



United States Department of Agriculture

# **Dust Mitigation Overview**

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**State Resource Conservationist**  
**Natural Resources Conservation Service**

**Arizona Dust Conference**  
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# Natural Resources Conservation Service

formerly Soil Conservation Service



**Natural Resources Conservation Service**



# Dust Mitigation Conference

- ▶ NRCS in collaboration with University of Arizona Cooperative Extension held conference January 20
- ▶ Dr. Paul Brown and Dr. James Walworth were main contributors
- ▶ Over 80 attendees



# Dust Mitigation Conference

- ▶ Safety and Health Considerations
- ▶ Mechanics of Wind Erosion
- ▶ Assessing Wind Erosion
  - Modeling
  - Measuring
- ▶ Importance of understanding weather systems and soil properties
- ▶ Mitigation
  - Agricultural BMP Program
  - Use of plant materials and land treatment
  - Soil biocrusts

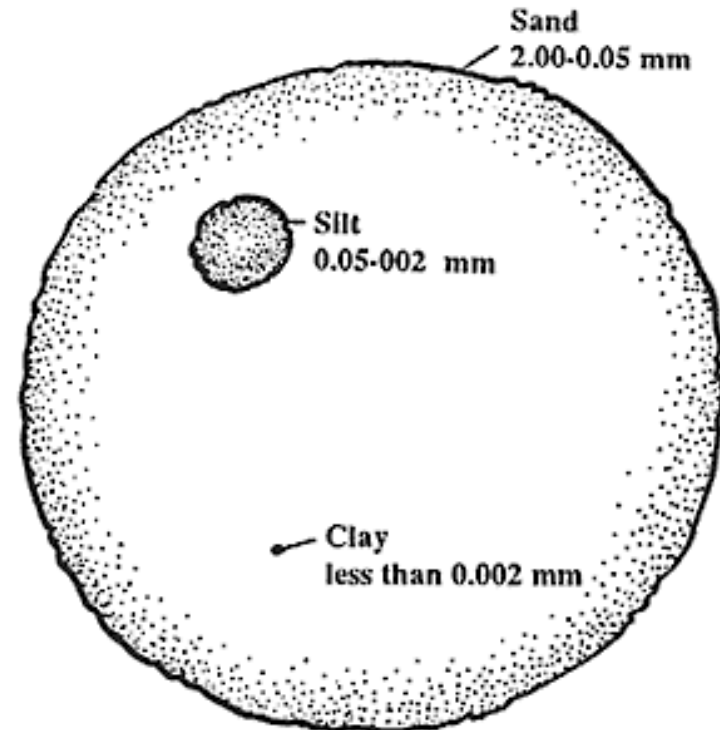


# Dust Mitigation Conference

- ▶ <https://extension.arizona.edu/2016-dust-assessment-management-mitigation-presentations>

# Importance of Soil Properties

- ▶ Texture
  - Sand
  - Silt
  - Clay
- ▶ Salinity
- ▶ Sodicity/Alkalinity
- ▶ Soil Chemistry



# Mitigation with Surface Compounds

- ▶ Emulsions
- ▶ Polymers
- ▶ Surfactants
- ▶ Resins
- ▶ Synthetic organics



# Mitigation with Plant Materials

- ▶ Cover Crops
- ▶ Native Plantings
- ▶ Mulch materials





# Mitigation with Plant Materials



>56 yrs. recovery time after veg clearing (Kade & Warren 2002)

**Project Seeks To Reclaim Abandoned Lands**

By Don Dale

RED ROCK, Ariz. — The Soil Conservation Service says there are hundreds of thousands of acres of abandoned croplands and other denuded lands in Arizona that are creating environmental problems—and the agency is starting to do something to reclaim them.

“The land has been abandoned because of water problems,” said Pat Williams, director of the SCS Plant Materials Center at Tucson.

Williams was in the Red Rock area recently with his assistant, Jim Briggs, to check on the re-

(See RECLAIMING, pg. 36)

**UNSEEDED** areas show contrast to re-vegetation sections, where grasses and plants have begun to re-establish themselves.

**PLANT SPECIES** in the re-vegetation area were selected for their adaptation to desert conditions; most are native to Arizona, though not necessarily to this area.

**JIM BRIGGS** and Pat Williams, photo at bottom left, examine a four-wing saltbush that appears to be thriving in a re-vegetation area. In the photo at bottom right, blue panic seedheads indicate the grass is doing well.

