

Dust Emissions in the 2022v1 Emissions Modeling Platform - December 11, 2024

Anthropogenic dust (fugitive dust) emissions in the U.S. EPA's National Emissions Inventory are nonpoint sources that fall under one of four EIS sectors: Unpaved Road Dust, Paved Road Dust, Construction Dust, and Agriculture – Crops & Livestock Dust. Together, fifteen SCCs in the 2022v1 Emissions Modeling Platform feature emissions for these EIS Sectors (a summary of these SCCs can be found at the end of the document). In the U.S. EPA's Emissions Modeling Platforms (EMP), these SCCs and four other nonpoint SCCs associated with mining and quarrying (in the "Industrial Processes – Mining" EIS Sector) are summed and reported as 'afdust' (anthropogenic fugitive dust).

The unpaved and paved road dust sectors reflect emissions of particulate matter from vehicles driving over unpaved and paved roads, respectively. Construction dust refers to residential, non-residential, and road construction activity, which are functions of acreage disturbed for construction. Agricultural dust is quantified for tilling operations, which consists of airborne soil particulate emissions produced during the preparation of agricultural lands for planting, as well as dust kicked up by animals. The mining and quarrying emissions reflect processes used to extract ore and associated overburden, including drilling and blasting, loading and unloading, and overburden replacement.

In the NEI, unpaved and paved road dust emissions feature a meteorological adjustment to the total emissions. The meteorological adjustment accounts for the impact of hourly precipitation and other relevant meteorological factors on dust emissions. The final adjustment factor is a single, county-level annual value between 0 and 1, with lower-emissions/greater-reductions typically found in areas with more frequent precipitation. The meteorological adjustment factors were developed by EPA and based on the ratio of the unadjusted to meteorology-adjusted county-level emissions, as generated by SMOKE.

An EMP applies the meteorological adjustments and an additional reduction to account for the "transportable fraction" of dust to all afdust SCCs (i.e., the emissions are "fully adjusted"). The conceptual model of a "transportable fraction" is the fact that some dust may be captured by near surface sources, such as vegetation and buildings, and not reach the broader atmosphere. The mass of dust emissions subject to a "transportable fraction" reduction is a function of land-use. It should be noted that both the meteorological adjustments and transportable fraction reductions are subject to the gridded resolution of the platform, meaning different emissions will result if these processes were applied to different grid resolutions.

The total impacts, nationwide, of the individual adjustments on anthropogenic dust emissions, as well as the "fully adjusted" emissions, are as follows:

EIS Sector	Unadjusted	Meteorologically Adjusted	Transportable Fraction	Fully Adjusted
Paved Road Dust	308,683	160,748	221,752	118,184
Unpaved Road Dust	865,312	476,110	608,473	345,090
Construction Dust	124,684	69,838	93,007	52,950
Agriculture – Crops & Livestock Dust	710,164	446,965	514,605	329,226
Industrial Processes - Mining	42,063	23,681	31,317	18,212
Total	2,050,907	1,177,342	1,469,153	863,663

SCC Code	EIS Sector	SCC Level 1	SCC Level 2	SCC Level 3	SCC Level 4
2294000000	Dust - Paved Road Dust	Mobile Sources	Paved Roads	All Paved Roads	Total: Fugitives
2296000000	Dust - Unpaved Road Dust	Mobile Sources	Unpaved Roads	All Unpaved Roads	Total: Fugitives
2311010000	Dust - Construction Dust	Industrial Processes	Construction: SIC 15 - 17	Residential	Total
2311020000	Dust - Construction Dust	Industrial Processes	Construction: SIC 15 - 17	Industrial/Commercial/Institutional	Total
2311030000	Dust - Construction Dust	Industrial Processes	Construction: SIC 15 - 17	Road Construction	Total
2325000000	Industrial Processes - Mining	Industrial Processes	Mining and Quarrying: SIC 10 and SIC 14	All Processes	Total
2325020000	Industrial Processes - Mining	Industrial Processes	Mining and Quarrying: SIC 10 and SIC 14	Crushed and Broken Stone	Total
2325030000	Industrial Processes - Mining	Industrial Processes	Mining and Quarrying: SIC 10 and SIC 14	Sand and Gravel	Total
2325060000	Industrial Processes - Mining	Industrial Processes	Mining and Quarrying: SIC 10 and SIC 14	Lead Ore Mining and Milling	Total
2801000000	Agriculture - Crops & Livestock Dust	Miscellaneous Area Sources	Agriculture Production - Crops	Agriculture - Crops	Total
2801000003	Agriculture - Crops & Livestock Dust	Miscellaneous Area Sources	Agriculture Production - Crops	Agriculture - Crops	Tilling
2801000005	Agriculture - Crops & Livestock Dust	Miscellaneous Area Sources	Agriculture Production - Crops	Agriculture - Crops	Harvesting
2801000008	Agriculture - Crops & Livestock Dust	Miscellaneous Area Sources	Agriculture Production - Crops	Agriculture - Crops	Transport
2805100010	Agriculture - Crops & Livestock Dust	Miscellaneous Area Sources	Agriculture Production - Livestock	Dust kicked up by Livestock	Beef cattle - finishing operations on feedlots (drylots)
2805100020	Agriculture - Crops & Livestock Dust	Miscellaneous Area Sources	Agriculture Production - Livestock	Dust kicked up by Livestock	Dairy Cattle
2805100030	Agriculture - Crops & Livestock Dust	Miscellaneous Area Sources	Agriculture Production - Livestock	Dust kicked up by Livestock	Broilers
2805100040	Agriculture - Crops & Livestock Dust	Miscellaneous Area Sources	Agriculture Production - Livestock	Dust kicked up by Livestock	Layers
2805100050	Agriculture - Crops & Livestock Dust	Miscellaneous Area Sources	Agriculture Production - Livestock	Dust kicked up by Livestock	Swine
2805100060	Agriculture - Crops & Livestock Dust	Miscellaneous Area Sources	Agriculture Production - Livestock	Dust kicked up by Livestock	Turkeys