

Wyoming Connects



Corridor 7 Plan

THERMOPOLIS TO US 310



MAY 2013

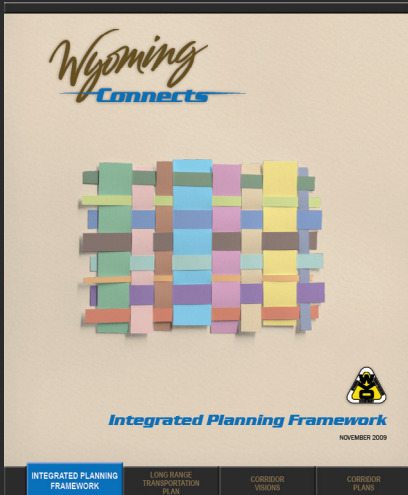
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FRAMEWORK

LONG RANGE
TRANSPORTATION
PLAN

CORRIDOR
VISIONS

CORRIDOR 7
PLAN



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:

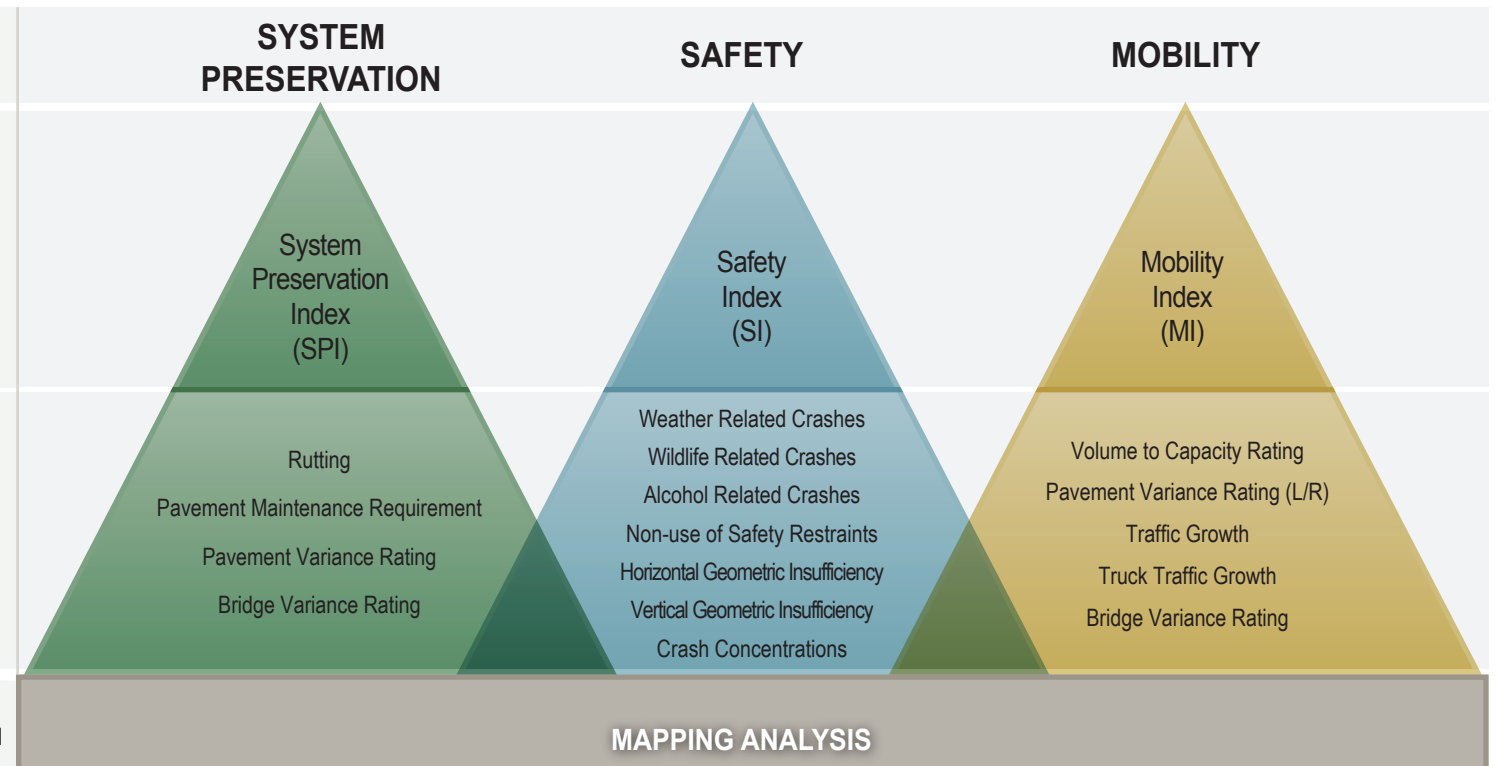
These are quantifiable and repeatable measurements that reflect the overall performance of the transportation corridor being analyzed. Targets for these indicators may be absolute and indicate a desired condition or comparative to current performance of the overall system to indicate relative priority.

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:

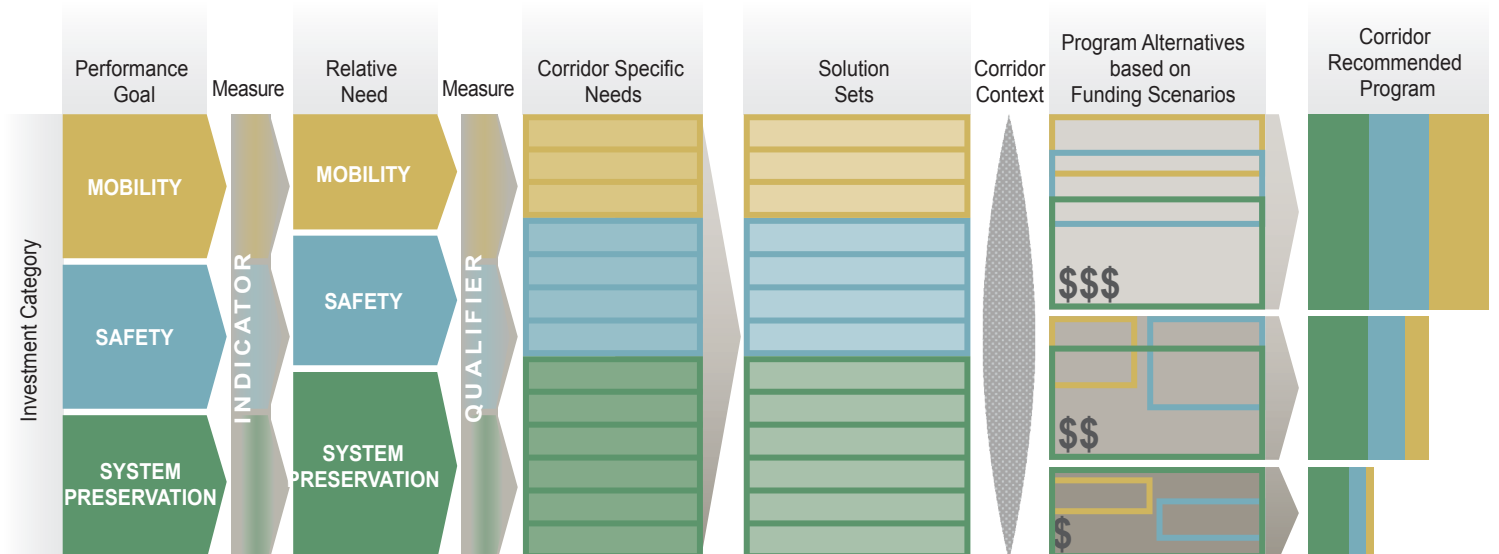
Mapping the deviated performance qualifiers against several factors to effectively prioritize, locate, and identify needs.



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 7 - THERMOPOLIS TO US 310 - WYO 120/US 14A CORRIDOR PLAN

CONTENTS

CORRIDOR PLAN PURPOSE	INSIDE FRONT COVER
I. STATE SIGNIFICANT CORRIDOR 7 - DESCRIPTION	1
Corridor Description	1
Corridor Segments	1
II. EVALUATION OF CORRIDOR PERFORMANCE	3
Step 1: Summary of Indicator and Qualifier Performance Measures	3
Step 2: System Preservation - Index Maps	4
Analysis of Investment Category Needs - System Preservation	5
Step 2: Safety - Index Maps	6
Analysis of Investment Category Needs - Safety	7
Step 2: Mobility - Index Maps	8
Analysis of Investment Category Needs - Mobility	9
Step 3: Analysis of Planning Segment Needs	10
Environmental Overview	10
Step 4: Summary of Corridor Needs	12
III. SOLUTION SETS	13
IV. RECOMMENDATIONS	14
Realizing the Corridor Vision	15
Corridor Performance	15

