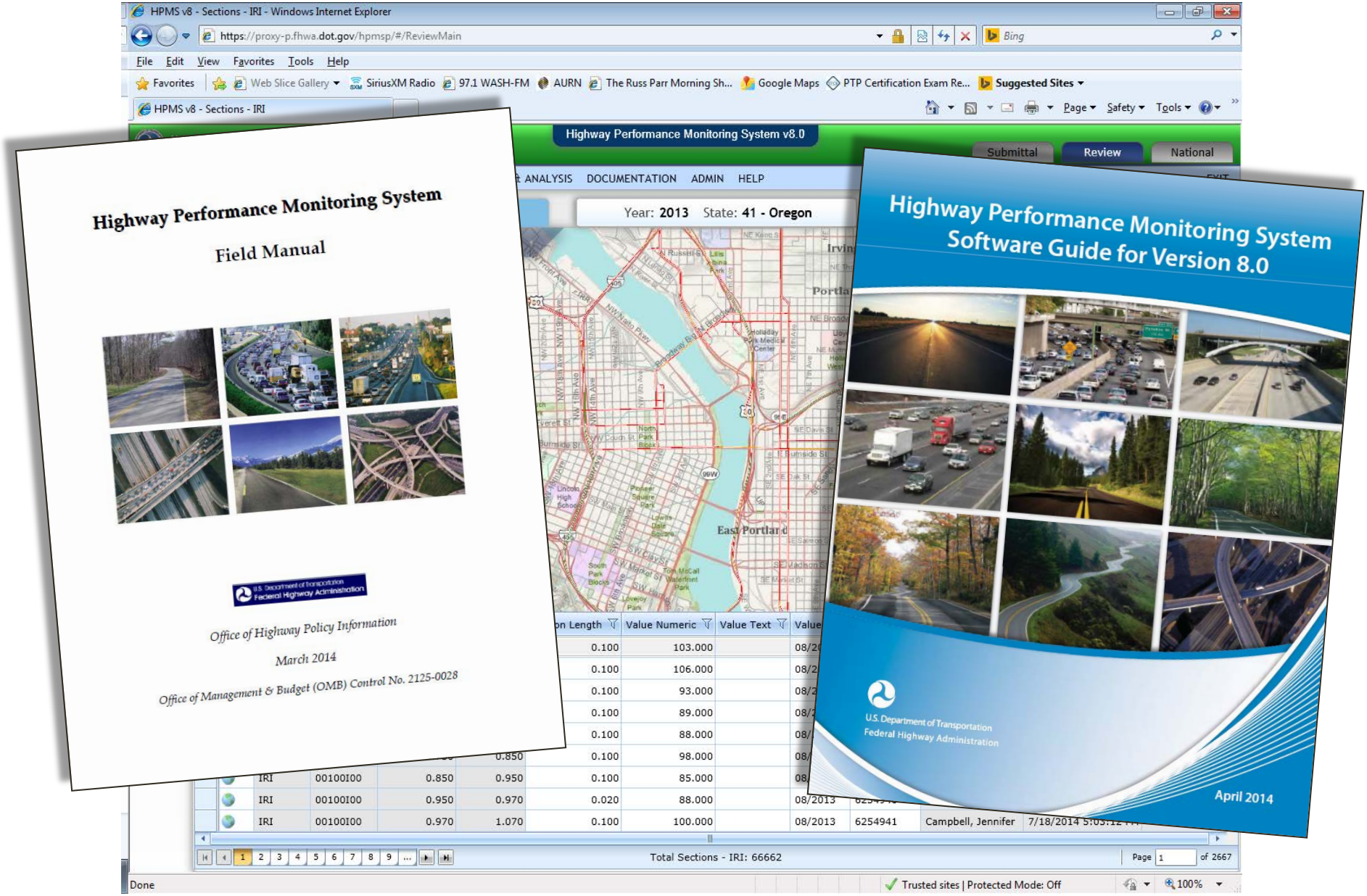
HPMS Field Manual & Software Updates

FHWA Highway Information Seminar

Arlington, VA

September 24, 2015

HPMS References & Resources



Field Manual

HPMS 2010+ Field Manual Releases

- February & September 2010
- March 2012
- March 2013
- March 2014
- ***March 2015 (Addendum Only)***

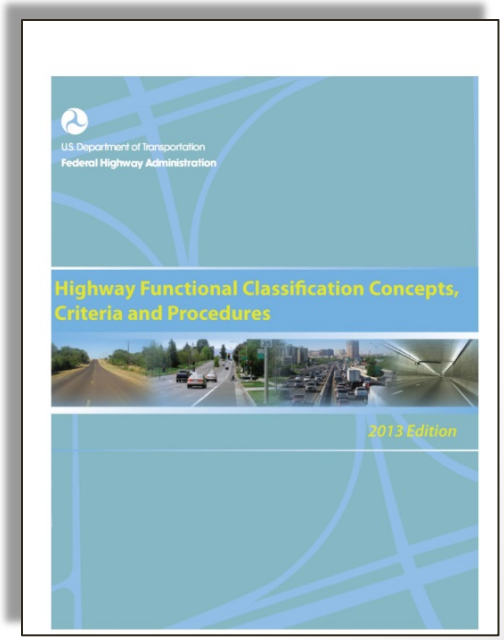
Addendum - Summary of Edits

- Routes dataset requirements
- Urban Area Boundaries dataset guidance
- Data item guidance

Facility Type	*Median Type*
Through Lanes	*Widening Obstacle*
Structure Type	*Widening Potential*
HOV Type	*Percent Passing Sight Distance*
HOV Lanes	*Year of Last Improvement*
Route Number	*Year of Last Construction*

Addendum - Summary of Edits (cont'd)

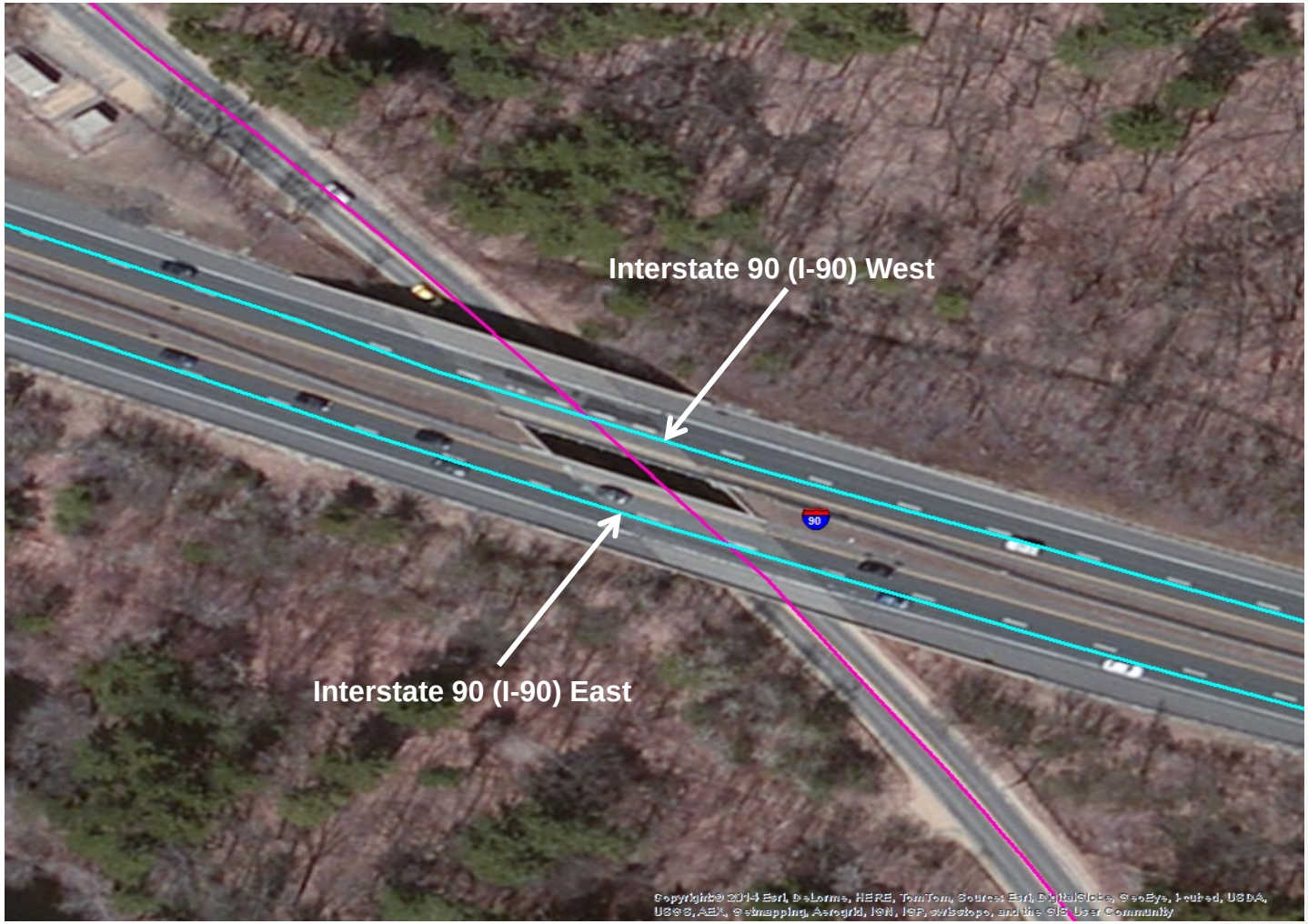
- Removal of 'Cracking Length' optional reporting requirement
- Functional Classification guidance



