

# HPMS Pavement Data Issues & Uses

RPUG/PE 2014

Blacksburg, VA

September 17, 2014



# Introduction

- Review of principal HPMS pavement data items
- Various data issues
- Some uses



# Main HPMS Pavement Data Items– current requirements

- **IRI (MRI):** full extent for all principal arterials & NHS. Sampled on rural minor arterials. 2-yr. cycle. Annual for NHS. 0.1 mi max. section length
- **Surface Type:** sampled. 2-yr. cycle.
- **Rutting:** sampled. 2-yr. cycle.
- **Faulting:** sampled. 2-yr. cycle.
- **Cracking Length (optional):** sampled. 2-yr. cycle.
- **Cracking Percent:** sampled. 2-yr. cycle.
  
- Note: sampled functional systems exclude rural minor collectors and rural & urban locals.



# Various Issues

- Data collection frequency
- Data collection extent/completeness
- Section length (IRI)
- Data standards (AASHTO, ASTM, LTPP Guide, etc.)
- QA/QC by State and FHWA staff



# Completeness

- 2012 HPMS data:
  - Virtually all States report complete IRI
  - 27 States missing >5% rutting data where expected
  - 28 States missing >5% percent cracking where expected



# QA/QC Initiative

- FHWA memo to field offices re: HPMS pavement data (8/9/2012)
  - MAP-21: Using HPMS data, report conditions, performance, & investment needs
  - Recent studies indicate significant variation, errors, & omissions
  - FHWA tasked to develop standards & guidance for National Highway Performance Program
  - Involves Division pavement staff to assist in HPMS QA/QC (see next slide)
- Soon-to-be-developed FHWA Pavement Monitoring Guide (PMG)
  - Phase 1 completed
  - Used in conjunction with *HPMS Field Manual*
  - Best practices, references to standards, etc.



# FHWA Roles & Responsibilities

- Headquarters
  - Provides technical assistance and training to DOTs for data collection/submission purposes
  - Reviews annual submittals for QA/QC purposes
  - Communicates priority data issues to be addressed to DOTs via Division Offices
- Division Offices
  - Conducts annual Program Reviews to identify micro-level deficiencies and develops Action Plans
- *Resource Centers - TBD*



# Uses

- *Highway Statistics* tables
- Support of FHWA Performance Management (recently per MAP-21)
- HERS pavement models
- Dashboards, analysis/visualization tools, reports, etc. ITIP (Integrated Transportation Information Platform) and HIPAT (Highway Infrastructure Performance Analysis Tool)





## Roadway Condition Dashboard

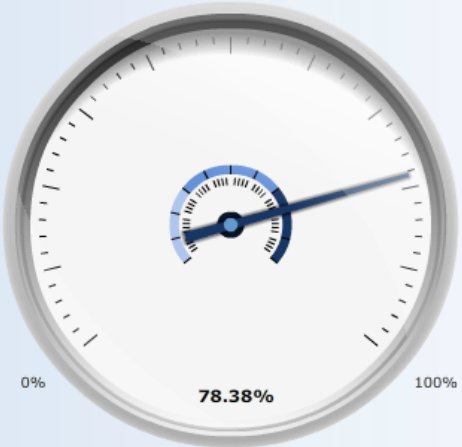
NOTE: This information is representative of roadways located on the National Highway System (NHS)

Select Year  
2012

Select State  
Missouri

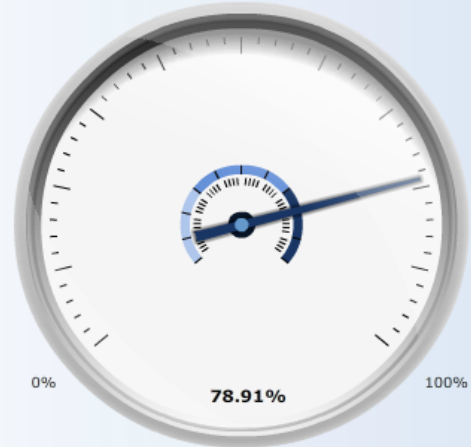
Pie Charts Gauges

System Extent /  
Surface Condition



% of Total Lane-Miles with Good  
Pavement (where IRI < 95)

