The impacts of weather on the nation’s road system greatly affect safety, mobility, and productivity. Weather affects roadway safety through increased crash risk, as well as exposure to weather-related hazards. On average 7,130 fatalities and 629,000 injuries occur every year during adverse weather conditions. Weather impacts roadway mobility by increasing travel time delay, reducing traffic volume throughput and speeds, increasing speed variance (a measure of speed uniformity), and decreasing roadway capacity (maximum rate at which vehicles can travel). Further, weather events influence productivity by disrupting access to road networks, and increasing road operating and maintenance costs.

Mitigation Strategies
Three types of road weather management strategies may be employed in response to environmental threats: advisory; control; and treatment strategies. Advisory strategies provide information on prevailing and predicted conditions to both transportation managers and motorists. Control strategies alter the state of roadway devices to permit or restrict traffic flow and regulate roadway capacity. Treatment strategies supply resources to roadways to minimize or eliminate weather impacts. Many treatment strategies involve coordination of traffic, maintenance, and emergency management agencies. These mitigation strategies are employed in response to various weather threats including fog, high winds, snow, rain, ice, flooding, tornadoes, hurricanes, and avalanches.

Purpose of the Best Practice Library
Due to the diverse geography and climates around the nation, state and local governments have deployed a wide variety of mitigation strategies in response to weather impacts. The Federal Highway Administration (FHWA) sought to compile premiere road weather management practices used by states around the nation. The Road Weather Management (RWM) Best Practices Library (BPL) serves to disseminate cutting-edge, innovative and effective mitigation strategies and practices to a national audience. State and local road weather management officials can use the BPL to learn how other states best respond to similar challenges.

The prior version of the BPL, Version 2.0, was released in 2003 and featured 30 practices from municipal and state transportation agencies. At this time, the practices from Version 2.0 are either mainstreamed or have been surpassed by superior solutions. Version 3.0, released in 2012, captures the state-of-the-art, presenting 27 all-new practices that build upon the states’ previous successes. This most recent version can be found at the following web link: http://www.ops.fhwa.dot.gov/weather/mitigating_impacts/best_practices.htm

Contents of the BPL
Table 1, subsequently shown, lists the various contributing states and their respective best practices that are highlighted in the BPL.

Examples of Practices Included in the BPL
As an illustration of the content of the BPL and the three mitigation strategies employed, several practices are highlighted here.

An example of an advisory strategy is Florida’s bridge wind alerting system. In Florida, high winds from hurricanes and tropical storms are regularly encountered by motorists. Such high winds across bridges pose a danger. To solve this problem, the Florida Department of Transportation (FDOT) deployed wind sensors on some bridges with incidences of high wind events. The system alerts FDOT if the wind speed is above various pre-programmed thresholds. Warnings to motorists and law enforcement can then be disseminated as needed. Now, the system provides a safe, efficient and accurate method to collect and disseminate wind speed information.

In California’s Central Valley region, dense fog routinely develops and leads to poor visibility for motorists. In 2009, the state deployed a system to control motorists driving through such potentially dangerous road conditions. On a thirteen mile stretch of CA State Highway 99 south of Fresno, the California Department of Transportation installed sensors and other equipment which determines visibility and traffic characteristics and automatically disseminates the collected data to Changeable Message Signs adjacent
to the road. These signs inform motorists of upcoming visibility conditions and instruct them to lower their vehicle speed if foggy conditions are present. A typical sensor array can be seen in Figure 1. In the next phase of this project, the information collected from the sensors will be relayed to the state’s 511 systems and also its road weather information website. Through timely dissemination of information to motorists, it is anticipated accidents and deaths related to fog will be mitigated.

Finally, an example of a treatment strategy is Idaho’s winter maintenance performance system. A means was needed to evaluate the benefits that the state’s maintenance program was providing during the winter months. In response to this challenge, a system of nearly 90 sensors was deployed at strategic locations in Idaho to collect data on road surface characteristics and local weather. When combined with data from the maintenance program, the effectiveness of various treatments can be derived. This leads to deployment of treatments tailored to be effective for local road conditions.

Anticipated Benefits
The FHWA seeks to provide state departments of transportation (DOTs) and transportation management centers (TMCs) with the best available tools. This set of best practices reflects some of the most effective and innovative mitigation strategies and supporting technologies currently in practice. The primary beneficiaries of this BPL include planners and maintenance staff at DOTs, operators at TMCs and ultimately, the traveling public. FHWA anticipates that with appropriate widespread adoption of these best practices, mobility, safety, and productivity will be increased during inclement weather.

Acknowledgments
The FHWA would like to thank all states and metro areas that contributed towards the BPL.

Requests for additional information on the BPL and requests to have a best practice featured in a subsequent version of the BPL can be submitted to weatherfeedback@dot.gov.