Optional Reporting Requirements

- Bi-directional coding/reporting for Rural Minor Collectors and Local roads
  - Functional System
  - Facility Type
  - Urban Code
- Optional data will help to facilitate Federal-aid project location efforts in Fiscal Management Information System (FMIS) 5.0

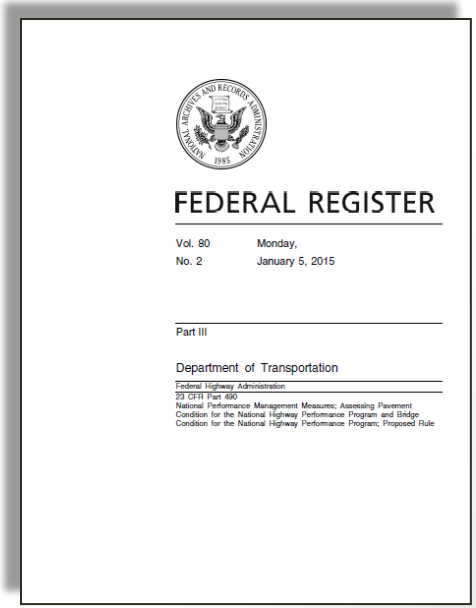
Divided Highways Reporting Scenario



Optional Requirements

HPMS 2010+ Field Manual Releases

- ***NPRM Version – 2016?***
  - ***Will address HPMS data collection/reporting requirements needed to support performance measures per the Pavement & Bridge NPRM (Notice for Proposed Rulemaking)***



FEDERAL REGISTER

Vol. 80 Monday,
No. 2 January 5, 2015

Part III

Department of Transportation

Federal Highway Administration
23 CFR Part 490
National Performance Management Measures; Assessing Pavement Condition for the National Highway Performance Program and Bridge Condition for the National Highway Performance Program; Proposed Rule

NPRM Version – **PROPOSED** Edits/Revisions

- Interstate pavement condition-related data items due to be submitted prior to June 15th
  - Functional System, Facility Type, Through Lanes, Urban Code, Structure Type, IRI, Surface Type, Rutting, Faulting, Cracking Percent, NHS
  - Bi-directional data to be reported where applicable
- Linear referencing system (LRS) network due to be submitted prior to June 15th
  - Must include geometry for all Federal-aid and NHS routes, and divided highways

NPRM Version – PROPOSED Edits/Revisions (cont'd)

- International Roughness Index (IRI)
  - Extent reporting requirement
  - Annual collection/reporting for Interstates
  - Biennial collection/reporting for non-Interstate NHS
  - Data collection date reporting format
  - AASHTO data collection specifications

		1	2	3	4	5	6	7
Functional System	NHS	Int	OFE	OPA	MiA	MaC	MiC	Local
Rural	FE	FE*	FE	FE	SP	SP*		
Urban	FE	FE*	FE	FE	SP*	SP*	SP*	

FE = Full Extent FE* = Full Extent in both directions SP = Sample Panel Sections SP* = Sample Panel Sections (optional)

NPRM Version – PROPOSED Edits/Revisions (cont'd)

- Surface Type
  - Extent reporting requirement
  - Annual collection/reporting for Interstates
  - Biennial collection/reporting for non-Interstate NHS
  - Pavement "group type" specifications
  - Pavement type guidance

		1	2	3	4	5	6	7
Functional System	NHS	Int	OFE	OPA	MiA	MaC	MiC	Local
Rural	FE	FE*	SP	SP	SP	SP		
Urban	FE	FE*	SP	SP	SP	SP	SP	

FE = Full Extent FE* = Full Extent in both directions SP = Sample Panel Sections

NPRM Version – **PROPOSED** Edits/Revisions (cont'd)

- Rutting
  - Extent reporting requirement
  - Annual collection/reporting for Interstates
  - Biennial collection/reporting for non-Interstate NHS
  - Valid value and data collection date reporting format
  - AASHTO data collection specifications

		1	2	3	4	5	6	7
Functional System	NHS	Int	OFE	OPA	MiA	MaC	MiC	Local
Rural	FE	FE*	SP	SP	SP	SP		
Urban	FE	FE*	SP	SP	SP	SP	SP	

FE = Full Extent FE* = Full Extent in both directions SP = Sample Panel Sections

NPRM Version – PROPOSED Edits/Revisions (cont'd)

- Faulting
  - Extent reporting requirement
  - Annual collection/reporting for Interstates
  - Biennial collection/reporting for non-Interstate NHS
  - Valid value and data collection date reporting format
  - AASHTO data collection specifications

		1	2	3	4	5	6	7
Functional System	NHS	Int	OFE	OPA	MiA	MaC	MiC	Local
Rural	FE	FE*	SP	SP	SP	SP		
Urban	FE	FE*	SP	SP	SP	SP	SP	

FE = Full Extent FE* = Full Extent in both directions SP = Sample Panel Sections

NPRM Version – PROPOSED Edits/Revisions (cont'd)

- Cracking Percent
  - Extent reporting requirement
  - Annual collection/reporting for Interstates
  - Biennial collection/reporting for non-Interstate NHS
  - Data collection date reporting format
  - AASHTO data collection specifications
  - Calculation procedures/examples

		1	2	3	4	5	6	7
Functional System	NHS	Int	OFE	OPA	MiA	MaC	MiC	Local
Rural	FE	FE*	SP	SP	SP	SP		
Urban	FE	FE*	SP	SP	SP	SP	SP	

FE = Full Extent FE* = Full Extent in both directions SP = Sample Panel Sections

t.gov/policyinformation/hpms/fieldmanual/ Highway Performance Mo...
ls Help
usXM Radio 97.1 WASH-FM Google Maps Suggested Sites

Our Mission
Our Staff
Offices
Highway Policy Information
About Us
Staff Directory
Calendar of Events
Other Sites & Resources
What's News
Transportation Policy Studies
International Programs
Legislative Affairs and Policy Communications
Publications

Office of Highway Policy Information
March 2014 (and March 2015 Addendum)

NOTICE:

Due to ongoing MAP-21-related rulemaking activities, the *HPMS Field Manual* did not undergo a formal update process this year. Therefore, an addendum document which addresses recent non-rulemaking modifications to various data collection and reporting guidance/requirements can be downloaded via the following link:

March 2015 HPMS Field Manual Addendum (PDF, 493 KB)

It is anticipated that the manual will undergo a formal update in 2016.

Full PDF Version, 6.73 MB
To view PDF files, you can use the Acrobat® Reader®.

Table of Contents

Chapter 1: INTRODUCTION

1.1 Background
1.2 Scope of The HPMS
1.3 Uses of HPMS Data
1.4 HPMS Staff Roles and Responsibilities
1.5 Reporting Requirements

- Full Extent Data
- Sample Panel Data
- Partial Extent Data
- Statewide Summary Data
- LRS Data
- HPMS Regulations

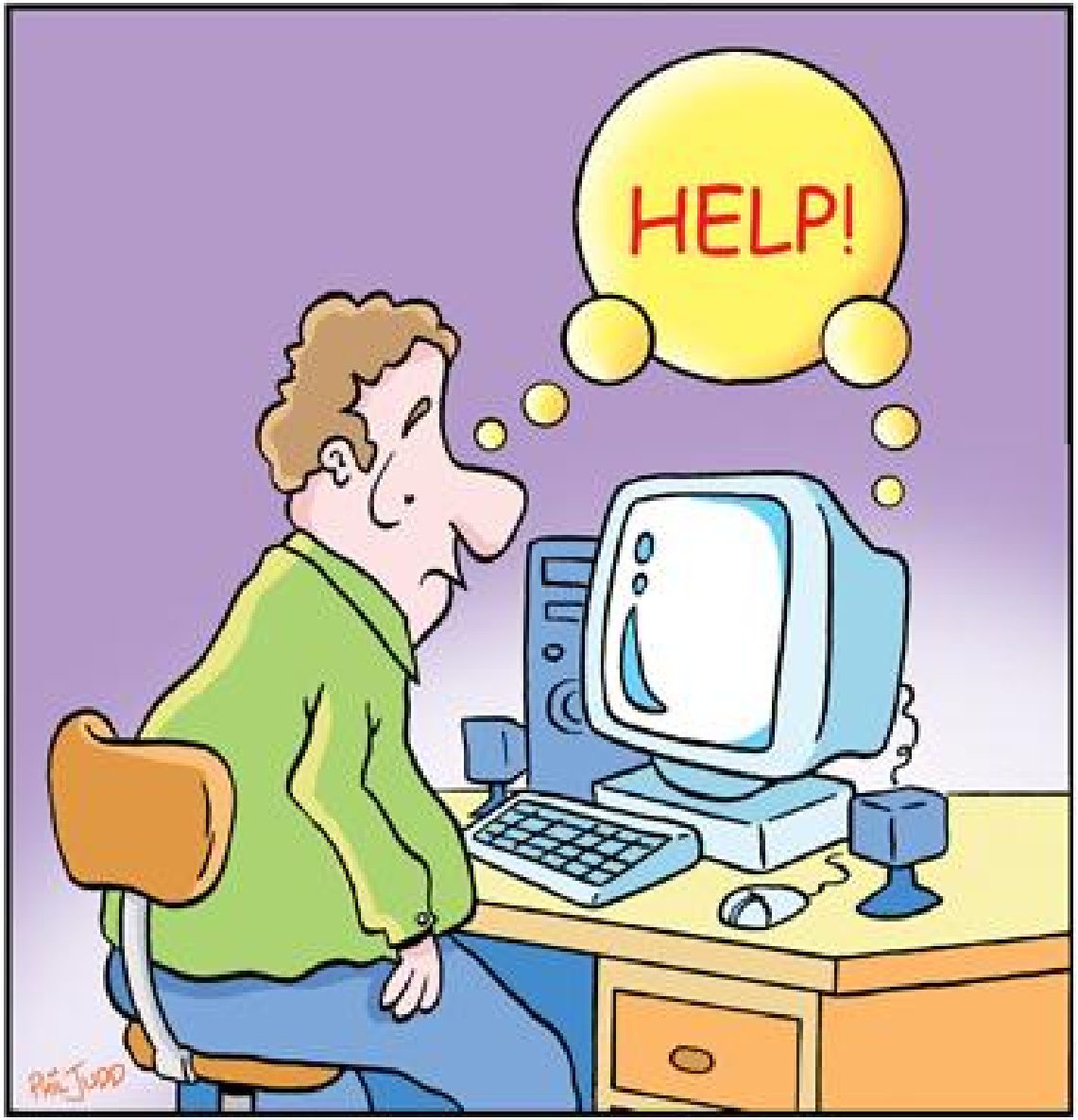
Highway Performance Monitoring System

Field Manual

Office of Highway Policy Information

the selected items.

