



## Notable results

- *Ninety-two percent of state and local bridges measured by deck area are in fair or better condition; 8% are structurally deficient*
- *Of the 3,286 bridges WSDOT manages, 137 have weight restrictions*
- *Measured by deck area, 9.3% of bridges on the National Highway System in Washington are structurally deficient*
- *WSDOT cleaned 44 fracture critical bridges in fiscal year 2014*

## Bridge conditions remain steady from previous year

Ninety-two percent of the state-owned bridges by deck area were in fair or better structural condition as of June 2014, the same as in June 2013. In terms of the number of bridges, 96 percent of state-owned bridges were in fair or better condition as of June 2014.

The percentage in fair or better condition is greater in terms of the number of bridges compared to the percentage of deck area because several large bridges — the State Route (SR) 99 Alaskan Way Viaduct and the SR 520 floating bridge — are classified as structurally deficient.

Combined, these two bridges (which are currently being replaced) account for 2 percent of the state-owned bridge deck area in Washington. When construction is completed on these projects in 2017, the percentage of bridge deck area in fair or better condition is expected to improve to 94 percent. In total, there are 24 bridges that account for 1.3 million square feet (2.7 percent of WSDOT-managed bridge deck area) that are in poor condition but are under contract for repair. Once these 24 bridge repairs or replacements have been completed and inspected, they will no longer be considered in poor condition.

Measuring bridge conditions by deck area provides a more comprehensive measure than by number of

### WSDOT's percent of bridges by deck area in good condition declines between 2009 and 2014

*Number of bridges and percent of bridges by deck area by condition category; Deck area in millions of square feet*

STRUCTURAL CONDITION		2009	2014	Trend	Overall Desired Trend
<b>GOOD/VERY GOOD</b> Bridges in good condition range from those with no problems to those having some minor deterioration of structural elements.	Number of bridges	2,828	2,855	↓	↑
	Percent of bridges	89.3%	86.9%	↓	
	Bridge deck area	37.9	37.3	↓	
	Percent of deck area	82.4%	80.1%	↓	
<b>FAIR</b> All primary structural elements are sound; may have minor section loss, deterioration, cracking, spalling or scour. This is the most cost-effective time to rehabilitate before the underlying structure is damaged. By doing this, the agency manages to the lowest life cycle cost. <sup>1</sup>	Number of bridges	261	290	↑	↓
	Percent of bridges	8.2%	8.8%	↑	
	Bridge deck area	5.3	5.5	↑	
	Percent of deck area	11.5%	11.7%	↑	
<b>POOR</b> A bridge in poor condition has advanced deficiencies such as section loss, deterioration, scour, or seriously affected structural components, and may have weight restrictions. A bridge in poor condition is still safe for travel.	Number of bridges	78	141	↑	↓
	Percent of bridges	2.5%	4.3%	↑	
	Bridge deck area	2.8	3.8	↑	
	Percent of deck area	6.1%	8.2%	↑	

Data source: WSDOT Bridge and Structures Office.

Notes: The above condition data only includes state-owned bridges.<sup>1</sup> Lowest life cycle cost methodology uses preventative maintenance to preserve the useful life of an asset and minimize maintenance costs over the life of an asset. This method assures that an asset is maintained at an acceptable condition, maximizing safety and useful life.

## WSDOT manages 141 structurally deficient bridges

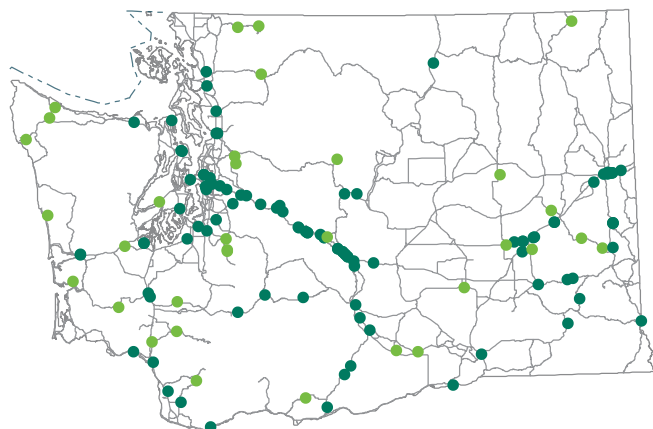
bridges because it factors in bridge size and magnitude. Reporting by deck area aligns with federal requirements of Moving Ahead for Progress in the 21st Century regulations (see table below and gray box in [Gray Notebook 50, p. 13](#)) and Gov. Jay Inslee's performance management system, Results Washington (see [p. vii](#)).

