



DMMC White Paper

Road Salt Level of Service Workshop Summary

Is your municipality using more road salt and ice removal material than it needs to?

What are the impacts on your municipality's budget and local watershed pollution levels? On September 26, DMMC hosted a workshop on road salt level of service with the goal of answering these questions. Attendees were treated to presentations from experts in the field and heard a local success story from the Village of Carol Stream. Presenters included Dr. Wilfrid Nixon Vice President, Science and the Environment at the Salt Institute; Phil Modaff, Public Works Director at the Village of Carol Stream; and Stephen McCracken, Program Manager at the DuPage River Salt Creek Workgroup. This white paper summarizes the presentations that were given.

Managing Road Salt Impacts in the DuPage County Area

[Stephen McCracken, Director of Watershed Protection -- DuPage River Salt Creek Workgroup](#)

Mr. McCracken kicked off the workshop with a presentation on managing the impacts of road salt in DuPage County. Road salt, particularly the chlorides within it, has a significant negative impact on the quality of the ecosystem within the county's watersheds. Chlorides (from NaCl, MgCl₂ & CaCl₂) don't break down in the environment and the technology is not available to remove them. Unfortunately there aren't any effective deicers that don't have a negative impact on the environment. Dissolved chlorides in rivers, streams, and lakes limit aquatic biodiversity and many DuPage waterways have been found to be breaking the state law for salt content. DuPage County is not alone in this; chlorides are a major waterborne pollutant in Cook, Will, and Kane Counties as well. The average chloride concentration is increasing. In the West Branch DuPage River, the average chloride concentration in the summer, for example, was 150 mg/l in 2006, 160 mg/l in 2009, and 180 mg/l in 2012.

In Illinois, our standards for chloride are 500 mg/l, which is different from our neighbors to the north and west that break the standards into chronic and acute testing. The State of Wisconsin maintains a chronic testing standard of 395 mg/l and an acute testing standard of 757 mg/l while Iowa maintains chronic and acute testing standards of 389 mg/l and 629 mg/l respectively.

Mr. McCracken proposed nine steps for salt reduction including driver training, calibrating salt spreaders, developing appropriate application rates given pavement temperature and weather forecasting, pre-wetting the deicer, updating equipment to the latest technology, coordinating application, controlling spread width, prioritizing road systems, and anti-icing. Each should be considered with a level of service in reducing salt usage.

Levels of Service in Winter Maintenance

[Wilfrid Nixon, Vice President, Science and the Environment – Salt Institute](#)

Dr. Wilfrid Nixon has conducted extensive research on road salt levels of service and presented some of his basic findings. He began his presentation with some unfortunate facts to demonstrate why we plow and deice roadways, including that 1,300 people are killed and 116,800 more are injured annually by snow and ice conditions on top of 544 million vehicle hour delays. An appropriate use of road salt can reduce crashes by 88%, injuries by 85%, and accident costs by 85%.

Creating an appropriate level of service is a complex process. If you want to look at winter maintenance appropriately, it must be considered as a system, which can be daunting. A level of service is at the center of winter maintenance and should ideally drive all actions. He explained that different roads should receive different levels of effort to remove snow and ice depending on average daily traffic and priority - an interstate system should not receive the same effort as a residential street. Because some roads are more important than others, each road has a defined level of service. This is the goal for the winter maintenance agency to achieve during and after a winter storm.

Suitable levels of service will vary by location – what works in Illinois would not work in Mississippi – and will depend on what local citizens want. Time of day may also be a consideration for which routes to prioritize. When establishing a level of service, a goal statement may be appropriate. An example of a level of service from Minnesota was discussed. In the example, bare lanes are defined the same for all roadway classifications: a driving lane is considered bare when it is free of snow and ice between the outer edge of the wheel paths and has less than one inch of accumulation on the center of the roadway. Roads were divided into different categories based on average annual daily traffic and given a target range of hours all roads within that classification should become bare. However Dr. Nixon warned about setting certain precedents. If a level of service is established that states that a specific classification of roadway will regain normal travel time within a range of hours, say one to three, but plows continually achieve the goal in one hour, should a time come when they require the full three hours to achieve the goal, residents may become upset. Even though the plows are still meeting the goal, residents may not see it that way - the plows have always been able to do it in one hour before, why were three required this time?

