

**Critical Review of EPA's
2011 NEI-based 2018 MOVES Activities**

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**MARAMA MOVES Workgroup Conference Call
April 28, 2014**

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)

SMOKE-MOVES SCCs

SMOKE v3.1

SCC2 road types

SCC2	Class
11	Rural Interstate
13	Rural Principal Arterial
15	Rural Minor Arterial
17	Rural Major Collector
19	Rural Minor Collector
21	Rural Local
23	Urban Interstate
25	Urban Freeway/Expressway
27	Urban Principal Arterial
29	Urban Minor Arterial
31	Urban Collector
33	Urban Local
00	Off-Network

There are 13 road types (SCC2)

2018 VMT/VPOP EPA versus VDEQ

VA Growth Rate Development

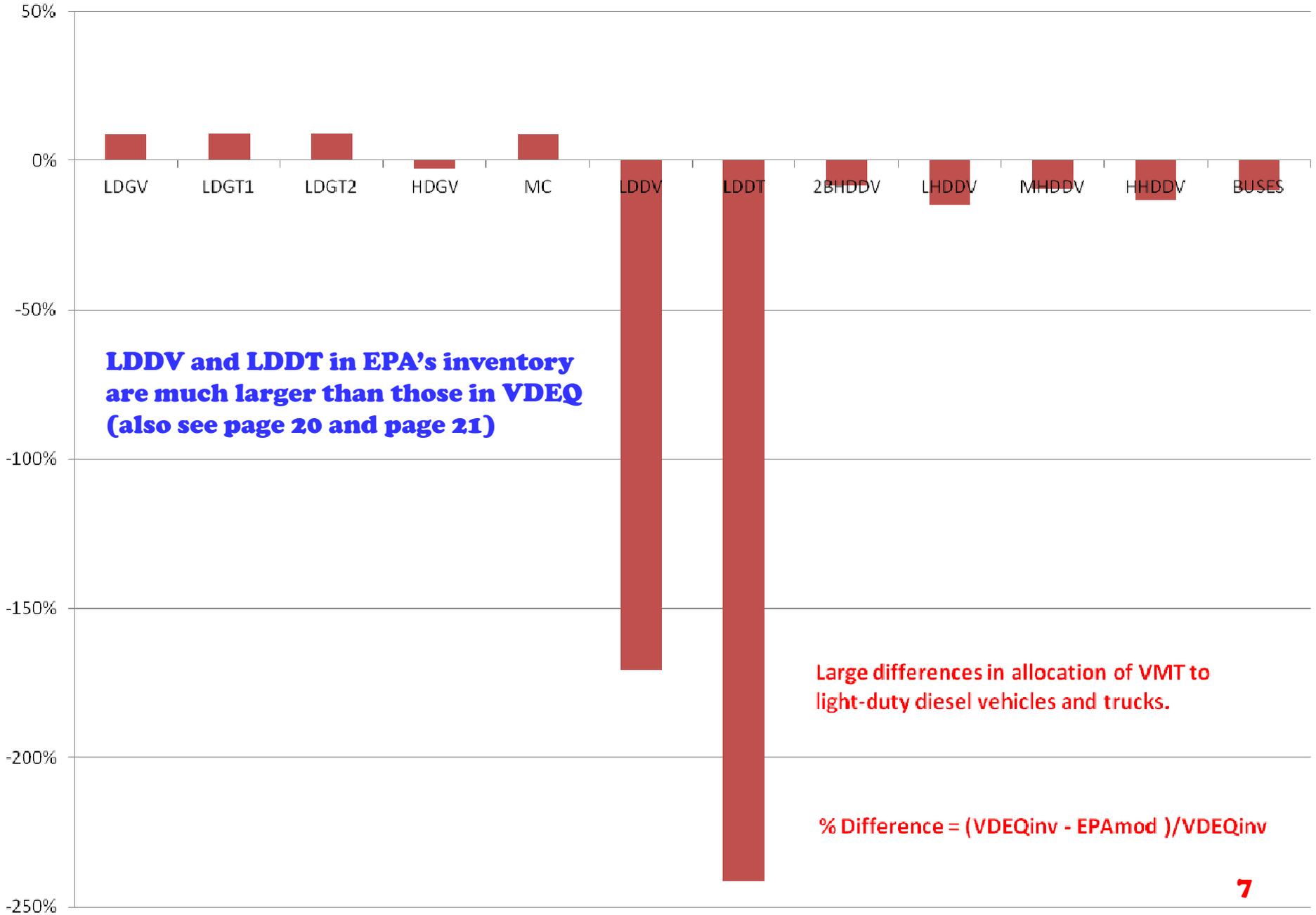
- **VMT growth rates were provided by VDOT as part of our normal interagency exchange of traffic data.**
- **VDOT develops growth rates based on their travel demand model.**
- **VMT growth rates vary by county and by road type.**
- **For VPOP application, a single VMT-weighted growth rate for each county is generated.**

2018 VA MOVES Inventory mode

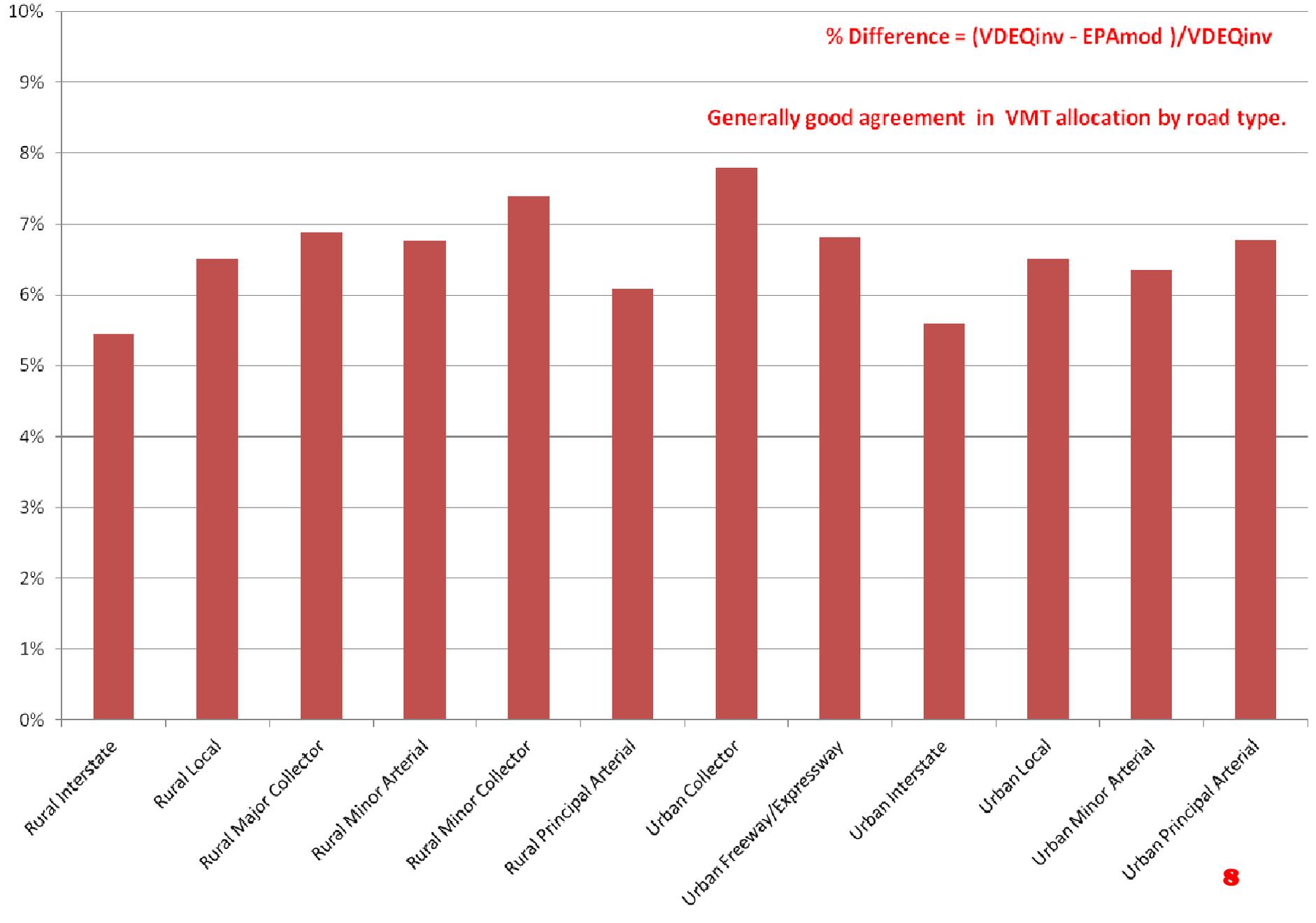
- **2011 VPOP is based on VIN data provided by DMV.**
- **2011 VMT is based on traffic data provided by VDOT.**
- **Growth rates obtained from VDOT were applied to 2011 VMT and VPOP to generate 2018 VMT and VPOP**
- **MOVES runs were conducted in inventory mode to generate a 2018 emission inventory.**
- **The SCC option was selected for MOVES output.**
- **This allows the VMT and VPOP output to be allocated by SMOKE-MOVES SCC.**

