



ADEQ 2019 Dust Stabilization Projects

Craig Pearson

Project Manager





Air Quality Division

MISSION

Our Mission

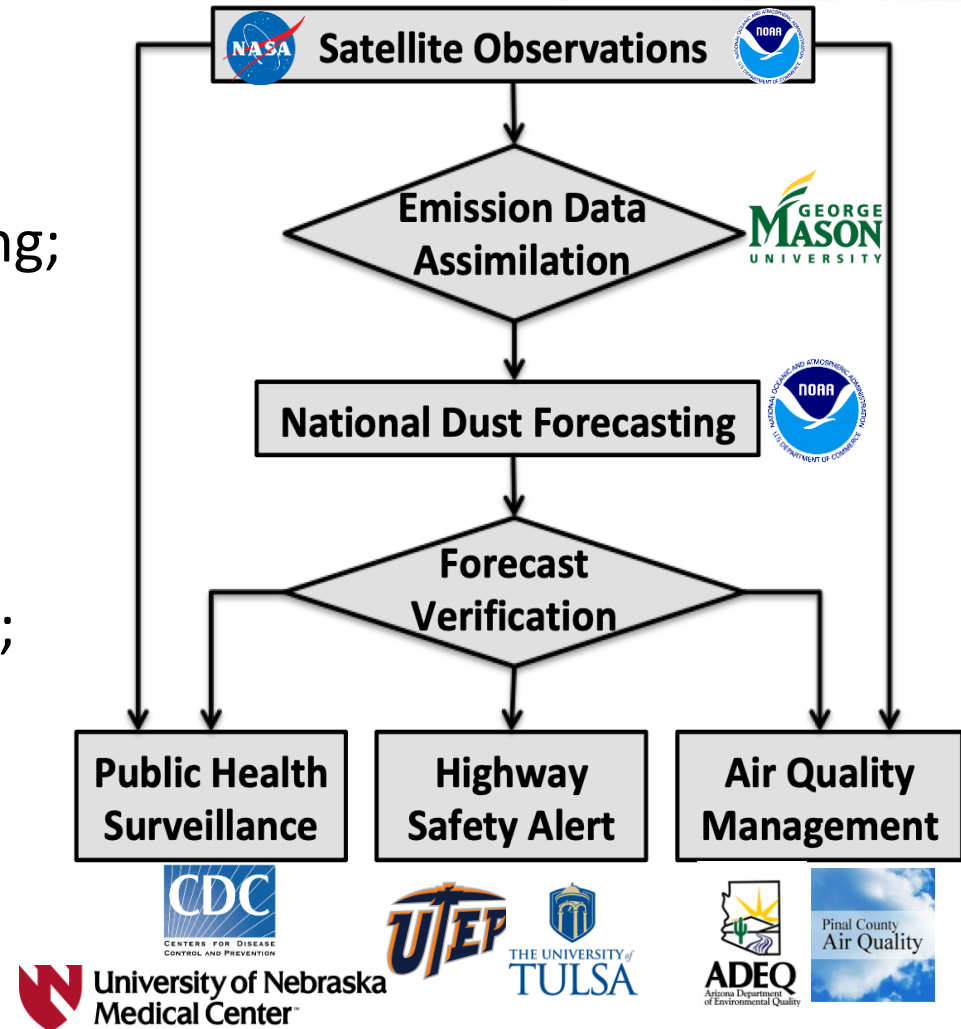
To protect and enhance public health and the environment by ensuring that ambient air is healthy to breathe, visibility in national parks and forests is pristine, and air quality does not negatively impact environmental systems. AQD accomplishes that mission by controlling current and future sources of air pollution.

