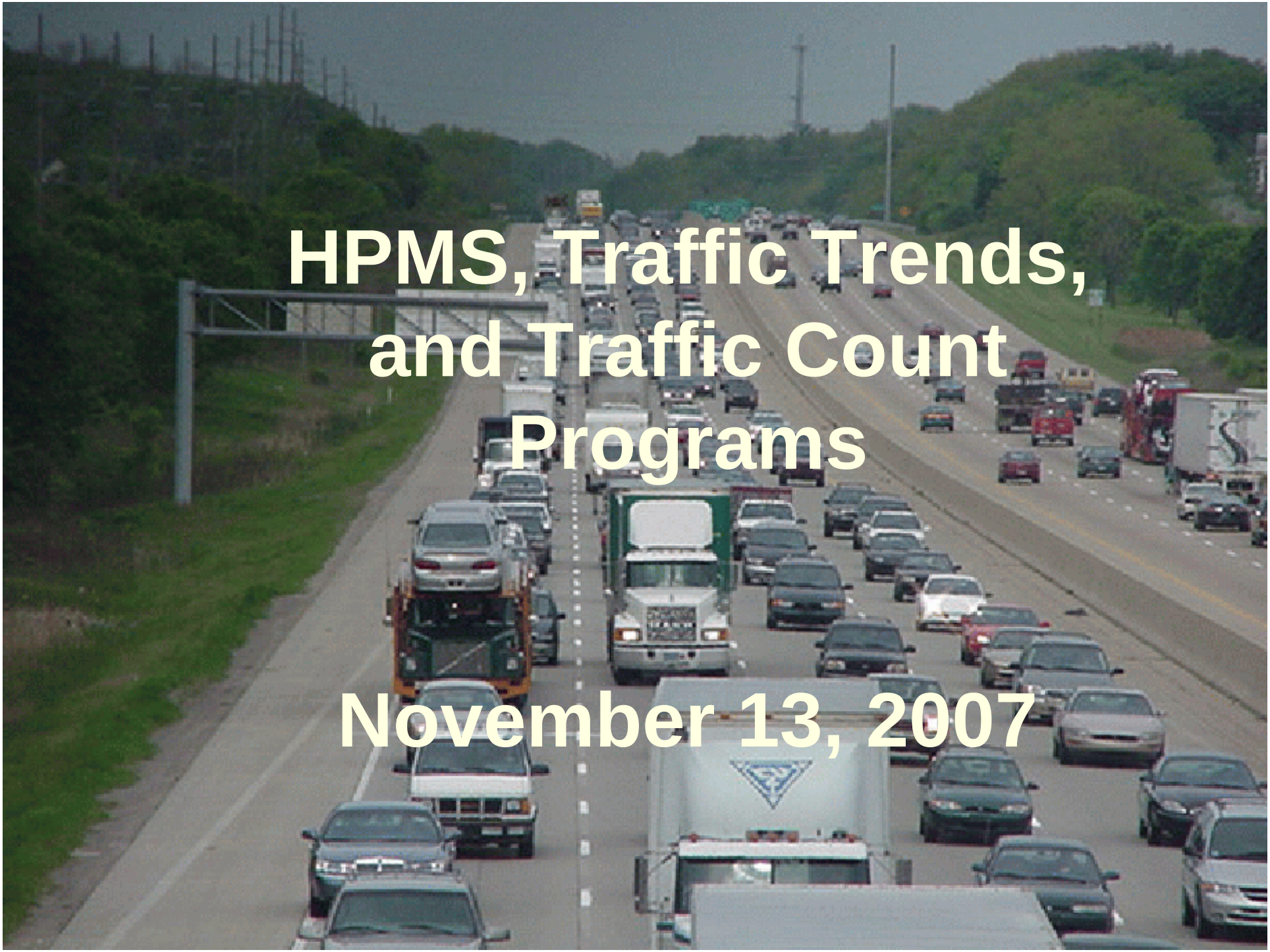


HPMS, Traffic Trends, and Traffic Count Programs

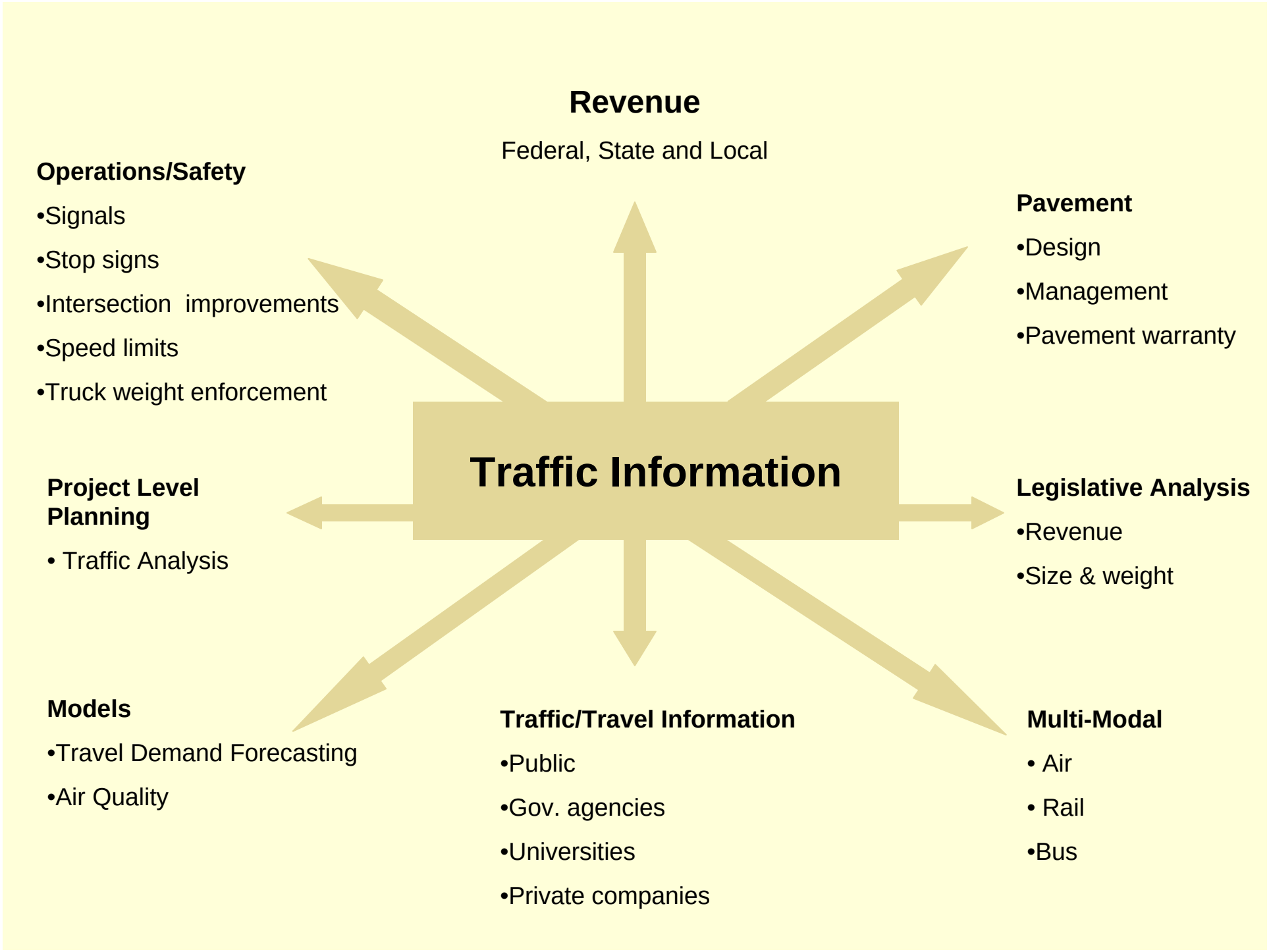
November 13, 2007

Welcome

- HPMS Count Program Update
- Traffic Trends 2005-2007
- Traffic Counting Programs

HPMS Update

- HPMS Samples need to be taken as always based on the MPO and region work programs (Several exceptions apply)
- HPMS universe counts need to be updated and MDOT is moving ahead identifying the scope of work
  - MDOT's overlaying networks on HPMS segment locations (the locations identified to fill in gaps a couple years ago)
  - MDOT seeking data – we're working to identify existing count programs and where gaps exist between them and the collection methods
  - MDOT may have to fill in the voids
- Coordinated approach
  - Share the information (public web site)
  - Minimize duplication of effort
  - Feed travel demand models
  - Feed HPMS needs


Revenue
Federal, State and Local
Operations/Safety
•Signals
•Stop signs
•Intersection improvements
•Speed limits
•Truck weight enforcement
Pavement
•Design
•Management
•Pavement warranty
Traffic Information
Project Level Planning
• Traffic Analysis
Legislative Analysis
•Revenue
•Size & weight
Models
•Travel Demand Forecasting
•Air Quality
Traffic/Travel Information
•Public
•Gov. agencies
•Universities
•Private companies
Multi-Modal
• Air
• Rail
•Bus

Bureau of Transportation Planning

- **Data Collection Section**

  The section conducts traffic/travel studies

  - Traffic counts
  - Vehicle classifications
  - Speed studies
  - Travel time studies
  - Truck weights
  - Speed studies
  - Special studies

- Lawrence Whiteside, Transportation Planner Specialist

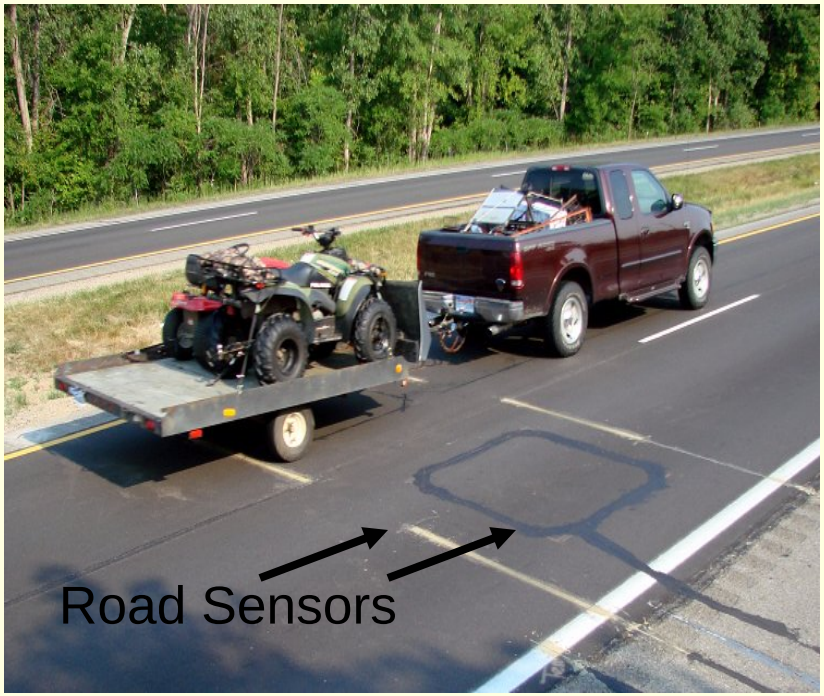
  The unit is responsible for estimating traffic volumes on state roads

