

Wyoming  
Connects

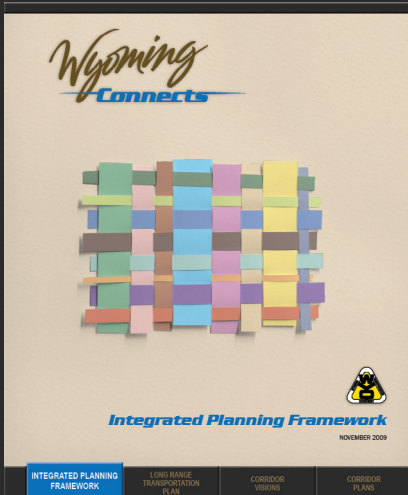


**Corridor 6 Plan**

YELLOWSTONE TO I-90



MAY 2013



**The Integrated Planning Framework** describes the planning process in detail, including the linkage between strategic goals and project programming - and all the steps in between.



**The Long Range Transportation Plan** evaluates the state transportation needs from a systems level, describes the issues and problems facing the State including future revenue and programming, and presents options for future investments, all within the context of the Integrated Planning Framework.



**Corridor Visions** are created for each State Significant Corridor (SSC) as a supplement to the LRTP. These define long term goals and objectives for each corridor based on the strategic goals of the Department, the investment goals of the LRTP, and the specific context of each corridor. The SSC system represents high volume routes in the state that connect major activity centers to each other and to points external to Wyoming. Urban areas are also evaluated as a group.



**Corridor Plans** build on the Corridor Visions by providing a more detailed look at specific needs and location-based solutions. The plans identify a set of solutions and a recommended program of improvements to be implemented over time that address specific, documented needs.

## CORRIDOR PLAN PURPOSE

This Corridor Plan is part of a set of documents created through a comprehensive planning process entitled Wyoming Connects. This set of documents captures consistent, transparent, and repeatable planning steps, analysis, and results designed to provide information to guide project selection and programming decision makers. Each document is designed to build upon prior documents and cascade the Strategic Goals of WYDOT forward from the overarching Strategic Plan to the system wide Long Range Transportation Plan, applied in the development of Corridor Visions, and the definition of Needs and potential Solutions to achieve the vision in Corridor Plans.

### PERFORMANCE BASED NEEDS

The Corridor Plan utilizes a performance based approach to needs definition. A system of performance measures is used to evaluate the corridor. The architecture of this tiered system is focused on the three Investment Categories identified in the Long Range Transportation Plan: System Preservation, Safety, and Mobility. Performance measures include both absolute and comparative targets. Absolute measures gauge progress towards long term goals, while comparative measures between corridor and system performance provide information to assist in prioritization.

A need is defined as a deviation between these targets and measured performance. The first tier of the system allows for rapid identification of need in each of the Investment Categories through a Performance Indicator. The second tier provides additional information to qualify potential causes through a set of Performance Qualifiers. GIS based Mapping Analysis tools provide for a spatial analysis of these measurements to further investigate causes and identify overlapping needs.

### TIERED APPROACH:

A method to evaluate performance goals at a general level and then advance through the system/hierarchy to filter data and define needs.

#### INVESTMENT CATEGORY

##### PERFORMANCE INDICATOR:

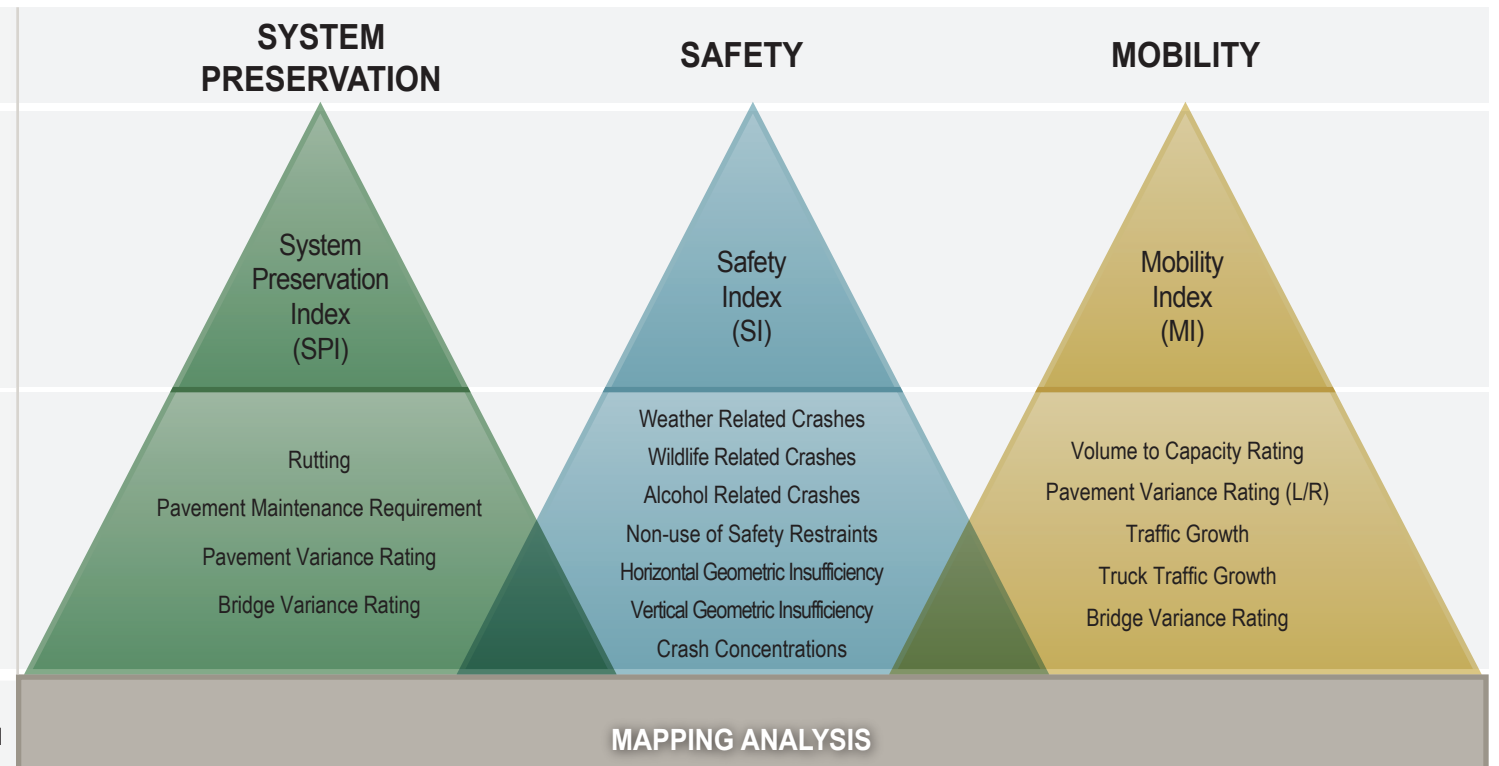
These are quantifiable and repeatable measurements that reflect the overall performance of the transportation corridor being analyzed. Targets for these indicators may be absolute and indicate a desired condition or comparative to current performance of the overall system to indicate relative priority.

##### PERFORMANCE QUALIFIER:

These measures include items that may contribute to the results of the indicator. These variables are measurable and actionable. They are used to qualify the need so that solution sets may be applied.

##### MAPPING ANALYSIS:

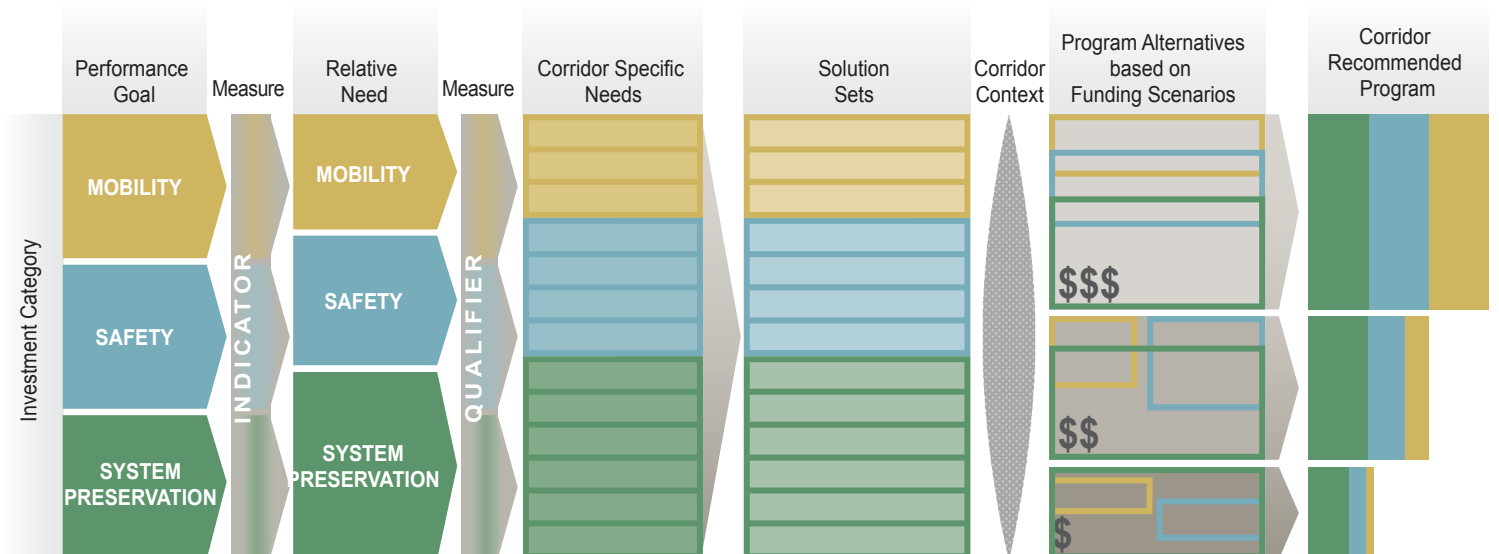
Mapping the deviated performance qualifiers against several factors to effectively prioritize, locate, and identify needs.



### NEEDS DRIVEN SOLUTIONS:

Performance based needs are captured and documented. These needs remain until the performance is changed. This approach also separates the discussion of need from the discussion of projects, which enhances the transparency of prioritization.

From WYDOT's list of preferred remedies to specific problems, preliminary solutions sets are developed for the identified needs. These sets may be tailored by the specific context of the corridor. For each of the three funding scenarios of the long range plan, the solutions to be considered may vary and the size of the program change. A recommended program can be selected based on anticipated funding levels.



## SSC 6 - YELLOWSTONE TO I-90 - US 20/US 14/US 16 CORRIDOR PLAN

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## I. STATE SIGNIFICANT CORRIDOR 6 - DESCRIPTION

### CORRIDOR DESCRIPTION

State Significant Corridor(SSC 6) extends from Yellowstone National Park's east entrance 197 miles eastward to Interstate 90 (I-90). Agriculture is an important industry along the corridor, although the majority of the traffic is tourism related. The Corridor is located within WYDOT District 5 and passes through three counties. SSC 6 connects the urban area of Cody on the west to the communities of Greybull and Dayton/Ranchester on the east. SSC 6 also serves the smaller towns of Wapiti, Emblem, and Shell.

