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XIII INTERNATIONAL WINTER ROAD CONGRESS

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WORLD ROAD ASSOCIATION
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SUSTAINABLE WINTER SERVICE FOR ROAD USERS

Road Weather Management Program (RWMP) Performance Measurement

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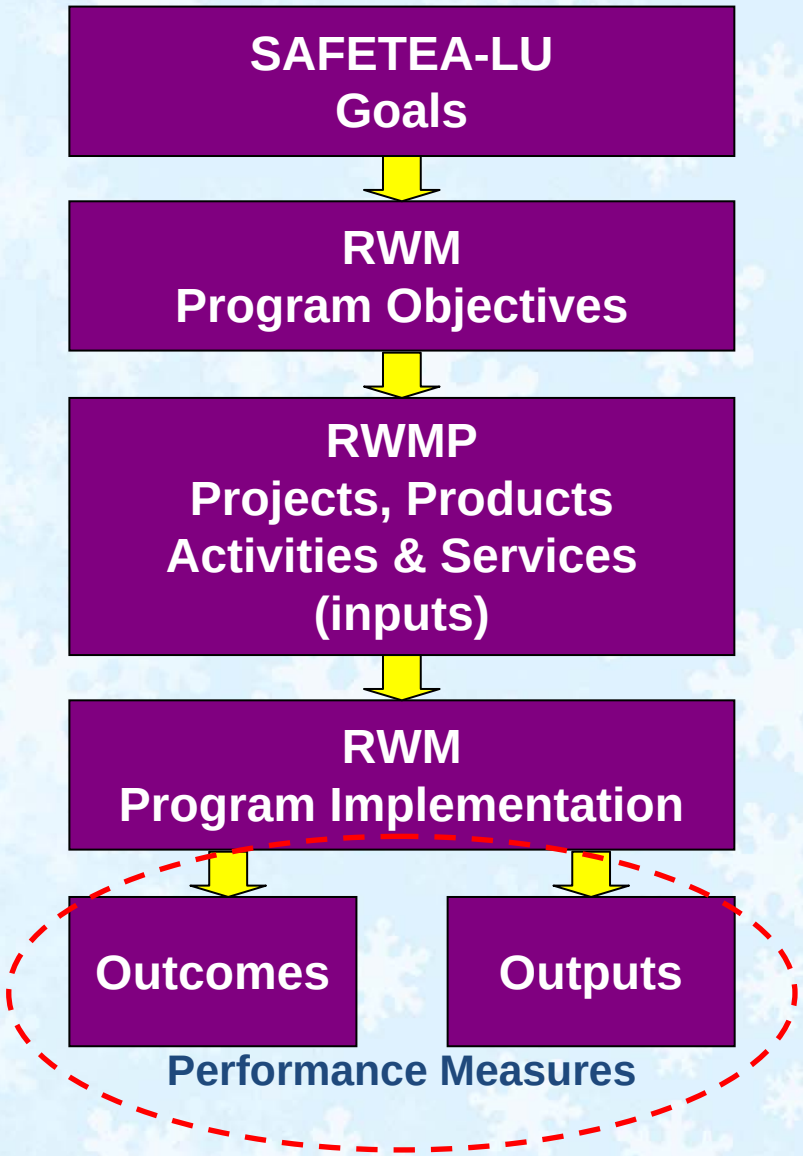
FHWA RWMP PERFORMANCE MEASURES PROJECT

Objective: Develop performance measures to use for evaluating the success of the RWMP in achieving the following SAFETEA-LU Section 5308 goals:

1. Maximize use of available road weather information and technologies
2. Expand Road Weather R&D efforts to enhance roadway safety, capacity, and efficiency while minimizing environmental impacts; and
3. Promote technology transfer of effective road weather scientific and technological advances.

PROJECT FRAMEWORK



RWMP OBJECTIVES AND ACTIVITIES CONTRIBUTING TO SAFETEA-LU GOALS

- Observing & Forecasting Research
  - *Clarus* Initiative
  - IntelliDrive^{SM} Weather Research
- Weather-Responsive Traffic Management
- Decision Support Research
  - Maintenance Decision Support System (MDSS)
- Stakeholder Coordination / Partnerships
- Training & Education

PERFORMANCE MEASUREMENT PROJECT HISTORY

PHASE 1 – Identify measures (Nov. 2006 – Jan. 2008)

