Road Dust
Introduction

- Tribal Air Quality Program
  - Air Quality Consultation
  - Technical Assistance
  - Air Monitoring Support
  - Mini-grants
Introduction

- What we’ve found
  - Road dust is #1 air quality concern in rural Alaska
  - Air monitoring can be useful to determine if there is a problem and how bad it is
  - Partnerships and collaboration are key to success
  - Biggest limitation is $$$
Sources of dust in rural AK

- Dirt roads
- Unpaved airport runways
- Exposed riverbeds/shorelines
- Un-vegetated lots
- Gravel pits and stockpiles
What’s in the dust?

- Chemicals
- Bacteria
- Fungi
- Heavy metals
Size matters!
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- 100 μm: ~3 sec
- 50 μm: ~11 sec
- 2.5 μm: ~4 minutes
- 1 μm: ~1 hour
- 5.9 hours
Health effects

- Aggravates existing heart and lung disease
- Damages lung tissue
- Mostly impacts children, Elders, people with asthma, people with heart conditions

The dose makes the poison!

- Size, time, amount exposed to, source, what’s attached to the dust, etc.
What’s safe?

- As little as possible
- Below 24 hr standard set by EPA’s National Ambient Air Quality Standards
  - $\text{PM}_{10} \leq 150 \, \mu g/m^3$
  - $\text{PM}_{2.5} \leq 35 \, \mu g/m^3$
What can we do?

- Slow Down
- Reduce number of vehicles on road
- Improve road surface
- Spread water or dust palliatives
Slow Down

- The faster you go, the more dust you kick up
- Knobby ATV tires kick up more dust than cars/trucks
- Speed limit signs
- Install speed bumps
Reduce Number of Vehicles

More vehicles = More dust

WALK!
Improve road surface

- Well graded and proper drainage
  - Reduces puddles
  - Fine particles float in water; when puddle dries these fine particles become dust

- Crowning
  - Too little of a crown = puddling
  - Too much of a crown = erosion

- Apply gravel to the road
  - Protects fine soils from vehicle wheels
Water or dust palliatives

Requires planning, coordination, equipment, training, and funding!!

- Water
- Water absorbing products
  - Calcium chloride
  - Magnesium chloride
  - Brine
- Binding dust particles together
  - Petroleum based binders
  - Organic nonpetroleum dust suppressants (vegetable oils, animal fats)
  - Electrochemical stabilizers
  - Synthetic polymer products
Things to consider

- How frequently must each product be spread
- Available equipment
- Cost of operating equipment (personnel, gas, maintenance)
- Cost of product
- Cost of shipping
- Environmental effects (water quality, subsistence, etc.)
A healthier environment = healthier people
Thank You!

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