MISCELLANEOUS PROCESS METHODOLOGY 7.11
Unpaved Road Dust, Farm Roads

(Updated April 2016)

EMISSION INVENTORY SOURCE CATEGORY
Miscellaneous Processes / Road Dust

EMISSION INVENTORY CODE (CES CODE) AND DESCRIPTION
645-646-5400-0000 (47431) Unpaved Road Travel Dust – Farm Roads

Method Summary. This source category provides estimates of the entrained geologic particulate matter (PM) emissions that result from vehicular travel over unpaved roads on agricultural lands due to mechanical disturbance of the roadway and vehicle-generated air turbulence effects. Emissions vary during the year according to the level of agricultural activity in each region. The California Air Resources Board (ARB) estimates PM10 emissions for county by multiplying crop specific harvested acres by a crop specific vehicle miles traveled (VMT) factor and an emission factor for unpaved roads. Emissions are then distributed to the 69 air basin/county/air district (COABDIS) regions. Fractions for other PM components (PM2.5 and total PM) are calculated using an ARB speciation profile. This update provides emissions estimates based on activity data for 2012 and was developed for the 2016 SIP Ozone Inventory, Version 1.04.

Activity Data Source. Agricultural unpaved road activity data are based on county specific harvested crop acreage and on crop specific VMT factors (VMT/acre/year). Activity, expressed as pounds PM10 per VMT/acre/year, is based on crop specific commodity VMT factors that reflect annual land preparation and harvest activity. These factors are used to compute farm road VMT for each county.

Harvested Acreage. For this update, 2012 harvested acreage from the U.S. Department of Agriculture's (USDA) National Agricultural Statistics Service (NASS) was used for all regions. NASS data are compiled from county level reports provided by the California County Agricultural Commissioners for more than 200 commodities identified by the California Department of Food and Agriculture (CDFA). Acreage for pasture lands, mushrooms, greenhouse, nursery and flower crops, and forest firewood was excluded as was crop specific acreage aggregated statewide as "Sum of Others". For counties split among two or more air basins, acreage was apportioned based on land surface areas [ARB, 2009 Almanac], except for Kern County, which was assigned 98% to the SJV Air Basin and 2% to the Mojave Desert Air Basin. Complete listings of California crop acreage by county/air basin/air district (COABDIS) region for this update are available here: https://www.arb.ca.gov/ei/areasrc/fullpdf/2012acreage.pdf

Vehicle Miles Traveled (VMT). ARB staff and a group of agricultural experts in the SJV Air Basin developed 20 representative crop profiles (Crop Calendars) that characterize the monthly distribution of annual land preparation and harvest activities for about 90 percent of California's crop acreage [ARB, April 2003]. Crops that were not specifically addressed were assigned a crop profile from a similar crop. Five commodity VMT factors, presented in Table A, were used to develop the crop specific VMT factors presented in Table B. Annual VMT are calculated as the product of crop specific harvested acreage and the assigned VMT factor. There is no adjustment for rainfall as crop calendars are assumed to reflect weather-related travel patterns on farm roads.

Table A. VMT Factors for Unpaved Farm Roads

Commodity	VMT Factors (VMT/acre/year)
Grapes	0.38
Tree & Citrus Fruit	1.23
Nut Crops	0.49
Cotton (large field)	0.40
Cotton (small field)	2.40