- Contractor: Battelle, UND, KMJ Consulting
- Literature Review and Synthesis (135+ documents)
- Preliminary Measures (Stakeholder Workshop -- 4/24/07)
- Feedback from practitioners (240 requests, 70 respondents)
- Narrowed down to 11 output and outcome measures
- Published final report, flyer

PHASE 2 – Quantify the measures (Feb. 2008 – Apr. 2009)

- Contractor: Battelle, UND
- Definition of Metrics and Data Sources, Implementation Plan
- Performance Indicators Identified
- Compiled available data on measures
- Conducted interviews with states
- Published final report, flyer

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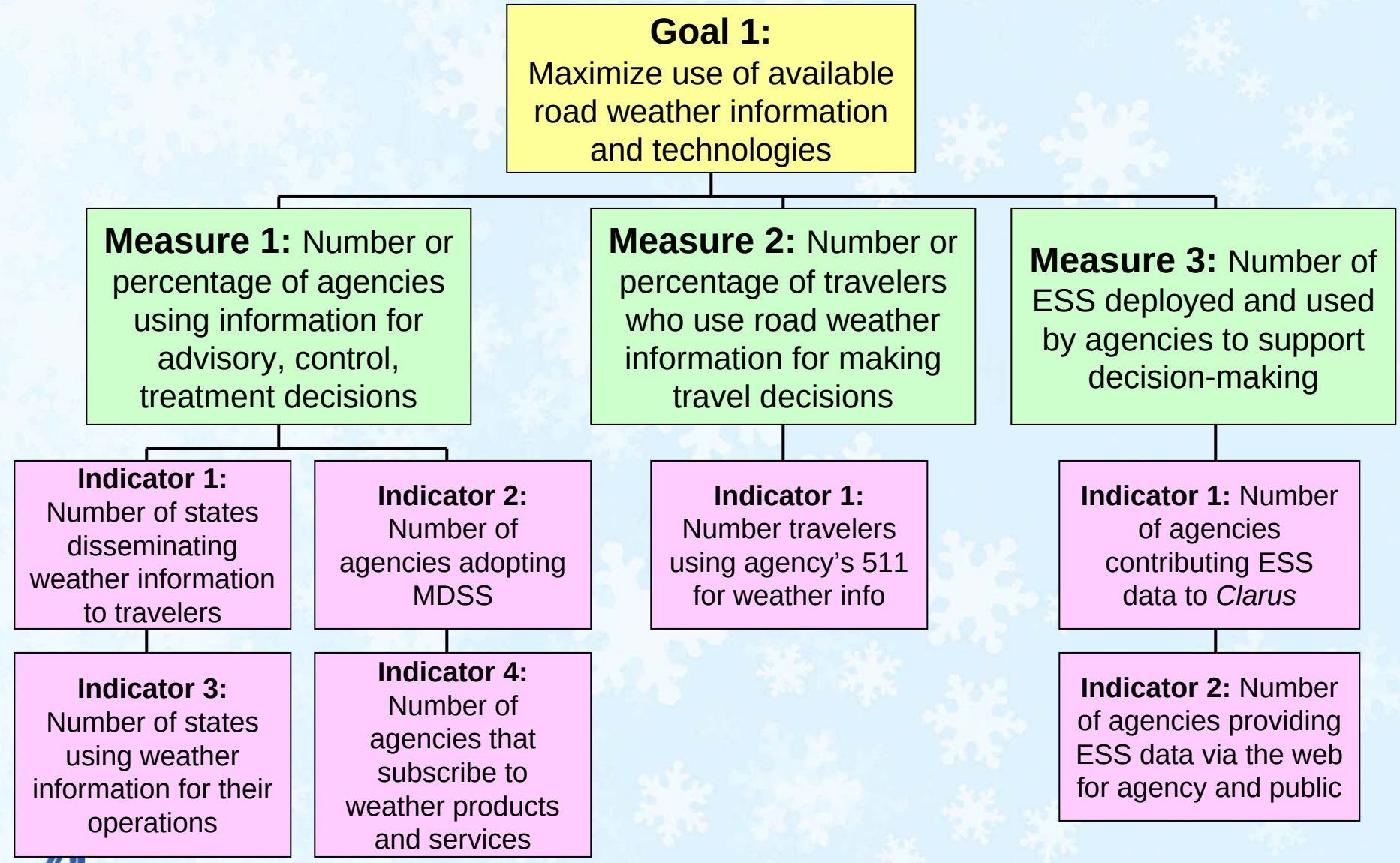
RWM PERFORMANCE MEASURES & INDICATORS



