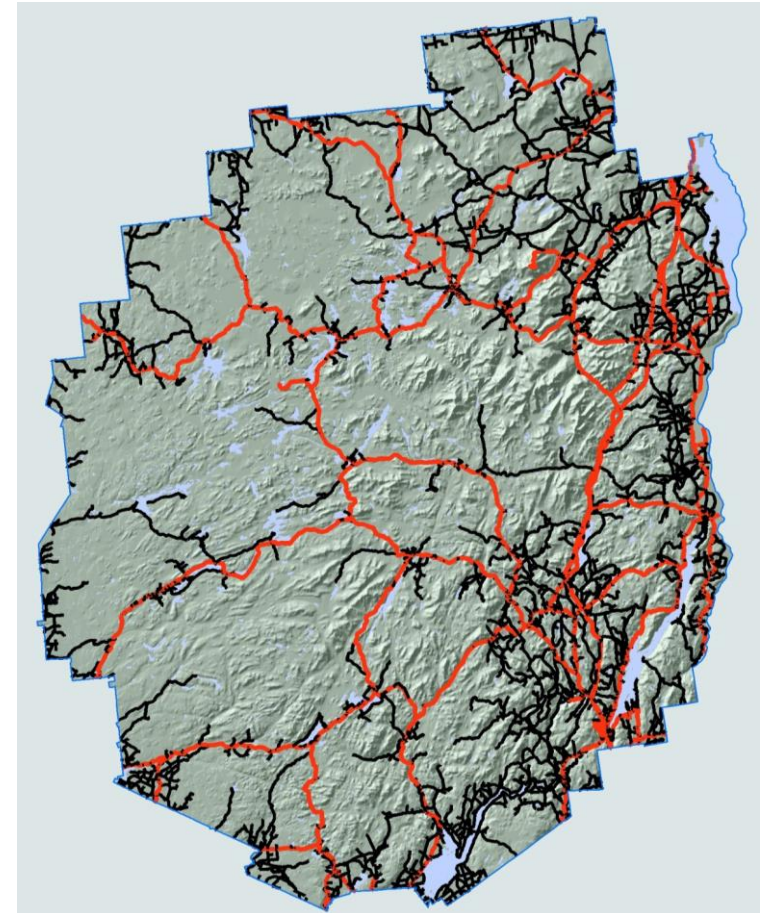


- The largest park preserve in the U. S comprising 6 million acres
- “Forever Wild” to preserve the state’s water supply and other valuable resources
- 2,759 lakes and ponds
- 1,500 miles of rivers fed by 30,000 miles of streams and brooks.
- The park contains the head waters to the Hudson River, Lake Champlain, as well as the Black, St. Lawrence and Mohawk Rivers.

Road Salt in the Adirondacks

- 10,555 lane-miles of paved roads
- 6,500,000 tons since 1980
- ¼ State roads
- ¾ Local roads
- 108,000 tons of salt used on state roads per year
- 84,700 tons of salt used on local roads per year

Kelting, D. L., & Laxson, C. L. (2010). Review of effects and costs of road de-icing with recommendations for winter road management in the Adirondack Park. *Paul Smith's College Adirondack Watershed Institute Report#2010-01.*



