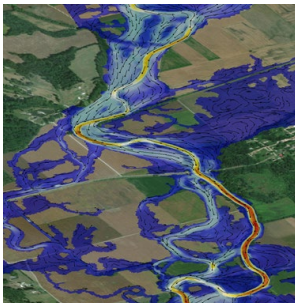
Every Day Counts
Innovation for a Nation on the Move

U.S. Department of Transportation
Federal Highway Administration





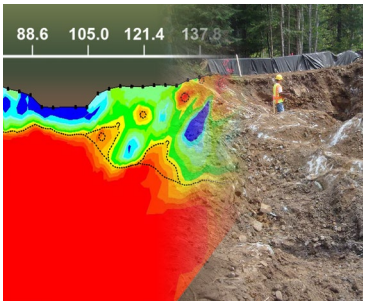
Every Day Counts:

Innovation for a Nation on the Move

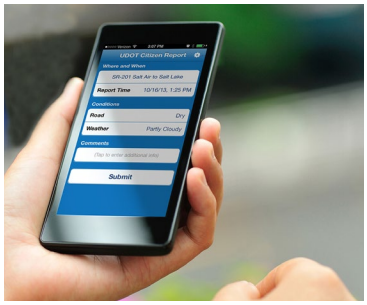
EDC-5 Final Report

April 2021

Foreword







Every Day Counts (EDC) is the Federal Highway Administration's program to advance a culture of innovation in the transportation community in partnership with public and private stakeholders. Through this State-based effort, FHWA coordinates rapid deployment of proven strategies and technologies to shorten the project delivery process, enhance roadway safety, reduce traffic congestion, and integrate automation.

This report summarizes the December 2020 status of deployment for the 10 innovations in the fifth round of EDC. The report is intended to be a resource for transportation stakeholders as they implement their innovation deployment plans and to encourage innovation in managing highway project delivery to better serve the Nation.

Quality Assurance Statement

The Federal Highway Administration provides high-quality information to serve government, industry, and the public in a manner that promotes public understanding. Standards and policies are used to ensure and maximize the quality, objectivity, utility, and integrity of its information. FHWA periodically reviews quality issues and adjusts its programs and processes to ensure continuous quality improvement.

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Every Day Counts

The Federal Highway Administration created **Every Day Counts** (EDC) to accelerate highway project delivery and foster an innovative culture in the transportation community. Through EDC's State-based model, FHWA collaborates with the **American Association of State Highway and Transportation Officials** (AASHTO) and other stakeholders to rapidly deploy proven but underused innovations to shorten the project delivery process, enhance safety, reduce congestion, and integrate automation. EDC provides Innovations for a Nation on Move that save time, money, and resources agencies can use to deliver more projects and better serve the traveling public.

EDC, which has promoted 52 innovations since 2011, has had a significant positive impact on the transportation community's adoption of new technologies and processes. Every State has advanced at least 20 EDC innovations, and some have deployed more than 45. Many of these technologies and processes are now mainstream practices. The 2015 **Fixing America's Surface Transportation Act** directed FHWA to continue working with stakeholders to advance innovation adoption through EDC.

Every 2 years, FHWA works with State and local governments, tribes, industry, and other stakeholders to identify a new set of innovative technologies and practices that merit accelerated deployment through EDC. **State Transportation Innovation Councils** (STICs) establish implementation performance goals, taking into account the innovations that will meet the unique needs of their State and local programs.

FHWA deployment teams offer technical assistance, training, and outreach to help the transportation community adopt EDC innovations. FWHA also offers assistance through its **STIC Incentive** and **Accelerated Innovation Deployment (AID) Demonstration** programs. The STIC Incentive program provides up to $100,000 a year per STIC to help make innovations standard practice. The AID Demonstration program provides up to $1 million to support the cost of deploying an innovation on any phase of a highway project. The program allocates up to $10 million a year in incentive funds.

During each EDC deployment cycle, FHWA reports regularly on innovation deployment status in each State and aggregates the data to provide a nationwide overview. FHWA also works with stakeholders to share success stories, specifications, best practices, and data through case studies, web conferences, presentations, and demonstration projects. The result is rapid technology transfer and accelerated deployment of innovation across the Nation.

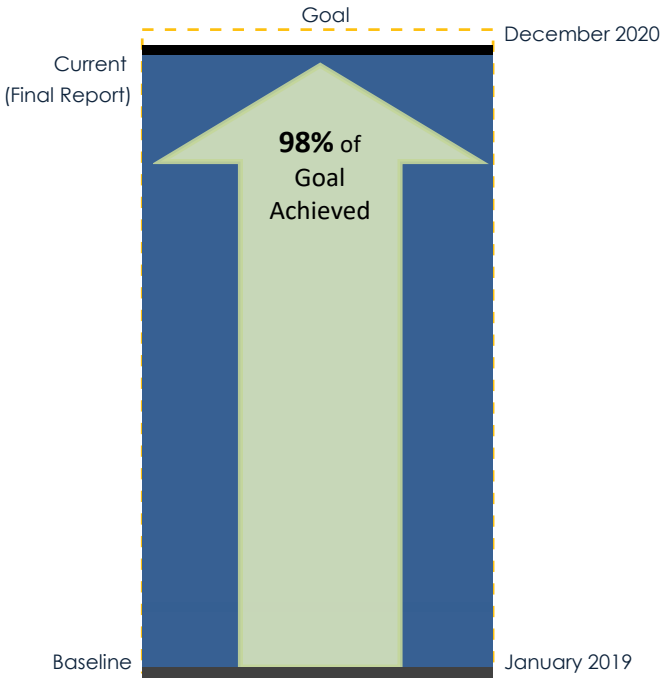
EDC-5 Innovation Implementation

Every 6 months, FHWA compiles a report on the status of the state of practice for the current round of EDC innovations. This section provides details on the 10 innovations FHWA encouraged States to adopt in EDC-5. It includes maps and charts that show the progress in advancing the technologies and practices by the end of December 2020.

The maps illustrate the innovation implementation stage in each State. The charts show the number of States that have demonstrated, assessed, or institutionalized the innovation, as well as the January 2019 baseline data and December 2020 goals States set.

This report uses "State" as a general term that includes the State transportation department, metropolitan planning organizations, local governments, tribes, private industry, and other stakeholders in a State or territory. Information is provided for the 50 States, Washington, DC, Puerto Rico, the U.S. Virgin Islands, and Federal Lands Highway (FLH), a total of 54 entities.

The following table defines the innovation deployment stages displayed on the maps and charts.



Attainment of Demonstration, Assessment, or Institutionalized Implementation Across All Innovations and State

Final Report

Innovation Implementation Stages

Not Implementing	The State is not using the innovation anywhere in the State and is not interested in pursuing the innovation.
Development Stage	The State is collecting guidance and best practices, building support with partners and stakeholders, and developing an implementation process.
Demonstration Stage	The State is testing and piloting the innovation.
Assessment Stage	The State is assessing the performance of and process for carrying out the innovation and making adjustments to prepare for full deployment.
Institutionalized	The State has adopted the innovation as a standard process or practice and uses it regularly on projects.

Advanced Geotechnical Methods in Exploration

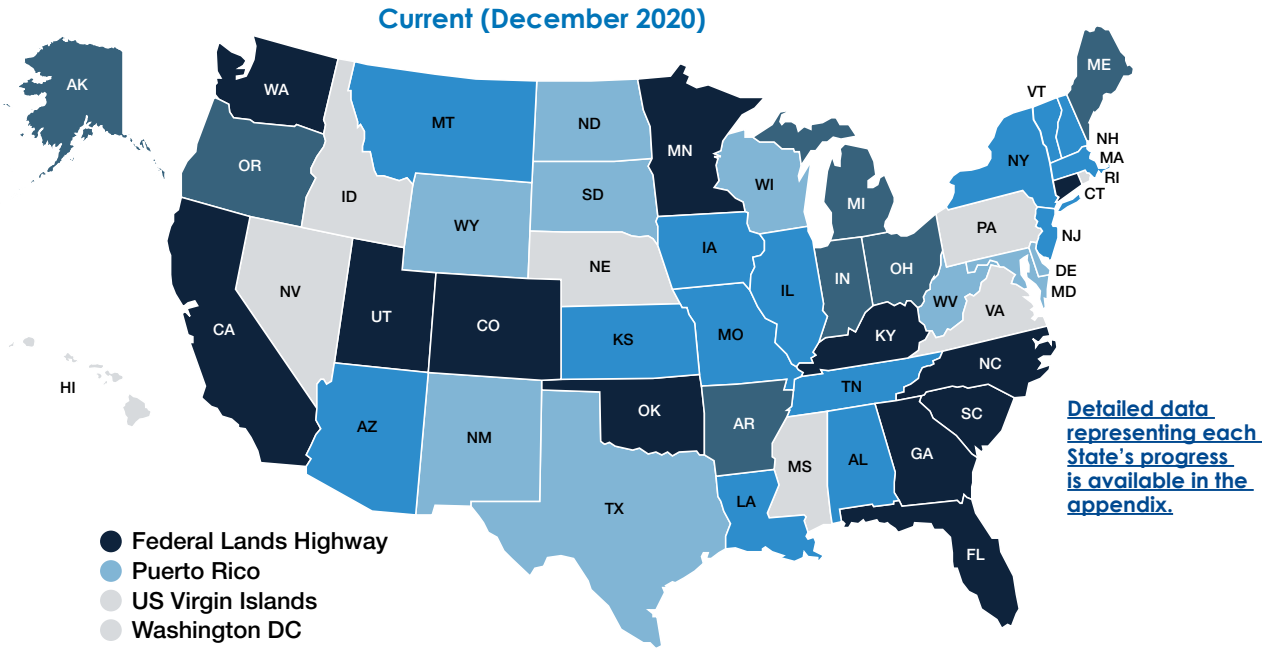
Advanced geotechnical methods in exploration (A-GaME) offer solutions for generating more accurate geotechnical characterizations that improve transportation project design and construction, leading to shorter project delivery times and reducing risks associated with limited data on subsurface site conditions.

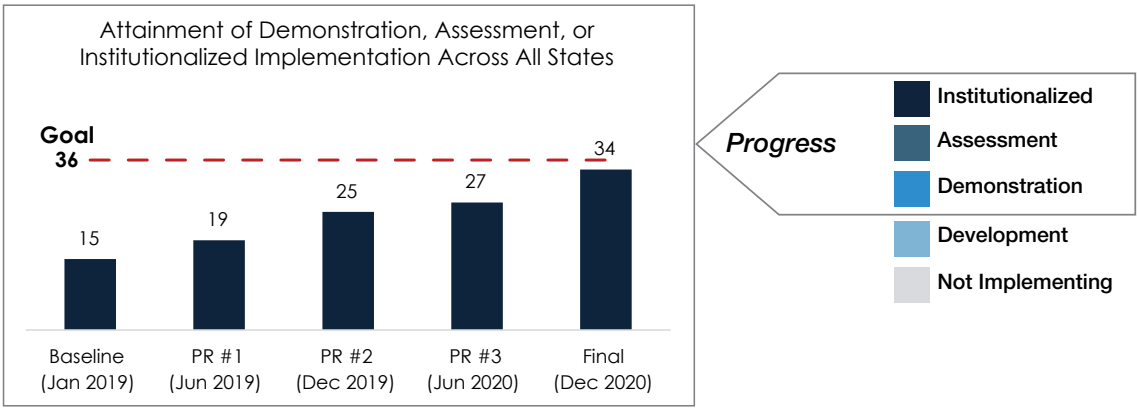
Effective site characterization is critical for recognizing potential problems that may affect design and construction and for ensuring safe, high-quality, and cost-effective projects. Conventional subsurface exploration methods provide limited data, however, which can result in constructability issues and increased cost.

