



# RURAL ALASKA DUST TOOLKIT

**A resource for communities in rural Alaska to use in determining strategies for managing road dust**



Compiled by  
the Alaska Department of Environmental Conservation  
and the U.S. Environmental Protection Agency

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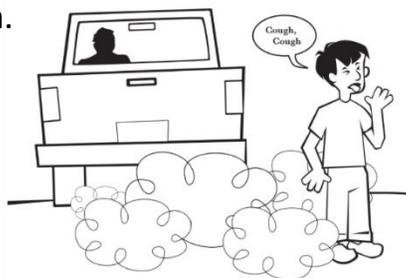
Dust is one of the top air quality concerns voiced by Tribes and rural communities throughout Alaska. In rural Alaska, ATVs and other vehicles driving on unpaved roads contribute to airborne dust that negatively impacts health, road safety, and quality of life.

## Rural Alaska Dust Toolkit

The Rural Alaska Dust Toolkit recommends five steps communities can take to manage road dust: a self-assessment of roads and capacity, behavioral changes, improvements to road design and maintenance, applying dust suppressants, and dust monitoring. The last two sections of the Toolkit provide information on funding, contacts, and additional resources.

We encourage you to move through each section of this Toolkit in order, as each step supports the next. Note that dust suppressants and dust monitoring may not be necessary for your community.

The long-term success of dust management depends on good roads and road use, as well as a clear understanding of your community's unique needs. If these steps are not enough to control dust in your community, then you may wish to consider applying a dust suppressant or invest in another form of road stabilization.



Who wants to eat dust? Nobody!  
Keep down the dust. We'll all breathe easier.

## Rural Alaska Road Dust Survey

Since 2007, ADEC has conducted road dust surveys to understand how dust affects rural communities, the scope of the problem, road and community specific information, and prior/existing dust control measures.

Findings show that road dust is a problem throughout the state.

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**Surveys completed:** 206

**Communities participating:** 142

**Years collected:** 2007, 2010, 2011, 2016

90% of communities indicated they have a dust problem.

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### Types of vehicles:

Based on 2010, 2011, and 2016 dust surveys, over 50% of reported vehicles in communities are ATVs; in some rural communities, this number is 90% or higher. Many communities observed that ATVs raised the most dust, even at slow speeds.

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### Use of dust suppressants:

About one-third of communities are using, or have used, some form of dust suppressant.

Although more than half of the communities responding to the survey were willing to try chemical palliatives, they had concerns about effectiveness, human and environmental health impacts, cost, longevity, and impacts on subsistence foods.

# RURAL ALASKA DUST TOOLKIT

## SECTION OVERVIEW

The Rural Alaska Dust Toolkit is a one-stop guide designed to help rural communities manage road dust. Follow these steps in order to determine the best dust control strategy for your community.

### Step 1—Self-Assessment

The first step to identifying an appropriate dust management strategy is to conduct a self-assessment to determine road characteristics and existing community capacity.

### Step 2—Behavior Change

Behavior change is one of the most effective and least expensive methods for reducing road dust.

### Step 3—Road Design and Maintenance

Proper road design and maintenance increases the effectiveness and longevity of dust control activities.

### Step 4—Dust Suppressants

Dust suppressants, also called “palliatives”, include a wide range of substances that are used to control dust on unpaved roads.

### Step 5—Dust Monitoring

Dust monitoring can be costly and is not always necessary to prove a dust problem since dust can be easily seen, but there may be other reasons why you might want to monitor.

### Step 6—Funding Guide

Many organizations offer funding for dust control or can provide funding suggestions.

### Step 7—Contacts and Resources

If you have questions about controlling road dust in your community, staff at ADEC, EPA, and ANTHC can connect you with additional contacts and resources to assist you further.

### Acronyms and Definitions



# 1—SELF-ASSESSMENT

The first step to identifying an appropriate dust management strategy is to conduct a self-assessment to determine road characteristics and existing community capacity.

## Identify sources of dust and priority areas

Dust control can be expensive, so, although dust might be a problem throughout the whole community, it is helpful to agree on priority areas to focus dust control efforts.

Identify roadways and other dust sources that impact the community most. These areas are important either because they are the location of a significant dust problem or because of their proximity to places where people live or gather. Priority areas for dust control might include the roads near homes, schools, or health clinics.