Discussion on Travel Trends
2005-2006

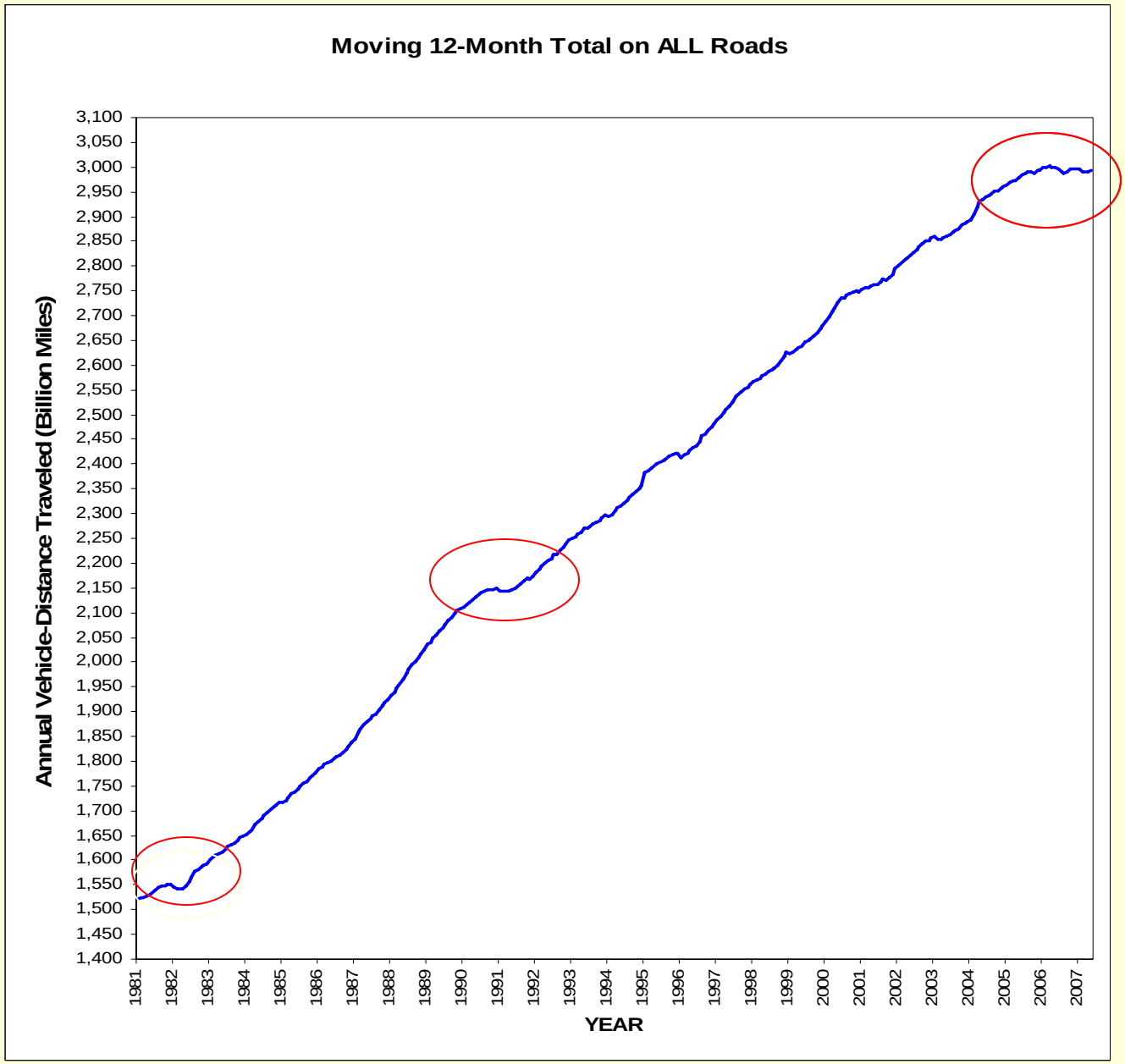
- Nationally
- Regional perspective
- Michigan specific
- Observations on 2007

Traffic Counting Methods

Short Term



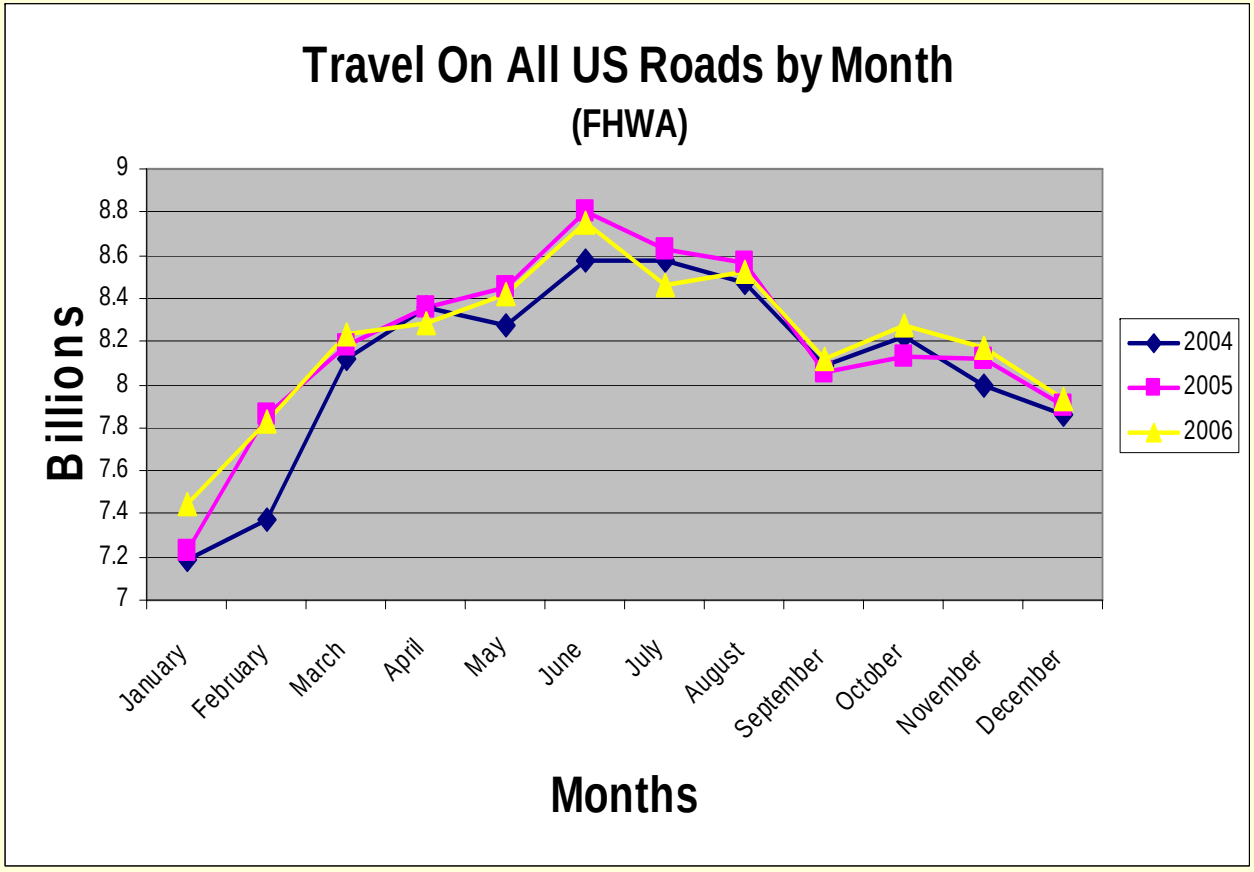
Permanent Traffic Recorder (PTR)



National Travel On All Roads

Estimate from FHWA

Travel on All U.S. Roads 2004-2006



2004/2005

+ 0.1%

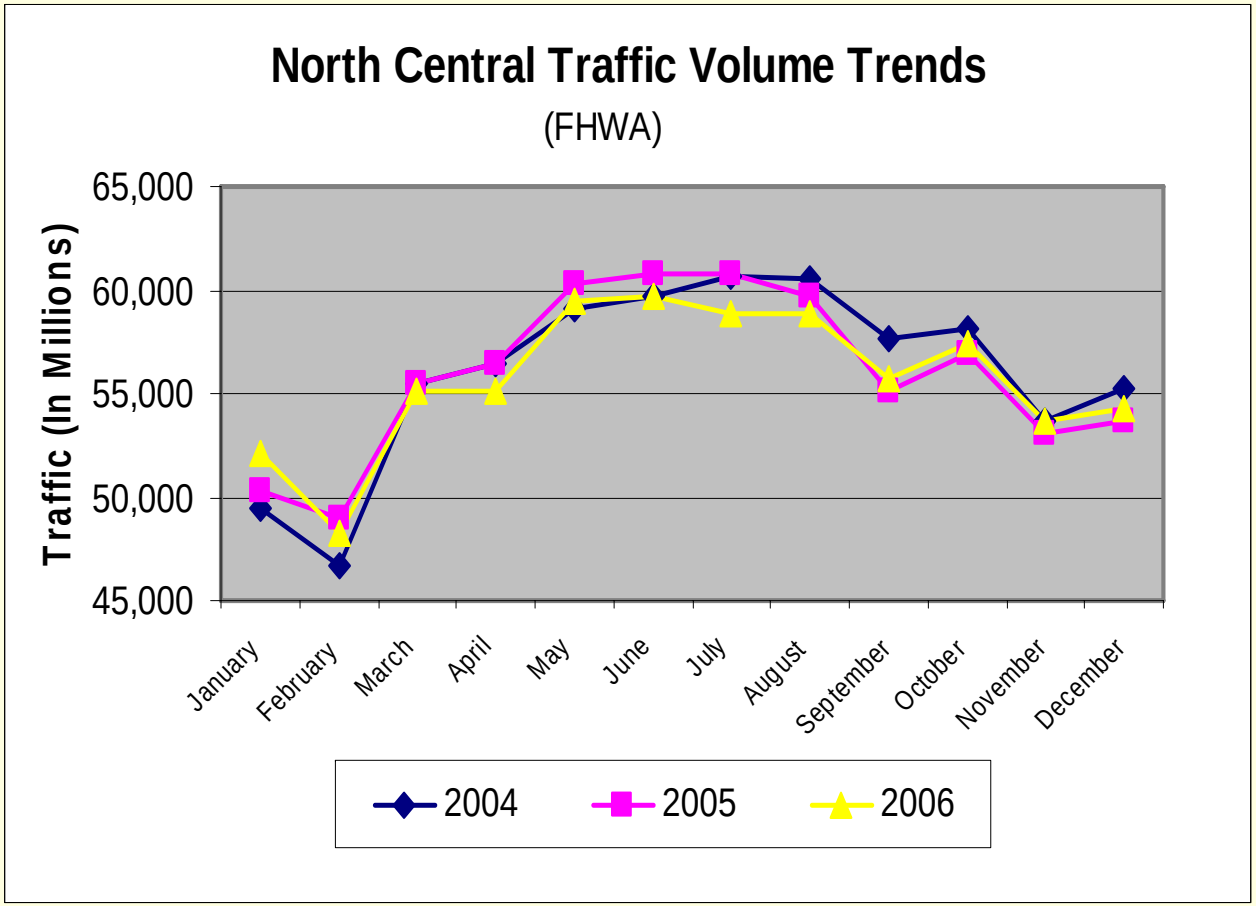
2005/2006

+ 0.2%

(FHWA estimate)

