

WRAP Regional Haze Planning Workgroup  
 Emissions Inventory & Modeling Protocol Subcommittee  
 Recommendations for Base Year Modeling  
 2/1/2019

## Introduction

The Regional Haze Planning Work Group for Emission Inventories and Modeling Protocol (RHPWG EI & MP) Subcommittee solicited comments from state and local air agencies in the WRAP region on EPA's 2014 NEIv2. This work focused on pollutants and emissions sectors that had the potential to influence photochemical modeling for Regional Haze Planning, such as large PM sources and major point sources. The main criteria pollutants of concern that were reviewed for Regional Haze modeling include PM10, PM2.5, NOx, SO2, and NH3. This document briefly summarizes the 2014 NEI v2 and then lists feedback and suggested revisions received from WRAP members. The modeling contractor will use these suggestions when setting up the regional photochemical modeling system.

## 2014 NEI v2 State Summary

WRAP state anthropogenic emission summaries for criteria pollutants of concern are shown in the table and chart below (wildfire and biogenic emissions not included; tribal data not included).

*Table 1: Anthropogenic Emissions Summary from 2014 NEI v2*

State	PM10 (tons)	PM2.5 (tons)	NOx (tons)	SO2 (tons)	NH3 (tons)
Alaska	70,736	14,839	128,307	9,480	1,097
Arizona	285,924	58,413	216,575	43,634	33,605
California	450,273	148,408	549,966	25,930	438,605
Colorado	245,533	58,295	251,396	33,314	54,032
Hawaii	73,042	22,144	49,574	20,714	7,977
Idaho	369,524	74,538	84,236	7,088	76,487
Montana	369,253	84,180	112,522	24,612	27,817
Nevada	168,385	30,956	84,854	15,403	18,975
New Mexico	437,159	60,108	185,963	15,049	20,224
North Dakota	449,301	101,167	173,657	62,198	43,696
Oregon	457,083	107,155	130,828	15,635	28,417
South Dakota	347,478	81,526	68,209	15,948	62,859
Utah	183,018	37,053	173,121	26,713	21,669
Washington	263,775	90,915	237,184	30,410	42,435
Wyoming	193,832	36,993	160,199	56,651	10,980

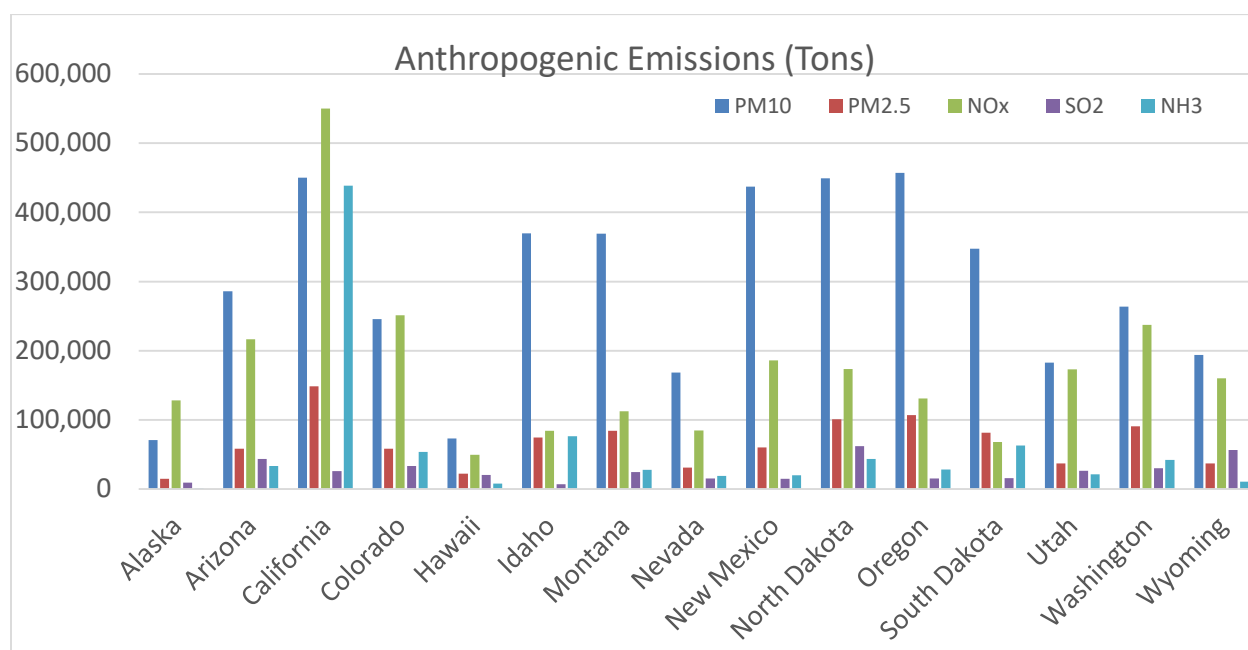


Figure 1: Anthropogenic Emissions Summary from 2014 NEI v2

## 2014 NEI v2 Sector Summary

WRAP state and tribal anthropogenic emission sector summaries for criteria pollutants of concern are shown in the pie charts below (wildfire and biogenic emissions not included). The top sectors are charted individually while all other sectors are lumped together. It is important to note that NEI Sector Summary data from EPA separates is aggregated by SCC, not the NAICS category. Thus, the sector summaries will split facility emissions across multiple sectors. For example, the emissions totals for “Industrial Processes – Petroleum Refineries” will be less than the total facility emissions for all petroleum refineries. This is because all boiler emissions are added into the “Fuel Combustion – Industrial Boilers, xxxxx” category, even if they are at a refinery facility.