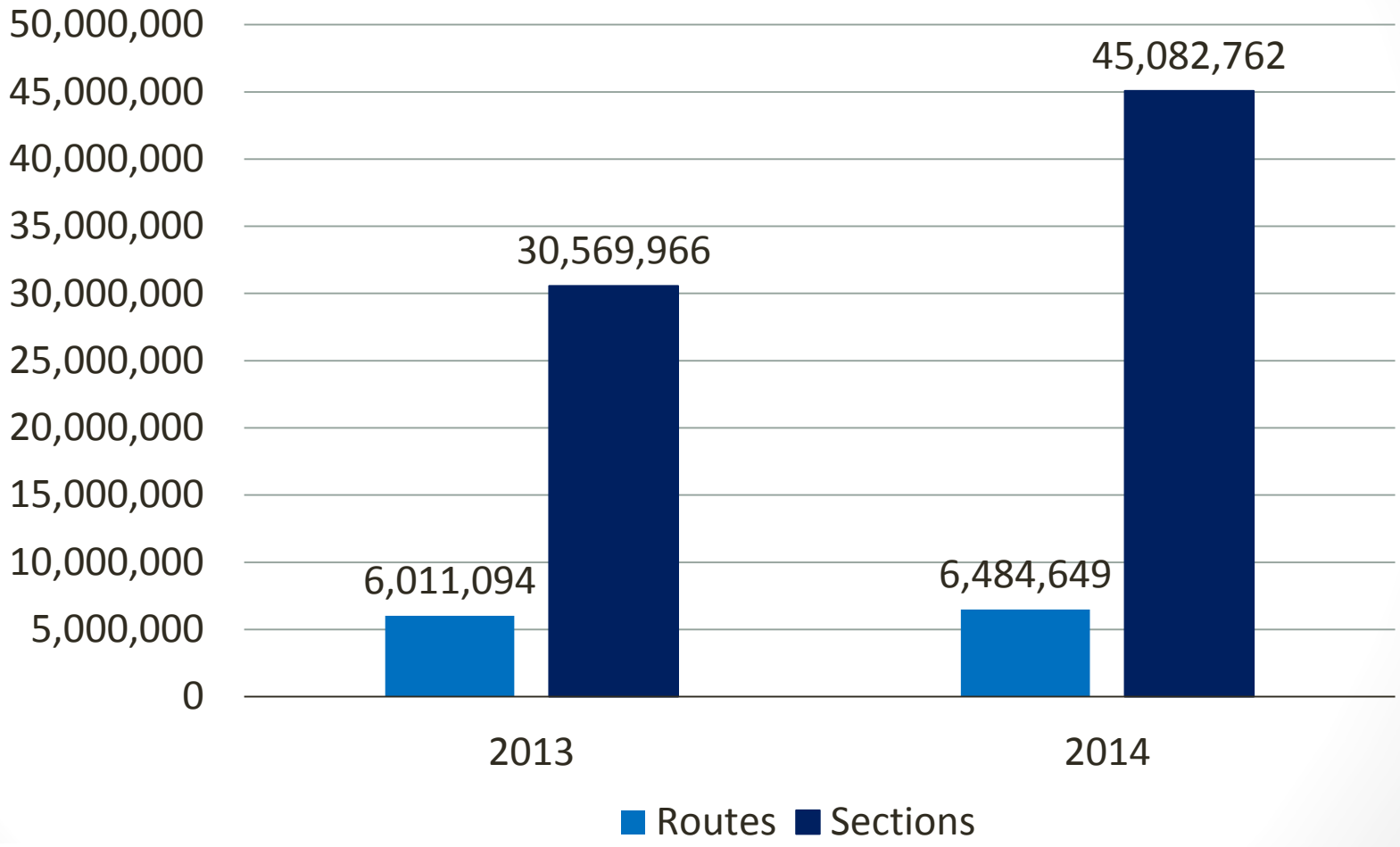
Software


HELP!

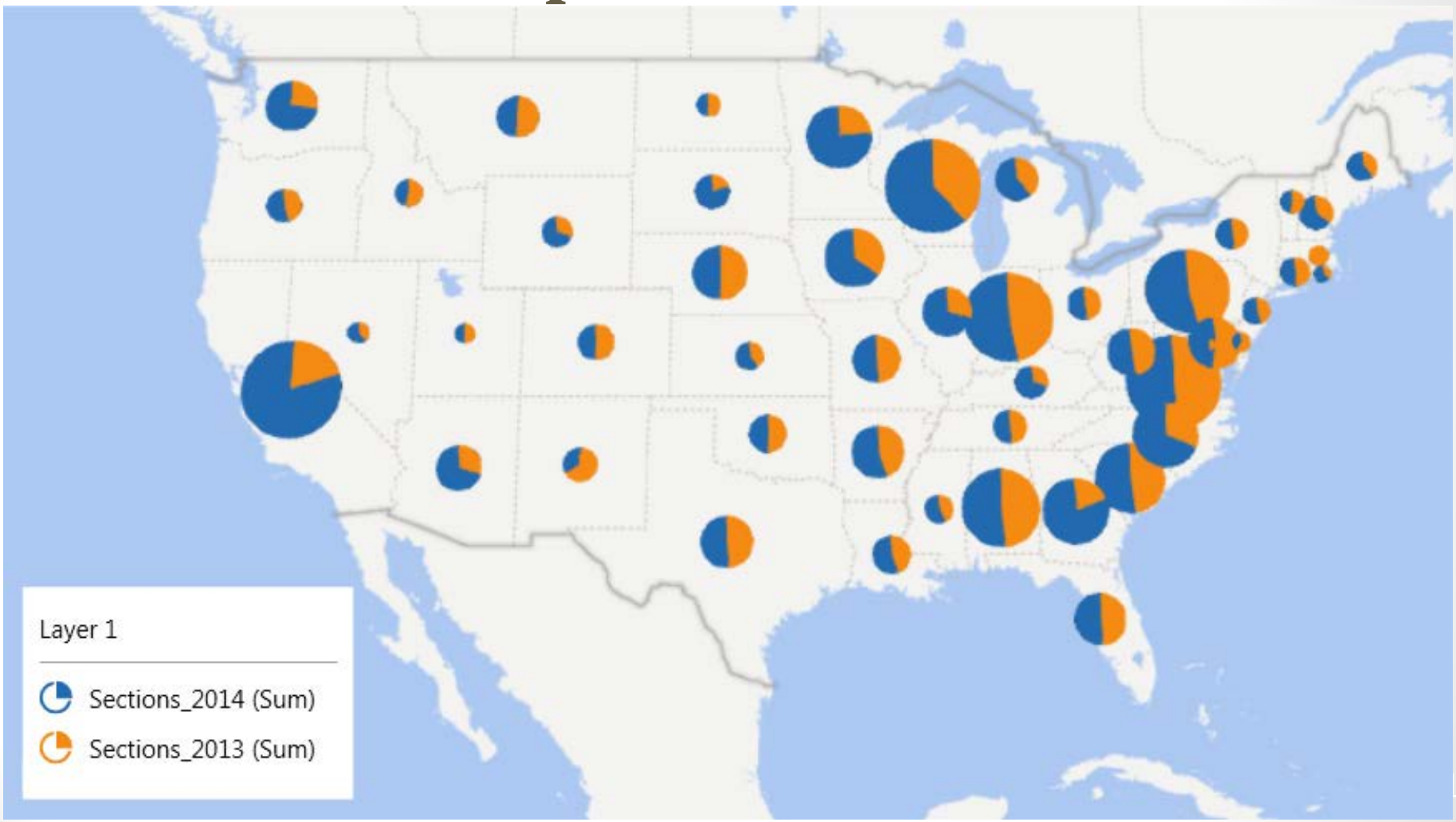
Topics

- Submission Review
- Data Validations
- Report Updates
- Software Updates
- Guidance Update Schedule

