

Winter Maintenance Decision Support Pooled Fund Study TPF-5(054)

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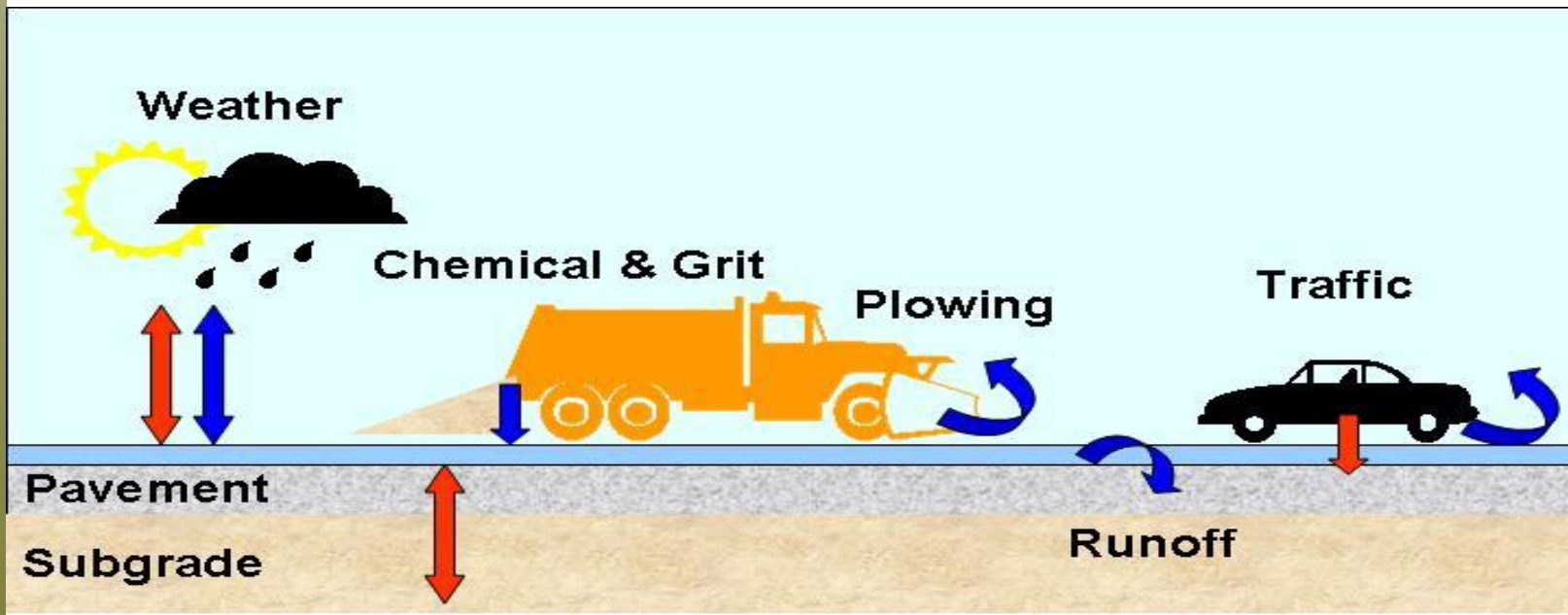
Why Maintenance Decision Support?

- Rising demands of travelers & commercial carriers
- High labor, material, equipment & fuel costs
- Constrained funding
- Reliable, timely condition reports hard to get
- Some weather conditions difficult to forecast
- Complex pavement response to weather, maintenance
- New deicing chemicals & techniques
- Environmental concerns
- Staff size, turnover, and inexperience