Regional Perspective

All Roads North Central Region
Traffic Comparison 2004 - 2006



2004/2005

- 0.2%

2005/2006

- 0.5%

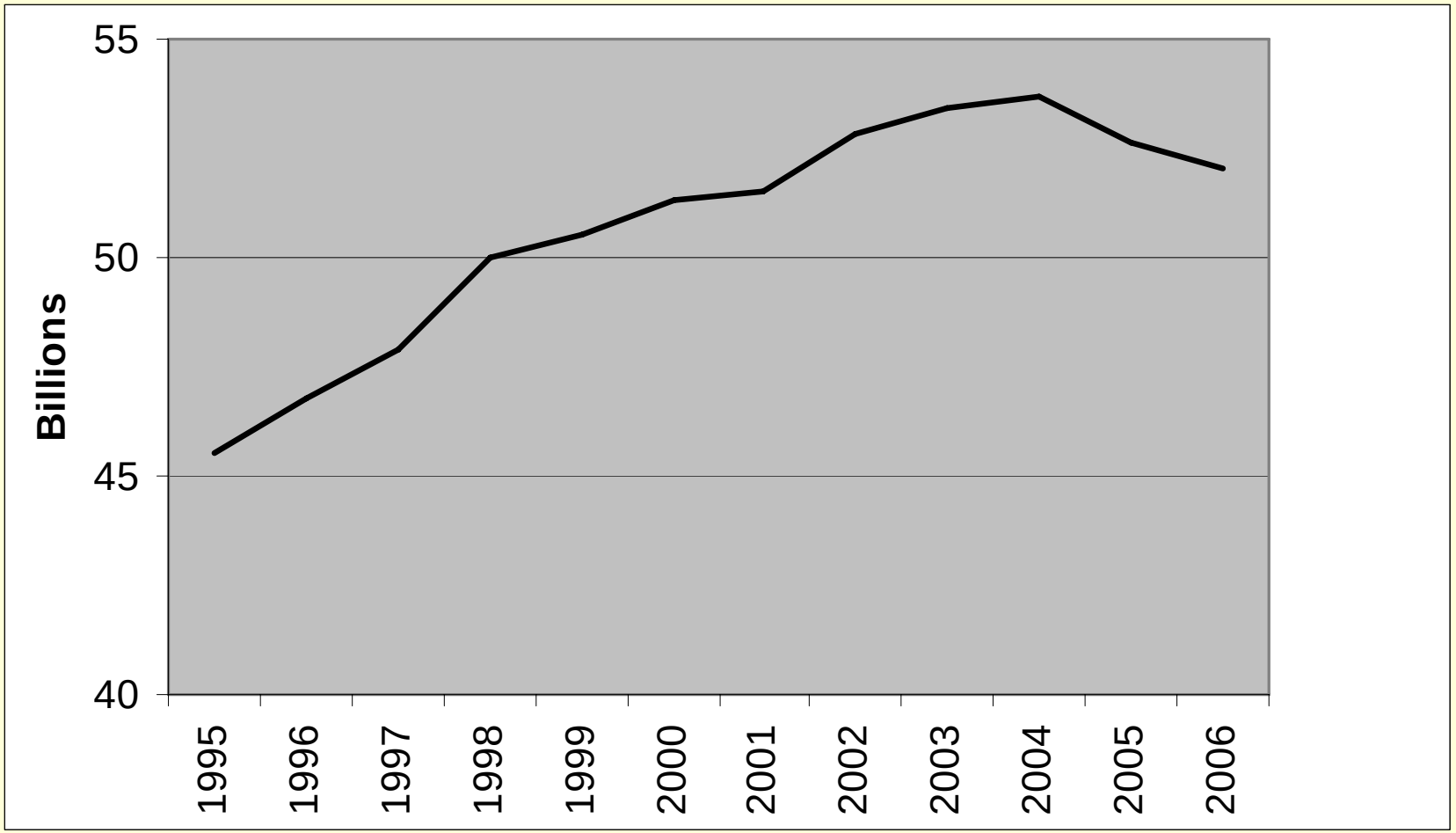
(FHWA estimate)

All Roads North Central Region
Percent Change 2005-2006
FHWA Estimate

- Iowa +0.6%
- Kansas +0.3%
- Missouri +0.1%
- N. Dakota +0.1%
- S. Dakota -0.3%
- Nebraska -0.4%
- Illinois -0.4%
- Minn. -0.5%
- Wisc. -0.6%
- Indiana -0.6%
- **Michigan -0.8%**
- Ohio -0.9%

Michigan Annual Vehicle Miles of Travel

State Trunkline Only



Trunkline Travel Estimates

Annual Vehicle Miles of Travel

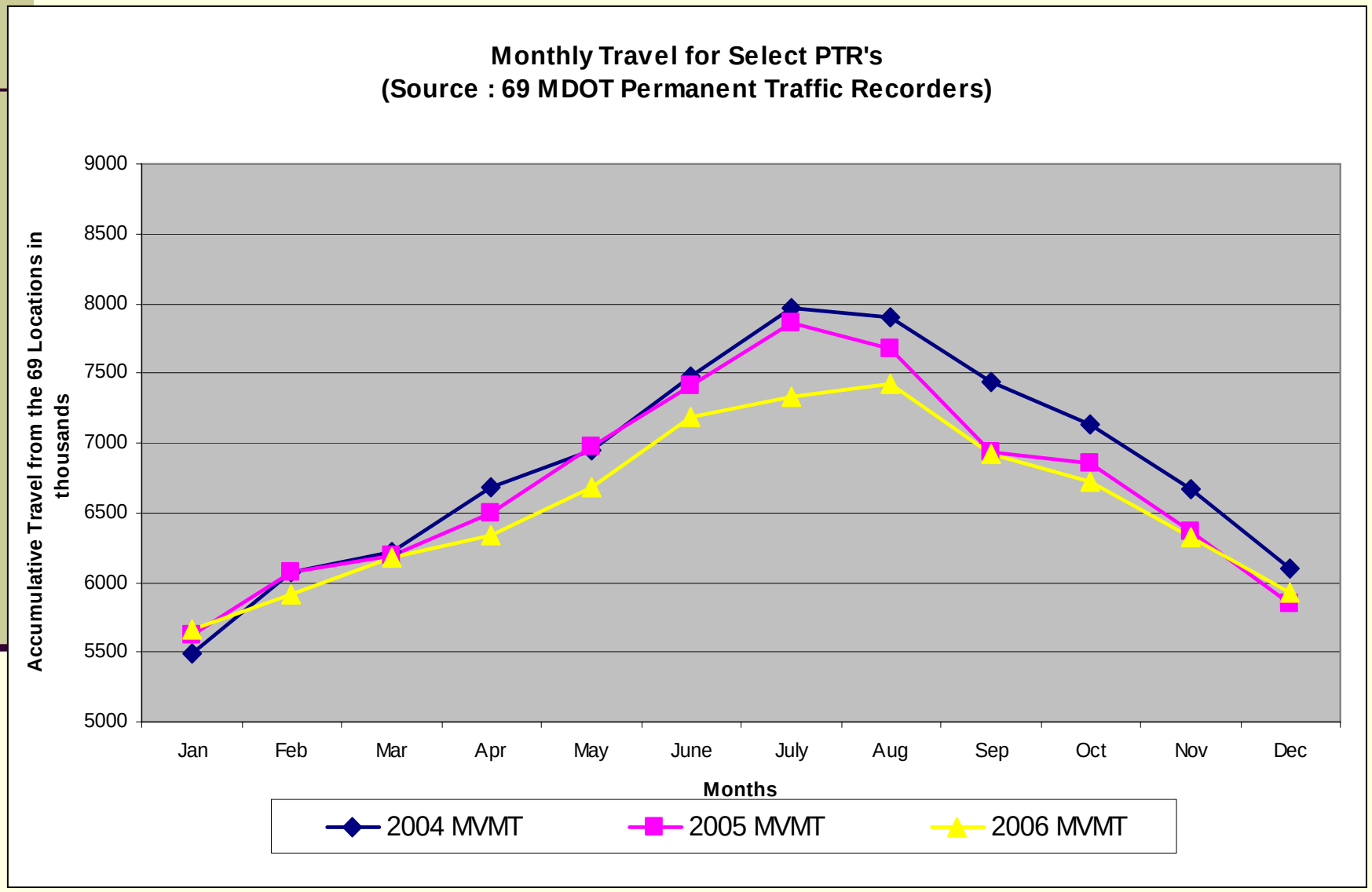
-**1.18% AVMT change 2005-2006**

52.01 billion (2006) 52.63 billion (2005)

-1.99% AVMT change 2004-2005

52.63 billion (2005) 53.7 billion (2004)