Proven but underused technologies are available that, when combined with processes that assess risk and variability, allow optimization of subsurface exploration programs for improved site characterization. These A-GaME technologies include cone penetration testing, seismic and electrical geophysics, measurement while drilling, and optical and acoustic televiewers.

Thirty-four States attained demonstration, assessment, or institutionalized stages of A-GaME implementation in EDC-5.

View **Innovation Spotlight video: Advanced Geotechnical Methods in Exploration**.





Innovation Spotlight

| Advanced Geotechnical Methods in Exploration |

In February 2020, a large landslide occurred on US-231 in Lacey's Springs, AL, causing severe damage to the roadway. This primary route connecting Huntsville and Birmingham is a heavily used corridor for commuters and closure of the road added 30-60 minutes to travel times.

Credit: Alabama DOT

Initial slope movement closing US-231 due to massive landslide in Lacey's Springs, Alabama.

Auburn University conducted one-dimensional seismic profiles and two-dimensional resistivity surveys for the Alabama Department of Transportation to aid in site characterization and develop a designed solution for this emergency response roadway section repair. The results of the geophysical imaging were combined with other subsurface information to identify stratigraphy and the instability mechanisms across the site. The investigation identified a layer of soft, wet clay overlying rock 30-40 feet below the roadway as a primary slip-plane. Ring shear testing on the clay confirmed that the subsurface slide plane was very weak in its current condition and would require a lot of effort, time and cost to stabilize.

The subsurface characterization contributed to the innovative decision to construct a bridge with a foundational system that could withstand stresses of additional slope movement after removing some of the existing embankment material. The bridge foundations were also instrumented with innovative Shape Acceleration Arrays to monitor any future movements to ensure the bridge is performing adequately over time, for which an AID Demonstration grant was requested. Site characterization, design of the solution, and construction of the new bridge took only approximately seven months to complete.

This project demonstrated how geophysical and geotechnical data can be combined to inform decisions in an emergency response project quickly. A-GaME technologies like multichannel analysis of surface waves (MASW) and electrical resistivity can be rapidly deployed in situations such as these to give a more complete understanding of site conditions.

Collaborative Hydraulics: Advancing to the Next Generation of Engineering (CHANGE)

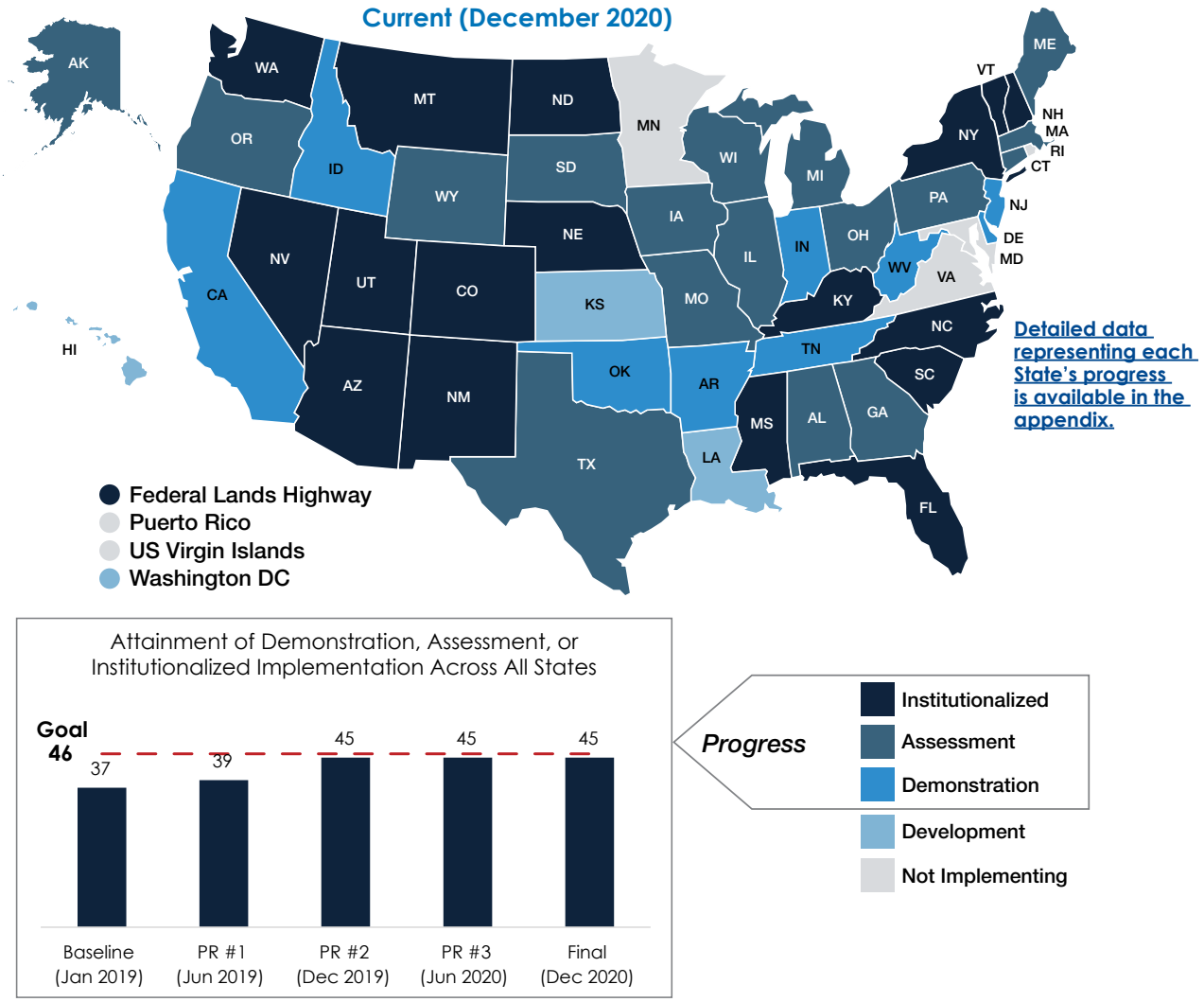
Tools in the **collaborative hydraulics: advancing to the next generation of engineering** (CHANGE) initiative improve understanding of complex interactions between river or coastal environments and transportation assets, enabling better design and project delivery and enhanced communication.

Advances in hydraulic modeling tools have made two-dimensional (2D) modeling more efficient, intuitive, and accessible to engineers and designers. Because 2D models avoid many of the limiting assumptions required by traditional one-dimensional models, the results can significantly improve the ability of highway agencies to design safer, more cost-effective, and more resilient structures on waterways.

The three-dimensional (3D) visualization capabilities of these hydraulic modeling tools aid in communicating design results and implications to stakeholders through intuitive and visually rich graphical output. That, in turn, can enhance collaboration and help streamline project development, including environmental and regulatory activities.

Forty-five States attained demonstration, assessment, or institutionalized stages of CHANGE implementation in EDC-5.

View **Innovation Spotlight video: Collaborative Hydraulics: Advancing the Next Generation of Engineering**.

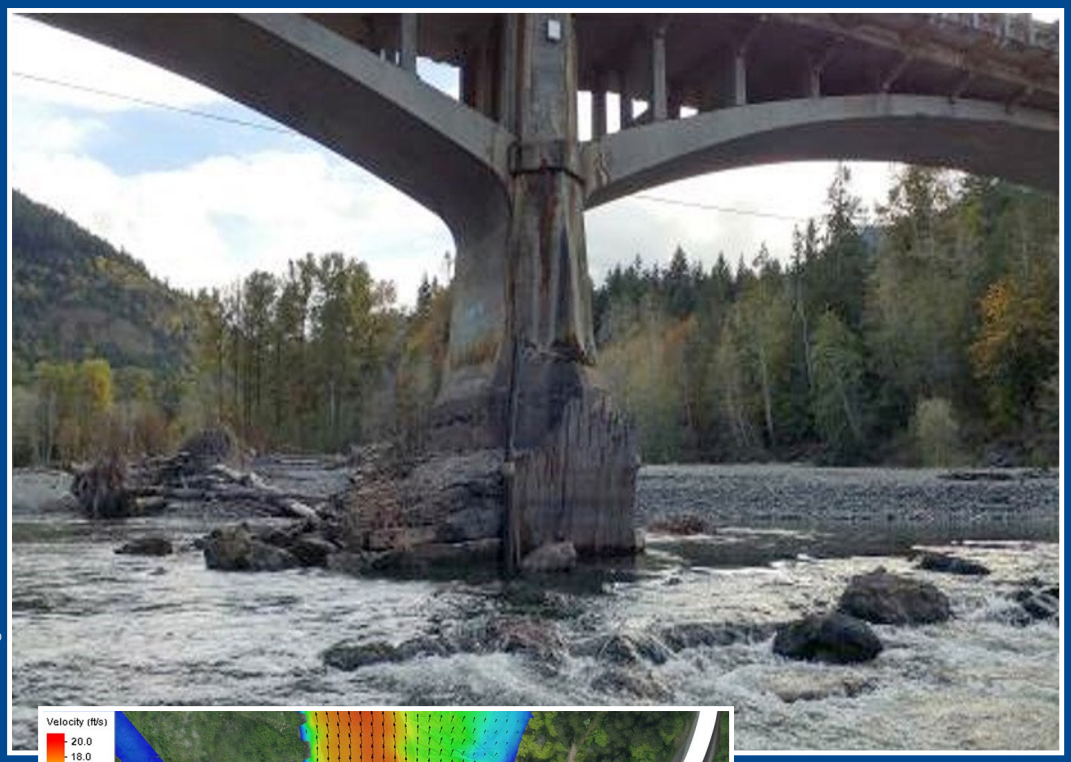


Innovation Spotlight

| Collaborative Hydraulics: Advancing to the Next Generation of Engineering |

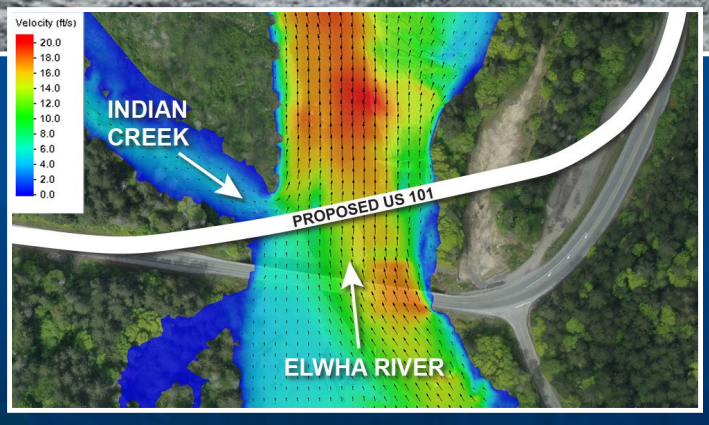
The Washington State Department of Transportation (WSDOT) has used 2D modeling on several projects including bridge replacements, bridge scour countermeasure design, fish barrier removal projects, and bridge scour emergencies.