- High Resolution Dust Forecasting
- Dust stabilization from non-toxic chemical stabilizer spray
 - I-10 corridor
 - Mile Post 190
 - Mile Post 222-226
- Dust stabilization research on a landscape scale



Project Goals:

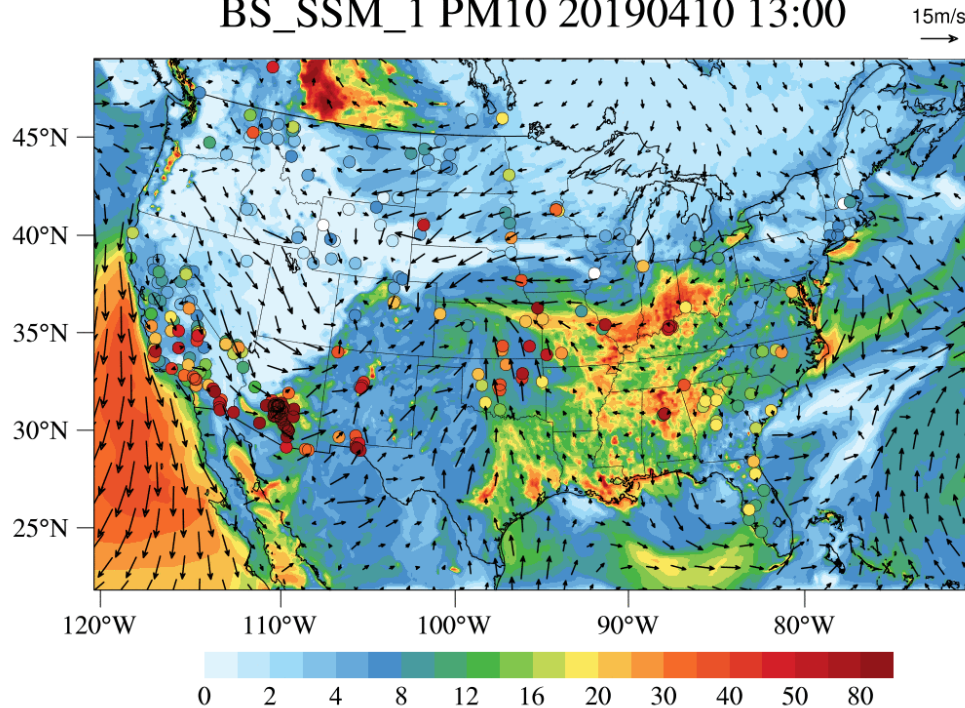
1. Improve dust forecasting;
2. Support three dust services:
 - a) Valley fever surveillance;
 - b) Highway safety alert;
 - c) Air quality management;



National Dust (PM₁₀) Forecasting with NOAA CMAQ

(CMAQ: Community Multiscale Air Quality model)

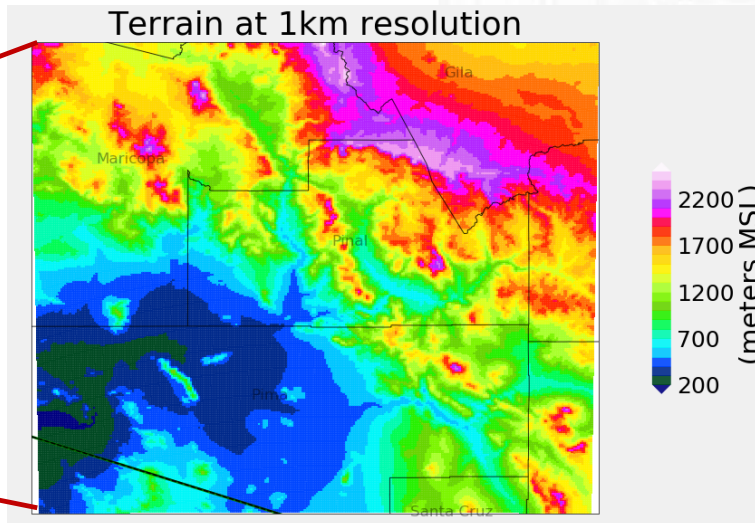
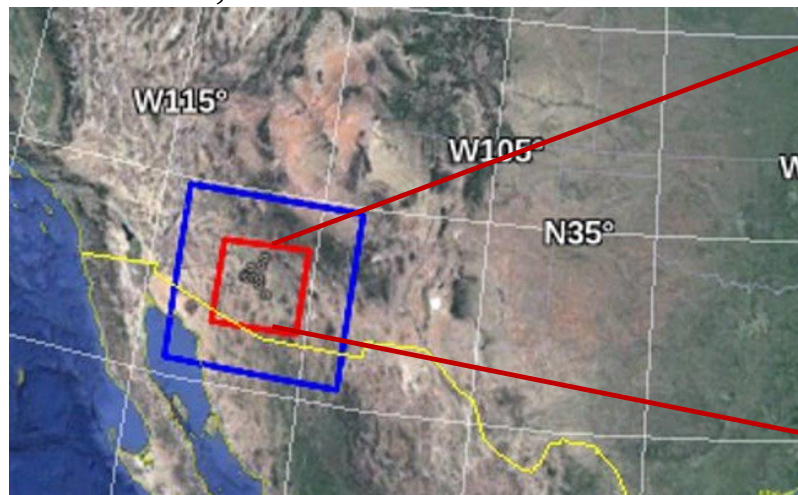
BS_SSM_1 PM10 20190410 13:00



