



ROAD WEATHER MANAGEMENT PROGRAM

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2021 ROAD WEATHER MANAGEMENT PROGRAM'S PERFORMANCE MEASURES UPDATE

The Federal Highway Administration's (FHWA's) [Road Weather Management Program \(RWMP\)](#) strives to mitigate the impacts weather can have on the Nation's highway system and the environment. Over the past 15 years, the RWMP conducted six periodic evaluations of its effectiveness in accomplishing its goals. Each evaluation is based on the program's objectives, which are periodically updated by the RWMP team and used by the road weather community as a guidepost for technical direction and activity. Data sources such as the RWMP's records, literature reviews, internet searches, and State department of transportation (DOT) surveys¹ are used to conduct each assessment. These periodic evaluations help to communicate the overall success of the RWMP and to identify areas that need more focus, support, and/or outreach in the future.

Presented here are the highlights of the 2021 *Road Weather Management Performance Measures Update* report. The report includes the latest progress, successes, and national state of the practice relating to the implementation of road weather strategies for each RWMP objective area.

STAKEHOLDER ENGAGEMENT

Overall Assessment = Strong performance in accomplishing the objective

Under this objective, the RWMP is focused on building and sustaining relationships with multi-disciplinary partners to support and advance the work of the road weather community.

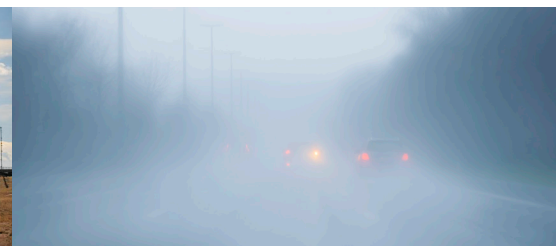
Stakeholder engagement was evaluated through stakeholder participation in FHWA-sponsored events and industry events where the RWMP presented information related to the program. The evaluation showed strong performance across all measures, specifically:

- The number of individuals and agencies participating in and benefiting from road weather management stakeholder meetings and workshops has continued to increase year-over-year, indicating continued interest in the RWMP's programming and topics.
- Strong participation levels in the RWMP's webinars, as well as industry meetings, site visits, and venues where the RWMP presented, indicate a continued interest in the topical offerings and continued engagement by the stakeholder community.

Results indicate the RWMP continues to evolve to meet the needs of its partners and continues to provide relevant programming to help enhance road weather management efforts across the country.

¹ A total of 41 State DOTs participated in the survey during the spring of 2021. State DOT statistics presented here are based on these responses.

Source: USDOT/Getty



RESEARCH AND DEVELOPMENT

Overall Assessment = Strong performance in accomplishing the objective

A major focus area for the RWMP is creating new research and development (R&D) projects and supporting existing R&D projects that benefit the road weather community.

The RWMP's performance in this area was assessed by looking at both transportation agency interest and deployment of R&D projects as well as the level of interest and use of connected infrastructure and connected and automated vehicles (CAVs) to support road weather management practices. Highlights of the assessment for this objective include:

- There is continued interest and rising participation levels for most FHWA road weather R&D projects.
- Most States are considering implementing applications to gather road weather data through connected infrastructure and CAVs, but have yet to develop these systems.
- Half of participating States have included connectivity topics in their strategic planning documents, while one-third have included automated driving capabilities in their documentation.
- Most States are interested in working with external organizations to advance connectivity and automation in their road weather management practices.
- Lastly, there is strong collaboration among States and external organizations in conducting non-USDOT sponsored research. The majority of participating States attributed their decision to participate in these external collaborations to the influence of the RWMP.

DEPLOYMENT

Overall Assessment = Strong performance in accomplishing the objective

The RWMP's mission is to lead and support the road weather community in the development and deployment of innovative technologies, solutions, and strategies.

Under this evaluation, deployment was assessed by the RWMP team, based on State agency adoption and use of road weather technology, data, and strategies. Examples of road weather data examined include participation in the Weather Data Environment (WxDE), subscription to road weather products and services, collection of mobile observations from vehicle fleets, use of environmental sensor stations (ESS) in operations and maintenance, and use of mobile data-based applications. Examples of technologies and strategies assessed include the dissemination of advisory road weather information, coordination with local National Weather Service (NWS) weather forecast offices, and adoption of decision-support technologies and methods. The evaluation showed that agencies are continuing to deploy technologies, solutions, and strategies in order to expand their capabilities. Specific findings include:

- The number of State DOTs participating in the WxDE program continues to increase, with 39 States reporting contributions in 2021.
- Agency use of traditional and innovative road weather products remains stable, but there is potential for more agencies to leverage innovations for operations.
- The number of agencies collecting real-time fleet data continues to increase as does the collection of mobile observations by agency fleets.
- The number of deployed ESS continues to increase, suggesting agency awareness of its value. However, agency ESS use remains stable revealing a potential for more agencies to leverage ESS in new ways.

- Agency mobile data-based application development has decreased, although agency interest in apps has increased, reflecting a potential area for increased RWMP focus.
- Agencies continue to use many mechanisms to disseminate road weather traveler information.
- The number of agencies deploying safety warning systems for road weather conditions continues to increase.
- A significant percentage of agencies coordinate with the NWS for messaging for winter (78 percent) and non-winter weather (68 percent) events, and over half attribute this to the RWMP.
- Agency use of decision support systems (Statewide use, 29 percent of respondents, and non-Statewide use, 17 percent of respondents) remains similar to the 2019 update, reflecting a potential future focus area for the RWMP.

