

Independent Environmental Monitoring Agency

Dust Suppression Best Management Practices

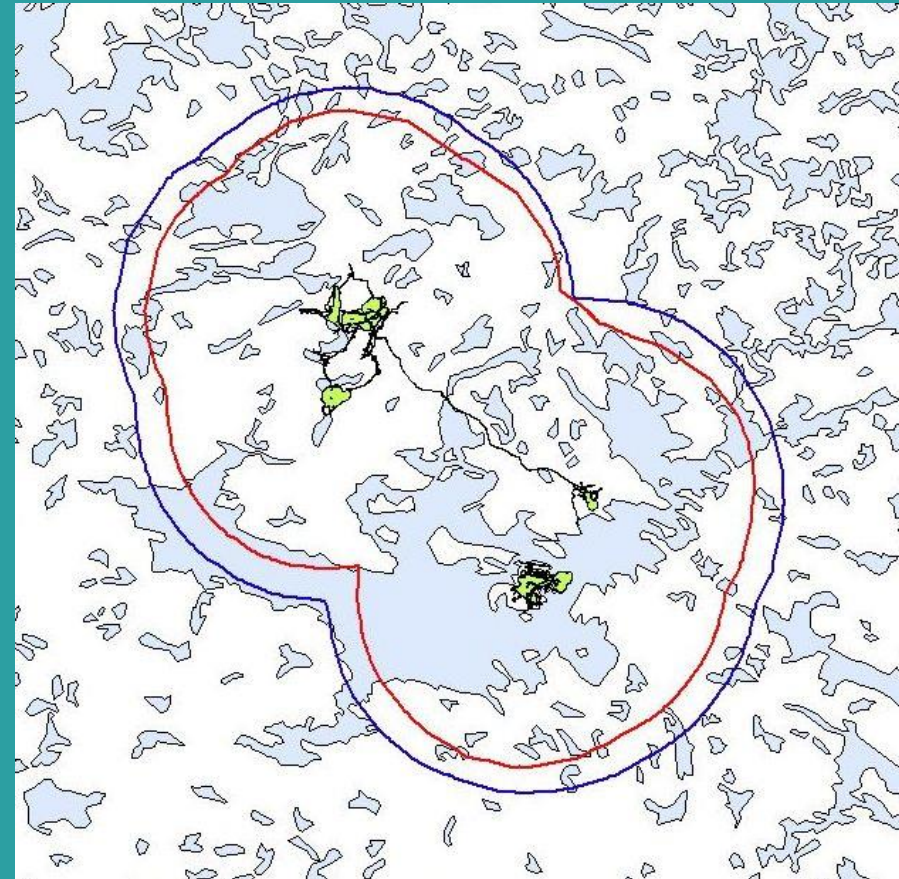
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Zone of Influence

- Boulanger et al. 2012 – 14 km ZOI (Zone of Influence) around Ekati-Diavik
- ZOI: area within which caribou abundance is less than would be expected from habitat alone



Red boundary = 14 km



Mechanism

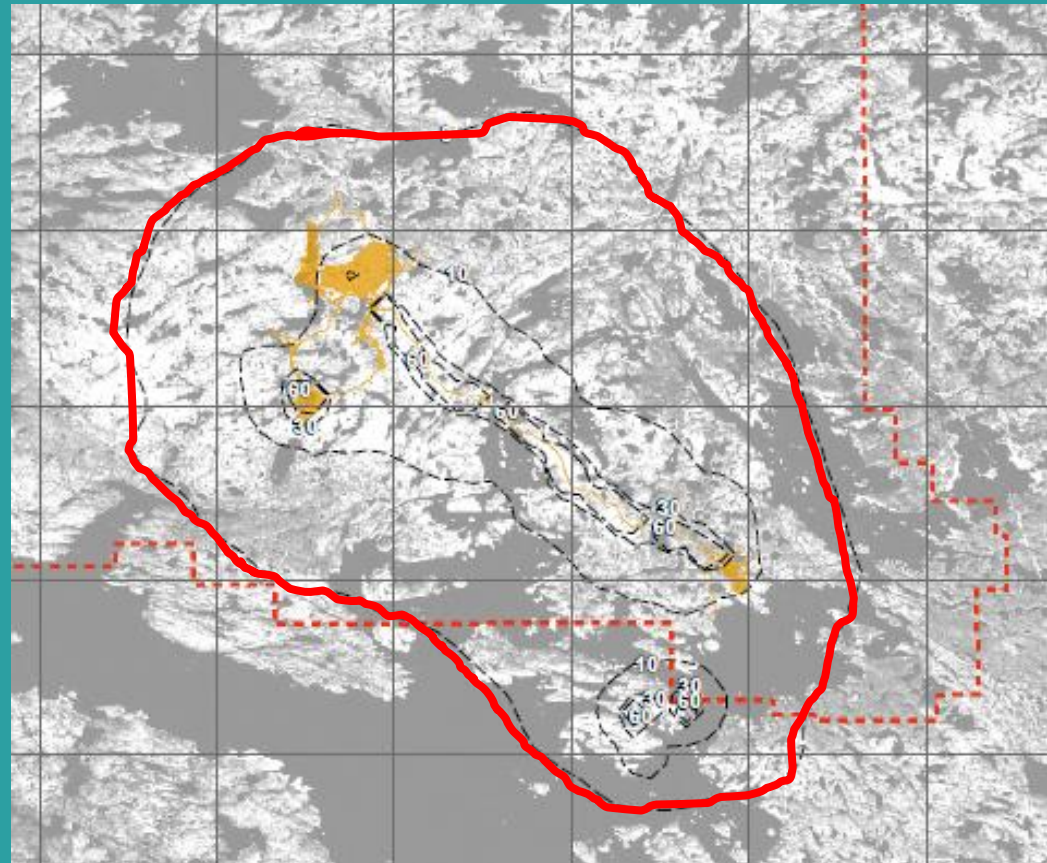
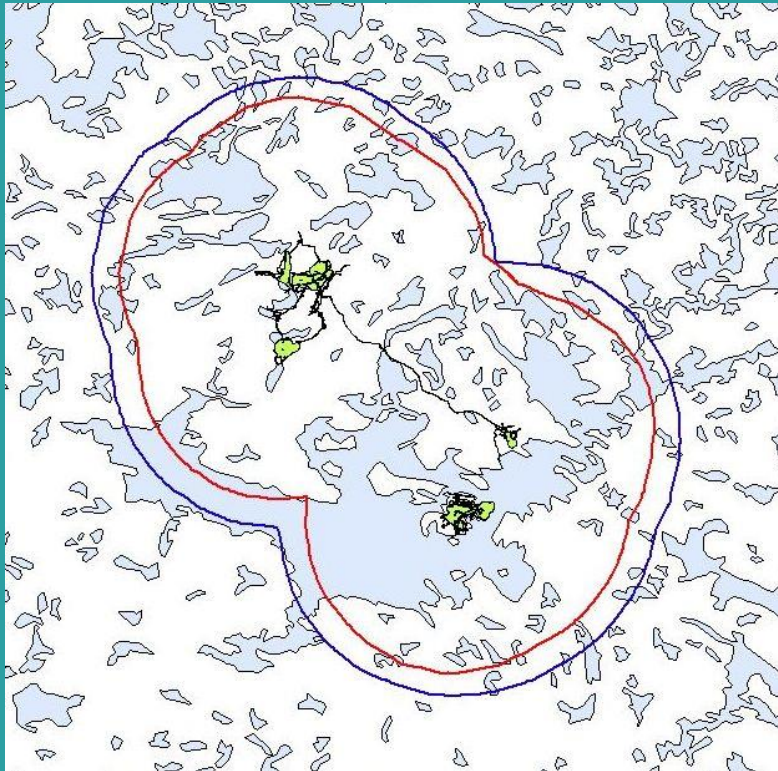
- Dust (response of ungulates (caribou) to dust on forage or food)