### Eight percent of bridges by deck area are structurally deficient

Structurally deficient bridges represented 8 percent (4.9 million square feet) of the total 61.8 million square feet of bridges in Washington as of June 2014. By number of bridges, 4.7 percent (341 bridges) of the 7,313 total bridges in the state were considered structurally deficient. A bridge is considered structurally deficient if it has deterioration on the deck, superstructure (everything above the supporting structure, such as the roadway beams and girders), and/or substructure. A bridge with a rating of four or lower on a scale of one to nine is rated as structurally deficient and also rated as poor by WSDOT (see table in [Gray Notebook 50, p. 14](#)).

Of the 341 state and local structurally deficient bridges in Washington as of June 2014, 141 were state-owned bridges managed by WSDOT, a slight increase from 138 in 2013. WSDOT's 141 structurally deficient bridges account for 3.8 million square feet of deck area, which is

**141** State-owned structurally deficient (SD) bridges — of these — **99** are on the National Highway System (NHS) bridges



Data source: WSDOT Bridge and Structures Office  
Note: Some dots overlap due to proximity

State-owned SD bridge  
● NHS bridge  
● Non-NHS bridge

The map above shows the locations of state-owned structurally deficient bridges. These bridges represent 3.8 million square feet of deck area, or 8.2 percent of the total deck area for bridges managed by WSDOT. In addition to the bridges shown above, there are 175 locally-owned structurally deficient bridges in Washington, 28 of which are on the National Highway System.

### Structurally deficient bridges in Washington state

As of June 2014; Deck area in millions of square feet; Percent of bridges and deck area considered structurally deficient (SD)

	National Highway System		Statewide	
	Number of bridges	Deck area	Number of bridges	Deck area
<b>State-owned</b>	2,259	39.2	3,286	46.6
Amount SD (%)	99 (4.4%)	3.6 (9.1%)	141 (4.3%)	3.8 (8.2%)
<b>Locally-owned<sup>1</sup></b>	199	3.8	4,027	15.2
Amount SD (%)	28 (14.1%)	0.4 (11.8%)	200 (5.0%)	1.1 (7.4%)
<b>Total</b>	2,458	43.0	7,313	61.8
Amount SD (%)	127 (5.2%)	4.0 (9.3%)	341 (4.7%)	4.9 (8.0%)

Data source: WSDOT Bridge and Structures Office.

Notes: Structurally deficient is equal to the state's poor condition rating.  
1 Bridges owned by counties and cities.

8.2 percent of the bridge deck area owned by WSDOT and 6.2 percent of all (state and local) bridge deck area in Washington. The number of state-owned structurally deficient bridges is projected to decrease to 137 bridges by 2019. This forecast is based on an expectation of how current funding will be applied to the bridge network, as well as likely bridge deterioration such as concrete deck and timber bridge deterioration, and steel bridge corrosion resulting from postponed painting.

The total deck area of structurally deficient bridges on the National Highway System (NHS) in Washington fell 3 percent, from 4.1 million in 2013 to 4.0 million in 2014. See [p. 6](#) for a description of the National Highway System.

### State and federal performance measures focus on bridges

New federal legislation, Moving Ahead for Progress in the 21st Century (MAP-21), will require that states have no more than 10 percent of bridge deck area classified as structurally deficient on the NHS. States failing to

#### Bridge condition reporting requirements

Condition targets by performance reporting system

Performance reporting system	Target	Which bridges are included?
Moving Ahead for Progress in the 21st Century (MAP-21) (see <a href="#">p. v</a> )	≤10% of deck area on structurally deficient (poor condition) bridges	All NHS bridges (state- and locally-owned)
Results Washington (see <a href="#">p. vii</a> )	≤10% of deck area on structurally deficient (poor condition) bridges	All NHS bridges (state- and locally-owned)
Governmental Accounting Standards Board (GASB)	≥90% of bridge deck area in fair or better condition	All state-owned bridges (NHS and non-NHS)

Data source: WSDOT Office of Strategic Assessment and Performance Analysis.

Note: NHS = National Highway System.

