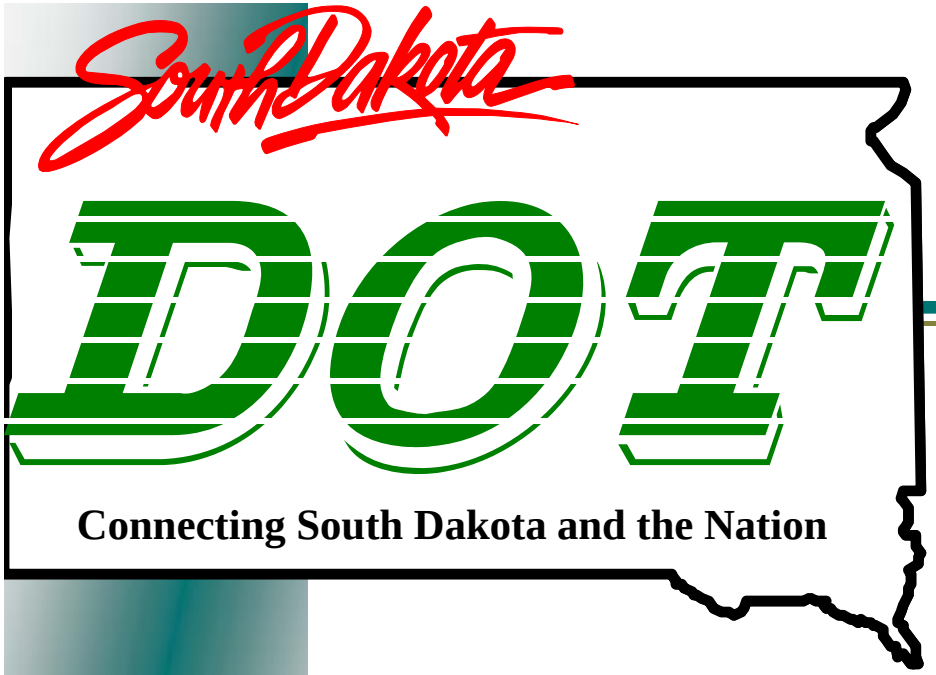


Weather-Responsive Regional Traveler Information System

David Huft, SDDOT Research Program Manager
Greg Ostermeier, Iteris, Inc.

Talking Technology and Transportation (T3) Webinar
March 26, 2015

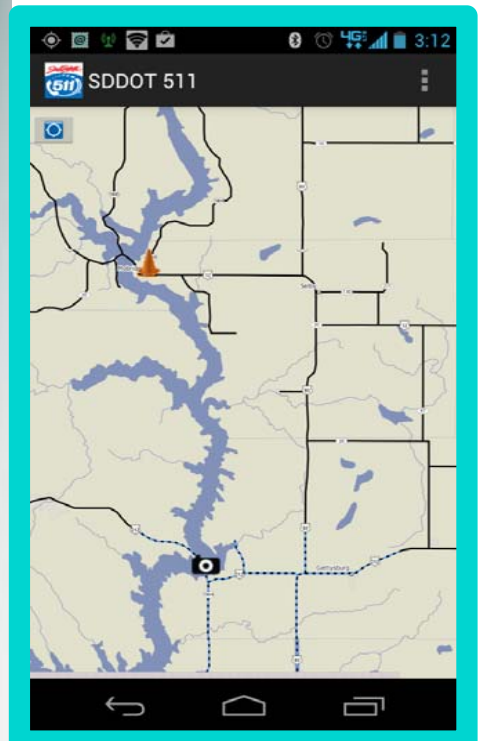
Project Origin & Team

- FHWA Road Weather Program
- "Weather Responsive Travel Management Implementation"
- Start October 2013
- End October 2015

ITERIS®

- Work by Iteris
  - Operates SDDOT's
    - ✧511 telephony , web site, mobile apps
    - ✧Road condition reporting system (IRIS)
    - ✧Maintenance Decision Support System (MDSS)
  - Compiles SDDOT mobile data
  - Developed and executed related *Clarus* Regional Demo

