

Review of CRC A88 Project -- Part Two VPOP and Long Haul VMT

Jin-Sheng Lin and Sonya Lewis-Cheatham
Virginia Department of Environmental Quality

Julie McDill
MARAMA

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What is the CRC Project?

- **Goal: Improve the default inputs used by USEPA in MOVES modeling**
- **Selected critical inputs to improve:**
 - Passenger car & truck age distribution
 - Passenger car & truck population
 - Combination long-haul VMT
 - Heavy-duty extended idling
- **For Age and population IHS data was obtained for 2011**

Passenger car/truck age distributions have been examined and presented on July 15 MARAMA MOVES call

Conclusions:

**CRC data missing vehicles older than 30 YR – an adjustment made
CRC vehicles are generally older than state data from VA, NY
CRC data contains some anomalies that should be reviewed.**

(1) CRC data -- VPOP

Data Resolutions:

Source Vehicle Types of CRC data (age distribution):

20, Passenger Car

30, Passenger Truck and Light Commercial Truck

Source Vehicle Types of CRC data (VPOP):

21, Passenger Car

31, Passenger Truck

32, Light Commercial Truck

Comparison between VA/NY County-Specific Data and CRC Data

NY data was provided by Eric Zalewsky of NYSDEC

2011 NY and VA State Inputs (submitted to 2011 NEI)

- **Data Sources: Vehicle registration data from State Department of Motor Vehicles (DMV)**
- **VA**
 - **State grants funding VIN decoding (outputs in MOBILE6 vehicle types)**
 - **EPA developed fractions were used to translate MOBILE6 source types to MOVES source types**
- **NY**
 - **Used its own codes to process registration data directly into MOVES source types**

MOVES Source Vehicle Types:

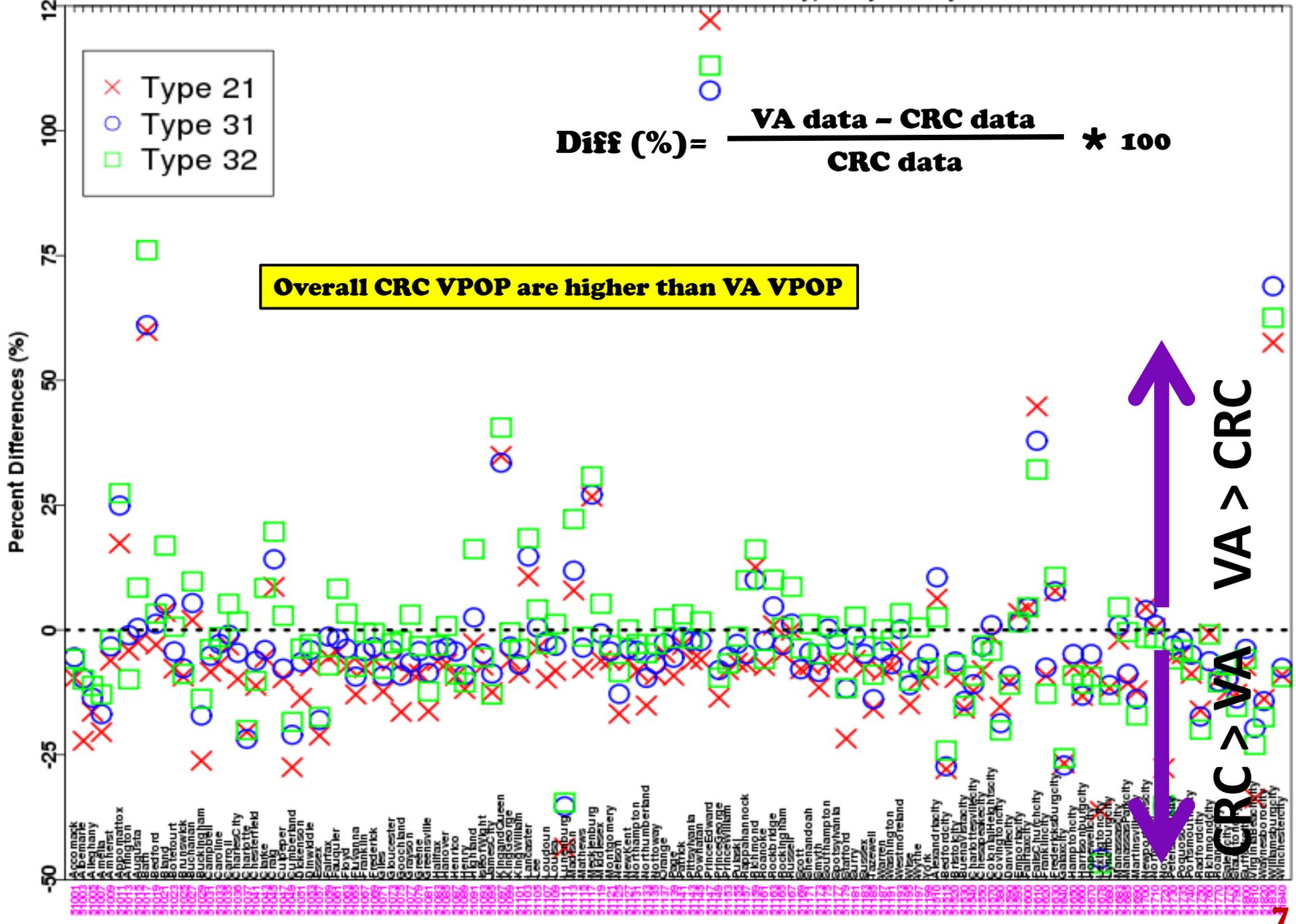
21, Passenger Car

31, Passenger Truck

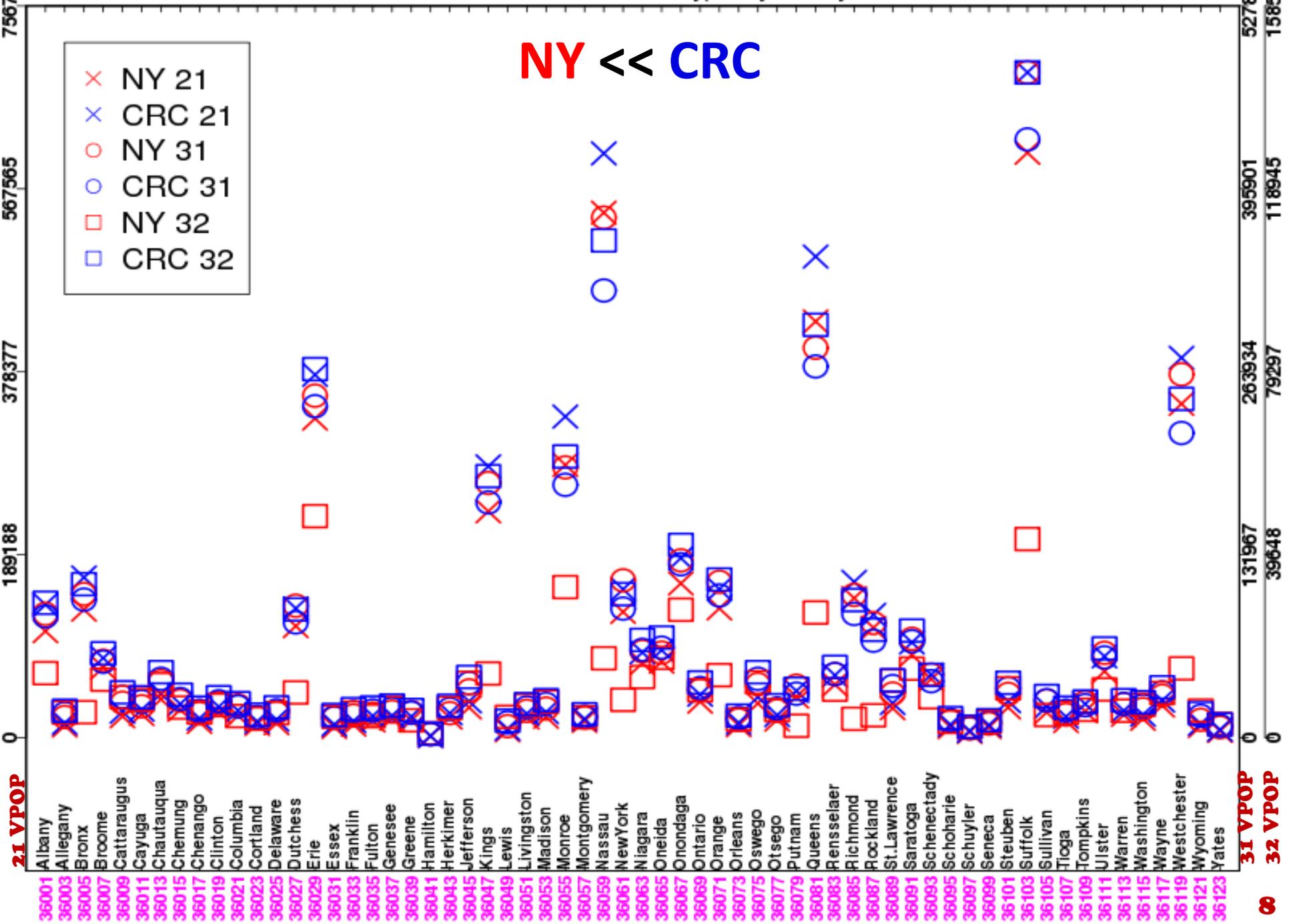
32, Light Commercial Truck

VIN decoding (used by VA and CRC) cannot decode vehicles older than 1981, which is the age 30 bin if BY=2011