TABLES

TABLE 1	Segments for State Significant Corridor 7	2
TABLE 2	Indicator and Qualifier Performance of Planning Segments	3
TABLE 3	STIP by Year and Corridor Segment	5
TABLE 4	Horizontal Geometry Insufficiency	7
TABLE 5	Vertical Geometry Insufficiency	7
TABLE 6	Critical Crash Concentrations	7
TABLE 7	Major Traffic Generators	9
TABLE 8	Traffic Growth	9
TABLE 9	Truck Traffic Growth	9
TABLE 10	Local/Regional Routes with Poor PSR	9
TABLE 11	SSC 7 Structurally Deficient Bridges (L&R)	9
TABLE 12	Important Environmental Considerations	11
TABLE 13	Recommended Solution Sets to Improve Performance in Each Index	13
TABLE 14	SSC 7 Recommended Strategies for Long Range Plan Funding Scenarios	14
TABLE 15	Review of Corridor Vision Goals and Other Considerations	15
TABLE 16	Corridor Performance	15

APPENDIX

SYSTEM PRESERVATION MAPS	
Rutting	A-1
Pavement Maintenance Requirement	A-2
Pavement Variance Rating	A-3
Bridge Variance Rating	A-4
SAFETY MAPS	
Weather Related Crashes	A-5
Wildlife Related Crashes	A-6
Alcohol Related Crashes	A-7
Non-use of Safety Restraints per Crash Data	A-8
Horizontal Geometry Insufficiency	A-9
Vertical Geometry Insufficiency	A-10
Crash Concentrations	A-11
MOBILITY MAPS	
Volume to Capacity Rating	A-12
Pavement Variance Rating (L/R)	A-13
Traffic Growth	A-14
Truck Traffic Growth	A-15
Bridge Variance Rating (L/R)	A-16
ENVIRONMENTAL CHARACTERISTICS	
Environmental Data Summary	A-17



I. STATE SIGNIFICANT CORRIDOR 7 - DESCRIPTION

CORRIDOR DESCRIPTION

State Significant Corridor (SSC) 7 is 124 miles long. It follows WYO 120 northwest from Thermopolis to Cody and then US 14A northeast from Cody and WYO 114 to its intersection with US 310 near Lovell. SSC 7 goes through the three counties and WYDOT District 5, all located in the north central part of Wyoming.

SSC 7 begins in Thermopolis at the US 20/WYO 789 intersection. Thermopolis is a small western town, location of the world's largest mineral hot spring at Hot Springs State Park. WYO 120 travels northwest across high plains to the town of Meeteetse. Meeteetse provides various summer and winter recreational activities and access to Cody, 50 east of Yellowstone National Park. SSC 7 continues northeast through the city of Powell to its intersection with SSC 8. Most of the corridor travels Bureau of Land Management managed lands and ranchlands on flat and rolling terrain. A BNSF Railway spur extends to Cody from Powell.

Cody and Powell are the only Urban Areas along SSC 7. Cody is a popular Gateway to Yellowstone National Park and prides itself on its small western town atmosphere. The economy in Cody is a mix of energy, agriculture, tourism and manufacturing. Powell is recognized as a progressive community also known for its small town atmosphere and high quality of life. Powell has a diverse commercial, industrial, educational, and agricultural/ranching based economy.

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 7 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.



Bison in the distance near Thermopolis

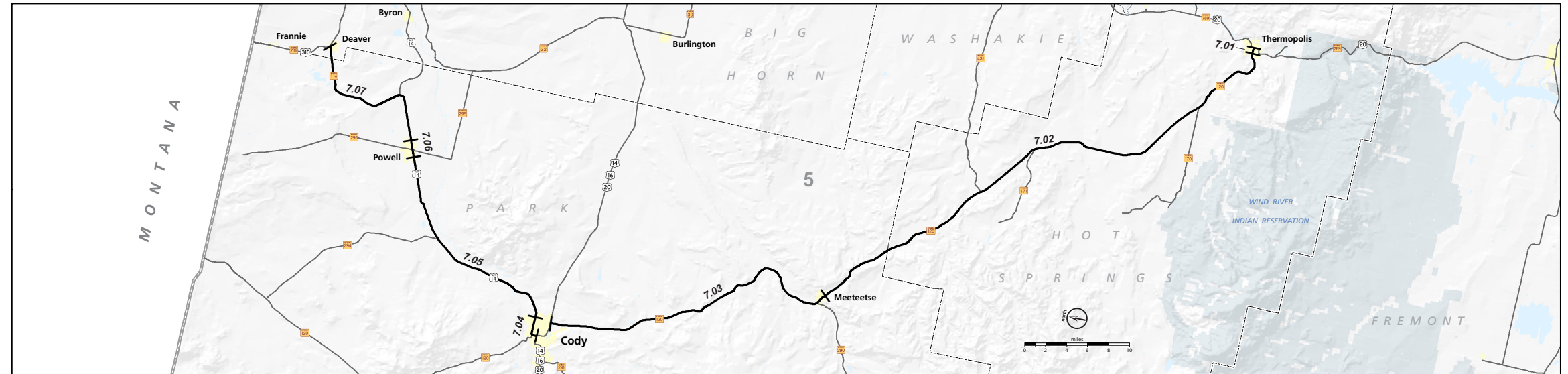
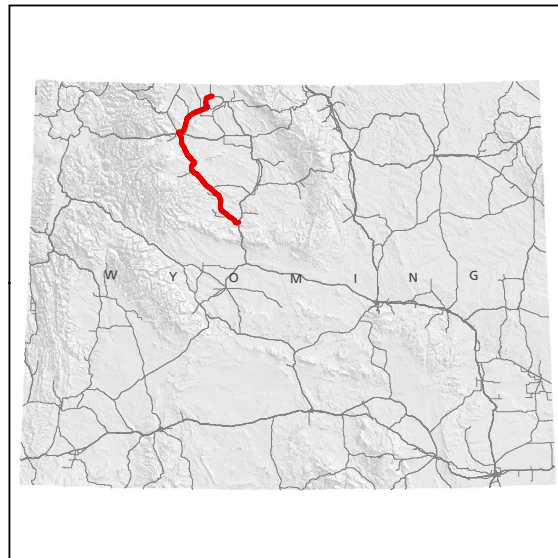


Table 1 - Segments for State Significant Corridor 7

Corridor 7	Segment	ML Route	Begin	End	Length	Description
	7.01	33	0.00	0.67	0.67	Thermopolis. Features: 5-lane cross section with curb, gutter, sidewalks, traffic signals, pedestrian crossings. Intersects SSC 8 (US 20/WYO789); fully developed corridor with residential and commercial land uses; Hot Springs State Park and Wyoming Dinosaur Center; tourism; urban terrain.
7.02	33	0.67	51.31	50.64	Thermopolis to Meeteetse. Features: 2-lane cross section; intersects Local Routes WYO 170, 171, and 431; road close gates; Owl Creek, Cottonwood Creek, Grass Creek, Gooseberry Creek, Buffalo Creek; Gooseberry Rest Area; BLM range and ranch lands; tourism route to national park area; flat and rolling terrain.	
7.03	33	51.31	81.21	29.90	Meeteetse to Cody. Features: 2-lane cross section; 2-lane cross section with 1 3-lane passing area; intersects SSC 6 (US 14/16/20) and Local Route WYO 290; Greybull River, Spring Creek, Meeteetse Creek, Cottonwood Creek, Little Dry Creek, Dry Creek, Sage Creek, Cody Canal; road close gates; BLM range and ranch lands; tourism route to national park area; flat and rolling terrain.	
7.04	29	0.00	2.25	2.25	Cody Urban Area (pop. 9,309). Features: 5-lane cross section through urban area, with traffic signals, turn lanes, sidewalks, curb, gutter, and pedestrian crossings; segment begins at intersection with SSC 6 (US 14/16/20), intersects with Local Route WYO 291; fully developed corridor with residential and commercial land uses; intercity bus; urban terrain.	
7.05	29	2.25	23.35	21.10	Cody to Powell. Features: 2-lane cross section with occasional passing lanes; shoulder width varies; intersects with Local Route WYO 294; town of Ralston; parallel BNSF Railway with at-grade RR crossing; Sage Creek, Shoshone River, Garland Canal, Eagle Creek, Alkali Creek; BLM range and ranch lands; agricultural; flat terrain.	
7.06	29	23.35	25.02	1.67	Powell Urban Area (pop. 5,524). Features: 4/5-lane cross section through urban area, with traffic signals, turn lanes, sidewalks, curb, gutter, and pedestrian crossings; intersects with Local Route WYO 295; fully developed corridor with residential and commercial land uses; urban terrain.	
7.07	29	25.02	29.52	4.51	Powell to Deaver. Features: 2-lane cross section with occasional passing lanes; shoulder width varies; intersects with SSC 8 (US 310/WYO 789) and Local Route 114; Bitter Creek; parallel BNSF Railway with 1 grade separation and 1 at-grade crossing; agricultural and ranch lands; adjacent to BLM lands; flat and rolling terrain.	
	32	29.57	40.62	11.05		

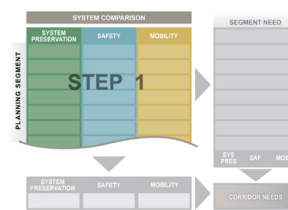
Source: URS Windshield Survey June 2012; Maintenance Section Reference Book 2012; Wyoming Connects: LRTP and Corridor Visions. Note: Descriptions of beginning and endpoints are approximate.



