

Submitting 2020 Mobile Source Data and Best Practices

EPA NEI Team

2021 MARAMA Mobile Sources Training Workshop

March 18, 2021



MOVES3 CDBs Available

- Starting point 2020 CDBs based on MOVES3 are available here:
 - https://gaftp.epa.gov/air/nei/2020/doc/supporting_data/onroad/initial_CDBs/
- These CDBs may be used by states as a starting point for generating CDBs to provide to EPA or states may provide CDBs created independently using MOVES3.
- Any CDBs submitted to EIS for the 2020 NEI should be complete and ready to run for the calendar year 2020.

Changes for MOVES3 Include:

- No need to estimate ramp fractions
- Source type 41 is now “Other Buses” (non-school, non-transit), rather than “Intercity Buses”
- A few additional source and fuel type combinations are allowed (e.g., “Other Buses” can be gasoline, diesel, or CNG; instead of just diesel)
- Use MOVES3.0.1, which has updates to include QA scripts

<https://www.epa.gov/moves/latest-version-motor-vehicle-emission-simulator-moves>

MOVES3 CDBs Include:

- MOVES CDBs may include the following input data:
 - vehicle miles traveled (VMT),
 - vehicle population,
 - vehicle starts,
 - average speed distribution,
 - hotelling,
 - age distributions,
 - hourly average speed profiles,
 - VMT fraction (by month, day, hour, and road type), and
 - inspection and maintenance (I/M) program

EPA 2020 CDBs:

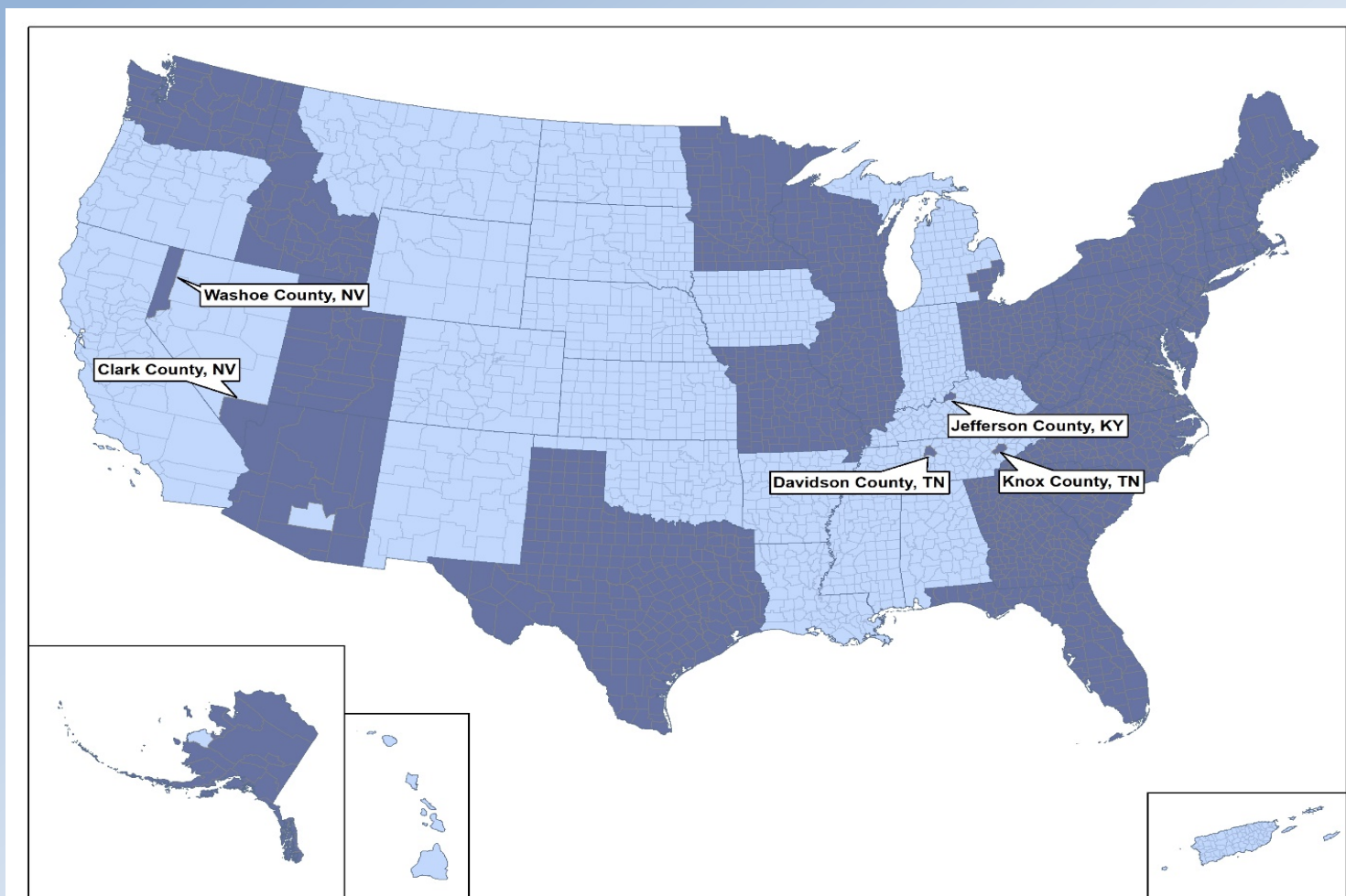
- The EPA also develops a set of input values to use in the event a state does not supply inputs.
 - These input values will be developed later in the NEI process, so are not present in the starting point CDBs that contain entirely MOVES3 default information.
- The EPA currently is planning to get VPOP / age distribution data for 2020, similar to what was used from the CRC A-115 project.
- EPA is also working on acquiring 2020-specific speed and temporal profile data, similar to what was used from the CRC A-100 project.

