Hinkson Creek

Collaborative Adaptive Management

Chloride Task Force Meeting Minutes

Date: **September 2, 2022**
Time: **8:00- 9:30 am**
Location: **MU General Service Building - room 194A**
900 E Stadium Blvd, Columbia, MO 65201

Present: *Pete Millier, Jessica Scholz, Tom Trabue, Cody Luebbering, Rusty Strodtman, Georganne Bowman, Tom Boland, Richard Stone, Mark Woodward, Greg Edington, Alba Argerich*
Absent: *Doug Coley, Hannah Wichern, Stacy Salter*

- **Minutes where approved by the group**
- **Discuss Mission Statement**

The hybridized mission statement was approved by the Task Force

Mission Statement: The Chloride Task Force will be successful if the team develops an interdisciplinary understanding of the actions and motivations driving the use of chloride-based deicers in the watershed and the resulting impacts of chloride on water quality, infrastructure, ecosystem, and human man safety. The goal of the Task Force is to supply a path forward to expand community members' understanding of chloride impacts, and Best Management Practices appliers can adopt.

- **Deicer Application**

Types of salt used availability is the driving factor for source

- Municipalities are using NaCl $75.97 per ton
- Application rate 200lb per lane mile is what is commonly used but can be as high as 80lb per lane mile (treatment types vary based on weather and road conditions
- Calcium Chloride lowers freezing temperature is rarely used on roads very reactive
- There are questions about the usability and impact Potassium acetate and calcium magnesium acetate has on streams

Brine usage

- The county is experiment with using bine in two of the county subdivisions closest to Hinkson Creek- MO DOT has a mix that the county can use
- The bine mix uses about 1/9 the chloride per lane mile
- The City uses a beet juice bine mix as a pretreatment when applicable
- The city bine mix salt is added to the water until 23.9% salinity salt that is not dissolved can be removed and applied
- The City has found brine to be useful as a pretreatment preventing the ice from bonding with the road

- Ice storms are tricky to get the right treatment, the water can wash away salt
- Brine is 1/8 the cost per lane mile
- A target approach to use bine near environmentally sensitive areas may be method to reduce impact on streams-maintaining efficiently

Prewetted salt

- Shoots bine onto the salt as it is falling out of the hopper to activate the salt chemical reaction
- If you just use salt it will sit there until it has heat or water to dissolve

Treated salt- Mag Chloride

- Columbia Land Care has been treated using NaCl with a mag chloride coating
- Reduces the amount of salt that is needed
- Lowers the freezing point- reacts quickly with the snow
- Works off of the base 600lb/ acre but the mag chloride coating reduces the amount needed
- It is more expensive

Roads- operational meeting occur each year to cordate

The group discussed passable lanes and community expectations

- the public and council expectations of snow removal are for a high degree of snow removal. The group discussed how norms have increased over the years
- Public staying off the roads during removal makes a notable difference in ice Prevented snow pact and lesson salt usage
- However, parked cars in neighborhoods are a risk for plow trucks.
- Employees and universities closing/going virtual made it easier to remove snow on roads, operational, and commercially. It was discussed if this transition would continue.

Operational (building & sidewalks

- Very high expectations for the snow the be completely burnt off- Driving lanes are expected to be as clear as sidewalk because that is where customers are walking and want to see concrete can curbs
- Pretreatment is a key part of Columbia Land Cares operations to prevent the ice bond from forming. However, this is not a norm for most contractors and clients often do not want the upfront expense
- Hotshot crews go out the following days to check on parking lots for drift and refreeze
- Liability is a driving factor especially working with contracts, the removing agent is the one who often takes the hit, before it comes the landowner, or the landowner can come after them for non-performance
- One bad slip and fall or fighting one is extensively expensive to the remover and landowner
- People walking is the greatest concern for the mall parking lot because of fall risks
- Car accident can in parking lot can also come back on the remover

Contracts-how often do you go out

- There are zero tolerance policies, 1-inch tolerance, or as needed
  - The mall for example requires equipment to be left on site
- Type of business is a driver for tolerance for example hospitals and orthoptic centers are zero tolerance
- However, CLC will refuse liability and keeping information in writing, if they are not in higher snow tolerance consumers. So that if a person gets in a car accident on a client's property they are not on the hook
- Seepage and snow piles from the parking lot is a problem at the Mall so they treat daily after a storm

- Some facility that have contracts have on site crews as well that can help with spot treatment and pretreatment

University snow removal

- Magnesium Chloride- because it does not need water to activate the salt
    - It is now double the cost, and is from the dead sea most likely going to go back to a NaCl with a MgCl2 coating
    - 6 sidewalk units that use brine- they have had success with apply it on formed ice
        - They are using the cities brine maker
    - Sand has been used and prewetted with chloride when salt is not available
        - Sand supplies traction, coal cinders where used throughout the area, but coal plants have become more effect, so the partials are too small
        - Others use sand- but friction coefficient after is a concern of sand and storm drain clogging
        - Sand loses its friction after it has been driven on 6 times

Snow placement

- When CLC established a commercial contract the snow pile locations are selected
- Piles in parking lots are placed as far away from building and walking paths as possible because of freeze thaw and ice forming
- Landscaping is a concern for placement and line of site
- Some locations will use detention ponds for snow piles or truck away the snow
- Not to too close to storm drains due to risk of freezing
- Standard road plowing leave snow side of the road
- Downtown during large snow events (normally more than 8 inches) the city will haul the snow the university's site- often dumping sites are in areas that are near streams due to site availably- there was concern about salt in the disposal of the snow
    - The parking utility pays for the typical year of hauling it is $30,000 an event to haul the snow away (the business downtown do not pay)
    - The university hauls snow to clear target areas such as hospital and fire areas- they disagreed with salt being a concern in the dumping locations because the snow they remove before salt application- before a snow they decide if they are removing it