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

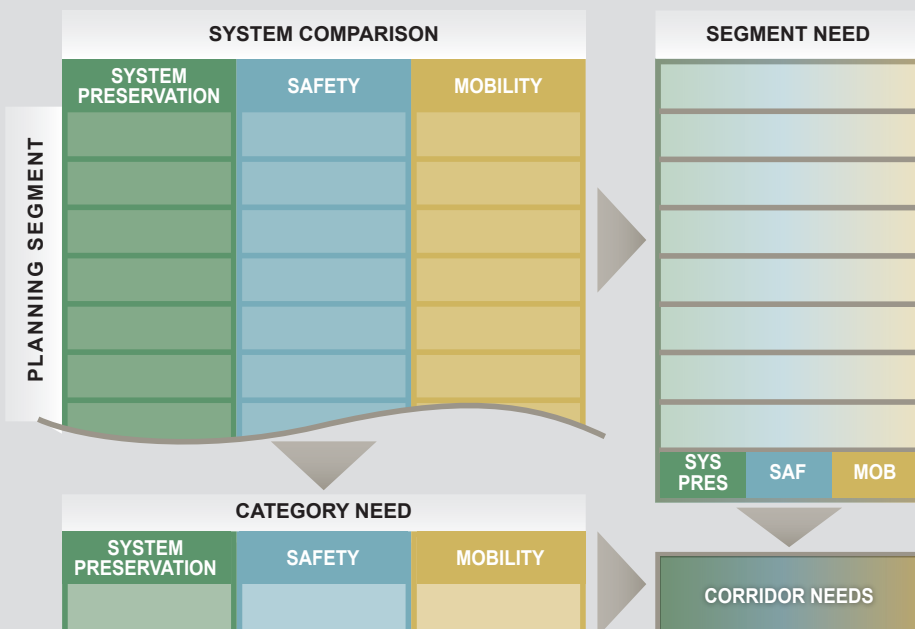
This corridor plan evaluates System Preservation, Safety, and Mobility performance using the process described in the Integrated Planning Framework, published separately. The plan analyzes the performance of planning segments described in Table 1 as compared to system averages. It identifies good, fair, 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 7

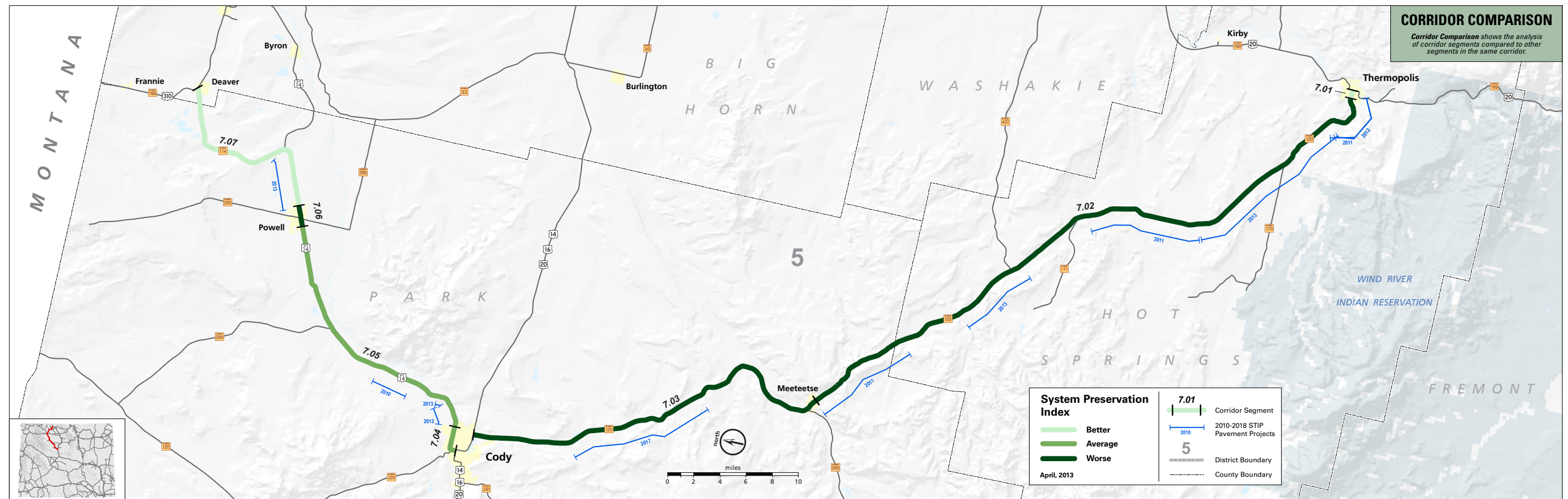
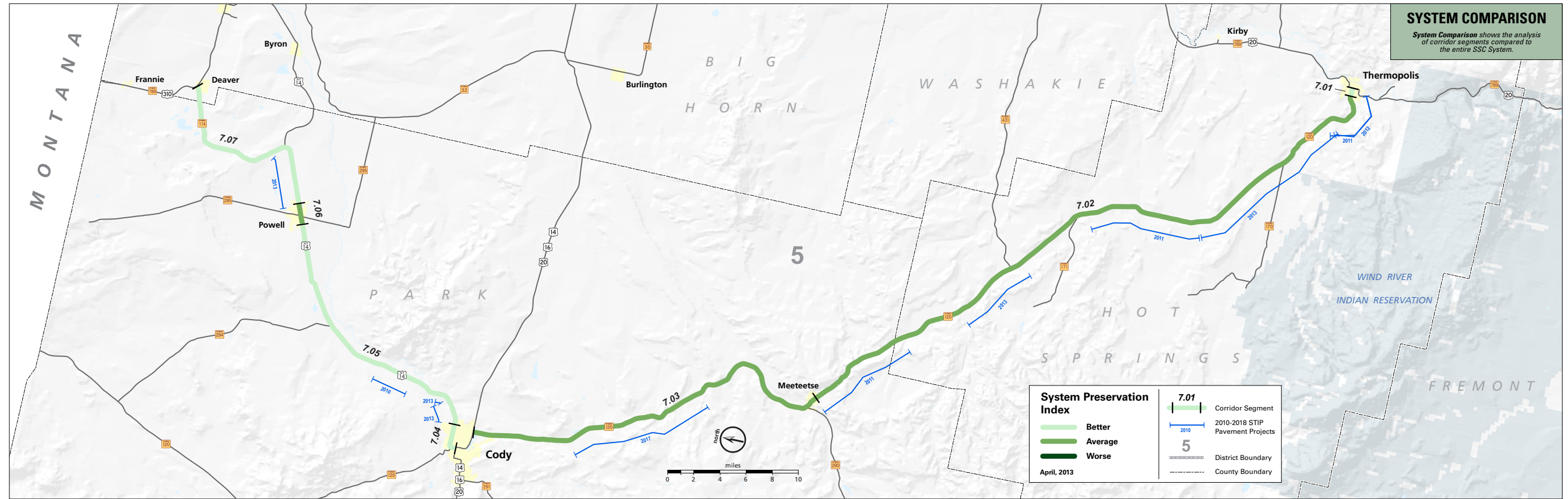
Segment	SYSTEM PRESERVATION					SAFETY								MOBILITY					
	System Preservation Index	Rutting	Pavement Maint. Requirement	Pavement Variance Rating	Bridge Variance Rating	Safety Index	Weather Related Crashes	Wildlife Related Crashes	Alcohol Related Crashes	Non-use of Safety Restraints	Horizontal Geometric 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)
7.01	Better	Good	Less	Good	Less	Good	Average	Less	Less	Average	Less	Less	Good	Better	Good	Fair	Less	Less	Less
7.02	Average	Good	Average	Good	Less	Good	Average	More	Average	Less	Average	Average	Poor	Average	Good	Poor	Average	Less	Less
7.03	Average	Good	Average	Fair	Less	Poor	Average	More	Less	Less	Less	Average	Fair	Better	Good	Fair	Average	Less	Less
7.04	Better	Good	Less	Good	Less	Good	Average	Less	More	More	Less	Less	Good	Worse	Good	Fair	More	Average	Less
7.05	Better	Good	Less	Good	Less	Poor	Less	More	Average	Less	Average	Average	Good	Better	Good	Fair	Average	Less	Less
7.06	Average	Good	Less	Good	Less	Fair	Less	Less	Average	More	Less	Average	Good	Average	Good	Good	Average	Average	Average
7.07	Better	Good	Less	Good	Less	Good	Less	Average	Average	Average	Less	Average	Poor	Average	Good	Fair	Average	Average	Less

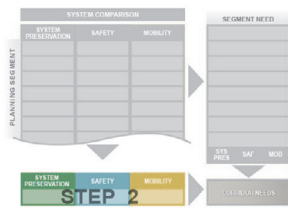




CORRIDOR 7

SYSTEM PRESERVATION - INDEX





Performance Index

The System Preservation Index is average or better across all segments.

Refer to the sections below for more information.