Running the MOVES QA Tool

- In order to run the NEI QA Tool on a county database (CDB), MOVES version 3.0.1 or greater must be installed.
- The QA Tool also assumes the CDB has already been built using the MOVES County Data Manager or otherwise and is ready to be checked.
- The tool will not aid in creating or populating an NEI CDB.

https://github.com/USEPA/EPA_MOVES_Model/blob/master/docs/NEIQAInstructions.md

2017 NEI State/Local Submitted Data



Dark blue areas submitted data. EPA default data
used for light blue areas

Complete State Checklist

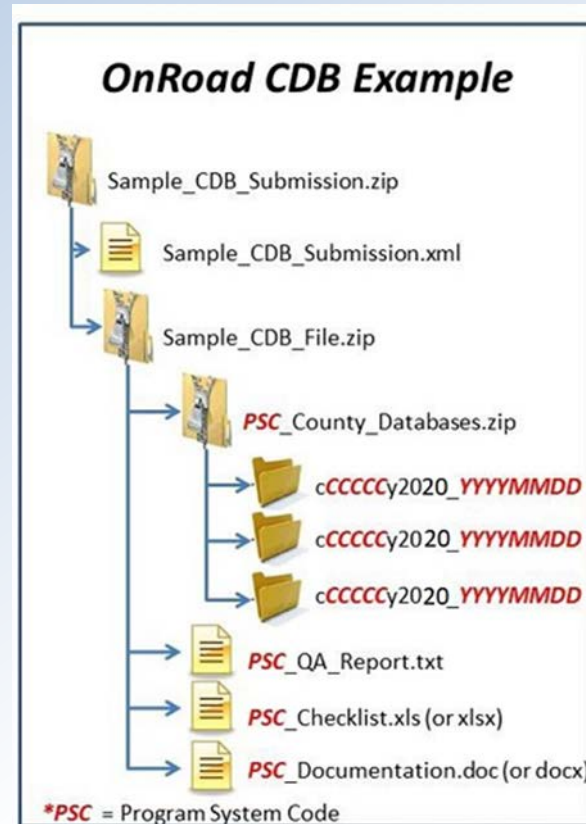
- ftp://gaftp.epa.gov/air/nei/2020/doc/supporting_data/onroad, download the CDB checklist, [“MOVES Onroad County Checklist.xlsx”](#).
- This spreadsheet will contain rows for every county in the nation. You can trim this list to only include the counties in your state.
- This checklist is intended to indicate which tables your agency has revised from EPA’s placeholder values with local data for each county’s CDB.
 - Please feel free to add footnotes as necessary to convey any nuances in the amount of local data in a particular table
- The CDB checklist also has a column to allow your agency to indicate counties for which you accept EPA default estimates for the submittal.

Complete Agency Submittal Checklist

County				Tables																																						
stateid	statename	countyid	countyname	Accept EPA Default Values	auditlog**	avft**	avgspeeddistribution	county	dayvmtfraction	fuelformulation	fuelsupply	fuelsupplyyear	fuelusagefraction	hotellingactivitydistribution**	hotellinghours**	hourvmtfraction	hpmstvtypeday**	hpmstvtypeyear	imcoverage	imcoverageesip	importstartsourcefraction**	monthvmtfraction	onroadretrofit**	roadtype**	roadtypedistribution	sourcecypeagedistribution	sourcecypedayvmt**	sourcecypeyear	sourcecypeyearvmt**	starts**	startshourfraction**	startsmothadjust**	startspeday**	startsourcefraction**	state	year	zone	zonemonthhour	zoneroadtype	countyyear	emissionratebyage	
9	CONNECTICUT	9001	Fairfield County		x	m	x	m	x	m	m	m	x	1	1	x		x	x	2		x			x	3		3								m	m	m	x	x	x	x
9	CONNECTICUT	9003	Hartford County		x	m	x	m	x	m	m	m	x	1	1	x		x	x	2		x			x	3		3								m	m	m	x	x	x	x
9	CONNECTICUT	9005	Litchfield County		x	m	x	m	x	m	m	m	x	1	1	x		x	x	2		x			x	3		3								m	m	m	x	x	x	x
9	CONNECTICUT	9007	Middlesex County		x	m	x	m	x	m	m	m	x	1	1	x		x	x	2		x			x	3		3								m	m	m	x	x	x	x
9	CONNECTICUT	9009	New Haven County		x	m	x	m	x	m	m	m	x	1	1	x		x	x	2		x			x	3		3								m	m	m	x	x	x	x
9	CONNECTICUT	9011	New London County		x	m	x	m	x	m	m	m	x	1	1	x		x	x	2		x			x	3		3								m	m	m	x	x	x	x
9	CONNECTICUT	9013	Tolland County		x	m	x	m	x	m	m	m	x	1	1	x		x	x	2		x			x	3		3								m	m	m	x	x	x	x
9	CONNECTICUT	9015	Windham County		x	m	x	m	x	m	m	m	x	1	1	x		x	x	2		x			x	3		3								m	m	m	x	x	x	x

Bundle CDB Submittal Components

- Once you have prepared the parts of your submittal, you'll need to zip them together in a specific way and reference them with the EIS/CDX required XML file.