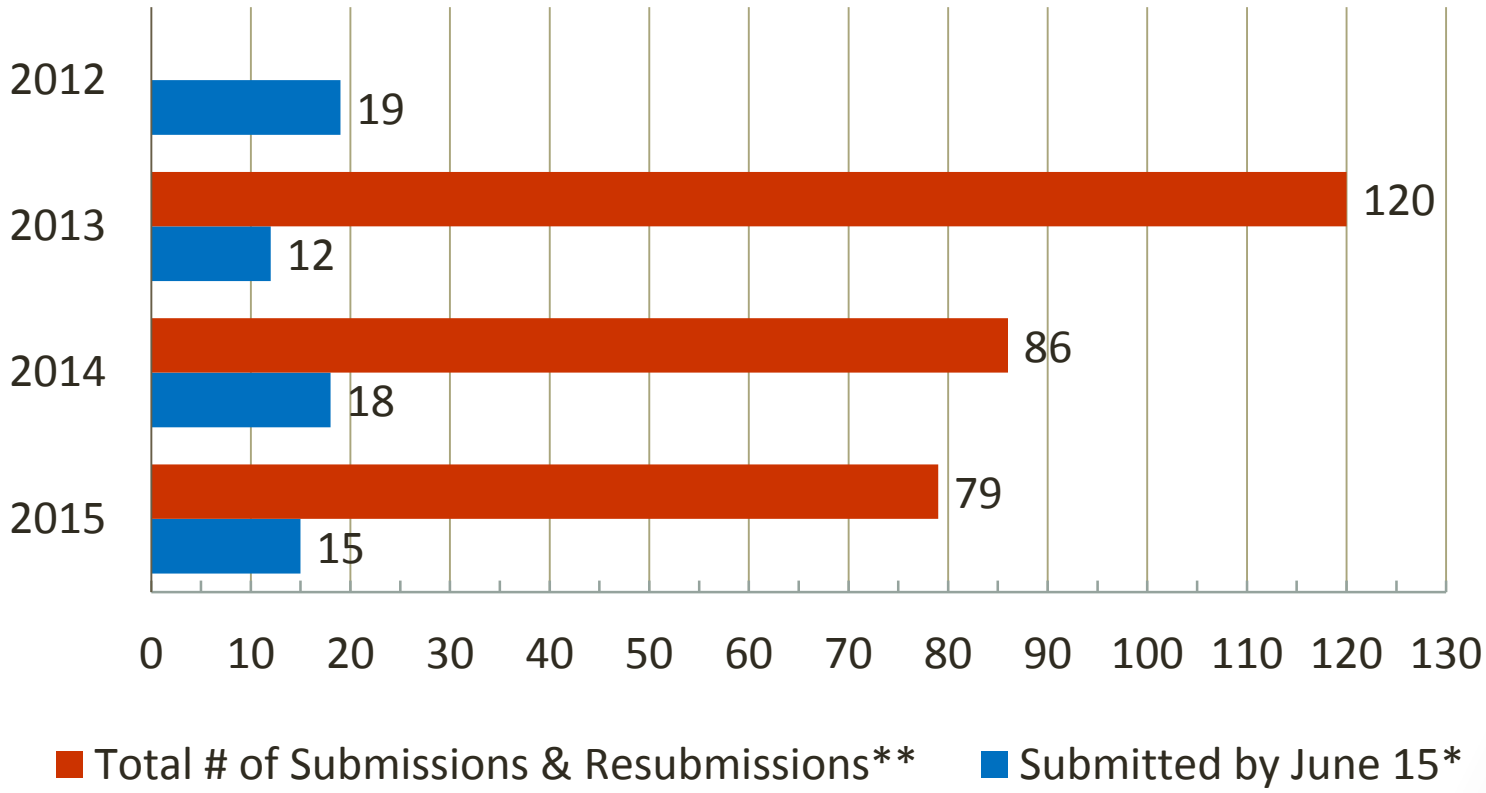
Submitted Records 2013-2014



Records Comparison 2013-2014

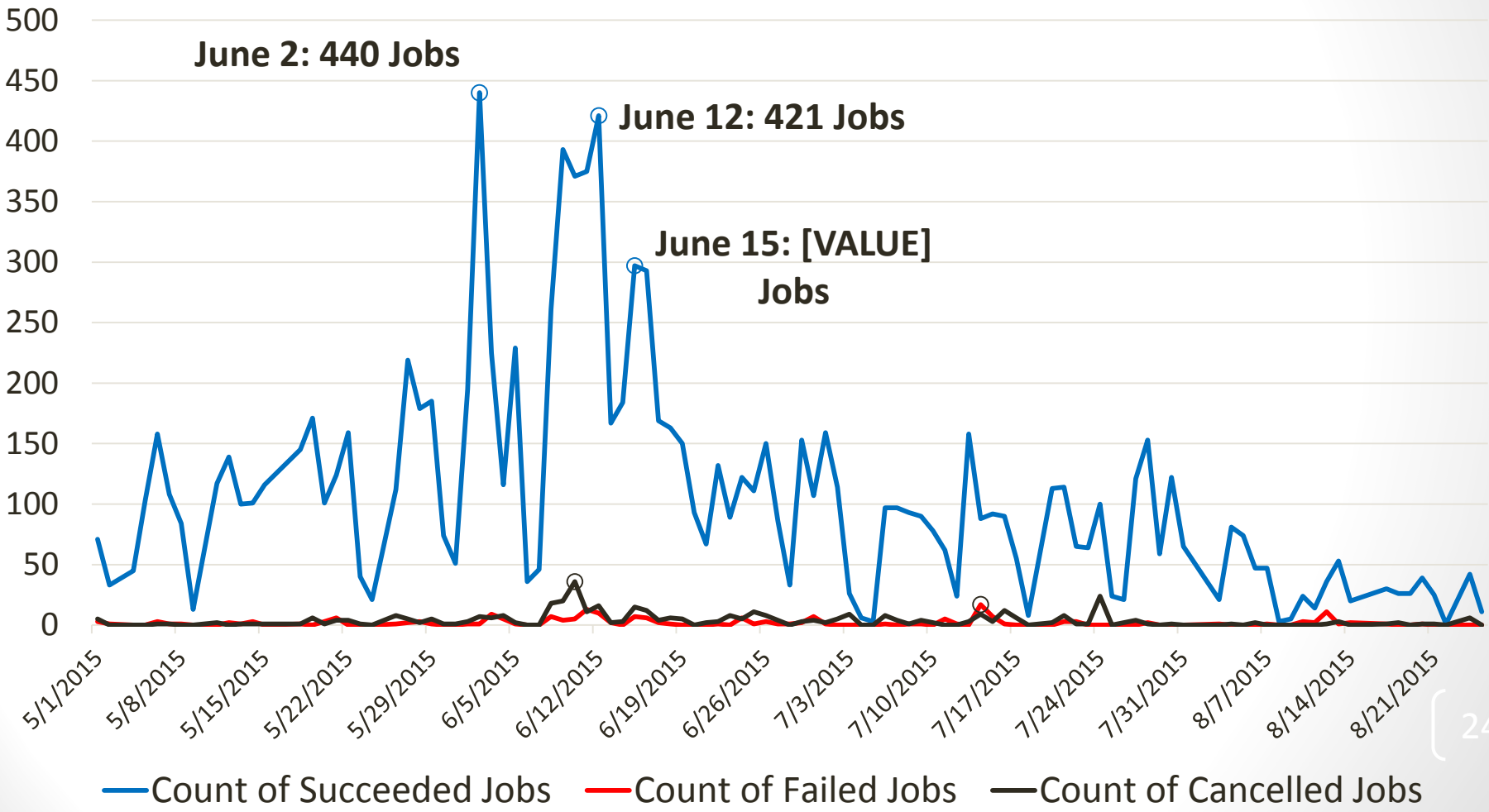


Submission Comparison
(Number of Submissions)

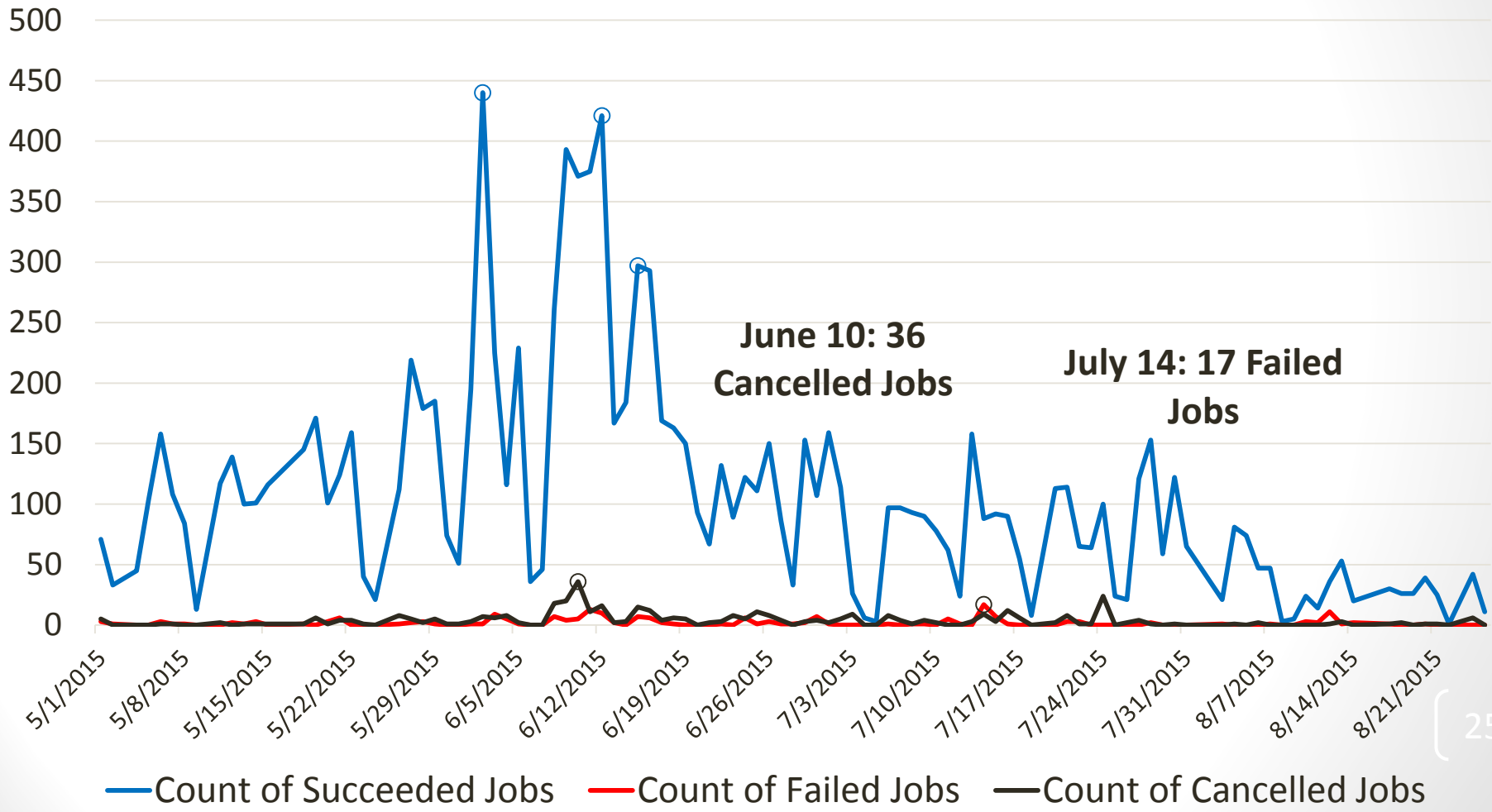


*Or Applicable HPMS Deadline Date (e.g. June 16, 2014)
** Through September 15, 2104.

