

# Bridge, Pavement, and System Performance Measures

—and—

## Asset Management *Final Rules Overview*

October 2017



U.S. Department of Transportation  
**Federal Highway Administration**

# Establishment and Reporting of Targets

Following slides applies to

- Bridge Measures
- Pavement Measures
- System Performance Measures



# Establishment of Performance Targets – State DOTs (490.105)

- First set of targets within 1 year of the effective date of the final rule: May 20, 2018.
- Target required for each performance measure
- Targets must be reported to FHWA by October 1, 2018.
- Each Performance Period: Cover 4 years
  - (2018-2021); (2022-2025), etc.
  - 2-year targets
  - 4-year targets



# Establishment of Performance Targets – State DOTs (490.105)

- Established targets:
  - Reflect the state investment strategies described in the state Asset Management Plan (490.107(b)(1)(ii)(C); 515.7(e); 515.9(g))
    - » Performance gap analysis (actual condition vs. expected target)(515.7(a))
    - » Life-cycle planning (minimizing the life-cycle cost while achieving expected targets, under budget constraint) (515.7(b))



# Establishment of Performance Targets – MPOs (490.105)

- Establish 4-year targets by supporting the State DOT target or establishing a quantifiable target
  - Establish targets within 180 days relevant State DOT(s) establish targets
  - Due Nov 16, 2018 (or earlier if FDOT establishes prior to May 20, 2018)
  - A multistate planning area -may choose different target establishment options for the portion of the planning area within each State



# State Reporting on Performance Targets (490.107)

- Baseline Performance Period Report
  - Baseline performance measures
  - 2- and 4-year established performance targets
- Mid Performance Progress Report
  - 2-year PMs vs. 2-year targets
- Final Performance Progress Report
  - 4-year PMs vs. 4-year targets



# State Reporting on Performance Targets (490.107)

- FHWA reviews the reports
  - For significant progress determination
    - » The actual condition is better than the baseline condition, or
    - » The actual condition is equal to or better than the established target
- If progress is not made for a target:
  - State DOT shall take action to achieve target