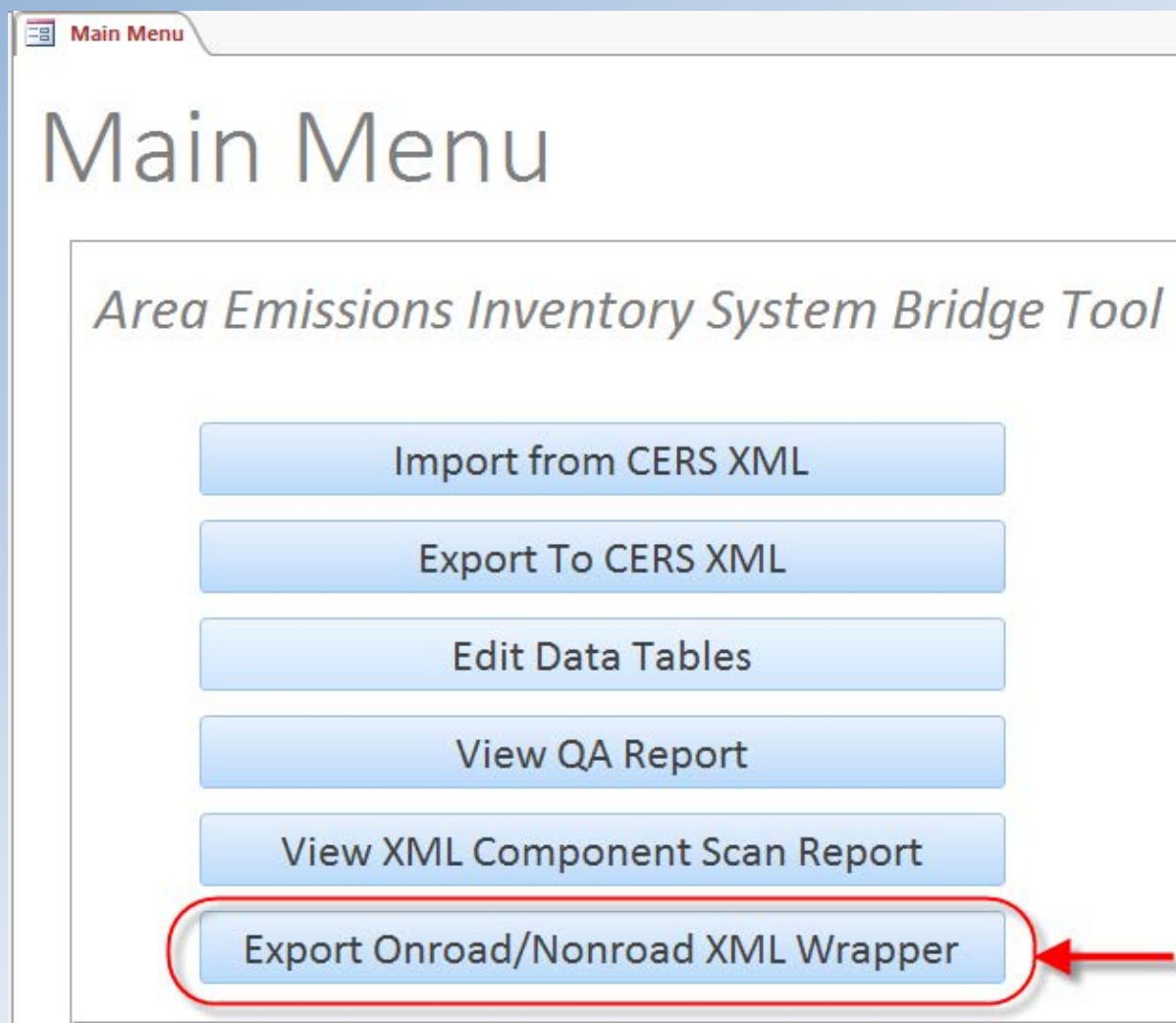
Create the XML File

1. Download the Nonpoint/Onroad/Nonroad Bridge Tool:

<https://www.epa.gov/air-emissions-inventories/eis-bridge-tools>

2. Open the file in Microsoft Access.
3. Choose the “Export Onroad/NonRoad XML Wrapper” from the Main Menu

Bridge Tool Main Menu



CERS XML Wrapper Example

Export CERS XML Wrapper for Activity Data

Export CERS XML Wrapper for Activity Data

File Location:

Complete / Verify Header Information

Data Category:	Onroad
Emissions Year:	2020
Submission Type:	Production
Activity Database Type:	CDB
Activity Database File:	YourZippedFileName.zip
User Identifier:	YourEISID
Author Name:	Your Name
Organization Name:	Your Organization
Program System Code:	Your PSC
EPA Dataset:	
Keywords:	Optionally fill
Submission Comment	Optionally fill

Create the XML File

- a. File Location = The name and location where the resulting XML file will be generated.
- b. Data Category: Choose “Onroad”
- c. Emissions Year: Set to 2020
- d. Submission Type: Choose either “QA” or “Production”
- e. Activity Database Type: Set to “CDB”
- f. Activity Database File: The name of the packaged set of zip files. Using the earlier example: “Sample_CDB_Submission.zip”
- g. User Identifier: Your EIS User ID
- h. Author Name: Your name (optional)
- i. Organization Name: The name of your organization (optional)
- j. Program System Code: The program system code of your organization
- k. EPA Dataset: Leave blank
- l. Keywords: Any keywords you would like to submit about the document (optional)
- m. Comment: Any comments about the document (optional)

Create the XML File (cont.)

- Each CDB submittal is a total replacement to any CDBs previously submitted by that agency.
- Thus, if a state submits every county in one submittal, then submits only one county in a subsequent submittal, only the one county will be present in EIS.
- You can check the feedback on your submittal in EIS by choosing your agency and the “Feedback Reports”

EIS Gateway - Agency Organization Detail: Feedback

EIS Gateway

Jonathan Miller, EIS, Content Manager Role, Inventory Developer Role, Authenticated Role, Inventory Selector Role, Account Manager Role

View/Add/Edit

- » Facility Inventory and Point Emissions
- » Potential Duplicate Facilities
- » Merge Processes
- » Nonpoint/ Onroad/ Nonroad Emissions
- » Event Emissions
- » NCD Activity Data
- » CDB Activity Data
- » Inventory Selection
- » Schedule Augmentation
- » Data Tagging

REPORTS

- » Request Reports
- » Report Downloads
- » Large File Download
- » Feedback Reports
- » Agency Submission History Report

REFERENCE DATA

Agency Organization Detail

CURRENT AGENCY

Agency Description: Alabama Department of Environmental Management
Agency Type: State
ETL Process Group: 2

Agency Responsibilities	Agency Members	Program System Codes	Allow Access	Feedback Reports	Nonpoint Survey
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SUBMISSION HISTORY