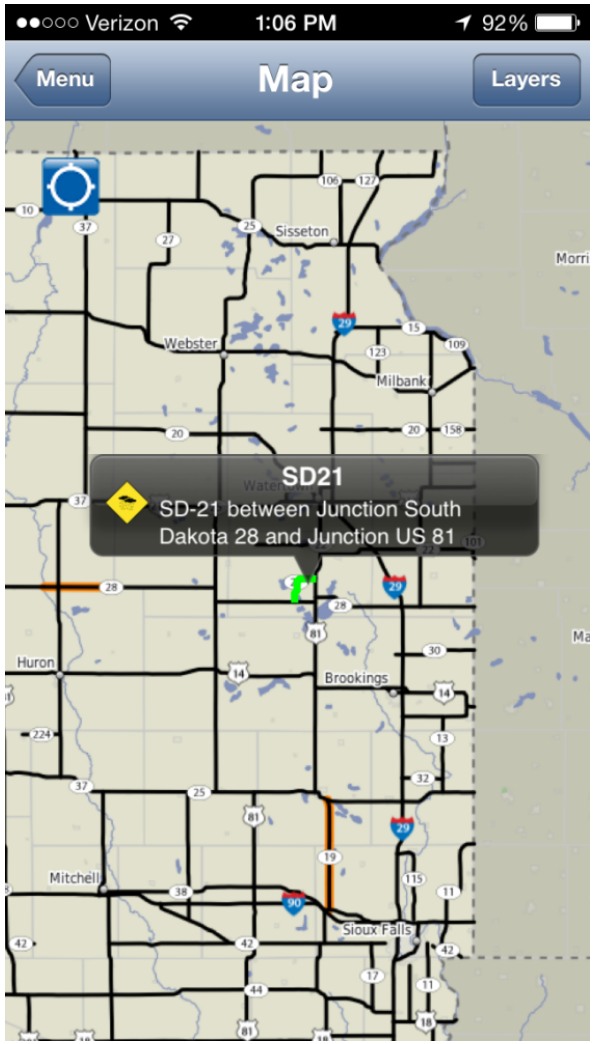
Where We Are Now—
Traveler Information Media



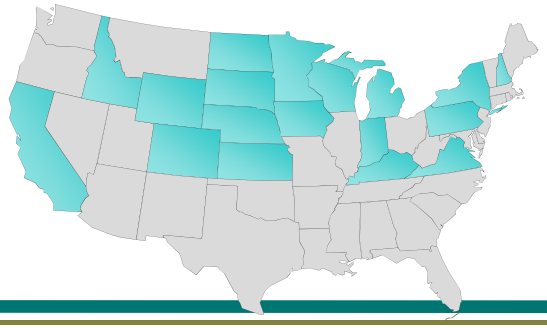
Where We Are Now—
Traveler Information Content

- Current road conditions
- Forecast weather conditions
- Camera images
- ClearPath511 road alerts
- Weather overlays
- Severe weather alerts
- Commercial Vehicle restrictions
- Traffic Incidents
- Congestion

