An Overview of the Integrated Transportation Data Platform (ITDP)

FHWA Highway Information Seminar

Arlington, VA

November 19, 2013

Presentation Outline

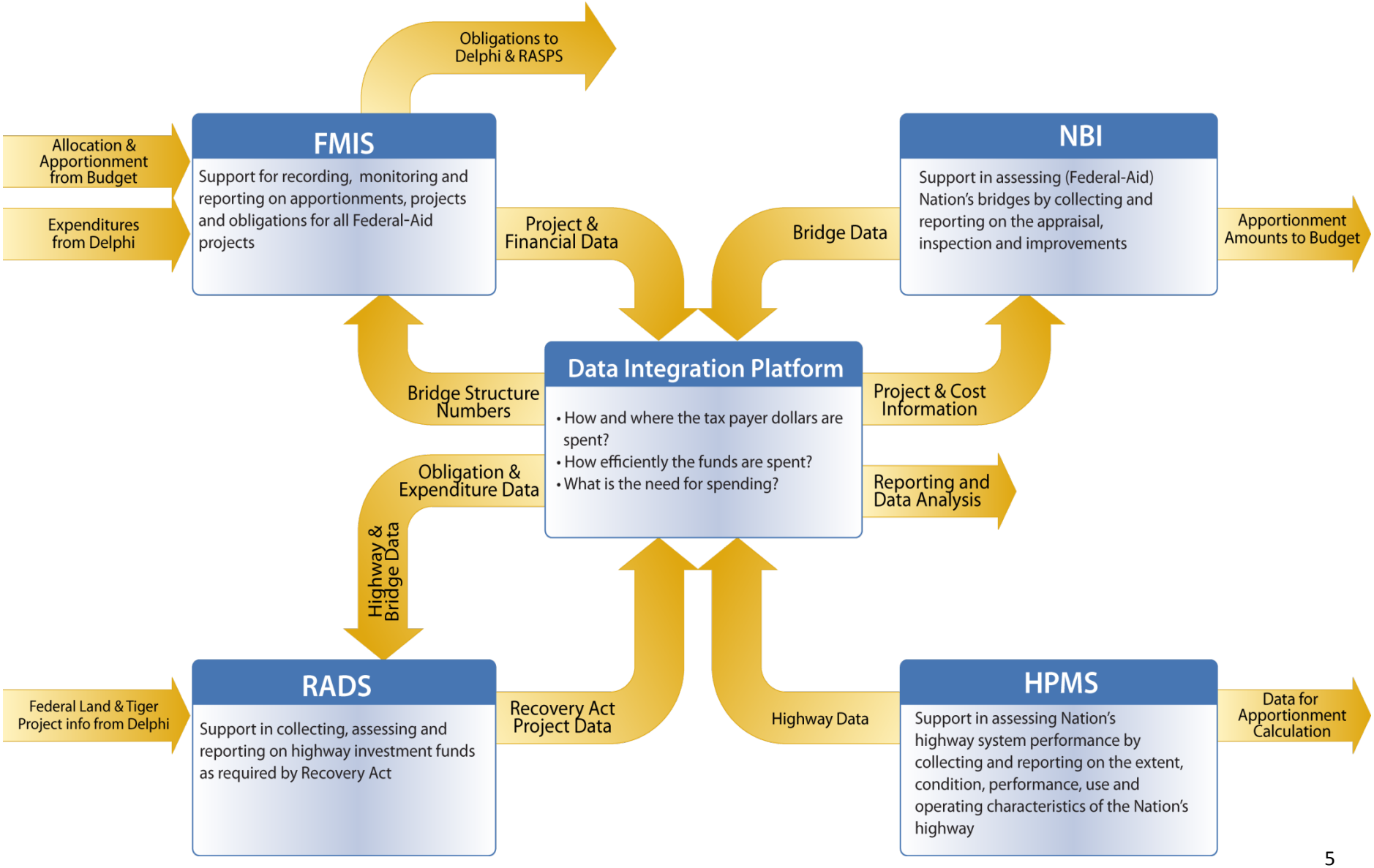
- ITDP Background
- ITDP Components Overview
- Implementation Considerations/Ideas
- Questions/Discussion

ITDP Background

Why Data Integration?

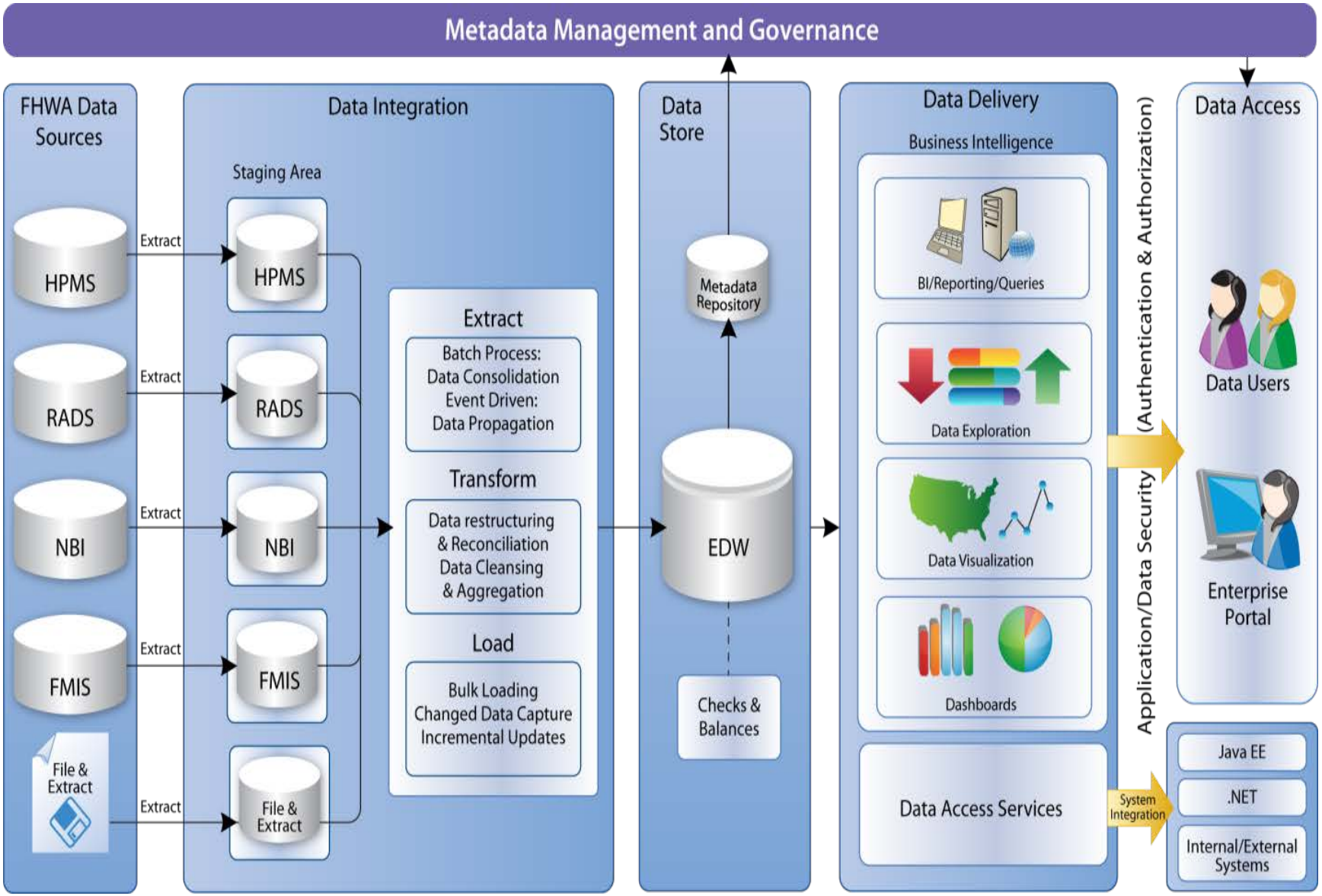
- FHWA manages a variety of mission-critical systems
- Systems currently operate independently of one another
- Performance management initiatives have created a demand for integrated data sources
- An enterprise data system will provide a comprehensive source of information for performance management purposes

