# Infrastructure Condition Evaluation (ICE) Tool

Office of Systems Planning

Freight Advisory Council

September 11, 2015

# Presentation outline

- Project objective
- Data analysis & evaluation structure
- Planning report overview
- ICE webtool demo
- Annual timeline & future enhancements
- Applications

# Infrastructure Condition Evaluation (ICE) objectives

- Evaluate the entire Primary Highway System, independent of current financial constraints, using a select group of criteria weighted in terms of relative significance.
  - Will provide the department with an initial screening and prioritization of Primary highway corridors.
  - These corridors would then represent those areas that could be considered for further study and possible programming.

# Data analysis

- Multiple datasets, available in Oracle Spatial
  - Geographic Information Management System (GIMS)
    - Traffic Counts, Structure Sufficiency Rating, Boundaries, etc.
  - Pavement Management Information System (PMIS)
    - PCI & IRI
  - Data provided for all roadway directions (dual segment)
- Linear Referencing Systems (LRS)
- Linear Overlay process
- Structured Query Language (SQL)

# Evaluation structure

- Seven evaluation criteria (next slide)
- Normalized to common scale (1-10)
- Determined appropriate weighting (percentage)
- Applied corresponding multipliers
- Maximum composite score = 100
- Low score indicates poorer conditions

# Evaluation criteria

| | |
|---|---|
| • Pavement Condition Index (PCI) | 25% |
| • Structure Sufficiency Rating | 25% |
| • International Roughness Index (IRI) | 15% |
| • Combination Truck AADT | 15% |
| • Single-Unit Truck AADT | 5% |
| • Passenger AADT | 5% |
| • Congestion (V/C) | 10% |
| | 100% |

# Corridor breakouts

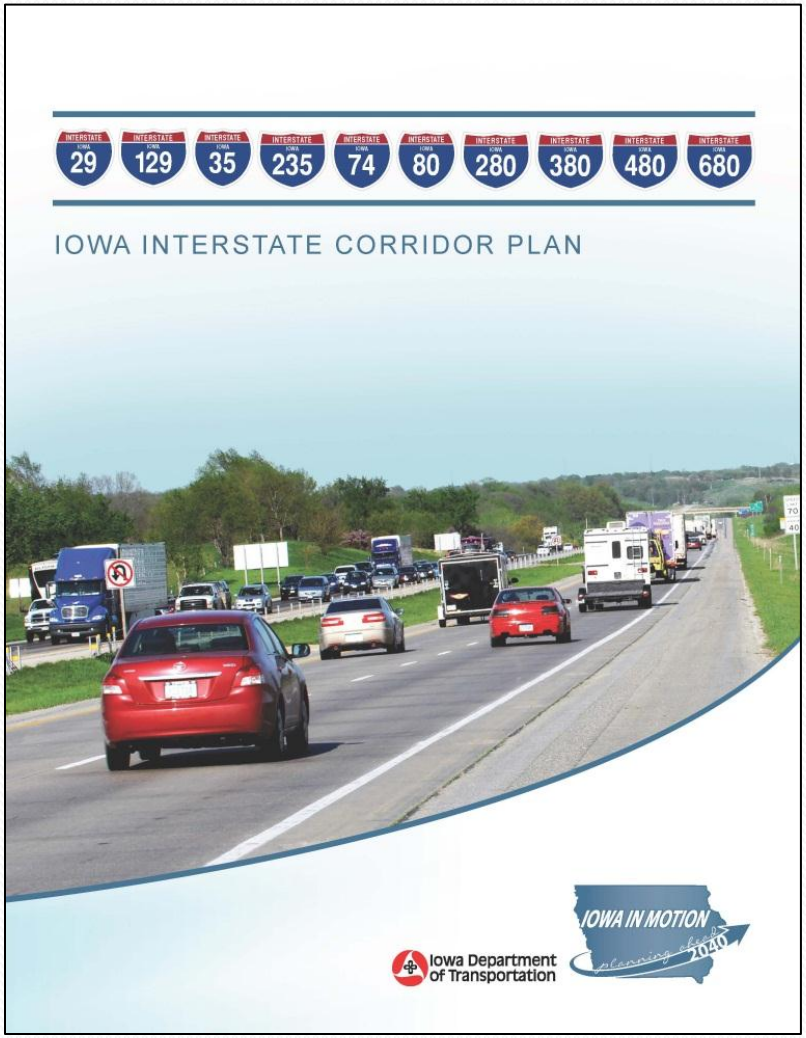
Corridors segmented at:

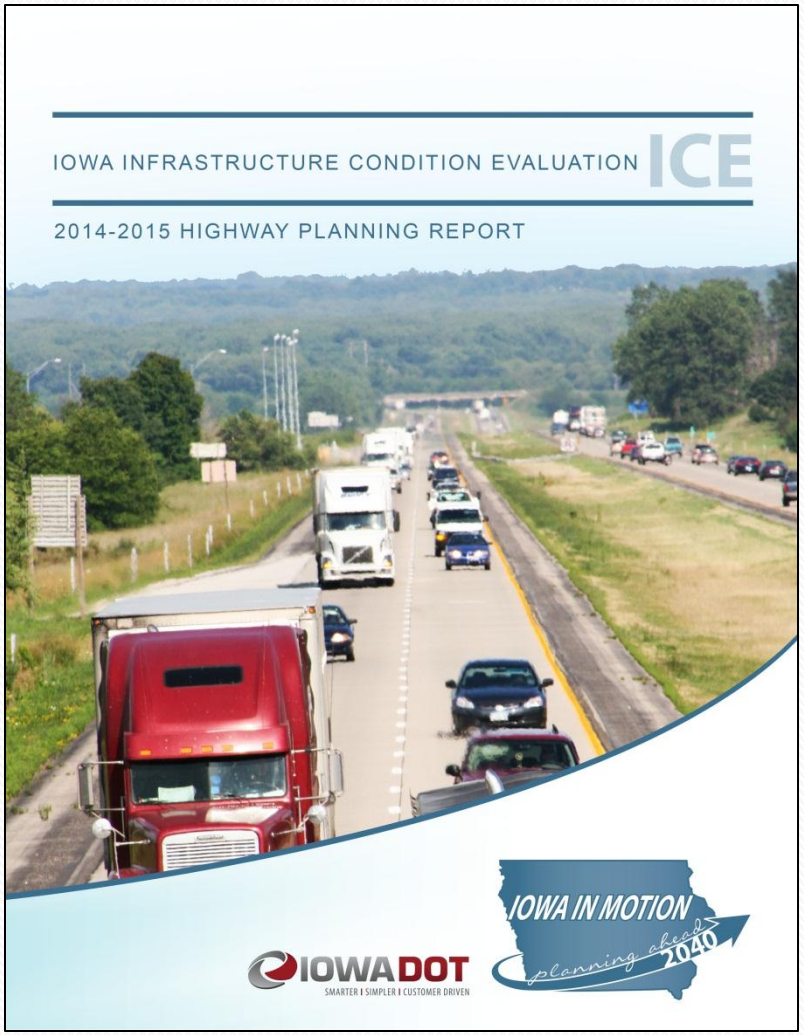
1) Interstate
2) NHS routes
3) City with a population of 20,000 or greater (consistent with CIN definition)
4) Transition from two-lanes to four-lanes or vice versa
5) Duplicate routes (appropriate precedence assigned)

**ICE Corridors by route type**

| Route system | Number of corridors |
|---|---|
| **NHS** | 122 |
| **Interstate** | 21 |
| **Non-interstate divided** | 39 |
| **Non-divided** | 62 |
| **Non-NHS** | 161 |
| **Divided** | 3 |
| **Non-divided** | 158 |
| **Total** | 283 |

