Item #7

Developing a traffic count database for the 2010 validation

Presentation
to the
TPB Travel Forecasting Subcommittee

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Background

- Underlying motivation of this work activity:
  - To prepare 2010 traffic counts for upcoming model validation work
  - To improve 2010 ground count data quality

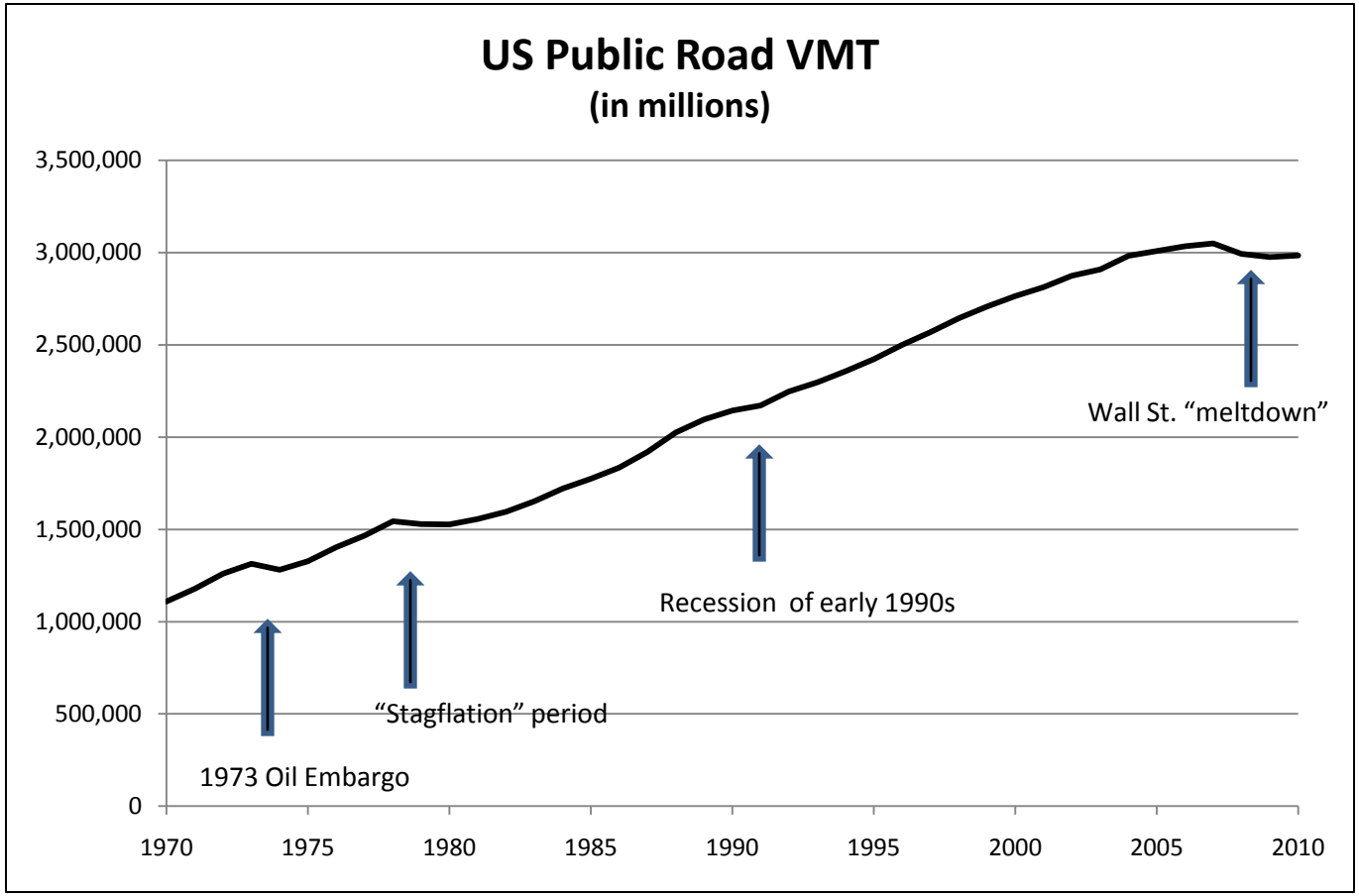
- Points of discussion:
  - Review recent observed national and local VMT trends
  - Describe background on the traffic count data
  - Describe the initial analysis of traffic count data over *multiple* years

Recent U.S. VMT has declined

"U.S. highway traffic volume declined by two percent year-over-year after the 2008 recession. That contrasts with a consistent one to two percent annual growth in the decade prior to 2008."