Data Integration Concept



5

Data Integration Architecture (Basic)



ITDP Components Overview

ITDP Components

- Dashboards
  - National Infrastructure
  - Federal-aid Projects
  - Recovery Act Projects
  - Roadways
  - Bridges
- Analysis / Visualization Tools
  - Ad-hoc Query
  - HIPAT (Highway Infrastructure Performance Analysis Tool)

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INTEGRATED TRANSPORTATION DATA PLATFORM (ITDP) BACKGROUND

The Federal Highway Administration (FHWA) currently manages a variety of mission critical applications and database systems that are used to collect, analyze, and report various types of data that describe the condition and performance of the nation's transportation infrastructure. In the agency's Strategic Implementation Plan (SIP) for performance year (PY) 2012, National Performance Objective CC-4 was established with the specific goal of improving the methods for collecting, managing, reporting and ensuring the quality and integrity of agency data in support of decision making at all levels of FHWA.

The Integrated Transportation Data Platform (ITDP) was developed with the ultimate goal of providing a "one-stop shopping" resource for various infrastructure condition and performance, and Federal-aid project data elements which are maintained independently within some of the agency's major data systems. In addition, ITDP aims to minimize data redundancy across systems to the extent possible, by providing a mechanism for potential data exchange between data systems. Currently, the ITDP integrates and provides seamless access to a myriad of data elements which are maintained within the following systems: (1) Fiscal Management Information System (FMIS), Highway Performance Monitoring System (HPMS), (3) National Bridge Inventory (NBI) and (4) Recovery Act Database System (RADS). Business intelligence (BI) solutions, such as SAP Business Objects and ESRI ArcGIS, have been deployed within the scope of the platform which provides users with the ability to perform various data analysis, visualization, and reporting activities.

Continue

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U. S. Department of Transportation
Federal Highway Administration

Integrated Transportation Data Platform (ITDP)

Return To UPACS

National Infrastructure | Federal-aid Projects | Recovery Act Projects | Roadways | Bridges | HIPAT | Ad-hoc Query

- National Infrastructure Data
- Federal-aid Project Data
- Roadway Condition Data (IRI)
- Roadway Condition Data (Rutting, Faulting)
- Roadway Condition Data (Truck Travel)
- Bridge Condition Data
- Recovery Act Project Data
- Base (Source) Data

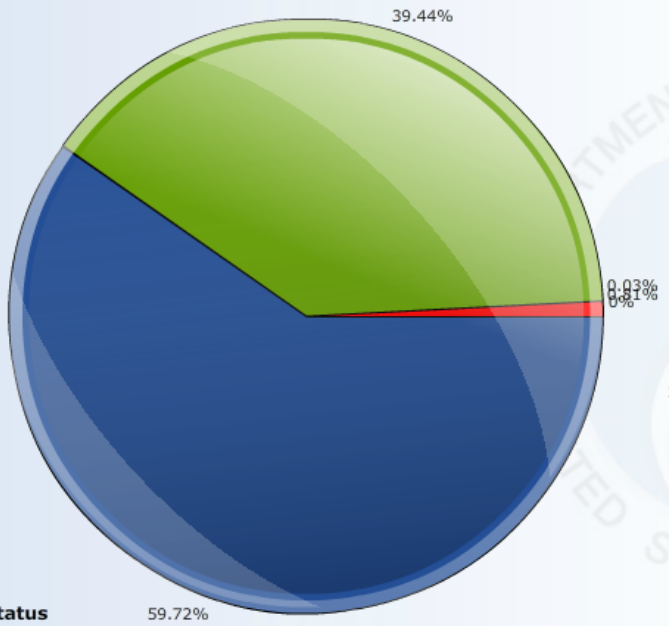
National Infrastructure Da

NOTE: This information is representative of roadways located on

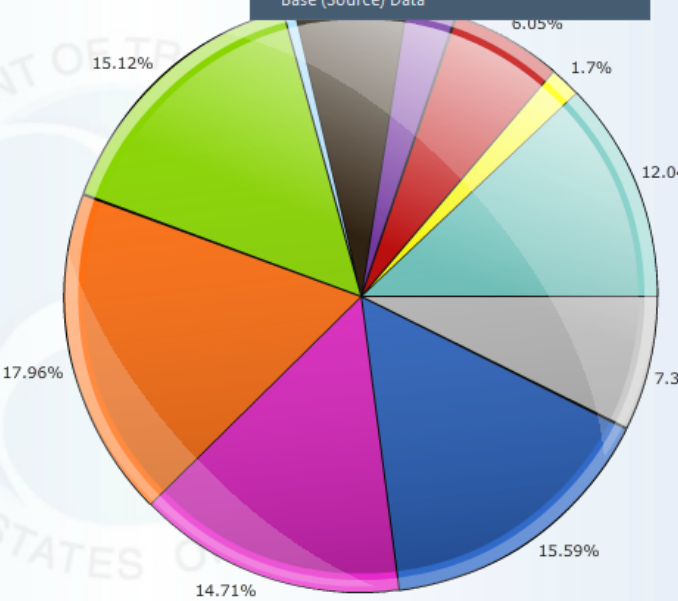
Project & Funding Summary | Project Status | Recovery Act Projects | Roadway Condition