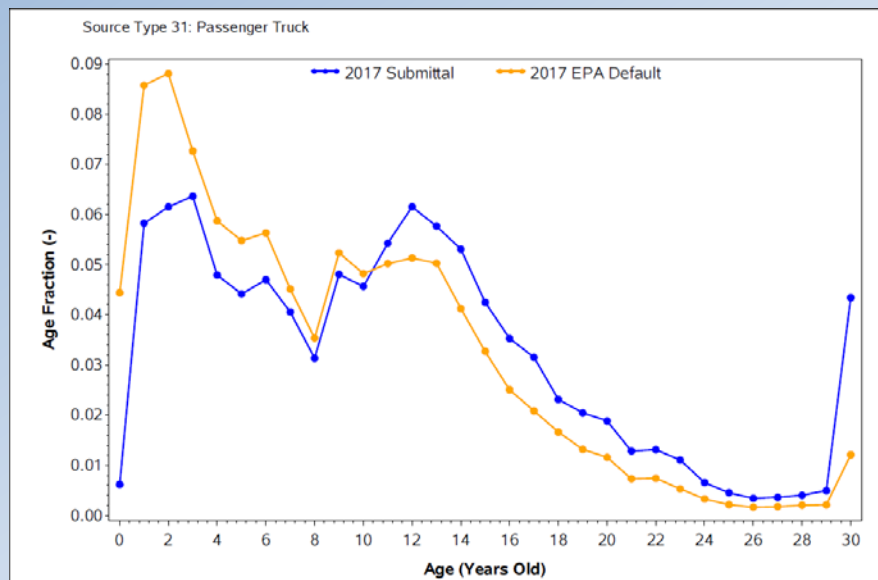
CDX Tracking #	Status	Submitter	Data Category	Type	Submitted	
d438e5d0-f75a-4ca9-8f98-728902dcc17d	COMPLETED	Anna Wood	Point	PRODUCTION	2017/12/27 11:33:34 AM	Download Report
ca820725-6990-477f-ada0-2b246df75fa5	COMPLETED	Anna Wood	Facility Inventory	PRODUCTION	2017/12/27 10:35:20 AM	Download Report
0d6c79ba-37e5-46d7-bb2e-038b2b6cb919	COMPLETED	Anna Wood	Facility Inventory	PRODUCTION	2017/12/22 02:09:42 PM	Download Report
7261d47d-debc-47fa-aade-cb18a651ece6	COMPLETED	Anna Wood	Facility Inventory	PRODUCTION	2017/12/22 11:54:57 AM	Download Report
ed127e6a-d893-41bc-894d-6327d2bb7d4e	COMPLETED	Anna Wood	Point	PRODUCTION	2016/12/28 02:42:37 PM	Download Report
29d88353-7eed-4ddd-8e2a-326de07bfa95	COMPLETED	Anna Wood	Facility Inventory	PRODUCTION	2016/12/28 11:45:08 AM	Download Report
a1c615fb-5184-4123-a01c-0f318e64f003	COMPLETED	Anna Wood	Facility Inventory	PRODUCTION	2016/12/27 03:27:55 PM	Download Report
a6c50cb0-446b-4207-adc3-e79c9c372b61	COMPLETED	Anna Wood	Facility Inventory	PRODUCTION	2016/12/23 12:14:50 PM	Download Report
8ce82b67-65ce-421e-b903-89158d704ee4	COMPLETED	Anna Wood	Facility Inventory	PRODUCTION	2016/12/23 11:26:07 AM	Download Report
15f28d93-c005-4ff5-aaed-9b74391ac84a	COMPLETED	Anna Wood	Facility Inventory	PRODUCTION	2016/12/23 10:49:04 AM	Download Report
de639a9f-443e-4e0c-a2f6-6713c66b870c	COMPLETED	Anna Wood	Point	PRODUCTION	2016/06/28 03:13:15 PM	Download Report
9717c949-0f2b-4f1d-be3f-f83620e7d65b	COMPLETED	Anna Wood	Point	PRODUCTION	2016/04/08 10:41:11 AM	Download Report
f742ef9b-a5ae-49ad-be1b-e7862427ef9f	COMPLETED	Anna Wood	Point	PRODUCTION	2016/04/08 10:20:29 AM	Download Report
791f17007-e0f3-4c30-88cc-47293f9674ab	COMPLETED	Anna Wood	Point	PRODUCTION	2016/01/06 03:10:22 PM	Download Report
c0f54f51-ca27-41f1-80a5-551f1a507ba3	COMPLETED	Anna Wood	Facility Inventory	PRODUCTION	2016/01/05 11:20:35 AM	Download Report

Age Distribution QA Summary

- Age distribution was found to be a key parameter that impacted emissions
- Many states provided age distributions with issues, e.g.,
 - Outdated year for age distribution draw (e.g., 2013)
 - LDV recession “dip” shifted by several years
- Unrealistically high fraction of older (or newer) vehicles
 - Can depend on time of the year the draw occurred (Jan vs. July vs. Dec)

2017 Age Distribution Plot Examples

An older (Jan) pull than default



State-submitted age distributions were used where they looked reasonable, with the exception of combination long-haul trucks where we used the EPA default age distribution for all states due to the fact they do not operate within the county they are registered.

Assessing the Importance of Speeds in the 2017 NEI

- Some submitted speed distributions look very different than CRC A-100, which used county-specific GPS-based data in many areas
- Zero time in bin 1 (speeds 0 to 2.5 mph), even on unrestricted roads (surface streets with intersections) – typical of travel demand models
- Speed distributions the same for all source types
- No variation in speeds by hour of day or weekday/weekend
- No variation in speeds by road type
- *If speed distributions were not realistic, EPA did not accept the submitted data*