After the removal of two dams on the Elwha River in northwest Washington State, the State declared an emergency on the existing US 101 Bridge due to changes in river conditions and susceptibility of the foundations to scour. WSDOT used 2D modeling to assess the vulnerability of the bridge and reported that 2D modeling was instrumental in communicating risk within the department and ensuring the safety of drivers.



Credit: Washington State DOT

US 101 Bridge extending over the Elwha River



Credit: FHWA

This overhead image of proposed location for new US 101 bridge features a graphical overlay showing water velocity

For the proposed US 101 bridge, WSDOT used 2D modeling throughout the project delivery process. This included assessing the performance of a scour countermeasure constructed during the emergency declaration; designing the new structure including the new bridge span length, pier locations, and scour depths; evaluating potential environmental effects including assessment of impacts to aquatic habitat; and identifying potential stream diversion parameters to be used during construction.

Crowdsourcing for Operations

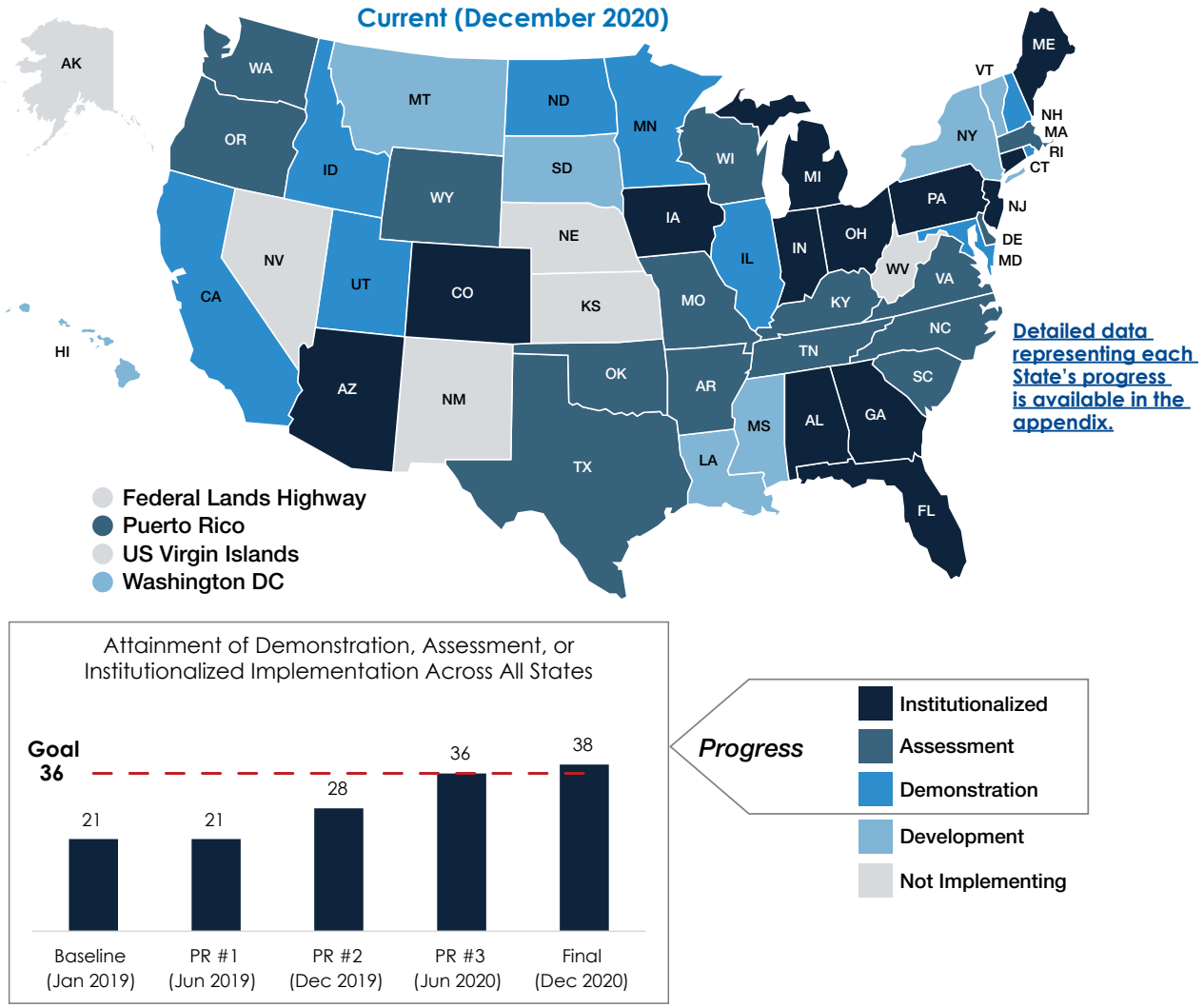
Crowdsourcing for operations turns transportation system users into real-time sensors on system performance, providing low-cost, high-quality data on traffic operations, conditions, and patterns.

Transportation systems management and operations (TSMO) programs strive to optimize the use of roadway facilities through traveler information, incident management, road weather management, arterial management, and other strategies targeting the causes of congestion. TSMO programs require real-time, high-quality, and wide-ranging roadway information. However, geographic coverage gaps, lags in information timeliness, life-cycle costs for field equipment, and jurisdictional stovepipes associated with fixed sensor and camera monitoring can limit agencies' abilities to proactively operate transportation systems.

Public agencies at the Federal, State, and local levels are increasing their situational awareness and the quality and quantity of operations data using crowdsourcing, which enables agency staff to cost-effectively apply proactive strategies and make better decisions that lead to safer and more reliable travel.

Thirty-eight States attained demonstration, assessment, or institutionalized stages of Crowdsourcing for Operations implementation in EDC-5.

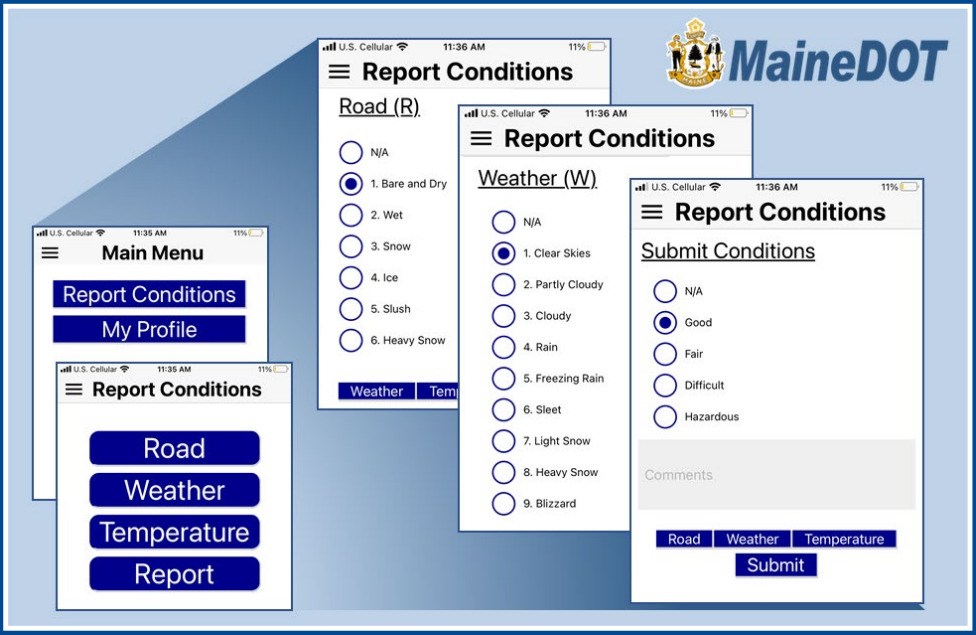
View **Innovation Spotlight video: Crowdsourcing for Operations**.



Innovation Spotlight

| Crowdsourcing for Operations |

The Maine DOT turned to **crowdsourcing** to affordably expand **traffic incident management** and **traveler information** to lower-volume roadways and to support data-informed operational planning. In the process, they also improved their Traffic Management Center (TMC) operational efficiency. Maine DOT leveraged **State Transportation Innovation Council** (STIC) resources for a site visit to understand how dashboards that integrate multiple data sources can improve real-time operations and operational planning. Maine DOT also built, tested, and is in the process of fully deploying an app to standardize and automate reports of pavement, weather, and temperature conditions from road crews into the State's TMC software. The app saves road crews and TMC operators tremendous time and data from the app also helps TMC operators quickly make decisions using more precise and timely road weather data.



Credit: MaineDOT

Crowdsourcing App improved decision-making with better, timely road weather data.

Credit: Unsplash.com

Project Bundling

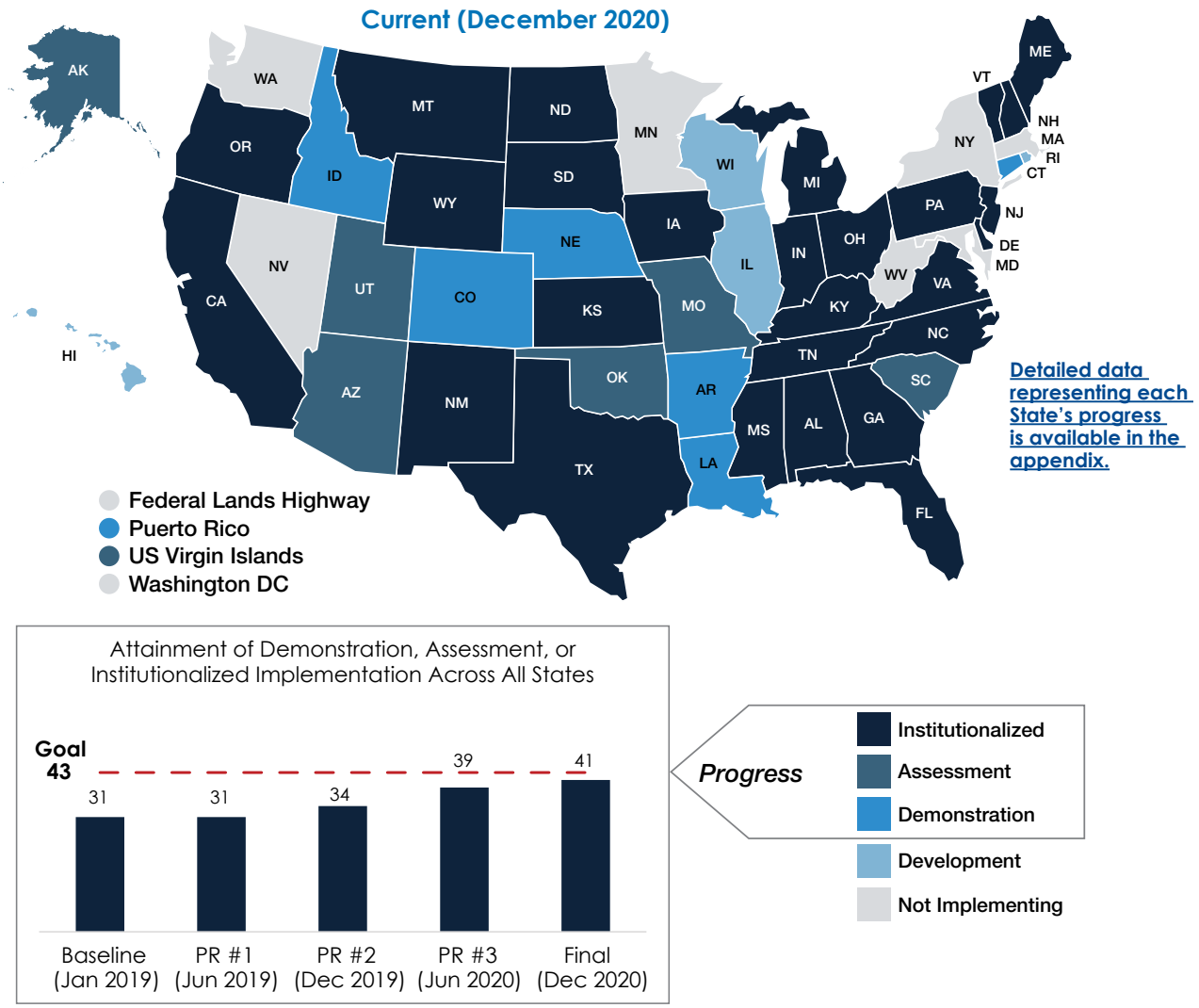
Project bundling is a versatile program and project delivery approach. Project bundling can save time and money and can also be customized to meet an agency's strategic program needs (e.g. safety goals, pavement and bridge management) by leveraging early planning and other economies of scale. Using advanced Project bundling approaches outlined in the Bridge Bundling Guidebook allows an agency to leverage many program delivery efficiencies in collaboration with their partners to meet strategic needs. Project Bundling has been shown to save agencies 10 percent or more on construction costs, reduce months of delivery time, and increase efficiency.