- ❖ April 10, 2019 saw one of largest dust storms, snow deposition in Minnesota;
- ❖ National 12km dust forecast captured Chihuahua dust, but failed to reproduce the high PM10 over southern AZ.
- ❖ A new high resolution air quality forecasting is being set up for Central AZ.

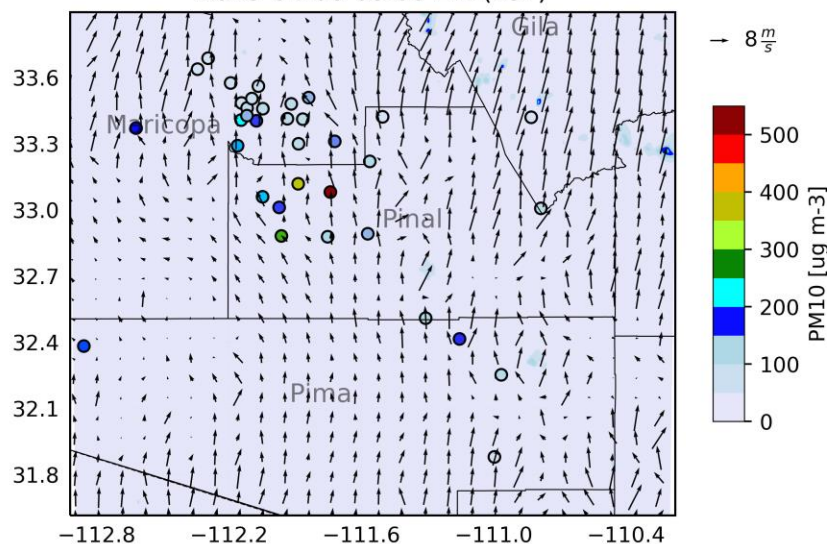
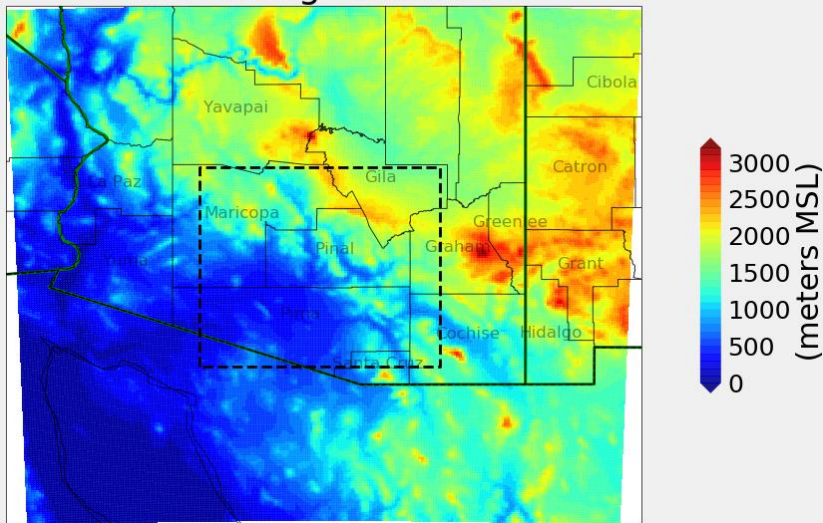
3km (Blue): Arizona; 1km(Red):
Central AZ;