Table B. CDFA Commodity and Assigned VMT Factor

CDFA Code	Crop Description	VMT Category	VMT Factor (VMT/acre/year)
101999	WHEAT ALL	Cotton (large)	0.40
104999	RYE GRAIN	Cotton (large)	0.40
106199	RICE MILLING	Cotton (large)	0.40
106269	FIELD CROP BY-PRODUCTS	Cotton (large)	0.40
111559	CORN WHITE	Cotton (large)	0.40
111991	CORN GRAIN	Cotton (large)	0.40
111992	CORN SILAGE	Cotton (small)	2.40
112999	OATS GRAIN	Cotton (large)	0.40
113995	BARLEY FEED	Cotton (large)	0.40
113999	BARLEY UNSPECIFIED	Cotton (large)	0.40
114991	SORGHUM GRAIN	Cotton (large)	0.40
115991	TRITICALE	Cotton (large)	0.40
121219	COTTON LINT UPLAND	Cotton (large)	0.40
121229	COTTON LINT PIMA	Cotton (large)	0.40
121299	COTTON LINT UNSPECIFIED	Cotton (large)	0.40
132999	SUGAR BEETS	Cotton (small)	2.40
151999	COTTONSEED	Cotton (large)	0.40
158269	SAFFLOWER	Cotton (large)	0.40
158316	SUNFLOWER SEED PLANTING	Cotton (small)	2.40
158499	JOJOBA	Cotton (small)	2.40
161131	BEANS LIMA LG. DRY	Cotton (small)	2.40
161132	BEANS LIMA BABY DRY	Cotton (small)	2.40
161199	BEANS LIMA UNSPECIFIED	Cotton (small)	2.40
161717	BEANS KIDNEY RED	Cotton (small)	2.40
161741	BEANS BLACKEYE (PEAS)	Cotton (small)	2.40
161742	BEANS GARBANZO	Cotton (small)	2.40
169999	BEANS DRY EDIBLE UNSPEC.	Cotton (small)	2.40
171019	WHEAT SEED	Cotton (large)	0.40
171049	RYE SEED	Cotton (large)	0.40
171069	RICE SEED	Cotton (large)	0.40
171129	OATS SEED	Cotton (large)	0.40
171139	BARLEY SEED	Cotton (large)	0.40
171519	COTTON SEED PLANTING	Cotton (large)	0.40
171582	SAFFLOWER SEED PLANTING	Cotton (large)	0.40
171619	BEANS SEED	Cotton (small)	2.40
171949	FIELD CROPS SEED MISC.	Cotton (large)	0.40
171959	SEED VEG & VINECROP	Cotton (small)	2.40
172119	SEED ALFALFA	Cotton (large)	0.40
172289	SEED CLOVER UNSPECIFIED	Cotton (large)	0.40
173079	SEED BERMUDA GRASS	Cotton (large)	0.40
173669	SEED SUDAN GRASS	Cotton (large)	0.40

Table B. CDFA Commodity and Assigned VMT Factor

CDFA Code	Crop Description	VMT Category	VMT Factor (VMT/acre/year)
173999	SEED GRASS UNSPECIFIED	Cotton (large)	0.40
178999	SEED OTHER (NO FLOWERS)	Cotton (large)	0.40
181999	HAY ALFALFA	Cotton (large)	0.40
188499	HAY GRAIN	Cotton (large)	0.40
188799	HAY WILD	Cotton (large)	0.40
188899	HAY SUDAN	Cotton (large)	0.40
188999	HAY OTHER UNSPECIFIED	Cotton (large)	0.40
195199	SILAGE	Cotton (large)	0.40
195299	HAY GREEN CHOP	Cotton (large)	0.40
195399	STRAW	Cotton (large)	0.40
198199	RICE WILD	Cotton (large)	0.40
198999	FIELD CROPS UNSPECIFIED	Cotton (large)	0.40
201119	ORANGES NAVEL	Tree & Citrus Fruit	1.23
201519	ORANGES VALENCIA	Tree & Citrus Fruit	1.23
201999	ORANGES UNSPECIFIED	Tree & Citrus Fruit	1.23
202999	GRAPEFRUIT ALL	Tree & Citrus Fruit	1.23
203999	TANGERINES & MANDARINS	Tree & Citrus Fruit	1.23
204999	LEMONS ALL	Tree & Citrus Fruit	1.23
205999	LIMES ALL	Tree & Citrus Fruit	1.23
206999	TANGELOS	Tree & Citrus Fruit	1.23
207999	KUMQUATS	Tree & Citrus Fruit	1.23
208059	CITRUS BY-PRODUCTS MISC.	Tree & Citrus Fruit	1.23
209999	CITRUS UNSPECIFIED	Tree & Citrus Fruit	1.23
211999	APPLES ALL	Tree & Citrus Fruit	1.23
212199	PEACHES FREESTONE	Tree & Citrus Fruit	1.23
212399	PEACHES CLINGSTONE	Tree & Citrus Fruit	1.23
212999	PEACHES UNSPECIFIED	Tree & Citrus Fruit	1.23
213199	CHERRIES SWEET	Tree & Citrus Fruit	1.23
214199	PEARS BARTLETT	Tree & Citrus Fruit	1.23
214899	PEARS ASIAN	Tree & Citrus Fruit	1.23
214999	PEARS UNSPECIFIED	Tree & Citrus Fruit	1.23
215199	PLUMS	Tree & Citrus Fruit	1.23
215399	PLUMCOTS	Tree & Citrus Fruit	1.23
215999	PLUMS DRIED	Tree & Citrus Fruit	1.23
216199	GRAPES TABLE	Cotton (small)	2.40
216299	GRAPES WINE	Grapes (all)	0.38
216399	GRAPES RAISIN	Grapes (all)	0.38
216999	GRAPES UNSPECIFIED	Grapes (all)	0.38
217999	APRICOTS ALL	Tree & Citrus Fruit	1.23
218199	NECTARINES	Tree & Citrus Fruit	1.23
218299	PERSIMMONS	Tree & Citrus Fruit	1.23