Select Year: All Years

Project Status Summary
Improvement Type: All



Project



Improvement Type
- New Construction
- 4R-Reconstruction Added Capacity
- 4R-Reconstruction No Added Capacity
- 4R-Maintenance Resurfacing
- 4R-Maintenance Restoration & Rehabilitation
- 4R-Maintenance Relocation
- Bridge New Construction
- Bridge Replacement-

Legend
Project Status

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ITDP - Integrated Transportation Data... Page Safety Tools

National Infrastructure | Federal-aid Projects | Recovery Act Projects | Roadways | Bridges | HIPAT | Ad-hoc Query | User Guide

Roadway Condition Dashboard

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

Select Year: 2011

Select State: Maine

Pie Charts | Gauges

System Extent / Surface Condition

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

Truck Travel / Surface Condition

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

Travel / Surface Condition

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

Done | Trusted sites | Protected Mode: Off | 90%

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Federal Highway Administration

Integrated Transportation Data Platform (ITDP)

Return To UPACS

National Infrastructure | Federal-aid Projects | Recovery Act Projects | Roadways | Bridges | HIPAT | Ad-hoc Query

Bridge Condition Dashboard

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

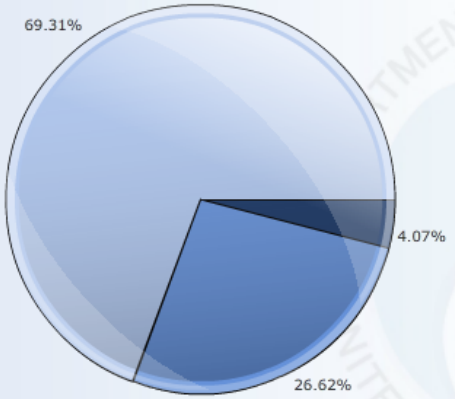
State | County

Select Year: 2011

Select State: Oregon

Pie Chart | Gauges

Distribution of Total Deck Area by Condition



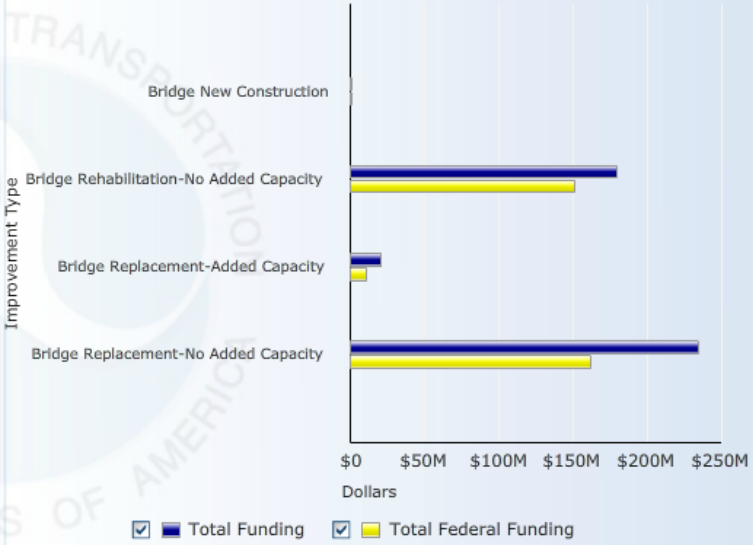
Legend

Condition

- Structurally Deficient (SD)
- Functionally Obsolete (FO)
- Not Deficient

Data Source: National Bridge Inventory (NBI), 2011

Project Funding By Improvement Type



Data Source: Fiscal Management Information System (FMIS), FY 2011

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Facets | Split | Visualize | Tutorials | Find | Records 11,743 / 100,000 (0.062s)

Measures (2/3 max)
- Structure Length (SUM)
- Deck Width (SUM)
- Average Daily Traffic (ADT) ...

Add Calculation...

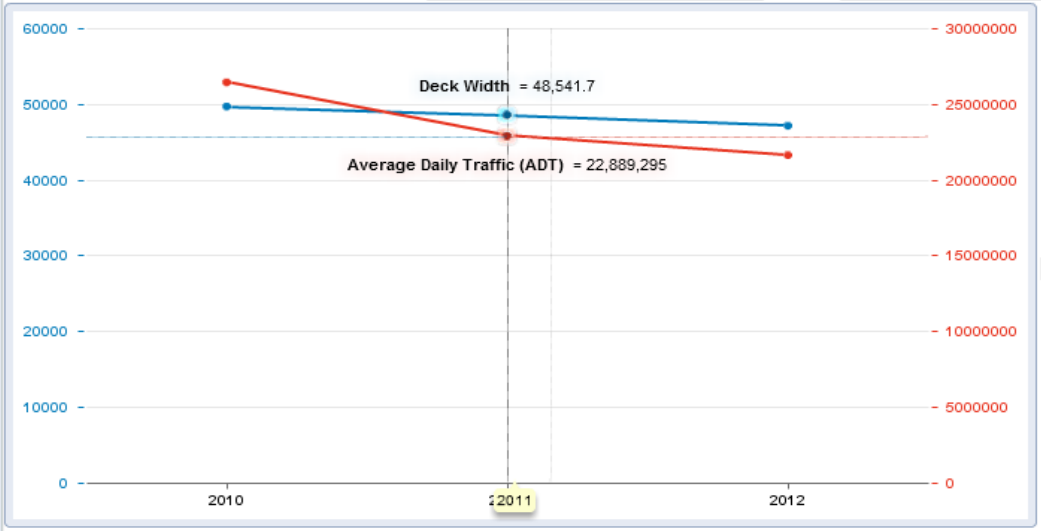
State		NHS		Record Year		Functional Class		Deck Rating		Functio
Alabama	2,356.3	0	118,740.5	2010	49,640.2	1	4,022	0	8,315.8	N
Alaska	297.8	1	26,563.5	2011	48,541.7	11	8,557.6	1	532.4	
Arizona	676.1			2012	47,122.1	12	3,718.6	2	1,680.2	
Arkansas	1,463.1					14	11,188.3	3	10,110.5	
California	11,942.1					16	9,894	4	44,768.6	
Colorado	1,638.4					17	5,574.9	5	31,938.1	
Connecticut	1,333					19	8,419.3	6	27,866.4	
Delaware	72.6					2	4,269.3	7	17,710.9	
District of Colu...	166.4					6	6,163.4	8	2,080.3	
Florida	829.7					7	19,076.5	9	300.8	
Georgia	1,712					8	9,826.8			
Hawaii	519.7					9	54,583.5			
Idaho	942.5						9.8			
Illinois	5,184									
Indiana	4,170.6									
Iowa	8,185.8									
Kansas	5,257.6									
Kentucky	2,548.6									
Louisiana	3,497.8									

Explore more...