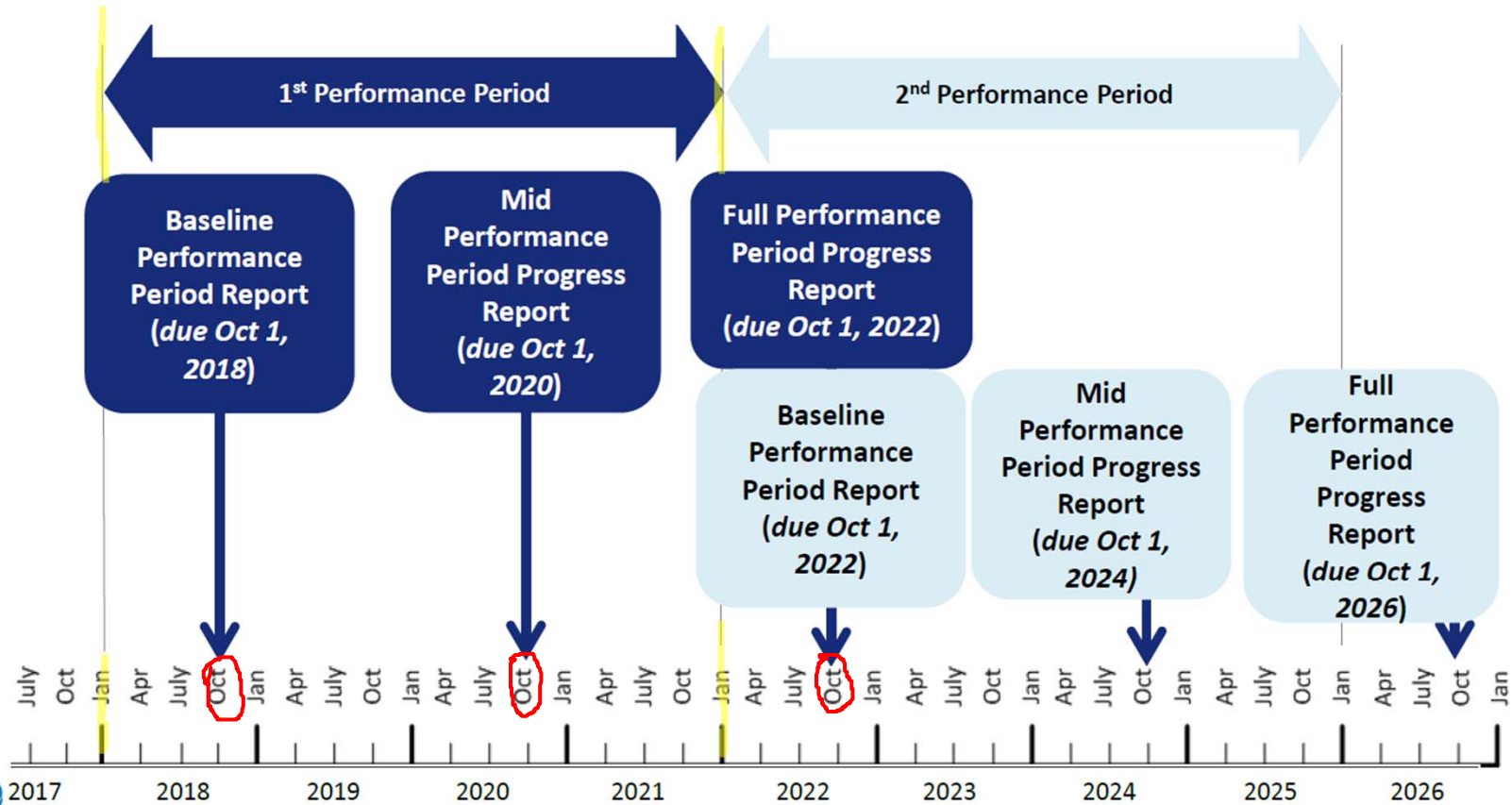


# MPO Reporting on Performance Targets (490.107)

- Reporting includes:
  - » Targets to respective State DOT(s) in a manner that is documented and mutually agreed upon by both parties
  - » Baseline level and progress toward targets in Metropolitan Transportation Plan
  - » Do not need to send to FHWA



# Timeline for performance periods and biennial reporting



# Performance Measures on NHS Bridges



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# Final Rule 490 Subpart D

- Effective date: May 20, 2017
- Only covers NHS Bridges
  - Includes bridges on- and off-ramps connected to the NHS



# Calculating NHS Bridge Condition Performance Measures (490.409)

Overall Bridge Condition Rating	Structure Type		Measures
	Bridges	Culverts	
	3 metric classification (58-Deck, 59-Superstructure, 60-Substructure)	1 metric classification (62-Culverts)	
✓ Good	All metrics rated "Good"	Metric rated "Good"	→ percentage of deck area classified as in "Good" condition
✓ Poor	Any metric rated "Poor"	Metric rated "Poor"	→ percentage of deck area classified as in "Poor" condition
✗ Fair	Minimum rated metric "Fair"	Metric rated "Fair"	



# Pavement Measures



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# Pavement Measures

Pavement Condition Measures	
Interstate System	Non-Interstate NHS
Percentage of pavements of the Interstate System in <b>Good</b> condition	Percentage of pavements of the non-Interstate NHS in <b>Good</b> condition
Percentage of pavements of the Interstate System in <b>Poor</b> condition	Percentage of pavements of the non-Interstate NHS in <b>Poor</b> condition



## ***Data Needed for Calculating the National Pavement Measures***

### **Condition Data:**

- Roughness (IRI)
- Rutting (asphalt pavements only)
- Cracking
- Faulting (concrete pavements only)
- Can use Present Serviceability Rating (PSR) only where speed limit < 40 mph