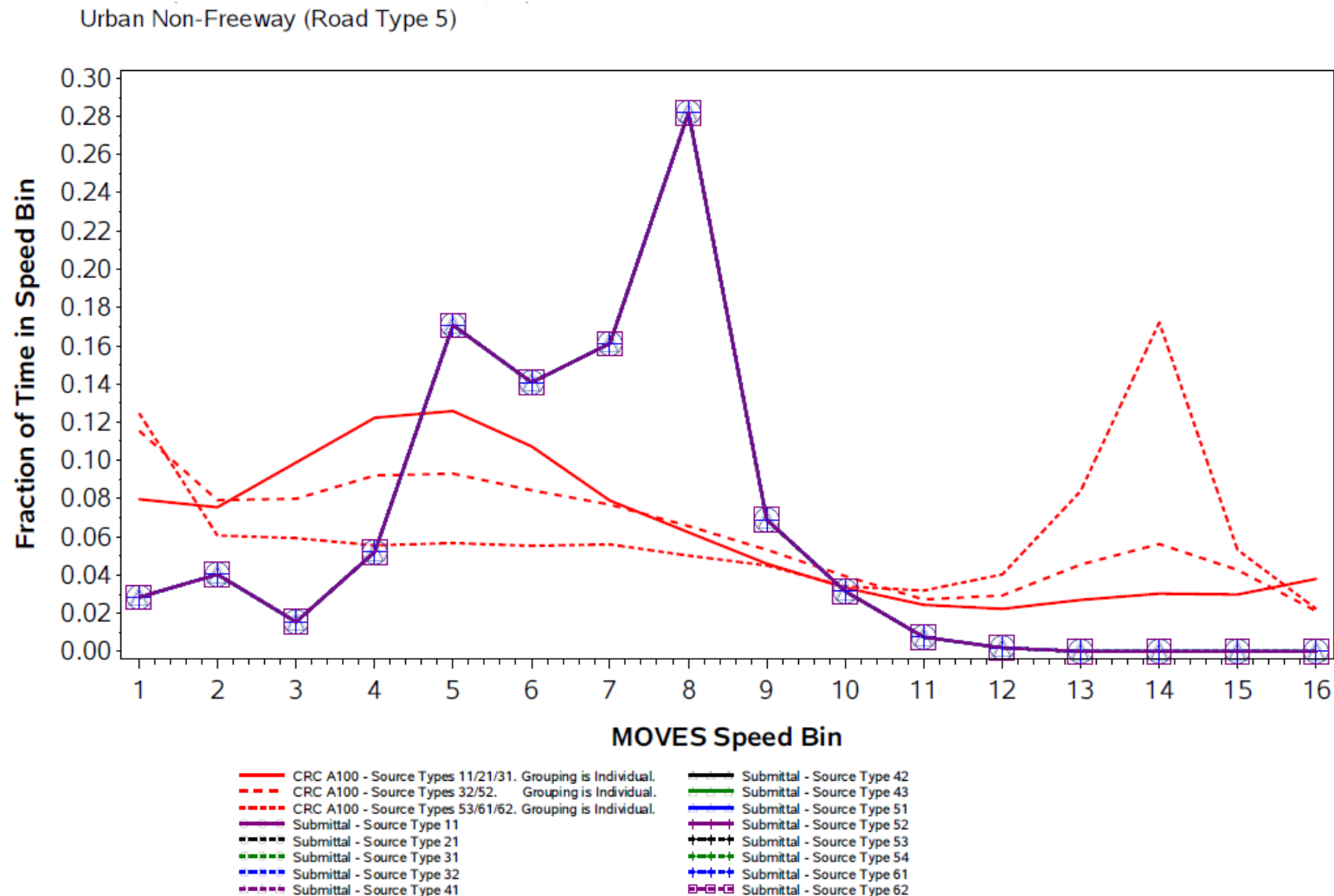
MOVES Speed Bins

MOVES takes *average speed distributions* for each road type, and source type
Speed fractions for each of these combinations sum to 1 [for each county]

<u>Bin</u>	<u>Midpoint (mph)</u>	<u>Range</u>
1	2.5	speed < 2.5mph
2	5	2.5mph <= speed < 7.5mph
3	10	7.5mph <= speed < 12.5mph
4	15	12.5mph <= speed < 17.5mph
5	20	17.5mph <= speed < 22.5mph
6	25	22.5mph <= speed < 27.5mph
7	30	27.5mph <= speed < 32.5mph
8	35	32.5mph <= speed < 37.5mph
9	40	37.5mph <= speed < 42.5mph
10	45	42.5mph <= speed < 47.5mph
11	50	47.5mph <= speed < 52.5mph
12	55	52.5mph <= speed < 57.5mph
13	60	57.5mph <= speed < 62.5mph
14	65	62.5mph <= speed < 67.5mph
15	70	67.5mph <= speed < 72.5mph
16	75	72.5mph <= speed

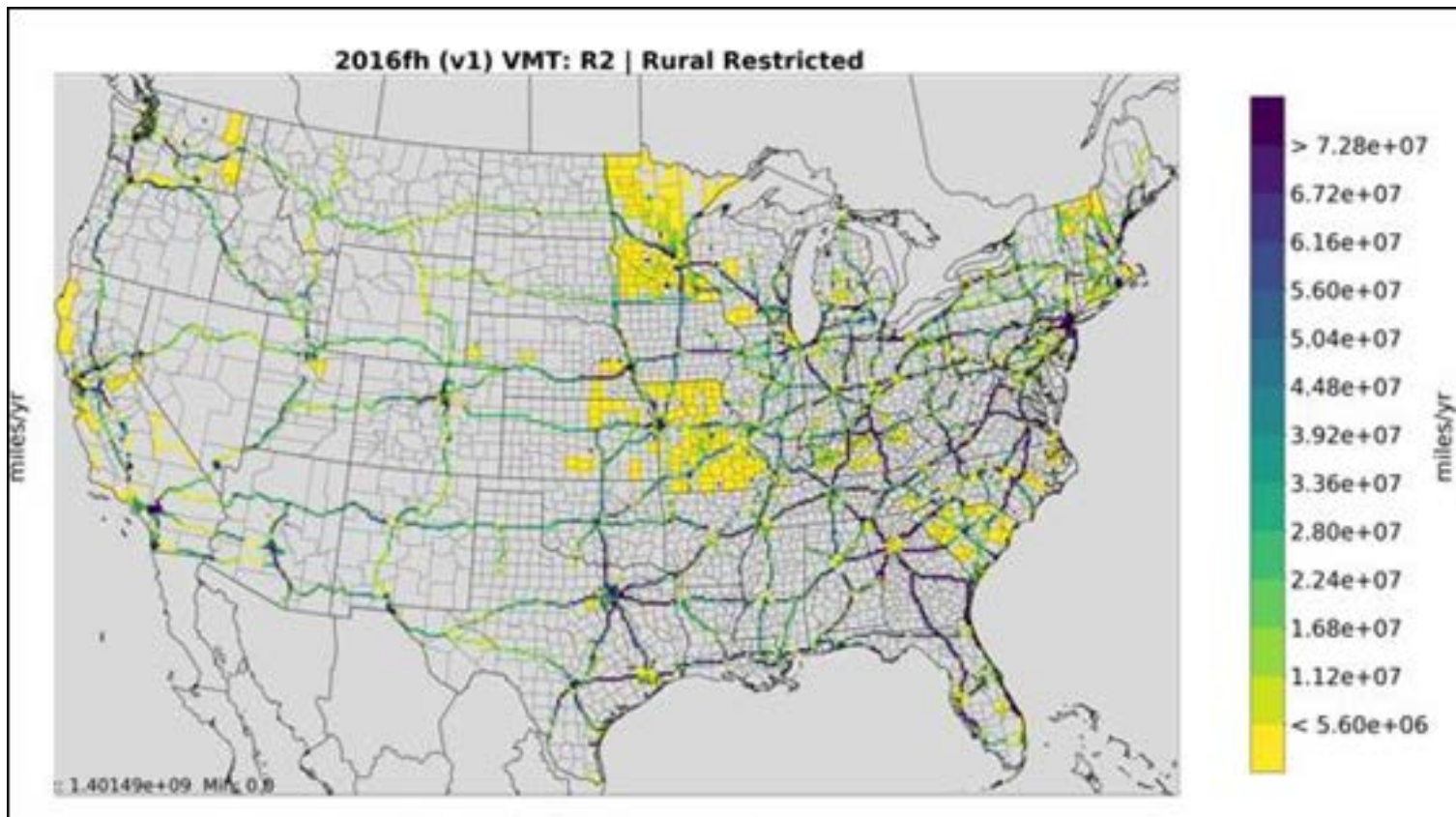
Speed Distribution

CRC data in red: light, medium, and heavy-duty for individual county at 8AM
Submittal data shown here same for each source type and quite different