VA VPOP Percent Differences for 3 Vehicle Types by County



NY VPOP for 3 Vehicle Types by County



21 VPOP

31 VPOP

32 VPOP

75675

567565

378377

189188

0

527868

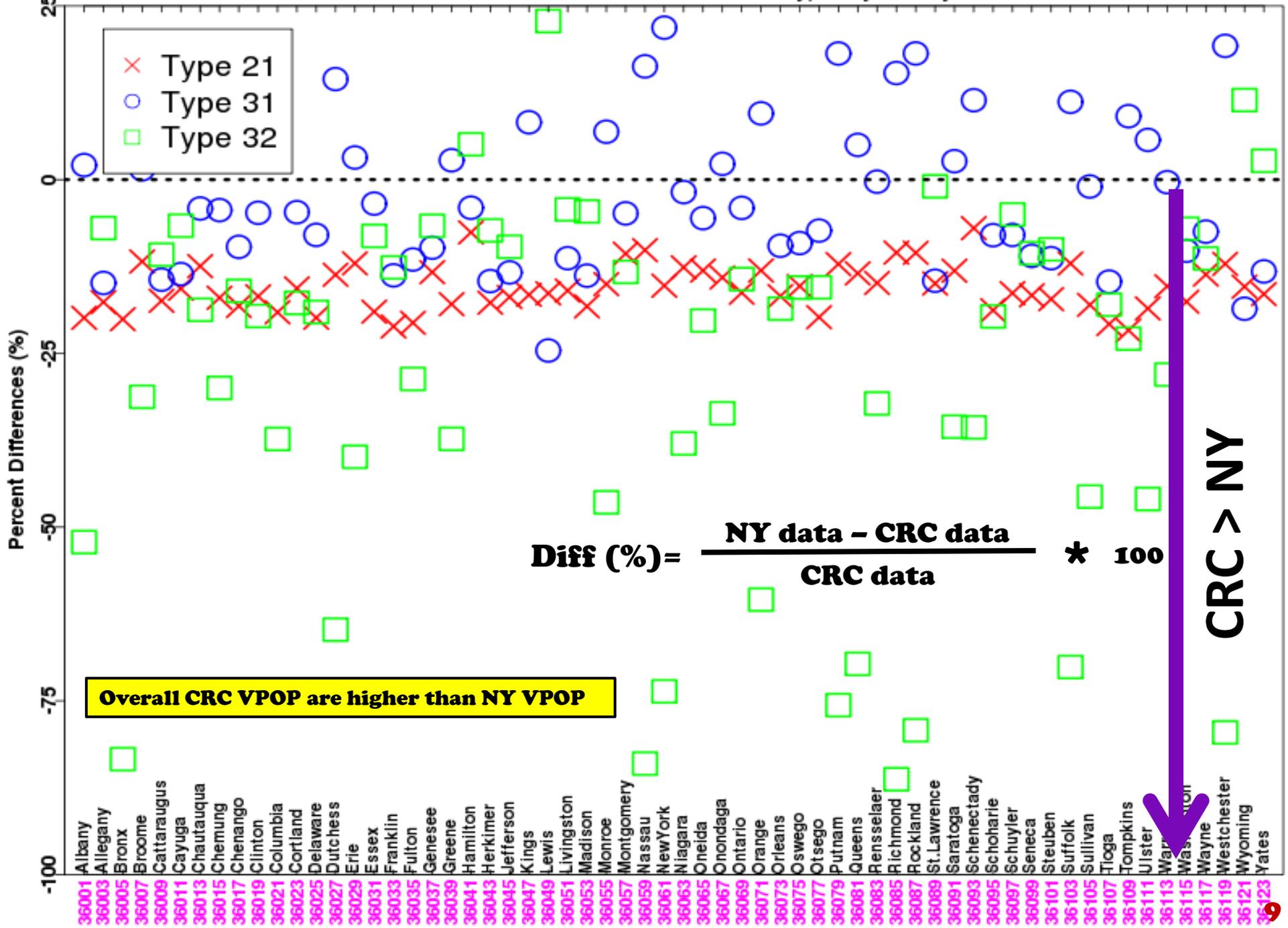