SYSTEM PRESERVATION					
Segment	System Preservation Index	Rutting	Pavement Maint. Requirement	Pavement Variance Rating	Bridge Variance Rating
7.01	Better	Good	Less	Good	Less
7.02	Average	Good	Average	Good	Less
7.03	Average	Good	Average	Fair	Less
7.04	Better	Good	Less	Good	Less
7.05	Better	Good	Less	Good	Less
7.06	Average	Good	Less	Good	Less
7.07	Better	Good	Less	Good	Less

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 6% of Corridor 7 has been identified as having a 1S need. This represents 7 miles of pavement. Segments 7.01 and 7.05 have 1S treatments recommended by the Pavement Management System. Based upon current available funding, only one project, representing 19 miles of pavement, has been selected to be completed within the next several years.

Approximately 55% of Corridor 7 has been identified as having a 2S need. This represents 67 miles of pavement. Segments 7.02, 7.03, 7.06, and 7.7 have 2S treatment recommended by the Pavement Management System. Based upon current available funding, only two projects, representing 15.8 miles of pavement, have been selected to be completed within the next several years.

Approximately 40% has been identified as having a 3S need. This represents 49 miles of pavement. Segments 7.02, 7.03, 7.04, 7.05, 7.06, and 7.7 have 3S treatment recommended by the Pavement Management System. Based upon current available funding, only two projects, representing 3.3 miles of pavement, have been selected to be completed within the next several years.

Pavement Variance Rating

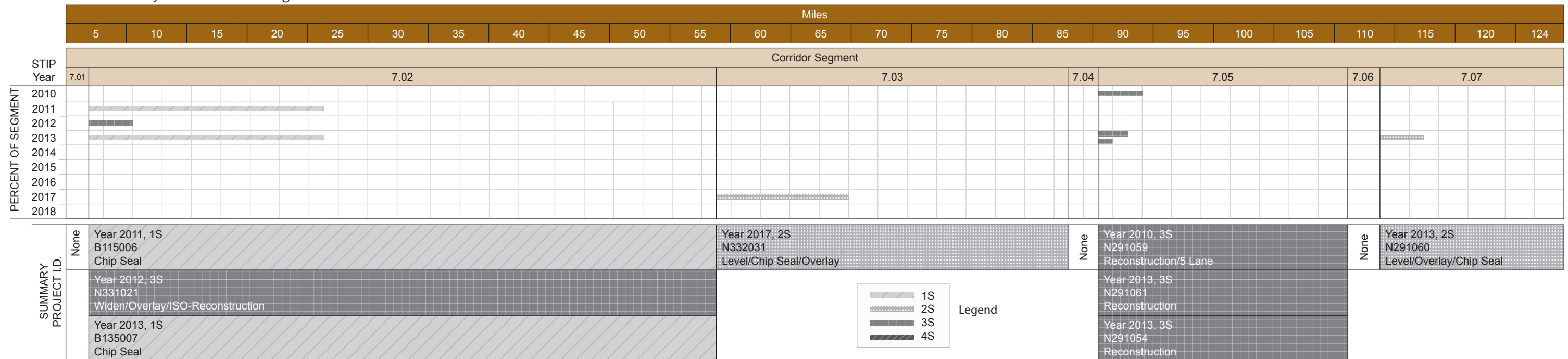
The Pavement Variance Rating is fair or better for the entire corridor. Pavement hotspots, identified by length and severity, occur in Cody, segment 7.03 and 7.04 (most or moderately severe).

Bridge Variance Rating

The Bridge Variance Rating for all of the corridor is better than the system average. All segments have at least one bridge with the exception of segments 7.01 and 7.04. There is one structurally deficient bridge on segment 7.06.

NOTE: See Appendix for maps documenting each performance qualifier.

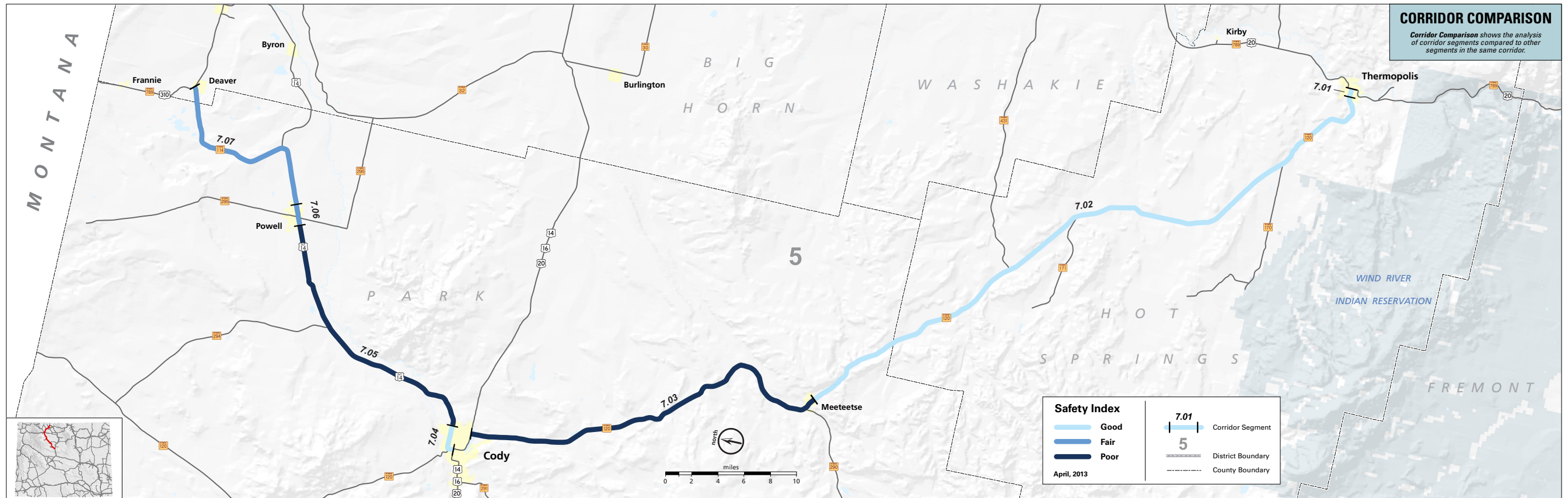
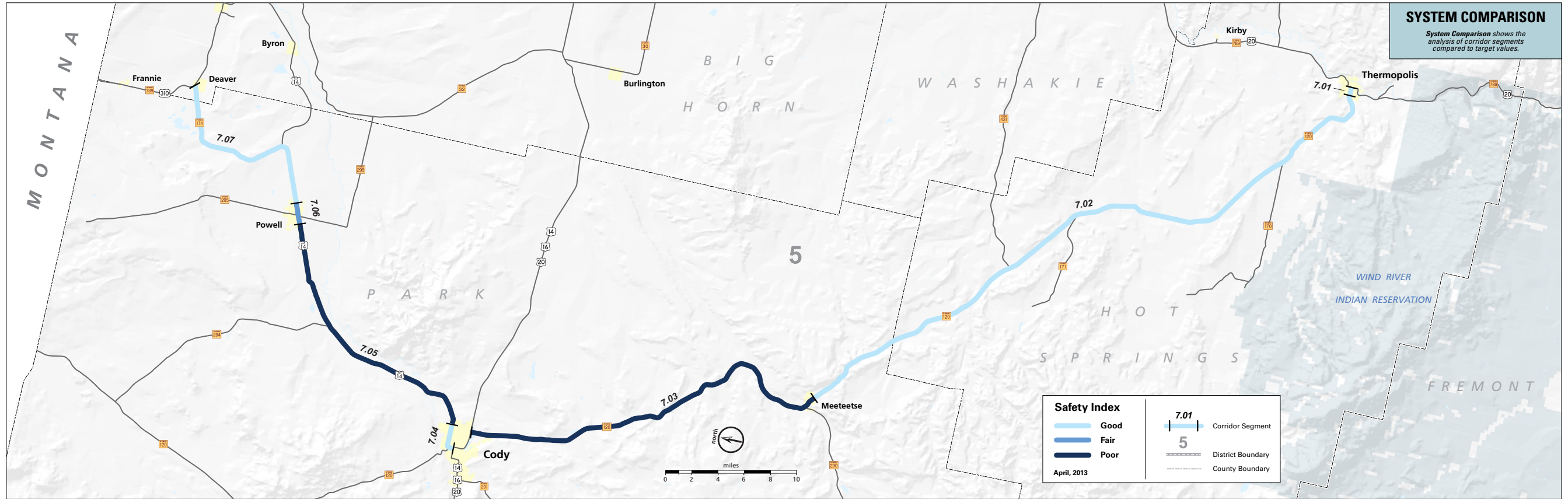
Table 3 - SSC 7 STIP by Year and Corridor Segment

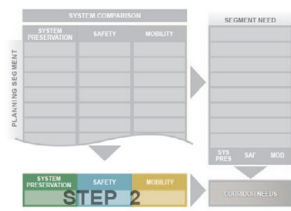




CORRIDOR 7

SAFETY - INDEX





Performance Index

The Safety Performance Index ranges from good to poor across the corridor. Segments rated poor include 7.03 and 7.05.