Figure 2 shows that Unpaved Road Dust and Agricultural Dust make up more than half the PM10 emissions in the WRAP region. Figure 3 shows that Prescribed Fire, Unpaved Road Dust, and Agricultural Dust make up more than half the PM2.5 emissions in the WRAP region. Figure 4 shows that On-Road Vehicles and Coal Power Plants make up half of the NOx emissions in the WRAP region. Figure 5 shows that Coal Power Plants make up more than half of the SO2 emissions in the WRAP region. Figure 6 shows that Agricultural Activities make up 85% of the NH3 emissions in the WRAP region. More detailed sector summaries (e.g. by county) can be seen [here](#).

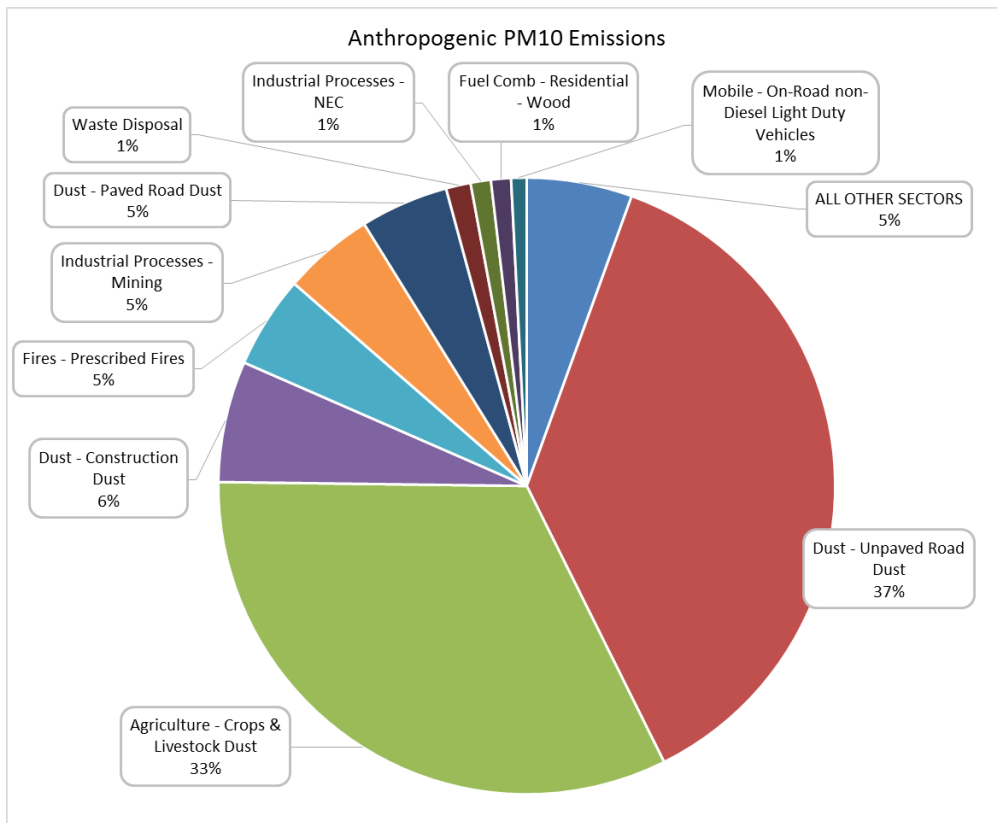


Figure 2: Anthropogenic PM10 Emissions Sector Summary 2014 NEI v2

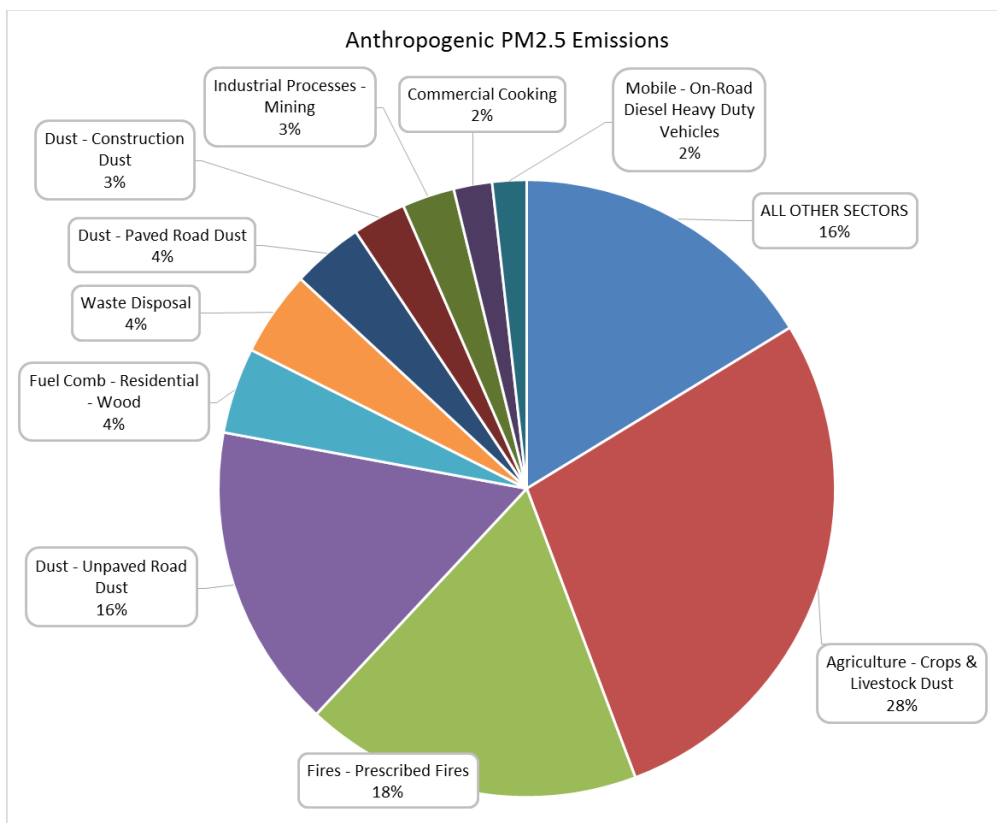


Figure 3: Anthropogenic PM2.5 Emissions Sector Summary 2014 NEI v2

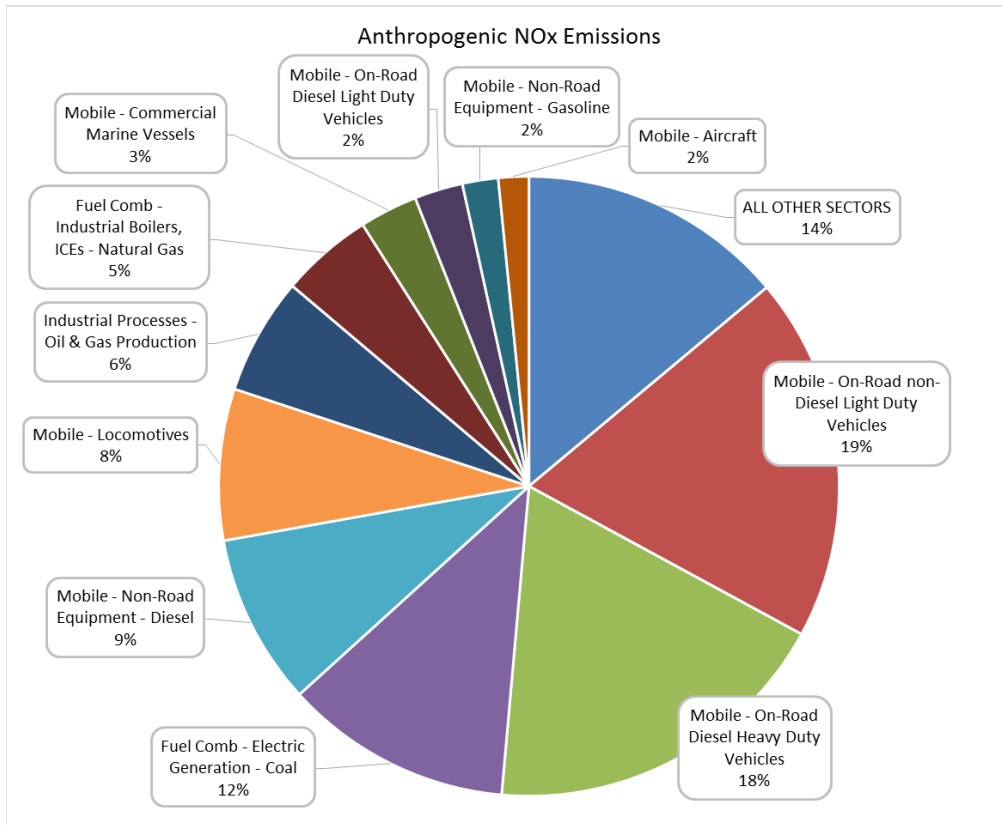


Figure 4: Anthropogenic NOx Emissions Sector Summary 2014 NEI v2

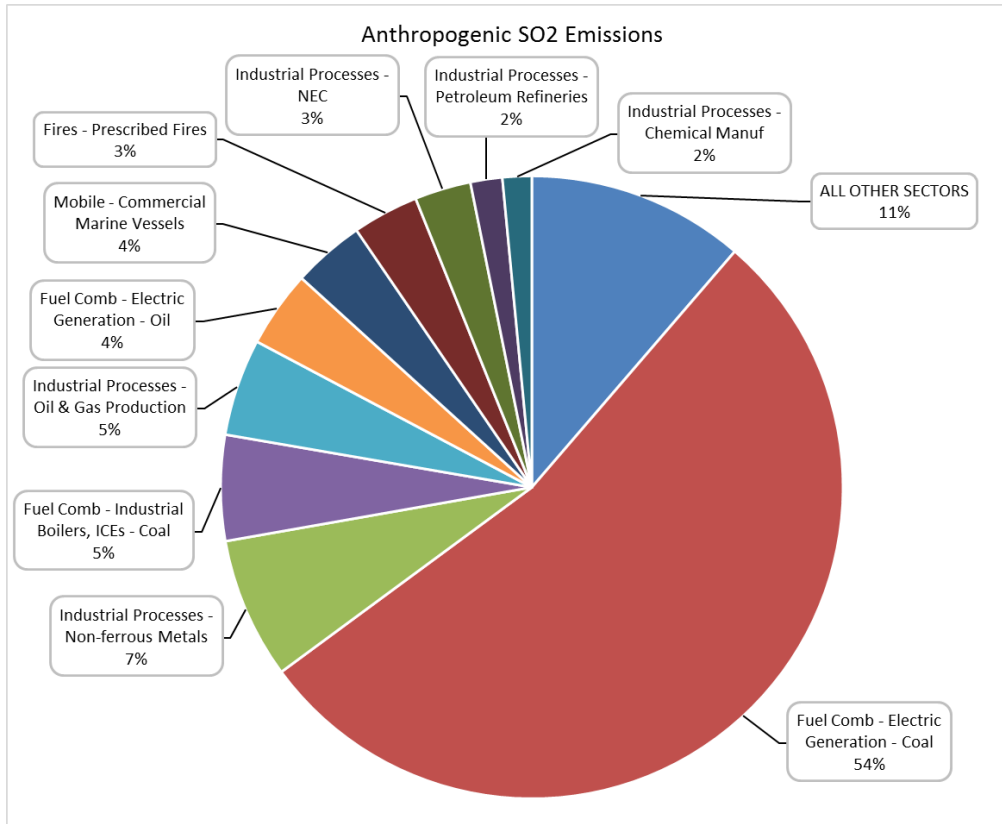


Figure 5: Anthropogenic SO2 Emissions Sector Summary 2014 NEI v2

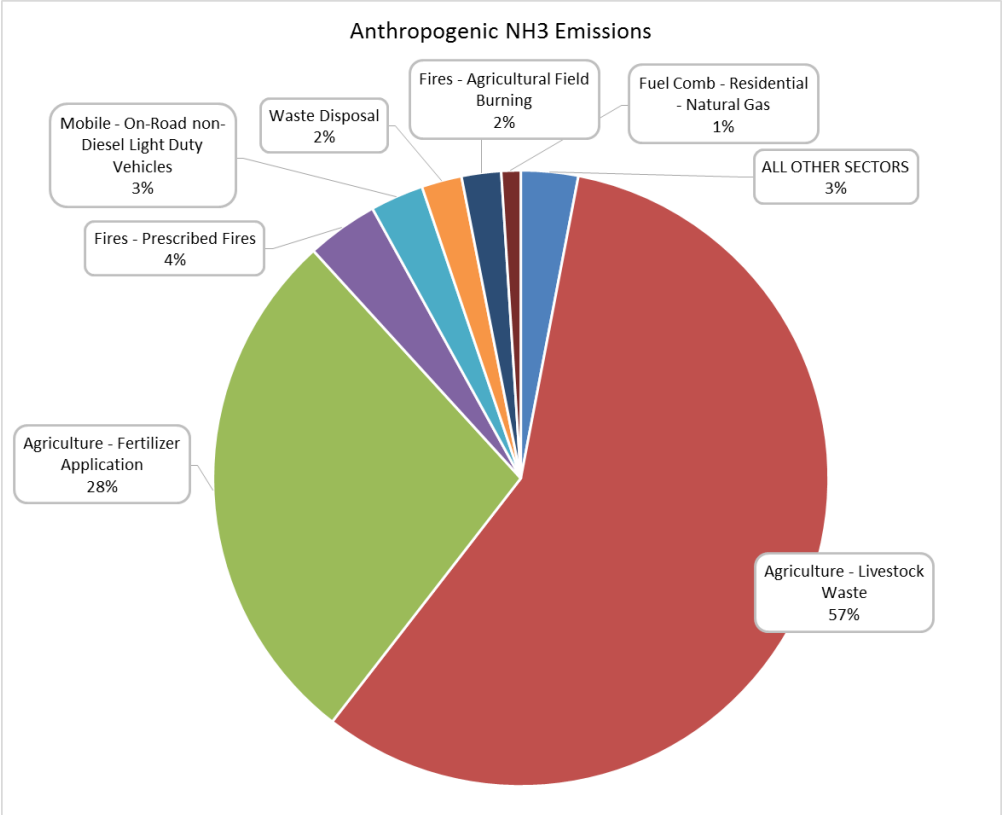


Figure 6: Anthropogenic NH3 Emissions Sector Summary 2014 NEI v2

