

# **RADS Viewer / HIPAT (Highway Infrastructure Performance Analysis Tool)**

Highway Information Seminar

National Highway Institute (NHI)

Arlington, VA

November 15, 2011

# HIPAT Background

- Coordinated effort between the offices of Infrastructure and Policy
- Goal: To develop a tool that can be used to assess the overall condition and performance of the Federal-aid system
- Tool will be used for informational purposes only



# HIPAT Background (cont'd)

- Tool does not introduce new health indices
- Primary focus is roads and bridges
- A more enhanced tool will incorporate other types of data (e.g. financial, safety, etc.)



# HIPAT Overview

- Resides within the Recovery Act Data System (RADS), as the "RADS Viewer"
  - Projects
  - Bridges (i.e. HIPAT)
- Web-based application capable of analyzing/reporting integrated data sources
  - HPMS
  - NBI



# Main Screen View

RADS - Recovery Act Database System - Windows Internet Explorer

https://fhwatap01.fhwa.dot.gov/rads/Maps/default.aspx

File Edit View Favorites Tools Help

Convert Select

RADS - Recovery Act Database System

U.S. Department of Transportation  
Federal Highway Administration

RADS - Recovery Act Data System v3.1 - Development

USDOT  
TIGER

HOME MAP VIEWER DATA VIEWER NATIONAL REVIEW OMB SUBMITTAL REPORTS CONTACT EXIT

Projects Bridges

Map View (right-click map surface for tools) t Type

Chart Active Item: Improvement Type

Zoom to state  
District of Columbia

Zoom to county

Map View Layers

Projects

Improvement Type

Obligation Amount

Roadways

IRI

AADT

**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

Pavement Improvement Bridge Improv  
Safety/Traffic Management Transp  
Improvement

U.S. Department of Transportation - Federal Highway Administration  
1200 New Jersey Avenue, S.E. - Washington, DC 20590

Trusted sites 100%

# Projects View

RADS - Recovery Act Database System - Windows Internet Explorer

https://fhwatap01.fhwa.dot.gov/rads/Maps/default.aspx

U.S. Department of Transportation  
Federal Highway Administration

RADS - Recovery Act Data System v3.1 - Development

USDOT  
**TIGER**

HOME MAP VIEWER DATA VIEWER NATIONAL REVIEW OMB SUBMITTAL REPORTS CONTACT EXIT

Projects Bridges

Map View (right-click map surface for tools) | Type

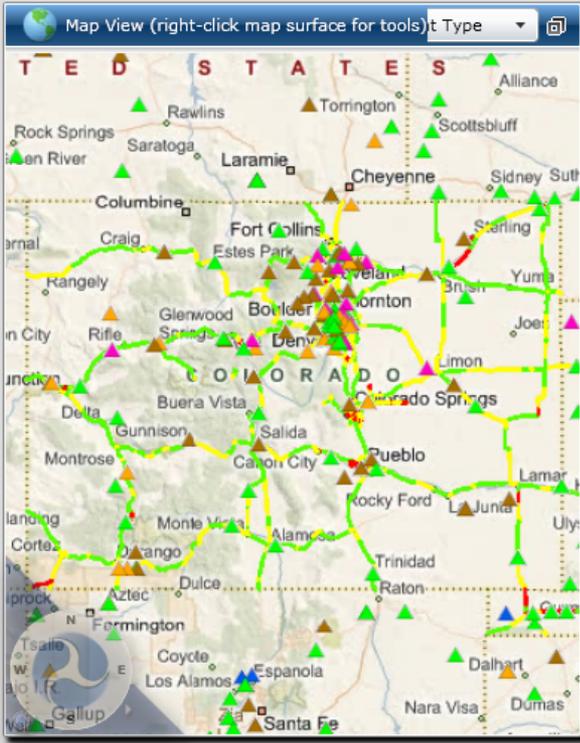
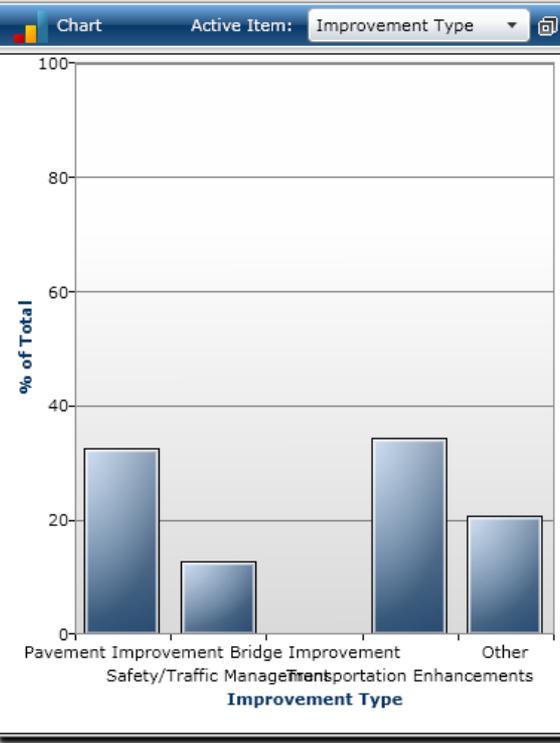


Chart | Active Item: Improvement Type



Improvement Type	% of Total
Pavement Improvement	35
Bridge Improvement	15
Safety/Traffic Management	35
Transportation Enhancements	15
Other	20

Zoom to state: Colorado

Zoom to county:

**Map View Layers**

**Projects**

- Improvement Type
- Obligation Amount

**Roadways**

- IRI
- AADT

U.S. Department of Transportation - Federal Highway Administration  
1200 New Jersey Avenue, S.E. - Washington, DC 20590

Trusted sites 100%

# HIPAT Overview (cont'd)

- Major Components:

- Map Viewer
- Data Table
- Statistics Table
- Chart

- Tools:

- Feature Identify
- Queries/Filters
- Spatial Select



# Data Sources

- HPMS

- Roadway condition & performance data
- Segment-based spatial data and attributes
- '09 data for 15 States

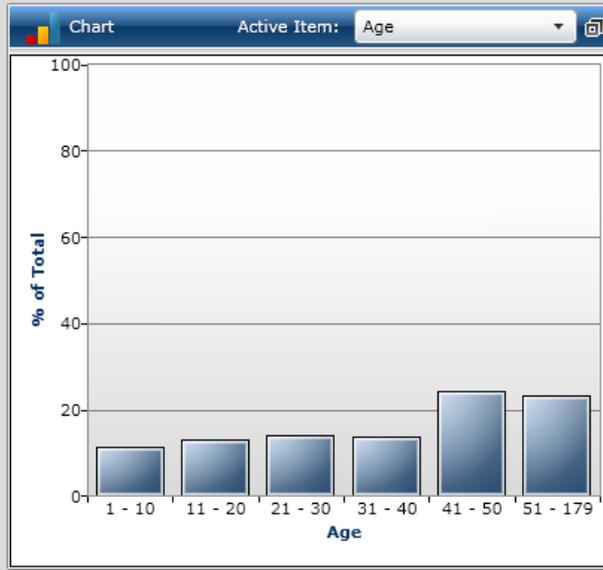
- NBI

- Bridge condition data
- Point-based spatial data and attributes
- '09 data for all States



# HIPAT View

Projects Bridges



Data Table Active Item: Bridge

Structure Number	Posted	Route Number	Scour
A-15-A	A	287	3
A-15-R	A	287	5
A-15-U	A	287	8
A-15-Z	A	287	3
A-16-A	A	287	8
A-16-C	A	287	5
A-17-AA	A	25	N
A-17-AB	A	25	N
A-17-AC	A	25	8
A-17-AD	A	25	3
A-17-AE	A	25	N

Page 1 of 110

Statistics

Type	Attribute	Mean	Minimum	Maximum
Roadway	Year Record	2009	2009	2009
Roadway	State Code	8	8	8
Roadway	Route ID	N/A	001 11200	86310 M
Roadway	Beginning Milepoint	44.311204	0.000	491.964
Roadway	Ending Milepoint	45.709481	0.010	497.223
Roadway	Functional System	3	1	5
Roadway	Urban Code	60719.521555	9298	99999
Roadway	Facility Type	1	1	4
Roadway	Through Lanes	2	1	12
Roadway	AADT	12158.726193	10	253000
Roadway	Route Number	39.046298	0	550
Roadway	IRI	91.601482	0	878