High-Resolution Dust Forecasts



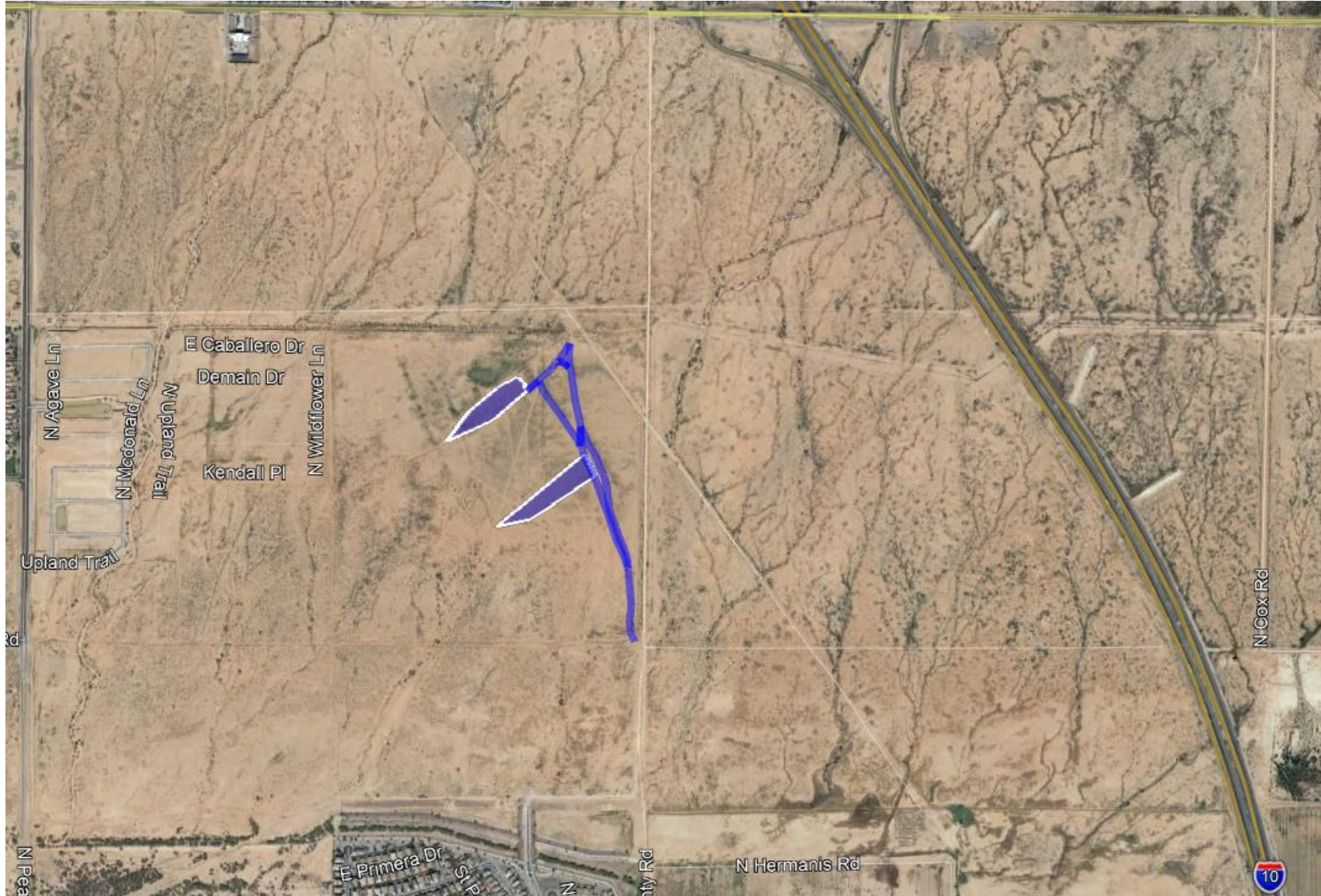
2013-04-08 08:00 AM (LST)

Modeling Domains



MP190 McCartney Rd

DITAT DEUS



- 8 total acres of Non-toxic chemical spray stabilizer were applied
- Signs were installed to mitigate earth moving activities

NOTICE

Dust mitigation to prevent wind-blown dust has occurred on this private property.