Table B. CDFA Commodity and Assigned VMT Factor

CDFA Code	Crop Description	VMT Category	VMT Factor (VMT/acre/year)
218399	POMEGRANATES	Tree & Citrus Fruit	1.23
218499	QUINCE	Tree & Citrus Fruit	1.23
218889	BIOMASS ORCHARD	Nut Crops	0.49
218899	FRUITS & NUTS UNSPECIFIED	Tree & Citrus Fruit	1.23
221999	AVOCADOS ALL	Tree & Citrus Fruit	1.23
224999	DATES	Tree & Citrus Fruit	1.23
225999	FIGS DRIED	Tree & Citrus Fruit	1.23
226999	OLIVES	Tree & Citrus Fruit	1.23
229999	KIWIFRUIT	Grapes (all)	0.38
234799	BERRIES LOGANBERRIES	Grapes (all)	0.38
236199	BERRIES RASPBERRIES	Grapes (all)	0.38
237199	BERRIES STRAWBERRIES F MKT	Cotton (small)	2.40
237299	BERRIES STRAWBERRIES PROC.	Cotton (small)	2.40
237999	BERRIES STRAWBERRIES UNSPEC	Cotton (small)	2.40
238199	BERRIES BLUEBERRIES	Grapes (all)	0.38
239999	BERRIES BUSHBERRIES UNSPEC.	Cotton (small)	2.40
261999	ALMONDS ALL	Nut Crops	0.49
263999	WALNUTS ENGLISH	Nut Crops	0.49
264999	PECANS	Nut Crops	0.49
265999	WALNUTS BLACK	Nut Crops	0.49
267999	MACADAMIA NUTS	Nut Crops	0.49
268079	PISTACHIOS	Nut Crops	0.49
268099	ALMOND HULLS	Nut Crops	0.49
301999	ARTICHOKES	Cotton (small)	2.40
302999	ASPARAGUS UNSPECIFIED	Cotton (small)	2.40
303999	BEANS LIMA GREEN	Cotton (small)	2.40
304199	BEANS SNAP FRESH MARKET	Cotton (small)	2.40
304399	BEANS FRESH UNSPECIFIED	Cotton (small)	2.40
304999	BEANS SNAP UNSPECIFIED	Cotton (small)	2.40
305999	BEETS GARDEN	Cotton (small)	2.40
306999	RAPPINI	Cotton (small)	2.40
307189	BROCCOLI FOOD SERVICE	Cotton (small)	2.40
307199	BROCCOLI FRESH MARKET	Cotton (small)	2.40
307299	BROCCOLI PROCESSING	Cotton (small)	2.40
307919	BROCCOLI UNSPECIFIED	Cotton (small)	2.40
308999	BRUSSELS SPROUTS	Cotton (small)	2.40
309999	CABBAGE CH. & SPECIALTY	Cotton (small)	2.40
310999	CABBAGE HEAD	Cotton (small)	2.40
313189	CARROTS FOOD SERVICE	Cotton (small)	2.40
313199	CARROTS FRESH MARKET	Cotton (small)	2.40
313299	CARROTS PROCESSING	Cotton (small)	2.40