Bundled contracts may be procured with a variety of alternative contracting methods, cover one county or the entire State, and involve innovative construction techniques and financing tools. A contract may be tiered to allow a combination of work types, such as design, preservation, or complete replacement. A project bundling program may use a series of bundling projects to achieve agency goals.

Bundling can help agencies maximize staff resources, save procurement time, leverage design expertise, capitalize on economies of scale, and help keep critical transportation assets in good repair. Bundling also supports greater collaboration during project delivery and construction.

Forty-one States attained demonstration, assessment, or institutionalized stages of Project Bundling implementation in EDC-5.

View **Innovation Spotlight video: Project Bundling**.



Innovation Spotlight | Project Bundling |

The Kentucky Transportation Cabinet (KYTC) is using **project bundling** to effectively accomplish strategic program delivery and more rapidly provide the benefits to their travelers. As part of the Bridging Kentucky Program, KYTC is addressing hundreds of bridges in poor condition or with significant weight restrictions to improve safety and system performance statewide.

KYTC is bundling projects of 2-20 bridges to accomplish a variety of objectives, including cost and time savings, assisting local economies and providing opportunities for smaller contractors. To enhance bundling, KYTC is using various contracting approaches, including traditional bid-build and design-build. Other benefits included: the ability to prioritize projects statewide, the development of scalable solutions to meet short and long-term needs, more streamlined coordination with utilities and railroads, creation of standardized design elements, flexibility with scheduling and materials procurement, and DOT staffing efficiencies (i.e. fewer contracts to manage, easier to plan inspector staffing/workload, streamlined coordination with local officials).

One of more than 260 bridges that have been replaced as part of the Bridging Kentucky program.

Credit: Kentucky Transportation Cabinet

Focus on Reducing Rural Roadway Departures

Rural roadway departures account for about a third of U.S. traffic fatalities—30 people every day. Systemic application of proven countermeasures on all public rural roads is critical to the **focus on reducing rural roadway departures** (FoRRRwD) initiative. These countermeasures help keep vehicles in their travel lanes, lower the potential for crashes, and lessen the severity of crashes that do occur.

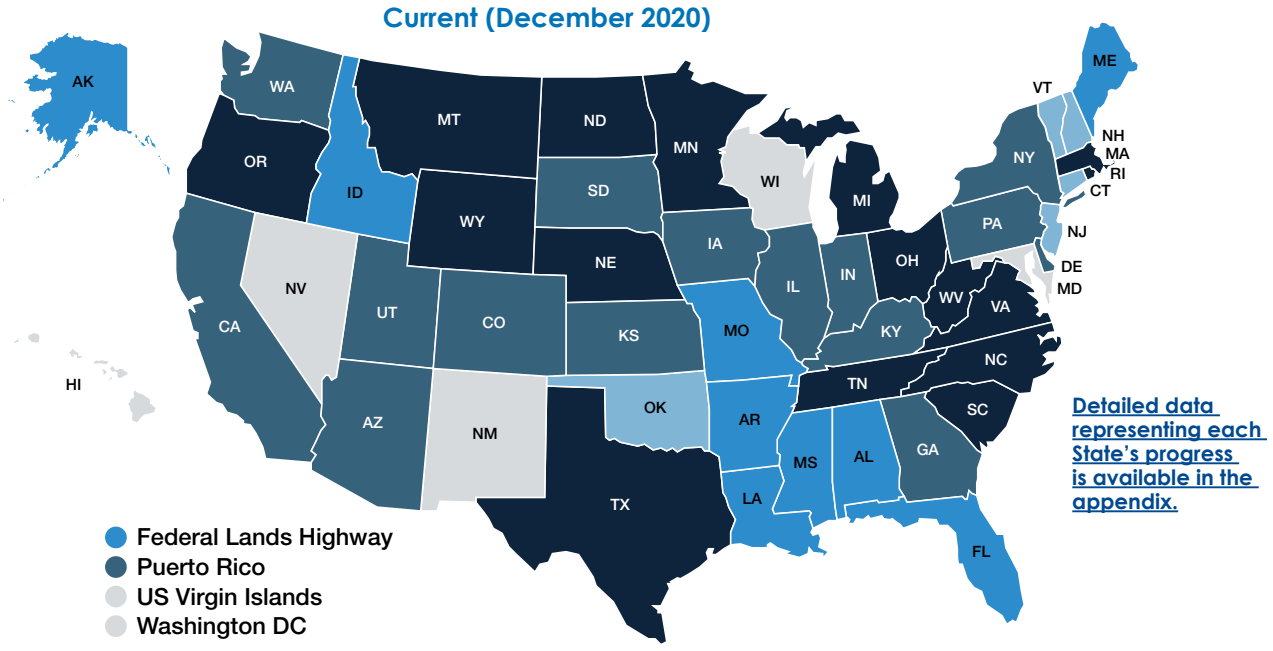
A data-driven, systemic approach can help transportation agencies prioritize the locations and countermeasures that will be most effective in reducing roadway departures. Agencies can use available data and a variety of tools to analyze their road systems, develop action plans, and deploy proven countermeasures.

Roadway departure countermeasures that enhance safety include the following:

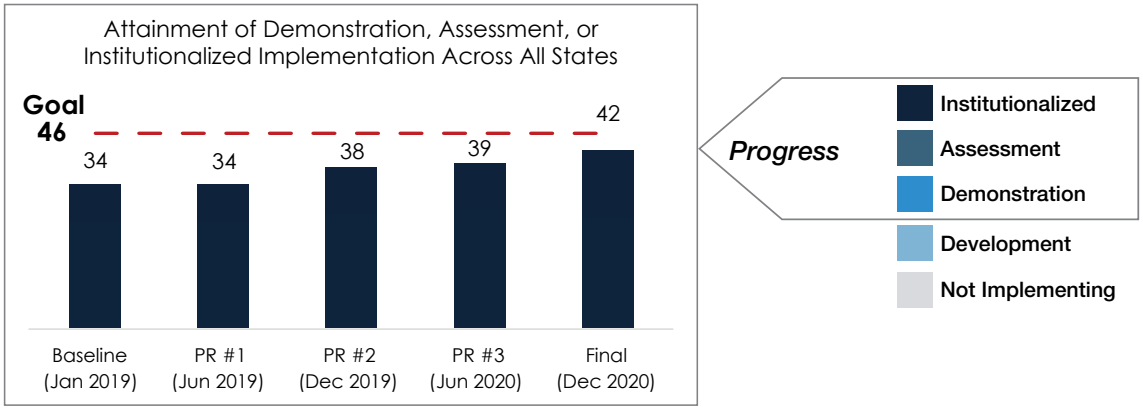
- Signage and markings delineate lane edges and alignment changes and help drivers navigate.
- Rumble strips provide an audible alert to drivers drifting from their lane.
- Friction treatments at curves or other key locations reduce loss of control.
- Shoulders, the **Safety Edge**[SM] paving treatment, and clear zones provide opportunities for a safe recovery when drivers leave the roadway.
- Roadside hardware reduces the severity of road departure crashes.

Forty-two States attained demonstration, assessment, or institutionalized stages of FoRRRwD implementation in EDC-5.

View **Innovation Spotlight video: FoRRRwD**.



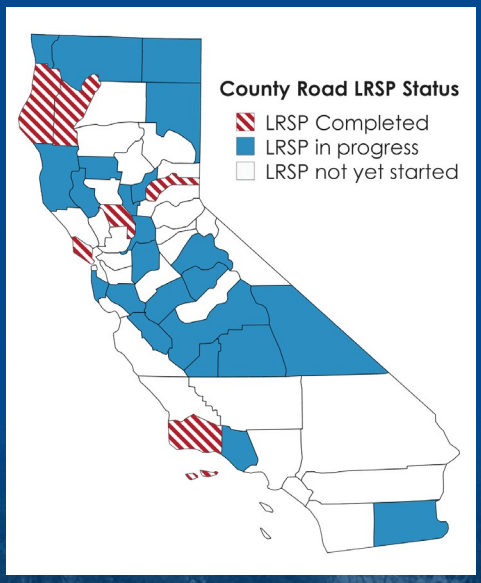
Detailed data representing each State's progress is available in the appendix.



Innovation Spotlight

| Focus on Reducing Rural Roadway Departures |

In California, over 800 people die each year due to a roadway departure on a rural road. That is more than two people lost every day. Over 60 percent of these occurred on local roads. The California Department of Transportation (Caltrans) is moving **FoRRRwD** by dedicating $18 million of their safety funding for local agency roadway safety improvements. In future funding cycles, for agencies to be able to apply for funding, the State will require a **Local Road Safety Plan** (LRSP) or equivalent that identifies a **4E approach** (engineering, education, enforcement, and emergency medical services) to local agencies' safety priorities.



Working with Caltrans, FHWA assisted six counties in developing LRSPs. Now, those counties are assisting other counties in the state by sharing their successes and lessons learned through peer exchanges, statewide webinars, and training. Together, this outreach and technical assistance has resulted in an additional 313 local agencies in 23 counties that have completed or started an LRSP. These efforts are making roads safer and reducing the risk and number of fatal and serious injury crashes.