- **2018 VA VMT by SCC = VDOT growth + inventory mode**

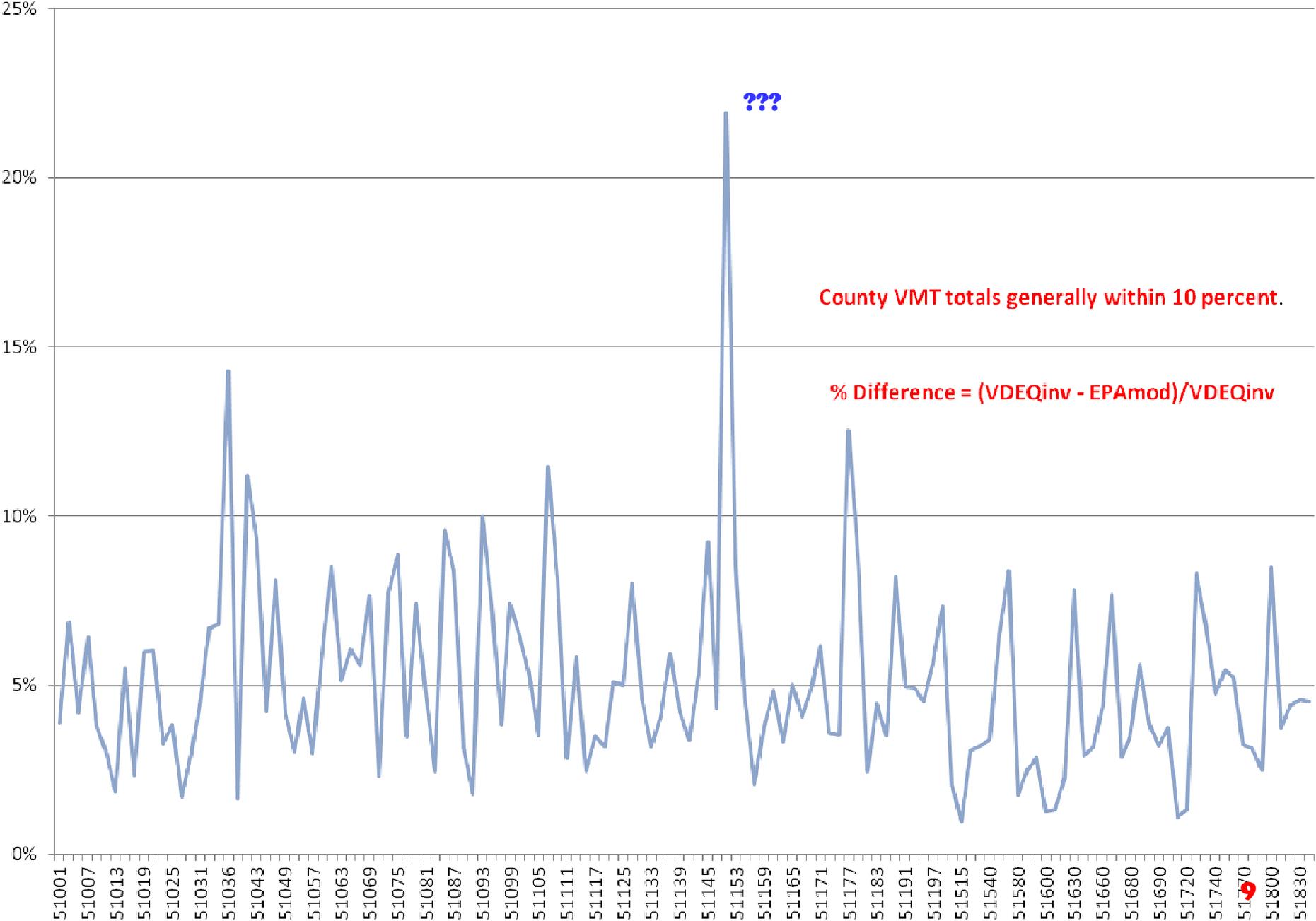
VMT Difference by Vehicle Type (2018)



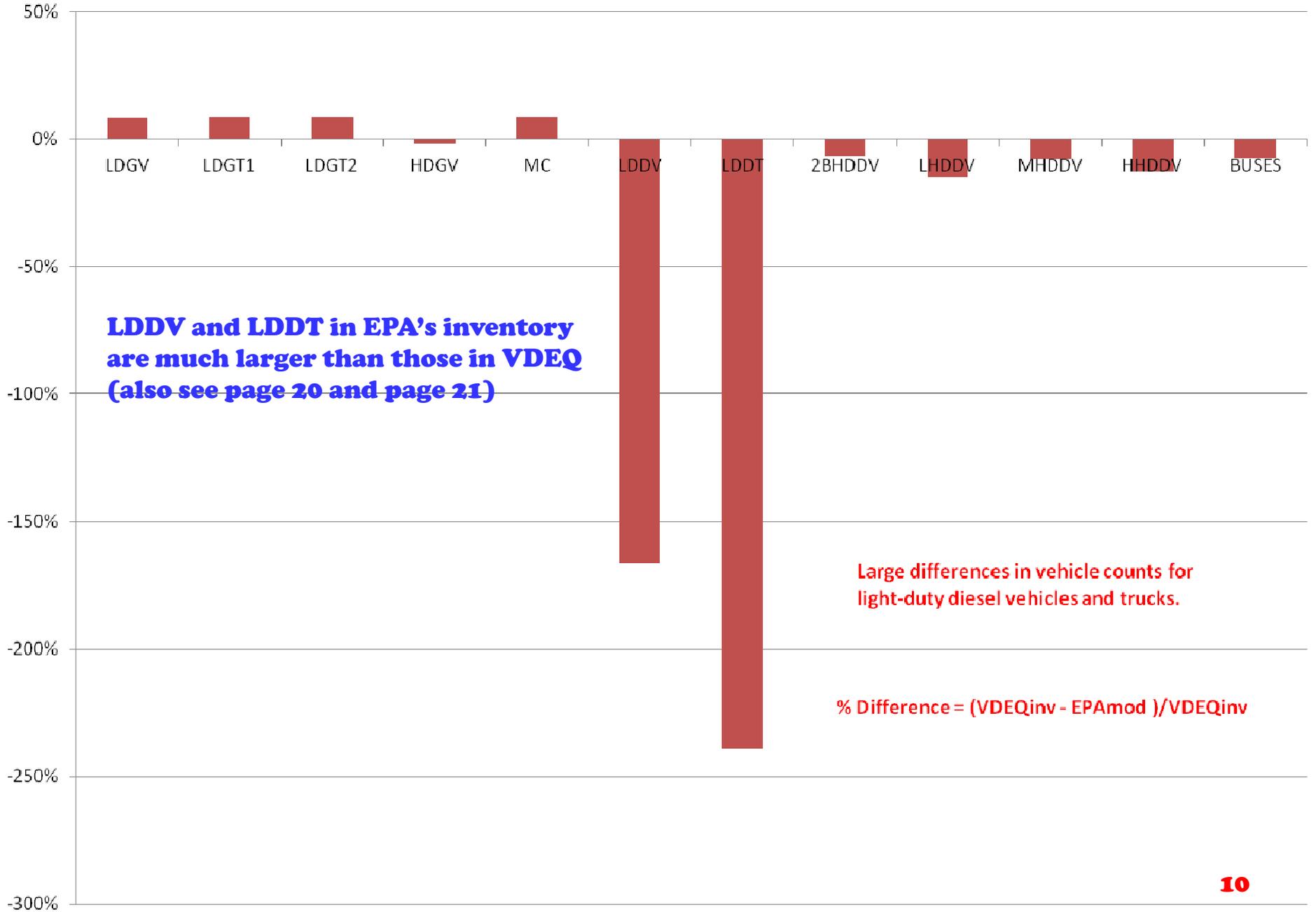
VMT Difference by Road Type (2018)



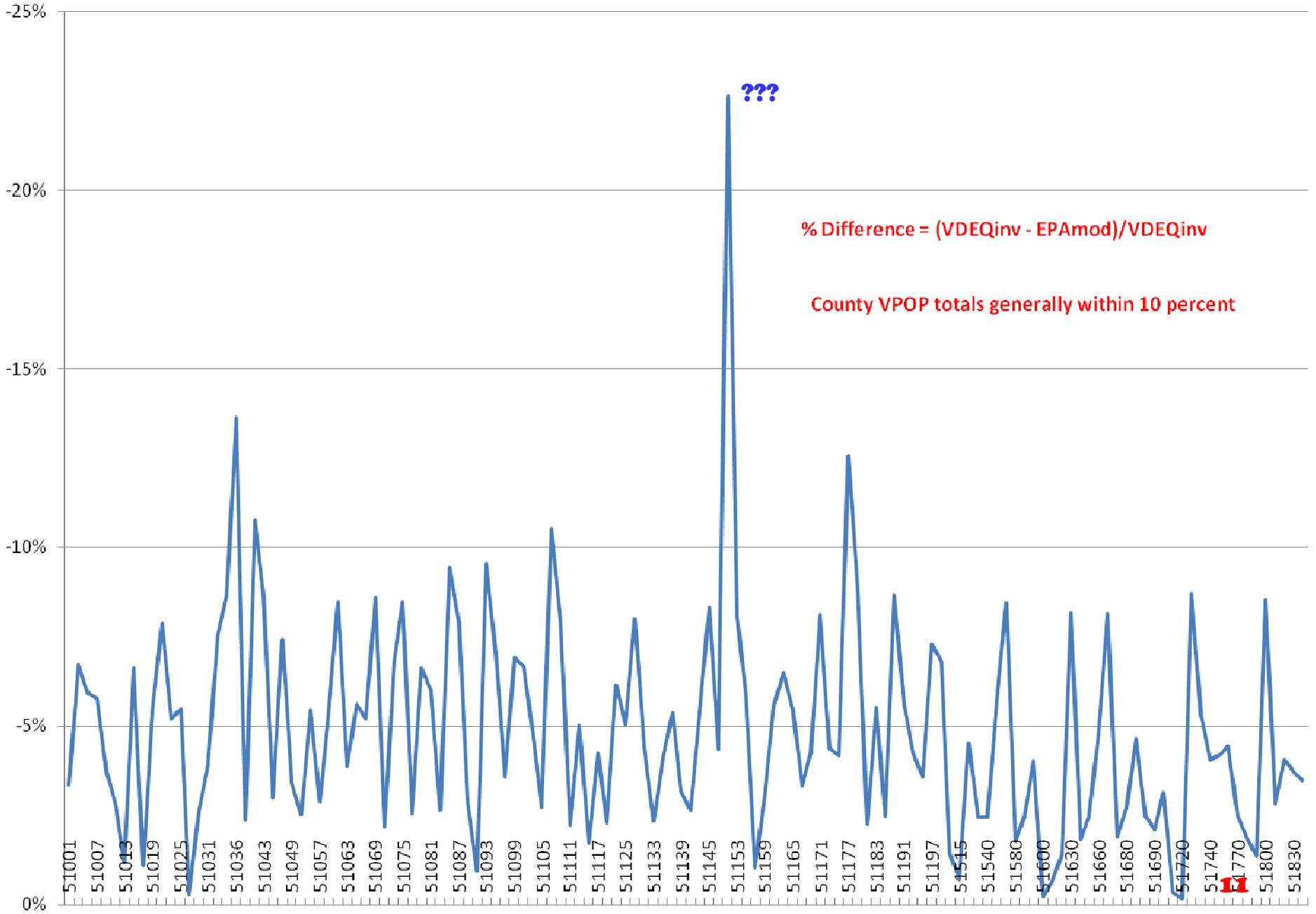
County VMT Differences (2018)