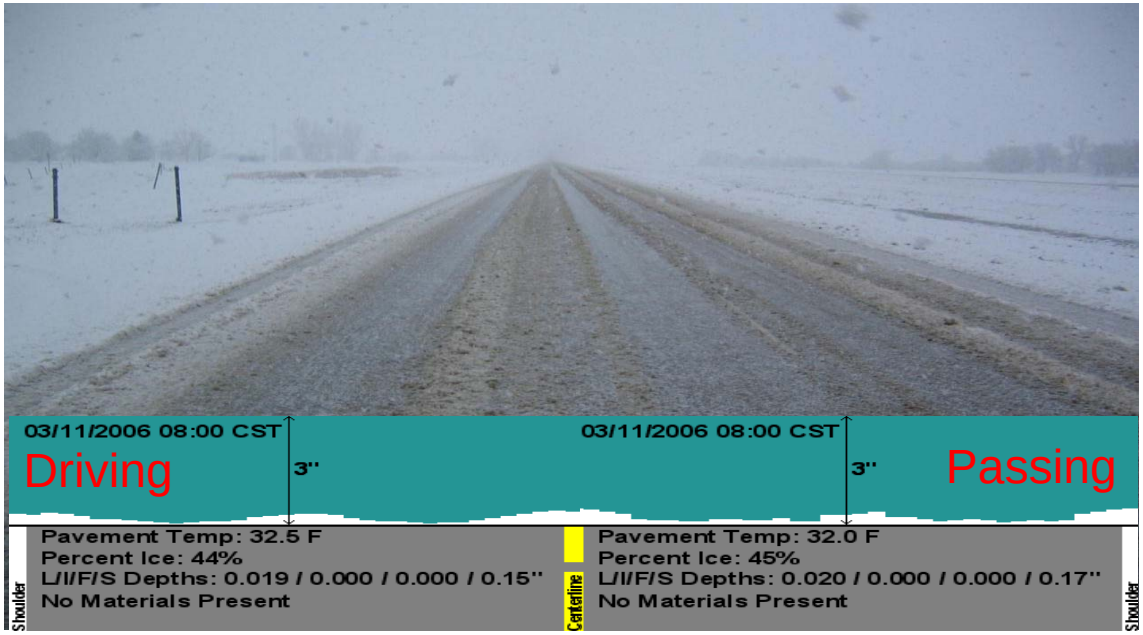
…on the State Highway Network



Where We Are Now— Maintenance Decision Support System (MDSS)



- Predict weather and road conditions
- Track applied maintenance
- Consider available resources
- Recommend treatment type, rate, timing
- Save material, fuel, labor
- Provide equal or better level of service



Where We Are Now—Limitations

- Road conditions reported by SDDOT maintenance staff, not 24/7
- Off-hours info can be outdated or misleading
- Travel info does not use:
  - MDSS road condition forecasts
  - MDC observations
  - ESS observations
  - Some important NWS messages
- Weather-related travel info does not get to DMS

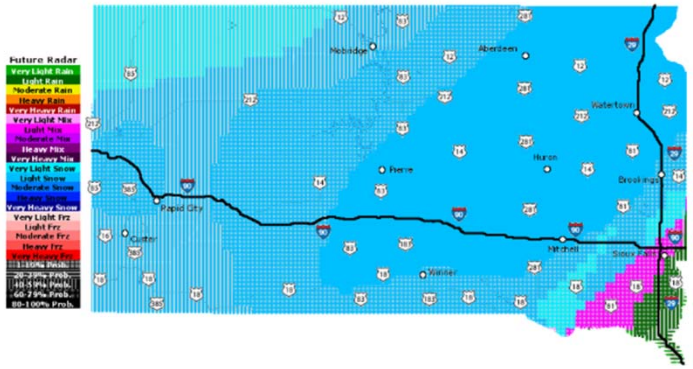
Where We Want to Be—
Available Data Sources

- MDSS
  - Detailed analyses and forecasts of road and weather conditions
- National Weather Service
  - Weather watch, warning, and advisory messages
- SDDOT
  - IRIS: Current road condition reporting system
  - ESS: Source of near-real-time observations 24/7
  - MDC/AVL: Snowplow operators most informed resource during and after winter weather events

Where We Want To Be—
Enhanced Traveler Information Services

- Expand 24/7 road weather information
- Display forecasted weather and adverse road conditions
- Leverage MDSS
  - particularly off-hours
  - on potentially bad road/weather conditions
- Combine IRIS/MDC road reporting
- Enhance content and display of severe weather advisories
- Show ESS weather info with camera images
- Use DMS to convey critical traveler alerts