Corridor 6 is also the Buffalo Bill Cody Scenic Byway from Yellowstone National Park to just west of the town of Wapiti. It passes through the Shoshone National Forest and has an abundance of wildlife crossings. SSC 6 continues east to Cody then east through the high plains. SSC 6 climbs through Shell Canyon and continues northeastward over Granite Pass into the Bighorn National Forest, which is also the Big Horn Scenic Byway. The winding grades present maintenance challenges due to

snow, ice, and unstable soils. West of Cody and east of Greybull experience heavy snow in the winter months. The corridor is a designated segment of the Northern Tier East-West Bicycle Route from Yellowstone National Park east to Greybull. US 14/16/20 was reconstructed by the Wyoming Department of Transportation (WYDOT) between the East Entrance to Yellowstone National Park and the Shoshone National Forest boundary in 2002.

SSC 6 passes through the urban area of Cody. The main part of the city is split across two levels, separated by about 60 feet in elevation. The Shoshone River flows through Cody in a deep canyon and defines local transportation. The primary industry in Cody is tourism. Cody is home to several art galleries and the Buffalo Bill Historical Center. The City is also host to the Cody Stampede Rodeo, one of the largest rodeos in the nation. Visitor accommodations and transportation alternatives are key to the tourism industry and economic livelihood of the city.

Additional information including environmental context, key issues, and emerging trends is provided in the Corridor Visions and LRTP phases of Wyoming Connects. This Corridor Plan focuses on the identification of the corridor needs through the analysis of corridor performance.

### CORRIDOR SEGMENTS

SSC 6 has been divided into 7 planning segments. Planning segments identify generally consistent sections of the corridor for planning level analysis. The planning segments vary in length depending on the context of the corridor. The corridor was segmented at all urban areas and at the intersection of other SSCs. Other context changes may include: roadway typical section (through lanes, shoulders, etc.), average daily traffic, intersecting routes, and terrain. Each segment break or endpoint was assigned as closely as possible to the nearest maintenance section endpoint; segments generally encompass multiple maintenance sections. The planning segments allow for an appropriate analysis and evaluation of corridor needs at a planning level while still providing geographic reference.

Table 1 and the accompanying map on the next page describe general characteristics of each corridor segment.



Bighorn Scenic Byway

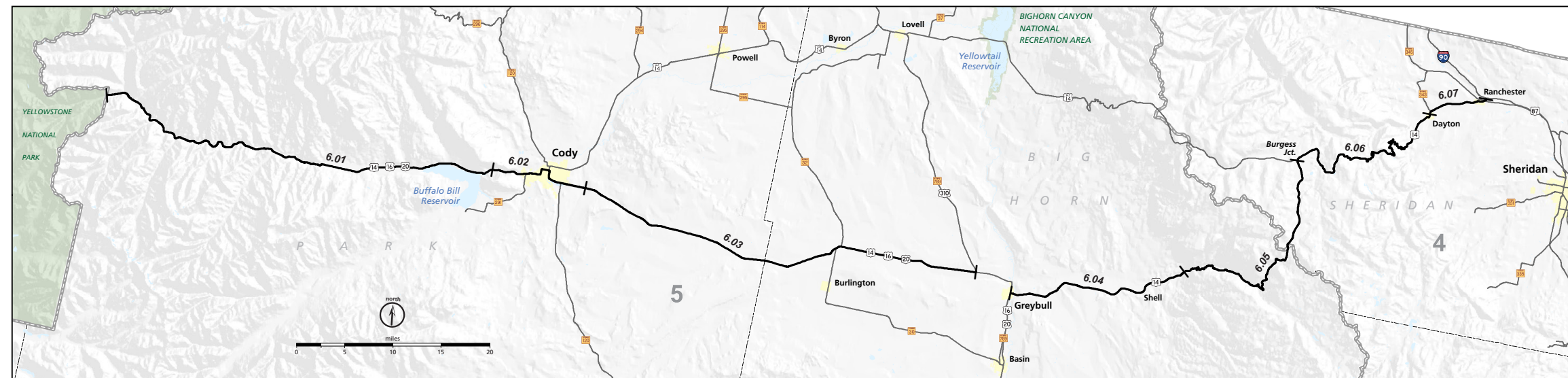
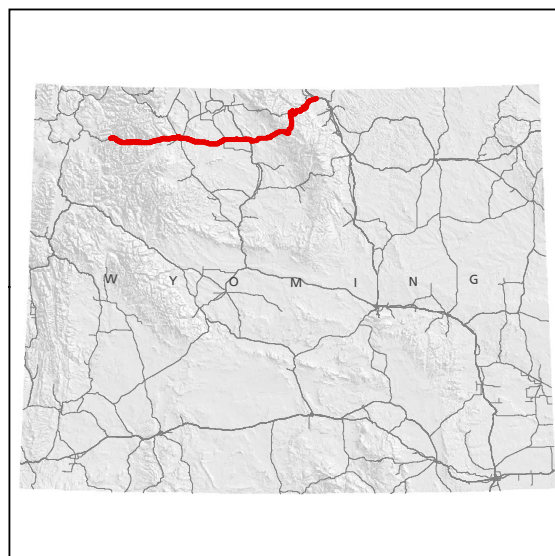


Table 1 - Segments for State Significant Corridor 6

Corridor 6	Segment	ML Route	Begin	End	Length	Description
	6.01	31	0.00	45.89	45.89	<b>Yellowstone to Cody.</b> Features: 2-lane cross section with climbing, passing, and other auxiliary lanes; 18 bridges; 3 tunnels; seasonal road close gate at Pahaka Lodge; Buffalo Bill Cody Scenic Byway; North Fork Shoshone River; Northern Tier East/West Bicycle Route; eastern gateway to Yellowstone National Park; federal lands recreation and tourism access; wildlife crossings; Shoshone Canyon; Buffalo Bill State Park and Reservoir; Shoshone National Forest; Bureau of Land Management; mountainous to flat terrain.
6.02	31	45.89	57.25	11.36	<b>Cody Urban Area (pop. 9,309).</b> Features: Multiple lane cross sections through urban area, with traffic signals, turn lanes, sidewalks, curb, gutter, and pedestrian crossings, intersects SSC 7 (WYO 120 south/US 14 Alt north), Regional Route WYO 120 north, Local Route WYO 291; Yellowstone Regional Airport; intercity bus; Northern Tier East/West Bicycle Route; the terrain is mountainous on west end, urban through town, transitioning to flat east of town.	
6.03	31	57.25	100.75	43.50	<b>Cody to US 310.</b> Features: 2-lane cross section; intersects SSC 8 (US 310), Local Routes WYO 30, WYO 32; town of Emblem; Northern Tier East/West Bicycle Route; range and ranch lands; Bureau of Land Management; flat terrain.	
6.04	37	0.00	20.36	20.36	<b>Greybull to Shell Canyon.</b> Features: multiple lane cross section through Greybull with center turn lanes and auxiliary lanes through developed area; 2-lane cross section east of Greybull on US 14; town of Shell; intersects SSC 8 (US 310 north/WYO 789 south); road close gate; Big Horn River; Shell Canal, Shell Creek, several minor creek/gulch crossings; transition from more developed and mixed use characteristics near Greybull with irrigated lands, rural to small urban residential, commercial, and industrial land uses to ranchlands east; rolling terrain.	
6.05	37	20.36	47.99	27.63	<b>Shell to Burgess Jct.</b> Features: 2-lane cross section, with occasional passing lanes west side Granite Pass; steep grades; terminates at intersection Local Route US 14 Alt; road close gates; Shell Creek, Big Horn Scenic Byway; recreation and tourism access to federal lands; mountainous terrain.	
6.06	37	47.99	83.45	35.46	<b>Burgess Jct. to Dayton.</b> Features: 2-lane cross section; curb/gutter in Dayton; intersects Local Route WYO 343; road close gates; South Fork Tongue River, Little Tongue River; Big Horn Scenic Byway; Big Horn National Forest; Medicine Wheel Visitor Center; irrigated pastures and ranch lands; recreation and tourism access to federal lands; mountainous terrain.	
6.07	37	83.45	89.87	6.42	<b>Dayton to Rancheater.</b> Features: 2-lane cross section; terminates at SSC 13 (I-90); curb/gutter in Rancheater; intersects Local Route WYO 343, WYO 345; BNSF Railway grade separation; large suburban lots mixed with small agricultural operations; flat terrain.	

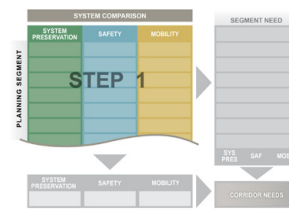
Source: URS Windshield Survey June 2012; Maintenance Section Reference Book 2012; Wyoming Connects: LRTP and Corridor Visions. Note: Descriptions of beginning and endpoints are approximate.



## II. EVALUATION OF CORRIDOR PERFORMANCE

This section describes the evaluation of specific corridor needs based on the performance based process defined in the IPF. The Performance Based Needs Process, shown below, illustrates the steps followed for this corridor plan. Indicative Performance measures based on existing or simply defined index measurements for each investment category of System Preservation, Safety, and Mobility were evaluated to preliminarily identify need relative to long term goals. Qualifying performance measures were evaluated to better assess contributing factors to the primary need indicators. The indicators and qualifiers were evaluated and analyzed relative to system averages and, when available, previously specified performance targets. This gap analysis identifies locations where needs exist, qualifies the nature of the need, and provides information on the priority relative to the system of SSCs and available funding.

Many of the measures were established as comparisons to the system average, therefore good performance indicates performance better than the system average. The reverse is also true, poor performance indicates that performance is below the average or rated as poor for a particular indicator or qualifier. As additional corridors are evaluated, specific performance targets may be set to measure absolute performance. The IPF process recommends a mix of absolute measures to evaluate true need relative to long term goals and comparative measures to assist in determining priority.



### STEP 1: SUMMARY OF INDICATOR AND QUALIFIER PERFORMANCE MEASURES

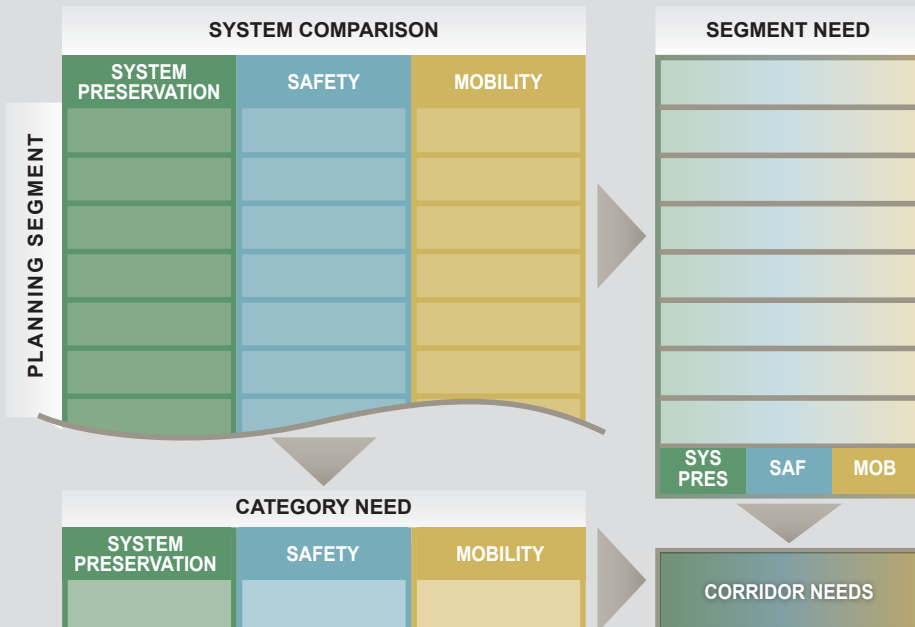
This corridor plan evaluates System Preservation, Safety, and Mobility performance using the process described in the Integrated Planning Framework, published separately. The plan analyzes the performance of planning segments described in Table 1 as compared to system averages. It identifies good, fair, poor or less, average, more performance for each segment in an overall index and for each contributing qualifier measurement.