Road Map to Reduce Road Salt



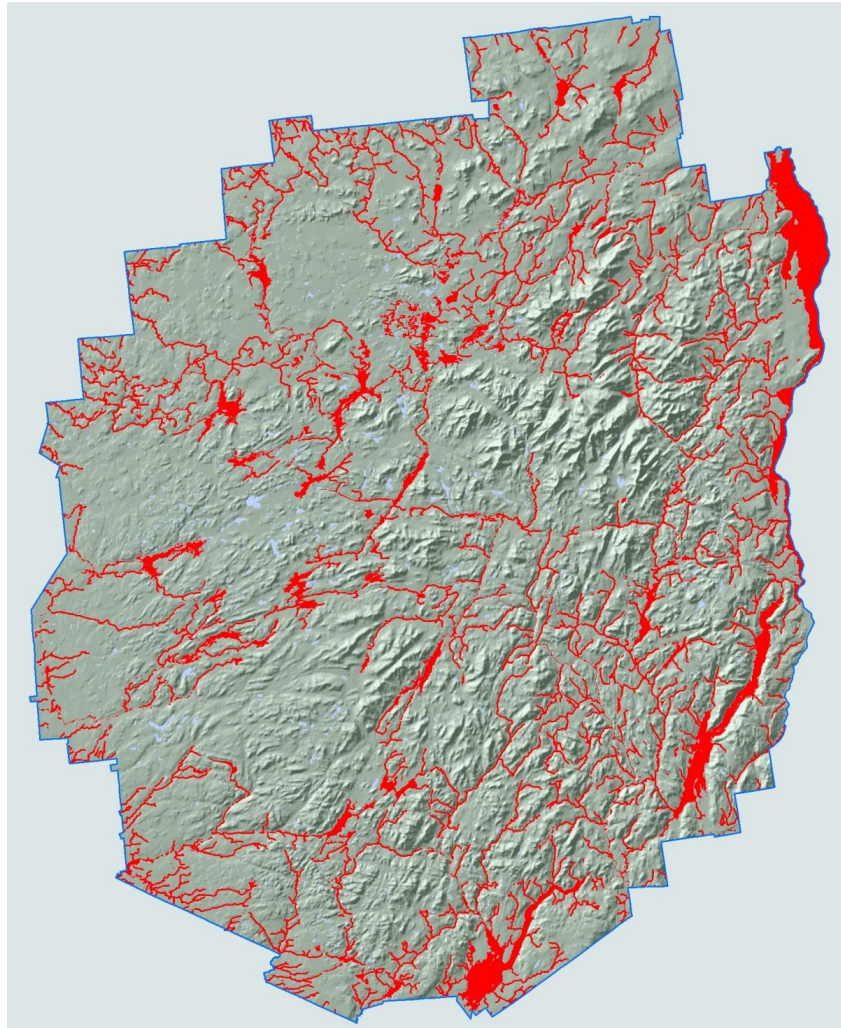
Relevant Local
Research

- Surface Water Impacts
- Ground Water Impacts
- Economic Impacts
- Public Safety Impacts

BMP's

- Reduce
- Use alternatives
- Upgrade equipment
- Improve training

Salted Roads and Surface Water



- Majority of surface water may be contaminated
- 6,000 miles of **streams**
 - 52% of total length
- 195,000 acres of **lakes**
 - 77% of total acres
 - 820 waterbodies