Filters: Structurally Defici... Y

Displaying: Deck Width, Average Dail... | Record Year: First 12 | By: None

Comparison | Percentage | Correlation | Trend | Geography



Record Year	Deck Width	Average Daily Tr...
2010	49,640.2	26,422,370
2011	48,541.7	22,889,295
2012	47,122.1	21,623,892
Total (3)	145,304	70,935,557

Done | Trusted sites | Protected Mode: Off | 98%

Highway Infrastructure Performance Analysis Tool (HIPAT) Overview

U.S. Department of Transportation
Federal Highway Administration

HIPAT Background

- Used to assess the overall condition and performance of the Federal-aid system
- Web-based application capable of analyzing/reporting integrated spatial data sources
  - HPMS
  - NBI
- Tool can be enhanced to incorporate other types of data (e.g. financial, safety, etc.)

HIPAT Background (cont'd)

- Tool will be used for <u>informational purposes only</u>
- Tool <u>does not</u> introduce new performance metrics
- Current focus is roads and bridges

ITDP - Integrated Transportation Data Platform - Windows Internet Explorer

https://fhwaapps.fhwa.dot.gov/dipp/Maps/default.aspx

U.S. Department of Transportation
Federal Highway Administration

Integrated Transportation Data Platform (ITDP)

Projects | Infrastructure | Health Report

Active Query SELECT Map_Project_WKB * FROM Map_Project_WKB WHERE (Map_ AQC: 0 AHC: 0

Select States

Map View (right-click map surface for tools)

Chart Categorization:

Getting Started

Welcome to the RADS Map Viewer. To get started, select a state from the list below or use the location associated with your UPACS account.

Go to UPACS location: Or, Select state:

Begin

USA
Alabama
Alaska
Arizona
Arkansas
California
Colorado
Connecticut
Delaware
District of Columbia
Florida
Georgia
Hawaii
Idaho
Illinois
Indiana
Iowa
Kansas

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1200 New Jersey Avenue, S.E. - Washington, DC 20590

Done | Trusted sites | Protected Mode: Off | 100%

Projects | Infrastructure | Health Report

Active Item NBI

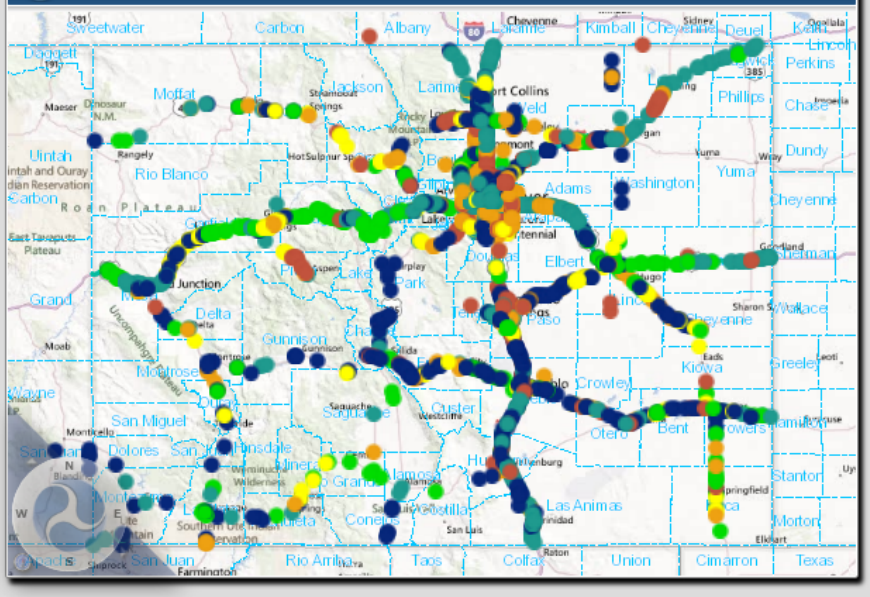
Active Query SELECT Map_NBI_WKB.* FROM Map_NBI_WKB WHERE (Map_NBI_V

AQC: 2238

AHC: 0

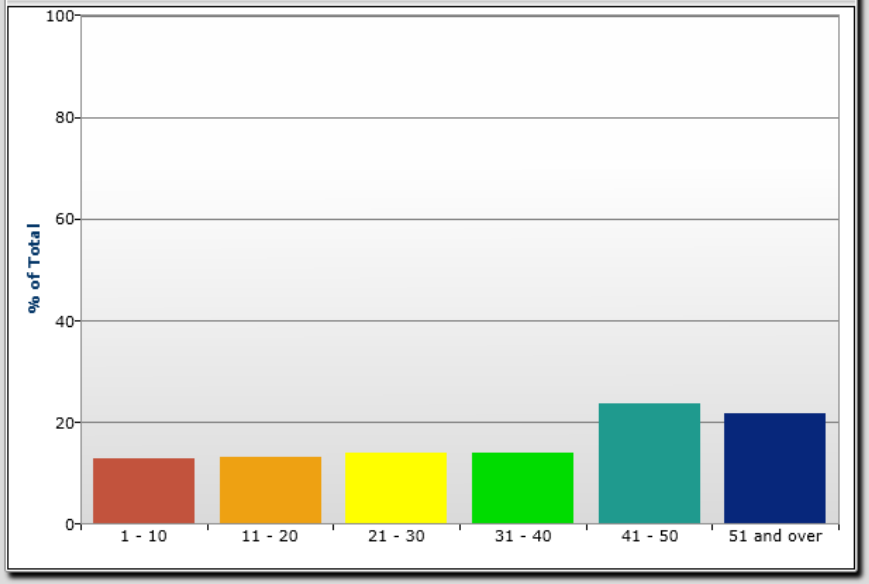
FSystems / States

Map View (right-click map surface for tools)



