

Wyoming Connects



Corridor 11 Plan

MUDDY GAP TO CASPER



MAY 2013

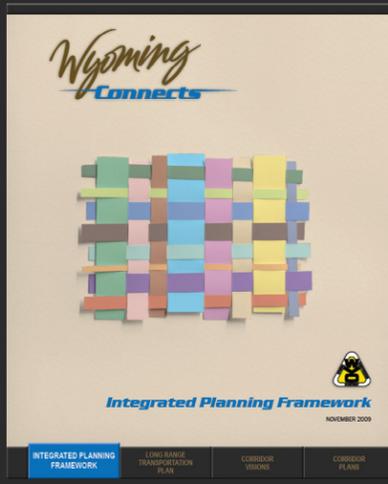
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FRAMEWORK

LONG RANGE
TRANSPORTATION
PLAN

CORRIDOR
VISIONS

CORRIDOR 11
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:

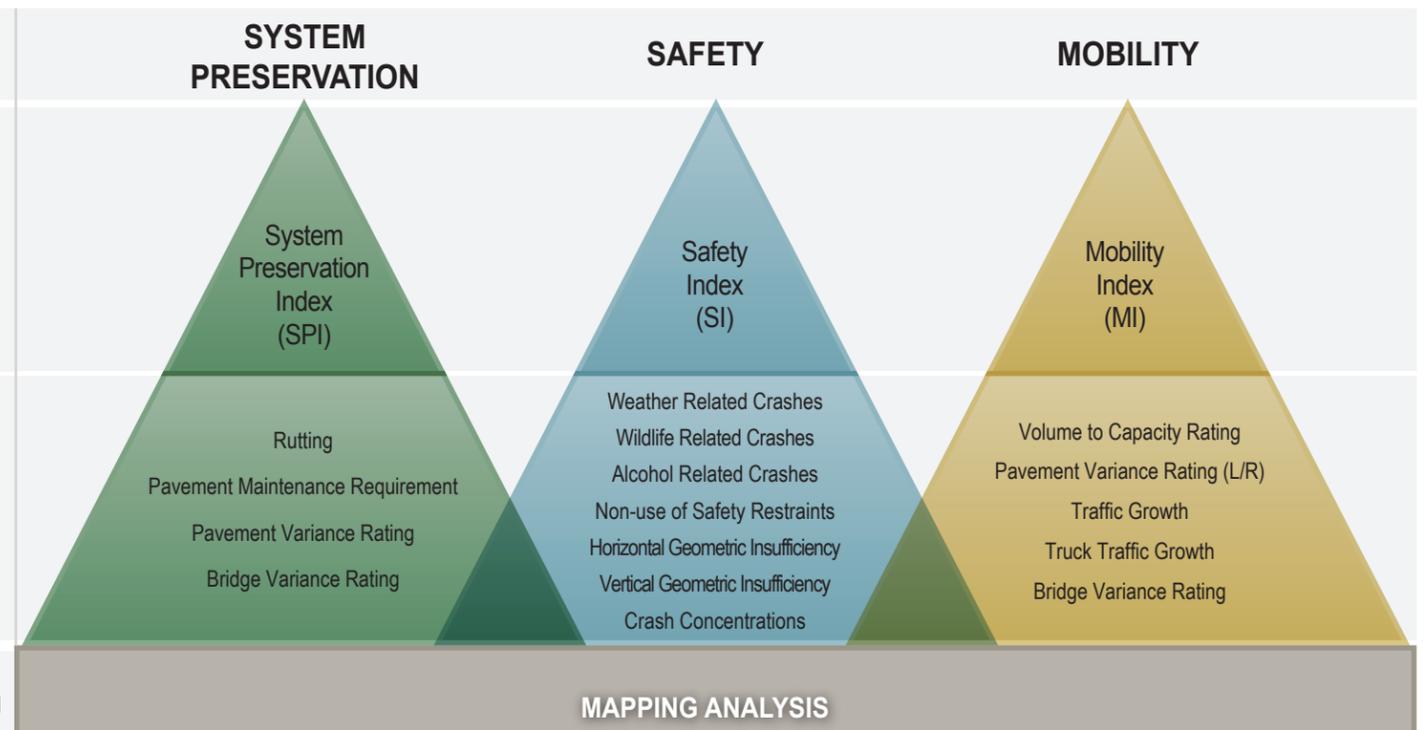
These are quantifiable and repeatable measurements that reflect the overall performance of the transportation corridor being analyzed. Targets for these indicators may be absolute and indicate a desired condition or comparative to current performance of the overall system to indicate relative priority.

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:

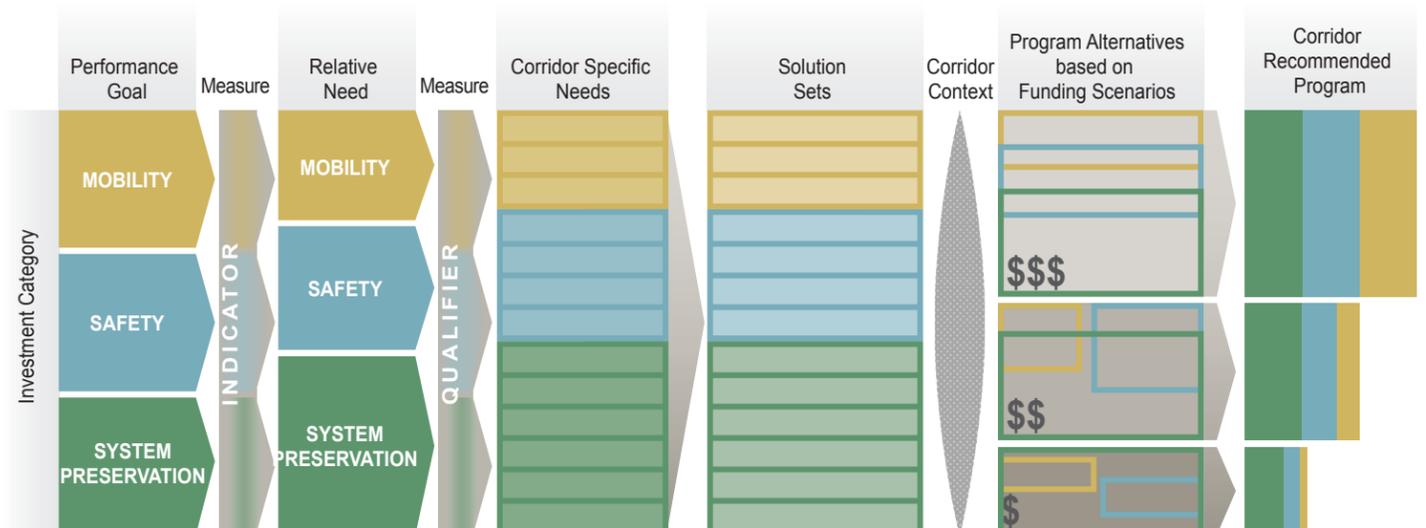
Mapping the deviated performance qualifiers against several factors to effectively prioritize, locate, and identify needs.



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 11 - MUDDY GAP TO CASPER - WYO 220 CORRIDOR PLAN

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I. STATE SIGNIFICANT CORRIDOR 11 - DESCRIPTION

CORRIDOR DESCRIPTION

State Significant Corridor (SSC) 11, from Muddy Gap to Casper, is 73 miles long, begins in Carbon County and continues through Natrona County to Casper. It is entirely within WYDOT District 2. SSC 11 follows WYO 220 through the town of Alcova before entering Casper. The Corridor is used for recreational access to Alcova and Pathfinder Reservoirs, camping and fishing sites, and the Pathfinder Bird Refuge. The route carries significant truck traffic between I-80 and Casper.