Throughout this report, the color green is used to represent System Preservation, blue represents Safety, and yellow represents Mobility. Lighter shades represent better performance and darker shades represent worse performance compared to the system average.

Table 2 summarizes the results for each performance index and qualifier for each planning segment on the corridor.

Table 2 - Indicator and Qualifier Performance of SSC 6

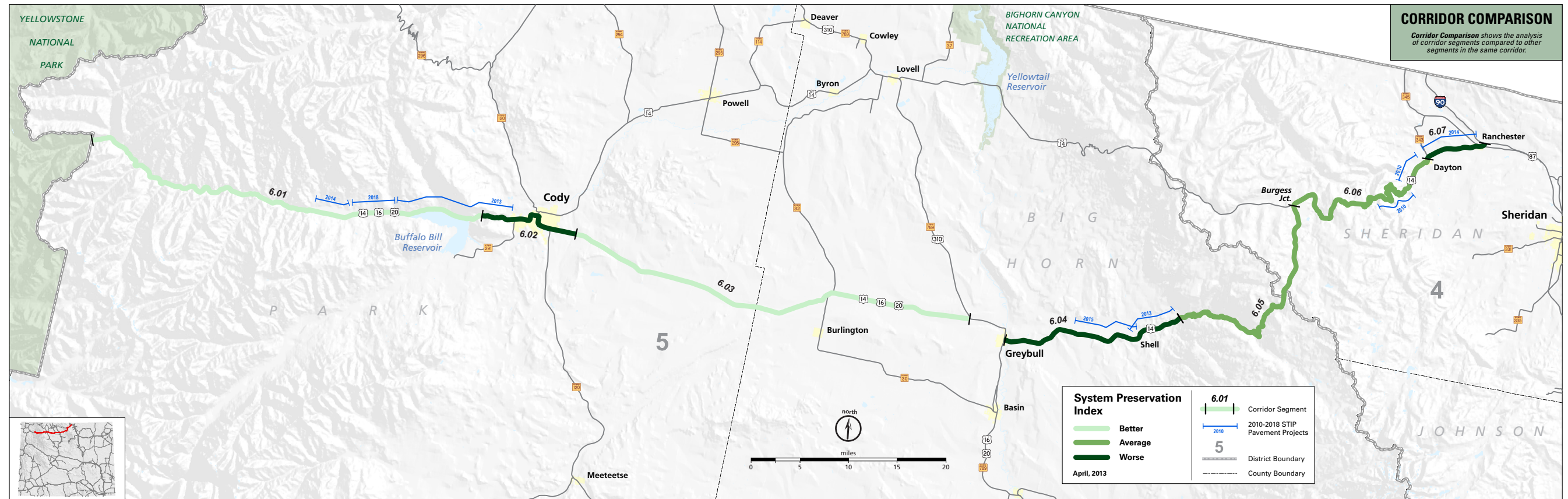
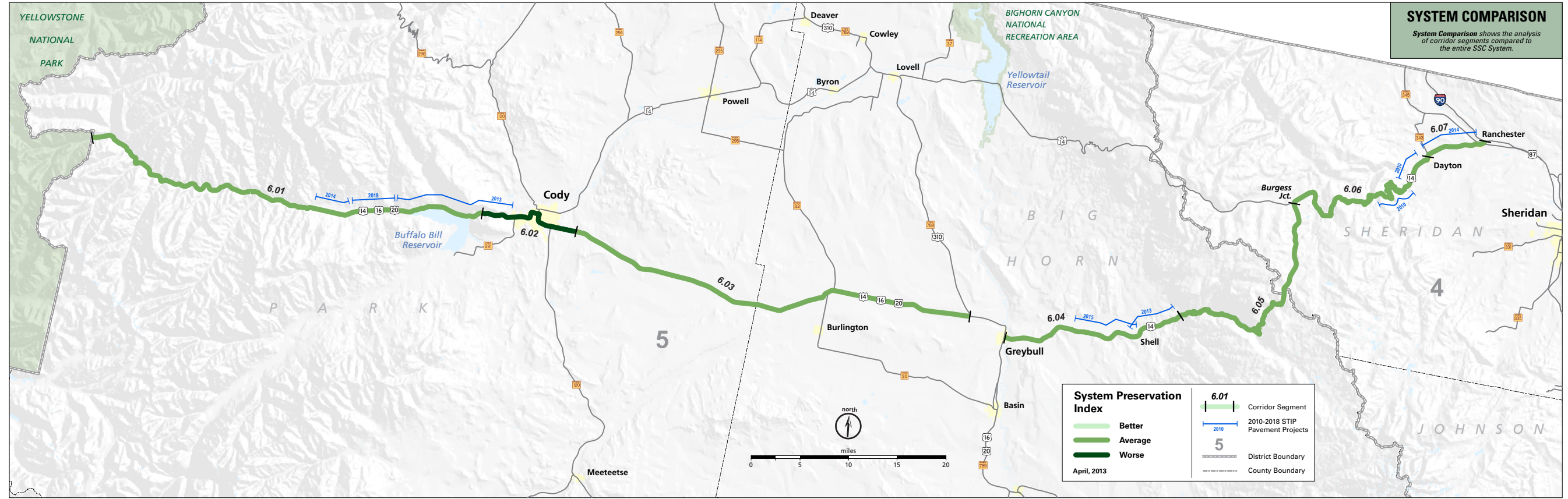
Segment	SYSTEM PRESERVATION					SAFETY								MOBILITY					
	System Preservation Index	Rutting	Pavement Maint. Requirement	Pavement Variance Rating	Bridge Variance Rating	Safety Index	Weather Related Crashes	Wildlife Related Crashes	Alcohol Related Crashes	Non-use of Safety Restraints	Horizontal Geometric Insufficiency	Vertical Geometric Insufficiency	Crash Concentrations	Mobility Index	Volume to Capacity Rating	Pavement Variance Rating (L/R)	Traffic Growth	Truck Traffic Growth	Bridge Variance (L/R)
6.01	Better	Good	Average	Good	Less	Good	Less	More	Average	Less	Average	More	Poor	Better	Good	Fair	More	Average	Less
6.02	Worse	Good	Less	Fair	More	Fair	Average	Less	Average	Average	Average	Average	Good	Worse	Good	Good	More	Less	More
6.03	Average	Good	Average	Good	Less	Fair	Average	More	Average	Less	Average	Average	Good	Average	Good	Good	Average	Less	Average
6.04	Average	Good	Average	Fair	Less	Fair	Less	More	Less	Average	More	Good	Better	Good	Fair	Average	Average	Average	Less
6.05	Average	Good	Average	Fair	Less	Fair	Average	Average	More	Average	More	More	Fair	Better	Good	Fair	Less	Average	Less
6.06	Average	Good	Average	Fair	Less	Fair	Average	Less	More	Average	More	More	Poor	Average	Good	Fair	Less	Average	Less
6.07	Average	Good	Less	Good	Average	Fair	Less	Average	More	Average	Less	Less	Good	Average	Good	Fair	More	Average	Less

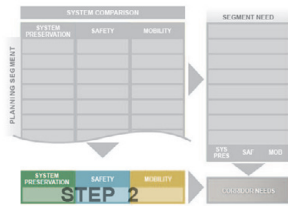




# CORRIDOR 6

SYSTEM PRESERVATION - INDEX





**Performance Index**

The System Preservation Index is average or better, with the exception of segment 6.02, which is worse than average.

Performance qualifiers with a negative effect on the System Preservation Index:

- The Bridge Variance Rating is rated as poor on segment 6.02.

Refer to the sections below for more information.

SYSTEM PRESERVATION					
Segment	System Preservation Index	Rutting	Pavement Maint. Requirement	Pavement Variance Rating	Bridge Variance Rating
6.01	Better	Good	Average	Good	Less
6.02	Worse	Good	Less	Fair	More
6.03	Average	Good	Average	Good	Less
6.04	Average	Good	Average	Fair	Less
6.05	Average	Good	Average	Fair	Less
6.06	Average	Good	Average	Fair	Less
6.07	Average	Good	Less	Good	Average

**Performance Qualifiers**

**Rutting**

There are no locations where the pavement falls within the poor category for rutting.

**Pavement Maintenance Requirements**

The pavement maintenance sections that were recommended by the Pavement Management System (Agile Assets) and not yet selected to receive funding within the STIP will continue to decline. If not treated fairly soon, the treatments will become more costly as conditions deteriorate.

Approximately 18% of Corridor 6 has been identified as having a 1S need. This represents 32 miles of pavement. Segments 6.01, 6.02, 6.04, 6.05, and 6.06 have 1S treatments recommended by the Pavement Management System. Based upon current available funding, only two projects, representing 23.1 miles of pavement, have been selected to be completed within the next several years.

Approximately 53% of Corridor 6 has been identified as having a 2S need. This represents 96 miles of pavement. Segments 6.01, 6.02, 6.03, 6.04, 6.06, and 6.07 have 2S treatment recommended by the Pavement Management System. Based upon current available funding, only one project, representing 7.3 miles of pavement, has been selected to be completed within the next several years.

Approximately 29% has been identified as having a 3S need. This represents 52 miles of pavement. Segments 6.01, 6.02, 6.03, 6.04, 6.05, 6.06, and 6.07

have 3S treatment recommended by the Pavement Management System. Based upon current available funding, only two projects, representing 8.7 miles of pavement, have been selected to be completed within the next several years. Only two projects, representing 24 miles of pavement, have been selected to be completed within the next several years.

**Pavement Variance Rating**

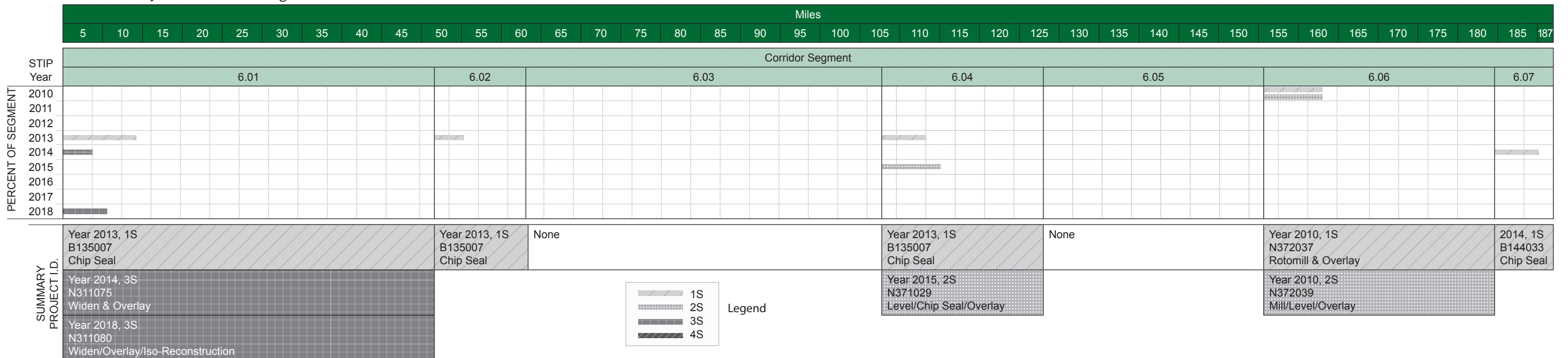
The Pavement Variance Rating is fair or better for the entire corridor. Pavement hotspots, identified by length and severity, occur in two locations in Cody, Segment 6.02 (most or least severe), and four other locations (most, moderately, least severe).