Curve warning signs like these, in Nevada County, CA, are one countermeasure featured in many LRSPs

Credit: Nevada County, CA

Safe Transportation for Every Pedestrian

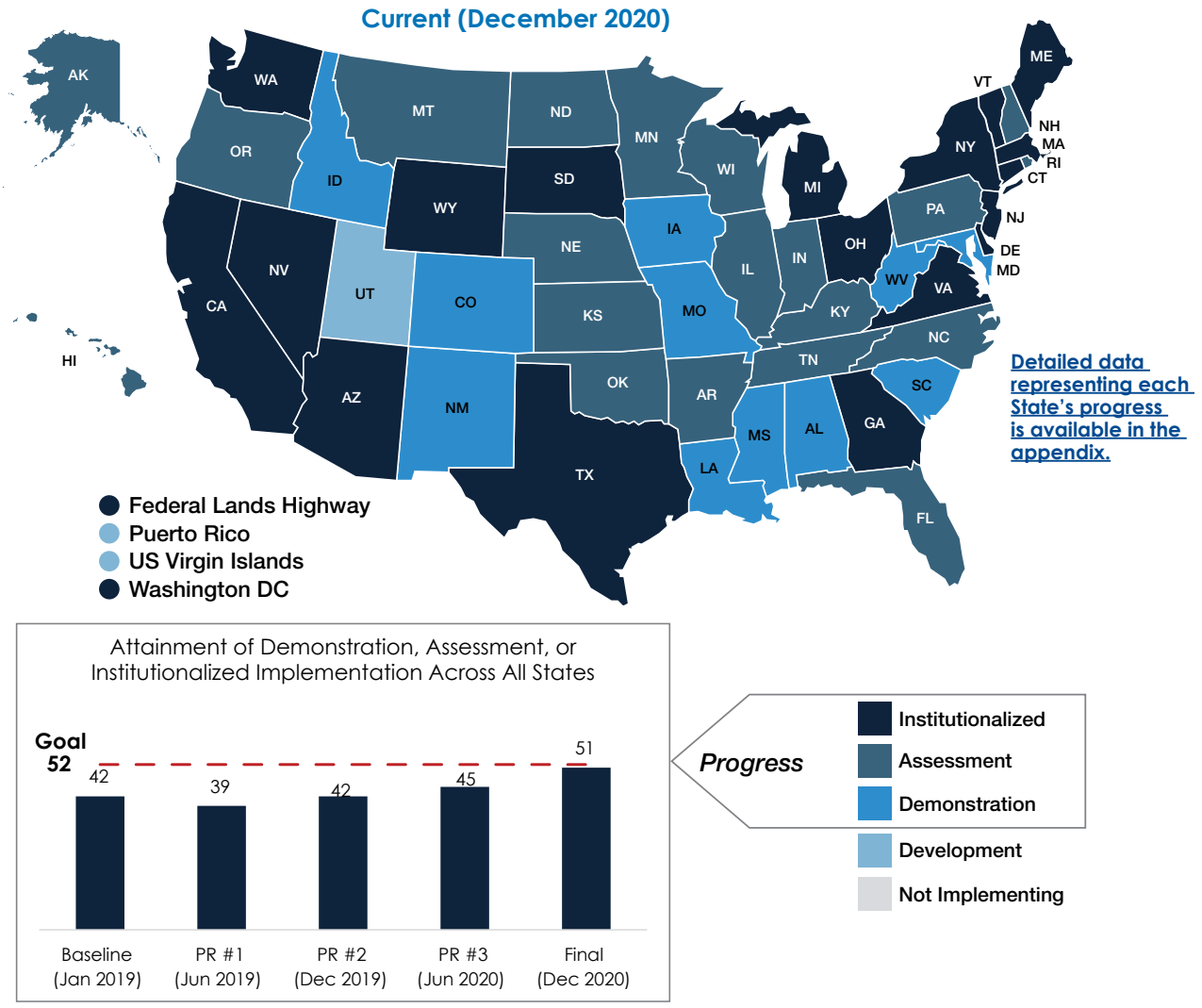
The **safe transportation for every pedestrian** (STEP) initiative features cost-effective countermeasures with known safety benefits that can reduce pedestrian fatalities at uncontrolled crossing locations and signalized intersections. Pedestrians account for more than 16 percent of all traffic fatalities. Seventy-two percent of pedestrian fatalities occur away from intersections, such as at midblock locations, and 26 percent happen at intersections.

The STEP initiative includes seven countermeasures to improve pedestrian safety:

- **Rectangular rapid flashing beacons** use an irregular flash pattern at midblock or uncontrolled crossing locations to increase driver yielding behavior.
- **Leading pedestrian intervals** at signalized intersections allow pedestrians to walk before vehicles get a green signal to turn, increasing visibility, reducing conflicts, and improving yielding.
- **Crosswalk visibility enhancements**, such as crosswalk lighting and enhanced signage and markings, help drivers detect pedestrians.
- **Raised crosswalks** can serve as a traffic calming measure and reduce vehicle speeds.
- **Pedestrian crossing/refuge islands** provide a safer place for pedestrians to stop at a road's midpoint before crossing the remaining distance.
- **Pedestrian hybrid beacons**, an intermediate option between a flashing beacon and a full pedestrian signal, provide stop control for higher speed, multilane roads with high vehicular volumes.
- **Road diets** can reduce vehicle speeds and the number of lanes pedestrians cross, as well as create space for new pedestrian facilities such as pedestrian crossing/refuge islands.

Fifty-one States attained demonstration, assessment, or institutionalized stages of STEP implementation in EDC-5.

View **Innovation Spotlight video: STEP**.



Innovation Spotlight

| Safe Transportation for Every Pedestrian |

The Maine Department of Transportation (MaineDOT) adopted a "community-focused" approach to implementing the STEP countermeasures as part of their STEP Action Plan in 2018 – also committing to develop a pedestrian safety toolbox and incorporating public involvement in MaineDOT pedestrian safety programs.

Credit: MaineDOT

MaineDOT RRFB installation

The community-focused approach to pedestrian safety emphasizes meetings with local agency staff, conducting Road Safety Audits (RSAs), and developing Pedestrian Safety Action Plans (PSAPs). MaineDOT accomplished the following during their work with STEP:

- Convened at least 35 pedestrian safety focused community meetings
- Conducted 99 RSAs to determine appropriate STEP countermeasures, with more scheduled in the coming year
- Completed 7 PSAPs for local agencies recommending STEP countermeasures, with more planned in the future
- Received project applications from at least 13 communities with PSAPs, including requests for low-cost pedestrian safety countermeasures.

One of the most common STEP countermeasures deployed by MaineDOT was the Rectangular Rapid Flashing Beacon (RRFB). The MaineDOT Highway Safety Improvement Program helped establish the State RRFB program where the State streamlines procurement of the equipment and municipalities pay for installation if a project qualifies.

MaineDOT is also substantially closer to finalizing their Pedestrian Safety Toolbox which will provide implementation guidance for the STEP Countermeasures and other pedestrian safety treatments.

Patrick Adams, MaineDOT's Active Transportation Planner, said "These efforts have facilitated a cultural change and improved acceptance of bicycle and pedestrian safety needs within MaineDOT and municipal systems across the State."

MaineDOT believes that what they have done could be replicated throughout the United States and extends the offer to share with and assist other States who are committed to raising awareness of pedestrian safety issues and are interested in incorporating similar strategies within their programs. MaineDOT also attributes some of its success to highly collaborative relationships with organizations like the Bicycle Coalition of Maine.

Unmanned Aerial Systems

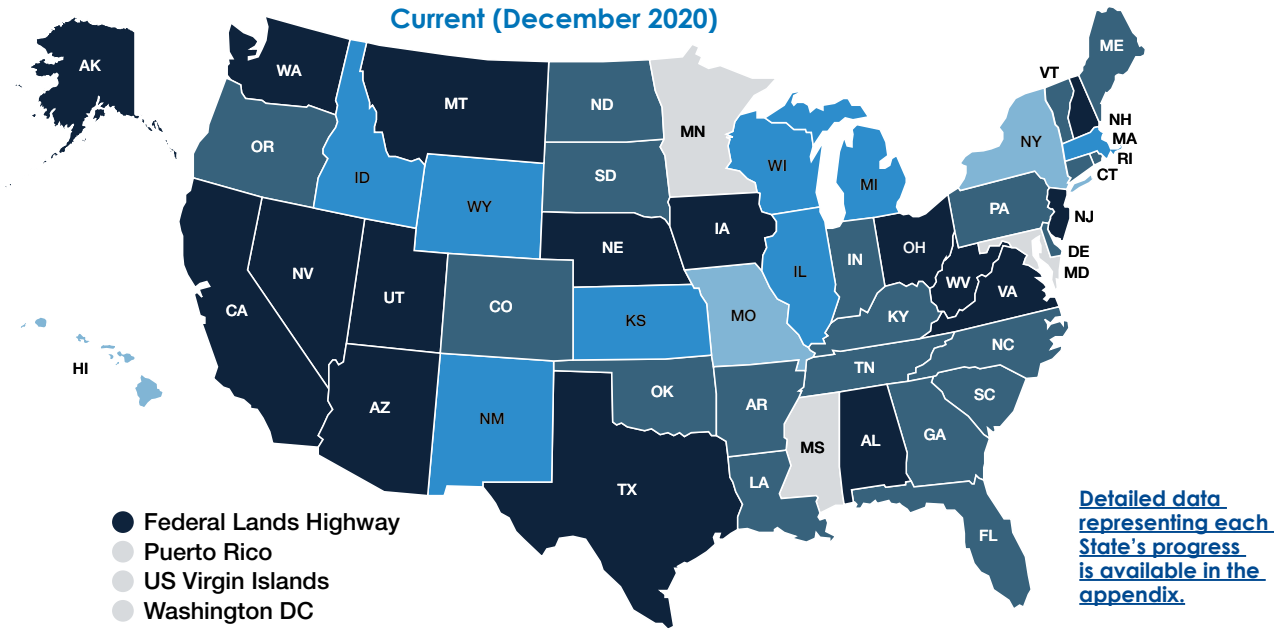
Unmanned aerial systems (UAS) can benefit many aspects of highway transportation by collecting high-quality data automatically or remotely. Multiuse aircraft controlled by certified operators on the ground, UAS can speed up data collection, increase safety and accuracy, and provide access to hard-to-reach locations.

Bridge inspection enhanced by UAS improves safety for the inspection team and traveling public by reducing the need for work zones. Construction inspection with UAS allows for a bird's-eye view of a project's progress and for the development of 3D terrain models that document construction processes and assist in assessment of earthwork quantity measurement.

UAS technology also helps agencies with emergency response after roadway disturbances such as rockslides, avalanches, and floods and damage assessment after earthquakes, fires, and bridge hits. It allows States to obtain quality data to make more informed decisions using a relatively low-cost platform.

Forty-five States attained demonstration, assessment, or institutionalized stages of UAS implementation in EDC-5.

View **Innovation Spotlight video: UAS**.