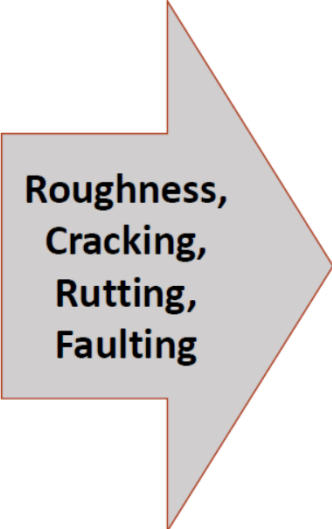
## ***Pavement Condition Thresholds***

	<b>Good</b>	<b>Fair</b>	<b>Poor</b>
<b>IRI (inches/mile)</b>	<95	95-170	>170
<b>Rutting (inches)</b>	<0.20	0.20-0.40	>0.40
<b>Faulting (inches)</b>	<0.10	0.10-0.15	>0.15
<b>Cracking (%)</b>	<5	5-20 (asphalt) 5-15 (JCP) 5-10 (CRCP)	>20 (asphalt) >15 (JCP) >10 (CRCP)



# Key Deadlines & Dates

## *Pavement TPM Regulations: Required Data Reporting*

	Interstate	Non-Interstate	
 <p>Roughness, Cracking, Rutting, Faulting</p>	<b>April 15</b>	<b>June 15</b>	<i>Due Date</i>
	<b>Every Year</b>	<b>2 Years</b>	<i>Frequency</i>
	<b>Full Extent</b> 1 Lane 1 Direction	<b>Full Extent</b> 1 Lane 1 Direction	<i>Coverage</i>



# Data Sources

## HPMS Field Manual (State DOTs report for each pavement section)

	Condition Metrics*	Inventory Data Elements	Effective Date
<b>Interstate System</b>	IRI, Rutting, Faulting, Cracking Percent	Through Lanes Surface Type Structure Type	January 1, 2018
<b>Non-Interstate NHS</b>	IRI, Rutting, Faulting, Cracking Percent	Through Lanes Surface Type Structure Type	January 1, 2020

*\*Per the existing HPMS Field Manual, only IRI and the inventory data elements are currently required for all segments of the NHS. This requirement changes on the effective date shown.*



***Pavement TPM Regulations:  
Minimum Condition and Penalty***

Minimum Condition Level: % of lane-miles of **Interstate System** in poor condition shall not exceed 5.0%

*FHWA will assess the minimum condition level annually using data in HPMS as of June 15*

Penalty: If minimum is not met, State must obligate more of NHPP funds and transfer some of STP funds to Interstate Program in next fiscal year



# Systems Performance Measures



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# Final Measures: System Performance and Freight

Measure Area	Performance Measures
Performance of the National Highway System (Subpart E)	<ul style="list-style-type: none"><li>• <b>Interstate Travel Time Reliability Measure:</b> Percent of person-miles traveled on the Interstate that are reliable</li><li>• <b>Non-Interstate Travel Time Reliability Measure:</b> Percent of person-miles traveled on the non-Interstate NHS that are reliable</li></ul>
Freight Movement on the Interstate System (Subpart F)	<ul style="list-style-type: none"><li>• <b>Freight Reliability Measure:</b> Truck Travel Time Reliability (TTTR) Index</li></ul>

Note: These measures contribute to assessing the National Highway Performance Program (NHPP) and National Highway Freight Program (NHFP)