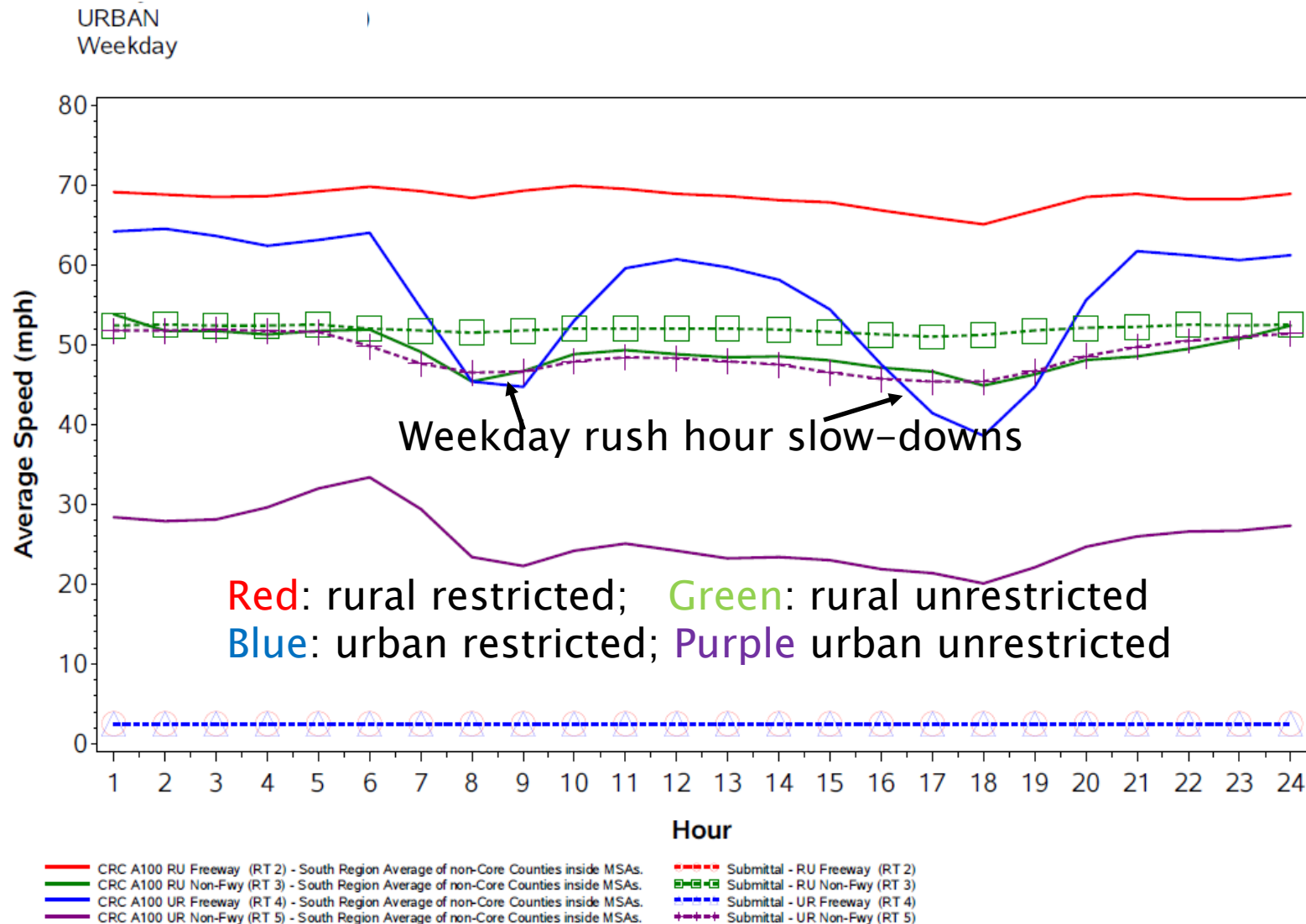


/proj1/EPA_2017_NEI_CDBs/2017_CDB_Review/Plotting/compare_speeds.sas 13NOV19 16:43

Erroneous or gap-filled values in Road Type Distribution



Flat weekday speed temporal profile submitted for 3 road types, CRC data shows rush hour slow-down



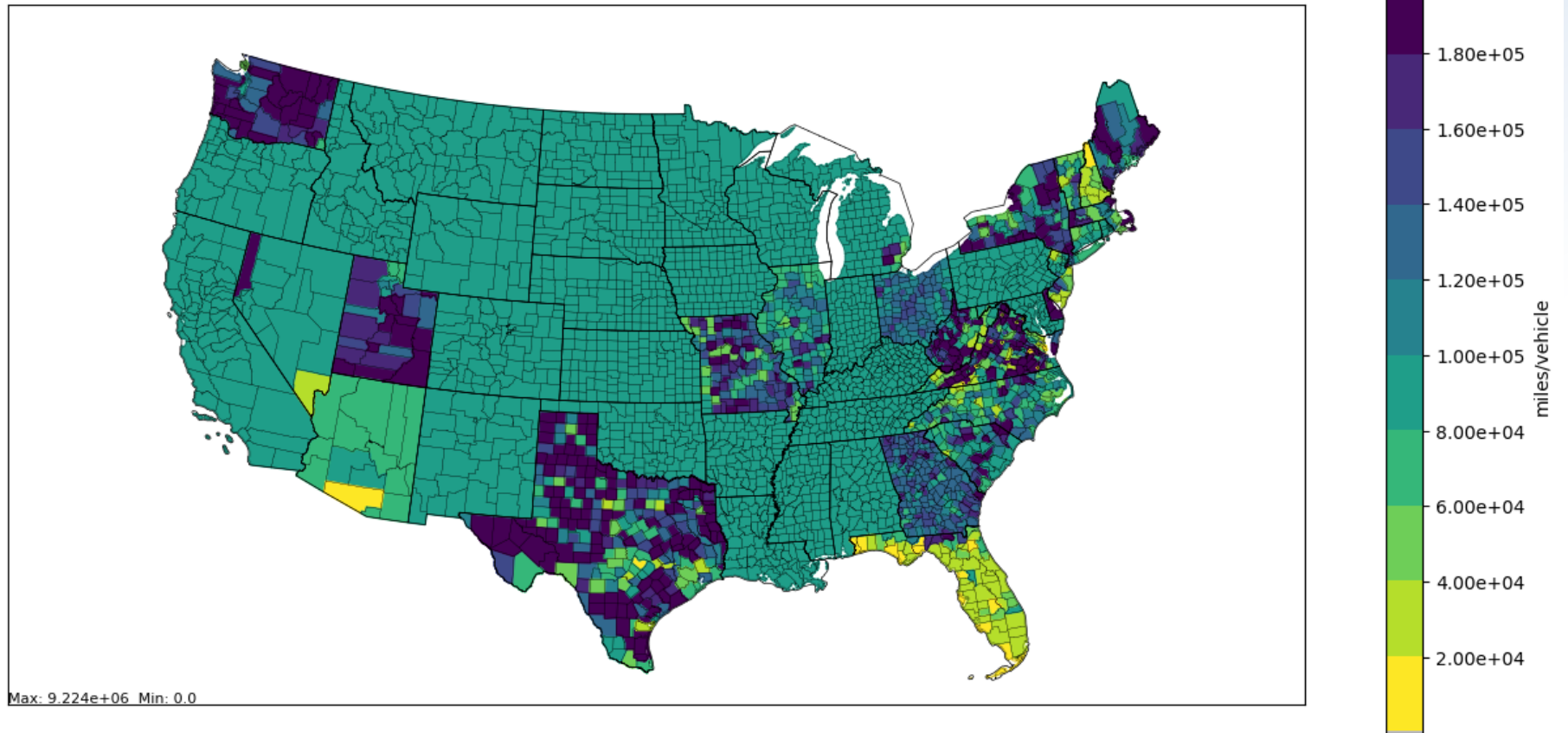
/proj1/EPA_2017_NEI_CDBs/2017_CDB_Review/Plotting/compare_speeds.sas 12NOV19 11:18