Table B. CDFA Commodity and Assigned VMT Factor

CDFA Code	Crop Description	VMT Category	VMT Factor (VMT/acre/year)
313999	CARROTS UNSPECIFIED	Cotton (small)	2.40
314189	CAULIFLOWER FOOD SERVICE	Cotton (small)	2.40
314199	CAULIFLOWER FRESH MARKET	Cotton (small)	2.40
314999	CAULIFLOWER UNSPECIFIED	Cotton (small)	2.40
316189	CELERY FOOD SERVICE	Cotton (small)	2.40
316199	CELERY FRESH MARKET	Cotton (small)	2.40
316999	CELERY UNSPECIFIED	Cotton (small)	2.40
318999	RADICCHIO	Cotton (small)	2.40
323999	CORN SWEET ALL	Cotton (small)	2.40
325999	CUCUMBERS	Cotton (small)	2.40
330999	EGGPLANT ALL	Cotton (small)	2.40
331999	ENDIVE ALL	Cotton (small)	2.40
332999	ESCAROLE ALL	Cotton (small)	2.40
333999	ANISE (FENNEL)	Cotton (small)	2.40
335999	GARLIC ALL	Cotton (small)	2.40
337999	KALE	Cotton (small)	2.40
339196	LETTUCE BULK SALAD PRODS.	Cotton (small)	2.40
339999	LETTUCE UNSPECIFIED	Cotton (small)	2.40
340999	LETTUCE HEAD	Cotton (small)	2.40
341999	LETTUCE ROMAINE	Cotton (small)	2.40
342999	LETTUCE LEAF	Cotton (small)	2.40
343999	MELONS CANTALOUPE	Cotton (small)	2.40
348999	MELONS HONEYDEW	Cotton (small)	2.40
354299	MELONS UNSPECIFIED	Cotton (small)	2.40
354999	MELONS WATERMELON	Cotton (small)	2.40
358999	ONIONS	Cotton (small)	2.40
359999	PARSLEY	Cotton (small)	2.40
361999	PEAS GREEN UNSPECIFIED	Cotton (small)	2.40
363999	PEPPERS BELL	Cotton (small)	2.40
364999	PEPPERS CHILI HOT	Cotton (small)	2.40
366999	PUMPKINS	Cotton (small)	2.40
367999	RADISHES	Cotton (small)	2.40
372999	ONIONS GREEN & SHALLOT	Cotton (small)	2.40
374189	SPINACH FOOD SERVICE	Cotton (small)	2.40
374199	SPINACH FRESH MARKET	Cotton (small)	2.40
374999	SPINACH UNSPECIFIED	Cotton (small)	2.40
375999	SQUASH	Cotton (small)	2.40
376999	SWISS CHARD	Cotton (small)	2.40
378199	TOMATOES FRESH MARKET	Cotton (small)	2.40
378299	TOMATOES PROCESSING	Cotton (large)	0.40
378999	TOMATOES UNSPECIFIED	Cotton (small)	2.40

Table B. CDFA Commodity and Assigned VMT Factor

CDFA Code	Crop Description	VMT Category	VMT Factor (VMT/acre/year)
380999	TURNIPS ALL	Cotton (small)	2.40
381999	GREENS TURNIP & MUSTARD	Cotton (small)	2.40
387999	LEEKS	Cotton (small)	2.40
391999	POTATOES IRISH ALL	Cotton (large)	0.40
392999	POTATOES SWEET	Cotton (large)	0.40
393999	HORSERADISH	Cotton (small)	2.40
394199	SALAD GREENS NEC.	Cotton (small)	2.40
394999	PEAS EDIBLE POD (SNOW)	Cotton (small)	2.40
395999	VEGETABLES ORIENTAL ALL	Cotton (small)	2.40
398499	TOMATILLO	Cotton (small)	2.40
398559	CILANTRO	Cotton (small)	2.40
398599	SPICES AND HERBS	Cotton (small)	2.40
398999	VEGETABLES UNSPECIFIED	Cotton (small)	2.40

Emission Factor Source. The statewide emission factor for geologic dust emissions from vehicular travel on all unpaved roads is 2.0 lbs PM10 per VMT [ARB, May 2003]. This is based on tests performed in the San Joaquin Valley by the University of California, Davis (UCD) [Flocchini, 2001] and the Desert Research Institute (DRI) [Gilles, 1996].

Emissions. PM10 emissions on unpaved farm roads are calculated for each crop as the product of VMT and the PM10 emission factor (EF_{PM10}) for unpaved roads. Emissions are summed by county, then distributed to each COABDIS region:
PM10 (tons/year) = VMT x EF_{PM10}/(2000 lbs/ton)
EF_{PM10} = 2.0 lbs PM10/VMT (statewide unpaved road default)

PM2.5 and total PM are derived from calculated PM10 emissions using ARB's size speciation profile #470 [Houck, 1989; Cowherd, 2005]. Particle size fractions are based on an average of dust measurements from 8 fields in the San Joaquin Valley and on 2006 updates to ARB PM2.5 speciation profiles [Gaffney, 2006] that apportioned more of the fine PM (<2.5 microns) into the coarse PM (>2.5 microns) category.

Total PM and PM2.5 emissions on unpaved farm roads are calculated as follows:
Total PM emissions (tons/year) = PM10 (tons/year)/0.5943
PM2.5 emissions (tons/year) = (PM10 (tons/year)/0.5943) x 0.0594
= PM10 x 0.10

Table 1 presents tons per year PM10, PM2.5 and total PM emissions from unpaved farm roads for 2012 by COABDIS region, along with harvested acreage and VMT.