Urban Transportation Monitor, 4/30/12

“Bumps and dips” in U.S. VMT growth reflects macro economic events



Source: http://www.fhwa.dot.gov/policyinformation/statistics/2010/vmt421.cfm

Reasons for VMT decline since 2008

- Economic recession
- Fuel price volatility
- Other demographic and behavioral changes

Implications for a 2010 validation:

- model has limited/no knowledge of these types macro dynamics, and so model performance may suffer as a result

Local VMT growth has been *mixed* at the jurisdiction level and *"flat"* at the regional level

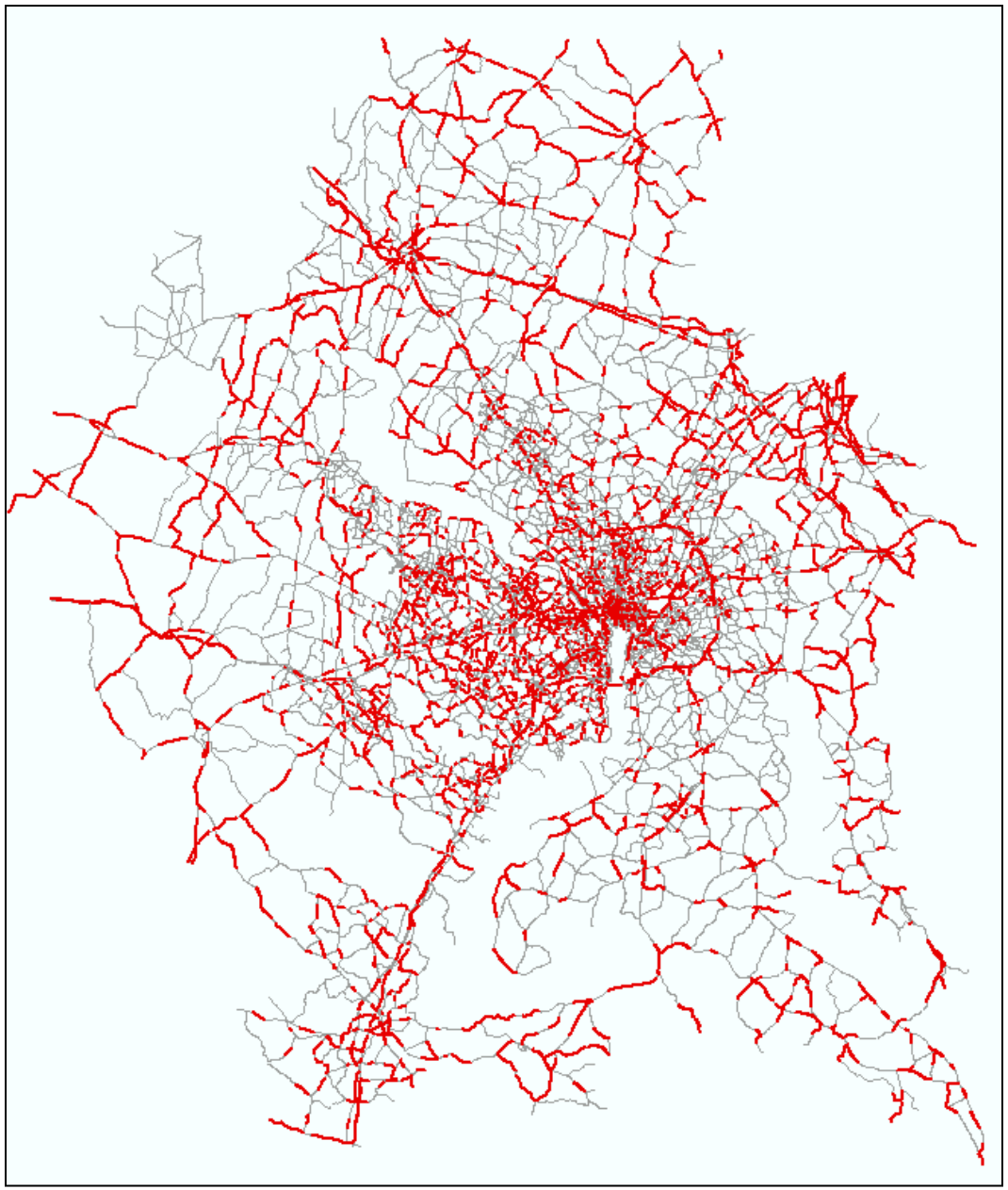
2007 & 2010 Daily Weekday VMT (On- and Off-Network)