Performance qualifiers with poor performance include:

- Wildlife Related Crashes are more than the average on all segments except 7.02, 7.03, and 7.05.
- Alcohol Related Crashes are more than the average on segment 7.04.
- Non-Use of Safety Restraints is more than the average on segments 7.04 and 7.06.
- Crash Concentrations are rated poor on segments 7.02 and 7.07.

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
7.01	Good	Average	Less	Less	Average	Less	Less	Good
7.02	Good	Average	More	Average	Less	Average	Average	Poor
7.03	Poor	Average	More	Less	Less	Less	Average	Fair
7.04	Good	Average	Less	More	More	Less	Less	Good
7.05	Poor	Less	More	Average	Less	Average	Average	Good
7.06	Fair	Less	Less	Average	More	Less	Average	Good
7.07	Good	Less	Average	Average	Average	Less	Average	Poor

Performance Qualifiers

Weather Related Crashes

Within SSC 7, the ratio of weather related crashes to total crashes was below the system average. The highest percentage of weather related crashes occurred in Segment 7.07, at 22% of the total crashes. The remaining segments in this corridor had a weather related crash rate approximately 15-17% of total crashes.

Wildlife Related Crashes

Corridor 7 is varied in its wildlife related collisions. Segments 7.02, 7.03, 7.05, and 7.07 have a high rate of accidents involving wildlife, all over 60%, while the remaining segments have an extremely low rate in comparison. Segments 7.01 and 7.06 have no reported accidents involving wildlife, and segments 7.04 and 7.07 have 5% and 7%, respectively.

Segment 7.07 had the highest rate of crashes involving wildlife within SSC 7, and all of the wildlife related crashes are with deer. The highest concentration is located near RM 35 and 39; however, deer related crashes can be found throughout this segment. These crashes do not correlate with migration routes documented by the Wyoming Game and Fish Department.

Alcohol Related Crashes

The percentage of alcohol related crashes is varied throughout the corridor. Segments 7.04 and 7.07, both short segments at 2.2 miles and 4.5 miles, respectively, had the highest percentages of alcohol related crashes. Segment 7.01, which is 0.67 mile, did not have any alcohol related crashes.

Non-use of Safety Restraint

The ratio of crashes in which a restraint device was not worn to total crashes varies within SSC 7 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 7.04, 7.06, and 7.07, at 78.46%, 87.5%, and 77.78%, respectively. These segments are in the Cody and Powell urban areas.

Horizontal Geometry Insufficiency

Several horizontal alignments were found to be insufficient based on the associated posted speed and an assumed emax of 8%. Segments 7.02 and 7.05 have 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
7.05	ML29	5.77	4
7.05	ML29	18.85	15

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 7.02, 7.03, 7.05, 7.06, and 7.07 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
7.03	ML33	56.06	CREST	2
7.03	ML33	58.42	SAG	2
7.05	ML29	23.32	SAG	5
7.07	ML32	36.02	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 7, which are listed in Table 6. Additionally, there is one Other type concentration. Segments 7.02 and 7.07 exhibit the most crash concentrations with 4 Critical concentrations, which occur between RM 8.7 and 9.2, RM 35.5 and 35.8, RM 25 and 25.5, and RM 27.5 and 28.

Table 6 - Critical Crash Concentrations

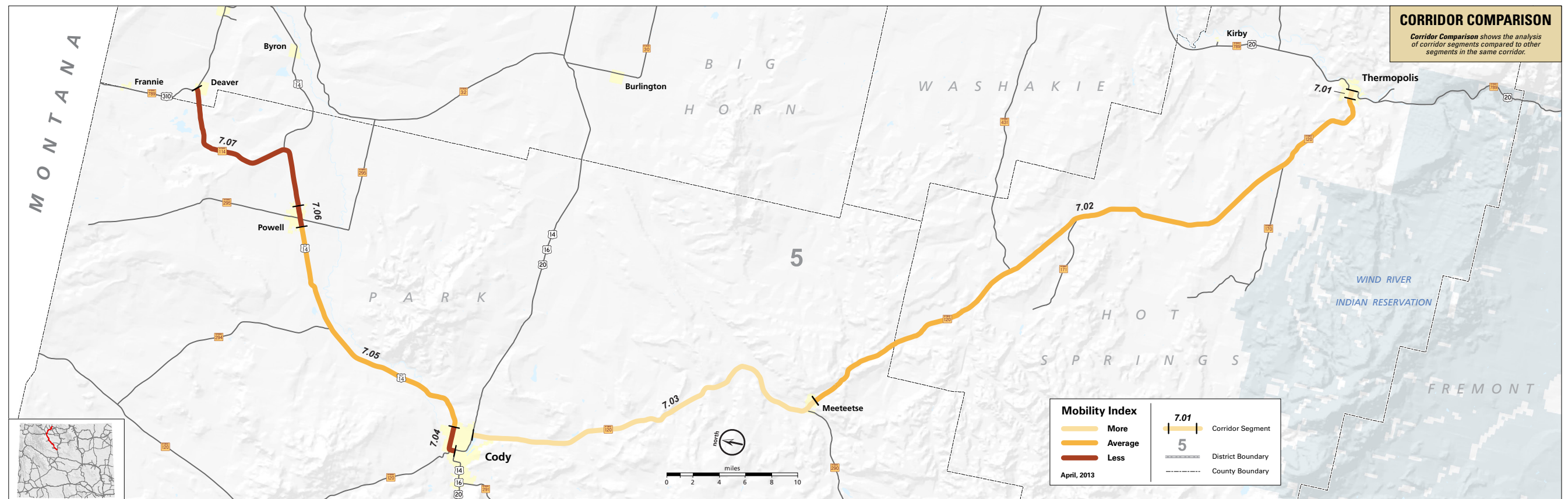
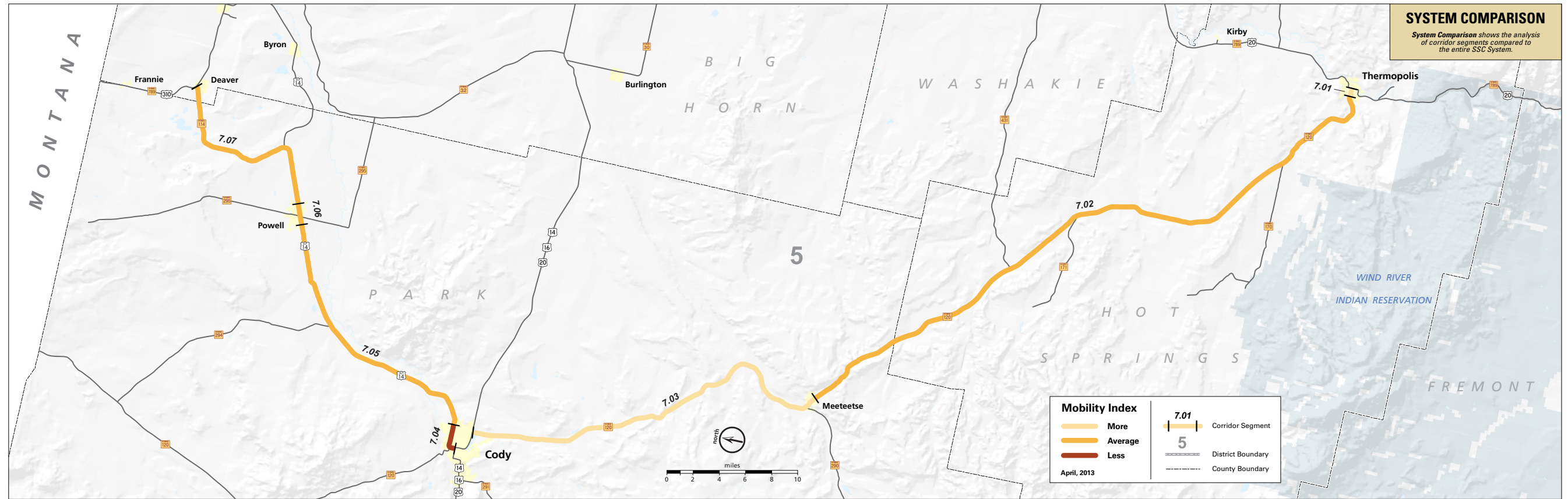
Segment	ML Route	Route Marker	
		From	To
7.02	ML33	8.7	9.2
7.02	ML33	35.5	35.8
7.03	ML33	60	60.5
7.07	ML29	25	25.5
7.07	ML29	27.5	28

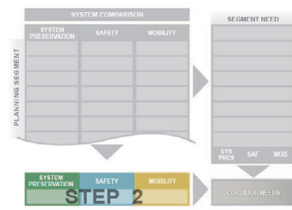
NOTE: See Appendix for maps documenting each performance qualifier.



CORRIDOR 7

MOBILITY – INDEX





Performance Index

The Mobility Performance Index for SSC 7 ranges from better to worse than average. Segments rated worse than average include 7.04.