# Mitigation with Soil Biocrusts

- ▶ Cyanobacteria
- ▶ Algae
- ▶ Mosses
- ▶ Lichens



# Mitigation with Animals

- ▶ High Density/  
Short Duration  
Grazing
- ▶ Native Seeding
- ▶ Imported feed





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# Other Mitigation Considerations

- ▶ Water
  - Supplemental Irrigation, Leaching
  - Water harvesting
  - Land Shaping
  - Existing ponds, canals
  - Soil Moisture Amendments
- ▶ Soil Amendments (for sodium treatment)
  - Gypsum
  - Sulphur
  - Sulphuric Acid

## Characterizing Dust Emission Hotspots

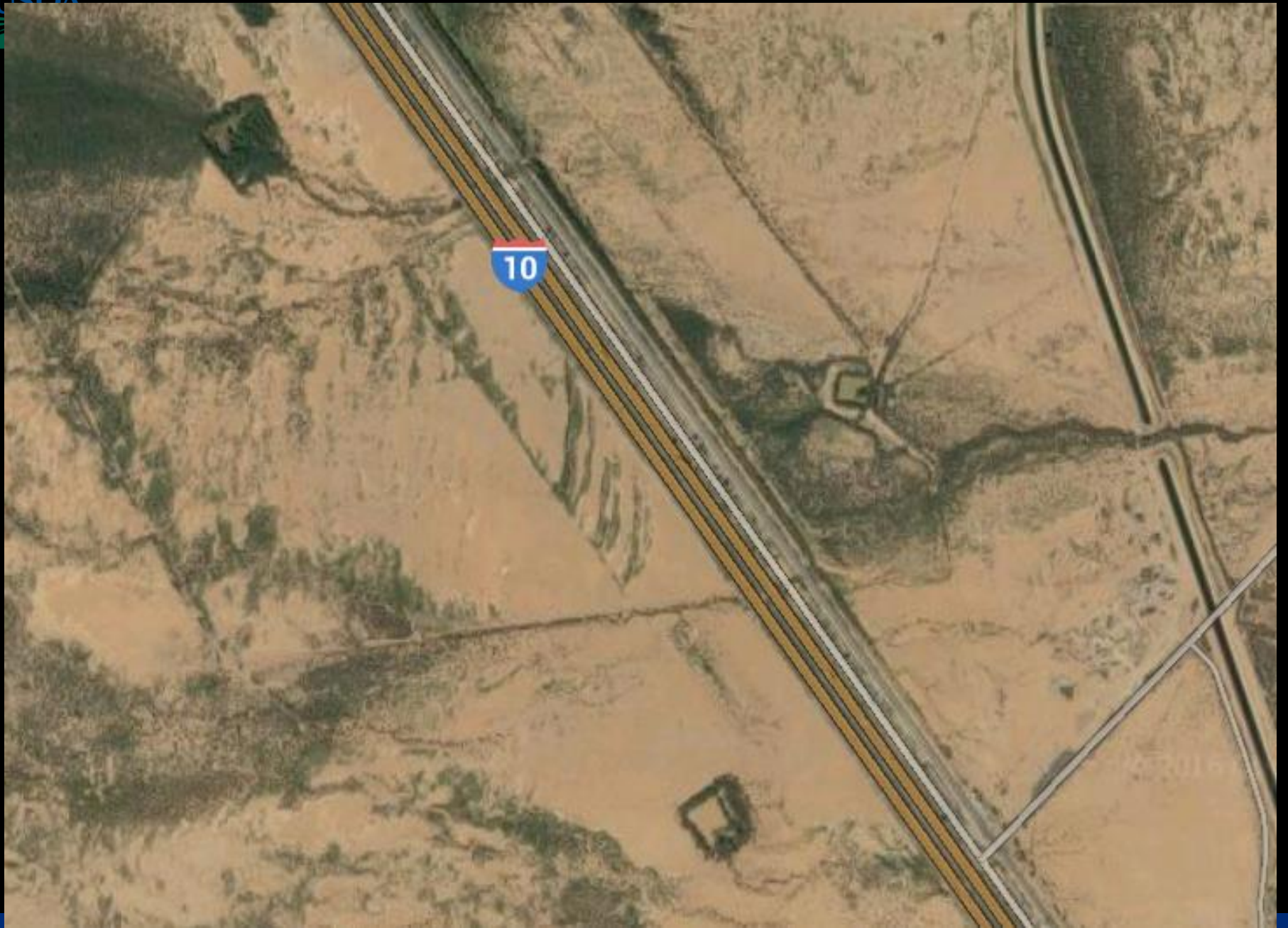
### Most probable locations and conditions for dust emission hotspots (from Gillette 1999):