## Feedback and Revisions of the 2014 NEI v2

States and Local Agencies that are part of the WRAP spent several months reviewing the 2014 NEI v2 summary data and model-ready data. Most updates and comments came from members of the RH EI & MP Subcommittee, but many other updates were provided by WRAP members not officially on the subcommittee. The EI & MP Subcommittee started monthly meetings on June 28, 2018 and spent time reviewing all emissions sectors except for Oil & Gas and Fire, which were assigned to their respective subcommittees. [This wiki page](#) was used as the primary site for posting original NEI v2 data and the revisions/comments submitted to the subcommittee. The review process focused on sector summaries, point source facility emissions, point source stack parameters, and MOVES on-road input data. A summary of the emissions updates requested is shown in Table 2. A more detailed list of emissions updates requested and comments is shown in Table 3.

Unfortunately, not all data submitted by states was ready for model inclusion. Where possible, data was compared to the NEI v2 and reformatted as “model ready” data. The following data was not used by the contractor for the “shakeout” round: Wyoming point source data (missing information), most Pima County data (missing information), and California point-source data (incorrect format). All data that was submitted to the contractor for the “shakeout” round is listed in Table 4. Data that is scheduled to be included in the 2<sup>nd</sup> version of base year modeling include: Pima county point sources, complete state inventory for California, and Wyoming point sources. Alaska also intends to submit several emissions changes for v2 of the base year modeling.

The subcommittee also tabulated a list of the states/agencies that submit minor source emissions to EPA (see Table 5). It is important to note that when stack parameters are not included in the model-ready files for point sources, a lookup table with default stack parameters by SCC code is used. However, if a record in the model-ready file has an “erptype” = 1, the emissions process should be modeled as a fugitive source and the stack parameter lookup values will not be used.

Table 2: Summary of Emissions Updates to 2014 NEIv2 submitted to RHPWG EI & MP Subcommittee from state and local air agencies.

State/Agency	Sector	Comments	Files provided	Emissions totals in update (TpY)	Emissions totals in 2014v2 NEI (TpY)	Status/notes		
California ARB	Facility point sources	Four EGU and nine nonEGU facilities missing from NEI	Facilities correction data file; stack parameters; stack reference to facility- unit-emissionsprocess	CO	11224	CO	10378	Data received. Update includes speciated VOCs. Stack parameters provided in supplemental spreadsheets.
				NH3	6.1	NH3	315	
				NOx	11830	NOx	10724	