Jurisdiction	2007 VMT	2010 VMT	Diff. ('10- '07)	% Diff.
District of Columbia	10,382,400	10,329,479	-52,921	-0.51%
Montgomery County	21,491,918	21,276,164	-215,753	-1.00%
Prince George's County	25,182,740	24,966,986	-215,753	-0.86%
Arlington County	4,783,129	4,644,638	-138,491	-2.90%
City of Alexandria	2,117,674	2,280,603	162,929	7.69%
Fairfax County	28,519,477	28,555,848	36,371	0.13%
Loudoun County	5,891,485	6,212,152	320,667	5.44%
Prince William County	9,066,119	9,473,218	407,099	4.49%
Frederick County	8,656,027	8,543,836	-112,192	-1.30%
Howard County	10,974,658	11,400,411	425,753	3.88%
Anne Arundel County	16,644,658	16,264,932	-379,726	-2.28%
Charles County	3,693,699	3,587,260	-106,438	-2.88%
Carroll County	3,728,219	3,685,068	-43,151	-1.16%
Calvert County	2,192,055	2,269,726	77,671	3.54%
St. Mary's County	2,433,699	2,430,822	-2,877	-0.12%
King George County	826,268	878,868	52,600	6.37%
City of Fredericksburg	1,043,174	998,422	-44,753	-4.29%
Stafford County	4,226,142	4,305,726	79,585	1.88%
Spotsylvania County	3,712,368	3,678,528	-33,841	-0.91%
Fauquier County	3,380,441	3,385,552	5,111	0.15%
Clarke County	812,404	758,851	-53,553	-6.59%
Jefferson County	1,195,908	1,220,373	24,465	2.05%
Total	**170,954,662**	**171,147,464**	**192,802**	**0.11%**