Temporal Data. Monthly temporal profiles allocate emissions to reflect the percentage of annual activity occurring each month and in the summer (May - October) and winter (November - April) seasons. The profiles reflect the crop mix and the associated harvested acreage unique to each county. Monthly emissions are calculated by multiplying annual emissions by the monthly fraction. No adjustments are made for rainfall as the crop calendars are assumed to reflect seasonal activity patterns. Farm road activity is assumed to be the same each day of the week and to occur primarily during daylight hours. Table 2 presents the monthly temporal emissions profiles by COABDIS region; a single county profile is used for counties split into two or more air districts.

Growth Parameter. Growth projections vary by region [Griffin, 2011]. For all regions of the state except the SJV Air Basin, growth reflects linear regressions of the 2000-2009 NASS harvested crop acreage for regions showing a definite trend (-3% to +3% annually) and no growth when the regression analysis showed either no observable trend or an unsustainable trend. For the SJV Air Basin, growth reflects linear regressions of 2000-2009 FMMP farmland acreage by COABDIS, applied to NASS harvested crop acreage for base year 2007. For all regions, growth is projected through 2020.

Changes in Method and Emissions Estimate. The significant changes for this update include:

- Emissions were updated based on 2012 harvested acreage data.
- County specific temporal profiles were updated to reflect seasonal variations in emissions, based on the mix of crops and associated harvested acreage.

These changes produced an emissions reduction of about 1% from the previous 2008 published inventory estimates.

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Table 1
2012 Dust Emissions from Unpaved Farm Roads

Air Basin	County	Air District	Harvested Acres	VMT	Emissions, tons/year		
					PM10	PM2.5	Total PM
GBV	Alpine	GBU	150.00	60.00	0.06	0.01	0.10
GBV	Inyo	GBU	5,028.00	2,047.00	2.05	0.2	3.44
GBV	Mono	GBU	15,933.00	6,833.13	6.83	0.68	11.50
LC	Lake	LAK	15,605.00	8,195.14	8.2	0.82	13.79
LT	El Dorado	ED	325.89	218.44	0.22	0.02	0.37
LT	Placer	PLA	1,028.05	434.27	0.43	0.04	0.73
MC	Amador	AMA	6,271.00	2,476.24	2.48	0.25	4.17
MC	Calaveras	CAL	2,125.00	1,016.11	1.02	0.1	1.71
MC	El Dorado	ED	3,295.11	2,208.63	2.21	0.22	3.72
MC	Mariposa	MPA	104.00	39.00	0.04	0	0.07
MC	Nevada	NSI	312.00	117.00	0.12	0.01	0.20
MC	Placer	PLA	13,364.65	5,645.47	5.65	0.56	9.50
MC	Plumas	NSI	10,000.00	4,000.00	4	0.4	6.73
MC	Sierra	NSI	3,550.00	1,420.00	1.42	0.14	2.39
MC	Tuolumne	TUO	560.00	457.96	0.46	0.05	0.77
MD	Kern	KER	15,759.98	10,868.58	10.87	1.09	18.29
MD	Los Angeles	AV	5,110.78	2,200.92	2.2	0.22	3.70
MD	Riverside	MOJ	31,548.09	31,122.26	31.12	3.11	52.37
MD	Riverside	SC	46,394.25	45,768.02	45.77	4.57	77.01
MD	San Bernardino	MOJ	25,338.64	25,172.31	25.17	2.52	42.36
NC	Del Norte	NCU	2,600.00	1,040.00	1.04	0.1	1.75
NC	Humboldt	NCU	10,600.00	4,240.00	4.24	0.42	7.13
NC	Mendocino	MEN	18,925.00	9,292.66	9.29	0.93	15.64
NC	Sonoma	NS	50,931.32	22,268.88	22.27	2.23	37.47
NC	Trinity	NCU	664.00	262.75	0.26	0.03	0.44
NCC	Monterey	MBU	373,871.00	783,158.29	783.16	78.28	1,317.78
NCC	San Benito	MBU	47,657.00	68,854.16	68.85	6.88	115.86
NCC	Santa Cruz	MBU	17,226.00	30,404.55	30.4	3.04	51.16
NEP	Lassen	LAS	72,743.00	29,097.20	29.1	2.91	48.96
NEP	Modoc	MOD	86,465.00	48,862.00	48.86	4.88	82.22
NEP	Siskiyou	SIS	104,817.00	46,327.39	46.33	4.63	77.95
SC	Los Angeles	SC	5,763.22	2,481.88	2.48	0.25	4.18
SC	Orange	SC	1,035.00	2,401.11	2.4	0.24	4.04
SC	Riverside	SC	51,961.56	51,260.18	51.26	5.12	86.25
SC	San Bernardino	SC	1,617.36	1,606.74	1.61	0.16	2.70
SCC	San Luis Obispo	SLO	108,293.00	112,155.72	112.16	11.21	188.72
SCC	Santa Barbara	SB	117,363.00	211,456.21	211.46	21.13	355.81
SCC	Ventura	VEN	93,692.00	167,859.22	167.86	16.78	282.45
SD	San Diego	SD	49,072.00	61,686.99	61.69	6.17	103.80