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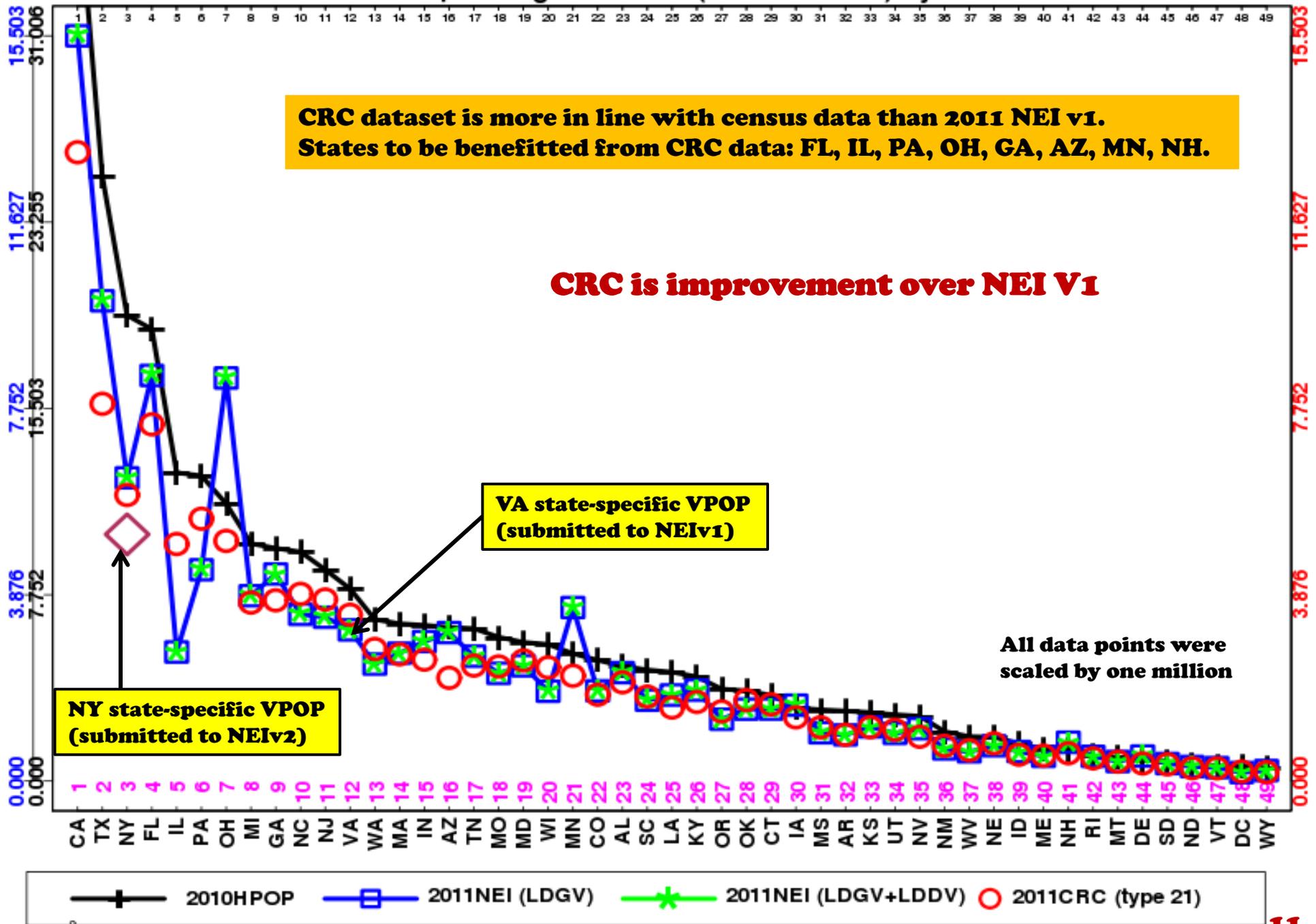
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NY VPOP Percent Differences for 3 Vehicle Types by County