Source: complied from DC, Maryland, Virginia HPMS data

Traffic counts used in model validation

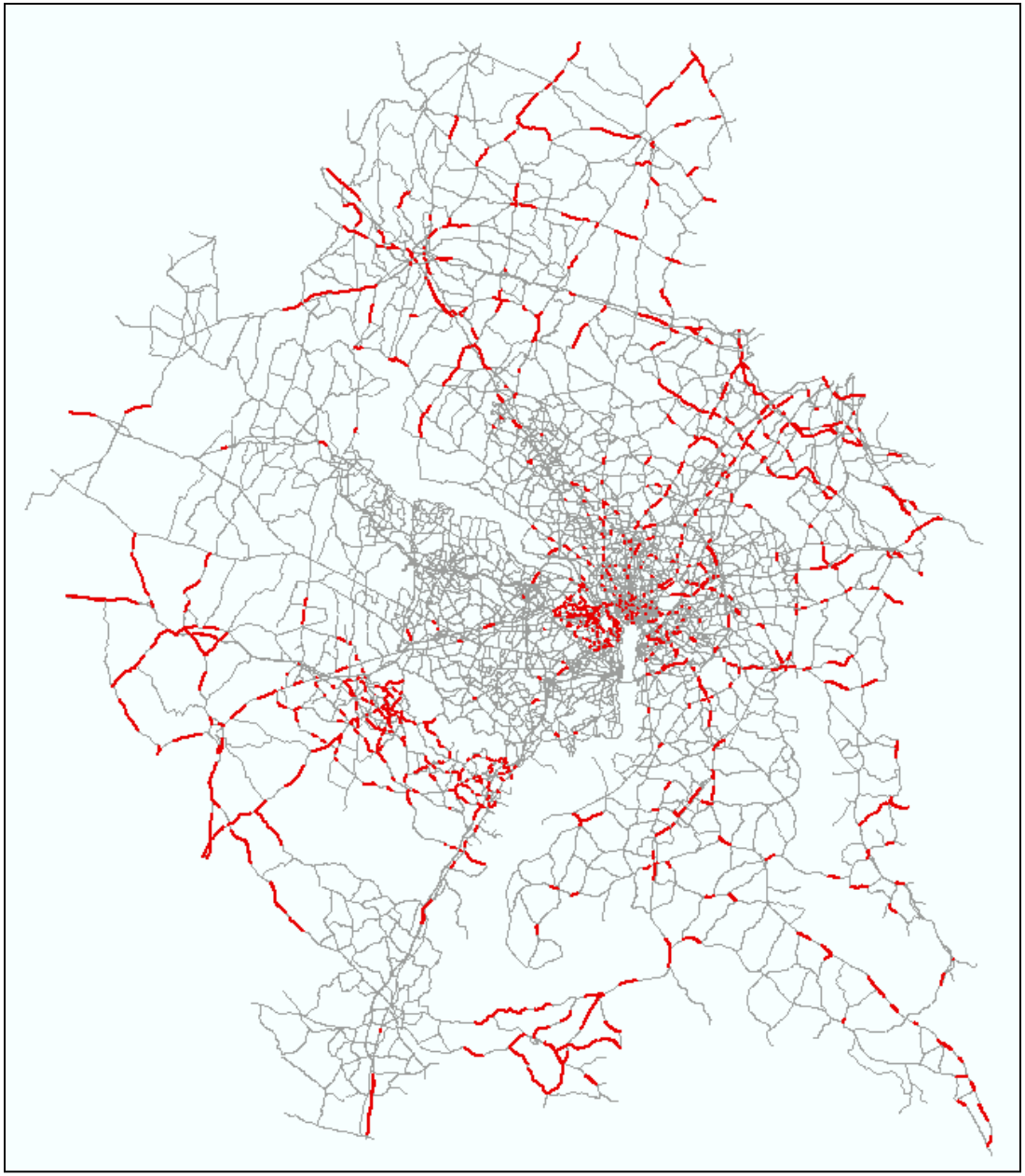
- TPB staff consults state DOT Highway Performance Monitoring System (HPMS) data
- Sampling requirements are rigorous:
  - Stratified random sample of locations relating to the physical characteristics and operating conditions of roadway sections:
    - Location (rural, small urban, urbanized)
    - Roadway functional class
    - Traffic volume group
- Two types of counting stations:
  - Permanent (continuous data collection)
  - Program (48-hour data collection)



Coverage of network links with daily counts

(~6,450 directional links for the year 2010)

Note: Many links associated with regional screenlines are still not populated with counts. This is an ongoing issue.



Coverage of network links with hourly counts

(~1,700 locations for 2010)

Caveats with HPMS procedures, data

- Permanent stations not always operational
- Program stations are surveyed in 3-year cycles
  - Off-year counts are synthesized from previous years
- Sample based on state roadway system, not regional
- Counts are non-directional (50/50 split assumed)
- Multiple counts may exist on a single link
- Differences in data collection practices exist between states
- Counts on priority facilities/lanes are not available

Recent advances in HPMS data use

- The placement of HPMS data into the RTDC platform has greatly facilitated staff's ability to code and analyze counts
  - Automated geo-referencing has replaced manual coding of counts on highway links
  - Annual uploads now allow for counts to be analyzed over multiple years, and in greater detail
- Initial analysis of count data follows below

Summary of directional HPMS count stations over time

Observations:

- Most of HPMS count stations have a “one-to-one” relationship with network links

- Variation between multiple counts on a single link needs to be studied

	2007	2008	2009	2010
Total count stations	6,639	6,657	6,660	6,720
Total directional links with at least 1 count station	6,358	6,375	6,382	6,453

Frequency and distribution of count stations by type and by year

Observations:

- Permanent stations are minimal in number
- For any given year, over half of the counts are factored from a previous year
- In 2007, over half of the sampled counts where developed with counts that were 2+ years old