Please avoid dragging, tilling and earth movement.

MP 190 McCartney Rd Post Treatment



- Still heavy activity at the site
- Broken Signs
- Stabilization is still intact where the surface hasn't been disturbed
- Heavily trafficked areas are not best suited to spray techniques



MP 222 – South of Picacho Peak

- Between mile posts 222-226
- 89 acres of Non-toxic chemical spray stabilizer were applied
- 3 acres were dedicated for a long term research application



Non Toxic Chemical Spray Application



Non Toxic Chemical Spray Application

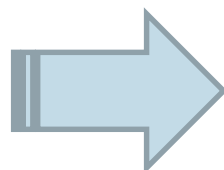


Adding Organic Materials to Accelerate Soil Stabilization and Dust Mitigation

Dr. Joseph Blankinship, UA
Samuel Rathke, UA

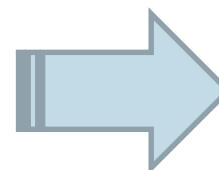
In theory:

**Increased soil
organic
matter**



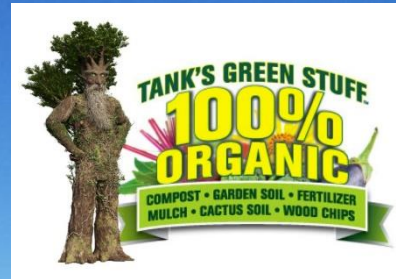
**Increased soil
stability**

**Increased soil
water and
nutrients**



**Increased
plant
cover**

Less dust



June 2019







Spreading with a tractor was necessary to remove lumps...



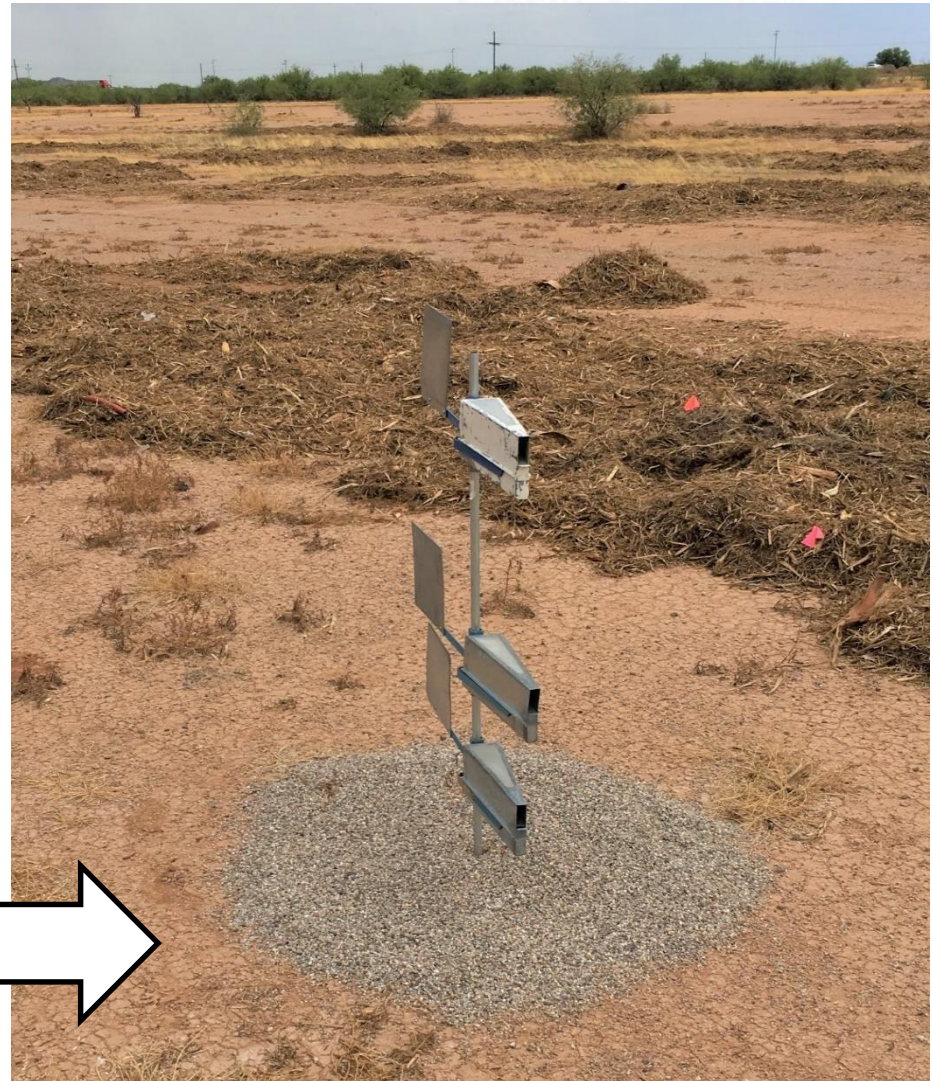
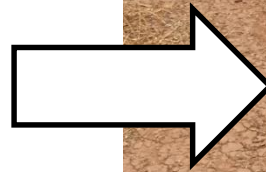