CRC Data - Continental Overview

VPOP for passenger vehicles (cars or trucks) by state



Average Passenger Cars Owned

VPOP2011 / HPOP2010

State	(1) CRC (type 21)	(2) NEIv1 (LDGV+LDDV)	(3) NEIv1 (LDGV)	State	(1) CRC (type 21)	(2) NEIv1 (LDGV+LDDV)	(3) NEIv1 (LDGV)
OK	0.4489	0.3998	0.3986	KS	0.3925	0.3961	0.3950
RI	0.4479	0.4891	0.4877	IN	0.3895	0.4489	0.4476
CT	0.4465	0.4199	0.4187	GA	0.3881	0.4451	0.4447
NH	0.4388	0.6145	0.6127	UT	0.3856	0.3601	0.3590
IA	0.4351	0.5199	0.5183	IL	0.3843	0.2099	0.2093
MD	0.4346	0.4165	0.4153	SC	0.3800	0.3648	0.3637
OH	0.4330	0.7290	0.7268	KY	0.3793	0.4374	0.4361
VA	0.4323	0.3942	0.3931	TN	0.3785	0.4106	0.4094
AL	0.4297	0.4731	0.4717	OR	0.3782	0.3366	0.3356
PA	0.4296	0.3471	0.3460	MS	0.3768	0.3397	0.3387
NJ	0.4296	0.3888	0.3876	MI	0.3756	0.3912	0.3901
NE	0.4294	0.4034	0.4022	CO	0.3571	0.3742	0.3731
SD	0.4273	0.4474	0.4460	NM	0.3565	0.3259	0.3249
VT	0.4224	0.4473	0.4459	CA	0.3511	0.4174	0.4162
WI	0.4158	0.3296	0.3286	ID	0.3494	0.3929	0.3918
MN	0.4130	0.6824	0.6804	WV	0.3462	0.3293	0.3283
WA	0.4085	0.3629	0.3618	NV	0.3413	0.4046	0.4034
NC	0.4084	0.3649	0.3638	LA	0.3374	0.3960	0.3948
MT	0.4077	0.4114	0.4102	AZ	0.3359	0.4845	0.4831
DE	0.4068	0.5821	0.5804	AR	0.3298	0.3301	0.3291
MA	0.4025	0.4076	0.4064	DC	0.3293	0.2939	0.2930
ME	0.3983	0.3880	0.3868	WY	0.3289	0.3891	0.3879
MO	0.3982	0.3753	0.3742	TX	0.3121	0.3985	0.3973
ND	0.3973	0.4486	0.4473	NY	0.3071	0.3265	0.3255
FL	0.3947	0.4501	0.4488				

No wild swing in CRC dataset!

Low: NY, WI, AR, WV, NM, DC, IL
High: OH, MN, NH, DE, IA, RI, AZ

Problematic states identified in May 27 presentation based on column (3) data

Columns (1), (2), (3) have included different vehicle types.
CRC dataset (column (1)) will correct most problematic states identified in May 27 presentation.

(2) CRC data - Long Haul Truck VMT

States were asked to review long haul VMT fraction:

$$\% = \frac{\text{long haul truck VMT}}{\text{single unit truck VMT} + \text{combination truck VMT}}$$

