



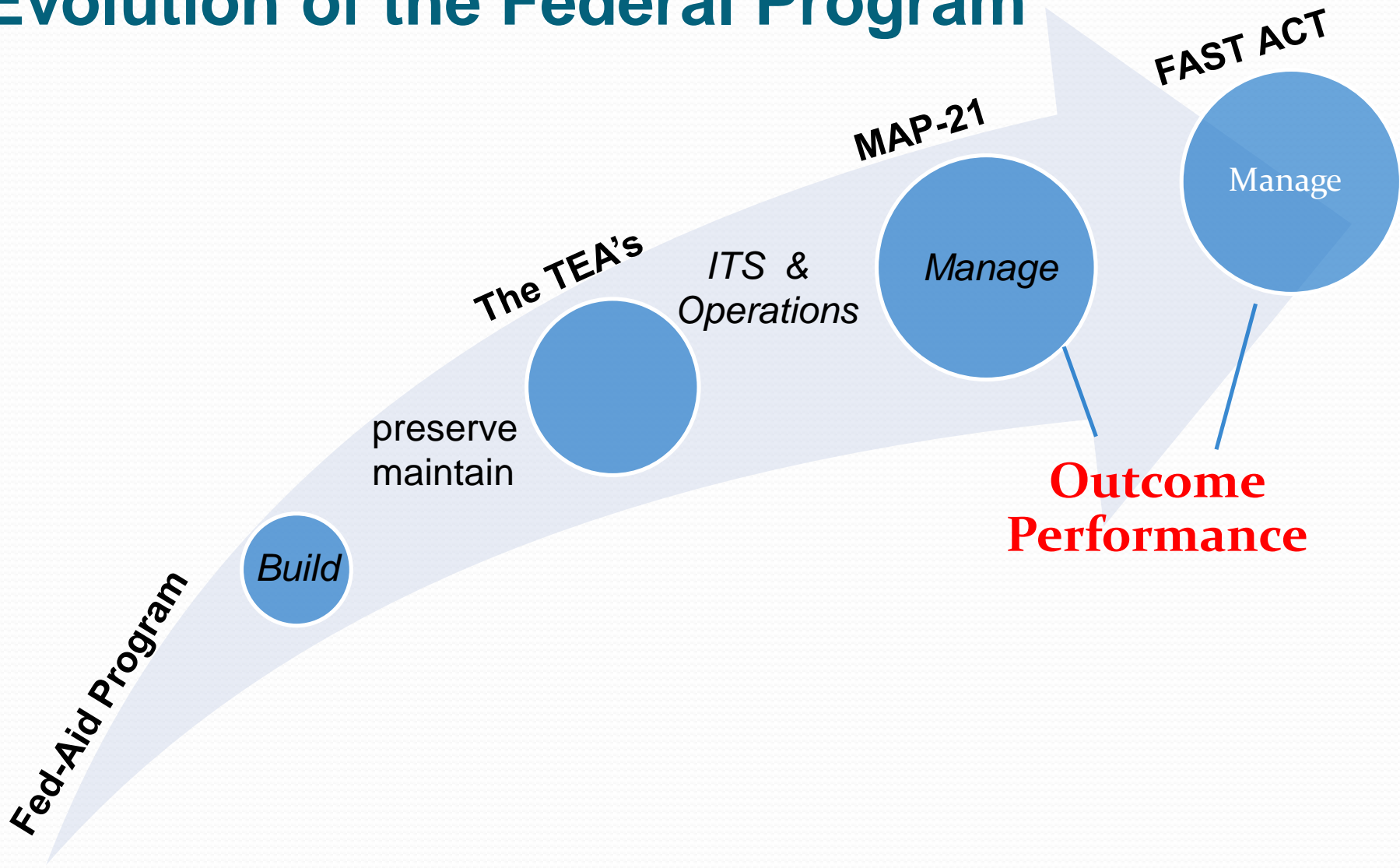
U.S. Department of Transportation  
Federal Highway Administration