Michigan Permanent Traffic Recorder Travel

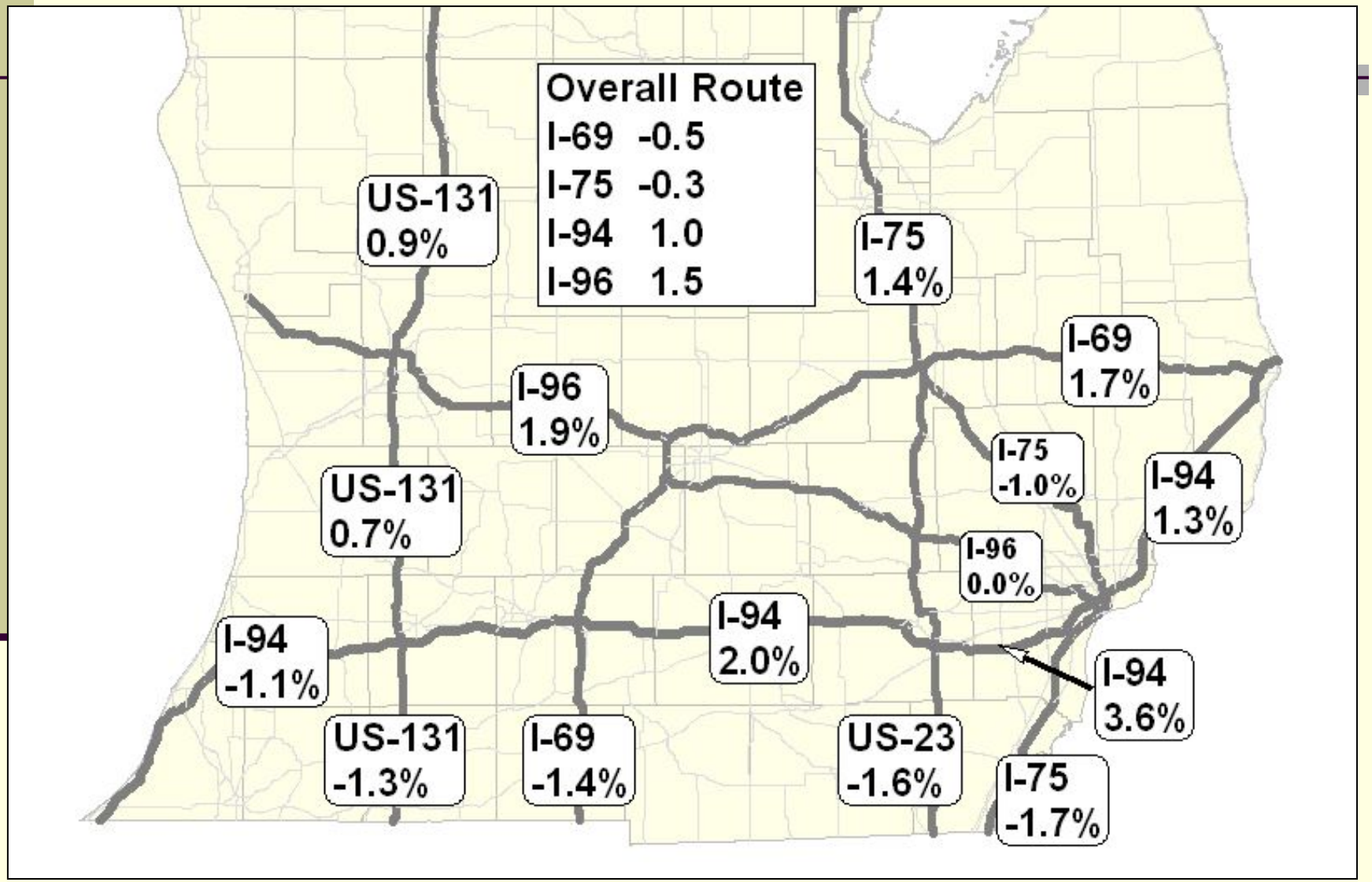


Michigan Permanent Traffic Recorder Travel

Percent Change
2005 - 2006

- **Urban Routes** **-0.89%**
- **Rural Routes** **-1.55%**
- **Recreational Routes** **-2.28%**

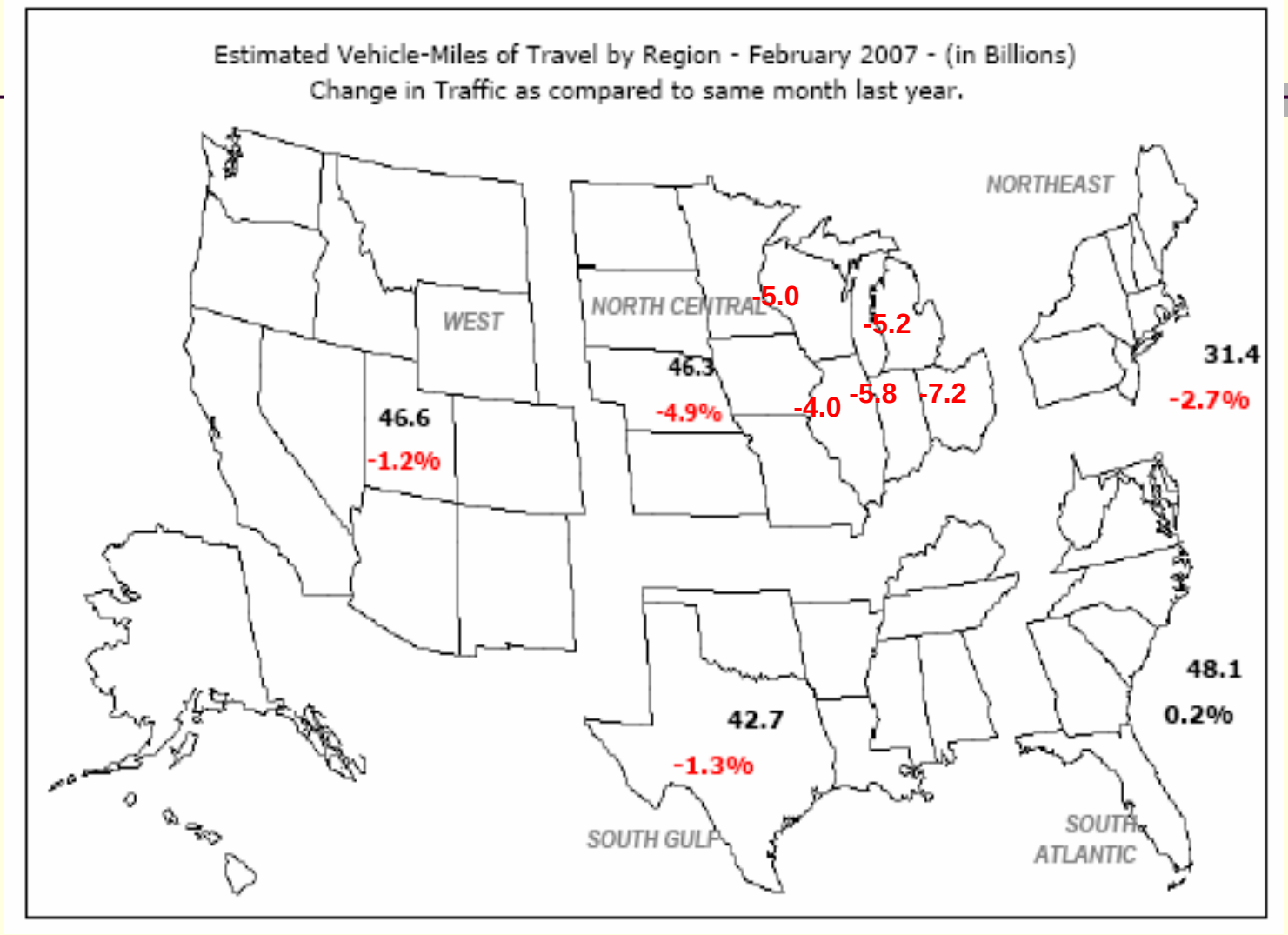
Route Vehicle Miles of Travel Change 2005-2006