Table 1
2012 Dust Emissions from Unpaved Farm Roads

Air Basin	County	Air District	Harvested Acres	VMT	Emissions, tons/year		
					PM10	PM2.5	Total PM
SF	Alameda	BA	10,035.00	4,392.05	4.39	0.44	7.39
SF	Contra Costa	BA	30,709.00	23,224.81	23.22	2.32	39.08
SF	Marin	BA	4,096.00	2,293.75	2.29	0.23	3.86
SF	Napa	BA	44,036.00	16,735.41	16.74	1.67	28.16
SF	San Francisco	BA	0	0	0	0	0
SF	San Mateo	BA	3,141.00	5,532.21	5.53	0.55	9.31
SF	Santa Clara	BA	19,407.00	31,382.58	31.38	3.14	52.81
SF	Solano	BA	50,426.00	31,350.57	31.35	3.13	52.75
SF	Sonoma	BA	23,967.68	10,479.47	10.48	1.05	17.63
SJV	Fresno	SJU	1,073,350.00	900,335.42	900.34	89.99	1,514.95
SJV	Kern	SJU	772,239.04	532,560.36	532.56	53.23	896.11
SJV	Kings	SJU	557,583.00	383,570.03	383.57	38.34	645.41
SJV	Madera	SJU	310,420.00	207,546.99	207.55	20.74	349.23
SJV	Merced	SJU	562,198.00	454,888.15	454.89	45.47	765.42
SJV	San Joaquin	SJU	690,367.00	482,386.64	482.39	48.21	811.69
SJV	Stanislaus	SJU	538,956.00	505,716.64	505.72	50.55	850.95
SJV	Tulare	SJU	893,908.00	922,802.60	922.8	92.23	1,552.76
SS	Imperial	IMP	565,617.00	519,490.84	519.49	51.92	874.12
SS	Riverside	SC	55,673.10	54,921.63	54.92	5.49	92.41
SV	Butte	BUT	213,910.00	109,466.31	109.47	10.94	184.19
SV	Colusa	COL	294,470.00	173,908.90	173.91	17.38	292.63
SV	Glenn	GLE	242,036.00	144,947.55	144.95	14.49	243.90
SV	Placer	PLA	6,168.30	2,605.60	2.61	0.26	4.38
SV	Sacramento	SAC	127,756.00	72,570.47	72.57	7.25	122.11
SV	Shasta	SHA	30,060.00	11,966.17	11.97	1.2	20.13
SV	Solano	YS	82,274.00	51,150.92	51.15	5.11	86.07
SV	Sutter	FR	230,115.00	140,785.42	140.79	14.07	236.89
SV	Tehama	TEH	63,510.00	43,372.61	43.37	4.34	72.98
SV	Yolo	YS	412,022.00	233,733.11	233.73	23.36	393.29
SV	Yuba	FR	63,866.00	35,858.44	35.86	3.58	60.34
Statewide Totals			9,389,416	7,914,992	7,915	791	13,318

Table 2
Temporal Profiles for 2012 Dust Emissions from Unpaved Farm Roads
(Annual sum of monthly values may not equal 100 due to rounding)