MAP-21

*Performance Management  
& Asset Management*

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# Evolution of the Federal Program



# National Highway Performance Program (\$21.8B)

- Funds an enhanced National Highway System, combining functions of the existing NHS, IM and Bridge Programs
- Enhanced NHS includes existing NHS, all principal arterials, STRAHNET, and intermodal connectors
- Requires an asset management plan
- States set targets for conditions and performance
  - Except interstate pavement condition – set by USDOT via rulemaking
  - Except NHS bridges – law set as non more than 10% of bridge deck area SD three years in a row.

Performance Areas	NPRM	Final Rule
Safety Performance Measures	March 11, 2014	Published March 16, 2016
Highway Safety Improvement Program	March 28, 2014	Published March 16, 2016
Statewide and Metro Planning; Non-Metro Planning	June 2, 2014	Published May 27, 2016
Pavement and Bridge Condition Measures	January 5, 2015	Anticipated December 14, 2016
Highway Asset Management Plan	February 20, 2015	Published October 24, 2016
System Performance Measures	April 22, 2016	Anticipated December 20, 2016

# MAP-21 Background – Performance Elements

- National Goals
- Measures
- Targets
- Plans
- Reports
- Accountability and Transparency



[www.fhwa.dot.gov/map21](http://www.fhwa.dot.gov/map21)

# Transportation Performance Management is....

*Transportation Performance Management is a strategic approach that uses system information to make investment and policy decisions to achieve national performance goals.*

# Performance Measures & Targets

- Track the impacts of investments
- Provide accountability to the public
- Evaluate a range of potential solutions to a transportation need
- Decisions are now – data driven and performance based

# MAP-21 Performance Target Setting Requirements: States

- Required to establish performance targets for all measures a year after publication
- May establish different targets for urbanized and rural areas
- Coordinate with MPOs and public transportation providers when establishing performance targets
- Incorporate measures and targets into plans



# MAP-21 Performance Target Setting Requirements: MPOs

After States establish their targets, MPOs are required to:

- Establish performance targets for all performance measures within 180 days after the State establishes its targets
- Coordinate with their StateDOT when establishing performance targets
- Communicate their targets to the state for inclusion in the statewide transportation plan
- Develop a system performance report as part of the MPO long range plan

# Target Setting

- Can targets be declining? Yes
- What data is used? HPMS
- What if a state doesn't achieve its targets?

***Proposed Consequences:*** *If a State has not made significant progress towards the achievement of a target in two consecutive FHWA determinations, then the State would be required to include in the next biennial performance report a description of the actions the State will undertake to achieve all related NHPP targets.*

# Proposed Performance Management Measures

- Safety Performance (4)

- Number of fatalities
- Rate of fatalities
- Number of serious injuries
- Rate of serious injuries

- Pavement/Bridge Performance (6)

- Pavement Condition – Percentage of pavements on the:
  - Interstate System in Good condition
  - Interstate System in Poor condition
  - Non-Interstate NHS in Good condition
  - Non-Interstate NHS in Poor condition
- Bridge Condition – Percentage of NHS Bridges:
  - Classified as in Good condition
  - Classified as in Poor condition

# Minimum Condition and Penalties for Pavements *(490.315 and 490.317)*

Minimum Condition Level: **Percentage of lane-miles of Interstate System in Poor condition would not exceed 5.0%**

*FHWA is committed to reassessing the minimum condition level after completion of the first full performance period*