**Bridge Variance Rating**

The Bridge Variance Rating for most of the corridor is average or better than the system average. All segments have at least one bridge. There are three structurally deficient bridges along SSC 6, two with bridge decks under 15,000 ft<sup>2</sup> and one under 30,000 ft<sup>2</sup>. The structurally deficient bridges are in segments 6.01 (1), 6.02 (1), and 6.07 (1), resulting in a Bridge Variance Rating of average or more when compared to the system average.

NOTE: See Appendix for maps documenting each performance qualifier.

Table 3 - SSC 6 STIP by Year and Corridor Segment

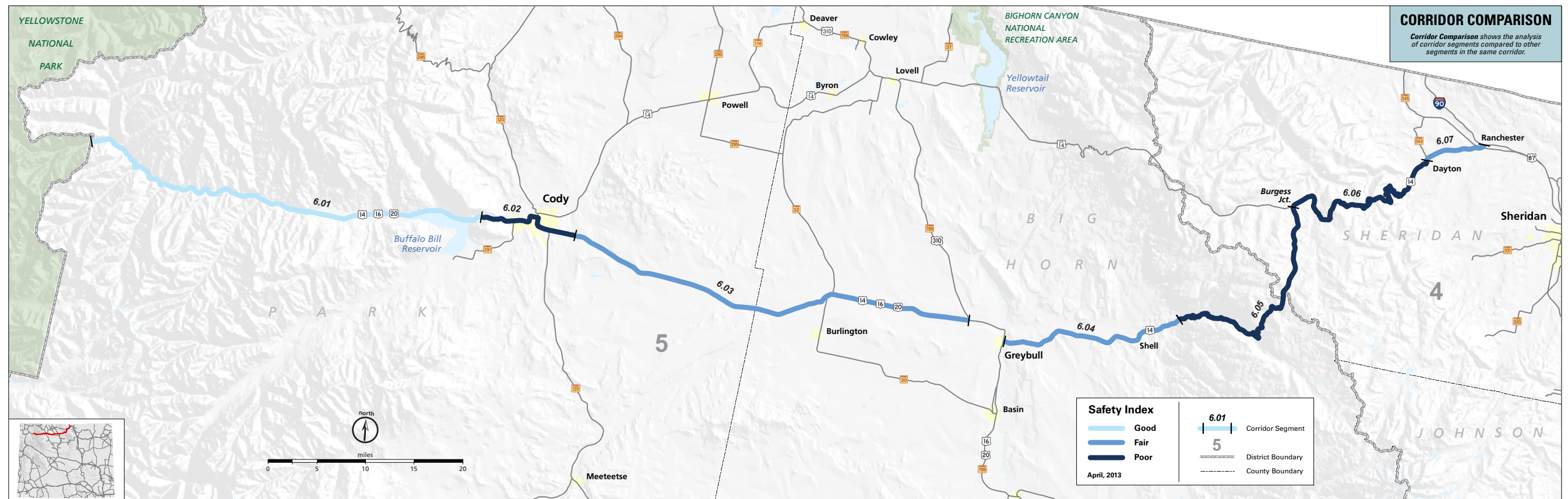
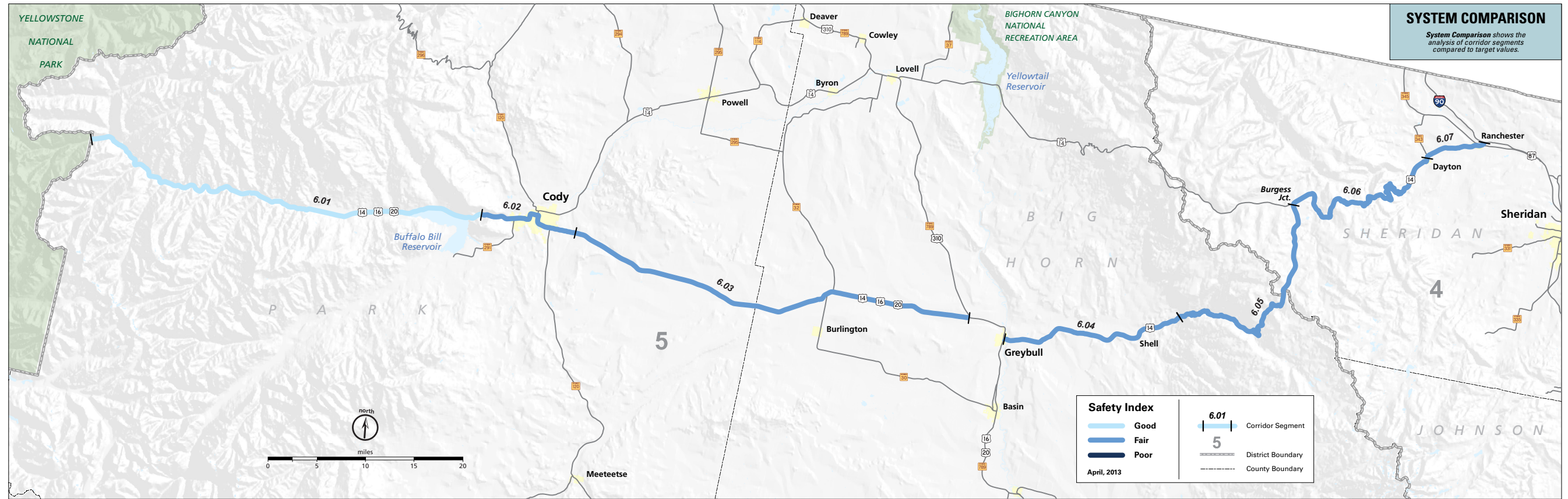






# CORRIDOR 6

SAFETY - INDEX





**Performance Index**

The Safety Performance Index ranges from good to fair across the corridor.

Performance qualifiers with poor performance include:

- Wildlife Related Crashes are more than the average on segments 6.01, 6.03, and 6.04.
- Alcohol Related Crashes are more than the average on segments 6.05, 6.06, and 6.07.
- Crashes on Horizontal Geometric Insufficient Curves are more than the average on segments 6.05 and 6.06.
- Crashes on Vertical Geometric Insufficient Curves are more than the average on segments 6.04, 6.05, and 6.06.
- Crash Concentrations are rated poor on segments 6.01 and 6.06.

Refer to the sections below for more information.

Segment	SAFETY							
	Safety Index	Weather Related Crashes	Wildlife Related Crashes	Alcohol Related Crashes	Non-use of Safety Restraints	Horizontal Geometric Insufficiency	Vertical Geometric Insufficiency	Crash Concentrations
6.01	Good	Less	More	Average	Less	Average	More	Poor
6.02	Fair	Average	Less	Average	Average	Average	Average	Good
6.03	Fair	Average	More	Average	Less	Average	Average	Good
6.04	Fair	Less	More	Less	Less	Average	More	Good
6.05	Fair	Average	Average	More	Average	More	More	Fair
6.06	Fair	Average	Less	More	Average	More	More	Poor
6.07	Fair	Less	Average	More	Average	Less	Less	Good

**Performance Qualifiers**

**Weather Related Crashes**

With the exception of Segment 6.06, the ratio of weather related crashes to total crashes was below the system average. Segment 6.06 had the highest percentage (30.5%) of weather related crashes and the adverse conditions were identified as snowing with snow or ice/frost on the roads. Segment 6.04 had the lowest percentage rate of weather related crashes, at 5% of the total crashes.

**Wildlife Related Crashes**

Corridor 6 is varied in its wildlife related collisions. Segment 6.01 (69%), 6.03 (57%), and 6.04 (64%) have a high rate of accidents involving wildlife compared to the statewide average (31%).

Segment 6.01 had 146 wildlife crashes within the study period. Two of the crashes were with moose (near route marker (RM) 2), while the remaining 144 wildlife crashes were with deer. These crashes were mostly at dawn, dusk, and during darkness. A majority of the deer related crashes were between RM 28 and 32; there

is also a noticeable concentration near RM 37. There are several migration routes documented by the Wyoming Game and Fish Department within this segment.

**Alcohol Related Crashes**

The percentage of alcohol related crashes is varied throughout the corridor, from Segment 6.04, which did not have any, to Segments 6.05 and 6.06, between Shell and Dayton, which had alcohol related crash rates approximately twice the system average.

**Non-use of Safety Restraint**

The ratio of crashes in which a restraint device was not worn to total crashes varies within SSC 6 from below the system average to higher than the system average. The highest percentage of crashes in which seat belts were not worn occurred in Segments 6.02 (71.2%) and 6.06 (72.0%).

**Horizontal Geometry Insufficiency**

Several horizontal alignments were found to be insufficient based on the associated posted speed and an assumed emax of 8%. Segments 6.05 and 6.06 has the most insufficient horizontal alignments within the segment. Further study will need to take place to determine specific needs of each alignment and the constraints to which it was designed and built.

Following is a summary of locations where a horizontal insufficiency corresponded to a crash. The data is not clear if the crash was directly related to geometry. However, locations with several accidents should be further studied. Table 4 summarizes locations of insufficient curves with more than one crash in near vicinity within the 5 year accident analysis period.

Table 4 - Horizontal Geometry Insufficiency

Segment	ML Route	Route Marker	# of Crashes
6.05	ML37	23.20	2
6.05	ML37	24.98	2
6.05	ML37	38.13	2
6.05	ML37	43.50	2
6.05	ML37	43.89	4
6.06	ML37	59.95	2
6.06	ML37	65.53	3
6.06	ML37	67.26	2
6.06	ML37	67.65	2

**Vertical Geometry Insufficiency**

Several vertical alignments were found to be insufficient based on the associated posted speed and the length of the curve for stopping sight distance. Segments 6.01, 6.04, 6.05, and 6.06 have the most insufficient vertical alignments within the segment. Further study will need to take place to determine specific needs of each alignment and the constraints to which it was designed and built.

Table 5 summarizes locations where a vertical profile corresponded to a crash. The data is not clear if the crash was directly related to the geometry. However, locations with several crashes should be further studied. The table summarizes locations of insufficient profiles with more than one crash in the near vicinity within the 5 year crash analysis.

Table 5 - Vertical Geometry Insufficiency

Segment	ML Route	Route Marker	Curve Type	# of Crashes
6.01	ML31	30.99	SAG	3
6.01	ML31	35.97	SAG	10
6.01	ML31	36.40	SAG	2
6.01	ML31	41.51	CREST	2
6.04	ML37	1.02	SAG	3
6.05	ML37	36.96	CREST	2
6.06	ML37	64.65	CREST	2
6.06	ML37	65.18	SAG	2
6.06	ML37	67.03	SAG	2

**Crash Concentrations**

Crash concentrations are identified by locating spatially significant clusters of individual crash events that are of a similar severity level. The concentrations fall into one of two severity types: Critical, which consists of only "Critical" level crashes, and Other, which consists of "Severe" and "Damage" level crashes.