Travel / Surface Condition



% of Total Travel (VMT) on Good  
Pavement (where IRI < 95)



Truck Travel /  
Surface Condition



% of Total Truck Travel (VMT) on  
Good Pavement (where IRI < 95)

Data Source: Highway Performance Monitoring System (HPMS), 2012



Active Item HPMS Active Query SELECT Rads.Map\_HPMS\_WKB.\* FROM Rads.Map\_HPMS\_WKB WHE AQC: 1270 AHC: 0

FSystems / States

Map View (right-click map surface for tools)

**Legend**

**Data Layers**

- HPMS
- Vertex
- NBI

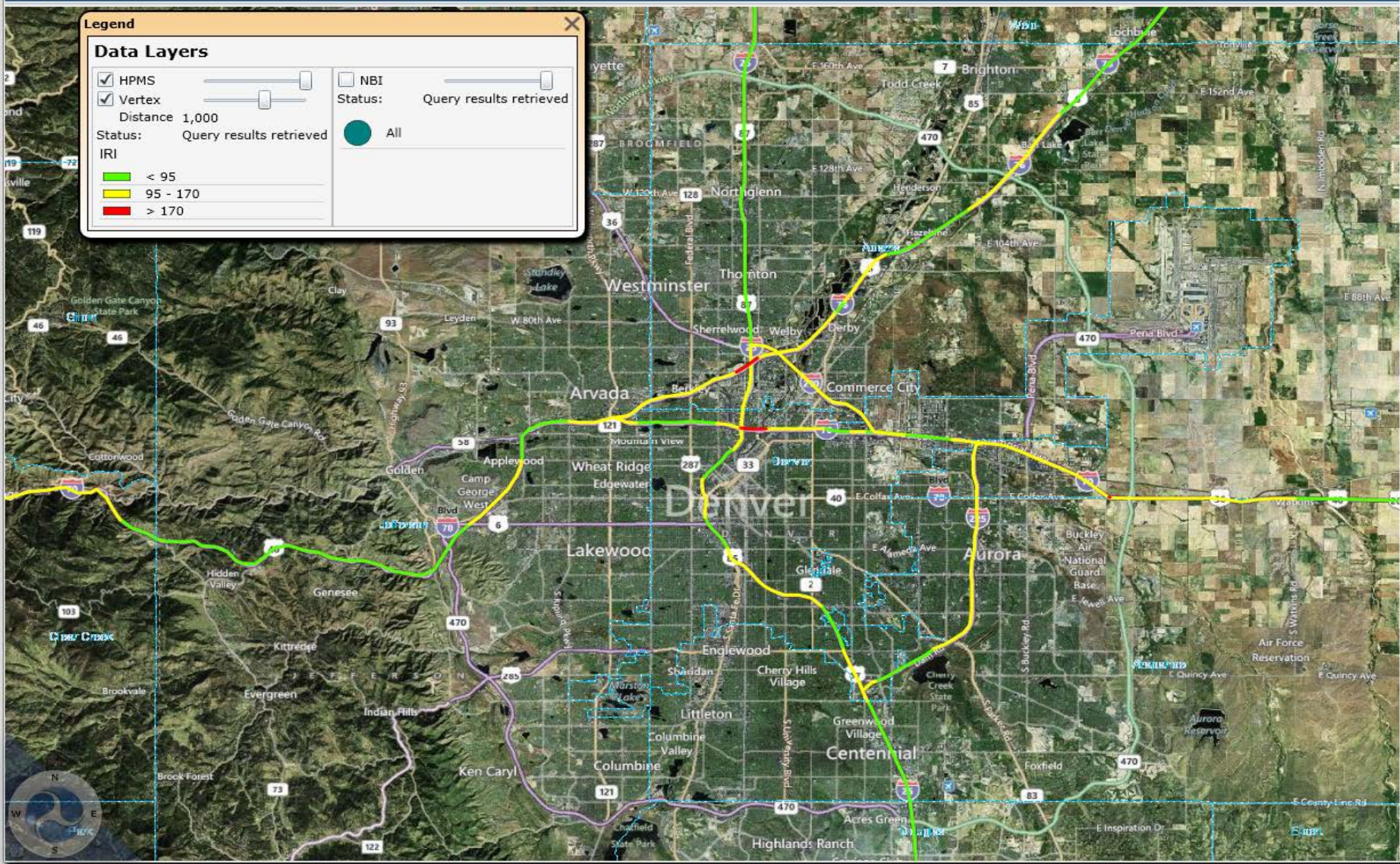
Distance 1,000

Status: Query results retrieved

IRI

- < 95
- 95 - 170
- > 170

Status: All





Active Item HPMS

Active Query

SELECT Rads.Map\_HPMS\_WKB.\* FROM Rads.Map\_HPMS\_WKB WHE AQC: 4237

AHC: 0

FSystems / States

Map View (right-click map surface for tools)

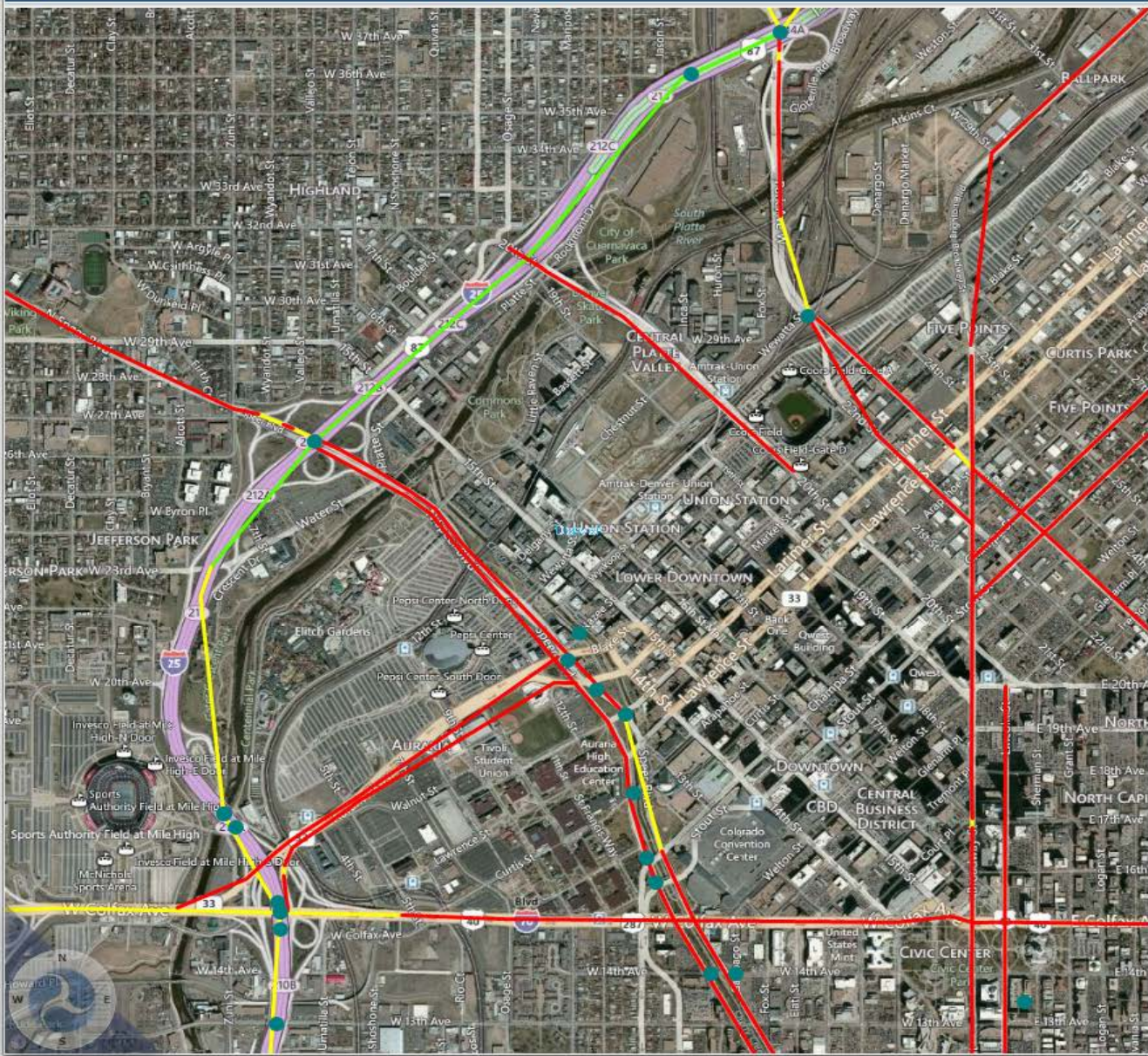
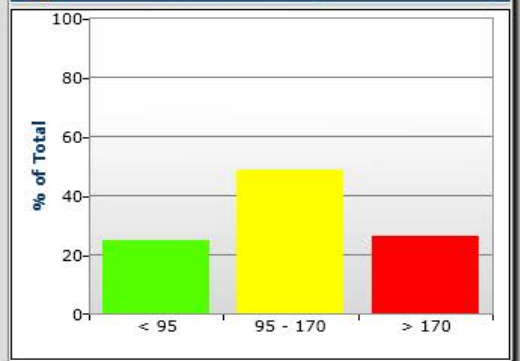