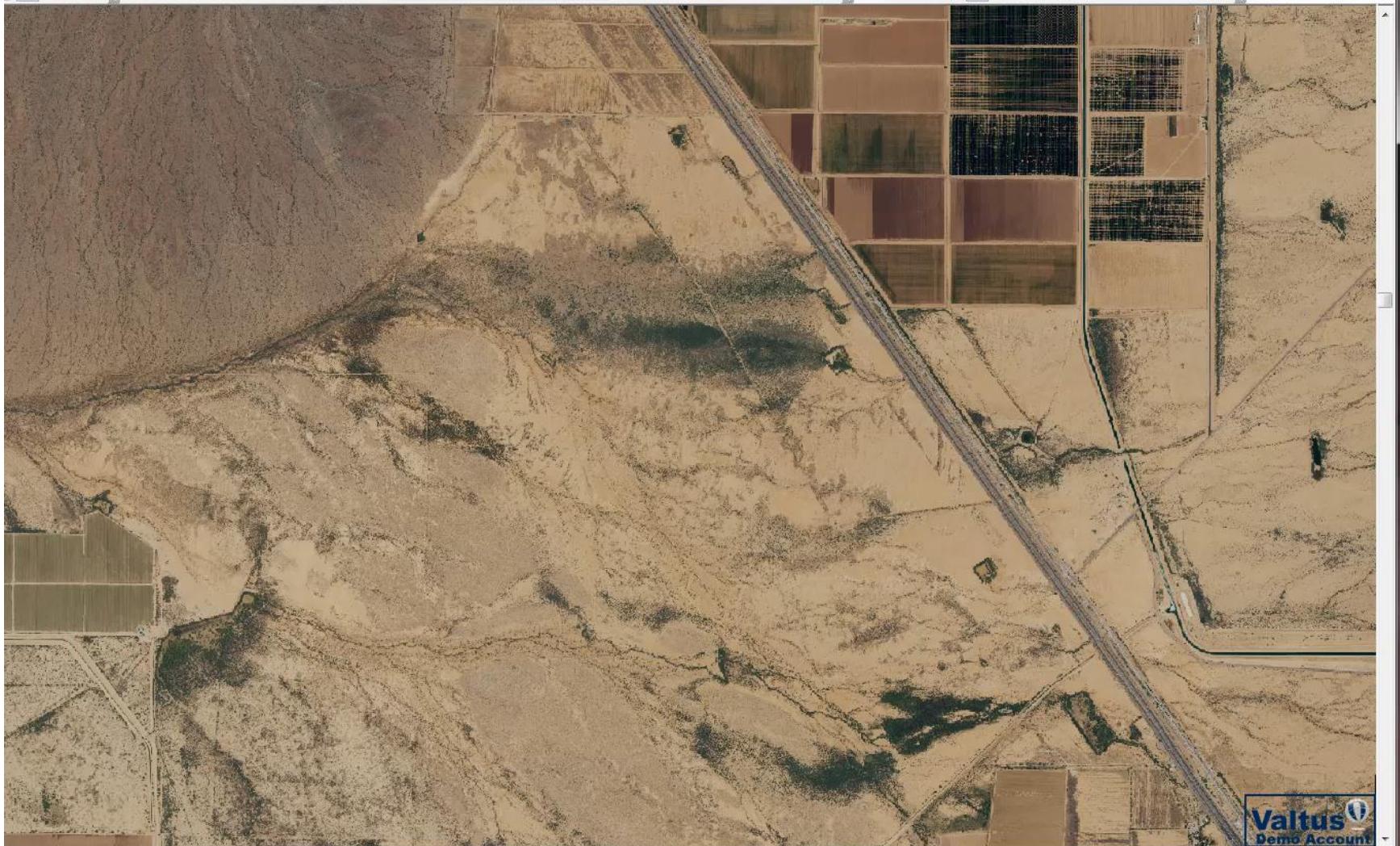
1. Unvegetated and free of gravel
2. Sandy sediments
3. Long fetch length
4. Smooth surface roughness ( $z_0$ )
5. Disturbed sediment
6. Lacking soil moisture/aggregates
7. Thick sediment deposits
8. Strong meso-scale winds
9. Topographically-forced wind convergence



(From Dr. Jason Field– Dust Mitigation Conference)









# So, What's it Going to Take?





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# Questions?

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