MDSS → 511/Website/Apps/DMS



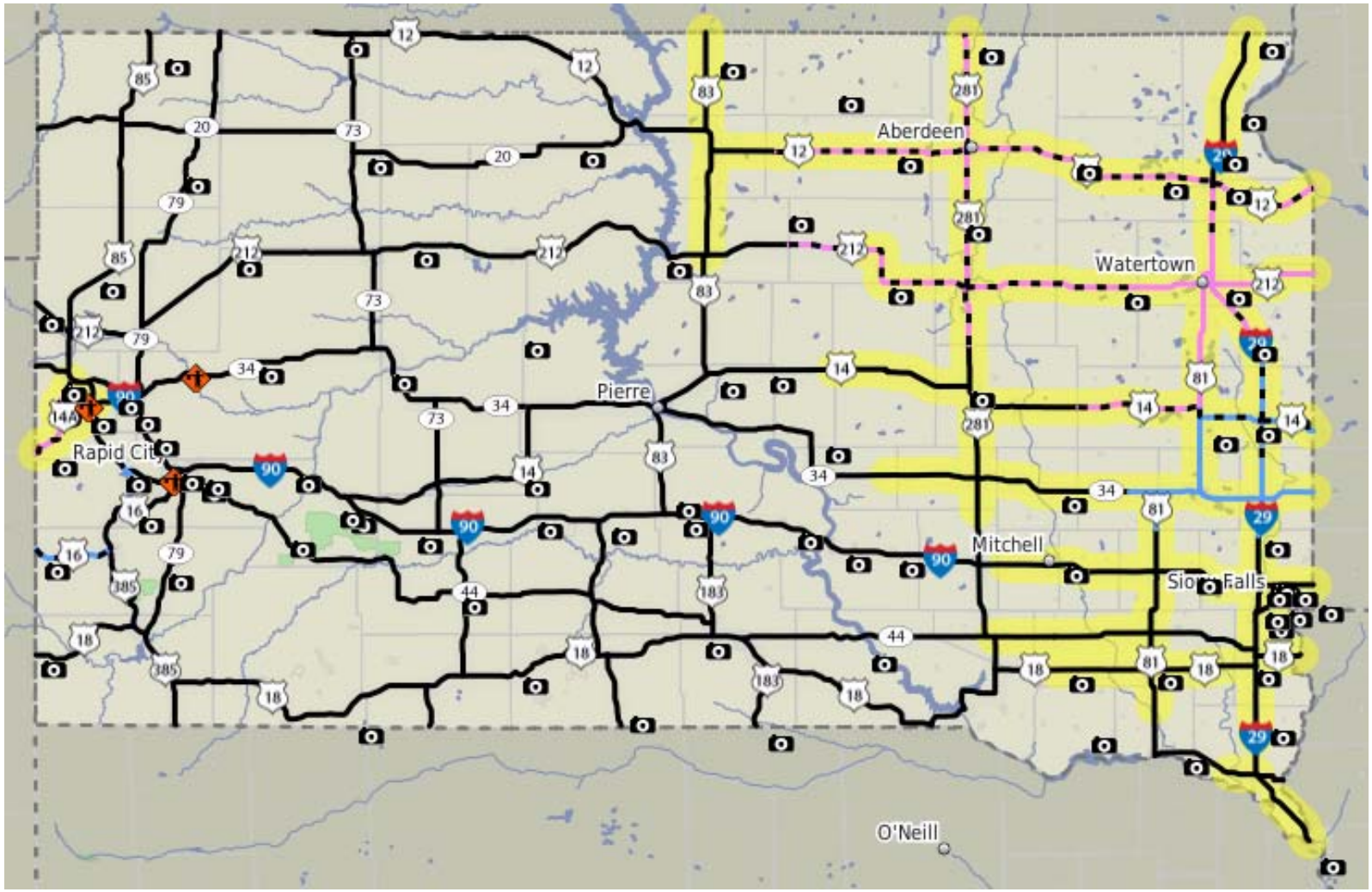
Opportunities

- Highlight roads or areas with potential for hazardous road or weather conditions
- Provide segment-specific text and voice messages
- Display DMS-specific messages impacting road ahead

Issues

- Configuration effort
- Condensing data into easily consumable info
- Presentation format
- Trade-off between actionable information and liability concerns
- Deferring to official observations from SDDOT personnel

MDSS-Based Threat Forecast



MDSS-Based Threat Forecasts

- Can view base layer with threat forecast shown

Threat Text Description

24 Hour Threat Forecast **(What is this?)** The following road condition threats are forecasted for 10AM CST Sat through 10AM CST Sun. Actual road conditions may vary from this forecast. Motorists are cautioned to be alert to changing conditions.