Chart

Categorization: Age



Data Table

	OBJECTID	DATA_YEAR	STATE_CODE_001	State_Name	County_F
	107699	2010	8	Colorado	08041
	107475	2010	8	Colorado	08041
	106698	2010	8	Colorado	08031
	106700	2010	8	Colorado	08031
	106701	2010	8	Colorado	08031
	107703	2010	8	Colorado	08041
	107713	2010	8	Colorado	08049
	107714	2010	8	Colorado	08049
	107715	2010	8	Colorado	08049
	106702	2010	8	Colorado	08031
	106703	2010	8	Colorado	08031
	106704	2010	8	Colorado	08031
	106705	2010	8	Colorado	08031

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Statistics

Type	Field	Count	Min	Max	Avg	Std.Dev	Median	Mode
	AGE_YRS	2238	0	100	35.89	20.2	38	41
	ADT_029	2238	8	249000	22391.96	30658.26	11018	2400
	DECK_COND_058	1777	3	9	6.66	1.08	7	0
	SUPERSTRUCTURE_COND_059	1777	3	9	6.95	1.08	7	0
	SUBSTRUCTURE_COND_060	1777	3	9	6.9	0.99	7	0
	SUFF_RAT	2238	6	100	84.96	14.56	90.2	0

Projects | Infrastructure

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)