The topography is plains or rolling terrain and travels through mostly Bureau of Land Management and ranch lands. SSC 11 lies along the historic Oregon Trail, passing the landmarks Devil's Gate and Independence Rock. The Pathfinder Bird Refuge and Reservoir is just east of the SSC 11. The Corridor parallels the North Platte River from just north Alcova to Casper.

Casper, the only urban area along SSC 11, is the second largest city in Wyoming, and has a federally designated Metropolitan Planning Organization. Casper is nicknamed "The Oil City" and has a long history of oil boomtown and cowboy culture, dating back to development of the nearby Teapot Dome. Casper is a regional center of banking and commerce. Development of Wyoming coal and uranium fields in recent decades has helped Casper continue its role as a center in the energy industry. Casper College offers bachelor's degrees from the University of Wyoming.

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 11 has been divided into 4 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.



Independence Rock

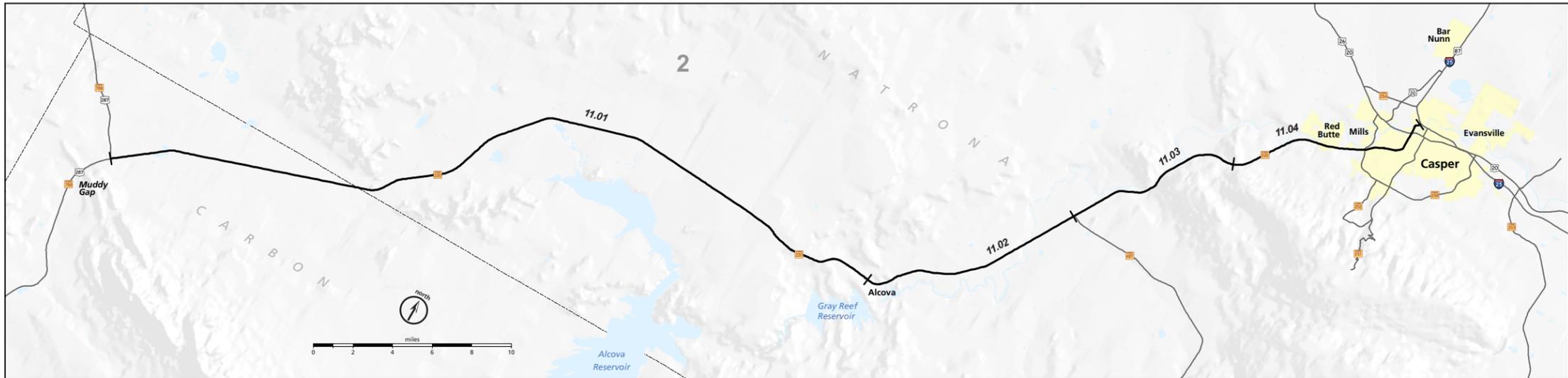
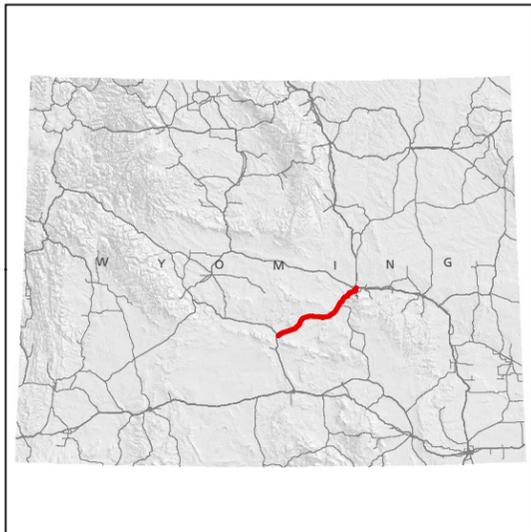


Table 1 - Segments for State Significant Corridor 11

| | | ML Route | Begin | End | Length | Description |
|-------------|---------------|----------|--------|--------|--------|---|
| Corridor 11 | Segment 11.01 | 21 | 44.31 | 86.00 | 41.69 | Muddy Gap to Alcovia Jct. Features: 2-lane cross section with occasional passing and turn lanes; segment begins at intersection with SSC 5 (US 287); road close gate; unnamed draw, Rush Creek, Sweetwater River, Dry Creek, Horse Creek, Casper Canal; Independence Rock Rest Area; Alcovia and Pathfinder Reservoirs; Pathfinder National Wildlife Refuge; wildlife crossings; BLM range and ranch lands; oil, energy development; flat to rolling terrain. |
| | Segment 11.02 | 21 | 86.00 | 97.30 | 11.30 | Alcovia Jct. to WYO 487. Features: 2-lane cross section with several passing and turn lanes; intersects Regional Route WYO 487; road close gate (2); Eagle Creek, N. Platte River, Bates Creek; wildlife crossings; farming; BLM range and ranch lands; oil, energy development; flat terrain. |
| | Segment 11.03 | 21 | 97.30 | 106.39 | 9.09 | WYO 487 to Casper. Features: 2-lane cross section with several passing and turn lanes; intersects Regional Route WYO 487; unnamed draw, Cottonwood Creek; wildlife crossings; farming; BLM range and ranch lands; oil, energy development; flat terrain. |
| | Segment 11.04 | 21 | 106.39 | 117.21 | 10.82 | Casper Metropolitan Planning Area (pop. 55,316). Features: Multi-lane urban section with curb, gutter, sidewalks, traffic signals, pedestrian crossings; intersects SSC 10 (US 20/26), Local Route WYO 258, ends at SSC 12 (I-25); changeable message sign; road close gate; BNSF Railway grade separation; N. Platte River; Natrona County International Airport; intercity bus route with bus station; local public fixed route bus service; fully developed urban corridor; energy development center; urban terrain. |

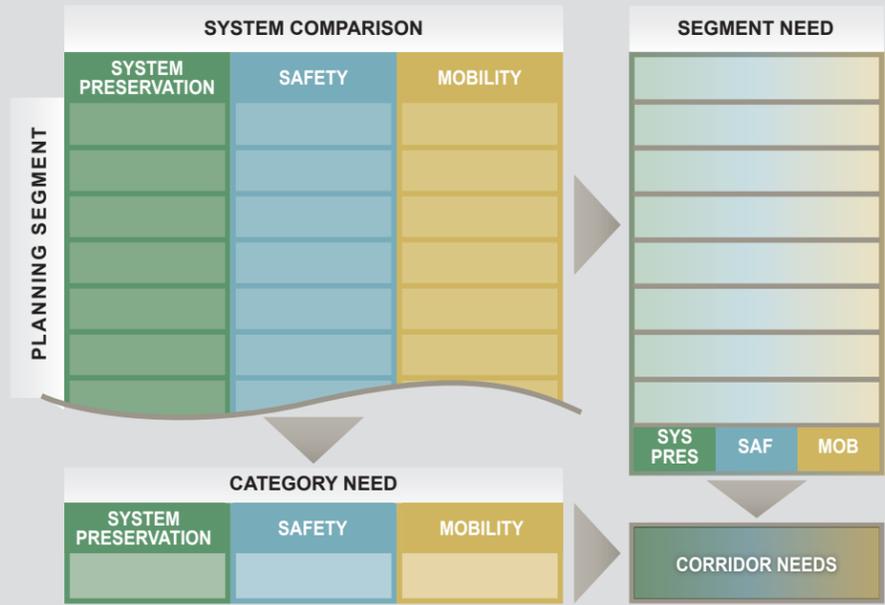
Source: URS Windshield Survey June 2012; Maintenance Section Reference Book 2012; Wyoming Connects: LRTP and Corridor Visions. Note: Descriptions of beginning and endpoints are approximate.