### Identify sources of dust:

- *Vehicles and ATVs on unpaved roads*
- *Human activities (such as driving) on areas without vegetation*
- *Wind blowing across unpaved roads, runways, and riverbeds*
- *Gravel pits*

[http://dec.alaska.gov/air/anpms/Dust/Dust\\_docs/Sources-Dust.pdf](http://dec.alaska.gov/air/anpms/Dust/Dust_docs/Sources-Dust.pdf)

## Road dust self-assessment

Completing a road dust self-assessment can help you identify the sources of dust and priority areas for dust control in your community. How are each of these areas affected by traffic, wind, geography, and surrounding vegetation? Who owns and maintains the roads in priority areas? What resources are available or would be needed for dust control?

The Rural Alaska Road Dust Community Self-Assessment on the next page will walk you through these and other important questions to assess road characteristics, available resources, and current capacity to address dust problems.

## Further reading and resources

[Controlling Road Dust in Rural Alaska: Practical Questions for Communities](#) (ADEC)

These questions can help your community decide what method is best to reduce road dust. [http://dec.alaska.gov/air/anpms/Dust/Dust\\_docs/Practical-Questions-controlling-dust.pdf](http://dec.alaska.gov/air/anpms/Dust/Dust_docs/Practical-Questions-controlling-dust.pdf)

[DOT&PF Right-of-Way Maps](#) (DOT&PF)

The Right-of-Way (ROW) Map Search Portal can assist you in determining roadway ownership or maintenance responsibilities. [http://www.dot.state.ak.us/edocs\\_code/rowmap/rowmaps.cfm](http://www.dot.state.ak.us/edocs_code/rowmap/rowmaps.cfm)

[Alaska Mapper](#) (Alaska DNR)

This tool allows users to search, research, and verify state land ownership and land use.

<http://dnr.alaska.gov/mapper/controller?gsid=62AB870DF27146E6DFE1B57566A1356B.tomcat-90>

[Spatial Database Management System](#) (BLM)

The Spatial Data Management System (SDMS) provides a graphical representation of land status.

<https://sdms.ak.blm.gov/isdms/imf.jsp?site=sdms>

# RURAL ALASKA DUST COMMUNITY SELF-ASSESSMENT

Community name: \_\_\_\_\_ Estimated population: \_\_\_\_\_

Name of person filling out this questionnaire: \_\_\_\_\_

E-mail address and/or phone number: \_\_\_\_\_

Name of your organization: \_\_\_\_\_

## Road Design

Are any of your roads paved? \_\_\_\_\_

If yes, approximately how many miles? \_\_\_\_\_

What is your typical road surface? Crushed gravel, dirt, silt, sand (circle those that apply)

On average, are your roads level/flat, moderately graded, steep? (circle those that apply)

## Road Ownership and Maintenance

How many miles of roadway are being maintained in the community? \_\_\_\_\_

Who is responsible for road maintenance? City, Village, IRA? \_\_\_\_\_

## Road Use

Approximate % of each: \_\_\_\_\_ ATVs \_\_\_\_\_ Cars \_\_\_\_\_ Pick-up trucks \_\_\_\_\_ Larger trucks \_\_\_\_\_ Bulldozers

**Sources of Dust:** Where does dust come from in the community?

Wind, roads, runways, riverbeds, gravel pits, vehicles, off-road driving (circle those that apply)

## Dust Monitoring

Has any dust monitoring been done in your community? If so, by whom, when, and what were the results?

## COMMUNITY RESOURCES

Does your community have...?

A grader to shape the roads?

A truck or ATV that can pull a trailer with a tote or water tank?

A mobile compactor?

A water truck?

A place to store dust control equipment or products?

Equipment that can lift 1-ton totes?

Water locally available for dust control?

## HEALTH IMPACTS

Are there many people in your community who are highly affected by dust? (People with asthma, allergies, chronic bronchitis, emphysema, coughing, irritated eyes/nose/throat, tightness of chest, shortness of breath)

## BEHAVIOR CHANGE

Have you tried educating people about the need to slow down to reduce dust?

Does your community have authority and capability to implement and enforce speed limits?

## DUST SUPPRESSANTS

Have you tried any of the following: Water, salt, or other suppressants? (circle those that apply)

Did the suppressant reduce dust effectively for more than a day? Very effectively, somewhat effectively, not effectively (circle those that apply)

## FUNDING

What funding does your community have available to pay for dust control activities?

## 2—BEHAVIOR CHANGE

Behavior change is one of the most effective and least expensive methods for reducing road dust.

### Slow down

Reducing vehicle speed on dry days will reduce the amount of airborne dust and help protect the health of children, elders, and other vulnerable populations. Slowing speeds from 40 mph to 20 mph can reduce road dust by up to 30%. Consider establishing speed limits and passing ordinances requiring drivers to slow down.