				PM10-PRI	3177	PM10-PRI	2870	
				PM25-PRI	1716	PM25-PRI	1706	
				SO2	3657	SO2	2767	
				VOC	4257	VOC	5461	
Arizona, Maricopa County AQS	Facility Point Sources	Accurate point source data did not make it into the NEI for 21 sources due to a formatting error	Maricopa County point source updates	CO	1401.7	CO	1431.3	Data Received
				NH3	199.5	NH3	198.2	
				NOx	1627.1	NOx	1693.7	
				PM10-PRI	475	PM10-PRI	560.8	
				PM25-PRI	470.3	PM25-PRI	190.9	
				SO2	78.5	SO2	79.9	
				VOC	755.6	VOC	1671.3	
Arizona, Pima County DEQ	All for NOx, VOC	Pima EI applies to eastern half of county	Sector FF10 files, ERG report, spatial allocation files	NOx	19621	NOx	26021	Data received.
				VOC	104824	VOC	219554	
Idaho	RWC, Residential outdoor recreation	NEI lists only PM-FIL, PM-CON. Other pollutants not included in NEI; Could affect more states than ID	ID RWC correction file, includes PM-PRI (Filt + Cond)	PM10-PRI	1781	PM10-PRI	926	Data received. Update includes speciated VOCs, HAPS for selected SCCs that were not included in NEI
				PM25-PRI	1781	PM25-PRI	926	
				NOx	198	NOx	118	
				SO2	36	SO2	23	
				VOC	1941	VOC	691	
				CO	12594	CO	6483	
				NH3	99	NH3	54	
Washington ECY	Construction dust	EPA method underestimates values for eastern part of state	WA construction dust revisions	PM10-PRI	40627	PM10-PRI	20436	Data received
				PM25-PRI	4062.7	PM25-PRI	2043.6	