Zoom to state  
Colorado

Zoom to county

**Map View Layers**

**Bridge Structures**

- Age
- Deck Condition
- Substructure
- Superstructure
- Sufficiency

**Roadways**

- IRI
- AADT

**Data Table Fields**

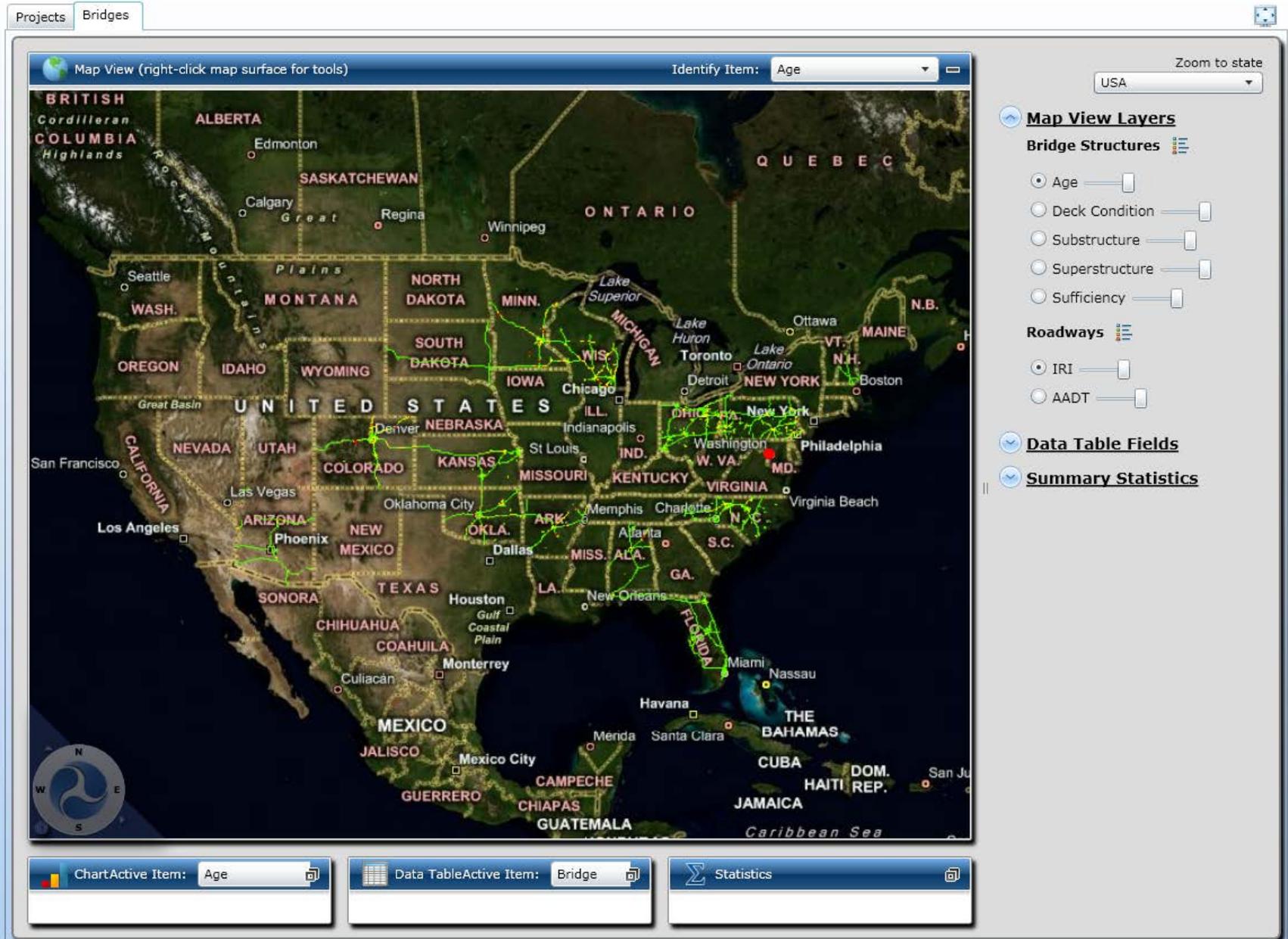
**Summary Statistics**

# Map Viewer Extents

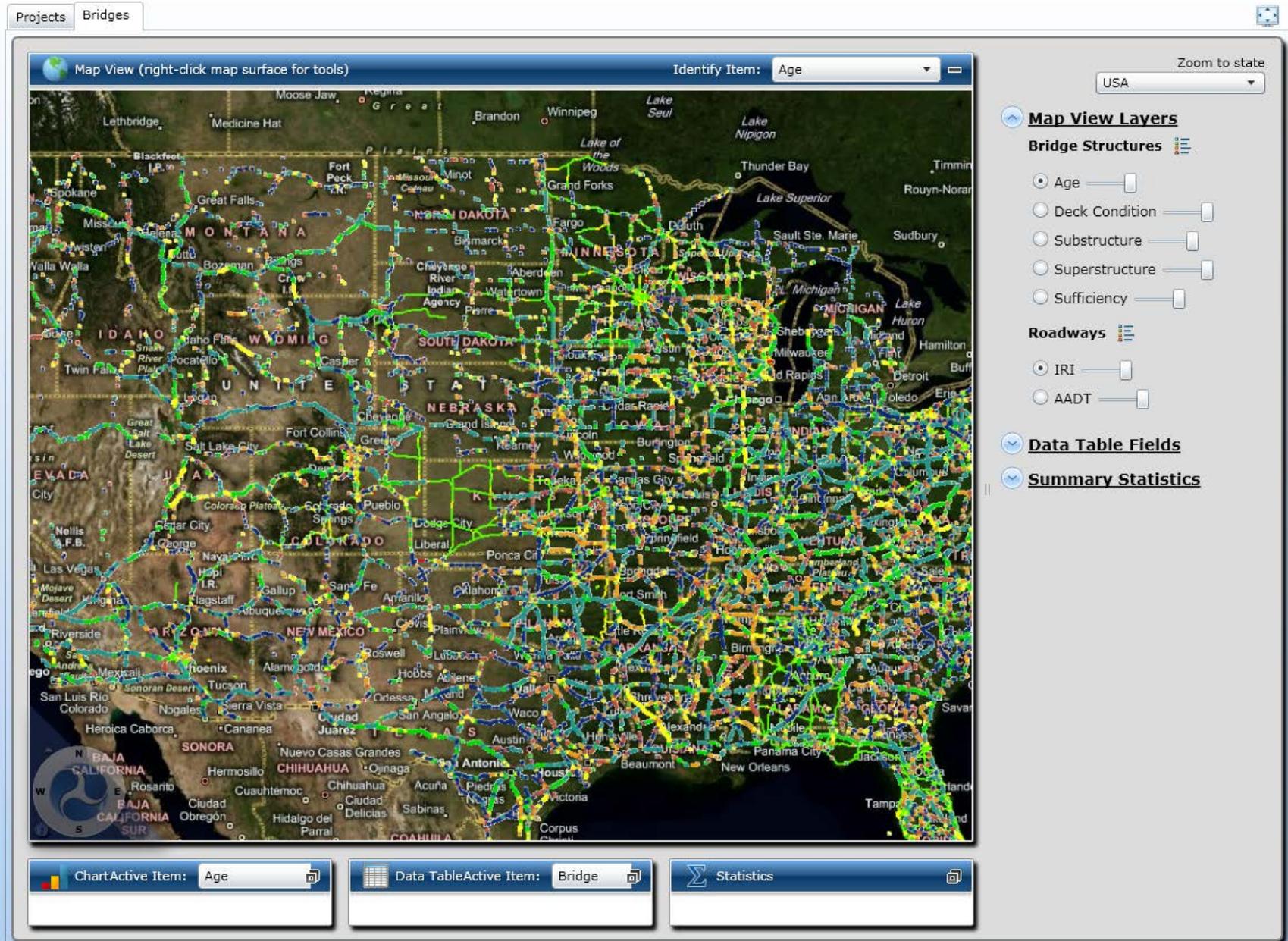
- National-level
- State-level
- County-level
- Corridor-level



