

Sediment Reduction from Winter Road Maintenance (Project #150808)

A project partially funded through a grant provided by
The Great Lakes Commission: Great Lakes Basin Program with funds from the
United States Department of Agriculture
Conducted by the Minnesota Erosion Control Association
November 2009

Sand is a major component of winter road maintenance, but it is not always a best maintenance management practice (BMP). Road abrasives increase sediment loads in the watershed; oils and chemicals that stick to abrasives pollute the water; and road abrasives fill in ditches and accelerate maintenance cycles of the ditches which uproot vegetation and leave soils unstable. Each year, sand is applied to Minnesota's roads, parking lots, and sidewalks, and inadvertently accumulates in local watersheds. In the Great Lakes Basin, there is little filtering before sediment drains into Lake Superior or its streams or wetlands.

With a grant from the Great Lakes Commission through the Great Lakes Basin Program, the Minnesota Erosion Control Association (MECA) completed a sediment study which included collecting data from area road/street departments to calculate the amount of sediment discharged into the Minnesota Lake Superior Basin during the winter of 2007-08 as a result of winter sanding operations. Twenty-six cities, two townships, four unincorporated areas, nine garages from seven counties, and MN/DOT District 1 were contacted to provide data. Each organization provided information on: 1) the total amount of abrasives they put on the roads for winter maintenance during the winter of 2007-08; 2) their street sweeping program and; 3) the estimated amount of sand reclaimed that season.

- 84,028 tons of sand was applied to the roads within the Lake Superior Basin in the winter of 2007-08 (not including sand applied by private companies and citizens to parking lots, sidewalks, and driveways)
- 21,299 tons (25%) of the sand was recovered by sweeping (does not include sand recovered in ditch or catch basin cleaning operations)
- Approximately 62,730 tons of sand (75%) was left behind to wash into Lake Superior and its watershed streams and wetlands.

Sand use estimates were obtained from local governments based on their sand purchase orders, the number of truckloads applied, or daily records. Some local governments apply a very minimal amount of sand in the winter by concentrating on curves, bridges, and stop signs. Several cities do not sand at all. No one surveyed does year-round sweeping. Forty-eight percent of the organizations interviewed sweep or hire others to sweep for them.

MN/DOT left behind approximately 10,125 tons (80% of what they applied), the counties 42,632 tons (90% of what they applied), the city's 9,497 tons (40% of what they applied), and the townships 476 tons (100% of what they applied). Seventy-five percent of the sand that is applied is not recovered. This is like dumping 4,480 ten-yard trucks into Lake Superior and its streams and wetlands. At this rate we could be filling the Metrodome every 19 years with the sand that is not recovered, just in the Lake Superior Basin in Minnesota.

	Tons applied	Tons Recovered	% Recovered	Sand Not Recovered (tons)
Counties:	47,538	4,906	10.3%	42,632
Townships:	476	0	0.0%	476
Towns/Cities:	23,389	13,892	59.4%	9,497
State:	12,625	2,500	19.8%	10,125
Grand Total	84,028	21,299	25.3%	62,730

The data collected was summarized in a Power Point presentation which was shared at a free training class held at the Duluth MN/DOT Headquarters on October 14, 2009. The Regional Stormwater Protection Team partnered with MECA to host a full class of 50 attendees from the public and private sector. In addition to presenting the study data, MECA worked with Fortin Consulting and MN/DOT to present the Winter Road Maintenance certification class which provides training on the environmental impacts of winter maintenance and best management practices (BMPs) to reduce impacts. Eighty-one percent of the attendees stated on evaluations that they would reduce environmental impacts as a result of the class. For more information and a schedule of future classes visit the Minnesota Pollution Control Agency's web site at www.pca.state.mn.us/roadsalt.

Improved sweeping practices must occur if winter abrasives are used. Winter sweeping is the only way to significantly improve recovery. Sand sitting on pavement does not provide winter safety, but instead becomes an environmental hazard. If sweeping does not occur until spring or fall, much of the abrasives have migrated from the road to the ditch or other unrecoverable areas. The combination of this new data illustrating the impact of winter road sand combined with the training will help reduce the sediment load into Lake Superior. Improved practices are likely to occur as a result of increased awareness and BMP training.