Vehicle Population Difference (2018)



County Vehicle Population Difference (2018)



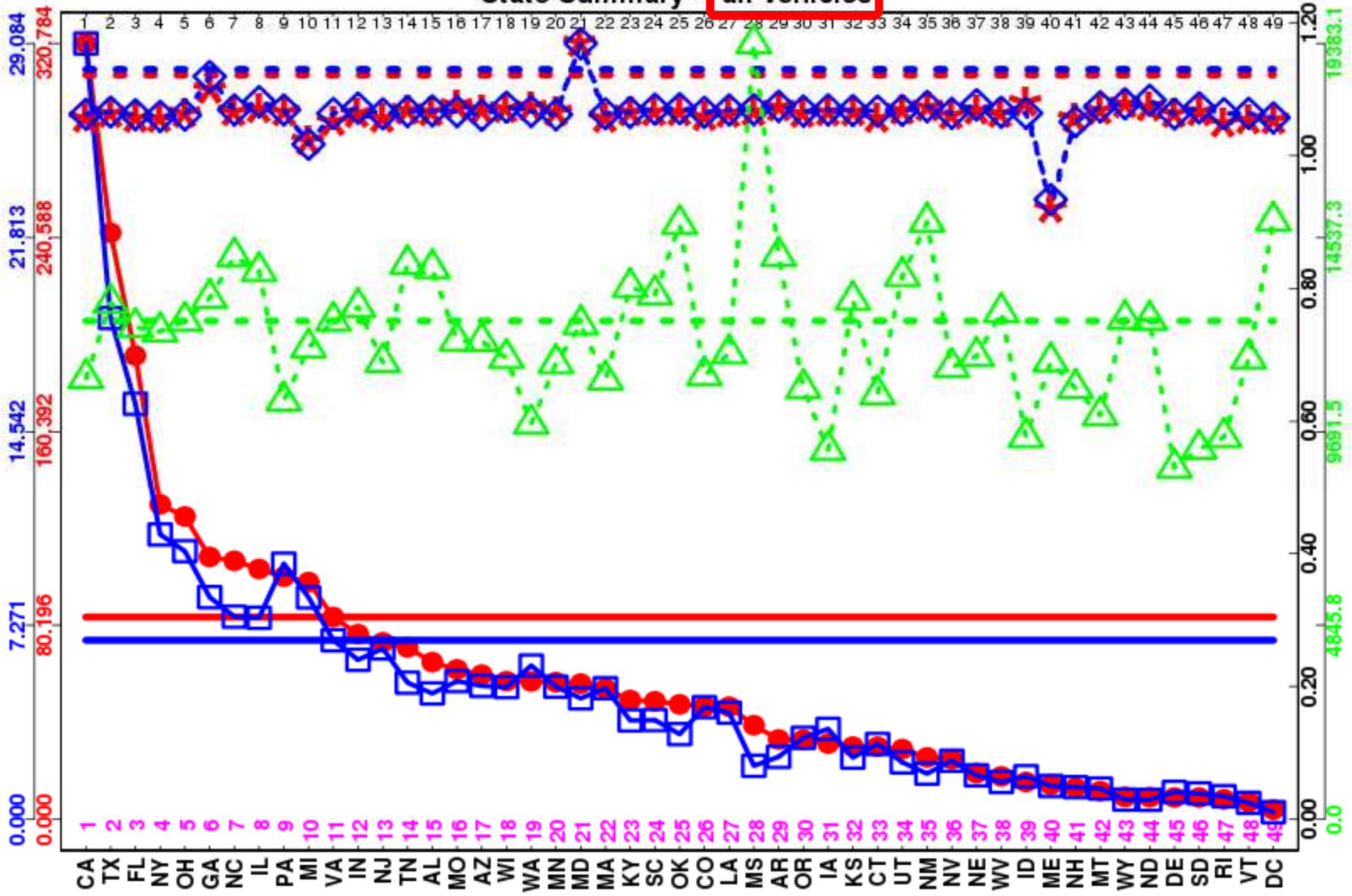
2011/2018 VMT/VPOP Continental Overview

Activity Parameters Examined

Parameter	Unit	Notes
(1) 2011VMT	miles/1 billion	2011NEI “scaled” VMT
(2) 2011VPOP	vehicles/1 million	2011NEI “scaled” VPOP
(3) 2018VMT/2011VMT	unit-less	growth factor
(4) 2018VPOP/2011VPOP	unit-less	growth factor
(5) 2011VMT/2011VPOP	miles/vehicle	annual average miles driven per vehicle in 2011

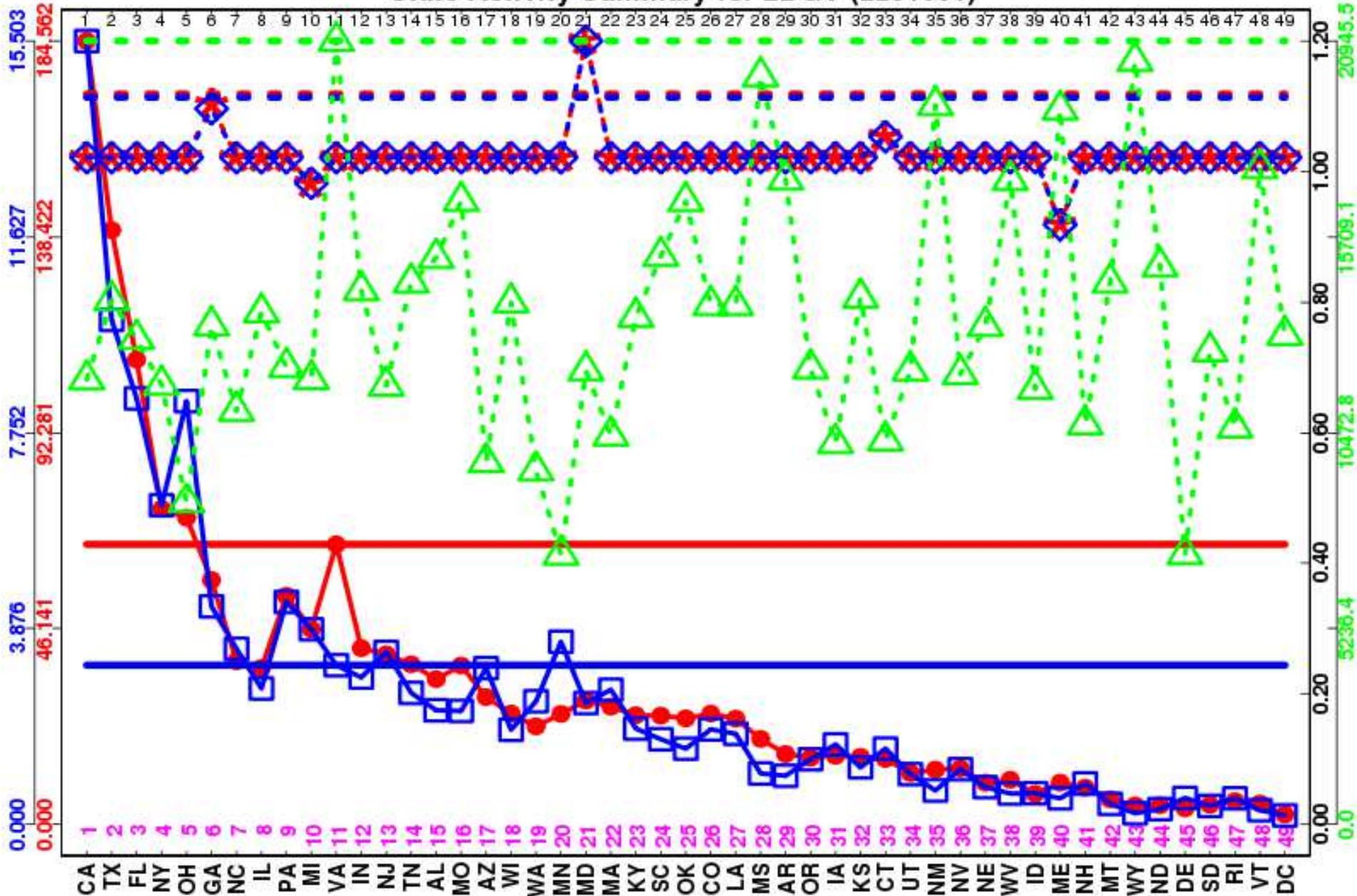
- Activity data were collected from 2011/2018 NEI modeling platform posted by EPA;
- States are ranked according to their **2011 total VMT** (from all vehicle types) and plotted on x axis (ranks are marked in **magenta**). The same ranks were used throughout (i.e., VMT for individual SCC vehicle type was not used in the ranking);
- The two growth factors share the same y axis;
- Corresponding numbers from VDEQ in-house inventory mode (described in page 6) are shown as horizontal reference lines for comparisons.

