3. Emission Inventories

Ecology developed emission estimates from maintenance plan sources to evaluate whether the emission sources or amounts have changed significantly in the years since Ecology prepared the first maintenance plan emission inventory (EI) in 2005.

Ecology developed four EIs:

- A base year/attainment inventory (2014)
- A mid-term projection inventory (2020)
- Two final projection year inventories (2025 and 2030)

While 2025 is the anticipated final year of the maintenance plan, Ecology prepared the 2030 projection in the event of a delay in plan approval.

The base year 2014 is the most recent year of the National Emissions Inventory (NEI) with actual emissions. The future year inventories include all the sources inventoried for the base year. Ecology based the future year inventories on projected activity levels and effects of current and future controls. The base year and future year inventories include annual and seasonal weekday emissions.

Details about the spatial surrogates, temporal profiles, and other information are available in Appendix A: Emission Inventory Documents (includes A.1 Inventory Preparation Plan (IPP) and A.2 Emissions Inventory Documentation for the Wallula PM_{10} Second 10-Year Maintenance Plan (EI Documentation).

Table 7 Comparison of Point Source Emissions from 2002 to 2014

Source	WMP2	(2014)	WMP1	(2002)	Difference (2014 - 2002)
	lbs per day	%	lbs per day	%	lbs per day
POINT SOURCES (≥ 70 Tons PTE)					
Boise Paper	659	9%	1,035	20%	-376
Simplot Feeders	1,826	26%	219*	4%	1,607
SMALL POINT SOURCES (< 70 Tons PTE)					
Agrium US Inc.	27	0%	472	9%	-445
Gas Transmission Northwest Station 8	11	0%	37	1%	-26

Source	WMP2	(2014)	WMP1	(2002)	Difference (2014 - 2002)
Greenbriar Rail Services	7	0%	-	0%	7
NW Grain Growers	34	0%	28	1%	6
Sandvik	-	0%	1	0%	-1
Simplot Agribusiness	9	0%	0	0%	9
Tessenderlo Kerley Inc.	24	0%		0%	24
Tyson	76	1%	208**	4%	-132
Western Stockmen	19	0%	-	0%	19
NONPOINT SOURCES					
Ag. Burning	0	0%	0	0%	0
Ag. Tilling Dust	2,380	34%	2,606	51%	-226
Ag. Harvesting Dust	324	5%	-	0%	324
Construction Dust	700	10%	-	0%	700
Paved Road Dust	412	6%	305	6%	107
Unpaved Road Dust	448	6%	124	2%	324
MOBILE/ SOURCES					
Mobile	57	1%	53	1%	4
TOTAL ALL SOURCES	7,013	100%	5,088	100%	1,925

Emission source categories in the 2005 plan were much the same as today. The sections below outline specific emissions for facilities that have permits and are considered point sources, such as the pulp and paper mill, feedlot, and other industrial sources.

3.1 2002 Emission inventory (for 2005 Maintenance Plan)

The 2002 attainment emissions inventory for a typical PM_{10} season day—identified for the 2005 plan as from June through September — indicates that most of the emissions came from agricultural tilling (51.2%), the pulp and paper mill (20.1%), and small industrial sources (19.0%).

The significant categories of sources in the 2005 plan base year emission inventory are listed below.

Table 8 Comparison of WMP2 Base Year 2014 to WMP1 Base Year 2002 PM_{10} Emissions

Source	WMP2	(2014)	WMP1	(2002)	Difference (2014 - 2002)
-	lbs per day	%	lbs per day	%	lbs per day
POINT SOURCES (≥ 70 Tons PTE)					
Boise Paper	659	9%	1,035	20%	-376
Simplot Feeders*	1,826	26%	219*	4%	1,607
SMALL POINT SOURCES (< 70 Tons PTE)					
Agrium US Inc.	27	0%	472	9%	-445
Gas Transmission Northwest Station 8	11	0%	37	1%	-26
Greenbriar Rail Services	7	0%	-	0%	7
NW Grain Growers	34	0%	28	1%	6
Sandvik	-	0%	1	0%	-1
Simplot Agribusiness	9	0%	0	0%	9
Tyson**	76	1%	208**	4%	-132
Western Stockmen	19	0%	-	0%	19
NONPOINT SOURCES					
Ag. Burning	0	0%	0	0%	0
Ag. Tilling Dust	2,380	34%	2,606	51%	-226
Ag. Harvesting Dust	324	5%	-	0%	324
Construction Dust	700	10%	-	0%	700
Paved Road Dust	412	6%	305	6%	107
Unpaved Road Dust	448	6%	124	2%	324
Mobile	57	1%	53	1%	4

~~Source~~	~~WMP2~~	~~(2014)~~	~~WMP1~~	~~(2002)~~	~~Difference (2014 - 2002)~~
~~TOTAL ALL SOURCES~~	~~6,989~~	~~100%~~	~~5,088~~	~~100%~~	~~1,901~~

~~* Simplot Feeders was counted as a small point source in the 2002 inventory~~
~~** Formerly Iowa Beef Processor~~

3.1.1 Changes to emission sources: Differences between 2002 and 2014 emission inventories.

Emission sources in the Wallula Maintenance Area have not changed much. Except for a few small sources and ~~an increase in activity (and adding~~ new equipment for corn and hay~~)~~ at the Simplot facility, there has been little change in emission sources. Ecology included emissions estimates for the same categories as the first maintenance plan in this attainment inventory and added construction dust and agricultural harvesting. Notable changes for specific sources are below:

- The Wallula Generating Station, a 1,300 MW gas turbine power plant was never built, (not to be confused with existing Gas Transmission NW, station 8 that began operation in 1996).
- Beef feedlot emissions, new emission factor~~, increase in activity.~~.
- Unpaved road dust vehicle miles traveled estimates increased.

Though the emissions sources are similar, some estimation methods, emission factors, and tools have changed. The changes resulted in higher estimates for some sources and lower for others.

For example, Ecology updated the emission factor from cattle feedlots to reflect the latest research. Ecology used the Bonifacio study (Bonifacio, 2012) as the basis of the new emission factor. This highly detailed study occurred over multiple years and reported emission factors in a variety of contexts. The new feedlot emission factor is approximately eight times higher than the old factor. See Appendix A., Emission Inventory Documentation, for details.