There are five Critical concentrations on Corridor 6, which are listed in Table 6. Additionally, there is one Other type concentration. Segments 6.01 and 6.06 exhibit the most crash concentrations with 4 Critical concentrations, which occur between RM 38.7 and 39, RM 42.8 and 43, RM 65.2 and 66, and RM 74.8 and 75.

Table 6 - Critical Crash Concentrations

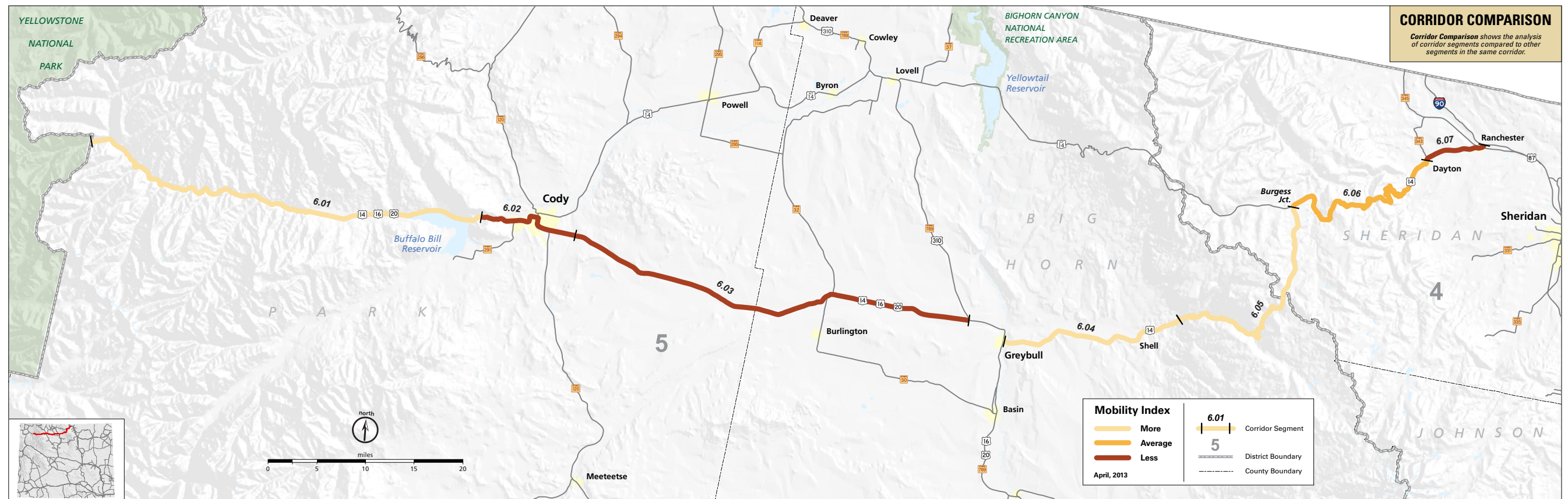
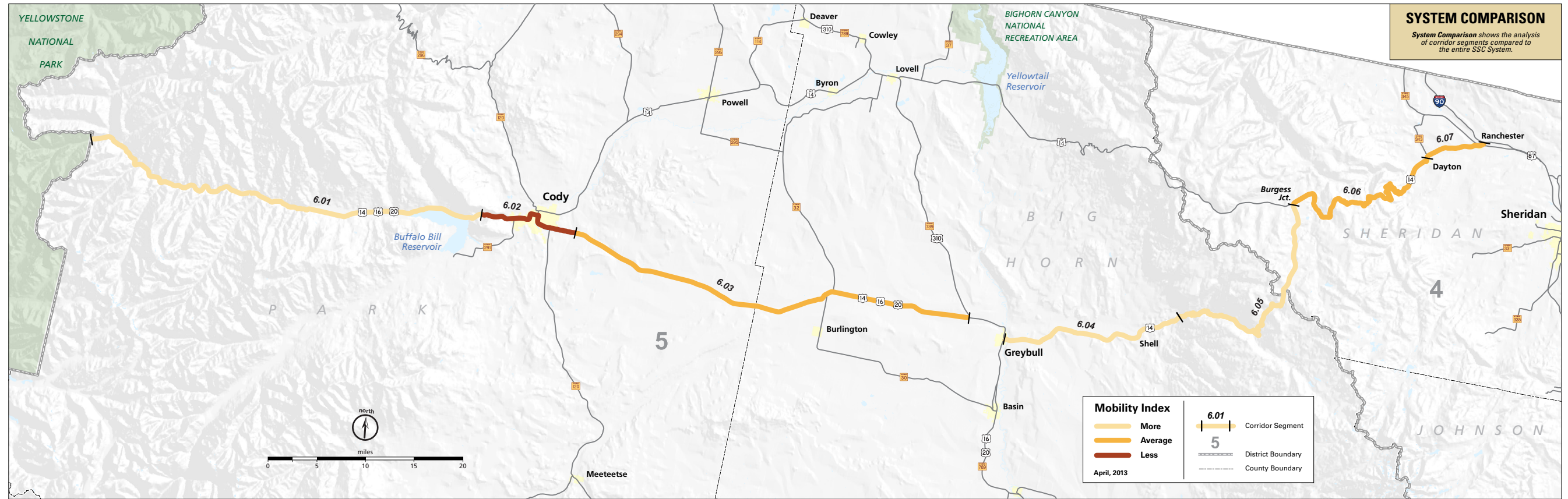
Segment	ML Route	Route Marker	
		From	To
6.01	ML31	38.7	39
6.01	ML31	42.8	43
6.05	ML37	43.7	45.2
6.06	ML37	65.2	66
6.06	ML37	74.8	75

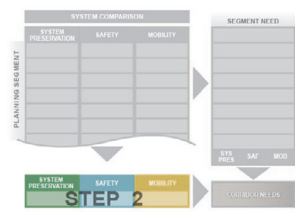
NOTE: See Appendix for maps documenting each performance qualifier.



# CORRIDOR 6

MOBILITY - INDEX





**Performance Index**

The Mobility Performance Index for segments on SSC 6 ranges from better to worse than average. Segments rated worse than average include 6.02.

Segment	MOBILITY					
	Mobility Index	Volume to Capacity Rating	Pavement Variance Rating (L/R)	Traffic Growth	Truck Traffic Growth	Bridge Variance (L/R)
6.01	Better	Good	Fair	More	Average	Less
6.02	Worse	Good	Good	More	Less	More
6.03	Average	Good	Good	Average	Less	Average
6.04	Better	Good	Fair	Average	Average	Less
6.05	Better	Good	Fair	Less	Average	Less
6.06	Average	Good	Fair	Less	Average	Less
6.07	Average	Good	Fair	More	Average	Less

One regional route connects to SSC 6. The condition of each local and regional route is associated with a planning segment and directly influences the mobility of that segment. The condition of these local and regional routes is generally fair. There is currently one structurally deficient bridge on the local and regional routes.

This route is subject to generally low volumes of traffic. Agriculture is an important industry align SSC 6, but the majority of traffic is tourism related. Shoulder widths vary from none to 4' with no rumble strips noted. This is adequate for low volume highways.

Table 7 - Major Traffic Generators

Major Traffic Generators
Yellowstone & Grand Teton National Parks
Employment and Tourism Center - Cody
Other dispersed local/regional recreation on public lands
Big Horn Scenic Byway
Buffalo Bill Scenic Byway/State Park & Reservoir
Farm to market transport - Big Horn River Valley

**Performance Qualifiers**

**Volume to Capacity Rating**

Volume to Capacity Ratio (V/C) is a measure that reflects mobility and quality of travel of a corridor or section of a corridor. It compares roadway demand (vehicle volumes) with roadway supply (carrying capacity). The volume to capacity rating for the entire SSC 6 is good.

**Traffic Growth**

The average traffic growth within the SSC System is 1.42%. The majority of segments in this corridor are less than this average. Segment 6.02 has the highest average annual traffic growth rate. This segment is located in the urban area of Cody on ML31.

Table 8 - Traffic Growth

Segment	AADT 2010	Average 20 Year Growth
6.01	1,471	2.00%
6.02	6,678	2.32%
6.03	1,314	1.23%
6.04	1,395	0.98%
6.05	652	-0.12%
6.06	883	-0.02%
6.07	2,855	1.88%

**Truck Traffic Growth**

The average truck traffic growth within the SSC System is 1.34%. All segments within SSC 6 are below this average. The majority of the corridor is a 2-lane rural roadway classification. Segment 6.04 has the highest average annual truck growth rate. This segment is from Greybull to just north of Shell via ML37.

Table 9 - Truck Traffic Growth

Segment	AADTT 2010	% Trucks 2010	Truck Traffic Growth
6.01	98	6.64%	0.88%
6.02	281	3.91%	0.07%
6.03	80	5.90%	-0.63%
6.04	118	8.34%	1.06%
6.05	48	8.44%	0.72%
6.06	43	5.39%	0.96%
6.07	111	4.01%	0.87%

**Local and Regional Roads**

Local and Regional Routes that connect to the SSC affect the Mobility Performance Indicator. These routes serve the important function of connecting rural areas to the primary routes. While traffic volumes are typically low on these secondary routes, maintaining them in acceptable condition is important to general mobility for the state. This analysis includes pavement and bridge condition as qualifiers.

**Local and Regional Roads Impacting Pavement Variance Rating (L/R)**

The Mobility Index may be affected by local and regional routes that have poor pavement condition as reflected by the Pavement Variance Rating (PVR). The PVR is the product of Pavement Sufficiency Rating (PSR) calculated as the deviation from the system average. There are no local/regional routes with Poor PSR in Corridor 6. Table 10 lists the local/regional routes with poor PSR.

Table 10 - Local/Regional Routes with Poor PSR

Segment	Average PVR	ML Route	Route Marker		Average PSR
			Begin	End	
NA					

**Bridge Variance Rating (L/R)**

The bridge variance rating for local and regional routes on SSC 6 shows 2 structurally deficient bridges. The locations of the bridges are shown in Table 11.