There will be several obstacles that will make achieving a level of service challenging. Most significantly is that each winter storm is different. Some storms will be easy, others will not. Dr. Nixon recommends taking data from each storm and developing a storm index to examine how efficiently the level of service is achieved. Is the right amount of material being applied in the right place at the right time and is it staying there, or does it just seem that way? Inefficiencies should be identified and removed. Detailed application rate programs should be established and followed.

Setting a level of service will also be a political activity. Local leaders, citizens, and budgetary constraints will all play a role in setting a level of service. Once set, adjusting them on the fly is not a good idea.

Changing Level of Service Expectations

[Phil Modaff, Director of Public Works – Village of Carol Stream](#)

Rounding off the workshop was a presentation by Phil Modaff, who explained how the Village of Carol Stream needed to evolve their level of service and how a recent harsh winter helped that along.

Mr. Modaff began by hypothesizing if plowing and deicing has gone too far. Clean and wet pavement is delivered on every street in Carol Stream following each event and the speed which it is delivered has increased due to improvements in materials and technology. However, personal vehicles are now better-equipped to drive in winter conditions, roadways are better constructed for traffic safety, and environmental and financial considerations are forcing an examination of programs.

The Village of Carol Stream is approaching level of service changes slowly and seeking input often and from a variety of sources. The change was prompted in part by the harsh winter of 2013-14. By late

December/early January, a salt shortage appeared possible and conservation measures might be necessary. By that time, the public works department had taken delivery of the entire order for the year and had enough on hand for approximately ten more events. Salt providers were out of product and no additional orders could be filled. Initially, staff identified moderate conservation measures that were approved by the Board to ensure the Village would have enough salt to last the full season, including eliminating salting on cul-de-sacs and courts unless there was ice, limiting salting until the final plowing pass (except for main arterials), requesting park district and school districts also conserve where possible, and expanding the use of anti-icing and deicing.

That wasn't enough, winter continued on and the shortage grew worse. The Village contacted other agencies to see what they were doing and identified further conservation measures, also approved by the Board, including salting only main arterials and collector streets and hills, curves, and school zones. The Village took care to notify residents in as many ways as possible of these measures, including through press releases, Village newsletters, and various social media. By utilizing these extreme conservation measures, the Village not only didn't run out, but ended the season with a surplus of 300 tons.

The Village used the challenges of this experience to implement operational changes that would not negatively impact level of service. These have included maximizing anti-icing and deicing opportunities, calibrating equipment and training more operators on how and why to do the same, strict application of the science of anti-icing and deicing, and talking with operators about strategy during every event. Operator training, understanding, and compliance are critical to the Village's success. A Board workshop session was also utilized to discuss benefits of reducing salt with elected officials.

In establishing service delivery expectations, changes have been implemented slowly and some flexibility is a must given differences in winters. All the while, communication with residents remains key through multiple outlets to ensure residents stay informed on changes.

Conclusion

Although it may be daunting, implementing a road salt level of service can be done and has numerous benefits. This paper offers a few ideas and examples to get you started, but as every municipality is different, it will be up to you to implement them in ways that agree with the nuances of your municipalities.

Founded in 1962, the [DuPage Mayors and Managers Conference](#) (DMMC) is a council of municipal governments representing over 1,000,000 people. A coalition of cities and villages, the Conference works to voice municipal concerns on local, regional, state, and national issues. It also serves its members and the region by fostering intergovernmental cooperation. The Conference is a not-for-profit organization supported by membership dues and grants.