MDSS Concept

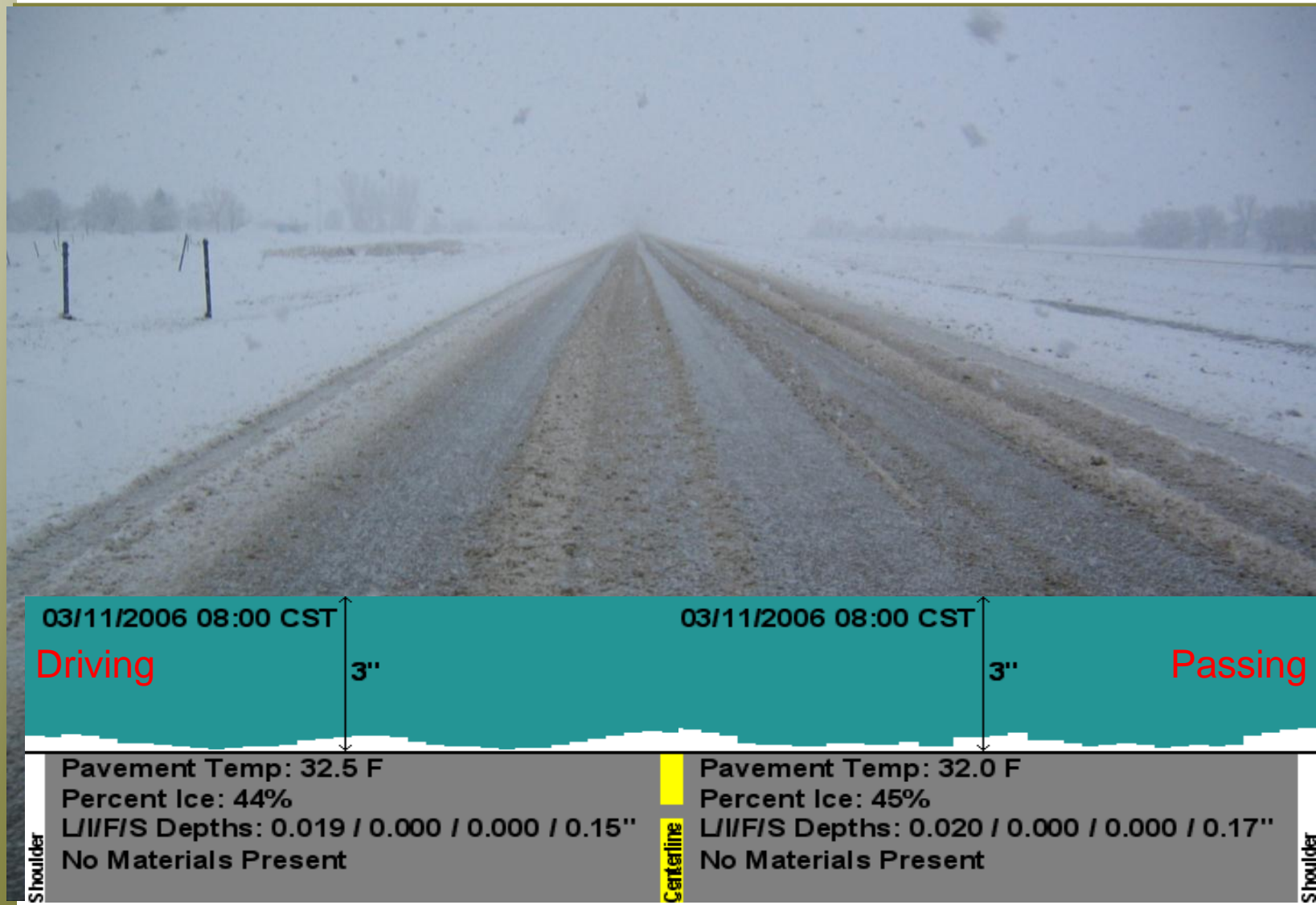
How Does It Work?