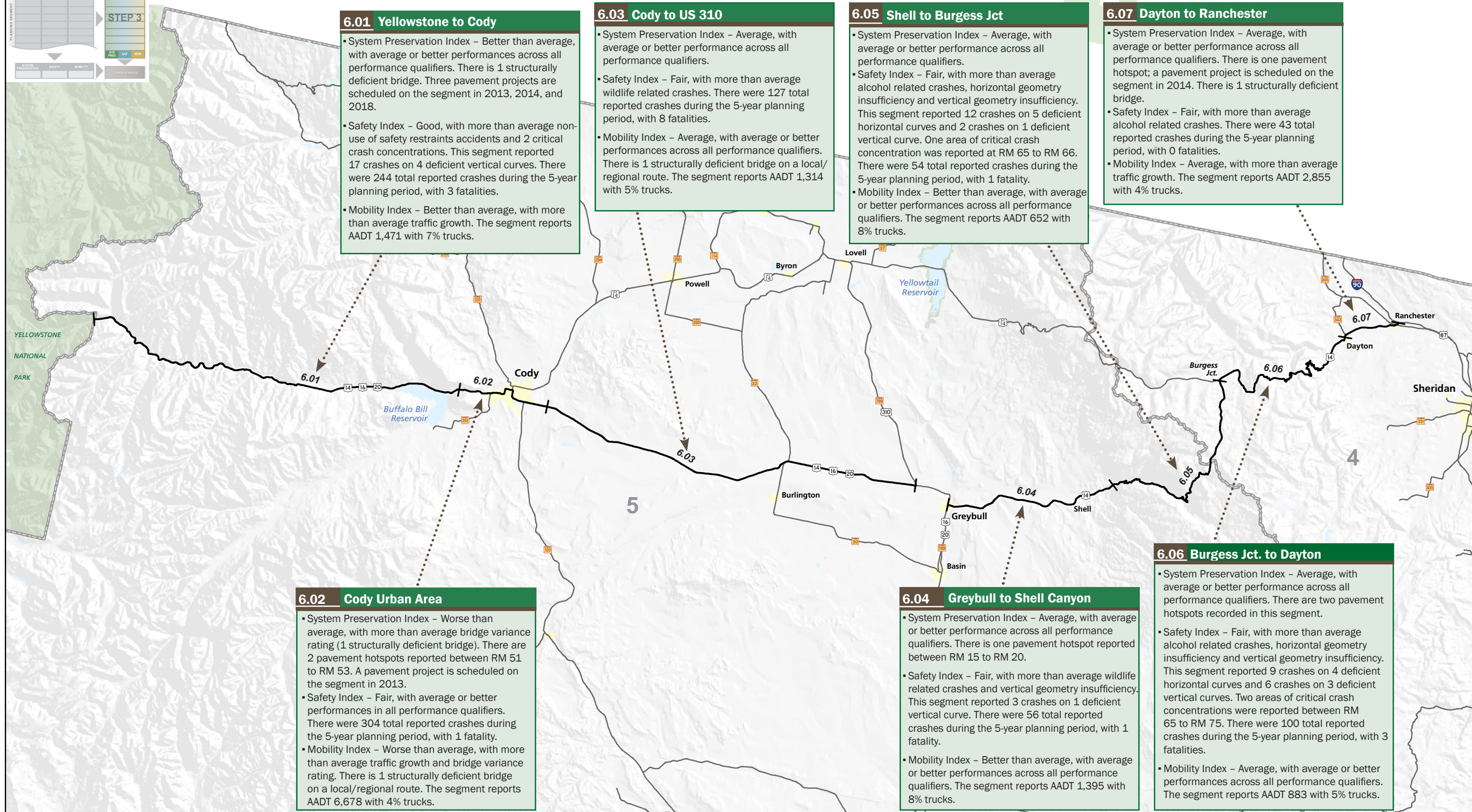
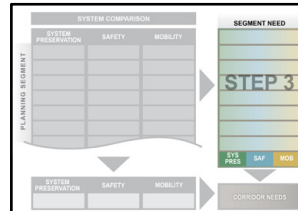
Table 11 - SSC 6 Structurally Deficient Bridges on Local/Regional Routes

Segment	ML Route	Route Marker
6.02	ML1501	3.14
6.03	ML1505	12.55

NOTE: See Appendix for maps documenting each performance qualifier.



STEP 3: ANALYSIS OF PLANNING SEGMENT NEEDS



**6.01 Yellowstone to Cody**

- System Preservation Index – Better than average, with average or better performances across all performance qualifiers. There is 1 structurally deficient bridge. Three pavement projects are scheduled on the segment in 2013, 2014, and 2018.
- Safety Index – Good, with more than average non-use of safety restraints accidents and 2 critical crash concentrations. This segment reported 17 crashes on 4 deficient vertical curves. There were 244 total reported crashes during the 5-year planning period, with 3 fatalities.
- Mobility Index – Better than average, with more than average traffic growth. The segment reports AADT 1,471 with 7% trucks.

**6.03 Cody to US 310**

- System Preservation Index – Average, with average or better performance across all performance qualifiers.
- Safety Index – Fair, with more than average wildlife related crashes. There were 127 total reported crashes during the 5-year planning period, with 8 fatalities.
- Mobility Index – Average, with average or better performances across all performance qualifiers. There is 1 structurally deficient bridge on a local/regional route. The segment reports AADT 1,314 with 5% trucks.

**6.05 Shell to Burgess Jct**

- System Preservation Index – Average, with average or better performance across all performance qualifiers.
- Safety Index – Fair, with more than average alcohol related crashes, horizontal geometry insufficiency and vertical geometry insufficiency. This segment reported 12 crashes on 5 deficient horizontal curves and 2 crashes on 1 deficient vertical curve. One area of critical crash concentration was reported at RM 65 to RM 66. There were 54 total reported crashes during the 5-year planning period, with 1 fatality.
- Mobility Index – Better than average, with average or better performances across all performance qualifiers. The segment reports AADT 652 with 8% trucks.

**6.07 Dayton to Ranchester**

- System Preservation Index – Average, with average or better performance across all performance qualifiers. There is one pavement hotspot; a pavement project is scheduled on the segment in 2014. There is 1 structurally deficient bridge.
- Safety Index – Fair, with more than average alcohol related crashes. There were 43 total reported crashes during the 5-year planning period, with 0 fatalities.
- Mobility Index – Average, with more than average traffic growth. The segment reports AADT 2,855 with 4% trucks.

**6.02 Cody Urban Area**

- System Preservation Index – Worse than average, with more than average bridge variance rating (1 structurally deficient bridge). There are 2 pavement hotspots reported between RM 51 to RM 53. A pavement project is scheduled on the segment in 2013.
- Safety Index – Fair, with average or better performances in all performance qualifiers. There were 304 total reported crashes during the 5-year planning period, with 1 fatality.
- Mobility Index – Worse than average, with more than average traffic growth and bridge variance rating. There is 1 structurally deficient bridge on a local/regional route. The segment reports AADT 6,678 with 4% trucks.

**6.04 Greybull to Shell Canyon**

- System Preservation Index – Average, with average or better performance across all performance qualifiers. There is one pavement hotspot reported between RM 15 to RM 20.
- Safety Index – Fair, with more than average wildlife related crashes and vertical geometry insufficiency. This segment reported 3 crashes on 1 deficient vertical curve. There were 56 total reported crashes during the 5-year planning period, with 1 fatality.
- Mobility Index – Better than average, with average or better performances across all performance qualifiers. The segment reports AADT 1,395 with 8% trucks.

**6.06 Burgess Jct. to Dayton**

- System Preservation Index – Average, with average or better performance across all performance qualifiers. There are two pavement hotspots recorded in this segment.
- Safety Index – Fair, with more than average alcohol related crashes, horizontal geometry insufficiency and vertical geometry insufficiency. This segment reported 9 crashes on 4 deficient horizontal curves and 6 crashes on 3 deficient vertical curves. Two areas of critical crash concentrations were reported between RM 65 to RM 75. There were 100 total reported crashes during the 5-year planning period, with 3 fatalities.
- Mobility Index – Average, with average or better performances across all performance qualifiers. The segment reports AADT 883 with 5% trucks.



**Environmental Overview**

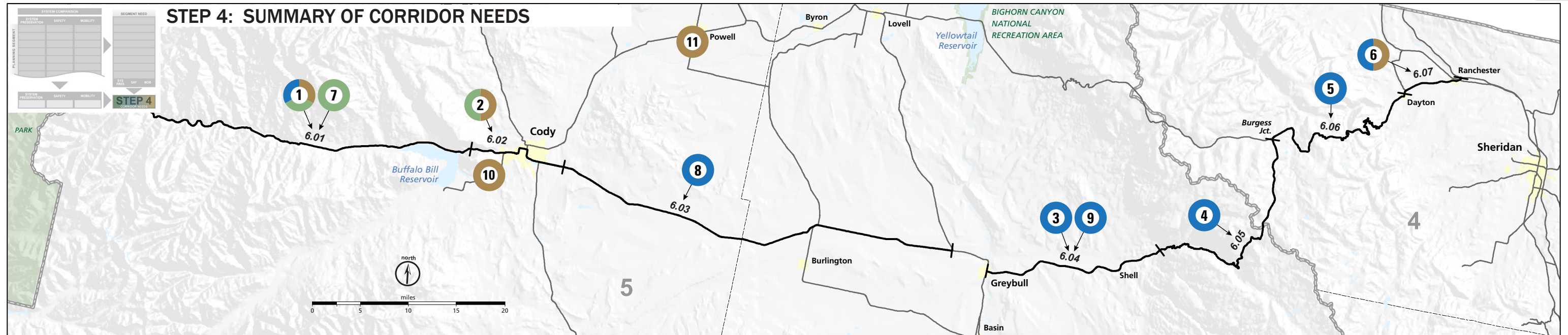
The Wyoming Interagency Spatial Database and Online Management System (WISDOM) was queried to identify natural resources that could be impacted by transportation projects. The following summary lists the general type of potentially impacted resources. The project development phase should investigate these resources in more detail to determine if mitigation activities are required. Please see Appendix and <http://wisdom.wygisc.org/> for detailed information.

There are eight different terrestrial habitat types located throughout the three special management areas within SSC 6. Two federally listed species within the corridor fall into one of three categories, candidate, endangered, and threatened. Three big game species and twelve raptor species are found in SSC 6. There are five different categories that fall under the aquatic habitat. There are four watersheds, six aquatic crucial priority areas, four aquatic enhancement priority areas, two combined crucial priority areas, and five combined enhancement priority area. See Table 12 for general locations.

*Table 12 - Environmental Considerations*

Category	WEST (Yellowstone National Park - Cody)	CENTRAL (Cody - Greybull)	EAST (Greybull - Ranchester)
Big Game Crucial Range	Elk	na	Elk Moose Mule Deer
Big Game Migration Route	na	Pronghorn Antelope	Elk
WGFD Aquatic Crucial Priority Areas SHP	Lower Shoshone River	Lower Shoshone River	Class 1 High Productivity Sport Fisheries Foothills to Prairie Steam & Riparian Corridors Lower Bighorn River Complex Prairie Stream & Riparian Corridors Yellowstone Cutthroat Trout Habitat YSC Restoration Watersheds
WGFD Terrestrial Crucial Priority Areas SHP	Sage Grouse Core Areas	Sage Grouse Core Areas	Lower Sweetwater River Watershed North Rawlins Popo Agie-Beaver Creek River Watershed
WGFD Combined Crucial Priority Areas SHP	Riparian	Riparian	High Elevation Riparian & Aspen Communities-East Slope Bighorn Mountains Riparian
Occurrence & Distribution (Federally Listed Species)	Greater Sage Grouse Grizzly Bear Whooping Crane	Greater Sage Grouse Whooping Crane	Gray Wolf Greater Sage Grouse

*Segment 6.01 is not included in this table due to an issue with WISDOM.*



**Summary of Needs**

This section summarizes needs by planning segment for each of the three performance indicators and the supporting performance qualifiers. The summary identifies overlapping needs, which provides guidance in the efficient prioritization of projects to best address deficiencies. The practice of completing projects that simultaneously address multiple needs may present cost savings as well as being most effective in improving performance indexes across the system. The summary also lists other needs in each of the three performance measurement areas. For more information about needs at the corridor level, see the maps in the appendix which compare both system level and corridor level needs.

SSC 6 needs occur across all categories: within System Preservation, structurally deficient bridges are noted on three segments. Within Safety, wildlife related and alcohol related crashes are noted. Crashes on several curves with deficient geometry occur in mountainous areas. Five areas of critical crash concentrations occur, also in mountainous areas. Within Mobility, traffic growth rates in Shoshone Canyon east of Yellowstone National Park and near Ranchester are reported as high. There are two structurally deficient bridges on local/regional routes.