Table ~~8~~7 Comparison of WMP2 Base Year 2014 to WMP1 Base Year 2002 PM_{10} Emissions Inventory

Source	2014 WMP2 (lbs per day)	2014 WMP2 (%)	2002 WMP1 (lbs per day)	2002 WMP1 (%)	2014 - 2002 Difference (lbs per day)
POINT SOURCES ≥ 70 Tons PTE					
Boise Paper	659	10%	1,035	20%	-376
Simplot Feeders *	~~1826~~ 1,147	~~26~~18%	219	4%	~~1607~~ 928
POINT SOURCES < 70 Tons PTE					
Agrium US Inc.	27	0%	472	9%	-445
Gas Transmission NW Station 8	11	0%	37	1%	-26
Greenbriar Rail Services	7	0%	-	0%	7

Source	2014 WMP2 (lbs per day)	2014 WMP2 (%)	2002 WMP1 (lbs per day)	2002 WMP1 (%)	2014 - 2002 Difference (lbs per day)
NW Grain Growers	34	1%	28	1%	6
Sandvik			1	0%	-1
Simplot Agribusiness	9	0%	0	0%	9
Tessenderlo Kerley Inc.	24	0%		0%	24
Tyson **	76	1%	208	4%	-132
Western Stockmen	19	0%		0%	19
NONPOINT SOURCES					
Ag. Burning	0	0%	0	0%	0
Ag. Tilling Dust	2,380	38%	2,606	51%	-226
Ag. Harvesting Dust	324	5%		0%	324
Construction Dust	700	11%		0%	700
Paved Road Dust	412	7%	305	6%	107
Unpaved Road Dust	448	7%	124	2%	324
MOBILE SOURCES					
All Mobile	57	1%	53	1%	4
TOTAL ALL SOURCES	**~~6989~~ 6,334**	**100%**	**5,088**	**100%**	**~~1901~~1,246**

* Simplot Feeders was counted as a small point source in the 2002 inventory

** Formerly Iowa Beef Processor

3.1.2 Temporal and spatial allocation

This section lays out how Ecology allocated the county emissions to derive the emissions inside the maintenance area only, and how Ecology chose which months to include as the season with the highest emissions. The emission inventory documentation has the details.

Ecology determined the PM_{10} season as the months with the highest monitored concentrations and emissions. These conditions occur in the summer and early fall months. Ecology defined the PM_{10} season in the first maintenance plan as June to September, based on monitoring data from 1996 – 2000. For this plan, Ecology reevaluated the season using data from the Kennewick-Metaline monitoring site from 2012 - 2016 (See Section 3 in the Emission Inventory Documentation, Appendix A.2)). Ecology calculated statistics both with and without exceedance days. Table 9 shows monthly median, mean, 3rd quartile, and max concentrations monitored. Higher median, mean, and 3rd quartile values generally occur May - October. Ecology excluded high wind events from the emissions inventory because they are intermittent and uncontrollable. When high wind days are excluded from monitored values, higher PM_{10} statistics generally occur July – October, with higher max concentrations consistently monitored from June to October. Based on this analysis, the season used for this emission inventory and the projection years, was June to October. ~~The recent reevaluation led Ecology to define June to October as the PM_{10} season. Ecology estimated emissions for each source category for each month in the season. Ecology summed the highest monthly emissions for each source to represent a typical season day's emissions.~~

~~Table 9 shows monthly median, mean, 3rd quartile, and max concentrations. Ecology calculated statistics both with and without exceedance days (top) and also without high wind events (bottom). Using the median, mean, and 3rd quartile, higher values generally occur May - October. Ecology did not consider high wind events in the inventory. By focusing on the days without high winds, higher values generally occur July – October.~~

Table ~~9~~8 Kennewick-Metaline Monthly PM_{10} ~~Concentrations~~ Statistics in µg/m³: 2012 ~~-~~ – 2016
(Statistics that changed when exceedance days were excluded are shown in parentheses)

Month	Median	Mean	3rd Quartile	Max
1	7	9.8 (8.4)	10	215 (103)
2	9	11.4	12	89
3	10	13.9	16	104
4	12	15.4	18	83
5	17	17.8	23	63
6	15	18.1	22	98
7	20.5	22.9	27	87

Month	Median	Mean	3rd Quartile	Max
8	25	34.1 (29.9)	36 (35)	589 (130)
9	21.5 (21)	27.7 (26.2)	31.3 (31)	226 (113)
10	14	20.8 (18.2)	24	222 (92)
11	10	17.8 (11.5)	14.3 (14)	619 (33)
12	7	8.7	10	34

-	-	With	Exceedances			Without	Exceedances	
Month	Median	Mean	3rd Quartile	Max	Median	Mean	3rd Quartile	Max
1	7	9.834	10	215	7	8.41	10	103
2	9	11.39	12	89	9	11.39	12	89
3	10	13.91	16	104	10	13.91	16	104
4	12	15.41	18	83	12	15.41	18	83
5	17	17.83	23	63	17	17.83	23	63
6	15	18.12	22	98	15	18.12	22	98
7	20.5	22.91	27	87	20.5	22.91	27	87
8	25	34.13	36	589	25	29.86	35	130
9	21.5	27.66	31.25	226	21	26.23	31	113
10	14	20.79	24	222	14	18.22	24	92
11	10	17.76	14.25	619	10	11.49	14	33
12	7	8.687	10	34	7	8.687	10	34

The recent reevaluation led Ecology to define June to October as the PM_{10} season. Ecology estimated emissions for each source category for each month in the season. Ecology summed the highest monthly emissions for each source to represent a typical season day's emissions. Based on this analysis, the season used for this emission inventory and the projection years, was June to October.

3.1.3 Wintertime PM coarse contribution confirmed

As part of the review of the season, the data show that PM_{10} maximums occur in the winter (Jan-March) and summer (June to October). In order to be sure that the high winter concentrations were not due to a greater percentage of fine particulate matter and the formation of secondary particulate matter, Ecology compared the monitored value's percentages of both coarse and fine particulate matter. The table below shows the high PM_{10} days (24-hr avg. > 60 µg/m3) that occurred in the winter, (Jan through March) from 2012 through 2016.

Table ~~10~~ 9 $PM_{2.5}$ and PM_{10} on high PM_{10} days in winter, 2012-2016

Date	NPM2.5	TPM10	Maximum wind speed	PM10: PM2.5
1/11/2014	2.4	215	-	90:1
3/19/2014	3.3	104	-	32:1
1/13/2014	3	103	-	-
2/25/2012	2.1	89	-	-
3/1/2014	5.6	68	13	-
2/28/2016	3.6	64	-	-
3/23/2015		60	-	-

3.1.4 PM distribution – Coarse mass dominates when concentrations are high

Table ~~11~~ 10 shows the 30 highest concentrations from 2012 - 2016. The exceedances (> 150 µg/m^3) and most of the other high concentrations are associated with high winds. The data also show that the percentage of coarse mass (PMc: particulate matter with an aerodynamic diameter between 2.5 µm and 10 µm) was greater than 84 percent for all but four days. Ecology monitored extreme wildfire smoke during the four days (marked with *) when the coarse mass (PMc) was less than 84 percent. This indicates that wind-blown dust sources dominated the high concentration days.