Rapid acceleration and braking also causes additional wear and tear on roads that leads to more dust. When youth are learning to drive, teach them to gently accelerate and decelerate. Demonstrate how much dust a vehicle creates on a dry day by driving quickly and then driving slowly so that people can see the difference first-hand.

### ATVs and road dust

Based on ADEC's dust surveys, more than 50% of vehicles in rural communities are ATVs. Surveys also indicate that ATVs raise the most dust, even at 5 mph, largely due to their knobby tires. During the driest days of summer, encourage people to walk, carpool, or bike to decrease dust.

### Youth involvement

Youth can play an important role in improving road dust in their communities. Include youth in making signs and developing slogans to combat road dust and in creating social media posts and videos. Develop activities that engage the youth in dust control throughout the community.



Please Mom, go slow so we don't make dust for other people.



Dust can be dramatically decreased by reducing speeds. Photos by Tom Moses from ADEC's "Reducing Dust in Rural Alaska."

## 2—BEHAVIOR CHANGE

### Outreach

Educate the community about the effects of dust and behavior changes that can help reduce road dust. Hold community meetings to generate ideas about actions the community would be willing to take. Ask people to share their observations, ideas, and concerns about road dust. Follow up on suggestions that are most workable and keep the community informed about the progress you are making.

#### Changing behavior is a community effort

- *Hold a community meeting to discuss the impacts of dust and possible ways to reduce it. Ask youth, elders, and tribal leadership to share their observations and ideas.*
- *Involve the community in conducting a road dust self-assessment and identifying sources of dust.*
- *Teach youth to accelerate and brake gently while driving.*
- *Hold a demonstration on a dry day to show how much dust is produced at different speeds.*
- *Post slow-down signs along the road at critical points and priority areas.*
- *Make radio announcements on the impacts of dust on the community and the importance of slowing down.*
- *Enforce speed limits with fees or community service.*
- *Keep at it! Behavior change takes time.*

### Further reading and resources

#### [Clean Air Activity Book](http://dec.alaska.gov/air/doc/dust-activity-book.pdf) (ADEC)

This children's coloring book can be used to educate kids about dust in their communities. <http://dec.alaska.gov/air/doc/dust-activity-book.pdf>

#### [Dust Education and Outreach Materials](http://dec.alaska.gov/air/anpms/communities/pm10-rural) (ADEC)

These site includes dust pamphlets, radio and TV commercials, handouts, and other resources that provide information about community dust, dust control, and dust health risks.

<http://dec.alaska.gov/air/anpms/communities/pm10-rural>

#### [Alaska Native Village Air Quality Fact Sheet and Video: Road Dust](https://www.epa.gov/tribal/alaska-tribal-air-toolkit) (EPA Region 10)

This fact sheet can be handed out in the community to provide information about what road dust is, health effects, why dust is a concern, and common sources of road dust. The short video can be shared on social media or at a community event. <https://www.epa.gov/tribal/alaska-tribal-air-toolkit>



## 3—ROAD DESIGN AND MAINTENANCE

Proper road design and maintenance increases the effectiveness and longevity of dust control activities.

### What is a good road?

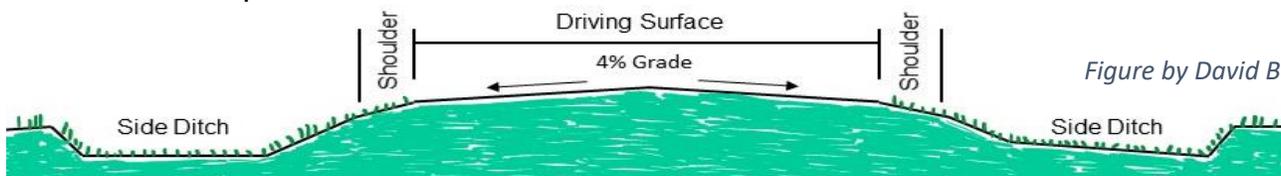
The key to a good road is proper road design and maintenance. A good road lasts a long time without forming potholes, corrugation (washboarding), ruts, or other kinds of erosion. A good road is safely maintained with available equipment and materials, has adequate drainage (the road does not flood during spring breakup), and does not buckle or break apart when it freezes/thaws. *Sometimes a well-designed and maintained road can prevent dust problems entirely.*

### Choosing the right road material

Unpaved roads are made of aggregates, which are mixtures of stone, sand, and fine particles. Aggregates make up the sub-base, base, or the surface of the road. When selecting an aggregate surface material, use well-graded material with a maximum particle size of 1 inch. The amount of fine-grained material (fines) in the road aggregate should be about 10-14%. ADOT&PF allows 8-20% depending on grading; however, the effectiveness of some chemical suppressants will be diminished if the fines content is too high or too low. The best natural surface materials contain a small percentage of natural clay.