Clean up of salt if no event occurs

- Salt is left on the parking lot after application weather an event occurs or not
- A granular will remain (if no rain) and work for a couple of weeks if event does occur
- Some city are vacuuming the salt up, NPDS requirements what sites to sweep applied salt if event did not materials
    - The erosion of a sweeper was a concern
    - And the salt is mixed with trash and depress so it would no longer be usable

❖ **Chlorides Impact on Streams**

- Hinkson creek is listed on the 303d list for aquatic life impairment- Hinkson has been monitored significantly more that most streams in the area
    - Water quality standard for chloride are set on frequency, duration, and magnitude.
    - Historically Hinkson has had 11 macroinvertebrates monitoring station DNR has monitored 20+years.
    - Macroinvertebrates are monitored evaluated to asses a streams health from these information Missouri Stream Condition Index (MSCI) score is given to a stream- invertebrates are a good tool to evaluate a streams quality, because they are not very mobile
        - Score are broken down into 4 categories poor, fair, good, and excellent- What uses to list streams on 303d list

- Criteria are set based off of reference streams in a 40-mile radius, and Hinkson are compared to theses stream to evaluate its health and have had minimal land change over the years
- The reverence streams met minion standards over 80% of the time
- The upper more rural portion of Hinkson Creek meet the minimum MSCI score a majority of the time
- The MSCI score drops in the urban potions of the Hinkson Creek

  - Chloride Criteria- for Missouri developed by EPA in 1988 using test organisms in a lab to determent the quality Missouri has adopted both acute and chronic criteria
    - Acute or immediate level is 860 mg/L
      - studies Mortality
    - Chronic based on 4 days exposure is 230 mg/L
      - studying in Mortality, reproduction, and growth
- Winter road application is the main source of chloride in the stream
  - Other sources include; water softeners, fertilizer, irrigation from tap water, manure, and dust suppressant
  - Chloride is harmful to aquatic plants and animals
  - One teaspoon of salt can pollute 5-gallons of freshwater
- Studied on Hinkson creek
  - Published studies include 2002 to 2017, MDNR; 2012, Allert et al; 2016, Nichols et al, 2017; Hubbart et al; 2020, Geosyntec; and more
- Chloride data on Hinkson- DNR the following data was collected in the macroinvertebrates season data collection (Mar-Apr) and (Sept-Oct) not during the winter application season
  - Conductance (uS/cm) indirect measure of dissolved and trends with chloride concentrations. Conductance can be used to indicate chloride concentrations because it can be monitored continually and more easily
    - Control: 275 to 500 uS/ Cm and up to 30 mg/L chloride
    - Reference: 175 to 475 uS/cm and up to 25 mg/L chloride
    - HC Rural; 275 to 575 uS/cm and up to 42 mg/L chloride
    - HC Urban: 275 to 878 uS/cm and up to 144 mg/L chloride

  - Upper Hinkson is comparable to the control stream Bonne Femme (Boone County)- but higher than the reference stream
  - Urban Hinkson Creek- number are significant higher
  - Background or base line conditions for chloride in a stream is around 15 to 20 mg/L ubiquitous in the environment
- Continuous Conductance Monitoring as a Method to Assess Winter Road Treatment Impacts
  - 2019 Geosyntec deployed 5 continuous conductance monitoring stations corresponding to macroinvertebrates locations from Dec 12, 2019 to May 12, 2020
  - Flow and conductance varied over the season with snow and rain events- The sites showed progression of conductance migrate down the urban portion of the stream
    - Rogers Road and Hinkson Creek Road sites in the upper portion of Hinkson conductance did not vary greatly over the season
    - At Broadway site down stream of i70, 63, and business conductivity increased after a 48-hour snow event- greater than chronic for over a week
    - Providence site conductivity increased similar to Broadway but at dramatic on the front side at as

        - Suggestion a significant load was not added and tributaries stream including Grindstone, Hommony, and Nelson creeks
        - However, the concretions in the stream is not getting significantly less and is staying elevated
    - Scott Boulevard site was like Providence
  - Conductance to chloride show that a chronic toxicity event occurs in December
  - Monitoring suggested that 63 and i70 connector is where the Chloride load stars and is relatively consistent to Scott Boulevard the last monitoring site
  - The results are not unique to Hinkson Creek these concentrations can be found north of us
- Method to address Chloride
    - Minnesota, Wisconsin, and others have resources about Best Management Practices-
    - BMPs do little to no treatment for chloride concentrations-
    - Sweeping and Brines seem to reduce the concentrations getting into the stream.
    - Alternative treatments are progressing

- Next Steps
  - Next meeting- Alba's Sampling Presentation and Mark is present on Insurance and Liability
  - Future questions different population groups are using how much, Municipal, Commercial, or Residential
    - Where could resources be directed in the future to reduce chloride
    - Talking to retail stores about how much they sell to potentially find residential usage
    - GIS exercises can help tease out land use to help showed chloride usage to compare municipal, commercial, to residential
    - Study having customers paying snow removers by event not per bag to reduce the over application