Table ~~11~~~~10~~ Kennewick-Metaline 30 Highest PM_{10} Concentrations in µg/m^3: 2012 - 2016

PM_{10}	$NPM_{2.5}$	Max. Wind Speed (mph)	Coarse Mass	Date
619	6	38	99%	11/2/2013
589	14.9	28.6	97%	8/14/2015
331	2.3	32.8	99%	11/17/2015
222	7.5	20.4	97%	10/28/2013
215	2.4	31	99%	1/11/2014
208	3	29.5	99%	10/30/2015
130	12.4	NA	90%	8/12/2014
113	3.2	21.9	97%	9/20/2015
112	10	20.8	91%	9/9/2012
104	3.3	26	97%	3/19/2014
103	3	29.4	97%	1/13/2014
98	5	NA	95%	6/12/2014
92	5.2	24.3	94%	10/7/2013
91	5	23	95%	10/10/2015
89	2.1	27.6	98%	2/25/2012
87	6.8	NA	92%	7/23/2014
83	2.1	33.3	97%	4/7/2013
82	45.7	8.6	44%	8/24/2015*
76	35	7.5	54%	9/21/2012*
72	3.8	24.2	95%	4/27/2013
72	9.4	20.2	87%	7/10/2015
71	4.9	20.2	93%	8/2/2016
71	6.1	15.8	91%	8/27/2016
69	5.7	11.1	92%	8/19/2016

PM_{10}	$NPM_{2.5}$	Max. Wind Speed (mph)	Coarse Mass	Date
68	30.4	4.9	55%	9/20/2012*
68	5.6	13.6	92%	3/1/2014
67	3.2	29.2	95%	4/10/2013
67	35.8	6.4	47%	8/22/2015*
66	10.4	19.8	84%	9/18/2014
66	9.5	15.3	86%	10/2/2015

Meteorological data collection in Kennewick started in August of 2012, so Ecology substituted Burbank data from January through July 2012. Table shows the monthly PM_{10} median, mean, 3rd quartile, and maximum values when wind speeds are 25 miles per hour; Table shows the same statistics when the hourly wind speed is 18 miles per hour.

Table ~~12~~11 PM$_{10}$ Summary Statistics When Max Hourly Wind <25 miles per hour

Month	Median	Mean	3rd Quartile	Max
1	7	7.421	10	19
2	9	10.23	12	64
3	10	12.22	15	68
4	12	14.49	18	72
5	16	17.33	23	39
6	16	18.33	23	60
7	20	22.09	27	72
8	27.5	32.72	41.25	82
9	22	27.07	32	113
10	14	19.28	24	222
11	10	11.41	14	33
12	7	8.789	10	34

Table ~~13~~ 12 PM$_{10}$ Summary Statistics When Hourly Wind <18 miles per hour

Month	Median	Mean	3rd Quartile	Max
1	7	7.59	10	19
2	9	9.62	12	27
3	10	12.35	15	68
4	12	13.26	17	37
5	15	16.94	22.5	38
6	16	17.01	22	41
7	19	20.65	26	60
8	27	32.19	41	82
9	21	25.55	32	76
10	14.5	17.44	23.75	66
11	10.5	12.03	15	33
12	7	8.963	10	30

Using the hourly wind-speed threshold of 18 mph shows that winter (Jan-March) is not generally a high PM$_{10}$ season in the absence of wind-blown dust. On March 1, 2014 there was a max value of 68 µg/m^3 that was not associated with high winds. However, March was not included in the PM$_{10}$ season since this was a lone event during the five-year period that occurred on a day with 3 hours of missing data.

This analysis demonstrates that PM$_{10}$ in the winter is not a function of woodstove smoke. Rather the majority of the wintertime particulate is from coarse particulate sources, such as windblown dust, road dust, etc. This information shows that the coarse mass is the largest percentage of the

PM_{10} when winds are high, even in the wintertime, and the summer season should be June through October.

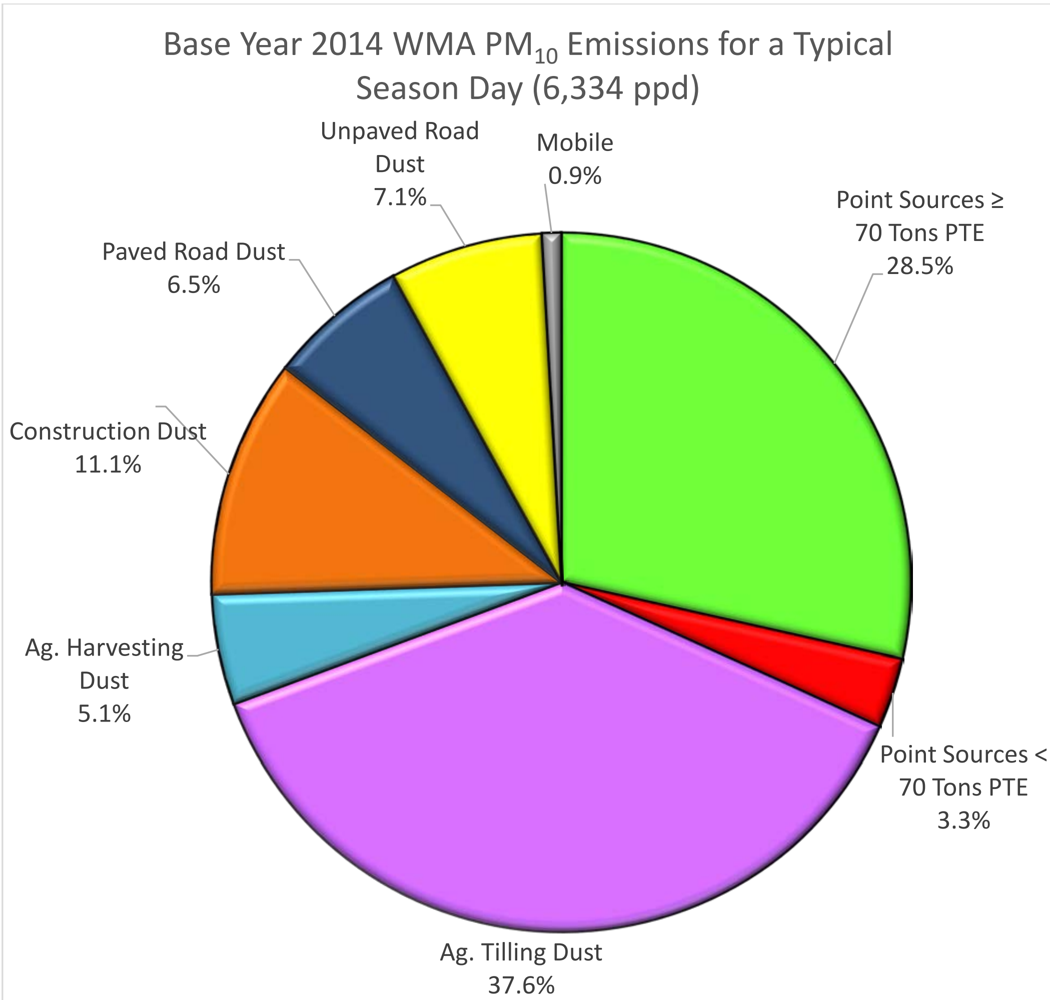
3.2 Base Year 2014 emissions inventory

Ecology based emission inventories on county 2014 or 2015 emission years and then spatially and temporally allocated for the Wallula Maintenance Area. The area is primarily agricultural with grain and row crops, poplar plantations, a large cattle feedlot and a pulp and paper mill. There are also several smaller commercial/industrial sources, as well as public roads, rail lines and marine traffic that contribute particulate matter to the area.