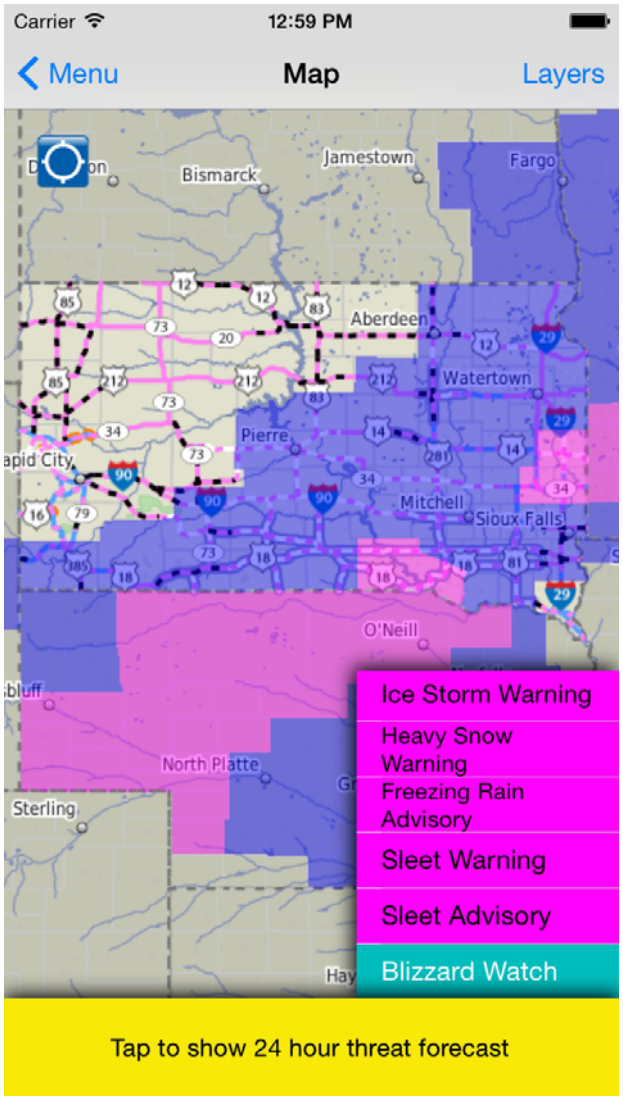
- from Junction South Dakota 47 North-Bowdle to Junction South Dakota 247-Roscoe
  - lightly icy road conditions possible between approximately 9PM Sat and 7AM Sun.

- from Junction South Dakota 247-Roscoe to Junction South Dakota 45 South-Ipswich
  - lightly slushy/icy road conditions possible between approximately 7PM Sat and 9AM Sun.

- from Junction South Dakota 45 South-Ipswich to 7.75 miles east of Junction South Dakota 45 North
  - snowy/slushy/icy road conditions possible between approximately 7PM Sat and 6AM Sun.

NWS Alerts → Website/Apps

- Selectable overlay to show on map
- Shows areal coverage
- Legend lists products active in SD and adjacent states
- Select covered road segment for more details



NWS Alerts → Website/Apps

- Example NWS segment report content

The following National Weather Service product is in effect: Winter Storm Warning between 2.0 mi E of Junction South Dakota 25-Exit 350 and Minnesota State Line beginning 12:00 PM CST Monday until 12:00 AM CST Tuesday.
National Weather Service product messages:
Winter Storm Warning message (1)
Winter Storm Warning message (2)
Winter Weather Advisory message (1)

- Product message links to NWS messages

URGENT - WEATHER MESSAGE
NATIONAL WEATHER SERVICE RAPID CITY SD
427 AM MST TUE FEB 17 2015

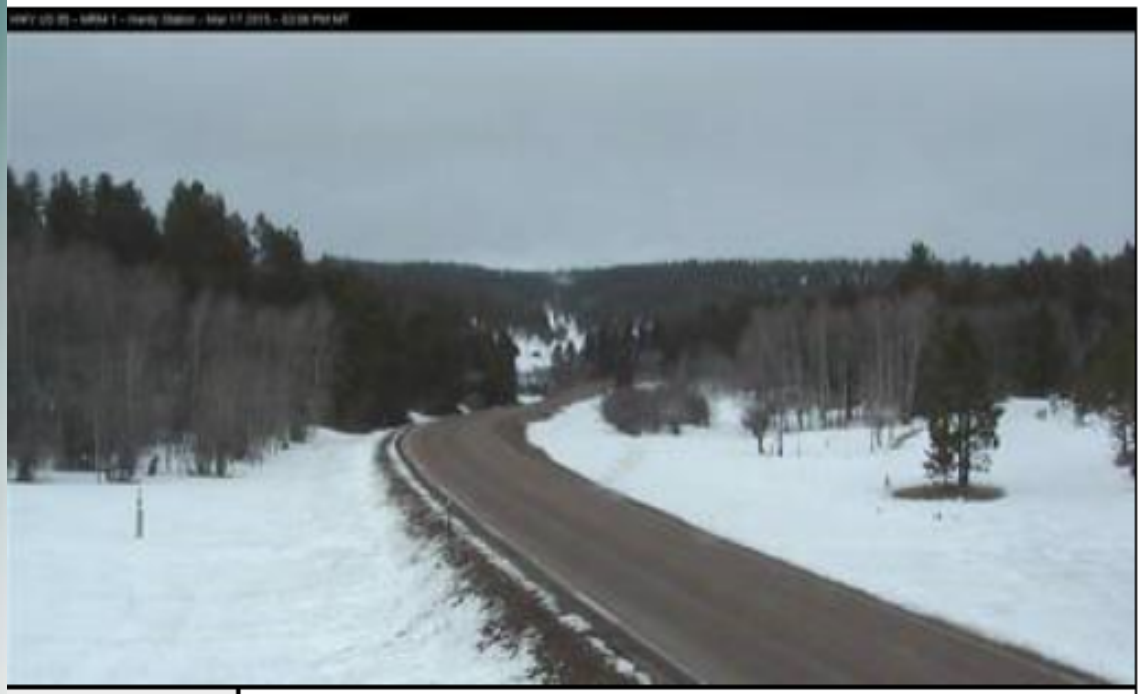
.GUSTY NORTHWEST WINDS WILL DEVELOP THIS MORNING ACROSS THE
NORTHWEST AND WEST CENTRAL SOUTH DAKOTA PLAINS. NORTHWEST WINDS
OF 25 TO 35 MPH ARE EXPECTED WITH GUSTS UP TO 50 MPH. WINDS WILL
DECREASE EARLY THIS EVENING.