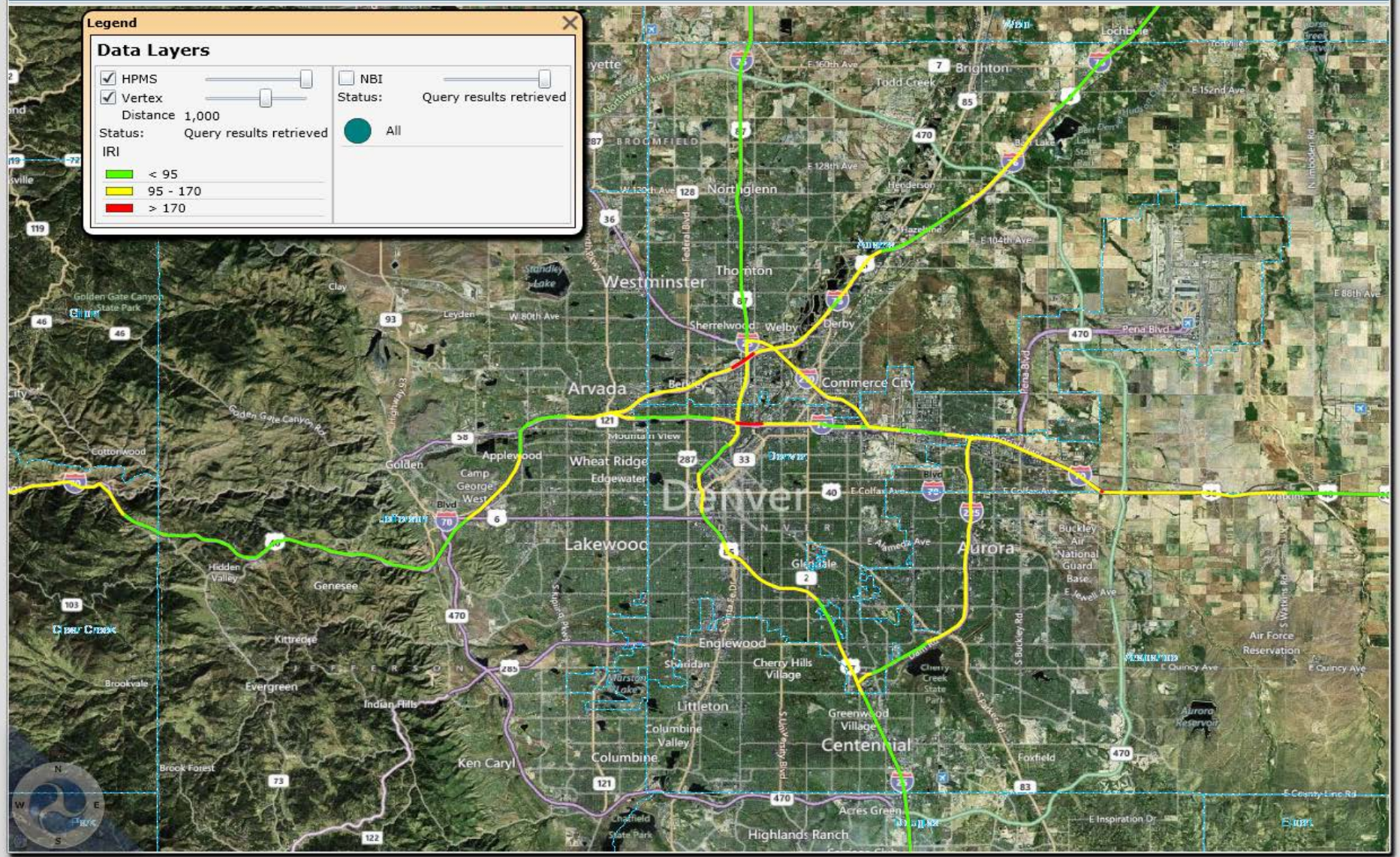


Chart | Categorization: IRI

Data Table

Statistics

Projects | Infrastructure

Active Item NBI

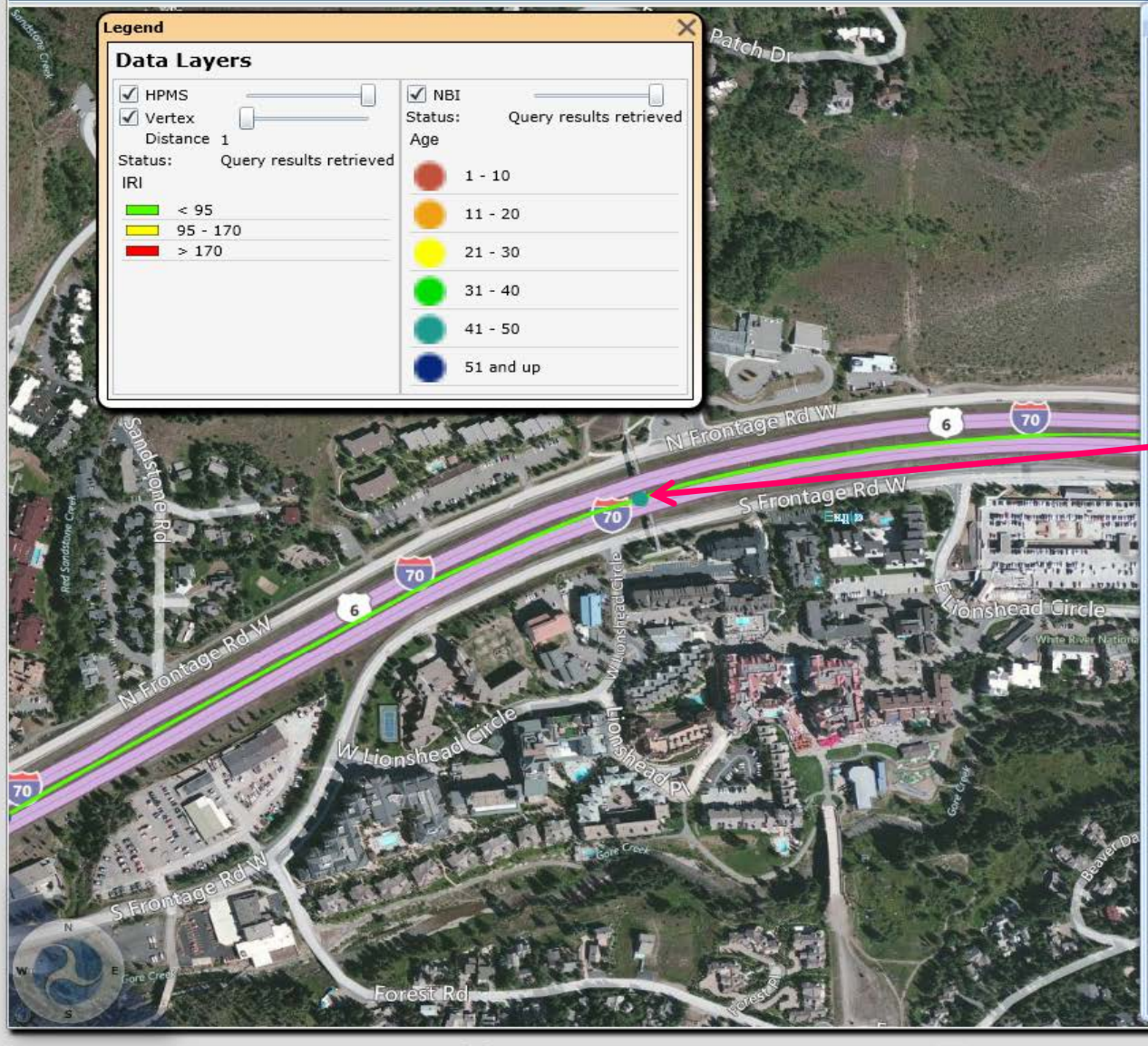
Active Query SELECT Rads.Map_NBI_WKB.* FROM Rads.Map_NBI_WKB WHERE (

AQC: 2205

AHC: 0

FSystems / States

Map View (right-click map surface for tools)



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_NUMBEF	F-11-N
RECORD_TYPE_005A	1
ROUTE_PREFIX_005B	1
SERVICE_LEVEL_005C	1
ROUTE_NUMBER_005	70A
DIRECTION_005E	0
HIGHWAY_DISTRICT_0	32
COUNTY_CODE_003	037
PLACE_CODE_004	80040
FEATURES_DESC_006	VAIL ROAD
CRITICAL_FACILITY_0	
FACILITY_CARRIED_0	I 70 ML WBND
LOCATION	IN VAIL
MIN_VERT_CLR_010	99.99
MI_PT	175.994
BASE_HWY_NETWORI	1
LRS_INV_ROUTE_013A	000000070A
SUBROUTE_NO_013B	0

Chart | Categorization: Age | Data Table | Statistics

Data Mining

Projects | Infrastructure

Active Item NBI

Active Query SELECT Rads.Map_NBI_WKB.* FROM Rads.Map_NBI_WKB WHERE (

AQC: 135

AHC: 100

FSystems / States

Map View (right-click map surface for tools)