State Summary - all vehicles



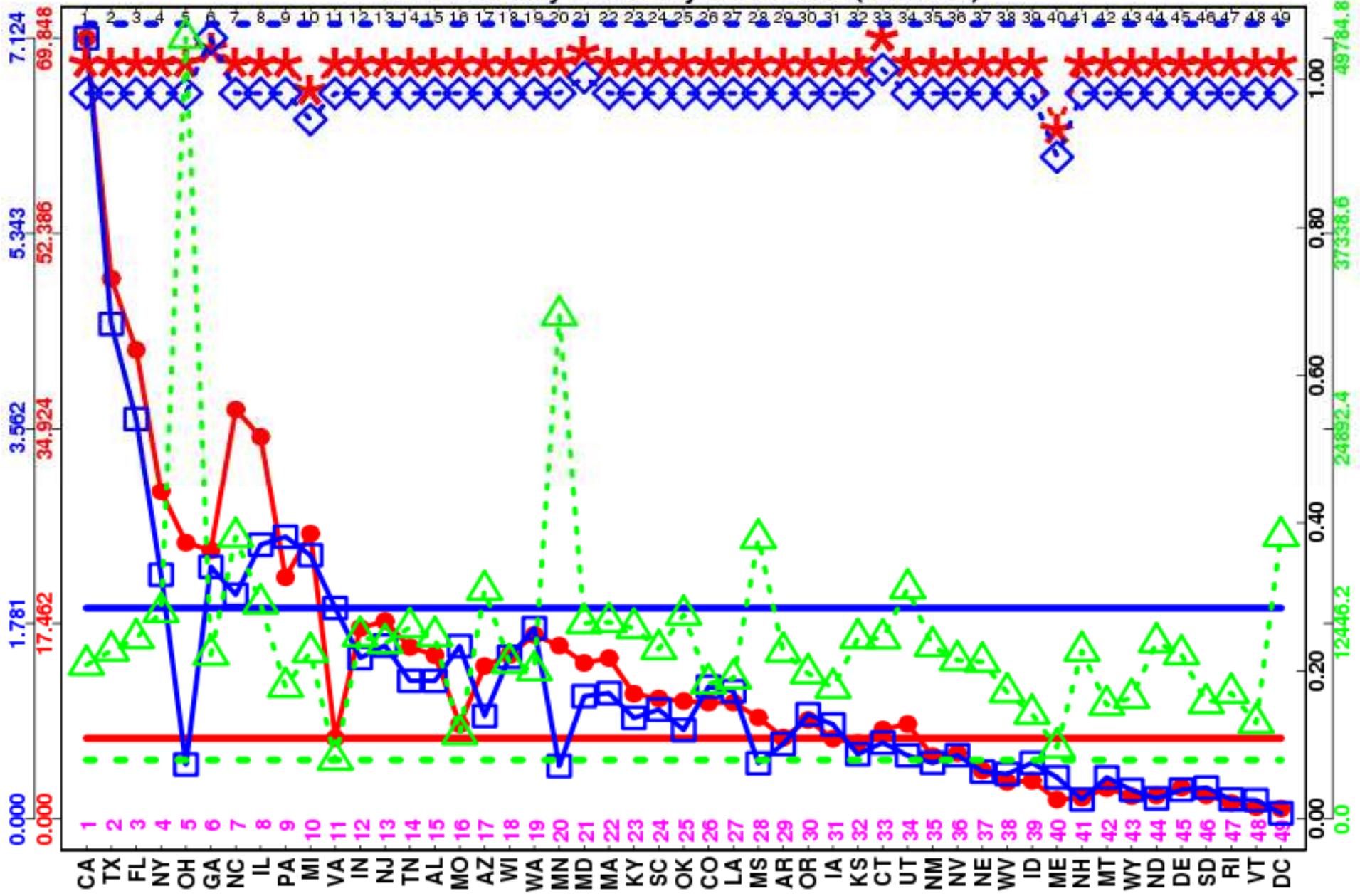
● 2011 VMT
 □ 2011 VPOP
 - * - 2018 VMT/2011 VMT
 - ◊ - 2018 VPOP/2011 VPOP
 - △ - 2011 VMT/2011 VPOP
 horizontal references: corresponding numbers from VDEQ MOVES inventory mode

State Activity Summary for LDGV (2201001)



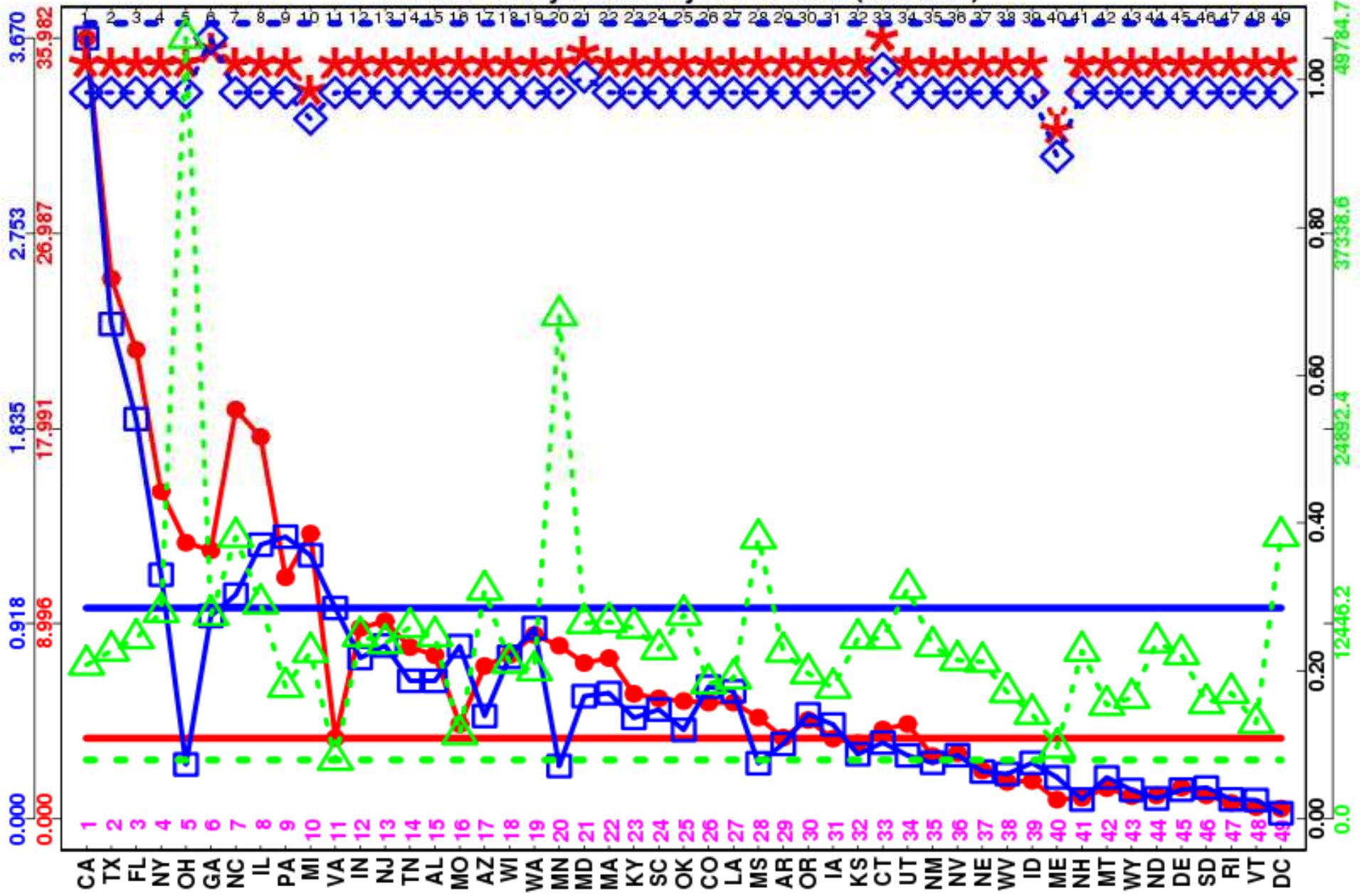
● 2011 VMT
 □ 2011 VPOP
 x 2018 VMT/2011 VMT
 ◇ 2018 VPOP/2011 VPOP
 △ 2011 VMT/2011 VPOP
 — horizontal references: corresponding numbers from VDEQ MOVES inventory mode

State Activity Summary for LDGT1 (2201020)



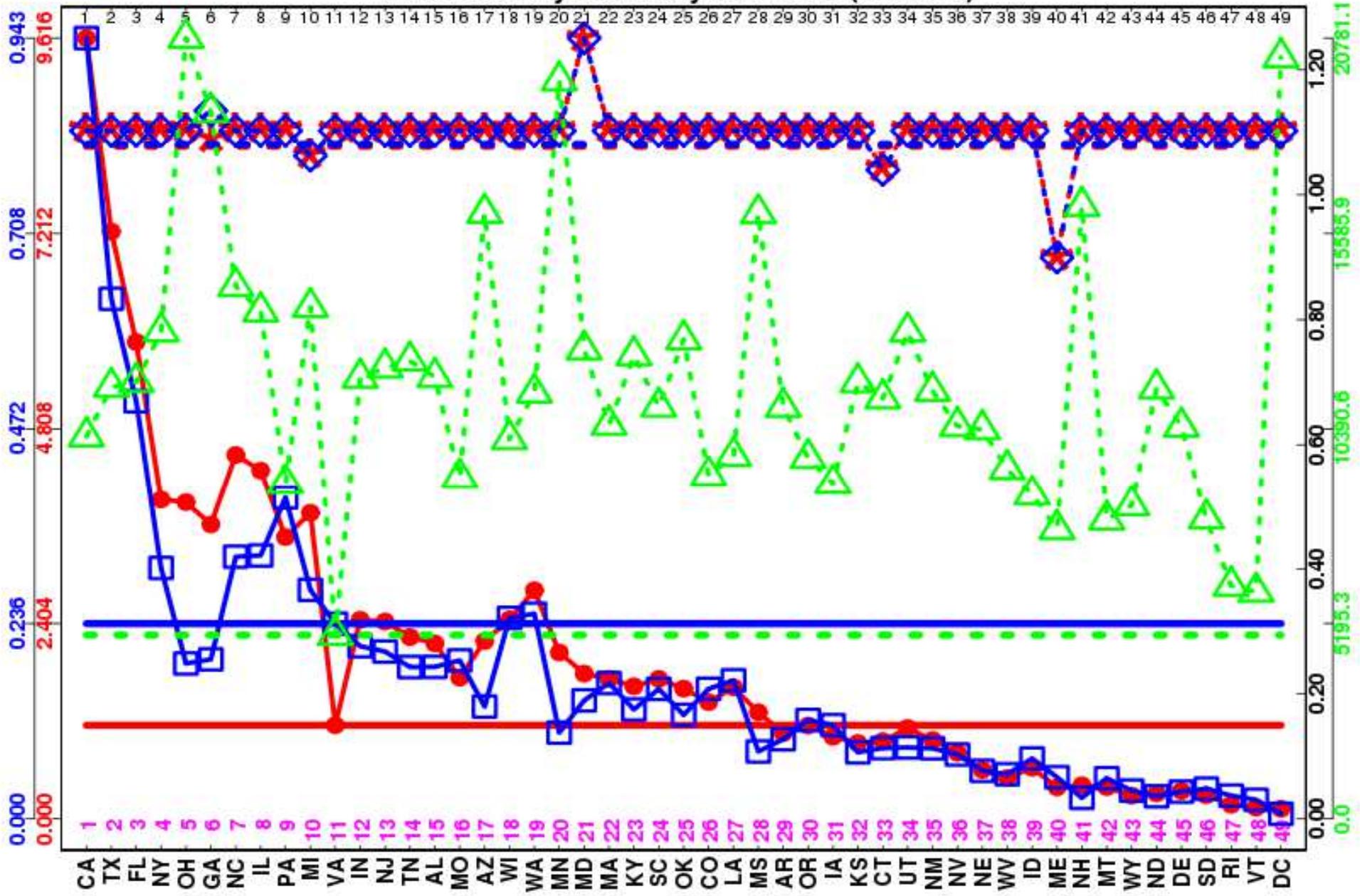
● 2011 VMT □ 2011 VPOP * 2018 VMT/2011 VMT ◇ 2018 VPOP/2011 VPOP △ 2011 VMT/2011 VPOP
— — - - - - - - - - - horizontal references: corresponding numbers from VDEQ MOVES inventory mode