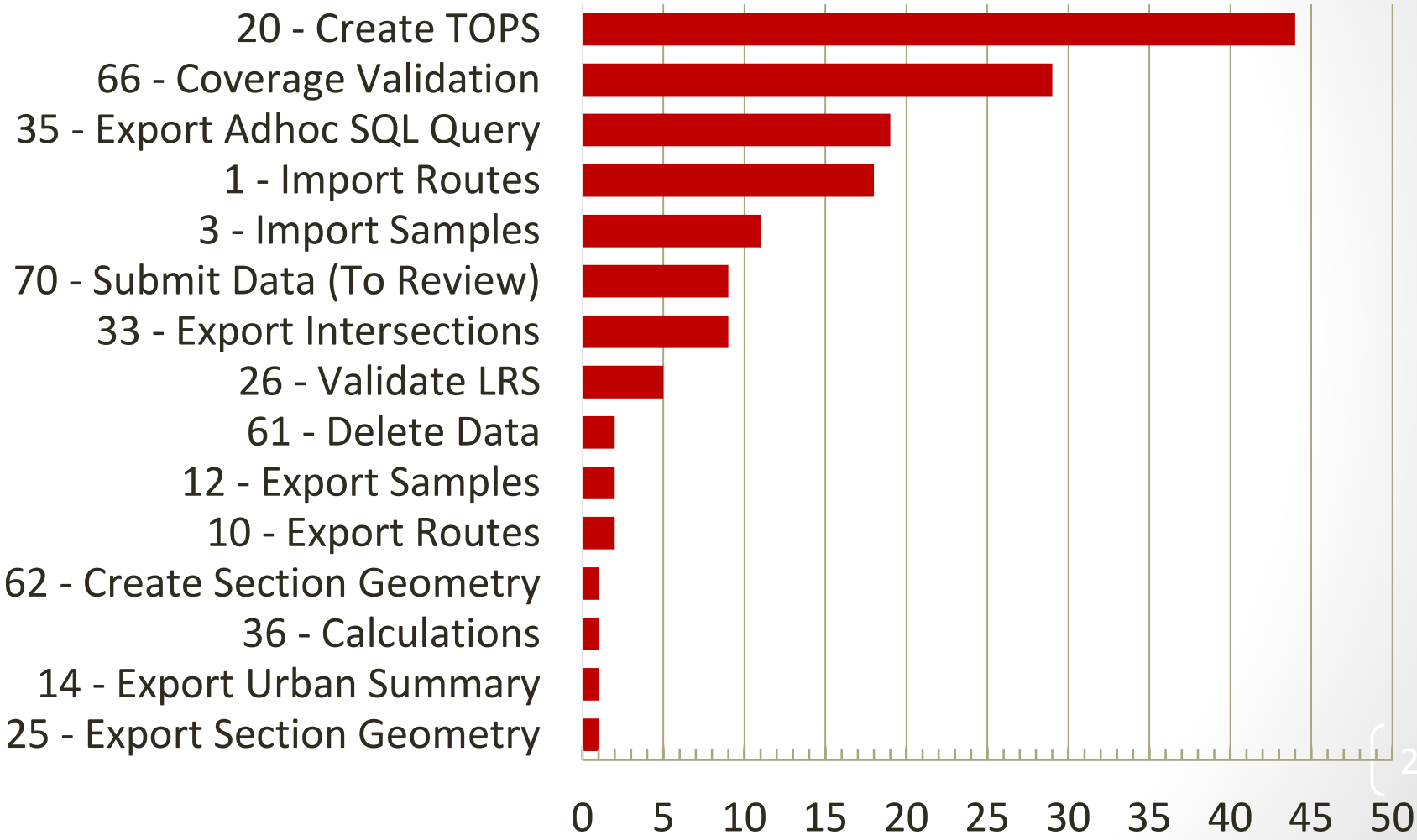
HPMS Jobs May through Aug. 2015



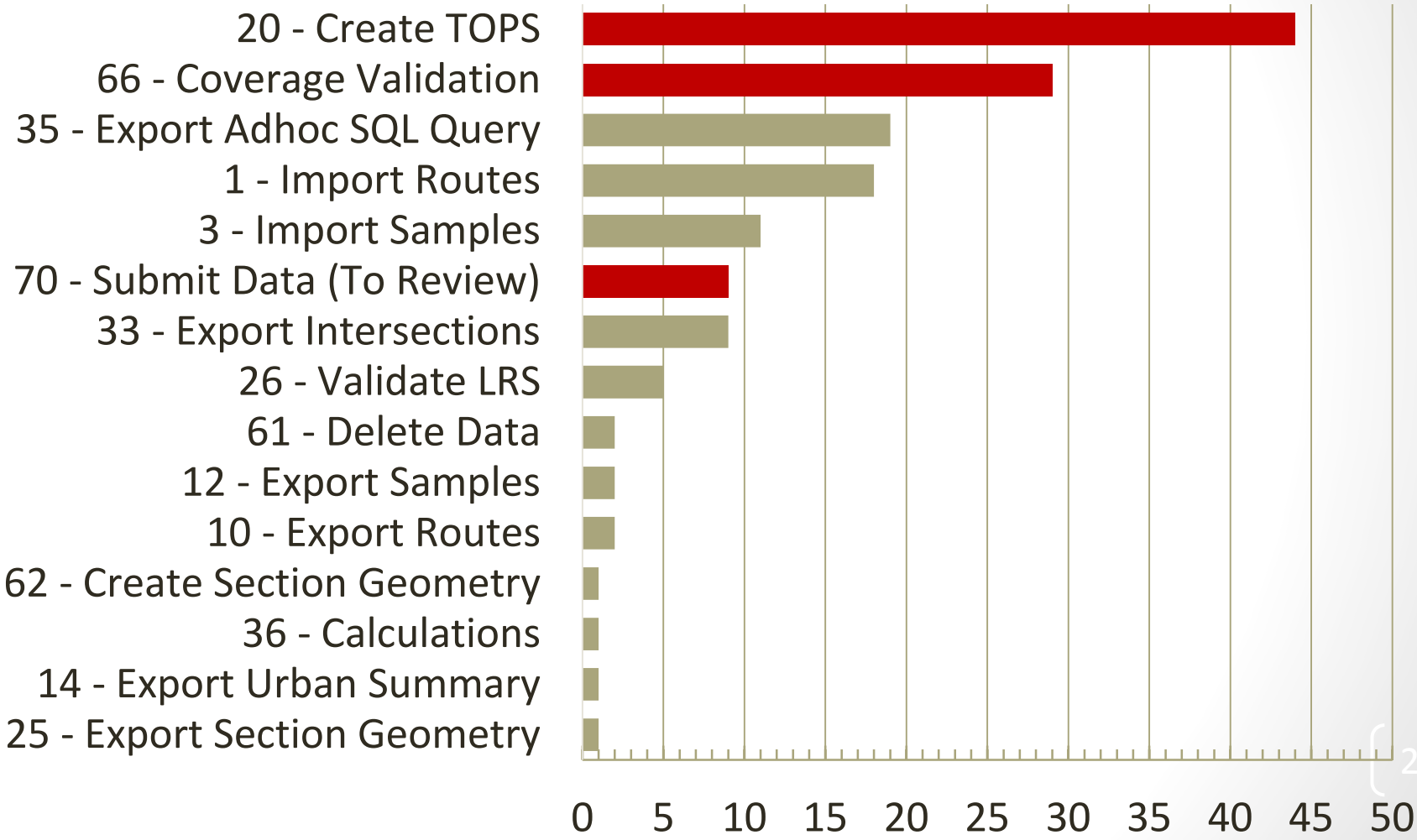
HPMS Jobs May through Aug. 2015



Failed HPMS Jobs May to Aug. 2015



Failed HPMS Jobs May to Aug. 2015



Processing Improvements

- Implemented
  - Update TOPS Process
- Scheduled for Winter Implementation
  - Conditional Process of Lengthy Jobs
  - Improve Geometry Processing during Submission Process
  - Revise the Full Intersection Procedures to decrease use of system database

Validation Changes

- Goals for 2016
  - Continue to add clarity
  - Focus on Data Quality
  - Support TPM as Appropriate

Validations Updated 2015

Import

- Urban Code
- Route Number
- Pct Peak Single/Combination
- K Factor
- D Factor
- Future AADT
- Shoulder Width L
- IRI

Validation Updates Cont.