Big game crucial range and migration routes intersect much of the corridor and should be investigated for concurrence with wildlife related crashes. The Shoshone River Canyon between Yellowstone National Park and Cody is considered an Aquatic Crucial Priority Area by the Wyoming Game and Fish Department. Numerous federally listed endangered species as well as Sage Grouse Core Areas are found in the corridor and should be considered in all project planning.

Based on the needs identified in this analysis and the recommended strategies and solution sets, this plan does not identify specific needs to preserve or acquire additional rights of way to accommodate improvements. Frequent driveway accesses, lack of access controls, and pedestrian traffic on US 20 in the Cody urban area present challenges for traffic management and should be evaluated for future improvements. Local and specific ROW requirements based on urban on needs in Cody should be evaluated in the Urban Areas Corridor Plan in cooperation with local governments and planning organizations.

**Overlapping Needs**

Overlapping needs are identified six segments:

- 1** 6.01 - SYSTEM PRESERVATION/SAFETY/MOBILITY: Bridge Variance Rating, Wildlife Related Crashes, Curves with Vertical Deficiency, Crash Concentrations, Traffic Growth
- 2** 6.02 - SYSTEM PRESERVATION/MOBILITY: Bridge Variance Rating, Traffic Growth
- 3** 6.04 - SAFETY: Wildlife Related Crashes, Curves with Vertical Deficiency
- 4** 6.05 - SAFETY: Alcohol Related Crashes, Curves with Vertical Deficiency, Curves with Horizontal Deficiency, Crash Concentrations
- 5** 6.06 - SAFETY: Alcohol Related Crashes, Curves with Vertical Deficiency, Curves with Horizontal Deficiency, Crash Concentrations
- 6** 6.07 - SAFETY/MOBILITY: Alcohol Related Crashes, Traffic Growth

**Other Performance Index Needs**

**System Preservation**

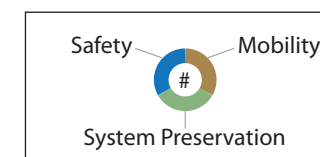
- 7** 6.01 - Structurally Deficient Bridge

**Safety**

- 8** 6.03 - Wildlife Related Crashes
- 9** 6.04 - Wildlife Related Crashes, Curves with Vertical Horizontal Deficiency

**Mobility**

- 10** 6.02 - Structurally Deficient Bridge (L/R)
- 11** 6.03 - Structurally Deficient Bridge (L/R)





### III. SOLUTION SETS

A solutions menu was created to address the needs identified in the previous sections. This menu identifies potential solution strategies grouped by performance measure categories. The strategies are a preliminary list based on industry accepted approaches and the efforts to date of WYDOT programs to document preferred approaches. This list is not intended to be all-inclusive, but represents types of improvements that may be employed to address documented needs.

Section IV recommends how the solution sets may be efficiently grouped depending on funding availability.

Table 13 - Recommended Solution Sets to Improve Performance in Each Index

System Preservation	Safety		Mobility	
<p><i>Pavement Maintenance Requirement &amp; Pavement Variance Rating</i></p> <p><i>Rutting</i> Mill Mill and overlay</p> <p><i>1S Treatments</i> Mill and overlay Seal Coat Cleaning and sealing joints Patching pavement Micro surfacing</p> <p><i>2S Treatments</i> Roadway Restoration</p> <p><i>3S Treatments</i> Reconstruct Roadway Roadway widening Upgrade geometric design</p> <p><i>Bridge Variance Rating</i> Bridge Replacement Channel reconstruction Cleaning and sealing bridge members Lower weight limits Restore drainage systems Scour countermeasures</p>	<p><i>Weather Related</i> Signage Automated anti-icing systems Grooved pavement ITS Larger signs Snow berms/grading Snow fencing Warning beacons</p> <p><i>Wildlife Related</i> Animal detection systems Animal jump-out or one-way gates ITS Remove brush from ROW Signage Warning beacons Wildlife bridge/underpass Wildlife fencing</p> <p><i>Alcohol Related</i> Centerline rumble strips ITS Law Enforcement Media campaign Shoulder rumble strips</p>	<p><i>Horizontal Geometry</i> Centerline rumble strips Dynamic curve warning system Guardrail Improve/restore superelevation Lighting Oversize/length restrictions Reconstruction/realignment Reduce posted speed Reflectors Shoulder rumble strips Signage Warning beacons</p> <p><i>Vertical Geometry</i> Larger signs Reconstruction/realignment Reduce posted speed Reflectors Signage Warning beacons</p> <p><i>Safety Restraints</i> ITS Law Enforcement Media campaign</p>	<p><i>Volume to Capacity Rating &amp; Traffic Growth / Truck Traffic Growth</i> Acceleration lane Capacity improvements Deceleration lane Increase lane width Intersection/interchange improvements Multimodal improvements Passing lanes Shoulder widening Through lanes Turn lane</p> <p><i>Bridge Variance (L/R)</i> Bridge Replacement Channel reconstruction Cleaning and sealing bridge members Lower allowable weight limits on bridge Restore drainage systems Scour countermeasures</p>	<p><i>Pavement Variance Rating (L/R)</i></p> <p><i>Rutting</i> Mill Mill and overlay</p> <p><i>1S Treatments</i> Cleaning and sealing joints Micro surfacing Mill and overlay Patching pavement Seal Coat</p> <p><i>2S Treatments</i> Roadway Restoration</p> <p><i>3S Treatments</i> Reconstruct Roadway Roadway widening Upgrade geometric design</p>





## IV. RECOMMENDATIONS

This section describes recommendations for strategies and priorities to address corridor needs. The selected strategies address the needs described in previous sections and are organized by the three strategic performance areas: System Preservation, Safety, and Mobility. These recommendations provide information and guidance consistent with the Strategic and Long Range Plans to help WYDOT select projects in coordination with the STIP process.

The recommended strategies have been packaged into solution sets that recognize the inherent overlap that investments may have across performance areas. For example, truck passing lanes may simultaneously improve traffic flow (Mobility) and reduce crashes (Safety).

The solution sets are tiered to the three Funding Scenarios identified in the Long Range Transportation Plan. The funding scenarios describe a progressively increasing budget, with generally defined allocations to System Preservation, Safety, and Mobility. With each succeeding level of investment, additional funding is allocated to address shortfalls in performance-based goals.

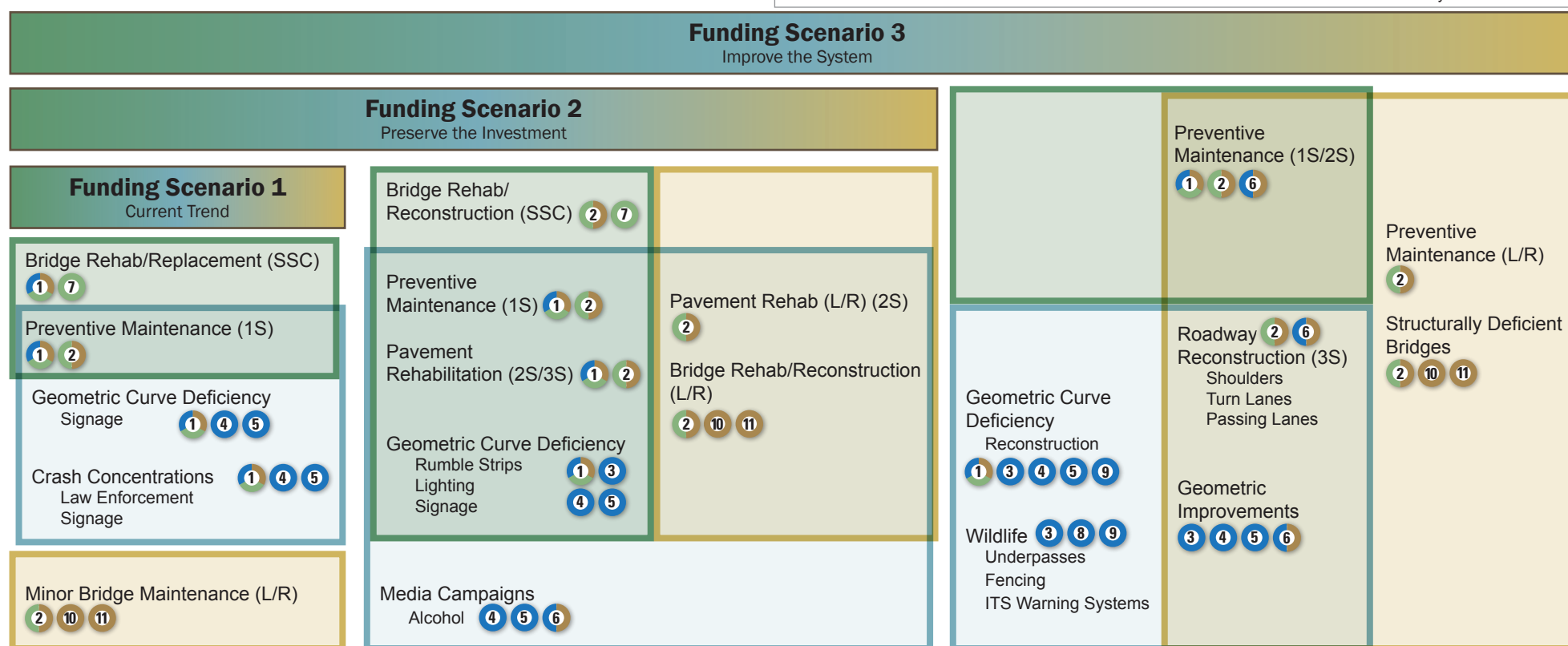
- Funding Scenario 1 – The continuation of program funding at current levels. Most funding is directed to System Preservation needs. System characteristics are expected to decline with inflation and increasing construction costs over time. Few major projects to address Safety, other than with specially restricted and allocated funds, or Mobility would be implemented.
- Funding Scenario 2 – Funding over and above the base level would allow additional investments in pavement and bridge projects to meet WYDOT goals.
- Funding Scenario 3 – Additional funding over and above Scenario 2 would allow WYDOT to maintain and improve existing conditions, achieve pavement and bridge condition goals, plus invest in major projects to improve Mobility.

### Funding Scenario 1

Funding Scenario 1, defined as the continuation of current program funding, is focused primarily on addressing System Preservation needs through preventive maintenance efforts. System Preservation needs are few for this corridor; the plan recommends that funds remain allocated to preventive pavement maintenance, along with reserving a portion to address identified safety needs. Safety needs include specific wildlife-related accident prone areas and alcohol-related crash locations. In addition, geometric insufficiencies related to critical crashes are documented at 18 locations and five areas are identified as critical crash concentrations. These needs may be only partially met under current funding and should be focused on areas with documented overlapping needs. Additional needs that cannot be met under Scenario 1 may be delayed pending additional funds under Scenarios 2 or 3.

- Minor surface treatments on the SSC mainline, including mill and overlay, including pavement hotspots.
- Bridge rehabilitation or replacement of structurally deficient bridges on the SSC mainline.
- Minor projects to improve safety not involving major construction, such as signage on deficient curves and wildlife crash areas, as well as alcohol-related law enforcement.

Table 14 - SSC 6 Recommended Strategies for Long Range Plan Funding Scenarios



### Funding Scenario 2

If sufficient funds to preserve the system in at least its current operational form are made available, WYDOT will direct funding to strengthen pavement and bridge conditions across the system, including on local and regional routes. SSC 6 has two structurally deficient bridges on local/regional routes. This scenario would allow investments to fully achieve WYDOT goals in pavement and bridge conditions. Additional investments should be made to improve safety for wildlife/alcohol related crashes, numerous structurally deficient curves, and other areas of crash concentrations.