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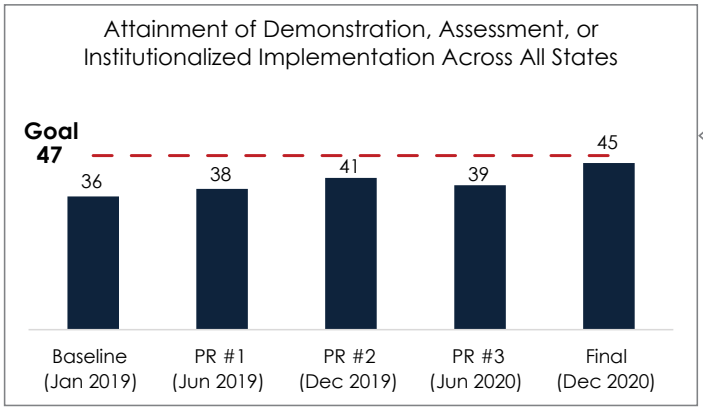
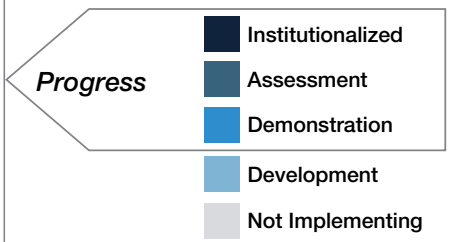
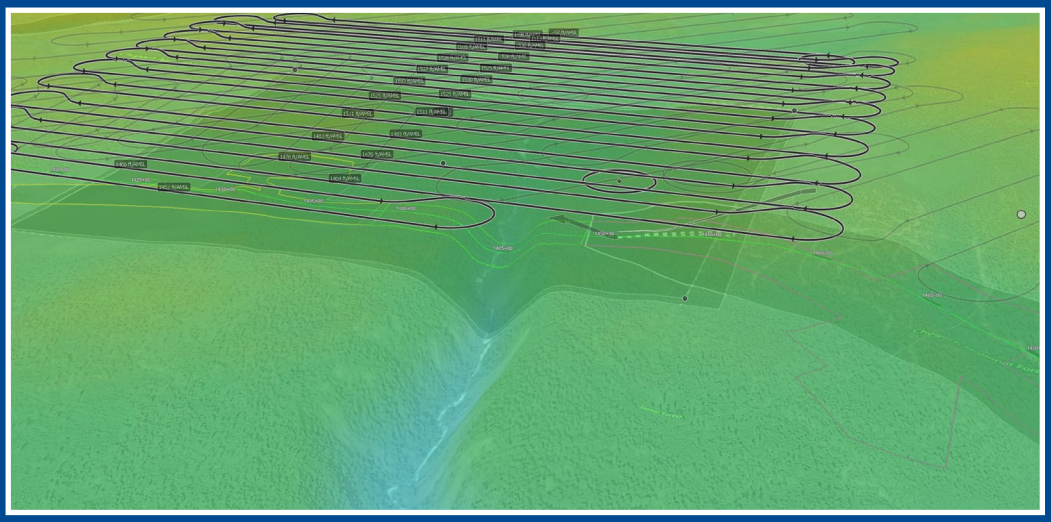




Innovation Spotlight | Unmanned Aerial Systems |

The Alaska Department of Transportation and Public Facilities (DOT&PF) has begun deploying UAS across the State to aid in design, construction and monitoring of large scale projects. The **Sterling Highway MP 45-60** is one of the first projects in the State to use data supplemented from UAS. By augmenting traditional survey acquisitions, DOT&PF is able to fill in the gaps with UAS data. ADOT&PF has been using fixed wing and multirotor systems to collect Light Detection and Ranging (LiDAR), Imagery, and environmental documentation since 2019. DOT&PF's ability to quickly acquire imagery and LiDAR and distribute to the project team, not only saves time, but allows for the public to be kept updated on project development through an online web portal.



(Top Left) A flight planning software is used to correct terrain inconsistencies with the UAS flight path, imagery overlap and Ground Sampling Distance (GSD) for the project acquisition area by using a Digital Surface Model (DSM). (Top Right) A point cloud deliverable highlighting a small section of the vegetation clearing progress for the 14 mile corridor. The benefits of using low altitude oblique and nadir imagery acquisition, allows for an accurate reconstruction of bare earth and dense vegetation from just a single flight. (Below) An aerial photo captured by UAS, shows the future location of one of Alaska's larger single span bridges in DOT&PF's inventory spanning across Juneau Creek at over 200ft high and over 700ft long.

Credit: Alaska DOT

Value Capture: Capitalizing on the Value Created by Transportation

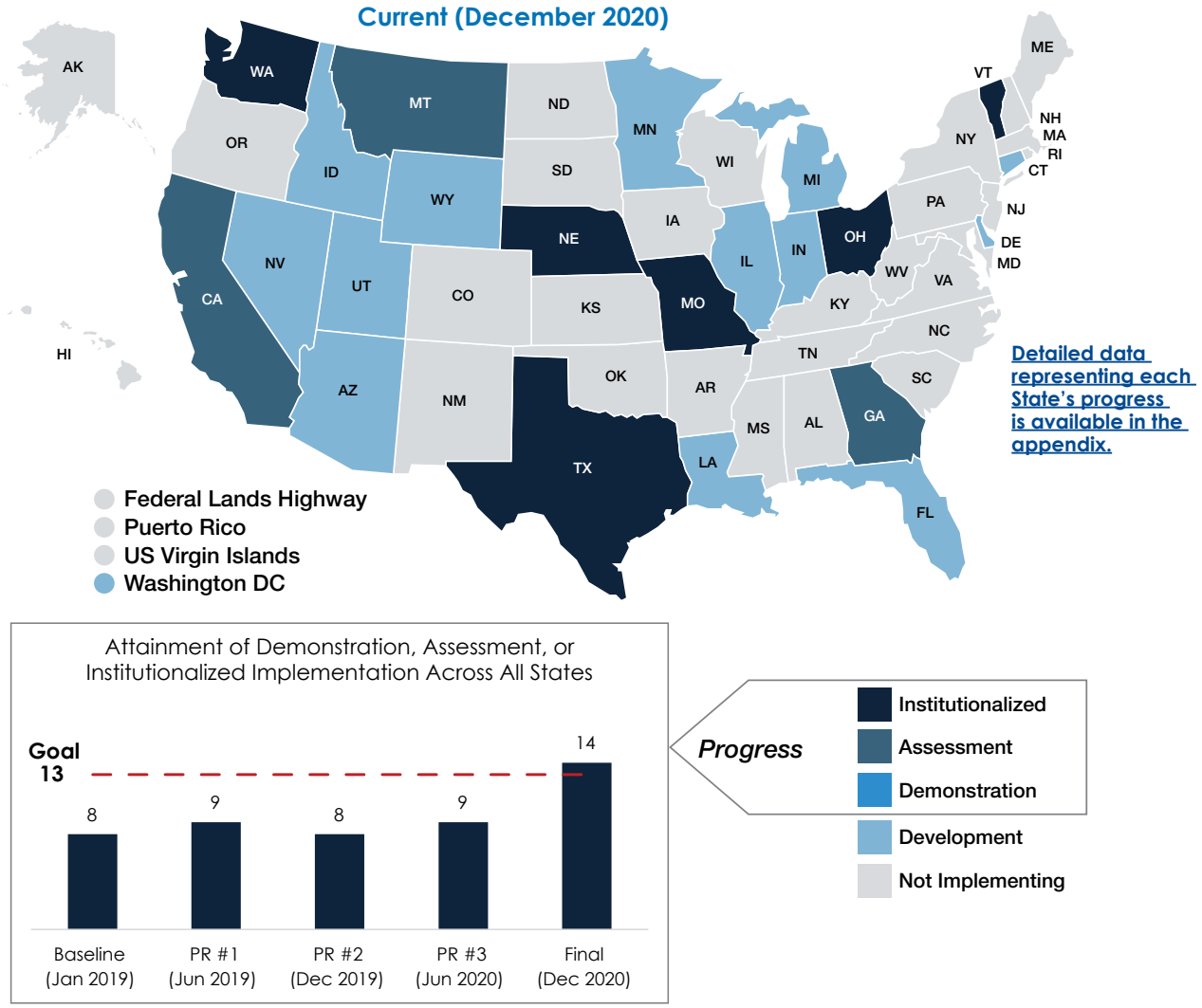
When agencies invest in transportation improvements, nearby land values often rise, benefiting landowners and developers. **Value capture** techniques enable agencies to share in a portion of these increased property values to invest in future transportation projects.

The value capture initiative promotes tools agencies can use to generate new and enhanced revenue sources to build, maintain, or reinvest in the transportation system. Agencies can add these tools—such as special assessments, right-of-way use agreements, development impact fees, tax increment financing, and transportation utility fees—to the mix of funding sources for transportation improvements.

Value capture tools enable agencies to address gaps in transportation funding and accelerate project delivery. Value capture is useful in urban, suburban, and rural settings and can help fund capital projects as well as operations and maintenance activities.

Fourteen States attained demonstration, assessment, or institutionalized stages of Value Capture implementation in EDC-5..

View **Innovation Spotlight video: Value Capture**.



Innovation Spotlight

| Value Capture: Capitalizing on the Value Created by Transportation |

The Atlanta City Council **recently approved a Value Capture Special Service District** to generate funding towards completing the Atlanta BeltLine's 22-mile multi-use trail loop. The new funding will generate $45 million in additional affordable housing funds, $12 million in additional small business support, and up to $150 million in construction funds targeted towards minority-owned contractors. Completion of the trail corridor is expected to deliver a total economic impact of $10 billion and nearly 50,000 permanent jobs for the City of Atlanta.

Credit: Atlanta Beltline Inc.

Before and after photos of Fourth Ward Park, Atlanta, GA – part of the Atlanta BeltLine project

Additionally, in the city of Biddeford, ME, a joint development project incorporated the design, build, finance, operation and maintenance of a 640-space parking garage, completed the city's urban RiverWalk, and improved pedestrian connections. The joint development project was able to accomplish all of this without the use of residential property tax dollars or impacting the city's tax rate. The city will contribute annual funding from its tax increment financing revenues and parking fees. The agreement also allows for revenue sharing with the city if parking revenues exceed forecasts. Construction of the garage is expected to provide the City of Biddeford over an additional $16 million in property taxes in the first 10 years of operation and a net benefit of nearly $40 million over the next 25 years in addition to continuing promotion of downtown development. The project is part of Biddeford's revitalization plan for its downtown Mill District and will also support the nearby Lincoln Mill and Riverdam Mill redevelopment projects.