# HIPAT View – National View

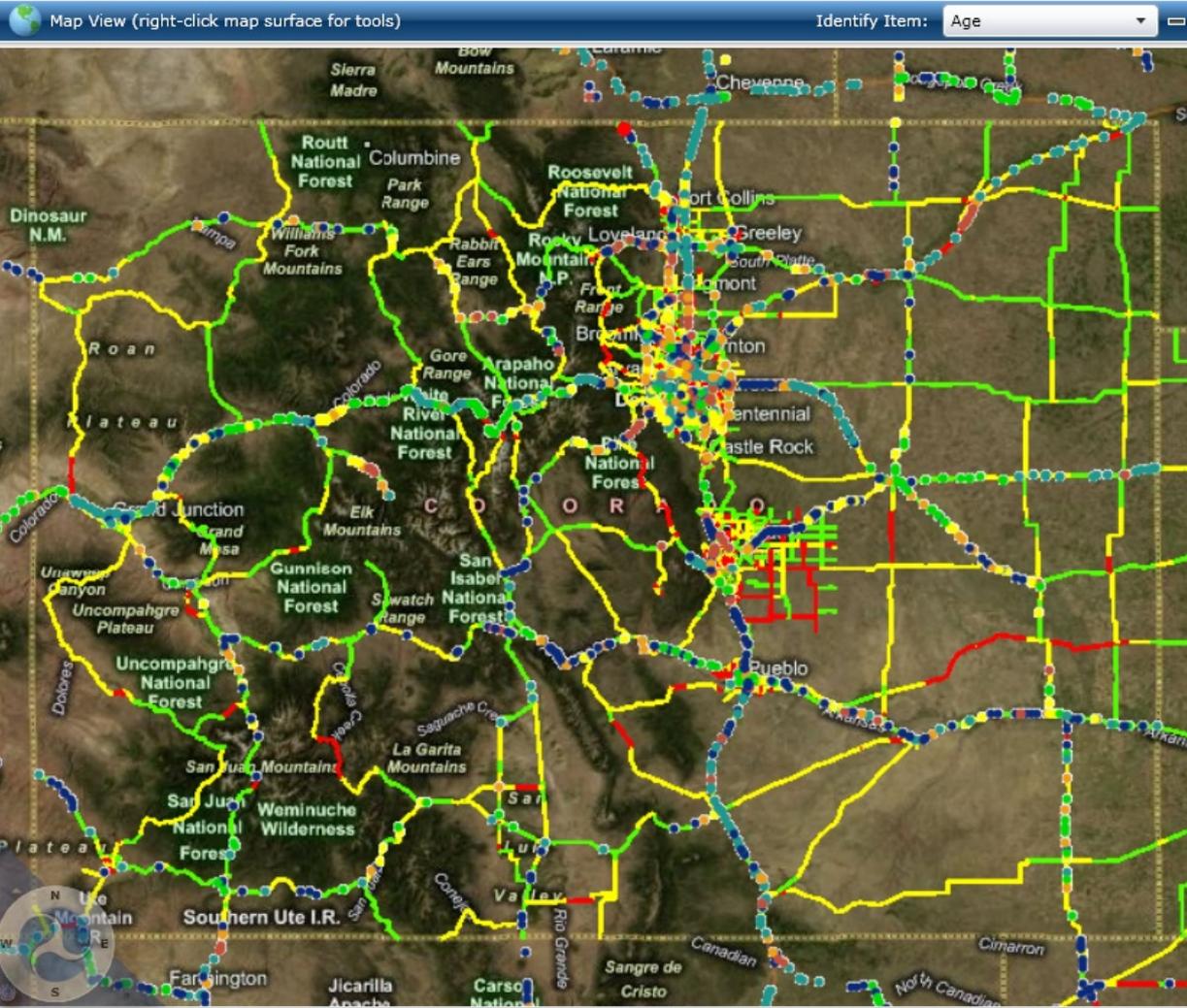


# HIPAT View – National View



# HIPAT View – State View

Projects Bridges



Zoom to state  
Colorado  
Zoom to county

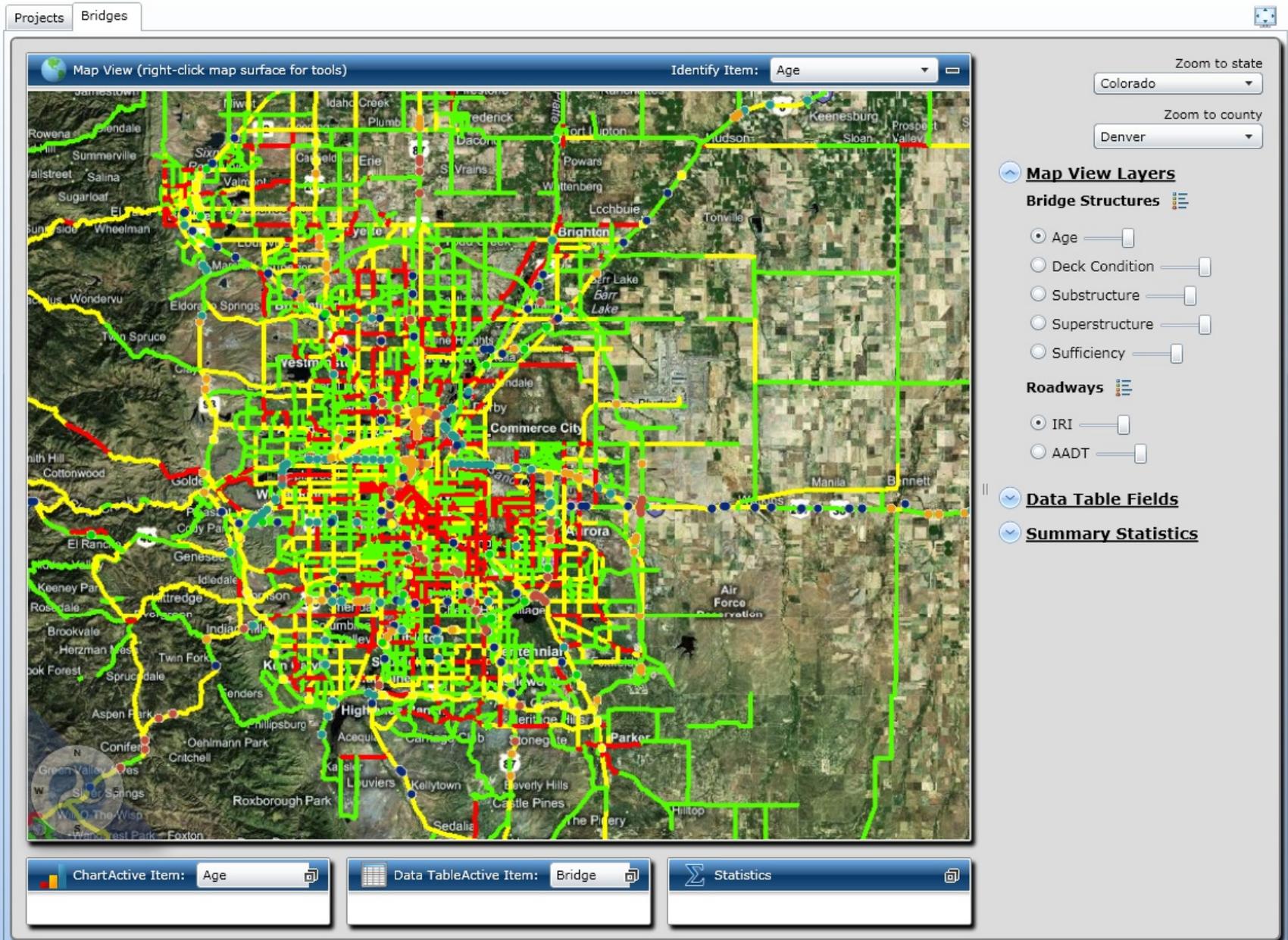
- Map View Layers**
- Bridge Structures**
- Age
  - Deck Condition
  - Substructure
  - Superstructure
  - Sufficiency
- Roadways**
- IRI
  - AADT
- Data Table Fields**
- Summary Statistics**