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



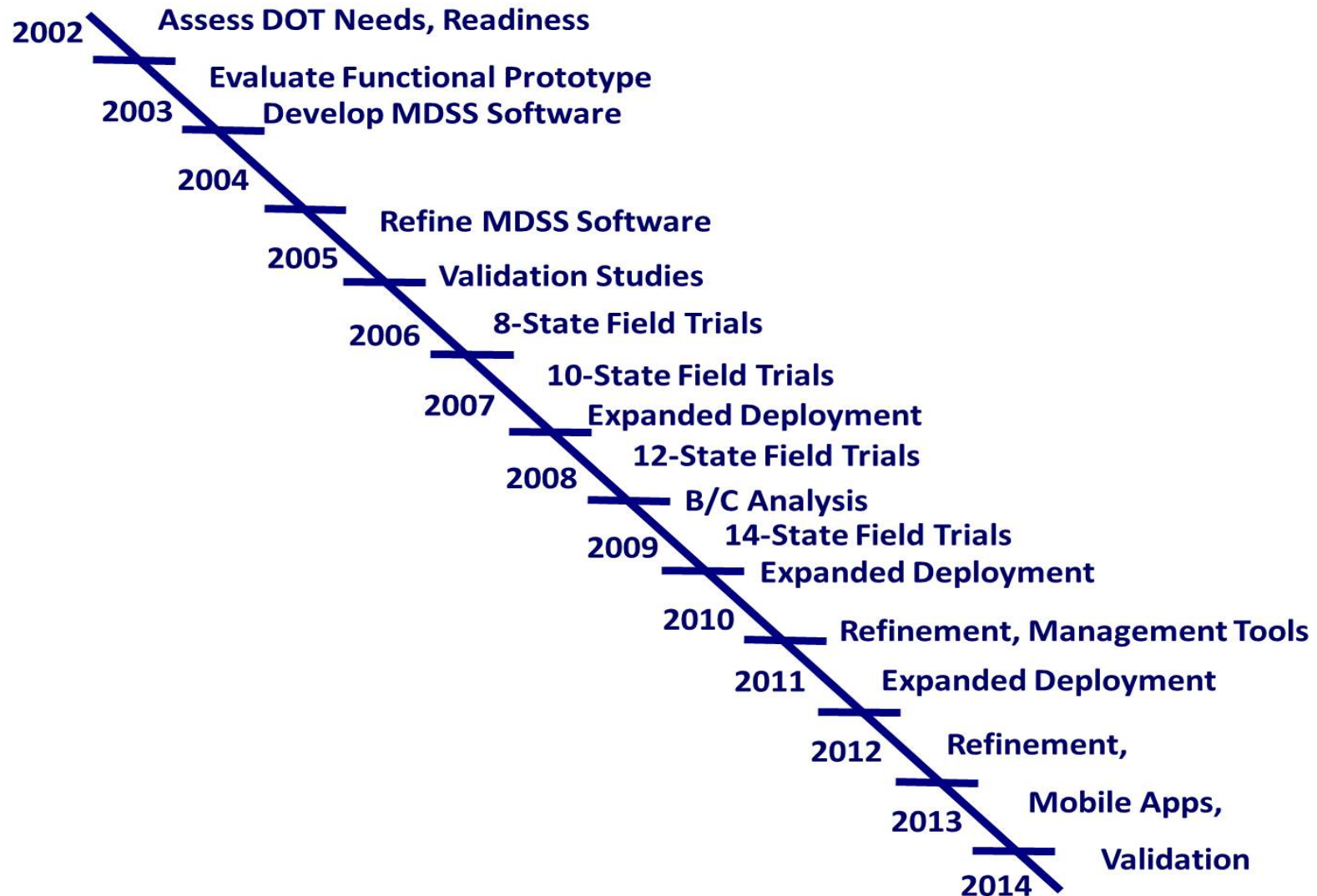
MDSS Concept

Modeling Reality



MDSS Pooled Fund Study

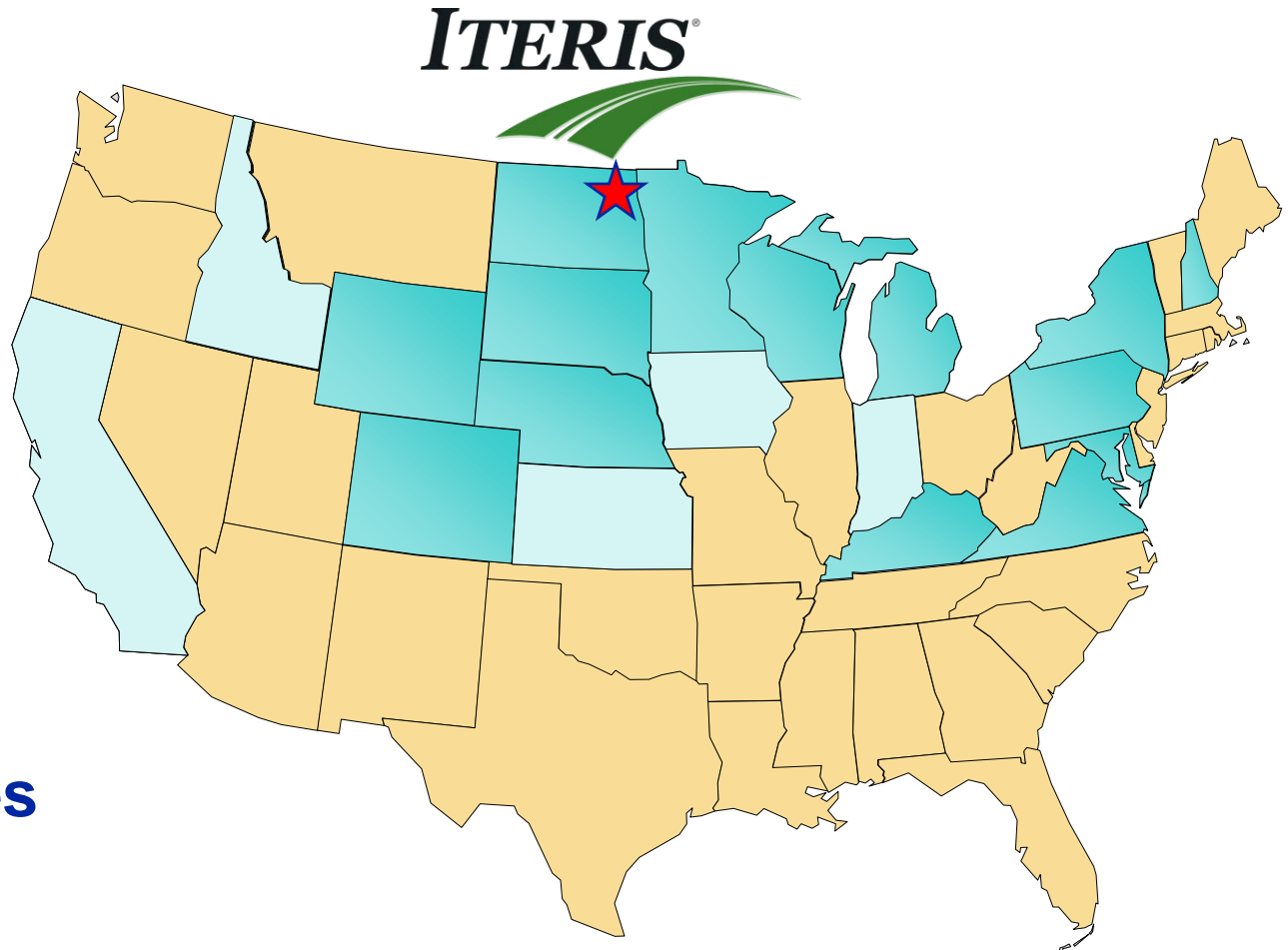
MDSS is New...but Maturing



MDSS Growth 2002-2014

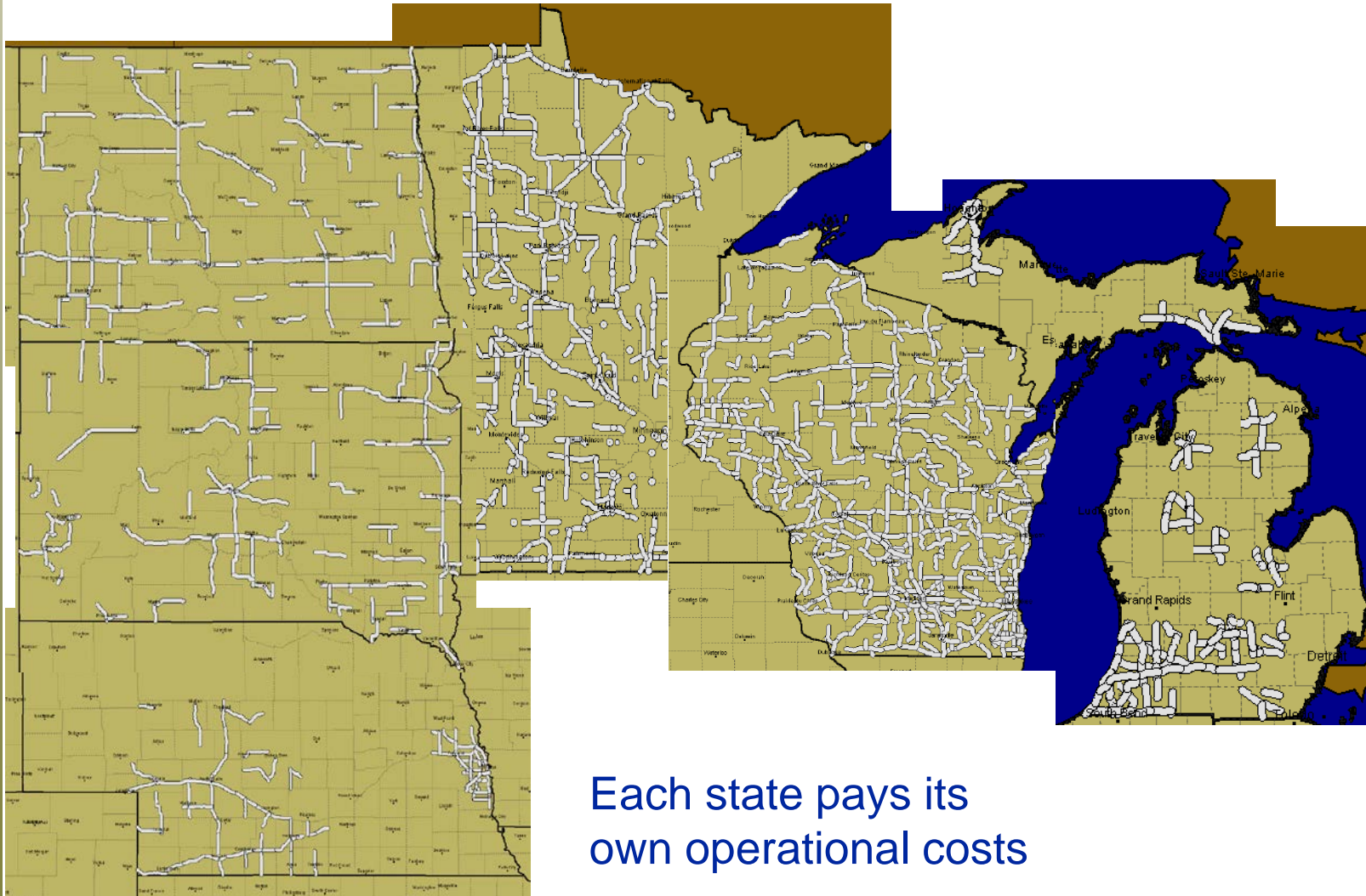
**5 states
(2002)**

**14 states
(2014)**



MDSS Pooled Fund Study

Example Deployment Levels



Each state pays its own operational costs

Benefit/Cost Studies

- 3:1 to 8:1 b/c ratio estimate by Western Transportation Inst.