# Asset Management: Bridge Annual Report

## Bridge load restrictions help ensure public safety

meet this target for three consecutive years must then devote National Highway Performance Program funds to improve bridge conditions. Results Washington (see [p. vii](#)) and MAP-21 set a target of having no more than 10 percent of National Highway System bridge deck area classified as structurally deficient (poor condition).

In addition, the state is required to follow Generally Accepted Accounting Principles, which include pronouncements from the Governmental Accounting Standards Board (GASB). This board governs the financial reporting of infrastructure assets, and requires WSDOT to maintain an up-to-date inventory of assets for which it performs and documents condition assessments. For the purpose of GASB reporting, WSDOT has a bridge condition goal of 90 percent of state-owned bridge deck area in fair or better condition.

### Most WSDOT managed bridges are on the National Highway System

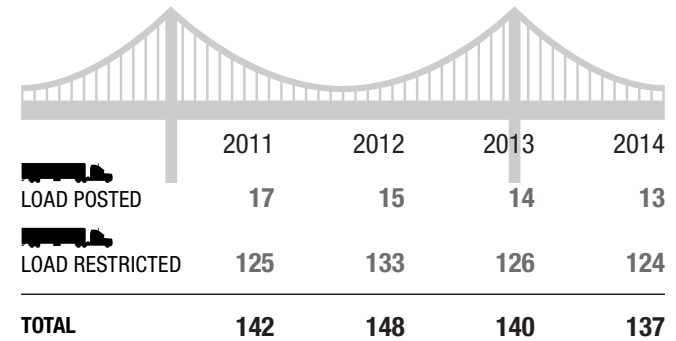
The NHS is a network of strategic highways within the United States, and includes both state and local highways and roads serving major airports, ports, rail and/or truck terminals, pipeline terminals and other transport facilities. Washington's NHS includes 2,458 bridges, 2,259 (92 percent) of which are managed by WSDOT. The remaining 199 (8 percent) are managed by cities and counties.

According to the Federal Highway Administration (FHWA), Washington ranked 13th highest in the nation in terms of the amount of structurally deficient bridge deck area on the NHS for state and local bridges in 2013.

FHWA rates bridges for structural deficiency by calendar year, using the same data and condition rating scale WSDOT uses for good, fair and poor condition. Unsafe bridges are closed and are not counted in WSDOT's rating.

Bridges rated as poor or structurally deficient have some deficiencies and are in need of future repair or replacement. The majority of WSDOT's bridge assets are in good condition today, and keeping bridges in good shape in the future requires the continued ability to maintain and preserve bridges to maximize their full service life. A bridge reaches its full service life when it is restricted from carrying legal size loads due to structural deterioration.

**WSDOT has 137 load posted or load restricted bridges**  
*Fiscal years (July through June), 2011-2014; Number of bridges with weight restrictions*



Data source: WSDOT Bridge and Structures Office.

Note: On load posted bridges, truck weights are restricted to a posted weight limit that is less than typical legal limits. On load restricted bridges, trucks must comply with reduced axle weights that are lower than typical legal limits.

### Number of load posted and restricted bridges declines

A total of 137 WSDOT bridges were load posted or restricted in 2014, down from 140 in 2013. As part of the bridge inspection program, WSDOT performs load rating tests to verify whether bridges can safely carry the weight of trucks using them. Bridges are designed to carry the standard truck weight load when they are built. If results show the structure cannot safely carry certain loads, WSDOT implements weight restrictions to reduce the risk of further damage:

- On load posted bridges, truck weights are restricted to posted weight limits that are less than typical legal limits.
- On load restricted bridges, trucks must comply with reduced axle weights that are lower than typical limits.

### No load posted bridges on major freight corridors in Washington

About one-third (40 bridges) of WSDOT's load posted or restricted bridges are on T-1 or T-2 freight corridors. Most of these are load restricted bridges, which affect large loads that are over legal weight limits. Trucking companies must obtain a special permit to haul loads that are over the legal limit. When a bridge is load restricted, trucks can be equipped with special trailers to distribute the weight or drivers can take an alternate route. Most bridge restrictions impact the movement of large equipment. Trucking companies that use alternate routes must factor the cost of transporting their freight as part of

## WSDOT performs 1,892 bridge inspections in FY2014

their operating costs. An increase in these transportation costs will eventually be transferred to consumers.