### Proper road design

The proper cross section for a road surface can be seen in the figure below. Drainage is the most important part of gravel road preservation. The road's crown is maintained by having sufficient drainage to allow water to flow to adjacent ditches. Ditches must be kept clean of vegetation and accumulated sediment to allow roadway water to run off. Roadside vegetation cover helps reduce dust and erosion.



### 10 Essentials of a Good Road (Institute of Transportation Studies)

1. Keep water away from the road
2. Build on a firm foundation
3. Use the best soils available
4. Compact soils well
5. Design for winter maintenance
6. Build for traffic loads and traffic volumes
7. Pave, or apply suppressants to, only those roads that are ready
8. Build from the bottom up
9. Protect your investment (make sure your roads can be maintained with the available materials and money)
10. Keep thorough records



Sieved gravel showing various sizes of material. An aggregate gradation is mostly composed of gravel, sand, and silt. (Photo from ADOT&PF presentation, "Alaska Gravel Road Problems.") [http://cem.uaf.edu/media/188432/gravel-roads-lecture\\_mchattie\\_june-2015.pdf](http://cem.uaf.edu/media/188432/gravel-roads-lecture_mchattie_june-2015.pdf)

## 3—ROAD DESIGN AND MAINTENANCE

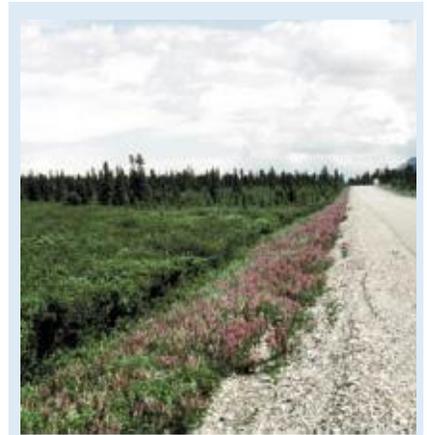
### Equipment, storage, and maintenance

Maintaining a road to control dust and the integrity of the road surface requires specialized equipment. A grader to shape the road and a compactor are often necessary for road maintenance. (See Section 6 for options for obtaining surplus equipment.) Storage for maintenance equipment and materials will extend their longevity by providing shelter from harsh elements. Local capacity to operate and maintain the equipment is also necessary.

### Vegetation cover

Vegetation along roads reduces dust by acting as a physical barrier between the road and community. Vegetation binds, covers, and stabilizes the soil along the road, further reducing erosion and dust. Soil needs to be conditioned for vegetation to grow readily.

Reducing soil compaction allows plants to spread quickly. Adding organic matter and fertilizer to the soil can help plants grow. Frequent watering is necessary during germination and the early stages of plant life. It is imperative to use native species. **AVOID INVASIVE PLANT SPECIES.**



*Vegetation along the road helps prevent erosion and dust. (Photo of a road in Denali National Park following road maintenance, from: "Interior Alaska Revegetation & Erosion Control Guide.")*

### Further reading and resources

[Dust Control Field Guide for Gravel Driving Surfaces](#) (ADOT&PF)

This guide includes information on the importance of dust control, road design, and proper suppressant selection. <http://tundra.ine.uaf.edu/wp-content/uploads/2015/07/dust-cntrl-fg.pdf>

[Alaska Soil Stabilization Design Guide](#) (ADOT&PF)

This guide discusses types of soil stabilization and road design. It provides an overview of different stabilizers, as well as detailed information on materials, design considerations, construction, expected performance, and costs. [http://www.dot.state.ak.us/stwddes/research/assets/pdf/fhwa\\_ak\\_rd\\_01\\_06b.pdf](http://www.dot.state.ak.us/stwddes/research/assets/pdf/fhwa_ak_rd_01_06b.pdf)

[Alaska Gravel Road Problems: A Common Sense View of How Gravel Roads Work](#) (ADOT&PF)

[http://cem.uaf.edu/media/188432/gravel-roads-lecture\\_mchattie\\_june-2015.pdf](http://cem.uaf.edu/media/188432/gravel-roads-lecture_mchattie_june-2015.pdf)

[A Revegetation Manual for Alaska](#) (report for Alaska Plant Materials Center by Stoney J. Wright)