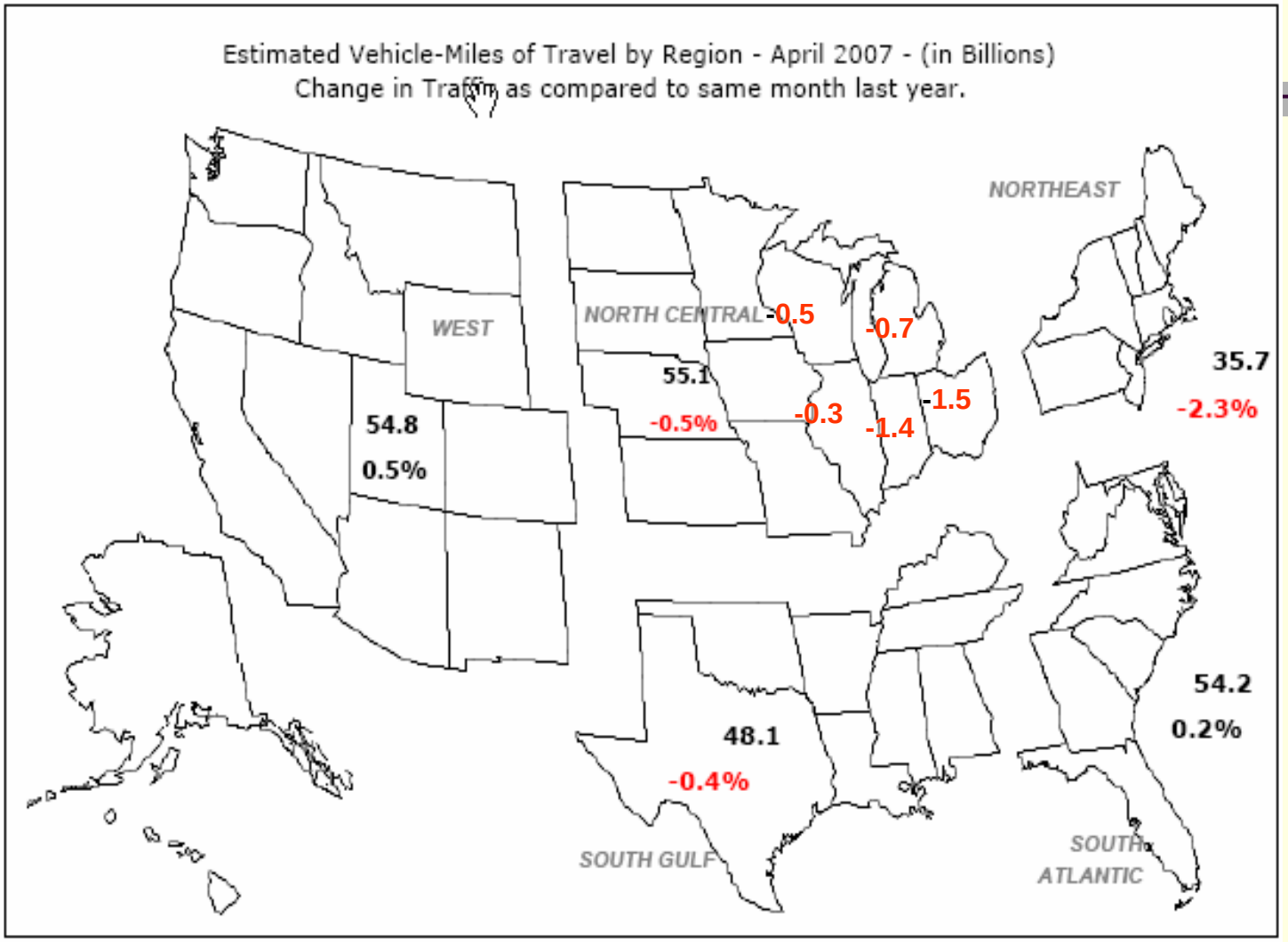
Discussion on Travel Trends

Observations on 2007 Travel Year to Date

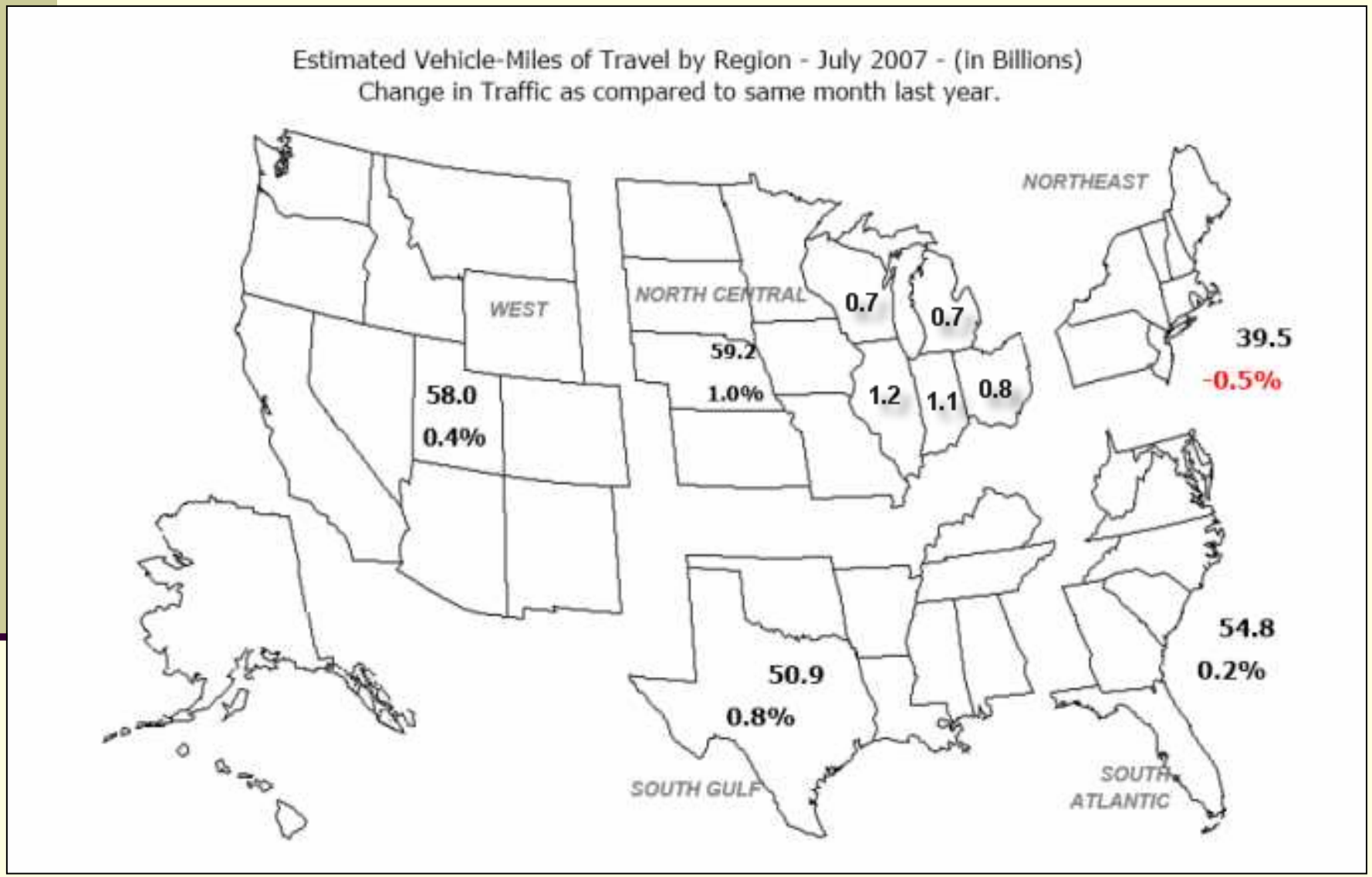
February 2007 Compared to February 2006



April 2007 Compared to April 2006



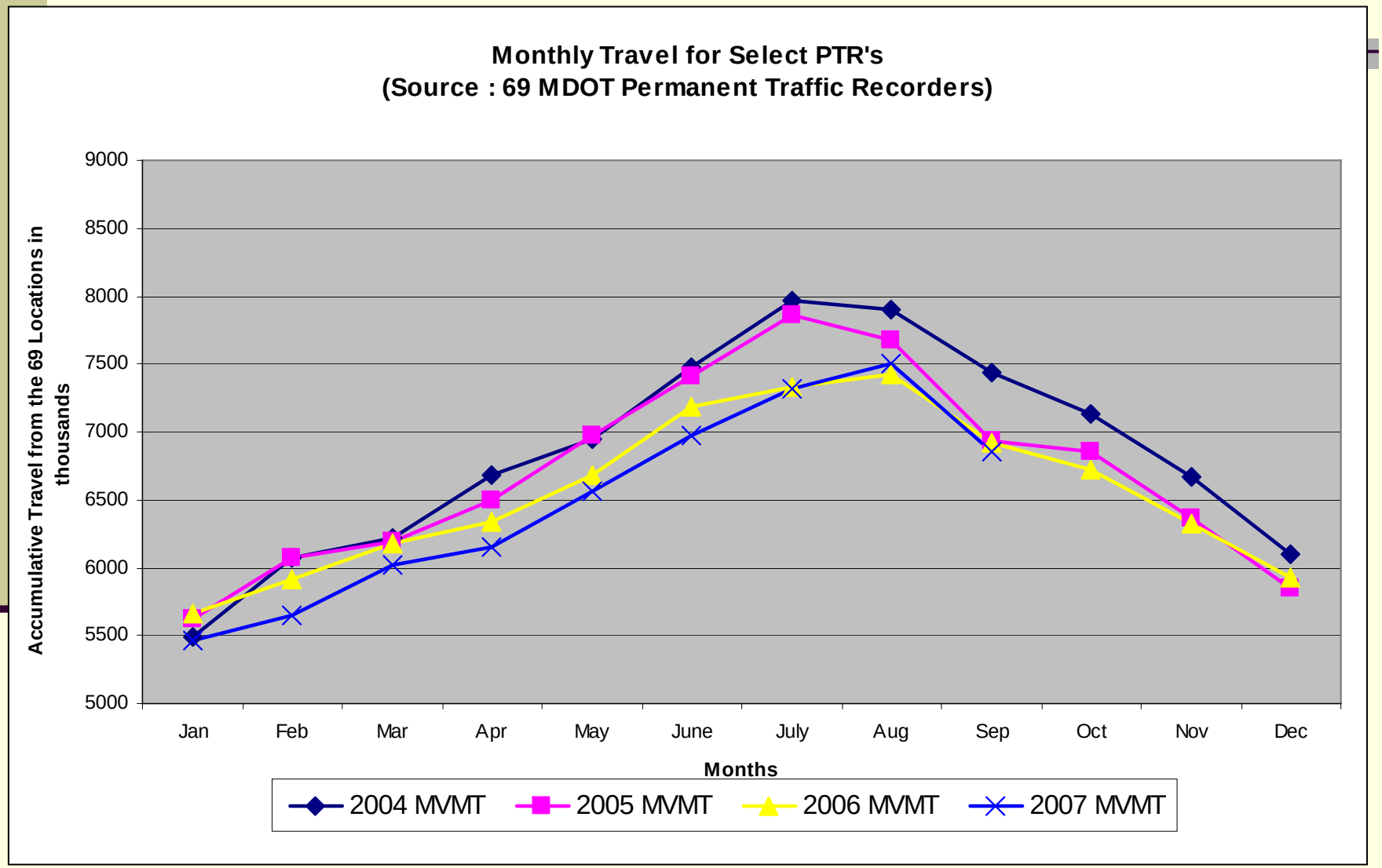
July 2007 Compared to July 2006



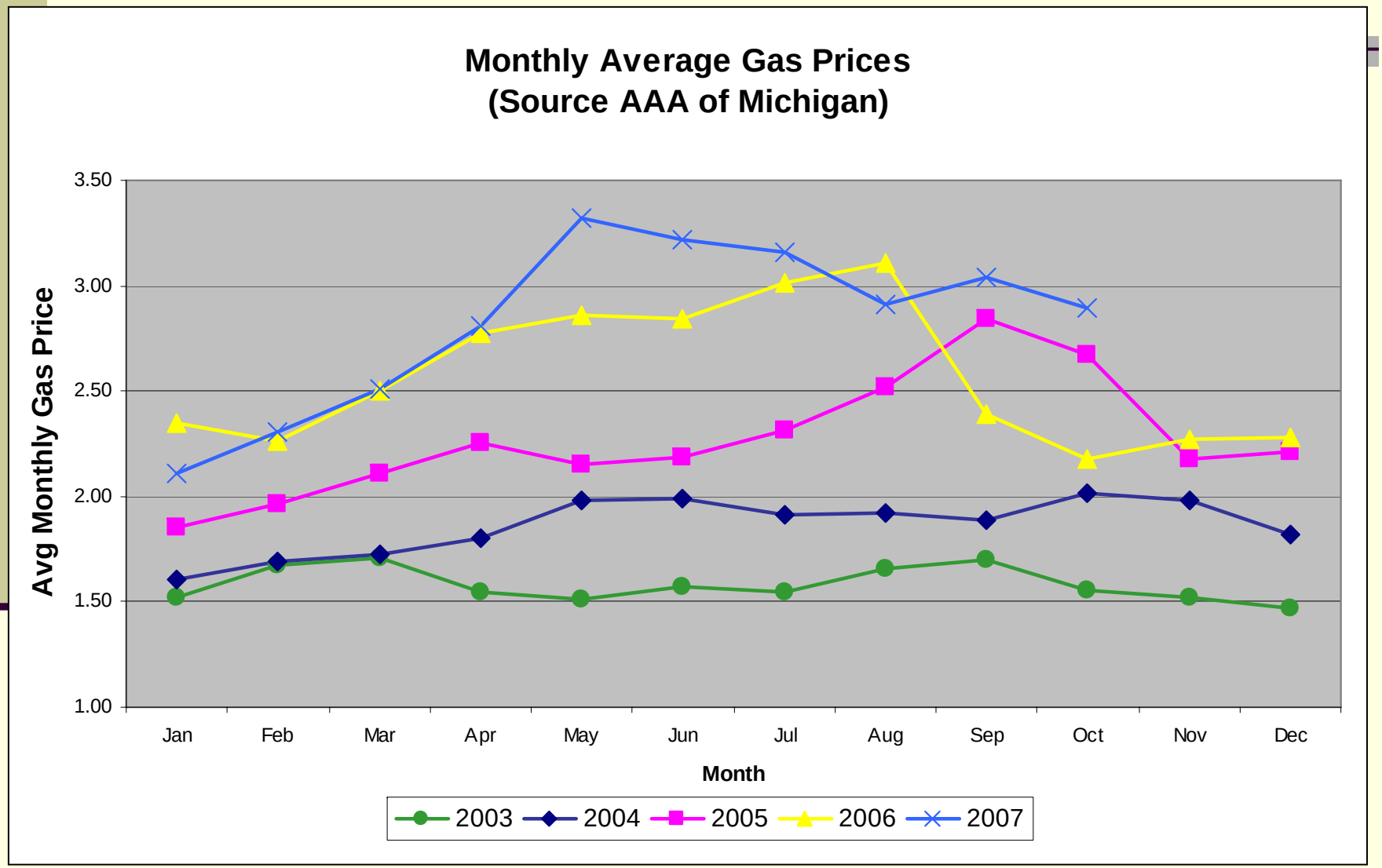
Holiday Travel Comparisons

- Memorial Day
  - 2006 vs 2007 -7.81%
  - 2005 vs 2006 -1.40%
- July 4th
  - 2006 vs 2007 -0.48%
  - 2005 vs 2006 -3.83%
- Labor Day
  - 2006 vs 2007 +1.91%
  - 2005 vs 2006 +5.75%

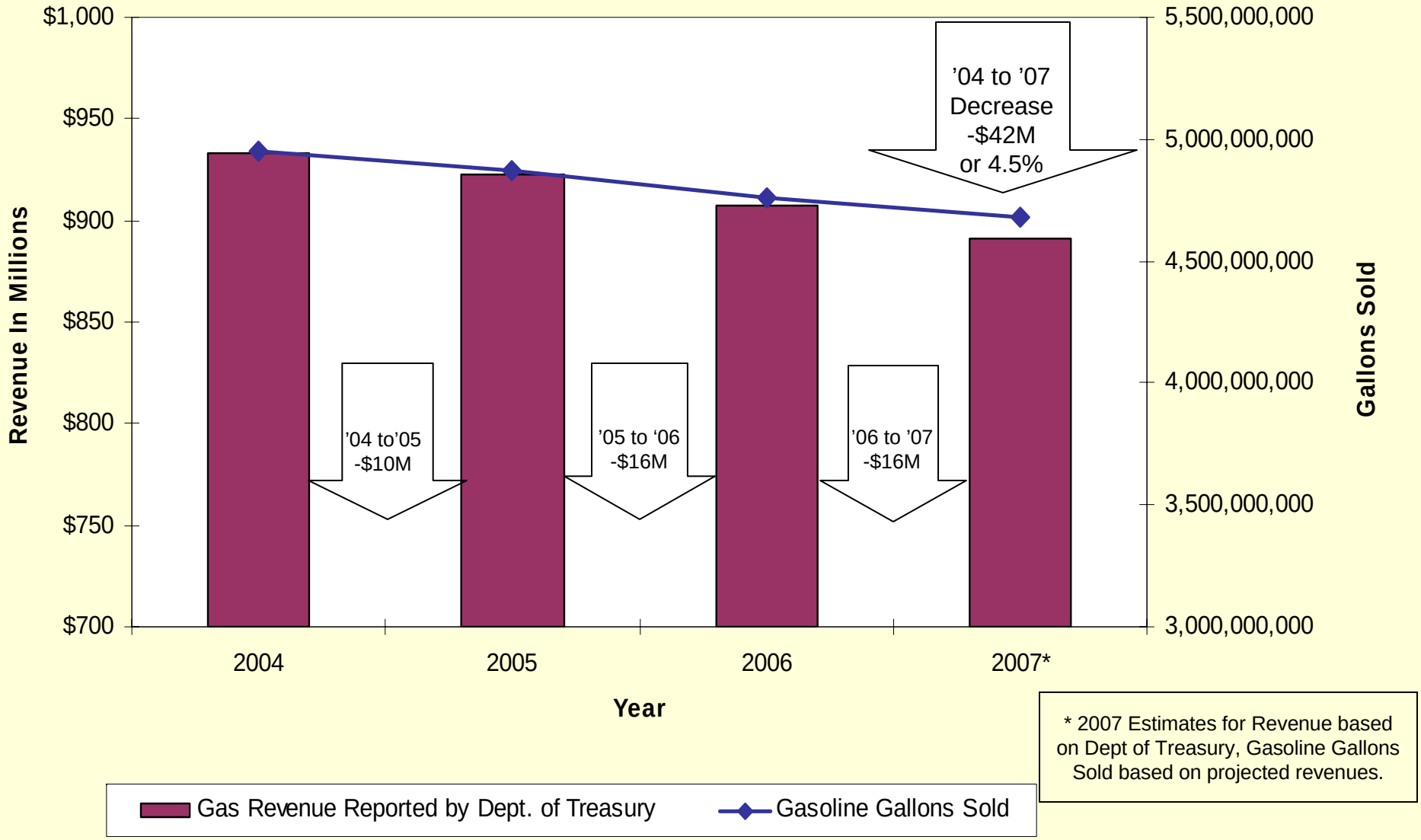
Michigan Permanent Traffic Recorder Travel

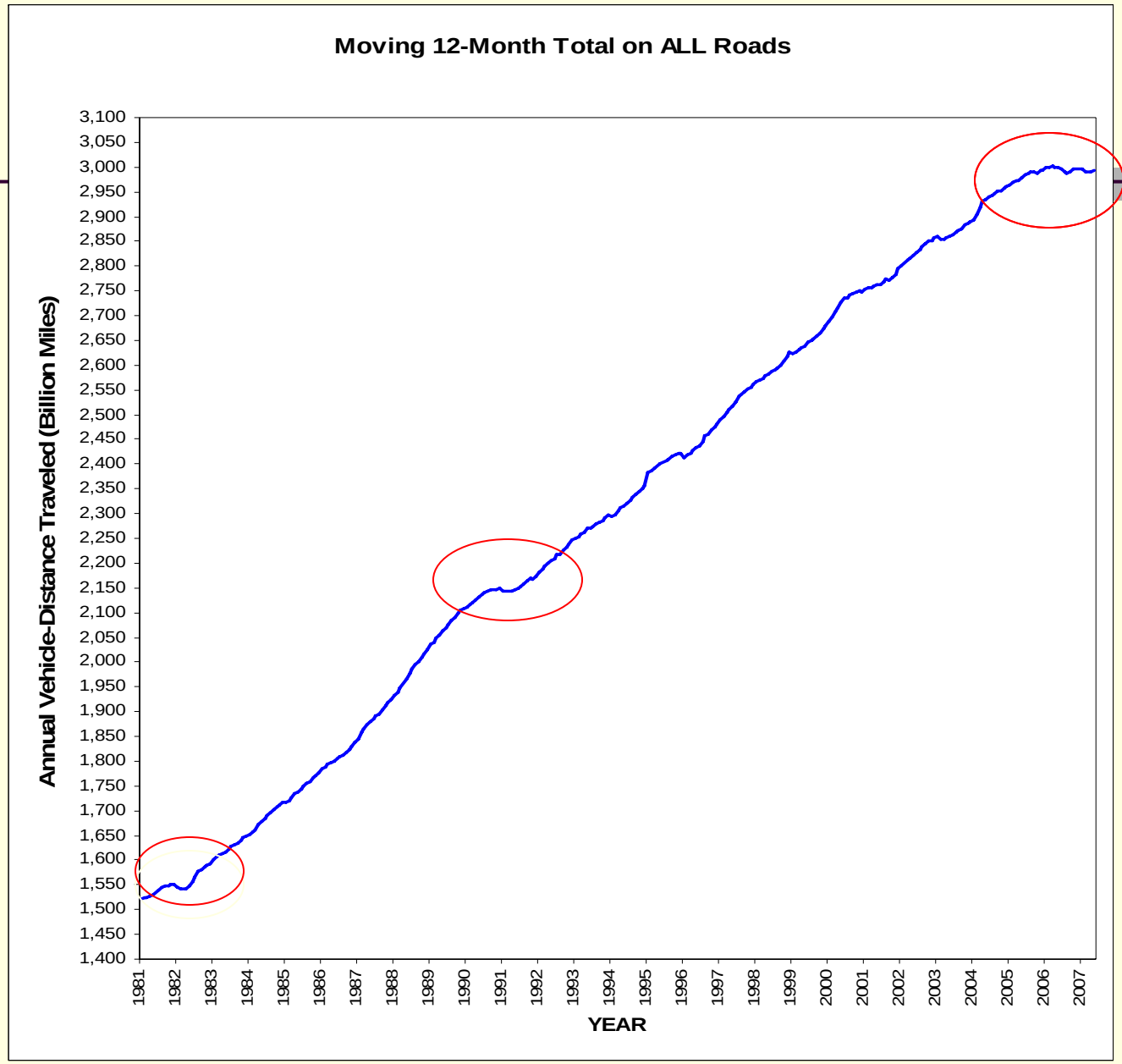


Average Trend of Michigan Gas Prices 2003-2007



Gasoline Gallons Sold Compared with MTF Gasoline Revenue





National Travel On All Roads

Estimate from FHWA

Traffic Count Programs

- Background information
- Count Program Development
- Seasonal Patterns
- AADT development

Background Information

Guidelines

- **Traffic Monitoring Guide -** Provides direction for improved traffic counting, vehicle classification, and truck weighing. Relate intensity of the monitoring effort to the quality of the data.
  http://www.fhwa.dot.gov/ohim/tmguide/index.htm

- **AASHTO Guidelines for Traffic Data Programs** -Improve quality of traffic information that supports decisions at all levels of the transportation professionals.

National Consistency

Definitions to keep in mind

- **AADT -** Annual Average Daily Traffic
  - Equivalent to averaging 365 daily volumes, differs from ADT (24 hour average of a count)
- **CADT** - Commercial Average Daily Traffic
  - Scheme F class 4 and above (Buses, 4 tire-6 axle SU and above)
- **Seasonal factors**
  - Adjustments to reflect differences in volumes between months
- **Day of week factors**
  - Adjustments to reflect differences between days of the week
- **EPCE -** Excess Passenger Car Equivalent
  - Adjustment for the effect of multi-axle vehicles over an axle counter
- **HPMS Samples**
  - Segments selected to provide system level statistics. Reviewed every 3 years.
- **HPMS Coverage Segments** - Non sampled segments
  - HPMS segments that are not samples. Similar segments on a road will be combined into a count segment.