HARDING-PERKINS-BUTTE-NORTHERN MEADE CO PLAINS-ZIEBACH-
NORTHERN FOOT HILLS-RAPID CITY-PENNINGTON CO PLAINS-HAAKON-
STURGIS/PIEDMONT FOOT HILLS-SOUTHERN MEADE CO PLAINS-
INCLUDING THE CITIES OF...BUFFALO...LEMMON...BISON...
BELLE FOURCHE...FAITH...DUPREE...SPEARFISH...RAPID CITY...WALL...
PHILIP...STURGIS...UNION CENTER
427 AM MST TUE FEB 17 2015

...WIND ADVISORY REMAINS IN EFFECT FROM 9 AM THIS MORNING TO 6 PM
MST THIS EVENING...

SDDOT ESS → Website/Apps

Full-Size View: Camera Images in the Hardy Station Area (click thumbnail for larger view)



Location	Hardy Station (SDHDY): Looking North
Description	Near WY border along US-85 @ MP 2.5
Image Time	Tuesday, Mar 17 at 3:06 PM MDT
Weather	Temp: 33F , Wind: SSW 19mph , Mar 17 at 3:33pm MDT

Hardy Station
SDHDY (South)
Near WY border along US-85 @ MP 2.5

Hardy Station
SDHDY (North)
Near WY border along US-85 @ MP 2.5

Hardy Station
SDHDY (Northeast)
Near WY border along US-85 @ MP 2.5

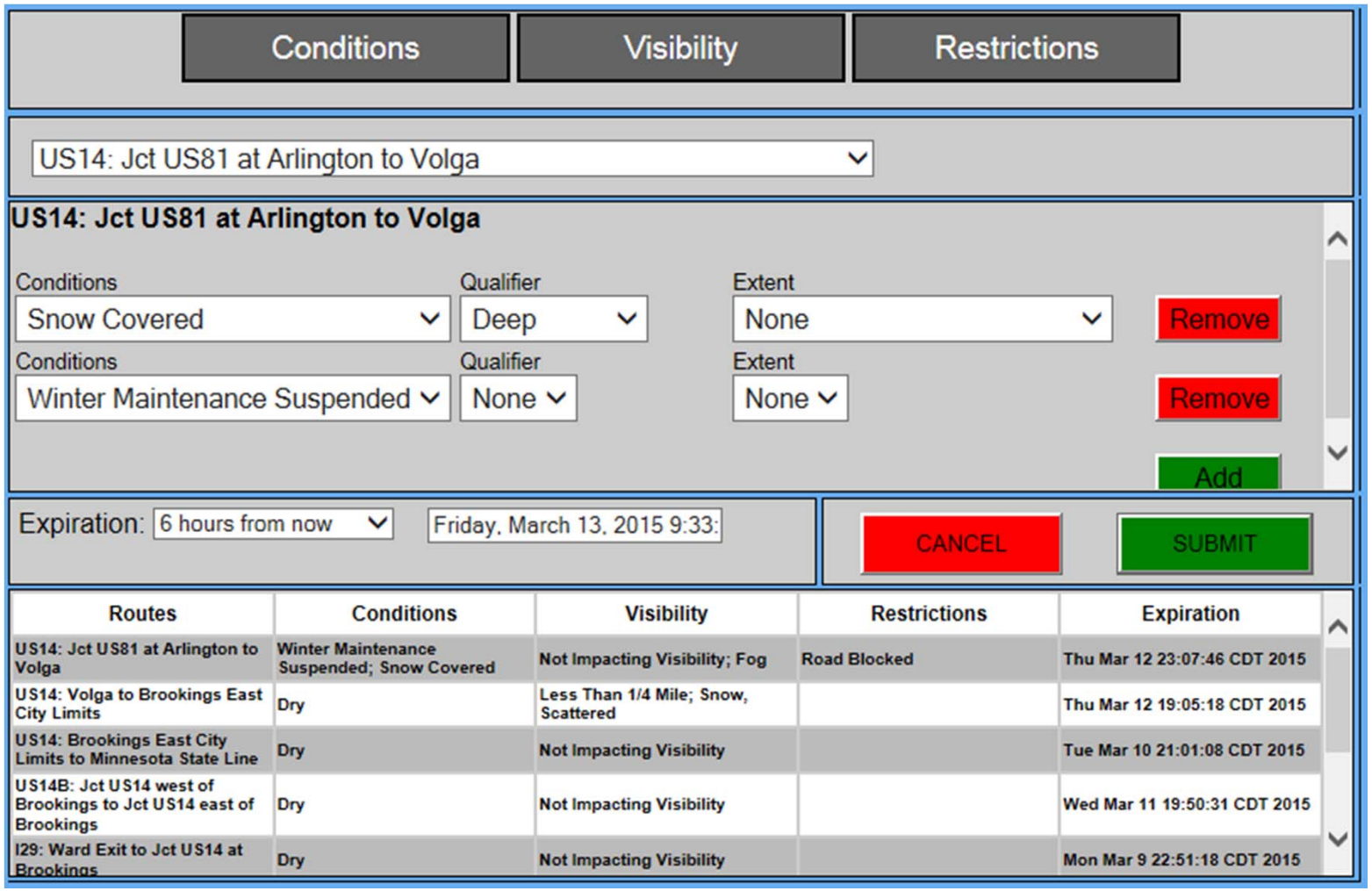
Dynamic Message Sign Content

- Currently 30 signs scattered along I-29 and I-90
- Provide content for downstream road spans
- Determine prioritization and what to report
- Maintaining human decision-making on content at least initially

Road Conditions Reporting

- Initial goal was simply to direct road condition reports from trucks into IRIS database
  - Different conditions data dictionaries