Each row of mulch is roughly 10-feet wide

We set up a total of nine (9)
1-acre plots near I-10 MM 223:

- 3 **control** plots
- 3 plots with **mulch** (7 rows)
- 3 plots with **chemical stabilizer** (Site-Lok)

There is a BSNE dust sampler in the center
of each plot, with dust collectors 25, 50,
and 100 cm above soil surface



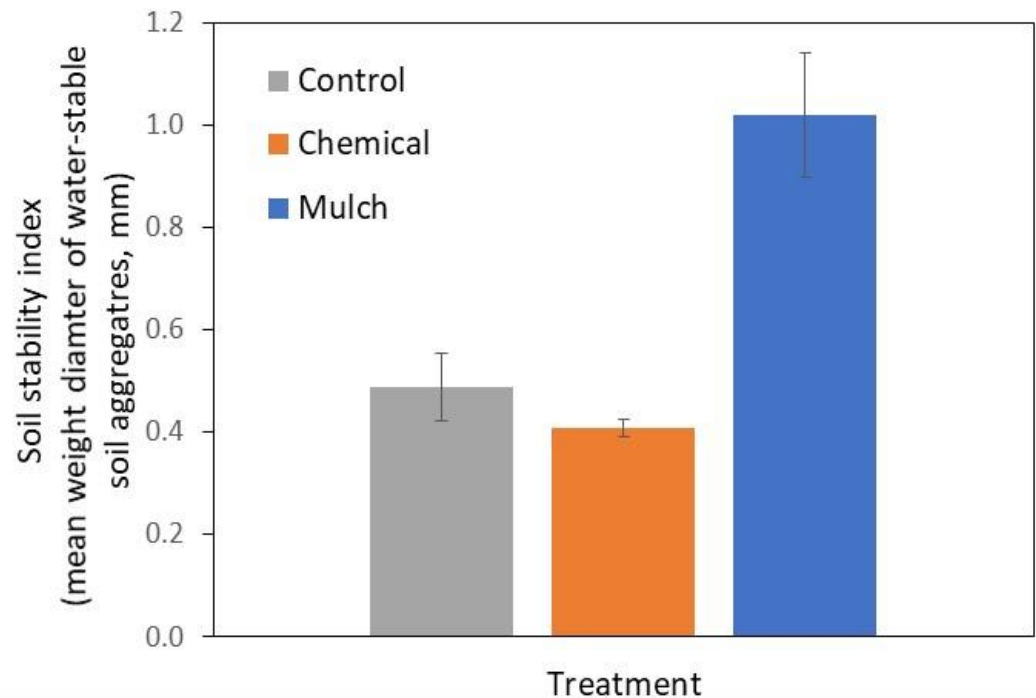
Soil stability results

After 6 months, our index of soil stability is definitely heading in the right direction with mulch...