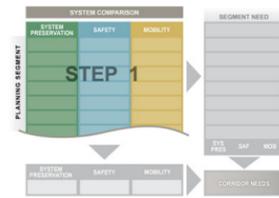
II. EVALUATION OF CORRIDOR PERFORMANCE

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.

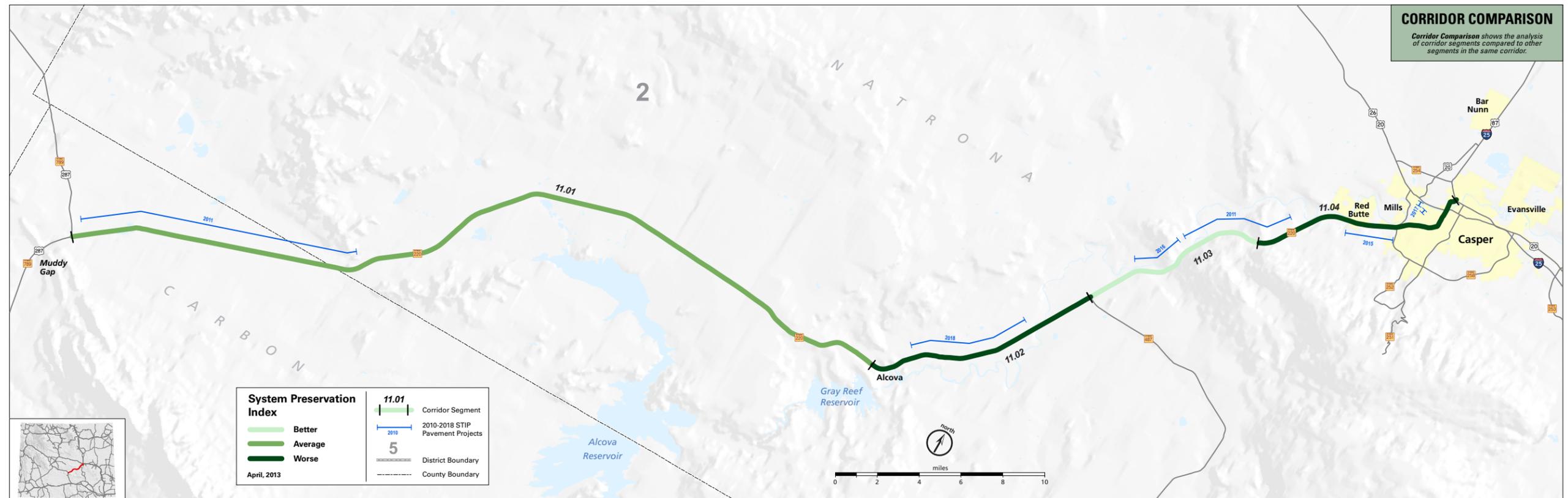
Table 2 - Indicator and Qualifier Performance of SSC 11

| 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) |
| 11.01 | Average | Good | More | Good | Average | Fair | Average | Average | Average | Average | Less | Less | Poor | Better | Good | Fair | Average | Average | Less |
| 11.02 | Average | Fair | More | Fair | Less | Poor | Average | Average | Average | Average | Less | Less | Fair | Better | Good | Fair | Average | Average | Less |
| 11.03 | Better | Good | Average | Good | Less | Poor | Average | Average | More | Average | Average | Average | Good | Average | Good | Fair | Less | Average | Less |
| 11.04 | Worse | Poor | Average | Poor | Less | Poor | Average | Less | Average | More | Less | Average | Poor | Average | Good | Fair | Average | Average | Less |

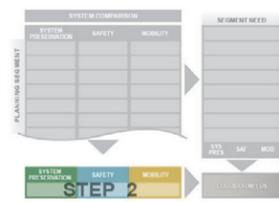


CORRIDOR 11

SYSTEM PRESERVATION - INDEX



STEP 2: ANALYSIS OF INVESTMENT CATEGORY NEEDS - SYSTEM PRESERVATION



Performance Index

The System Preservation Index is average or better, with the exception of segment 11.04, which is worse than average.

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

- The Pavement Rutting score on segment 11.04 is poor.
- The Pavement Maintenance Requirement on segments 11.01 and 11.02 is more than average.
- The Pavement Variance Rating on segment 11.04 is poor.

Refer to the sections below for more information.

| Segment | SYSTEM PRESERVATION | | | | |
|---------|---------------------------|---------|-----------------------------|--------------------------|------------------------|
| | System Preservation Index | Rutting | Pavement Maint. Requirement | Pavement Variance Rating | Bridge Variance Rating |
| 11.01 | Average | Good | More | Good | Average |
| 11.02 | Average | Fair | More | Fair | Less |
| 11.03 | Better | Good | Average | Good | Less |
| 11.04 | Worse | Poor | Average | Poor | Less |

Performance Qualifiers

Rutting

There are five locations where rutting falls within the poor category along ML 21 in segment 11.04: 4 miles between route marker (RM) 108 and 113, 0.37 miles between RM 115.37 and 115.74, and the worst rutting of 1 mile between RM 116 and 117.

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.

There are no segments identified as having a 1S need within Corridor 11.

Approximately 23% of Corridor 11 has been identified as having a 2S need. This represents 17 miles of pavement. Segments 11.02, 11.03, and 11.04 have 2S treatment recommended by the Pavement Management System. Based upon current available funding, only three projects, representing 9 miles of pavement, have been selected to be completed within the next several years.

Approximately 77% has been identified as having a 3S need. This represents 56 miles of pavement. Segments 11.01, 11.02, 11.03, and 11.04 have 3S treatment recommended by the Pavement Management System. Based upon current available funding only one project, representing less than a mile of pavement, has been selected to be completed within the next several years.

Based upon current available funding within the STIP, Corridor 11 has identified one 4S project, representing three miles of pavement.