ChartActive Item: Age

Data TableActive Item: Bridge

Statistics

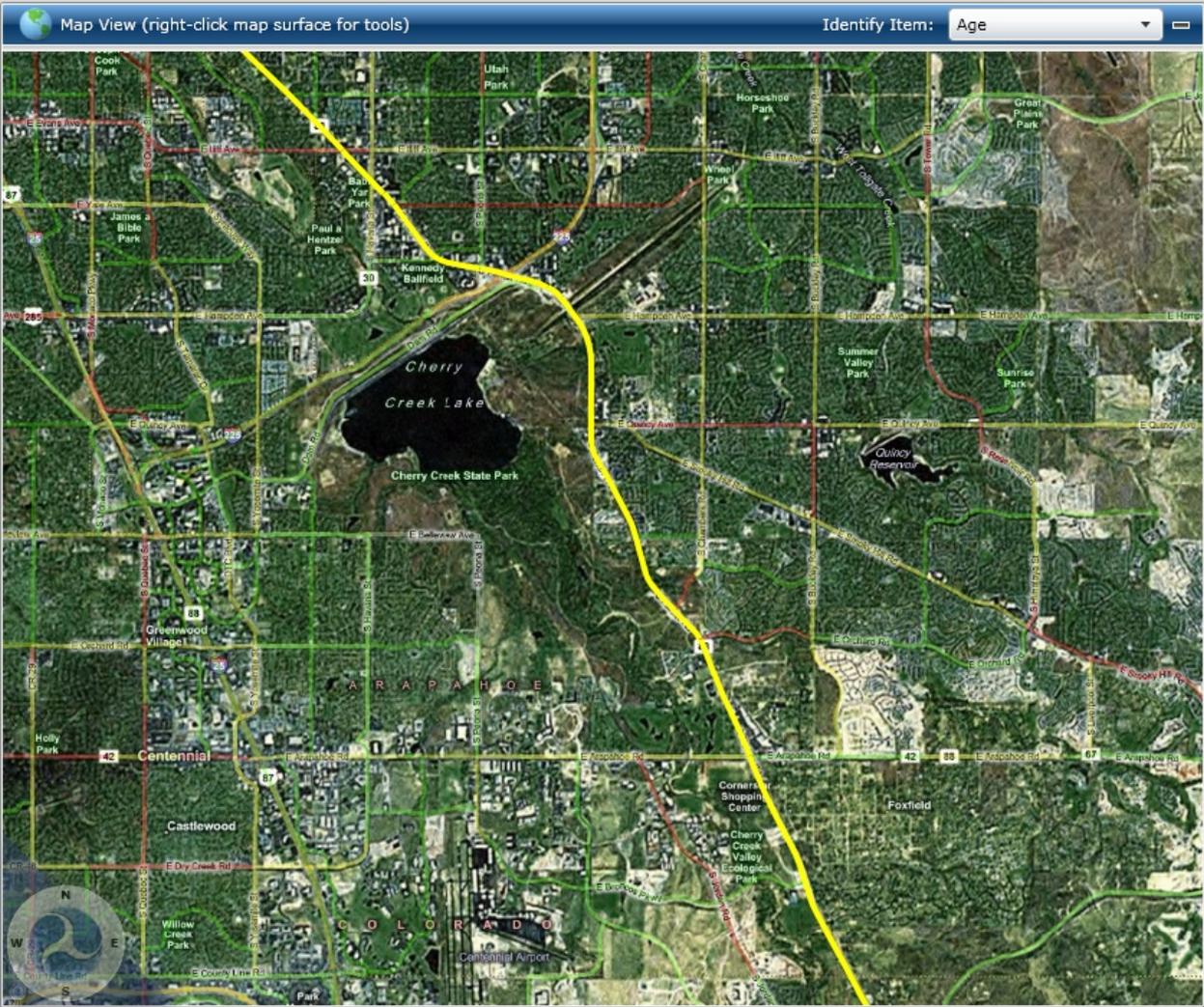
# HIPAT View – County View



# HIPAT View – Corridor View

Projects Bridges

Map View (right-click map surface for tools) Identify Item: Age



Zoom to state  
Colorado

Zoom to county

**Map View Layers**

**Bridge Structures**

- Age
- Deck Condition
- Substructure
- Superstructure
- Sufficiency

**Roadways**

- IRI
- AADT

**Data Table Fields**

**Summary Statistics**

ChartActive Item: Age

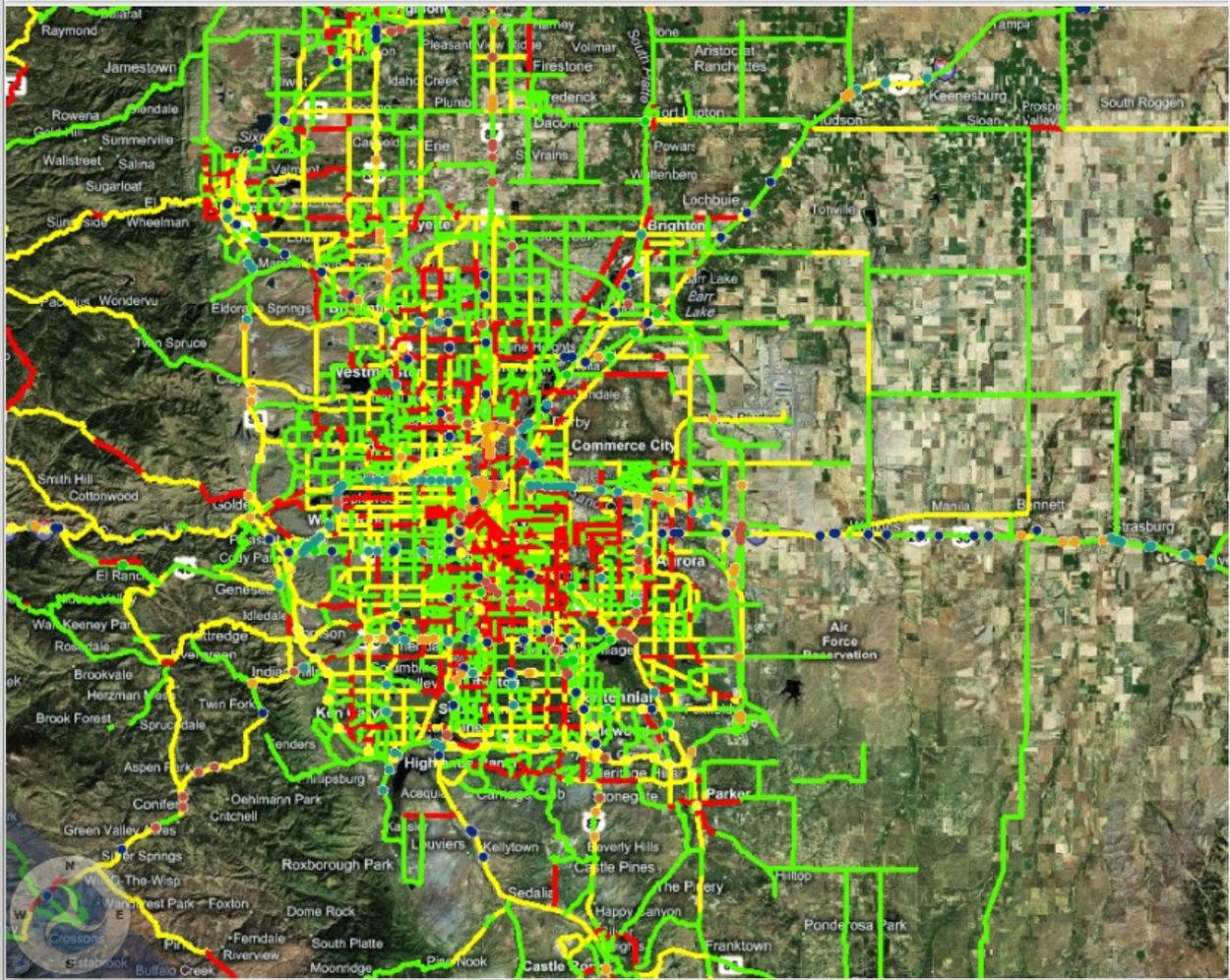
Data TableActive Item: Roadway

Statistics

# HIPAT View – Data Layers

Projects Bridges

Map View (right-click map surface for tools) Identify Item: Age



Zoom to state  
Colorado

Zoom to county  
Denver

**Map View Layers**

**Bridge Structures**

- Age
- Deck Condition
- Substructure
- Superstructure
- Sufficiency

**Roadways**

- IRI
- AADT

**Data Table Fields**

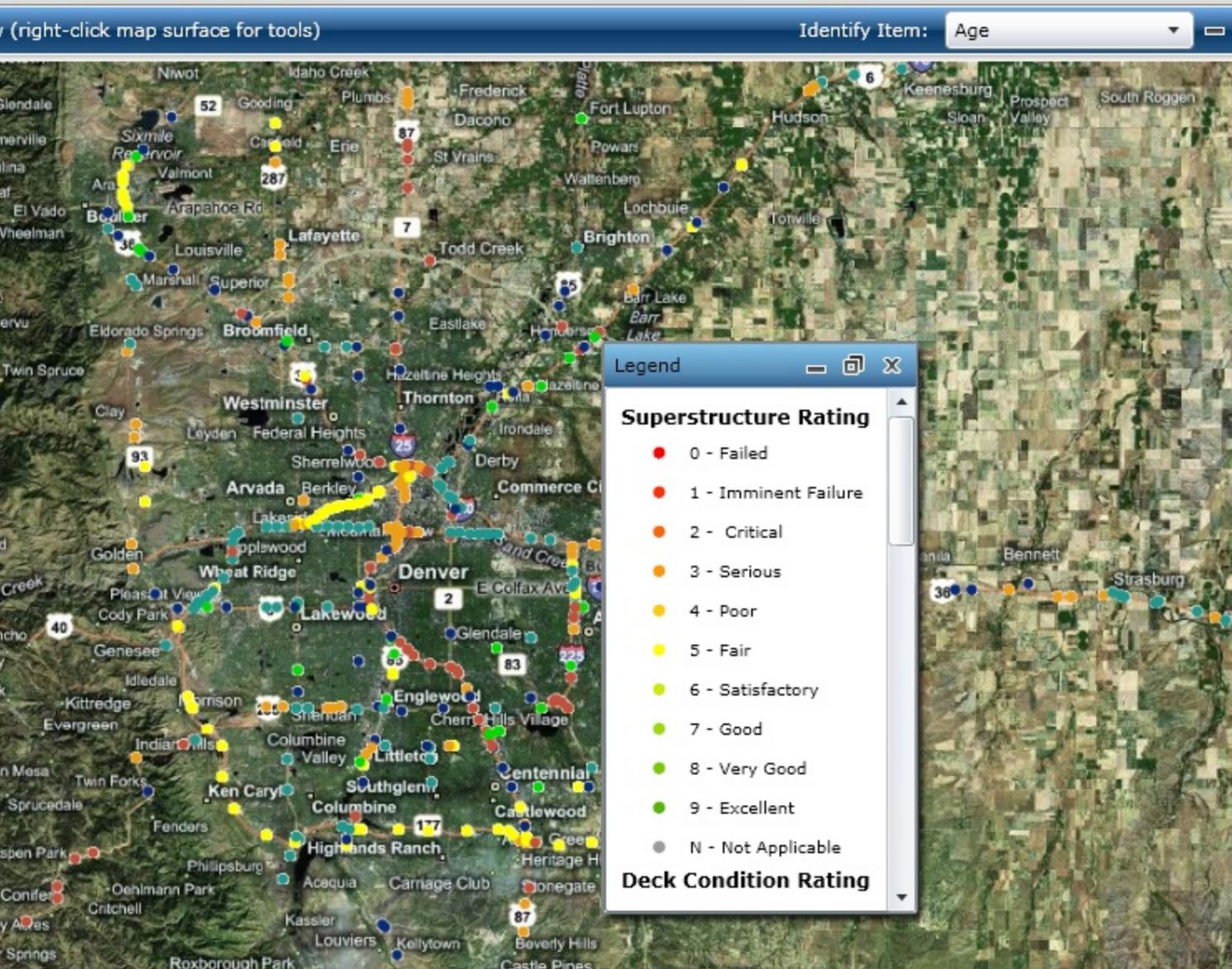
**Summary Statistics**

ChartActive Item: Age

Data TableActive Item: Bridge

Statistics

# HIPAT View - Legend



Zoom to Colorado

Zoom to Denver

**Map View Layers**

**Bridge Structures**

- Age
- Deck Condition
- Substructure
- Superstructure
- Sufficiency

**Roadways**

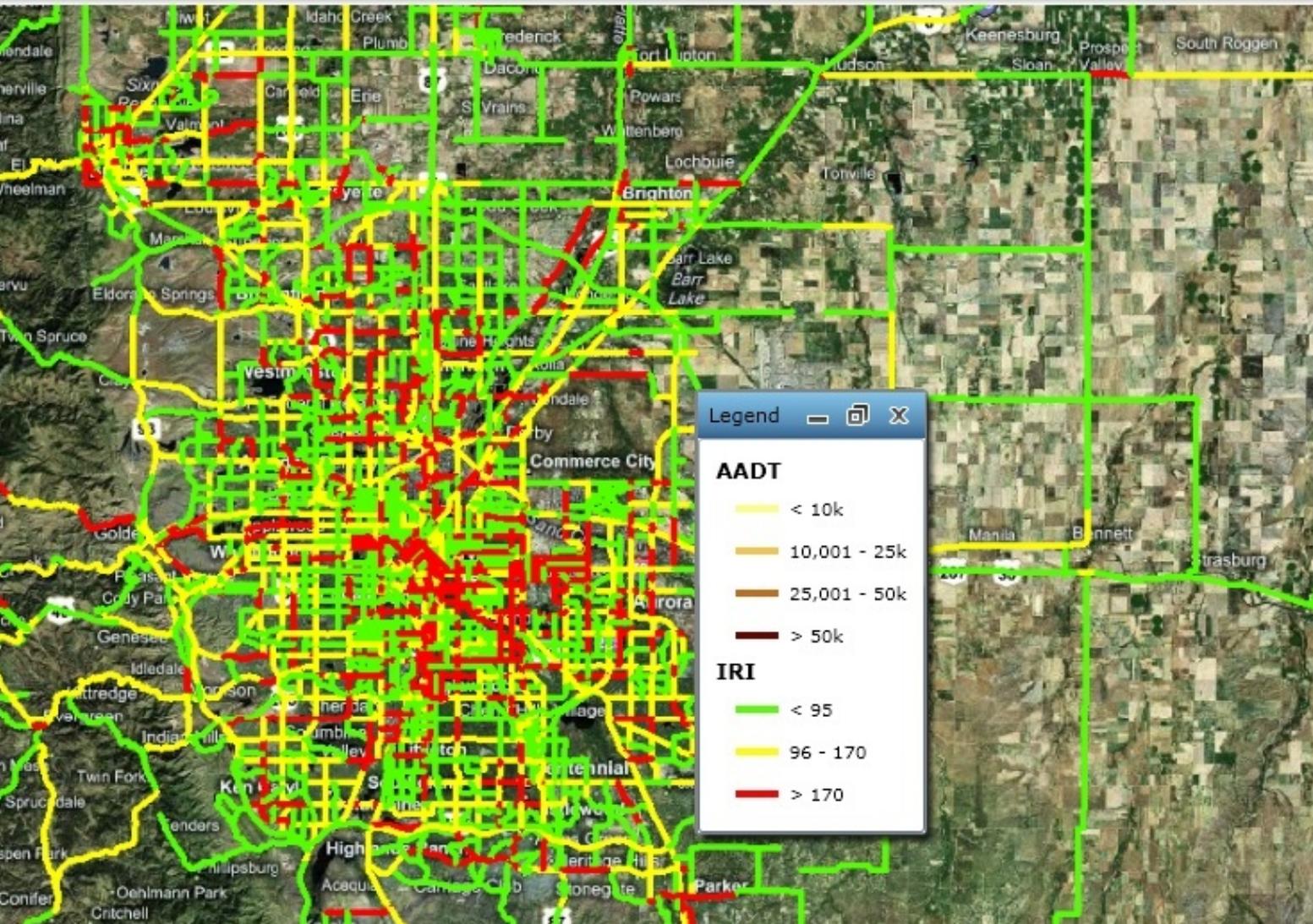
- IRI
- AADT

**Data Table Fields**

**Summary Statistics**

# HIPAT View – Legend

(right-click map surface for tools) Identify Item: Age



Colorado

Denver

## Map View Layer

### Bridge Structures

- Age
- Deck Condition
- Substructure
- Superstructure
- Sufficiency

### Roadways

- IRI
- AADT

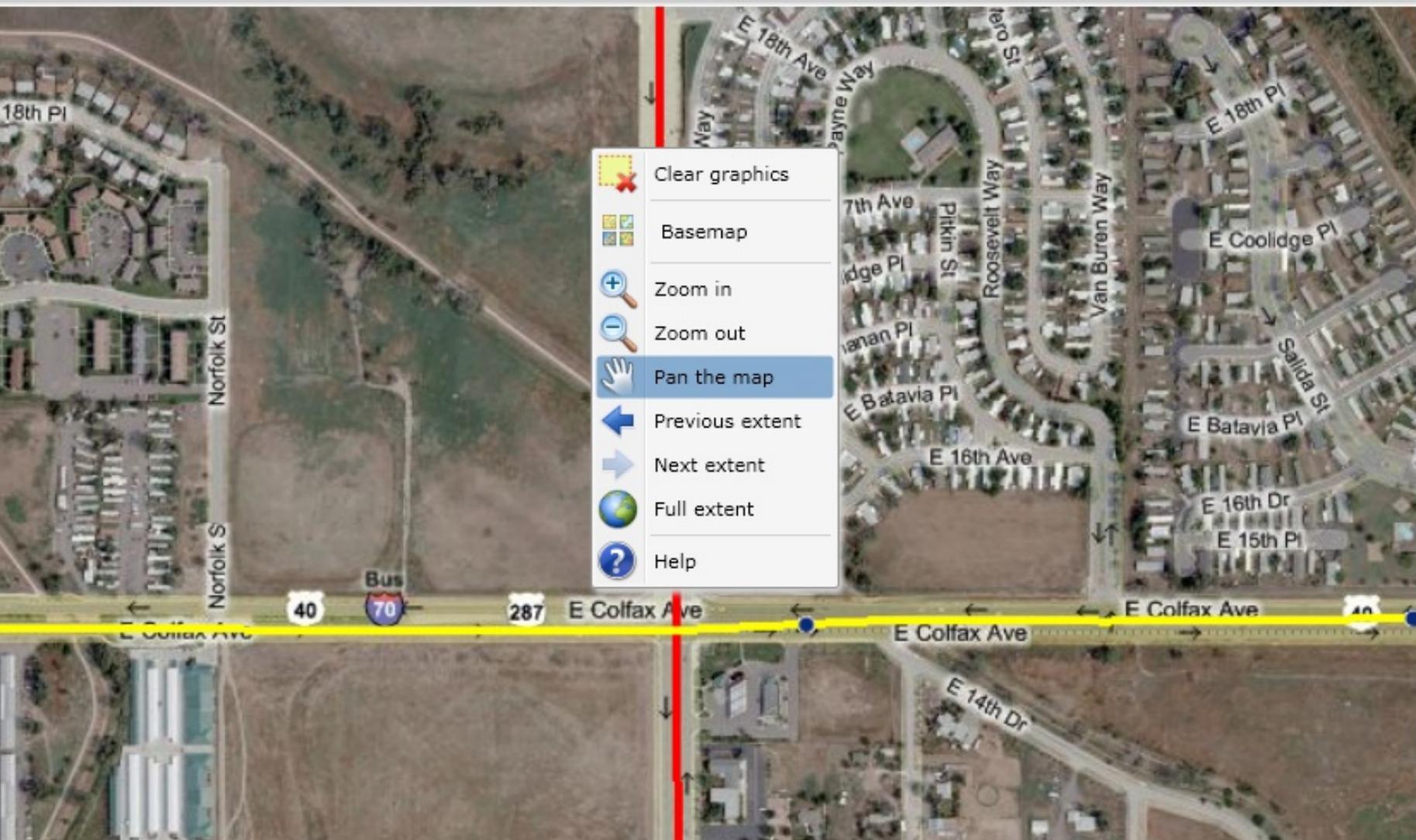
## Data Table Field

## Summary Statis

# Map Viewer - Tools

Subjects Bridges

Map View (right-click map surface for tools) Identify Item: Age



# Map Viewer – Identify Tool

Map View (right-click map surface for tools)

Zoom to state  
Colorado

Zoom to county

**Map View Layers**

**Bridge Structures**

- Age
- Deck Condition
- Substructure
- Superstructure
- Sufficiency

**Roadways**

- IRI
- AADT

**Data Table Fields**

**Summary Statistics**

Age IRI

Structure Number F-18-AZ

**OBJECTID:**

**Year Record:** 2009

**State Code:** 8

**Structure Number:** F-18-AZ

**Route Number:** 70

**Functional System:** 1

**Facility:** I 70 ML

**Mile Point:** 289.41829

**Year Built:** 1974

**Age:** 37

**AADT:** 21100

**Deck Condition:** N

**Rating:**

**Superstructure:** N

**Rating:**

**Substructure:** N

**Rating:**

**Culvert Condition:** 6

**Rating:**

ChartActive Item: Age