Chart Categorization: IRI



Data Table

OBJECTID	Year_Record	State_Co
121676	2010	8
121708	2010	8
121709	2010	8
121710	2010	8
121718	2010	8
121719	2010	8
121720	2010	8

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Statistics

Type	Field	Count	Min	Max	Avg	Std.Dev
	AADT	4237	20	249000	25944.8	30885.39
	VMT	4237	3.6	319788	18900.7	31155.45
	IRI	4237	0	880	144.49	76.13



Active Item **NBI** Active Query `SELECT Rads.Map_NBI_WKB.* FROM Rads.Map_NBI_WKB WHERE (` **AQC:** 2205  
**AHC:** 0

FSystems / States

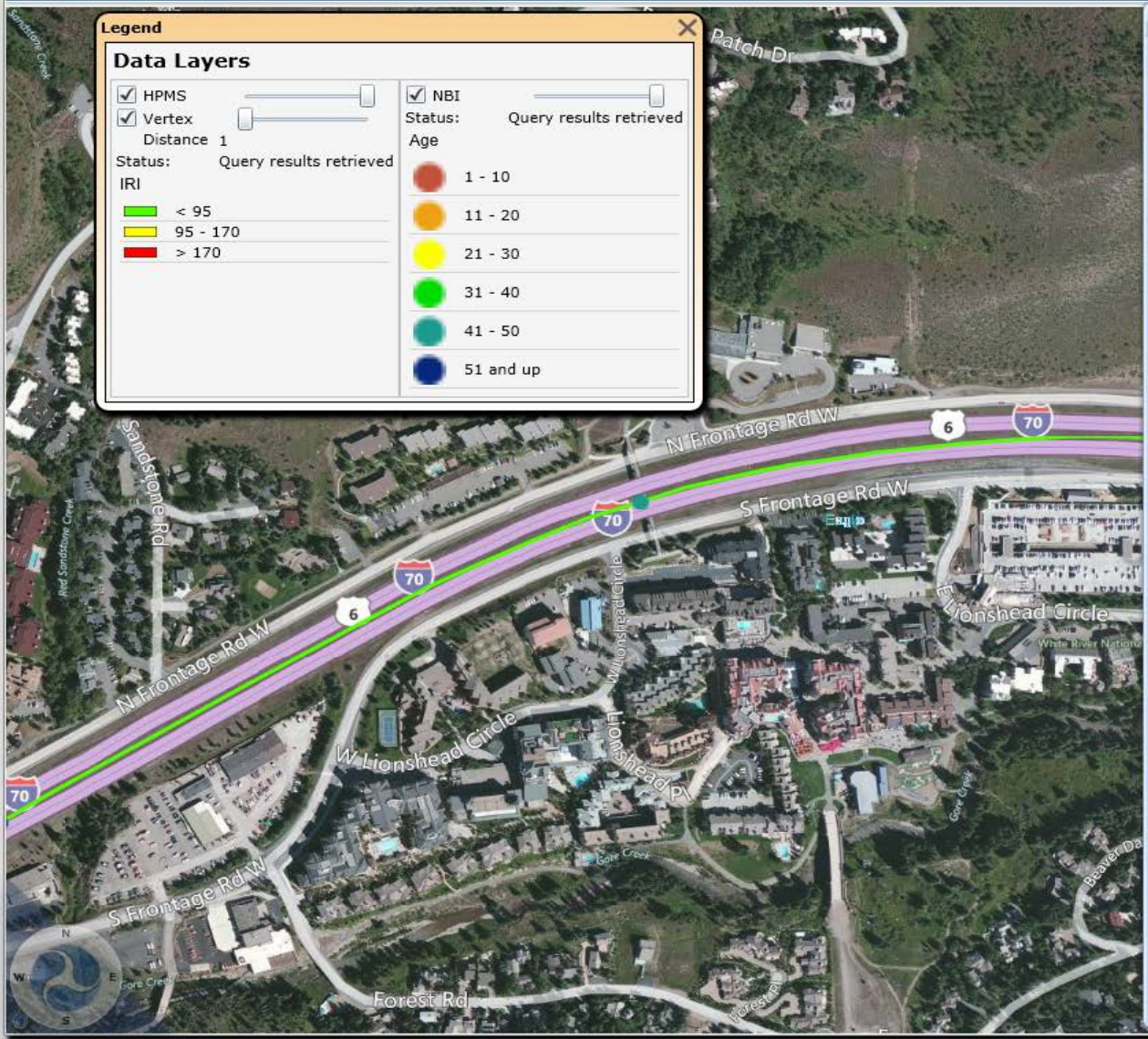
Map View (right-click map surface for tools) **P S G Z**

### Legend

**Data Layers**

- HPMS
- Vertex Distance 1
- Status: Query results retrieved
- IRI
- < 95
- 95 - 170
- > 170

- NBI
- Status: Query results retrieved
- Age
- 1 - 10
- 11 - 20
- 21 - 30
- 31 - 40
- 41 - 50