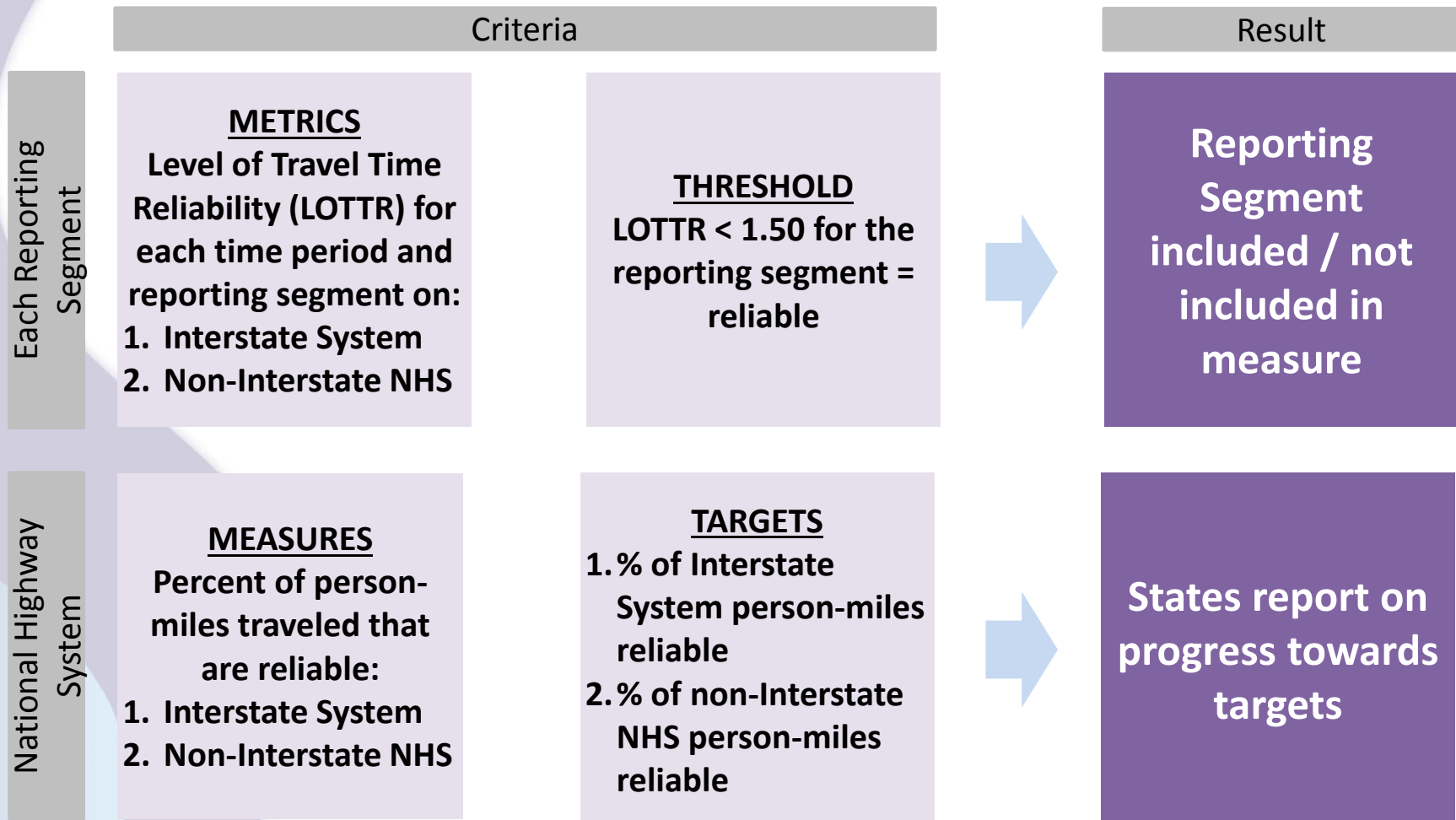


## GHG Measure Delayed

- While the rule took effect on May 20, 2017, certain portions of the rule pertaining to the GHG measure (the percent change in CO<sub>2</sub> emissions from 2017, generated by on-road mobile sources on the NHS) have been delayed indefinitely.
- FHWA will be publishing a NPRM in the *Federal Register* pertaining to the GHG measure.