Air Basin	County	Air District	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
GBV	Alpine	GBU	0.00	0.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00
GBV	Inyo	GBU	0.17	0.17	9.91	9.91	9.91	9.91	9.91	9.91	9.91	10.09	10.09	10.09
GBV	Mono	GBU	0.10	0.10	9.16	9.16	9.16	9.86	9.87	11.02	11.02	11.03	10.33	9.18
LC	Lake	LAK	3.27	2.22	4.32	6.15	8.11	8.11	6.15	6.15	12.21	16.36	15.45	11.51
LT	El Dorado	ED	4.15	4.15	4.52	7.87	9.54	9.54	7.87	7.87	8.43	14.25	12.58	9.23
LT	Placer	PLA	0.96	0.52	5.91	12.36	20.11	5.75	1.85	0.85	10.33	14.54	17.31	9.51
MC	Amador	AMA	0.80	0.17	4.01	9.13	12.32	12.32	9.13	9.13	11.11	14.47	11.91	5.53
MC	Calaveras	CAL	1.13	1.13	2.31	5.85	7.62	7.62	5.85	5.85	15.25	18.15	16.39	12.85
MC	El Dorado	ED	4.15	4.15	4.52	7.87	9.54	9.54	7.87	7.87	8.43	14.25	12.58	9.23
MC	Mariposa	MPA	0.00	0.00	0.00	10.53	15.79	15.79	10.53	10.53	10.53	15.79	10.53	0.00
MC	Nevada	NSI	0.00	0.00	0.00	10.53	15.79	15.79	10.53	10.53	10.53	15.79	10.53	0.00
MC	Placer	PLA	0.96	0.52	5.91	12.36	20.11	5.75	1.85	0.85	10.33	14.54	17.31	9.51
MC	Plumas	NSI	0.00	0.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00
MC	Sierra	NSI	0.00	0.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00
MC	Tuolumne	TUO	4.98	4.98	7.60	7.60	7.60	7.60	7.60	7.60	7.60	12.29	12.29	12.29
MD	Kern	KER	1.25	2.24	3.23	9.22	6.02	8.14	4.87	3.70	8.62	13.97	25.06	13.69
MD	Los Angeles	AV	0.94	0.16	10.33	9.14	9.32	9.32	9.30	9.30	10.08	10.43	11.02	10.66
MD	Riverside	MOJ	3.79	5.11	7.57	7.27	5.47	6.52	9.51	5.28	5.78	14.04	17.68	11.98
MD	Riverside	SC	3.79	5.11	7.57	7.27	5.47	6.52	9.51	5.28	5.78	14.04	17.68	11.98
MD	San Bernardino	MOJ	2.99	1.63	9.27	5.45	3.25	4.22	17.62	3.36	5.31	22.00	14.72	10.17
NC	Del Norte	NCU	0.00	0.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00
NC	Humboldt	NCU	0.00	0.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00
NC	Mendocino	MEN	2.21	2.21	2.21	9.34	12.91	12.91	9.34	9.34	9.34	14.81	11.25	4.11
NC	Sonoma	NS	1.29	1.10	2.51	9.15	12.66	13.56	10.04	9.15	9.34	13.77	12.23	5.20
NC	Trinity	NCU	0.00	0.00	8.37	10.09	10.94	10.94	10.09	10.09	10.09	10.94	10.09	8.37
NCC	Monterey	MBU	2.75	4.05	7.10	6.00	3.03	3.49	21.90	3.55	3.56	26.53	12.39	5.65
NCC	San Benito	MBU	3.16	3.11	5.71	5.82	3.25	3.49	20.36	4.76	5.09	26.01	12.39	6.85
NCC	Santa Cruz	MBU	2.28	8.79	10.18	4.96	3.01	5.18	12.86	4.53	4.53	14.18	17.09	12.42
NEP	Lassen	LAS	0.00	0.00	9.51	9.75	10.00	10.14	10.02	9.38	9.63	9.75	11.03	10.78
NEP	Modoc	MOD	2.28	2.47	7.75	7.56	7.56	9.55	9.59	9.02	9.02	10.21	12.59	12.40
NEP	Siskiyou	SIS	2.01	0.42	8.49	5.32	5.32	9.62	9.66	7.28	8.86	8.99	17.02	17.02
SC	Los Angeles	SC	0.94	0.16	10.33	9.14	9.32	9.32	9.30	9.30	10.08	10.43	11.02	10.66
SC	Orange	SC	0.76	15.59	15.44	0.61	0.58	5.54	5.94	5.76	5.76	1.65	21.22	21.15
SC	Riverside	SC	3.79	5.11	7.57	7.27	5.47	6.52	9.51	5.28	5.78	14.04	17.68	11.98
SC	San Bernardino	SC	2.99	1.63	9.27	5.45	3.25	4.22	17.62	3.36	5.31	22.00	14.72	10.17
SCC	San Luis Obispo	SLO	4.11	5.26	6.82	6.39	6.16	7.27	12.04	6.09	6.53	15.37	13.56	10.40
SCC	Santa Barbara	SB	4.45	6.95	8.31	6.14	5.07	5.61	13.04	5.38	5.40	17.52	13.06	9.06
SCC	Ventura	VEN	3.23	7.17	8.56	4.68	2.65	3.59	15.70	4.17	4.22	20.96	15.23	9.84
SD	San Diego	SD	6.05	6.83	6.94	6.19	5.91	6.13	7.77	6.56	6.64	13.89	14.02	13.06