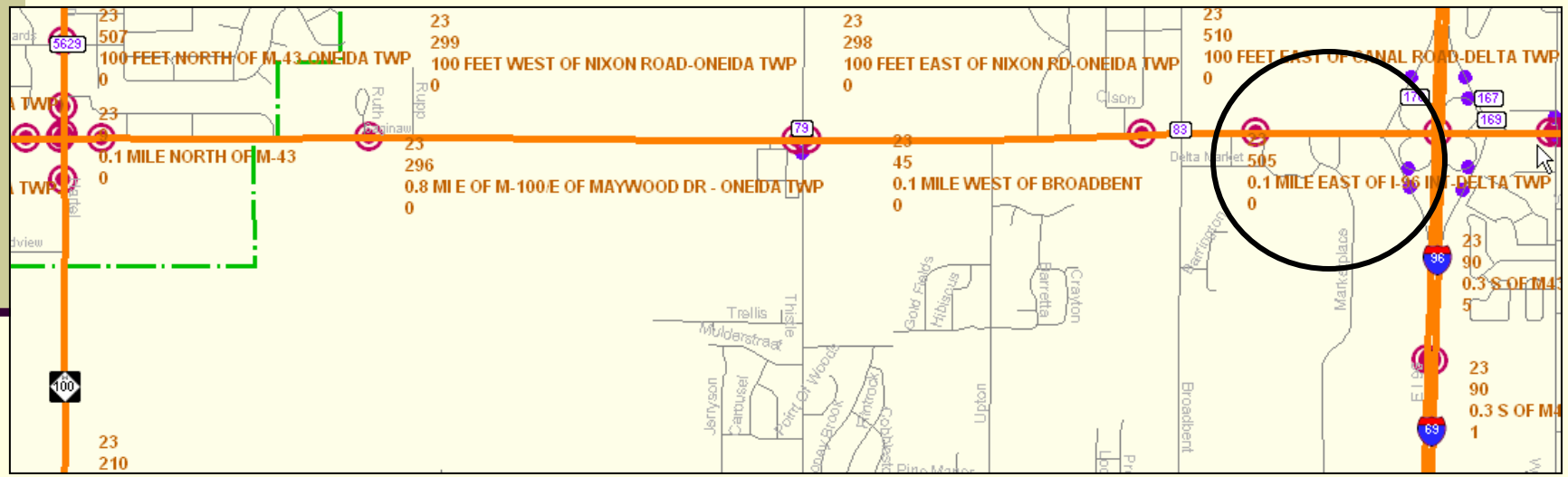
Count Segmentation

- The primary objective is to count frequently enough so that the traffic volume estimate available for a given segment accurately portrays the traffic on the individual segments of the roadway. (TMG)

- Roadway "segments" are treated homogenously with respect to traffic (that is, traffic volumes are the same for the entire roadway segment.) (TMG)
  - For a limited access highway, this is true between interchanges.
  - This is for all practical engineering purposes the same for rural roads where access and egress along a 10-mile segment is limited to a few driveways and low volume, local access roads.

What is good segmentation?

0440-9	23041	8279	15278	0	0	WCL GRAND LEDGE	CNT	7976	8059 S	6797	298	870	11.0	60	7
0460-9	23041	15278	16137	0	0	JCT M-100	CNT	11053	11165 S	10228	298	1150	10.0	60	7
0470-9	23042	0	1958	0	0	NIXON ROAD	CNT	18955	19146 S	20931	1123	2085	11.0	60	7
0477-9	23042	1958	2957	0	0	BROADBENT RD.	CNT	23028	23261 S	22723	1123	2487	11.0	60	7
0480-9	23042	2957	3663	0	0	JCT I-96	CNT	28977	29270 S	28829	1123	3274	11.0	60	7
0482-9	23042	3663	3950	0	0	CANAL RD.	CNT	33679	34019 S	34023 S	602	3738	11.0	55	7



Count Program Development

- **Frequency -** MDOT is on a 2 year cycle for State Trunklines. HPMS sample segments are on a 3 year cycle. HPMS universe coverage counts will be on a 6 year cycle.
- **Duration –** Usually a minimum 48 hours. Areas with stable variability, like some cities or rural areas with no recreation, could be 24 hours.
- **Time of year –** The least seasonal adjustments occur with May and October counts.
- **Day of week -** Typically Monday through Thursday has less variability than weekends.
- **Traffic Volume by Hour of the Day -** the hours of the day are used to determine the peak hours and the directional split.

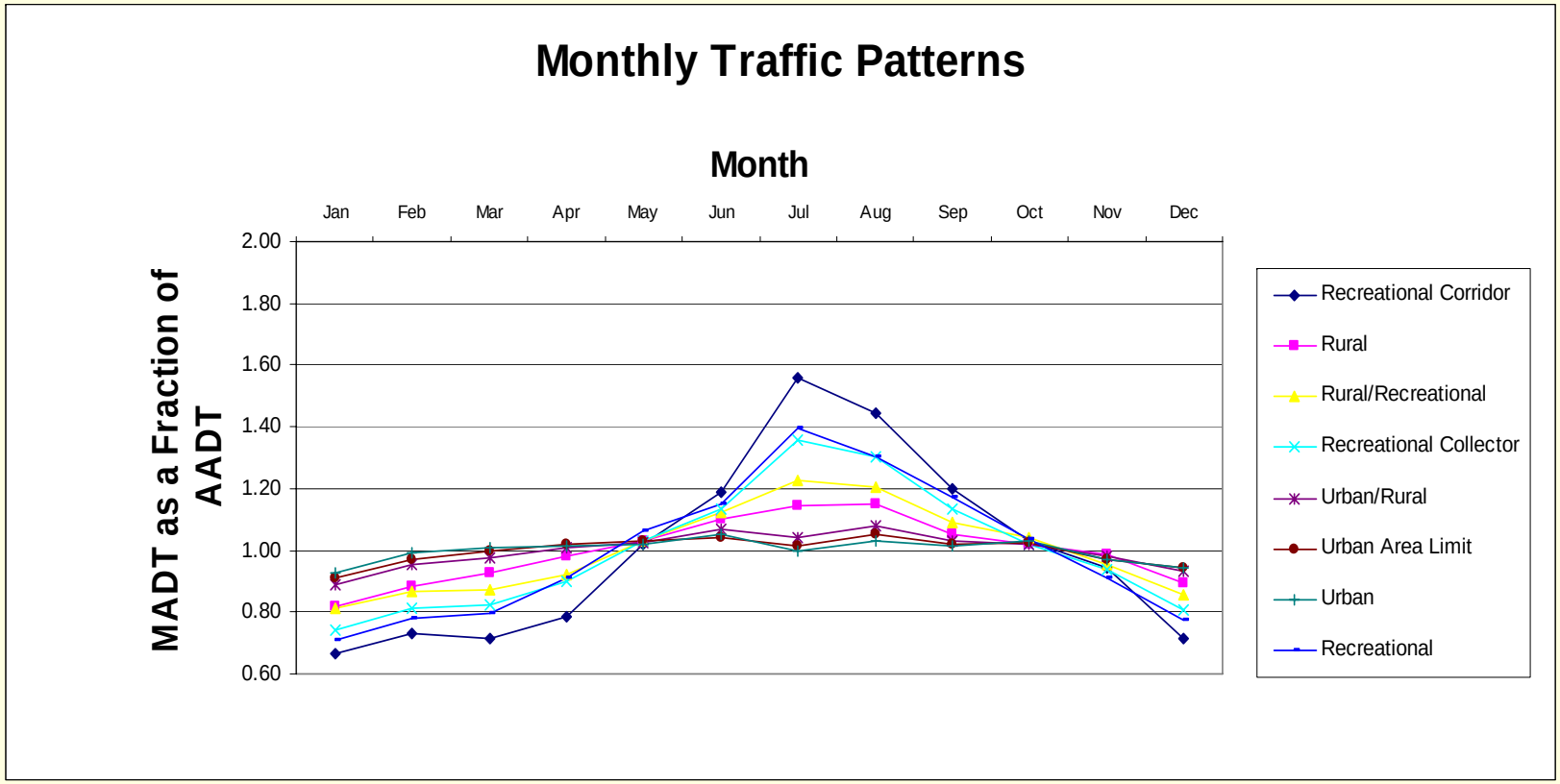
Count Program Development (Cont.)

- Roadway sections experiencing high growth require more frequent counts
  - Roads near growing urban centers
  - Expanding recreational sites may need more frequent counting
- Rural area segment volumes may experience little change over time.
- Count roads in volatile areas more frequently
  - This ensures that you have up-to-date statistics (roadway design, maintenance, & repair work)
  - Frequent collection efforts limit the use of growth factors where volatility exist.
- High growth areas can be identified based on knowledge
  - Travel generators, highway projects, requirements for highway maintenance, building permits, and population shifts.

Seasonal Factors from Eight Patterns

- Urban/Rural
- Rural
- Urban
- Recreational Collector
- Recreational Corridor
- Rural Recreational
- Urban Area Limit
- Recreation

Seasonal Patterns used by MDOT



NOTE: Over 140 PTR sites used in the seasonal pattern analysis

Seasonal Adjustment Factors

- Developed using FHWA Traffic Monitoring Guide (TMG)
- Using our PTR sites
- SPSS Analysis
- Quality Assurance and Quality Control Methods
  - Complete data (control for missing months)
  - Three years of data
  - Review of data
- Applied to over 2,500 counts each year

AADT Development

- First, and probably most obvious, get all counts to a 24 hour average.
- Determine an applicable seasonal pattern group.
  - Urban type travel, rural type, recreational (MDOT has eight patterns)
- Determine the impact of commercial traffic for axle adjustments to hose counts.
  - Many 5 axle or 9-11 axle trucks would have to be accounted for to estimate axle adjustments.
  - May also want to estimate commercial average daily traffic if they are prominent.
- Basic formula – V*AAF*SAF or V*SAF-EPCE
  - V = Avg 24 hr volume
  - AAF = Axle adjustment factor
  - SAF = Seasonal adjustment factor
  - EPCE = Excess Passenger Car Equivalent (MDOT uses this factor)

Michigan Department of Transportation
Short Count Report

County Ingham Control Section 33042 Station Number 15 Milepoint 01.697 Route Number 043 Direction E

Route Designation 2 Roadway Name M-43 SAGINAW Station Description 100 FEET WEST OF HOWARD STREET