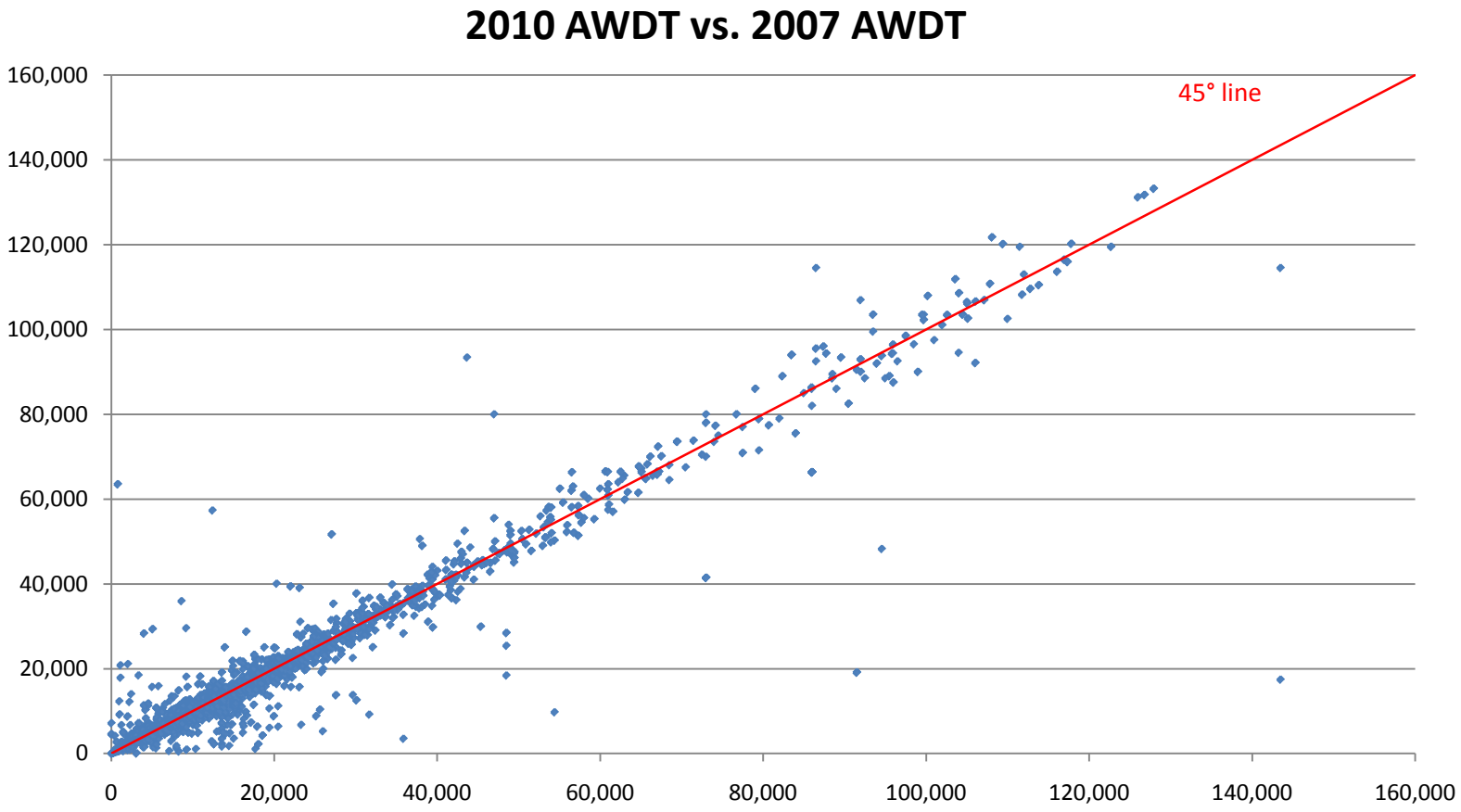
Frequency:

	2007	2008	2009	2010
Permanent	144	136	148	154
Current Year	1,944	1,634	2,924	1,979
Factored_1Yr ago	947	1,795	1,525	2,787
Factored_2Yrs ago	885	998	1,670	1,495
Factored_3+Yrs ago	2,719	2,094	393	305
Total	6,639	6,657	6,660	6,720