HPMS			MOVES			MOBILE6 Composite Vehicle Types			
Vehicle Type		Vehicle Class	HPMS Vtype ID	Source Type ID	Source Use Type	Veh Type		Description	
1	Motorcycles	Motorcycles	10	11	Motorcycle	16	MC	Motorcycles (All)	
2	Passenger Cars	Passenger Cars	20	21	Passenger Car	1	LDV	Light-Duty Vehicles (Passenger Cars)	
3	Two Axle, 4 Tire Single Unit Vehicles	Other 2-axle / 4-tire Vehicles	30	31	Passenger Truck	2	LDT1	Light-Duty Trucks 1 (0-6,000 lbs. GVWR, 0-3,750 lbs. LVW)	
						3	LDT2	Light-Duty Trucks 2 (0-6,000 lbs. GVWR, 3,751-5,750 lbs. LVW)	
						4	LDT3	Light-Duty Trucks 3 (6,001-8,500 lbs. GVWR, 0-5,750 lbs. ALVW)	
				32	Light Commercial Truck	5	LDT4	Light-Duty Trucks 4 (6,001-8,500 lbs. GVWR, 5,751 lbs. and greater ALVW)	
						6	HDV2B	Class 2b Heavy-Duty Vehicles (8,501-10,000 lbs. GVWR)	
4	Busses	Buses	40	41	Intercity Bus	15	HDBT	Transit and Urban Buses	
				42	Transit Bus				
				43	School Bus	14	HDBS	School Buses	
5	Two Axle, 6 Tire Single Unit Trucks	Single Unit Trucks	50	51	Refuse Truck	7	HDV3	Class 3 Heavy-Duty Vehicles (10,001-14,000 lbs. GVWR)	
6	Three Axle Single Unit Trucks			52	Single-Unit Short-Haul Truck	8	HDV4	Class 4 Heavy-Duty Vehicles (14,001-16,000 lbs. GVWR)	
7	Four or More Axle Single Unit Trucks			53	Single-Unit Long-Haul Truck	9	HDV5	Class 5 Heavy-Duty Vehicles (16,001-19,500 lbs. GVWR)	
				54	Motor Home	10	HDV6	Class 6 Heavy-Duty Vehicles (19,501-26,000 lbs. GVWR)	
						11	HDV7	Class 7 Heavy-Duty Vehicles (26,001-33,000 lbs. GVWR)	
8	Four Axle or Fewer Single Trailers	Combination Trucks	60	61	Combination Short-Haul Truck	12	HDV8A	Class 8a Heavy-Duty Vehicles (33,001-60,000 lbs. GVWR)	
9	Five Axle Single Trailers			62	Combination Long-Haul Truck	13	HDV8B	Class 8b Heavy-Duty Vehicles (>60,000 lbs. GVWR)	
10	Six or More Axle Single Trailers								
11	Five Axle or Fewer Multi-Trailers								
12	Six Axle Multi-Trailers								
13	Seven or More Axle Multi-Trailers								

SMOKE-MOVES SCCs

SMOKE v3.1

SCC7 vehicle types

SCC7	Class	Description
2201001	LDGV	Light Duty Gasoline Vehicles
2201020	LDGT1	Light Duty Gasoline Truck 1 and 2
2201040	LDGT2	Light Duty Gasoline Truck 3 and 4
2201070	HDGV	Heavy Duty Gasoline Vehicles 2B thru 8B and Gasoline Buses
2201080	MC	Motorcycles
2230001	LDDV	Light Duty Diesel Vehicles
2230060	LDDT	Light Duty Diesel Trucks 1 thru 4
2230071	2BHDDV	Heavy Duty Diesel Vehicles Class 2B
2230072	LHDDV	Heavy Duty Diesel Vehicles Class 3, 4, and 5
2230073	MHDDV	Heavy Duty Diesel Vehicles Class 6 and 7
2230074	HHDDV	Heavy Duty Diesel Vehicles Class 8A and 8B
2230075	BUSES	Heavy Duty Diesel Buses (School and Transit)

There are 12 vehicles types (SCC7)

Vehicle Source Types

TYPE	HPMS	MOVES	MOBILE6	SCC
# of classes	6	13	16	12
Usage	MOVES VMT inputs	MOVES VPOP, Age distribution	Historical and/or DMV classes	MOVES and SMOKE outputs

