



MnDOT District 1, Duluth Subarea KAc Project

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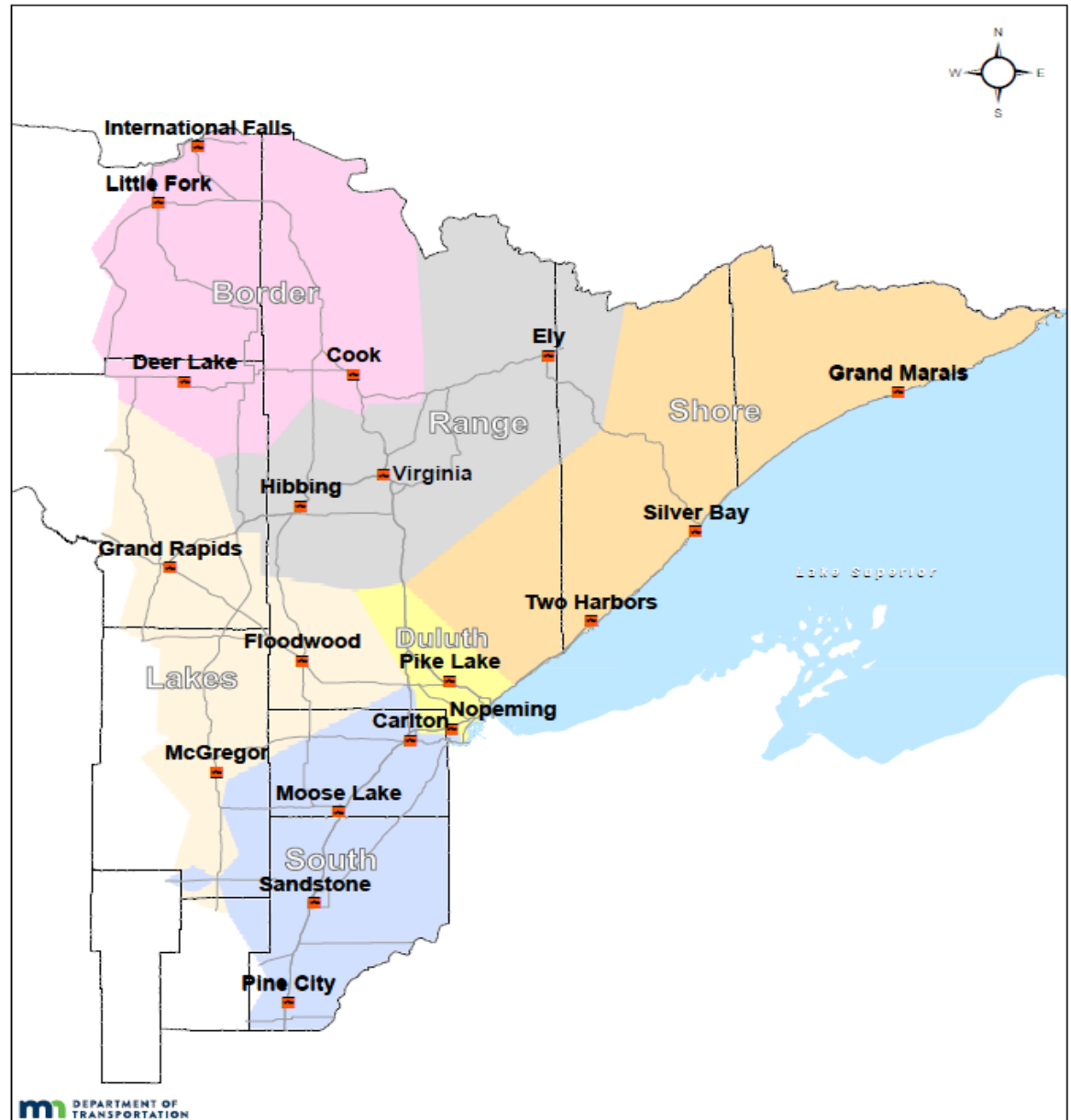
Why???

- 1 teaspoon of salt impairs five gallons of water
- MnDOT District 1 average annual salt usage of 37000 tons
- Lake Superior contains 10 % of the worlds fresh water; more than all the other great lakes combined.
- D-1 is home to the St. Louis River drainage basin, Rainy River drainage basin, Mississippi drainage basin, Voyageur's National Park, and the Boundary Waters wilderness area
- We are committed to keeping the roadways safe for the motoring public while remembering to be good economic and environmental stewards.