The 2014 base year emissions inventory for a typical PM_{10} season day in the maintenance area, which occurs from June through October, indicates that emissions come from agricultural tilling and harvesting (3943%); a cattle feedlot (2618%); the pulp and paper mill (9%); and10%); other point sources; (3%); road and construction dust; (25%); and motor vehicles (26mobile sources (1%). Motor vehicles are an insignificant source of PM_{10} emissions and justifies exclusion from regional analysis for transportation conformity[20,22]. Since coarse mass is the largest percentage of particulate matter detected, there is no need to include precursor emissions in the inventories.

Since Wwoodstoves are used most heavily in the wintertime, so they do not significantly contribute to the pounds per season day totals. Furthermore, days with large PM_{10} concentrations are mostly impacted by coarse particulate (PM_{10} – $PM_{2.5}$; e.g. dust); thus the emissions inventory was developed for sources of coarse particulate and excludes sources that only emit fine particulate, such as woodstove emissions. Therefore, Ecology did not include emissions from woodstoves in either the inventory for the serious maintenance plan (May 2005) or this emission inventory or projections. Ecology did not include residential wood combustion in the EI because it is only a small source on days with large PM_{10} concentrations.

[20 21] Washington made a demonstration in the WMA serious attainment plan, Section 4.7 (2004) that motor vehicles do not now or in the future contribute significantly to nonattainment and requested an exemption from regional analysis for transportation conformity. Although, EPA granted this exemption, project-level transportation conformity requirements still apply.


Base Year 2014 WMA PM10 Emissions for a Typical Season Day (6,334 ppd)
Unpaved Road Dust 7.1%
Mobile 0.9%
Point Sources ≥ 70 Tons PTE 28.5%
Paved Road Dust 6.5%
Construction Dust 11.1%
Ag. Harvesting Dust 5.1%
Point Sources < 70 Tons PTE 3.3%
Ag. Tilling Dust 37.6%

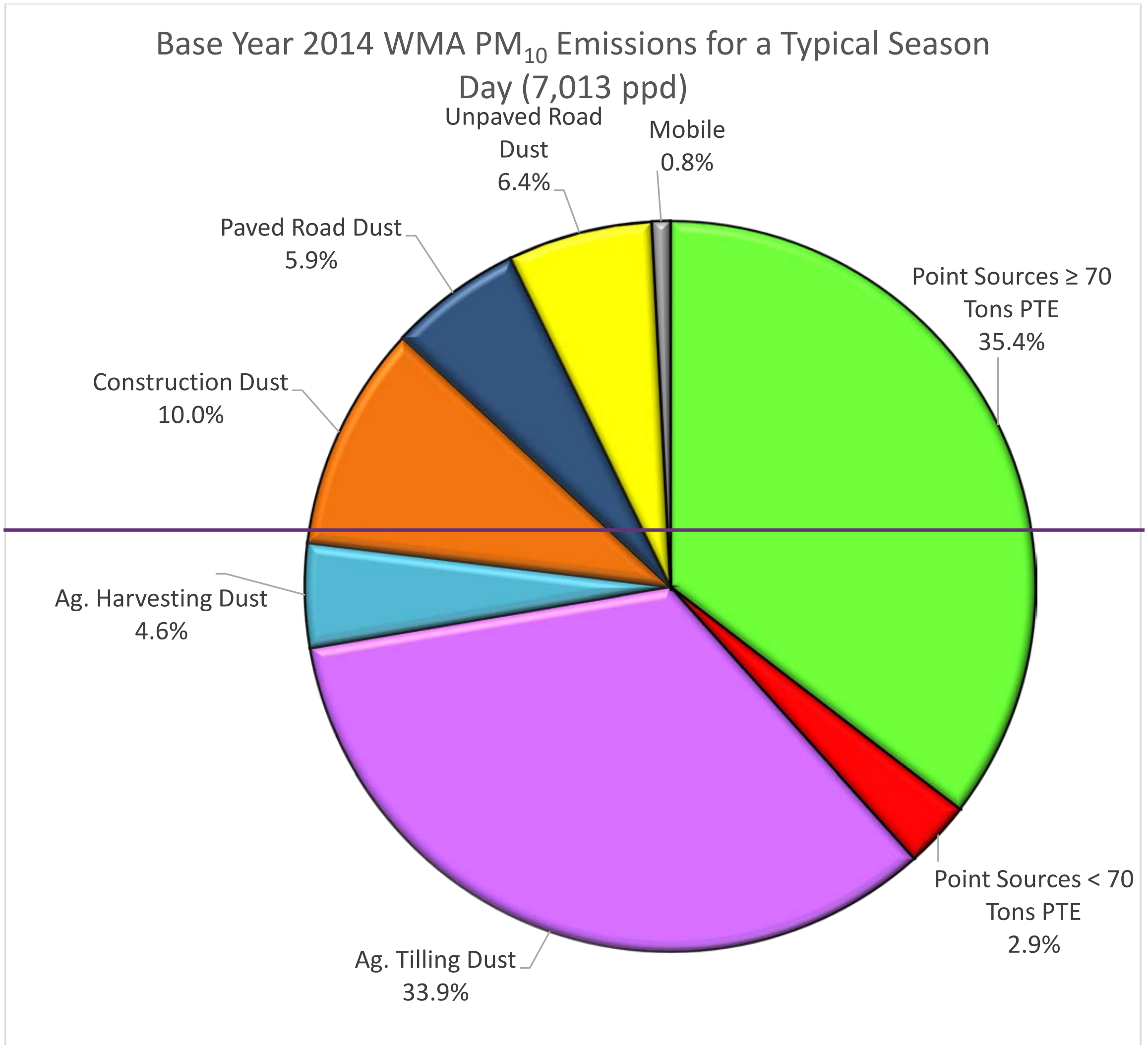


Figure 10 Source Categories for Base Year 2014, Percent Pounds Per Season Day

Table ~~14~~13 below shows the emissions in the WMA by source type, category and includes tons per year, pounds and the percentage per season day.