GOAL 1 – MAXIMIZE USE OF AVAILABLE ROAD WEATHER INFORMATION & TECHNOLOGIES

- States providing travelers with Wx information increased 46% from 2004 to 2007.
- In 2007, 22 states reported providing route-specific weather forecasts, up 69 percent over 2004.
- In 2007, 46 states used atmospheric data, 45 states used pavement condition data for operations, and 30 states implemented traffic control strategies.
- By 2008, 30 agencies reported some use of MDSS, and five reported operational use.
- From 2004 to 2007, the number of state DOTs using Wx information increased 31 percent.
- From 2006 to 2009, agencies contributing ESS data to *Clarus* increased from 3 to 39.
- In 2008, 33 states had 41 operating 511 systems, and 25 offered road weather information.

RWM PERFORMANCE MEASURES & INDICATORS

Goal 2:
Expand road weather R&D efforts to enhance roadway safety, capacity, and efficiency while minimizing environmental impacts

Measure 1:
Number of agencies participating in and benefiting from road weather R&D projects

Measure 2:
Percentage of time roadway meets safety and capacity LOS standards during and after weather events

Indicator 1: State-level winter response LOS statistics and performance standards

Measure 3:
Reduction in agency costs (labor, equipment, material) due to adoption of decision support systems

Measure 4:
Reduction in user costs (e.g., delay, crashes, emissions) due to improved road weather strategies

Indicator 1:
Reductions in crashes due to RWMP practices adopted by public agencies

Indicator 2: Reduction in capacity losses, delays due to RWMP practices adopted by public agencies

GOAL 2 – EXPAND ROAD WEATHER R&D EFFORTS TO ENHANCE ROADWAY SAFETY, CAPACITY & EFFICIENCY WHILE MINIMIZING ENVIRON. IMPACTS

- 88% of agencies participating in road weather R&D said they experienced moderate or substantial benefits, and 20 said they were involved in more than one RWMP initiative.
- 32% of agencies measure “time to wet/bare pavement;” 11% measure “time to pre-event travel speeds after a weather event;” and 18% measure “customer satisfaction with maintenance and recovery time.”
- Fog warning systems have reduced crashes by 70-100%; the use of RWIS use increased by 17%; anti-icing strategies were up 83%; and wet pavement detection by 39%.
- Low visibility warning systems reduced speed variability by 22% and increased speeds by 11%; variable speed limits reduced average speed by 13%.

RWM PERFORMANCE MEASURES & INDICATORS

Goal 3:
Promote technology transfer of effective road weather scientific and technological advances

Measure 1:
Number of agencies/individuals visited or contracted through technology transfer and outreach activities

- **Indicator 1:** Number of agencies participating in *Clarus* initiative activities
- **Indicator 2:** Number of agencies participating in MDSS stakeholder meetings

Measure 2: Rate of adoption of RWMP technologies by agencies that participated in workshops or training

- **Indicator 3:** Number of participants in RWMP hosted, sponsored or promoted training

Measure 3:
Number of RWMP technology development, testing and deployment activities of the public or private sector

- **Indicator 1:** Number of agencies contributing their ESS data to *Clarus*
- **Indicator 2:** Public and private sector use of quality-checked *Clarus* data

Measure 4:
Number of road weather technologies developed through partnerships reaching operational deployment

- **Indicator 3:** Number of states adopting MDSS technology and methods

GOAL 3 – PROMOTE TECHNOLOGY TRANSFER OF EFFECTIVE ROAD WEATHER SCIENTIFIC & TECHNOLOGICAL ADVANCES

- State DOT participation in *Clarus* stakeholder meetings increased 68% between 2004-2008.
- 22 of 30 state agencies interviewed (73%) are involved in the *Clarus* Initiative, and 41 state DOTs have participated in one or more annual MDSS stakeholder meetings.
- 17 of 30 agencies (57%) are involved with MDSS and 13 (43%) with both the *Clarus* Initiative and MDSS.
- 151 persons attended 6 road weather management training courses; 925 participated in 28 RWMP sponsored MDSS Road Shows.
- 79% of state agencies interviewed have visited the RWMP web site; 12 downloaded materials, and 71 percent participated in an NTOC webcast.
- Between 2001 and 2008, ~90 projects have been initiated through federal, state and university sponsorship with RWMP input and support.

FOR MORE INFORMATION

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