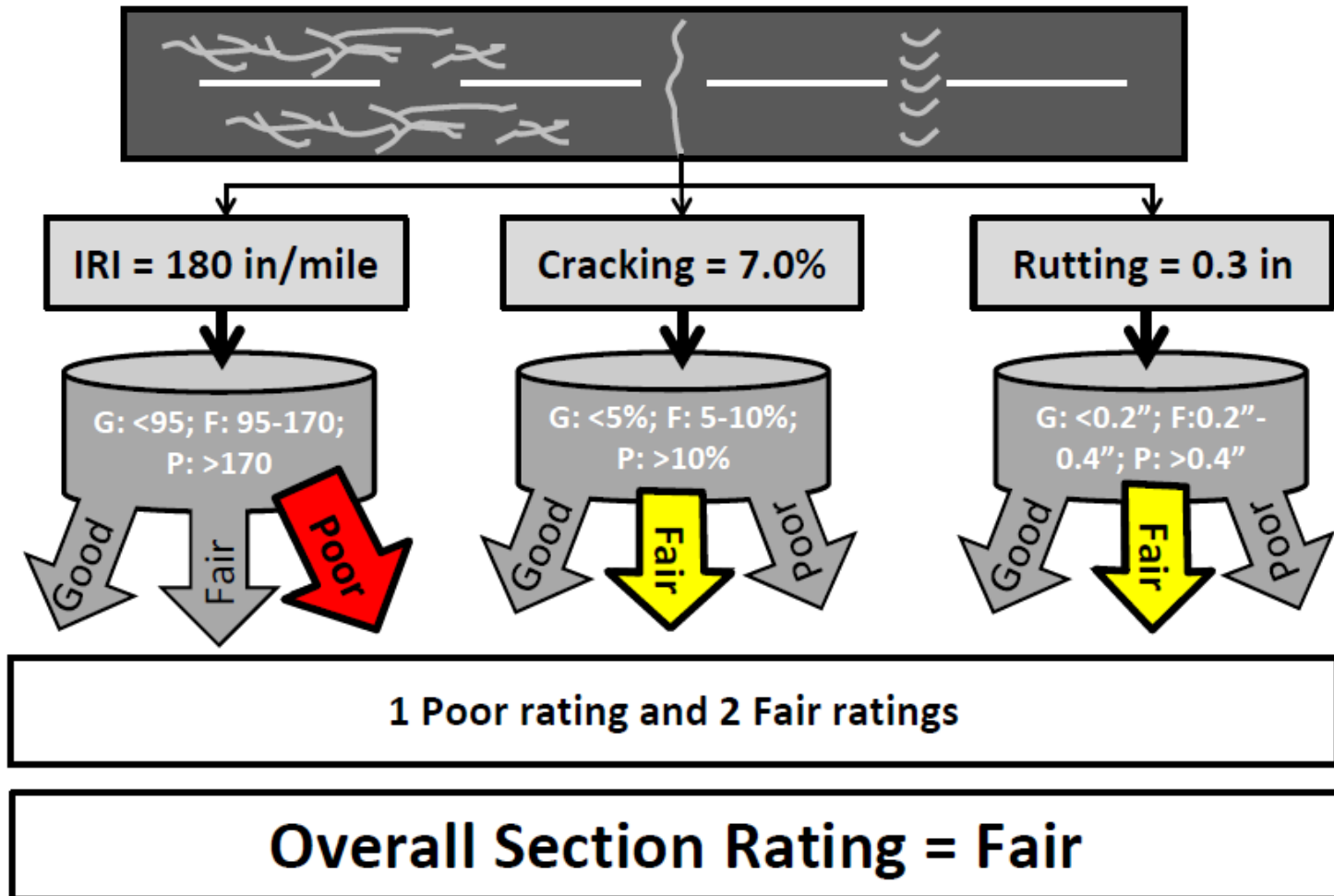
**Penalty: If minimum not met for two consecutive years, State must obligate NHPP & transfer STP funds**

# Pavement Condition Thresholds

		Good	Fair	Poor
<b>IRI</b> <i>(inches/mile)</i>		<95	95-170	>170
<b>Cracking</b> <i>(%)</i>	<i>Asphalt</i>	<5	5-20	>20
	<i>JPCP</i>	<5	5-15	>15
	<i>CRCP</i>	<5	5-10	>10
<b>Rutting</b> <i>(inches)</i>		<0.20	0.20-0.40	>0.40
<b>Faulting</b> <i>(inches)</i>		<0.05	0.05-0.15	>0.15