# § 490.507 Travel Time Reliability Measures



## § 490.509 Travel Time Reliability Data Sources

Relevant Data	Data Source(s)
<ul style="list-style-type: none"><li>• <b>Travel times</b></li><li>• <b>NHS travel time segments</b></li></ul>	<ul style="list-style-type: none"><li>• National Performance Management Research Data Set (NPMRDS) , <b>OR</b></li><li>• Equivalent data set</li></ul>
<ul style="list-style-type: none"><li>• <b>AADT/volumes</b></li><li>• <b>Annual traffic volume (AADT x 365)</b></li></ul>	<ul style="list-style-type: none"><li>• Highway Performance Monitoring System (HPMS)</li></ul>
<ul style="list-style-type: none"><li>• <b>Occupancy factors</b></li></ul>	<ul style="list-style-type: none"><li>• Provided by FHWA, likely based on national surveys, <b>OR</b></li><li>• Other allowed data sources</li></ul>

# § 490.509 Travel Time Reliability

## Applicable Time Periods

Full Year (Jan 1-Dec 31)



Weekdays (Mon – Fri)

6 – 10am

10am – 4pm

4 – 8pm

Weekends

6am – 8pm

Four Total Time Periods

# § 490.511 Level of Travel Time Reliability (LOTTR) Metric (Example)

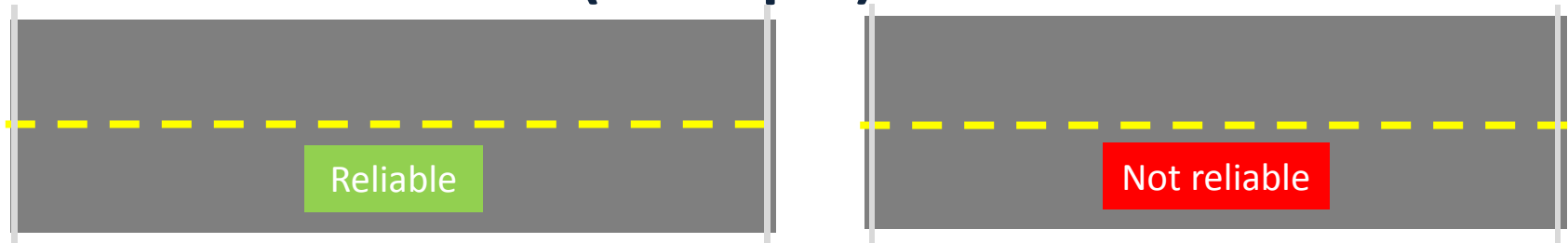
$$\frac{\text{Longer Travel Time (80th)}}{\text{Normal Travel Time (50th)}} = \frac{\# \text{ seconds}}{\# \text{ seconds}} = \text{Level of Travel Time Reliability Ratio}$$

Level of Travel Time Reliability (LOTTR) <i>(Single Segment, Interstate Highway System)</i>		
Monday – Friday	6am – 10am	LOTTR = $\frac{44 \text{ sec}}{35 \text{ sec}} = 1.26$
	10am – 4pm	LOTTR = 1.39
	4pm – 8pm	LOTTR = <b>1.54</b>
Weekends	6am – 8pm	LOTTR = 1.31
Must exhibit LOTTR below 1.50 during <b>all</b> of the time periods		<b>Segment is not reliable</b>

**HPMS Submittal:** Starting in 2018, State DOTs report LOTTR metrics and the corresponding 80<sup>th</sup> and 50<sup>th</sup> percentile times for each time period and directional AADT for each reporting segment by June 15 of each year, for the previous year's measures



# § 490.513 Calculating Travel Time Reliability Measures (Example)



Length	1.000 mi.	0.750 mi.
Annual Traffic Volume	2,000,000	3,500,000
Occupancy Factor	1.3 persons/vehicle	1.7 persons/vehicle
<b>Segment Total</b>	<b>Reliable: 2,600,000 person-miles</b>	<b>Unreliable: 4,462,500 person-miles</b>
	$\frac{\Sigma (\text{Reliable person-miles})}{\Sigma (\text{Total person-miles})}$	