The Lincoln Garage and RiverWalk, city of Biddeford, ME

Credit: City of Biddeford, ME

Virtual Public Involvement

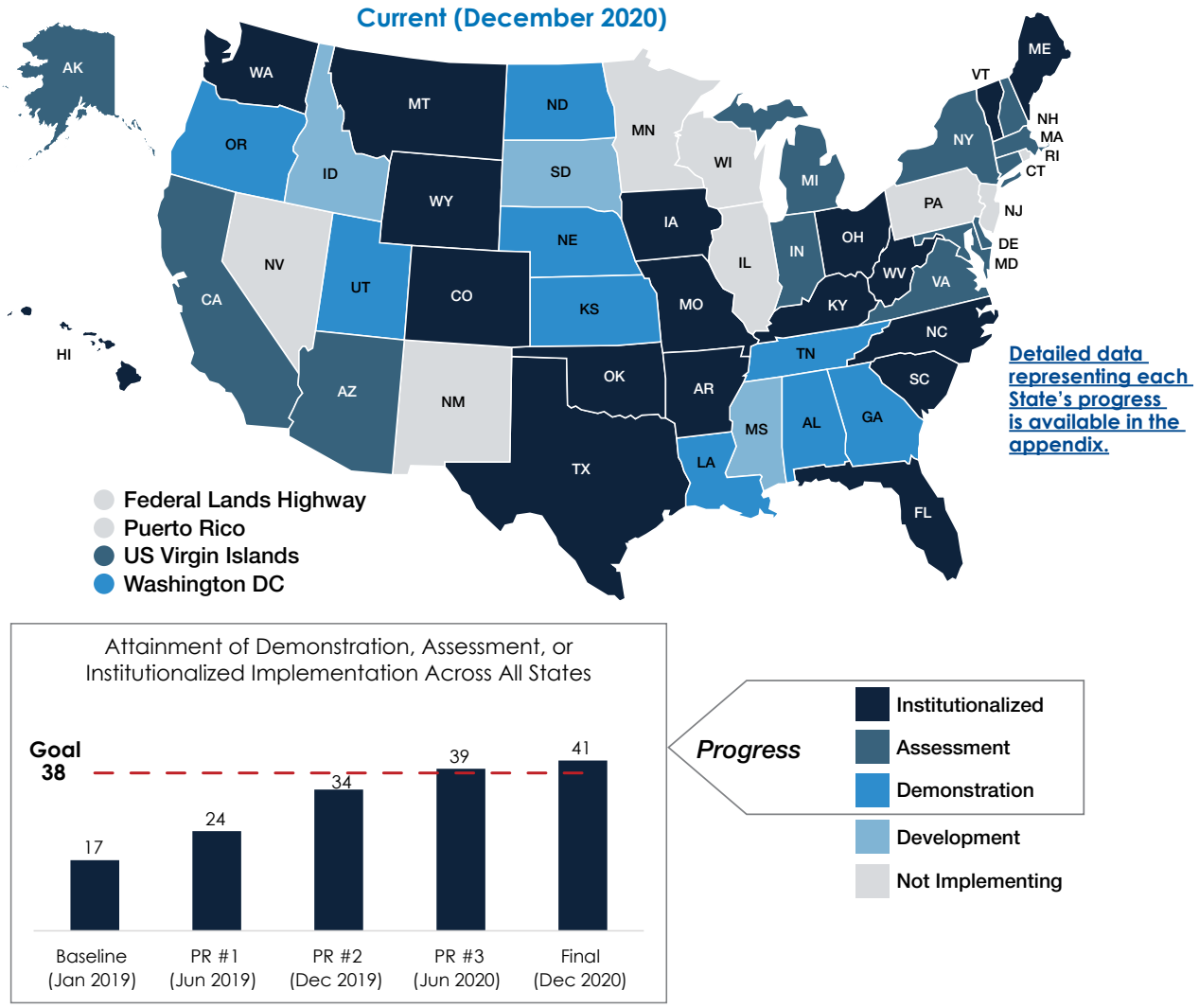
Involving the public in transportation planning and project development can help agencies accelerate project delivery by identifying concerns early in the decision-making process. **Virtual public involvement** strategies enhance agencies' efforts to engage the public by supplementing traditional processes such as face-to-face meetings with digital technology.

Virtual tools and strategies—including mobile applications, project visualizations, do-it-yourself videos, crowdsourcing tools, virtual town halls, mapping tools, and all-in-one tools—make public involvement more accessible. These approaches offer convenient, low-cost methods to inform the public, encourage participation, illustrate projects and plans, and get feedback.

Virtual public involvement can aid in establishing a common vision for transportation and ensure that the public's opinions and needs are considered during planning and project development. Virtual tools can also engage wider, more diverse audiences more efficiently and address barriers to public participation, such as participants' busy schedules, as well as securing broad-based pubic involvement across a diverse landscape of participants.

Forty-one States attained demonstration, assessment, or institutionalized stages of Virtual Public Involvement implementation in EDC-5.

View **Innovation Spotlight video: Virtual Public Involvement**.



Innovation Spotlight

| Virtual Public Involvement |

The Michigan Department of Transportation (MDOT) serves a wide diversity of urban and rural communities throughout the State. In 2019, MDOT began a pilot funded by FHWA's STIC Incentive Program to develop and evaluate VPI tools – such as online surveys, virtual public meetings, and visualizations – to provide information and gather public input during the planning, project development, and environmental review processes. In 2018-2019, MDOT used VPI to enhance its public engagement for **Michigan Mobility 2045**, its Statewide Long-range Transportation Plan update. For this plan, MDOT used online surveys and telephone town halls. They also paired VPI tools with in-person meetings to increase the effectiveness of their public involvement. MDOT is institutionalizing VPI through pilot projects and the development of agency VPI guidance and reference documents on VPI tools for MDOT staff, and the inclusion of VPI in the MDOT Public Involvement Procedures.

Michigan DOT's online survey for its long-range transportation plan, Michigan Mobility 2045.

Credit: Michigan DOT

Weather-Responsive Management Strategies

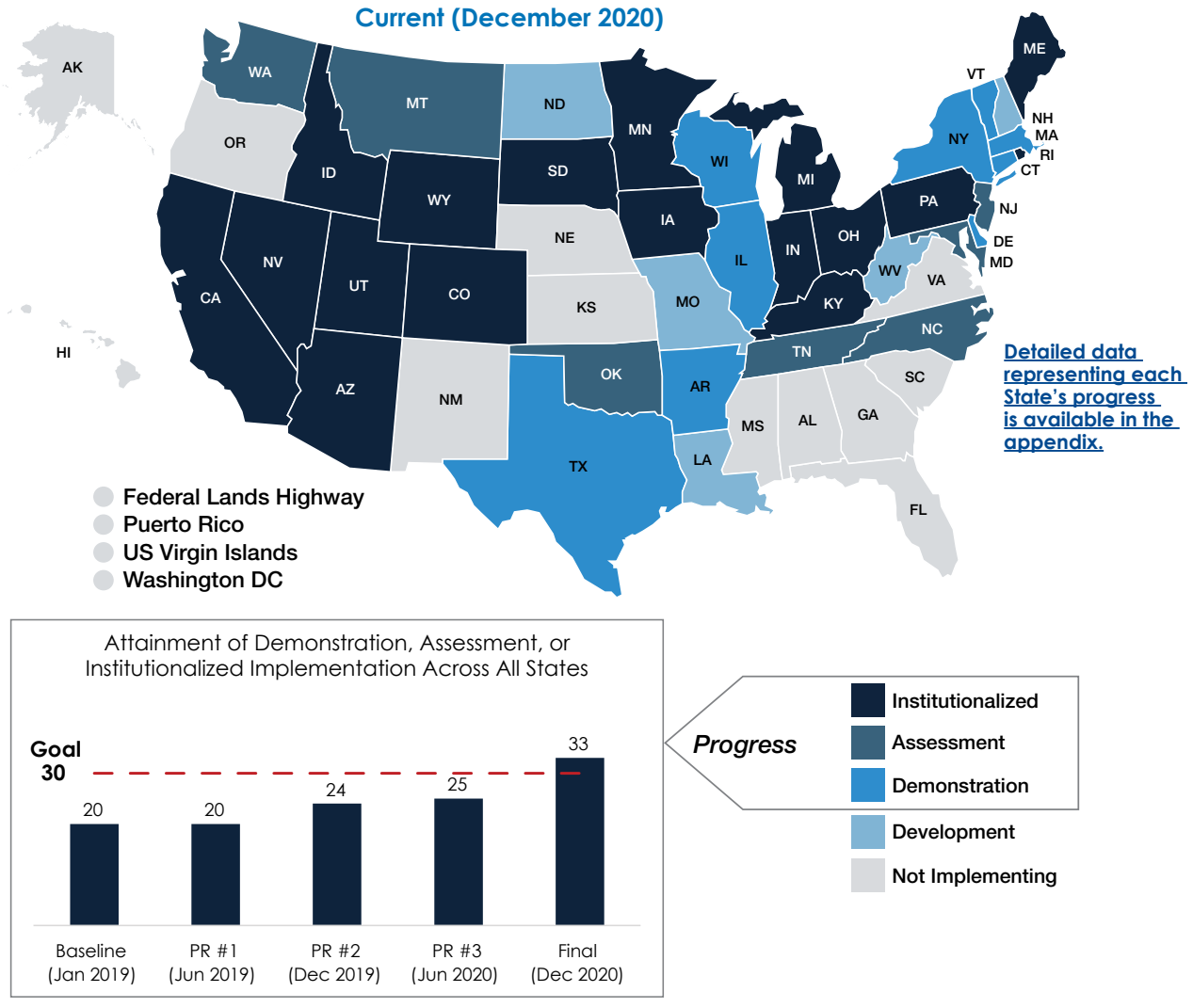
Weather-responsive management strategies can increase the effectiveness of traffic operations and highway maintenance during adverse road weather conditions.

Inclement weather is a factor in one out of five crashes on U.S. roads. Each year, nearly 6,000 people are killed and more than 245,000 are injured in weather-related crashes. Inclement weather also contributes to traffic delays, increased freight costs, and environmental impacts from road salt use.

Weather-responsive management strategies promotes adoption of traffic and maintenance management approaches that use road weather data from **integrating mobile observations** and connected vehicles, combined with informed decisions stemming from **Pathfinder**. Traffic management strategies such as motorist advisory systems, signal timing, and variable speed limits can help agencies improve safety and keep traffic and freight moving. Maintenance management strategies such as plowing, debris removal, and water drainage maintenance also enhance safety and mobility, while anti-icing and deicing techniques can reduce the cost and negative environmental effects of chemical use.

Thirty-three States attained demonstration, assessment, or institutionalized stages of Weather Responsive Management Strategies implementation in EDC-5.

View **Innovation Spotlight video: Weather Responsive Management Strategies**.



Innovation Spotlight

| Weather-Responsive Management Strategies |

Over the past two winter seasons, Massachusetts DOT (MassDOT) has installed Mobile Road Weather Information Sensors (RWISs) in area supervisor and key staff vehicles operating across the Commonwealth. The mobile sensors provide an additional level of data to the Department's existing road and ambient air temperature sensor readings. The Mobile RWIS data – including grip level, pavement and air temperature, surface condition, height of water, snow, and ice, relative humidity, and frost/dew points – enable supervisors significantly more information to base real-time winter roadway treatment decisions. MassDOT conducts deicing on its 15,000 lane-mile roadway system 150 to 350 times every winter season. Every application costs the Department approximately $90,000 in salt and has the potential to impact over one billion gallons of groundwater. By using the new sensor data, supervisors are better able to determine grip level and more accurately determine the need for roadway treatment. As a result, MassDOT is not only improving safety along its roadways, but it is reducing the cost of its winter maintenance treatments and reducing its environmental impact.

Credit: MassDOT

RWISs like these are installed on area supervisor and key staff vehicles across the Commonwealth.

Acronyms and Abbreviations

2D.....two-dimensional
3D.....three-dimensional
AASHTO.....American Association of State Highway and Transportation Officials
A-GaME.....advanced geotechnical methods in exploration
AID Demonstration.....Accelerated Innovation Deployment Demonstration
CHANGE.....collaborative hydraulics: advancing to the next generation of engineering
DOT.....department of transportation
EDC.....Every Day Counts
EDC-5.....Every Day Counts round five
FHWA.....Federal Highway Administration
FLH.....Federal Lands Highway
LiDAR.....Light Detection and Ranging
STEP.....safe transportation for every pedestrian
STIC.....State Transportation Innovation Council
UAS.....unmanned aerial system

More Information

See the **EDC-5 innovations** web page for information and resources.

Watch **introductory webinars** for overviews and examples of how agencies use the EDC-5 innovations.

Contact **EDC-5 deployment teams** for information, technical assistance, and training.

Get innovation deployment assistance and incentives through the **STIC Incentive** and **AID Demonstration** programs.

View the EDC-5 Destination Innovation video.