# Pavement Metric Rating Example

Example for an asphalt surfaced Interstate section located in a rural area



# Calculation of Pavement Measures (490.313)

Pavement Type			
	Asphalt and Jointed Concrete	Continuous Concrete	
Overall Section Condition Rating	3 metric ratings (IRI, cracking and rutting/faulting)	2 metric ratings (IRI and cracking)	Measures
Good	All three metrics rated "Good"	Both metrics rated "Good"	→ percentage of lane-miles in "Good" condition
Poor	≥ 2 metrics rated "Poor"	Both metrics rated "Poor"	→ percentage of lane-miles in "Poor" condition
Fair	All other combinations	All other combinations	

# Minimum Condition and Penalty for Structurally Deficient Bridges *(490.411 and 490.413)*

Minimum condition level:  **$\leq 10\%$  of total deck area of NHS bridges classified as Structurally Deficient**

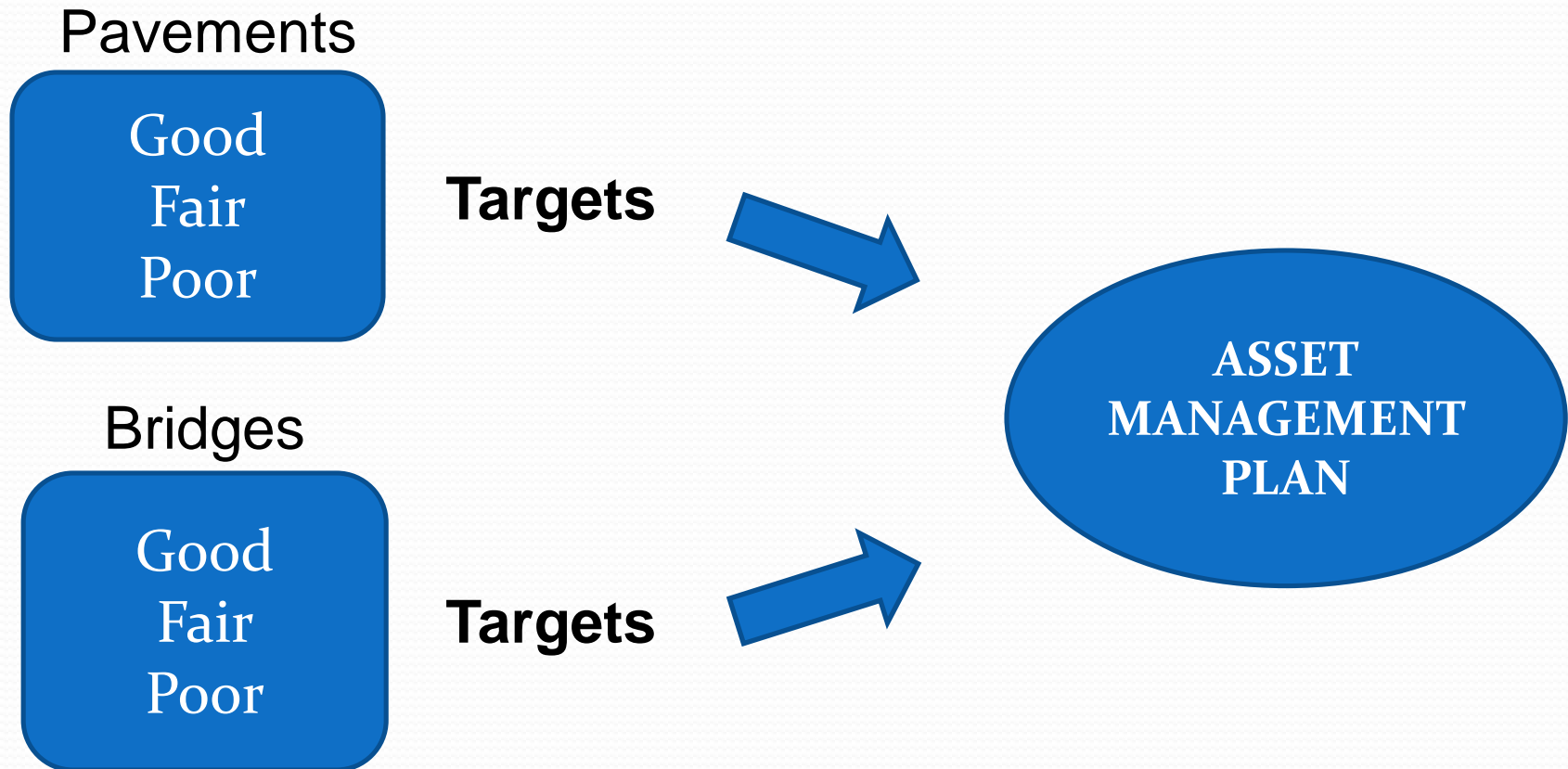
Calculation:

$$100.0 \times \frac{\text{Total Deck Area of NHS Bridges Classified as Structurally Deficient}}{\text{Total Deck Area of NHS Bridges in a State}}$$

Penalty: **If for 3 consecutive years the minimum condition level is not met, State must set aside and obligate NHPP funds for eligible projects on bridges on the NHS**



# Performance to Plan



# What is Asset Management?



Performance Areas	NPRM	Final Rule
Safety Performance Measures	March 11, 2014	Published March 16, 2016
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# Asset Management Definition

Asset management is a **strategic and systematic process** of operating, maintaining, and improving physical assets, with a focus on engineering and economic analysis based upon quality information, to identify **a structured sequence of maintenance, preservation, repair, rehabilitation, and replacement actions** that will achieve and sustain a desired state of good repair over the lifecycle of the assets at minimum practicable cost. (23 U.S.C. 101(a)(2), MAP-21 §1103)

# Risk-Based Asset Management

Risk-Based Asset Management is a powerful decision making ***framework*** that makes it possible to view the impact of today's decisions on tomorrow's infrastructure sustainability, both in terms of performance and value.

# Purpose of this Regulation

- Establish a **process** that State DOTs use to develop a risk-based asset management plan
- Establish the **minimum requirements** for the development of an asset management plan
- Set forth **minimum standards** for a State DOT to use in developing and operating bridge and pavement management systems
- Describe the **penalties** for a State DOT's failure to develop and implement an asset management plan

# Asset Management: Five Core Questions

1. What is the current state of my assets?
2. What is my required level of service/ performance?
3. Which assets are critical to sustained performance?
4. What are my best “Operations and Maintenance” and “Capital Improvement” investment strategies?
5. What is my best long-term funding strategy?

# Assets Included in the Plan

## § 515.009 (a,b,c)

- An asset management plan applies to:
  - Pavements on the NHS
  - Bridges on the NHS
  - All other **NHS infrastructure assets** within the right-of-way corridor (tunnels, ancillary structures, signs, etc.)
  - Other **public roads**

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*All asset management process and plan requirements shall apply to all included assets*



# Coordination with Other NHS Asset Owners

- The processes established by State DOTs shall include a provision for the State DOT to obtain necessary data from other NHS owners in a collaborative and coordinated effort. 23 CFR 515.7(f)
- **State DOTs shall use the best available data to develop their asset management plans.** 23 CFR 515.7(g)
- MPOs roles and responsibilities with regard to asset management plans are addressed in 23 U.S.C. 134(h)(2)(D) and 23 CFR 450.306(d)(4).

# Requirements for Assets Other Than NHS Pavements and Bridges

- 23 CFR 515.9(l) was added to include the requirements applicable to other public roads or other assets voluntarily included in the plan.
- Should States decide to include other public roads or other assets they are required to address the following using a level of effort consistent with their needs and resources.