State/Agency	Sector	Comments	Files provided	Emissions totals in update (TpY)	Emissions totals in 2014v2 NEI (TpY)	Status/notes																												
Washington ECY	RWC fireplace emissions	ECY believes estimates for four counties are grossly overestimated and wants to replace with values from EPA RWC tool v3.2	WA fireplace emissions revisions for King, Pierce, Kitsap, Snohomish counties	<table border="1"> <tr><td>CO</td><td>1356</td></tr> <tr><td>NH3</td><td>16</td></tr> <tr><td>NOx</td><td>24</td></tr> <tr><td>PM10-PRI</td><td>215</td></tr> <tr><td>PM25-PRI</td><td>215</td></tr> <tr><td>SO2</td><td>3.6</td></tr> <tr><td>VOC</td><td>172</td></tr> </table>	CO	1356	NH3	16	NOx	24	PM10-PRI	215	PM25-PRI	215	SO2	3.6	VOC	172	<table border="1"> <tr><td>CO</td><td>17130</td></tr> <tr><td>NH3</td><td>207</td></tr> <tr><td>NOx</td><td>299</td></tr> <tr><td>PM10-PRI</td><td>2713</td></tr> <tr><td>PM25-PRI</td><td>2713</td></tr> <tr><td>SO2</td><td>46.0</td></tr> <tr><td>VOC</td><td>2173</td></tr> </table>	CO	17130	NH3	207	NOx	299	PM10-PRI	2713	PM25-PRI	2713	SO2	46.0	VOC	2173	Data received. Update does not include speciated VOCs. NEI contains speciated VOCs, etc. (e.g. formaldehyde at 206 TpY).
CO	1356																																	
NH3	16																																	
NOx	24																																	
PM10-PRI	215																																	
PM25-PRI	215																																	
SO2	3.6																																	
VOC	172																																	
CO	17130																																	
NH3	207																																	
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PM10-PRI	2713																																	
PM25-PRI	2713																																	
SO2	46.0																																	
VOC	2173																																	
Oregon DEQ	Unpaved Road Dust	EPA method overestimates unpaved road dust in Western Oregon	Unpaved road dust adjustments	<table border="1"> <tr><td>PM10-PRI</td><td>26839</td></tr> <tr><td>PM25-PRI</td><td>2664</td></tr> </table>	PM10-PRI	26839	PM25-PRI	2664	<table border="1"> <tr><td>PM10-PRI</td><td>299270</td></tr> <tr><td>PM25-PRI</td><td>29839</td></tr> </table>	PM10-PRI	299270	PM25-PRI	29839	Data received																				
PM10-PRI	26839																																	
PM25-PRI	2664																																	
PM10-PRI	299270																																	
PM25-PRI	29839																																	
Wyoming	Facility point sources	Update includes EIs for 50 Buttes and House Creek facilities	Mainline emissions file	<table border="1"> <tr><td>CO</td><td>27</td></tr> <tr><td>NOx</td><td>49</td></tr> <tr><td>SO2</td><td>0.3</td></tr> <tr><td>PM2.5-PRI</td><td>2.6</td></tr> <tr><td>PM10-PRI</td><td>2.6</td></tr> <tr><td>VOC</td><td>54</td></tr> </table>	CO	27	NOx	49	SO2	0.3	PM2.5-PRI	2.6	PM10-PRI	2.6	VOC	54	Data for these facilities were not submitted to EPA and are not in the NEI	Data received. Data provided include some speciated VOCs																
CO	27																																	
NOx	49																																	
SO2	0.3																																	
PM2.5-PRI	2.6																																	
PM10-PRI	2.6																																	
VOC	54																																	
Montana	Facility Point Sources	Many missing segments and facilities	All Point Sources	<table border="1"> <tr><td>CO</td><td>2479</td></tr> <tr><td>NOx</td><td>2633</td></tr> <tr><td>SO2</td><td>46.9</td></tr> <tr><td>PM2.5-PRI</td><td>437.7</td></tr> <tr><td>PM10-PRI</td><td>2355.2</td></tr> <tr><td>VOC</td><td>1300</td></tr> </table>	CO	2479	NOx	2633	SO2	46.9	PM2.5-PRI	437.7	PM10-PRI	2355.2	VOC	1300	Data for these facilities or segments were not submitted to EPA and are not in the NEI	Data received. Data missing from the NEI was separated out.																
CO	2479																																	
NOx	2633																																	
SO2	46.9																																	
PM2.5-PRI	437.7																																	
PM10-PRI	2355.2																																	
VOC	1300																																	



Table 3: Comments and Revisions Submitted to RHPWG EI & MP Subcommittee from state and local air agencies.