Pavement Variance Rating

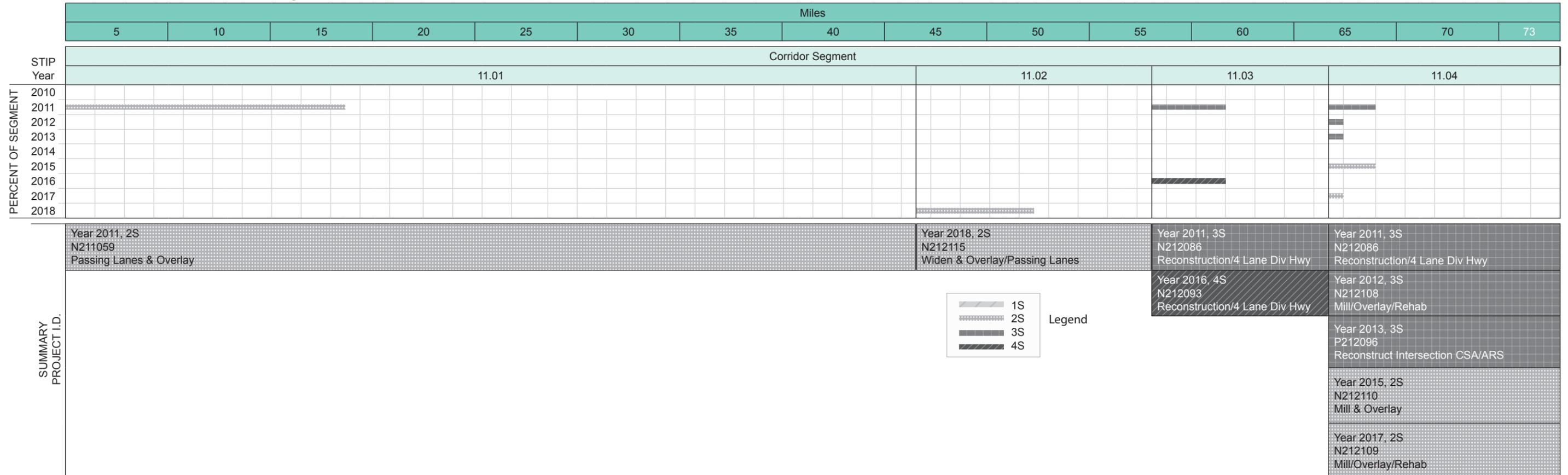
The Pavement Variance Rating is fair or better for the entire corridor with the exception of a poor rating on Segment 11.04 (Casper). Pavement hotspots, identified by length and severity, occur in nine locations near Casper, segment 11.04 (most, moderately, least severe), and one other location (least 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 two structurally deficient bridges along SSC 11, both with bridge decks under 15,000 ft² and the lowest WYDOT severity rating. The structurally deficient bridges are in Segment 11.01, resulting in a Bridge Variance Rating of average when compared to the system average.

NOTE: See Appendix for maps documenting each performance qualifier.

Table 3 - SSC 11 STIP by Year and Corridor Segment

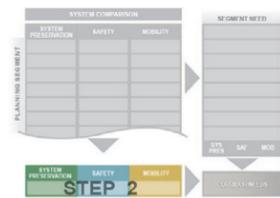




CORRIDOR 11

SAFETY - INDEX





Performance Index

The Safety Performance Index is poor across all segments in the corridor.

Performance qualifiers with poor performance include:

- Alcohol Related Crashes are more than the average on segment 11.03.
- Non-Use of Safety Restraints is more than the average on segment 11.04.
- Crash Concentrations are rated poor on segments 11.01 and 11.04.

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 |
| 11.01 | Fair | Average | Average | Average | Average | Less | Less | Poor |
| 11.02 | Poor | Average | Average | Average | Average | Less | Less | Fair |
| 11.03 | Poor | Average | Average | More | Average | Average | Average | Good |
| 11.04 | Poor | Average | Less | Average | More | Less | Average | Poor |

Performance Qualifiers

Weather Related Crashes

Within SSC 11, the ratio of weather related crashes to total crashes was below the system average. The highest percentage of weather related crashes occurred in Segments 11.01 and 11.02, at approximately 24% each, and the adverse conditions primarily involved snow, blowing snow, and severe wind.

Wildlife Related Crashes

Corridor 11 has a higher rate of accidents in its southwest segments. The likelihood of wildlife related accidents decreases as a vehicle travels to the northeast. Segments 11.01 and 11.02 received a wildlife related accident rating of 40% and 37% respectively. Segments 11.03 and 11.04 received a 27% and 5% respectively.

Segment 11.01 is a rural segment between Muddy Gap and Alcova. Along this 42-mile segment, deer and antelope crashes were found. Thirty-eight of the 55 animal crashes were with a deer. These crashes occurred mostly during darkness. The crashes were mostly sporadic within the segment; however, there was a slightly higher concentration near RM 55. These crashes do not correlate with migration routes documented by the Wyoming Game and Fish Department.

Alcohol Related Crashes

The percent of alcohol related crashes is at or above the system average. Meaning that the number of crashes which occurred which included alcohol compared to the total number of crashes within the corridor was at or greater than the system

average. Segment 11.03 had the highest percent of alcohol related crashes. In Segment 11.04, an 11-mile urban section, 52 of 62 alcohol related crashes occurred in the 5-mile section from RM 113 through 117.

Non-use of Safety Restraint

The ratio of crashes in which a restraint device was not worn to total crashes is at or above the system average. Segment 11.04 had the highest percentage (89.73%) of crashes in which seat belts were not worn.

Horizontal Geometry Insufficiency

Corridor 11 has one horizontal alignment found to be insufficient based on the associated posted speed and an assumed emax of 8%. The horizontal alignment insufficiency was calculated along ML 21 at RM 101.6. Only one crash was recorded at this location. The data is not clear if the crash was directly related to the geometry. Because of the low number of crashes, it is suggested funding be spent in other locations where there are more crashes that can be attributed to poor roadway geometry.

Table 4 - Horizontal Geometry Insufficiency

| Segment | ML Route | Route Marker | # of Crashes |
|---------|----------|--------------|--------------|
| N/A | | | |

Vertical Geometry Insufficiency

Corridor 11 has 5 vertical alignments that were found to be insufficient based on the associated posted speed and the length of the curve for stopping sight distance.

All of the vertical insufficiencies within Corridor 11 had zero to one crash reported. Because of the low number of crashes, it is suggested funding be spent in other locations where there are more crashes that can be attributed to poor roadway geometry.

Table 5 - Vertical Geometry Insufficiency

| Segment | ML Route | Route Marker | Curve Type | # of Crashes |
|---------|----------|--------------|------------|--------------|
| N/A | | | | |

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 11, which are listed in Table 6. Additionally, there is one Other type concentration. Segments 11.01 and 11.04 exhibit the most crash concentrations with 4 Critical concentrations, which occur between RM 80 and 80.5, RM 83 and 83.3, RM 110.5 and 110.6, and RM 110.8 and 111.

Table 6 - Critical Crash Concentrations

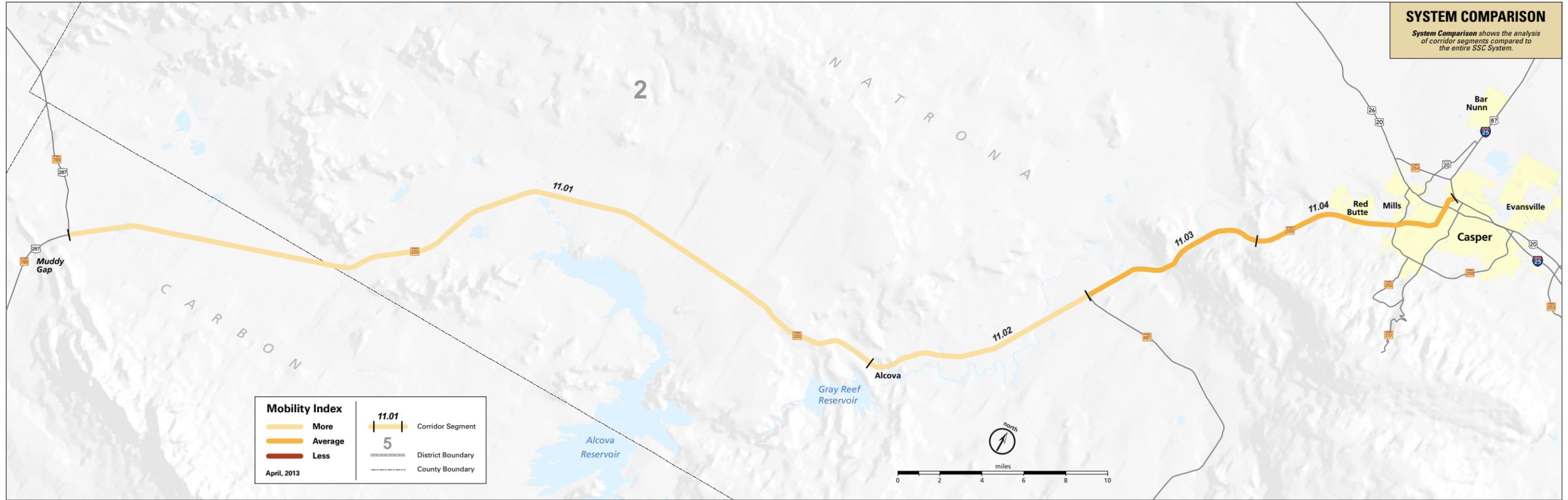
| Segment | ML Route | Route Marker | |
|---------|----------|--------------|-------|
| | | From | To |
| 11.01 | ML21 | 80 | 80.5 |
| 11.01 | ML21 | 83 | 83.3 |
| 11.02 | ML21 | 87 | 87.2 |
| 11.04 | ML21 | 110.5 | 110.6 |
| 11.04 | ML21 | 110.8 | 111 |