# Minimum Content

## § 515.009 (d)

1. Asset management **objectives**
  - Align with the agency's mission
  - Consistent with the purpose of asset management
2. Asset management **measures and targets**, relating to:
  - Condition of pavements on the Interstate system
  - Condition of pavements on the NHS
  - Condition of bridges on the NHS
3. Summary **listing of NHS pavements and bridges**, sorted by:
  - Pavements on the Interstate system
  - Pavements on the NHS (excluding the Interstate)
  - Bridges on the NHS

# Minimum Content (cont.)

## § 515.009 (d)

4. **Performance gap** identification
5. **Life-cycle cost** analysis
6. **Risk management** analysis, including the results of the periodic evaluations under § 515.019
7. **Financial plan** covering, at a minimum, a 10-year period
8. **Investment strategies** - § 515.019(f)

# Performance Gap Analysis

## § 515.007(a)(1)

- Identify at a minimum the following:
  - **Performance targets** for the condition of pavements and bridges in the TAMP
  - Gaps in the **effectiveness** of the NHS
  - Gaps between **existing conditions and performance targets**
  - **Alternative strategies** to close or address these gaps

# Life-Cycle Cost Analysis

## § 515.007(a)(2)

- A process to estimate cost of management an asset class, or asset sub-group, over its whole life
- Address at a minimum the following (for each asset class or asset sub-group):
  - Desired **condition**
  - **Deterioration models**
  - Potential **work types**, including treatment options
  - Strategy for **minimizing life-cycle costs**, while achieving performance targets

# Risk Management Analysis

## § 515.007(a)(3)

- Establish a process that produces the following:
  - **Identification of risks** that can affect NHS condition and effectiveness
  - **Assessment of these risks** in terms of likelihood, impact, consequence
  - **Evaluation and prioritization** of these risks
  - **Mitigation plan** addressing top priority risks
  - **Approach for monitoring** top priority risks
  - **Evaluation of facilities**, carried out under § 515.019

# Risk Examples

- Funding
- Extreme weather events
- Climate change (long term)
- Construction / materials costs
- Data and data quality
- Workforce
- Political changes
- Leadership changes
- Etc.



# 10-Year Financial Plan

## § 515.007(a)(4)

- Address at a minimum the following:
  - **Annual costs** over minimum period (10 years)
  - Anticipated **funding sources**
  - Estimated **cost of expected future work** to implement
  - Estimated **funding levels** expected to be available
  - Estimated **value of pavements and bridge assets**
  - Needed annual **investment to maintain value** of these assets

# Investment Strategies

## § 515.007(a)(5)

- Address how the **investment strategies – described in § 515.009(f)** – are influenced by the following:
  - Performance gap analysis – § 515.007(a)(1)
  - Life-cycle cost analysis – § 515.007(a)(2)
  - Risk management analysis – § 515.007(a)(3)
  - Anticipated available funding and estimated cost of future work types

# Phase-In of Plan Development

## § 515.011

- The initial plan **must include**:
  - The State DOT's processes for developing its plan
  - Measures and targets for assets covered by the plan
  - Investment strategies
- The initial plan **may exclude** one or more of the following:
  - Life-cycle cost analysis
  - Risk management analysis
  - Financial plan analysis
- Use **best available information** for other parts

# Asset Management Plan Certification

## § 515.013 (a, b, d)

- Plan **deadline**: 1 year after effective date of final rule
- FHWA reviews plan within 90 days; 3 possible outcomes:
  - **Certified** with no deficiencies
  - **Certified with minor deficiencies**, asset management processes substantially meet the requirements
  - **Denied**, with written notice of specific **requirement deficiencies**
- Period to cure deficiencies: **90 days**
  - FHWA may extend this period upon request
  - For minor deficiencies, State shall notify FHWA in writing when corrective actions are completed
- Update and resubmit plan to FHWA on **Oct. 1, every 4 years**

# Important Deadlines!

## Certification/Recertification

- First State-approved initial asset management plan
  - Not later than **April 30, 2018**
- First State-approved fully compliant asset management plan
  - Not later than **June 30, 2019**
- State FHWA decides if the State DOT's processes meets the requirements no later than 90 days after receiving the State's request
- State DOT shall update and resubmit its plan development processes to the FHWA at least **every 4 years**.