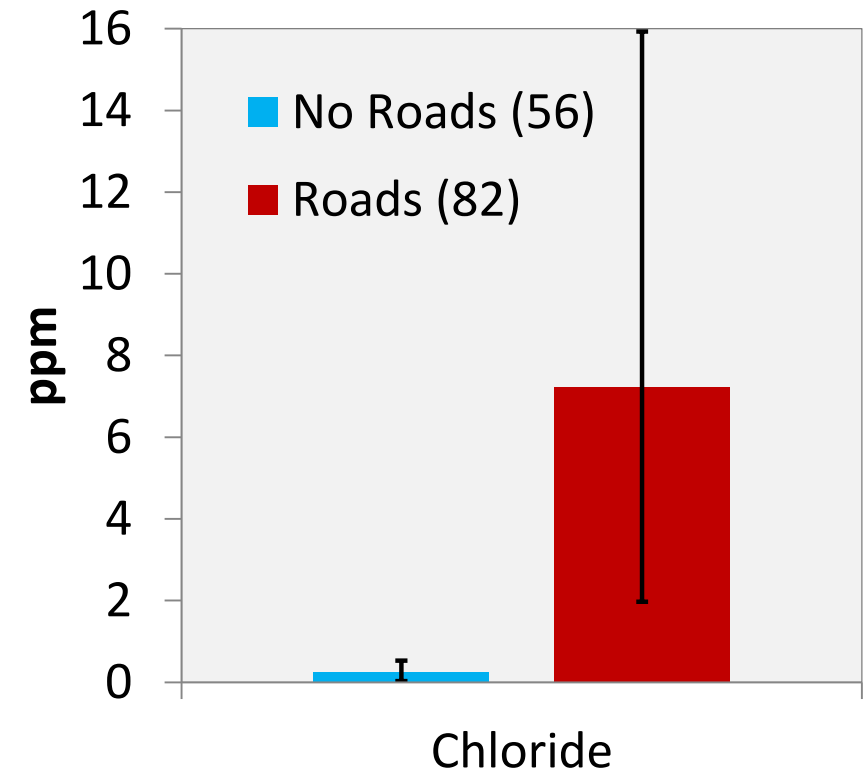


Regalado, S. A., & Kelting, D. L. (2015). Landscape level estimate of lands and waters impacted by road runoff in the Adirondack Park of New York State. *Environmental monitoring and assessment*, 187(8), 1-15.

Median Lake Chloride



- Regional Salinization
 - <0.5ppm w/no roads
 - 14X higher w/roads



Kelting, D. L., Laxson, C. L., & Yerger, E. C. (2012). Regional analysis of the effect of paved roads on sodium and chloride in lakes. *Water Research*, 46(8), 2749-2758.