Data TableActive Item: Bridge

Statistics

# Map Viewer – Base Map Tool

The screenshot displays the 'Map Viewer – Base Map Tool' interface. At the top, there are tabs for 'Projects' and 'Bridges'. The main map area shows a street network with a bridge highlighted in red. The bridge is located on E Colfax Ave, crossing N Almont Blvd. The map includes labels for various streets such as E 18th Ave, E 17th Ave, E 16th Ave, E 14th Ave, E 13th Ave, E 18th Pl, E Coolidge Pl, E Buchanan Pl, E Batavia Pl, E 16th Dr, E 15th Pl, E 14th Dr, E 14th Pl, E 13th Pl, and E 13th Ave. A yellow bus icon is visible on E Colfax Ave. The interface also features a 'Map View Layers' panel on the right, which includes sections for 'Bridge Structures' (Age, Deck Condition, Substructure, Superstructure, Sufficiency) and 'Roadways' (IRI, AADT). The bottom status bar shows 'ChartActive Item: Age', 'Data TableActive Item: Bridge', and 'Statistics'.

Projects Bridges

Map View (right-click map surface for tools) Identify Item: Age

Zoom to state  
Colorado

Zoom to county

**Map View Layers**

**Bridge Structures**

- Age
- Deck Condition
- Substructure
- Superstructure
- Sufficiency

**Roadways**

- IRI
- AADT

**Data Table Fields**

**Summary Statistics**

ChartActive Item: Age

Data TableActive Item: Bridge

Statistics

# Data Table Tools

- Filter/Query
  - Single Attribute
  - Multiple Attributes
- Spatial Selection
- Zoom to Selected Feature(s)
- Export



# Data Table

Projects Bridges

Data Table Active Item: Bridge

Structure Number	AADT	Age	Culvert Condition Rating	Deck Condition Rating	Functional System	Facility	
A-15-A	3600	53	N	5	2	US 287 ML	N
A-15-R	3600	51	N	7	2	US 287 ML	N
A-15-U	3600	51	N	7	2	US 287 ML	N
A-15-Z	3600	50	N	7	2	US 287 ML	N
A-16-A	3600	48	N	7	2	US 287 ML	N
A-16-C	3600	48	N	7	2	US 287 ML	N
A-17-AA	8950	48	N	7	1	I 25 ML SBND	N
A-17-AB	8950	48	N	7	1	I 25 ML NBND	N
A-17-AC	8800	48	N	6	1	I 25 ML NBND	N
A-17-AD	8800	48	N	6	1	I 25 ML SBND	N
A-17-AE	8950	48	N	7	1	I 25 ML NBND	N
A-17-AF	8950	48	N	7	1	I 25 ML SBND	N
A-17-AG	8950	48	N	7	1	I 25 ML NBND	N
A-17-AH	8950	48	N	7	1	I 25 ML SBND	N
A-17-AI	8950	48	N	7	1	I 25 ML NBND	N
A-17-AJ	8950	48	N	7	1	I 25 ML SBND	N
A-17-AK	8800	48	N	7	1	I 25 ML NBND	N
A-17-AL	8800	48	N	7	1	I 25 ML SBND	N
A-17-AM	8800	48	N	7	1	I 25 ML NBND	N
A-17-AN	8800	48	N	7	1	I 25 ML SBND	N