QA of VMT/VPOP

- If VMT/VPOP is too high (e.g., a rural county w/ an interstate highway), negative emission factors can result
- Make comparisons and rankings by state and source type
- Determined a threshold to recalculate more appropriate VPOP to reflect “number of vehicles on the roadways”, as opposed to “number of vehicles registered in county”

VMT/VPOP Ratio Graphical QA

2017 draft (with state data) onroad VMT/VPOP ratio: Combination Long-Haul Trucks



Enforced Maximum Allowable VMT/VPOP Ratio

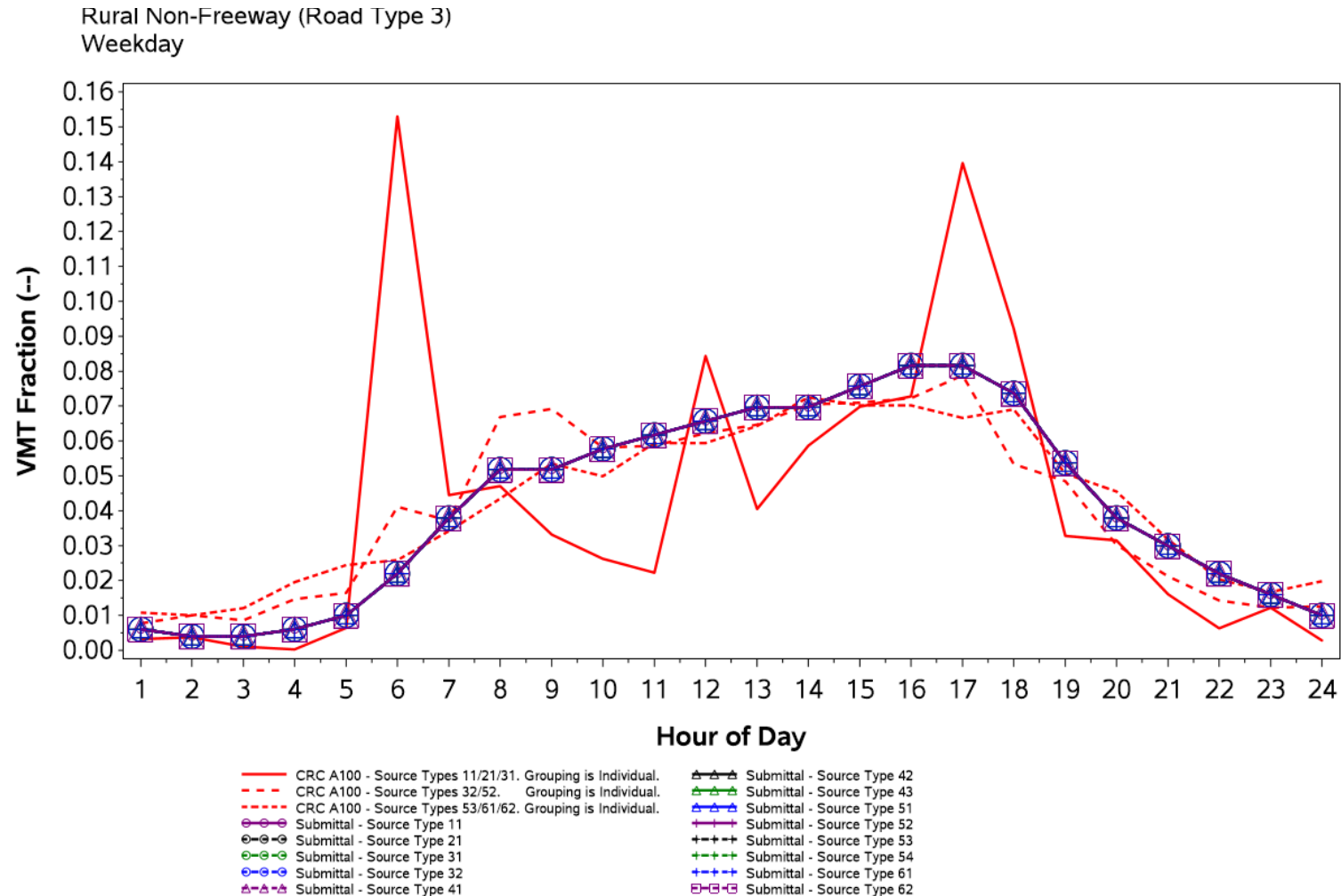
MOVES source type	Source type description	Maximum VMT/VPOP ratio (miles per year)
11	Motorcycle	7,500
21	Passenger Car	31,000
31	Passenger Truck	31,000
32	Light Commercial Truck	31,000
41	Intercity Bus	130,000
42	Transit Bus	90,000
43	School Bus	30,000
51	Refuse Truck	60,000
52	Single Unit Short-haul Truck	45,000
53	Single Unit Long-haul Truck	60,000
54	Motor Home	7,000
61	Combination Short-haul Truck	150,000
62	Combination Long-haul Truck	150,000