Year 2007 CityLANSING Machine Number 3792 Count Type STATEWIDE Construction Code

Time	Mon 9-17	Tue 9-18	Wed 9-19	Thu 9-20	Fri 9-21	Sat 9-22	Sun 9-23
12-0100AM		171	126				
01-0200AM		77	109				
02-0300AM		68	93				
03-0400AM		57	51				
04-0500AM		50	75				
05-0600AM		210	190				
06-0700AM		472	493				
07-0800AM		1218	1211				
08-0900AM		1322	1373				
09-1000AM		1118	1344				
10-1100AM	1197	1171	1045				
11-1200AM	1335	1468					
12-0100PM	1724	1632					
01-0200PM	1485	1479					
02-0300PM	1546	1567					
03-0400PM	1913	1998					
04-0500PM	2177	1961					
05-0600PM	2576	2733					
06-0700PM	1495	1555					
07-0800PM	1098	1105					
08-0900PM	944	1028					
09-1000PM	721	765					
10-1100PM	329	417					
11-1200PM	250	283					
Daily Total	18790	23925	6110				
24 Hr Total	23553	24227	1045				
AM Hi Hr End	12:00	12:00	09:00				
Hi for AM	1335	1468	1373				
PM Hi Hr End	06:00	06:00					
Hi for PM	2576	2733					
% Hi Hr Factor 24 Hr Totals	10.94	11.28	100.00				

Michigan Department of Transportation
Traffic Information Unit
Total Volume Estimation

00690170 9 **C.S.1: 23061** **Beg: 12370** **End: 13935** **PR1:** **Beg: 0** **End: 0**

C.S.2: **Beg: 0** **End: 0** **PR2:** **Beg: 0** **End: 0**

From: JCT M-50 **To: JCT I-69 BL CHARLOTTE** **Cluster: 2**

Last Year's ADT: 30154 **Last CommADT/Axle Adjustment: 6135\ 8076**

County: 23 **CS Milepoint: 12803** **PR Milepoint: 12803**

Station: 87 **Counted: CL**

Desc: 0.1 MI N OF M-50

Calender Day

Date	Dir	Day	Hrs	Count	x	DF	x	SF	=	Adj Count	-	Excess Veh	=	ADT Est
06/27/2006	01	3	15	11259		2		0.915		0		0		0
06/28/2006	01	4	24	16511		2		0.915		30215		0		30215
06/29/2006	01	5	11	5960		2		0.915		0		0		0
06/27/2006	05	3	14	11163		2		0.915		0		0		0
06/28/2006	05	4	24	15416		2		0.915		28211		0		28211
06/29/2006	05	5	11	4982		2		0.915		0		0		0

Sum of ADT Estimates: 58426

# of Estimates: 2

Estimated ADT: 29213

Maximum Estimate: 30215

Minimum Estimate: 28211

24 Hour Period

Date	Dir	Day	Hrs	Count	x	DF	x	SF	=	Adj Count	-	Excess Veh	=	ADT Est
06/27/2006	01	3	24	15706		2		0.915		28742		0		28742
06/28/2006	01	4	24	16596		2		0.915		30371		0		30371
06/29/2006	01	5	2	1428		2		0.915		0		0		0
06/27/2006	05	3	24	14816		2		0.915		27113		0		27113
06/28/2006	05	4	24	15818		2		0.915		28947		0		28947
06/29/2006	05	5	1	927		2		0.915		0		0		0

Sum of ADT Estimates: 115173

# of Estimates: 4

Estimated ADT: 28793

Maximum Estimate: 30371

Minimum Estimate: 27113

THE SEGMENT ADT IS---> 28793

Michigan Department of Transportation
Traffic Information Unit
Total Volume Estimation

00690640 9 **C.S.1:** 44043 **Beg:** 940 **End:** 5110 **PR1:** **Beg:** 0 **End:** 0
C.S.2: **Beg:** 0 **End:** 0 **PR2:** **Beg:** 0 **End:** 0

From: ELBA RD **To:** LAKE NEPESSING RD **Cluster:** 1

Last Year's ADT: 33146 **Last CommADT/Axle Adjustment:** 4737\ 6117

County: 44 **CS Milepoint:** 1660 **PR Milepoint:** 1354

Station: 65 **Counted:** SC

Desc: 0.3 MILE EAST OF ELBA RD.

Calender Day

Date	Dir	Day	Hrs	Count	x	DF	x	SF	=	Adj Count	-	Excess Veh	=	ADT Est
06/06/2006	03	3	14	13248		2		0.895		0		4003		0
06/07/2006	03	4	24	19597		2		0.895		35079		4003		31076
06/08/2006	03	5	12	8472		2		0.895		0		4003		0
06/06/2006	07	3	14	13391		2		0.895		0		4003		0
06/07/2006	07	4	24	20010		2		0.895		35818		4003		31815
06/08/2006	07	5	12	8934		2		0.895		0		4003		0

Sum of ADT Estimates: 62891
# of Estimates: 2
Estimated ADT: 31446
Maximum Estimate: 31815
Minimum Estimate: 31076

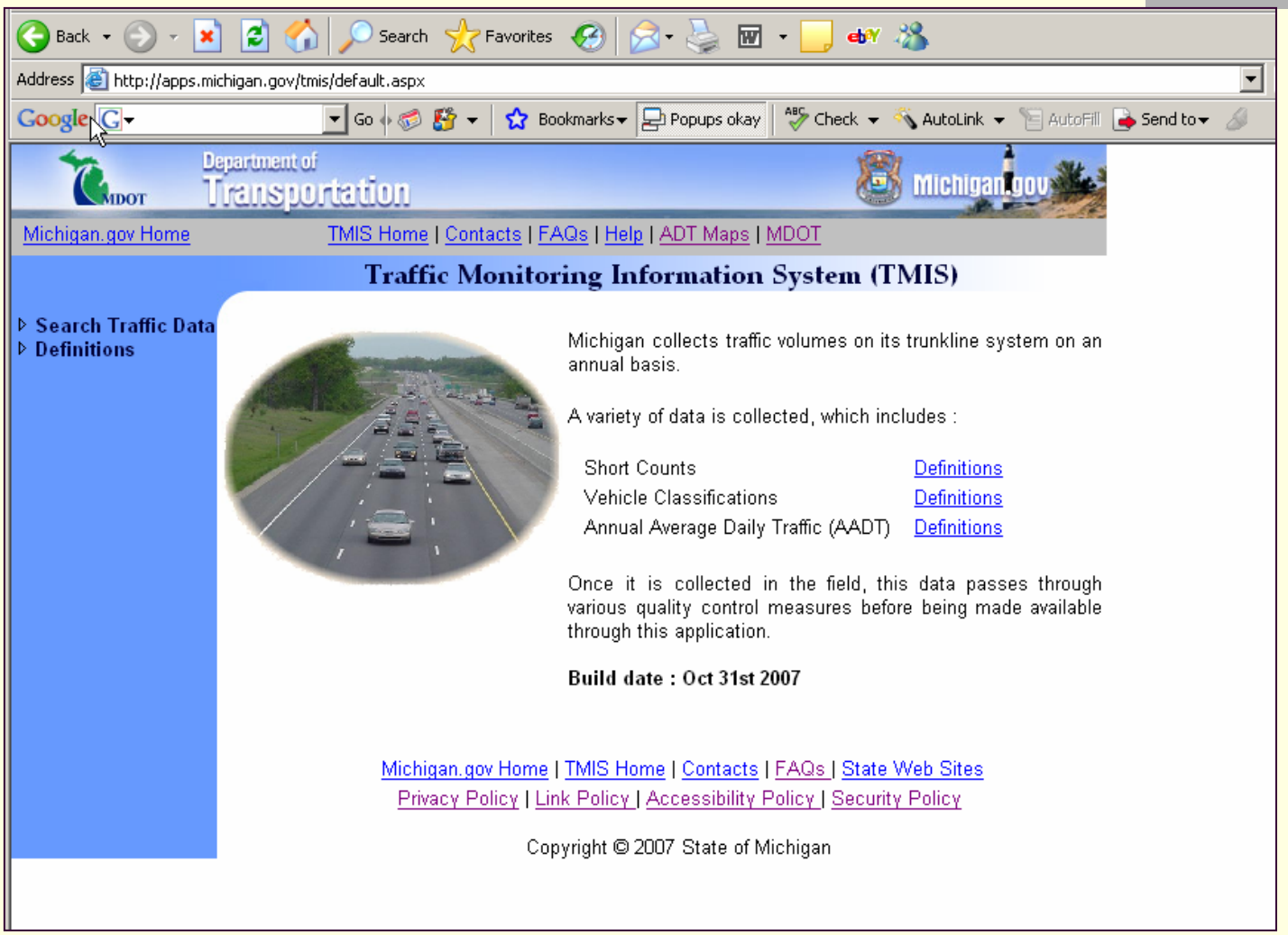
24 Hour Period

Date	Dir	Day	Hrs	Count	x	DF	x	SF	=	Adj Count	-	Excess Veh	=	ADT Est
06/06/2006	03	3	24	19419		2		0.895		34760		4003		30757
06/07/2006	03	4	24	19758		2		0.895		35367		4003		31364
06/08/2006	03	5	2	2140		2		0.895		0		4003		0
06/06/2006	07	3	24	19905		2		0.895		35630		4003		31627
06/07/2006	07	4	24	20343		2		0.895		36414		4003		32411
06/08/2006	07	5	2	2087		2		0.895		0		4003		0

Sum of ADT Estimates: 126159
# of Estimates: 4
Estimated ADT: 31540
Maximum Estimate: 32411
Minimum Estimate: 30757

THE SEGMENT ADT IS---> 31540

New in 2007


Back
Search
Favorites
Address
http://apps.michigan.gov/tmis/default.aspx
Google
Go
Bookmarks
Popups okay
Check
AutoLink
AutoFill
Send to
Department of Transportation
MDOT
Michigan.gov
Michigan.gov Home
TMIS Home | Contacts | FAQs | Help | ADT Maps | MDOT
Traffic Monitoring Information System (TMIS)
Search Traffic Data
Definitions
Michigan collects traffic volumes on its trunkline system on an annual basis.
A variety of data is collected, which includes :
Short Counts Definitions
Vehicle Classifications Definitions
Annual Average Daily Traffic (AADT) Definitions
Once it is collected in the field, this data passes through various quality control measures before being made available through this application.
Build date : Oct 31st 2007
Michigan.gov Home | TMIS Home | Contacts | FAQs | State Web Sites
Privacy Policy | Link Policy | Accessibility Policy | Security Policy
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Travel Information Unit
Data Collection Section
Michigan Department of Transportation
517-373-2249

Questions?

Contact:

Larry Whiteside – Traffic Specialist (517) 373-2272 whitesidel@michigan.gov