- 51 and up



### Identify Results

**Matching Items**

- NBI** (search completed)
  - STRUCTURE\_NUMBER\_008='F-11-N'
  - STRUCTURE\_NUMBER\_008='F-11-O'
- HPMS** (search completed)

**Details for** STRUCTURE\_NUMBER\_008='F-11-N'

OBJECTID	66469
DATA_YEAR	2010
STATE_CODE_001	8
State_Name	Colorado
County_FIPS	08037
STRUCTURE_NUMBER	F-11-N
RECORD_TYPE_005A	1
ROUTE_PREFIX_005B	1
SERVICE_LEVEL_005C	1
ROUTE_NUMBER_005D	70A
DIRECTION_005E	0
HIGHWAY_DISTRICT_CODE	32
COUNTY_CODE_003	037
PLACE_CODE_004	80040
FEATURES_DESC_006	VAIL ROAD
CRITICAL_FACILITY_007	
FACILITY_CARRIED_008	I 70 ML WBND
LOCATION	IN VAIL
MIN_VERT_CLR_010	99.99
MI_PT	175.994
BASE_HWY_NETWORK	1
LRS_INV_ROUTE_013A	000000070A
SUBROUTE_NO_013B	0



Active Item **HPMS** Active Query `SELECT Rads.Map_HPMS_WKB.* FROM Rads.Map_HPMS_WKB WHE` **AQC: 443**  
**AHC: 0**