Separation of soil into water-stable aggregates using wet-sieving method

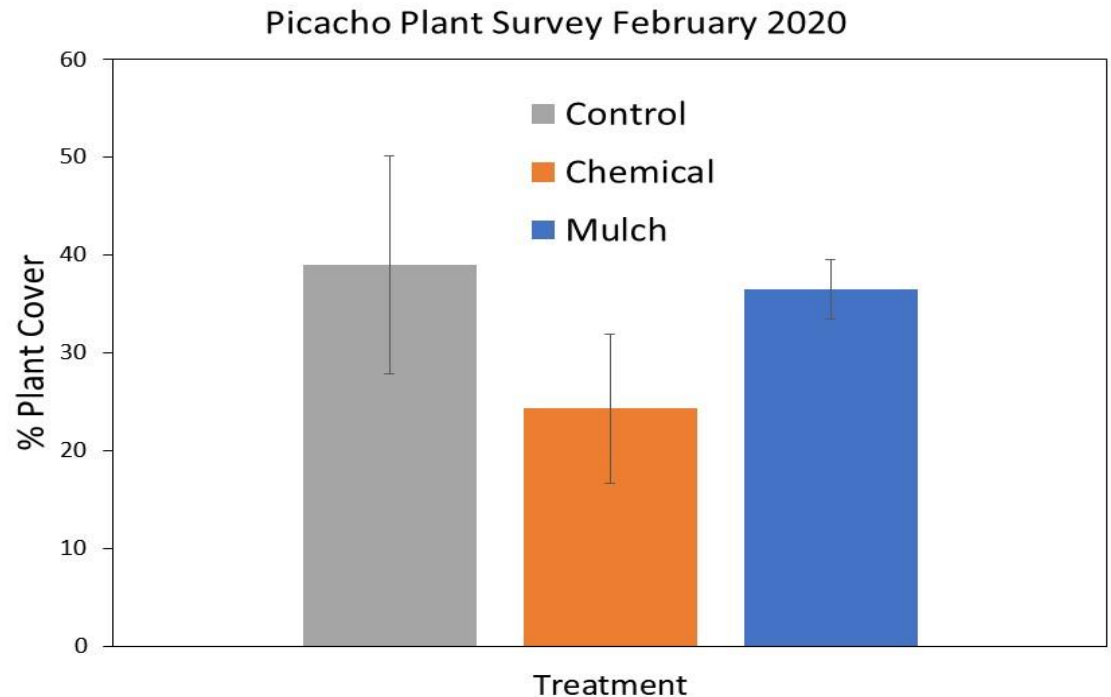
Picacho Soil Aggregate Stability: February 2020



Plant results

During 2019-2020 winter rainy season...

Compared to the control treatment, the chemical treatment tended to decrease plant cover and the mulch had no effect, so far.