This manual is designed to help communities select appropriate seed mixes and methods for revegetation. [http://plants.alaska.gov/pdf/pmc\\_reveg/PMC\\_reveg.htm](http://plants.alaska.gov/pdf/pmc_reveg/PMC_reveg.htm)

[Road Design Resources](#) (ADEC)

[http://dec.alaska.gov/air/anpms/Dust/Dust\\_docs/Road-Design-Resources.pdf](http://dec.alaska.gov/air/anpms/Dust/Dust_docs/Road-Design-Resources.pdf)



## 4—DUST SUPPRESSANTS

Dust suppressants, also called palliatives, include a wide range of substances that are used to control dust on unpaved roads.

### Types of suppressants

The main categories of dust suppressants are: water, salt-based products, petroleum based products\*, organic non-petroleum based products, electrochemical products, polymer products, synthetic fluids, enzymes, and clay additive products. Water and salt-based suppressants are the two most common types of suppressants used in Alaska. Salt-based suppressants absorb water and work by increasing the moisture content of the unpaved road surface. Other suppressants—petroleum based, organic non-petroleum, electrochemical stabilizers, and synthetic polymers—work by binding fine particles together or onto larger particles.

### Water as a suppressant

Water is readily available in most communities and is inexpensive in comparison to other dust control options. However, applying water is labor-intensive, as it must be reapplied frequently since it dries out quickly, and requires equipment to spread. If too much water is applied, or if it is applied unevenly, the unpaved road can become muddy, develop potholes, and erode. Using water from nearby rivers can add silt to the road, which can create more dust. Water is best used for dust suppression at temporary construction sites and in communities with infrequent dust problems. Water is not an effective dust-control method for more than a few hours.

### Why manage dust?

- **Safety:** dusty roads may lead to more accidents due to reduced visibility
- **Health:** dust particles may become a health hazard if they are inhaled and become trapped in the lungs
- **Environmental:** high levels of dust fall into water systems and may adversely affect aquatic life that is not adapted to high levels of sedimentation
- **Subsistence:** airborne dust from unpaved roads may include additional contaminants, such as oil from vehicles or spilled waste that can settle on nearby subsistence foods sources, water bodies, or roadside fish drying racks.
- **Road maintenance costs:** controlling dust by treating roads with dust suppressants can lower road maintenance costs by reducing gravel loss

<http://www.enr.gov.nt.ca/sites/enr/files/guidelines/dustsuppression.pdf>

*\*[18 AAC 75.700 Surface Oiling Permit](#): No person may discharge, cause to be discharged, or permit the discharge of oil, asphalt, bitumen, or a residuary product of petroleum on to the land of the state unless that person has been issued a surface oiling permit under [18 AAC 75.730 Decision on application for surface oiling permit; permit term and conditions](#). Refer to [18 AAC 75.720 Prohibitions for a list of prohibited surface oil components](#).*

## 4—DUST SUPPRESSANTS

### Salt-based suppressants

Salt-based suppressants work by absorbing moisture from the air to bind dust particles together or onto larger particles. To remain effective, salt-based suppressants need at least 30% relative humidity. Calcium chloride and magnesium chloride are the most common types of salt-based suppressants. Wet weather may wash away salt-based suppressants, so it is imperative to avoid application before rainy conditions. Salt-based suppressants may cause roadside subsistence foods or fish racks to have a bitter taste. Salt-based suppressants can be applied as a liquid or a solid. Generally, one or two treatments are required per season.



*Portable applicators for spraying dust suppressants can be easily flown to rural Alaska on a small aircraft. The system can be mounted to a trailer and pulled by an ATV. (Photo from UAF/ADOT&PF report: “Managing Dust on Unpaved Roads and Airports”)*

### Other suppressants

A wide range of other dust suppressants are used throughout Alaska, although the health impacts of these materials have not been fully assessed. Synthetic fluids and polymers are commonly used. Synthetic fluids bind soil particles together; synthetic polymers bind soil particles together and form a film on the road surface. Vegetable oil and soap solutions have been listed as suppressants used; however, there is little evidence showing their effectiveness.

### Roadway preparation and suppressant performance

Suppressant performance depends on good road design and maintenance, reduced driving speed in high-dust areas, and how well the suppressant is applied. All of these factors can extend the life of a suppressant as an effective means of controlling dust for a significant period of time.

### Further reading and resources

[Alaska Rural Dust Control Alternatives](#) (ADEC)

This report reviews different dust control measures and provides a dust suppressant selection guide.