# Highway Planning Report



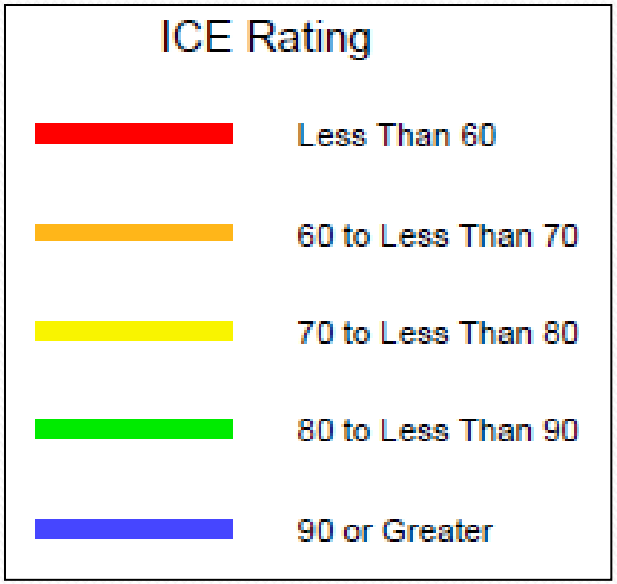
# Table summaries

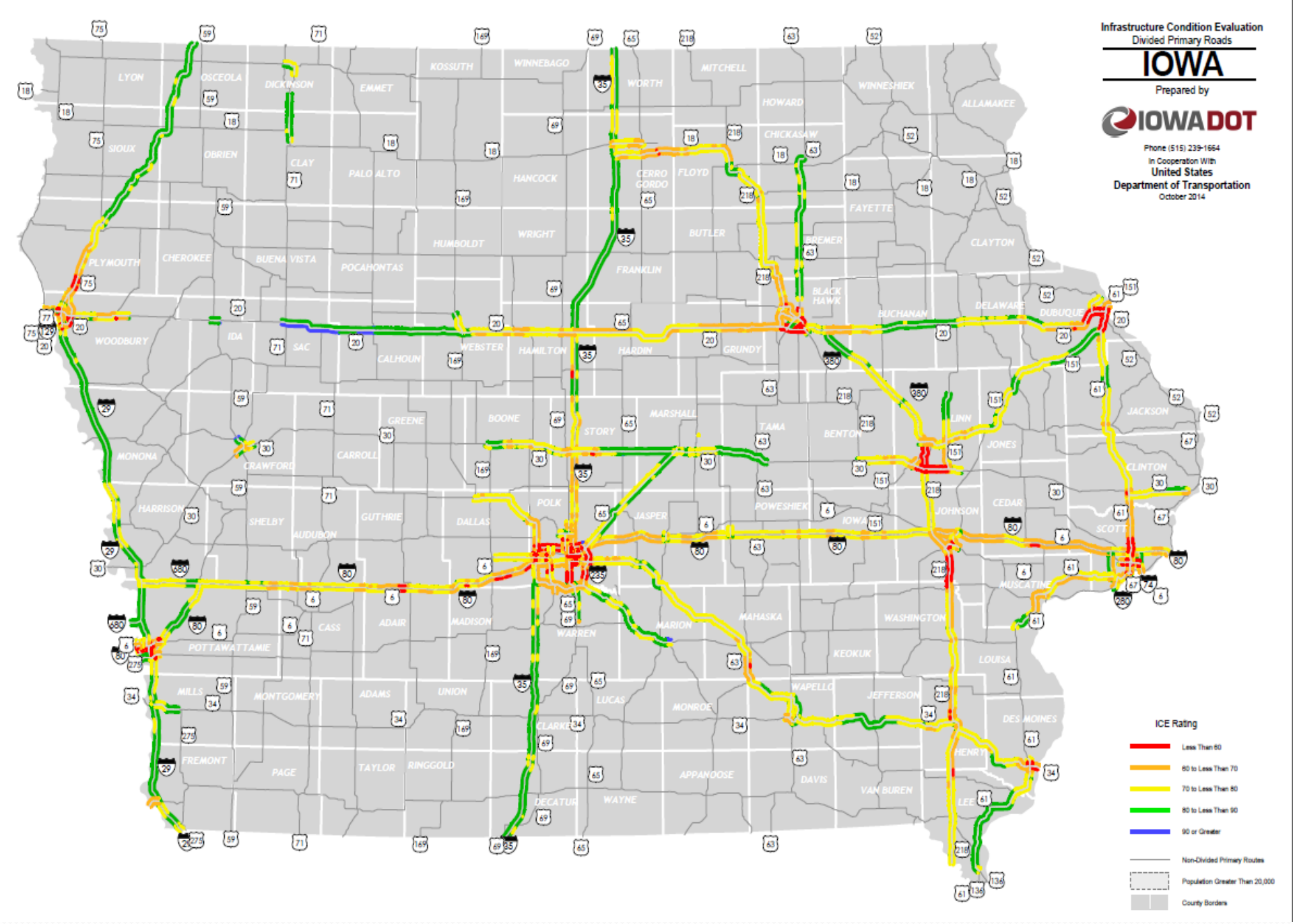
- Corridors summarized by ICE rating and individual criteria
- Also, District and system-level summaries

