

SOURCE INVENTORY
CATEGORIES # 764 - 765
WIND BLOWN DUST

1999 EMISSIONS

Introduction

Included in these categories are fugitive dust emissions resulting from wind erosion across agricultural fields (Cat. #764) and from wind erosion of soil on unpaved roads (Cat. #765).

Methodologies

Total acreage for field crops, vegetable crops, fruit and nut crops, nursery crops, plants, flowers and miscellaneous crops were obtained for each county as reported in the "Agricultural Crops, 1999". The estimated crop acres were used as throughput for the calculation of wind erosion from agricultural fields (Cat# 764).

The number of miles of unpaved road for each county were estimated from the "1999 California Abstracts", and converted into acreage. It was assumed a typical width of a road was 25 feet. These acreage of unpaved road were used as throughput for the calculation of wind blown dust from unpaved roads (Cat# 765).

Emission factors from dust emissions were developed based on the U.S. Department of Agriculture's equation:

$$\text{Em. F.} = E \times I \times C \times K \times L \times V \quad \text{in tons/acre/yr.}$$

Where E = portion of total wind erosion loses as suspended particulates
I = soil erodibility, t/acre/yr.
C = climatic factor
K = surface roughness factor
L = unsheltered field width factor
V = vegetative cover factor
(K, L, V depends on the crop type)

Typical Values of above constants:		
	Agricultural Land	Unpaved Roads
E	.025	.038
I	38-220	86, 47, 56
C	~.15	~.15
K	.8, .6, .1, .6	~1.0
L	.74, .83, .77, .56	.29 - .34
V	.05, .91, .26, .26	~1.0

Particulate emissions from agricultural wind blown dust were calculated by multiplying the crop acres by the emission factors developed by the U.S. Department of Agriculture, as above.

Particulates emissions from wind blown dust from unpaved roads were calculated by multiplying the unpaved acreage by the emission factors as developed above.

Sample calculations:

For Agricultural Windblown Dust, field crops in Alameda County:

$$\begin{aligned} \text{Emission Factor} &= 0.025 \times 86 \times 0.15 \times 0.8 \times 0.74 \times 0.05 \\ &= 0.009546 \text{ ton/acre/yr} \end{aligned}$$

$$\begin{aligned} \text{Emissions} &= 8,904 \text{ acres} \times 0.009546 \text{ ton/acre/yr} / 365 \text{ days/yr} \\ &= 0.23 \text{ ton/day of particulates} \end{aligned}$$

For Unpaved Road Windblown Dust, in Alameda County:

$$\begin{aligned} \text{Emission Factor} &= 0.038 \times 86 \times 0.15 \times 1 \times 0.32 \times 1 \\ &= 0.157 \text{ ton/acre/yr} \end{aligned}$$

$$\begin{aligned} \text{Emissions} &= (235 \text{ mi} \times 5280 \text{ ft/mi} \times 25 \text{ ft}) / 43,560 \text{ sq.ft/acre} \\ &\quad \times (.157 \text{ ton/acre/yr}) / 365 \text{ days/yr} \\ &= 0.31 \text{ ton/day of particulates} \end{aligned}$$

Monthly Variation

Emission distribution through the months were estimated to be equal throughout the year.

County Distribution

The report on Agricultural Crops for each county showed total acreage for each and are used in distributing emissions throughout the counties.

TRENDS

History

Emissions throughout the years were estimated based on the report of acreage of each county.

Growth

Projections to year 2030 were estimated to be the same, with the assumption there would be no major changes in the acreage on agricultural lands and unpaved roads.