MOBILITY						
Segment	Mobility Index	Volume to Capacity Rating	Pavement Variance Rating (L/R)	Traffic Growth	Truck Traffic Growth	Bridge Variance (L/R)
7.01	Better	Good	Fair	Less	Less	Less
7.02	Average	Good	Poor	Average	Less	Less
7.03	Better	Good	Fair	Average	Less	Less
7.04	Worse	Good	Fair	More	Average	Less
7.05	Better	Good	Fair	Average	Less	Less
7.06	Average	Good	Good	Average	Average	Average
7.07	Average	Good	Fair	Average	Average	Less

SSC 7 has no connecting regional routes. The condition of each connecting local route is associated with a planning segment on SSC 7 and directly influences the mobility of that segment. There is currently one structurally deficient bridge on a local route.

SSC 7 carries high numbers of agricultural and truck traffic. Vehicle/wildlife conflicts are a key issue along the corridor. This route is subject to generally low volumes of traffic. Shoulder widths vary from 4' to 8' with some rumble strips noted.

Table 7 - Major Traffic Generators

Major Traffic Generators
Farm to market transport - Powell area
Employment centers - Powell & Cody
Mineral production - bentonite & gypsum
Hot Springs State Park - Thermopolis
Tourism destinations - Cody

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 7 is good.

Traffic Growth

The average traffic growth within the SSC System is 1.42%. The majority of segments in this corridor are above average. Segment 7.04 has the highest average annual traffic growth rate. This segment is located in the urban area of Cody on ML29.

Table 8 - Traffic Growth

Segment	AADT 2010	Average 20 Year Growth
7.01	2,891	0.25%
7.02	1,229	1.32%
7.03	1,905	1.41%
7.04	11,104	2.03%
7.05	5,582	1.66%
7.06	6,714	1.63%
7.07	2,108	1.51%

Truck Traffic Growth

The average truck traffic growth within the SSC System is 1.34%. All segments within SSC 7 are below this average. Segment 7.04 has the highest average annual truck growth rate. This segment is located in the urban area of Cody.

Table 9 - Truck Traffic Growth

Segment	AADTT 2010	% Trucks 2010	Truck Traffic Growth
7.01	232	8.02%	0.32%
7.02	126	10.44%	0.26%
7.03	212	11.14%	0.30%
7.04	447	4.02%	1.09%
7.05	266	4.87%	0.40%
7.06	374	5.28%	1.02%
7.07	424	8.63%	0.65%

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. Poor PSR is reported on local/regional routes associated with Segments 7.02 and 7.04. 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	
7.02	1.95	ML174	0.00	0.60	1.30
7.02	1.47	ML901	0.00	8.63	1.78
7.04	0.78	ML1507	0.00	46.19	2.47

Bridge Variance Rating (L/R)

The bridge variance rating for local and regional routes on SSC 7 shows 1 structurally deficient bridge. The location of the bridges is shown in the table below.

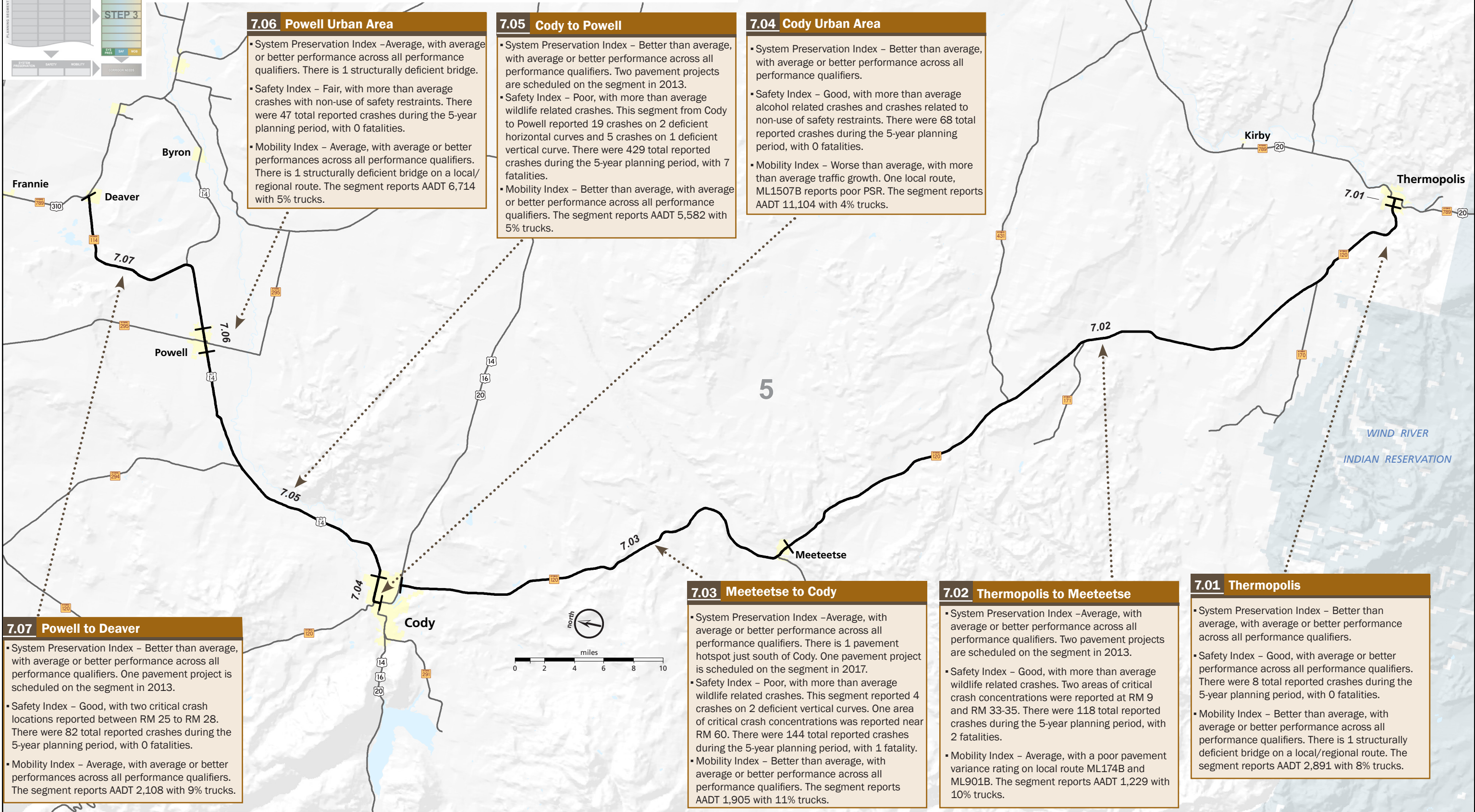
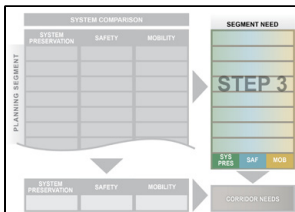
Table 11 - SSC 7 Structurally Deficient Bridges on Local/Regional Routes

Segment	ML Route	Route Marker
7.06	ML1505	12.55

NOTE: See Appendix for maps documenting each performance qualifier.



STEP 3: ANALYSIS OF PLANNING SEGMENT NEEDS



7.06 Powell Urban Area

- System Preservation Index – Average, with average or better performance across all performance qualifiers. There is 1 structurally deficient bridge.
- Safety Index – Fair, with more than average crashes with non-use of safety restraints. There were 47 total reported crashes during the 5-year planning period, with 0 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 6,714 with 5% trucks.

7.05 Cody to Powell

- System Preservation Index – Better than average, with average or better performance across all performance qualifiers. Two pavement projects are scheduled on the segment in 2013.
- Safety Index – Poor, with more than average wildlife related crashes. This segment from Cody to Powell reported 19 crashes on 2 deficient horizontal curves and 5 crashes on 1 deficient vertical curve. There were 429 total reported crashes during the 5-year planning period, with 7 fatalities.
- Mobility Index – Better than average, with average or better performance across all performance qualifiers. The segment reports AADT 5,582 with 5% trucks.

7.04 Cody Urban Area

- System Preservation Index – Better than average, with average or better performance across all performance qualifiers.
- Safety Index – Good, with more than average alcohol related crashes and crashes related to non-use of safety restraints. There were 68 total reported crashes during the 5-year planning period, with 0 fatalities.
- Mobility Index – Worse than average, with more than average traffic growth. One local route, ML1507B reports poor PSR. The segment reports AADT 11,104 with 4% trucks.

7.07 Powell to Deaver

- System Preservation Index – Better than average, with average or better performance across all performance qualifiers. One pavement project is scheduled on the segment in 2013.
- Safety Index – Good, with two critical crash locations reported between RM 25 to RM 28. There were 82 total reported crashes during the 5-year planning period, with 0 fatalities.
- Mobility Index – Average, with average or better performances across all performance qualifiers. The segment reports AADT 2,108 with 9% trucks.

7.03 Meeteetse to Cody

- System Preservation Index – Average, with average or better performance across all performance qualifiers. There is 1 pavement hotspot just south of Cody. One pavement project is scheduled on the segment in 2017.
- Safety Index – Poor, with more than average wildlife related crashes. This segment reported 4 crashes on 2 deficient vertical curves. One area of critical crash concentrations was reported near RM 60. There were 144 total reported crashes during the 5-year planning period, with 1 fatality.
- Mobility Index – Better than average, with average or better performance across all performance qualifiers. The segment reports AADT 1,905 with 11% trucks.