KNOWLEDGE AND TECHNOLOGY TRANSFER

Overall Assessment = Strong performance in accomplishing the objective

The RWMP's mission to lead and support the road weather community in developing and deploying innovative technologies, solutions, and strategies is achieved through successful knowledge and technology transfer.

Under this assessment, the RWMP's success at conducting knowledge and technology transfer is focused on the level of participation in FHWA-sponsored external trainings and capability assessments, along with how well the RWMP activities align with advances and trends in RWM within the next five to ten years. Specifically, the evaluation showed:

- State DOTs continue to be interested in assessing their road weather programs.
- RWMP activities largely align with advances and trends, however the RWMP should work with State agencies and research institutions to enable more discussion and understanding of the advances and trends which are newer with less real-world application.
- Under this reporting period, external trainings did not occur due to the course content requiring significant updates (resulting in the course not being offered).

INNOVATION, RESILIENCE, AND SUSTAINABILITY

Overall Assessment = Moderate performance in accomplishing the objective

One aspect that the RWMP focuses on is promoting innovation, resilience, and sustainability by communicating innovative solutions, standards, approaches, and data needs for road weather management.

Under this assessment, the degree to which innovation, resilience, and sustainability are communicated is based on State agency adoption and use of new and innovative approaches to road weather management, as well as the planning and preparation States have implemented towards resilience and sustainability. The evaluation showed positive impacts with regard to promoting innovation. The assessment of resilience and sustainability showed mixed messages about agency adoption with responses suggesting staff may not be aware of their agencies' activities. Findings for this objective include:

- There are no data that suggests a significant change in fatal crashes related to inclement weather when considering either the crash rate per billion vehicle miles traveled or per licensed drivers.

- Salt usage remains relatively constant at the national level, suggesting that strategies for reducing salt use are not yet widespread enough to have an overall impact on use. There are variations in salt use: for example, years with mild winters typically cause dips in usage. However, there are examples of innovative and creative approaches to reducing salt usage which represent positive impacts of the RWMP.
- Agency use of diverse traffic control and road treatment strategies during inclement weather is strong.
- Agency use of real-time tools for roadway maintenance is very strong. Agencies reported moderate use of real-time traffic control or management, and post-event analysis. There was limited use of tools for the prediction of impacts of RWM strategies.
- Compared with the 2019 survey, there was little to no change in agency responses to participation in climate change adaptation planning and preparation of extreme weather response processes. Agency responses regarding extreme weather participation reflect that more than half of the participants (57 percent) indicated they have participated in extreme weather response planning. However, individual agency responses were inconsistent from the 2019 to 2021 survey (e.g., some agencies that reported they had participated in climate change activities in 2019 reported they had not in 2021), suggesting that the knowledge of these activities by the individuals responding each year varies. Agency responses indicated that participation in vulnerability risk assessments and resilience planning for road weather management is low with less than 20 percent of responders indicating participation.

WHAT IS NEXT FOR THE RWMP?

The 2021 performance measures assessment indicated strong performance by the RWMP in accomplishing the objectives of the program. While analysis of specific performance measures revealed some areas and topics that the RWMP could better emphasize, the findings broadly point to successes of the RWMP. As such, the primary programmatic recommendation is for the RWMP to continue outreach and engagement efforts to State DOTs as these have been successful for advancing the RWMP objectives. Additionally, the RWMP may use the findings of this 2021 analysis to identify and prioritize specific areas and topics to highlight or emphasize as part of future outreach and engagement efforts.

Detailed recommendations were developed for each performance measure in the report to help guide the future of the RWMP and its activities. These recommendations are summarized below for each objective:

- **Stakeholder Engagement.** Continue to work with agencies and industry stakeholders to identify topics of interest based on stakeholder needs, develop programming, and conduct events regularly based on feedback received and continue working with organizational and industry champions to maintain momentum in reaching RWMP objectives.
- **Research and Development.** Continue to work with agencies to push R&D projects into the mainstream to aid the evolution from research to operational practices. Continue to promote research and to provide opportunities for States to participate in events in which they can learn about different research projects within the road weather community. Given the newness of CAV technologies, nurture interest through sponsored demonstrations, peer exchanges, and site visits so agencies can learn from one another.
- **Deployment.** Continue conducting outreach activities to promote deployment and document the benefits of deploying new technologies, solutions, and strategies, particularly for agencies that may not be advancing their capabilities. This may include some targeted outreach to understand the reasons for not deploying.

- **Knowledge and Technology Transfer.** Continue to conduct outreach to promote the RWM Capability Maturity Framework as well as updated training (once it becomes available). Maintain programmatic focus on data use, collaboration, and severe weather; but also work with organizations to identify deployments related to automated decision making and vehicle automation to enable more discussion and a better understanding of those two focus areas.
- **Innovation, Resiliency, and Sustainability.** It is recommended that outreach and promotion of innovation continue as-is, and that the RWMP communicate with agencies to understand whether resilience and sustainability should remain as focus areas. This may include consideration of more activities to identify and track salt usage and new snow and ice management approaches to reducing salt usage, to understand the existence of real-time traffic control and post-event analyses, to reintroduce the benefits of extreme weather planning and climate change adaptation planning, and to encourage vulnerability and resilience actions to increase participation by agencies.

For more information on the 2021 RWMP Performance Measures Update and the complete results, visit <https://ops.fhwa.dot.gov/weather/>



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