  - Different locations at which conditions set
    - ✧Defined road segments in IRIS for ATIS
    - ✧Point reports from trucks applied to subsequent travel
- Decision to provide a slimmed version of IRIS interface as website accessible within truck

Road Conditions Reporting



Routes	Conditions	Visibility	Restrictions	Expiration
US14: Jct US81 at Arlington to Volga	Winter Maintenance Suspended; Snow Covered	Not Impacting Visibility; Fog	Road Blocked	Thu Mar 12 23:07:46 CDT 2015
US14: Volga to Brookings East City Limits	Dry	Less Than 1/4 Mile; Snow, Scattered		Thu Mar 12 19:05:18 CDT 2015
US14: Brookings East City Limits to Minnesota State Line	Dry	Not Impacting Visibility		Tue Mar 10 21:01:08 CDT 2015
US14B: Jct US14 west of Brookings to Jct US14 east of Brookings	Dry	Not Impacting Visibility		Wed Mar 11 19:50:31 CDT 2015
I29: Ward Exit to Jct US14 at Brookings	Dry	Not Impacting Visibility		Mon Mar 9 22:51:18 CDT 2015

Evaluation

- Better traveler information service?
  - Usage statistics from websites and apps showing how often new information used and selected
  - Surveys of general public and recruited users from state agencies and like
- Road conditions reporting improvements?
  - Are reports more timely or frequent?

Questions?

- Contact

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http://safetravelusa.com/sd

Thank You!!