# Penalties

## § 515.015

If State DOT has not developed and implemented a TAMP consistent with the requirements of the final rule by:

Deadline	Penalty
<b>18 months</b> after the effective date of the final rule	<ul style="list-style-type: none"><li>FHWA will <b>not approve</b> any further projects using NHPP funds</li><li>FHWA <b>may extend</b> the 18-month period if FHWA determines that State DOT has made a good faith effort</li></ul>
The <b>second fiscal year</b> after the effective date of the final rule and each fiscal year after	<ul style="list-style-type: none"><li>The maximum Federal share for NHPP projects shall be reduced to <b>65 percent</b> for that fiscal year</li></ul>

# Bridge & Pavement Management

## § 515.007(b)

- Use bridge and pavement management systems that include procedures for:
  - Collecting, processing, storing, and updating **inventory and condition data** for all NHS bridge and pavement assets
  - Forecasting **deterioration** for these assets
  - Determining **life-cycle benefit-cost analysis of alternative strategies** for managing condition of assets
  - Identifying **short- and long-term budget needs**
  - Determining optimal **strategies for identifying projects**
  - Recommending **programs and implementation schedules**



# Roles and Responsibilities

## State DOTs Responsibilities

- Develop processes to prepare a risk-based asset management plan. 23 CFR 515.7
- Develop an asset management plan using the established processes. 23 CFR 515.9
- Implement the asset management plan. 23 CFR 515.13(b)



# Roles and Responsibilities

## **FHWA Responsibilities**

- Certify State DOT's asset management processes at least every 4 years.
- Determine annually whether the State DOT has developed and implemented an asset management plan consistent with 23 U.S.C. 119.
- Set forth the minimum standards for a State DOT to use in developing and operating highway bridge and pavement management systems under 23 U.S.C.150 (23 CFR515.17).

# Benefits of Asset Management

An Asset Management Plan addresses issues and challenges to answer critical questions. Like how will we:

...develop long-term **investment strategies** to manage assets over their whole life.