State	Reviewing Agency	2014NEIv2 Inventory	Comments	Attachments
Alaska	DAQ	Airport, marine, dust, wildfires, O&G	See attachment	<a href="#">Alaska comments</a>
	DAQ	Minor sources	List of minor sources reported for 2014 NEI	<a href="#">Alaska memo</a>
Arizona	AZDEQ	All sectors	No substitutions needed	<a href="#">Arizona comments</a>
	AZDEQ	Point source stack parameters	List of descriptors for non-airport SCCs with missing stack parameters	<a href="#">Comments on point source SCCs, AZSCCDescriptors</a>
	AZDEQ	Point source stack parameters missing values	No updates	<a href="#">Review of missing stack parameters</a>
	Maricopa County AQD	nonpoint; point source; onroad	nonpoint data are accurate; there are more accurate point source data that did not make it into the NEI due to a formmating error; onroad looks OK	<a href="#">Maricopa County comments</a> , <a href="#">Maricopa County point source updates</a>
	Pima County DEQ		Attached data were not submitted to EPA for inclusion into the 2014 NEIv2 dataset. These are Pima DEQ's best estimates for 2014. Inventories include annual NOx and VOCs, along with OSD, estimates. Note that inventories represent the eastern portion of Pima County.	<a href="#">Pima County comments</a> , <a href="#">Pima County.zip</a>
	Pinal County	All sectors, including unpaved road dust	EI person is reviewing; will respond with comments	<a href="#">Pinal County comments</a>
	Albuquerque	All sectors	No need for any changes	<a href="#">Albuquerque comments</a>
California	CARB	Mobile Sources	Email thread regarding use of CA's EMFAC vs. EPA's MOVES model for mobile source emissions	<a href="#">CARB Comments</a>
	CARB	Facility point sources	Correction data file for point source emissions from 13 facilities	<a href="#">Facilities correction data file</a> , <a href="#">Facilities correction memo</a>

State	Reviewing Agency	2014NEIv2 Inventory	Comments	Attachments
	CARB	Facility point sources	Stack parameter updates for point source emissions	<a href="#">CARB Stack Parameter Corrections</a> , <a href="#">Stack Reference to Facility-Unit-Emissions</a> , <a href="#">Stack parameters update memo</a>
	CARB	Nonpoint, Nonroad	see attachment	<a href="#">CARB Comments Huth</a>
	CARB	nonpoint updates in FF10 format	Zip file containing one file to remove cattle husbandry dust from solid waste categories; three files with "hard zeros" for various pollutants and counties in sectors relating to industrial boilers, oil and gas, and poultry husbandry.	<a href="#">California FF10 updates</a> ; <a href="#">Memo Huth</a>
Colorado	CDPHE	All sectors	Sectors appear consistent with [Colorado] data	<a href="#">Colorado Comments</a>
	CDPHE	Onroad Mobile	Issue with how EPA treated vehicle age distributions in 2014 NEI	<a href="#">Colorado comments on MOVES vehicle age distribution</a>
Hawaii	HDoH	See comments and data attachments	See attached comments	<a href="#">Hawaii comments</a> ; <a href="#">Hawaii Comparison of Phase 1 spreadsheet to HI SLEIS</a> ; <a href="#">HI Data Pt Src review</a>
Idaho	IDEQ	Residential wood combustion	Updates to 2014v2 RWC inventories for Idaho	<a href="#">Idaho Comments</a> ; <a href="#">2014 NEIv2 RWC Corrected</a>
Montana	MTDEQ	All sectors	No changes to 2014 NEI; potential issues with O&G inventories in Big Horn Basin (review pending)	<a href="#">Montana Comments</a>
	MTDEQ	Stack parameters	Updates for Oldcastle facility	<a href="#">Oldcastle update file</a> , <a href="#">Montana memo</a>
	MTDEQ	oilgas, ptegu, ptnonipm	Data missing from NEIv2	<a href="#">MT updates for oilgas ptegu</a> ; <a href="#">MT updates for oilgas ptegu ptnonipm data</a>
Nevada	NDEP	All sectors, emphasis on major point sources	No changes at this time; Washoe County indicated their MOVES inputs were not included	<a href="#">Nevada comments</a>
	Clark County	All sectors	Data are OK to use as is	<a href="#">Clark County comments</a>
	Washoe County	all sectors	NEI data are correct for Washoe County	<a href="#">Washoe County comments</a>

State	Reviewing Agency	2014NEIv2 Inventory	Comments	Attachments
	NDEP	default stack parameters	Clarification on fields in default stack parameter file	<a href="#">NDEP Memo Harpring</a>
New Mexico	NMENV	All sectors	EPA's change in methodology from 2011 to 2014 reduced road dust emissions by 50%. In 2014, VMT was obtained from a MOVES run instead of an NMIM run, and separated into paved and unpaved values based on census-region level ratios.	<a href="#">New Mexico Comments 1</a> , <a href="#">New Mexico Comments 2</a>
North Dakota	DoH	Point source stack parameters	Stack parameter replacements for a couple of their coal power facilities, noted in red (columns S thru W)	<a href="#">2014NEIv2_stack_revisions_ND</a>
	DoH	Point sources and other sectors	Inventories look reasonable	<a href="#">North Dakota Comments</a>
Oregon	ODEQ	nonpoint nonroad onroad	EPA data is accurate for Oregon nonpoint, nonroad and onroad sources. See comments.	<a href="#">Oregon Comments</a>
	ODEQ	Point sources	EPA data are accurate for Oregon point sources	<a href="#">Oregon Comments Swab</a> , <a href="#">Oregon Comments Stocum</a> , <a href="#">Point source review materials</a>
	ODEQ	Unpaved Road Dust	Review by the RHPWG EI & MP Subcommittee indicates abnormally high values for OR	<a href="#">Email correspondence indicating WA may provide updates for OR unpaved road dust emissions</a>
	LRAPA	Major point sources	Updates provided to EPA. Pending confirmation that correct data is in NEI	<a href="#">Oregon LRAPA comments</a>
	ODEQ	Unpaved roads	Adjustments made by WA-ECY	<a href="#">Unpaved road adjustments</a> , <a href="#">map showing revisions</a> , <a href="#">Memo</a>
South Dakota	DENR	All sectors	No changes	<a href="#">South Dakota Comments</a>
Utah	UDEQ	non-point SOx, non-road mobile diesel locomotive SO2	Updates provided, other sectors look OK for RH modeling	<a href="#">Utah Comments</a> , <a href="#">SOx Discrepancy - OpenBurning LandClearing</a> , <a href="#">Mobile Sources Comparison</a>