As of June 2014, there were no load posted bridges on T-1 freight corridors (routes carrying more than 10 million annual tons), and two load posted bridges on T-2 freight corridors (routes carrying four to 10 million annual tons). Bridges with load postings below the legal weight limit can impact routine freight movement, such as garbage trucks or trucks delivering goods to grocery stores. An online map of load restricted and load posted bridges in Washington state is available at <http://www.wsdot.wa.gov/commercialVehicle/Restrictions/Default.aspx>.

### WSDOT's bridge inventory grows

The state-owned bridge inventory WSDOT manages included 3,829 structures as of June 2014. These add up to 46.6 million square feet of deck area, which is equal to about 736 lane miles, approximately the distance on Interstate 5 between Federal Way and Sacramento, California.

WSDOT has added 16 vehicular bridges (plus another 19 bridge structures) to its inventory since June 2013, primarily due to new bridges being built. The average age of WSDOT's vehicular bridges is 44 years. WSDOT has 283 bridges that are 75 years old or older, which have 1.95 million square feet of total deck area.

### WSDOT bridge inventory increases by 35 in FY2014 *Inventory of WSDOT bridges as of June 2014*

	Number
Vehicular bridges longer than 20 feet	3,093
Structures less than 20 feet long	402
Culverts longer than 20 feet	131
Pedestrian structures	76
Ferry terminal structures	68
Tunnels and lids	43
Border bridges maintained by border state <sup>1</sup>	6
Border bridges maintained by WSDOT <sup>2</sup>	5
Railroad bridges	5
<b>Total WSDOT bridge structures</b>	<b>3,829</b>

Data source: WSDOT Bridge and Structures Office.

Notes: Total of 3,829 does not equal the total number of state bridges on p. 5 (3,286), because it includes additional structure types.

1 WSDOT funds 50 percent of the preservation for 11 border bridges. Six of these bridges are maintained by the border state (five with Oregon and one with Idaho). 2 Four of these bridges are shared with Oregon and one with Idaho.

### WSDOT plans to perform 1,892 bridge inspections *Fiscal year 2014<sup>1</sup>; Number of inspections by type*

Type of inspection	Number
WSDOT routine bridge inspection	1,504 <sup>2</sup>
WSDOT under bridge inspection truck (UBIT) bridge inspections	267 <sup>3</sup>
Local agency UBIT inspections	69
WSDOT routine ferry terminal inspections	24
Fracture critical ferry terminal inspections	20
Local agency routine inspections	8
<b>Total WSDOT bridge inspections</b>	<b>1,892</b>

Data source: WSDOT Bridge and Structures Office.

Notes: 1 July 2013 through June 2014. 2 Of these, 151 are on a four-year inspection frequency. 3 Of these, 92 are for fracture critical bridges.

### Inspection program ensures that bridges open to public are safe

WSDOT manages bridges through inspection, maintenance, rehabilitation and replacement. These are essential aspects of bridge management to prolong their service life, keep costs down and maintain bridge safety.

The Federal Highway Administration (FHWA) mandates that all publicly-owned bridges be inspected at least once every two years with a few exceptions. WSDOT performs federally mandated inspections on all state-owned bridge structures as outlined in the National Bridge Inspection Standards to determine bridge conditions, and preservation and maintenance needs. Local agencies follow the same guidance for inspections as the state; bridges are inspected at least once every two years using the same national inspection standards. Even though most local governments inspect their own bridges, WSDOT conducts field reviews and provides training and technical assistance to Washington cities and counties for inspecting bridges on local roads.

While the majority of WSDOT's bridges are inspected on a two-year cycle, there are eight bridges with specific watch items that are inspected annually. Currently, a total of 453 concrete bridges that are in good condition and meet defined FHWA criteria are inspected on a four-year cycle.

Bridge engineers also perform specialized work to determine the condition of selected elements of a bridge (such as fracture critical members and mechanical elements on movable bridges), along with the routine inspections.