Cross Check

- Through Lanes
- AADT Single/Combination Unit
- Cracking Percent
- D Factor
- K Factor
- Pct Peak Single/Combination
- Single/Combination Unit AADT
- IRI

Coverage

- Route Number
- Curves A-F
- Grades A-F
- Pct Pass Sight
- IRI
- PSR
- Base Thickness

U.S. Department of Transportation

Federal Highway Administration

HPMS SCORECARD

2014

Generated: July 16, 2015

DRAFT

DVC

Data Visualization Center

s summary

Overall Score

85

	Year 2014	Year 2013	Year 2012	Year 2011	Year 2010
Number of Records	481,019	376,961	365,548	136,351	127,165
Number of Variables	74	68	66	65	58
Number of Routes	5,150	4,103	4,090	3,965	4,554
Number of Sections	193,327	59,784	57,743	7,878	8,747

i inventory

ACCESS_CONTROL ●
COUNTER_PEAK_LANES ●
COUNTY_CODE ●
F_SYSTEM ●
FACILITY_TYPE ●
HOV_LANES ○
HOV_TYPE ○
MAINTENANCE_OPERATIONS ●
OWNERSHIP ●
PEAK_LANES ●
SPEED_LIMIT ●
STRUCTURE_TYPE ●
THROUGH_LANES ●
TOLL_CHARGED ●
TOLL_TYPE ●
TURN_LANES_L ●
TURN_LANES_R ●
URBAN_CODE ●
WEIGHTED_DESIGN_SPEED ●

p pavement

BASE_THICKNESS ●
BASE_TYPE ●
CRACKING_LENGTH ○
CRACKING_PERCENT ●
FAULTING ●
IRI ●
LAST_OVERLAY_THICKNESS ●
PSR ●
RUTTING ●
SURFACE_TYPE ●
THICKNESS_FLEXIBLE ●
THICKNESS_RIGID ●
YEAR_LAST_CONSTRUCTION ●
YEAR_LAST_IMPROV ●

t traffic

AADT ●
AADT_COMBINATION ●
AADT_SINGLE_UNIT ●
AT_GRADE_OTHER ●
CAPACITY ●
DIR_FACTOR ●
FUTURE_AADT ●
K_FACTOR ●
NUMBER_SIGNALS ●
PCT_GREEN_TIME ●
PCT_PEAK_COMBINATION ●
PCT_PEAK_SINGLE ●
PEAK_CAPACITY ●
SIGNAL_TYPE ●
STOP_SIGNS ●
VOLUME_SERVICE_FLOW_RATIO ●

g geometric

CURVES_A ●
CURVES_B ●
CURVES_C ●
CURVES_D ●
CURVES_E ●
CURVES_F ●
GRADES_A ●
GRADES_B ●
GRADES_C ●
GRADES_D ●
GRADES_E ●
GRADES_F ●
LANE_WIDTH ●
MEDIAN_TYPE ●
MEDIAN_WIDTH ●
PCT_PASS_SIGHT ●
PEAK_PARKING ●
SHOULDER_TYPE ●
SHOULDER_WIDTH_L ●
SHOULDER_WIDTH_R ●
TERRAIN_TYPE ●
WIDENING_OBSTACLE ●
WIDENING_POTENTIAL ●

r route

ROUTE_NUMBER ●
ROUTE_QUALIFIER ●
ROUTE_SIGNING ●

sn special networks

FUTURE_FACILITY ●
NHS ●
STRAHNET_TYPE ●
TRUCK ●

Data Item status: ● Submitted & Reasonable ● Submitted & Worth Exploring ○ Not Submitted & Fine ○ Not Submitted but Worth Exploring

pavement: detailed review

Overall Condition

Represented as percent of total lane miles

Good

Fair

Poor

Interstate

National Highway System

Principal Arterial Systems

Lower Level Systems

Outliers

Sections with outlying values

Faulting

Functional System	Number of Sections	Total Lane Miles	% of All Lane Miles Submitted
Interstate	119	11.82	3%
NHS	169	16.82	3%
PAS	169	16.82	3%
Lower Level Systems	12	1.11	1%

% Cracking

Functional System	Number of Sections	Total Lane Miles	% of All Lane Miles Submitted
Interstate	0	0	0%
NHS	0	0	0%
PAS	NA	0	0%
Lower Level Systems	NA	0	0%

Rutting

Functional System	Number of Sections	Total Lane Miles	% of All Lane Miles Submitted
Interstate	0	0	0%
NHS	0	0	0%
PAS	NA	0	0%
Lower Level Systems	1	0.1	0%

IRI

Functional System	Number of Sections	Total Lane Miles	% of All Lane Miles Submitted
Interstate	6	0.46	0%
NHS	88	7.72	0%
PAS	79	6.9	0%
Lower Level Systems	476	46.02	0%

Adjacent Sections

Adjacent sections with the same value

Faulting

Functional System	Number of Sections	Total Lane Miles	% of All Lane Miles Submitted
Interstate	1093	100.3	30%
NHS	1566	156.6	29%
PAS	1599	159.9	29%
Lower Level Systems	199	19.9	17%

% Cracking

Functional System	Number of Sections	Total Lane Miles	% of All Lane Miles Submitted
Interstate	4150	415	57%
NHS	7410	741	43%
PAS	7532	753.2	45%
Lower Level Systems	335.7	335.7	24%

Rutting

Functional System	Number of Sections	Total Lane Miles	% of All Lane Miles Submitted
Interstate	836	83.6	18%
NHS	1720	172	14%
PAS	1741	174.1	15%
Lower Level Systems	1837	183.66	14%

IRI

Functional System	Number of Sections	Total Lane Miles	% of All Lane Miles Submitted
Interstate	429	42.9	5%
NHS	940	94	3%
PAS	916	91.6	3%
Lower Level Systems	2325	232.46	2%

2013–2014 Sections

Sections with the same value as previous year

Faulting

Functional System	Number of Sections	Total Lane Miles	% of All Lane Miles Submitted
Interstate	1832	182.65	49%
NHS	2841	283.28	43%
PAS	2834	282.68	43%
Lower Level Systems	502	49.52	28%

% Cracking

Functional System	Number of Sections	Total Lane Miles	% of All Lane Miles Submitted
Interstate	7029	701.8	96%
NHS	16505	1647.23	97%
PAS	16323	1629.09	97%
Lower Level Systems	13910	1380.77	97%

Rutting

Functional System	Number of Sections	Total Lane Miles	% of All Lane Miles Submitted
Interstate	41	4.1	1%
NHS	304	30.34	2%
PAS	294	29.34	2%
Lower Level Systems	1460	144.69	11%

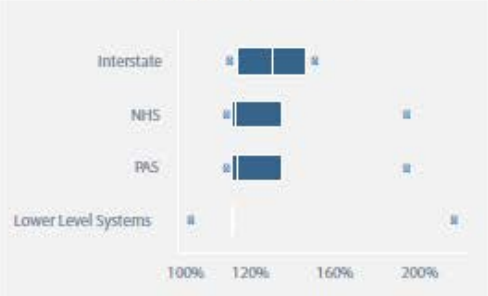
IRI

Functional System	Number of Sections	Total Lane Miles	% of All Lane Miles Submitted
Interstate	339	33.76	4%
NHS	5978	596.13	20%
PAS	5880	586.39	21%
Lower Level Systems	13616	1356.79	12%

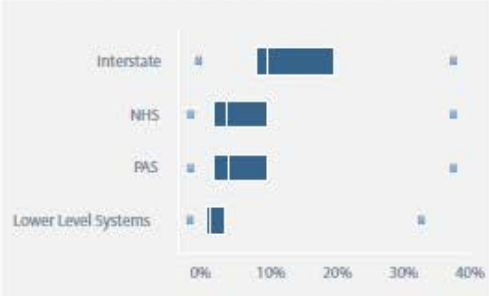
Extreme Future AADT Values

Functional System	Total lane Miles	% of lane Miles
Interstate	0	0%
NHS	0	0%
PAS	0	0%
Lower Level Systems	0	0%

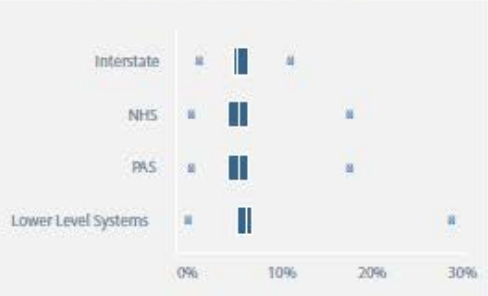
Future AADT relative to AADT



Combination Unit AADT relative to AADT



Single Unit AADT relative to AADT



Adjacent Sections

Adjacent sections with the same value

AADT

Functional System	Number of Sections	Total Lane Miles	% of All Lane Miles Submitted
Interstate	110	234.63	25%
NHS	570	876.76	27%
PAS	595	886.36	29%
Lower Level Systems	1134	1940.95	15%

FAADT

Functional System	Number of Sections	Total Lane Miles	% of All Lane Miles Submitted
Interstate	0	0	NaN%
NHS	0	0	NaN%
NA	NA	NA	NA
NA	NA	NA	NA

AADT_COMBINATION

Functional System	Number of Sections	Total Lane Miles	% of All Lane Miles Submitted
Interstate	74	107.09	12%
NHS	459	575.86	18%
PAS	448	559.03	18%
Lower Level Systems	121	134.23	8%

AADT_SINGLE_UNIT

Functional System	Number of Sections	Total Lane Miles	% of All Lane Miles Submitted
Interstate	74	107.09	12%
NHS	458	567.95	18%
PAS	446	550.95	18%
Lower Level Systems	122	141.73	8%

2013–2014 Sections

Sections with the same value as previous year

Functional System	Number of Sections	Total Lane Miles	% of All Lane Miles Submitted
Interstate	24	36.36	4%
NHS	488	657.21	21%
PAS	475	608.44	20%
Lower Level Systems	3679	5037.25	38%