7.02 Thermopolis to Meeteetse

- System Preservation Index – Average, with average or better performance across all performance qualifiers. Two pavement projects are scheduled on the segment in 2013.
- Safety Index – Good, with more than average wildlife related crashes. Two areas of critical crash concentrations were reported at RM 9 and RM 33-35. There were 118 total reported crashes during the 5-year planning period, with 2 fatalities.
- Mobility Index – Average, with a poor pavement variance rating on local route ML174B and ML901B. The segment reports AADT 1,229 with 10% trucks.

7.01 Thermopolis

- System Preservation Index – Better than average, with average or better performance across all performance qualifiers.
- Safety Index – Good, with average or better performance across all performance qualifiers. There were 8 total reported crashes during the 5-year planning period, with 0 fatalities.
- Mobility Index – Better than average, with average or better performance across all performance qualifiers. There is 1 structurally deficient bridge on a local/regional route. The segment reports AADT 2,891 with 8% trucks.



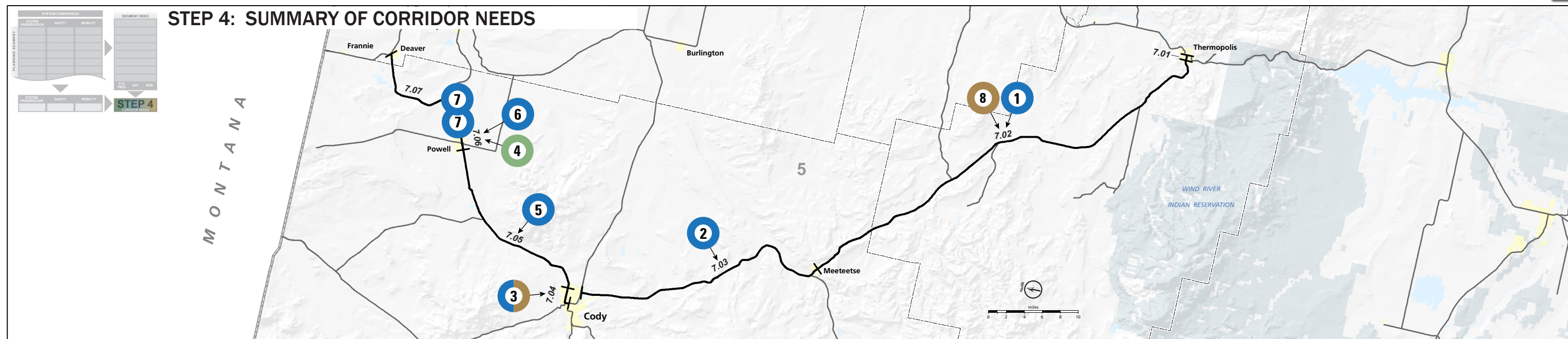
Environmental Overview

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.

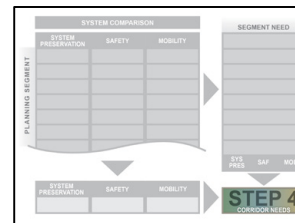
There are ten different terrestrial habitat types located throughout the seven special management areas within SSC 7. Five federally listed species within the corridor fall into one of three categories, candidate, endangered, and threatened. Three big game species and fourteen raptor species are found in SSC 7. There are five different categories that fall under the aquatic habitat. There are thirteen watersheds, three aquatic crucial priority areas, three aquatic enhancement priority areas, one combined crucial priority area, and one combined enhancement priority area. See Table 12 for general locations.

Table 12 - Environmental Considerations

Category	SOUTH (Thermopolis - Meeteetse)	CENTRAL (Meeteetse - Cody)	NORTH (Cody - Hwy 310)
Big Game Crucial Range	Mule Deer Pronghorn Antelope	Elk Mule Deer	Mule Deer
Big Game Migration Route	Pronghorn Antelope	Mule Deer Pronghorn Antelope	na
WGFD Aquatic Crucial Priority Areas SHP	Upper Bighorn River Yellowstone Cutthroat Trout Habitat"	Lower Shoshone River Yellowstone Cutthroat Trout Habitat	Lower Shoshone River
WGFD Terrestrial Crucial Priority Areas SHP	na	Sage Grouse Core Areas	na
WGFD Combined Crucial Priority Areas SHP	Riparian	Riparian	Riparian
Occurrence & Distribution (Federally Listed Species)	Black-footed Ferret Gray Wolf Greater Sage Grouse Grizzly Bear	Black-footed Ferret Greater Sage Grouse Whooping Crane	Greater Sage Grouse Whooping Crane



STEP 4: SUMMARY OF CORRIDOR NEEDS



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 7 needs occur in all categories: one pavement hotspot is documented just south of Cody. Within Safety, wildlife and alcohol related crashes as well as crashes related to the non-use of safety restraints are documented. Five areas of critical crash concentrations occur along the corridor. Within Mobility, traffic growth rates just north of Cody are reported as high and poor pavement variance rating on local routes is documented on segment 7.02.

Several big game crucial range and migration routes intersect parts of the corridor and should be investigated for concurrence with wildlife related crashes. The Upper Bighorn River and Lower Shoshone River are considered Aquatic Crucial Priority Areas for Yellowstone Cutthroat Trout by the Wyoming Game and Fish Department. Several 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. Traffic growth near the Cody urban area present challenges for traffic management and should be evaluated for future improvements. Local and specific ROW requirements based on urban area needs should be evaluated in the Urban Areas Corridor Plan in cooperation with local governments and planning organizations.

Overlapping Needs

Overlapping needs are identified on three segments:

- 1 7.02 - SAFETY: Wildlife Related Crashes, Crash Concentrations
- 2 7.03 - SAFETY: Wildlife Related Crashes, Pavement Hotspot, Crash Concentrations
- 3 7.04 - SAFETY/MOBILITY: Alcohol Related Crashes, Non-use of Safety Restraints, Crash Concentrations, Traffic Growth

Other Performance Index Needs

System Preservation

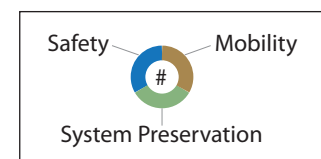
- 4 7.06 - Structurally Deficient Bridge

Safety

- 5 7.05 - Wildlife Related Crashes
- 6 7.06 - Non-Use of Safety Restraints
- 7 7.07 - Crash Concentrations

Mobility

- 8 7.02 - Pavement Variance Rating (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 & 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 & 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.

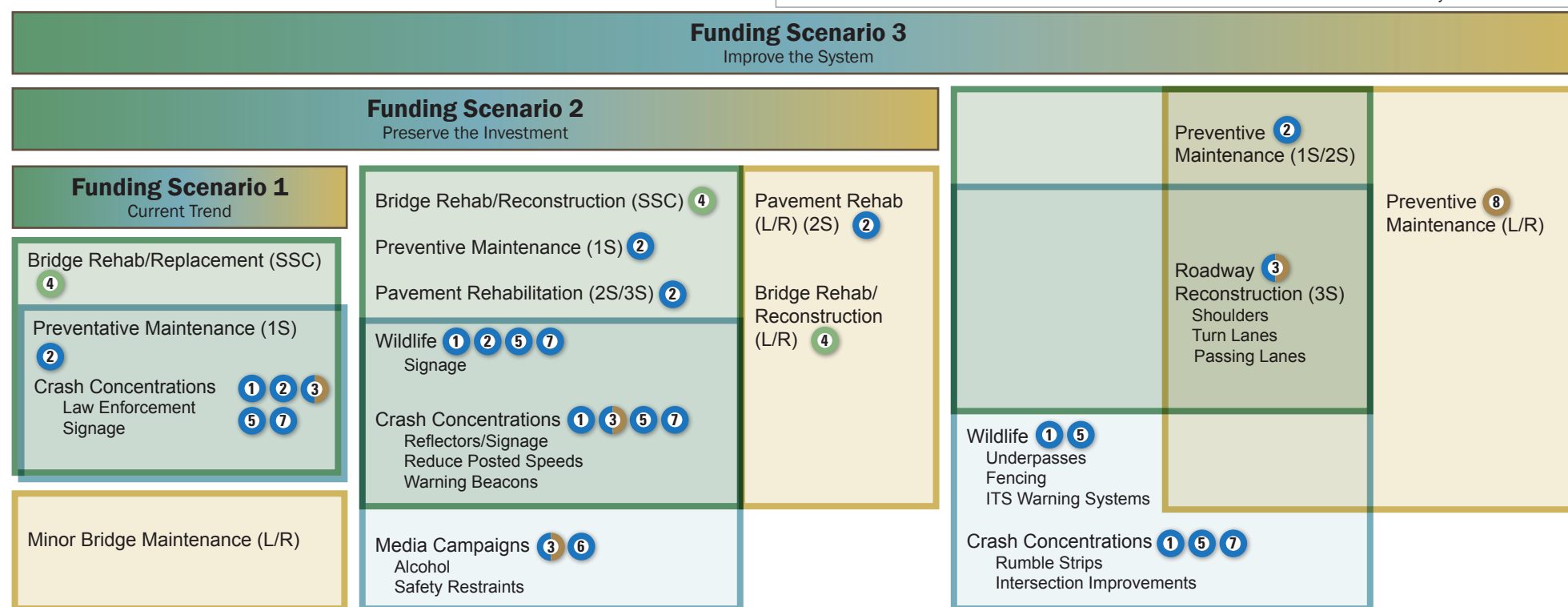
- Funding Scenario 1 – The continuation of program funding at current levels. Most funding is directed to System Preservation needs. System characteristics are expected to decline with inflation and increasing construction costs over time. Few major projects to address Safety, other than with specially 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, 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 and safety restraint law enforcement.