Zoom to state  
Colorado  
Zoom to county

**Map View Layers**

**Bridge Structures**

- Age
- Deck Condition
- Substructure
- Superstructure
- Sufficiency

**Roadways**

- IRI
- AADT

**Data Table Fields**

**Summary Statistics**

Page 1 of 110

Map View (right-click map surface for) | ChartActive Item: Age | Statistics

# Data Table – Filter/Query 1

Projects Bridges

Map View (right-click map surface for tools) Identify Item: Age



Zoom to state  
Colorado

Zoom to county

**Map View Layers**

**Bridge Structures**

- Age
- Deck Condition
- Substructure
- Superstructure
- Sufficiency

**Roadways**

- IRI
- AADT

**Data Table Fields**

**Summary Statistics**

Chart Active Item: Age

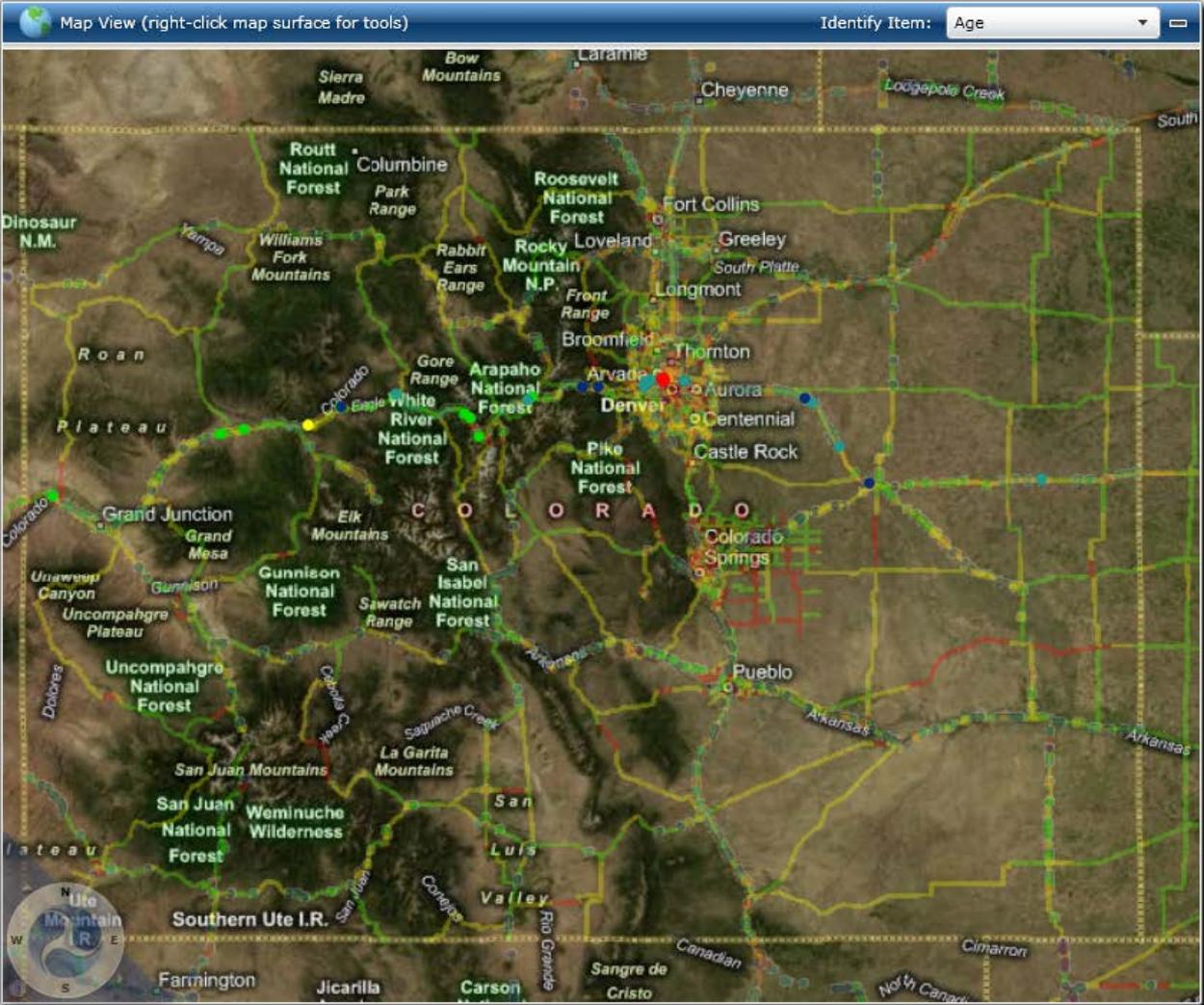
Data Table Active Item: Bridge

Statistics

# Data Table – Filter/Query 2

Projects Bridges

Map View (right-click map surface for tools) Identify Item: Age



Zoom to state  
Colorado

Zoom to county

**Map View Layers**

**Bridge Structures**

- Age
- Deck Condition
- Substructure
- Superstructure
- Sufficiency

**Roadways**

- IRI
- AADT

**Data Table Fields**

**Summary Statistics**

ChartActive Item: Age

Data TableActive Item: Bridge

Statistics

# Data Table – Filter Query 3

Projects Bridges

Map View (right-click map surface for tools) Identify Item: Age

Zoom to state USA

**Map View Layers**

- Bridge Structures**
  - Age
  - Deck Condition
  - Substructure
  - Superstructure
  - Sufficiency
- Roadways**
  - IRI
  - AADT