[Managing Dust on Unpaved Roads and Airports](#) (report by David Barnes, Ph.D., P.E. and Billy Connor, P.E. with UAF; 2014)

[Dust Palliative Selection and Application Guide](#) (USDA – Forest Service)

This guide contains information on various dust control products and tips on selecting and applying dust suppressants.



## 5—DUST MONITORING

Dust monitoring can be costly and is not always necessary to prove a dust problem since dust can be easily seen, but there may be other reasons why you might want to monitor.

### Why monitor dust?

Monitoring dust allows communities to determine the concentration of coarse particulate matter (PM<sub>10</sub>) in the air and how local air quality compares with the National Ambient Air Quality Standard for dust (PM<sub>10</sub>). Data from dust monitoring can be used to quantify and document the dust problems in a community and may be helpful for securing funding and other resources. Dust monitoring may also be conducted to determine the effectiveness of dust control measures.

### Types of dust monitoring

Instruments supported by ADEC are Federal Reference Method (FRM) monitors intended for regulatory monitoring. Instruments supported by Alaska Native Tribal Health Consortium (ANTHC) are commonly smaller, survey-style dust monitors, which do not have to meet the same stringent quality control requirements as ADEC's regulatory monitoring equipment. Some mobile monitors can be attached behind an ATV and used to determine the effectiveness of dust control products or activities. Traffic counting can help quantify road usage, which is an important factor when determining application rates for dust suppressants. Visual surveys may also be conducted to assess dust levels before and after dust control.

### Should my community consider dust monitoring?

- *Have you been told that you need air monitoring data for additional support and/or funding?*
- *Do you want to measure how effective your efforts to control dust air pollution are by monitoring before and after dust control activities?*
- *Do you feel that air quality data will be of particular value in implementing an air quality control or study?*
- *Can potential dust solutions be implemented without air monitoring?*



*Stationary air monitors can be placed alongside unpaved roads in communities near a reliable power source and frequently-used routes where the most individuals are expected to be exposed to dust. Photo credit: Noorvik (2012)*

## 5—DUST MONITORING

### Monitoring equipment

Dust monitoring is typically completed using stationary monitors that evaluate the concentration of airborne dust particles. Filters are installed in the sampler after being weighed. Ambient air is then drawn through the filter media by a pump. After the sampling period, the filter is reweighed and the concentration of PM<sub>10</sub>/dust is calculated. Some monitors do not use a filter, but instead, use a light-scattering laser photometer for real-time data.

### Challenges with dust monitoring

There are various challenges associated with dust monitoring:

- Equipment can break down if not properly operated or maintained
- Setup and monitoring must be precisely documented to ensure accurate measurement
- A trained community member must frequently check the equipment
- Filters for stationary monitors need to be changed regularly
- Fluctuations in power delivery can create inaccuracies in the data
- Wildfires and airborne ash can skew particulate matter concentration measurement



*Stationary monitors are frequently used by rural communities to monitor dust. Photo from DustTrak manual.*

### Further reading and resources

#### [Air Monitoring Decision Tree](#) (ANTHC)

This flowchart can assist communities in determining if they should consider air monitoring. [https://anthc.org/wp-content/uploads/2015/12/CEH\\_Air\\_Monitoring\\_Decision\\_Tree.pdf](https://anthc.org/wp-content/uploads/2015/12/CEH_Air_Monitoring_Decision_Tree.pdf)

#### [Ruby Road Dust PM<sub>10</sub> Monitoring 2015-2016](#) (ADEC)

This report discusses a project completed in Ruby, Alaska in 2015 and 2016 to monitor ambient airborne road dust concentrations before and after the application of synthetic-fluid dust suppressants. Five roadside monitors were used. [http://dec.alaska.gov/air/anpms/Dust/dust\\_docs/ruby-road-dust-air-quality-monitoring-2015-2016-report-adeq.pdf](http://dec.alaska.gov/air/anpms/Dust/dust_docs/ruby-road-dust-air-quality-monitoring-2015-2016-report-adeq.pdf)



## 6—FUNDING GUIDE

Many organizations offer funding for dust control or can provide funding suggestions.

### Funding strategy

Develop a strategy to obtain funding for your dust control plan. Before requesting funds:

1. Develop a “roads profile” by completing the dust self-assessment included in this Toolkit
2. Identify the area of your community that has the worst dust impacts, determine which roads are contributing dust to those areas, and where the most vulnerable people and environments are located (e.g. schools, elders’ homes, subsistence food areas).
3. Identify which methods of dust control you believe will be the most effective.
4. Determine the costs associated with each option, including the costs of labor, training, equipment and maintenance, materials (e.g., signs, suppressants), and shipping.
5. Identify who owns and manages the roads and airport runways. If you do not know, contact the Alaska Department of Natural Resources, Bureau of Land Management or DOT&PF for information on land or right-of-way ownership and management.