# Asset Management: Bridge Annual Report

## WSDOT strategically preserves bridge assets

### WSDOT develops a plan for cleaning fracture critical bridges in the state

WSDOT received a letter from the FHWA in December 2013, outlining corrective actions and underscoring the need to clean fracture critical bridges so they could be properly inspected. A bridge or structure is classified as fracture critical if it contains any support members (a piece/member of a bridge structure that is under tension, where failure would likely cause a portion of or the entire bridge to collapse). For information on fracture critical bridge conditions in Washington, see [Gray Notebook 50, p. 7](#). The letter outlined specific actions to address the issue:

- Action 1: Identify a prioritized list of state-owned fracture critical member bridges needing to be cleaned. This was completed by WSDOT in March 2014.
- Action 2: Institute and fund a bridge cleaning program to clean state-owned bridges prior to performing a bridge inspection. WSDOT increased maintenance spending by \$2 million starting in the 2013-2015 biennium to implement the cleaning plan. Bridge cleaning and inspection of state fracture critical bridges began in January 2014; all of these bridges will be inspected and washed on an annual cycle by January 2017.
- Action 3: Develop a local agency bridge list and plan for addressing bridge cleaning, which was done by WSDOT in March 2014. This list includes about 70 structures for which local agencies are responsible to fund the cleaning efforts. The plan of corrective action will be amended to incorporate the local agency prioritized list of bridges and specific action items.
- Action 4: Report on progress of bridge cleaning for state and local bridges quarterly beginning in March 2014. During the first year of the program (fiscal year 2014), WSDOT completely cleaned 44 state bridges and partially cleaned six. Despite the current bridge cleaning backlog, WSDOT expects to be caught up by 2017. Of the 70 local agency bridges, half have been inspected to date.

### Maintenance plans \$10.6 million in bridge repairs during biennium

WSDOT employs various strategies to extend the service life of its assets, while minimizing life cycle costs. These strategies include performing day-to-day maintenance repairs as well as bridge preservation work to ensure bridge assets do not deteriorate to a condition that is beyond repair. Bridge maintenance

work is mainly performed by WSDOT regional crews and is often completed within a matter of days.

Hundreds of maintenance repairs are needed each year on bridges throughout the highway system. During the 2013-2015 biennium, crews plan to perform \$10.6 million in structural bridge repairs, which include a combination of Priority 1 (highest priority) through Priority 3 (lowest priority) repairs. In FY2014, 54 percent of Priority 1 repairs were completed, leaving a 46 percent backlog. Refer to [Gray Notebook 50, p. 7](#), for more information on bridge maintenance.

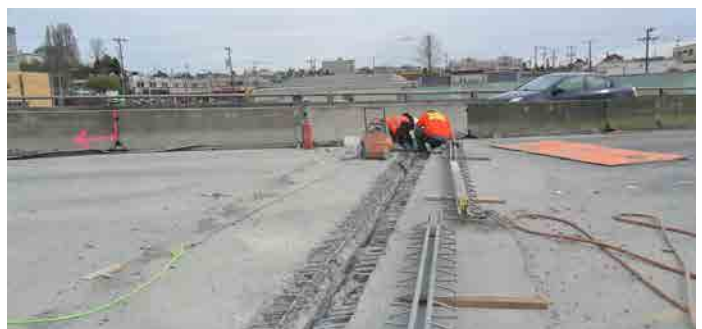
### WSDOT uses cost-effective strategies to preserve bridges

Through the use of strategic asset management, timely bridge maintenance and preservation, WSDOT can maximize the useful service life of bridges. This work helps keep bridges safe and serving the public at the least cost to taxpayers.

In contrast to maintenance repairs, WSDOT mainly hires private sector contractors to perform preservation work. Bridge preservation strategies WSDOT uses include rehabilitating or replacing bridge elements, repainting steel bridges, and overlaying concrete bridge decks. A bridge is considered for replacement when the problem causing the structural deficiency may reduce the load-carrying capacity of the bridge, and the cost of rehabilitation is more than 50 percent of the replacement cost.

### Strategy: Replace deteriorated bridge elements

WSDOT had nine rehabilitation projects underway between July 2013 and June 2014, which repaired or replaced bridge elements. This work included completing the



*Between January and early spring 2014, WSDOT replaced 33 expansion joints across northbound and southbound I-5 in downtown Seattle. The original 50-year-old expansion joints were replaced with new, watertight joints that can bend and flex as the concrete expands and contracts with changing traffic and weather patterns, improving safety for drivers.*

## One third of steel bridges are due for painting

Interstate 5 (I-5) Skagit River bridge, replacing bridge expansion joints along I-5 in downtown Seattle, replacing anchor cables on the two I-90 floating bridges across Lake Washington, and completing expansion joint repairs on the eastbound Tacoma Narrows Bridge.