- Preventive maintenance could be deferred and/or advanced, depending on life cycle, as recommended by the Pavement Management System.
- Reconstruction (2S/3S) to address higher traffic volumes in the Shoshone River Canyon and west of Ranchester.
- Improvement of pavement condition of Local and Regional Routes, to include preventive maintenance or mill and overlay.
- Minor projects to improve safety not involving major construction, such as rumble strips, lighted signage (geometric deficiencies and wildlife-related crashes), and alcohol-related media campaigns.

### Funding Scenario 3

If additional funds are made available to WYDOT under Funding Scenario 3, opportunities would be created to address all three investment categories, thus preserving the investment and improving the overall “health” of the system. Additional funds allow project selection to address overlapping needs, therefore investing funds most effectively. The additional funds would expand to include other items to improve performance in the Mobility Index.

- Roadway reconstruction (3S) to meet long term goals, including correction of geometric deficiencies.
- Turn lanes, passing lanes, and other auxiliary lanes to address traffic volumes and safety issues in Shoshone River Canyon and in the Burgess Junction area.

### Performance Measurement Over Time

As these performance measures are continually monitored over time it will become evident how the recommended solution strategies and the selected projects address the needs of the corridor and the overall system. Addressing deficiencies documented in the corridor plan will effectively improve the System Preservation, Safety, and Mobility indexes at both the corridor and system level.

Ongoing performance measure documentation is critical to identify trends, capture the existing health of the system, and allowing an accurate forecast of the future health of Wyoming’s Transportation system. The need for additional funding and/or more aggressive solutions will become evident if performance measures fail to meet WYDOT goals.

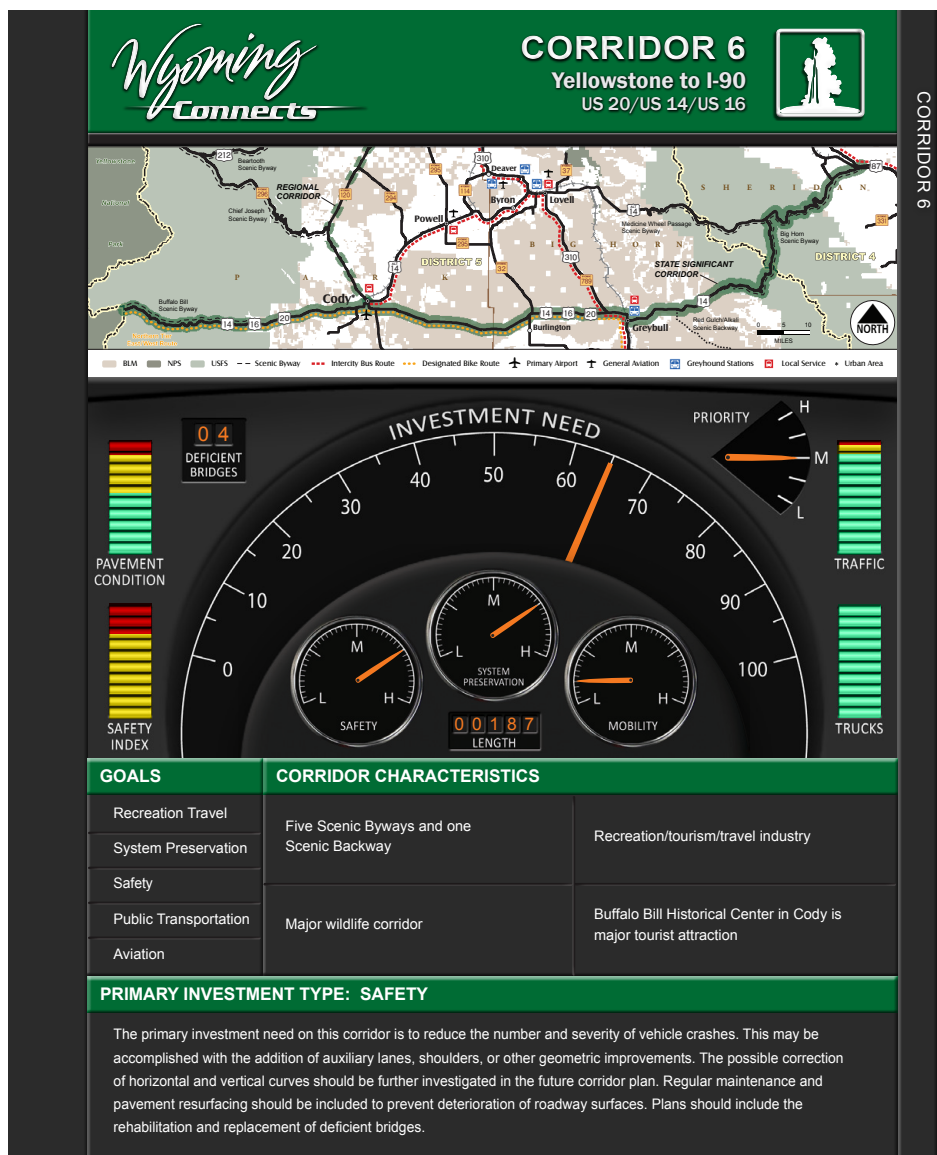


## REALIZING THE CORRIDOR VISION

As part of the statewide Wyoming Connects and Long Range Transportation Plan, the Corridor Vision for SSC 6 - and all SSCs - focuses on the identification of overall system performance aggregated from the evaluations of each individual corridor's "health" relative to WYDOT's long-term Strategic Goals. The identified types of investment needs (system preservation, safety, and mobility) expressed in the Corridor Vision are reflected in the three primary need indicators of this Corridor Plan. The analysis of each investment type generated goals representing corridor health issues as communicated by the planning and public process used in development of the Vision. See *Wyoming Connects: Corridor Visions* for more information.

### Corridor Vision Goals

The Yellowstone to I-90 Corridor Vision captured Key Issues and Emerging Trends of critical importance and how SSC 6 could best serve the communities it connects over the long term. While issues were identified relative to each investment type, the Primary Investment Type is Safety:



The primary investment need on this corridor is to reduce the number and severity of vehicle crashes. This may be accomplished with the addition of auxiliary lanes, shoulders, or other geometric improvements. The possible correction of horizontal and vertical curves should be further investigated in the future corridor plan. Regular maintenance and pavement resurfacing should be included to prevent deterioration of roadway surfaces. Plans should include the rehabilitation and replacement of deficient bridges.

Additional goals which reflect the full context, character, and issues of SSC 6 were set as high priority goals as indicated in Table 15. A review of these Vision Goals compared to the findings of this Corridor Plan provides for a conformance check and identifies additional issues to be considered when evaluating potential projects and implementation plans.

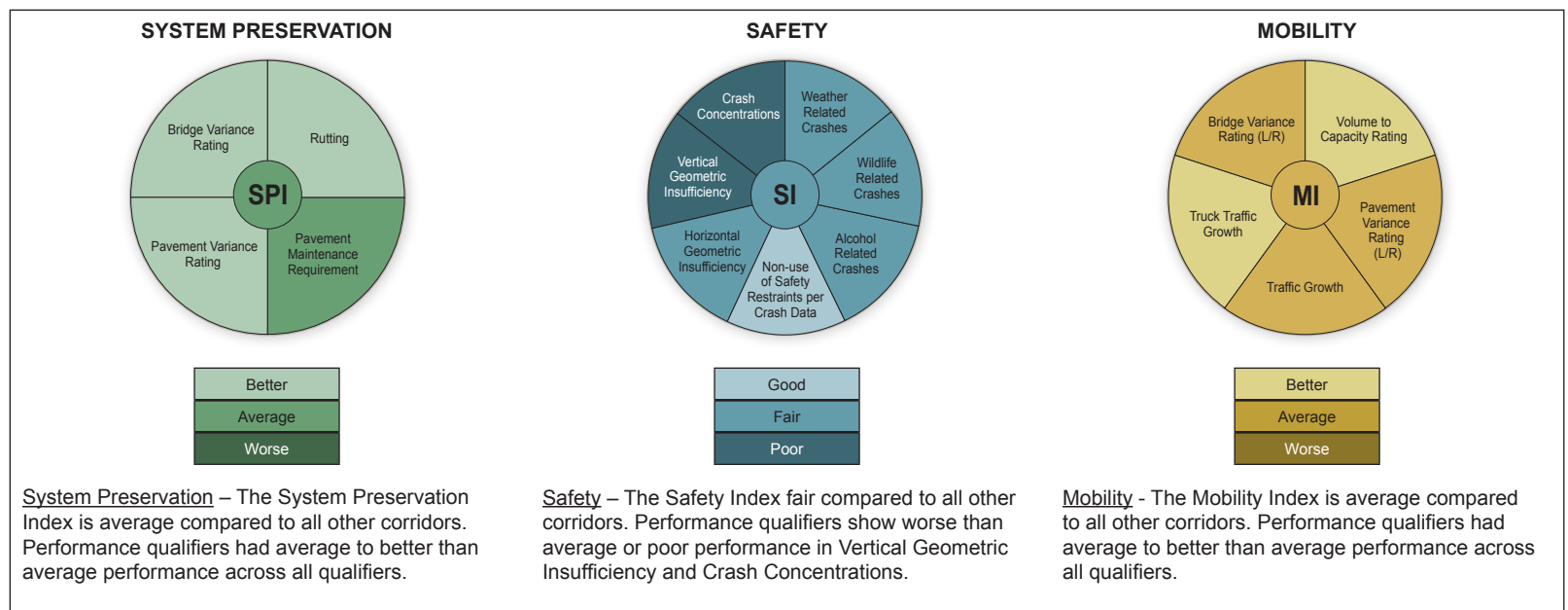
Table 15 - Review of Corridor Vision Goals and Other Considerations

Corridor Visions		High Priority	Other Considerations
Investment Category	Goal		
System Preservation	Preserve the existing transportation system	✓	Several structurally deficient bridges are identified on the corridor and on associated local/regional routes.
Safety	Reduce fatalities, injuries, and property damage crash rate	✓	Corridor plan identifies wildlife and alcohol related crashes as hazards, along with geometric deficiencies in mountainous areas.
Mobility	Support farm to market economic sustainability		Big Horn River valley is an important regional contributor to the agricultural sector.
	Support recreation travel		Growing volumes on Buffalo Bill Cody Scenic Byway and Bighorn Scenic Byways, along with safety and geometric deficiencies identified in plan.
	Improve public transportation opportunities		Improvements to transit services in Cody.
	Ensure airport facility meets existing and projected demands		Airport is important regional facility and access to Yellowstone National Park.

## CORRIDOR PERFORMANCE

Table 16 shows SSC 1 corridor performance compared to the system. The center of each chart indicates the value of the performance index, with each section indicating the performance qualifier for each measure.

Table 16 - Corridor Performance



### Coordination with System Priorities

The corridor comparison can be used to help assign a priority level to entire corridors, if conditions warrant. The Corridor Plans – Executive Summary is published under separate cover and provides an overview of corridor comparisons. The summary identifies areas of greatest need within all performance indexes and for performance qualifiers across the state system. By addressing these areas of greatest need, whether by program, corridor, or corridor segment WYDOT will ensure positive changes in reported conditions throughout Wyoming.

Dashboard from Corridor Visions