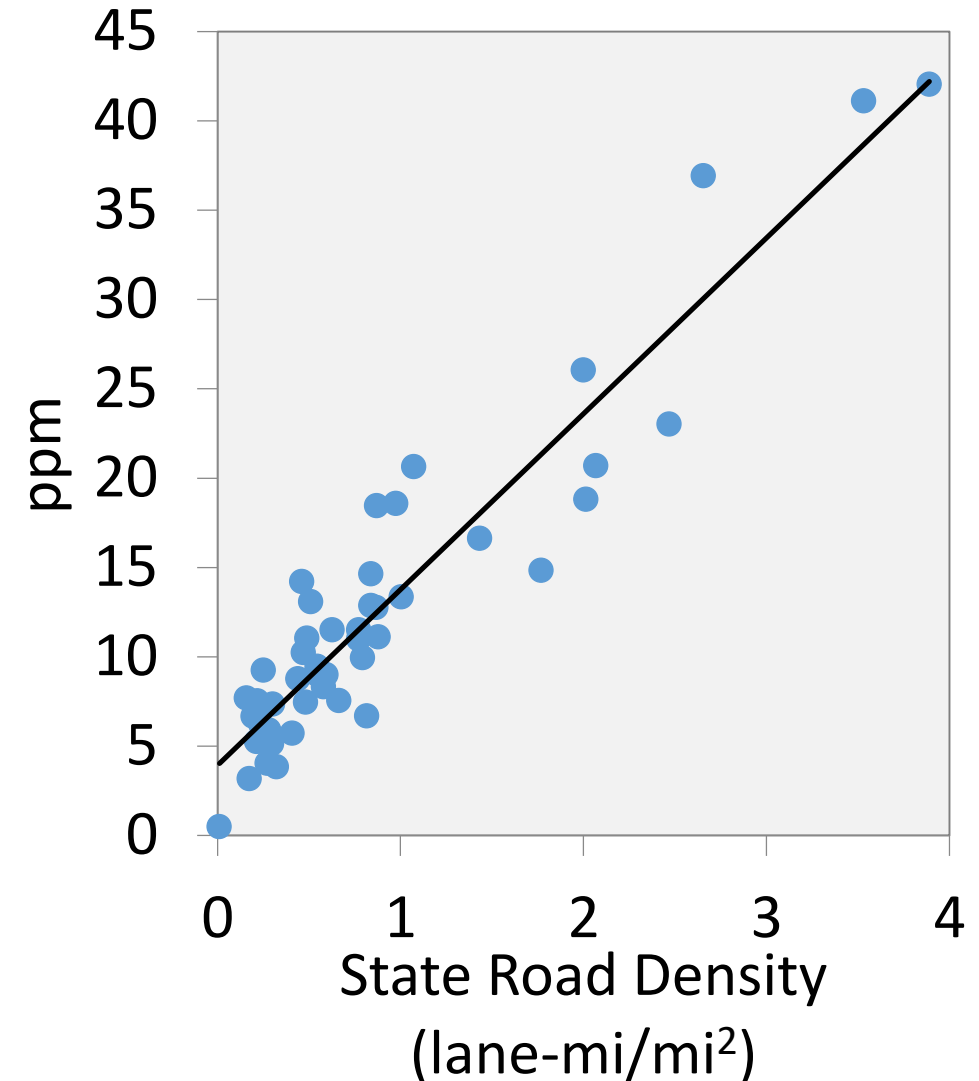


Lake Chloride and State Road Density

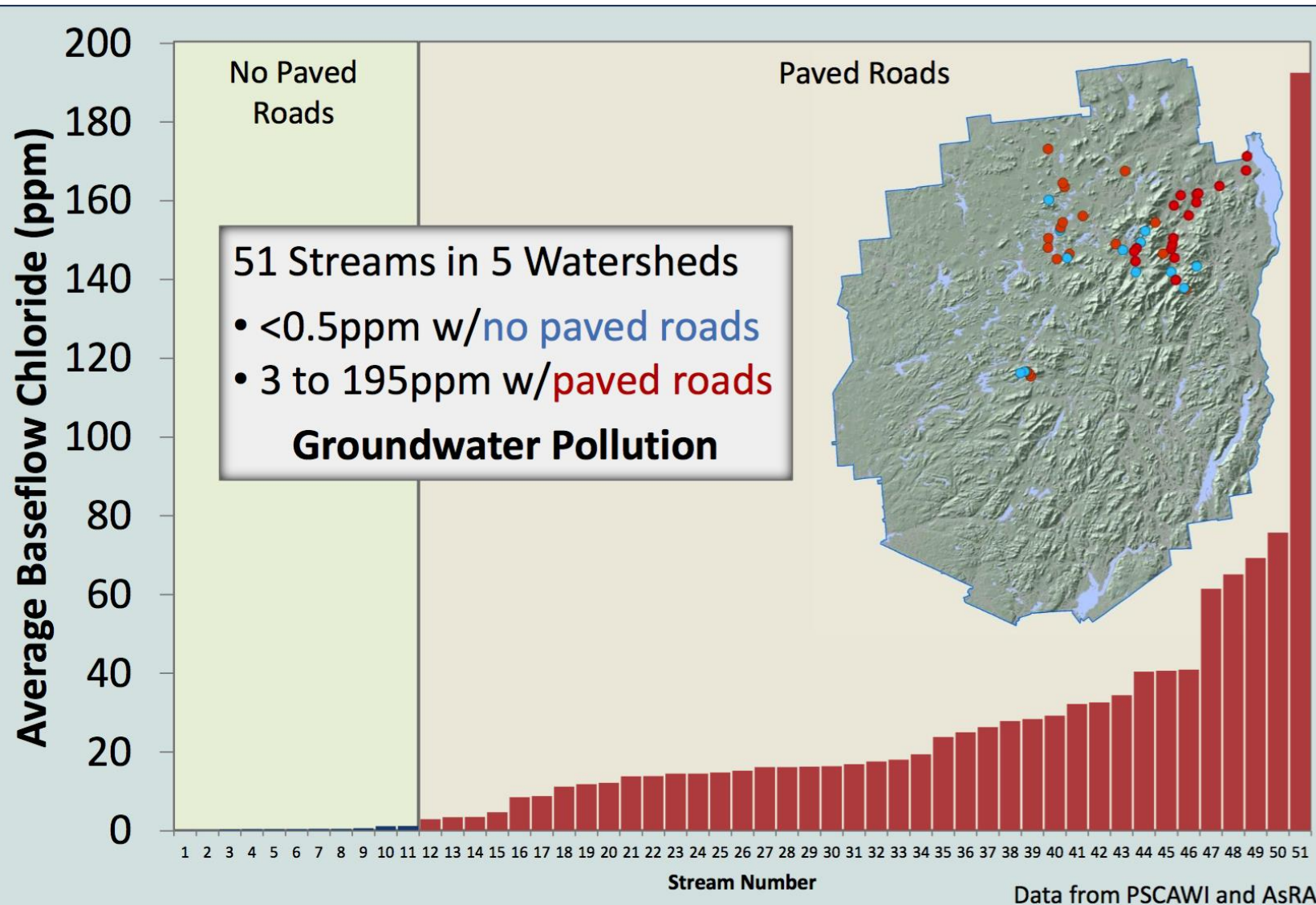


- No relationship between local road density and Cl
- State road density explained 84% of the variation in Cl
- Higher road density equals higher salt load
- **Regional salinization is from salting state roads (NYS DOT)**

Kelting, D. L., Laxson, C. L., & Yerger, E. C. (2012). Regional analysis of the effect of paved roads on sodium and chloride in lakes. *Water Research*, 46(8), 2749-2758.



Stream Baseflow Chloride



Salted Roads and Groundwater



- 1,600 square miles of **unconfined aquifers**¹
- Most overlain by **salt contaminated surface water**

Regional Groundwater Pollution

¹Aquifer data from APA GIS Dataset

Drinking Water

Potential Public Health Impacts

Road salt contamination in groundwater can result in:

1. Compromise taste of well water
2. Excess sodium can increase blood pressure, increased risk of stroke, heart failure, osteoporosis, stomach cancer and kidney disease.
3. De-icing salts can displace heavy metals in the soil near roadways, possibly leaching into groundwater and contaminating drinking water supplies.

(See page 26 – 27 of Review of Effects and Costs of Road De-icing with Recommendations for Winter Road Management in the Adirondack Park)



Well and Aquifer Study

Road Salt may be contaminating well water in the Adirondacks.

We're sponsoring a study with Dan Kelting, Director of Adirondack Watershed Institute at Paul Smiths College, to:

1. Obtain a statistically valid park-wide sample of drinking water wells
2. Determine the extent and magnitude of road salt contamination of shallow groundwater
3. Determine the extent and magnitude of road salt contamination of deep groundwater



Economic Impacts

Road Salt is expensive when we take corrosion costs into account:

- **National annual direct cost of corrosion** in the United States at \$23.4 billion. Koch et al. (2001)
- **Lower resale values** – as much as 20 percent less for a 10-year-old automobile, according to NACE (2002).
- In 2002, the national annual cost of **exhaust system replacements due to corrosion** was **\$1.68 billion** (Koch et al. 2002).
- NACE (2002) estimated the total costs of corrosion-related repairs, preventative maintenance and replacement of bridges across the United States to be in the range of **\$8.3 billion annually**.



Local Economic Impact

When you take all of the corrosion into account, road salt may not be the most cost effective option.

New Study

1. Private vehicle costs
 - Vehicle maintenance and repair
 - Vehicle depreciation
2. NYS Department of Transportation vehicle costs
 - Vehicle maintenance and repair
 - Vehicle depreciation
3. Roadway infrastructure costs
 - Bridge maintenance and repair
 - Bridge deterioration



Going Forward

NYSP21 Grant

- **Reaching out to Municipalities in the Adirondacks**
- **Road Salt Working Group – State-level efforts**
- **“Hold the Salt” – Public Awareness Campaign**