Appendix

States	Advanced Geotechnical Exploration Methods (A-GaME)	Collaborative Hydraulics (CHANGE)	Use of Crowdsourcing to Advance Operations	Project Bundling	Reducing Rural Roadway Departures (RwD)	Safe Transportation for Every Pedestrian (STEP)	Unmanned Aerial Systems (UAS)	Value Capture	Virtual Public Involvement (VPI)	Weather-Responsive Management Strategies (WRMS)
Alabama	Demonstration Stage	Assessment Stage	Institutionalized	Institutionalized	Demonstration Stage	Demonstration Stage	Institutionalized	Not Implementing	Demonstration Stage	Not Implementing
Alaska	Assessment Stage	Assessment Stage	Not Implementing	Assessment Stage	Demonstration Stage	Assessment Stage	Institutionalized	Not Implementing	Assessment Stage	Not Implementing
Arizona	Demonstration Stage	Institutionalized	Institutionalized	Assessment Stage	Assessment Stage	Institutionalized	Institutionalized	Demonstration Stage	Assessment Stage	Institutionalized
Arkansas	Assessment Stage	Demonstration Stage	Assessment Stage	Demonstration Stage	Demonstration Stage	Assessment Stage	Assessment Stage	Not Implementing	Institutionalized	Demonstration Stage
California	Institutionalized	Demonstration Stage	Demonstration Stage	Institutionalized	Assessment Stage	Institutionalized	Institutionalized	Assessment Stage	Assessment Stage	Institutionalized
Colorado	Institutionalized	Institutionalized	Institutionalized	Demonstration Stage	Assessment Stage	Demonstration Stage	Assessment Stage	Not Implementing	Institutionalized	Institutionalized
Connecticut	Institutionalized	Assessment Stage	Institutionalized	Demonstration Stage	Development Stage	Institutionalized	Assessment Stage	Demonstration Stage	Assessment Stage	Demonstration Stage
Delaware	Development Stage	Demonstration Stage	Assessment Stage	Institutionalized	Assessment Stage	Institutionalized	Assessment Stage	Development Stage	Assessment Stage	Demonstration Stage
Federal Lands Highway	Institutionalized	Institutionalized	Not Implementing	Not Implementing	Demonstration Stage	Institutionalized	Institutionalized	Not Implementing	Not Implementing	Not Implementing
Florida	Institutionalized	Institutionalized	Institutionalized	Institutionalized	Demonstration Stage	Assessment Stage	Assessment Stage	Demonstration Stage	Institutionalized	Not Implementing
Georgia	Institutionalized	Assessment Stage	Institutionalized	Institutionalized	Assessment Stage	Institutionalized	Assessment Stage	Assessment Stage	Demonstration Stage	Not Implementing
Hawaii	Not Implementing	Development Stage	Development Stage	Development Stage	Not Implementing	Assessment Stage	Development Stage	Not Implementing	Institutionalized	Not Implementing
Idaho	Not Implementing	Demonstration Stage	Demonstration Stage	Demonstration Stage	Demonstration Stage	Demonstration Stage	Demonstration Stage	Development Stage	Development Stage	Institutionalized
Illinois	Demonstration Stage	Assessment Stage	Demonstration Stage	Development Stage	Assessment Stage	Assessment Stage	Demonstration Stage	Demonstration Stage	Not Implementing	Demonstration Stage
Indiana	Assessment Stage	Demonstration Stage	Institutionalized	Institutionalized	Assessment Stage	Assessment Stage	Assessment Stage	Development Stage	Assessment Stage	Institutionalized
Iowa	Demonstration Stage	Assessment Stage	Institutionalized	Institutionalized	Assessment Stage	Demonstration Stage	Institutionalized	Not Implementing	Institutionalized	Institutionalized
Kansas	Demonstration Stage	Development Stage	Not Implementing	Institutionalized	Assessment Stage	Assessment Stage	Demonstration Stage	Not Implementing	Demonstration Stage	Not Implementing
Kentucky	Institutionalized	Institutionalized	Assessment Stage	Institutionalized	Assessment Stage	Assessment Stage	Assessment Stage	Not Implementing	Institutionalized	Institutionalized
Louisiana	Demonstration Stage	Development Stage	Development Stage	Demonstration Stage	Demonstration Stage	Demonstration Stage	Assessment Stage	Development Stage	Demonstration Stage	Development Stage
Maine	Assessment Stage	Assessment Stage	Institutionalized	Institutionalized	Demonstration Stage	Institutionalized	Assessment Stage	Not Implementing	Institutionalized	Institutionalized
Maryland	Development Stage	Not Implementing	Demonstration Stage	Not Implementing	Not Implementing	Demonstration Stage	Not Implementing	Not Implementing	Assessment Stage	Assessment Stage
Massachusetts	Demonstration Stage	Assessment Stage	Assessment Stage	Not Implementing	Institutionalized	Institutionalized	Demonstration Stage	Not Implementing	Assessment Stage	Demonstration Stage
Michigan	Assessment Stage	Assessment Stage	Institutionalized	Institutionalized	Institutionalized	Institutionalized	Demonstration Stage	Development Stage	Assessment Stage	Institutionalized
Minnesota	Institutionalized	Assessment Stage	Demonstration Stage	Not Implementing	Institutionalized	Assessment Stage	Not Implementing	Development Stage	Not Implementing	Institutionalized
Mississippi	Not Implementing	Institutionalized	Development Stage	Institutionalized	Demonstration Stage	Demonstration Stage	Not Implementing	Not Implementing	Development Stage	Not Implementing
Missouri	Demonstration Stage	Assessment Stage	Assessment Stage	Assessment Stage	Demonstration Stage	Demonstration Stage	Development Stage	Institutionalized	Institutionalized	Development Stage
Montana	Demonstration Stage	Institutionalized	Development Stage	Institutionalized	Institutionalized	Assessment Stage	Institutionalized	Assessment Stage	Institutionalized	Assessment Stage
Nebraska	Not Implementing	Institutionalized	Not Implementing	Demonstration Stage	Institutionalized	Assessment Stage	Institutionalized	Institutionalized	Demonstration Stage	Not Implementing

States	Advanced Geotechnical Exploration Methods (A-GaME)	Collaborative Hydraulics (CHANGE)	Use of Crowdsourcing to Advance Operations	Project Bundling	Reducing Rural Roadway Departures (RwD)	Safe Transportation for Every Pedestrian (STEP)	Unmanned Aerial Systems (UAS)	Value Capture	Virtual Public Involvement (VPI)	Weather-Responsive Management Strategies (WRMS)
Nevada	Not Implementing	Institutionalized	Not Implementing	Not Implementing	Not Implementing	Institutionalized	Institutionalized	Development Stage	Not Implementing	Institutionalized
New Hampshire	Demonstration Stage	Institutionalized	Demonstration Stage	Institutionalized	Development Stage	Assessment Stage	Institutionalized	Not Implementing	Assessment Stage	Development Stage
New Jersey	Demonstration Stage	Demonstration Stage	Institutionalized	Institutionalized	Development Stage	Institutionalized	Institutionalized	Not Implementing	Not Implementing	Assessment Stage
New Mexico	Development Stage	Institutionalized	Not Implementing	Institutionalized	Not Implementing	Demonstration Stage	Demonstration Stage	Not Implementing	Not Implementing	Not Implementing
New York	Demonstration Stage	Institutionalized	Development Stage	Not Implementing	Assessment Stage	Institutionalized	Development Stage	Not Implementing	Assessment Stage	Demonstration Stage
North Carolina	Institutionalized	Institutionalized	Assessment Stage	Institutionalized	Institutionalized	Assessment Stage	Assessment Stage	Not Implementing	Institutionalized	Assessment Stage
North Dakota	Development Stage	Institutionalized	Demonstration Stage	Institutionalized	Institutionalized	Assessment Stage	Assessment Stage	Not Implementing	Demonstration Stage	Development Stage
Ohio	Assessment Stage	Assessment Stage	Institutionalized	Institutionalized	Institutionalized	Institutionalized	Institutionalized	Institutionalized	Institutionalized	Institutionalized
Oklahoma	Institutionalized	Demonstration Stage	Assessment Stage	Assessment Stage	Development Stage	Assessment Stage	Assessment Stage	Not Implementing	Institutionalized	Assessment Stage
Oregon	Assessment Stage	Assessment Stage	Assessment Stage	Institutionalized	Institutionalized	Assessment Stage	Assessment Stage	Not Implementing	Demonstration Stage	Not Implementing
Pennsylvania	Not Implementing	Assessment Stage	Institutionalized	Institutionalized	Assessment Stage	Assessment Stage	Assessment Stage	Not Implementing	Not Implementing	Institutionalized
Puerto Rico	Development Stage	Not Implementing	Assessment Stage	Demonstration Stage	Assessment Stage	Development Stage	Not Implementing	Not Implementing	Not Implementing	Not Implementing
Rhode Island	Not Implementing	Not Implementing	Demonstration Stage	Development Stage	Institutionalized	Assessment Stage	Assessment Stage	Not Implementing	Not Implementing	Institutionalized
South Carolina	Institutionalized	Institutionalized	Assessment Stage	Assessment Stage	Institutionalized	Demonstration Stage	Assessment Stage	Not Implementing	Institutionalized	Not Implementing
South Dakota	Development Stage	Assessment Stage	Development Stage	Institutionalized	Assessment Stage	Institutionalized	Assessment Stage	Not Implementing	Development Stage	Institutionalized
Tennessee	Demonstration Stage	Demonstration Stage	Assessment Stage	Institutionalized	Institutionalized	Assessment Stage	Assessment Stage	Not Implementing	Demonstration Stage	Assessment Stage
Texas	Development Stage	Assessment Stage	Assessment Stage	Institutionalized	Institutionalized	Institutionalized	Institutionalized	Institutionalized	Institutionalized	Demonstration Stage
US Virgin Islands	Not Implementing	Not Implementing	Not Implementing	Assessment Stage	Not Implementing	Development Stage	Not Implementing	Not Implementing	Assessment Stage	Not Implementing
Utah	Institutionalized	Institutionalized	Demonstration Stage	Assessment Stage	Assessment Stage	Development Stage	Institutionalized	Development Stage	Demonstration Stage	Institutionalized
Vermont	Demonstration Stage	Institutionalized	Development Stage	Institutionalized	Development Stage	Institutionalized	Assessment Stage	Institutionalized	Institutionalized	Demonstration Stage
Virginia	Not Implementing	Not Implementing	Assessment Stage	Institutionalized	Institutionalized	Institutionalized	Institutionalized	Not Implementing	Assessment Stage	Not Implementing
Washington	Institutionalized	Institutionalized	Assessment Stage	Not Implementing	Assessment Stage	Institutionalized	Institutionalized	Institutionalized	Institutionalized	Assessment Stage
Washington DC	Not Implementing	Development Stage	Development Stage	Not Implementing	Not Implementing	Institutionalized	Not Implementing	Demonstration Stage	Demonstration Stage	Not Implementing
West Virginia	Development Stage	Demonstration Stage	Not Implementing	Not Implementing	Institutionalized	Demonstration Stage	Institutionalized	Not Implementing	Institutionalized	Development Stage
Wisconsin	Development Stage	Assessment Stage	Assessment Stage	Development Stage	Not Implementing	Assessment Stage	Demonstration Stage	Not Implementing	Not Implementing	Demonstration Stage
Wyoming	Development Stage	Assessment Stage	Assessment Stage	Institutionalized	Institutionalized	Institutionalized	Demonstration Stage	Development Stage	Institutionalized	Institutionalized