Table ~~14~~ 13 Base Year 2014 Wallula Maintenance Area PM_{10} Emissions Summary

Source Type	**Category**	**Tons per Year**	**Pounds per Season Day**	**% Pounds per Season Day**
Point	≥ 70 Tons PTE	~~453~~330	~~2,485~~1,806	~~35~~29%
Point	< 70 Tons PTE	32	206	3%
Nonpoint	Ag. Burning	11	0	0%
Nonpoint	Ag. Tilling Dust	231	2,380	~~34~~38%
Nonpoint	Ag. Harvesting Dust	14	324	5%
Nonpoint	Construction Dust	92	700	~~10~~11%
Nonpoint	Paved Road Dust	53	412	~~6~~7%
Nonpoint	Unpaved Road Dust	62	448	~~6~~7%
Onroad	Mobile	10	57	1%
	All Sources Total	**~~958~~835**	**~~7,013~~6,334**	

3.2.1 Maintenance area point sources

Figure 11 shows the location of regulated point sources.

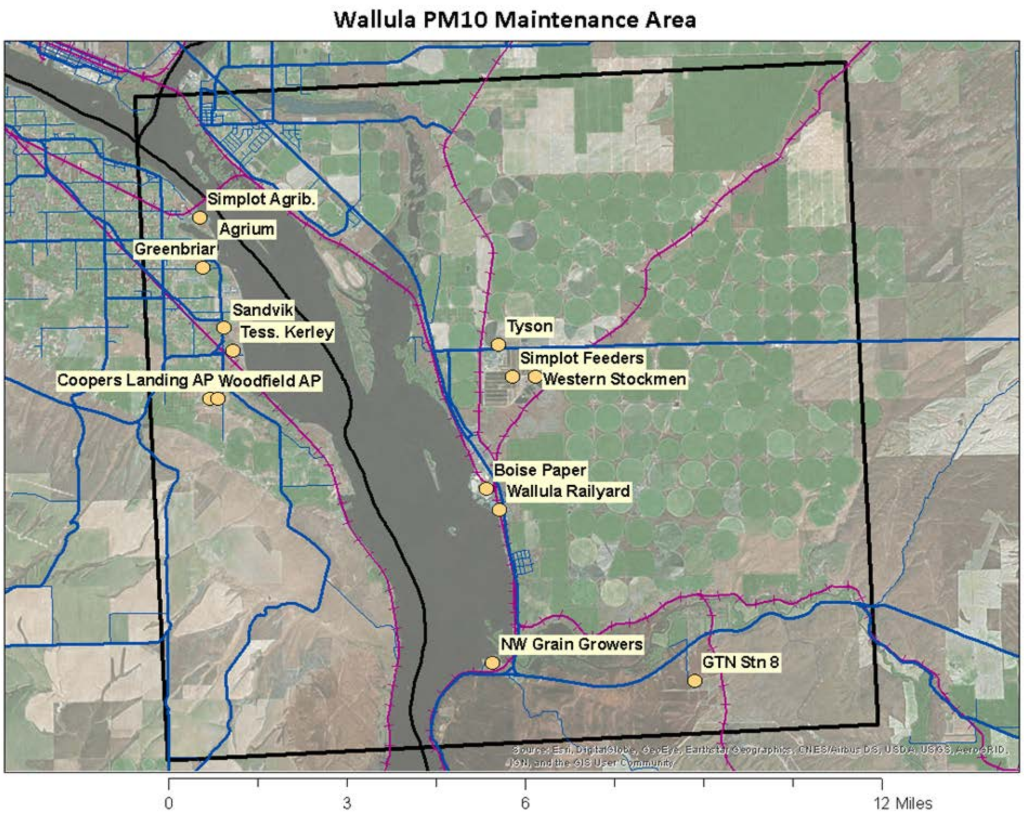


Figure 2 Regulated Air Emission Facilities, 2014

Table ~~15~~14 shows point source emissions for the Wallula Maintenance Area. Boise Paper and Simplot Feeders area the two largest emissions sources.

Table ~~15~~ 14 Base Year 2014 Point ~~Sources~~Source Emissions, Wallula Maintenance Area

Source Name	Emission Year	Tons per Year	Pounds per Season Day	% Pounds per Season Day
Sources > 70 tpy				
Boise Paper	2014	120	659	~~24.5~~32.7%
Simplot Feeders	2014	~~333~~209	1,~~826~~147	~~67.9~~57.0%
Sources < 70 tpy				
Agrium US Inc.	2014	2	27	1.~~0~~3%

Source Name	Emission Year	Tons per Year	Pounds per Season Day	% Pounds per Season Day
Gas Transmission ~~Northwest~~NW Station 8	2014	2	11	0.~~4~~5%
Greenbriar Rail Services	2014	1	7	0.~~2~~3%
NW Grain Growers	2015	4	34	1.~~3~~7%
Simplot Agribusiness	2014	1	9	0.~~3~~4%
Tessenderlo Kerley Inc.	2014	4	24	~~0.9~~1.2%
Tyson	2014	14	76	~~2~~3.8%
Western Stockmen	2015	3	19	0.~~7~~9%
All Point sources		**~~485~~360**	**2,~~691~~2,013**	

3.2.2 Nonpoint and mobile sources

Nonpoint and mobile sources include agricultural tilling, harvesting and burning as well as emissions from mobile sources and road dust. For more details on assumptions and estimation sources see Appendix A. Emission Inventory Documents.

Agricultural Dust: Agricultural dust is a major and variable source of emissions in the maintenance area. Ecology calculated emissions for tilling and harvesting as described in the Emission Documentation (sections 5.2.2 and 5.2.3). The agricultural crops grown in the largest amounts in the WMA are wheat (winter, spring), corn (sweet and feed), hay (timothy and alfalfa), peas, and potatoes.[3]

Mobile Sources: Mobile sources continue to be an insignificant source of PM_{10} emissions in the WMA. As a result, a motor vehicle emission budget is not required and transportation conformity does not apply in this area (see 40 CFR 93 109(k)).

3.3 Projected inventories

Ecology is providing three projection year inventories, 2020, 2025 and 2030. For details see Appendix Z, AA, BBB, respectively within Appendix A.1 and A.2. Emission Inventory Preparation Documentation. Table ~~16~~ 15 provides a summary of the three projected years in tons per year. Following tables show projected tons per year, seasonal pounds per day, and percentage pounds percentage of lbs per season day for 2020, 2025, and 2030. Graphs are provided for projected emission inventory years, lbs per season day.