Functional System	Number of Sections	Total Lane Miles	% of All Lane Miles Submitted
Interstate	0	0	NaN%
NHS	0	0	NaN%
NA	NA	NA	NA
NA	NA	NA	NA

Functional System	Number of Sections	Total Lane Miles	% of All Lane Miles Submitted
Interstate	3	10.91	1%
NHS	224	296.2	9%
PAS	212	250.1	8%
Lower Level Systems	355	455.8	30%

Functional System	Number of Sections	Total Lane Miles	% of All Lane Miles Submitted
Interstate	7	9.43	1%
NHS	145	195.6	6%
PAS	139	180.5	6%
Lower Level Systems	298	360.63	23%

inventory

2014 Summary Statistics

Current year summaries by Functional System

ACCESS_CONTROL (FE*)

Functional System	Total Measured Lane Miles	Total Expanded Lane Miles	N	N (NA)	Min	Median	Max
Interstate	NA	NA	210	0	1	1	1
NHS	NA	NA	1,913	0	1	3	3
PAS	NA	NA	1,863	0	1	3	3
Lower Level Systems	10,227.42	10227.42	1,135	0	2	3	3

COUNTER_PEAK_LANES (SP)

Functional System	Total Measured Lane Miles	Total Expanded Lane Miles	N	N (NA)	Min	Median	Max
Interstate	894.79	894,790	309	0	2	2	23
NHS	2,740.60	2740.603	885	0	1	2	23
PAS	2,638.33	2638.326	865	0	1	2	23
Lower Level Systems	4,384.64	4384.640	881	0	1	1	3

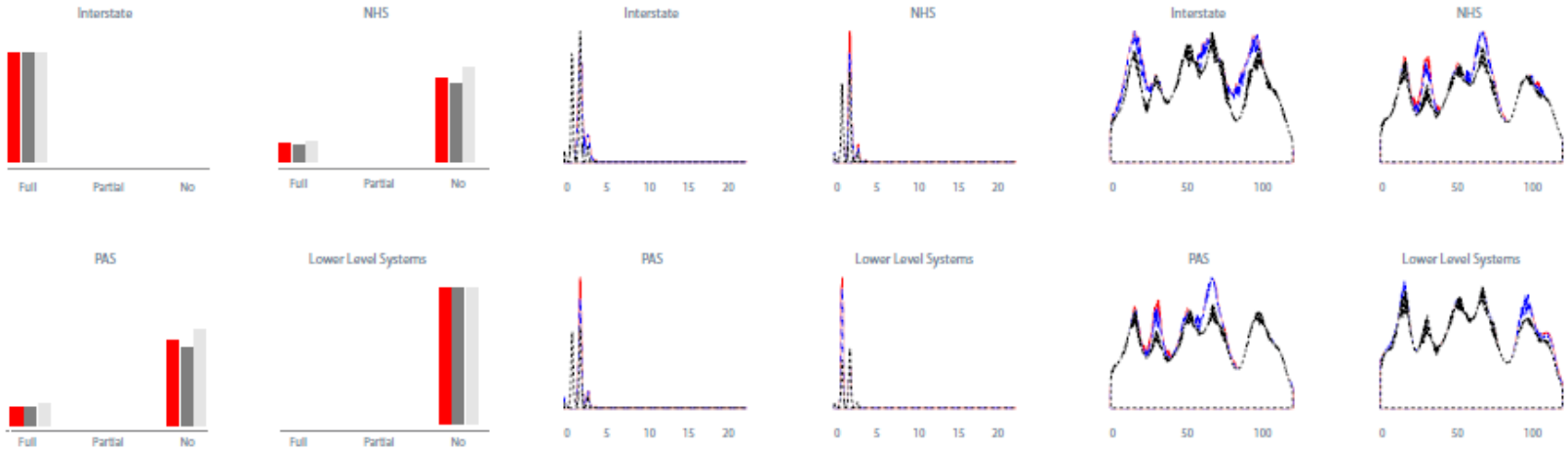
COUNTY_CODE (FE)

Functional System	Total Measured Lane Miles	Total Expanded Lane Miles	N	N (NA)	Min	Median	Max
Interstate	NA	NA	210	0	1	65	121
NHS	NA	NA	1,913	0	1	65	127
PAS	NA	NA	1,863	0	1	65	127
Lower Level Systems	NA	NA	6,682	0	1	63	127

Distributions

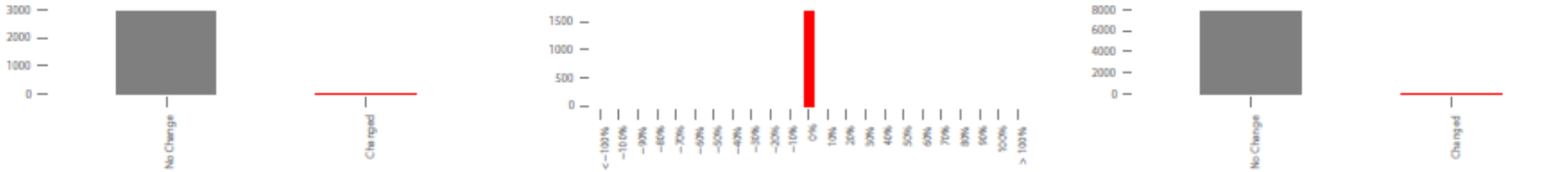
Plotting data distributions for current year, previous year, and previous nation

2014
2013
National



Relative Changes at the Section Level

Summarize how data changed year over year at the section level



inventory

2014 Summary Statistics

Current year summaries by Functional System

F_SYSTEM (FE + R)

Functional System	Total Measured Lane Miles	Total Expanded Lane Miles	N	N (NA)	Min	Median	Max
Interstate	NA	NA	310	0	1	1	1
NHS	NA	NA	1,913	0	1	3	5
PAS	NA	NA	1,863	0	1	3	3
Lower Level Systems	NA	NA	6,682	0	4	5	6

FACILITY_TYPE (FE + R)

Functional System	Total Measured Lane Miles	Total Expanded Lane Miles	N	N (NA)	Min	Median	Max
Interstate	NA	NA	310	0	2	2	2
NHS	NA	NA	1,921	0	1	2	7
PAS	NA	NA	1,863	0	1	2	2
Lower Level Systems	NA	NA	6,682	0	1	2	2

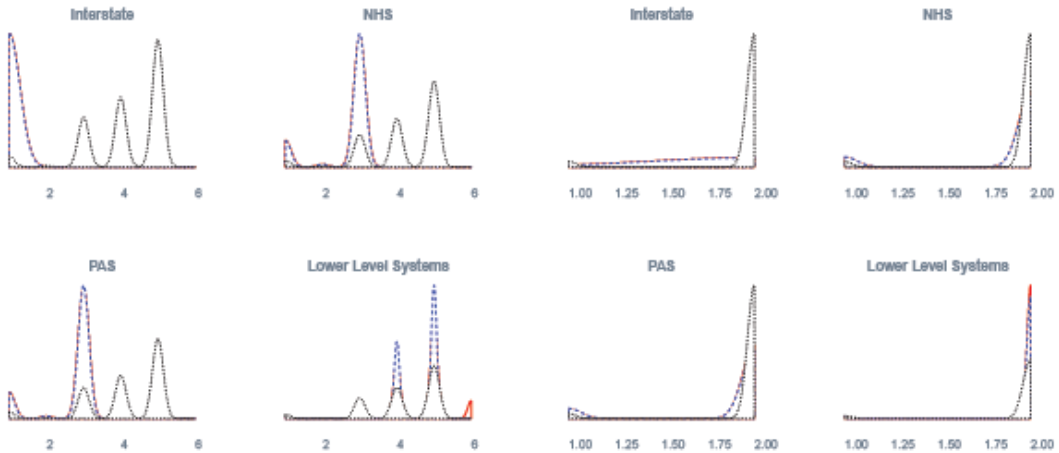
HOV_LANES (FE**)