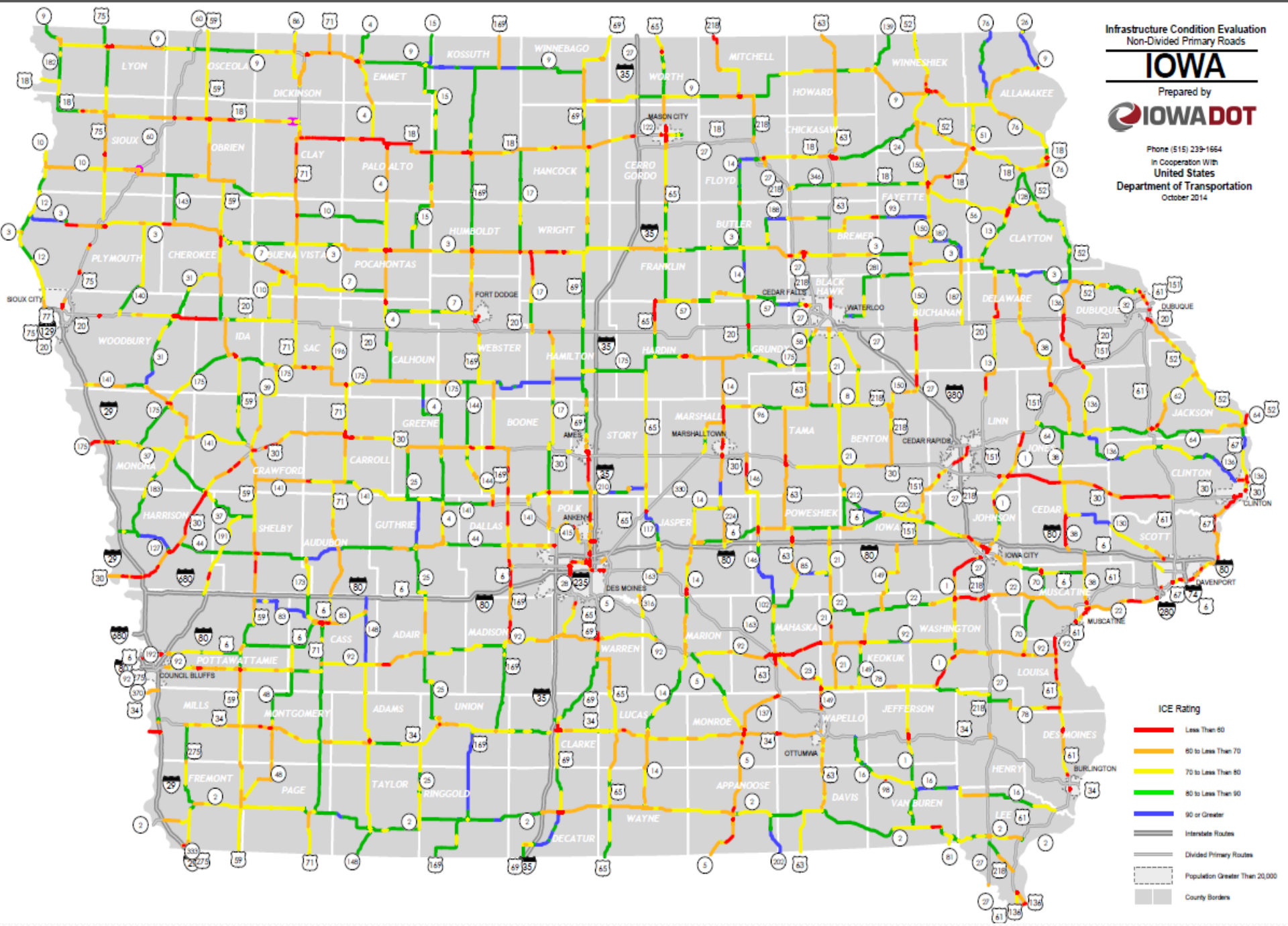
| | | | ICE RATING | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| RANK | CORRIDOR | ROUTE TYPE | ALL | N/E | S/W | PCI | IRI | SUFF | PASS AADT | SINGLE AADT | COMBO AADT | V/C |
| 46 | IA 4 (jct of IA 144 to jct of IA 141) | ND | 69.29 | - | - | 5 | 3 | 9 | 8 | 7 | 9 | 9 |
| 47 | IA 17 (jct of US 20 to jct of IA 3) | ND | 69.34 | - | - | 7 | 5 | 10 | 7 | 6 | 3 | 9 |
| 48 | IA 5 (jct of IA 5/US 65 to jct of I-35) | D | 69.40 | 69.13 | 69.66 | 8 | 6 | 10 | 2 | 3 | 5 | 5 |
| 49 | IA 13 (jct of E16 in Central City to east jct of IA 3/IA 13) | ND | 69.46 | - | - | 7 | 4 | 10 | 4 | 4 | 6 | 8 |
| 50 | I-35 (east jct of I-80/I-235 to jct of US 30) | I | 69.56 | 69.26 | 69.85 | 7 | 7 | 9 | 4 | 3 | 7 | 5 |
| 51 | IA 92 (east jct of IA5/IA 92 to north jct of IA 1) | ND | 69.62 | - | - | 6 | 4 | 10 | 7 | 6 | 7 | 9 |
| 52 | IA 2 (jct of US 65 to jct of IA 5) | ND | 69.62 | - | - | 5 | 4 | 10 | 7 | 5 | 8 | 9 |
| 53 | IA 141 (jct of US 71 to jct of US 59) | ND | 69.63 | - | - | 5 | 3 | 10 | 8 | 7 | 7 | 9 |
| 54 | US 65(west jct of US 34/US 65 to beginning of non-divided near Indianola) | ND | 69.68 | - | - | 6 | 4 | 10 | 6 | 6 | 7 | 9 |