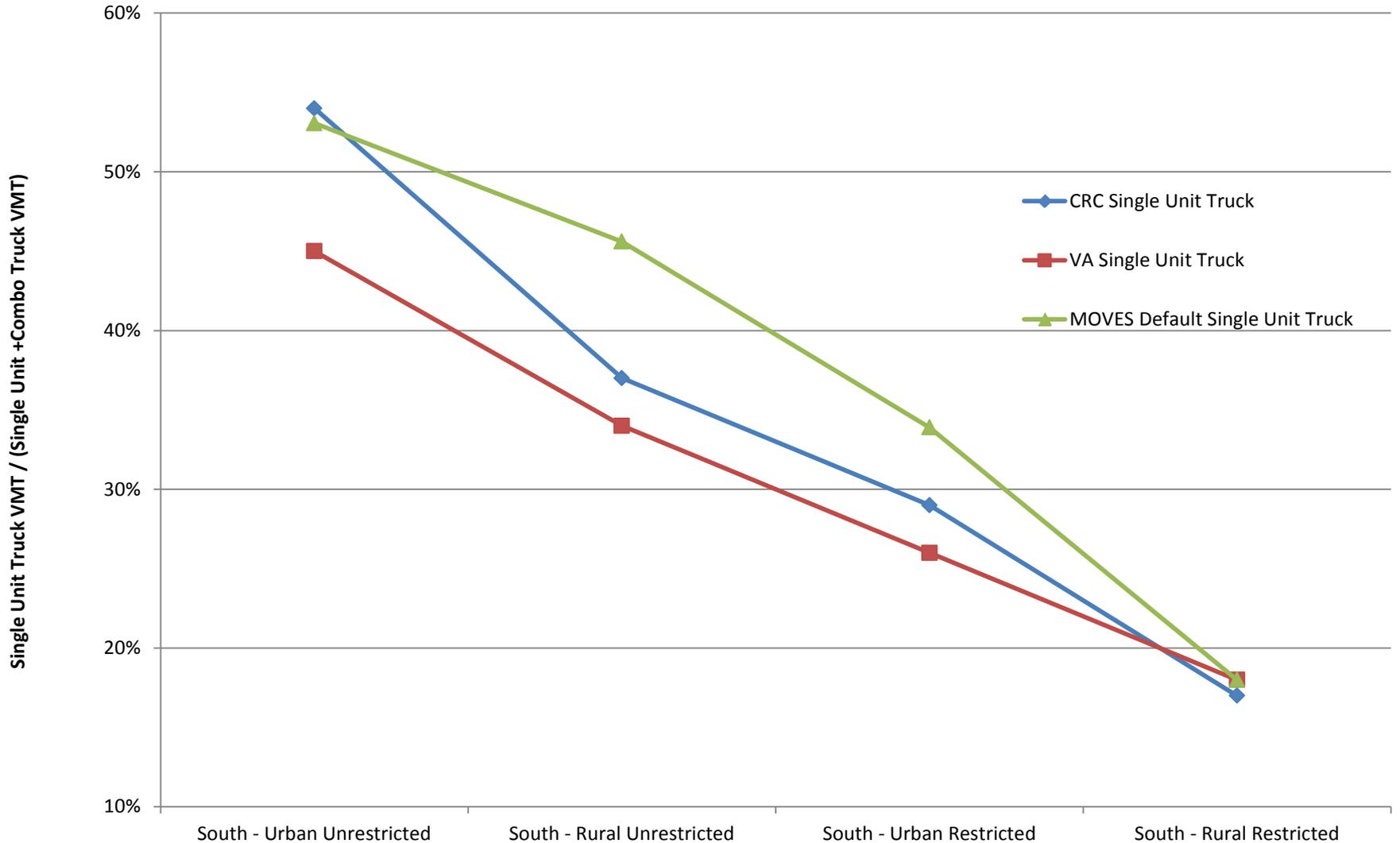
Issues specific to CRC A88:

- **MOVES VMT input is by HPMS vehicle type (single unit truck, combination truck).**
- **HPMS vehicle types do not include separate groups for long-haul trucks and short-haul trucks.**
- **The lack of local VMT data for long-haul trucks and short-haul trucks makes it difficult to verify CRC regional percentages for long-haul versus short-haul VMT.**

Other related issues:

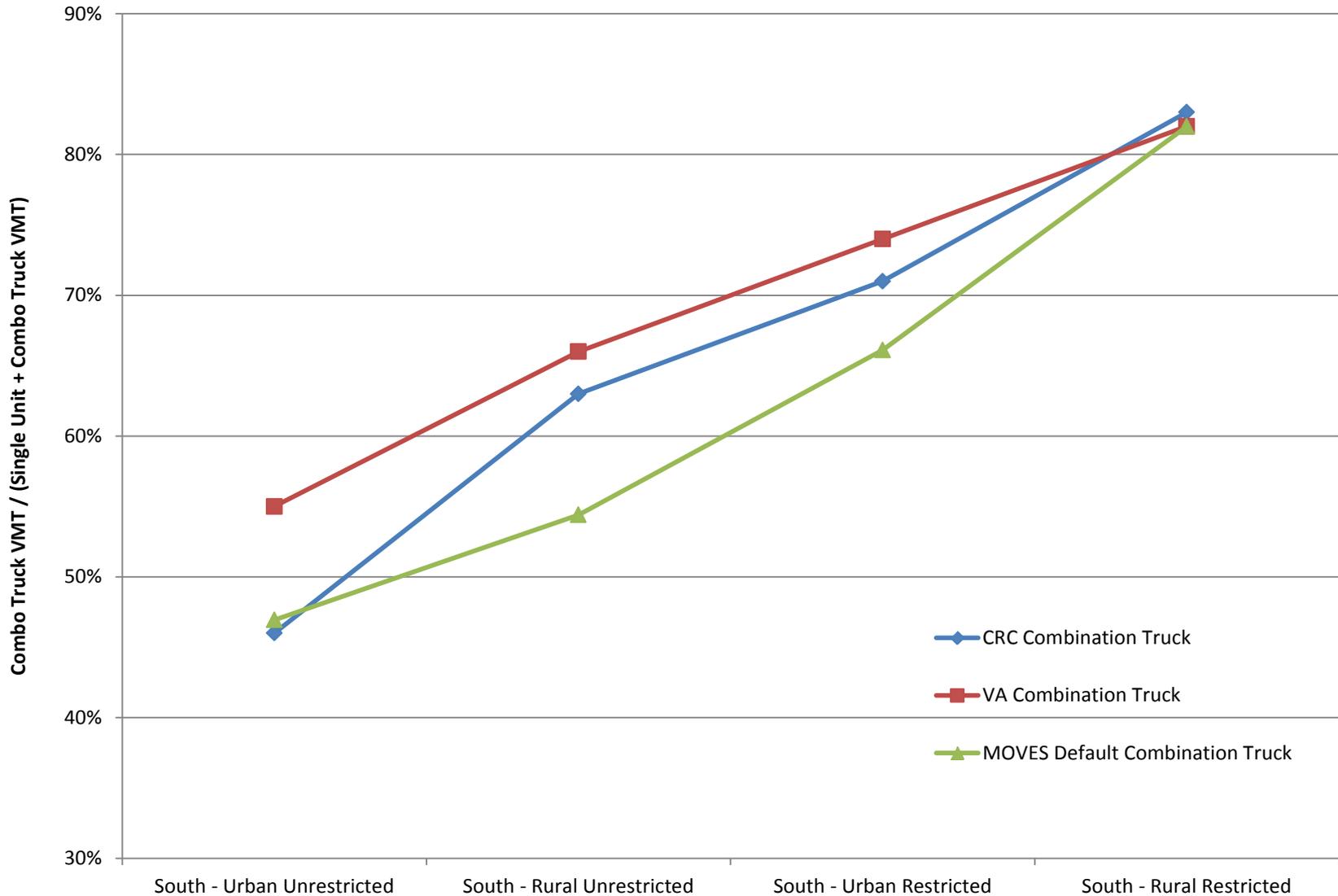
- **Mapping between the four vehicle types is complicated and generally not a one-to-one relationship .**
- **SCC source types cannot be mapped to the other three source types.**
SMOKE-MOVES reports (by SCCs) are questionable, because they cannot be verified by MOVES reports. This issue is compounded by activity (VMT/VPOP) non-conservation.

Single Unit Truck VMT Fraction Comparison – State Average vs CRC Regional Average



Long haul VMT fraction cannot be evaluated

Combination Truck VMT Fraction Comparison – State Average vs CRC Regional Average



Long haul VMT fraction cannot be evaluated

Summary on CRC dataset

- **Compared to state-specific data from NY/VA DMV, CRC dataset has higher VPOP for three source types: passenger car, passenger truck, light commercial truck (more emissions?)**
- **July 15 presentation demonstrated CRC vehicle ages lean toward to older vehicles (more emissions?)**
- **Correction to age 30 bin will include age 30+ vehicles (more emissions?)**
- **CRC dataset is an improvement over NEI v1, especially for states which provided no data**