No Data

Distributions

Plotting data distributions for current year, previous year, and previous nation

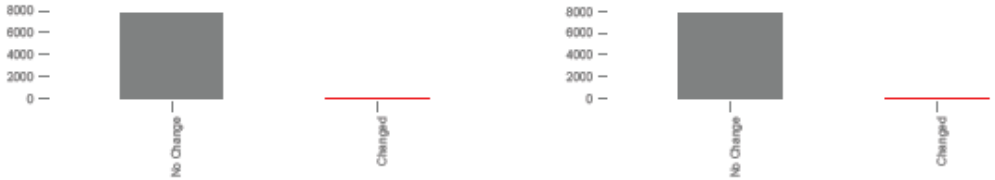
2014
2013
National



No Data

Relative Changes at the Section Level

Summarize how data changed year over year at the section level



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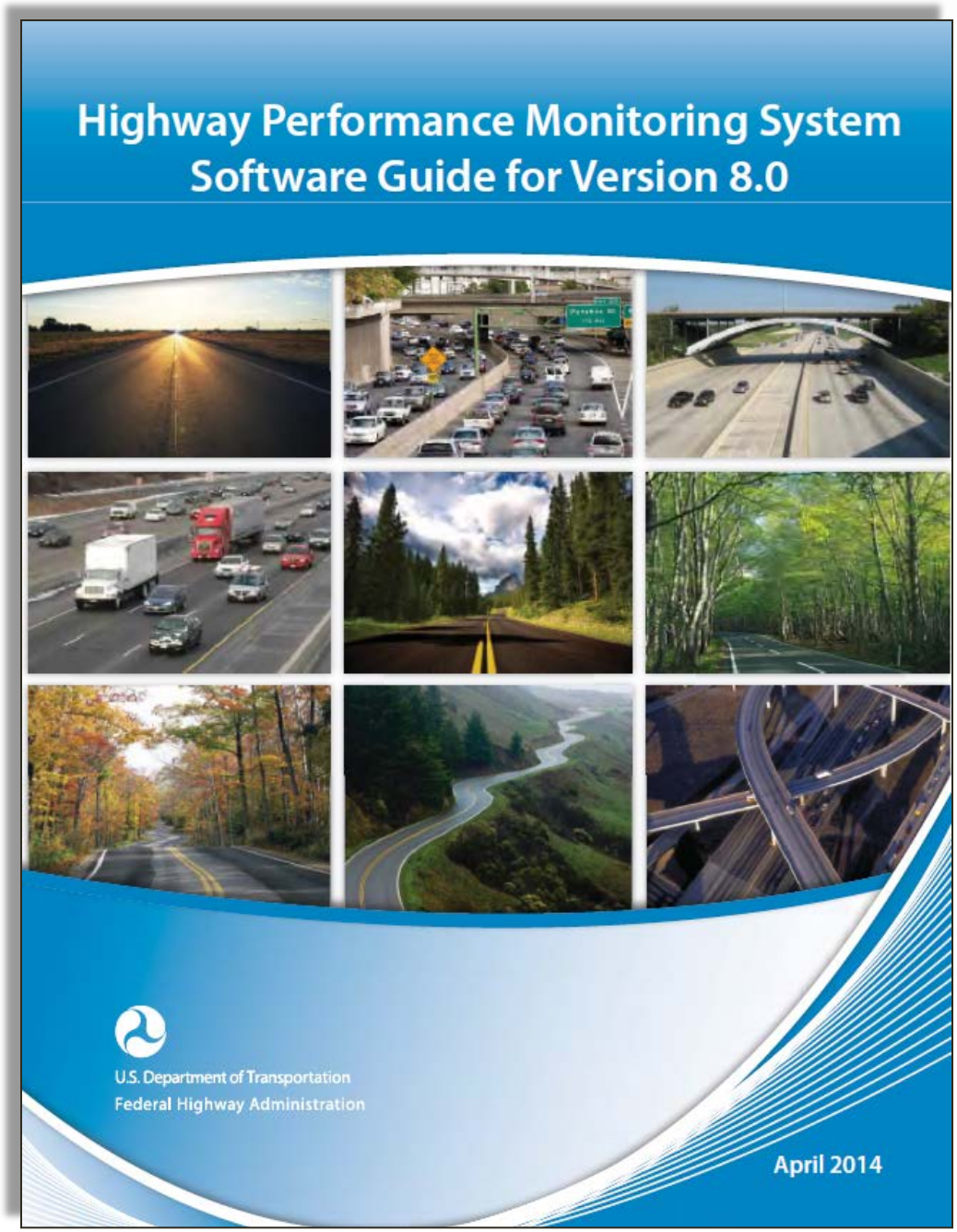
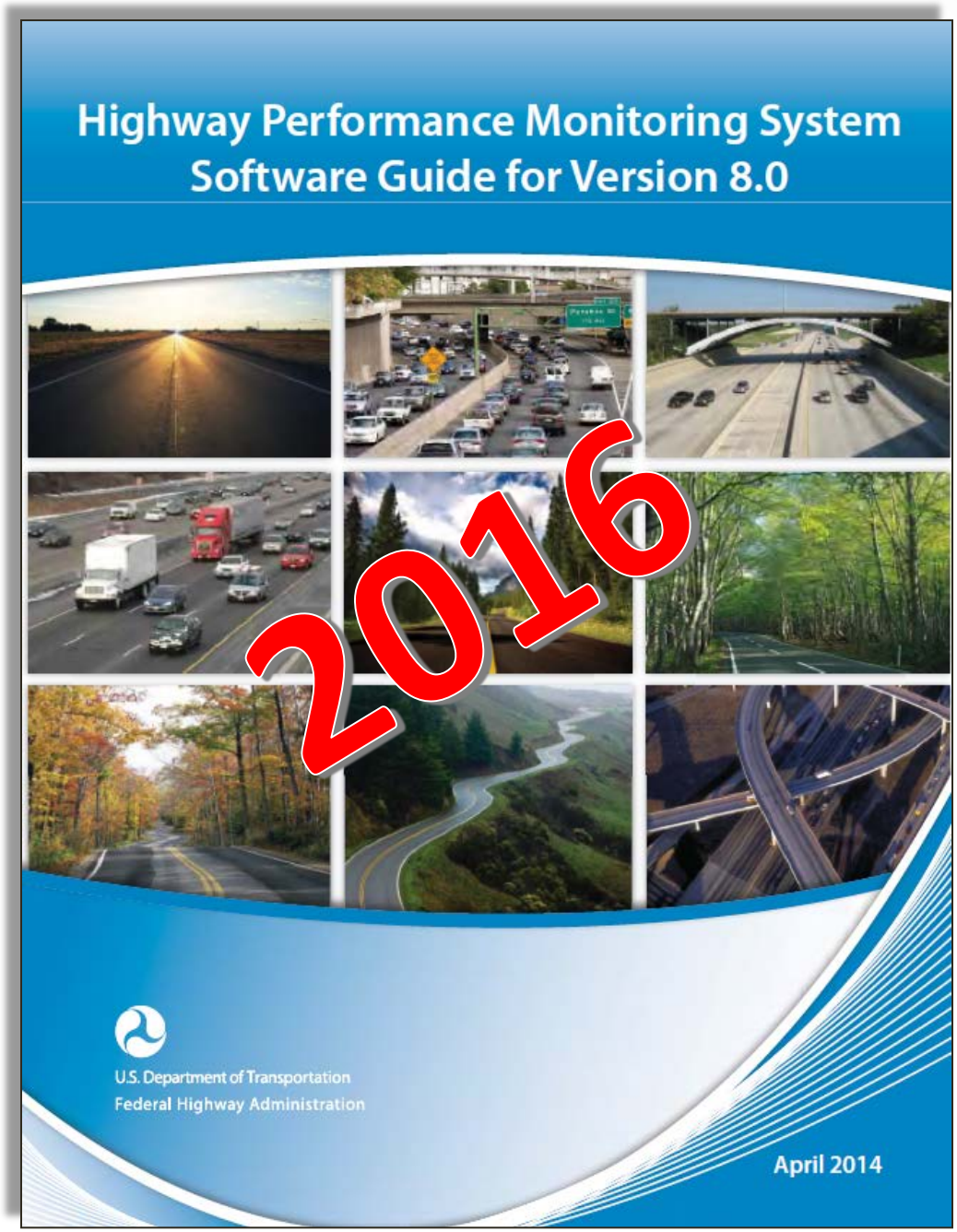
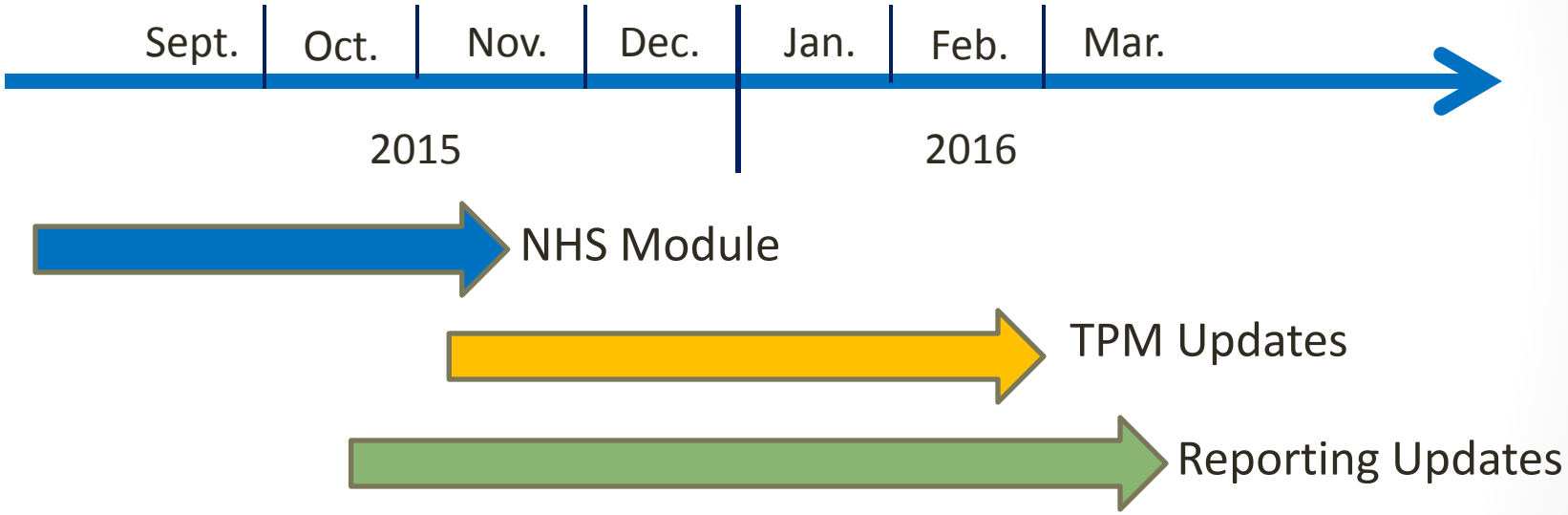

Highway Performance Monitoring System
Software Guide for Version 8.0
U.S. Department of Transportation
Federal Highway Administration
April 2014


Highway Performance Monitoring System
Software Guide for Version 8.0
2016
U.S. Department of Transportation
Federal Highway Administration
April 2014

Ongoing/Future Work Projects



Questions / Comments?

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