**Data Table Fields**

**Summary Statistics**

ChartActive Item: Age

Data TableActive Item: Bridge

Statistics



# Data Table – Spatial Select

Projects Bridges

Map View (right-click map surface for tools) Identify Item: Age

Zoom to state Colorado

Zoom to county

**Map View Layers**

**Bridge Structures**

- Age
- Deck Condition
- Substructure
- Superstructure
- Sufficiency

**Roadways**

- IRI
- AADT

**Data Table Fields**

**Summary Statistics**

ChartActive Item: Age

Data TableActive Item: Roadway

Statistics

# Data Table – Zoom to Selected

Projects Bridges

Map View (right-click map surface for tools) Identify Item: Age

Zoom to state Colorado

Zoom to county

**Map View Layers**

**Bridge Structures**

- Age
- Deck Condition
- Substructure
- Superstructure
- Sufficiency

**Roadways**

- IRI
- AADT

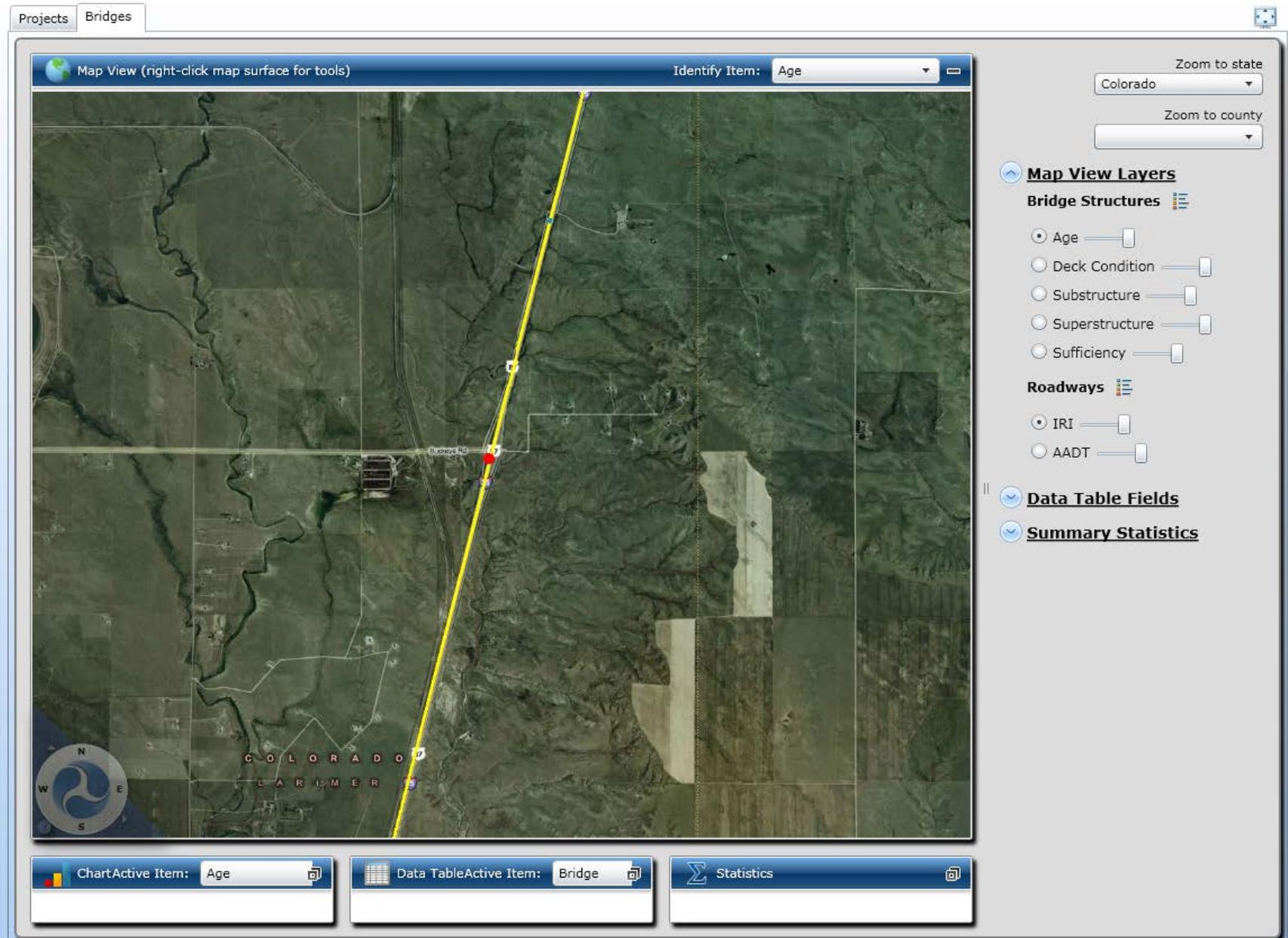
**Data Table Fields**

**Summary Statistics**

Chart Active Item: Age

Data Table Active Item: Bridge

Statistics



The screenshot displays a GIS application window. At the top, there are tabs for 'Projects' and 'Bridges'. The main map area shows a satellite-style view of a rural landscape with a prominent yellow line representing a bridge structure. A red dot is visible on the map near a road labeled 'Busby Rd'. The map view has a title bar that says 'Map View (right-click map surface for tools)' and an 'Identify Item' dropdown menu set to 'Age'. To the right of the map, there are two zoom controls: 'Zoom to state' with a dropdown menu showing 'Colorado', and 'Zoom to county' with an empty dropdown. Below these are three expandable sections: 'Map View Layers' containing 'Bridge Structures' (with radio buttons for Age, Deck Condition, Substructure, Superstructure, and Sufficiency) and 'Roadways' (with radio buttons for IRI and AADT); 'Data Table Fields'; and 'Summary Statistics'. At the bottom of the window, there are three panels: 'Chart Active Item: Age', 'Data Table Active Item: Bridge', and 'Statistics'.

# Data Table – Export

CO IS70 Export\_Test.xls - Microsoft Excel

	A	B	C	D	E	F	G	H	I	J	K
1		Structure Number	AA DT	Age	Culvert Condition Rating	Deck Condition Rating	Functional System	Facility	Field100	Field101	Fracture Crit
2	###	E-16-GY	55000	44	N	4	11	I 70 ML EBND	Y	N	N
3	###	E-16-HE	43000	43	N	4	11	I 70 ML EBND	Y	N	N
4	###	E-16-HF	43000	43	N	4	11	I 70 ML WBND	Y	N	N
5	###	E-16-JK	53000	43	N	5	11	I 70 ML WBND	N	N	N
6	###	E-16-JL	53000	43	N	5	11	I 70 ML WBND	N	N	N
7	###	E-16-JM	42800	43	N	6	11	I 70 ML WBND	N	N	N
8	###	E-16-JN	53000	43	N	6	11	I 70 ML EBND	N	N	N
9	###	E-16-JO	42800	43	N	7	11	I 70 ML EBND	N	N	N
10	###	E-16-JP	53000	43	N	6	11	I 70 ML EBND	N	N	N
11	###	E-16-KB	6515	31	N	7	11	NB RAMP TO I70/I76	N	N	N
12	###	E-16-KC	15048	30	N	7	11	RAMP TO I 70 EBND	N	N	N
13	###	E-16-KD	14000	31	N	8	11	RAMP TO SH 121 ML	N	N	N
14	###	E-16-MR	49350	20	N	6	11	I 70 ML EBND	N	N	N
15	###	E-16-MS	49350	20	N	6	11	I 70 ML WBND	N	N	N
16	###	E-16-NJ	119000	19	N	7	11	I 70 ML	N	N	N
17	###	E-16-OQ	7000	17	N	7	11	I70 NB RMP,..75 MI.	N	N	N
18	###	E-16-PJ	7000	18	N	6	11	RAMP TO I 70 WBND	N	N	Y
19	###	E-16-PL	137000	15	N	7	11	I 70 ML	N	N	N
20	###	E-16-PM	43350	16	N	7	11	I 70 ML WBND	N	N	N
21	###	E-16-XA	84200	2	N	8	11	I70 ML	N	N	N
22	###	F-06-AF	360	34	N	7	1	RAMP TO I 70 WBND	N	N	N
23	###	F-06-AH	360	27	N	7	1	RMP TO FRONTAGE RD	N	N	N
24	###	F-06-K	214	40	N	5	1	I 70 ACCESS RD	N	N	N
25	###	F-06-M	214	40	N	5	1	I 70 ACCESS RD	N	N	N
26	###	F-06-O	13300	39	N	7	1	I 70 ML WBND	N	N	N
27	###	F-06-P	13300	39	N	7	1	I 70 ML EBND	N	N	N
28	###	F-06-Y	10100	36	N	6	1	I 70 ML EBND	N	N	N
29	###	F-06-Z	10100	36	N	6	1	I 70 ML WBND	N	N	N

Ready | Scroll Lock | 100% | Done | Trusted sites | 100%

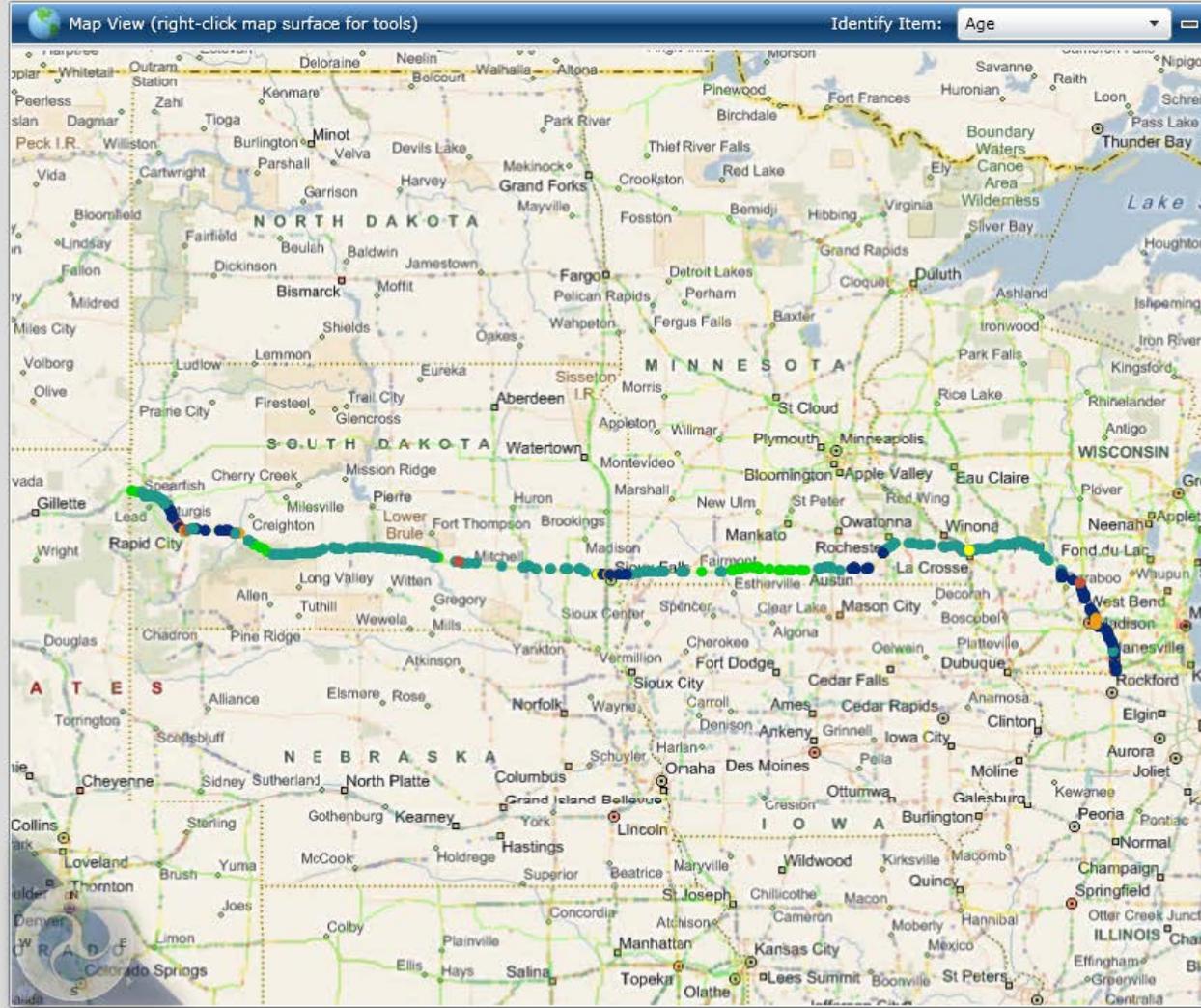
# Statistics Table

- Statistics by Attribute
  - Mean
  - Minimum / Maximum
  - Standard Deviation
  - Count
  - Mode
  - Median



# Statistics Table

Projects Bridges



## Data Table Fields

### Structures

- Year Record
- State Code
- Structure Number
- Route Number
- Functional System
- Facility
- Mile Point
- Year Built
- Age
- AADT
- Deck Condition Rating
- Superstructure Rating
- Substructure Rating
- Culvert Condition Rating
- Scour Critical
- Posted
- Fracture Critical
- Sufficiency Rating
- Field100
- Field101

### Roadway

- Year Record
- State Code
- Route ID
- Beginning Milepoint
- Ending Milepoint
- Functional System
- Urban Code
- Facility Type
- Through Lanes
- AADT
- Route Number
- IRI
- County Code