Bridge rehabilitation projects address specific bridge elements needing repair; the most common types of repairs include expansion joint replacement, concrete column repair, and anchor cable replacements on floating bridges.

### Strategy: Repainting steel bridges keeps bridges in fair or good condition

WSDOT has completed painting on three bridges and plans to complete 11 repainting projects on eight steel bridges by the end of the 2013-2015 biennium, with a total estimated cost of \$54.8 million. These bridges include the State Route (SR) 99 George Washington Aurora Avenue

#### WSDOT needs \$694 million for 10-year steel bridge painting plan

*Fiscal years (FY) 2013 through 2023; Planned projects and spending for 2013-2015 biennium; Dollars in millions*

Painting needs	Number of bridges	Cost to repaint
Currently due or past due <sup>1</sup>	110	\$467.0
11 projects planned for 2013-2015 biennium <sup>2</sup>	8.5 <sup>3</sup>	\$54.8
<b>Remaining backlog</b>	<b>101.5</b>	<b>\$412.2</b>
Due within the next 10 years	43	\$282.0
<b>10-year total need</b>	<b>144.5</b>	<b>\$694.2<sup>3</sup></b>

Data source: WSDOT Bridge and Structures Office.

Notes: 1 There are 56 bridges that are currently past due and 54 that are due for painting. 2 WSDOT painted three bridges, and plans to complete 11 additional projects on eight bridges, and share the cost of the U.S. 101 Astoria bridge with Oregon in the 2013-2015 biennium. 3 The projected 10-year total need increased from \$486.2 million since being reported in [Gray Notebook 50, p. 9](#), due to the cost of paint increasing from \$40 to \$50 per square foot.



Both spans of the Interstate 5 Nooksack River Bridge near Ferndale (pictured above) are scheduled for painting in 2014. To protect the bridge for years to come, crews will remove rust, old paint and other debris, and put on fresh coats of primer and paint.

Bridge in Seattle, six steel trusses on I-5 from Woodland to Ferndale and four other bridges across the state. In addition, WSDOT will share the cost of repainting the U.S. 101 Columbia River Astoria Bridge with Oregon.

A protective paint coating on a steel bridge is essential for preventing corrosion, extending the bridge's service life and keeping the bridge in fair or better condition. Keeping up with painting can stretch taxpayer dollars and prevent the number of bridges in poor condition from increasing.

Bridges are prioritized for repainting based on the amount of corrosion and the route on which they are located. Bridges on primary freight routes are given top priority. Steel truss bridges should be repainted every 20 to 25 years on average and newer steel girder bridges should be painted approximately every 40 years. Bridge painting is a major repair project with significant costs due to the complexity of safety, environmental regulations and containment system requirements. On average, a steel truss bridge is considered in poor condition if it has been due for painting for at least five years, or 10 years for steel girder bridges.

### Cost of painting for due or past due bridges totals \$467 million

WSDOT manages 323 steel bridges of which 110 are currently due or past due to be repainted. The estimated cost to paint these 110 bridges is \$467 million. Forty-three additional bridges are expected to become due for painting in the next 10 years with a total estimated cost of \$282 million. This biennium's planned funding to complete painting on eight bridges plus provide half the cost of the U.S. 101 Astoria Bridge represents about \$54.8 million, which is 7.9 percent of the total 10-year need.

### WSDOT completes routine bridge cleaning research

Bridge washing programs around the country were established and are executed in order to allow for easier structural inspections based on the idea that bridge washing extends the life of the bridge coating.

In partnership with the University of Washington, WSDOT conducted a search of current literature and a survey of other state departments of transportation to quantify the benefits of cleaning steel bridges versus the costs associated with the expected deterioration if a bridge is not cleaned. The research project was unable to demonstrate a clear cost-benefit basis for the annual washing of steel bridges.