Table 2
Temporal Profiles for 2012 Dust Emissions from Unpaved Farm Roads
(Annual sum of monthly values may not equal 100 due to rounding)

Air Basin	County	Air District	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
SF	Alameda	BA	1.63	0.98	7.76	9.11	10.43	10.43	9.11	9.11	9.76	11.89	11.22	8.57
SF	Contra Costa	BA	8.19	2.82	16.66	2.48	2.64	2.82	3.03	2.87	9.69	12.18	19.06	17.57
SF	Marin	BA	2.56	2.56	6.06	6.38	6.54	11.11	10.95	6.38	6.38	7.82	16.79	16.47
SF	Napa	BA	0.12	0.12	0.27	10.45	15.55	15.55	10.45	10.45	10.45	15.65	10.56	0.37
SF	San Francisco	BA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SF	San Mateo	BA	1.39	14.60	14.93	1.81	1.86	5.23	5.19	5.61	5.61	9.93	19.94	13.91
SF	Santa Clara	BA	4.26	5.87	7.95	3.61	1.93	2.42	15.02	4.83	5.88	22.88	15.67	9.68
SF	Solano	BA	4.79	2.47	11.37	3.46	3.55	5.66	6.17	4.05	9.36	11.44	19.52	18.17
SF	Sonoma	BA	1.29	1.10	2.51	9.15	12.66	13.56	10.04	9.15	9.34	13.77	12.23	5.20
SJV	Fresno	SJU	3.46	4.02	7.40	3.87	3.56	5.26	6.90	6.08	10.13	15.63	19.21	14.48
SJV	Kern	SJU	1.25	2.24	3.23	9.22	6.02	8.14	4.87	3.70	8.62	13.97	25.06	13.69
SJV	Kings	SJU	6.09	2.89	12.92	1.69	1.64	3.99	4.22	1.89	8.24	10.97	23.71	21.74
SJV	Madera	SJU	4.18	1.11	7.70	3.76	4.01	4.90	3.85	3.17	13.32	15.50	20.63	17.87
SJV	Merced	SJU	6.38	1.98	13.56	1.70	1.78	3.15	3.60	2.29	10.72	12.16	21.77	20.91
SJV	San Joaquin	SJU	5.15	3.00	11.12	2.38	2.81	5.01	4.94	3.14	10.10	12.17	21.10	19.08
SJV	Stanislaus	SJU	5.37	4.64	13.86	1.52	1.55	2.39	2.89	1.84	10.97	15.50	21.54	17.92
SJV	Tulare	SJU	6.43	2.33	12.49	4.42	3.35	4.92	3.76	2.19	8.26	11.71	22.15	17.98
SS	Imperial	IMP	2.99	3.07	7.89	6.20	4.73	6.44	15.45	5.90	6.44	17.16	13.37	10.38
SS	Riverside	SC	3.79	5.11	7.57	7.27	5.47	6.52	9.51	5.28	5.78	14.04	17.68	11.98
SV	Butte	BUT	1.69	1.79	4.39	7.09	10.89	3.84	1.95	1.41	14.36	17.97	19.43	15.19
SV	Colusa	COL	2.81	3.66	7.96	7.54	11.44	4.32	2.69	2.06	10.88	15.85	18.36	12.42
SV	Glenn	GLE	3.76	2.78	9.09	5.70	8.25	3.96	2.67	1.88	11.61	15.40	19.40	15.49
SV	Placer	PLA	0.96	0.52	5.91	12.36	20.11	5.75	1.85	0.85	10.33	14.54	17.31	9.51
SV	Sacramento	SAC	5.64	1.56	11.00	4.80	6.02	6.70	5.90	4.55	9.18	11.34	17.70	15.59
SV	Shasta	SHA	0.00	0.00	8.66	10.72	12.75	8.74	7.71	7.71	10.69	11.72	11.69	9.63
SV	Solano	YS	4.79	2.47	11.37	3.46	3.55	5.66	6.17	4.05	9.36	11.44	19.52	18.17
SV	Sutter	FR	4.05	2.29	8.45	7.38	10.98	4.36	2.85	2.28	10.68	14.52	18.07	14.09
SV	Tehama	TEH	3.63	3.42	4.63	4.20	4.21	4.76	4.76	4.20	13.34	16.73	18.06	18.05
SV	Yolo	YS	6.82	1.46	13.03	3.25	4.08	3.64	3.93	2.91	10.49	11.87	19.73	18.79
SV	Yuba	FR	2.54	2.54	5.03	9.44	13.86	5.03	2.82	2.82	11.52	16.27	16.27	11.86