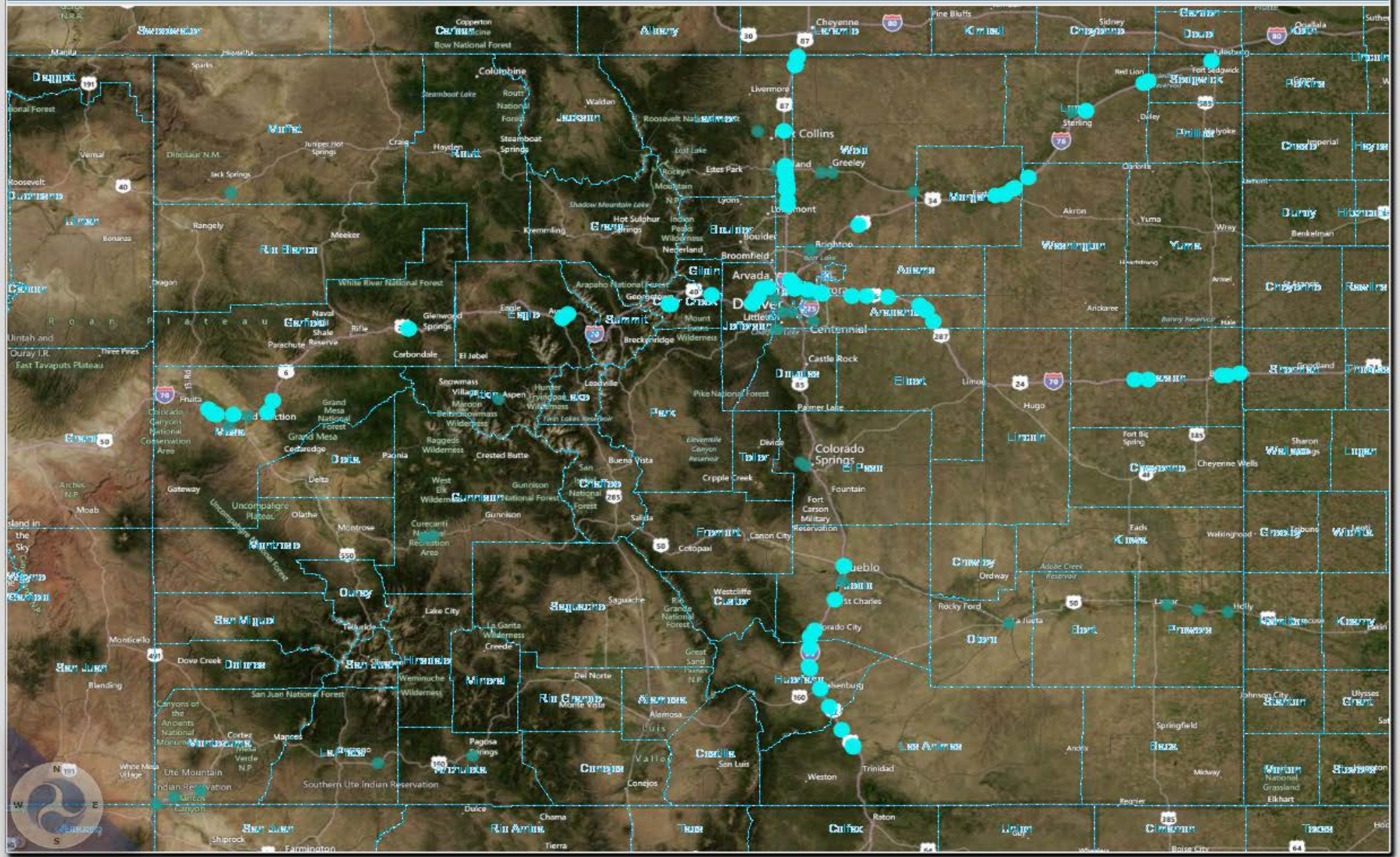


Chart | Categorization: Age

Data Table

Statistics

Projects | Infrastructure

Active Item HPMS

Active Query SELECT Rads.Map_HPMS_WKB.* FROM Rads.Map_HPMS_WKB WHE

AQC: 443

AHC: 0

FSystems / States

Map View (right-click map surface for tools)

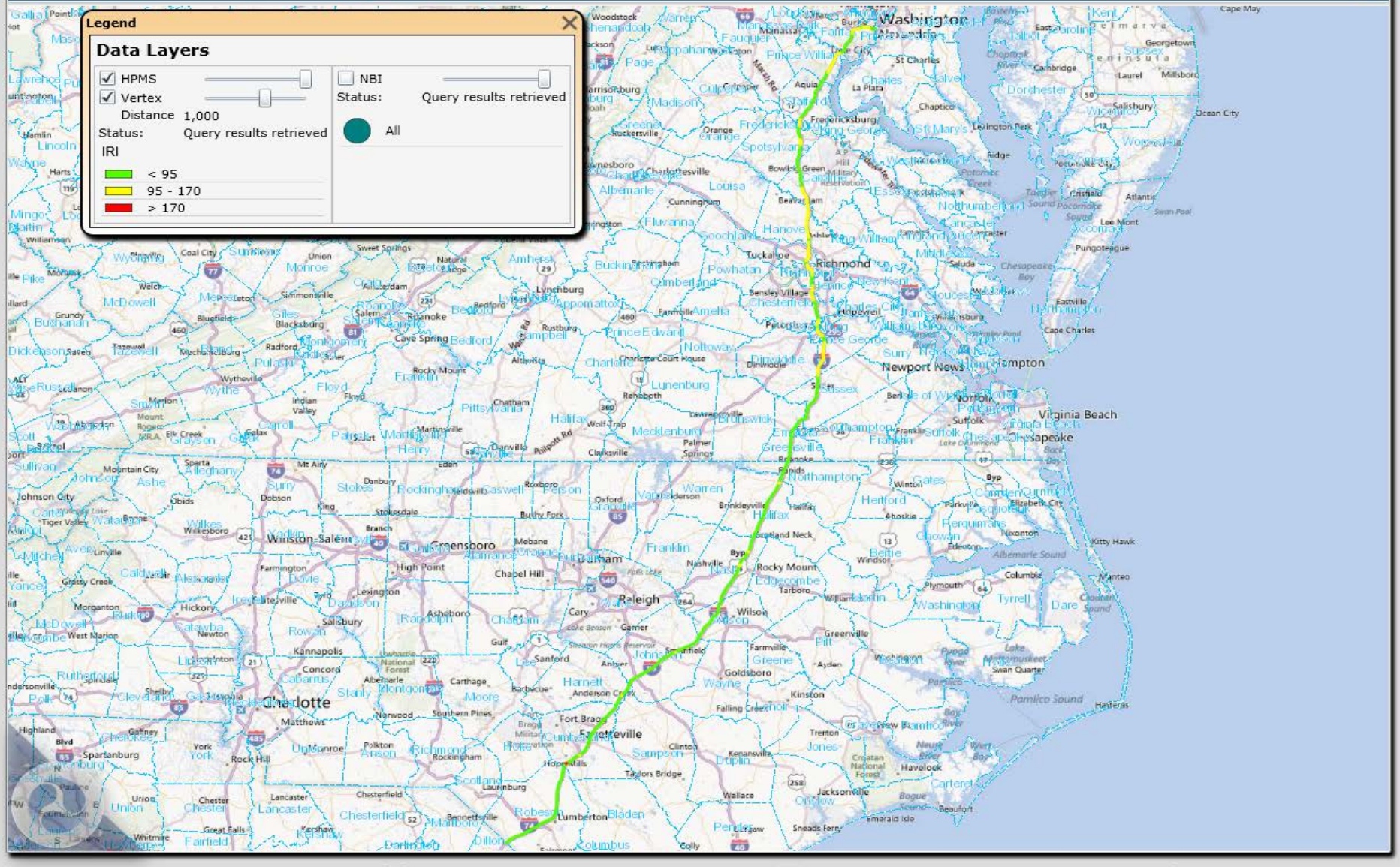


Chart | Categorization: IRI

Data Table

Statistics

Infrastructure Health Report (Currently in Development)

Projects | Infrastructure | HealthReport

Active Query SELECT Rads.Map_HPMS_WKB.* FROM Rads.Map_HPMS_WKB WHE

AQC: 1229
AHC: 0

FSystems / States

Dashboard | Pavement | Summary | Bridge

Map View (right-click map surface for tools)

Infrastructure Health

INFRASTRUCTURE HEALTH

Overall Corridor Health

Overall G/F/P: 70/27/4

PAVEMENT CONDITION

% of Pavement G/F/P

Pavement Red Flags

Vs. System

Outliers

BRIDGE CONDITION

% of Bridges G/F/P

Bridges Age

Bridge Red Flags

Vs. System

Outliers

Corridor Composition

	Lane-Miles		#
	Urban	Rural	Bridges
Interstate	4428.90	3440.65	1795.00
Free/ Expressways	0.00	0.00	958.00
Principal Arterials	0.00	0.00	1266.00

Length (mi.): 1496

Daily VMT: 95426118

Climate Zone: Wet-Freeze

AADT Range: 7700 - 304000

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https://fhwaapps.fhwa.dot.gov/dipp/Maps/default.aspx

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Federal Highway Administration

Integrated Transportation Data Platform (ITDP)