Table 14 - SSC 7 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 7 has one structurally deficient bridge on the main route. 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 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 north of Cody.
- Improvement of pavement condition of local and regional routes, to include preventive maintenance or mill and overlay.
- Minor maintenance on bridges on local and regional routes so as to maintain bridge condition and the Mobility Index.
- Minor projects to improve safety not involving major construction, such as rumble strips and lighted signage to address wildlife-related crashes, and safety restraint/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 addressing traffic growth.
- Turn lanes, passing lanes, and other auxiliary lanes to address traffic volumes and safety issues in north of Cody.

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.

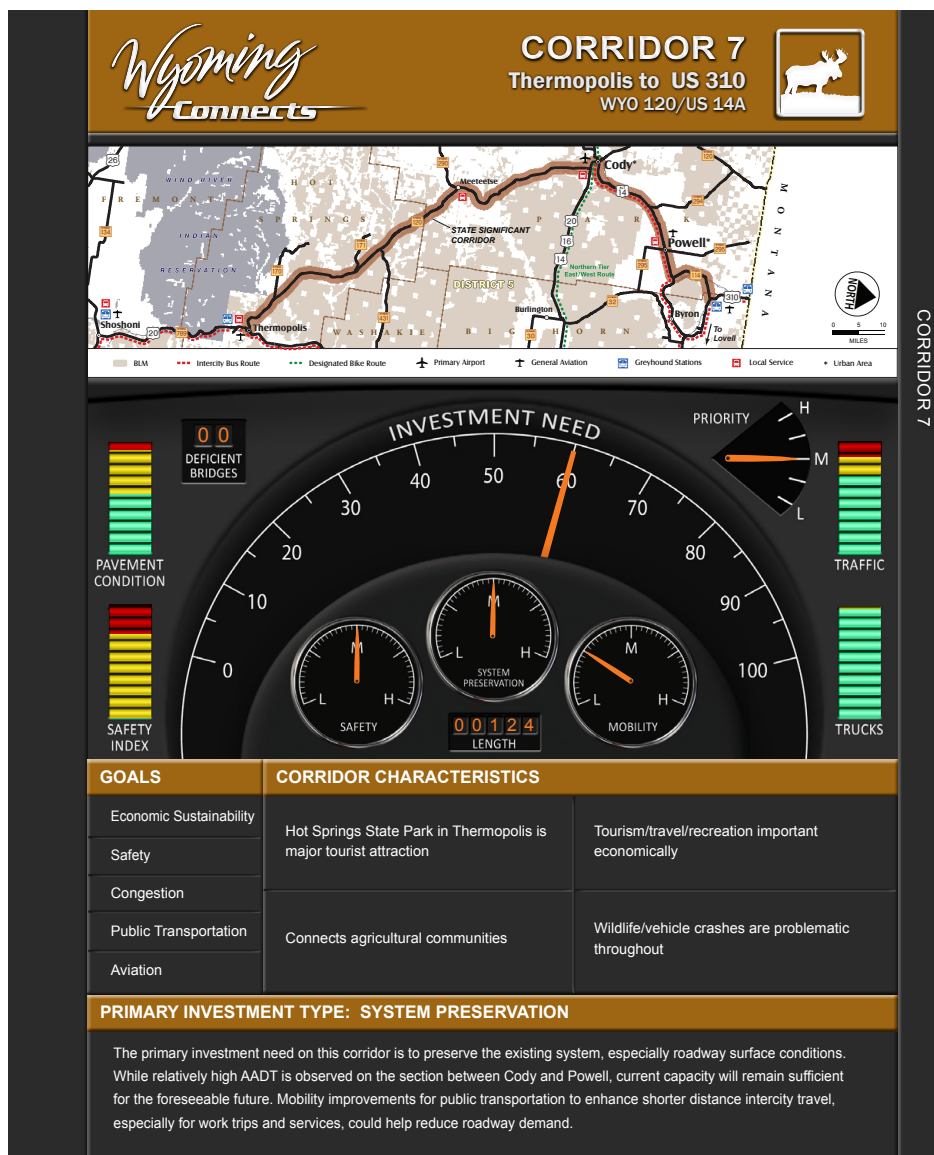


REALIZING THE CORRIDOR VISION

As part of the statewide Wyoming Connects and Long Range Transportation Plan, the Corridor Vision for SSC 7 - 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 Thermopolis to US 310 Corridor Vision captured Key Issues and Emerging Trends of critical importance and how SSC 7 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 System Preservation:



The primary investment need on this corridor is to preserve the existing system, especially roadway surface conditions. While relatively high AADT is observed on the section between Cody and Lovell, current capacity will remain sufficient for the foreseeable future. Mobility improvements for public transportation to enhance shorter distance intercity travel, especially for work trips and services, could help reduce roadway demand.

Additional goals which reflect the full context, character, and issues of SSC 7 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.

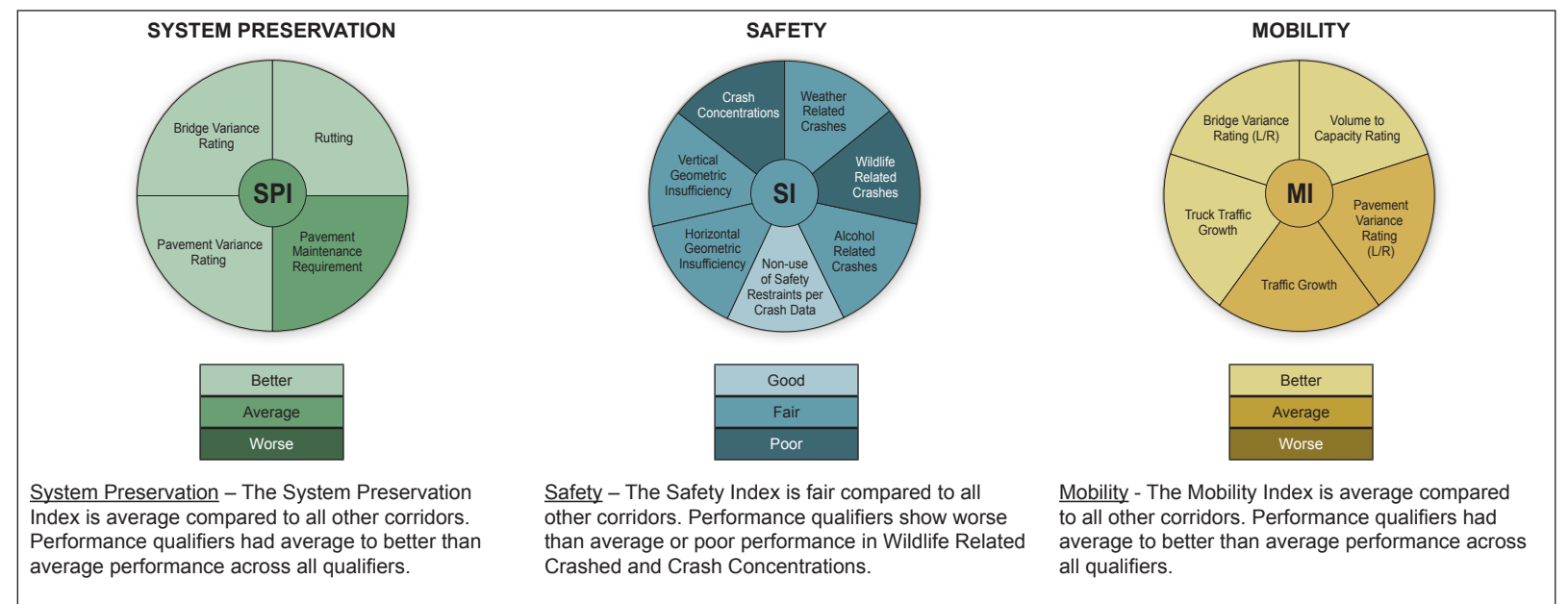
Table 15 - Review of Corridor Vision Goals and Other Considerations

Corridor Visions		High Priority	Other Considerations
Investment Category	Goal		
System Preservation	Support farm to market economic sustainability	✓	Corridor Plan supports the Vision by committing to System Preservation as an important goal.
Safety	Reduce fatalities, injuries, and property damage crash rate		The Safety Index and performance scores identify specific locations to address high crash rates.
Mobility	Reduce traffic congestion and improve traffic flow at selected locations		Traffic growth north of Cody is documented, along with safety issues, which may indicate the need for Mobility improvements over the long term.
	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.