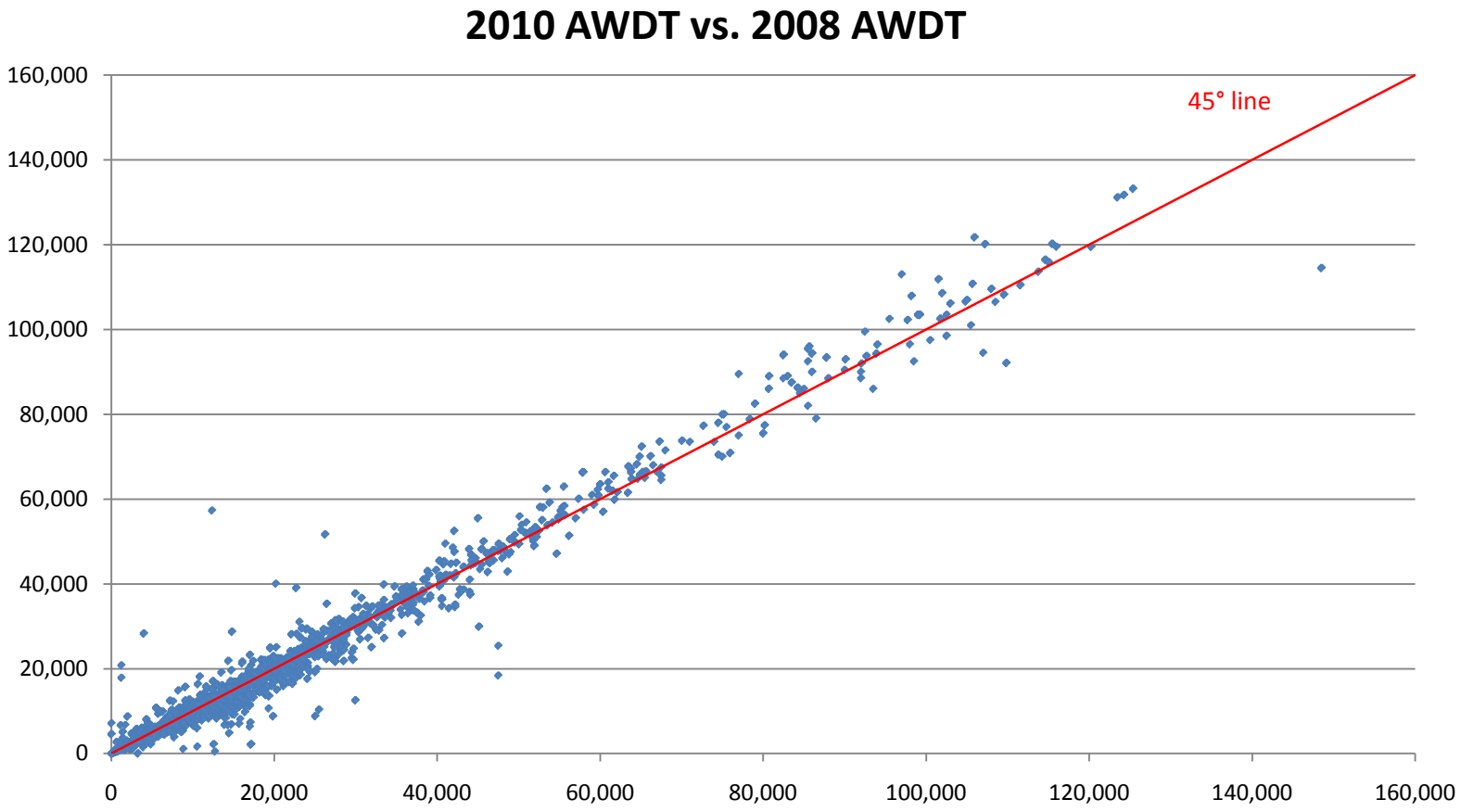
Distribution:

	2007	2008	2009	2010
Permanent	2.2%	2.0%	2.2%	2.3%
Current Year	29.3%	24.5%	43.9%	29.4%
Factored_1Yr ago	14.3%	27.0%	22.9%	41.5%
Factored_2Yrs ago	13.3%	15.0%	25.1%	22.2%
Factored_3+Yrs ago	41.0%	31.5%	5.9%	4.5%
Total	100.0%	100.0%	100.0%	100.0%