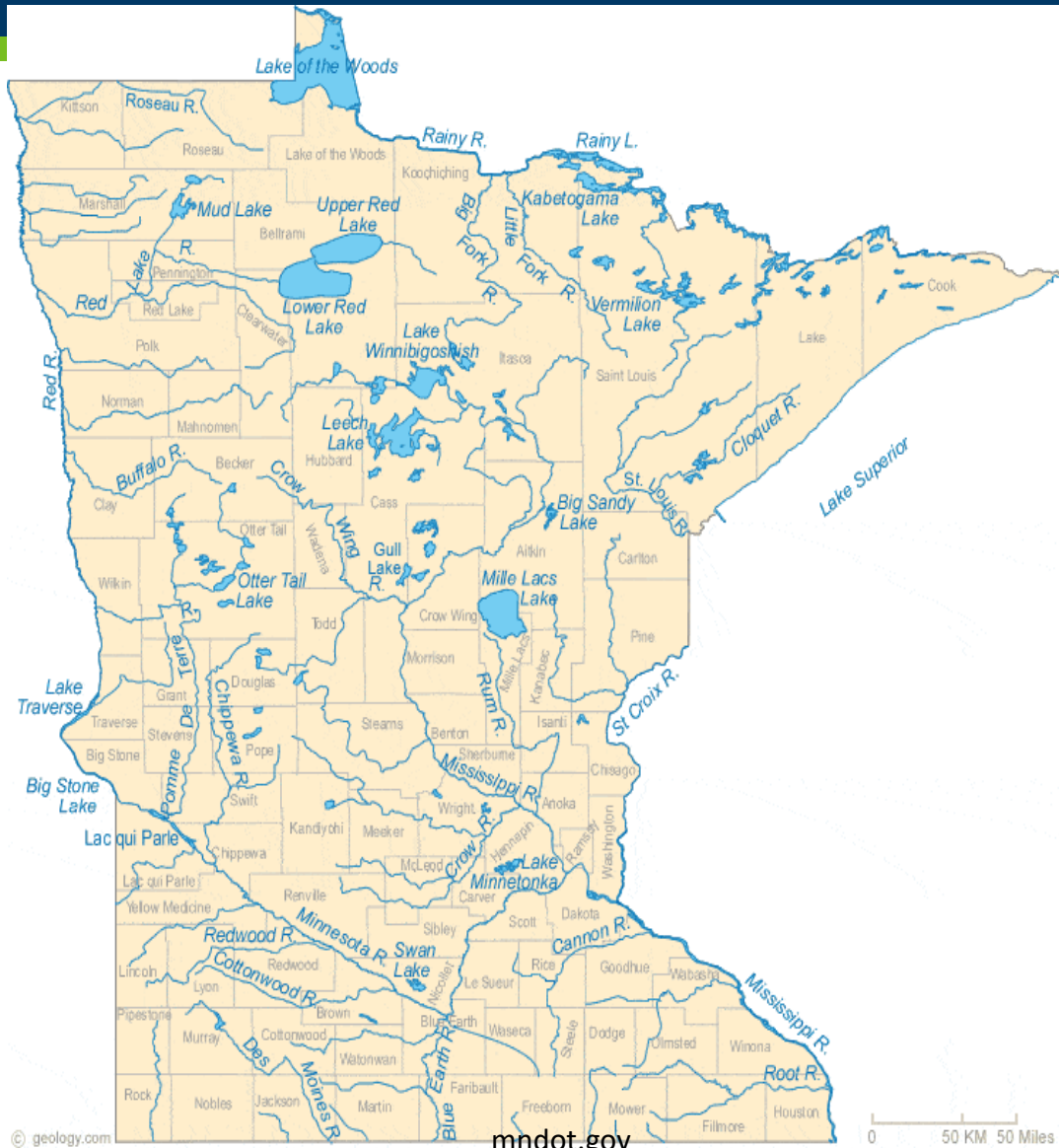
District 1

- 6 Sub-areas
- 19 Truck Stations
- 22 Reload Sites
- 3800 lane miles
- 99 routes

Minnesota Department of Transportation DISTRICT 1



Minnesota Waterways



Maintenance

- Alternative Chemical – Potassium Acetate
 - Effective to much lower temps (-20F)
 - Doesn't corrode steel or absorb moisture
 - Less environmental impact
 - Price significantly lower now (\$4.50/gal)
- 4th season in Mesaba/2nd Ave ramp fixed spray system
- 2017-18 Snow & Ice Season:
 - Primary deicing chemical on 2 routes
 - 2018-19 Snow & Ice season – 4 dedicated KAc routes

Cost per lane mile

- **KAc: 10 to 30 gal/LM x \$4.50/gal = \$45 to \$135/LM**

Salt: 400#/LM (pick a #) x \$75/ton / 2000#/ton = \$15/LM

Not all is as it seems, however..