[3] 2014 National Agriculture Statistical Service (NASS) data for county emissions and the 2016 WA Dept. of Ag shapefile for spatially distributing to the maintenance area.
<https://agr.wa.gov/FP/Pubs/docs/2016WSDACropDistributionMetadata.pdf>

Table ~~16~~ 15 Summary of Projected Emission Inventory Years, 2020, 2025 and 2030, tpy

Source Type	Category	2020	2025	2030
Point	≥ 70 Tons PTE	654	654	654
Point	< 70 Tons PTE	80	80	80
Nonpoint	Ag. Burning	11	11	11
Nonpoint	Ag. Tilling Dust	231	231	231
Nonpoint	Ag. Harvesting Dust	14	14	14
Nonpoint	Construction Dust	97	102	106
Nonpoint	Paved Road Dust	56	59	66
Nonpoint	Unpaved Road Dust	66	68	71
Onroad	Mobile	8	7	7
	All Sources Total	1,216	1,226	1,241

Figure 12 below shows source categories for a typical season day for projection year 2020.

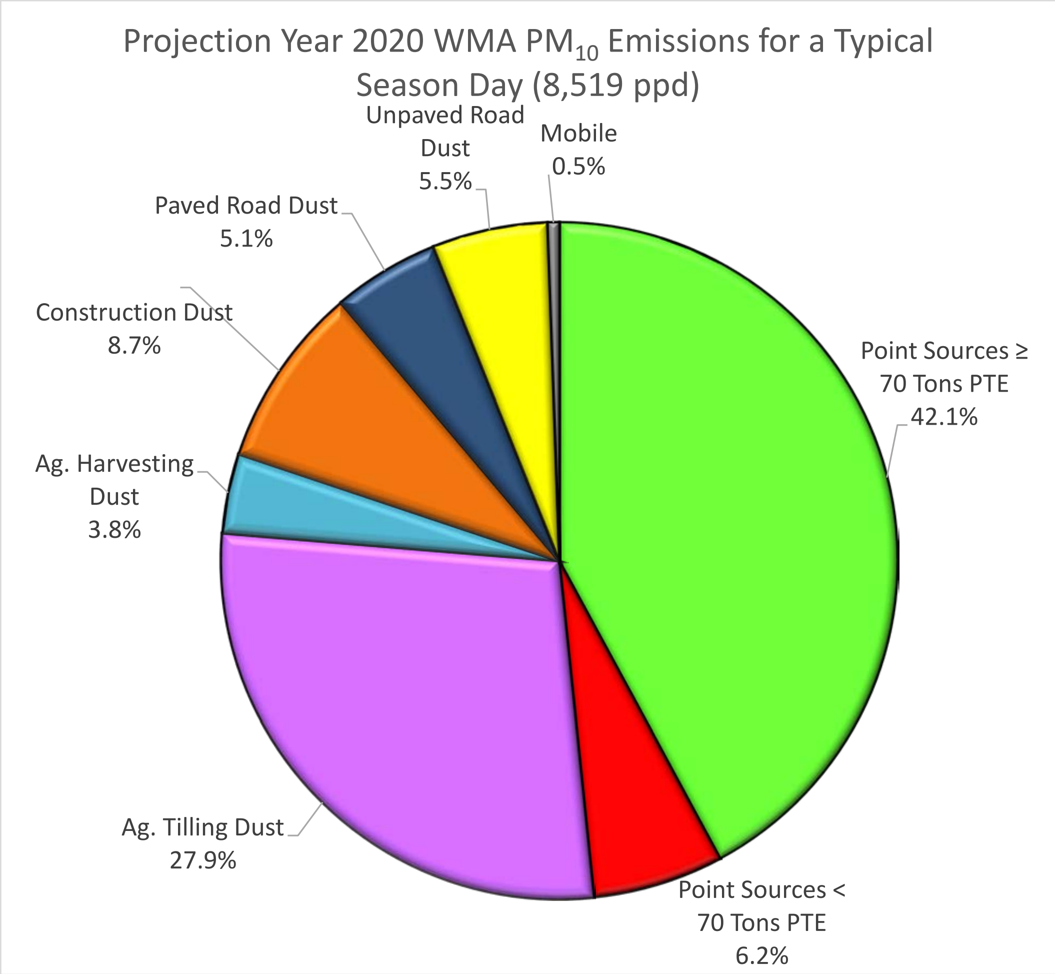


Figure 12 Projection Year 2020 PM_{10} Emissions, Pounds per Season

Day Table 17 16 Projection Year 2020 PM_{10} Emissions Summary

Source Type	Category	Tons per Year	Seasonal Pounds per Day	% Pounds per Day
Point	≥ 70 Tons PTE	654	3,588	42%
Point	< 70 Tons PTE	80	532	6%
Nonpoint	Ag. Burning	11	0	0%
Nonpoint	Ag. Tilling Dust	231	2,380	28%

Source Type	Category	Tons per Year	Seasonal Pounds per Day	% Pounds per Day
Nonpoint	Ag. Harvesting Dust	14	324	4%
Nonpoint	Construction Dust	97	742	9%
Nonpoint	Paved Road Dust	56	435	5%
Nonpoint	Unpaved Road Dust	66	471	6%
Onroad	Mobile	8	46	1%
	All Sources Total	**1,216**	**8,519**	