- Indiana 1st-year deployment 2008/2009
 - \$12M reduced salt use
 - \$1.3M overtime & fuel
 - \$11M overall after normalizing for winter conditions
 - ~27% of normal winter maintenance budget
- SD can't estimate savings because of change to "salt only" at same time

- MnDOT savings winter 2009-2010



MDSS Current Focus Areas

MDSS Mobile Apps



Map
View



Observations

MDSS Current Focus Areas

MDSS Mobile Apps



Camera Views

Verizon 1:44 PM

Map MP 144.5 to 157, Wolf Cr...

1 2 3

MDSS Roadway

13 7:40:00 PM	57	Dry
13 6:40:00 PM	59	Dry
13 5:40:00 PM	61	Dry
13 4:40:00 PM	63	Dry
13 3:40:00 PM	65	Dry
13 2:40:00 PM	68	Dry
13 1:40:00 PM	78	Dry
13 12:40:00 PM	103	Dry
13 11:40:00 AM	96	Dry
13 10:40:00 AM	83	Dry

Table Current

Time Slider

Observations
and Forecasts



Assessment of Recommendations

MDSS Step

- Predict Weather
- Predict Road Conditions
- Recommend Treatment
- Predict Treated Conditions

Validation

- Predicted=Observed?
- Predicted=Observed?
- Treatment Reasonable, Appropriate?
- Predicted=Observed?