Map View (right-click map surface for tools) **P S I C Z**

### Legend

#### Data Layers

- HPMS  NBI
- Vertex

Distance 1,000 Status: Query results retrieved

IRI

- < 95
- 95 - 170
- > 170

● All

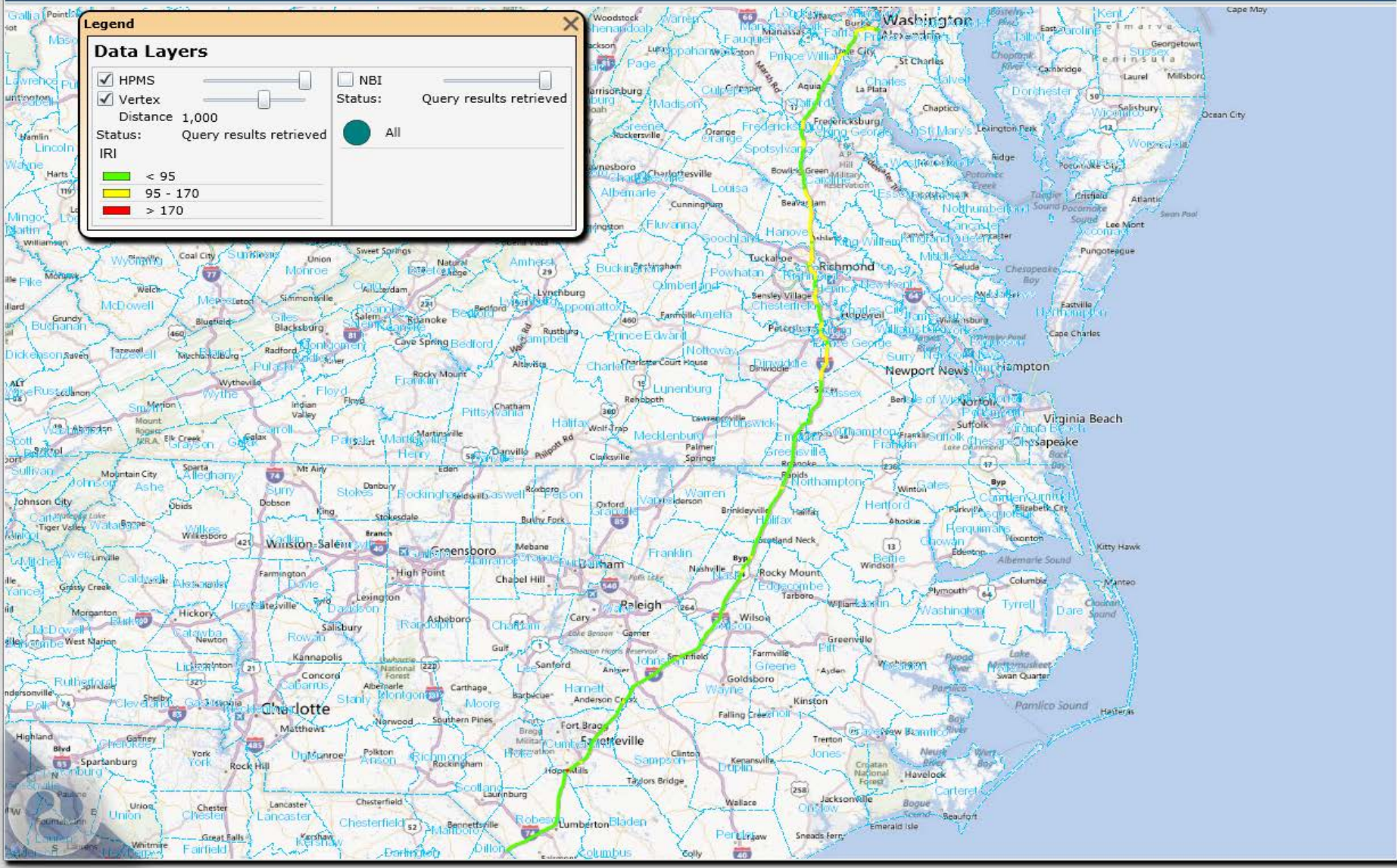


Chart Categorization: IRI Data Table Statistics

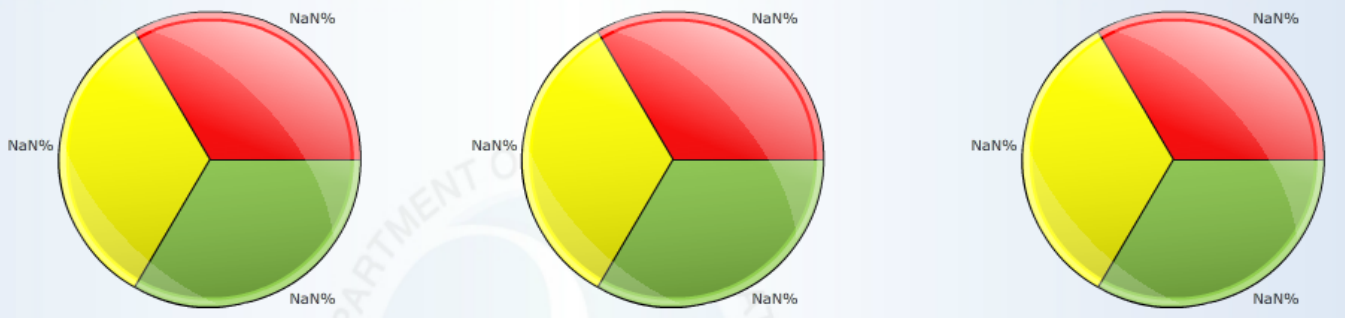
## Roadway Condition Dashboard

NOTE: This information is representative of roadways located on the National Highway System (NHS)