Mechanism

- ZOI aligns with outer boundaries of dust (TSP – total suspended particulate) deposition



Rescan (2006)



Traditional Knowledge

- The communities have also told IEMA that dust could be the cause of the observed ZOI
- Dust was also identified as a concern at the January 2013 Caribou Gathering





Dust Management

- Reduce traffic
- Reduce speed (60 to 30 kph = up to 65% reduction)
- Improve road design – puddles float fine particles
- Reduce exposed ground – gravel
- Slow the wind – wind breaks





Dust Suppression

- Why use?
 - Safety – visibility on the road
 - Health – inhaling dust
 - Vegetation – affects habitat (and caribou?)
 - Aquatic resources
 - Road maintenance costs
 - Aesthetics





Permitted Dust Suppression

- GNWT ENR
 - Water
 - Calcium chloride
 - DL 10
 - EK-35?
- Govt. of Nunavut
Dept. of Environment
 - Water
 - Calcium chloride
 - DL 10
 - EK-35
 - DUST-STOP





Dust Suppression Options

- Water
 - Generally effective <12 hrs
 - Salt water more effective than fresh water
- Calcium chloride
 - Salt-based
 - Water attractant – draws moisture out of air
 - Toxic to some plants
 - May be an attractant to ungulates





Dust Suppression Options

- DL 10
 - Asphalt product, mixed with water and soap solution
 - 30 m setback from bridges
- EK-35
 - Synthetic organic dust control product
 - Approved for airstrips
- DUST-STOP
 - Proprietary modified cellulose blend: a mineral based component and a starch based polymer derivative





Fugitive Dust

Best Management Plan

1. Identify Source (unpaved road)
2. Identify Composition of Dust
3. Description of Fugitive Dust control
4. Schedule for Implementation
5. Implementation Approach and Training
6. Inspection and Maintenance Procedures
7. Record Keeping to Verify Compliance



Fugitive Dust

Best Management Plan

3. Description of Fugitive Dust control
 - Watering;
 - Chemical dust suppressants if needed;
 - Enforcement of speed limits; and
 - Roadway maintenance and clean-up procedures.



Fugitive Dust

Best Management Plan

4. Schedule for Implementation

- Daily visible inspections of roadways
- Weekly inspections of the roadway surfaces
- Appoint qualified and trained on-site dust control supervisor
- Record keeping – observations and mitigation



Fugitive Dust

Best Management Plan

6. Inspection and Maintenance Procedures
 - Daily during moderate weather conditions, and twice daily on hot dry days (<0.25 mm of rainfall for the preceding 24 hours and a temperature >20 Celsius);
 - **Mitigation hinges on easy visual observations** of dust plumes, not delayed measurements.



Fugitive Dust

Best Management Plan

Plume Size	Measure	Corrective Action
Large	More than 3 times the size of the truck	Watering on haul and access roads.
Moderate	2-3 times the size of a truck	Limited watering of haul roads and high traffic areas.
Small	Same size as truck	Repeat visual inspection within 2 hours
No Plume	Smaller than half the height of the tires	None



THANK YOU!

Questions/Comments?



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