Other Efforts & Concerns

- Intellectual Property
 - IP generated within the Pooled Fund Study
 - Regarding MDC
- Mobile Data Collection
 - Next generation MDC
 - Expand routes & vehicles
- Management Reports
 - By route, vehicle, storm, season, area
- Route Configuration
 - Pavement
 - Treatments
 - Route and Cycle Times
 - Level of Service

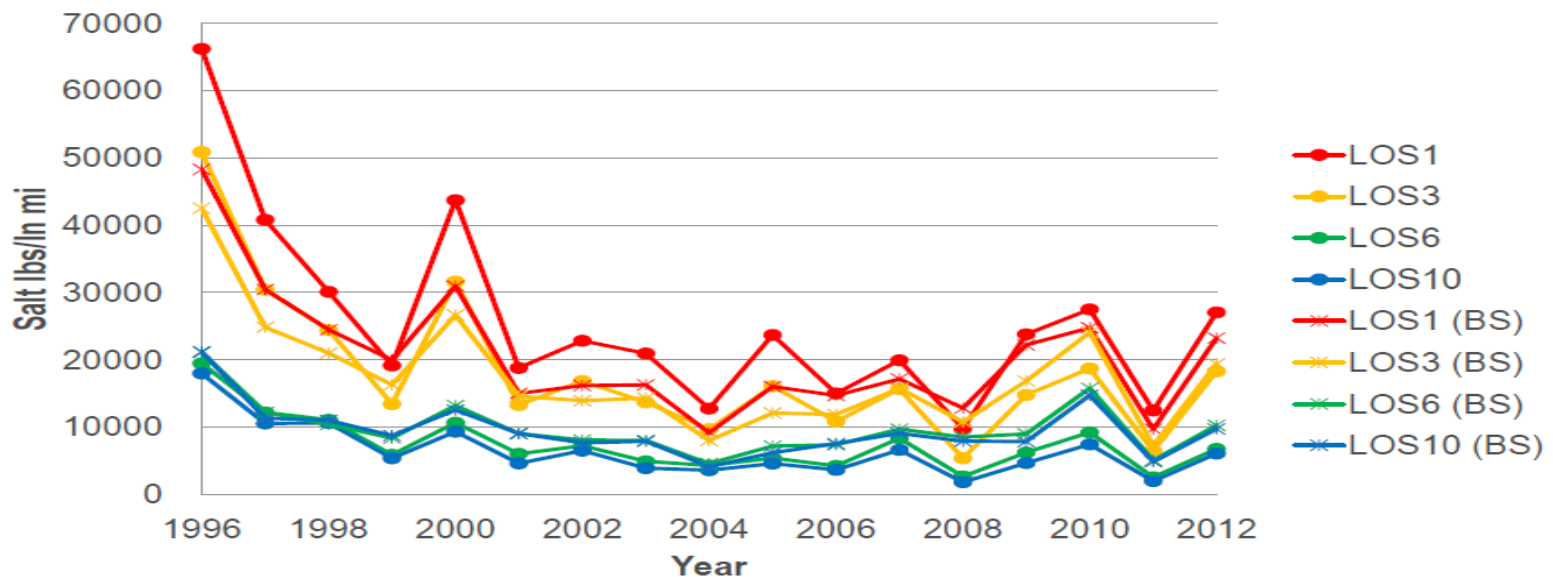


Level of Service Analysis

➤ Two-Part **Simulation**

- Use baseline configuration on all sites varying weather and LOS
- Use agency-specific configurations and vary LOS

➤ Compare to actual agency records to identify need to adjust configuration



Benefits of Membership

- Jointly led leading-edge R&D
- Convenient funding mechanism
- Low-risk opportunity to deploy
- Learning
 - State to State
 - Vendor to State
 - State to Vendor
- Intellectual property: open but not public domain
- Nationally prominent forum for advancing MDSS and related technologies



Questions?

1.

Please contact:

2.

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3.

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4.

Thank you!

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