Dust Control Category	Specific Product	Control Cost (\$ per mile of road treated)	Control Effectiveness Range	Control Duration
Moisture Increase	Watering	\$32	0% - 50%*	1-2 hours
	Calcium Chloride	\$26,000	0% - 70%**	6 months
Particle Agglomeration	EK-35	\$20,000	0% - 99%***	1 year
	Lignosulfonate	\$22,000	0% - 90%*	2 months
Soil Coverage	Gravel	\$84,000	0% - 30%*	3 months
	Geotextile	\$27,000	N/A	10 years
	Asphalt Paving	\$2,700,000	90% - 99%	15 years
	Fiberglass Plates	\$2,800,000	90% - 99%	10 years

*Example of a cost estimate for different dust suppressant options. Table from “Alaska Rural Dust Control Alternatives” report prepared for the Alaska Department of Environmental Conservation in 2006.*

### Equipment

If you need equipment, you may be able to find it on a surplus list, borrow it from another community, or get it on loan from another organization.

- **GSA (General Services Administration):** This website provides a list of surplus federal equipment available to eligible entities. <https://www.gsa.gov/portal/category/21183>
- **AK DOT&PF State Equipment Fleet:** AK DOT&PF auctions surplus vehicles and heavy equipment. Government entities (including local government, schools, and village organizations) and nonprofits (classified under section 501(C) of United States tax code) can also purchase surplus equipment at fair market value before equipment is auctioned. Preregistration is required. <http://www.dot.state.ak.us/sef/auctionsnew.shtml>
- **Other communities:** Contact nearby communities for equipment sharing

## 6—FUNDING GUIDE

### Assistance

**Alaska Department of Transportation and Public Facilities (DOT&PF):** If your road or airstrip is managed by DOT&PF, contact DOT&PF to request maintenance and assistance.

**US Department of Transportation and Federal Highways Administration (USDOT, FHWA):** Villages can contact their AK USDOT area planner to inquire about funding for purchasing dust and speed signs, dust suppressants, and road paving.

**Department of Community and Regional Affairs (DCRA):** DCRA manages numerous assistance and funding programs, and provides technical assistance for project planning and management.

**Native Corporations:** Native Corporations should be contacted about controlling dust on land they manage; they may also be able to provide assistance with equipment needs.

**City, Borough, Village:** If the city, borough, or village owns and maintains the targeted roads, they may have funding or a mechanism to seek funding. Include them early in the planning process as you may need approvals from village councils, assemblies, or commissions.

**Alaska Native Tribal Health Consortium (ANTHC):** ANTHC provides planning assistance, has developed a Phase I Assessment process for road dust decision-making, and provides funding from their EPA Clean Air Act Grant to tribes working on air quality projects.

**Bureau of Indian Affairs (BIA):** BIA manages road maintenance funding and works with USDOT to administer the Tribal Transportation Program. Each community gets an annual transportation budget which can be used for purchasing dust suppressants, road maintenance, and equipment.

**EPA's Indian Environmental General Assistance Program (GAP):** Contact your EPA Project Officer about adding dust control capacity-building activities to your GAP budget and work plan.

**Denali Commission:** The Denali Commission's Transportation Program supports the planning, design, construction, and improvement of community roads and streets.

**University of Alaska, Alaska University Transportation Center (AUTC):** AUTC collaborates with a variety of government, private sector, academic, and other research partners. They can assist communities in assessing dust abatement options, costs, and provide logistical guidance.

### Further reading and resources

[\*Potential Funders and Cooperators\*](#) (ADEC)

[http://dec.alaska.gov/air/anpms/Dust/Dust\\_docs/Cooperators-funding-sources.pdf](http://dec.alaska.gov/air/anpms/Dust/Dust_docs/Cooperators-funding-sources.pdf)



## 7—CONTACTS AND RESOURCES

If you have questions about controlling road dust in your community, staff at ADEC, EPA, and ANTHC can connect you with additional contacts and resources to assist you further.