Select Year: 
 Select State: 
 Select Functional System:

IRI
  Rutting
  Faulting
  Truck Travel

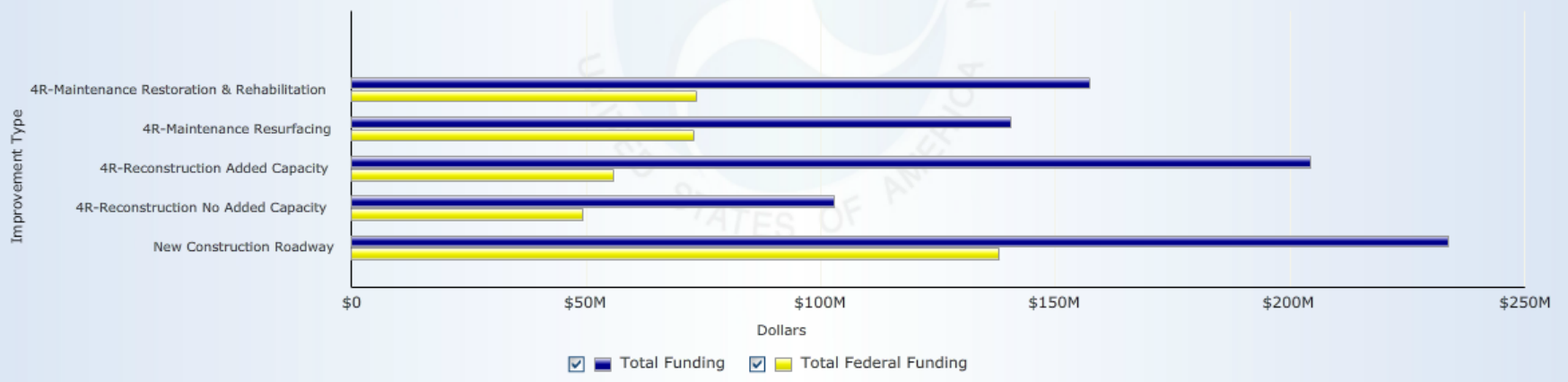
Legend
 Distribution of Total IRI By Mileage By Lane-miles By Daily Travel



**IRI (Units: inches/mile)**  
 < 95  
 95-169  
 > 169

Data Source: Highway Performance Monitoring System (HPMS), 2012

### Project Funding By Improvement Type



# Conclusion / Contact

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