**Measure:** % of person-miles reliable, for full extent of the system



## § 490.609 Freight Reliability Data Sources

### Relevant Data

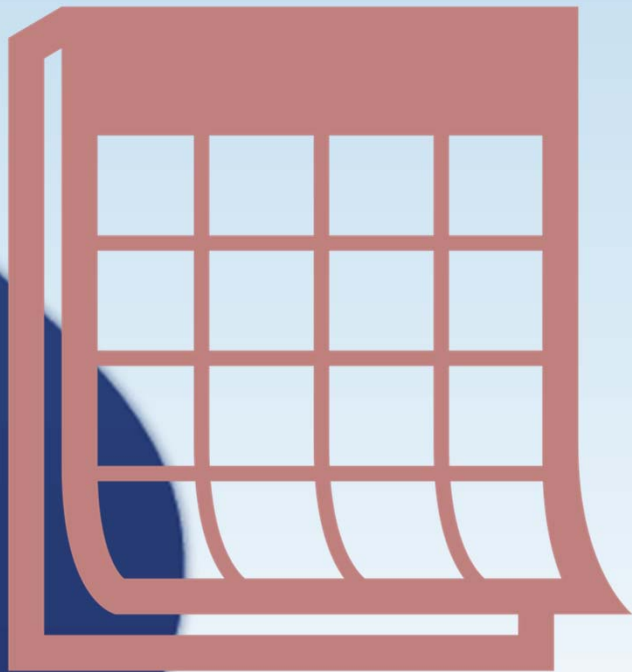
- Truck travel times
- Interstate travel time segments

### Data Source Options

- NPMRDS, ***OR***
- Equivalent data set

# § 490.609 & 490.611 Freight Reliability Applicable Time Periods

Full Year (Jan 1-Dec 31)



Weekdays (Mon – Fri)

**6 – 10am**

**10am – 4pm**

**4 – 8pm**

Overnight (all days)  
**8pm – 6am**

Weekends

**6am –  
8pm**

Five Total Time Periods

# Final Measures: CMAQ Program

Measure Area	Performance Measures
Measures to Assess the CMAQ Program – Traffic Congestion (Subpart G)	<ul style="list-style-type: none"><li>• <b>Peak Hour Excessive Delay(PHED) Measure:</b> Annual Hours of Peak Hour Excessive Delay (PHED) Per Capita</li><li>• <b>Non-Single Occupancy Vehicle Travel (SOV) Measure:</b> Percent of Non-Single Occupancy Vehicle (SOV) Travel</li></ul>
Measure to Assess the CMAQ Program – On-Road Mobile Source Emissions (Subpart H)	<ul style="list-style-type: none"><li>• <b>Emissions Measure:</b> Total Emissions Reduction</li></ul>

**N/A for Florida**



# Asset Management



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# Asset Management Goal

- Maintain the highway infrastructure asset system in a state of good repair
- Manage network for the long term at the minimum practical cost to:
  - Improve or Preserve asset condition and system performance
  - Manage risk
- Short-term performance target are key indicators



## Key Requirements

- Each State DOT must develop a Transportation Asset Management Plan (TAMP) for the NHS to improve or preserve the condition of the assets and the performance of the NHS
- TAMP must cover a 10-year period



# Key DEADLINES & Dates

- By April 30, 2018: State must submit risk-based **initial TAMP**
- **By June 30, 2019: State must submit fully compliant TAMP**
- Every 4 years thereafter: Recertification for updates
- **By July 31 each year: Annual Determination by FHWA**
- October 1, 2019 and each year: If TAMP not developed and implemented, Federal share on NHPP will be reduced to 65% in that fiscal year.



# Risk-Based TAMP

## Key Plan Contents:

- Pavement and bridge inventory and conditions on the NHS
- Objectives, measures, and targets
- Performance gap identification
- Lifecycle Planning
- Risk Management Analysis
- Financial Plan
- Investment Strategies



## For Additional Information



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