US Hwy 2 Bong Bridge



Nopeming KAc - Bong Bridge route

- **Route material usage (Oct, 24th 2018- Jan 16th, 2019)**
- **Brine----- 0 gallons**
- **Salt -----6 tons**
- **KAc treated winter sand-----114.95 tons**
- **Potassium acetate—5826.10 gallons**
- **Material cost- \$30,747.82**

Heading into Tunnels



Nopeming Kac I-35 Tunnels route

- **Route material usage (Oct, 24th 2018-Jan. 16th, 2019)**
- **Winter sand----- 23.27 tons**
- **Potassium acetate– 3535.90 gallons**
- **Material cost- \$ 18,811.27**

Hauling snow from elevated roadways



Nopeming (Can of Worms- Ramps route)

TP1D0351

- **Route material usage (Oct, 24th, 2018- Jan. 16th, 2019)**
- **Brine----- 2065.91 gallons**
- **Salt ----- 196.89 tons**
- **Winter sand----- 41.27 tons**
- **Potassium acetate-- 318 gallons**
- **Material cost- \$18,743.58**

View of the Blatnik Bridge



US Hwy 53 - Blatnik Bridge



Pike Lake KAc – Blatnik Bridge route

- **Route material usage (Oct, 24th 2018-Jan. 16th, 2019)**
- **KAc treated Winter sand----- 64.05 tons**
- **Potassium acetate-- 3865.57**
- **Material cost- \$20,287.06**

Acetate truck in action



Pike Lake TP1D0532

- **Route material usage (Oct, 24th 2018-Jan. 16th, 2019)**
- **Brine----- 4225.03**
- **Salt ----- 434.53 tons**
- **Winter sand----- 106.91 tons**
- **Material cost- \$38,671.91**

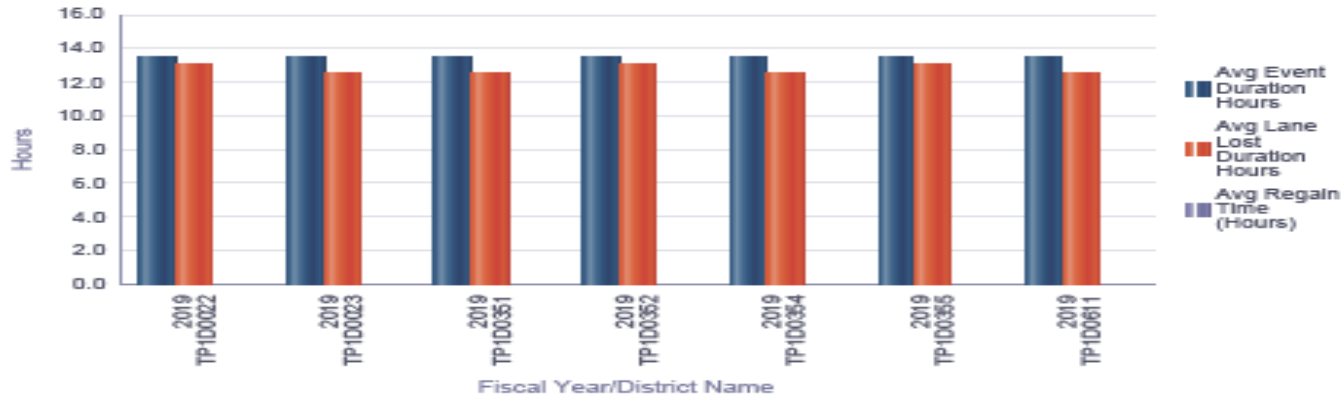
Promising results

- **Average salt use on adjacent routes- 430 tons to date for season**
- **Nearly zero chlorides on designated Kac routes**
- **Nearly 100 % reduction in salt use as on adjacent routes**
- **What about regain times?**

Project ID Durations Comparison

Time run: 1/18/2019 3:31:03 PM

v1



Fiscal Year	Project Id	Avg Event Duration Hours	Avg Lane Lost Duration Hours	Avg Regain Time (Hours)
2019	TP1D0022	13.5	13.0	0.0
	TP1D0023	13.5	12.5	0.0
	TP1D0351	13.5	12.5	0.0
	TP1D0352	13.5	13.0	0.0
	TP1D0354	13.5	12.5	0.0
	TP1D0355	13.5	13.0	0.0
	TP1D0611	13.5	12.5	0.0

Fiscal Year is equal to 2019
 and Fiscal Month Name is equal to January
 and Event End Date is between 10/24/2018 and 01/16/2019
 and District Name is equal to D1-Duluth
 and Truck Station Name is equal to Nopeming
 and Service Level Name is equal to SUPER COMMUTER , URBAN COMMUTER
 and Subarea Name is equal to DULUTH



- Application rate = **10 – 30 gal/LM**
 - Total applied ('17-'18) = **28,000 gal** (1190 at 2nd Ave)
 - Performance:
 - Bare Lane recovery has been nearly exactly the same on all super and urban commuter routes
 - Cold Weather 'Hot Spots'
- Current study underway to determine performance and establish application recommendations

Questions?

Thank you!

Chris Cheney, Steve Baublitz