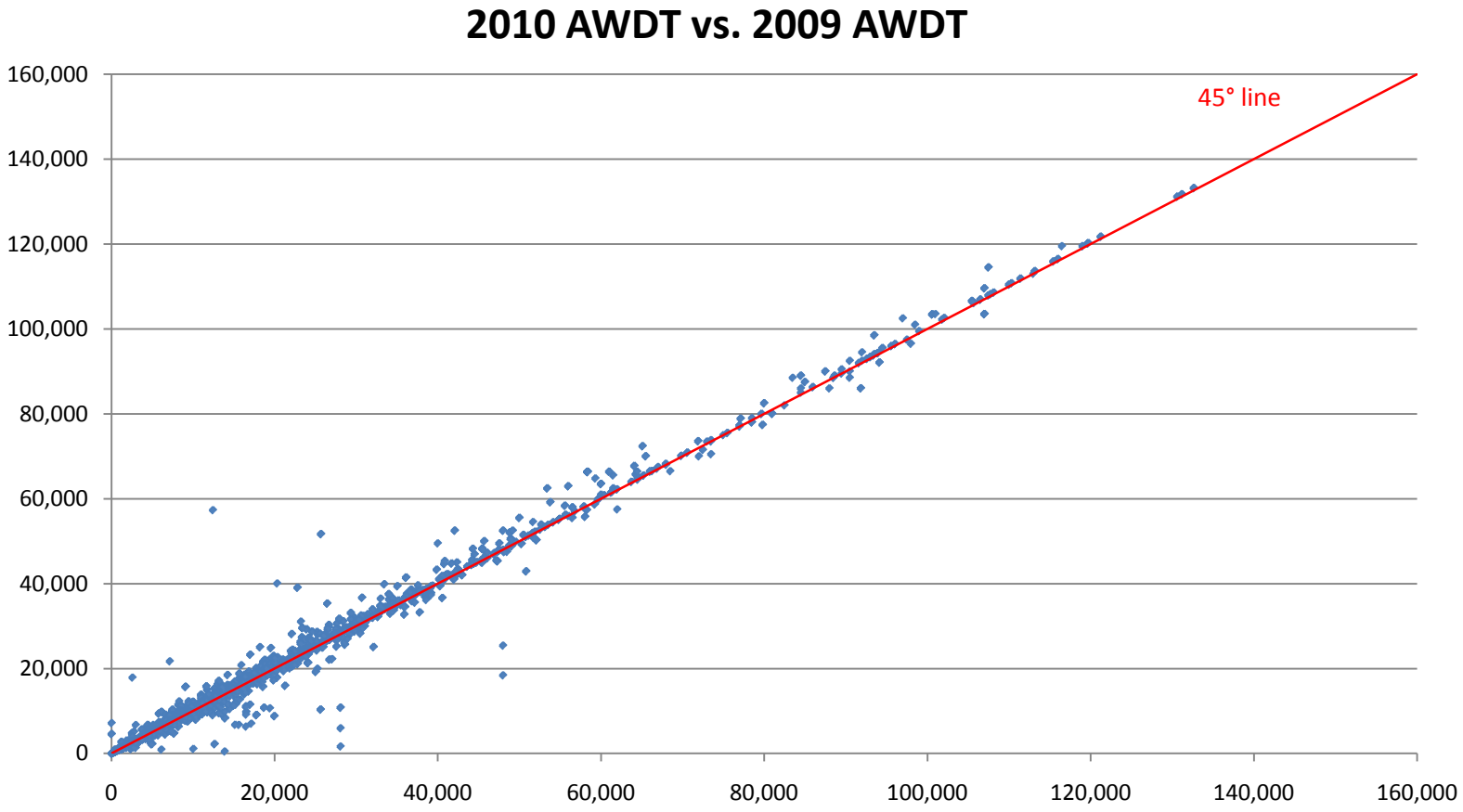
Notable inconsistencies appear when correlating 2010 counts with 2007 counts



Improved correlations are found when comparing 2010 and 2008 counts



Even greater correlations are found when comparing 2009 counts with 2010



Conclusions

- The analysis of multi-year data has given staff new insights as how to assess data quality
- Count correlation between years will be used to vet the quality of count stations
- Staff seeks to improve validation data *before* changing the model
- Time-of-day traffic counts are still lacking
- Some screenline links are still missing counts