State Activity Summary for LDGT2 (2201040)



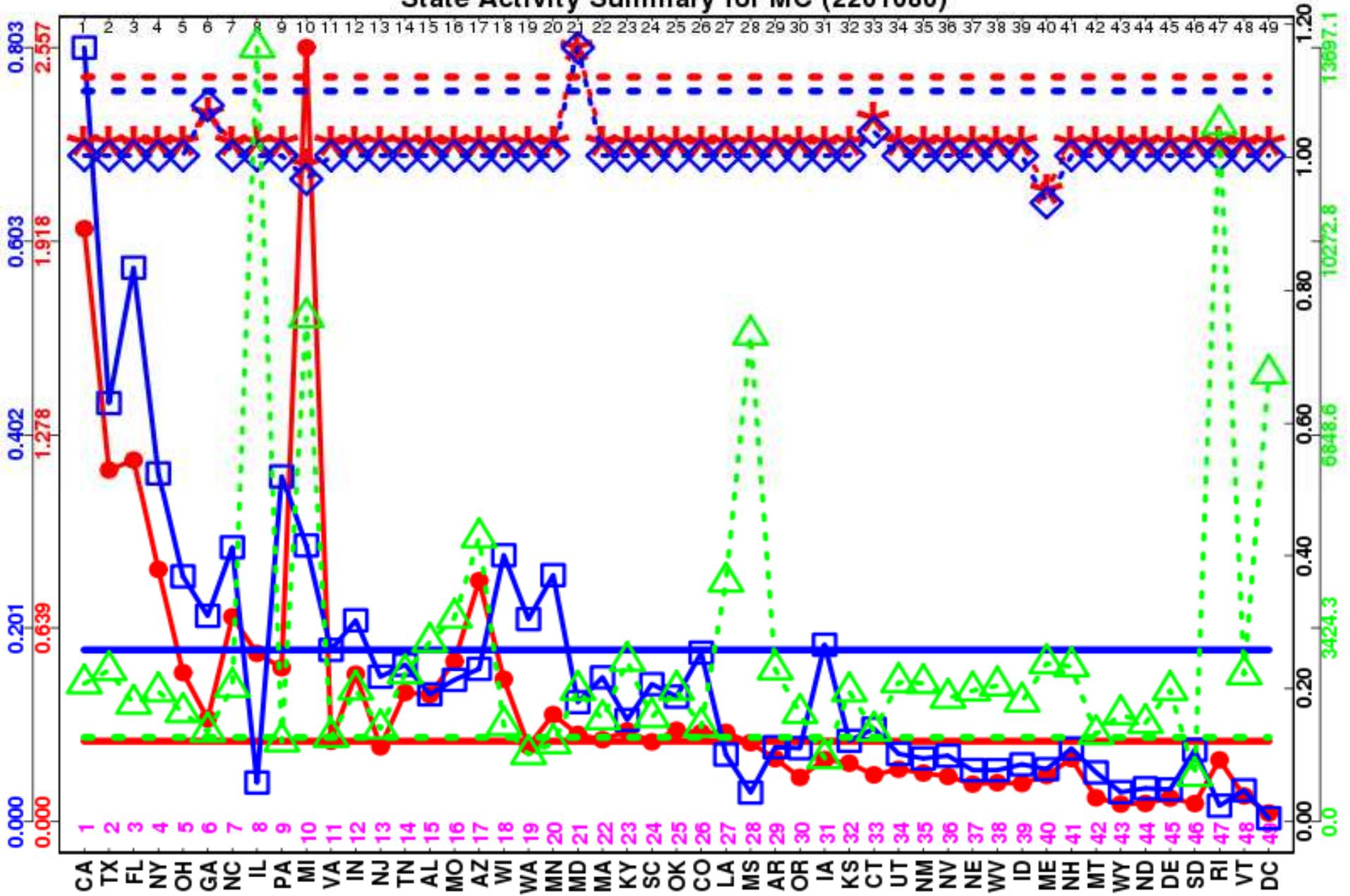
● 2011 VMT
 □ 2011 VPOP
 - * - 2018 VMT/2011 VMT
 - ◇ - 2018 VPOP/2011 VPOP
 - △ - 2011 VMT/2011 VPOP
 — — — — — horizontal references: corresponding numbers from VDEQ MOVES inventory mode

State Activity Summary for HDGV (2201070)



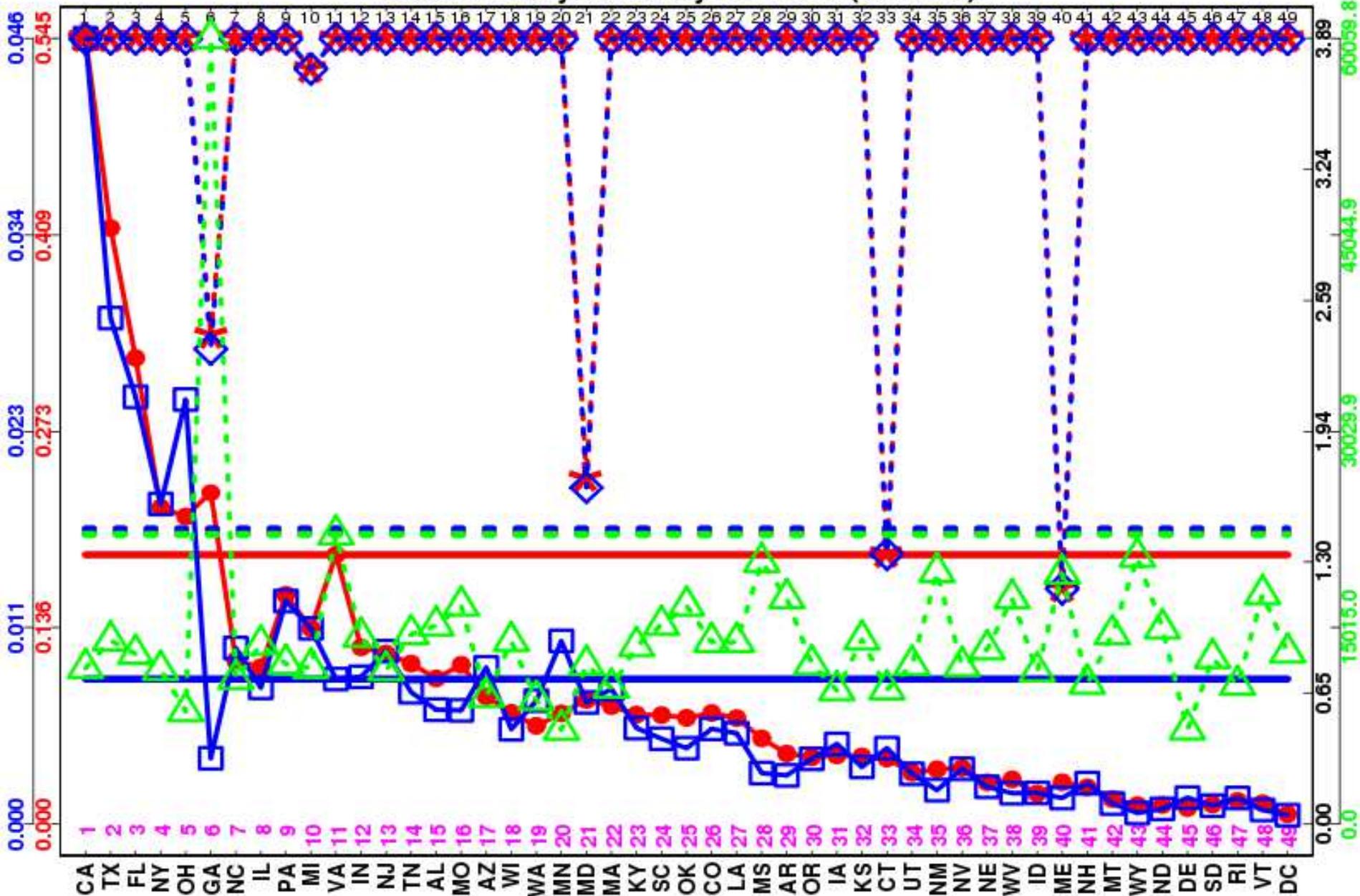
● 2011 VMT
 □ 2011 VPOP
 x 2018 VMT/2011 VMT
 ◇ 2018 VPOP/2011 VPOP
 △ 2011 VMT/2011 VPOP
 — horizontal references: corresponding numbers from VDEQ MOVES inventory mode

State Activity Summary for MC (2201080)