# Asset Management: Bridge Annual Report

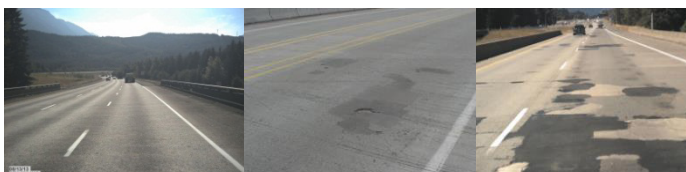
## WSDOT completes 11 bridge deck overlay projects

### Strategy: Repairing concrete bridge decks extends service life

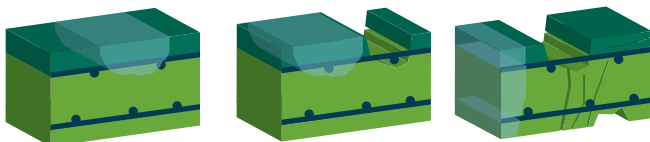
WSDOT completed 11 bridge overlay projects to date within a total budget of \$8.4 million for the 2013-2015 biennium. WSDOT is also in the process of replacing the concrete deck on the I-5 Stillaguamish River southbound bridge north of Marysville. This project has a total budget of \$8.5 million. WSDOT has one concrete overlay project planned for the 2015-2017 biennium. In addition to these overlay projects, WSDOT maintenance crews plan to spend \$2.8 million for bridge deck repairs. For the first half of the biennium (fiscal year 2014), 31,000 square feet of bridge deck repairs have been completed.

A concrete overlay repairs an existing concrete bridge deck, providing corrosion protection for the steel reinforcing and roadway surface. WSDOT crews routinely provide temporary repairs in the form of quick-cure patching materials to keep bridges in service. These repairs normally have a service life of a few years. A full bridge deck rehabilitation and concrete overlay provides a longer service life of at least 25 years and is more cost-effective for bridge decks that have repeated deterioration, yet is less expensive than replacing the entire deck or bridge.

A bare concrete deck is due for repair and overlay when 2 percent or more of the area is deteriorated or has had previous maintenance repairs. This is also the trigger that will classify a bridge as structurally deficient. Bridges programmed for overlay are prioritized based on the total square footage of deterioration and the type of freight route on which the bridge is located. Bridges on the most important freight routes are prioritized first.



**DETERIORATION <1%**      **DETERIORATION <2%**      **DETERIORATION >2%**



A bridge deck is in good condition (shown above left) with less than 1 percent deterioration. A concrete bridge deck is classified as fair (above center) when the surface shows 2 percent patching, but the underlying structure is not damaged. This is the most cost-effective time to perform repairs. Waiting until a deck is in poor condition (above right) costs more because damage cannot be repaired and the deck must be replaced. These decks are at high risk to damage vehicles and often require emergency repairs which disrupt traffic.

### National Transportation Safety Board presents findings for Skagit River Bridge collapse

The National Transportation Safety Board (NTSB) held a board meeting on July 15, 2014, to present their findings and safety recommendations for the Interstate 5 Skagit River Bridge collapse. On May 23, 2013, a span of the Skagit River Bridge collapsed after an over-height truck struck the top of the low-clearance steel through-truss bridge. Between 2008 and 2013, 10 through-truss bridges in Washington have been struck a total of 15 times. Including the Skagit River Bridge, four bridges in Washington have failed due to over-sized vehicles (see [Gray Notebook 46, p. 13](#), for more information on historical WSDOT bridge failures).

WSDOT is currently working to enact the recommendations of the NTSB. This includes improving freight industry access to route data so that trucking companies can better plan travel routes of oversized loads. A copy of the presentation as well the NTSB's preliminary report can be accessed at [http://www.nts.gov/investigations/2013/mt\\_vernon\\_wa/mt\\_vernon\\_wa.html](http://www.nts.gov/investigations/2013/mt_vernon_wa/mt_vernon_wa.html).



### Results Washington Leading Indicator

Based on current funding levels, control the percent of state and local bridges in poor condition from increasing over 10 percent by 2017.

**Status:** At risk (yellow)  
**Strategies:**

**Percent of bridges on the NHS that are structurally deficient (by deck area)**

<b>1. Replacing deteriorated bridge elements</b> - WSDOT performs major preservation repairs	State-owned (see <a href="#">p. 5</a> )	9.1%
	Locally-owned (see <a href="#">p. 5</a> )	11.8%
	Combined (see <a href="#">p. 5</a> )	9.3%

by addressing specific bridge elements to improve a bridge with a low condition rating. The most common types of repairs include floating bridge anchor cable replacement, expansion joint replacement and concrete column repair.

**2. Repainting steel bridges** - A protective paint coating on a steel bridge is essential to prevent corrosion, extend the bridge's service life and keep the bridge in fair or better condition. Continuing to keep up with painting can prevent the number of bridges in poor condition from increasing.