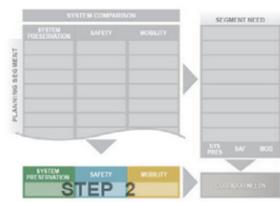
NOTE: See Appendix for maps documenting each performance qualifier.



CORRIDOR 11

MOBILITY - INDEX





Performance Index

The Mobility Performance Index for SSC 11 is average or better than average.

| MOBILITY | | | | | | |
|----------|----------------|---------------------------|--------------------------------|----------------|----------------------|-----------------------|
| Segment | Mobility Index | Volume to Capacity Rating | Pavement Variance Rating (L/R) | Traffic Growth | Truck Traffic Growth | Bridge Variance (L/R) |
| 11.01 | Better | Good | Fair | Average | Average | Less |
| 11.02 | Better | Good | Fair | Average | Average | Less |
| 11.03 | Average | Good | Fair | Less | Average | Less |
| 11.04 | Average | Good | Fair | Average | Average | Less |

One regional route connects to SSC 11. The condition of connecting local and regional routes is associated with a planning segment and directly influences the mobility of that segment. The condition of some connecting local and regional routes is poor. There are currently no structurally deficient bridges on the local and regional routes.

SSC 11 serves as a truck route between Casper and Rawlins and is used for recreational access to the Alcova Reservoir, camping and fishing sites. SSC 11 is also used as an alternative route during road closure of SSC 1. This route is subject to generally low to moderate volumes of traffic with an increase in traffic as it approaches Casper. Shoulder widths vary from 4' to 8' with some rumble strips noted.

Table 7 - Major Traffic Generators

| Major Traffic Generators |
|---|
| Pathfinder, Seminoe, & Alcova Reservoirs |
| Oil/gas production and transport |
| Employment center - Casper |
| Dispersed local/regional recreation on public lands and N. Platte River |
| Truck route Rawlins to Casper |

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 11 is good.

Traffic Growth

The average traffic growth within the SSC System is 1.42%. All segments in Corridor 11 are less than this average. Segment 11.01 has the highest average annual traffic growth rate. This segment connects Muddy Gap to Alcova on ML21.

Table 8 - Traffic Growth

| Segment | AADT 2010 | Average 20 Year Growth |
|---------|-----------|------------------------|
| 11.01 | 1,966 | 1.28% |
| 11.02 | 3,005 | 1.25% |
| 11.03 | 3,592 | 0.94% |
| 11.04 | 12,990 | 1.12% |

Truck Traffic Growth

The average truck traffic growth within the SSC System is 1.34%. All segments of SSC 11 are above this average. The majority of the corridor is a 2-lane rural roadway classification. Segment 11.01 has the highest average annual truck growth rate. This segment is from Muddy Gap to Alcova via ML21.

Table 9 - Truck Traffic Growth

| Segment | AADTT 2010 | % Trucks 2010 | Truck Traffic Growth |
|---------|------------|---------------|----------------------|
| 11.01 | 1,966 | 29.97% | 1.94% |
| 11.02 | 3,005 | 24.69% | 1.88% |
| 11.03 | 3,592 | 23.98% | 1.63% |
| 11.04 | 12,990 | 12.12% | 1.54% |

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 segment 11.04. 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 | |
| 11.04 | 0.99 | ML1302 | 0.00 | 4.37 | 2.26 |

Bridge Variance Rating (L/R)

The bridge variance rating for local and regional routes on SSC 11 shows no structurally deficient bridges.

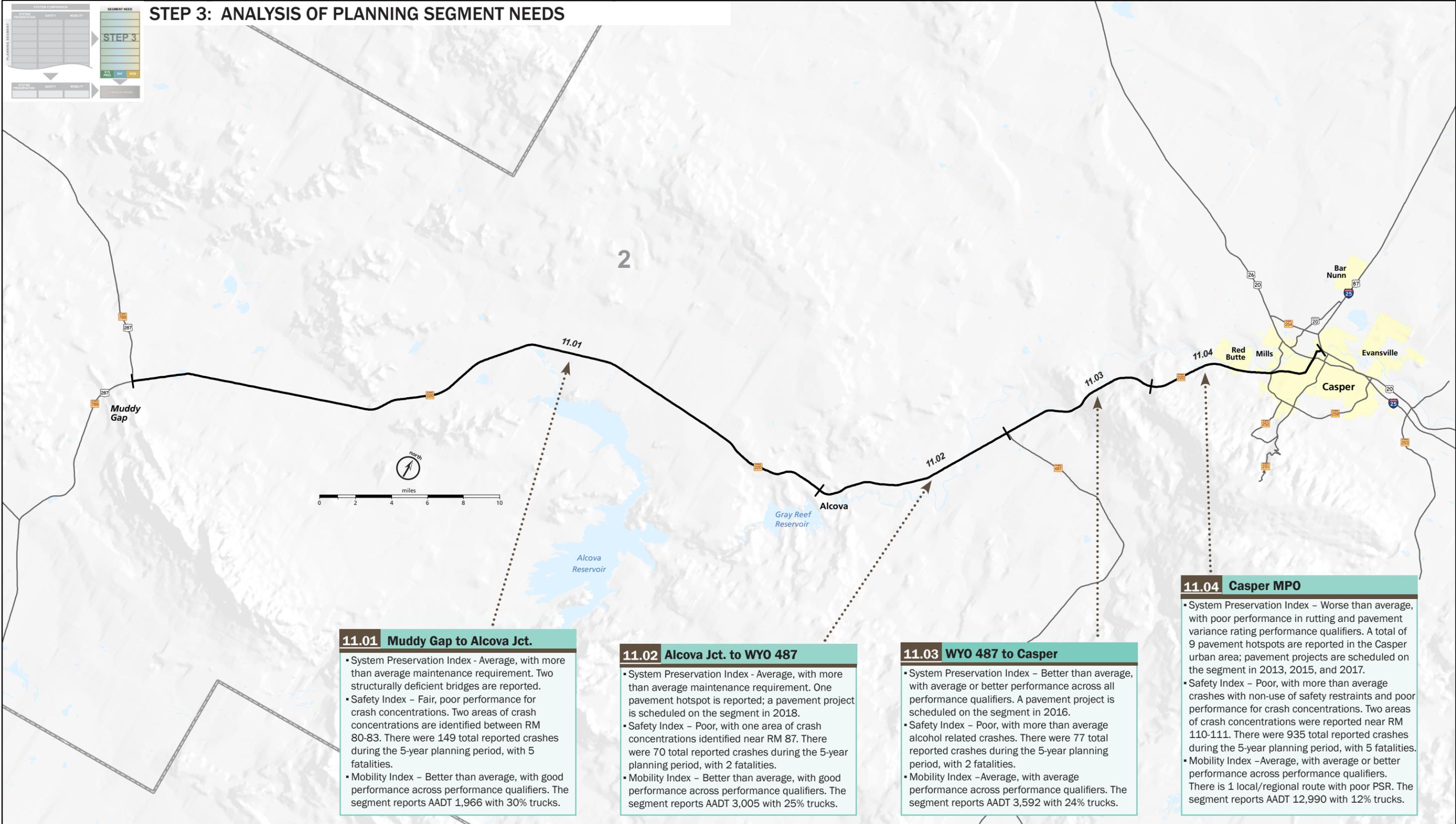
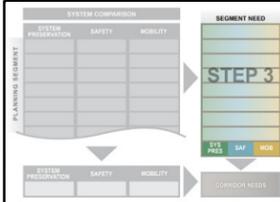
Table 11 - SSC 11 Structurally Deficient Bridges on Local/Regional Roads