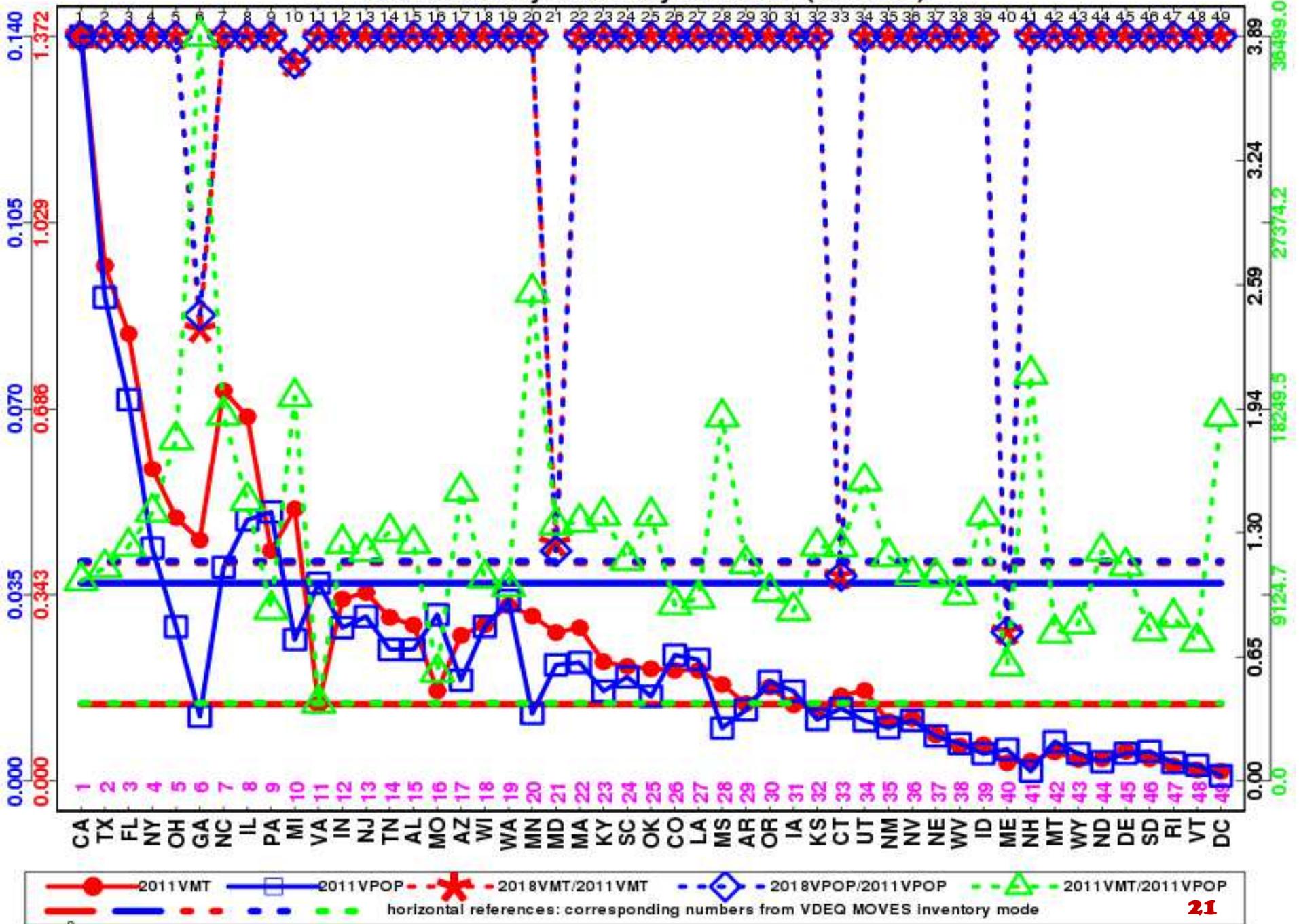
● 2011 VMT
 □ 2011 VPOP
 * - - 2018 VMT/2011 VMT
 ◇ - - 2018 VPOP/2011 VPOP
 △ - - 2011 VMT/2011 VPOP
— — - - - - - - horizontal references: corresponding numbers from VDEQ MOVES inventory mode

State Activity Summary for LDDV (2230001)

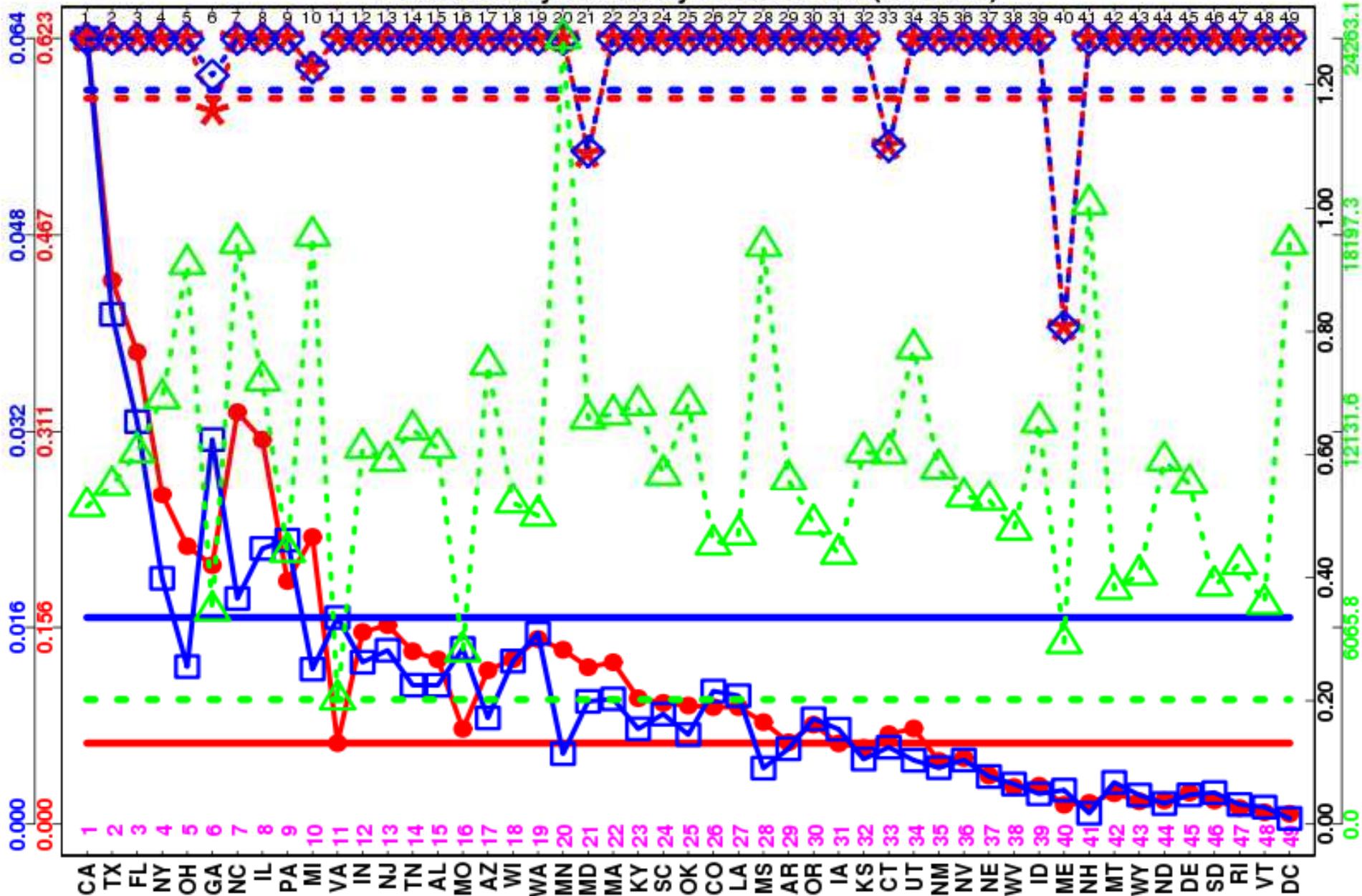


—●— 2011 VMT
 —□— 2011 VPOP
 - - * - - 2018 VMT/2011 VMT
 - - ◇ - - 2018 VPOP/2011 VPOP
 - - △ - - 2011 VMT/2011 VPOP
— — — horizontal references: corresponding numbers from VDEQ MOVES inventory mode

State Activity Summary for LDDT (2230060)