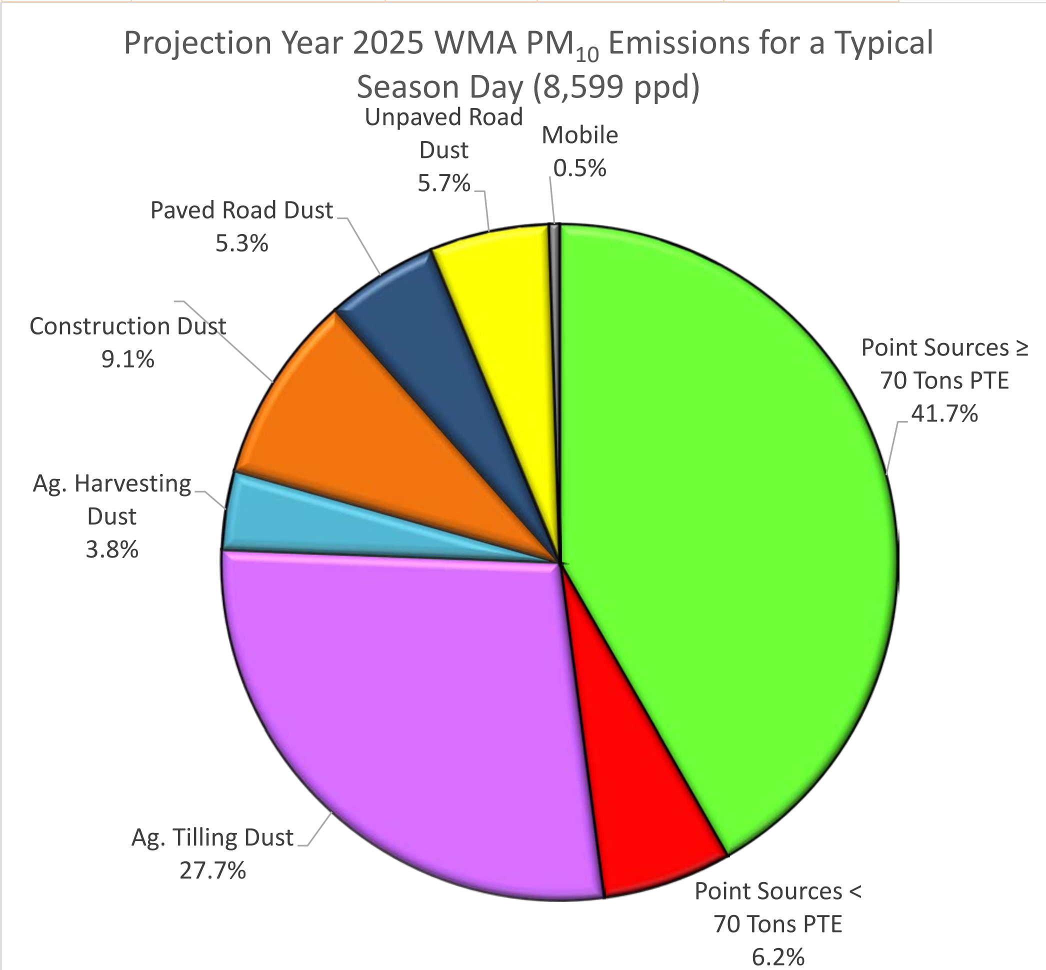


Figure 13 Emissions for Projection Year 2025, Pounds Per Season Day

Table ~~18~~ 17 below shows tons per year, seasonal pounds per day and percent pounds per day for projection year 2025.

Table 17 Projection Year 2025 PM_{10} Emissions Summary

Source Type	Category	Tons per Year	Seasonal Pounds per Day	% Pounds per Day
Point	≥ 70 Tons PTE	654	3,588	42%
Point	< 70 Tons PTE	80	532	6%
Nonpoint	Ag. Burning	11	0	0%
Nonpoint	Ag. Tilling Dust	231	2,380	28%
Nonpoint	Ag. Harvesting Dust	14	324	4%
Nonpoint	Construction Dust	102	780	9%
Nonpoint	Paved Road Dust	59	459	5%
Nonpoint	Unpaved Road Dust	68	492	6%
Onroad	Mobile	7	42	0%
	All Sources Total	**1,226**	**8,599**	

Figure 14 below shows the various emission sources, pounds and percentages for a typical season day for projection year 2030 in the WMA.

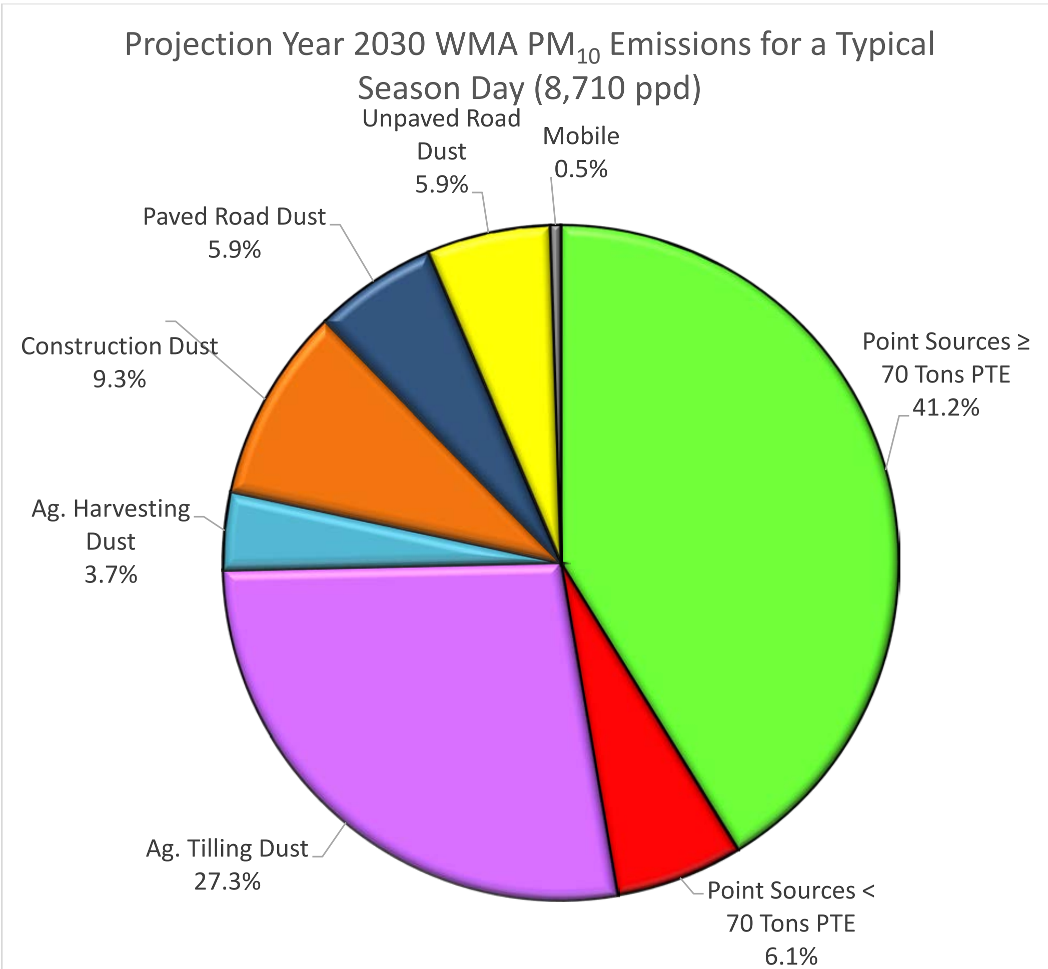


Figure 14 Projection Year 2023 PM_{10}, Typical Season Day, lbs/day

Table ~~19~~ 18 below shows emissions from point, nonpoint and on-road emissions for projection year 2030.

Table ~~19~~ 18 Projection Year 2030 PM_{10} Emissions Summary

Source Type	Category	Tons per Year	Seasonal Pounds per Day	% Pounds per Day
Point	≥ 70 Tons PTE	654	3,588	41%
Point	< 70 Tons PTE	80	532	6%
Nonpoint	Ag. Burning	11	0	0%
Nonpoint	Ag. Tilling Dust	231	2,380	27%
Nonpoint	Ag. Harvesting Dust	14	324	4%
Nonpoint	Construction Dust	106	813	9%
Nonpoint	Paved Road Dust	66	514	6%
Nonpoint	Unpaved Road Dust	71	515	6%
Onroad	Mobile	7	43	0%
	All Sources Total	**1,241**	**8,710**	

As stated earlier, Simplot Feeders and Boise Cascade are the two largest point sources inside the maintenance area. Table ~~20~~ 19 shows the 2020 through 2030 projected PM_{10} ~~values~~emissions for ~~these and other~~all point sources in the WMA.