Mulch plot
2/4/20





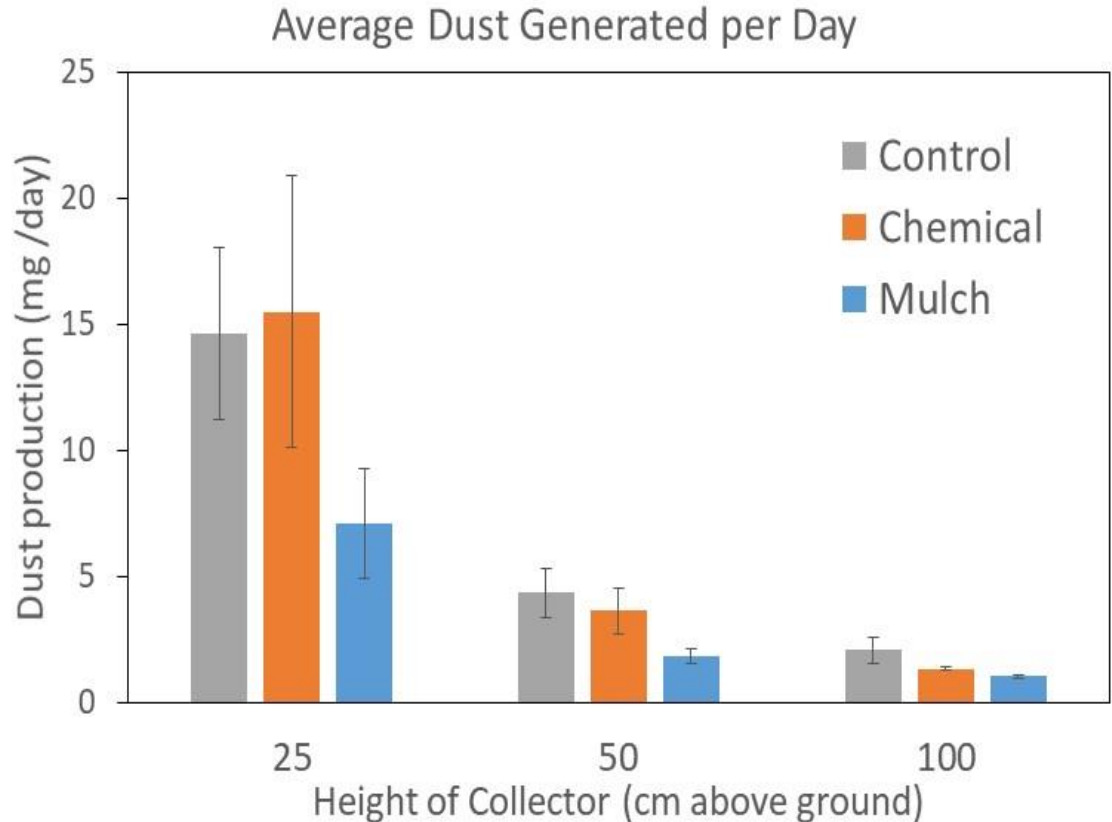


Dust results

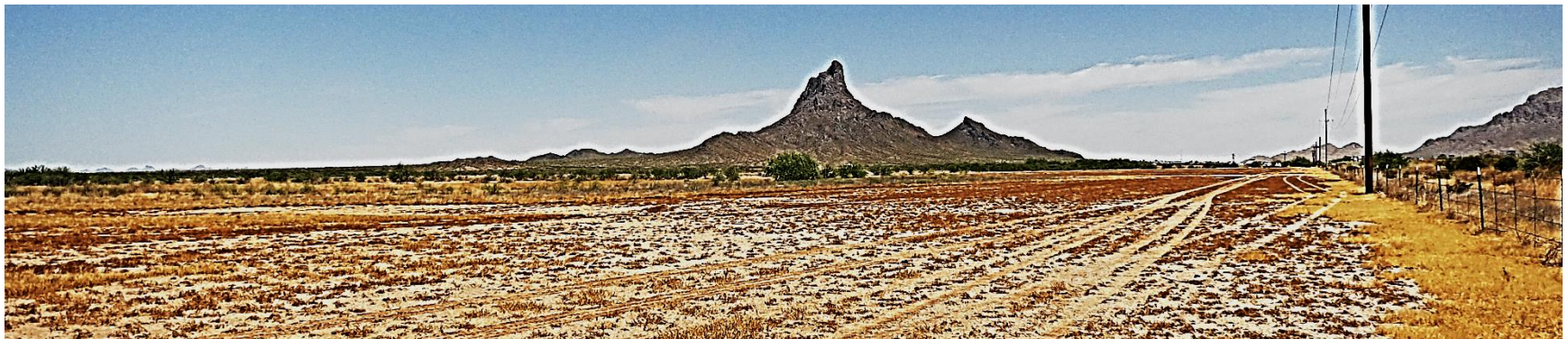
After 6 months...

Chemical stabilizer has had no effect at 25 cm height and reduced dust by 17% and 35% at 50 cm and 100 cm heights.

Mulch has reduced dust by 50-57% at all heights!



- Access Agreements
 - Private property owners can be hard to locate
- Long Term Projects vs Short Term Stabilization
 - Immediate
- Access to water spray application
- Access to vacant land plots





Contacts

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