Projects | Infrastructure | Health Report

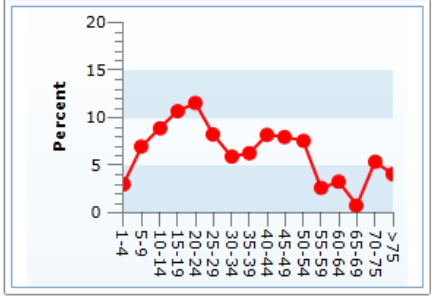
Active Query SELECT Map_HPMS_WKB.* FROM Map_HPMS_WKB WHERE ((Map_

AQC: 498
AHC: 0

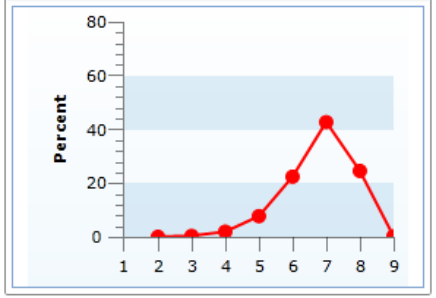
FSystems / States

Dashboard | Pavement | Summary | Bridge

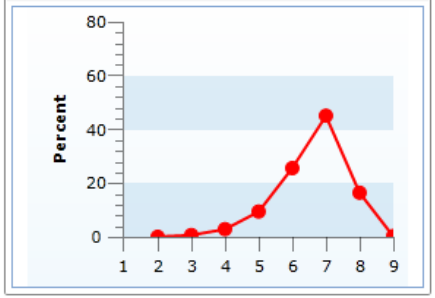
Bridge Age



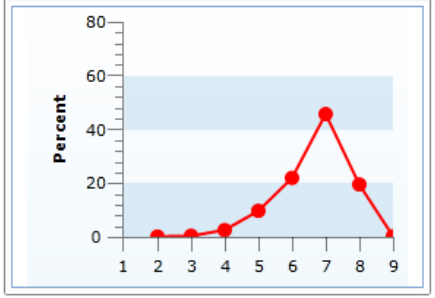
Superstructure Condition Rating



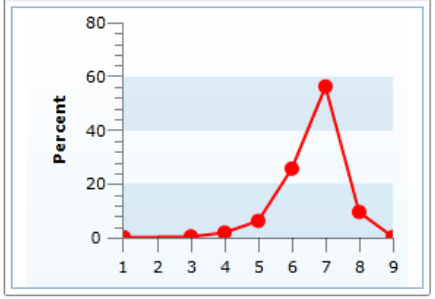
Deck Condition Rating



Substucture Condition Rating



Culvert Condition Rating



Red Flags

Bridge condition is not significantly worse than comparable national average.

There are no extreme outliers for bridge condition in the corridor.

Ten Lowest Average Condition Rating Val

State_Name	STRUCTURE_NUMBE
Colorado	A-26-F
Colorado	BA46-46-28.8-57
Colorado	DOU039-00.63
Colorado	057012E01.3011A
Colorado	LA36-39-18-140
Colorado	LA79-40-35-112

Done | Trusted sites | Protected Mode: Off | 100%

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Federal Highway Administration

Integrated Transportation Data Platform (ITDP)

Projects | Infrastructure | Health Report

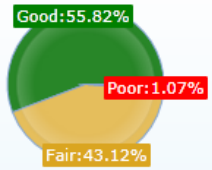
Active Query SELECT Map_HPMS_WKB.* FROM Map_HPMS_WKB WHERE ((Map_

AQC: 498
AHC: 0

FSystems / States

Dashboard | Pavement | Summary | Bridge

G/F/P Pavement Condition

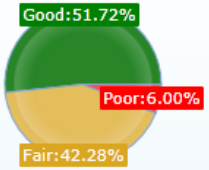


By Lane-Miles
By VMT

Summary Statisitcs

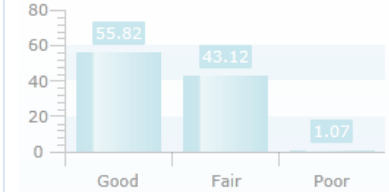
PAVEMENT	CORRIDOR	BRIDGES
Lane-miles:	Length (mi.):	Bridges:
4119.46	952.71	8522
Avg. IRI:	Climate Zone:	Deck Area (sq.m.):
101.4	Wet-Freeze	4664249
	Daily VMT:	# of SD:
	31885353	578
	AADT Range:	# Load Posted:
	6200 - 249000	

G/F/P Bridge Condition



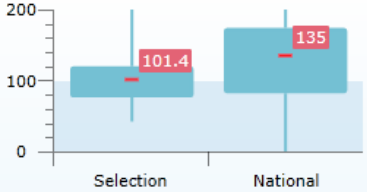
By # of Bridges
By Deck Area

G/F/P Pavement Condition History

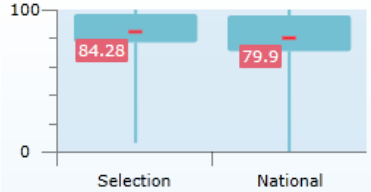


By Lane-Miles
By VMT

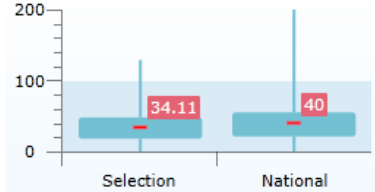
Pavement vs National (Average IRI)



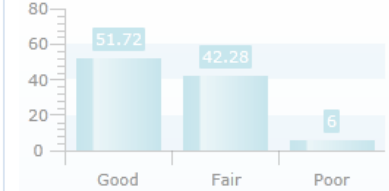
Bridge vs National (Average Sufficiency R



Bridge vs National (Average Age)



G/F/P Bridge Condition History



By # of Bridges
By Deck Area

Done | Trusted sites | Protected Mode: Off | 100%

Quality Assurance/Quality Control

Projects | Infrastructure

Active Item NBI **Active Query** **AQC:** 2408 **AHC:** 0

Select States

Map View (right-click map surface for tools)

Chart | Categorization: Deck Rating | Data Table | Statistics

Implementation Ideas/Considerations

Division Offices Consulted

- California
- Montana
- Rhode Island
- Utah
- Washington

Potential Uses

- From an *Oversight* perspective, HIPAT could be used as a tool to help:
  - Visualize and identify Federal-aid eligible roads and bridges
  - Improve/address data quality issues
  - Determine planning/design alternatives for projects managed by Federal Lands

Potential Uses (cont'd)

- From an *Stewardship* perspective, HIPAT could be used as a tool to help:
  - Conduct safety data analysis in support of HSIP and SHSP initiatives
  - Evaluate the impacts of infrastructure investments over time
  - Support multi-State corridor-level planning studies

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