<p><b>Alaska Department of Environmental Conservation</b> ADEC's Air Quality Division provides outreach materials on rural dust, support for community-based solutions and community education, and information on rural emission inventories.</p>	<p><b>Molly Birnbaum</b> Non-Point Mobile Sources 907-269-4913 <a href="mailto:molly.birnbaum@alaska.gov">molly.birnbaum@alaska.gov</a></p>
<p><b>Environmental Protection Agency</b> EPA provides outreach materials on dust, support for community education, and technical assistance on integrating dust control activities into grant workplans. Funding is available for tribal air programs through Clean Air Act grants and Indian General Assistance Program grants for capacity building activities. EPA is investigating the relative toxicity of dust suppressants used in Alaska and their impacts on human health and the environment.</p>	<p><b>Kayla Krauss</b> Alaska Tribal Air 206-553-2728 <a href="mailto:krauss.kayla@epa.gov">krauss.kayla@epa.gov</a></p> <p><b>Erin McTigue</b> Alaska Tribal Air 206-553-1254 <a href="mailto:mctigue.erin@epa.gov">mctigue.erin@epa.gov</a></p>
<p><b>Alaska Native Tribal Health Consortium</b> ANTHC provides air quality technical consultation and trainings, supports tribal air quality assessments and monitoring, and awards tribal air quality mini-grants.</p>	<p><b>Air &amp; Healthy Homes Program</b> 907-729-3430 907-729-4006 <a href="mailto:ceh@anthc.org">ceh@anthc.org</a></p>
<p><b>University of Alaska, Alaska University Transportation Center (AUTC)</b> AUTC conducts research on new ways to monitor dust, apply dust suppressants, assess performance of dust suppressants, and can help provide recommendations on dust suppressant application rates.</p>	<p><b>Billy Connor, P.E.</b> Alaska University Transportation Center 907-474-5552 <a href="mailto:bgconnor@alaska.edu">bgconnor@alaska.edu</a></p> <p><b>David Barnes, Ph.D., P.E.</b> Civil/Environmental Engineering 907-474-6126 <a href="mailto:dlbarnes@alaska.edu">dlbarnes@alaska.edu</a></p>

### Further reading and resources

[Dust—Rural Communities](#) (ADEC)

Visit ADEC's website to learn more about rural dust. <http://dec.alaska.gov/air/anpms/communities/pm10-rural>

[Dust Monitoring and Community Self-Assessment Map](#) (ADEC)

This map shows the surveys completed in 2007, 2010, 2011, and 2016, as well as monitoring locations.

[http://dec.alaska.gov/air/anpms/Dust/dust\\_docs/dust-survey-complete-map-022018.pdf](http://dec.alaska.gov/air/anpms/Dust/dust_docs/dust-survey-complete-map-022018.pdf)



# ACRONYMS AND DEFINITIONS

## Useful Acronyms

**ADEC:** Alaska Department of Environmental Conservation

**ADNR:** Alaska Department of Natural Resources

**ADOT&PF:** Alaska Department of Transportation and Public Facilities

**ANTHC:** Alaska Native Tribal Health Consortium

**BLM:** Bureau of Land Management

**USDOT:** US Department of Transportation

**EPA:** United States Environmental Protection Agency

**FHWA:** Federal Highways Administration

**FRM:** Federal Reference Method

**NAAQS:** National Ambient Air Quality Standard

**PM<sub>10</sub>:** coarse particulate matter

**UAF:** University of Alaska Fairbanks

## Definitions

**Aggregate:** Gravel is made up of three groups of aggregate: stone, sand, and fines.

**Coarse particulate matter (PM<sub>10</sub>, dust):** Dust falls into the category of PM<sub>10</sub>, or coarse particulate matter, which includes particulate matter of 10 microns or less. PM<sub>10</sub> primarily comes from road dust, agricultural dust, river beds, construction sites, mining operations, and similar activities.

**Corrugation/washboarding:** Corrugation of the road surface occurs as a result of erosion, and creates a driving surface characterized by many small bumps and dips.

**Fines:** Fines are the fine-grained material in road aggregates. Fines are clay and silt sized particles. When fines are not bound to the surface of other particles, they easily become airborne dust.

**Fugitive dust:** Fugitive dust is small airborne particles called particulate matter.

**Invasive plants:** Invasive plants are not native to a region and have a tendency to spread quickly, overtaking native plants.

**Native plants:** Native plants are indigenous to an area and occur naturally. They form the most sustainable habitat. When choosing revegetation as a dust mitigation strategy, only use native plant species.

**Suppressant:** Dust suppressants, or “palliatives”, are applied to unpaved roads to control dust.

**Road crown:** Road crown describes the cross-sectional shape of a road surface. A well-designed crown allows water to run off a road.

**Road grade:** Road grade, or road slope, is the incline of the road.



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