## Summary Statistics

- Mean
- Minimum
- Maximum
- Std Deviation
- Count
- Mode
- Median

Chart Active Item: Age

Data Table Active Item: Bridge

Statistics

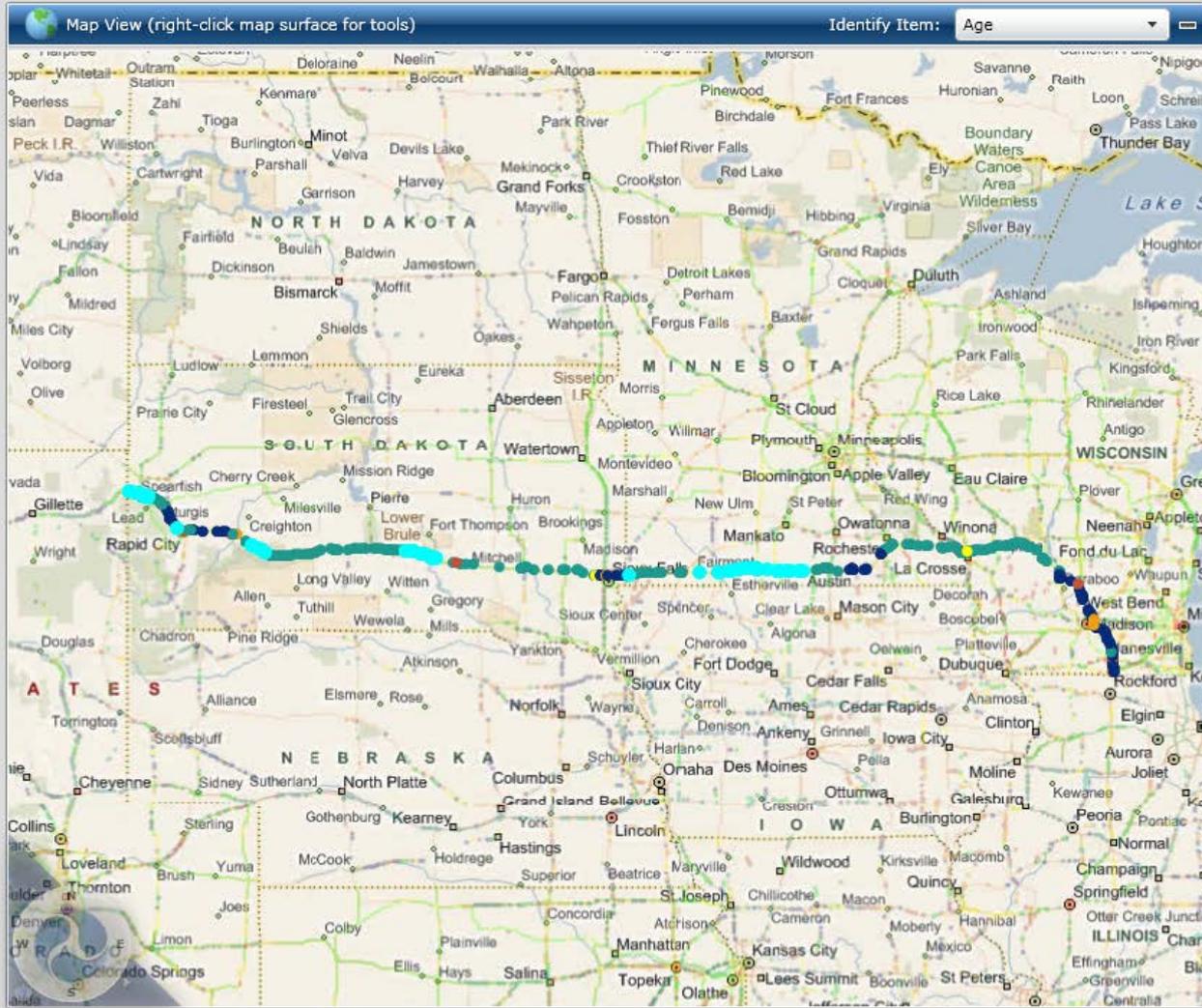
# Chart Display

- Bar Chart
- Percent of Total by Class/Range
  - AADT
  - IRI
  - Bridge Age
  - Deck Condition Rating
  - Substructure Rating
  - Sufficiency Rating
  - Superstructure Rating



# Chart Display

Projects Bridges



## Data Table Fields

### Structures

- Year Record
- State Code
- Structure Number
- Route Number
- Functional System
- Facility
- Mile Point
- Year Built
- Age
- AADT
- Deck Condition Rating
- Superstructure Rating
- Substructure Rating
- Culvert Condition Rating
- Scour Critical
- Posted
- Fracture Critical
- Sufficiency Rating
- Field100
- Field101

### Roadway

- Year Record
- State Code
- Route ID
- Beginning Milepoint
- Ending Milepoint
- Functional System
- Urban Code
- Facility Type
- Through Lanes
- AADT
- Route Number
- IRI
- County Code

## Summary Statistics

- Mean
- Minimum
- Maximum
- Std Deviation
- Count
- Mode
- Median

ChartActive Item: Age

Data TableActive Item: Bridge

Statistics

# Current Data Issues

## ■ HPMS Data

- Underlying linear reference systems (LRS) networks contain location reference errors

## ■ NBI Data

- Cannot be linear referenced for most States
- Contains erroneous latitude/longitude coordinates

## ■ Data issues ultimately impact visualization and display properties



# Erroneous Data Example

Projects Bridges

Map View (right-click map surface for tools)

Identify Item: Age

Zoom to state  
Kansas

Zoom to county

**Map View Layers**

**Bridge Structures**

- Age
- Deck Condition
- Substructure
- Superstructure
- Sufficiency

**Roadways**

- IRI
- AADT

**Data Table Fields**

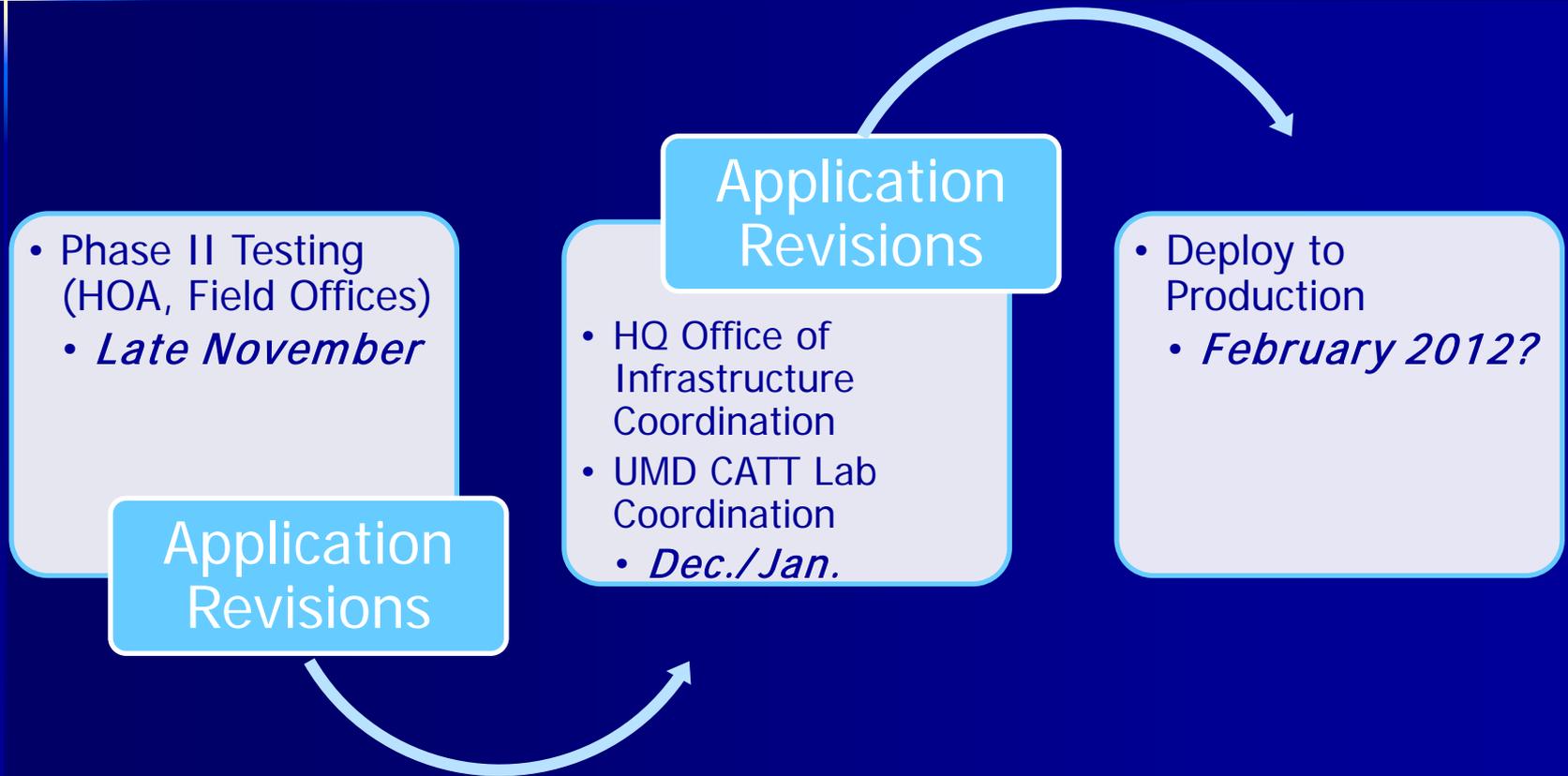
**Summary Statistics**

Chart Active Item: Age

Data Table Active Item: Bridge

Statistics

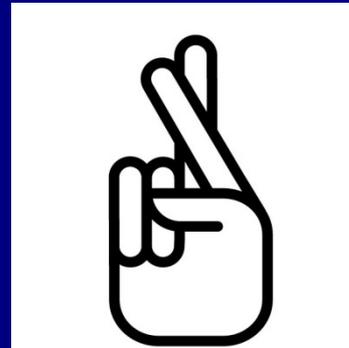
# Next Steps



**Questions???**



**Live Demo**



# Contacts

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