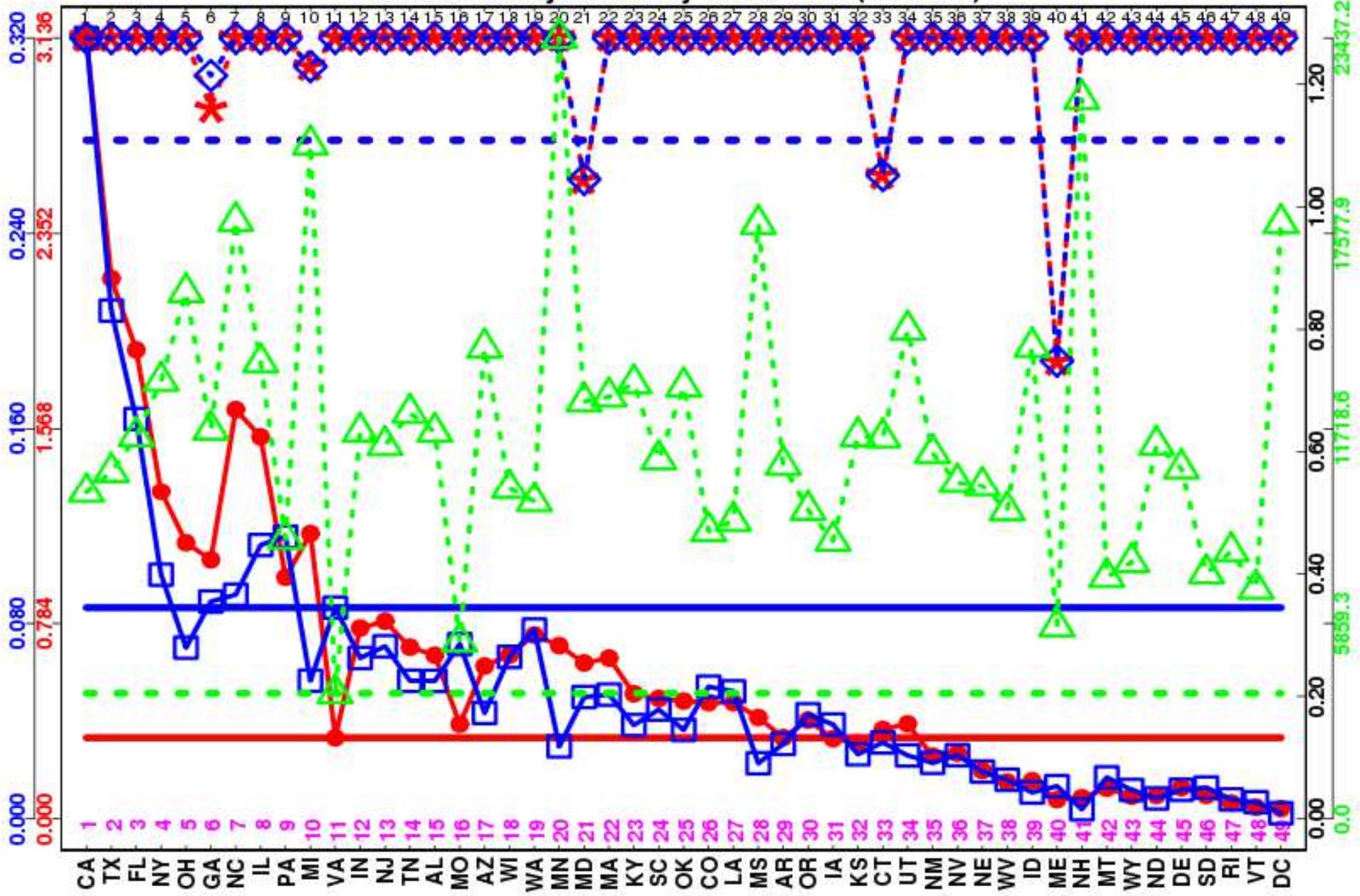


State Activity Summary for 2BHDDV (2230071)



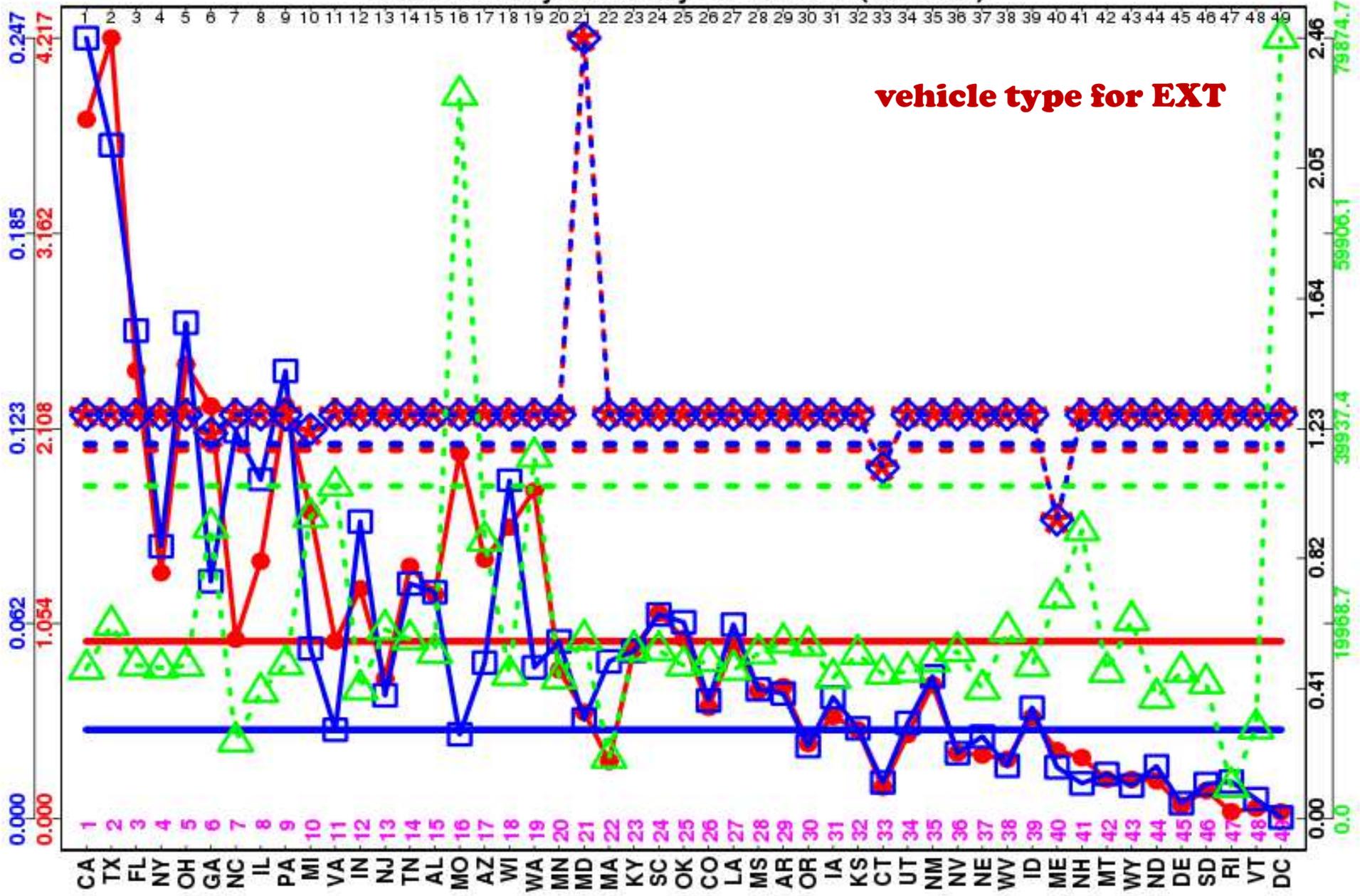
● 2011 VMT
 □ 2011 VPOP
 - - * 2018 VMT/2011 VMT
 - - ◇ 2018 VPOP/2011 VPOP
 - - △ 2011 VMT/2011 VPOP
 horizontal references: corresponding numbers from VDEQ MOVES inventory mode

State Activity Summary for LHDDV (2230072)



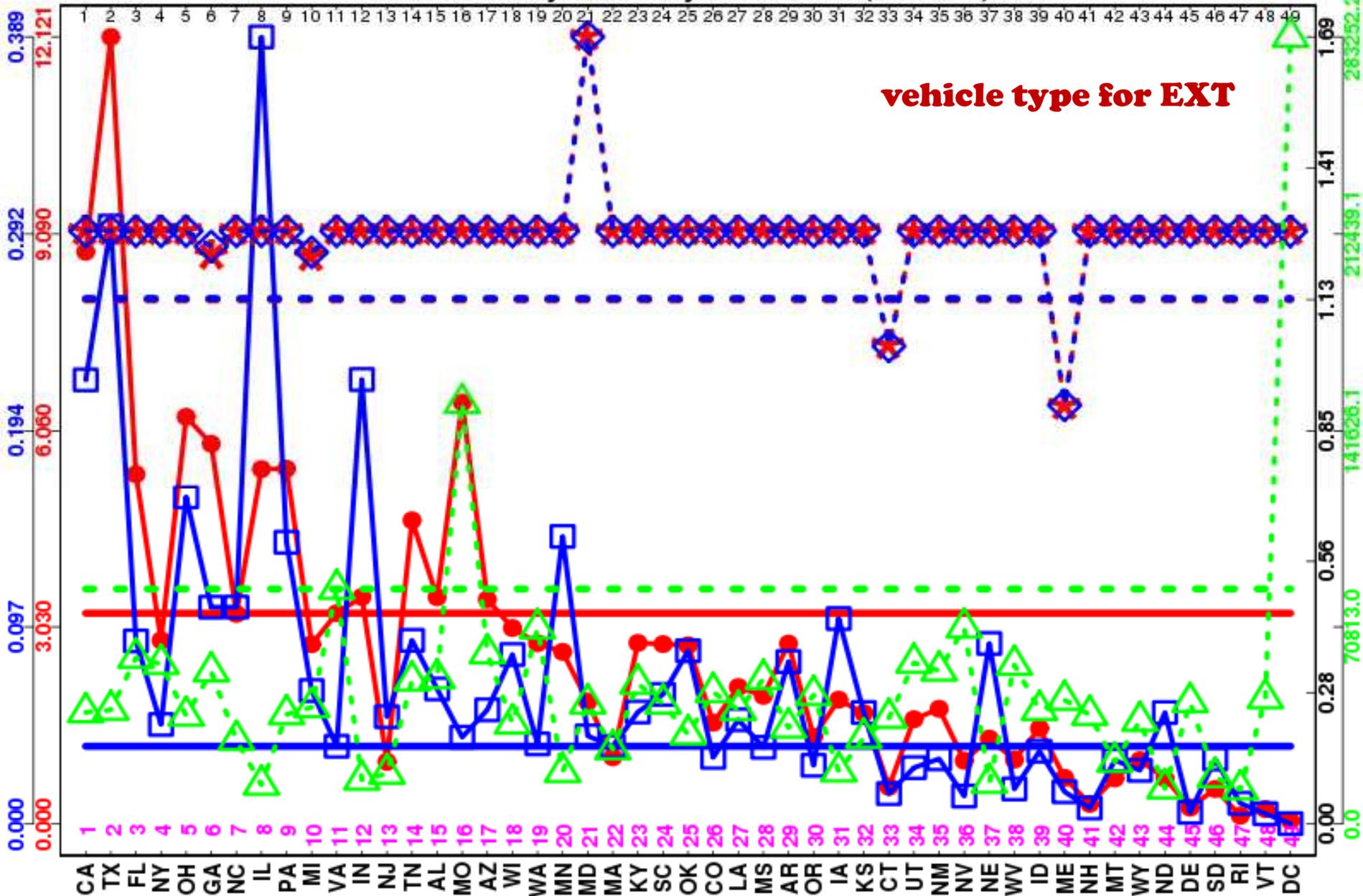
● 2011 VMT
 □ 2011 VPOP
 - * - 2018 VMT/2011 VMT
 - ◆ - 2018 VPOP/2011 VPOP
 - △ - 2011 VMT/2011 VPOP
 — — — — — horizontal references: corresponding numbers from VDEQ MOVES inventory mode

State Activity Summary for MHDDV (2230073)