| Segment | ML Route | Route Marker |
|----------------------|----------|--------------|
| No deficient bridges | | |

NOTE: See Appendix for maps documenting each performance qualifier.



STEP 3: ANALYSIS OF PLANNING SEGMENT NEEDS



11.01 Muddy Gap to Alcova Jct.

- System Preservation Index - Average, with more than average maintenance requirement. Two structurally deficient bridges are reported.
- Safety Index - Fair, poor performance for crash concentrations. Two areas of crash concentrations are identified between RM 80-83. There were 149 total reported crashes during the 5-year planning period, with 5 fatalities.
- Mobility Index - Better than average, with good performance across performance qualifiers. The segment reports AADT 1,966 with 30% trucks.

11.02 Alcova Jct. to WYO 487

- System Preservation Index - Average, with more than average maintenance requirement. One pavement hotspot is reported; a pavement project is scheduled on the segment in 2018.
- Safety Index - Poor, with one area of crash concentrations identified near RM 87. There were 70 total reported crashes during the 5-year planning period, with 2 fatalities.
- Mobility Index - Better than average, with good performance across performance qualifiers. The segment reports AADT 3,005 with 25% trucks.

11.03 WYO 487 to Casper

- System Preservation Index - Better than average, with average or better performance across all performance qualifiers. A pavement project is scheduled on the segment in 2016.
- Safety Index - Poor, with more than average alcohol related crashes. There were 77 total reported crashes during the 5-year planning period, with 2 fatalities.
- Mobility Index - Average, with average performance across performance qualifiers. The segment reports AADT 3,592 with 24% trucks.

11.04 Casper MPO

- System Preservation Index - Worse than average, with poor performance in rutting and pavement variance rating performance qualifiers. A total of 9 pavement hotspots are reported in the Casper urban area; pavement projects are scheduled on the segment in 2013, 2015, and 2017.
- Safety Index - Poor, with more than average crashes with non-use of safety restraints and poor performance for crash concentrations. Two areas of crash concentrations were reported near RM 110-111. There were 935 total reported crashes during the 5-year planning period, with 5 fatalities.
- Mobility Index - Average, with average or better performance across performance qualifiers. There is 1 local/regional route with poor PSR. The segment reports AADT 12,990 with 12% trucks.



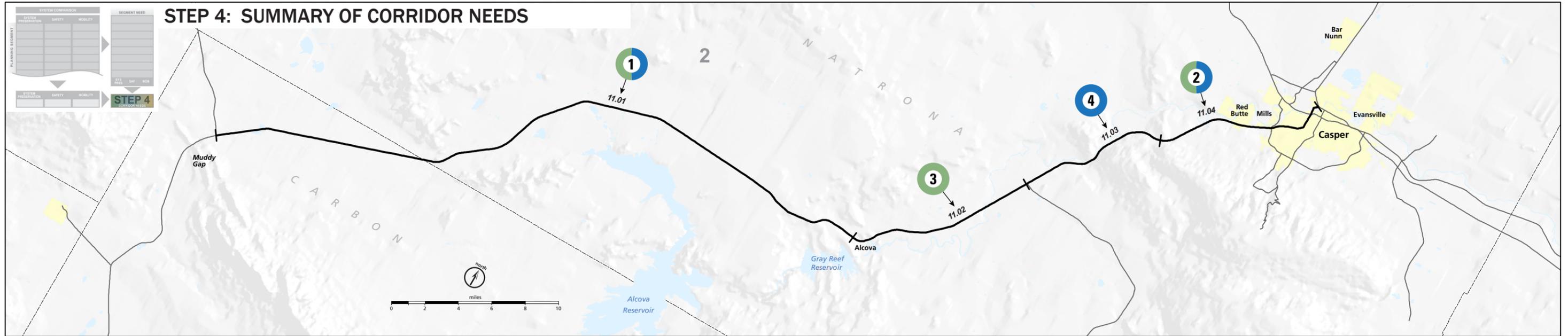
Environmental Overview

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.

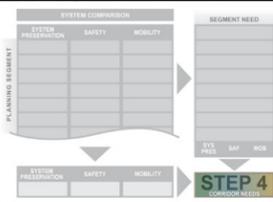
There are eight different terrestrial habitat types located throughout the twelve special management areas within SSC 11. Eight federally listed species within the corridor fall into one of three categories, candidate, endangered, and threatened. Two big game species and fifteen raptor species are found in SSC 11. There are five different categories that fall under the aquatic habitat. There are thirty-three watersheds, three aquatic crucial priority areas, four 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 | WEST (Muddy Gap - Alcova) | CENTRAL (Alcova - State Hwy 487) | EAST (State Hwy 487 - Casper) |
|--|--|--|--|
| Big Game Crucial Range | Mule Deer Pronghorn Antelope | Pronghorn Antelope | Mule Deer |
| Big Game Migration Route | na | na | na |
| WGFD Aquatic Crucial Priority Areas SHP | North Platte Corridor | North Platte Corridor | North Platte Corridor |
| WGFD Terrestrial Crucial Priority Areas SHP | Dry Creek-Rattlesnake Hills Lower Sweetwater River Watershed | Bates Hole | Bates Hole |
| WGFD Combined Crucial Priority Areas SHP | na | na | na |
| Occurrence & Distribution (Federally Listed Species) | Black-footed Ferret Greater Sage Grouse | Black-footed Ferret Greater Sage Grouse | Black-footed Ferret Greater Sage Grouse Yellow-billed Cuckoo |



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 11 needs are concentrated in the System Preservation and Safety categories. Within System Preservation, pavement needs are noted on three of four segments, with a concentrated series of pavement hotspots in the Casper urban area. In addition, and three structurally deficient bridges are reported on the corridor, but are minor in size. Within Safety, alcohol related and non-use of safety restraint related crashes are reported as more than average. A total of four crash concentrations occur, with two on the southern end and two in the Casper area. High traffic and truck volumes in Casper may be related to both the pavement issues and frequency of crashes.