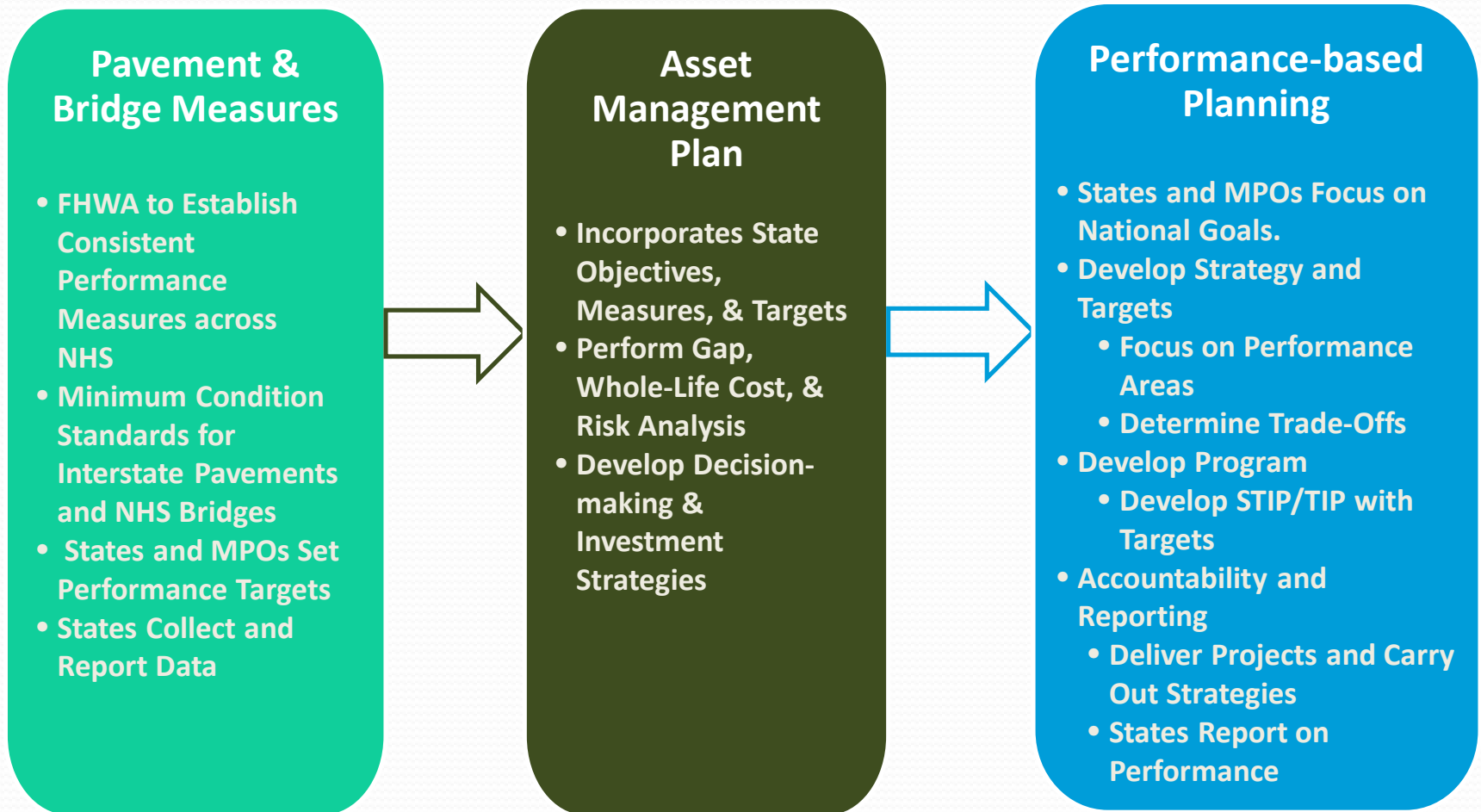
...manage infrastructure performance **10 years from now?**

...manage risks to system performance and condition of assets

# The Relationship

- Proposed 23 CFR 450.206(c)(4) A State shall integrate into the statewide transportation planning process, directly or by reference, the goals, objectives, performance measures, and targets described in this section, in other State transportation plans and transportation processes...

# The Relationship



# Consistency Determination

## Annual Consistency Determination

- First annual consistency determination will occur after the June 30, 2019 deadline
- No later than August 31, 2019, FHWA decides if an asset management plan is consistent with the 23 U.S.C. 119
- Annual consistency determination will occur not later than July 31 in each year thereafter

# Collaboration and Coordination

- Better “decision-making”
- Strengthen accountability
- Transparency
- Communicate/understand successes and failures

# Forthcoming Guidance

- FHWA has developed draft guidance on Certification/recertification of State's asset management processes; and annual consistency determination
- FHWA is developing framework on the following:
  - Life Cycle Planning
  - Risk Management
  - Financial plan
- Anticipated release date – July 2017

# Keys to Success...

- Establish a baseline
- Good data collection
- Network approach
- Accurate life-cycle projections
- Proper scope of work at the correct time
- Funding levels to match needs



# *The FUTURE*

## This is how we do business:

- Preserve our assets and minimize their whole life cost
- Operate in a financially sustainable manner
- Provide a framework to improve performance on a long-term basis





# *Thank You*

## **Questions?**

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