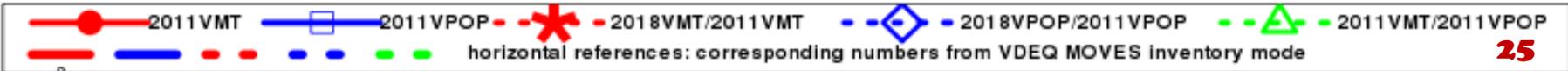


● 2011 VMT
 □ 2011 VPOP
 ✱ 2018 VMT/2011 VMT
 ◇ 2018 VPOP/2011 VPOP
 △ 2011 VMT/2011 VPOP
 — horizontal references: corresponding numbers from VDEQ MOVES inventory mode

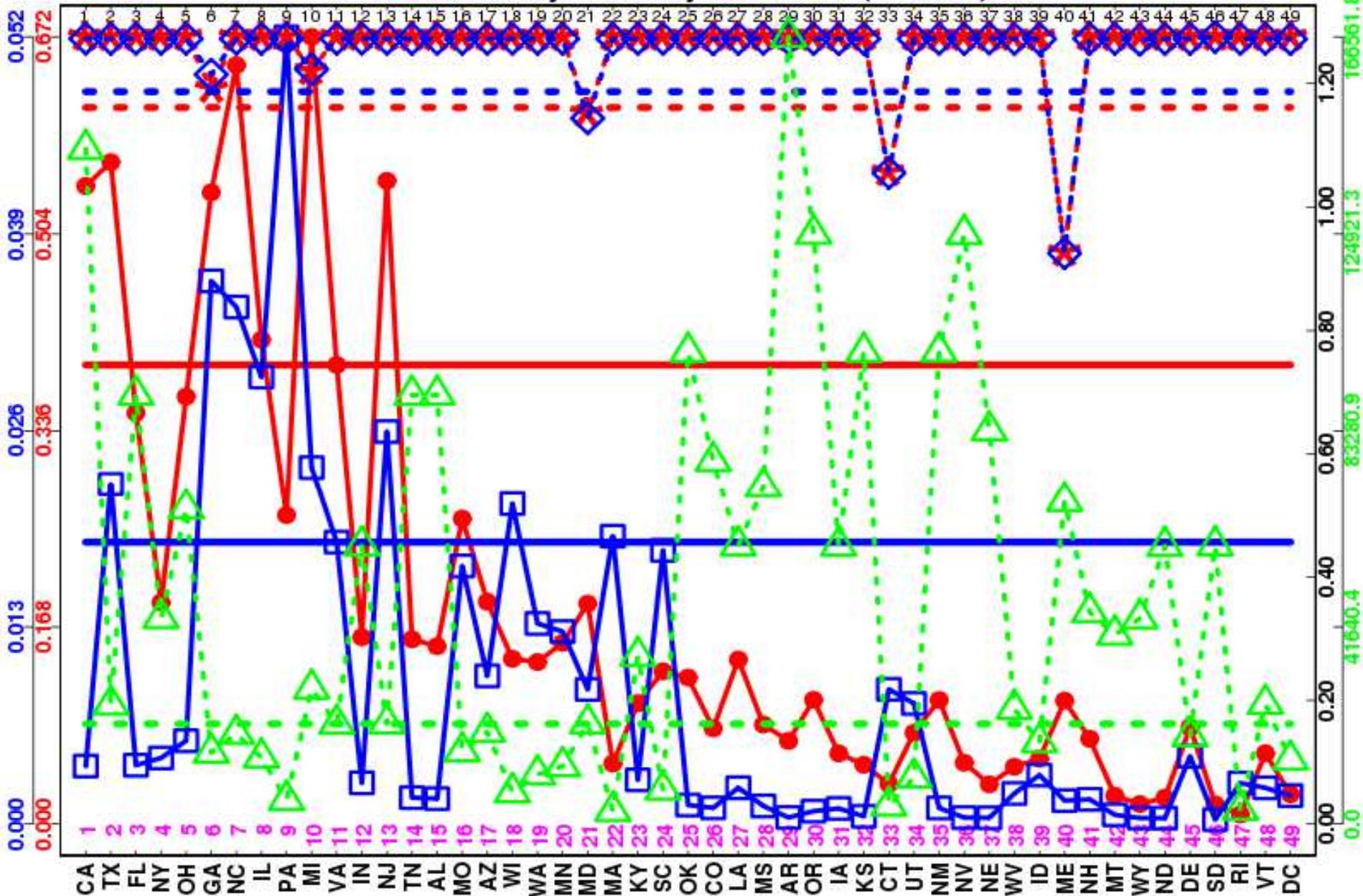
State Activity Summary for HHDDV (2230074)



vehicle type for EXT

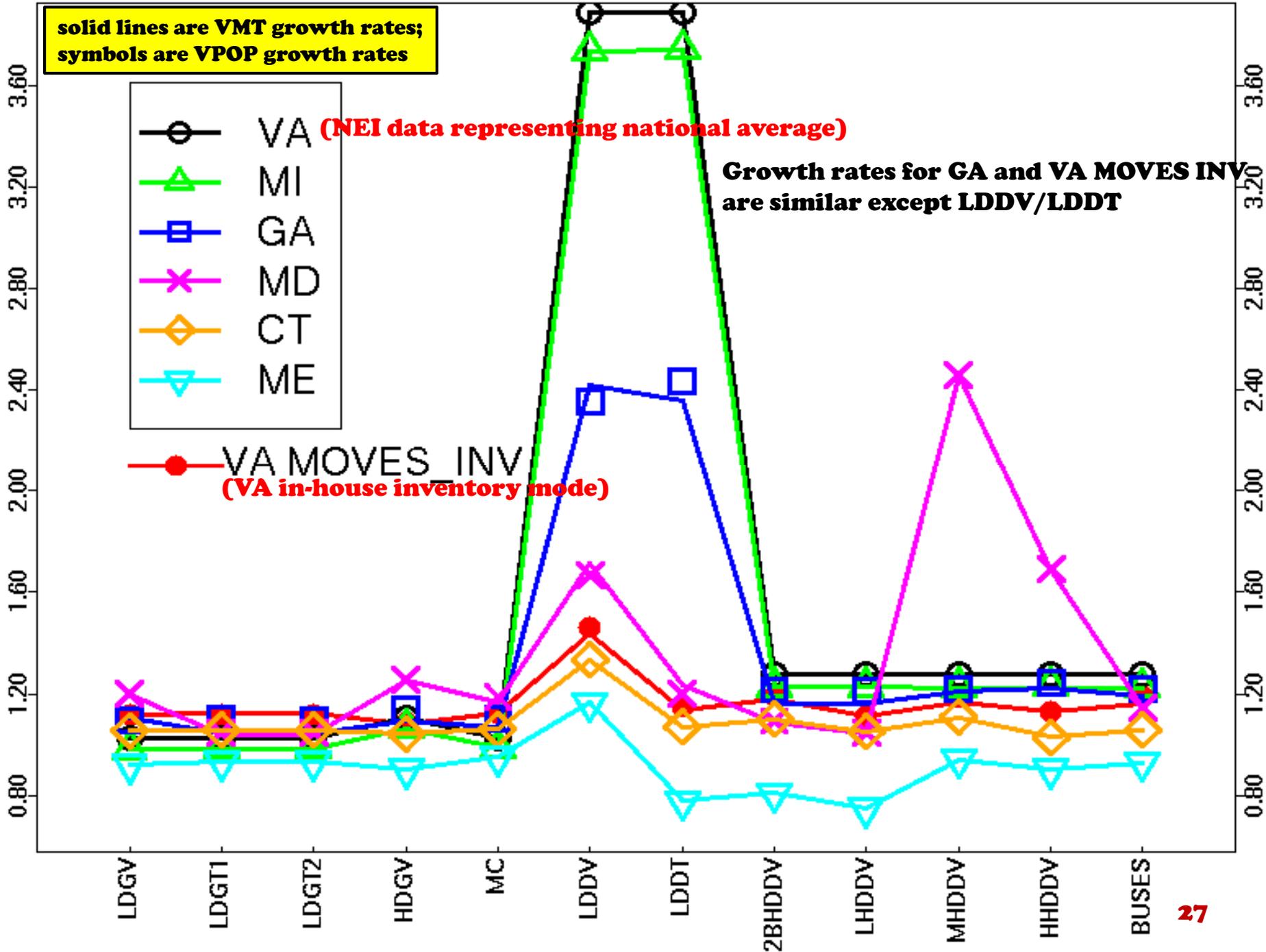


State Activity Summary for BUSES (2230075)



● 2011 VMT
 □ 2011 VPOP
 x 2018 VMT/2011 VMT
 ◇ 2018 VPOP/2011 VPOP
 △ 2011 VMT/2011 VPOP
 ——— horizontal references: corresponding numbers from VDEQ MOVES inventory mode

Growth Rates for Six Selected States



Summary

- **Southeast & Mid-Atlantic gasoline vehicle growth rates are generally higher than national**
- **Northeast and Midwest gasoline vehicle growth rates generally lower than national**
- **National diesel vehicle growth rate seems excessive and requires QA**
- **Some state growth rates seem out of step with other state estimates and require QA**

Summary

- **Ratios of VMT/VPOP indicate a need for targeted QA of state submitted 2011 VMT & VPOP:**
 - **Buses in AR = 167,000 miles/year on average**
 - **HHDDV in MO = 152,000 miles/year on average**
 - **MHDDV in MO = 74,000 miles/year on average**
 - **LDDV in GA = 60,000 miles/year on average**
 - **Motorcycles in IL = 14,000 miles/year on average**
 - **LDGT1 and LDGT2 in OH = 50,000 miles/year on average**
 - **LDGV in VA = 21,000 miles/year on average**
 - **VMT/VPOP for many vehicle types in DC are very high**

Summary

- **GA and VA used similar projection method for growth. The two states therefore have similar growth rates for most vehicle types. It's not known what methods were used by other states**
- **EPA used a national average growth rate by vehicle type for all states. The same national average growth rate is applied to both VMT and VPOP**
- **Limited state-specific data indicates regional differences**
- **Regional growth rates (by RPO) are preferred for a source sector as important as mobile emissions**
- **EPA should re-examine the diesel vehicle growth rates that are out of step with state estimates**
- **Some state growth rates should be subjected to QA checks**
- **States are encouraged to submit county-specific growth to EPA for inclusion in 2018NEI version2**