Several environmental issues should be considered in all project planning. Crucial range for Pronghorn Antelope and Mule Deer is present through most of the corridor. The entire North Platte River Corridor is also noted by the Wyoming Game and Fish Department as an Aquatic Crucial Priority Area. Three federally listed endangered species are found in the corridor.

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 needed improvements. Local and specific ROW requirements based on urban on needs in urban areas should be evaluated in the Urban Areas Corridor Plan in cooperation with local governments and planning organizations. Frequent driveway accesses and lack of access controls on unreconstructed parts of WYO 220 present challenges for traffic management. ROW in the Casper area should be evaluated for future improvements.

Overlapping Needs

Overlapping needs are identified on two segments:

- 1 11.01 - SYSTEM PRESERVATION/SAFETY: Pavement Maintenance Requirement, Crash Concentrations
- 2 11.04 - SYSTEM PRESERVATION/SAFETY: Rutting, Pavement Variance Requirement, Number of Crashes with Non-use of Safety Restraints, Crash Concentrations

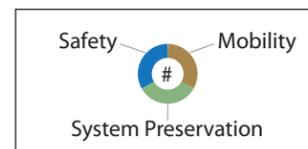
Other Performance Index Needs

System Preservation

- 3 11.02 - Pavement Maintenance Requirement

Safety

- 4 11.03 - Alcohol Related Crashes



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, an intersection improvement 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.

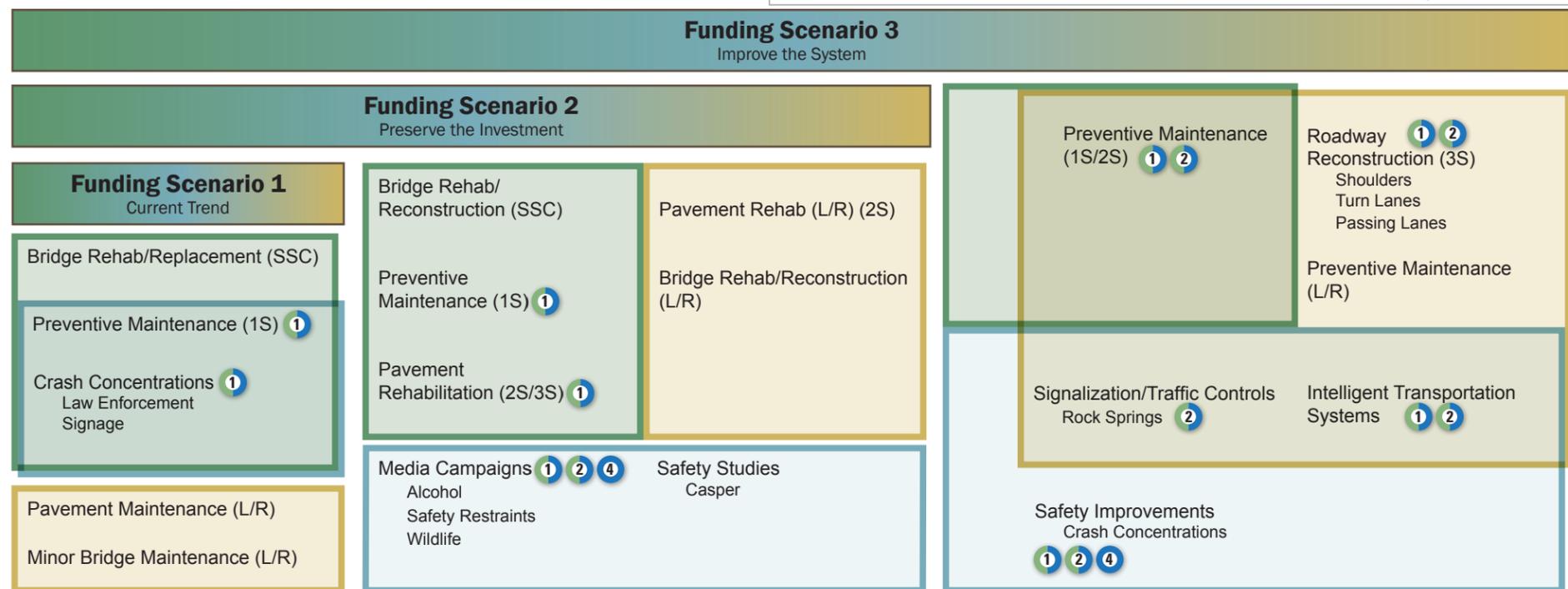
Funding Scenario 1

Funding Scenario 1, defined as the continuation of current program funding, is focused primarily on addressing System Preservation needs through preventive maintenance efforts. For this corridor, the plan recommends that these funds remain allocated to preventive maintenance, along with reserving a portion to address identified safety needs. Safety needs other than several areas of crash concentrations have not been specifically identified by type, except for segment 11.03 where alcohol is a significant factor. Many crashes are made more serious by the failure to use safety restraints. A very large number of crashes on segment 11.04 in Casper are reported, along with several fatalities, which are concurrent with high traffic volumes.

System Preservation and Safety needs may be only partially met under current funding. Improvements 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.
- Minor surface treatments on local and regional routes to extend service life.
- Bridge rehabilitation and replacement of structurally deficient bridges on the SSC mainline.
- Minor projects to improve safety not involving major construction, such as signage, right-of-way work, and law enforcement.

Table 14 - SSC 11 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 11 has significant pavement needs in the Casper area. Any additional bridge deficiencies not met in Funding Scenario 1 should be addressed. This scenario would allow investments to fully achieve WYDOT goals in the System Preservation investment category.

- Preventive maintenance could be deferred and/or advanced, depending on life cycle, as recommended by the Pavement Management System.
- Improvement of pavement condition of Local and Regional Routes, to include preventive maintenance or mill and overlay.
- Bridge rehabilitation on structurally deficient bridges on local and regional routes.
- Minor projects to improve safety not involving major construction, such as rumble strips, lighted signage, fencing, and media campaigns.
- Traffic operations improvements in the Casper area to address crash concentrations.

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, particularly on segments with higher traffic volumes (Casper) and for truck traffic (Muddy Gap).

- Roadway widening (3S), including shoulders, to better address truck traffic.
- Turn lanes, passing lanes, and other auxiliary lanes to address spot congestion and safety issues.
- Roadway reconstruction (3S) to address deficiencies in Casper.
- Intersection and signalization improvements in Casper.
- Intelligent Transportation Systems (ITS) to address truck traffic.

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.