State	Reviewing Agency	2014NEIv2 Inventory	Comments	Attachments
Washington	ECY	Construction Dust	EPA's emissions calculation methodology for construction dust is over-generalized for Washington state	<a href="#">Washington Comments, WA 2014 ConstructionDust EI Revisions.xlsx</a>
	ECY	Fireplace emissions	Updated fireplace emissions for four counties in the Puget Sound area	<a href="#">WA 2014 Fireplace EI Revisions.xlsx</a> <a href="#">WA 2014 Fireplace EI Revisions.docx</a>
Wyoming	WDEQ	Unpaved road; point sources	Raised concerns for Unpaved Road Emission; recommendations for representativeness of point source emissions	<a href="#">Wyoming Comments</a>
	WDEQ	Facilities emissions not in NEI	See attached	<a href="#">50 Buttes and House Creek Emissions</a>

Table 4: Data Files Submitted to Contractor for 1<sup>st</sup> version (shakeout) of Regional Haze Base Year Modeling.

<b>Data Transfer</b>	<b>State</b>	<b>filename</b>	<b>Action Taken</b>	<b>Comments</b>
Part 1	AZ	Maricopa_Point_updated.csv	Replaced NEI data	Included in Shakeout Round
Part 1	MT	MT_OldCastle_ptnonipm_ADD.csv	Added to NEI data	Included in Shakeout Round
Part 1	AZ	Pima_Aircraft_Annual_FF10.txt	Not Used	Incomplete Data Set
Part 1	AZ	Pima_Area_Annual_FF10.txt	Added to NEI data	Included in Shakeout Round
Part 1	AZ	Pima_Line-Locomotives_Annual_FF10.txt	Added to NEI data	Included in Shakeout Round
Part 1	AZ	Pima_Point_Annual_FF10.txt	Not Used	Incomplete Data Set
Part 1	AZ	Pima_Yard-Locomotives_Annual_FF10.txt	Added to NEI data	Included in Shakeout Round
Part 1	WA	WA_RWC_nonpoint_updated.csv	Replaced NEI data	Included in Shakeout Round
Part 2	CA	CA Hard zeros for industrial boilers.csv	Replaced NEI data	Included in Shakeout Round
Part 2	CA	CA Hard zeros for layer and broiler wastes.csv	Replaced NEI data	Included in Shakeout Round
Part 2	CA	CA Hard zeros for O&G production.csv	Replaced NEI data	Included in Shakeout Round
Part 2	ID	ID_RWC_updated.csv	Replaced NEI data	Included in Shakeout Round
Part 2	OR	OR_UnpavedRdDust_updated.csv	Replaced NEI data	Included in Shakeout Round
Part 2	UT	UT_LandClr_SO2_updated.csv	Replaced NEI data	Included in Shakeout Round
Part 2	WA	WA_ConstDust_updated.csv	Replaced NEI data	Included in Shakeout Round
Part 3	ND	ND_ptegu_updated.csv (stack update)	Replaced NEI data	Included in Shakeout Round
Part 4	MT	ptnonipm_Montana_Missing_Data.csv	Added to NEI data	Included in Shakeout Round
Part 4	MT	oilgas_Montana_Missing_Data.csv	Added to NEI data	Included in Shakeout Round
Part 4	MT	ptegu_Montana_Missing_Data.csv	Added to NEI data	Included in Shakeout Round

Table 5: Status of minor-sources included in the 2014 NEI v2 point-source facility dataset

<b>State</b>	<b>Minors Submitted to EPA?</b>
Alaska	Yes (see updates on wiki)
Arizona	Pima County says No – AZDEQ: No
California	Yes - All minors submitted for NEI years
Colorado	Yes - All sources down to 1 ton
Hawaii	No
Idaho	No
Montana	Yes – Sources down to 25 tons except portables
Nevada	Yes - All minors submitted for NEI years
New Mexico	No
North Dakota	No
Oregon	No
South Dakota	No
Utah	
Washington	No
Wyoming	Yes - All minors submitted for NEI years