# Map summaries

- Statewide and individual District maps
- Displayed by divided and non-divided




Infrastructure Condition Evaluation
Divided Primary Roads
IOWA
Prepared by
IOWA DOT
Phone (515) 239-1664
In Cooperation With
United States
Department of Transportation
October 2014
ICE Rating
Less Than 60
60 to Less Than 70
70 to Less Than 80
80 to Less Than 90
90 or Greater
Non-Divided Primary Routes
Population Greater Than 20,000
County Borders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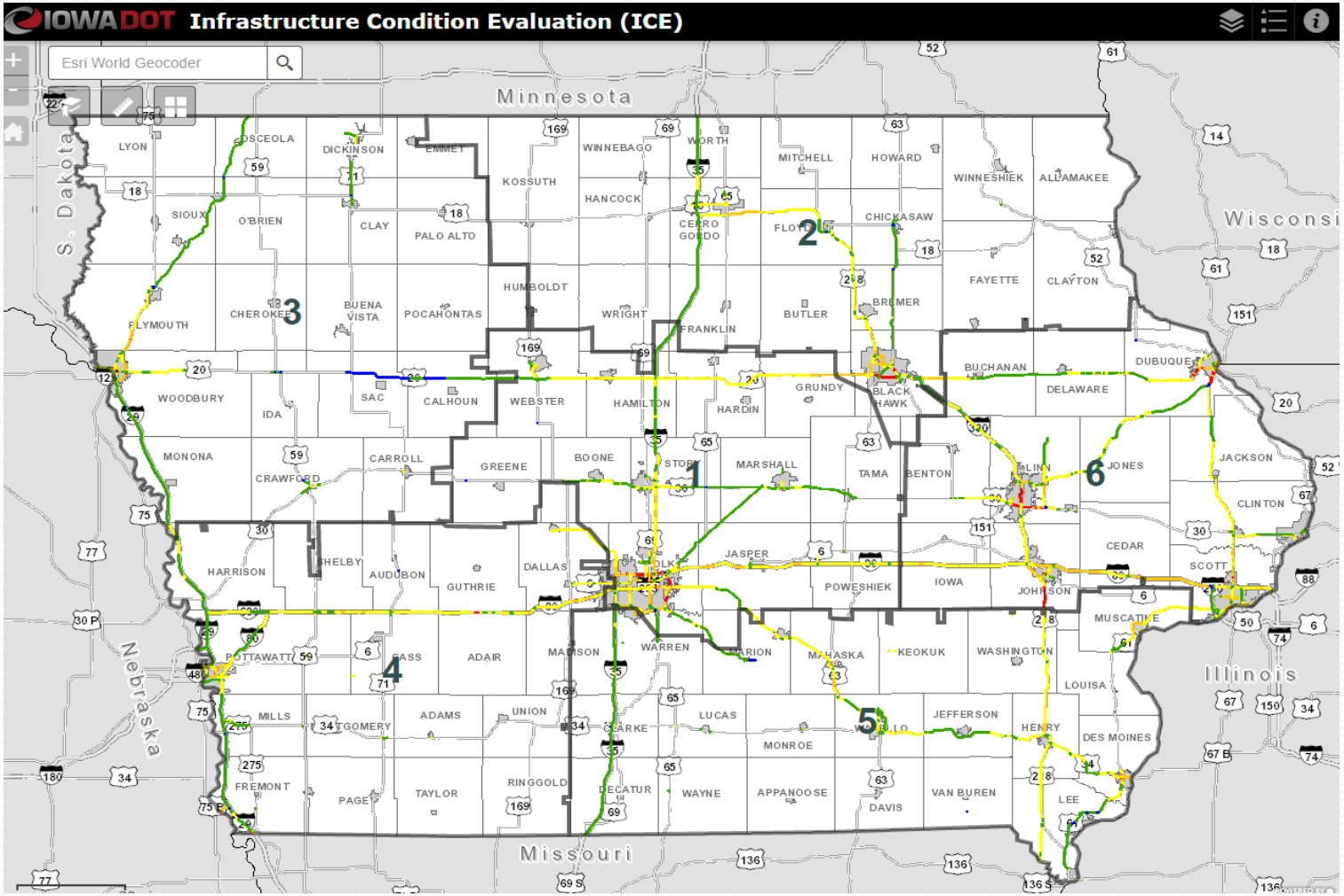
# ICE webtool demo



# Timeline & future enhancements

## Annual update cycle

- Internal stakeholder outreach
- Conduct linear overlay and re-run data analysis
- Annual ICE planning report by end of calendar year

## Potential Enhancements

- Forecast future conditions
- Incorporate possible safety, operations, environmental components
- Trend analysis in report and through ICE dashboard

# Additional applications

- State Freight Plan
  - “VCAP” project evaluation matrix
  - Examines:
    - iTRAM statewide truck VHT impact (value)
    - ICE ratings (condition)
    - INRIX travel speed/bottlenecks (performance)
- Transportation Systems Management & Ops (TSMO) Plan
  - ICE-OPS: Using ICE-like evaluation structure, tailored to operations
  - Bottlenecks, incident frequency, crash rate, planning time index, major event locations, weather-sensitive corridors, & ICE

# Evaluation strengths

- Flexible tool that allows for quick custom analysis
- Easy access to all input data and processed output data
- Provides a single composite rating for all Primary Highway System segments, in addition to individual criteria
- Evaluation results easily summarized in table and map form, consumed via web-based tool
- Useful input to DOT decision-making process

# Questions?

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