**3. Repairing concrete bridge decks** - WSDOT is working to reduce the number of bridges classified as structurally deficient by addressing bridges with the highest benefits and the most cost savings. One strategy to do so is to repair and rehabilitate concrete bridge decks to extend their service life.

### Immediate mitigation for at risk or off plan status:

WSDOT is seeking funding of a new transportation revenue package with funding for asset preservation.

## Bridge Asset Management Plan prioritizes investments

### City, county bridges remain in good condition

Local agency bridge conditions as of June 2014

Condition	County bridges		City bridges		Total <sup>1</sup>	
	% of bridges	% of deck area	% of bridges	% of deck area	% of bridges	% of deck area
Fair or better	96%	96%	94%	90%	96%	93%
Good	83%	85%	77%	75%	82%	80%
Fair	13%	11%	17%	15%	14%	13%
Poor	4%	4%	6%	10%	5%	7%

Data source: WSDOT Local Programs Office.

Note: The percent of deck area of bridges in each rating category is calculated out of total deck area of all county- or city-owned bridges.

<sup>1</sup> Percents may not add to 100 due to rounding.

### Most local bridges are in good condition

There are 7,300 bridges across Washington on city streets, county roads and state highways. Of these, more than 4,000 are locally owned and support an average of 10 million crossings per day. Approximately 5 percent of Washington's local bridges are considered to be in poor condition in 2014, remaining steady from 2013. Keeping them in good repair is necessary to avoid much larger replacement costs in the future.

From an analysis of the deck area that cities and counties maintain, it is clear they have similar roles to WSDOT in managing Washington's local bridges. Federal funding has helped local agencies maintain their bridges with limited funding since 1978. The most critical near-term local bridge needs include:

- A statewide study to determine seismic vulnerability of local bridges
- Flexibility to conduct bridge strengthening as part of preservation (previously ineligible for federal funding)
- Improving weight restricted and load posted bridges
- Addressing identified bridge "bottlenecks"
- Partnership funding for regionally significant bridges
- Flexibility to fund priority projects on community access bridges longer than 20 feet (previously ineligible for federal funding)

In order to maintain the current bridge condition ratings for locally-owned bridges and avoid more weight restrictions and load posted bridges, continued investment in preservation is needed.

*Contributors include Rico Baroga, Kyle McKeon, Bruce Thill, DeWayne Wilson and Alison Wallingford*

### Bridge Asset Management Plan

WSDOT's Bridge Asset Management Plan focuses on achieving the greatest return through available investments. WSDOT utilizes the lowest life cycle cost (LLCC) model, which uses incremental preventative maintenance activities to preserve the life of the asset while avoiding more costly repairs. WSDOT's bridge asset management goals are based on the following critical categories, ranked from highest to lowest priority:

1. Border bridges: These are interstate responsibilities with Oregon or Idaho, which are the highest obligation held by WSDOT in bridge asset management. For more information on WSDOT's border bridges, see [Gray Notebook 50, p. 12](#).
2. Scour critical bridges: "Scour" refers to the erosion of stream bed material from under bridge foundations; bridges are classified as "scour critical" if they have the potential for scour depth to be lower than the foundation. Scour failure is the most common reason for bridge collapse in Washington and the U.S. Addressing scour critical bridges is a high priority due to safety concerns and to avoid emergency repairs. WSDOT currently has one bridge under contract for scour repair (SR 108 Wildcat Creek bridge near McCleary; see [Gray Notebook 50, p. 11](#)).
3. Bridge repairs: Including anchor cable replacements on floating bridges and repairs to keep movable bridges functional.
4. Bridge painting: LLCC methodology says to paint a bridge when it is due, before serious deterioration of the coating system occurs. Waiting until significant corrosion attacks the steel is a "worst first" methodology that wastes money and is more expensive.
5. Bridge deck repair and overlays.
6. Replacement and rehabilitation of structurally deficient bridges.
7. Seismic retrofits: All planned projects are under contract or have been completed. Due to current bridge preservation needs and a lack of funding, no new projects are planned.
8. Miscellaneous structures (sign bridges, walls, etc.)
9. Timber bridges: WSDOT's long-term plan is to eliminate all timber bridges (there are about 90 remaining) due to the long-term maintenance concerns and the difficulty in inspection.
10. Functionally obsolete bridges: A bridge is functionally obsolete if its design is not suitable for current traffic needs. More than a quarter of the bridges owned by WSDOT are classified as functionally obsolete.