If VMT/VPOP exceeded the ratio, we added vehicles until we reached maximum ratio

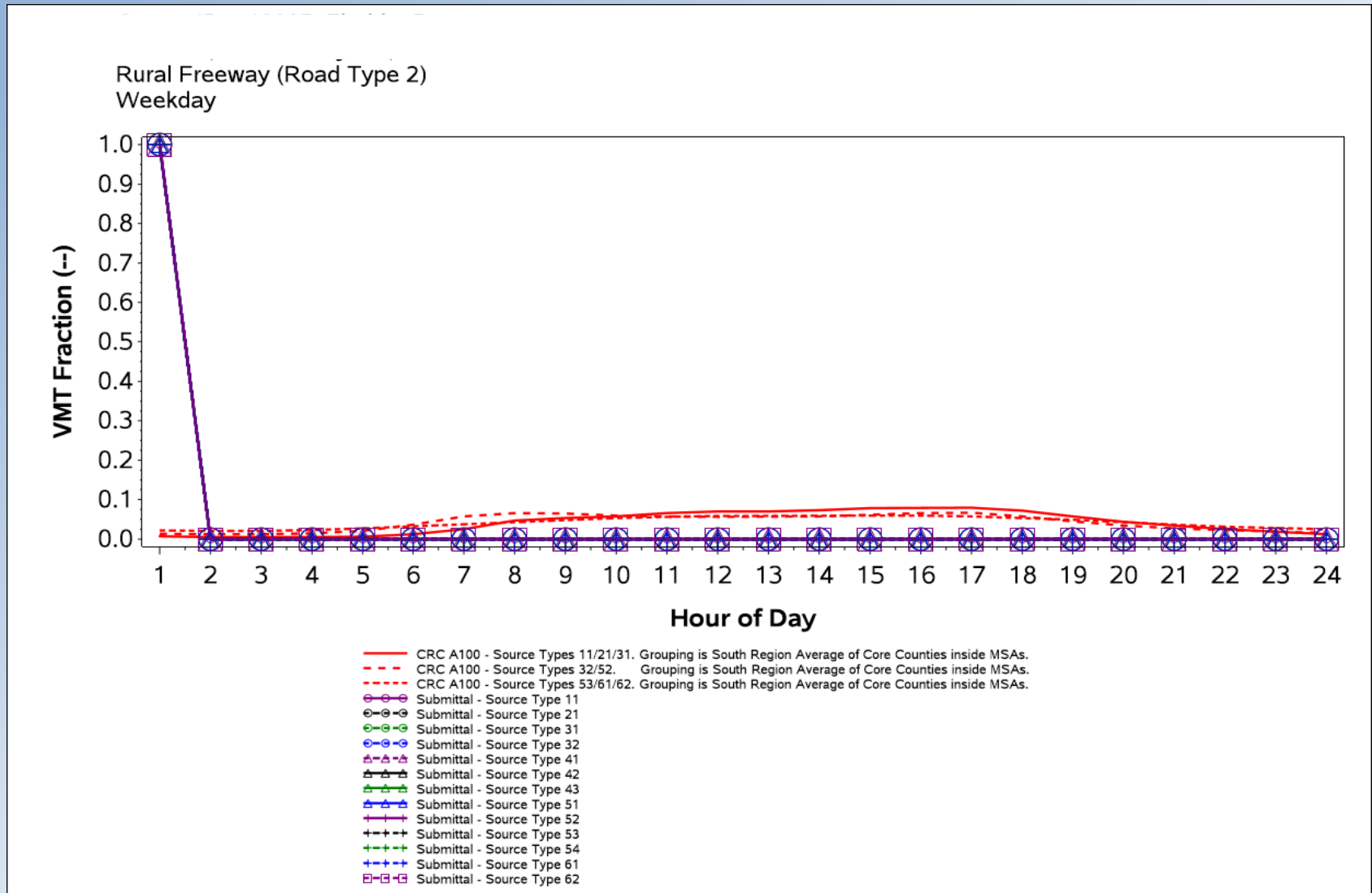
QA of VMT Fraction

- We did not accept either weekday=weekend profiles or 100% of VMT in hour 1 for road types that do not exist.
- We opted to use CRC data for both day types, where states submitted weekday=weekend profiles.
- We spot-updated hourVMTFraction with CRC data for just missing road types, in cases where we otherwise liked the HourVMTFraction data.
- Used CRC where flat hourly profiles submitted

VMT Fraction: No variation by vehicle type; no rush hours shown



VMT Fraction: First bin = 1 where road type does not exist



QA Resolution

- The EPA resolved each of the above data problems by coordinating with state/local agencies individually and/or presenting intentions during monthly meetings with the multi-jurisdictional organization (MJO) MOVES workgroup.
- In some cases, the agency preferred to submit a corrected CDB. In other cases, the agency provided the EPA with instructions for a “spot correction” to a table or simply accepted the EPA’s proposed update.

Additional Tips for CDB Submittals

- Do not populate submitted CDBs with MOVES default data without telling us in your submittal checklists.
- EPA uses refinery production compliance data to develop the fuel supply. SLTS are therefore not expected to supply fuel property information.
- EPA uses meteorological data derived from the Weather Research and Forecasting Model (WRF) to develop MOVES-ready meteorological inputs. SLTs are therefore not expected to populate these tables in their submitted CDBs.
- Road type should be county-specific at minimum and be based on the actual road network within that county. In order to avoid emissions appearing to be smeared across an entire state, county-specific road type distributions should be supplied to EPA.

Additional CDB QA Checks

- Age distribution represented a different data year than 2017 (i.e., LDV recession “dip” shifted by several years)
- Incorrect table keys on CDB tables (`SourceTypeAgeDistribution`, `RoadType`)
- Incorrect column order on CDB tables (`IMCoverage`, `RoadType`)
- Empty tables for `year` and/or `roadTypeDistribution` tables
- Inconsistent splits of cars and light-duty trucks across state
- IMCoverage table covered gasoline but not flex-fuel vehicles
- IMCoverage table contained wrong countyID
- RoadType table incorrect structure
- Expected VMT tables (SourceTypeDayVMT, SourceTypeYearVMT, and HPMSVtypeDay) were missing
- Values sum to zero for some source types in the `RoadTypeDistribution` table
- Old data (year 2017) re-submitted for `HotellingHours`
- Old MOVES default data (year 2017) submitted for `HotellingActivityDistribution`
- Multiple-hour blocks used in the profile instead of hourly variation

Considerations for 2020

- Install MOVES **version 3.0.1** to assure you have no IT/installation issues. Send questions to mobile@epa.gov
- COVID-19 – States should consider submitting monthly VMT **Fraction** if data is available.
- **Good COVID resource:**
<https://www.bts.gov/covid-19/>
- EIS Production Submission Window Opens for SLT submittals 7/1/21
- SLTs last day for EIS submittal of Point, Onroad Mobile, Nonroad Mobile and Events data category emissions 1/15/2022
- 2020 NEI Plan can be found:



Thank You!

If you have follow-up questions or comments,
please email Janice Godfrey and Alison Eyth