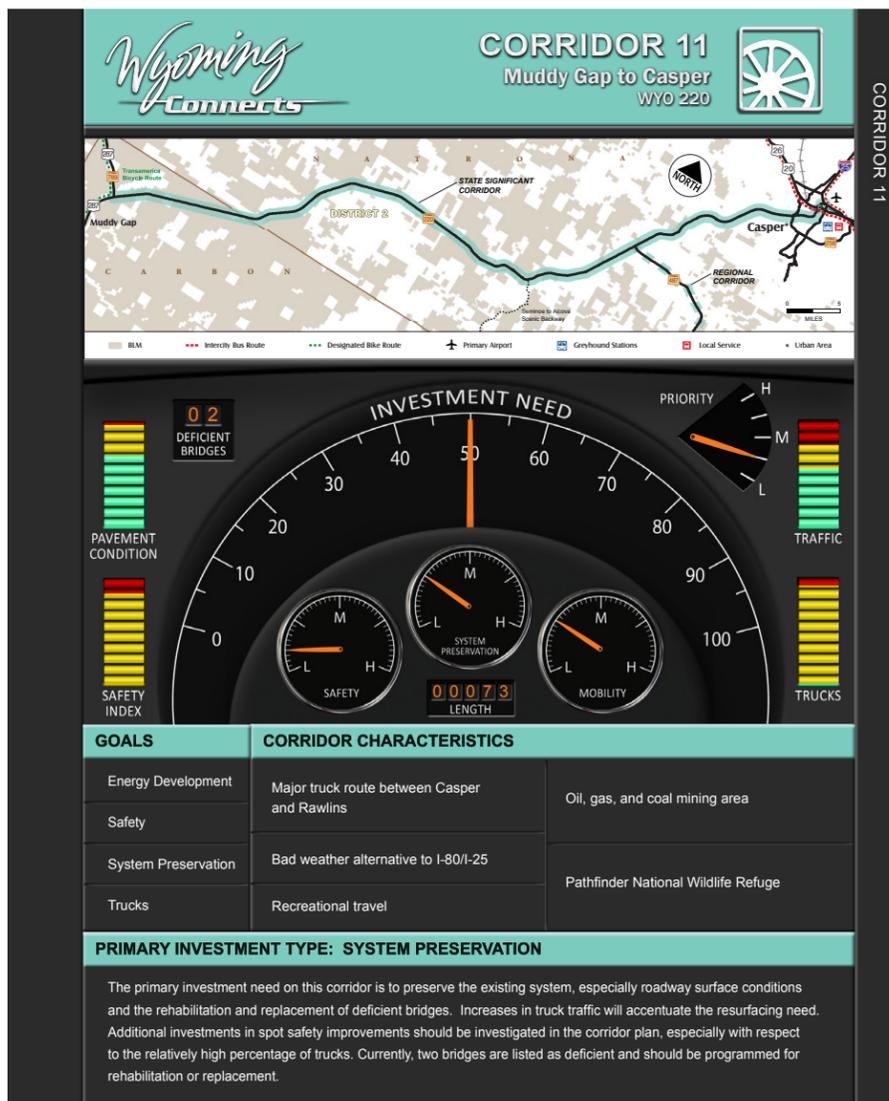
Ongoing performance measure documentation is critical to identify trends, capture the existing health of the system, and allowing an accurate forecast of the future health of Wyoming’s Transportation system. The need for additional funding and/or more aggressive solutions will become evident if performance 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 11 - 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 Muddy Gap to Casper Corridor Vision captured Key Issues and Emerging Trends of critical importance and how SSC 11 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 and the rehabilitation and replacement of deficient bridges. Increases in truck traffic will accentuate the resurfacing need. Additional investments in spot safety improvements should be investigated in the corridor plan, especially with respect to the relatively high percentage of trucks. Currently, two bridges are listed as deficient and should be programmed for rehabilitation or replacement.

Additional goals which reflect the full context, character, and issues of SSC 11 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.

Dashboard from Corridor Visions

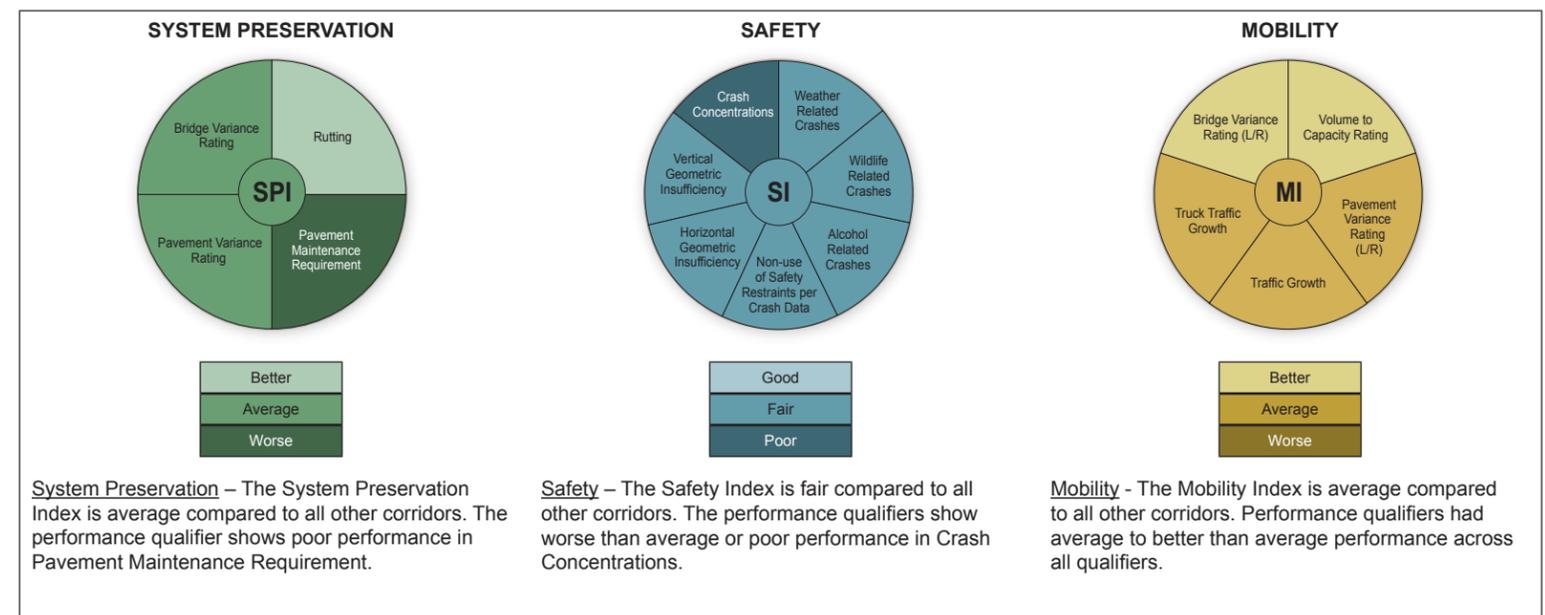
Table 15 - Review of Corridor Vision Goals and Other Considerations

| Corridor Visions | | High Priority | Other Considerations |
|---------------------|---|---------------|--|
| Investment Category | Goal | | |
| System Preservation | Plan for continuing energy industry impacts to road system | ✓ | The pavement management system identifies locations for maintenance and rehabilitation. |
| | Preserve the existing transportation system | ✓ | Corridor Vision identifies System Preservation as the primary investment area. The Corridor Plan targets poor pavement conditions in several areas for improvement, along with rehabilitation of structurally deficient bridges. |
| | Accommodate growth in truck freight transport | | Truck traffic continues to be a significant factor on the corridor, which connects I-80 to Casper and I-25. Truck and general traffic increases contribute to poor pavement conditions in the Casper area identified as pavement hotspots. |
| Safety | Reduce fatalities, injuries, and property damage crash rate | ✓ | The Corridor Vision and the Corridor Plan identify specific locations of higher crash incidence. Opportunities should be identified to simultaneously address safety concerns along with pavement rehabilitation in appropriate locations. |
| Mobility | NA | | Truck traffic throughout the corridor and urban-type congestion in Casper are identified as long term issues and should be addressed with infrastructure improvements as funding allows. |

CORRIDOR PERFORMANCE

Table 16 shows SSC 11 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.