Table ~~20~~ 19 2020-2030 Projection Year Point Sources, Wallula Maintenance Area

Source Name	Tons per Year	Pounds per Season Day	% Pounds per Season Day
Sources > 70 tpy			
Boise Paper	184	1,010	24.5%
Simplot Feeders	471	2,578	62.6%
Sources < 70 tpy			
Agrium US Inc.	3	30	0.7%
Gas Transmission Northwest Station 8	4	22	0.5%
Greenbriar Rail Services	1	14	0.3%
NW Grain Growers	30	230	5.6%
Simplot Agribusiness	4	31	0.7%
Tessenderlo Kerley Inc.	5	27	0.7%
Tyson	27	148	3.6%
Western Stockmen	6	31	0.7%
All Point Sources	734	4,120	

4. Maintenance Demonstration

Table 1 ~~21~~ 20 below shows the monitored ~~values~~PM_{10} concentrations at Kennewick, with and without flagged or concurred upon exceedances due to natural events.

Table 1 ~~Monitoring values~~ Monitored PM_{10} concentrations related to attainment of the 24-hour NAAQS, 2013-2017

~~Kennewick~~Year	First Max	Second Max	Number of Exceedances
2013 (with natural events)	619	226	3
2013 (without natural events)	92	83	0
2014 (with natural events)	215	130	1
2014 (without natural events)	130	104	0
2015 (with natural events)	589	332	3
2015 (without natural events)	113	91	0
2016	76	71	0
2017 (with natural events)	261	207	3
2017 (without natural events)	107	103	0

The 24-hour PM_{10} standard is not to be exceeded more than once per year on average over a three year period. The three-year period evaluated for compliance was 2015-2017. The EER recommends that states submit, and the EPA review, only those flagged exceptional events necessary for demonstrating compliance with the PM_{10} standard. Therefore, in determining 2015-2017 attainment, EPA Region 10 concurred upon exceptional event demonstrations for:

- The August 14, 2015 high wind event in a letter dated May 23, 2016. (Two other high wind episodes were flagged as exceptional events in 2015; however, event demonstrations for these episodes were not necessary in meeting the three-year average for compliance with the PM10 standard as shown in the equation below).
- The three days with exceedances for the September 2017 wildfire event, submitted to EPA on March 20, 2019; EPA has notified Ecology that they expect to send the concurrence letter for two of three dates (9/5, 9/6) shortly.

The EER allows for a process to have data excluded for days impacted by natural events beyond the state's control, where anthropogenic sources are adequately controlled. Ecology may exclude monitoring data for exceedances influenced by exceptional events, like high winds or wildfire from compliance calculations once EPA concurs with Ecology's demonstration that the data meets the criteria in the EER.

For official compliance with the 24-hour PM_{10} standard, Ecology must show that the estimated exceedances are equal to or less than 1. Using the number of exceedances remaining from 2015, 2016 and 2017 after data for concurred upon events are excluded, the compliance value at Kennewick for the WMA is:

$$(2_{2015} + 0_{2016} + 1_{2017})/3) = 1$$

EPAs concurrences on these events are not final until EPA takes regulatory action. When EPA acts on this maintenance plan, the approval of the EE demos for the dates used for determining compliance will be final.

4.1 Projected emissions to future concentrations shows attainment

Ecology compared the 2014 Design Value to projected inventories. We subtracted background before calculations, and added background back in after calculations. The variables and results are shown in the table below.

Table ~~22~~21 Projected Design Value Calculation Variables

Variable, units	Value
2014 Design Value, µg/m³	112
Background, µg/m³, (From 1991 attainment plan (ref)	20
2014 lbs/season day all sources	~~7,013~~6,334
2025 projected emissions	8,~~519~~599
2030 projected emissions	8,~~599~~710

(2014 Design Value) x (Projected year emissions/2014 emissions) = Concentration in projected year

DV in 2025 w/o background correction $\quad 112 * \cancel{\left(\frac{8519}{7013}\right) = 136} \left(\frac{8599}{6334}\right) = 152$ µg/m³

Table ~~23~~ 22 Projected Design Value Calculation Results, with and without background removed

Calculation Parameters	Value, µg/m³
2025 DV (without background removed before calculation)	~~136~~152
2030 DV (without background removed before calculation)	~~138~~154
2025 DV (using 20 µg/m3 background)	~~132~~145
2030 DV (using 20 µg/m3 background)	~~133~~147

Equation 1. $\quad$ 2025 DV: $(112 - 20) * \left(\frac{\cancel{8519}8710}{\cancel{7013}8599}\Big/6334\right) + 20 = 1\cancel{12}25 + 20 = \cancel{132}145$

Equation 2. $\quad$ 2030 DV: $(112 - 20) * \cancel{\left(\frac{8599}{7013}\right)} \left(\frac{8710}{6334}\right) + 20 = 1\cancel{13}27 + 20 = 1\cancel{33}47$

Therefore, since the projected design value of ~~133~~ 145 is less than the NAAQS threshold of (150~~,~~ µg/m³, the WMA will continue to maintain the standard through the maintenance period (2025).

Ecology acknowledges that the projected Design Value is close to the NAAQS threshold. However, the projected Design Value was calculated using a worst-case-scenario that is primarily dependent on two factors described below.

1) The 2014 Design Value of 112 µg/m^3 was due to a wind event that occurred on September 9, 2012, when winds peaked at 20 mph. EPA defines a high-wind dust "exceptional event" as having average winds over 40 mph for at least one hour and PM_{10} concentrations exceeding 150 µg/m^3. EPA allows for a revised threshold of 25 mph for many western states and also acknowledges that, if soil has been disturbed (e.g. by tilling practices), winds of 18 mph would be enough to cause high-wind dust events. If a high-wind threshold of 18 mph was used, and all natural events were excluded, the 2014 Design Value would be 71 µg/m^3.

2) The projection of emissions from Simplot doubled the base year estimate due to the assumption that the facility would increase activity to the permitted allowable 80,000 head of cattle. If the actual maximum head of cattle reported at Simplot was used (53,302 head), the projected 2025 Design Value would be 132 µg/m^3.

For comparison, if the high-wind threshold of 18 mph was used and all natural events were excluded, combined with using the actual maximum head of cattle reported at Simplot, the projected 2025 Design Value would be 82 µg/m^3.